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by MAJOR GENERAL H. H. ARNOLD

SEPTEMBER
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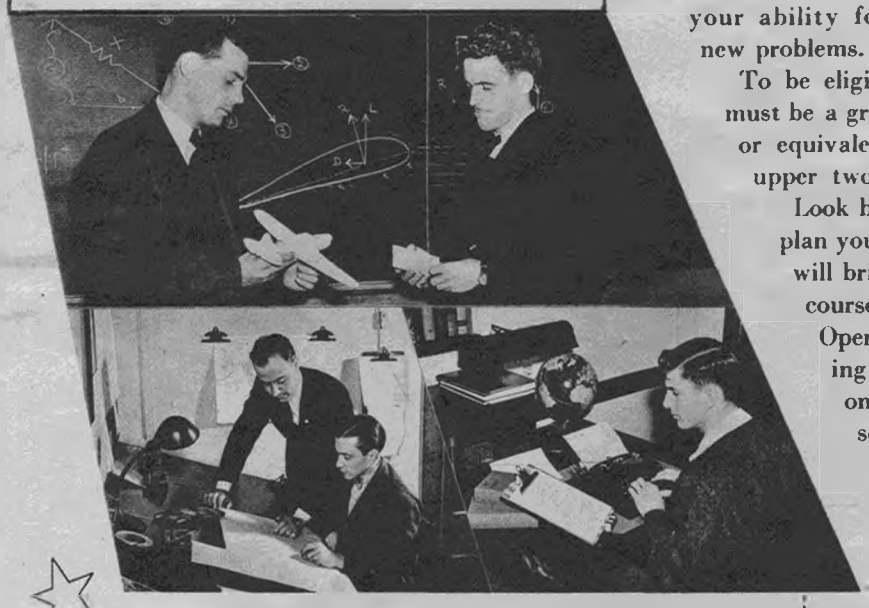

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SEPTEMBER, 1941 — VOLUME XVI NO. 6
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FULL-COLOR COVER PHOTO OF CONSOLIDATED B-24 LONG-RANGE BOMBER BY RUDY ARNOLD

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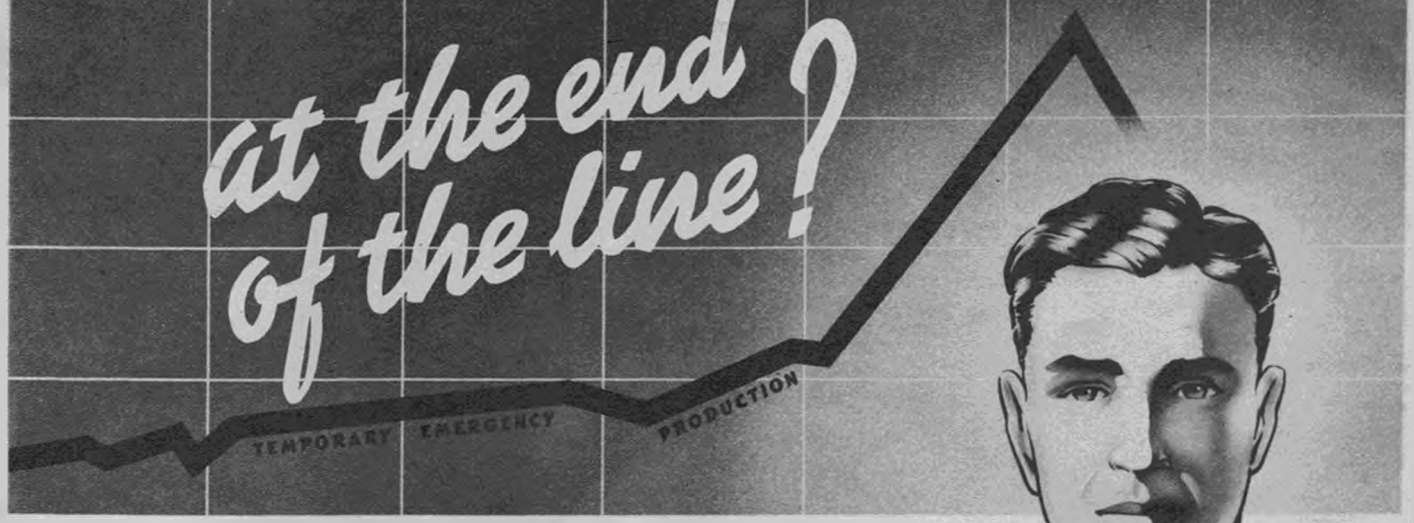
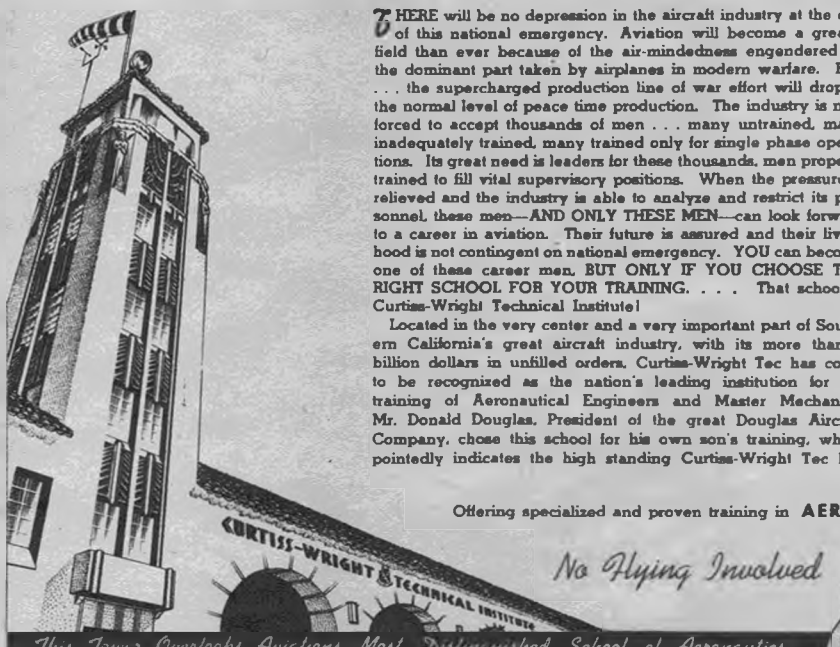


AVIATION HAS JOBS FOR THOUSANDS

BUT CAREERS ONLY FOR TRAINED MEN



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We scan the aeronautical horizon and report our personal findings.

THE parents of the cadets at Randolph Field need not worry about the condition of the planes they fly. The expert mechanics who check them are under a rigid inspection system—and that ain't all! If their work contains an infraction, no matter how slight, it means a solo mopping job of a Randolph Field hangar, and *that* means twenty thousand square feet of mopping.

★ ★ ★

The other day at Floyd Bennett, sitting with Lieutenant Commander Don F. Smith, commanding officer of the new naval air base at that field, we noticed a weird-looking object being towed past the windows. It looked like an ebony mock-up of a Douglas DB-7 sans wings and propellers. It was a DB-7, but not a mock-up. Prepared for shipment to England, it had been completely covered, insignia, camouflage, windows and all with a black, greasy goo. This is to protect them while on ship deck en route. They are being partially dismantled and prepared for shipment at Floyd Bennett under the direction of the navy air gang. The field, recently taken over by the navy, makes about the finest navy field in the country.

★ ★ ★

"Priorities May Help the Light Plane!" by E. E. Porterfield, Jr., which appears in this issue, represents the thoughts of one manufacturer in regard to material shortages affecting the field. We have had some mighty interesting comments on the subject from other light-plane manufacturers, and present them herewith. J. H. Torrens, president of Luscombe Airplane Corp., comments as follows:

"The light airplane is primarily responsible for saving Uncle Sam time and money in training much-needed pilots. . . . Recognizing its importance to America's first line of defense, an invincible air force, Washington officials both in the army and OPM have indorsed the CPTP. These men know that our efforts to produce better training aircraft both now and in the years ahead cannot be realized unless the small supply of necessary materials which we require are furnished to us on regular schedules. Present indications are that our comparatively negligible requirements will be taken care of. It is easy to see that many light airplanes can be made of the same amount of metal as is required for one bomber or fighter. In other words, the metal required to turn out one military airplane could indirectly be responsible for the training of several hundred primary pilots."

Fred Kehrer, speaking for the Aeronca Aircraft Corp., has this to say on the importance of light planes:

"Ask the man on the street how the U. S. aviation picture looks to him and you'll no doubt hear a long list of facts on the superiority of the pursuits, giant bombers and the rest of our air armada. But let's give a thought to light planes. There were some who thought that the national emergency would put light-plane manufacturing at a standstill. That the government needs its support is no longer debatable. Randolph, Kelly, Maxwell—all are familiar names as training centers for our expanding air forces. Yet the 'incubator' for a good many fledgelings is the CPT program, and they depend on light-plane manufacturing for an increasing number of primary training ships. Today, 900 civilian pilot training centers are in operation turning out 3,000 private pilots per month and 750 secondary trainees per month—or 25 percent of the flying cadets going into the army and navy air service. How do these 25 percent compare with the rest? Figures from CAA authorities show that only 12 percent of the CPT trained cadets are eliminated as compared to 39 percent for those who haven't had the benefit of the CPT course. That's a big relief to John Q. Public's sagging pocketbook in addition to speeding up our military program.

"The National Intercollegiate Flying Club air meet at Aeronca Field in Middletown, Ohio, was an inspiration to watch. 'Bomb dropping' of flour bags with surprising accuracy, spot landings that hit the spot—yet the college boys and girls ran through the three-day meet without one accident in all their scheduled events. Army and navy officers were among the pleased observers throughout the meet.

"Captain Eddie Rickenbacker recently stressed the importance of the light plane in the post-war era. The thousands of young men now receiving their wings will want to continue with this medium of transportation. Low-priced, economical planes will revolutionize transportation as thoroughly as the automobile replaced the horse and buggy. In turn the expansion of light-plane manufacturing will help cushion the economic let-down and afford an outlet for the army of trained workers in our military plants."

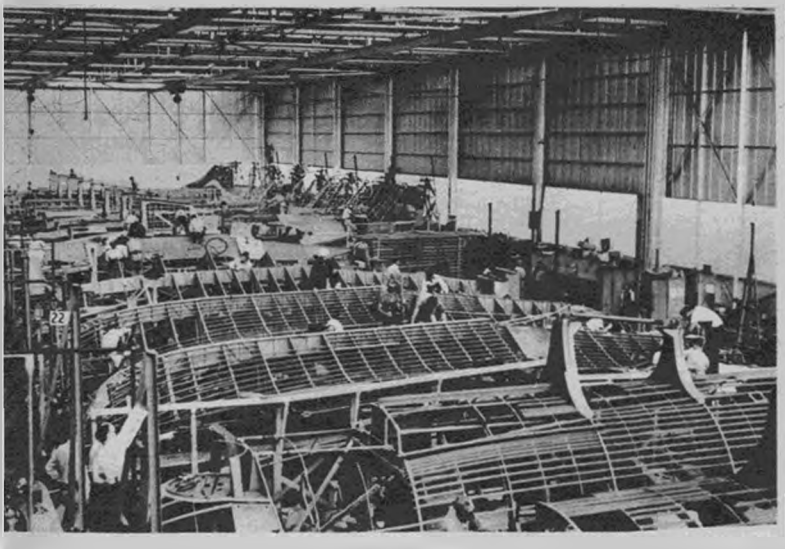
★ ★ ★

While in Louisville at this year's NAA Forum, we met Charles W. Sutherland, president of General Aircraft Corp., turners-out of the new and sensational Skyfarer. Imagine our surprise to find he was the same Charlie Sutherland we used to know at a boys' camp in New Hampshire about eighteen years ago! It was from this same Camp Wyanoke that we had our first plane ride in an old Curtiss flying boat with Robert Fogg, now with the CAA. Fogg was flying the mail from point to point on Lake Winnepesaukee, and one morning agreed to cart us along to the next camp. There we got out, thanked him, and started back on the three-mile walk to Wyanoke. We hadn't hoofed very far when we heard a roar overhead and saw the ship going the same way! The captain explained later that he discovered he'd left the wrong mail sack at Wyanoke. Anyway, our feet were twice as tired when we got back to camp.

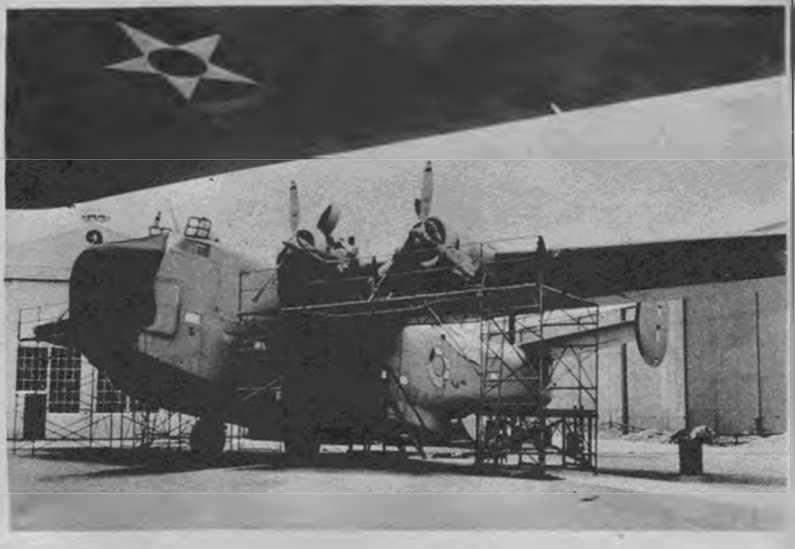
CONSOLIDATED CLOSE-UP

FROM a humble beginning in a Rhode Island factory formerly used to make feather boards for winding bolts of cloth, the vast factories of Major Reuben H. Fleet have grown. The present Consolidated plant at San Diego covers many acres and employs many thousands of skilled workers. The major, dynamic spark plug of the corporation, entered the army air corps in 1917 and served in various capacities until he decided the real opportunities in aviation were outside the army. He resigned and the industry has been the gainer ever since. Beginning with trainers, his designs advanced through various models to the famous PBY flying boat which found sensational success and rightly so. These famous long-range patrol bombers were reputation-builders and from them have sprung the new and equally famous B-24 and PB2Y-2 as well as other Consolidated ships. The name of Consolidated has become synonymous with long-range aircraft.

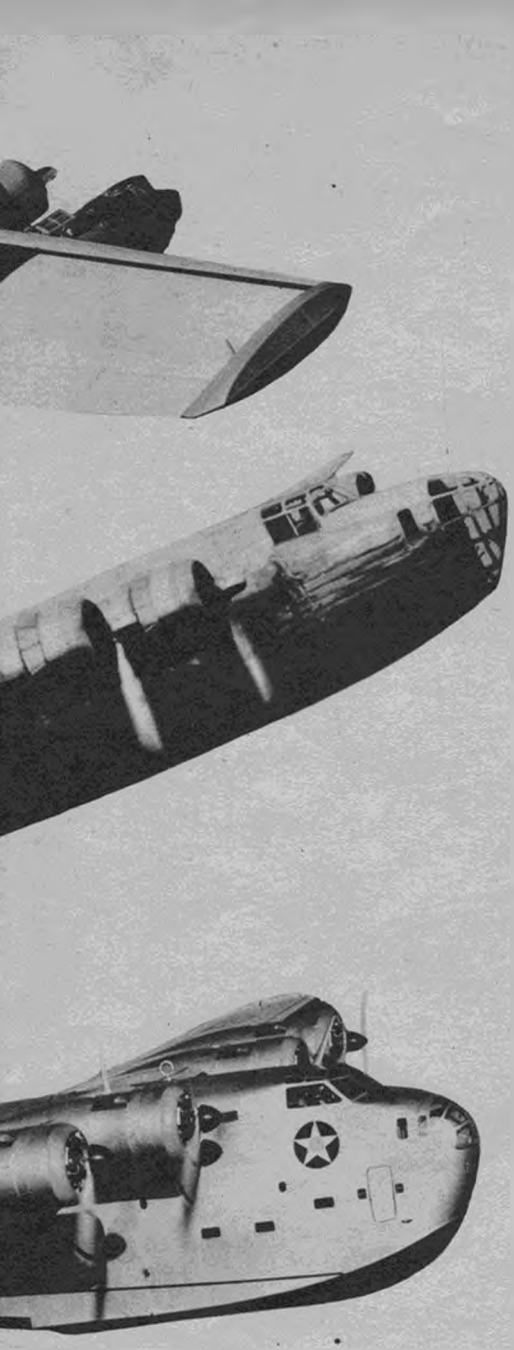
Huddle. Left, Merril C. Meigs, chief of aircraft production of the O. P. M., confers with Major Fleet on plans for future.

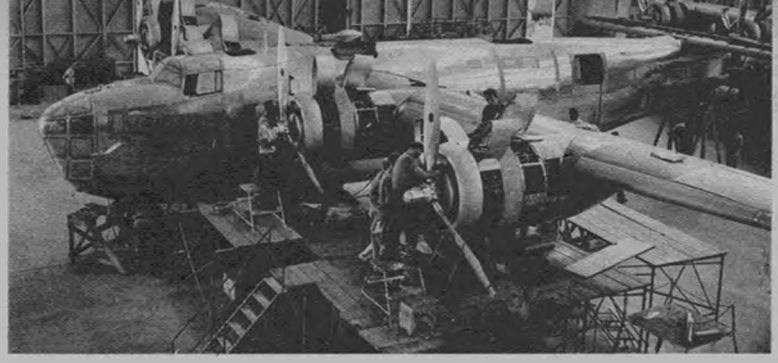


In rotatable jigs the hulls of PBY boats are being assembled and covered. The nearest hull is right side up; those beyond are bottom up, being covered.



Outdoor check. The huge Consolidated PB2Y-2 flying boats are given their final check inspection outside the plant to make room for those coming along behind.





Ready for debut. Last step in B-24 assembly is fitting of props and cowlings, after which the ship is moved into the yard outside the factory for a final check before flight.

Last step. With the plexiglass windows carefully protected from scratches and sun, the final adjustments are made on the engines before the test pilot takes over his job.

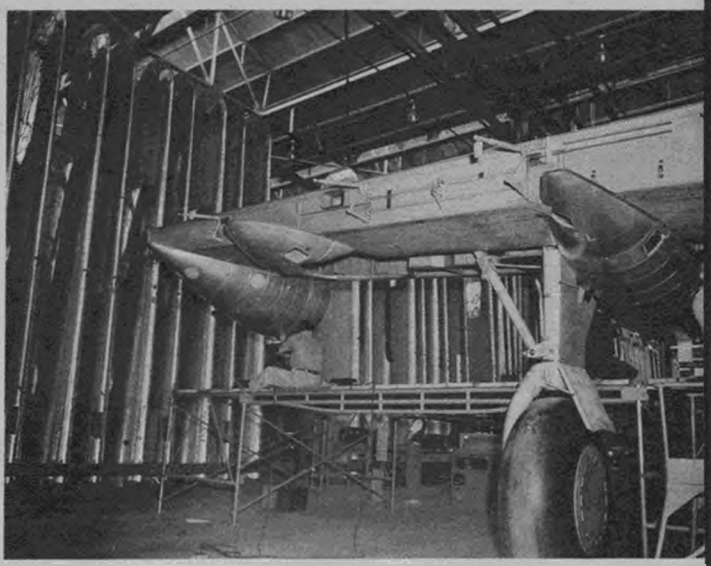
Coming right behind. Back in the plant more B-24 wing center sections are going together. Note engine nacelles under wing panels for four 1,250 h. p. P. & W. engines.

By day and by night B-24's come off the line. This night shot shows the big long-range four-engine bombers being assembled by the night shift.

Output builds up. The partially finished B-24's and PBY's fill every available inch of space about the huge factory yard. Note the tail turret location at the lower right.

Continued on Next Page

Frozen assets. Portable ice chest keeps rivets chilled until ready for use. They are kept from 0 to 25 degrees below zero until used to prevent splitting when driven.



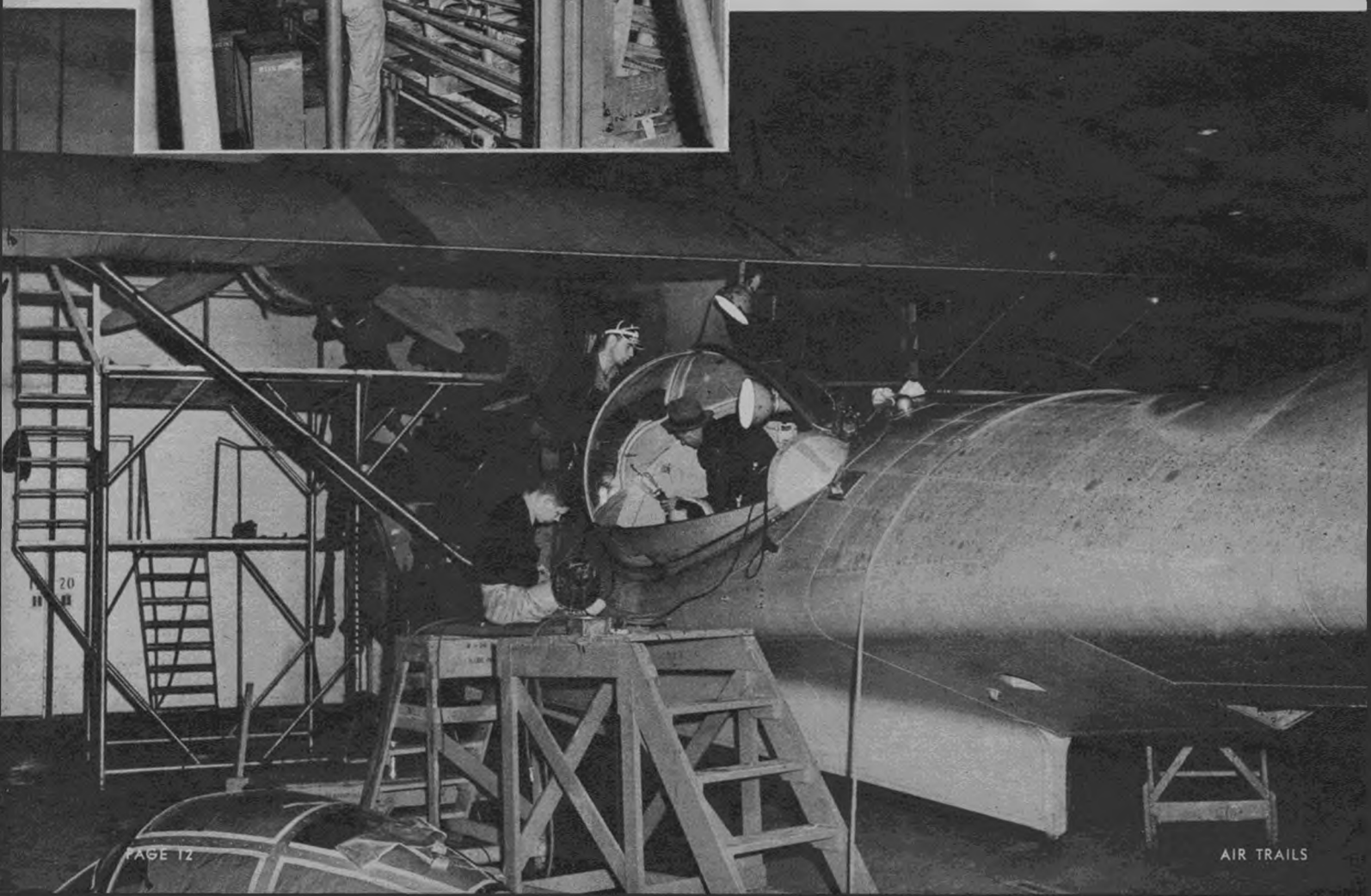
B-24 wings being readied for attaching to center section. The latter, complete with wheels at right, receives wings and rolls on down the assembly line.

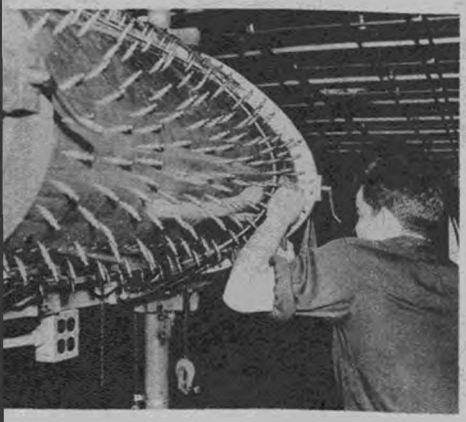
CONSOLIDATED CLOSE-UP

Continued from Preceding Page

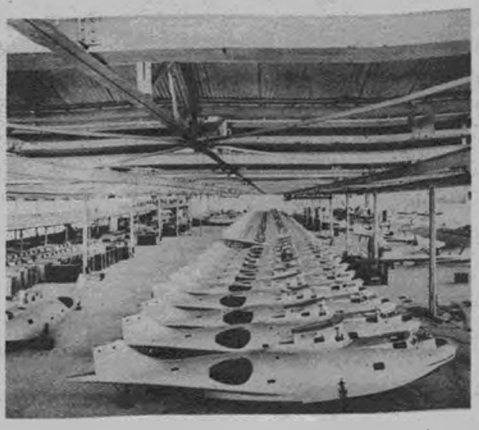
Not the tinware department but experts assembling the center wing section stood on edge in its jig. Ovals with crimped edges are cut in ribs for lightness.

Opened blister. Mechanics are fitting plexiglass covering to machine-gun side blister on one of the PBY-5 patrol bombers. Missing portion on floor in front.

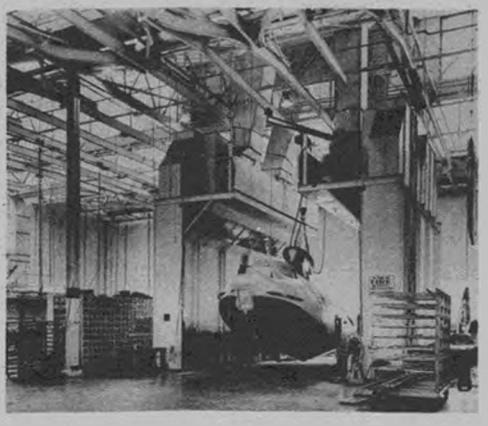




Resembling a cactus, this wing-section lip is set up with studs to be perfectly aligned for riveting.

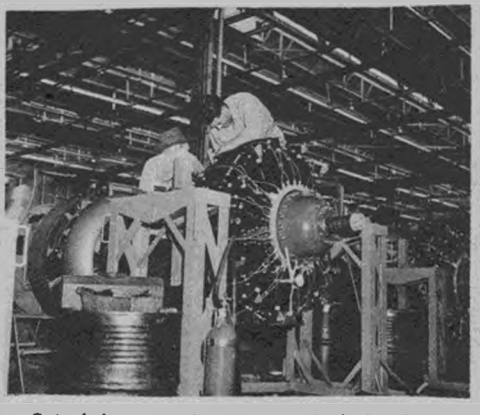


Line-up of PBY-5's awaits wings. One of these, known as Catalina in England, spotted Bismarck.

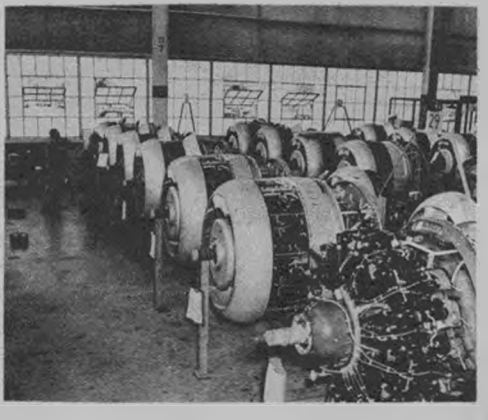


First flight is made on a crane in the paint department where the hull is sprayed for protection.

Wasps' nest. Hundreds of thousands of dollars' worth of engines for Consolidated bombers are ready.

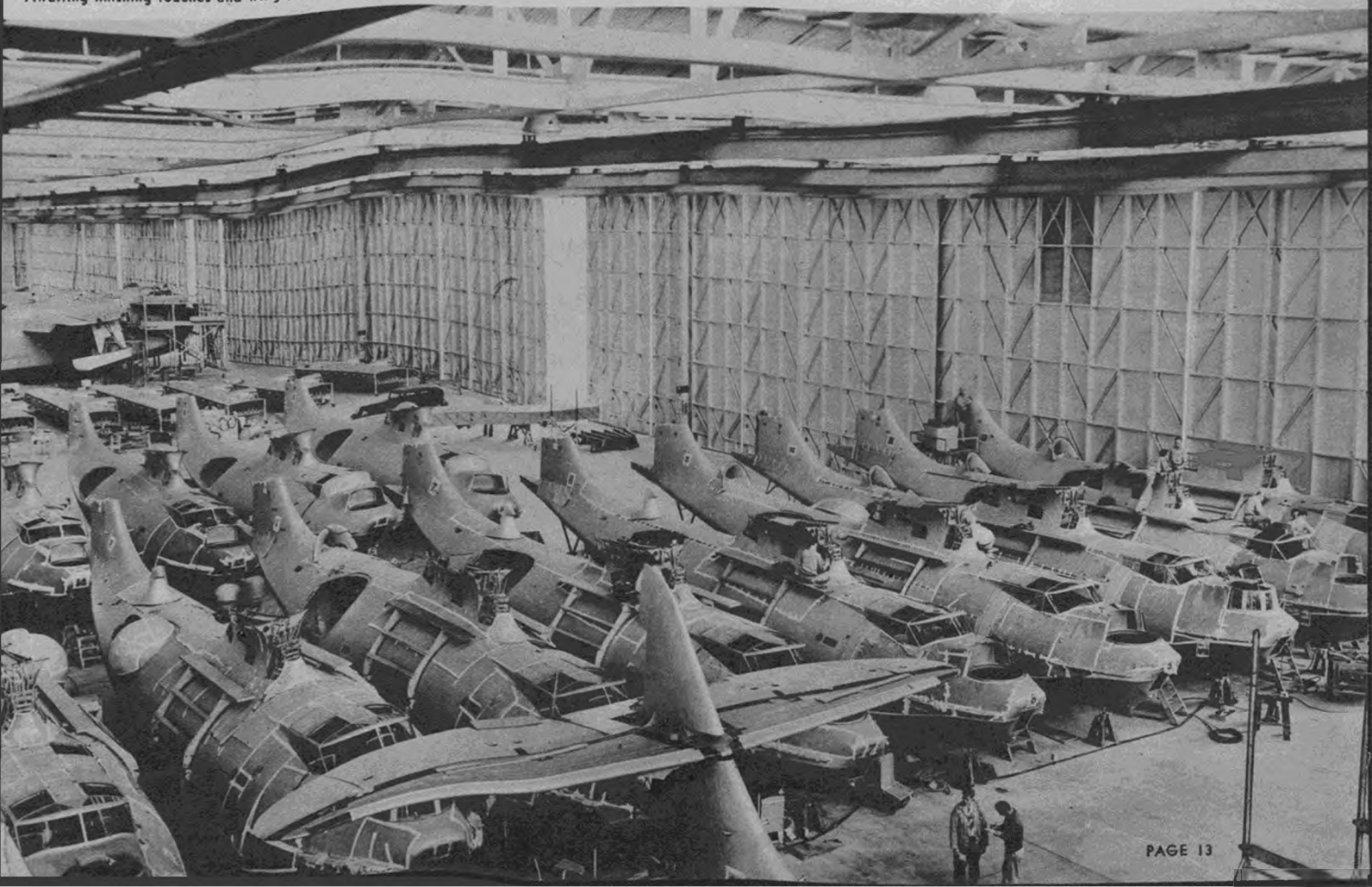


Out of the crate, the engine is checked and given inspection before being installed in its mounting.

