

AIR TRAILS

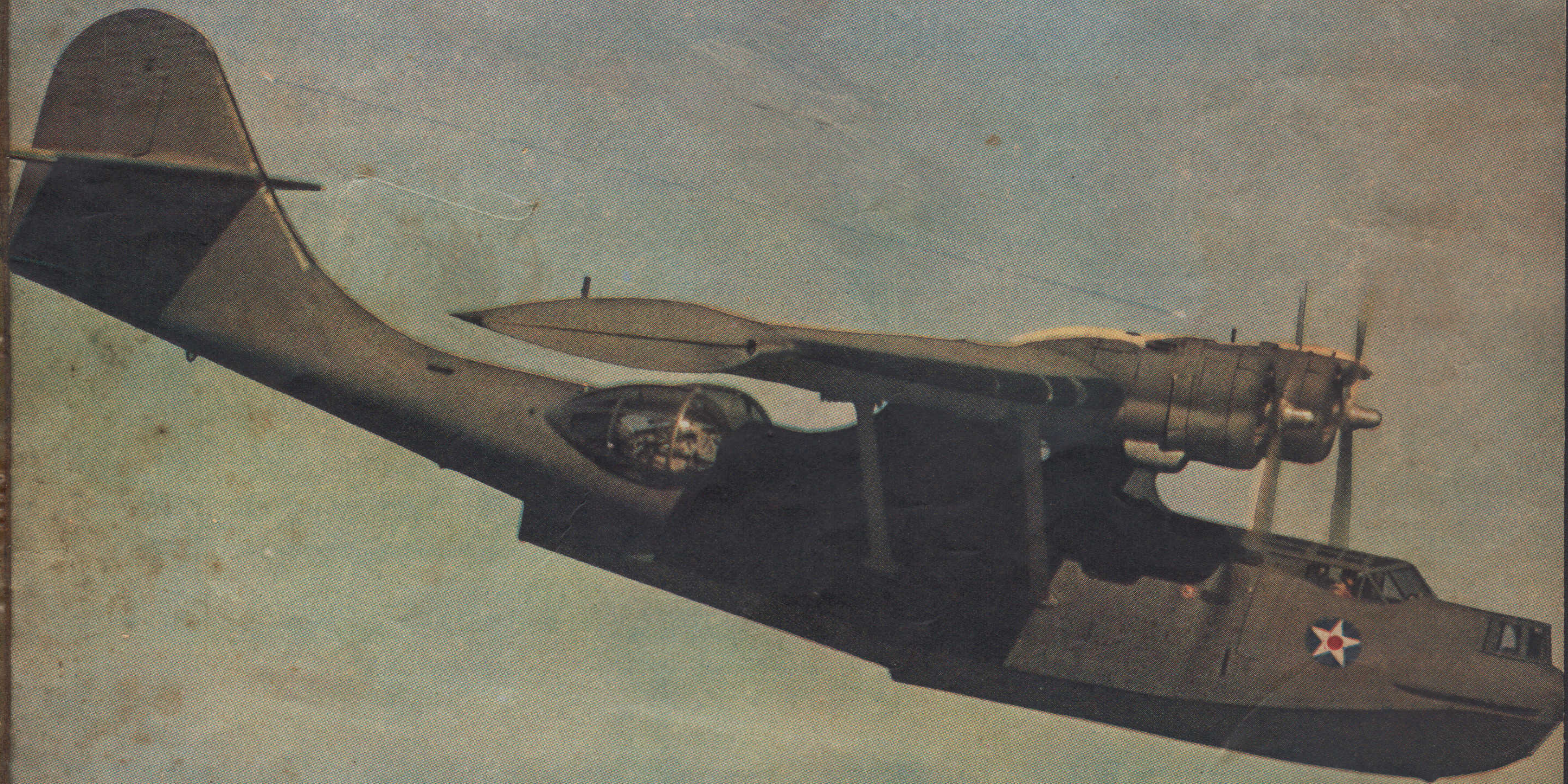
JUNE '42

THE MODEL BUILDER'S GUIDE

SUBMARINE AIRCRAFT CARRIERS MODELS WITHOUT BALSA

JUNE
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AIR TRAILS

JUNE, 1942

VOLUME XVIII NO. 3

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You **TOO, MUST
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It is imperative that before you invest in a course of career training you determine what the returns will be on your investment . . . for your choice of a school in which to take your training will determine how much money you will make all the rest of your life.

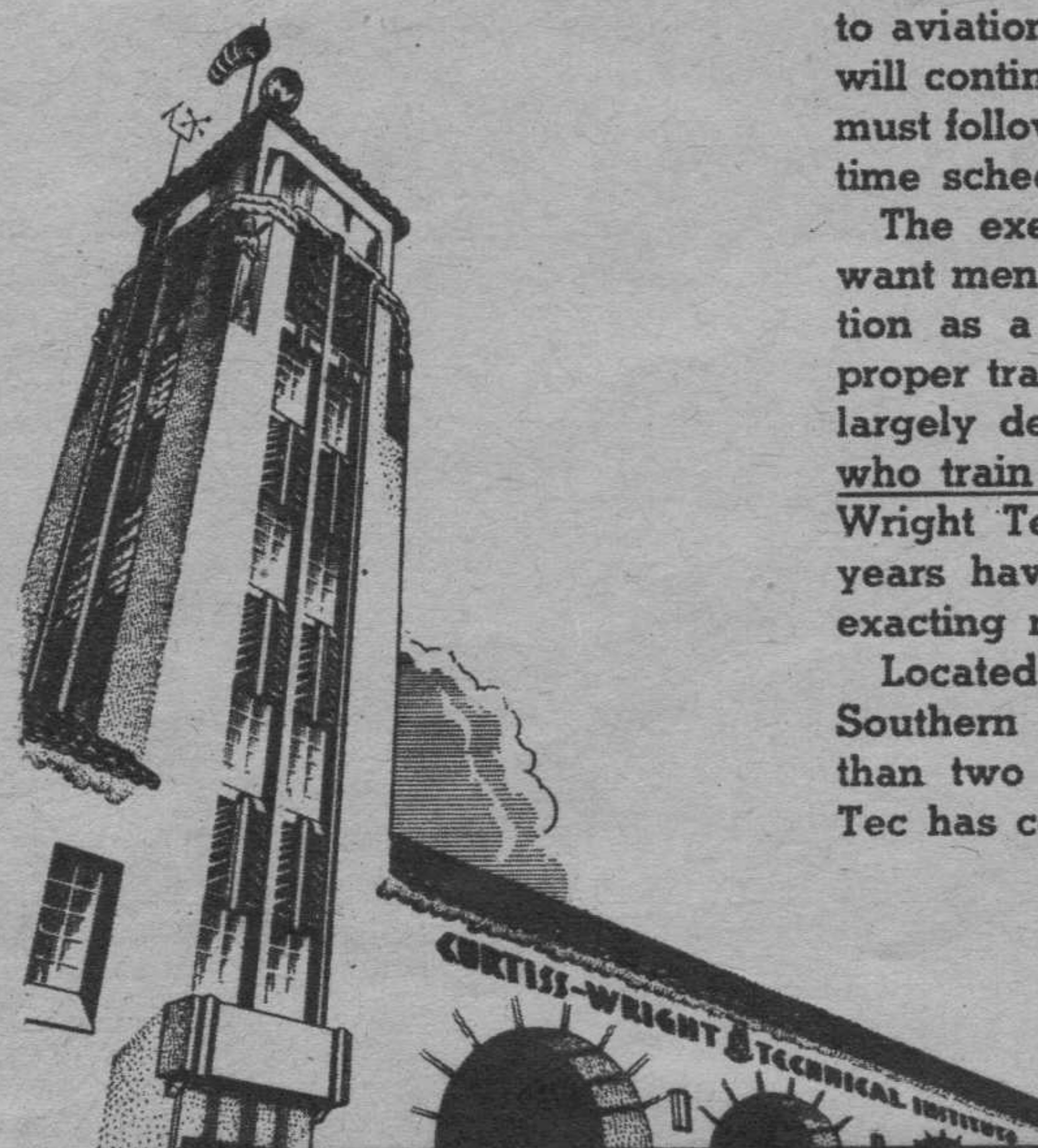
Curtiss-Wright Tec's career training is carefully designed to do just one thing:—TO MAKE MONEY FOR YOU, so upon graduation you can be independent and self-supporting for life. Our thousands of successful graduates have proven that Curtiss-Wright Tec training gets results and always pays, since it trained them in advance for the highest position they could ever expect to occupy. It can do the same for you.

This school has never guaranteed positions for its graduates, but practically every graduate has obtained immediate employment and is advancing rapidly. The demand for our graduates far exceeds the supply, and we honestly believe that every student who enrolls here will be able to obtain, with our assistance, immediate employment upon graduation.

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AT-6

Reviewing Stand



How to Do Aircraft Sheet Metal Work.

By Carl Norcross and James D. Quinn, Jr. (McGraw-Hill Book Co., Inc., 330 West 42nd St., New York City, \$2.20.) The metal airplane of modern times demands the services of thousands of skilled metal workers. The student worker or apprentice will find many answers to puzzling questions in this book, along with descriptions of equipment and their correct and incorrect uses. Beginning with simple blueprint reading, the reader is carried through all the various essential steps to the final chapters on skin fitting and spot welding. Questions at the end of each chapter enable the reader to check his progress. A difficult subject mightily well covered.

Women and Wings.

By Charles E. Planck. (Harper & Brothers, 49 East 33rd St., New York City, \$2.75.) The distaff side of aviation has never been adequately covered with the exception of a few stellar personalities whose deeds have caught the public fancy through the years. Hundreds of other women figures in aviation have been also worthy of recording, and here an author does the job. The more than three hundred pages, many of them in pictures, present a parade of women's achievement in aviation that will amaze its readers. The latter portion of the book contains lists of records and year-by-year accomplishments for ready reference. Certainly a recommended book for libraries and women interested in flying.

Youth Must Fly—Gliding and Soaring for America.

By E. F. McDonald, Jr. (Harper & Brothers, 49 East 33rd St., New York City, \$2.50.) With the exception of some technical books there have been mighty few works dealing exclusively with motorless flight. This new work is a very complete and comprehensible treatment of a long-neglected phase of aviation. The author, long an enthusiast for gliding and soaring, has compiled a remarkably complete case for the furtherance of this important activity. Had this country recognized the implications and possibilities of glider training when Germany did, and later Russia, we might not now be frantically training pilots for the future—we'd have them by the thousands. The eleven chapters cover the various training methods, types and characteristics of equipment, while the appendices cover such concrete information as club operation, licenses and regulations and data on the ships currently available. A fine coverage of an important side of flight.

The Blue Book of American Aviation.

(The Aviation Statistics Institute of America, Asheville, N. C.) This publication, dealing with the "who's who in the aviation industry," will be particularly valuable to those wishing to contact members of the industry or for libraries interested in a reference work dealing with the various aviation organizations, publications, State aviation officials, air lines, aviation schools and colleges, airports, and aviation officialdom in Washington. All of these headings are covered in detail plus a detailed list of manufacturers and a buyers' guide listing the producers of various types of aviation supplies and material. This book will be an important addition to aviation libraries.

Adventure Was the Compass.

By Alma Heflin. (Little, Brown & Co., 34 Beacon St., Boston, Mass., \$2.75.) Proving that there is still adventure just around the corner even if the corner be several thousand miles from home and covered (Turn to page 46)

What's Your Question?

D. A., Washington, D. C.—The American designation of the Martin Baltimore is 187.

C. M., Liberty, Miss.—On take-off, the propeller is set at low pitch and the mixture at rich; after the ship has gained altitude, the pitch is changed to high and the mixture leaned out; coming in for a landing, the propeller is again reset to low angle and the mixture control to rich.

Staff Sergeants T. B. G. and F. P. S., Luke Field, Ariz.—Plans for gliders can be obtained from Volmer Sailplanes, 1010 Mariposa Ave., Glendale, Calif., and the Soaring Society of America, Box 71, Elmira, N. Y.; glider kits from Bowlus Sailplanes, Inc., San Fernando, Calif.

D. D., Erie, Pa.—The Lockheed P-38 is supposed to be faster than the Bell P-39. We do not know how the Grumman Skyrocket compares with them, as no official figures on its performance have been released. The Bell Airacobra is powered by a 12-cylinder Allison engine.

E. J. H., Lincoln, Nebr.—The Douglas DB-7 and the A20-A are essentially the same airplane. The DB-7 was powered by two 900 h. p. Pratt & Whitney engines, while the A20-A has two Wright double-row engines of 1,600 h. p. each.

T. W., Coldwater, Mich.—We cannot supply you with all the information you want on the Consolidated PB-3 as most of it is restricted. The span of the ship is 104 ft.; wing area, including ailerons, 1,400 sq. ft.; overall length, 65 ft. 2 in.; height, 17 ft. 11 in.

E. C., Philadelphia, Pa.—Sorry, we do not know if there is any literature issued on parachute troops. Suggest that you write to the War Department, Washington, D. C.

C. G., East Keansburg, N. J.—The Republic Guardsman and the AT-12 are the same airplane. The book, "War in the Air," is published by Random House, Inc., 20 East 57th St., New York City. The British Fairey Fulmar is equipped with rear machine guns. The Focke-Wulf 187

is not as fast as the Messerschmitt Me.110, and the Junkers Ju.87 has been in the service of the German air forces since the very beginning of the present war.

P. J., New York City—Regarding your inquiry on a book dealing with different methods of soldering, we suggest that you write to Pitman Publishing Co., 2 West 45th St., New York City, and ask them to send you a list of books on this subject.

H. V., Warren, Mich.—The best way to have your plans enlarged from quarter to full size is to have them photostated to the required dimension.

D. E. J., Lacombe, Canada—For information regarding requirements to become an aerial photographer in the United States army, write to the Adjutant General of the Army, Washington, D. C. You must be a United States citizen to qualify.

Miss L. M., Narrowsburg, N. Y.—Formerly an applicant as stewardess

on an air line had to be a registered nurse. Lately, however, this requirement has been withdrawn. The physical requirements are: maximum height, 5 ft. 5 in.; weight, between 100 and 120 lbs.; age, between 21 and 26. The air lines train stewardesses in their own schools. For further information, write to the Office of Education, Washington, D. C., which publishes a booklet on how to become an air hostess.

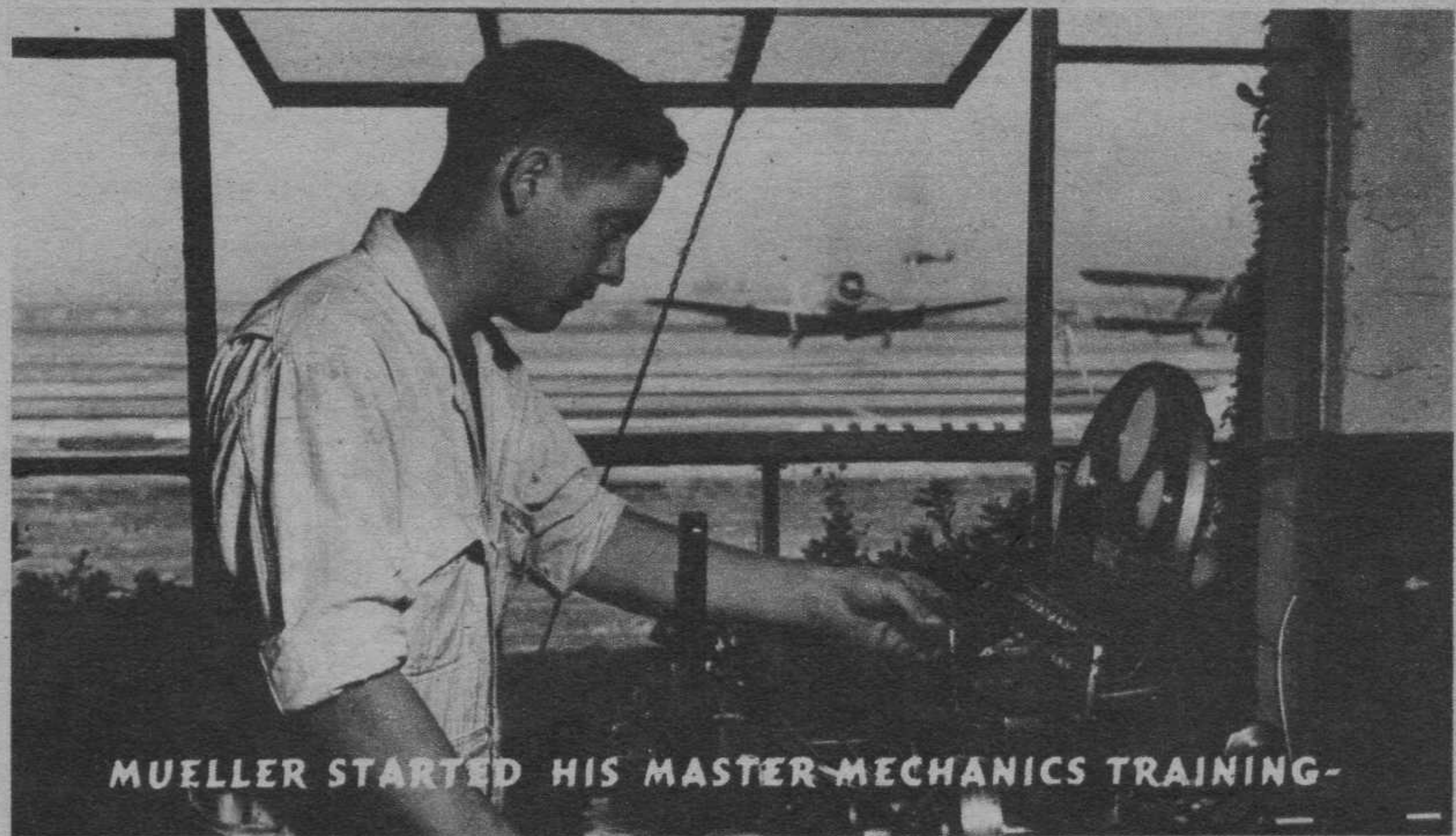
V. B., Ida, Mich.—The ship pictured on the clipping which you sent us is a Bell YMF-1, otherwise known as the Airacuda. It's a multiplace convoy fighter mounting two 37-mm. cannons and a number of machine guns. It is supposed to have a speed in excess of 300 m. p. h. and is powered by two Allison 12-cylinder liquid-cooled engines developing 1,110 h. p. each.