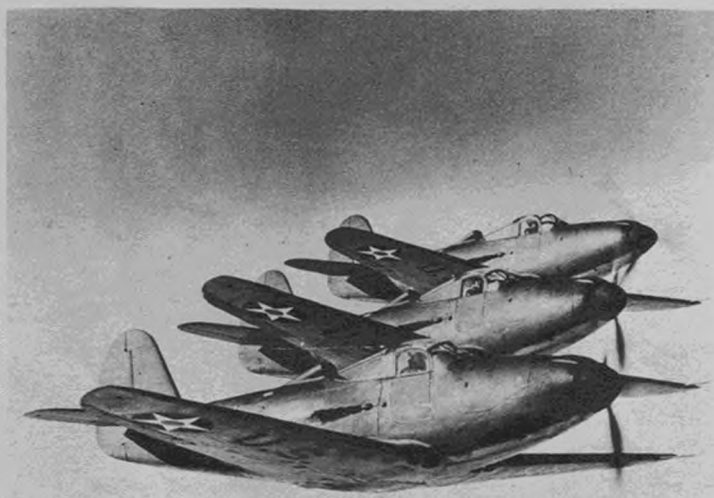


Ready for B-24's. These 1,250 h.p. Pratt & Whitneys are fitted with cowlings, exhaust rings, mounts.

Awaiting finishing touches and wings, these PBY-5's fill every available foot of the huge plant. Note PBY-5 wing center sections and big PBY2Y-2 in left background.



Three strikes on the enemy. America's Bell Airacobras indicate advanced designs.



The Republic YP-43 pursuit-interceptor will meet any invader, with pleasure.

BY MAJOR GEN. H. H. ARNOLD
Deputy Chief of Staff for Air

TOMORROW'S AIR MIGHT

"The security of our nation demands that we build without delay the strongest air force in the world."

AN air force is a balanced compound of airmen, airplanes and air bases, and to paraphrase Admiral Mahan, the most important of these is airmen, airplanes and air bases.

There was a time when the term "airman" referred, by common consent and usage, to the pilot. This probably grew out of the fact that the pilot first appeared on the scene as a combat crew member of military aircraft. Then, too, his will directed the air vessel in flight and his skill took it to the fight, maneuvered it in combat and brought it home again.

Now, all that is changed. The bombardier, the gunner, the navigator and the engineer play roles of almost equal importance in operating the military airplane in the course of the normal mission. It requires the teamwork, co-ordination and vital play of all to bring the big bomber through a modern trial by fire. The pilot is and may always be the senior member, team captain or commander of the fighting plane, since he sits at the controls and the vessel moves at his will and direction. The others are, however, none the less essential to the successful bombing mission. Only in fighter, single-seater aircraft does the pilot still fight alone, playing the ambidextrous role of pilot, gunner, navigator, engineer.

The ground crew of trained specialists is as essential to the success of a modern air force as are the combat crewmen. It has been estimated that it requires ten men on the ground to keep one man in the air. These mechanics, radio men, armament and instrument specialists meet the plane before its engines have stopped as it taxies into the flying line and begin inspecting, overhauling and reloading it with fuel and munitions. An airplane is not only most vulnerable on the ground, but it is performing no useful mission and must, for efficiency and economy, be returned to fighting trim as soon as possible. A modern combat plane can be refitted for a succeeding mission before its crew has been sufficiently rested. This has led to the problem of multiple crews, further increasing the number of operating personnel required in an active air force.

The United States possesses the largest pool of possible airmen of any nation. It has been estimated by our recruiting service

Air power in the making. Over the unmistakable design of Randolph Field, great army training center, these future army pilots practice close formation flying.

Proof that our engineers are out in front in heavy long-range bomber design is the giant B-24, capable of over 300 m.p.h. with four tons of bombs. Crew of 6 to 9.

Our Lockheed P-38 supercharged twin-engine single-place fighter, with a speed well over 400 m.p.h., is one of the world's best ships in this category.

(Continued on Next Page)

Our newly acquired air outposts are rapidly being manned and armed to increase our might. These B-18A bombers are based at San Juan, Puerto Rico.

Skill, metals and sparks. Our unlimited supply of essential elements of air might are rapidly being brought to peak production to assure our position.

TOMORROW'S AIR MIGHT

(Continued from Preceding Page)

that there are about 300,000 men in this country possessing the requisite degree of education, the characteristics and physical set-up fitting them for flying training, and who are in the proper age bracket from twenty to twenty-six years. Probably one half of these can be trained as gunners, navigators or in some one of the other functions of the combat airman. There is not another nation in the world, including Germany or Great Britain, which can produce more than half this figure, employing the same standards. We have, therefore, the manpower for the world's predominant air force.

It takes between eight months and a year to train any of these airmen for ground or combat crews. Our school capacity is a further limiting factor. Under our present plans we are now training about 12,000 pilots and 10,000 other combat crewmen annually and about 40,000 ground maintenance men. The expansion now in progress will permit us to more than double that figure for 1942. Thus, we can have 300,000 men trained by the close of 1943.

The airplane, the second of the requisite factors in air-force building, is in many respects the more serious of our problems. First, there must be a determination of what plane types to build and in what quantities. The present conflict in Europe was but a few months old when it became evident that the present-day fighting plane must have leakproof fuel tankage, pilot armor and increase in fire power. Many other improvements were indicated, such as increased speed and ceiling for fighters and increased range for bombers. The present prime headache is the indication that all new fighters and bombers alike should have pressure cabins. It is now quite clear that the new battlefield upstairs is well above the 30,000-foot level. That introduces not only new problems of oxygen supply, but calls for heating guns, cockpit heaters, de-icers and many another device for safety or crew comfort.

After a determination has been made to build a plane in quantity, it requires great determination to let it alone, to insure its flow at maximum production rates through the line. There is the strongest urge to introduce the new changes which recent discoveries or inventions have indicated will give it more speed or power.

Here again, in this matter of production capacity, we in the United States are favored above all other peoples. We have the basic and essential metals and raw materials in more abundance than any other nation. It has been said that we alone possess the raw material in sufficient quantity to produce 50,000 planes and the 200,000 power plants which they would require in the course of their usable life. Our engineers and designers are superior to any found elsewhere. We do not now have more aircraft manufacturing establishments than some of the other nations, but we undoubtedly possess the requisite manpower and machinery to build the largest airplane and engine industry in existence. These establishments will probably be completed before this year has run its course.

We need make no apology for our planes' types. We have the finest single and twin-engine fighters in existence. At least two of our fighters have such performance characteristics that either of the combatant nations would sell their collective souls for five thousand of them. Our leadership in the long-range bomber field has been established ever since our first Flying Fortress appeared. At least two of our four-engine bombers are superior to anything in their class now belaboring the nerve centers of Europe these nights. Our latest types of medium and light bombers compare favorably with any which appeared as the playmate of the panzer divisions in Greece or Crete. No, it is not in types that our deficiency lies, but in quantity. Some of the world's other air forces started building first, many years ahead of our national determination to have an air force. We have found to our sorrow that time cannot be bought or improvised, although we are making giant strides in our determination to close the gap.

Air bases have been all too often overlooked in this business of building an air force. It is not an imposing or an inspiring or thrilling phase like airplane building or pilot training, but it is

Weird wagon. Stagnation in ideas will never bother American designers and engineers. Here's the Grumman Skyrocket, unorthodox but mighty effective.

equally important. It was but lately demonstrated in the battle for Crete what an all-important consideration these bases can be in air conflict. The Germans could dispatch their aircraft, gliders and parachute troops from bases only seventy or eighty miles distant, while the British had to employ flying fields more than two hundred miles distant on the north African coast. It was a foregone conclusion to wise airmen, therefore, as to how the battle of Crete would go. The proximity of bases enabled England to gain superiority over Dunquerque for a few hours and this permitted the escape of the embattled B. E. F.

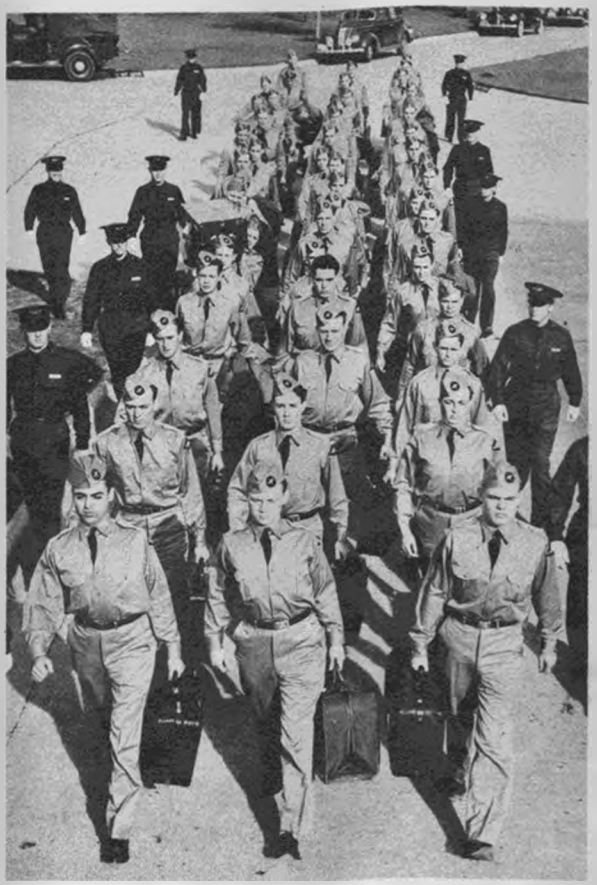
Many have pondered the delay which always ensues after each succeeding German conquest. Some have opined that it was for rest of crews; others thought it concerned bringing up supplies or perfecting plans. In reality the best guess is that these weeks were used in preparing the new bases essential to new air conquest.

Our present determination to build new bases well eastward into the Atlantic from Newfoundland to Trinidad is a wise move in air strategy. These bases form the stout shield which may stand between the Western Hemisphere and marauding aërial hordes which can be dispatched from Europe and Africa. An air base is more than a landing field. It must contain within its framework the fuel tankage, the munitions storage capacity, the repair facilities, the housing for personnel and the technical installations and communications facilities essential to the modern air force. Generally the central base will be surrounded by dispersion fields or subbases. The whole installation will be underground or well camouflaged and dispersed. Nothing promotes the mobility and the range of the air weapon or circumscribes such definite limitations to air operations as the provision or lack of suitable operating bases. That is a lesson which we have learned unmistakably from the present plight of Europe.

Given these essential ingredients to air forces, airmen, airplanes and air bases, it lies within our capacity to develop adequate air power for the protection of our hemisphere. It but remains to employ this mighty instrument economically and along sound tactical and strategical lines. This means that our leaders must be trained in the use of air forces. Fortunately we have about one thousand airmen of more than ten years' experience, many of them trained initially in the First World War. They have been the leaven for our rapidly expanding air force, and upon them we must rely for the air leadership in that vast new organization, the mighty American air force of the future.

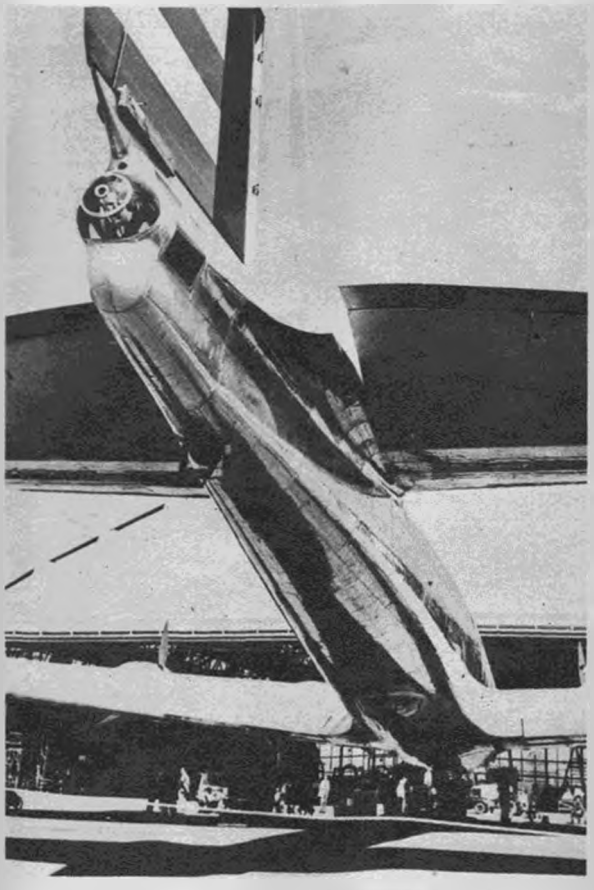
We know now, as we see the burning cities, the sinking ships, the mutilated armies, the devastated countries which have fallen prey to that first nation which first conceived and first dared to employ an air force, that these are axioms of modern military strategy:

> The only adequate antidote for an attacking air force is a superior air force. Air forces have come to join armies and navies as equal if not more decisive and ter- *(Turn to page 33)*

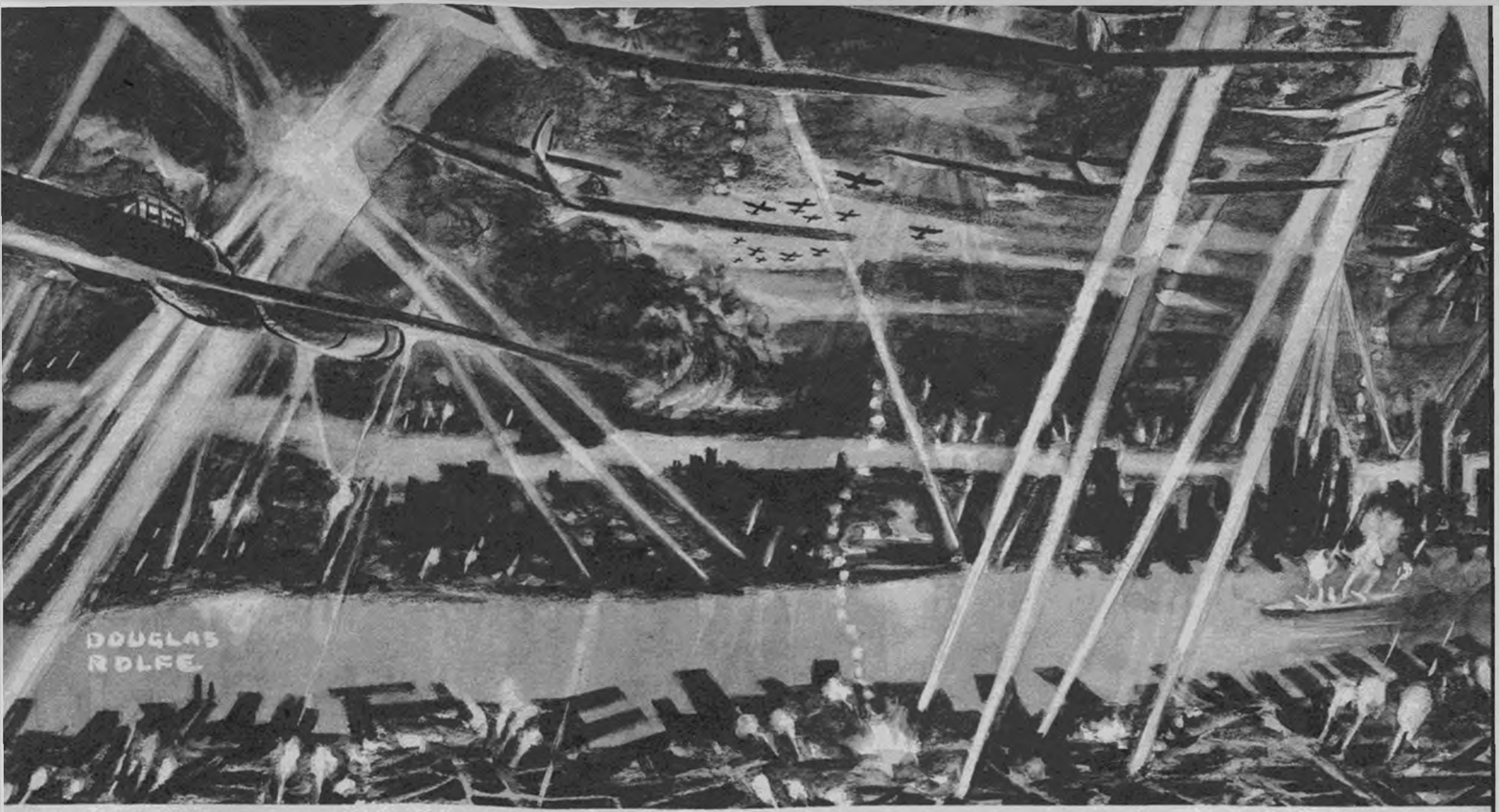


And still they come. In an unending stream new pilot material arrives at training fields. High standard assures our manpower.

For offensive defense. Famous Flying Fortress used also by the British in far-off raids against enemy bases. Our long-range bombers lead the world in load and effective range.



Stinger window. This unique view shows the tail turret of the Douglas B-19 super fortress. Weighs 82 tons, has range of 7,750 miles.



Artist's conception of what a night raid on New York might look like. In the foreground the New Jersey docks with their A. A. guns and searchlights; beyond, the

WHAT IF NEW YORK IS BOMBED?

BY O. B. MYERS

Our greatest city has been preparing. Here's a complete, dramatic picture of how it would go into action.

THE lights change. The flood of north-and-south traffic in Times Square comes to a halt, the first cars dart out of the side streets. Held up at a crossing, a man in a light-gray suit raises his eyes to glance at the gigantic clock atop the Paramount Tower. It stands at nine thirty. He notes the time, but for some reason does not lower his gaze. With head tipped back he continues to stare at the sky above and beyond the apex of the tower. The morning sky is a clear, unadulterated blue, with here and there a cloud. Against one of those clouds he thought he saw something—a speck? He blinks his eyes, and looks again. It is too high; he cannot be sure.

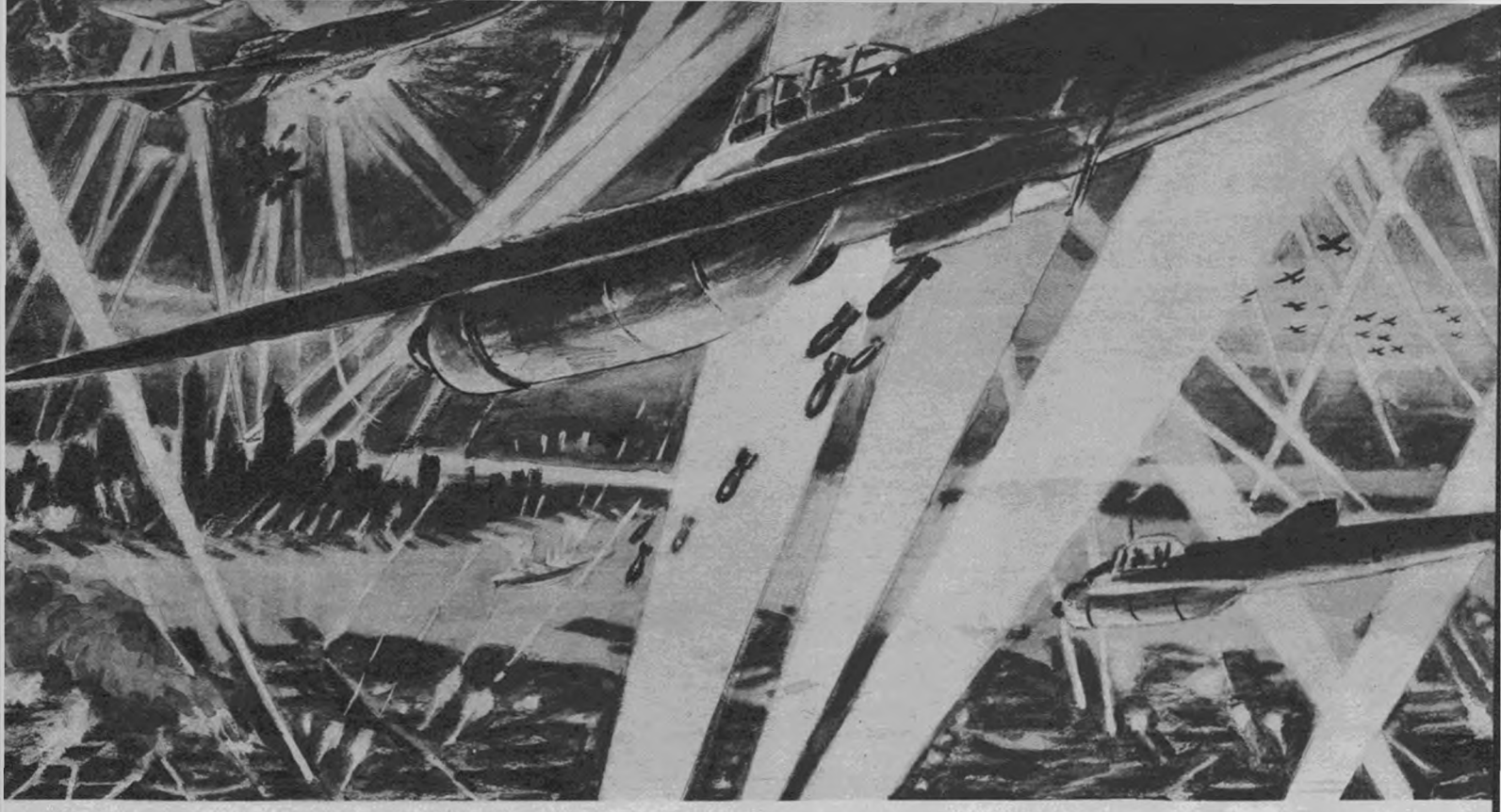
But while he is staring a sound reaches his ears. It comes from far off, almost muffled in the rumble of traffic; a deep, solid thud, as if a heavy beam had fallen on a concrete floor. Few others appear to notice it; was he dreaming? But others have noticed his posture; with the irrepressible curiosity of the human race, other heads tilt back, other eyes peer upward. He hears a voice ask, "What is it?" and the last syllable of the question is cut off by a blasting roar.

This time there is no question of dreaming it. His eardrums shudder at the impact of an explosion, which drags itself out for five or six seconds in the crash and splinter of falling beams and masonry. It seems almost at his elbow, though actually around the corner and a full block away; the screams that follow are almost inaudible. On its heels comes another, not as near, but still violent enough to shake the sidewalk under his feet. A siren begins to moan.

Spotters of the Aircraft Warning Service of the American Legion locate the enemy.

Defense Information Headquarters teletype operators pass along this information to others along route of enemy planes.

Plotters work out route of invader on this huge chart table. Numbers, height and speed are added.



Hudson River and Manhattan Island itself. From over Long Island come the interceptors to be joined by others from across the lower bay. Above, the enemy horde.

All around him the bustle of the crowded pavements has frozen to a halt. With faces rigid and pale, men and women stare at the sky, or at each other. For a few moments they cannot comprehend what they are seeing and hearing. From an open orange-drink stand on the corner a radio continues to blare a popular tune. Automatically the traffic lights flick from red to green, but the traffic remains motionless.

A kid selling papers darts a quick look at the sky. His jaw drops, and his skinny frame seems to cringe. "Geez!" he croaks. "A bomb raid!" And he starts to run.

The man in the gray suit grabs him by the arm. "Wait a minute! Don't start running! Where are you going?"

The lad gulps, conquers his first terror. "The . . . the subway!"

"O. K. But take it easy."

The youngster moves off at a rapid trot. Others who were on the point of running in panic, likewise control their pace. A police whistle shrills; traffic begins to roll. As the man in the gray suit turns on his heel, the music from the radio ceases abruptly, a voice takes its place, level and unhurried:

"Enemy aircraft are over the metropolitan area. For advice and instruction turn your dial to—"

The white-jacketed counterman twists a knob.

"Those on the streets, take shelter," another cool, businesslike voice is saying. "Subway stations, basements, in doorways. If a bomb falls near you, do not run to the scene. If you see a fire, telephone—"

The words are drowned in a terrific concussion. On the other side of Times Square the front wall of a huge movie palace, empty at this hour, bulges, cracks and topples outward. The mass of masonry seems to fall slowly, disintegrating in midair, and crashes to the street in a tremendous cloud of dust and rubble. Some are caught beneath it, some flee just in time. The man in the gray suit is driven to his knees by the blast; as he rises he hears from the radio, now itself blown to the floor inside the booth, the same cool, level voice: "—leave your car where it is. If you need first aid, call—"

The greatest metropolis in the western hemisphere is experiencing its first enemy bombardment from the air.

Like all New Yorkers, the man in the gray suit has been reading about bombed cities overseas, and in the few weeks since his own country entered the war has read even more about warning, defense and shelter precautions. But the actual impact of the first bomb on New York is a terrific shock. How does he take it? Without dusting off his knees he strides quickly across the square to where a squad car has pulled up. To the police officer jumping out he shows a card headed, "Civil Defense Volunteer," and gives his name and qualifications. The cop points west.

"Take the side street. Demolition trucks will be here in a minute. Signal for first aid if needed. Worst cases first."

The civilian nods, scrambling away over the gritty rubbish. He is pale and trembling, but has no idea of hiding. He has listened to only one lecture about his duties, and hasn't a *(Turn to page 30)*

At airfields antiaircraft crews spring into action ready for the enemy, while pursuit-interceptors roar off, directed by radio.

By night every clear space, even cemeteries, will harbor A. A. guns, searchlights, listening units.

In the suburbs residents will take refuge from bomb splinters in shelters like this.

Canada to many means Rockies. Noted for their rugged, snow-covered beauty, they are never better seen than from the air. Trans-Canada planes cross them daily.

TRANS-CANADA

In case you've never flown across Canada, here's your chance to see the sights of Neighbor No. 1.

Lake of the Woods, popular vacation spot, certainly looks the part when seen from air. Trans-Canada's 22 airliners flew more than 5,000,000 miles in 1940.

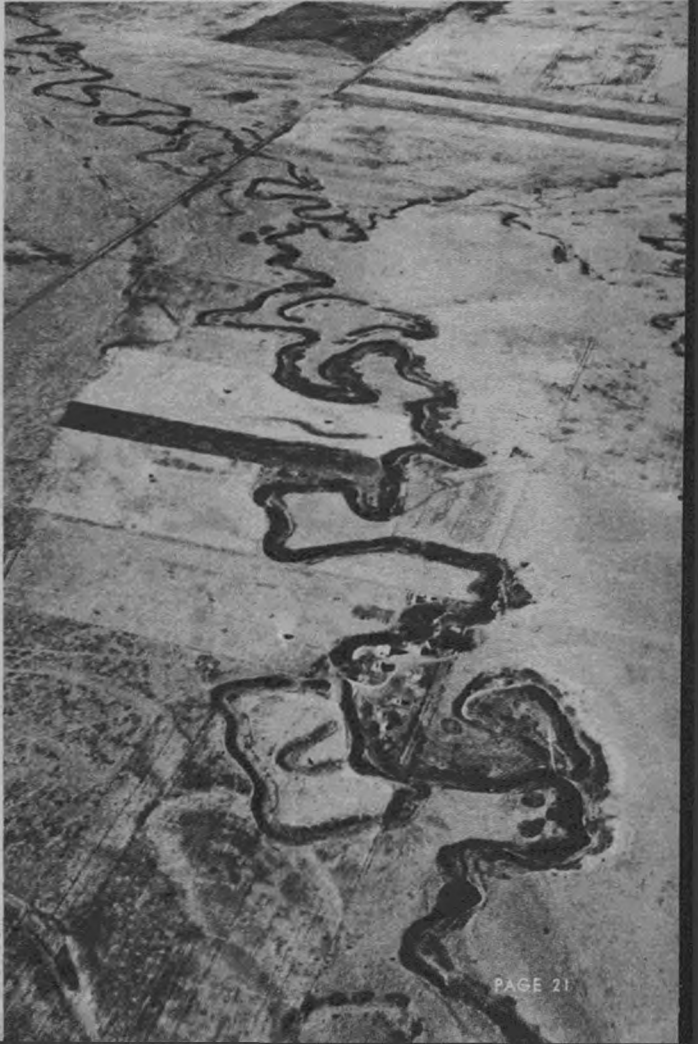
Canada's widely spaced, but excellent airports are now under military direction for the duration, but T. C. A. Lockheed Lodestars are regular visitors and welcome.

In direct contrast to the Rockies, Canada's prairie country is vast and amazingly flat. This section of our northern neighbor is ideal for military training fields.

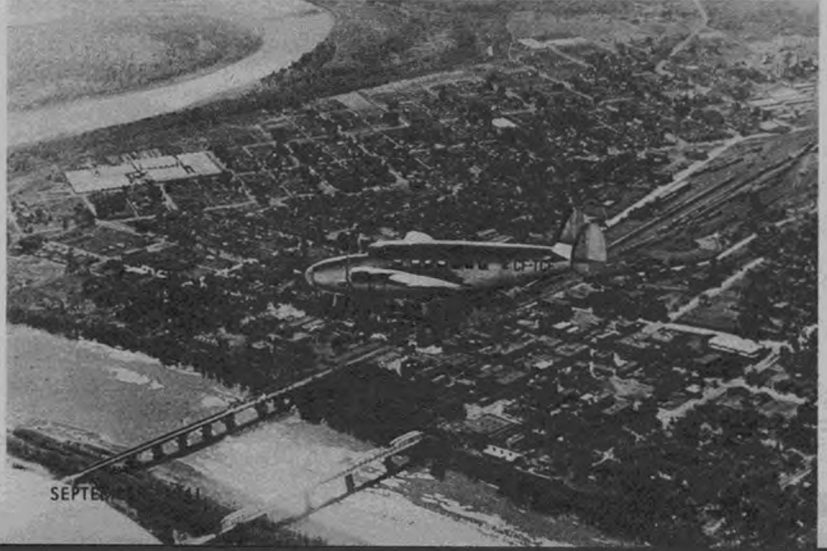
White spots before your eyes, in Canada, often turn out to be dried-up alkali lakes that dot prairies.

Another welcome sight. Lunch a la Lodestar never fails to please passengers aloft.

Meandering river. On the flight from Halifax on the Atlantic to Vancouver on the Pacific, many fantastic sights will greet you.



Names belie the size of some of Canada's cities. This is Medicine Hat, early trading post.



PRIORITIES MAY HELP THE LIGHT PLANE!

BY E. E. PORTERFIELD, JR.
Pres. Porterfield Aircraft Corp.

One manufacturer explains why he thinks substitutes in materials needn't hurt—may even produce a better ship!

The author's latest product, result of sixteen years' experience in the light-plane manufacturing field. This Porterfield is typical of modern light-plane designing.

FOR several months we people in the light-plane industry wondered what the Office of Production Management was going to do to us. We thought that we had a definite place in the defense scheme, but did not know whether Washington saw eye to eye with us or not. Now that the blow has fallen, some of us find that we are not hard hit at all. In fact, it is possible that the OPM may be just what the light-airplane business needs!

For many years, competition has forced us to spend considerable money on refining and improving our airplanes. Getting the last ounce of performance out of a ship which would probably never leave its home airport was vastly important. Pounds sliced off here and there meant everything to us, since they gave us just that edge over our competitor which we thought necessary. Of course, our competitor was slicing off pounds, too—adding little gadgets here and there to help keep the cost of his airplane higher, and ours higher, too. All the while we were neglecting the fact that our light training airplane didn't need those gadgets at all.

Now we believe that the OPM, established to take care of an emergency which is not normal, may cause a more normal situation in the light-plane field.

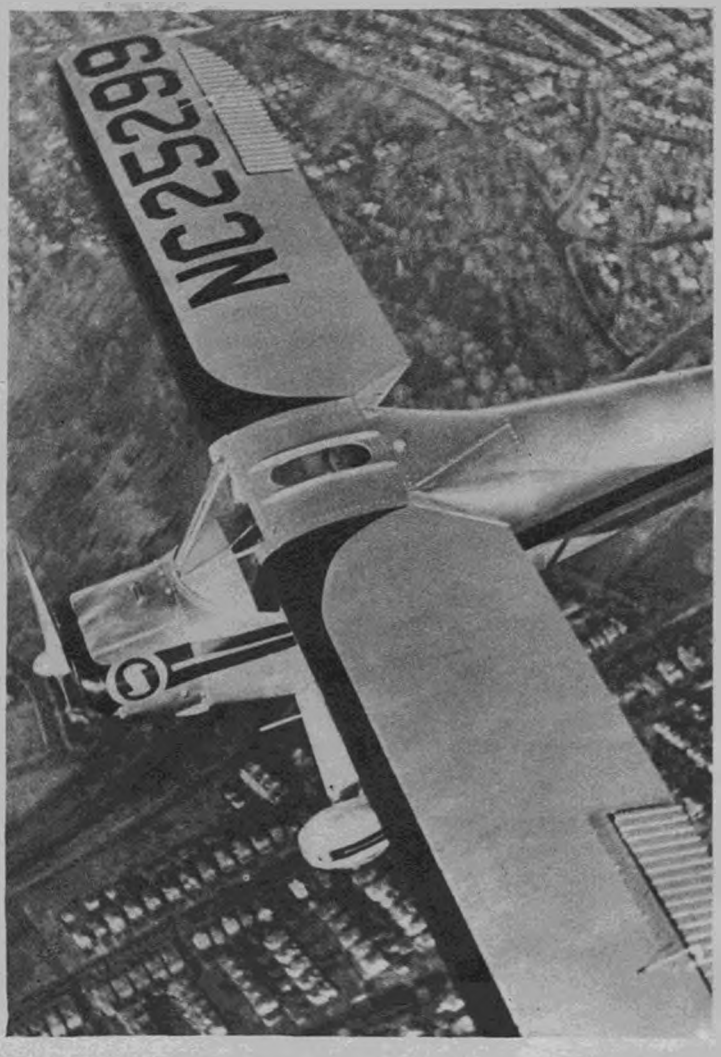
At present, we manufacturers are issued a B-4 priority rating on aluminum for non-CPT airplanes. However, the Civil Aeronautics Authority has been issued another rating, A-10, and may release aluminum to manufacturers who are building CPT ships. Each light-plane manufacturer is allowed 195 pounds of aluminum for each CPT airplane. This includes finished parts, such as wheels and engines, and raw stock for the remainder of the ship.

That is not much aluminum! And because it is not, we may well see some startling changes in the light-plane industry. It is highly possible that a process of substitution may start—since substitution is now the patriotic thing—that will give us the real, easy-to-build and easy-to-get light plane that we started out to find twelve years ago.

Here at our factory we know that by increasing the empty weight of our airplane only twenty pounds, we can do away with many of the hard-to-get "aircraft" materials we always considered so important in aircraft construction. Though we will still have aluminum in the engine, the cowling and the wheels, we can replace it almost everywhere else. Spruce can be eliminated entirely. Seamless tubing can be replaced with welded tubing. All with a sacrifice of twenty pounds.

We started, remember, with a light training plane. And we have, after making all these substitutions, a light training airplane. No more, no less; to all intents and purposes it flies just the same. It is stronger, if anything, and it's just as fast. Perhaps the take-off run has been extended a foot for each pound *(Turn to page 33)*

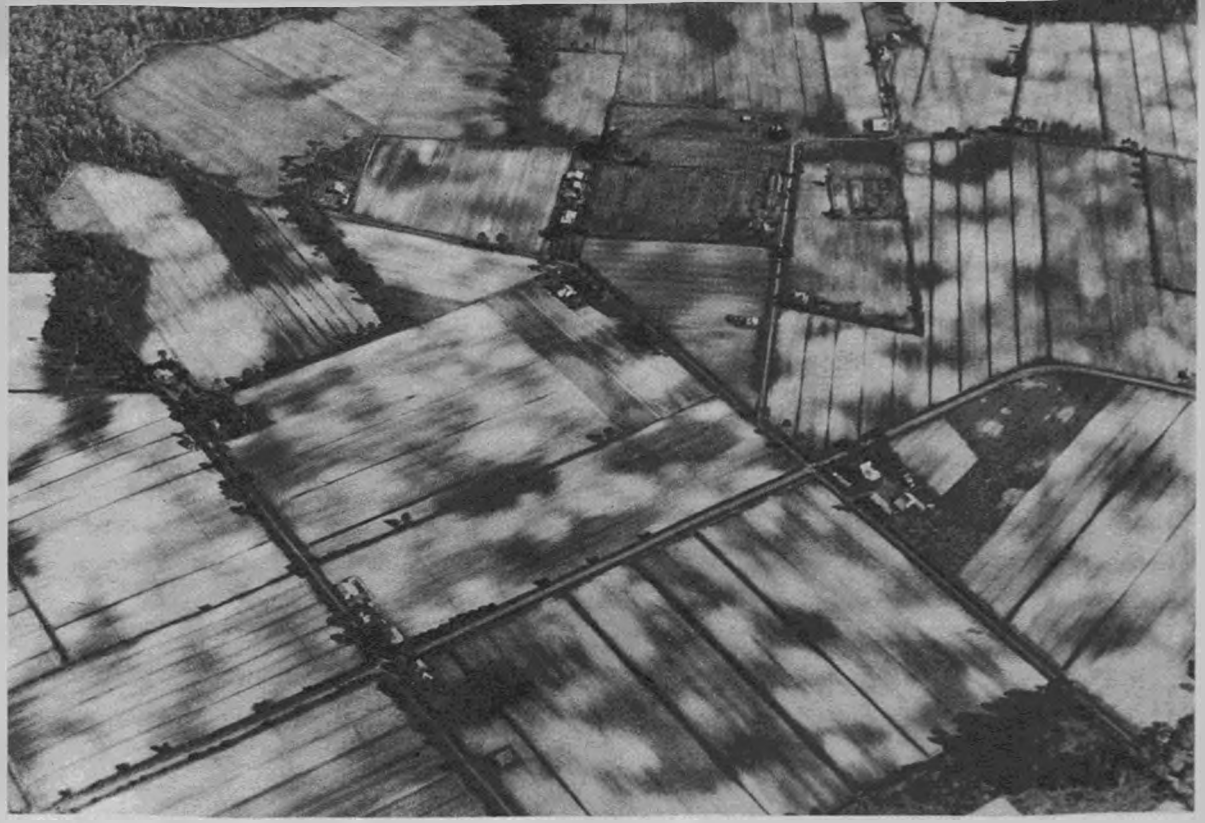
Hey, what's this, a British plane moored to the Empire State Building? Nope, just one of the money-raising Flitfires from the famous Piper Cub factory.



Here's looking at you, through the roof. Priorities are of particular interest to builders of such all-metal light planes as the Luscombe Silvaire shown here.

Another interested party is the Aeronca Super Chief, whose excellent flight qualities are famous. Thousands of future military pilots train on light planes.

Taylorcraft close-up. One of the oldest names in the light-plane industry is that of C. G. Taylor. His latest includes a tandem trainer. Here's the Delux.



The country is full of potential airports for the light-plane owner. You can have a complete first-class field, and all to yourself, at very little cost.

THE FARMER BUILDS A FIELD

BY JAMES A. WALES, JR.

Attention, light-plane owners: here's how to make a private airport.

Fields under cultivation may be used—sacrificing only a few rows. Several tricks convert an active barn into a hangar.

WHETHER you live on the Western plains, in a valley in the Alleghenies or on a New Jersey farm there is land either on your own property or right near it which is big enough and sufficiently suitable otherwise for a light-plane airport. Chances are that if you don't fly already, you have wanted to and some day intend to do so. The rural folks these days really find use for airplanes, too.

Any vehicle or means of transportation faster and of greater endurance than the faithful old mare will sooner or later gain general acceptance with the American farmer. The automobile was ridiculed by farmers in the early days, and one of the main reasons was because the crops required to buy one were out of proportion to the supposed value of a mechanical, and therefore undependable, contrivance which did little more than make a terrific noise, scare the horses and raise dust. Today the automobile is a necessity on every worth-while farm. As the auto has replaced the horse for "long-distance" farm travel, so, too, will the light airplane take over many of the tasks now performed by the automobile.

Tucked away neatly in barns, stables and home-made hangars, many little airplanes spend their nights down on the farm and their days up in the air. A trip to the city for tools, replacement parts and household goods is now merely a matter of minutes. Instead of going to town three or four times a month, the flying farmer can run in almost at random. In addition to transportation, the airplane affords the large-scale farmer an excellent means of inspecting the progress of his various crops, and supervisors of large farming companies sometimes use airplanes to travel about the huge properties from field to field. Light planes have been rigged up as crop dusters and as such have saved their owners many times their moderate costs in one summer.

The first thing the farmer should think about, after buying a plane, is an airfield on his property. In selecting a suitable field for an airport there are many things to consider, *(Turn to page 32)*

WHY PICK AN AIR SCHOOL?

BY JOHN H. RIORDAN

High-school grads! Are you undecided between going to college and aviation school? Here's the case for the aviation school.

TODAY the young man just out of high school generally has a fairly firm conviction relative to his career. He would like to find out what business demands in the way of training—secure that training and step into a position somewhere near that of his choosing. Yes, one, two, three—just like that! The trouble is, most colleges, industries and professions don't run that way; the journalist, the advertising man, the doctor, the lawyer, the architect must each go through a long period of finding himself and his place even after he has spent from four to ten thousand dollars and some years learning his vocation.

Aviation has radically altered this entire procedure. It hasn't had time to worry about tradition. It hasn't had time to wait for a college education. In one fell swoop, it has had to sever all the red tape to win its men, because of the terrific competition among aviation organizations to secure trained employees.

And startling to the industry itself, that method is securing in a hurry men who know a lot less about Greek letters and far more about the business of engineering, building, maintaining and piloting airplanes than they ever expected. Even parents are getting a surprise, for they find that with only *half* of the savings set aside for Bob's college education having been used for the aviation training he took, here he is already drawing down a pay check very close to father's.

Let's backtrack briefly in this educational revolution, see how it came about. The aviation industry needed men, men well trained to do certain specific jobs—to engineer planes, to build them and fly them. So a handful of colleges in America volunteered to produce a few hundred graduates "four years from now" and aviation politely said: "Hitler won't wait for young America to intersperse aviation training with sociology, economics, ancient history, football, fraternity dances, six-hour school days, five-day school weeks, summer, Christmas and Easter vacations. . . . We need men in a hurry. We have production sched- *(Turn to page 39)*

Interest in a chosen career is essential to success. Aviation at present leads in interest among the youth of America.

Mile-square campus. This splendid layout of the California Flyers School of Aeronautics is typical of modern air schools. Douglas test hangar at lower right.

SUPER-MEN FOR SUPER-SHIPS

BY JOHN R. HOYT

The modern aerial warrior must be made of sterner stuff than in the past to handle such ships as the Curtiss XSB2C-1 dive bomber at right.

Warplanes are becoming more intricate by the hour. Can modern man fly tomorrow's ships?

AIRPLANE speeds, in less than a quarter of a century, have increased tenfold and airplane performances have achieved the incredible. It is possible to go aloft today at the rate of a mile a minute, so fast that the average man would actually be gasping for breath before he knew what had happened to him. The old Wright pusher plane with its 40 m. p. h. speed would be outdistanced ten times by a modern pursuit job thundering through the skies at 400 to 500 m. p. h. The airplane engine has literally leaped from a puny, cumbersome plant to a compact unit capable of producing 2,000 horses—a tiny engine whose output is the equivalent of a small steam locomotive.

Engineers anticipate future progress by working on airfoil design that will permit speeds approaching the speed of sound. But the question at this time does not appear to be one of plane design, but human limitations. In the same period that has seen the magical development of the airplane, man's physical, psychological and neurasthenic structure has altered very little. More men are flying today than ever before, and flying is no longer regarded as a superhuman achievement. In fact, the trend is toward the opposite view, which is exactly the reverse of what ought to happen. If ever a superman were needed, it is now when airplanes are becoming more difficult to fly and men are being worn to exhaustion by increased demands upon their alertness, energy and nerves.

In short, airplanes are being designed and built for greater performance. They fly faster, higher, longer and carry a greater load. They are not only becoming more difficult to fly from the criterion of technique, but from a physical standpoint. Let us see exactly what is happening and try to point out the trends and limitations to be encountered.

The technical difficulties are usually introduced via the improvement route. One of the fairly recent improvements was the retractable landing gear, which increased cruising speeds by several miles per hour. It also made possible the wheels-up landing, adding still one more item to the lengthy list of things *(Turn to page 36)*

Tomorrow's Air Might

(Continued from page 17)

rifying organizations in national conflict and international negotiation.

The nation which would survive in these times must provide sufficient airpower to gain and to maintain air superiority in any theater which it would control.

The security of our nation demands that we build without delay the strongest air force in the world.

We know that air forces are no longer mysteries, either in building or in employment; we have read aright the lessons from burning, stricken Europe. We know that air forces are but balanced compounds of airmen, airplanes and air bases. We have the capacity, the opportunity, the materials, the man power to build the world's mightiest air force, and we have the plan, the initiative, the determination to see that job through.

Priorities May Help The Light Plane!

(Continued from page 22)

added, but what does it matter?

Let's take our substitutions one by one and consider them. Aluminum and its alloys have been associated with airplanes for so long that we are not accustomed to think of airplanes without them. But if we take the aluminum leading edge off our light plane, and replace it with one of birch plywood, have we lost anything? The metal edge dents easily, is hard to repair, and if not repaired destroys the efficiency of the wing. A stroll around any airport will show you that most of them are dented, and most have not been repaired.

Along about 1931, a good many manufacturers began replacing their wooden ribs with metal. Metal ribs became almost standard throughout the industry, in spite of the fact that the CAR does not allow you to repair them. Wooden ribs, on the other hand, do not even constitute a major repair unless three or more of them have been damaged.

Here we stuck resolutely to the wooden rib, so we don't have to substitute, unless we change from spruce to fir. But many a light-plane manufacturer will find himself resurrecting the old rib jigs and mixing up a pot of glue. Light planes as a whole will benefit. The wooden rib lends itself to production admirably. It lasts as long as the protective coating given it, and this coating is renewed each time the ship is majored. It can be repaired in the field, or replaced without disturbing the rest of the wing. As a result, the anxiety attending light-plane ownership has been materially lessened by its addition.

And then there is spruce. Since most of us were very small we have heard about how important spruce was to the airplane. And to something with a little heft, it is important, because it takes some of the weight away from a lot of bulk. But it would be possible to do away with every piece of spruce in our airplane, substituting kiln-dried Douglas fir, and still stay within our twenty-pound weight increase.

Fir is easily obtainable, almost anywhere in the country. The average grade of aircraft spruce, on the whole, is much lower than it was two years ago, and because of the demand for it, the grade is getting worse. The strength-weight ratio of fir is considerably higher, so that if the same size pieces are used, a stronger structure will result. The assembly time for the two materials is exactly the same, but the cost of the fir is much less, so that if it is substituted, it will be easier to keep prices down in the face of mounting costs.

There are other ways in which the manufacturer can play the OPM game to his own advantage. When it became almost impossible to obtain drag wires for our wings, due to defense demands on established sources, we developed our own. To do this meant going through four operations, in four outside factories. But in the end we had drag wires when we wanted them. For a time, we were replacing composition pulleys with those of our own make, sawn from 17 ST bar stock and machined. This became impractical, however, when the aluminum became hard to get, but there are other materials available for the same purpose which may eventually be used.

Of course, we are still using aluminum for gas tanks because it makes the best tank. If pressed, though, all light-plane manufacturers could substitute a Terneplate tank. These are heavy, it is true, and are not included in our projected twenty-pound weight increase. But, if necessary, some of the refinements in a training airplane could be removed so that such a tank could be used.

We have found, on checking with CPT operators who use our equipment, that there is practically no maintenance cost attending those materials which are fairly easy to get in spite of the emergency. The reason for this is not so obscure when it is remembered that most of the hard-to-get materials are of a special nature. They are a corruption of something else for aircraft purposes, and are not as strong as the original.

Work such as that involved in CPT training demands a lot of strength. Weight really isn't so important. The first manufacturer with nerve enough to use galvanized-iron cowling will release a lot of aluminum for other purposes. He'll increase the weight of his product, too, but he may be finding a method of producing the universal airplane that this country has wanted for so long.

The paring-down process has already begun. Precious stock and precious parts are being released by concerns like ours because fighters and bombers need them. Perhaps we will come out of this emergency with better, stronger, more usable planes.


MEET T

E P-38

Two supercharged Allison engines drive this twin-tail-boom Lockheed fighter at over 400 m.p.h. Props revolve in opposite directions. Shell cannon and heavy-caliber machine guns fill center nose.

Super-men For Super-ships

(Continued from page 26)

to check off before the pilot could set his plane on the ground.

Other technical developments are the constant-speed propeller, the landing flap, lockable tail wheel, cowling flaps, de-icers, radio, twin engines and so on. Each advancement brought more details, more items to be remembered. That one additional item to be checked off has lowered the margin between a crash and a successful landing; it has been estimated in the present war in Europe that pilots are so exhausted by the strain of fighting that they cannot contend with any additional gadgets to remember. As a matter of fact, statistics show that for every two pilots killed in combat, there are three killed in crashes not involving combat.

Performance, therefore, appears to have struck a limiting factor, which is the ability of man to cope with the advanced technique required to fly a high-performance airplane. And when it is remembered that with a huge air corps the standards must be lowered, and that inferior material will be trained as pilots, we can easily see that planes must be very simple in order to avoid complicated techniques. Pilots who are tired simply cannot pay much attention to details, and pilot fatigue will diminish the pilot's ability to cope with a long list of sundry items. Unfortunately, this fact alone is not going to deter engineers from designing more advanced and complicated airplanes.

But supposing that all gadgets and devices are made automatic, leaving nothing for the pilot to worry about but his adversary. The modern airplane is so fast, and the physiological effect so devastating, that not all pilots will be able to fight day in and day out. According to eminent authorities on aviation medicine, the time is now at hand when serious attention must be given to the question of *pilot fatigue*. It has been pointed out abroad that pilots over twenty-seven are *old*, and should not fly fighter planes. What happens in a modern, high-speed plane that the average man can't endure? Why pilot fatigue? Can modern man fly tomorrow's airplane?

There are several things causing pilot fatigue, among them being the following four factors. First, type of flying—combat or observation. Second, type of plane: speed, performance and mission. Third, duration of flight: i. e., ordinary weariness. Fourth, physiological effects of flying, altitude and chemical changes.

The fatigue resulting from flight causes a pilot to forget even the simplest safety precautions. More pronounced is the fatigue of high-altitude work, which is illustrated by the following instance.

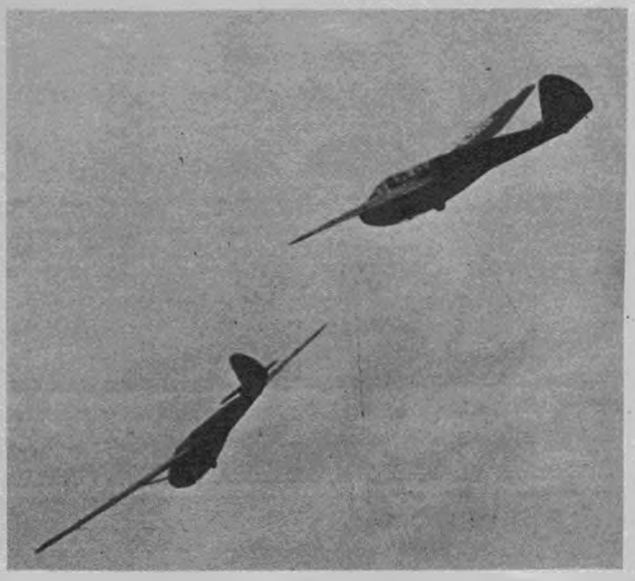
Pilot A took off for a simulated battle in the air, using camera guns. After getting to 30,000 feet, where oxygen was required, he made the mistake of removing his oxygen pipe for a second while he searched the cockpit for a pencil. He stooped over to get the pencil, groped for it, and the next thing he knew his airplane was in a screaming dive with the altimeter reading 10,000! He had dived almost four miles in a series of zooms, ruining his motor and almost killing himself. The effect of the predicament fatigued him so much that upon coming in to land he forgot to lower his retractable landing gear, landing the plane on its belly and again nearly committing suicide.

It must be acknowledged that this is not the fault of the plane. Planes will fly perfectly if man is capable of flying them, but engineers can produce planes so efficient and so marvelous that men cannot fly them. This year our various warplanes will fly to 35,000 feet with ease, dive at 500-600 m. p. h., carry from 2,000 to 15,000 pounds of explosives, and fly nonstop 2,000 to 4,000 miles. Eventually the engineer will have to give more and more consideration to the question: "Can the pilot who will fly this plane take care of each added improvement?"

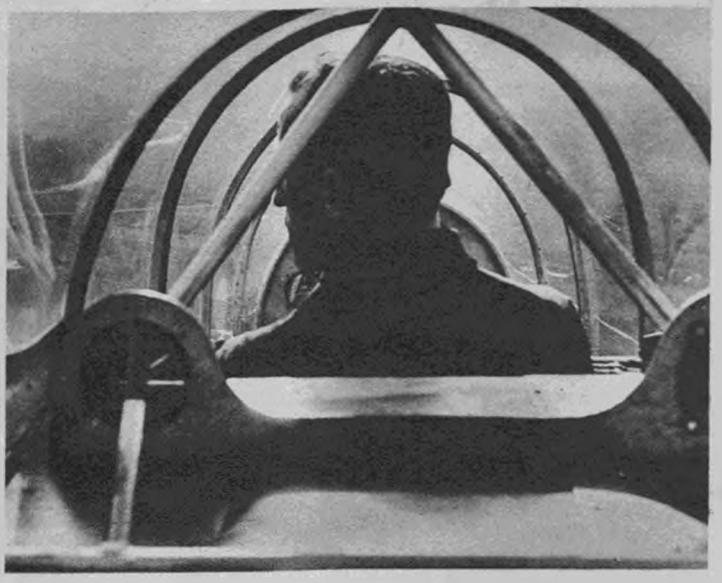
For example, the new type interceptor fighters take a man to altitude so rapidly that many of the pilots become afflicted with "caisson disease," or the "bends," caused by the liberation of nitrogen bubbles in the bloodstream. At 25,000 feet, where there is not enough air to keep an ordinary candle burning, a pilot becomes mentally hazy, and this lack of oxygen affects his brain to the point where he can no longer think clearly. At 30,000 feet unconsciousness results from lack of oxygen, and this may cause a permanent impairment of the brain, or even death. This was proved by actual test, the experiment having been conducted by doctors in a pressure chamber; the pilot, before passing out, mistakenly believed he could hold his breath long enough to bail out after having relinquished his oxygen pipe.

But the use of oxygen is another gadget—and yet it seems that if the present rate of development continues, oxygen will be used by all fighter pilots. Not only for high-altitude work and in interceptors, which are now supplied with oxygen from the moment they leave the ground in order to suppress the vicious "caisson disease," but for all kinds of combat work.

The reason lies in the fact that a modern plane, traveling at high speed, imposes terrific forces upon a pilot's body. A fast, powerful plane flying at 400 m. p. h. is tame enough when flying level, but the minute its course is altered a terrific force is imposed upon the pilot's body. This force is measured in G's, one G being the normal effect of gravity at the earth's surface. When a sufficient force—says 5 G's—is imposed, the blood is drained from the brain, thereby depriving the brain of oxygen. This, if it is prolonged, will cause a condition known as "blacking out," and doctors claim that this condition is very similar to the anoxia (oxygen lack) experienced at high altitudes. If the human brain is damaged from repeated periods of this oxygen starva-



Two Schweizer two-place ships chase each other in close formation during a demonstration flight for the army experts at Harris Hill, N. Y.



Inside stuff. This demonstrates the excellent visibility from a modern all-metal sailplane. Taken from the rear seat of one of the planes shown at the left.

GLIDER BANDWAGON

BY ALEXIS DAWYDOFF

In this hullabaloo about U. S. military glider training, why not listen to our glider pilots?

GLIDING, in the last few months, has been playing a fairly prominent part in the headlines of our newspapers. During the conquest of Crete a number of gliders were used by the Nazi Luftwaffe to land troops on the Greek island. Almost as soon as the news was released articles appeared in different publications giving the low-down on how this was done and what role gliders will play in future warfare. Several of these articles were written by high-powered airplane pilots, others by people having only a remote conception of the value and application of gliders and gliding. The gist of most of these articles seemed to be that the war department may launch a campaign for acquiring troop-carrying machines for the army air corps. Many writers attempted to prove that as a military weapon the motorless ship has very little value. Even light-plane manufacturers became nervous, fearing that the glider might steal their thunder. One of them went so far as to say that the same feat, with additional touches, could be accomplished by a swarm of light planes.

The object of this article, however, is not to criticize all these authors and orators. Its main point is to warn those interested and active in the American glider movement that we are balancing on a danger point because of all this sudden limelight. For a number of years we have been struggling on our own, occasionally putting in a bid for recognition by the government, only to be brushed away like bothersome flies. In the early stages of our development we were considered as just a bunch of screwballs. A little later we were looked upon as Good-time Charleys who were wasting their time and talents going nowhere on nothing. Then it slowly started to dawn on some of the big boys in Washington that we might have something there. A great deal of credit for this last goes to the C. A. A. inspectors who were delegated by Washington to attend the 1940 National Soaring Contest, to Dick duPont for his untiring championing of our cause, to Earl Southee and a few others who kept in close contact with the sport. Then the war came and with it word that the German air might owes its enormous reserve of pilots to gliding. A quick census enlightened the inquirers that we have in the neighborhood of 145 glider clubs in this country, about 400 glider pilots and less than one hundred licensed gliders. Certainly nothing to *(Turn to page 38)*

Genial John Wilson, superintendent of the Lewis School of Aeronautics, gets congratulations of Instructor Art Hoffman for his first soaring flight.

The army hears how. Instructor Hoffman of Frankfort-Lewis School of Soaring, Lockport, Ill., explains the release to army pilots taking glider training.

SKY SCANNERS

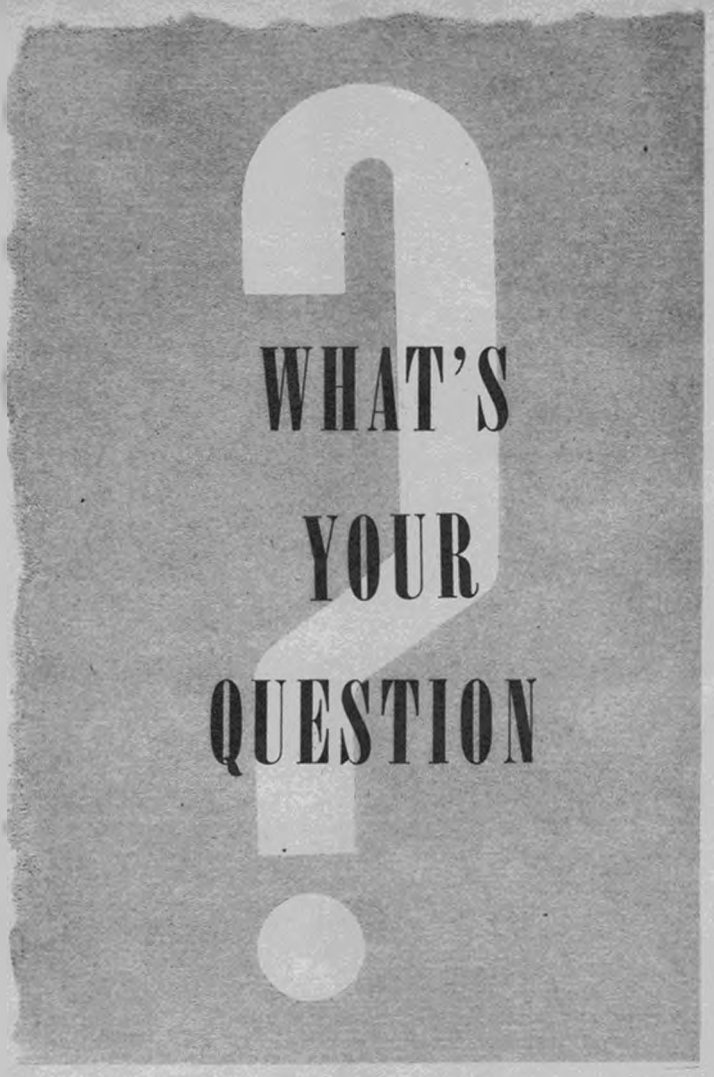
Someone recently said there are no more civilians in England, everyone is in the service. One of the most important groups of civilians is the aircraft warning service composed of men past active military age. Rain or shine, day or night, they man their posts to give advance warning of invading enemy planes. High praise goes to these veterans.

With the aid of this complicated spotting scope the range, height and speed of the invaders are computed. Instrument rotates to follow flight of enemy planes.

Invader beware! This middle-aged observer and spotter reports by phone the movements of both friendly and enemy aircraft.

Post relief arrives to take over the next stretch of duty. The wall of the circular pit bears compass and section numbers and directions. Note tin hats.

Homework. A detailed log of all aircraft observed is kept by each post for reference. England's spirit shows in this fine old gentleman's face.



QUESTION: Would you please tell me what ever became of the Curtiss XP-42? What is the speed of the Douglas DB-7A? R. E. F., Tipp City, Ohio.

Answer: The XP-42 was an experimental ship and was built in order to test a new type of engine and cowling. We do not know what happened to it; it was not a service type. The Douglas DB-7A is supposed to have a maximum speed of 320 m.p.h.

Question: What color are British warplanes, and American ships built for England, painted on the underside? C. P. B., Quebec, Can.

Answer: They are painted sky-blue.

Question: Could you please tell me what is the service ceiling of the following planes: Boeing Stratoliner, Curtiss-Wright CW-20, and the Curtiss Hawk 75A? J. G., Seattle, Wash.

Answer: The Boeing Stratoliner has a service ceiling of 24,000 ft.; Curtiss-Wright CW-20, 26,900 ft., and the Hawk 75A, 32,700 ft.