S. H., Washington, D. C.—The drawings of the bomber noses which you sent us are: top, Douglas B-18A; bottom, B-18. Both ships are alike except for the noses. (Turn to page 65)

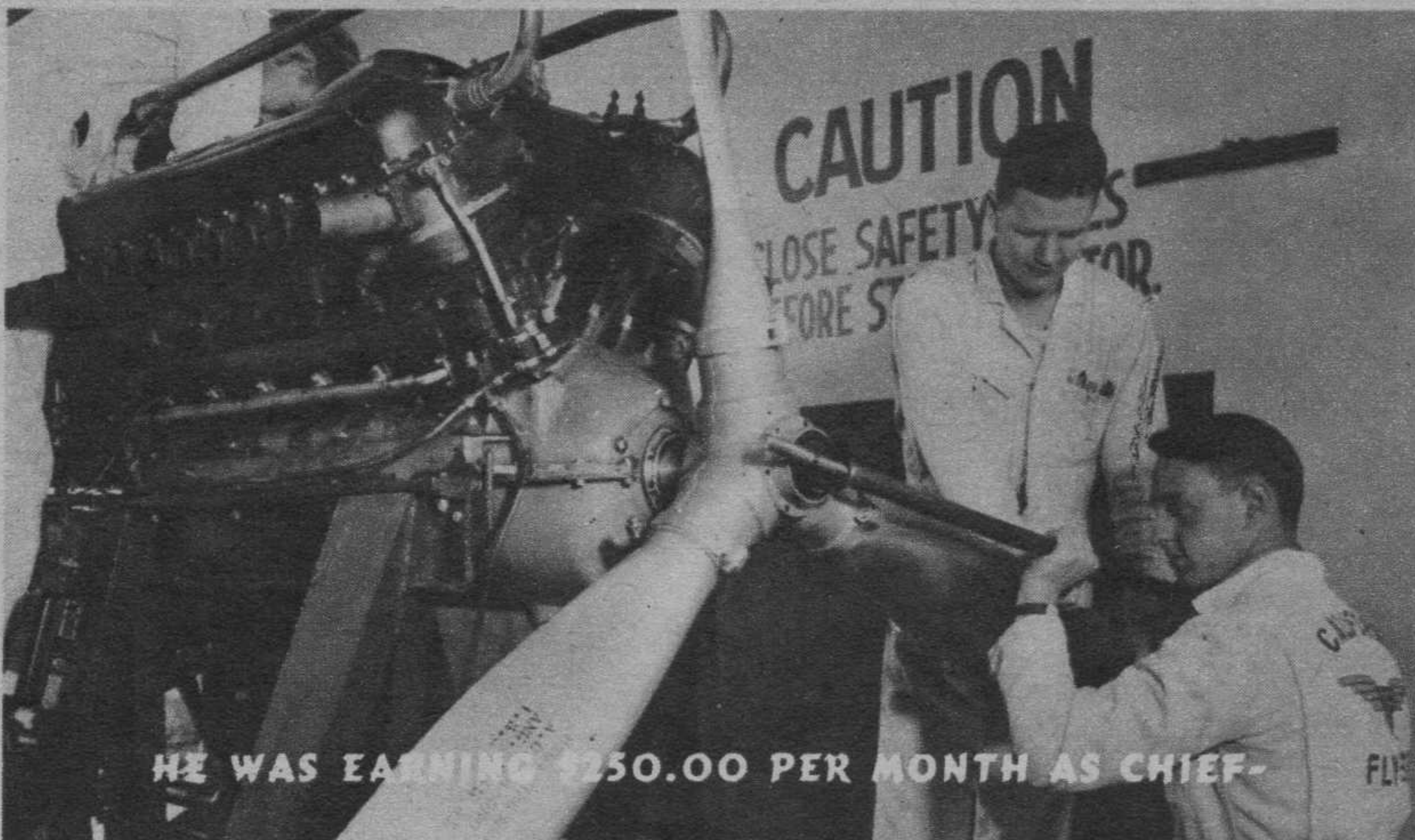
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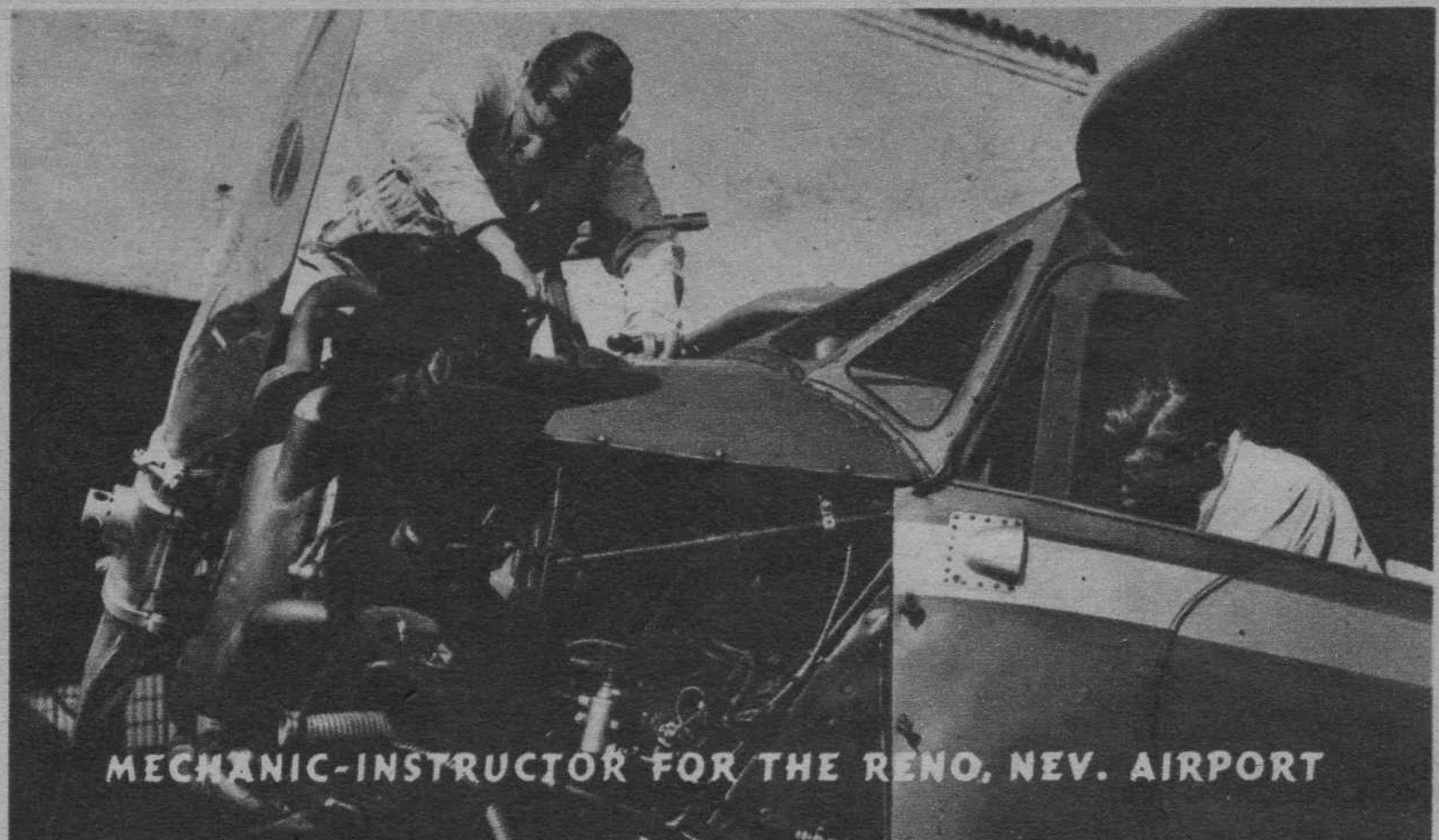
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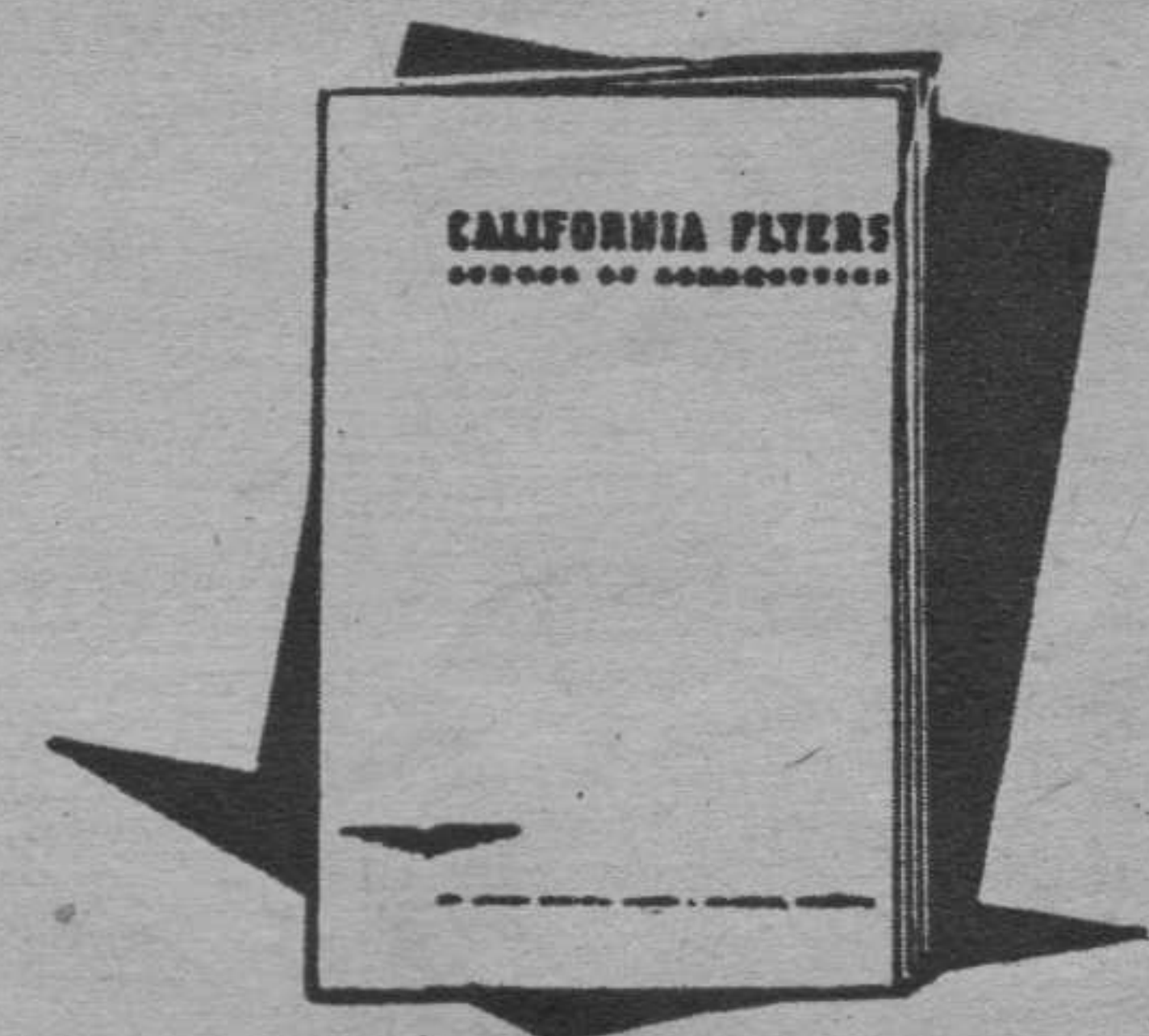
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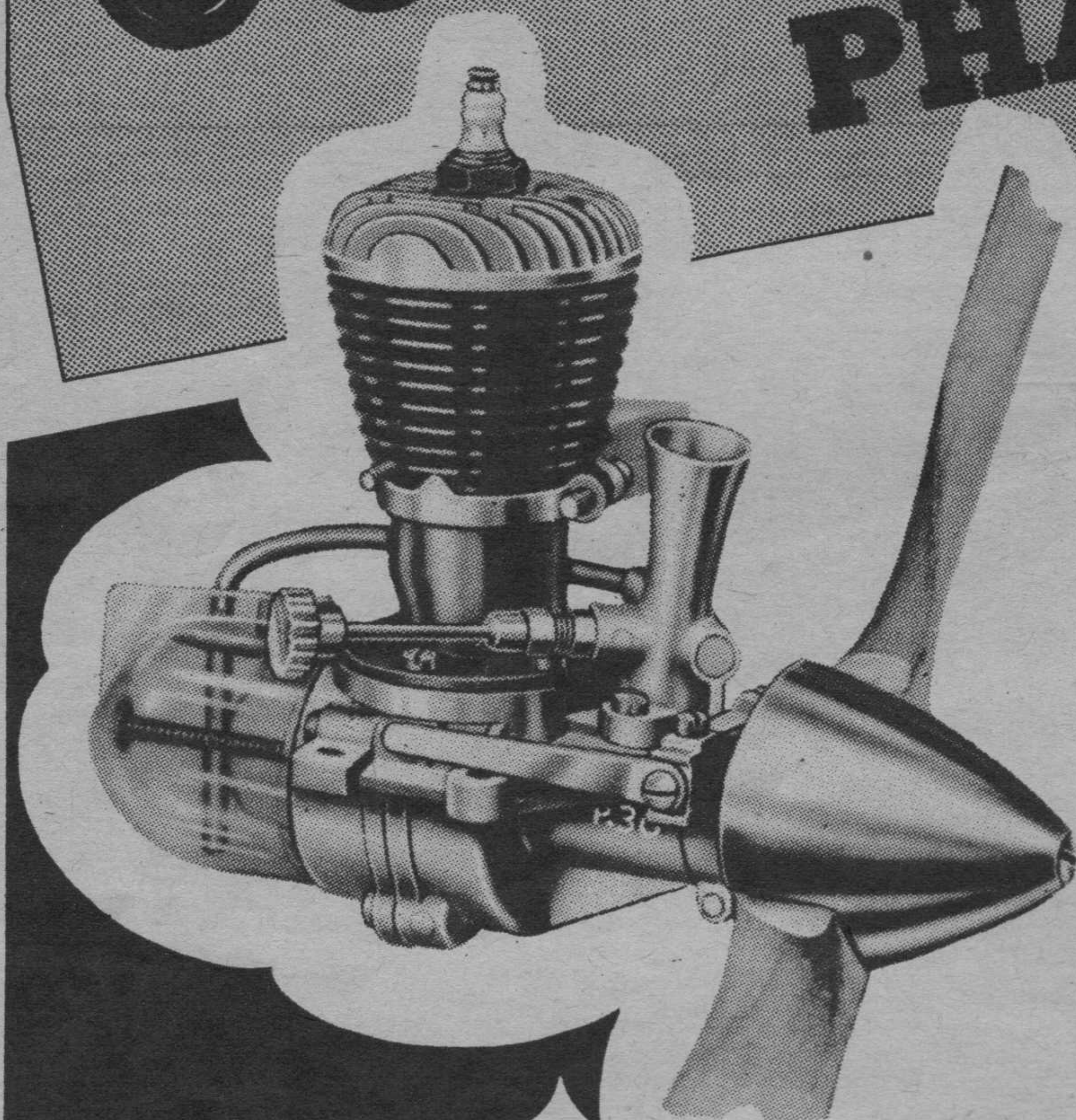
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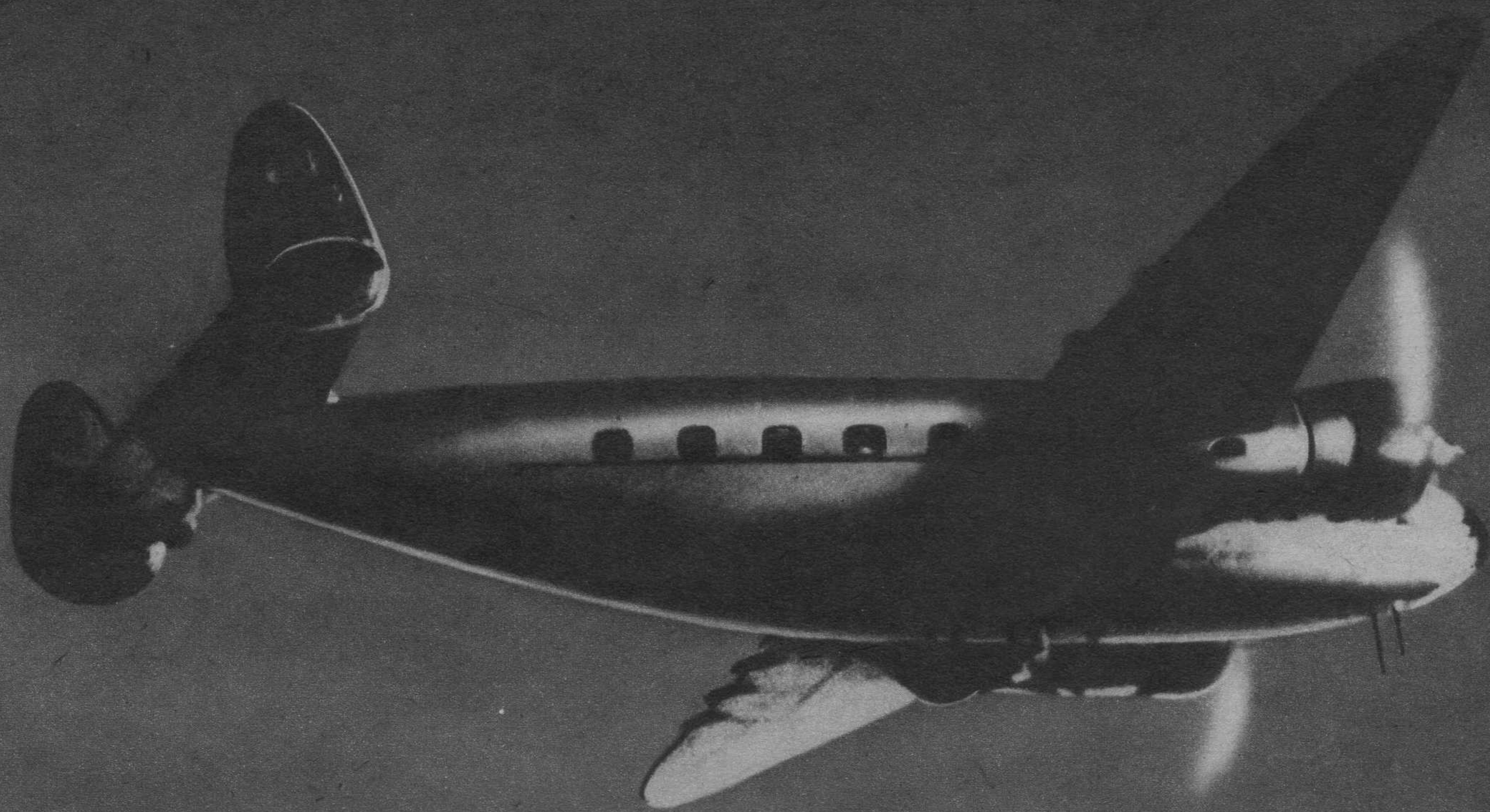
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AT-JUNE, 1942

Orville Wright Today

BY DOUGLAS J. INGELLS



O. Wright and certificate awarded at unveiling of Dayton Wright Memorial.



Prelude to powered flight. This test glider built by the Wrights flew very well.

What's he like, thirty-nine years after he helped found the airplane? Exactly what does he think of aviation—now?