Question: Could you tell me where I can get plans for the Ercoupe? J. K., Toronto Can.

Answer: Sorry, but plans for the Ercoupe are not available. This ship is a production job and its manufacturers, naturally, are not going to sell plans for it.

Question: How high is the tail assembly of the B-19, who makes it and what are its specifications? K. L., Stephens, Ark.

Answer: The B-19 is built by Douglas Aircraft Co., Santa Monica, Calif. The top of the rudder is 42 ft. 9 in. from the ground, the span is 212 ft., the length 132 ft. It is powered by four Wright Cyclone engines of 2,000 h.p. each. The gas capacity is 11,000 gals., the range 7,500 mi.

Question: Is there a plane being manufactured or in the experimental stage having a twin rudder, tricycle landing gear, high wing and single engine? A. C., Johnstown, Pa.

Answer: Yes, a ship of that type is manufactured by the General Aircraft Co., Lowell, Mass. Called the Skyfarer, it's a two-place cabin monoplane powered by a 75 h.p. geared Lycoming engine.

Question: I read "Used Planes Are His Hobby" by Marian B. Reeder in a recent issue and would appreciate your letting me have further information on how to get Claud Dry's Aircraft Directory. A. A. P., Brooklyn, N. Y.

Answer: Send 25 cents to Used Aircraft Directory, Box AT-456, Athens, Ohio.

Question: Would you please let me know the horsepower of the engines on the Consolidated B-24? Is it true that the Allison is coming out with a 2,000 horsepower engine? What is the aspect ratio of a wing? P. L., Montreal, Canada.

Answer: The Consolidated B-24 is powered by four Pratt & Whitney Twin Wasp engines of 1,250 h. p. each. The Allison Co. has been experimenting with a 2,000 h. p. engine, but so far, to our knowledge, it is not in production. The aspect ratio of a wing is the ratio of span to chord, otherwise length of wing to its width. For example, if a wing is 40 feet long and 5 feet wide, it is said to have an aspect ratio of 8.

Question: What is the range of the P-38, P-39 and the P-40? What are the dimensions of the Lycoming 01230, 12-cylinder flat engine and the Allison? Does the pilot of the Focke-Wolf 198 sit upright or lie prone? H. Y., Osborn, Ohio.

Answer: We do not know the range of the P-38. The P-39 has a range of 1,560 miles at cruising speed, and the P-40, 945 miles. We do not have any figures on the Lycoming 01230. The Allison is 94.47 in. long, 50.94 in. high and 28.94 in. wide. The pilot of the FW-198 sits in the upright position.

Question: Is the Boeing P-26A pursuit plane still used by the U. S. army air corps? T. H., East Chattanooga, Tenn.

Answer: As far as we know these ships, although not in active service, are still being used at some of the air corps bases. A few of them are stationed in Panama.

Question: Where can I purchase a copy of the Aircraft Year Book and the new issue of the Aerosphere? What are their prices? H. B., Irvington, Ky.

Answer: The Aircraft Year Book can be bought from the Aeronautical Chamber of Commerce, 30 Rockefeller Plaza, N. Y. C. It costs $5. The Aerosphere, from Aircraft Publications, 370 Lexington Ave., N. Y. C.; $10.

Question: Does a person have to have a college education to be a pilot or a mechanic in the navy? F. S., Herkimer, N. Y.

Answer: To be a pilot in the navy you must have at least two years of college education, or pass a written examination which is the equivalent of two years of college courses. A mechanic is not required to have this educational standard, but he must have gone through four years of high school.

Question: What are the addresses of firms making primary glider kits? What are the gliding schools, if any, here in the East? Is there a C. A. A. bulletin giving rules and regulations about gliding, and if so what number is it? J. F., New York City.

Answer: There was one firm making primary glider kits: Stone Aircraft Co., Box 57, Detroit, Mich. We do not know if they are still active. Write to them. The Elmira Area Soaring Corp., Elmira, N. Y., is the only organization conducting a glider school in the East. Rules and regulations governing the licensing of glider pilots are published in the C. A. A. Bulletin No. 20.

Question: Is there any book published that has photographs and specifications of all military airplanes in the world? Where can I obtain it and how much does it cost? N. H., Paris, Ont., Can.

Answer: Janes All the World's Aircraft is the most complete book on this subject. It is published by Sampson Low, Marston & Co., Ltd., London, England, and costs in the neighborhood of $20. You may be able to obtain it through a first-class bookstore. Another excellent book is the Aerosphere, published by Aircraft Publications, 370 Lexington Ave., New York City, whose price is $10.

Question: Could you tell me how old one should be in order to be eligible for a private license, and where to get one? Will you please give me the information regarding the Curtiss SBC-4, Stearman PT-13 and what motor powers the Messerschmidt 109? K. W., Dayton, Ohio.

Answer: You must be 18 years old in order to get a private pilot's license. It is issued by the Civil Aeronautics Authority, Washington, D. C., but you can obtain it at fields where there is a branch of the C. A. A., and in cases of airports without such branches, an examining inspector will often come out when there is a sufficient number of students ready to take tests. The school operator usually takes care of that by notifying the C. A. A. The SBC-4 has a span of 34 ft., length, 27 ft. 6 in. It weighs 4,548 lbs. empty, has a gross weight of 6,256 lbs., is powered by a Wright Cyclone engine of 950 h. p. The top speed is 235 m.p.h., cruising speed 176 m. p. h., landing speed 68 m. p. h. and service ceiling 24,500 ft. The Stearman PT-13 has a span 32 ft. 2 in., length 24 ft. 9.5 in., weight empty 1,997 lbs., gross weight 2,686 lbs., maximum speed 125 m.p.h., cruising speed 103 m. p. h., landing speed 51 m. p. h. It is powered by 225 h. p. Lycoming engine. The Messerschmidt 109 is powered by a Daimler-Benz liquid-cooled engine of 1,050 h. p.

Question: I am fifteen years old and very interested in flying. I will not be sixteen until November, and would like to know if it would be lawful to take flying lessons this summer, and then next November get a license right when I'm sixteen. J. S., Charles City., Ia.

Answer: No, this will be unlawful. At sixteen you can get only a student's permit. You are not eligible for a license until you are eighteen years old.

What If New York Is Bombed?

(Continued from page 19)

very clear idea of what to do. But he can plainly see the injured, half buried, and he hears the siren of an approaching ambulance. He goes to work—

He is not the only one to be taking up for the first time duties new and strange to him. Unseen by him, all over the metropolitan area, men and women are going into action. In fact, although he does not know it, the first step was taken more than ten minutes before he lifted his eyes to glance at the Paramount clock.

The aircraft warning net, originally tried experimentally in the summer of 1940 with the co-operation of the American Legion, within the few weeks previous has been expanded into a complete and far-flung organization. Volunteer spotters from every walk of life have been enrolled, instructed in their duties, and fashioned hastily but efficiently into a nerve system no less sensitive for being huge in extent. Each district has its central control post where there is always a hand ready to lift a receiver. The first call came in from the farthest extremity of Jones Beach.

"Unidentified planes approaching from southeast," was the report. "Flying northwest at approximately eighteen thousand feet; estimated speed, two hundred miles an hour. Five planes in first group; another group behind it just coming into sight. Large planes, heavy bomber type—"

Before the spotter had completed his report, the warning was being flashed over other wires to the central control posts of all the emergency services. It had scarcely been received before confirmatory reports began pouring in from other spotters scattered along the western end of Jones Beach and at Long Beach. Within a minute it is definitely known that these are hostile planes, that there are a score in all, divided into three groups, flying at stepped altitudes and in three slightly different directions. While the planes were still crossing the Long Island shore line, barely within sight of their ultimate objectives, the various defense arms were beginning to function.

The first flash went to the air defense command of the army, at Mitchel Field. Here several squadrons of interceptor planes are based, constantly on the alert. Some of those poised on the apron are Lockheeds and Airacobras, the latest type, capable of climbing straight up at close to a mile a minute. Many are the older P-40's, considered obsolete, but not yet relegated to the junk heap. Exhausts burst into thunder; those with air-cooled motors, requiring less warming up, get off first, though they will shortly be caught by the more powerful liquid-cooled types.

Some are already in the air, others are turning over, when one of the raiders, taking a tangent in this direction, looses a stick of bombs. They straddle one corner of the airdrome, blasting two enormous craters in the apron and setting fire to a hangar in which more interceptors are waiting. But this by no means knocks out the army, which has long since learned from the British the meaning of the word *dispersal*. All of the interceptors are not here. Flights are posted to LaGuardia Airport, to Floyd Bennett, to Newark, to Miller Field on Staten Island and to numerous smaller fields scattered through New Jersey and Westchester. The same flash warning has been relayed to these points, and from each one planes are roaring up.

The advance flash has also gone to the army's antiaircraft artillery stations, scattered through Brooklyn, Staten Island, the Bronx and New Jersey. As quickly as those bombers come within range, the batteries of archies began to wham, and fragments of shrapnel spatter in the streets. The course of the raiders is trailed across the sky by the shell bursts; though none is hit at that altitude, they are at least prevented from coming lower.

But even before the first gun fired police headquarters had received the preliminary warning and girded for action. Here is the greatest coolness. Police officers by the very nature of their trade are always ready for an emergency, and these men have been further prepared. The traffic cops hold their posts, directing crowds to shelters and forestalling panic. Many don steel helmets, which they have handy.

Within the department, and yet separate, the Disaster Control Board, created after the hurricane of 1938, has been expanded to a special emergency force and trained for just this contingency. Nearly two thousand picked men have been schooled in first aid, rescue and resuscitation, rigging and demolition, and electrical emergency work. They are divided into sections, each section equipped with a full-rigged truck. Before that first bomb fell near Times Square, these trucks were poised in opened doorways, motors running, their crews in position. As the calls come in they head out to the hard-hit danger points.

Nor has the fire department been caught flat-footed by the first flash. For many months, under the direction of the mayor and the commissioner, lectures have been going on at the Fire College in Queens, delivered by men who went to London in 1940 to get their information first hand. All the chiefs and at least one man from every company have attended these lectures. They know how to deal with incendiaries, with burning gas mains, with short-circuited power lines, with the deadly thermite-and-magnesium bombs. In addition to the regular apparatus, they have a number of special trucks. Not as many as they will have a little later; but the ones available are quickly on the job.

The departments of health and of sanitation have likewise heard the warning. They, too, have emergency crews standing by, ready for their tasks. They likewise have learned from the experiences of London that the concussion of a large bomb can crack a sewer lying thirty or forty feet below the surface, and that a broken water main cuts off, not only water, but the source of hydraulic power that operates elevators and much heavy machinery. They have studied their underground maps until they know them by heart, and are prepared to valve off any stricken district. They know right where to lay their hands on spare pipe and fittings, pumps, precast concrete sections, and special tools of all kinds. Their water carts and tank trucks stand ready to carry water to any section where the supply is cut off by burst mains, or polluted by sewage.

The public utilities have made their own preparations, in close co-operation with the mayor's civilian defense organization. A bomb falls in the railroad yards west of the Pennsylvania Station. Before the smoke has drifted away switches are opened, cutting off the current in the third rail in the neighborhood of the crater. A gang of laborers, stripped to the waist, but wearing steel helmets, goes to work with pick and shovel. A flat car equipped with a crane and loaded with rails and ties moves up. The twisted steel and splintered ties are jerked up and aside; new rails are laid. The men glance up occasionally, muttering. But their comments are on the good luck that led the missile to land here, rather than in the station.

The Edison Co. has both gas and electrical crews on the job. One echelon of raiders has swung over Brooklyn and the vast shipping and oil depot of Newtown Creek. One bomb falls within the gigantic gas plant in Astoria; a column of flame mushrooms into the sky. No, not one of the six-million-cubic-foot holders; a feeder main. The engineers rush for the valves, closing one here, opening one there. The burst main is "bagged off," the flames burn themselves out. A portable compressor is rolled across the yard, and shortly the whole Greenpoint section is getting by-passed gas without knowing it.

Another group of enemy bombers has crossed midtown Manhattan, more in the hope of starting a fatal panic than of doing military damage. Two thousand-pounders fall in adjacent streets. One strikes a row of old brownstone-front houses in the Thirties. The building hit and the two on either side collapse in one heap of rubble. The other bomb explodes against the side wall of a modern steel-framed skyscraper at the level of the twelfth floor. The concussion is felt throughout the building, but the only casualties are on the twelfth floor itself, and in the street directly beneath.

At the end of the block a civil defense warden has just pulled an armband from his pocket and put it on. He looks up the street, then turns into a telephone booth and asks for a secret number which he knows, but which has never been made public, lest a flood of frantic calls jam the essential trunks. He reports briefly the exact location and the type and extent of damage. As he steps out to the street again, wailing sirens are converging on that block. Regular ambulances from two nearby hospitals, special ambulances and cars driven by volunteers, some of them women, whose armbands tell that they have been coached in emergency duties. They delve into the wreckage amid thick clouds of dust, dragging out the wounded, quieting their cries, sending them off in the ambulances.

But there are others, perhaps, buried in that tangle of steel and stone, whose cries cannot be heard. A demolition crew rolls up in a dark-green truck from which they haul jacks, axes, chain hoists, oxyacetylene torches, and sledge hammers. They work swiftly but with care, swinging beams aside, digging here, prying there, and frequently pausing to listen at yawning cracks in the heap. A doctor waits at their heels.

In the middle of the street stands a man with a different kind of armband, taking notes on a piece of paper. He is an intelligence observer of the civil defense corps, also specially trained. He has nothing to do with warning or rescue, but before night he will submit to the proper authority a complete report on that particular hit. The estimated size of the bomb, the number and degree of casualties, the type of building struck, how much it was injured, the effect of the blast on neighboring structures, the promptness and efficacy of rescue and repair work, and any other details he may think important. From his report, and others like it, the whole results of the raid can be summed up, and lessons learned which will be valuable in the future.

The third group of raiders has branched up the East River, aiming their blows for the bridges, the Hell Gate power plant, the gas holders at Ninety-ninth Street, and the Harlem River piers and markets. From 20,000 feet a bridge makes a slim target, however; most of the Molotov bread baskets fall into the water. But one strikes the edge of the traffic ramp leading to the Third Avenue bridge over the Harlem. There is a fountain of cobblestones, and in the yawning crater a succession of sizzling flashes that give off an acrid stink. The explosion has severed the power cable that operates the motors which lift the drawbridge. The surface of the roadway can be repaired within twenty-four hours, perhaps; river traffic may have to wait a little longer before the bridge can be raised, although linemen wearing asbestos gloves and shatter-proof goggles are already jumping out of an emergency truck.

By the time the big, four-motored bombers have loosed their loads and headed off across the upper bay the interceptors have made contact with them. The hum of their powerful motors, four miles up, is like the ominous drone of a flock of hornets as they overtake the lumbering larger

(Turn to page 32)

Dear Mom:

Well, here it is another week-end and I'm not a General yet. But give me time.

Matter of fact, I have too much time on my hands—on evenings and weekends.

The nearest village is 5 miles away. All you find there is a general store, a garage and a canning factory—nowhere to go for any good clean fun, unless you drop in at a smoke-filled juke joint on the way.

Well, Mom, there's a big favor you can do me. The U. S. O. is trying to raise $10,765,000 to run clubs for us, outside of camp. Places with lounge rooms, dance floors, games, writing rooms. Places you can get a bite to eat without paying a king's ransom.

I know you don't have an idle million lying around, but if you could get the family interested and some of the neighbors, and if that happened all over the country, the U. S. O. could raise $10,765,000 overnight.

I'd appreciate it a lot, Mom, and so would every other mother's son in the U. S. Army and Navy.

Love,
Bill

They're doing their bit for you. Will you do your bit for them? Send your contribution to your local U. S. O. Committee or to U. S. O., Empire State Building, New York, N. Y.

OPEN YOUR HEART
OPEN YOUR PURSE
GIVE TO THE

U ★ S ★ O ★

UNITED SERVICE ORGANIZATIONS

These organizations have joined forces to form the U.S.O.: the Y.M.C.A., National Catholic Community Service, Salvation Army, Y.W.C.A., Jewish Welfare Board, National Travelers Aid Association.

What If New York Is Bombed?

(Continued from page 30)

planes. It is barely penetrated by the sizzling crackle of machine-gun fire. In the canyons of lower Manhattan necks crane upward. High over the bay appears a tiny puff of smoke. The puff drags itself out into a plume, twisting into a stretched-out corkscrew shape as it lengthens downward. Alongside of it appears a series of white specks. The blazing fuselage smashes into the water a few hundred yards off the Statue of Liberty; the parachutes drift down toward Jersey City.

Far out at sea boilers are being driven at forced draft. That warning, followed by later reports, has been flashed in navy code; ships are racing to position. Cruisers, destroyers, patrol boats and coast-guard cutters, all mounting pompoms and high-trajectory guns. The raiders that escape the interceptors will find their homeward path made uncomfortable for them. And those that manage to climb above range of the antiaircraft artillery may find themselves being tracked down by carrier-based pursuit. The return trip won't be dull.

Meanwhile, behind them, the great city of New York catches its breath and licks its wounds. It has felt its first enemy air raid. It has been hurt; sorely hurt in spots. There are many dead and injured in the hospitals and morgues. Proud buildings are gutted, a bridge is temporarily unusable, half of one borough has no telephone service. Fires are burning; some of them will still be burning at nightfall. But are the people cowed, panic-stricken, crying for surrender—as the enemy hoped when he launched this raid?

The man in the gray suit gets up off his knees and wipes his grimy, bleeding hands on the slack of his pants. Fishing in his pocket for a cigarette, he glances up at the sky behind the Paramount Tower.

"So what?" he mutters belligerently.

The Farmer Builds a Field

(Continued from page 24)

and it is hoped that some of the suggestions herein will be helpful.

Generally speaking the wide-open spaces on the vast Western farmlands present no problem at all. It is best to pick out a field with a good sod surface away from large trees or other obstructions such as overhead wires, buildings and silos. If you ordinarily plant the field of your choice, it will not be necessary to strip it entirely of its productiveness. To operate a light plane you need only one or two runways. Remember, when choosing a field, to make your longest runway run parallel to the direction of the prevailing winds. Your longest runway should be approximately 1,000 feet long if there are no obstructions at either end. The longer the better, of course, and if trees, fences or buildings are close to either end of the main runway, it should be long enough to allow a normal approach and take-off with plenty of room to spare under conditions when no wind is encountered.

The average wingspread of a light plane is in the neighborhood of thirty-five feet, but even though it were only twenty feet, you would still be better off to make your runways from eighty to one hundred feet wide. It is sometimes necessary to land and take off crosswind, which involves a certain amount of drift. Making your runways wide enough will save you the embarrassment of possibly harvesting corn with your propeller instead of in the usual fashion. Actually a light plane can be landed on a very narrow stretch of ground, even on a country road if necessary. But in making your own airport for regular use it is best not to limit your space too much. It is surprising how little you actually sacrifice in productive farming space even for an adequate airport. If part of the field is planted, keep low crops in it so you can see over them while taxiing on the ground. In most light planes your head is about five feet above the ground; therefore, you should not use a cornfield if it is possible to use a potato field, for example.

If you are somewhat limited for space, you may find it necessary to confine yourself to just one runway. Be sure to choose level ground. Small humps can be leveled off by hand or machine. Be sure to roll your soft ground so it will support the weight of your plane easily. Good turf has a certain amount of give to it and makes the ship easier to handle while landing and taxiing. Ground which tends to be very muddy in the spring should not be chosen if you can find a grass field nearby. Obviously hilly country brings up the problem of extensive leveling operations which tend to make home airport construction a major-size job. A certain amount of grade is of no harm, and we would estimate that a rise of one foot in every hundred is about as much as should be allowed without grading. The high end of the runway should be at the windward side of the field so that you make your landings uphill into the wind. A somewhat longer runway is required in this instance because of uphill take-offs which will necessitate a slightly longer run. A slight roll on any part of the runway is of no major importance, but you should mark it with flags on either side so you do not land on the high part and bounce back into the air.

If a rectangular field is not available, choose one that does fulfill the major requirement—its longest dimension must be parallel to the prevailing wind direction and free from high obstructions at either end.

Naturally no one wants to walk a few hundred yards to the garage whenever he decides to take his car out. You will not want to leave your airplane away out in some distant field if you have a large barn available right in back of the house. Try to select a field adjacent to the barn if you want to hangar your ship close to home. Some barns have unused stables which can be quickly converted into hangar space. In rebuilding such stables, be careful not to weaken the main supports even though you will need to relocate most of them to obtain a clear space long enough to accommodate the wingspread of your ship. It is possible to build out from the side of a barn so that the wings and nose can be contained in the new addition and the tail and long part of the fuselage rest inside the barn proper. The doors are the hardest part of the housing problem. Sliding doors are best, but take a lot of room, and next in line come the folding type used in most individual hangars.

If it so happens that a barn hangar is out of the question, you may want to build your own T-shaped hangar out of prefabricated sections now available nationally at low cost. A complete hangar can be purchased in the neighborhood of $350-$400, ready to erect. If this looks too expensive, at least investigate and maybe you will be able to find enough materials right at home to build one along the same lines. Sometimes a hangar is more trouble than it is worth, in which case you will have to take greater care of your ship, as rain and wind must be guarded against. Good, strong tie-down stakes and some three-eighth-inch rope will do the trick. Make sure your controls are tied down at night so the control surfaces will not slap around in high winds. Canvas covers over the engine, propeller and windshield are essential.

The most important item of all on any airport is the ever-present wind sock. Easy to make, this should be mounted at the highest possible point right on, or adjacent to, your airport. The diameter at the large end must be no more than a foot or so and should taper down to about two thirds of that at the other end. The easiest way to make a good wind sock is to inspect carefully one at a major airport. Or they can be purchased for a few dollars at any aviation supply house.

The take-off run of any airplane is increased in high altitudes. At 5,000 feet above sea level it takes about twice as long to get off as at sea level. This is because the rarefied air at higher altitudes does not produce the lifting power of the denser air at sea level. In turn this means that your airport should be constructed as much according to the rules governing performance at high altitudes as to any of the other considerations we have mentioned.

Take your time making your airport. Do a good job and it will more than repay you in the long run. Remember, it's all your own!

tion, the damage is likely to be permanent.

A recent accident was attributed directly to the results of high acceleration. The pilot executed a steep pull-out, after which he did a steep turn. The prolonged high G's caused him to lose consciousness, as his plane was seen to turn and dive into the ground. Still other deaths have been attributed to heart attacks; it seems that pilots do not realize the effects of oxygen starvation until it is too late. The effect is so insidious that one can be practically *unconscious* and still feel no ill effect.

Something must be done to prevent these blackouts, and yet the speed of a fighter or interceptor plane increases almost daily. Higher horsepowers, better design, and better construction mean higher performance. But the performance is already at a point where the pilots are cracking up, three in normal flying to two in combat.

Fast, speedy planes capable of high performance affect a pilot not only from a physical standpoint, but mentally as well. The faster, more dangerous a plane may be, the more the mental strain of trying to fly it and keep up with it. Things happen fast at 400 m. p. h., and one needs only to travel that fast to realize it. At that speed 586 feet flash by each second; the thought of meeting an adversary in a similar plane is not exactly comforting.

An adversary, flying a plane of as high or higher performance, would introduce even greater technical, physical and mental strain. This in turn would permit the pilot armed with the best protective devices to win, and this point seems to be the end of all arguments. For if planes are going to be superdeveloped, and if pilot endurance is a human factor, some remedy must be found.

We know that the standards for student pilots are excellent, that each student must be possessed of superior heart, eyes and lungs. But sooner or later a huge aërial armada must be developed, and there simply aren't enough supermen to go around. At that time the planes will be far ahead of the pilots. Something will have to be done to bring the two together.

This has been attempted, according to a persistent rumor, by German dive bombers; these pilots, it is said, have been drugged prior to take-off to pep up their performances. There are a number of such pep drugs known to scientists, among them being ephedrine and benzedrine. College students have been known to use them before final exams, and they do pep up a person, raising the blood pressure and general alertness. But how long this lasts, or how effective it is in combat, no one has yet stated or attempted to prove.

To 100,000 pilots, not all of them supermen, the strain of such flying will mean exhaustion, not only physically, but mentally and moralely. And then the ratio of crack-ups away from the battle area will increase. Engineers can produce planes so efficient and so terrific that men cannot fly them—perhaps not this year, but in years to come. Planes having unthought-of rates of acceleration are a possibility. Eventually the engineer will have to give more and more consideration to the question: "Can the pilot who will fly this plane take care of each added feature?"

For example, as more speed is sought and acquired, the wings will be a hindrance rather than a help; they will be very necessary in landing the plane, and as every pilot knows, the landing speed must be slow for safety's sake, especially for tired, worn pilots. In order to have a small wing area at high speed and a large wing area at landing speed, some talk has been made about retractable wings, capable of being withdrawn during flight; but here again is an added contrivance for the pilot to remember—and to forget.

What is there to do about this problem? First of all, there is little release or hope for the reduction of nerve strain. The eternal jitteriness of mortal combat can hardly be reduced to a nonentity; the nervousness prior to public speaking or battle is seldom, if ever, dispelled. That much we must accept.

But the problem of coping with design offers a possibility. Like the clutch and gear shift in an automobile, the other operations can be made largely automatic. Gadgets can be reduced to a minimum, and operations can be simplified. Carburetors, flaps, landing gear and miscellaneous devices are already becoming so modified and improved that they no longer add to nerve strain. Plane design in relation to landing speeds, stability and ease of operation is well understood; cockpit design, instrument placement, comfortable seats and controls are also factors that *must* be considered in an effort to lessen pilot strain.

The problem of flight duration can be solved only by having a sufficient number of pilots to act as reserves in time of battle. This obstacle is being fought very slowly at present, and the prospects of having an aërial army with thousands of pilots are not very good. That means that one pilot may fly hours at a time, so reducing his reservoir of nervous energy that he will add to the list of those cracking up by accident rather than enemy bullets.

The question of *type* of flying may be attacked by putting men into the type of flying for which they are best fitted. As combat work causes "blacking out" due to high accelerations and load factors, men who best withstand these forces should be assigned to the work. According to the doctors it is the blood draining from the brain that causes "blacking out"; therefore short, stocky men would be well fitted because the distance from heart to head is less in a stocky man. Also there is the thought of altering plane design to accommodate a pilot in a recumbent position, thus permitting an even distribution of blood throughout the body at all times.

There is also the suggestion that pilots subject to these strains protect themselves by girdles, designed to restrict the blood flow. Firm stomach muscles, good physical condition and abstinence from tobacco, alcohol and night life are mandatory if a pilot wishes to survive.

The last factor—the physiological effects of chemical change because of altitude—can be compensated for in a certain degree by the use of compressed oxygen. It does not solve the anoxia problem, but it gives the best solution known thus far. For rapid ascent oxygen must be used prior to take-off; this reduces the nitrogen bubbles that cause ill effects. At present, sealed chambers, such as are used in Stratoliners, do not seem to be practical in military aircraft, although this idea would solve both the oxygen and the pressure problem.

But what of tomorrow, when ascents are made even more rapidly? Or when speeds are higher, planes are more complicated, and more is demanded of a fighter pilot? Will it become necessary to have a predecompression chamber to acclimate pilots to high altitudes before they take off? Will the sealed cockpit be made practical? Will every device, from landing gear to propeller, be made completely automatic?

Or will it become necessary to key all pilots to a fighting pitch with benzedrine, or some as yet unheard-of stimulant? The terrific mental, physical and neurasthenic strains may force pilots to use anything that will achieve an ultimate advantage—and victory—over an enemy.

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Glider Bandwagon

(Continued from page 27)

build up a sizable reserve of pilots from. Nevertheless, bills were introduced in Congress to appropriate $500,000, this sum later being raised to $5,000,000, "to do something about gliding." In itself this seemed a good indication that gliding was getting some sort of recognition. On the other hand, it let loose a mob of so-called experts who by virtue of having seen gliders in operation "way back when," jumped on the bandwagon and decided to go on the $5,000,000 ride, if and when this money is appropriated. As pointed out in an open letter by Commander Ralph Barnaby, president of the Soaring Society of America, published in the magazine *Soaring:*

"These bills, as introduced, do not stand the chance of the proverbial snowball of getting serious consideration, much less being passed. First of all, they attempt to cram down the CAA's throat something about which the CAA has not been consulted, and in a form in which it is not in sympathy. The bill tops this off by setting up a couple of jobs at a salary higher than those being paid at present to men working for the administration in positions of equal if not superior authority and responsibility. We understand that there is already considerable scramble over who might be the lucky recipient of the $8,000 and $9,000 jobs 'if and when.'"

And there it is, my friends. Even before the bills are passed there is already a scramble for the fat pay check. And believe you me, the recipient will not be anyone closely connected with gliding who spent years of unselfish work for the advancement of the sport. The thought behind the creation of these bills is fine and we appreciate that some effort is being made to help gliding, but what's lacking entirely is knowledge of the circumstances and intelligent presentation. Before anything is done three main things are necessary: first, glider instructors; second, gliders and towing equipment, and third, operation bases. Without taking care of these elements first the whole thing is going to become a chaos, an unintelligent apportioning of money which will inflate gliding like a balloon and may repeat the misadventures of the early '30s. This is one reason why the CAA should have a hand in it. Not everyone can build a glider and not everyone can make a good instructor. You may be an A-1 pilot, but you may be a total failure as an instructor. Throwing too much money into the movement will only mean greater confusion. The gliding movement should grow in a healthy manner, and a certain assistance should be given to it —but not by smothering it with greenbacks.

A good example of intelligent assistance is the way the British government subsidizes gliding. Clubs are paid a certain sum of money for each "A," "B," "C" and Silver "C" pilot they turn out. By the time a club member reaches the "C" stage the government has paid to the club approximately $105. When he gains his Silver "C" an additional $90 goes to the club's exchequer. The British government does not organize these clubs, and pays only for part of their expenses, believing that if the clubs foot some of their bills it gives them more initiative. This makes for a healthy growth of the organizations.

May we remind the powers-that-be in the capital that the glider movement in this country has an organization called the Soaring Society of America, Inc., whose officers are elected by a representative group of glider pilots and people closely associated with the game, that these men therefore are the logical and only people to seek information and advice from whenever the government wants it, that no other organizations whatsoever, unless members of the Soaring Society of America, have any weight as far as we are concerned. Will it also remember that there are a number of glider pilots and clubs over here who have made gliding in this country what it is and that these men and organizations deserve first consideration. They do not want to get rich; they have gone on before without $8,000 and $9,000 a year salaries. Nevertheless, they deserve recompense for their years of unselfish struggle. The now-existing clubs and soaring schools are a natural set-up for training and developing future glider pilots; already some of the schools are training air-corps men. By helping these organizations a normal growth of the movement will result, and will help the glider manufacturer as well. Why not follow the example of the CPT program, which helped both the operator and the manufacturer? But for Heaven's sake don't be as slow with your payments!

NEWS AND EVENTS

Arthur Hoffman, chief gliding instructor of the Frankfort-Lewis School of Soaring at Lockport, Ill., writes that the two-place Cinema II sailplane has at last received its ATC. It was granted Class 1 approval, which licenses it for airplane tow, aerobatics, inverted and blind flight, when equipped with proper instruments. It's the first sailplane to gain such an approval in this country. According to Hoffman, 150 hours and several cross-country flights have been logged by the Cinema II owned by the school. Recently Stan Corcoran and Jim Smiley made a goal flight from the Lewis-Lockport airport to Purdue University, Lafayette, Ind., for the purpose of attending a dinner being given there. After a rather eventful flight during which they rose to an altitude of 8,000 feet and on one occasion were as low as 150, they arrived at their destination just in time for the eats. First time we ever heard of anyone going to a banquet in a sailplane. The same day Hoffman took off in the single-place Cinema and with only a variometer for instruments gained 6,500 feet in a strong thermal and cruised for an hour and a half over Joliet, Ill.

The Frankfort-Lewis school has been training six air-corps men. Up to date they all have soloed and three of them have soared for over half an hour each.

And talking of the army being interested in glider training, our personal spies report that the army has rigged up wind machines and placed gliders in front of them. When the canned wind is set in motion these gliders can be manipulated by actuating controls, simulating flight attitudes without getting 'way up thar.

Dallas Wise, Sr., president of the Detroit Glider Council, describes in a letter to us some very interesting flights made by the gang at the Triangle Gliderport, Plymouth, Mich., during a recent week end. "On Saturday Charles Kohls, Jr., in the Wolf flew 1 hour, 40 minutes, reaching an altitude of 4,900 feet and landing at Monroe, Mich., 32.5 miles from Triangle. Bud Meeker in the Franklin soared 1 hour, 35 minutes, reaching 5,000 feet and landing at our new field near Ypsilanti, approximately 10 miles distant.

"Sunday was a real honey of a day. L. D. Montgomery played around in the Wolf, finally catching a thermal. He went cross country, staying in the air 3 hours, 28 minutes, reaching 6,700 feet and finally landing at Freemont, Ohio, 72 miles away. Lyle Maxey, flying the Midwest, soared for 25 minutes and landed at the Wayne County airport, a distance of 10 miles. He flew back to Triangle in a Luscombe with a friend, picked up his trailer and went after the Midwest, brought it back to the gliderport for another take-off, and this time made it stick. He remained in the air 3 hours and 35 minutes, landing at Tymochtee, Ohio, about 102 miles from Triangle; his highest altitude during the flight was 8,800 feet. At times his variometer showed a rate of climb of 18 feet per second. One of the most remarkable flights was made by Lyman Wiard, who rose in the XYZ Glider Club Franklin to a little over 8,000 feet. He remained in the air for 1 hour and 20 minutes, landing at Toledo, Ohio, 36 miles away. Johnny Nowak took the Polish sailplane Orlik out for a flight during which he climbed to 8,700 feet, soared 11 miles south of the field and finally arrived back with 3,000 feet to spare. Ted Bellak played around with the Baby Bowlus, reaching 5,000 feet and staying up an even hour. Dallas, Jr., and I arrived a little after 5 p. m. and Dallas took our trusty Franklin to 2,200 feet for an 18-minute flight. I only managed to get an 8-minute flight in just around 6 p. m. The fun was all over then."

Dick Johnson of Los Altos, Calif., youngest Silver "C" pilot in America, has placed an order for a two-place Schweizer sailplane.

Lewin B. Barringer, who is with the Southwest Airways, Phoenix, Ariz., has organized the Southwest Glider Club. The new club is purchasing a two-place Cinema II sailplane which will be used for instruction as well as exploration of soaring possibilities in Arizona.

Parker Leonard, Jay Buxton and Ray Parker are all working for the soaring school of the Elmira Area Soaring Corp., Elmira, N. Y. One of its latest graduates is Wolfgang Langewische, famous light-plane power pilot and author of books on flying.

The Airhoppers Gliding and Soaring Club of New York now has four privately owned sailplanes. The latest addition is a Goeppingen Wolf recently purchased by Steve Bennis and Red Falin.

As we go to press we learn that the members of the Naval Affairs Committee said that they would recommend a complete study and adoption of a glider training program by the navy. Nice work, gentlemen—but have you ever talked to the navy brass hats about glider training? They do not seem to like the idea.

Why Pick An Air School?

(Continued from page 25)

ules. We want men to do the job—today—*today!*"

They said this over and over again, and in the meantime students at the engineering colleges were off at Lake Moochankee getting a well-deserved rest from the war news. So the aviation industry did the only thing it could do. It turned to the limited number of aviation schools that have been doing an excellent job of preparing young men for aviation for many years. These schools taught but one thing—and that was aviation. They taught aviation on a twelve-month basis on an eight-hour school day and a five-day school week. They threw in athletics and recreation after hours to keep young men sound and healthy and not to fill Rose Bowls. They set aside all the other academic subjects on the premise that if you give a good, sound, young, healthy mind and body a good job at good pay, he will find out on his own what year Hannibal crossed the Alps. As T. Lee, Jr., director of the Boeing School of Aeronautics, puts it: "The high-school student who graduates in 1941 and who is trying to decide between a course of vocational training for aviation and time in college, should try to find out how far he should have progressed toward his life's objective during the next two years if he elects courses in vocational training as compared to the academic courses offered by colleges. An early start in a chosen career is one of the first essentials of successful achievement. The sounder a young man's training the better his chances for success. In industry, as in all other competitive effort, the fittest survive and succeed."

Getting down to cold hard facts, the vocational aviation schools found, for example, that the young man who studied to be an aeronautical engineer in an aviation school would learn as much aeronautical engineering in fourteen months as he would in college in four years. But they found

(Turn to page 56)

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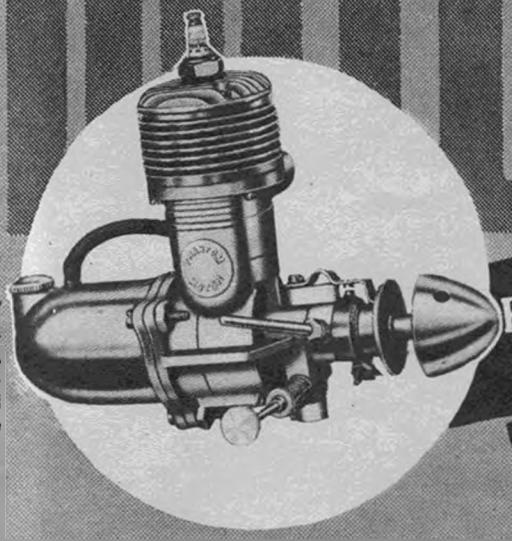

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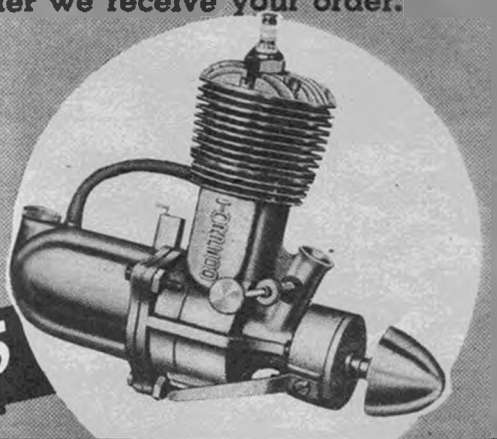

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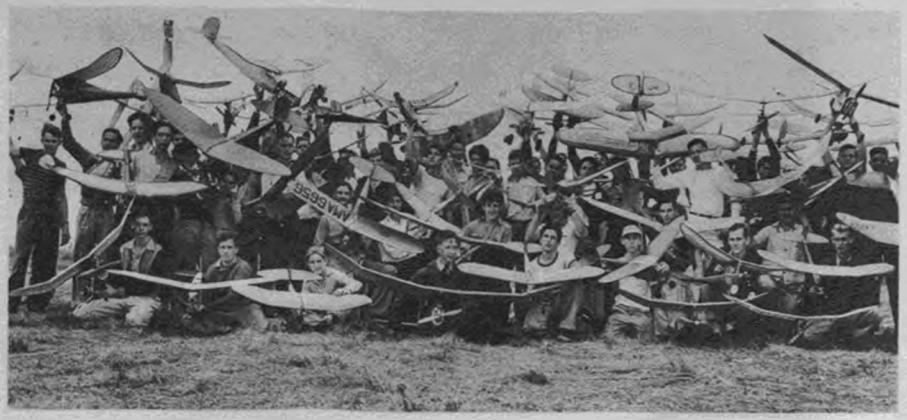


Florida paper: "At least twenty craft were damaged badly in crack-ups and three others are still 'missing,' but only injuries were the mental sufferings of competitors at Miami Model Aircraft meet."

The winnah! Jerry Williams won Air Trails trophy and Bunch Tiger at Southern California contest.

Model matters

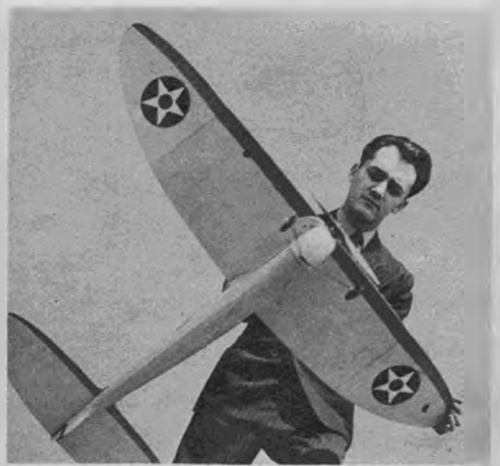
Gordon Light's Dope Can. Moon's On The Field.

THE DOPE CAN. (By Gordon Light.) Tulsa, Okla., appeared frequently in model news when champions Dague and Wriston were holding forth. They've faded out and the news we have about Tulsa comes via Kansas City, Mo. Twenty-eight members of the Winged Motors Club of that city invaded Tulsa and took practically all of the gas prizes. The Tulsa safari cost only $3.75 per member, which included everything from gas to meals. This proves that long trips are within the means of practically all clubs. WMC members had such a good time they plan several repeat performances.

Charley Hall and Izzy Gabel made the trip in Charley's Ford along with Allan Teal and Dave Kneeland. About 2 a. m. Saturday, just outside Tulsa, they got off the beam. Charley was at the controls and pulled off into a field to spend the rest of the night. Charley slept on top of the car, Izzy underneath it, Allan and Dave in it. Next morning they woke up to find officials preparing the field for the contest. Quite by accident they had spent the night on the model field, although the boys still claim it was simply good navigation and blind flying.

Correspondent George Dossett claims WMC is one of the liveliest clubs in the country. Any club that can gather twenty-eight members for a several-hundred-mile trip does have something.

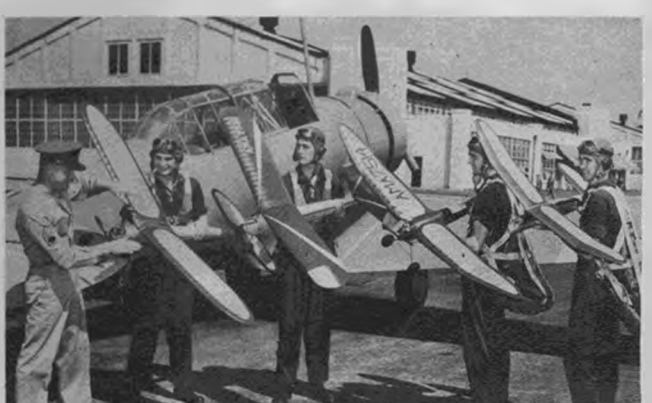
H. A. Thomas had a head-on collision with a thermal at the Arkansas State Exchange Club meet June 8th in Little Rock and won a trip to the Nationals. He didn't want to turn it down, but he had promised Mrs. H. A. that he'd take her to Los Angeles the middle of July. Any other time, he ruefully admitted, he'd probably have finished last in a *(Turn to page 59)*



Look out above! Carl Goldberg shows how with Comet's new 1941 Zipper he designed. Climb is its middle name.

W. F. Keough won his Air Trails trophy for longest single flight at N. A. A. convention meet at Louisville, Kentucky.

The gals fought it out at G. M. A. A. of Southern California meet. L. to R.—Mrs. Marley, Mrs. Bunting (winner), Mrs. Boles, Mrs. Cummings.



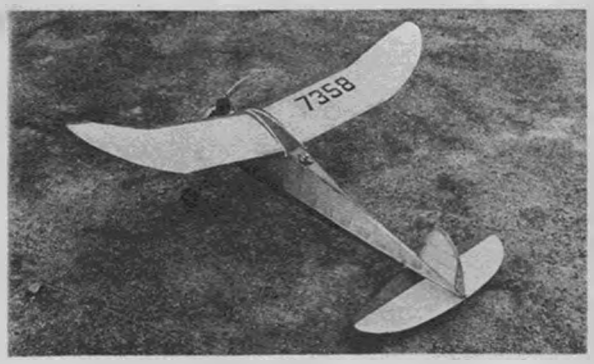
Army wings. Tech. Sergeant Albert Lessard (left), 46th School Squadron, Randolph Field, built these and 32 other gas models in 15 years in army.

THE REQUEST

BY FRANK EHLING

With the experience of hundreds of models, old-timer Frank Ehling created this rugged, flyable, A or B job.

The author cranks the Request; used Bantam and Hi-Speed engines with success. Any large Class A or small Class B will do.



You can't beat the Request for climb. Won't loop, even when it is so adjusted. Teardrop fuselage section cuts drag in climb.

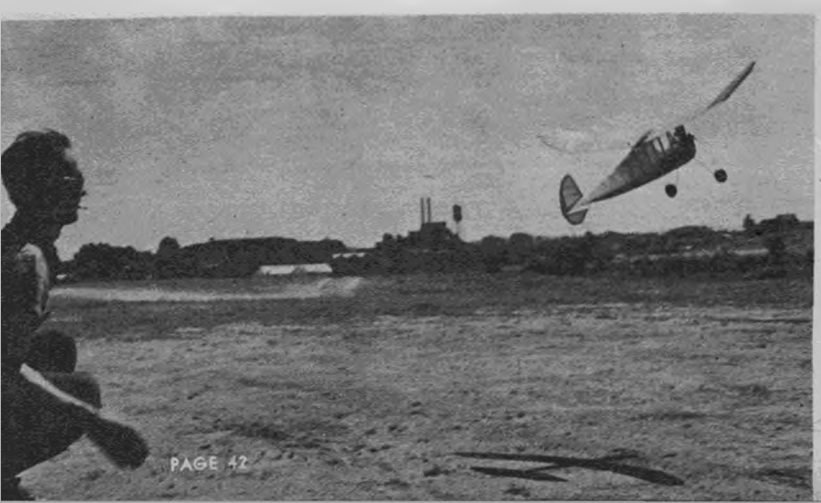
Two fuselage sides are assembled on bench somewhat like "crutch" procedure. Bottom fairing is added later. Flight timer is set on top fuselage.

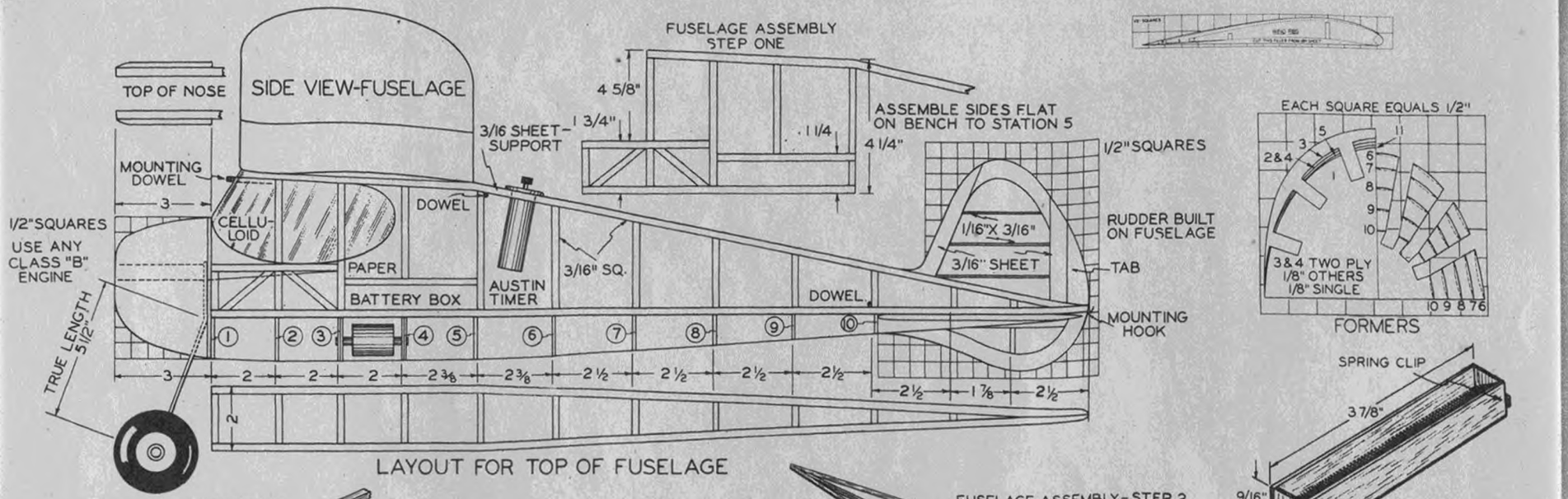
THE Request was designed to give good flying results. It lived up to our expectations in more ways than one. The ship was first flown as Class A with the new Bantam engine. This combination was considered hot. Later the ship was sold. The new owner used a Hi-Speed engine and the model's glide was improved despite the additional two ounces of engine weight.

The new owner was disappointed. It seems he wanted the model to perform like a real ship, and the only type of flight it turned in was that of a scientific model constantly pointing its nose to the sky and climbing until the ignition timer stopped the engine. Flights of this description were common even under low power. Under increased power the model would not fly at a greater angle but would climb at a faster rate of speed.

At a recent contest a stunt event was being run off. The Request was entered and adjusted to loop. Positive incidence was applied to the wing and negative to the tail. During the flights the engine was opened to the limit. The ship climbed with a terrific rate of speed yet showed no signs of looping.

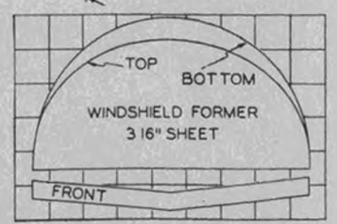
And now a few words in reference to the construction. Streamlining was incorporated in the job if it provided *(Turn to page 57)*

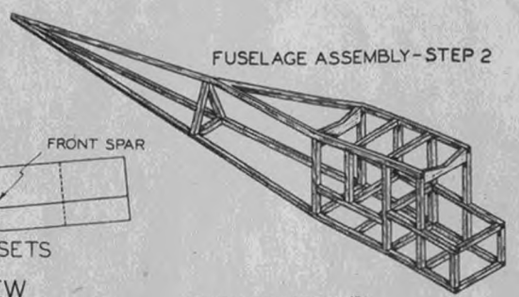


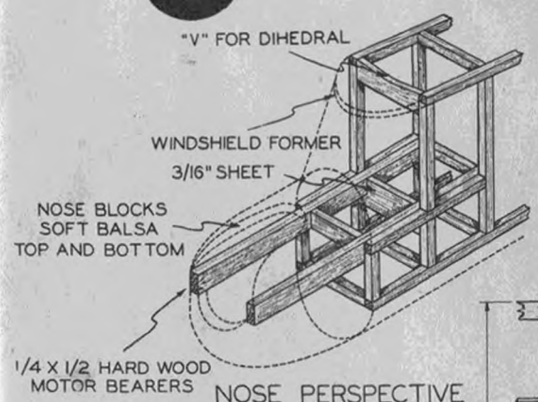

SIDE VIEW-FUSELAGE
TOP OF NOSE
MOUNTING DOWEL
3
1/2"SQUARES
USE ANY CLASS "B" ENGINE
TRUE LENGTH 5 1/2"
CELLU-LOID
DOWEL
PAPER
BATTERY BOX
3/16 SHEET-SUPPORT
AUSTIN TIMER
3/16" SQ.
DOWEL
1/16"X 3/16"
3/16" SHEET
TAB
MOUNTING HOOK
RUDDER BUILT ON FUSELAGE
1/2"SQUARES
ASSEMBLE SIDES FLAT ON BENCH TO STATION 5
FUSELAGE ASSEMBLY STEP ONE
4 5/8"
1 3/4"
1 1/4
4 1/4"
1 2 3 4 5 6 7 8 9 10
3 2 2 2 2 3/8 2 3/8 2 1/2 2 1/2 2 1/2 2 1/2 2 1/2 1 7/8 2 1/2
2
LAYOUT FOR TOP OF FUSELAGE

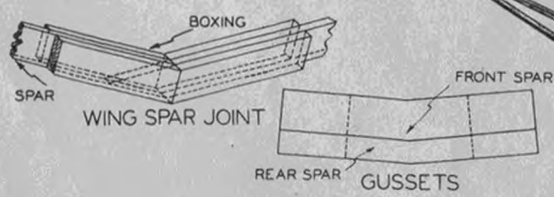
EACH SQUARE EQUALS 1/2"
3&4 TWO PLY 1/8" OTHERS 1/8" SINGLE
FORMERS

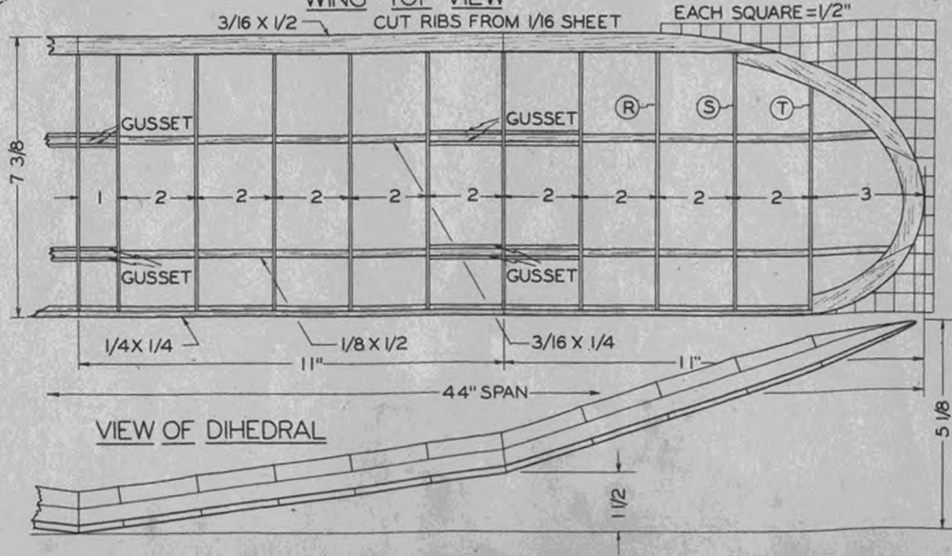
SPRING CLIP
3 7/8"
9/16"
SPRING CLIP
9/16"
BATTERY BOX

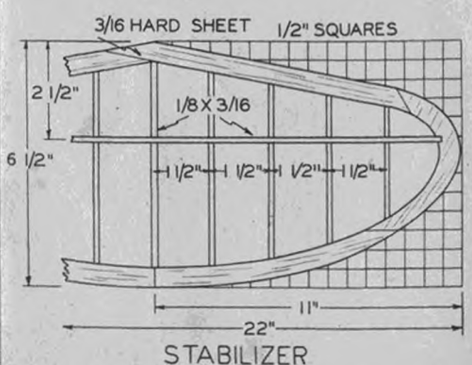

TOP
BOTTOM
WINDSHIELD FORMER 3 16" SHEET
FRONT

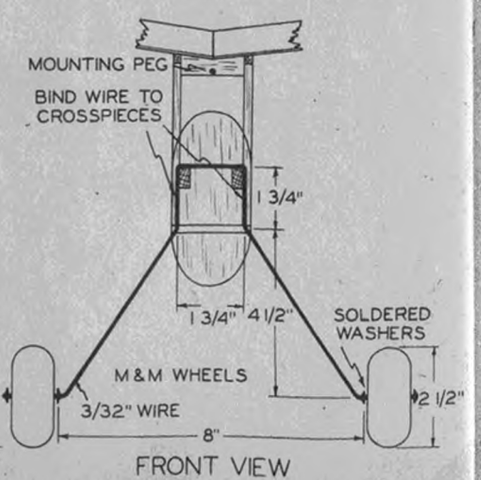

FUSELAGE ASSEMBLY-STEP 2


"V" FOR DIHEDRAL
WINDSHIELD FORMER
3/16" SHEET
NOSE BLOCKS SOFT BALSA TOP AND BOTTOM
1/4 X 1/2 HARD WOOD MOTOR BEARERS
NOSE PERSPECTIVE


BOXING
SPAR
WING SPAR JOINT
FRONT SPAR
REAR SPAR
GUSSETS


WING-TOP VIEW
3/16 X 1/2
CUT RIBS FROM 1/16 SHEET
EACH SQUARE=1/2"
GUSSET
GUSSET
GUSSET
GUSSET
R
S
T
7 3/8
1 2 2 2 2 2 2 2 2 2 3
1/4X 1/4
1/8 X 1/2
3/16 X 1/4
11"
11"
44" SPAN
VIEW OF DIHEDRAL
5 1/8
1 1/2


3/16 HARD SHEET
1/2" SQUARES
2 1/2"
1/8 X 3/16
6 1/2"
1 1/2" 1 1/2" 1 1/2" 1 1/2"
11"
22"
STABILIZER


MOUNTING PEG
BIND WIRE TO CROSSPIECES
1 3/4"
1 3/4"
4 1/2"
SOLDERED WASHERS
M&M WHEELS
3/32" WIRE
2 1/2"
8"
FRONT VIEW

This might be any meet until you note that the ships all have webfeet. (Shoes prevent check on contestants.) Note efficient bulletin board.

WEBFOOT MEET

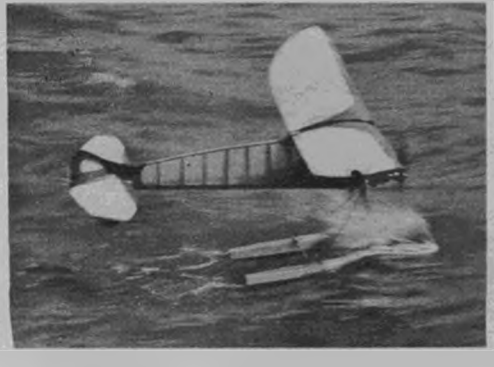
So you think tall grass is nice! Hampton Roads (Va.) Model Club prefers water for a field.

Modified "Burkard" amphibian with Ohlsson 23 flew well for J. Councill.

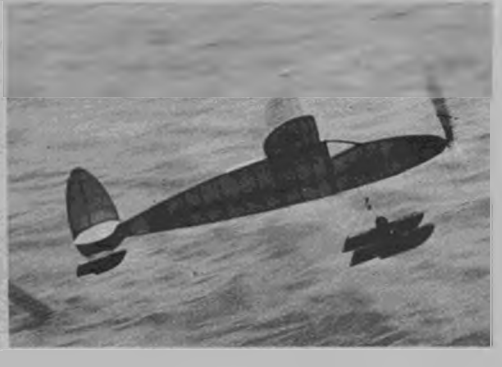
And this three-pontoon original performed nicely for Designer Lee. Note shortness of float back of step.

Yo-ho-ho and a bottle of dope! Contestants use fancy cruiser, Miss Green-acres, to retrieve their seaplanes.

This original model by Norman Purdy did well. One on hat did not so well.



Let us spray. Ed Black's "A" Bantam-powered job hits wave. Angle of model floats reversed from plane floats.



Double-duty Korda job. Dick Simmons' clever model has clip-on floats for use as either land or seaplanes.

DOWN THE RUNWAY

Official aeromodeling news compiled by the Academy of Model Aeronautics, governing body of model aviation in America.

CONDUCTED BY AL LEWIS, EXECUTIVE DIRECTOR

THE editors of Air Trails, recognizing the rapid growth of model aviation resulting from a greatly intensified air defense program, have been kind enough to let us devote our column this month to a discussion of model-aviation clubs and how they can operate to the benefit of all.

Whenever a group of model builders get together, they form a natural group which is an excellent basis for the establishment of a club. Not often, however, do these enthusiasts recognize the real value of a club. We find the benefits, as outlined in the Academy's official "Chapter Manual," as follows: (1) The general model-aeronautics program is dependent very largely upon the concerted, co-ordinated local activity. (2) Organized activity in any community will produce more rapid and satisfactory results than scattered individual efforts. (3) Local organizations, after establishment, can affiliate with the national movement and thus have the benefit of national recognition, and in all ways their activities will take on greater importance than if they were not associated with the governing organization.

All that sounds very formal, but accept the assurances of AMA national headquarters folks that united you can learn more, go further and have a great deal more fun than if you try to carry on your local model-airplane activity in a disjointed manner.

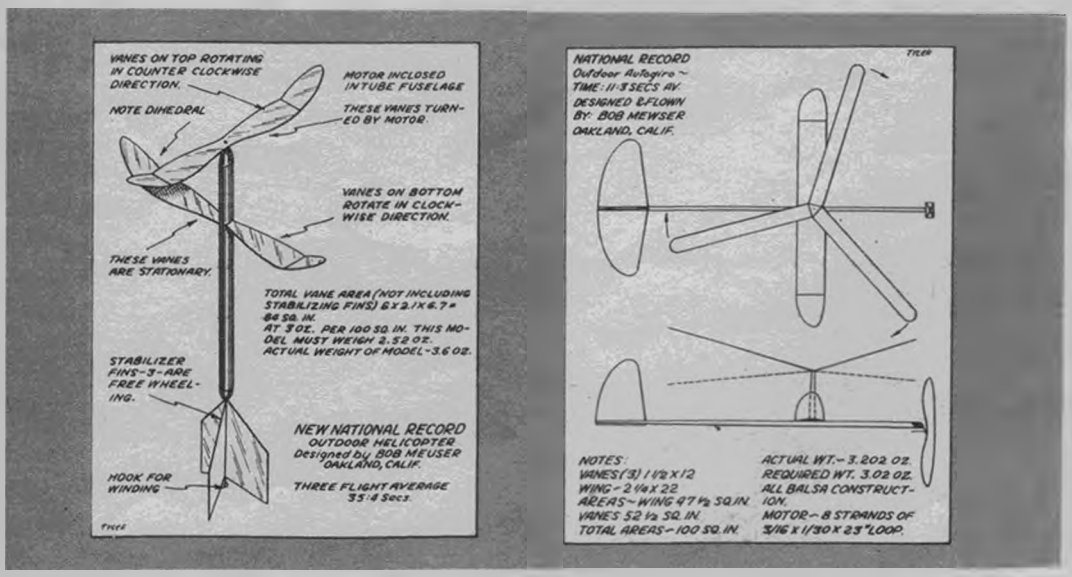
Now, understanding that you are interested in the organization of a model club, we are going to outline a few suggestions in question-and-answer form.

Question: How many members should we have?

Answer: As many as you can conveniently work with. The larger the community, the more prospects you should know. If you have a great many members, it might be advisable to divide them up into different groups by age classes so the very young enthusiasts won't "get in the hair" of the adult members. Then, too, by having different groups it will be more of a novelty when an older group meets with a younger group to offer aid and counsel.