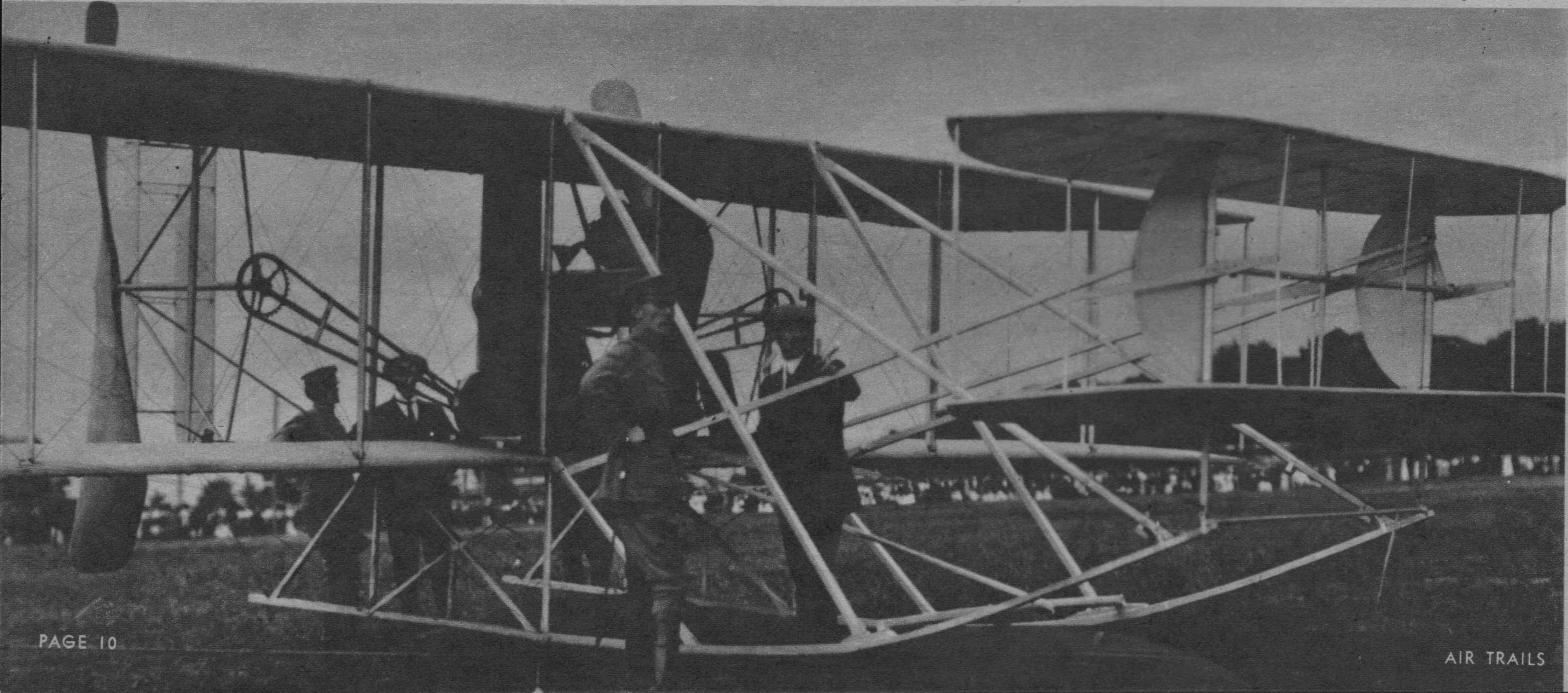
THIS is the story of a modest, unassuming American who gave the world its wings, watched them grow big and strong, span continents and oceans, but who sits alone today and sees them trying to destroy themselves.

His name is Orville Wright.

The beginning was on the windswept sands of Kitty Hawk, North Carolina, one cold, gusty day in December, 1903, when man first flew. Here on this isolated spot where only a life-saving station marked the location off Cape Hatteras, this war's most potent weapon was born—a heavier-than-air flying machine which made a sustained flight under its own power. Few heard about it then and those who did scoffed it down. But we hear it today in the whine of the Nazi Stukas. It is typified by Dunkirk and Coventry, Moscow and London, Pearl Harbor and Manila, Java, Burma, Australia. Yet Orville Wright, who made that initial flight, hates to think of these things which are happening every hour in this world he lives in.

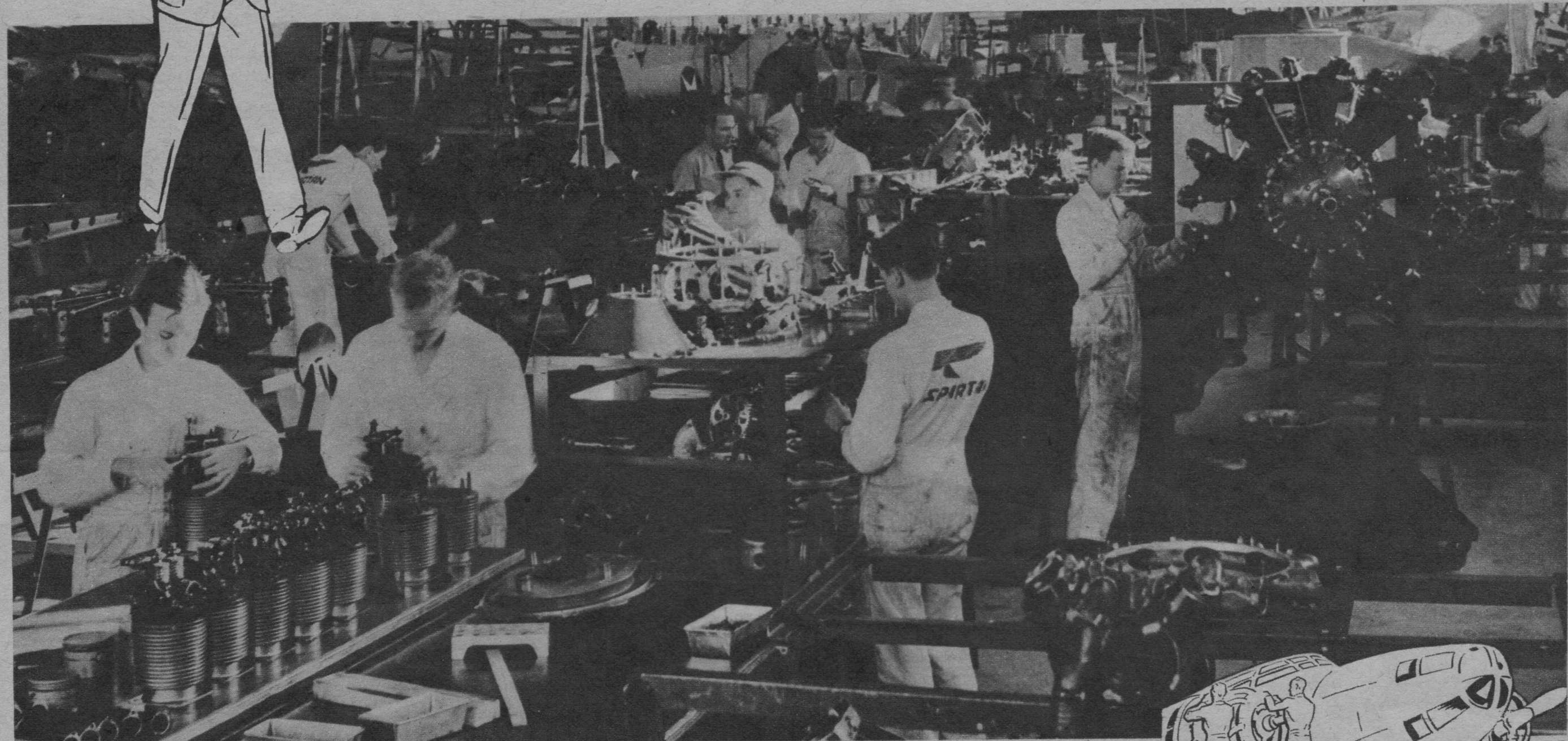
(Turn to page 42)

The army's first airplane. Uncle Sam bought this Wright catapult-launched ship in 1908. Speed 40 m. p. h., range 125 mi., weight 826 lbs. Wright taught officers.

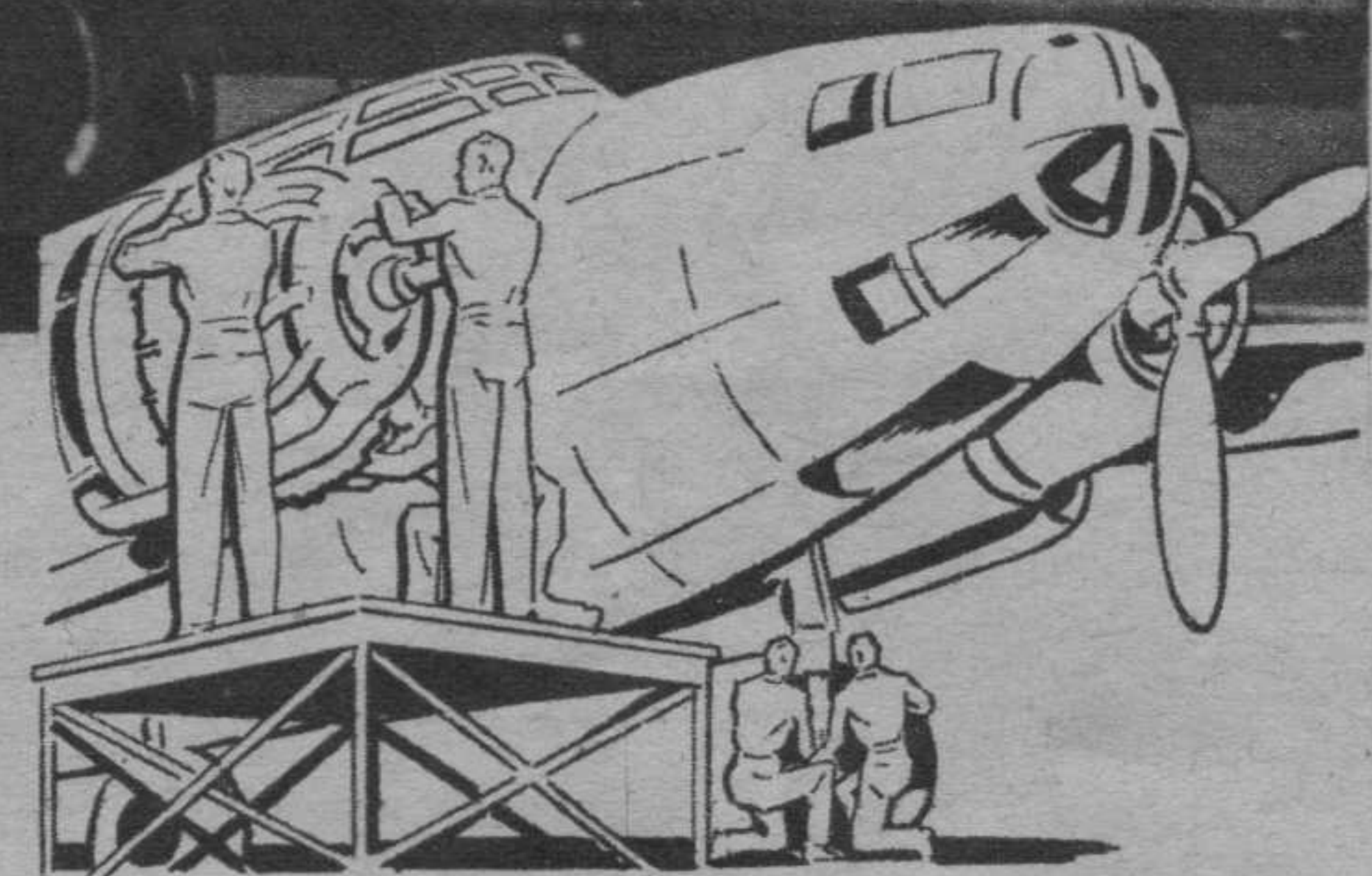




Come to SPARTAN for Training that Fits You for a Lifetime Career



EVERY month more and more young men are coming to SPARTAN for training which enables them to play an important part in the nation's great victory program today, and which equips them for a lifetime career in the great commercial aviation industry to follow. Striking evidence of why SPARTAN is the first choice of so many young men is shown in the above photograph of 22 of the school's 27 modern buildings, providing a total floor space of over 10 acres.



REMEMBER a "Quickie" course can leave you out in the "cold" after this emergency. You need thorough, complete training to be one of the skilled aviation technicians who will enjoy a *prosperous permanent career* during the peacetime years to come.

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pletely equipped shops and laboratories for every type of aviation training are here for you.

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**Serve Where You Will Be Most Valuable
to Your Country—and to Yourself**—If you are fitted

for the armed forces, enlist at once. But if you have a skill that makes you more valuable for technical service, then give that where it is needed. If you do not have the needed skill, SPARTAN will train you.

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- | | | |
|--|--|--|
| <input type="checkbox"/> Commercial Pilot | <input type="checkbox"/> Aircraft or Engine Mechanic | <input type="checkbox"/> Airline Communications |
| <input type="checkbox"/> Air Transport Pilot | <input type="checkbox"/> Aircraft Sheet Metal | <input type="checkbox"/> Private Pilot Course |
| <input type="checkbox"/> Commercial Flight Instructor | <input type="checkbox"/> Engine InstallationMechanic | <input type="checkbox"/> Weather Forecasting |
| <input type="checkbox"/> Airline Maintenance Engineering | <input type="checkbox"/> Aircraft Assembly Mechanic | <input type="checkbox"/> Instrument Technician |
| <input type="checkbox"/> Aeronautical Engineering | <input type="checkbox"/> Airline Service Mechanic | <input type="checkbox"/> Women's Instrument Technician |



Engineer of the future. This engineering student at the Casey Jones School of Aeronautics works on an actual plane design from specifications. First-term students review math, geometry, drafting, shop work.



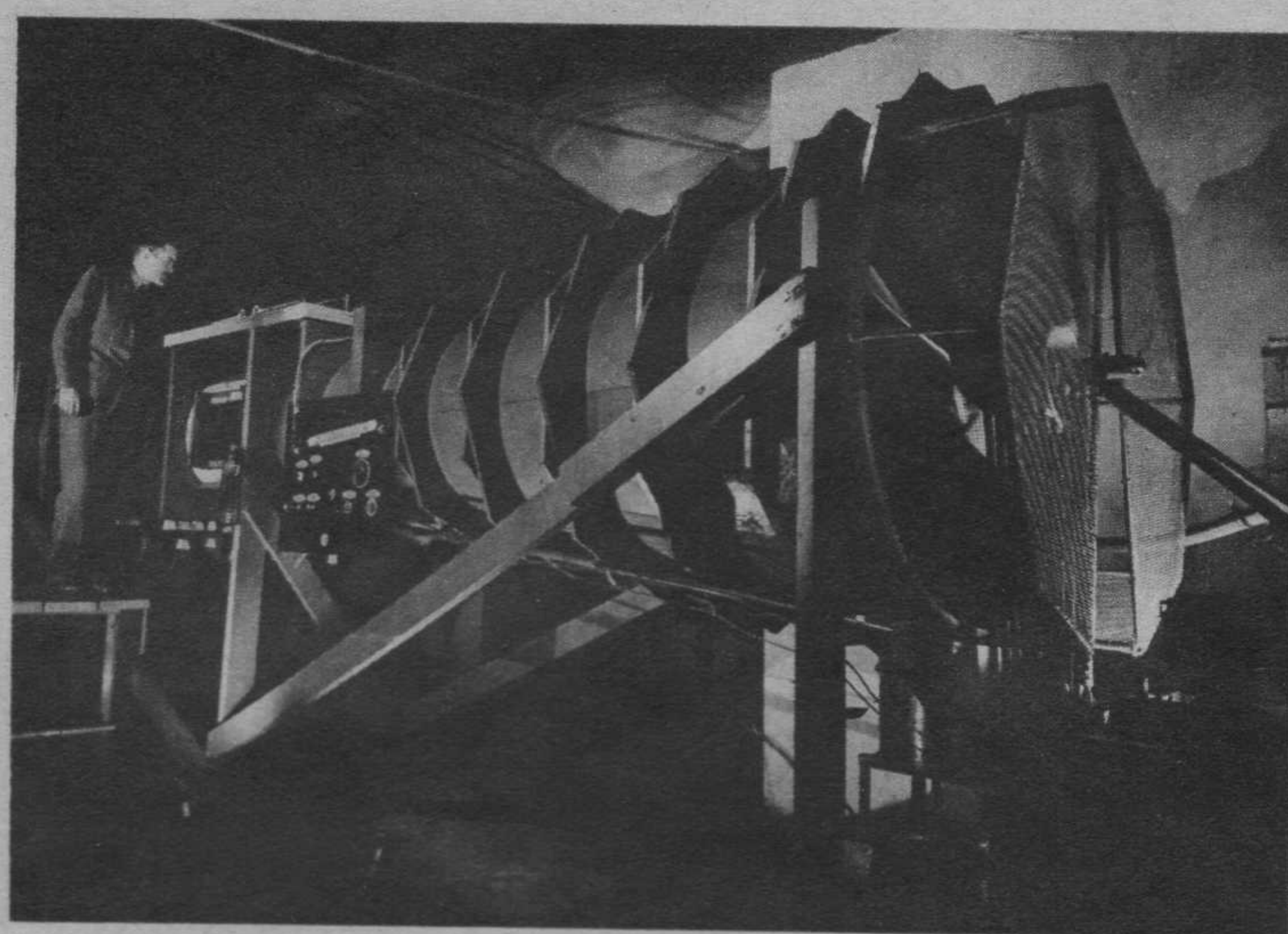
After elementary subjects are reviewed, wind-tunnel models and their reaction are studied.

Design Your Own

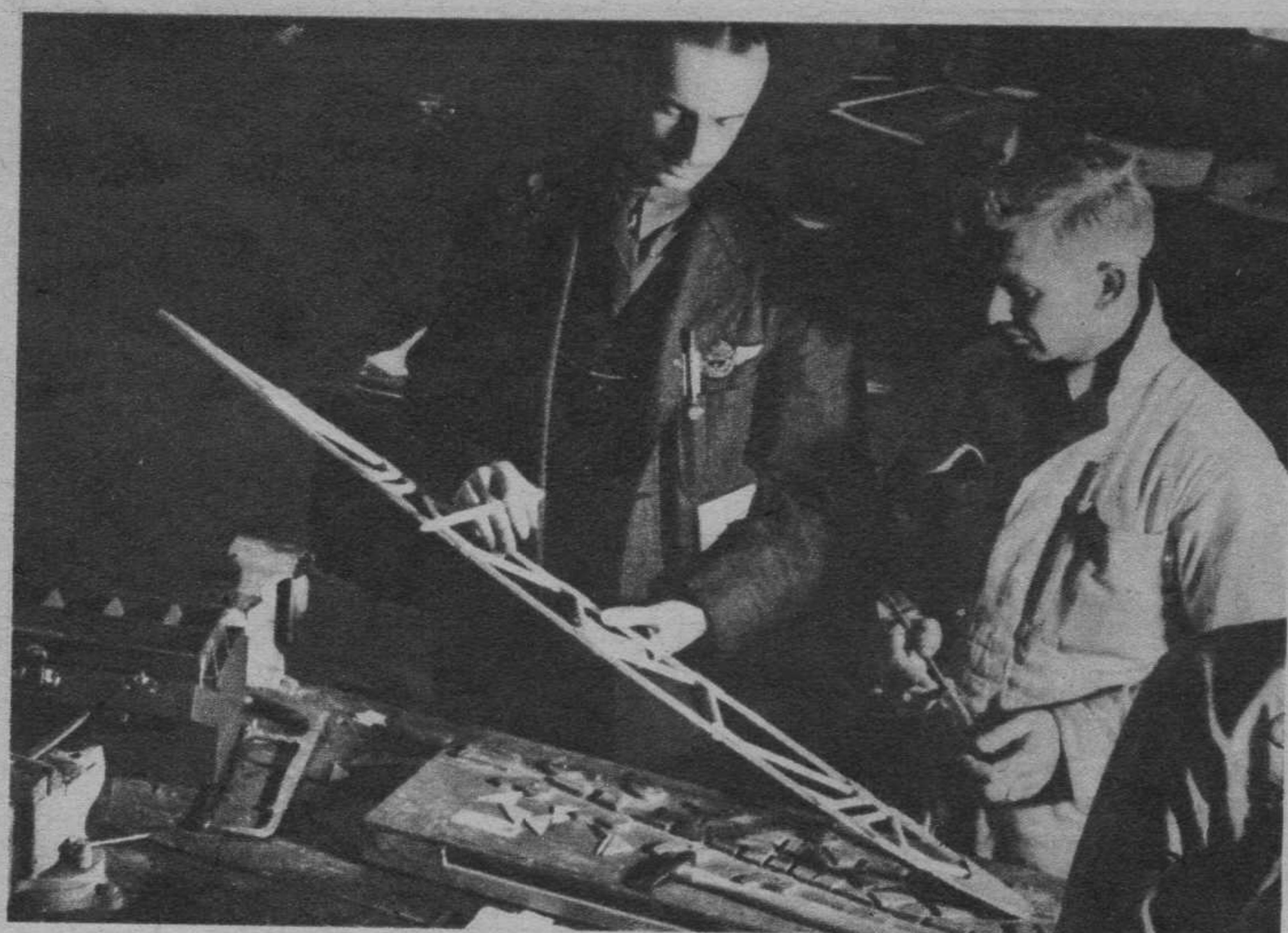
At most air schools the engineering student must design a plane from specifications. Here: Casey Jones.



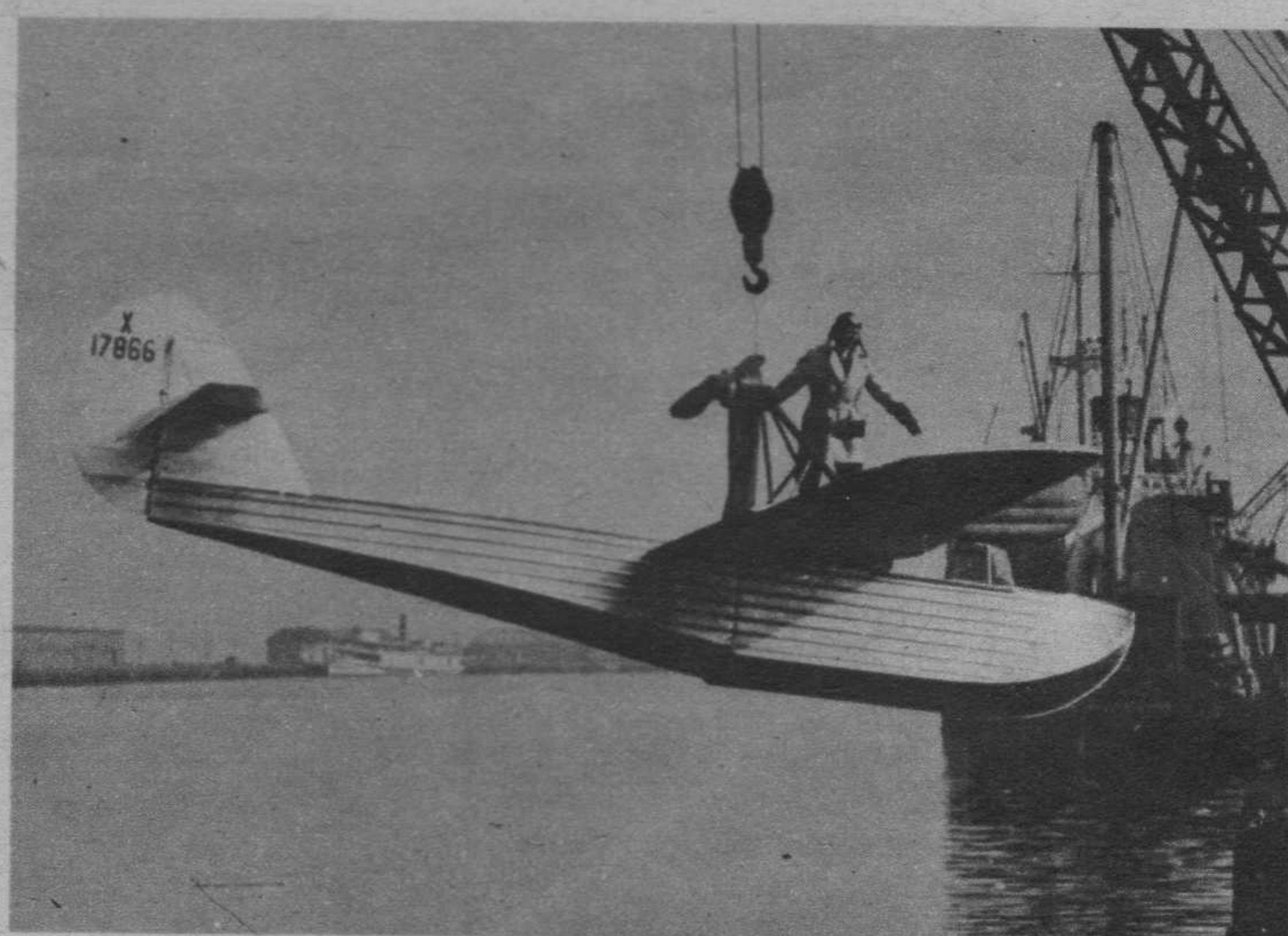
From the reaction of tunnel models, data is obtained for designing actual planes. Each student works from individual specifications given him by instructor. Many of these classroom-blueprint planes show promise.



During the junior year Casey Jones students study advanced aerodynamics, calculus and kindred subjects needed for complicated flight formulae. In this tunnel this data goes into actual use on test models to scale.



In the shop, test ribs designed by students are built and tested for the indicated strength. If they fail to stand up, the student redesigns them until they do. Thus actual work proves the student's design theories.



Some of the student designs show such progress and merit they are developed further. This light seaplane, designed by Ray Applegate, was completed in the school shop. Aviation designers have rosy future.

Convoy of Commerce

Off shore...above coastal sea lanes... among islands... Lockheed Hudson bombers fly guard over ships that carry men and supplies to all our fighting fronts.

These vigilant sentinels are heirs of the first Lockheed Hudson—first American ship to serve with Britain's Coastal Command. In structure, they are the same tough transport design that needed few changes to become a famous bomber.

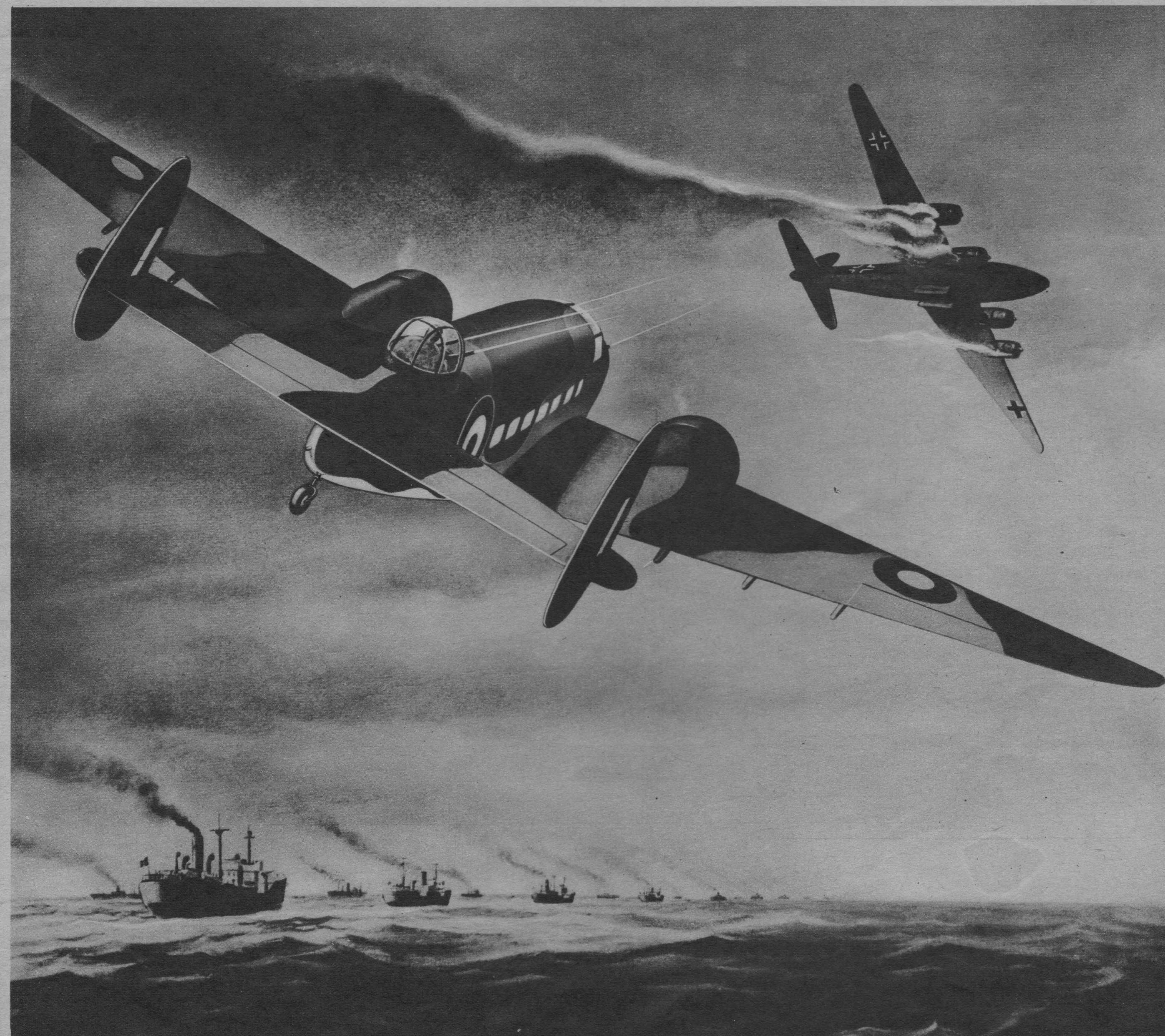
In armament, they are superior...re-armed and turreted to take full advantage of the lessons of total war.

In tradition of performance, they live up to the reputation of the Hudsons that helped perform the miracle of Dunkerque...smashing hard, smashing often, to crush our Axis foes.

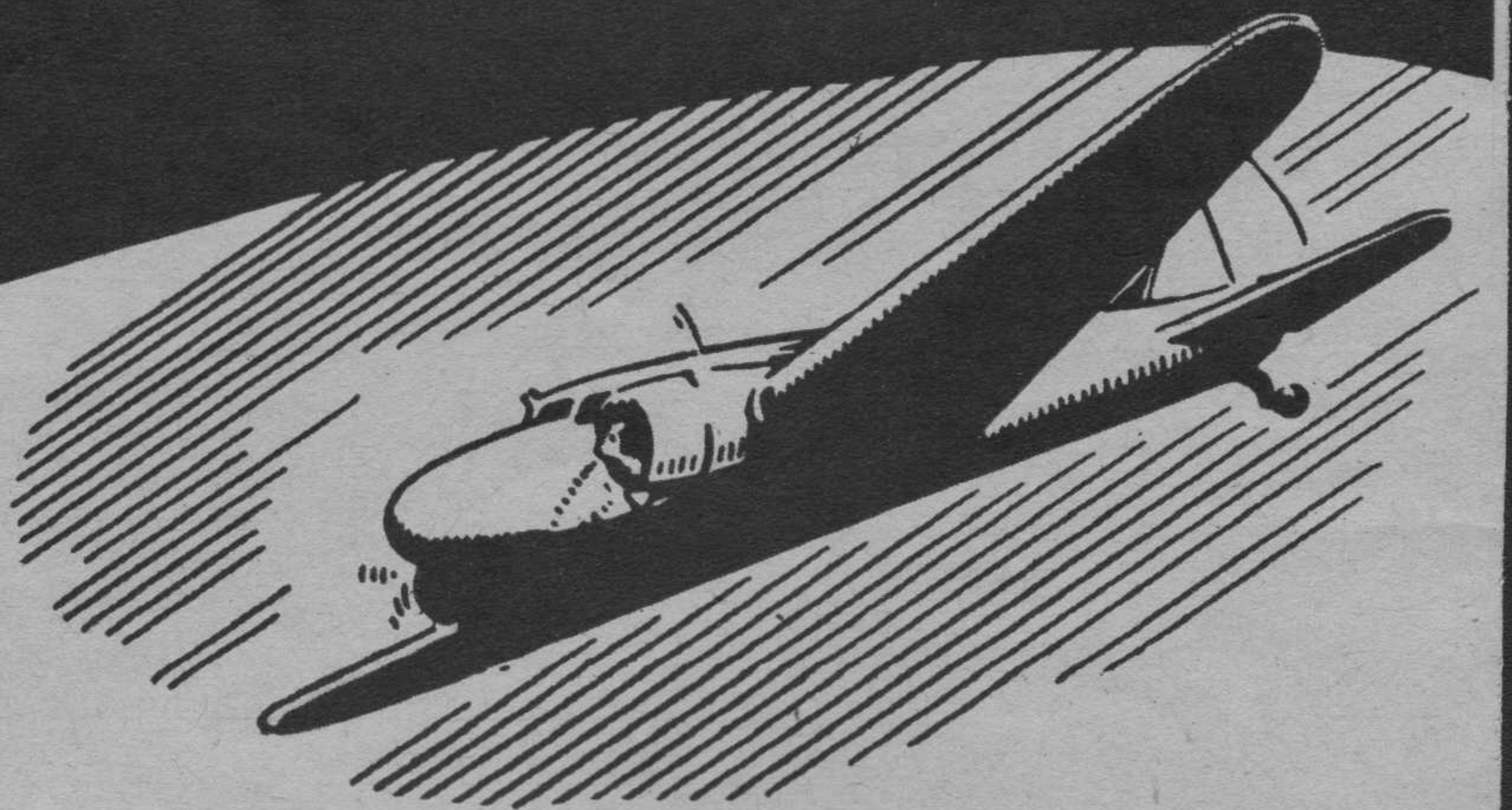
**... for Protection today
and Progress tomorrow**



LOOK TO *Lockheed* FOR LEADERSHIP



You CAN'T zoom into an AVIATION CAREER!



Yes! Aircraft builders need trained men. . . .

Yes! Aviation demands skill and knowledge and trained intelligence.

But! U. S. aircraft manufacturers want, and want badly, key-men—not “bolters and nutters,” who have to ask “where does this little bolt go, Bill?”—the type of men who, in the words of Svend Pedersen, Director of Education and Public Relations of the Lockheed Aircraft Corporation, “make up the backbone of such an organization”!

By what yardstick are these key-men measured at Lockheed? Four years’ apprenticeship! There isn’t any “zooming” into aircraft careers at Lockheed, or any other important aircraft plant!

There is just as much skill and knowledge and intelligence demanded of “aircraftsmen”—those men on whom rests one of the greatest responsibilities ever handed to industrial workers—as on the men who make up the backbone of any other industry.

There has been too much loose talk about “Aircraft Production Training Courses,” and “Aircraftsmen Trained in Four Weeks,” and “Zooming into an Aviation Career.” We’ve got to be honest about this matter.

“Aircraftsmanship,” the knowledge and skill that must predominate among aircraft workers, is not something to be obtained “overnight,” or by reading a few short articles.

It is unfortunate that only those connected with the aircraft industry

appreciate the absolute necessity of special training of all aircraft personnel.

And here’s how I. C. S. handles the problem:

I. C. S. has paid to specialists in the past three years \$34,740 for the data only, from which training for Aircraft Mechanics and Aviators is provided . . . \$6244 for one subject only—“The Aviation Engine”; \$2552 for “Sheet Metal Work”; \$2843 for “Measuring Instruments”; \$1536 for “Aviation Engine Ignition.”

That gives you an idea as to how “Specialists” do the job.

If you’re looking for a “career” in aviation, if you’re aiming to become a key-man in the aircraft industry, if your objective is more than to be a “cog” in the machine or a “number” on the

assembly line, don’t be mistaken: You’ve got your work cut out for you. You can’t reach these objectives by any quicker process than have those select few who are the “backbone” of the industry today. They worked, they studied, and they studied from authoritative instructional data, and under the guidance of a competent faculty.

I. C. S. Training is designed and conducted to make these objectives possible. It is not an educational Irish stew . . . a conglomeration of unrelated facts. It is real . . . thorough . . . practical and approved by unquestionable acceptance.

If you’re a man with a definite objective in the Aviation Industry, we will be glad to send you the truth about a Career in Aviation. A letter or a post-card will bring information . . . or use the coupon.

INTERNATIONAL CORRESPONDENCE SCHOOLS

BOX 4930-D, SCRANTON, PENNA.

Please send my free copy of “AVIATION OPPORTUNITIES,” and complete information on the course marked.

- ☐ AIR PILOT
- ☐ AVIATION MECHANIC
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- ☐ AVIATION ENGINES

- ☐ AVIATOR
- ☐ AIRPLANE DRAFTING
- ☐ FUNDAMENTALS OF AERONAUTICAL ENGINEERING

Name _____ Age _____

Address _____

City _____ State _____





NOTE TO AN AXIS AIRMAN*

Remember this lad? That's right, he's one of the guys you strafed on the ground somewhere East of Suez. He didn't stay on the ground? That's just too bad, but that's not an American habit. ☆☆☆ American pilots are performing the splendid two-fisted job we've learned to expect, but they must have first-class equipment to win the ultimate victory. ☆☆☆ Aeronca has dedicated itself to an "all out" pledge in devoting its energy and resources to the Armed Forces of the United States in order to assure victory in the shortest possible time. ☆☆☆ The Aeronca Aircraft Corp., Middletown, Ohio, U.S.A.

*SINCE DECEASED



The Aeronca Victory Award

The Aeronca Aircraft Corporation pledges its entire resources of equipment and experience to produce only the finest in material and manufacture for the men who are privileged to fly for their country. ☆☆☆ The — Aeronca Victory Awards — presented to employees for skill that develops better products or creates time-saving operations — is our dedication of an "all out" pledge to win the war in the shortest space of time.