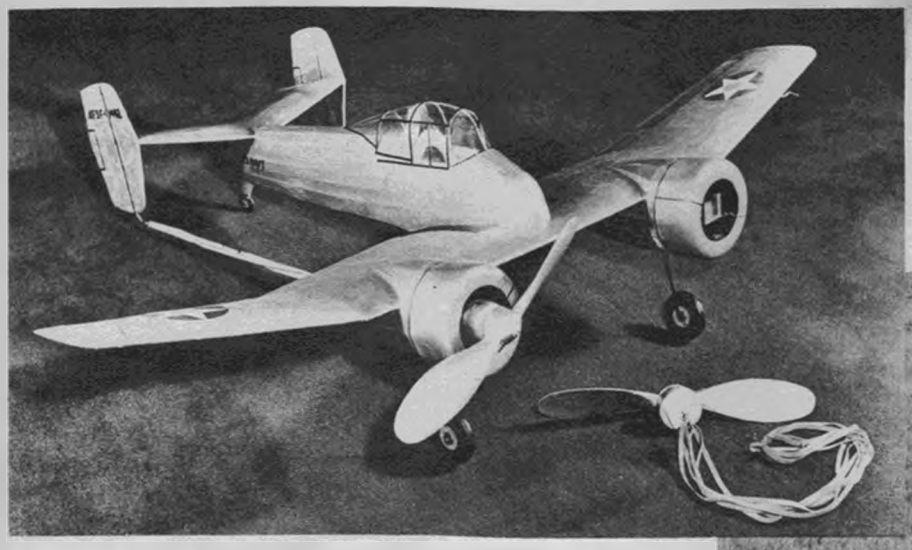
Question: Do we need a sponsor?

Answer: If you are already established as a group, you can be a little choosy about your sponsor, if you desire this. If you are not formally organized, you may want to pick a sponsor and let him do the organizational groundwork for you. Unless you are well set up and confident that you can carry on without sponsorship, it is wise to consider this, since the right type of sponsor can do a great deal for any organization. Sponsorship by a local *(Turn to page 63)*

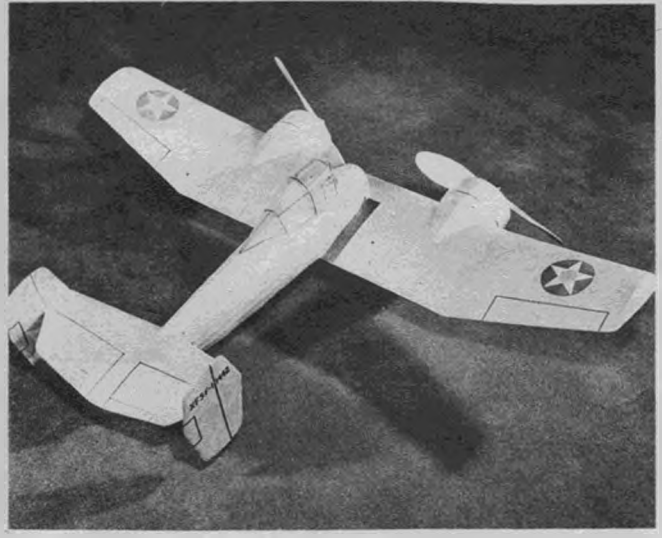


SKYROCKET

BY SID STRUHL



Built to the exact scale of an inch to the foot, only dihedral and lower rudders were changed for flyability. Rubber motors detach for appearance.



Scale stabilizer is thirty percent of wing, making a stable flying model. Though built as strongly as a Wakefield model, weight is only five ounces.

Two twelve-inch props turn in opposite directions to counteract the torque.

Skyrocket coming up! Model does two minutes in calm air, winder wound.

This flying scale Grumman Skyrocket will hit the clouds if you don't watch out!

WE are presenting this month for our flying scale fans a most unusual model. The Grumman Skyrocket! Although performance figures are, of course, a military secret, the ship is believed to attain a top speed of at least 450 miles per hour, and climb in the neighborhood of 6,000 feet per minute—which is straight up! The cruising range of the Skyrocket is just as startling. It is more than 1,200 miles. Carrying two cannons and four heavy machine guns, the Skyrocket is just about the most heavily armed fighter in the world.

The model used by the navy employs two Wright Double Row Cyclone 14 engines, model Gr-2600-a5d, each developing 1,200 horsepower at 2,300 r.p.m. at 8,000 feet. This engine makes 1,500 horsepower available for the take-off and for a five-minute-maximum engine-run time. The army version of the Grumman Skyrocket will be powered by two in-line Allisons.

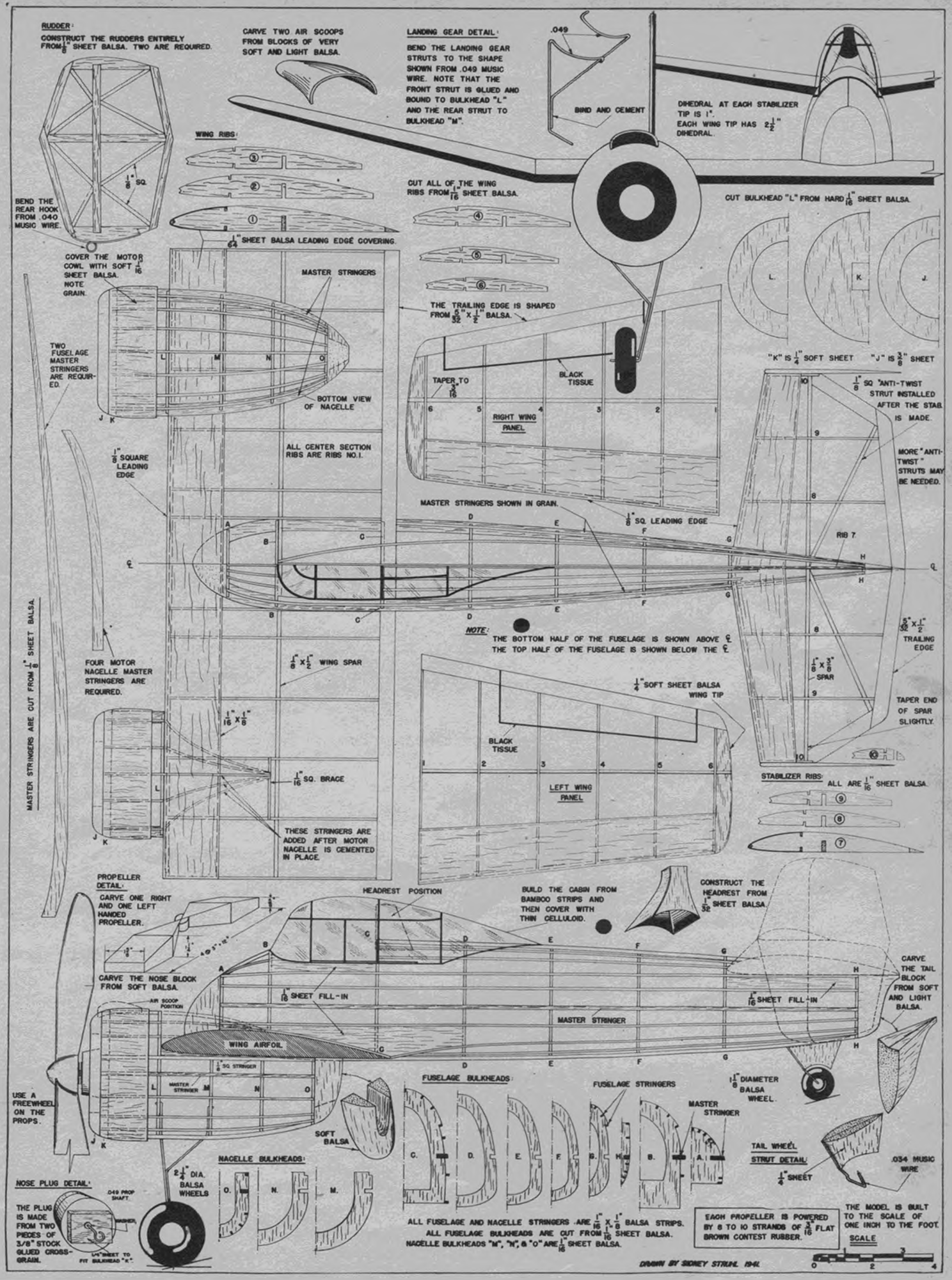
Our model of the Skyrocket is built to the exact scale of 1 inch to 1 foot with but a slight variation in *(Turn to page 64)*

FULL-SIZE PLANS

one sheet 38 inches x 50 inches

No more need to enlarge plans or to make your own working drawings. Now you can get full-size plans identical in detail to the scaled-down drawing on the opposite page. This is just one of a series. Be sure to tell your friends and fellow club members. Only a limited number of these full-size plans will be printed, so order immediately. Send twenty-five cents per plan to

AIR TRAILS FULL-SIZE PLANS
79 Seventh Avenue, New York, N. Y.


RUDDER:
CONSTRUCT THE RUDDERS ENTIRELY FROM 1/8" SHEET BALSA. TWO ARE REQUIRED.
CARVE TWO AIR SCOOPS FROM BLOCKS OF VERY SOFT AND LIGHT BALSA.
LANDING GEAR DETAIL:
BEND THE LANDING GEAR STRUTS TO THE SHAPE SHOWN FROM .049 MUSIC WIRE. NOTE THAT THE FRONT STRUT IS GLUED AND BOUND TO BULKHEAD "L" AND THE REAR STRUT TO BULKHEAD "M".
.049
BIND AND CEMENT
DIHEDRAL AT EACH STABILIZER TIP IS 1". EACH WING TIP HAS 2 1/2" DIHEDRAL.
WING RIBS:
BEND THE REAR HOOK FROM .040 MUSIC WIRE.
1/8" SQ.
CUT ALL OF THE WING RIBS FROM 1/16" SHEET BALSA.
CUT BULKHEAD "L" FROM HARD 1/16" SHEET BALSA.
1/64" SHEET BALSA LEADING EDGE COVERING.
COVER THE MOTOR COWL WITH SOFT 1/16" SHEET BALSA. NOTE GRAIN.
MASTER STRINGERS
THE TRAILING EDGE IS SHAPED FROM 5/32" X 1/2" BALSA.
TWO FUSELAGE MASTER STRINGERS ARE REQUIRED.
BOTTOM VIEW OF NACELLE
TAPER TO 3/16"
BLACK TISSUE
RIGHT WING PANEL
"K" IS 1/4" SOFT SHEET "J" IS 3/8" SHEET
1/8" SQ "ANTI-TWIST" STRUT INSTALLED AFTER THE STAB. IS MADE.
1/8" SQUARE LEADING EDGE
ALL CENTER SECTION RIBS ARE RIBS NO.1.
MORE "ANTI-TWIST" STRUTS MAY BE NEEDED.
MASTER STRINGERS SHOWN IN GRAIN.
1/8" SQ. LEADING EDGE
RIB 7
NOTE:
THE BOTTOM HALF OF THE FUSELAGE IS SHOWN ABOVE ℄
THE TOP HALF OF THE FUSELAGE IS SHOWN BELOW THE ℄
5/32" X 1/2" TRAILING EDGE
FOUR MOTOR NACELLE MASTER STRINGERS ARE REQUIRED.
1/8" X 1/2" WING SPAR
1/8" X 3/8" SPAR
1/4" SOFT SHEET BALSA WING TIP
TAPER END OF SPAR SLIGHTLY.
1/16" X 1/8"
BLACK TISSUE
1/16" SQ. BRACE
LEFT WING PANEL
STABILIZER RIBS: ALL ARE 1/16" SHEET BALSA.
THESE STRINGERS ARE ADDED AFTER MOTOR NACELLE IS CEMENTED IN PLACE.
MASTER STRINGERS ARE CUT FROM 1/16" SHEET BALSA.
PROPELLER DETAIL:
CARVE ONE RIGHT AND ONE LEFT HANDED PROPELLER.
HEADREST POSITION
BUILD THE CABIN FROM BAMBOO STRIPS AND THEN COVER WITH THIN CELLULOID.
CONSTRUCT THE HEADREST FROM 1/32" SHEET BALSA.
CARVE THE NOSE BLOCK FROM SOFT BALSA.
AIR SCOOP POSITION
1/16" SHEET FILL-IN
1/16" SHEET FILL-IN
CARVE THE TAIL BLOCK FROM SOFT AND LIGHT BALSA.
MASTER STRINGER
WING AIRFOIL
1/8" SQ. STRINGER
MASTER STRINGER
USE A FREEWHEEL ON THE PROPS.
SOFT BALSA
FUSELAGE BULKHEADS:
FUSELAGE STRINGERS
1/8" DIAMETER BALSA WHEEL.
MASTER STRINGER
TAIL WHEEL STRUT DETAIL:
1/4" SHEET
.034 MUSIC WIRE
2 1/4" DIA. BALSA WHEELS
NACELLE BULKHEADS:
NOSE PLUG DETAIL:
.049 PROP SHAFT.
WASHER
1/16" SHEET TO FIT BULKHEAD "K".
THE PLUG IS MADE FROM TWO PIECES OF 3/8" STOCK GLUED CROSS-GRAIN.
ALL FUSELAGE AND NACELLE STRINGERS ARE 1/16" X 1/8" BALSA STRIPS.
ALL FUSELAGE BULKHEADS ARE CUT FROM 1/16" SHEET BALSA.
NACELLE BULKHEADS "M", "N", & "O" ARE 1/16" SHEET BALSA.
EACH PROPELLER IS POWERED BY 8 TO 10 STRANDS OF 3/16" FLAT BROWN CONTEST RUBBER.
THE MODEL IS BUILT TO THE SCALE OF ONE INCH TO THE FOOT.
SCALE
0 2 4
DRAWN BY SIDNEY STRAHL 1941.

MODEL'S EYEVIEW

How to take aerial photos from a gas job.

Hinged trapdoor opens automatically when Auto-Knips timer cuts motor. Small bakelite camera shoots 35-mm. film. Its weight is negligible.

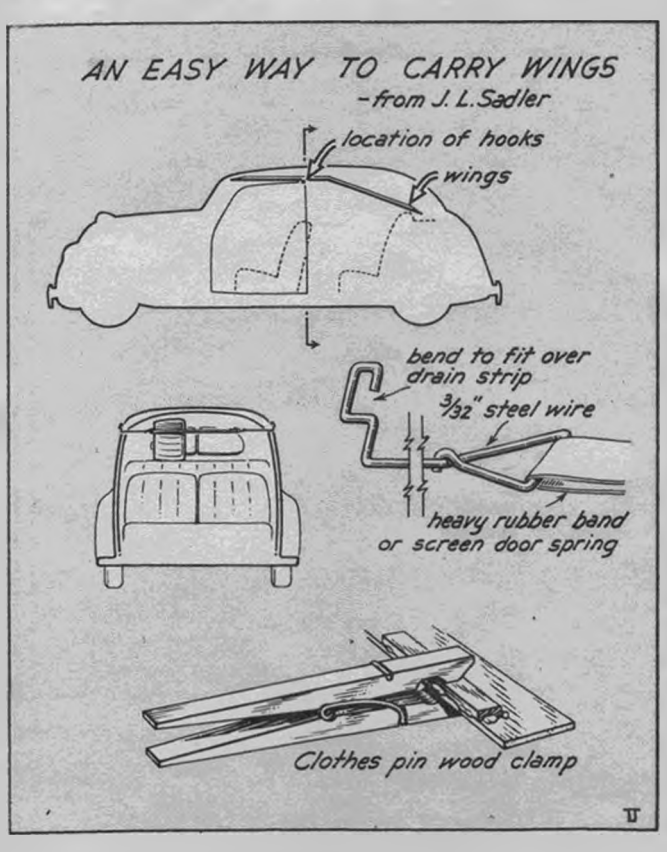
Oliver Pfeil, left, and his brother William built this Comet Clipper camera model. The one-wheel landing gear saves weight and cuts drag.

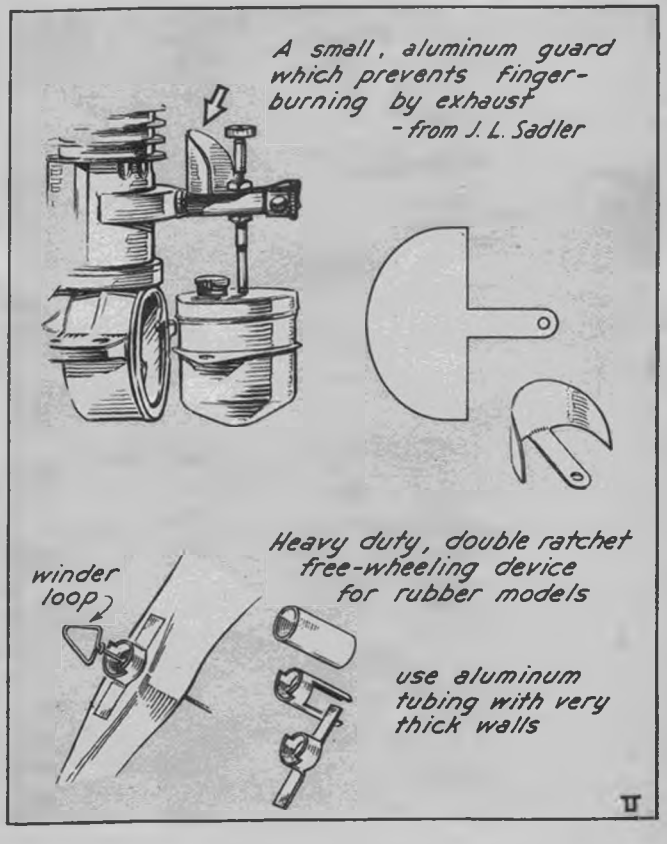
WHILE experimenting with their planes, William and Oliver Pfeil, of San Antonio, Texas (where they also run a model shop) decided to shoot pictures from them. They rebuilt a Comet Clipper, put one wheel (landing) on it instead of two, and constructed a trapdoor underneath the fuselage for the camera to rest in. They haven't shot very many pictures as yet, because of lack of time, but the ones they have are very successful. They have no way of controlling the flight of the plane except to make it fly in a circle and to start it close to where the picture is to be taken. Naturally, the timer, which cuts the motor, is the greatest control factor that they use for limiting the flight. Ordinarily, the plane is set to fly forty seconds before the picture is taken. The timer cuts the motor, opens the trapdoor and releases the shutter, consecutively. The plane has a wingspread of six feet and is powered by a one-fifth horsepower motor. A small bakelite camera is used.

One way of flying without getting your feet off the ground. The photo was taken by Pfeil's camera plane. Took off near road in background.

★ ★

KNACKS BY H. A. THOMAS





STICKLER

Six years of constant experimenting evolved this very simple, high-performance stick job.

Korda found gas-type pylon caused model to drift out of sight too fast in windy weather. Note the multispar wing and tail construction.

THIS stick job is the result of about six years of constant experimenting with different ideas picked up at contests and in model books. The main idea behind it was to keep it as simple as possible and yet get top results from every flight. Originally, the model was a 100 square inch job, back in 1934. Its main features were a very fast climb combined with a free-wheeling prop which proved fairly effective at that time. However, the wing area was raised to 150 square inches in 1936, then to 200 square inches in 1937, and just recently, since these plans were sent in, was raised to 300 square inches. The dihedral was changed to polyhedral. Free-wheeling props gave way to one-bladed folding props and finally to two-bladed ones.

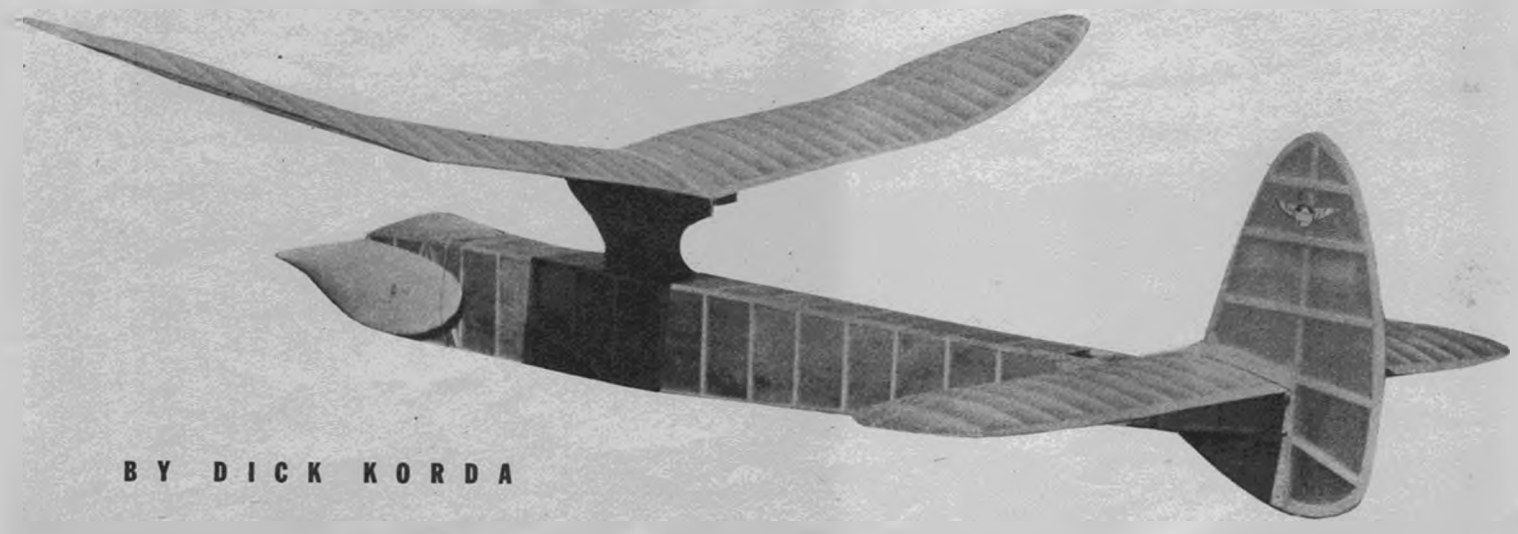
Several types of wing mounts were tried on this stick model. The first was just an old-fashioned bird-cage mount which made the ship a bit more stable, but this idea was discarded because of its added drag and weight. Next to be tried was a Goldberg mount which works wonders on a gas job but which acted more as a rudder on this stick. After quite a lot of testing and contest flying, it too was finally given up as it made the ship very hard to adjust under power, and caused it to have a very large circle in the glide, allowing it to drift out of sight too fast.

Several other ideas added only recently were the use of a balsa skid on the bottom of the body, running from the back of the filled-in nose section to the seventh cross brace. This will help keep dirt and small stones from getting inside and cutting the rubber. This skid is made from a hard sheet of $\frac{1}{4} \times \frac{3}{4}$" balsa. Gas-model Silkspan paper was substituted for ordinary tissue on the body. When properly doped, the ship can be flown in wet weather without having the body twist from the force of the rubber.

When doping the model, try the following adjustments in the wing and tail, looking at the model from the front. The stabilizer should have a little more lift on the right side. The rudder post should be cemented firmly, but the leading edge should be offset to the right about $\frac{1}{16}$ to $\frac{3}{32}$", and pinned in place until the correct setting has been determined and then cemented. The left wing *tip section* should also have a little more lift in it than the rest of the wing. To determine the amount of incidence needed, start by resting the wing directly on the body and gliding it. Keep adding sheets of $\frac{1}{32}$" flat until the ship has a

(Continued on next page)

Above—Author with 200 sq. in. version. Newest model is 300 sq. in. Below—This photo shows details of the adjustable wing mounting fin.



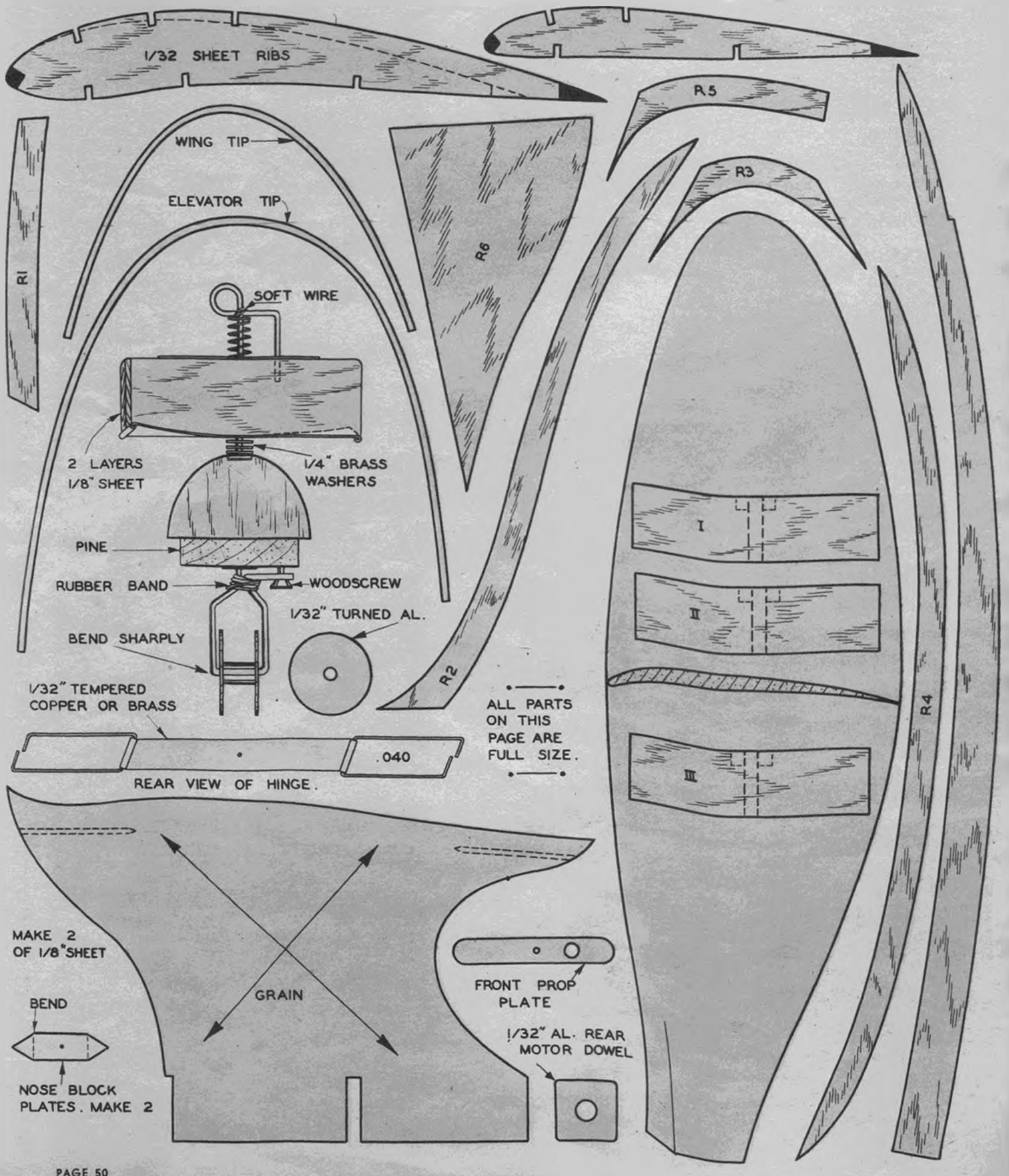
BY DICK KORDA

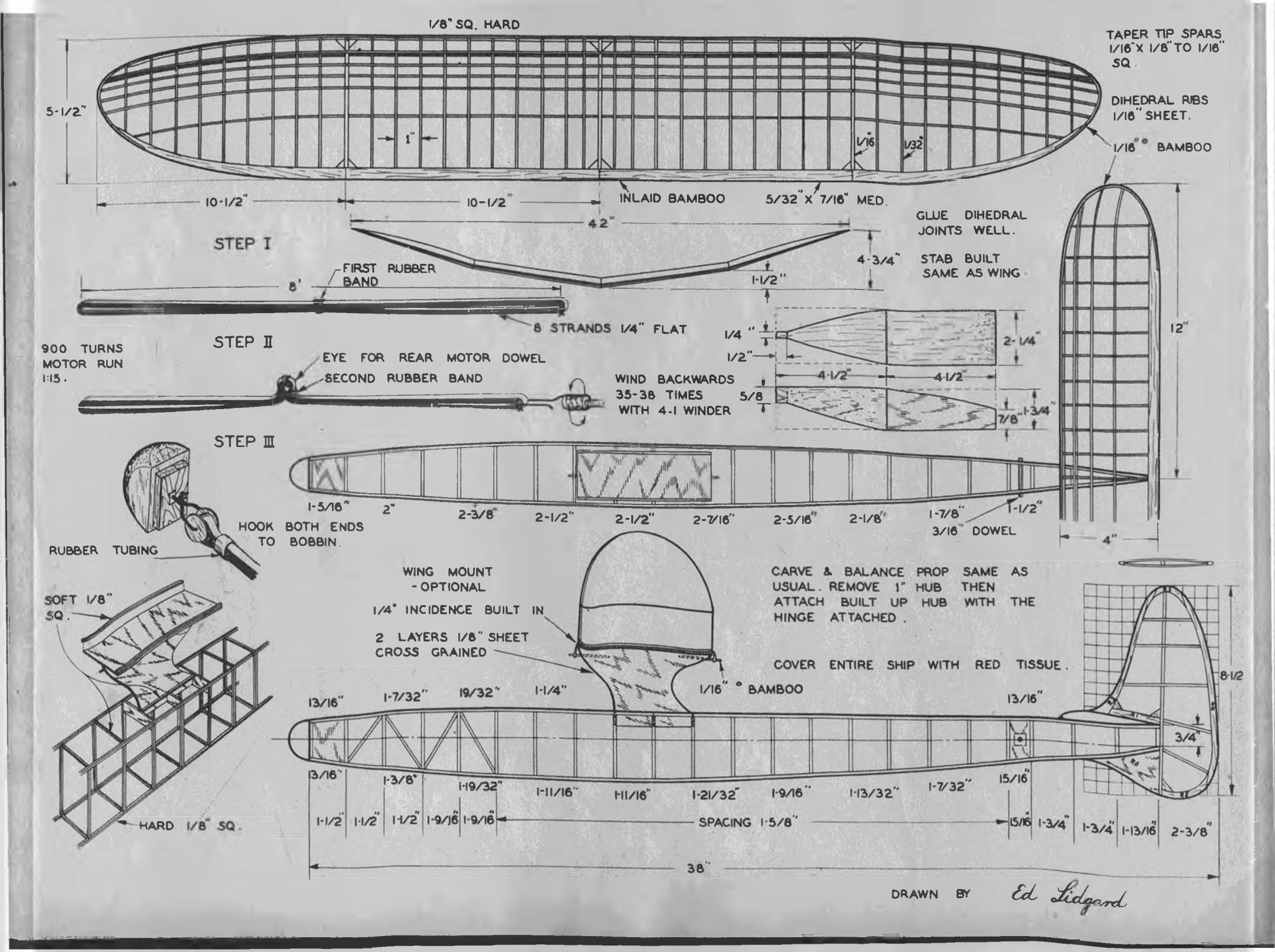
very flat glide with a slight right turn.