AERONCA

We built the first sub actually to hold a plane, back in 1925. Have our enemies, since then, developed under-sea carriers of giant dimensions and possibilities?

THE telephone connected by direct wire to the interceptor command rang at 21:38 that night. It was no ordinary telephone bell, but a gong that clanged a loud rattling alarm which could be heard through the entire hangar. The twenty-five interceptor pilots on the night alert rose instantly from their chairs and cots. They stood in silence, their eyes fixed on the major at the telephone. He took notes rapidly, then asked for a repeat, which he checked. "Right. . . . Right. . . . Right. . . ."

Heard above the officer's sharp staccato was the sound of men running. They were the mechanics, reporting the planes on the apron. They opened the "greenhouse" hatches, and when the pilots arrived they helped them into the cockpits, checked their safety belts and parachute harness and handed them their oxygen masks. Then the mechs saluted: "Good luck, sir." The pilots nodded solemnly.

Two hours later, with fuel dwindling to a critical point, the formation returned from a futile search. The ephemeral planes had vanished as completely and mysteriously as those that startled San Francisco into two blackouts December 8th, the night after Pearl Harbor, and last January 3rd.

In both forays the planes came from seaward. Apparently they set their course by radio co-ordination, using the beams of the commercial broadcasting stations. But when the stations were put off the air by the blackout, the invaders lost their way and scurried back to sea. But not before they had been detected by the army authorities, who described them as "undoubtedly enemy aircraft."

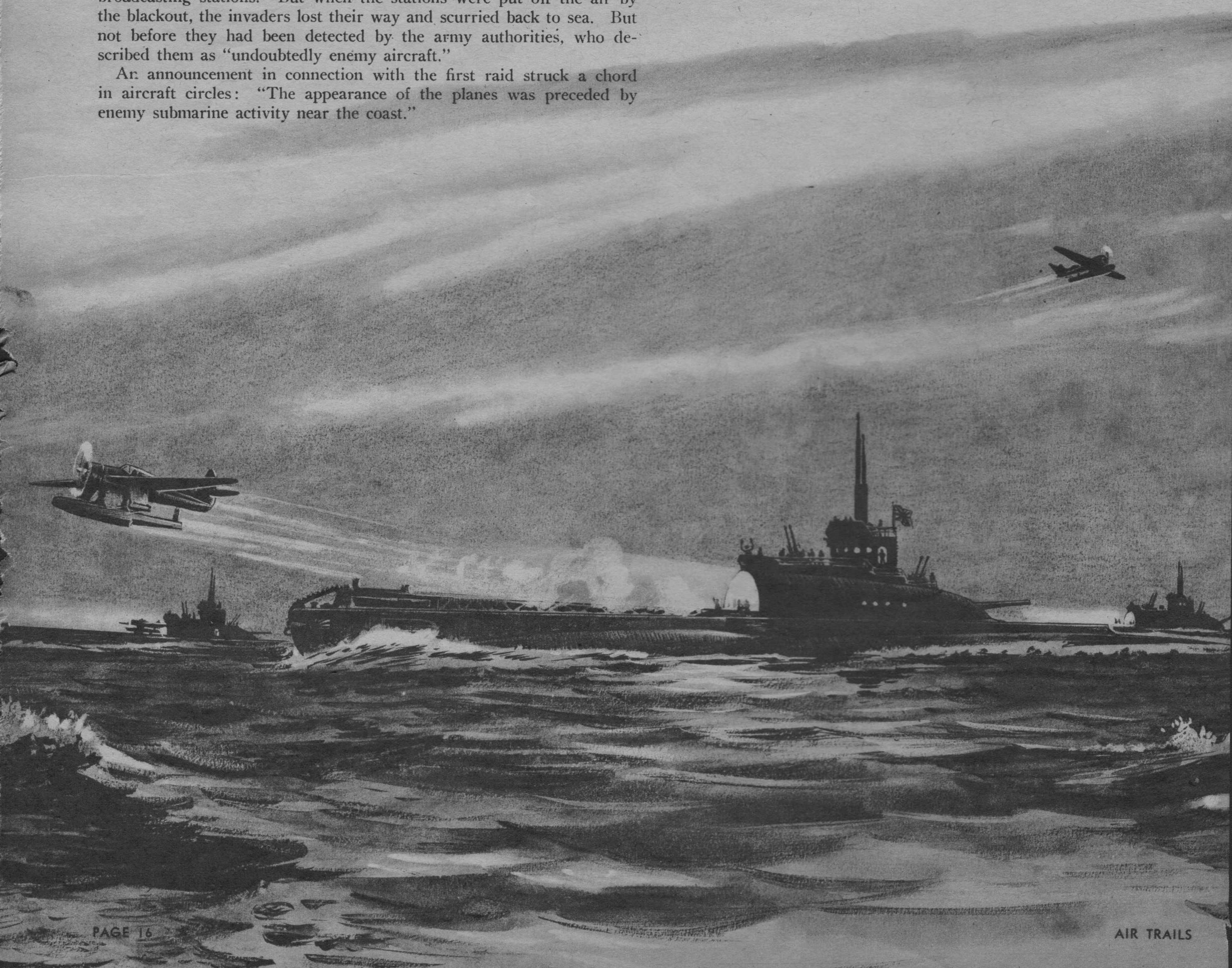
An announcement in connection with the first raid struck a chord in aircraft circles: "The appearance of the planes was preceded by enemy submarine activity near the coast."

"Could it be," speculated several officers, "that a submersible aircraft carrier is out there?"

The theory of a submarine aircraft carrier is not as fantastic as some might think. In 1925, the Glenn L. Martin Co. built a small seaplane scout for the navy to experiment with on an S-series submarine. The little scout was built so it could be dismantled and stowed in a deck hangar aft of the conning tower. It was launched by submerging the stern until the scout rode on its pontoons. The tests were successful, but the parsimony of congressional appropriations caused further development to be abandoned. England, however, followed the American experiment by building a deck hangar on the submarine M-2. The British scout had folding wings and the hangar was forward of the conning tower. The plane was launched by catapult.

The next step in submarine aircraft development was taken November 8, 1929, when the French launched *le Surcouf* at Cherbourg. It was at that time the world's largest submarine, and had a deck hangar aft of the conning tower. *Le Surcouf*, named after Robert Surcouf, famous French privateer who raided British shipping in the Indian seas early in the 19th Century, mounted an armament worthy of its namesake. There were two eight-inch guns directed forward from the deckhouse, two 37-mm. antiaircraft guns, and four machine guns on deck. It had

Submarine



ten torpedo tubes and carried twenty-two torpedoes. The giant sub had a cruising range of 12,000 miles and speeds of eighteen knots on the surface and ten knots submerged. It could dive in two minutes and go down to a depth of seventy fathoms. In tests, it remained submerged for sixty hours. Length of *le Surcouf* was 361 feet; beam, 29; and height, 23. Gross displacement was 4,304 tons. Power plants were Sulzer Diesels of 7,600 horsepower for surface operation and electric motors of 3,400 horsepower for undersea work.

The craft, like its American and British predecessors, had a deck hangar for one small plane fitted with folding wings. Its method of launching still is a military secret, but there were no signs of a catapult, so it may be assumed that the American method of launching may have been used. From last reports, *le Surcouf* was in a harbor at Martinique, a French possession in the West Indies, still under control of the Vichy government.

Simon Lake, American inventor of the modern submarine, told this writer he did not "know" whether the Axis nations have submersible aircraft carriers, but that it was "extremely likely." Mr. Lake pointed out that Germany demonstrated effectively the possibilities of long-range cargo transportation by submersibles when the *Deutschland* made two trips across the Atlantic and docked here during the other

war. He also cited the fact that the *Deutschland* got through the British blockade with "complete ease." The advance Germany has made with submarines, in size, power and range, since the *Deutschland* would enable her to send out sub carriers with as many as ten scout planes, or, perhaps a couple of light bombers in their holds, Mr. Lake said.

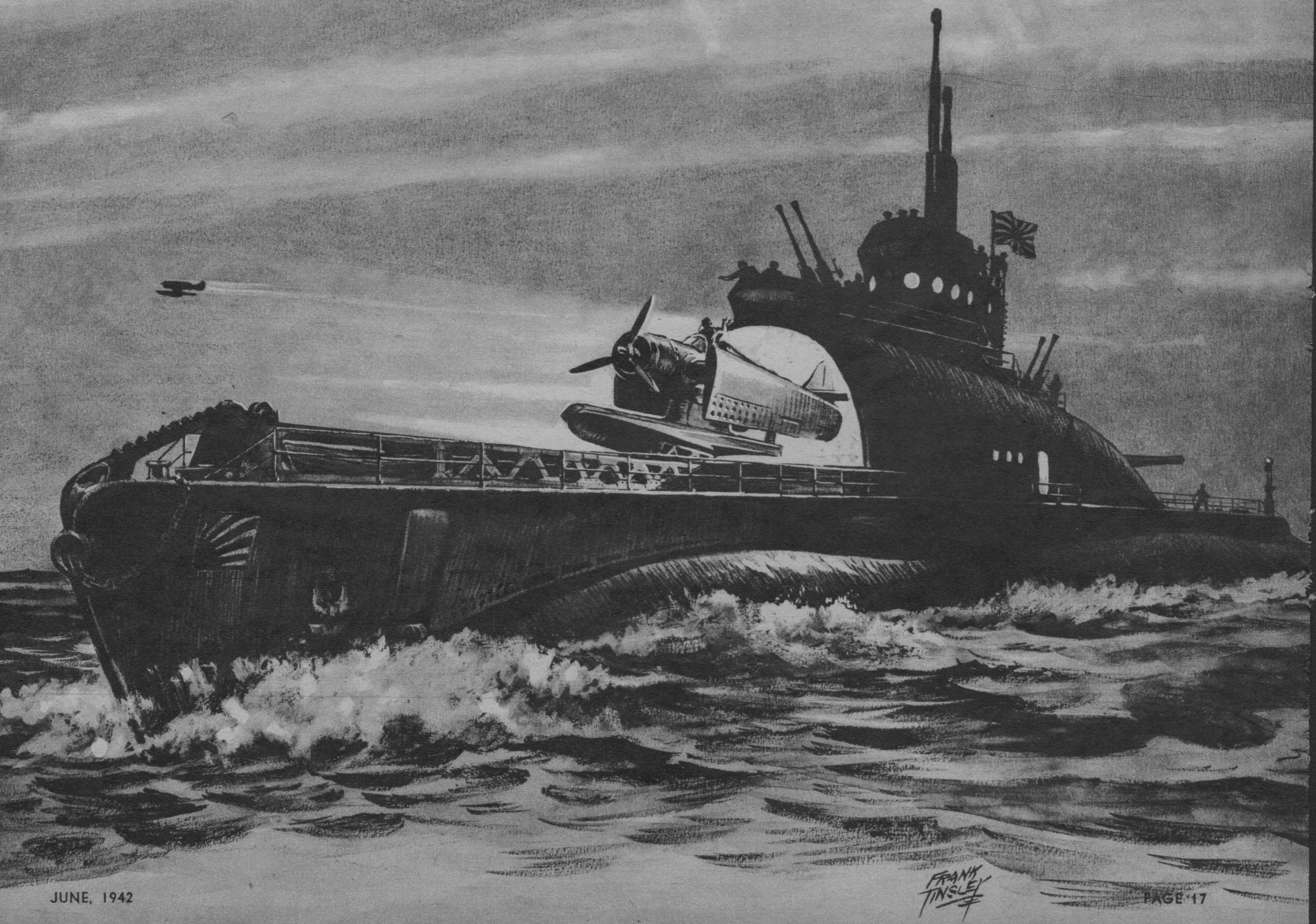
The aircraft would be hoisted to the deck by a collapsible mast, assembled on deck and launched with a cargo boom, he added. Mr. Lake favors the American method of using aircraft that can be dismantled, instead of the folding-wing types. "The wings could be stowed up-end or sidewise for space economy," he said, "thus increasing the carrier's aircraft capacity. . . . Submarine aircraft carriers," he continued, "could slip up to within twenty-five miles of their objectives. They could rest under the surface, snug as a bug in a rug, and carry out the assembling and launching at night."

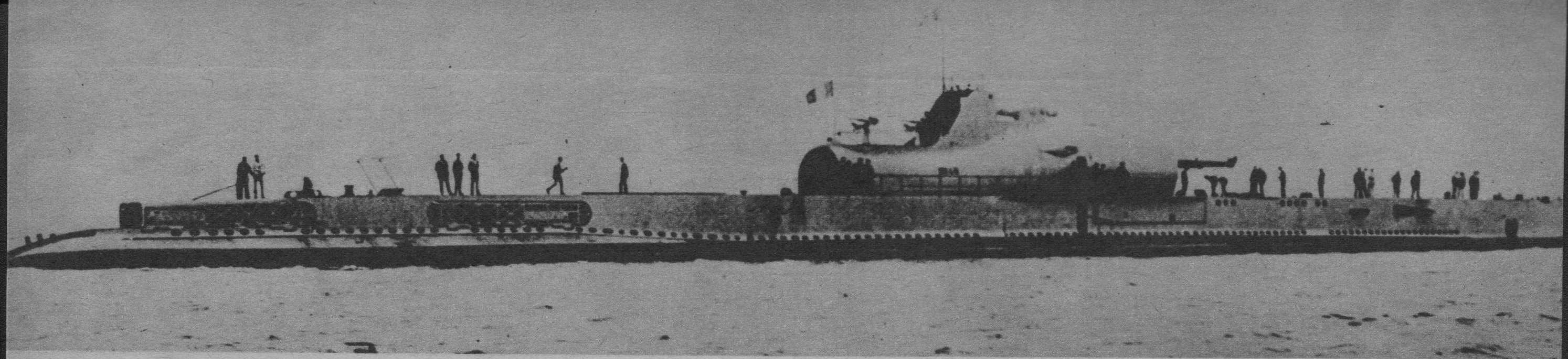
In addition to having carriers, the Axis nations could have auxiliary subs with fuel and replacement parts, he said.

Another advocate of submarine aircraft carriers is Major Alford J. Williams, famous super-speed pilot and former navy flier accredited with developing dive bombing. Recently, in his syndicated newspaper column, he said: "Why don't we build one giant submarine, the same

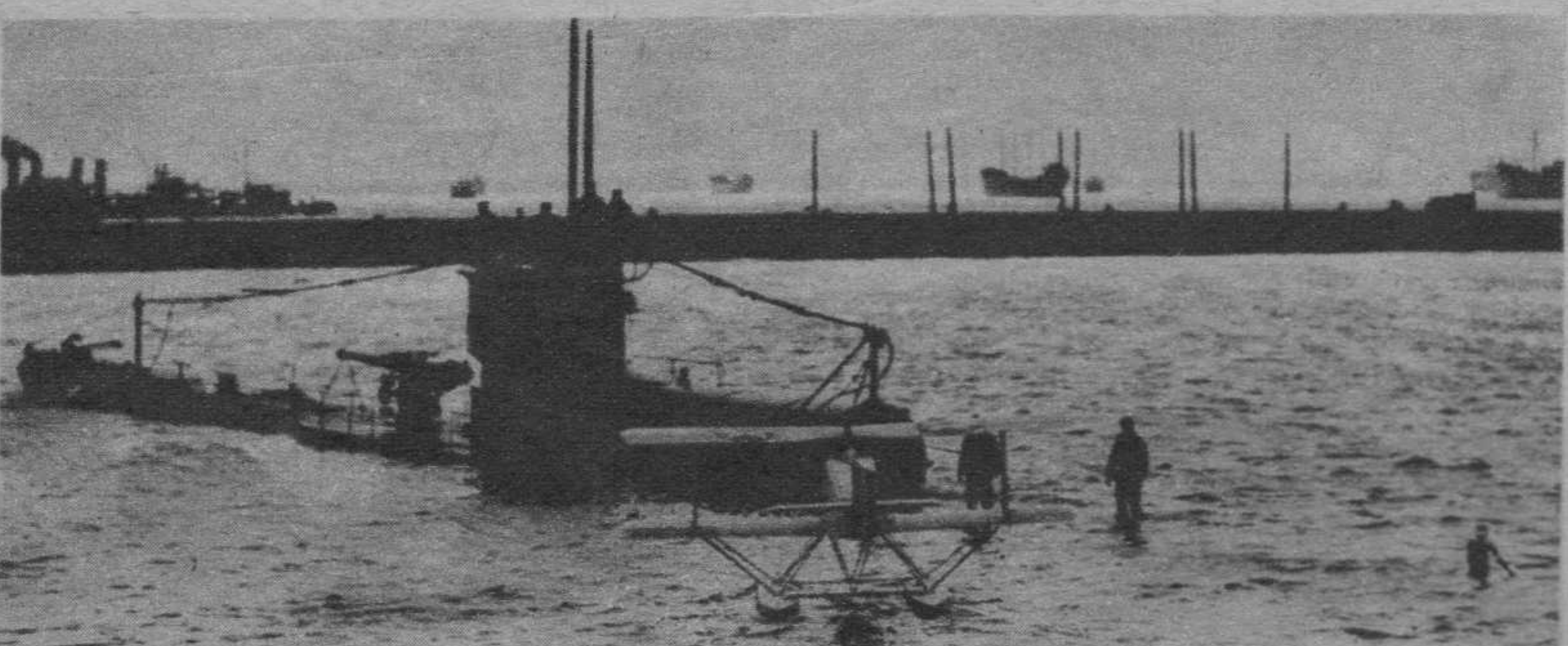
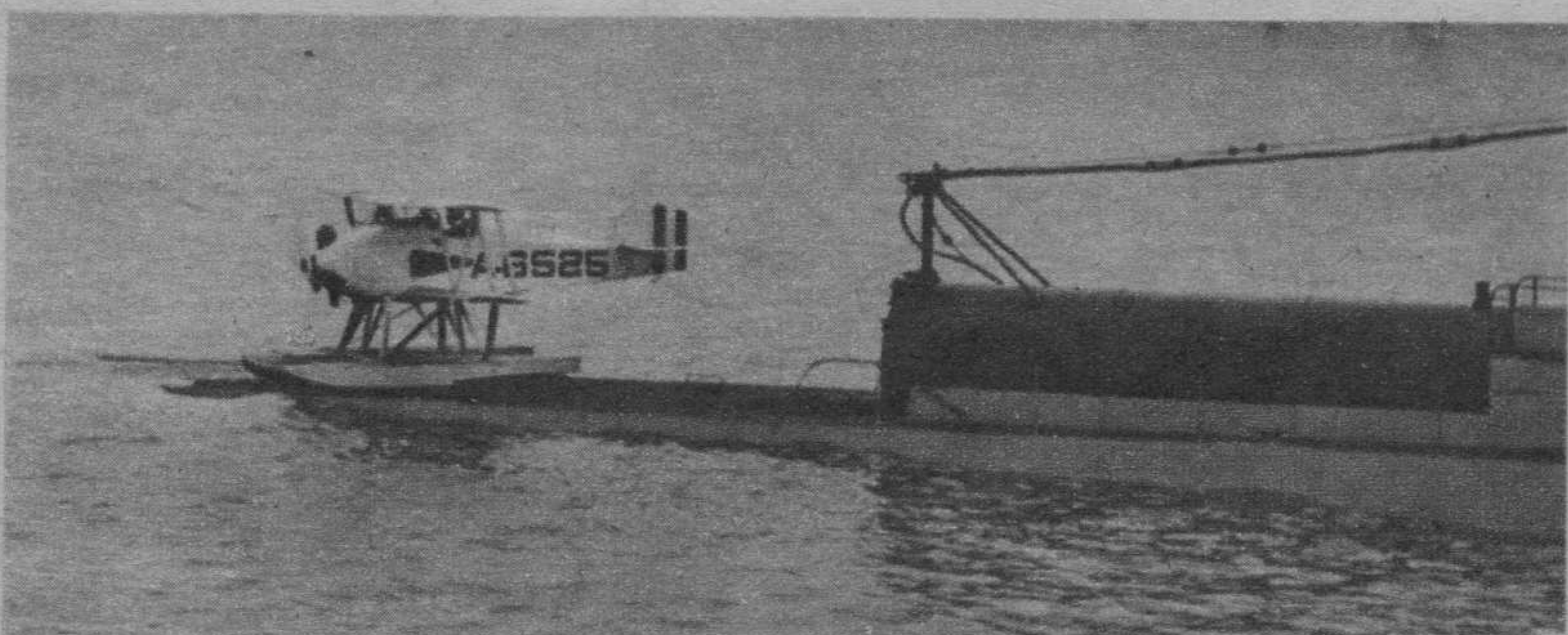
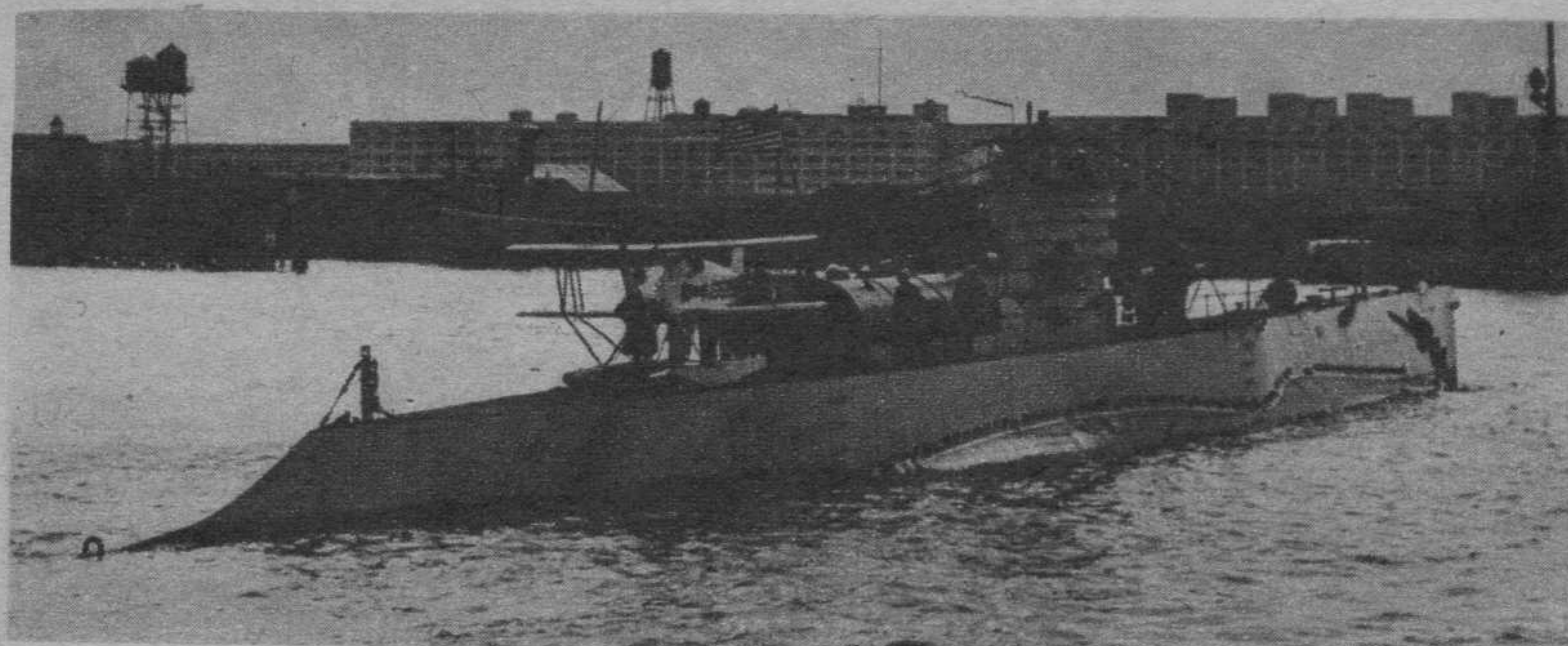
Aircraft Carriers

BY SLOAN TAYLOR





France, too, has experimented with the plane-carrying submarine. The giant Surcouf, said to be the largest submarine in the world, carries one scouting plane with folding wings.



Not so many years after the close of the first World War there appeared the first plane-carrying submarine, the U. S. S. S-1. This tiny Martin seaplane was assembled on deck and launched by submerging rear of submarine.

England's contribution to the plane-carrying submarine was the M-2, which launched its two-seater scouting plane from a catapult afterdeck assembly.

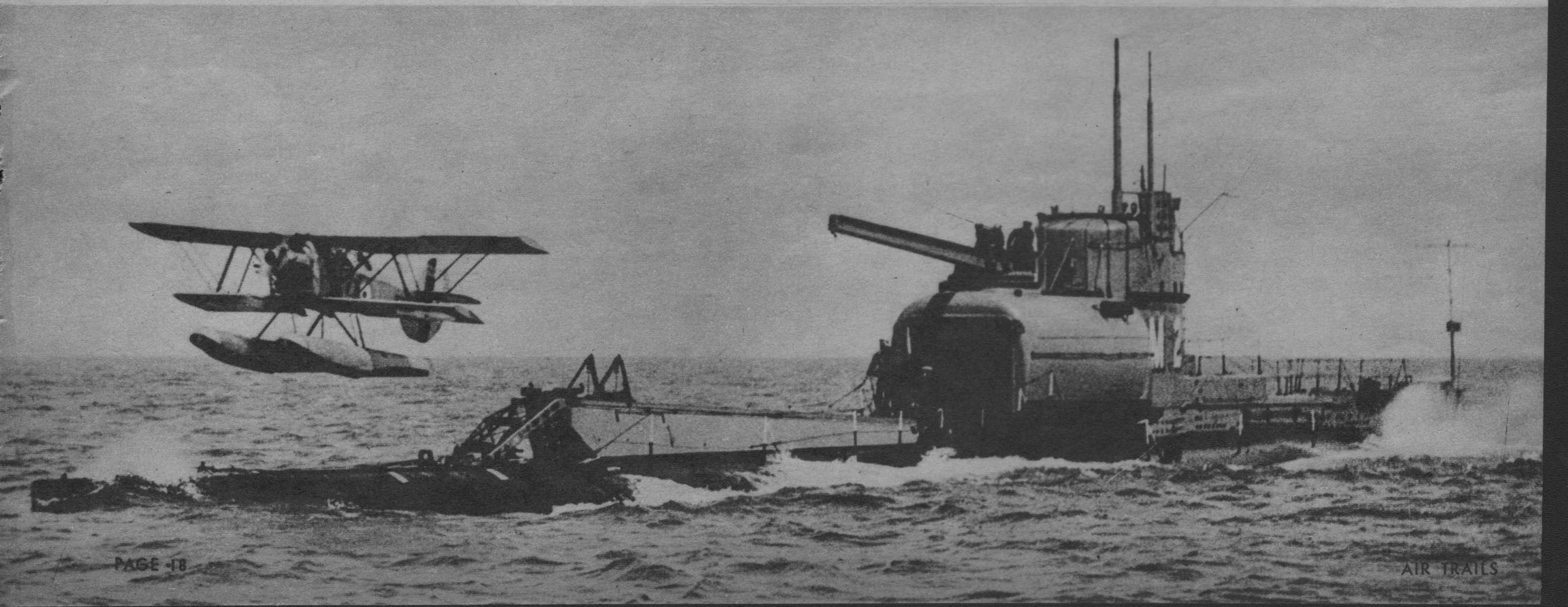
tonnage as a light cruiser (in other words, build a submarine cruiser, and probably also one submersible aircraft carrier), develop the hit-and-run principle and beat the daylights out of the rest of the world with the daring and engineering brains of which America holds a plenitude?"

Perhaps Major Williams' earnest and appropriate suggestion will be heard as a voice in the wilderness. So, let us look frankly upon the prospect we face in accepting Mr. Lake's wary but seemingly accurate résumé.

The vision of the possibility of an attack by these monsters, especially when they are in the hands of monsters, is not a lovely one. Already, submarines have shelled and torpedoed United Nations' ships within sight of our Atlantic coast. With a flotilla of submersible aircraft carriers, supported by mother ships cruising safely two or three hundred miles at sea, the enemy could penetrate the country too deep for comfort.

If the mission were purely reconnaissance, one or two of these ships with a range of at least one thousand miles would be launched just off the coast, making it difficult to detect and intercept them before the ships were far inland. At night infrared photos could be taken, transmitted to the waiting sub by radio or television, in case the plane feared interception, and then return to be picked up by the submersible at a prearranged spot at sea. If the planes do not return, the sub commander has his pictures and information. For this sort of work, probably, special small black planes might be carried, or special radio-photo-equipped planes.

A bomber attack by a sub-borne fleet carries a vastly impressive set of implications. With a range of at least one thousand miles and a bomb load of roughly a thousand pounds each, this fleet could operate with what looks like very worth-while effectiveness. For example, should such an attack be launched from close inshore off New York, the fleet might split up into various units, with the planes from each submersible aimed at a different target. Get out your map of the United States and with the point of a compass just off New York swing a five-hundred-mile semicircle around this launching point. The area it incloses will amaze you! For example, it will reach from the lower part of New Brunswick to the lower end of North Carolina along the coast and far enough inland to include all of Lake (Turn to page 60)





Axis Bombers— U. S. Bound

BY JAMES L. H. PECK

Let's take a load-and-range look at the various types of ships that would bomb us—considering, also, the likely methods.

TO what extent Axis bombing of American soil takes place will depend largely upon, first, how expensive we can make it for the venturesome Axis raiders; secondly, the available quantity of their bombers that are capable of negotiating the distances; and, thirdly, the bombing scheme Hitler and his partners intend to carry out against America.

During the epic debacle of the Battle of Britain, Adolf lost probably the last chance he'll have to get on English soil simply because the Royal Air Force took greater toll of Nazi craft than the Luftwaffe could afford to lose—the damage they did notwithstanding. Luftwaffe losses were so great during attempts at bombing Moscow last summer that Goering's boys soon gave it up as a bad job. The efficiency of American naval, aerial, and ground antiaircraft defenses—together with the public's psychological preparation and condition—will determine for the Axis commanders whether or not the efforts of attempting raids on continental U. S. are worth the effort. If our defenses cost them too many men and machines and if there is little or no hysteria and confusion on the part of the populace, we can make it too costly for repetition. But Hitler must, and will, try to bomb us in order to find out how much the effort will cost him.

Because of the greater distances involved in crossing the Pacific, we may reasonably expect Axis raiders to favor the shorter Atlantic approach. There is still another reason why the East may be chosen. Although there are several aircraft factories and naval establishments along the Pacific coast, there is a greater concentration of war industry and of population along, or near, the Atlantic coast. There are several methods by which attack might be launched, and, in most of these cases, different types of planes would be used for each method because



Enemy bombers attacking America will have to elude the 24-hour watch of more than a million volunteer observers of the Aircraft Warning Service.

of the varying distances to be negotiated and for other reasons which will become apparent.

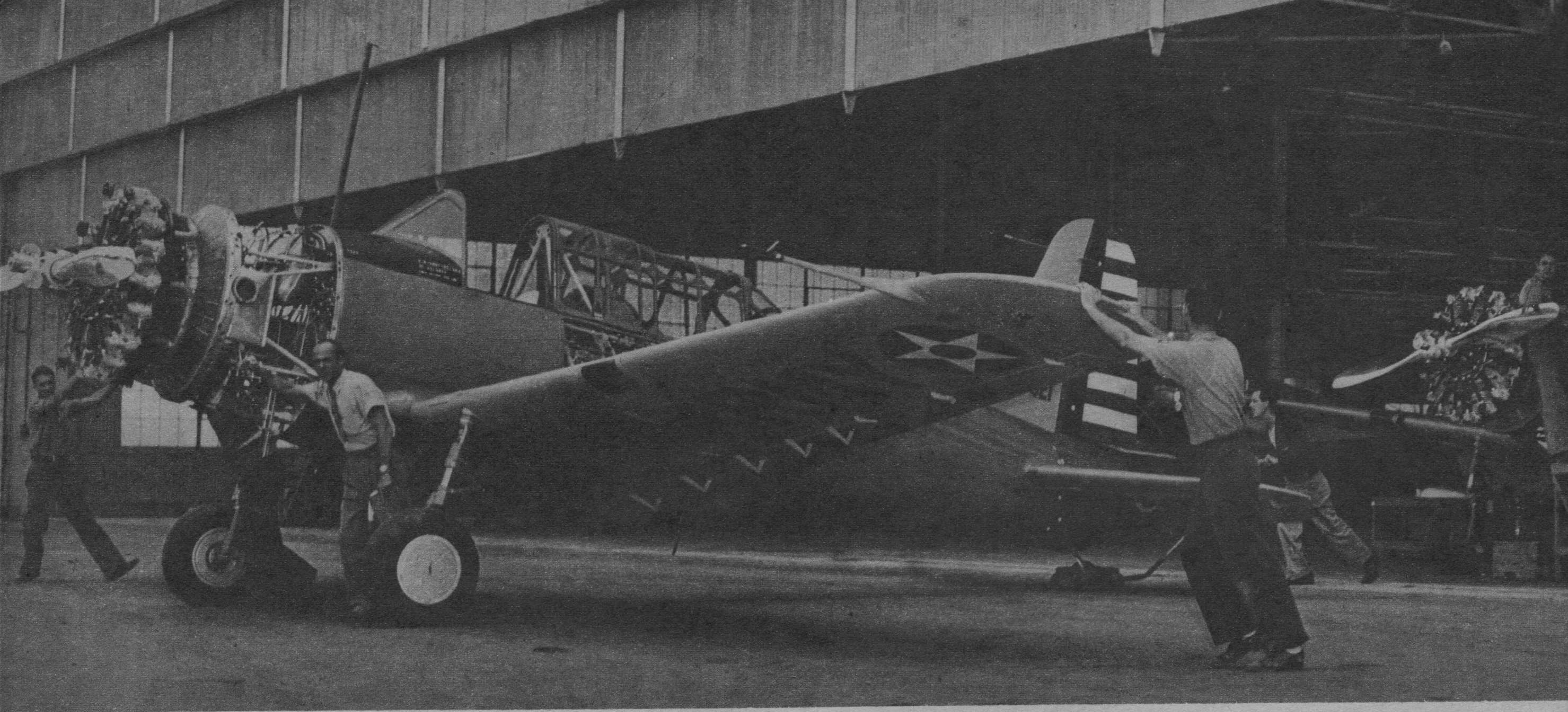
Recent reports from British sources which have proved accurate in the past reveal that the Luftwaffe has available several hundred long-range bombers, most of which are of new type, and of which only relatively few have been used to date. This ties in with other reports that the Nazis have redesigned a number of their newest transports and sea-planes to function as bombers; these, of course, are in addition to several known new bomber prototypes.

Among these new long-range bomber landplane prototypes are the Gotha Go. 155, Junkers Ju. 96, Focke-Wulf 200K2, Heinkel He. 116 and 177, and the Blohm & Voss 142—all large four-motored ships.

The Gotha Go. 155 has been in design for more than three years and has undergone several modifications; it is reported to be Germany's fastest long-range plane, having a top speed of 340 miles per hour and a range of more than 4,000 miles with reduced bomb load. It is powered by four 1,375 h. p. Daimler-Benz motors, is armed with two power turrets, and carries a crew of seven.

The Junkers Ju. 96 is better known. It is an improved model of the Ju. 89 and is powered by four Junkers Jumo 1,200 h. p. engines. It has a wing span of 95 feet and is 64.5 feet long and has a useful load of 20,000 pounds. Speed is about 300 m. p. h., and the ship has a range of 3,300 miles.