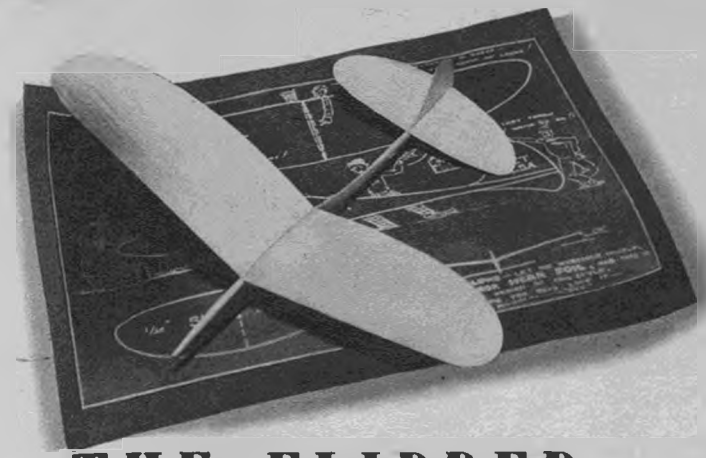
After all adjustments have been completed the model should have a motor run of about 75 seconds, a circle of about 200 to 250 feet in diameter and an average of about 3½ to 4 minutes in the calm evening air

The ship is very sensitive to currents and has gone out of sight directly overhead on a dead-calm day, and has also been flown from sight on very windy days when 5 or 6 minutes was top time. Use as much care in adjusting and flying the ship as you do in building it and you will have as good a chance as the next fellow.

May all your flights be big ones!




1/8" SQ. HARD
TAPER TIP SPARS 1/16" X 1/8" TO 1/16" SQ.
DIHEDRAL RIBS 1/16" SHEET.
1/16" ° BAMBOO
5-1/2"
1"
1/16"
1/32"
10-1/2"
10-1/2"
INLAID BAMBOO
5/32" X 7/16" MED.
42"
GLUE DIHEDRAL JOINTS WELL.
STEP I
4-3/4"
STAB BUILT SAME AS WING
FIRST RUBBER BAND
8'
1-1/2"
8 STRANDS 1/4" FLAT
1/4"
2-1/4"
12"
900 TURNS MOTOR RUN 1:15.
STEP II
EYE FOR REAR MOTOR DOWEL
SECOND RUBBER BAND
1/2"
4-1/2"
4-1/2"
WIND BACKWARDS 35-38 TIMES WITH 4-1 WINDER
5/8
7/8"
1-3/4"
STEP III
1-5/16"
2"
2-3/8"
2-1/2"
2-1/2"
2-7/16"
2-5/16"
2-1/8"
1-7/8"
1-1/2"
3/16" DOWEL
4"
HOOK BOTH ENDS TO BOBBIN.
RUBBER TUBING
WING MOUNT - OPTIONAL
1/4° INCIDENCE BUILT IN
2 LAYERS 1/8" SHEET CROSS GRAINED
CARVE & BALANCE PROP SAME AS USUAL. REMOVE 1" HUB THEN ATTACH BUILT UP HUB WITH THE HINGE ATTACHED.
COVER ENTIRE SHIP WITH RED TISSUE.
SOFT 1/8" SQ.
1/16" ° BAMBOO
13/16"
1-7/32"
19/32"
1-1/4"
13/16"
8-1/2
3/4"
3/16"
1-3/8"
1-19/32"
1-11/16"
1-11/16"
1-21/32"
1-9/16"
1-13/32"
1-7/32"
15/16"
1-1/2"
1-1/2"
1-1/2"
1-9/16"
1-9/16"
SPACING 1-5/8"
15/16"
1-3/4"
1-3/4"
1-13/16"
2-3/8"
HARD 1/8" SQ.
38"
DRAWN BY Ed Lidgard



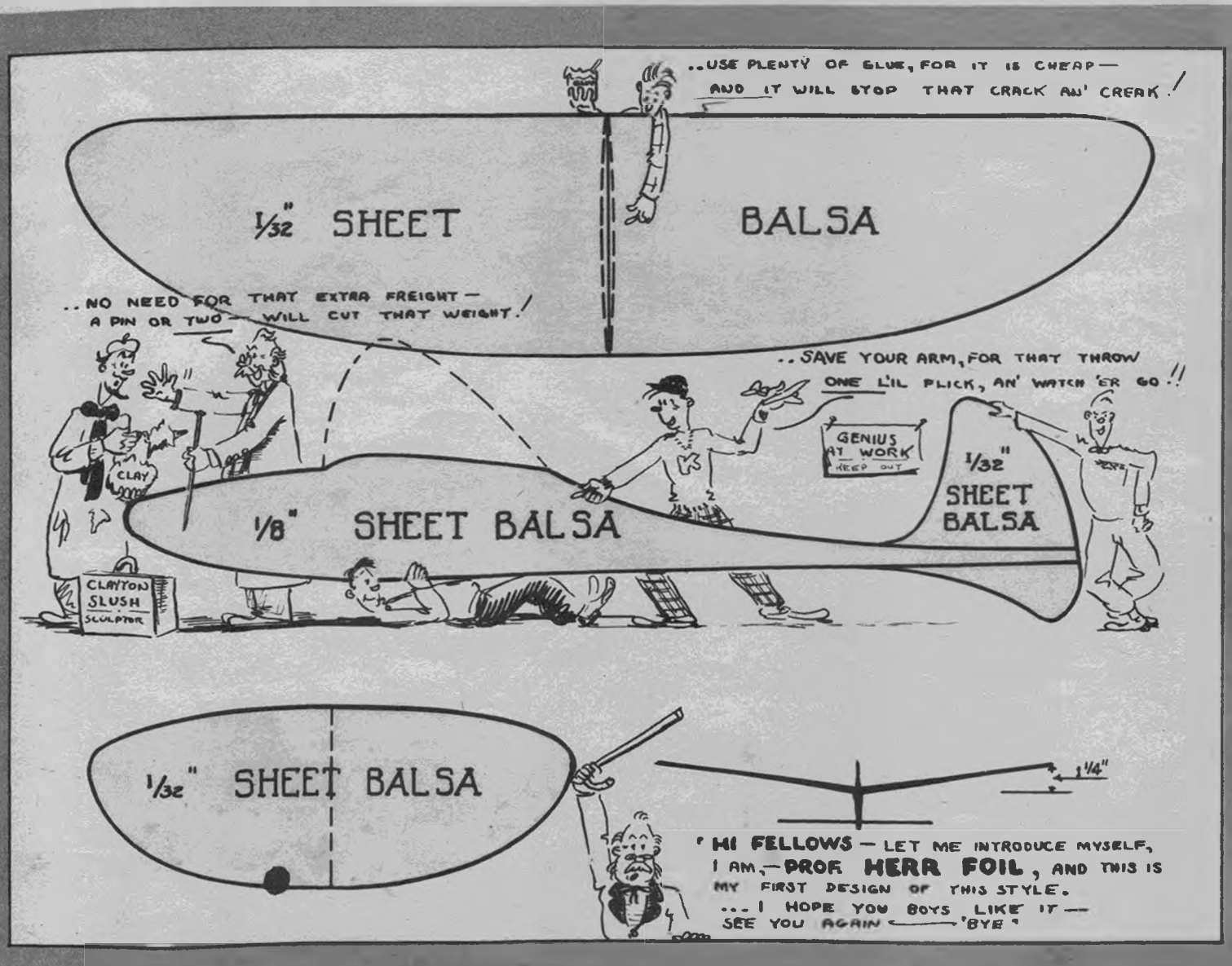
THE FLIPPER

BY HERR FOIL, K.A.C., A.M.A., N.A.A.

A hat-box is its hangar, a living room its flying field. Look out for the lamp!

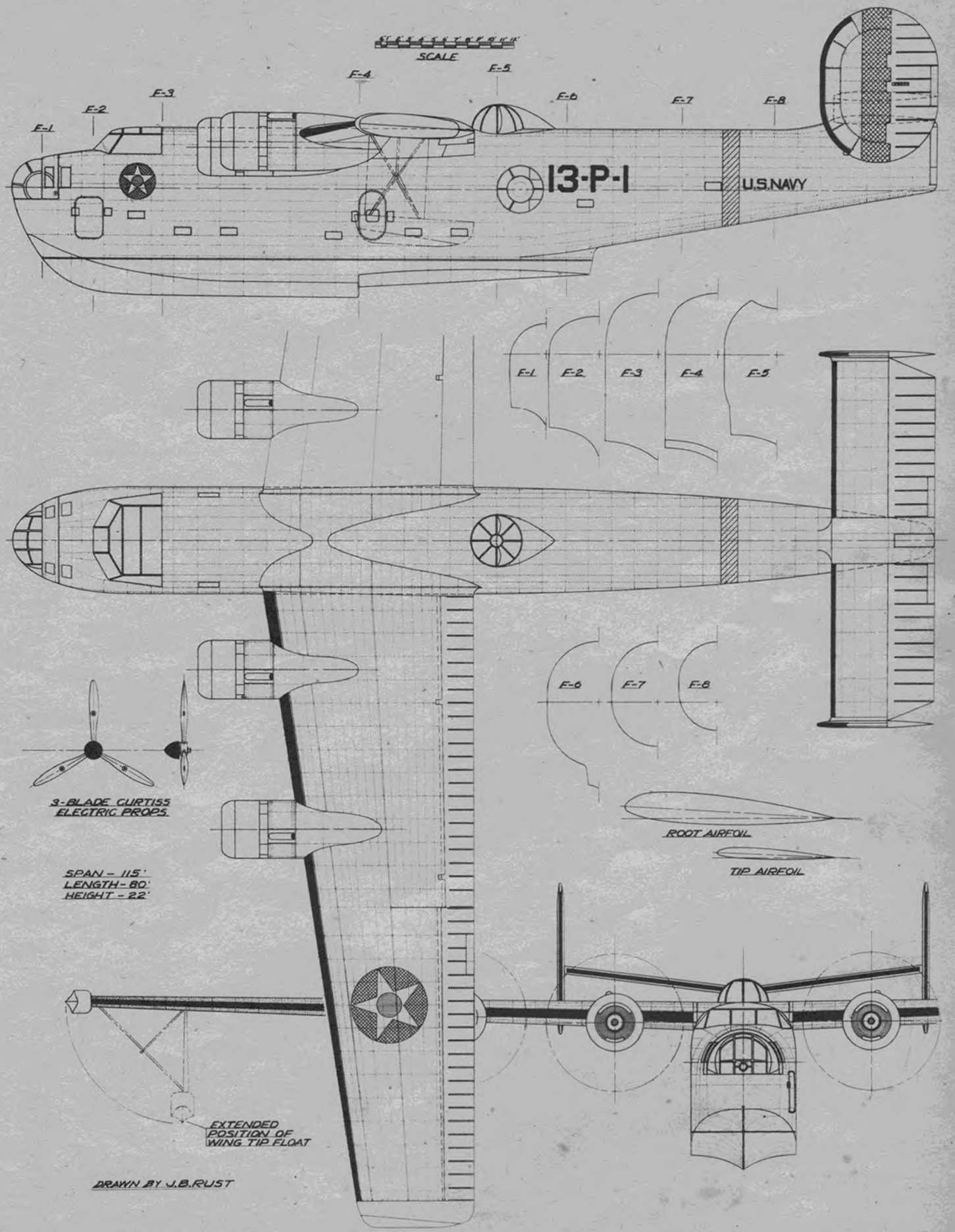
MAY I introduce myself, fellows? I am Professor Herr Foil, holding professional degrees in the K. A. C., A. M. A. and N. A. A. I have been designing, building and flying models for the past decade. During that time I have gained much knowledge in these phases of model aëronautics, and also through my association with you model builders throughout the country. One thing stands out in my observations—many beginners start their model-building career with models that really are above their capabilities.. For the sake of these beginners and future national champions, I have designed this simple but efficient glider.

Start on the fuselage, which is made from $\frac{1}{8}$" sheet balsa, by cutting to the designed outline and sanding smooth. The corners should be rounded to reduce weight and to streamline the model. The wing is cut from $\frac{1}{32}$" sheet balsa having a straight grain, and sanded smooth by removing the saw-cut marks and fuzz. The center joining section of the wing should coincide with the dotted lines; this will insure the proper amount of dihedral and smooth joint to the fuselage. The rudder and stabilizer are cut from $\frac{1}{32}$" sheet balsa and sanded smooth so that light can be seen through them. A good grade of glue well applied should hold the surfaces onto the fuselage. Particular care should be taken on the wing-to-fuselage joint so that the wing fits on evenly and securely. After a few minutes of glue drying, a pin can be inserted into the nose for weight, and the model can then take to the air. A bit of left rudder will insure a right-hand launch with much altitude for that floating glide.



CONSOLIDATED PB2Y-2

BY J. B. RUST



Engelhardt's Northwest Model Shop.

HE BUILDS 'EM, TOO

MOST model concerns start with a maximum of enthusiasm on the part of the owner and a minimum of knowledge about the business. As time goes on the knowledge increases and in a majority of instances the enthusiasm lags, eventually causing the proprietor to become known as a "former builder."

Bill Engelhardt, who with his father operates the Northwest Model Shop in Chicago, Illinois, still has that original enthusiasm, and due to the fact that the model shop was an offshoot of a mighty interesting hobby, the firm has a fine business knowledge to boot. The success of the shop is attributed partly to the fact that an effort is made to carry everything pertaining to the hobby line. A greater portion of the success, however, is attributed to Bill himself. His active contest participation has helped to interest many in the hobby on Chicago's great Northwest Side.

Bill isn't just another modeler. By no means. His *(Turn to page 63)*

Bill with famous So-Long he designed.

"DON'T QUOTE ME!"

Talk of the trade as overheard in factory, field, store.

STEWART P. ELLIOTT of the Emporium in San Francisco wound up his tour of the hobby centers from coast to coast and eastern Canada by attending the Nationals and Model Industry Association meeting at Chicago. It is three years since Mr. Elliott made his first hobby pilgrimage. Today he is probably the best informed person on the growth and development of the hobby industry. . . . Dr. Burgess of the Burgess Battery Co. is the proud operator of two hobby shops—one in Miami, Florida, and a super deluxe hobby haven in Chicago, complete with soundproofing, air-conditioning and fluorescent lights.

What has become of nearly a year of research by the makers of Eveready Batteries in their quest for improved model gas engine ignition systems and batteries to match? . . . Prices on Silkspan, the material which in a very short period became America's favorite model covering, have been recalled and deliveries may be slowed up due to increase in cost of some ingredients by 600 percent. If some substitute raw materials are found, everything will be upsy-daisy. But if not—can we get Jap tissue under present world conditions?

The Model Industry Association's credit service has come up for close scrutiny by the Board and the streamlined version will eliminate painful grievances caused in the past. It is unlawful for a modeler (anyone) to misrepresent himself, ask and obtain trade discounts illegitimately. Some wiseacres better watch out!

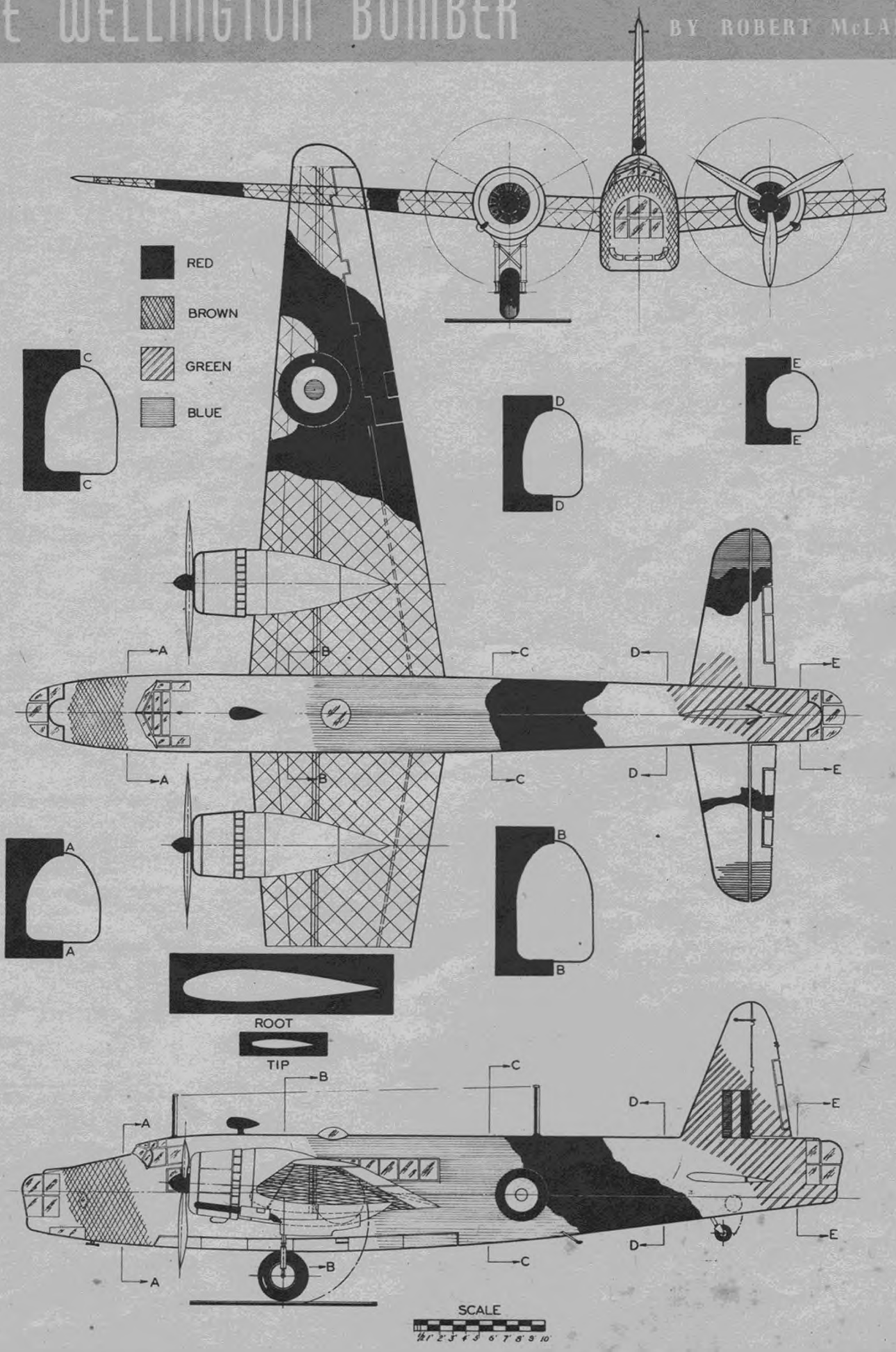
Scientific's new catalogue, premiered at the Nationals, is a pip. Despite the fact that son Johnny, formerly a guiding light in the business, stepped out a year ago, and son Harold was drafted, Daniel Frisoli has carried out beautifully a superb program of expansion. . . . Polk's Model Craft Hobbies, Inc., have been appointed manufacturers' representatives for the nation of the Bay Ridge line. . . . Lionel Lefferts of Skyway has patented and perfected an excellent low-price model knife which will be distributed to the trade by a firm which has had a great deal of success in putting over the X-Acto line of surgical hobby and craft knives. . . . Lewis Barnett, of International Models, receives credit for being the first to announce acceptance of defense stamps as payment for mail orders. . . . Burkhard Engineering Co. will soon have on the market metal-covered scale models at really reasonable prices. . . . "Thermal Buster" is the name of a new gadget by Best-By-Test, used on their latest Class C rubber job to prevent out-of-sight flights. A fuse is run beneath the wing hold-on rubbers under the fuselage. When lighted the fuse severs the rubber after any time selected, depending on fuse length. The wing is tethered by cord attachments that permit it to slide rearward, at the same time increasing its angle of attack. The result is a parachutelike descent. A small asbestos-paper patch beneath the fuselage eliminates fire hazard.

Rubber strands, used for powering models, have increased in price seventy-five percent. With endurance jobs using nearly a skein of rubber, it may be cheaper to power with gas engines—if you can get gas engines! . . . Hats off to Clifford Rogers and the Model Industry Association for their efforts (with support from A. M. A. and A. Y. A.) in obtaining recognition of the model industry's needs for aluminum for gas-engine production. Barring other production stumbling blocks, this material will now become available—but it won't benefit anyone except those model *(Turn to page 57)*

BY THE TRAVELING SALESMAN

THE WELLINGTON BOMBER

BY ROBERT McLARREN



Why Pick An Air School?

(Continued from page 39)

something even more important: that in addition to learning calculus, logarithms and cathedrals, he got into shopwork and took a motor apart, constructed a wing section, and when he washed his hands he found that he had a good idea of what it was all about.

The greatest advantage that the aviation school has over the academic school is equipment plus experienced instruction. For an example, take a look at California Flyers School of Aeronautics in Inglewood, California. Here is a school that has the vast facilities and equipment to build and rebuild airplanes. It is approved by the United States government to repair airplanes and motors, and does. The facilities at this school represent an investment far larger than the total investment in equipment for all mechanical and engineering instruction of many colleges and universities. One of the departments of one of the divisions of training at California Flyers is the motor test stand. This little item represents an investment of $50,000 alone, and bear in mind that this is only one small division of the school.

The industry said: "That's the kind of training we need. Now give us about a hundred times more graduates than you have in the past and we'll have the situation licked in no time." The situation is licked—all but the hundred times. The young men securing aviation training at government-approved aviation schools are much in demand, and they will be for many years to come. And while schools are nearing capacity, there is still plenty of room for the fellows who are sitting at home wondering if now is really the time.

Men in aviation love to have some Uncle Adolphus bring up the romance business. What if Bob's decision to get into aviation is based upon emotion rather than common sense! There are a thousand good, sound reasons why he should get into aviation anyway, even if he hasn't used them in reaching his decision. It really doesn't make any difference whether Bob wants to do something sensible for foolish reasons or something sensible for sound reasons—the result is the same. After all, if he eats spinach, he eats it because he likes it, not because it is good for him. As long as he chooses an industry which is one of the most highly respected in the nation, that assures him a well-paying future with all the opportunity for advancement in the world, we can't let a little thing like Bob's love for a pair of wings on his coat lapel stand in the way. Or maybe the whole thing was best expressed by Oliver L. Parks, president of Parks Air College, when he pointed out:

"Practically every student who enters aviation school does so because he wants to, not because he was sent. Quite often he has planned ahead for a long period before entering, and frequently has had to do a good job of selling in order to get his parents' consent, sometimes in addition to earning for himself a part of the necessary funds. Obviously he has a purposeful interest, and it is this that makes him willing and able to carry a heavy schedule month after month. He has a definite objective, and working toward it is a pleasure."

O. K., Bob has selected aviation because he likes it. Aviation would like to have him if he is trained. And both Bob and aviation will probably make quite a success out of each other in the very near future, at least as soon as he can graduate from that government-approved training school. He will go to this school for a specified period of time for a specified tuition and then he will gain a position in the division of aviation he chose. All he has to do is choose that division. Concerning the range of his choice, E. L. Chambers, assistant manager of Aero Industries Technical Institute, has this to say: "Whatever the particular talents of the high-school graduate, he can display them some place in the field of aviation. In addition to pilots, navigators, mechanics and engineers, aviation is in constant need of trained meteorologists, metallurgists, accountants, statisticians, traffic experts, public-relations and advertising men, personnel heads, chemists, airport managers and countless others."

There are, of course, three specific divisions in which the student may become associated: aeronautical engineering, piloting and mechanics. Under the division of aeronautical engineering he may in a short period of three months' training become a draftsman. Under piloting, he may select the air lines, fly for fixed-base operators or become an instructor. Under mechanics he may specialize in airplanes or motors or construction or by taking the training of the master mechanic become proficient in all three of these fields. If he is interested in close precision work he may select aircraft instruments. It goes without saying that Bob should pick on a definite field, consider the career opportunities separately, see how they fit into his interests, talents and ability. Outstanding ability is not *the* thing in Bob's make-up, because the sound training he is going to get will teach him that which he must know, providing he is interested and ambitious. Naturally, if he is going to be an aeronautical engineer he must have an interest in mathematics. If he is going to specialize in maintenance mechanics he should show an interest in building things. With this interest, his aviation-school training will take care of the rest.

One last thing. Either a fellow goes to college in September or he gets into aviation now. Aviation will be a lucrative field for young Americans for many years to come. Airline expansion and private flying haven't begun to reach their potentialities. Listen to a recent statement by Maxwell W. Balfour, director of Spartan School of Aeronautics:

"Young men entering upon a career in aviation at this time will enter a field far different from the overcrowded older professions. In a relatively short time they can enjoy the benefits which accrue to men in other industries only after years of seniority

and experience. Young men entering aviation as a career today will be the executives of the industry in the future. Opportunities for promotion are unexcelled. This extraordinary expansion has just begun and will continue for a number of years.

"Do not be misled by the thought that the industry will suffer a slump when the present military crisis subsides. With the enormous number of pilots produced by the military services, civil and commercial flying will undergo an expansion undreamed of at the present time. All first-class mail, fast express and perishable freight will be carried by air. Feeder lines will form a vast network connecting the smaller towns.

"With the enormous tooling and mass-production facilities being constructed during the present emergency, aircraft can and will be manufactured at much lower costs than have been possible in the past. With the advent of low prices, the family airplane will become an actuality. Along with it will come repair stations, parts supply houses and numerous other businesses similar to those associated with the automotive industry.

"The serious young man graduating from high school should give deep consideration to the possibilities of a career in aviation, for he has an opportunity here which has not been and may not again be offered. Not more than once in an average lifetime is a major industry born."

There are young men in America today who are saying: "I am going to be a mechanic. I am going to enroll in a government-approved school September 14th. On May 14th next I am going to work for a company I have selected. On May 15th, incidentally, I'm going to get married and I will make a salary that will keep us above the modest-income group." Cocky? Overconfident? No —he's talking about aviation.

The Request

(Continued from page 42)

some strength. The large nose block added strength to the ship's nose. The fuselage brought to a triangle (cross-sectional view) at the rear gave strength to that portion. The round formers and their stringers built on the underside of the fuselage combined with the triangular-shaped top side gave the body a more or less teardrop cross section, which offers less resistance than a square or a rectangle. Additional streamlining is offered by celluloid windshield.

With regard to the aërodynamical viewpoint. The thrust line is designed just high enough to make possible a fairly short landing gear, thereby cutting down considerable drag. The polyhedral wing gives the ship a "rolling" flight characteristic while the ship is climbing instead of the tight spirals that sometimes spin a model to destruction. The stabilizer is placed low in regard to the wing to afford a biplane effect, thus increasing stability. The main wing dihedral and the rudder combination are planned so that the ship can be made to spiral in either direction by simply using the rudder tab.

The fuselage is built in the conventional manner. One side is built upon the other. When dry, remove from the plan and separate the lower longerons and a portion of the top longerons (the short distance up to where the triangle starts). The cross-pieces are cemented in their respective places. The formers are cut out of stock, notched and cemented to the bottom side of the fuselage. The stringers are then added. The motor mounts are shaped and mounted in the fuselage with plenty of cement. The landing gear is bent to shape, then cemented and bound to the uprights and motor bearers. The nose block is cemented lightly in position and then carved to shape. After it is removed it is hollowed out until its wall thickness is about ⅛". The windshield former is cemented in place and the windshield itself is made from a stiff grade of celluloid. The dowel (front fastener for wing) is cemented in position, and the ship is ready to be sanded and covered.

The wing is of the two-spar-type construction. Make a full-size drawing. Cut sufficient ribs and wing-tip parts from the correct thicknesses of sheet stock. Construct wing and put gussets at each break in dihedral.

The stabilizer is made of sheet stock and ribs. When dry, sand to a streamline section. The rudder is made in a similar fashion. The coil and batteries are then installed. The easiest way to find their location is to mount motor, wheels and stabilizer and then measure off 30 percent from the leading edge of the wing, placing the weights so that the model balances at that point.

"Don't Quote Me!"

(Continued from page 54)

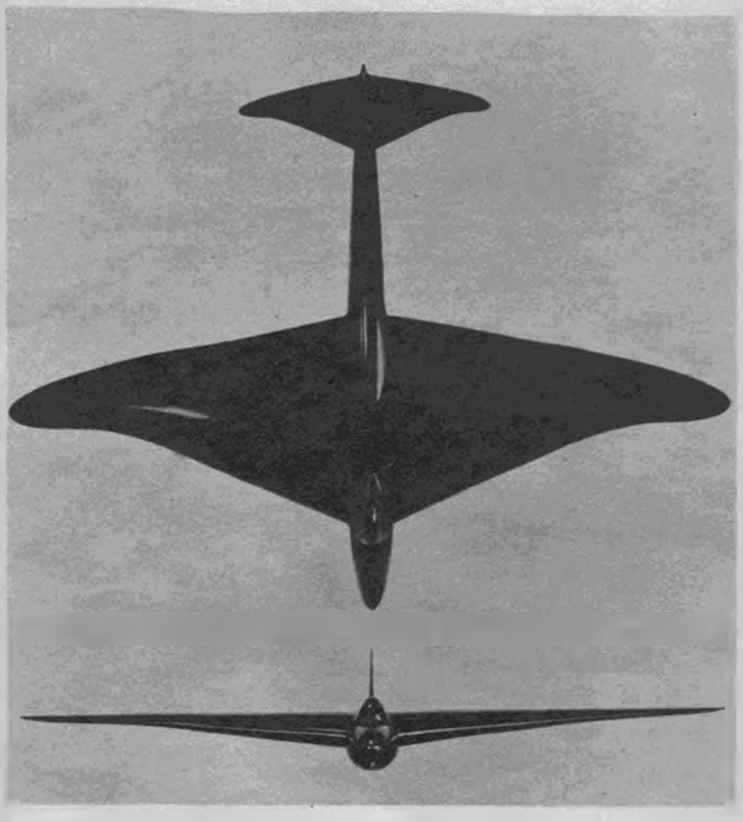
engine manufacturers who do their own die-casting, since casting plants are too busy with more lucrative business.

Did you see Ray Arden's (Atom engineer) model of the model of the Atom? Weight ⅛ ounce and it runs! It is one third the size of his last year's world's smallest operating gas engine! . . . The Cannon 30 would fill a bad gap in Class B engine shortage if they could be delivered in sufficient quantities! . . . The granting of patents to Scientific for a double-edged model knife will call for retrenchment—or royalty payments by more than one model manufacturer. . . . It won't be long before Comet brings forth a Class B version of the Sailplane.

Will somebody *puleeze* come to the aid of metropolitan New York modelers and get them a model airport? The model game in the nation's largest city is really suffering because of lack of flying room.

FUTURE FIGHTER?

Dummy destroyer. Full-sized mock-up of revolutionary fighter being designed by Manta Aircraft Corp. Highly specialized wing is expected to give unheard-of performance.



Weird top view of the fighting plane as it was constructed in a six-foot model. This model performed remarkably well in wind-tunnel tests. Wing design by David R. Davis.

Model Matters

(Continued from page 41)

contest. While he was chasing his winning flight he had to take off pants and shoes and swim Fourche Bayou, continuing the chase through a cornfield in a dripping union suit and bare feet. Swimming the dad-burned Bayou is an old Arkansas custom. Sooner or later all the builders seem to get around to it.

H. A. is helping illustrate a new model airplane handbook along with Paul Plecan. Both these boys have contributed many good drawings to our model department. Bill Winter, associate editor of Air Trails, is editing the book. Work is well under way and it promises to be a worthwhile addition to our too-meager list of model airplane books.

More than likely model builders interested in radio control will now have an easier time getting the required Federal Communications Commission license necessary for r. c. experiments. Recently the America Radio Relay League recommended that the F. C. C. establish a temporary type of license with less stringent examination than the regular amateur license and with a lowered code speed requirement of seven words per minute. The license would be issued for a one-year term and would be nonrenewable. This type of license is designed to fill up the ranks of the radio amateurs that have been somewhat depleted by the army and navy.

If distinguished honorary members are the key to a successful model airplane club, the Garden City (Michigan) outfit should go over big. Mel Williamson, producer of "Wings of Destiny," Donald Douglas, C. G. Taylor and Colonel Roscoe Turner have all accepted honorary membership. But the success of the club will be in the hands of the twenty-five active members who at the present time are going strong.

Early this season in Chicago the Riser Riders and the Aeronuts held a joint outdoor stick contest. Marino Perpignani lost his stick on the second flight. He went home to get another model to finish his flights. When he got there he found his "lost" model waiting for him. So he went back to the field and flew it the third time, which was long enough to put him second with a three-flight total of 28:16.8. The Riser Riders won the contest. They're only a little more than a year old, but are one of Chicago's most enthusiastic clubs.

The Eastern States meet on June 7th attracted many old-timers, including C. G. Grant, Irv and Nat Polk, Manny Radoff, Leo Weiss and others from the New York area who hadn't been seen together in a long time. Leo suggested a reunion of old-timers. Which is a good idea. Just think, the little fellows whom we remember only as youngsters are probably married and have youngsters who are building models. Just what constitutes an old-timer is hard to pin down. Certainly let's not eliminate those who didn't begin until 1928, because if there is a free banquet we don't want to be left out. The ticket of admission should be a replica of the model on which the old-timers cut their modeling eyeteeth.

Here's the lament of the wife who turned out to be too good a model builder. Take it easy, girls, or you'll have the same trouble:

> My husband's a modeler;
> I am, too.
>
> He went to a contest;
> I went, too.
>
> He won a trophy;
> I won two.
>
> Now he won't speak—
> What'll I do?

The Mercury Mites Gas Model Club of Brooklyn, New York, has novel identification cards for models. In addition to the builder's name and address the card has an invitation to join the club. The last line—"$$$$$ Rewards $$$$$ Rewards $$$$$"—is probably what really brings back lost models. It's a lot fairer than the old trick of printing, "This model is being used for scientific research. If found, please notify . . ." The MMGMC has thirty-six active members, invites interested builders over sixteen to join. They'd like other clubs to join their drive for better flying facilities in the metropolitan area. Address letters to 1592 Lincoln Place, Brooklyn, New York.

W. R. Cruthirds used to awe the boys in Little Rock, Ark., as being a stern and formidable junior high school teacher. Then he was bit by the model bug. Now they find he's a sociable person with far-above-average modeling ability. The kids have even more respect for him now.

Somebody asked if light-weight barographs have been carried in models. We hadn't heard of any work being done along this line. But it would be interesting to get an idea of how high the models really fly when they disappear directly overhead in the clutches of a current. Once in a while models are sighted by airplanes at considerable altitude. Soaring pilots ride currents as high as 19,000 feet. But we can only guess—and we're usually much too enthusiastic—at the altitude of our own pride-and-joys.

Richard W. Morse of the Progressive Aviation Club reports Rochester is holding its own in modeling. Photos of a gas model line-up prove that PAC is doing its part. He'd like to contact other builders. His address is 191 Penhurst St., Rochester, N. Y.

Joe White of Chattanooga, Tenn., writes that there are about 125 licensed models in that city, but even so there's not enough organized effort to start an AMA chapter. The boys have broken into factions which don't pull together. It's unlikely there'll be a local contest this summer, although the fellows are planning to attend nearby meets. It's none of our business, but it seems only fair that every group of builders holds its own invitation meet now and then to keep in mind the work and trouble involved and make the members more appreciative of other people's

contest efforts. Model builders are about as nice people as you'd meet anywhere. They work miracles with a little wood, tissue and cement. But when it comes to quibbling and fussing over minor details, they're champs. Chattanooga isn't different from any other city in this respect.

John Dilly is running the Canadian Nationals this year. As usual this important Canadian event will be held August 25th and 26th in Toronto. John is one of Canada's most active builders despite war orders that keep him working many hours overtime. Last year he won the grand championship at the Canadian Nationals. Hope he has similar success with his new job as meet director.

ON THE FIELD. (By Carroll Moon.) The biggest meet of the season in the East (at least up to the time of going to press) was held Saturday, June 7th, at Hadley Field, N. J., under the auspices of the Kresge Model Aero Club. The contest, commonly called the Eastern States, drew nearly 200 entries from as far away as New Hampshire, and the cream of the modeling crop was on hand. Aided by assistants in the form of a troop of soldiers from nearby Raritan Arsenal, Leon Shulman and Ben Shereshaw, co-directors of the club and co-contest directors, did a fine job and put on a swell show.

Despite almost ideal flying conditions, times were low. Test flights early in the morning often went over ten minutes, but thermals were few and far between when actual "officials" were being made. Pat Viola, of Philadelphia, flying a Sailplane powered by an Ohlsson 60, took first in Class C with a total of 9:43.5. Second was Coleman Barney, Jr., with 9:02. Howard Simmons was third with 8:13 (last year he was top winner) and W. Brandle was fourth. In Class B, Bill Emmons, flying a So-Long (published recently in Air Trails) powered by an Ohlsson 23, was top man with a total of 9:32. Second was the Gressen team of Basil and Charles with 8:35. Fred Gross was third and Russell Simmons, fourth. F. Antosh, of Scranton, took Class A with a Cleveland Playboy, powered by a Bantam. His time was 9:33. V. Jensen was second, Gene Biseloff third and Andy Stevast was fourth.

One of the most interesting events of the day was the stunt event, captured by Howard Simmons. His ship, according to schedule, took off easily and with full power attained about 750 feet altitude. Suddenly it appeared to spin in, came down about 100 feet, righted itself and repeated this maneuver three times. As a finale it did a slow barrel roll, flipped out and made a good landing. Howard was the big winner of the day, his flying winning for him the high point honors among entries.

According to a casual inspection of flying, a majority of ships seen were kit jobs. Carl Goldberg would have laughed with glee at the Comet jobs on the field, although Megow and other nationally prominent houses were also well represented. One of the best flights of the day was turned in by a Thermal Magnet which did 14:03 on a test hop powered by a Dennymite. However, in officials the ship was not lucky in hitting risers, and, although it averaged 2:25, it did not place.

Among the prominent modelers and leaders present were Irwin Polk, Ed Roberts, Nat Polk, Phil Zechitella, Ernest Gamache, Charles Grant, Will Effinger, Sr., Angie Cardiello and many others. Roberts flew up from Philadelphia with his Ryan sport job, circled the field several times and after meeting many of his old friends in the crowd, took off again and headed back to Brown land. It was truly a swell meet in every respect, worthy of the name that the Kresge organization has built up over the years.

The day following the Eastern States, some of the more hardy modelers—those not completely fagged—journeyed to Vineland, N. J., for a gas meet there.

The day was as ideal as the previous one, and some pretty fine flying resulted. Martin Nemirofsky, of Philadelphia, won first in Class C, taking home a $200 I. C. S. scholarship for highest average time of the day, plus a Brown D, a Megow Flagship, a Megow Ranger, four props, an Austin Timer, a quart of oil and cement. He also won the high single-time trophy. His total for three flights was 420 seconds. In Class B, Leon Shulman of the Kresge Club took first with a total of 351 seconds. His prizes included a Forster motor, Zipper and Ranger kits, three props, oil and cement. Ed Manulkin of Philadelphia won the Class A event with a total of 344 seconds. His prizes included a Bantam motor, American Ace and Ranger kits, oil, props and cement. Harry Meyer won the stunt event. In the beauty event Dwight Shuster was first. The Springfield Gas Model Club of Springfield, Pa., won the cup for the largest number of entries with 21. The Bronx Airscrews took the prize for traveling the longest distance. The meet was directed by Andrew Canino, who (according to our spies) did a fine job.

Speaking of clubs, while at the Eastern States we met four members of the Nashua, N. H., Cloud Chasers, who made a two-day trip to attend the meet. They were Miss Denise Lucier, Miss Bernice Schalkowski, Joe Belanger, Pete Tamulonis and Winslow Paine. All flew, and all had fine ships. Just unfortunate they didn't place. That's the kind of enthusiasm that makes modeling the game that it is. Imagine—500 miles to a contest!

On May 18th the Third Allegheny Mountain Area Model Meet was held at the Pittsburgh-Butler Airport, and drew a fine field from that area. Among those present was Carl Hopkins, State contest director of West Virginia, who acted as honorary official. (Hyah, Carl!) Bob Byham, of Meadville, took the gas event with an average of 2:46. In the R. O. G. rubber event, Ed Gummell was first with 2:16 average. Owen Niehaus won the stick event with 2:16. Harry G. Vogler, Jr., was contest director—he's the guy who is doing such a swell job in that area.

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Brown is experimenting with a new timer, to be much better than anything previously offered. Bantam has a new 25 which the experts say is "hotter'n a pistol"—but it is not on the market yet. Comet 35s are swell when broken in properly—procedure should take about five hours.

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One of the biggest June meets in Pittsburgh was the Pennsylvania State Exchange Club Championship Meet, held at the Pittsburgh-Butler Airport on June 15th. Modelers were on hand from Oil City, Chambersburg, Harrisburg, Connelsville and other centers throughout the State and included many nationally famous figures in the hobby. Among the "big shots" on hand were Bill Good, Ed

Fulmer and Jack Tracz. Harry G. Vogler, Jr., directed the meet. The Exchange Club was represented by Charles M. Christler and Walter Burkhardt. Franklin Hall of Meadville was determined Grand State Champion with a total of 250 points. His winnings included second in Class A gas, fourth in Class B gas, second in Class C gas. Other winners were: Class A gas, Ed Orr, first; Class B gas, Jas Morris, first; Class C gas, Dorrance Huffman, first. Charles Harris took the Fuselage ROG rubber event. Ray Matthews was first in the stick event and Owen Niehaus was tops in the towline glider event.

The Agricultural and Mechanical College of Texas held its third annual Model Aircraft Contest on May 11th, as a part of the Engineers Day celebration of the school. Professor Howard W. Barlow, head of the aeronautical engineering department, conducted the meet, and submitted a fine report on the day's flying. J. E. Givens won the Class A event, Billy Bishop was first in Class B and Norman Weber led the field in Class C. High time for the day was 1,230 seconds (an average of nearly 7 minutes) turned in by Givens, who won the A event.

The New York State Exchange Club Model Meet, which was held at the Albany, N. Y., Airport on June 15th, drew a crowd of 5,000 spectators and nearly 100 entries from throughout the State in both rubber and gas classes. The cabin event for the Air Youth State medals resulted in a win for Pat Mallione of E. Hartford, Conn., with a three-flight average of 3:17. Richard Ulmer won the junior award in this event. In the stick event, Bob Flood of Schenectady was first with a 7:40 average. Irwin Whittemore won the junior event. Flood also took the Class A event. In Class B, Al Roberts was top man, while Don Johnson took the Class C award. Gas times were considerably lower than those in the rubber events.

Championships are a "dime a dozen" this month. The West Coast Championship Gas Model Meet, held in Fresno, Calif., May 25th, was sponsored by the Fresno Exchange Club and the Fresno Gas Model Association. James Monroe took top honors in the contest and set a new high single-flight record of 20:35 to do it. His ship was a Brown-powered Sailplane. His average for two flights was 12:25. Miles Gupton won the junior event, with Jubue Nishina second and Hireshi Doi third. Betty Culver won the women's event. In Class A, Frank Gallistl won with a scaled-down Buzzard Bombshell using an Ohlsson 19. Ralph Scruggs won in Class B with a Torpedo-powered Zipper. Ralph Guernsey won the scale event with a beautifully made Stinson Reliant.

The Fresno Gas Model Association did a swell job in the handling of the contest, which was reported by Mrs. Ocie Randall, recording secretary. Arle Armstrong was contest director, William Dunham was head timer and Ralph Smith assisted him. Jack Newhall, Leo Harris, A. D. Baird, Jerry Nettleton, Willard Marsh, Dan Daniels, Louis Coelho and Charlie Palmer represented the Exchange Club. All in all there were 228 entries, making it one of the biggest contests reported so far this year. Next year the club plans to put on the West Coast Nationals, with the winner being sent to the Nationals at the club's expense. The club has a new field (880 acres) which is one of the best fields on the West coast. (This is half again as big as LaGuardia Airport. Hiyah, New York!)

In Detroit, Mich., the Seventeenth Annual Metropolitan Detroit Schools Outdoor Contest was held on May 24th, and according to the reports was a huge success. Fred Schelter was contest director.

NATIONALS WINNERS

Flash! As we go to press, the results of the 1941 Nationals at Chicago are available. Due to lack of space we are giving only first-place winners. (For the complete picture see the next issue.)

Radio-control Event—N. E. Walker, first; 83 points.

International Moffett Finals—Ray Beaumont, U. S. A., first; time, 1082.

Flying Scale Event, Junior Division—Paul B. MacCready, Jr., first; 49.6 points.

Flying Scale Event, Senior Division—Walter S. Eggert, first; 60.5 points.

Flying Scale Event, Open Division—Henry Struck, first; 61.1 points.

National Champions—H. Struck, New York City, first; 175 points.

Team Champions—Junior Aviation League, Boston, first; 150 points.

Class C Gas, Open Division—Sal Taibi, first; time, 1482.7.

Class C Gas, Senior Division—Walter Brandle, first; time, 1322.0.

Class C Gas, Junior Division—Jerry Brofman, first; time, 804.1.

Outdoor Cabin, Open Division—Dick Korda, first; time, 1082.7.

Outdoor Cabin, Senior Division—Ray Beaumont, first; time, 1133.5.

Outdoor Cabin, Junior Division—Samuel Scuro, first; time, 1008.5.

Class B Gas, Junior Division—Edward A. Vargo, first; time, 574.9.

Class B Gas, Senior Division—P. W. Klintworth, first; time, 1474.4.

Class B Gas, Open Division—W. A. Gibson, first; time, 900.3.

Outdoor Stick, Senior Division—Raymond Foster Smith, first; time, 1184.5.

Outdoor Stick, Junior Division—Paul B. MacCready, Jr., first; time, 907.2.

Outdoor Stick, Open Division—Edward Lamb, first; time, 1002.0.

Best Finish Event—Allen Vopal.

Class A Gas, Senior Division—John Findra, first; time, 668.4.

Class A Gas, Junior Division—William Repenning, first; time, 819.2.

Class A Gas, Open Division—W. A. Gibson, first; time, 1297.2.

Indoor Cabin, Open Division—Gordon Cain, first; time, 847.2.

Indoor Cabin, Senior Division—Stanley Stanwick, first; time, 827.3.

Indoor Cabin, Junior Division—Robert Sandborg, first; time, 596.5.

Indoor Stick, Open Division—Merrick S. Andrews, first; time, 1104.7.

Indoor Stick—Junior Division—Robert Sandborg, first; time, 745.9.

Indoor Stick, Senior Division—Stanley W. Stanwick, first;. time, 1127.0.

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He Builds 'Em, Too

(Continued from page 54)

own ship, the So-Long, which appeared in Air Trails, won first place in Class B Open for him at the 1940 Nationals in Chicago. In addition he has scored in many other contests in the Midwest. The So-Long is now being manufactured in kit form by Aircraft of Chicago. Of course, the Northwest Model Shop handles it. As a result of Bill's remarkable success with this design, his shop is a headquarters for the particular model. His ability to give competent advice to builders as to construction and details is, of course, an important sales angle.

The shop has been established for more than five years and is generally known as "the little store with the big stock." Bill is a member of the Chicago Buzzards Gas Model Club and the shop is more or less a headquarters for the organization. The club had three national gas model champs in the last three years, all of them being featured in Air Trails. They were the Lackey Zenith, Buzzard Bombshell and, of course, the So-Long. Other clubs which patronize the shop include the Chicago Model Nuts, the Vultures and several others. Many of the customers are among the outstanding contest winners in the area.

A full line of the popular kits, motors, accessories, et cetera, combined with expert motor service and advice, plus long hours of work, seem to be the keynote of the firm's success. "Of course, it's all in the game," says Bill. "Even the building part. There is an unlimited amount of sport and education to be derived from building and flying models or building a squadron of beautifully finished solid scale ships."

Down The Runway

(Continued from page 45)

service organization, such as an Exchange Club, is highly satisfactory in almost every case.

Question: We can have a sponsor, but since he is a "commercial," we are wondering if this is all right.

Answer: There are many hobby shops and department stores sponsoring model airplane clubs which conduct this activity on a very high plane. Naturally, they are trying to build sales and customer good will, but this is only fair considering the time, effort and money that their staff put into aiding the clubs. Conversely, there are some commercial establishments that overcommercialize clubs which they sponsor, and these usually don't last very long.

Question: Do we need a senior adviser?

Answer: Unless the membership of your group includes adults who have the time and opportunity to act in an advisory capacity, it is wise to seek some sort of senior adviser or advisers. You will find that a person working in this capacity who is well known in the community can do a great deal for you whenever you want to put on exhibitions or meets. The policy of "pulling strings" is nothing new, and the more people you have access to through a senior adviser, the better equipped your club will be to carry out its work.

Question: How much should our dues be?

Answer: This depends entirely upon what you expect to do. Do you wish to finance contests? Do you wish to send a high-point winner for the season to the National Meet? Your dues, if any, should be as small as possible. Adopt the policy of collecting once or twice a year rather than expecting members to "cough up" a dime or so at each meeting.

Question: What sort of by-laws do we need?

Answer: Simple ones. Get someone who is familiar with organizational work to help you in preparing yours, or secure a copy of the AMA "Contest Manual" which has some proposed by-laws which are simple to set up and easy to operate under.

Question: How often should we have meetings?

Answer: At regular intervals, weekly, if possible, and not less than twice a month.

Question: Should we have any social activities?

Answer: By all means. Most groups make the mistake of talking models, models, models. After a while this palls on even the most enthusiastic flier. In a moment, we will outline some thoughts on how you can bring social activity into your club work.

Now that some of the more frequent questions have been taken up, we will go into the general procedure for the establishment of a model-airplane club. The first step is to call an "organization meeting" of the leading model builders in your community. You get news of this around the neighborhood by word of mouth, notices on school bulletin boards, notices in hobby shops, and through announcements in the newspapers. When the time for meeting arrives, be sure to pick a live-wire chairman and make certain that all who want to see the club organized get up and speak briefly on the benefits of club organization. If by-laws are desired, a committee should be appointed to draw these up, and a nominating committee can also be appointed to choose a slate of officers, or these officials can be elected by popular vote.

One difficulty almost every club encounters is how to build up attendance for regular meetings. One way to meet the problem is to appoint a resourceful, imaginative project committee, which will undertake to line up interesting sessions. This project committee can invite distinguished speakers from nearby air centers, can bring visiting model

builders to town to speak before the club, and secure movies for club meetings.

If your committee is qualified, it is not impossible for its members to prepare a ground-school course which can be administered by local school-teachers and airport instructors. A course in model-airplane building could be undertaken with a small investment of material and labor.

The main difficulty, of course, is in conducting club meetings in a formal yet friendly manner. Meetings should never be permitted to become free-for-alls; nor should horseplay be tolerated during formal sessions. Plenty of fun and interest can be aroused through various educational and amusing projects, some of which we outline here:

Miniature Models. No, that is not redundancy; that is fun. Build six-inch turn-pushers, twelve-inch R. O. G.'s, rubber-powered miniature copies of well-known gas models, feather-weight paper or balsawood gliders.

Pylon Flying. Set up a pylon in center of your clubroom and fly rubber models around this. Use a light-weight tether to attach the models to the pylon. In addition to duration flights, a point system can be worked out for the best take-offs, landings and stable performances.

Speed Building Contest. See how fast the group can build a rubber or gas model. Prepare plans in advance and have everyone study his section thoroughly. Put sixteen fellows to work building a fuselage in four parts. Have half a dozen fellows work on each section of the tail services. Have a team to cover sections as soon as they are complete. Parts can either be cut out (prefabricated) or you can start from scratch and cut all your wood. This is a splendid stunt for some good newspaper publicity and creates a great deal of fun in any club.

Spelling Bee. Hold a modern aero-modeling version of the spelling bee. Divide the club into two teams and feed them definitions. Let them spell some of the complicated terms found in aviation and model aviation. Put on a quiz program and ask who won the Wakefield event in 1937, what was the longest flight made with a gas model last year or what is the definition of an autogiro.

So much for some of the projects you can undertake at club meetings. Don't forget there are many things you can do outside of the club meetings. Theater parties frequently can be arranged through the courtesy of a local theater manager. Special visits to the airports where you can go behind the scenes are always enjoyed by club members. In the promotional field, it is wise to have a standing committee to arrange for displays in store windows, and, knowing that some hard labor is a conditioner for anyone, perhaps you can start an air-marking campaign and paint the name of your city on various roofs in the community.

A final word concerns those social functions we mentioned previously. To vary the model-building program, try holding picnics, beach parties, hiking trips, motor cavalcades, wiener roasts, skating parties, boat rides, et cetera, all in the correct season, of course. If your organization has enough adults among its membership, bridge parties or dances can be conducted. If the majority of your members are young, hold a parents' night once in a while, together with an exhibition of models to show the adults just what you are doing in the way of club activity. The recruiting of new members should go on constantly, and the induction of members should be dignified and impressive. Be sure to introduce all new members and make each feel at home.

A number of the points outlined here are detailed in the Academy's "Chapter Manual," which has been mentioned before, and information on this may be obtained from AMA Headquarters, Willard Hotel, Washington, D. C.

More Sanctioned Meets. If you've kept your past issues of Air Trails handy, you know that we've been running in these columns listings each month of sanctioned AMA competitions—and shame on you if you haven't kept those magazines. Here are additions to the previous listings:

August 16th, 17th. New Orleans, La. Class AAA Fourth Annual Gulf State Meet at New Orleans Aero Club airport for rubber-powered cabin, scale and stunt models as well as all classes of gas-powered craft. The battle will be sponsored by the New Orleans Aero Club and $700 in trophies, medals and cash are being offered. From 350 to 500 contestants are expected to attend, and those interested should contact Whalen J. Norman, the contest director, at 4506 Feret St., New Orleans, La.

August 17th. Middletown, R. I. Class AA Second Annual Southeastern New England Gas Model Championship Meet at Middletown airport. Sponsored by the Fall River (Mass.) Model Aero Engineers, the meet will be for all classes of rise-off-ground gas models. Merchandise, ribbons and cups will be awarded winners. Approximately seventy-five entrants are expected by Mrs. Marie C. Potter, who can be reached at Box 135, Gardner Ave., Ocean Grove, Mass.

August 31st. Lincoln, Nebr. Record Trials will be conducted by the Lincoln Model Aircraft Engineers at Arrow airport. Forty-five members are expected to enter and try for new national records. Nearby modelers interested in joining the club and flying should write Jack Moralez, at 1118 O St., Lincoln, Nebr.

August 31st. Yeadon, Pa. Class AA Gas Model Contest sponsored by the Mainliners Aero Club at Island Road field. Two hundred will fly for trophy and medal awards. Contest director will be William D. Coverdale, 85 Lincoln Ave., Yeadon, Lansdowne, Pa.

September 20th. East Hartford, Conn. Class AA Connecticut Model Aircraft Meet at Rentschler Field. Sponsored by United Aircraft Corp. and the Hartford Y. M. C. A., the competition will be open to rubber-powered rise-off-ground and hand-launched entries, gliders and solid exhibition scale models. Eight cups, medals and other awards will be available to an expected 100 contestants. For complete details get in touch with Frank W. Schade, Room 510, City Hall (27 West Main Street), New Britain, Conn.

The Skyrocket

(Continued from page 46)

the dihedral of the wing and the lengthening of the lower portion of the rudders. The alteration was necessary on the rudders to provide an even line of thrust.

Although our model is a little larger than the average flying scale model, having a wingspan of 42 inches, nevertheless the flights are something to behold. As you can well imagine, the climb is terrific, due to the thrust of two 12-inch propellers. Torque is eliminated by having the propellers revolve in opposite directions, which is a great boost to stability. Flights are very stable, thanks to the general set-up of the plane. The scale stabilizer is of ample size, 30 percent of the wing area, and we made it more effective by using a lifting airfoil. Tip spillage is at a minimum at the stabilizer tips because of the twin rudders.

Construction used on the model is comparable to the strongest Wakefield entry and yet the weight of the finished model was only 5 ounces, dope and all. This is not up to weight rule, because there are 220 square inches in the wing.

After glancing at the plans you will note that although the ship is strong the construction is rather simple. However, the working time is increased over the average scale model by its size.

CONSTRUCTION

When working from the magazine plans it will be necessary to increase them to full scale.

The fuselage is built on two side keels which we shall call the master stringers. Cut two of these master stringers as shown on the plans from full-cut 1/8" sheet balsa and mark the position of the fuselage bulkheads upon them. Now cut the fuselage bulkheads as shown from 1/16" sheet balsa. Since the bulkheads are so wide you will have to cement two sheets together to obtain the necessary width. Cement the bulkheads in their proper positions on the master stringers and allow to dry. Keep a check to make sure that they are at right angles to master stringers. You may now add the other fuselage stringers, which are 1/16 x 1/8" strips set on edge. Carve the nose block and the tail block to rough shape and cement the nose block to "A" and the tail block to "H." After the cement has set, you may finish them off with sandpaper. Note the 1/16" sheet fill-in between stringers just below the stabilizer, at the wing-fuselage joint and at the cockpit.

Make the tail wheel as shown in the plans, but do not install it until after the fuselage is covered. The bamboo framework of the cockpit inclosure is not made until the fuselage is covered.

The fuselage is covered with wet Silkspan. When using Silkspan wet, large areas may be covered with one piece of paper. Thus you will need only one piece of paper for each side of the fuselage. The bottom of the fuselage from "D" forward is not covered until the wing is cemented in place.

The motor nacelles are constructed

in much the same manner as the fuselage. Of course, two nacelles are required. Note how the rear blocks of the nacelles are carved out to allow passage of the rubber motors from the prop shafts to the rear hooks located at the bottom of the rudders.

All nacelle stringers are $1/16 \times 1/8$" except the stringer that rests upon the bottom of the wing, this being 1/8" square. You will note that the stringers on the top of the wing behind bulkhead "L" are installed after the nacelles are cemented to the completed wing. The front section of the nacelles is covered with soft $1/10$" sheet balsa wrapped around the front to simulate the cowling.

Bend the landing gear to the shape shown in the plans from .049 music wire and cement the front strut to "L" and the rear strut to "M." When the cement has set, sew right through the bulkheads with needle and thread to make a very strong joint. Then add several more coats of glue. The wheels are 2¼" in diameter and are of $11/16$" thick laminated balsa. Cement large-faced bushings to each side of the wheels to form a bearing. A drop of cement at the end of each axle will keep the wheels in place.

Cover the nacelles in the same manner as the fuselage.

The complete wing plan is shown on the plans, so you may build it directly upon them. Structure member sizes are given in the plans. Pin the trailing edge and the center spar on the plans. Cut the necessary wing ribs from quarter-grained $1/16$" sheet stock. Cement the ribs in place and then add the leading edge. After the cement has set, remove the structure from the plans and install 2½" dihedral at each wing tip. Now add the two smaller spars of $1/16 \times 1/8$" strips of balsa. Add the wing tips, which are shaped from very soft and light balsa. The $1/64$" sheet covering of the leading edge is now cemented into place.

Cover the wing with Silkspan, using one piece of paper for each wing panel. After the covering is sprayed with water and has dried, brush two coats of clear dope on the covering. Now cut a section to match the fuselage contour at the wing center section. Cement bulkhead "C" to the top of the trailing edge, cement bulkhead "B" to the front part of the wing spar running completely to the bottom of the spar, and cement the bottom of the nose block to the sheet covering of the leading edge. If the plans are followed accurately all these members will line up perfectly.

The stabilizer is built in much the same way as the wing. Remember that the stabilizer has 1" dihedral at each tip. Note the 1/8" square antitwist strut which is put in after the stabilizer is completed. It is advisable to put more 1/8" square diagonal braces in the stabilizer than shown for the extra strength that is needed. Remember that the stabilizer has to stand the strain of the two tightly wound motors.

Two rudders are required and they may be built directly upon the plans. Use 1/8" flat stock throughout. Bend two rear hooks to the shape shown and cement very firmly to the bot-

"This is our experimental department—we're constantly in search for new ideas."

tom of the rudders as indicated in the plans.

Cover the stabilizer and rudders with Silkspan in the usual manner. Cement the rudders to the ends of the stabilizer very securely. Now cement the stabilizer to the fuselage. It would be wise to put a slight degree of positive incidence in the stabilizer to do away with some of the balancing weight in the nose of the model.

Carve two propellers from blocks of balsa 1¼ x 1⅝ x 12". Shape the blocks to the plan shown and then proceed to carve a right and a left-handed propeller. That is, be sure that the propellers revolve in opposite directions. Leave the blades rather thick for the extra strength and extra weight in the nose. Add a spinner to each propeller hub from hard balsa. Use some sort of free-wheeling on the propellers to improve the glide.

Make two nose plugs from hard balsa as shown in the side view of the nacelle. The plug is removable and is held in place by a balsa square to fit snugly into bulkhead "K." Cement large-faced bushings in the front of the nose plug and to the back of the propeller spinner. Bend a prop shaft from .049 music wire, slip through the nose plug, insert several washers and then into the propeller.

When the model is completely covered and assembled, brush on two coats of clear dope. All exposed wood parts such as the propellers are given more coats of clear dope. When the dope has dried, sand the fuzz off with fine sandpaper such as 10/0. Now brush on two coats of very thin silver dope. Keep the dope thin enough to give a solid coat of color. All details are in black dope, such as the wing walk and the motor fronts. Elevator, rudders and ailerons are shown by doping strips of black over the covering.

FLYING

The original model was powered by eight strands of 3/16" flat brown rubber, due to the lightness of the wood used. For the average model ten strands of 3/16" flat rubber should be enough power to take it plenty high.

It will be necessary to bend two S hooks to hook the motors onto the rear hooks. To wind the ship up is a two-man job. Have your helper hold the ship by the props and stretch the motors out past the tail and hook them to a double winder such as used on twin-pushers.

Before any test flights are made, glide the model over tall grass to adjust the glide. In all probability the ship will be slightly tail-heavy; that is, it stalls or mushes in the glide. Add the required weight to the front of the motor nacelles until the glide is smooth.

Starting with about seventy-five or 100 turns in the motor, try several R. O. G. flights until you have all of the bugs ironed out. Adjust the rudders to have the model circle. It does not matter what direction the turn is, because there is no torque. Under full power the model is capable of flights close to two minutes in calm air. And with strong thermals present—well, who knows!

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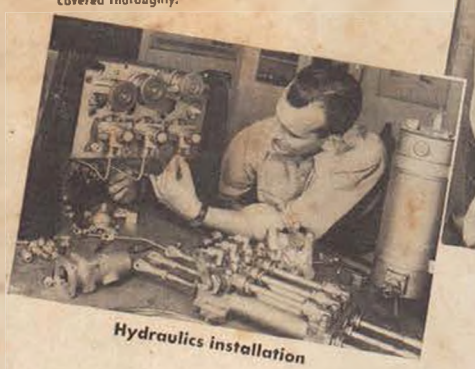

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