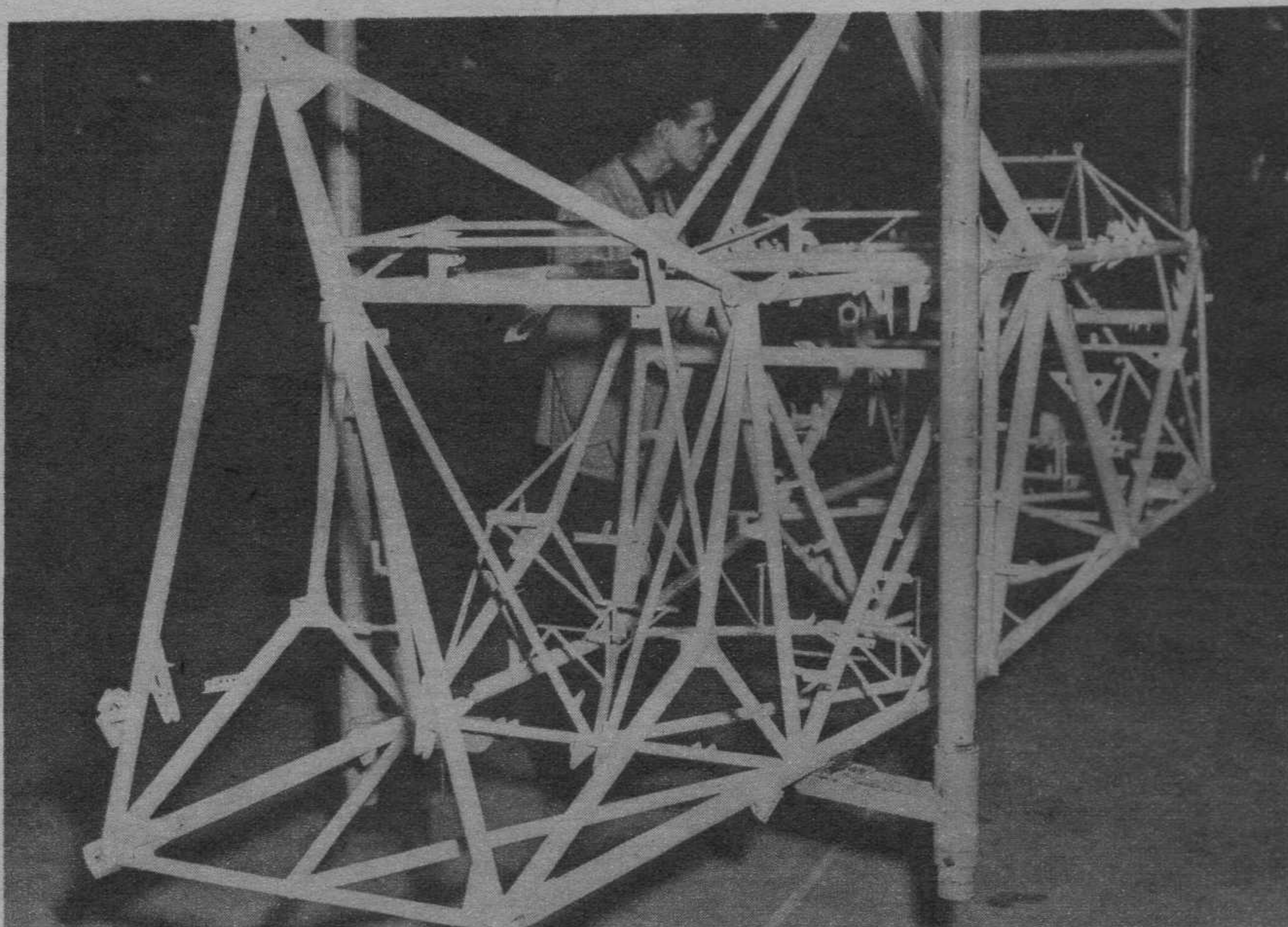
(Turn to page 50)



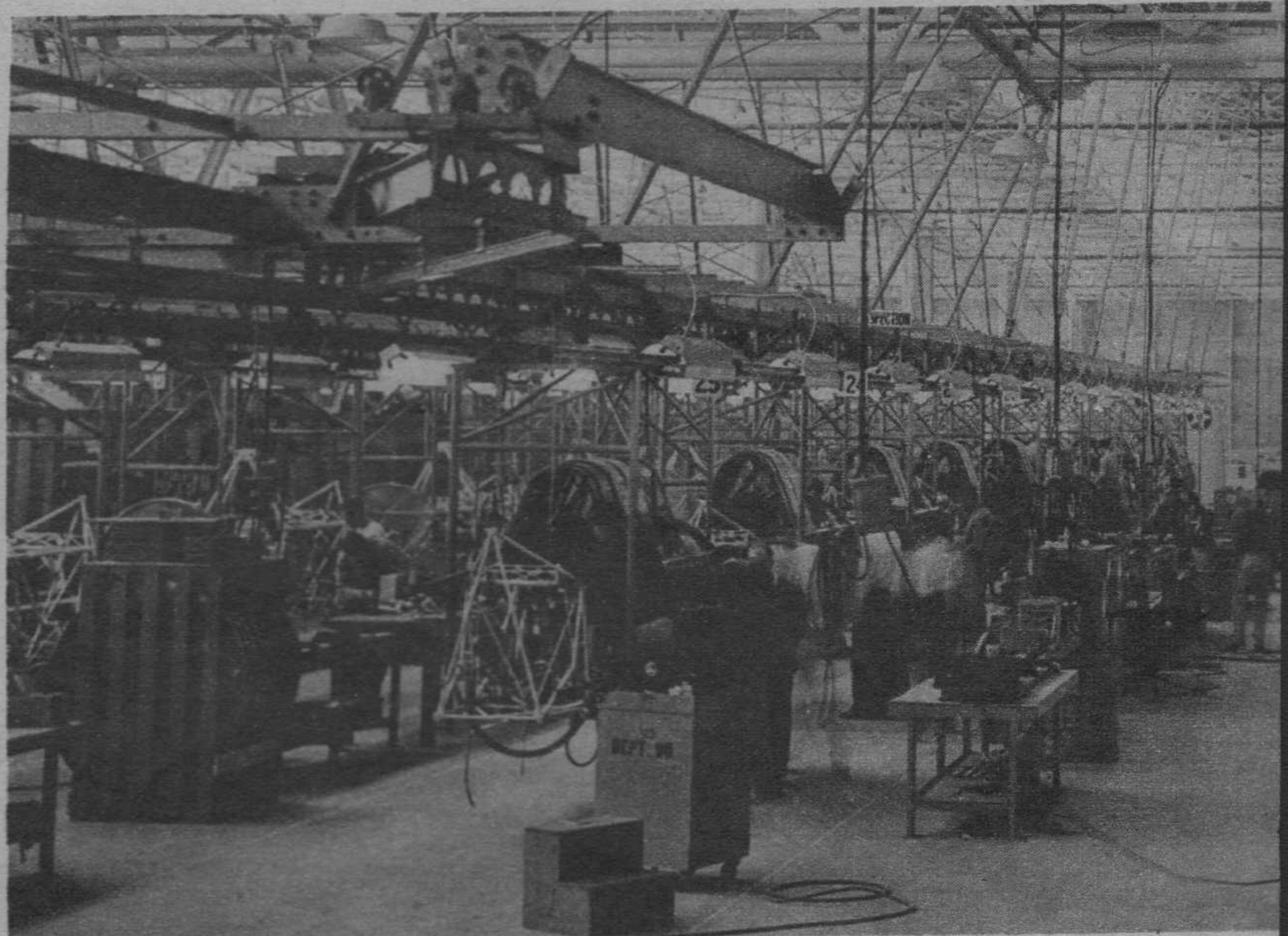
From the ever-rolling production lines of the Vultee plant come these basic trainers for our cadets. All that is lacking now is the engine cowling, which is added in test per

Valiant Production

With a unique production system, Vultee is turning out Valiant trainers in record-breaking fashion. Watch 'em come off the line.

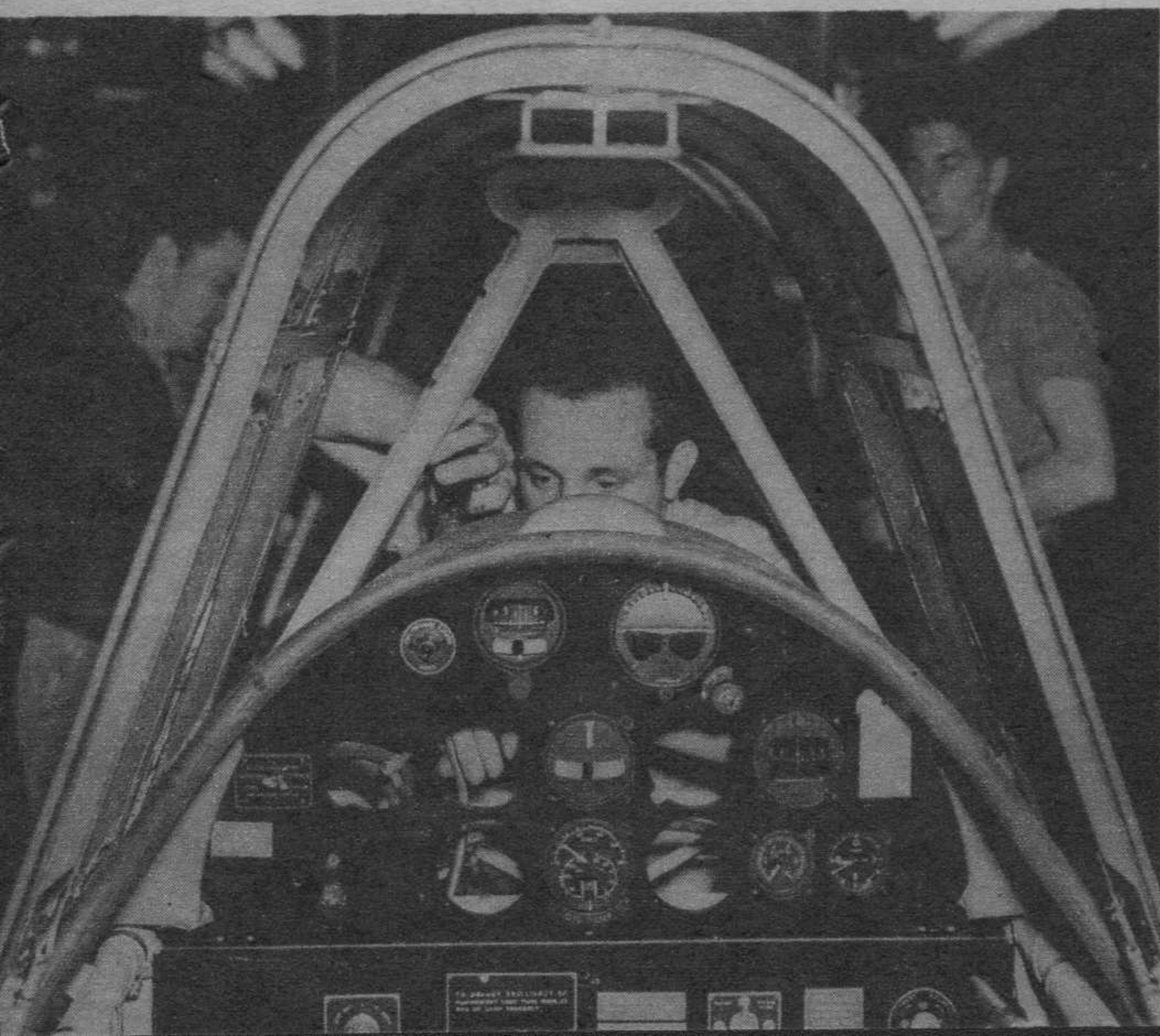


The skeleton of a basic trainer starts down the line. To this sturdy welded cockpit section are added the various parts and subassemblies that complete the ship.



To this first section are added cowlings, wiring, seats and other details as it travels along the overhead conveyor track. Each step adds new accessories to its frame.

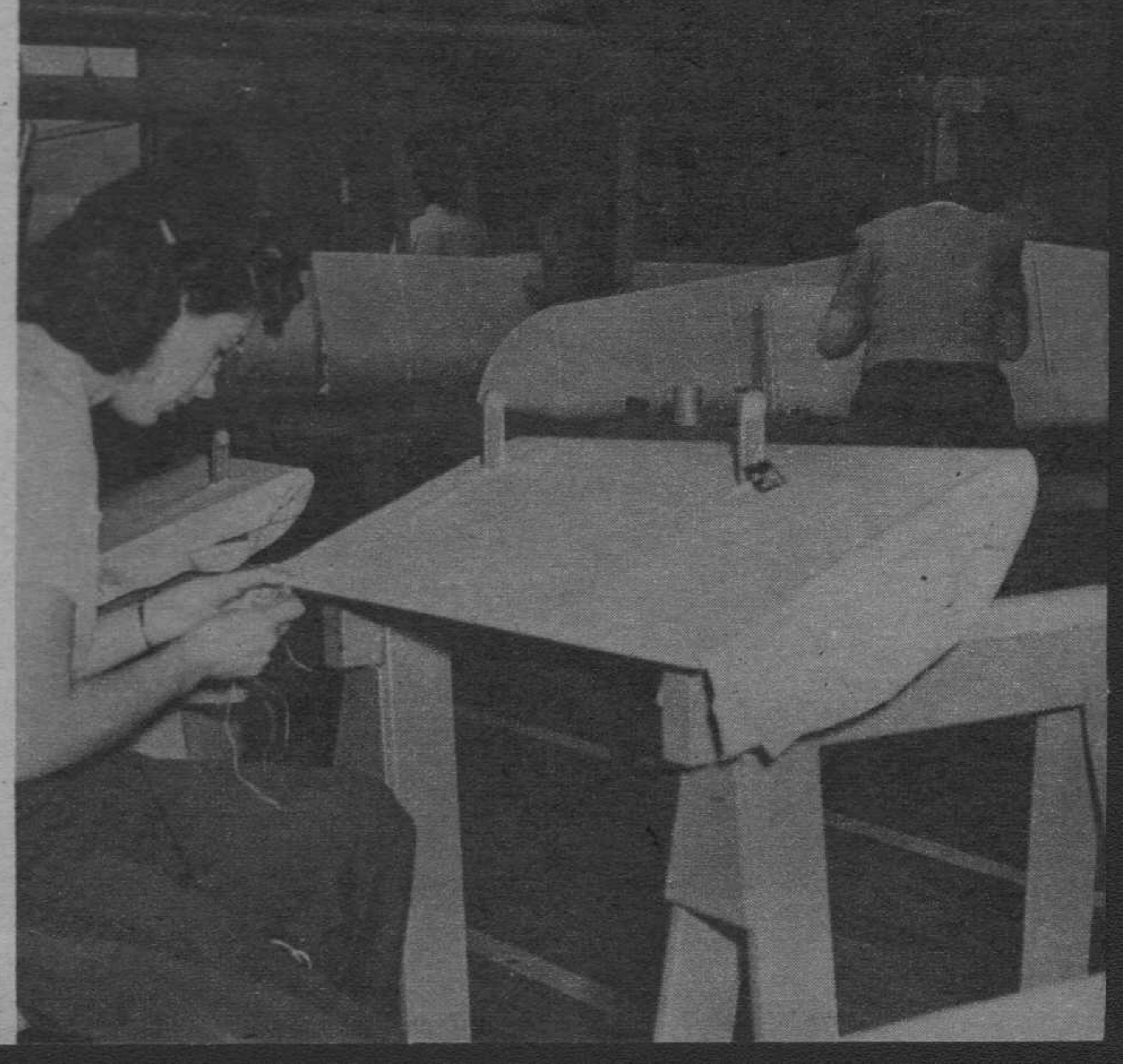
Fitting instruments and wiring. Inverted V strut above instrument board protects crew in turnover.

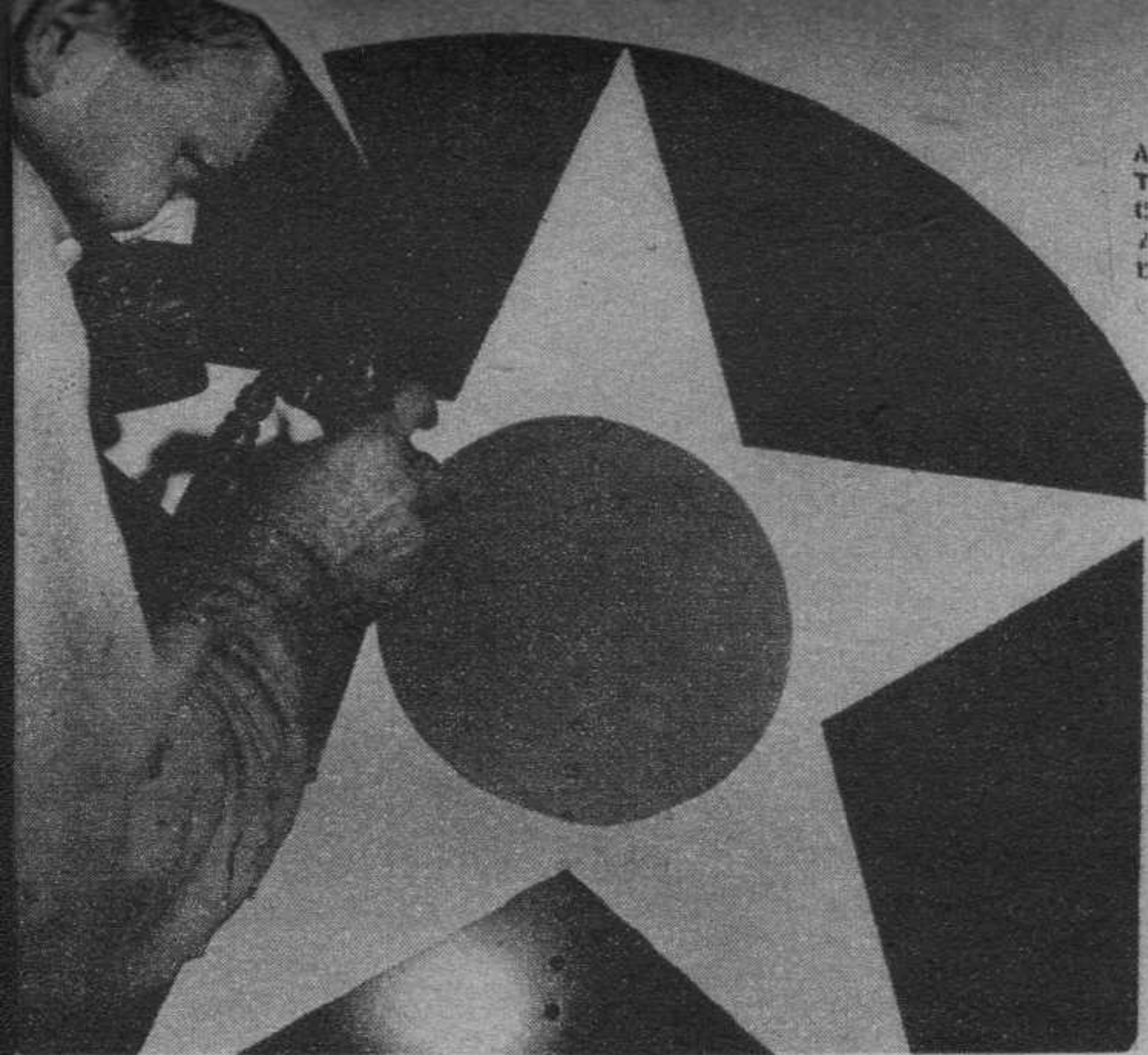


Tail assembly when finished goes to paint room, then is added to original cockpit section on line.

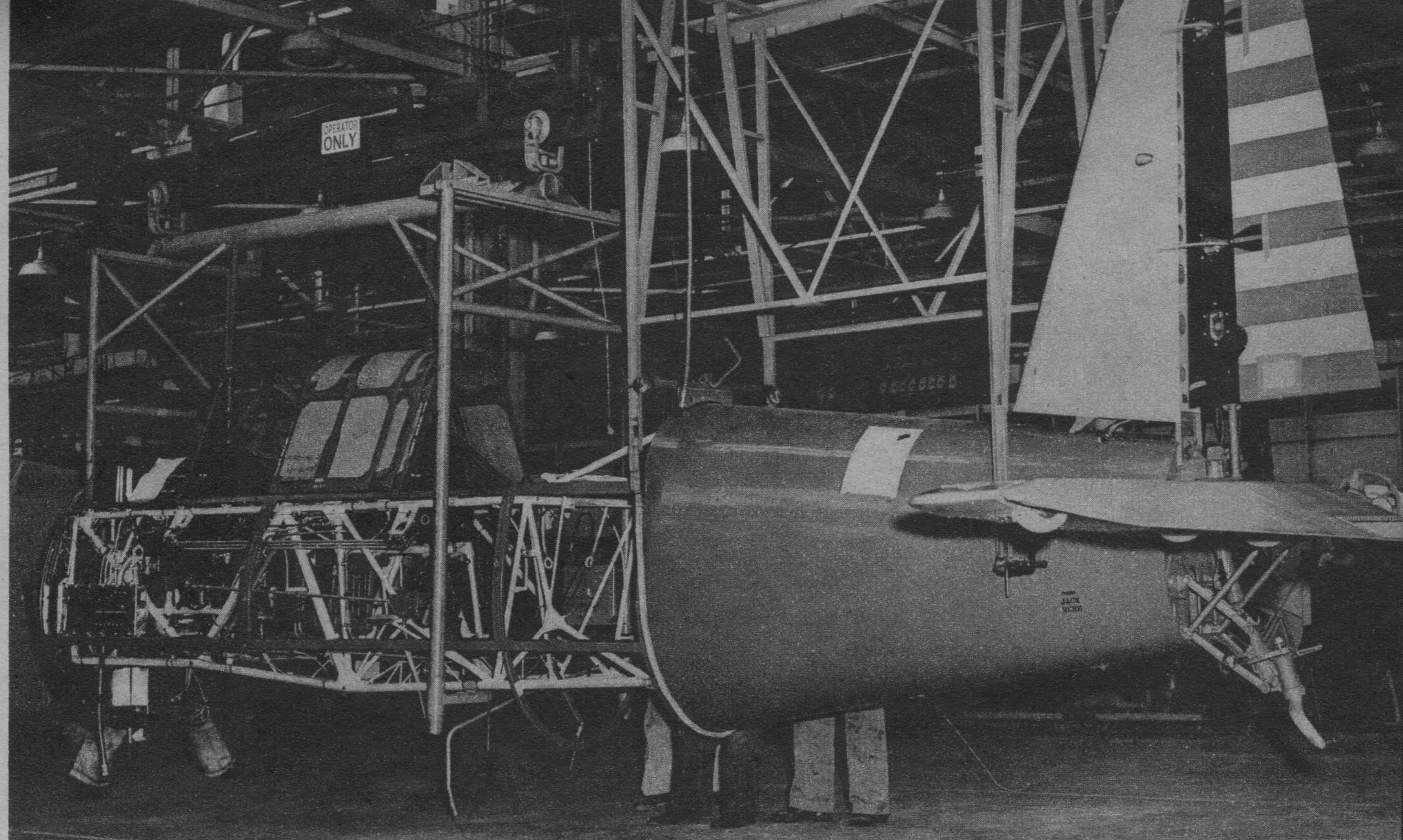
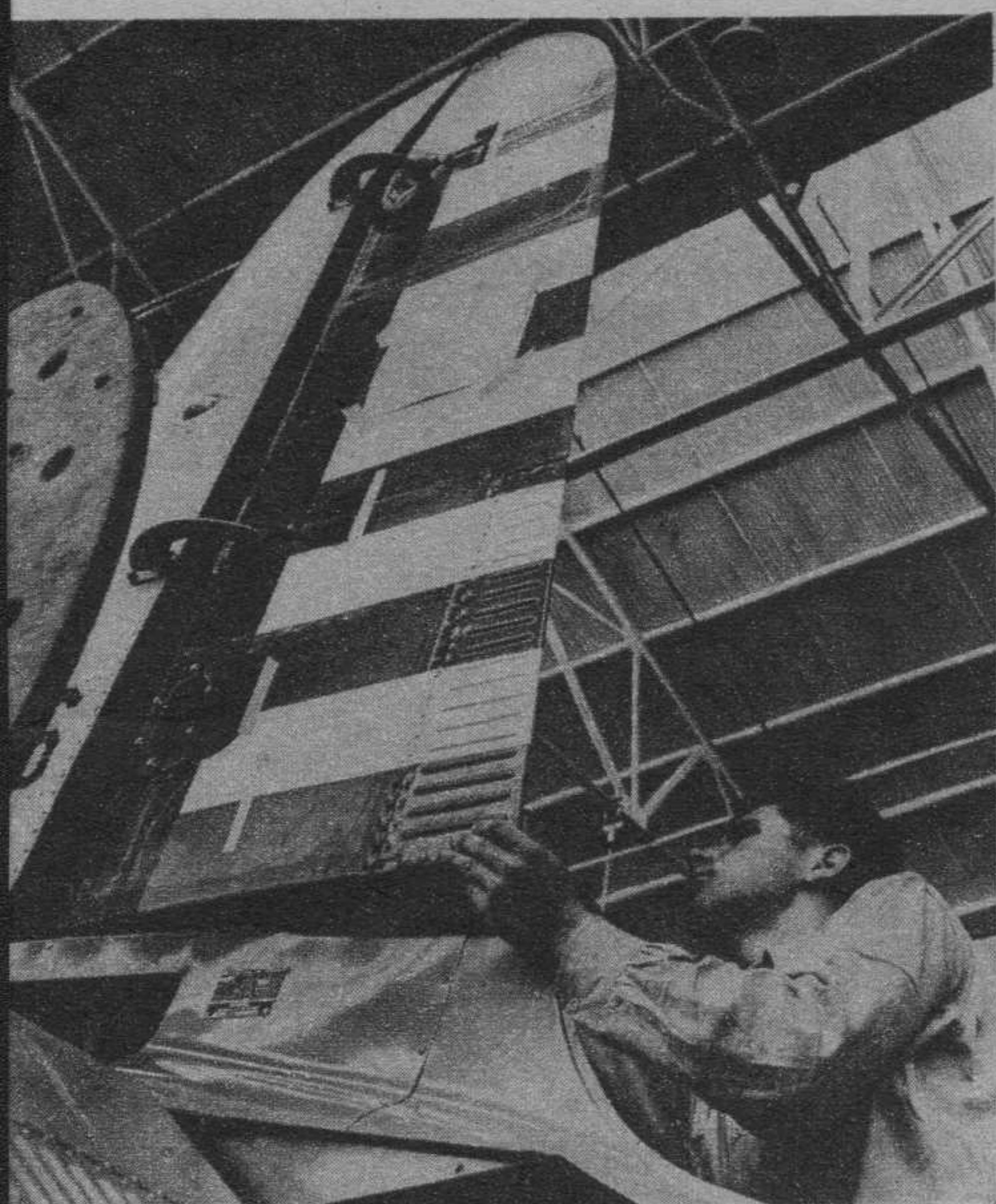


Women, too, contribute to Valiant production. Here they sew fabric to control areas. More and more women join aviation.



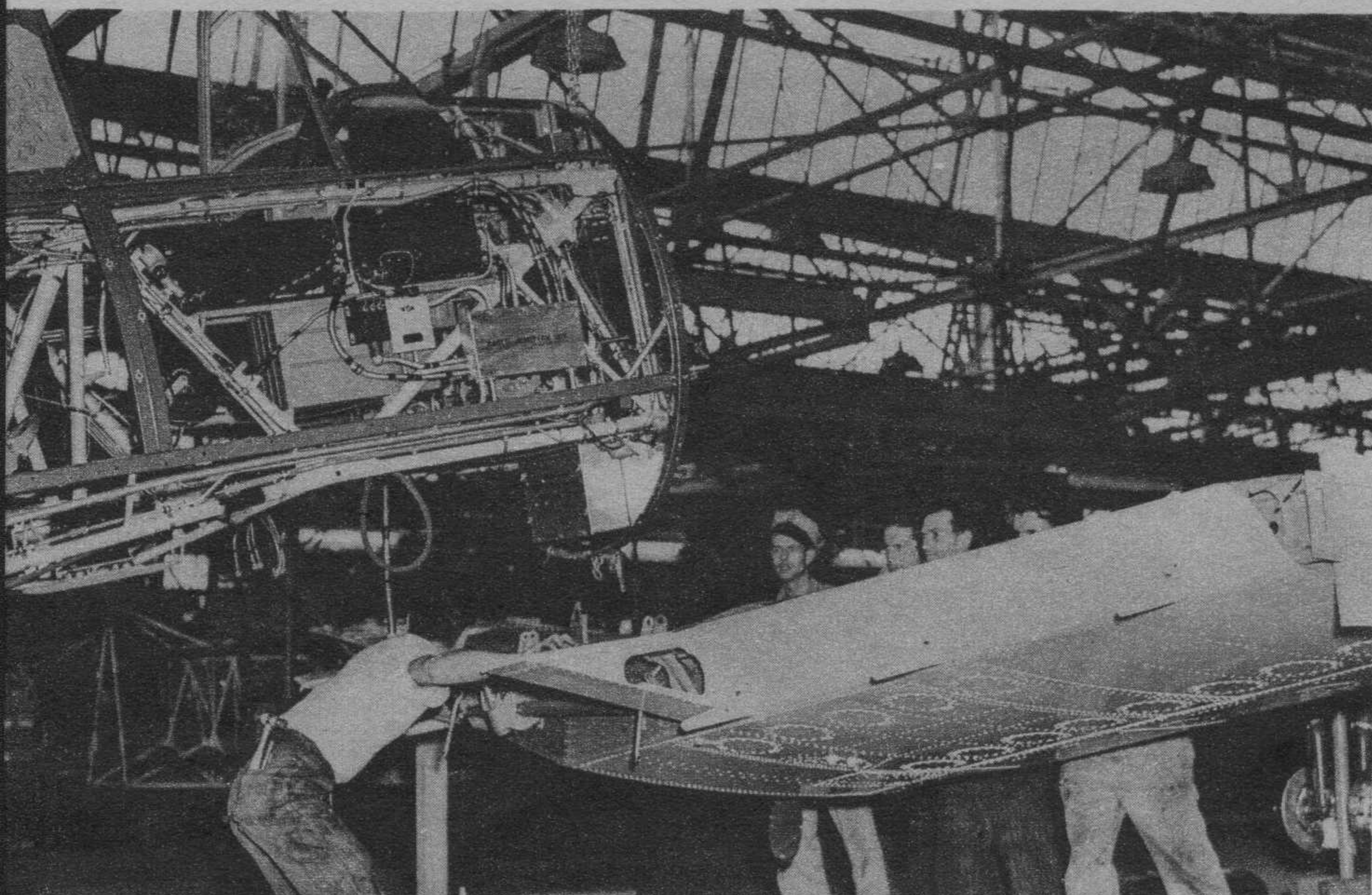


Wings finished in another department receive famous army insignia and are added to the ship.



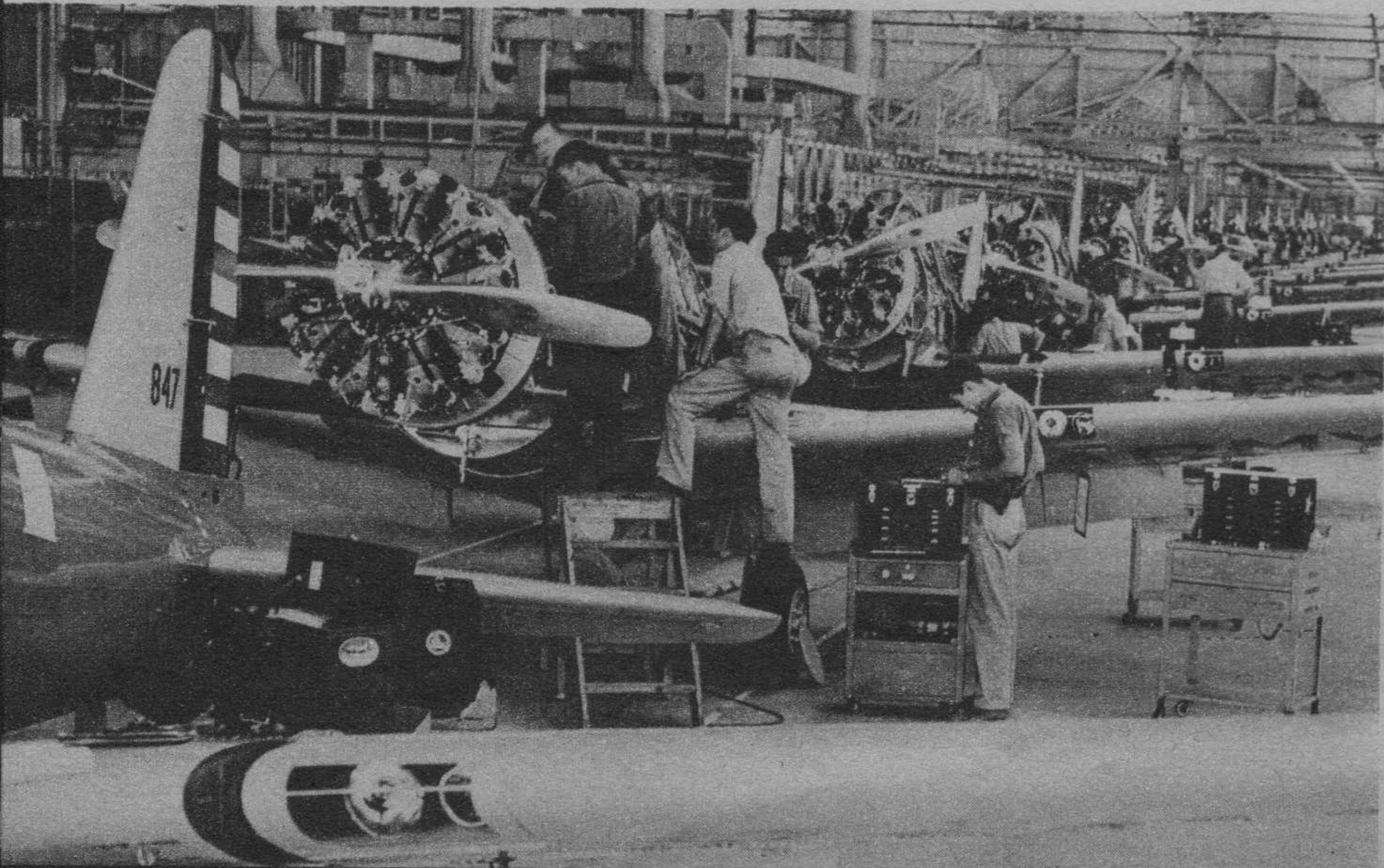
Tail assembly complete with elevators and rudder joins the fuselage section. The tail and fuselage conveyors meet each other.

Movement of tail sections is checked for perfect adjustment and ease of operation.



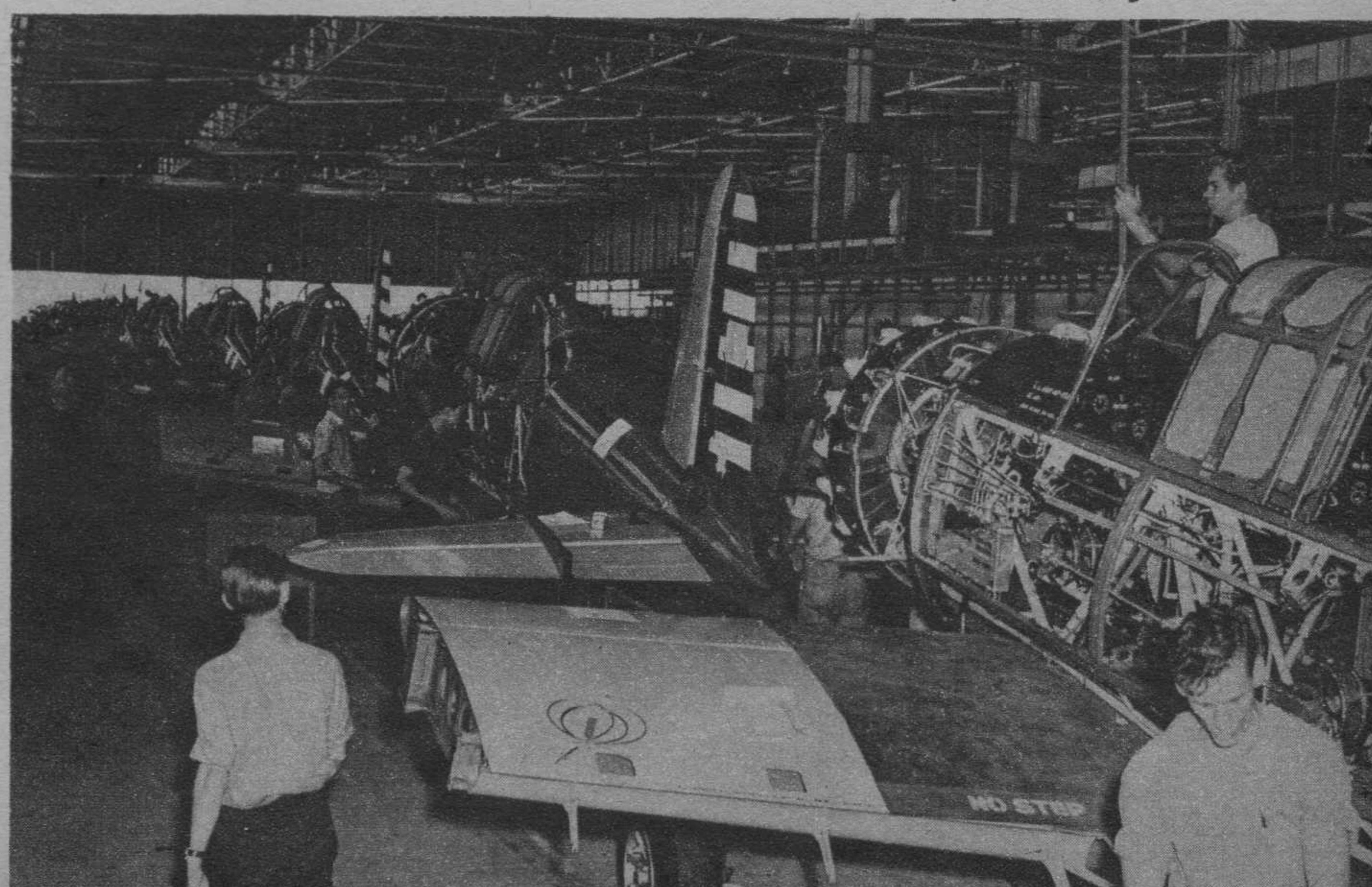
The body grows wings. Here the wing section complete, with the exception of outer panels, is added to the plane's fuselage. This inboard wing section will contain the landing gear.

With the wing section added, the landing gear and engine are attached. Such details as fire wall, landing lights and prop are also attached at this point before the last-minute checks.



Final company O. K. is applied after rigid inspection. Here hydraulic line to brake is approved. Later, army inspectors also give ship a complete check.

Down the final line and out through the door to flight. Here the trainers get final parts, wing tips and various last-minute details. Keep 'em rolling!





Rear Admiral John H. Towers, U. S. N., Chief of Bureau of Aeronautics, Navy Division, made this statement especially for Air Trails.

NAVY DEPARTMENT
BUREAU OF AERONAUTICS
WASHINGTON

On the 23rd of February the high schools throughout the country received their first sets of model airplane plans. This was the beginning of a program that would enable the youth of America to become an essential part of the war effort, the building of exact scale, model planes.

As the war continues, the importance of this work increases. Pilots must be able instantly to recognize plane types. Their training is aided with practice on model planes. Gunners on the ground, in the air, and spotters at lookout stations must have complete training in plane identification. This training includes the use of model planes.

All those who are taking part in the building of model planes, both students and instructors, have accepted a responsible job. Obviously, these models are useless for training purposes unless they are accurate reproductions of the true plane. Shoddy, careless work has no place in aviation. It's too costly. The same rigid care and craftsmanship must be the rule for the school workbench.

John H. Towers
Rear Admiral U.S.N.
Chief of the Bureau of Aeronautics



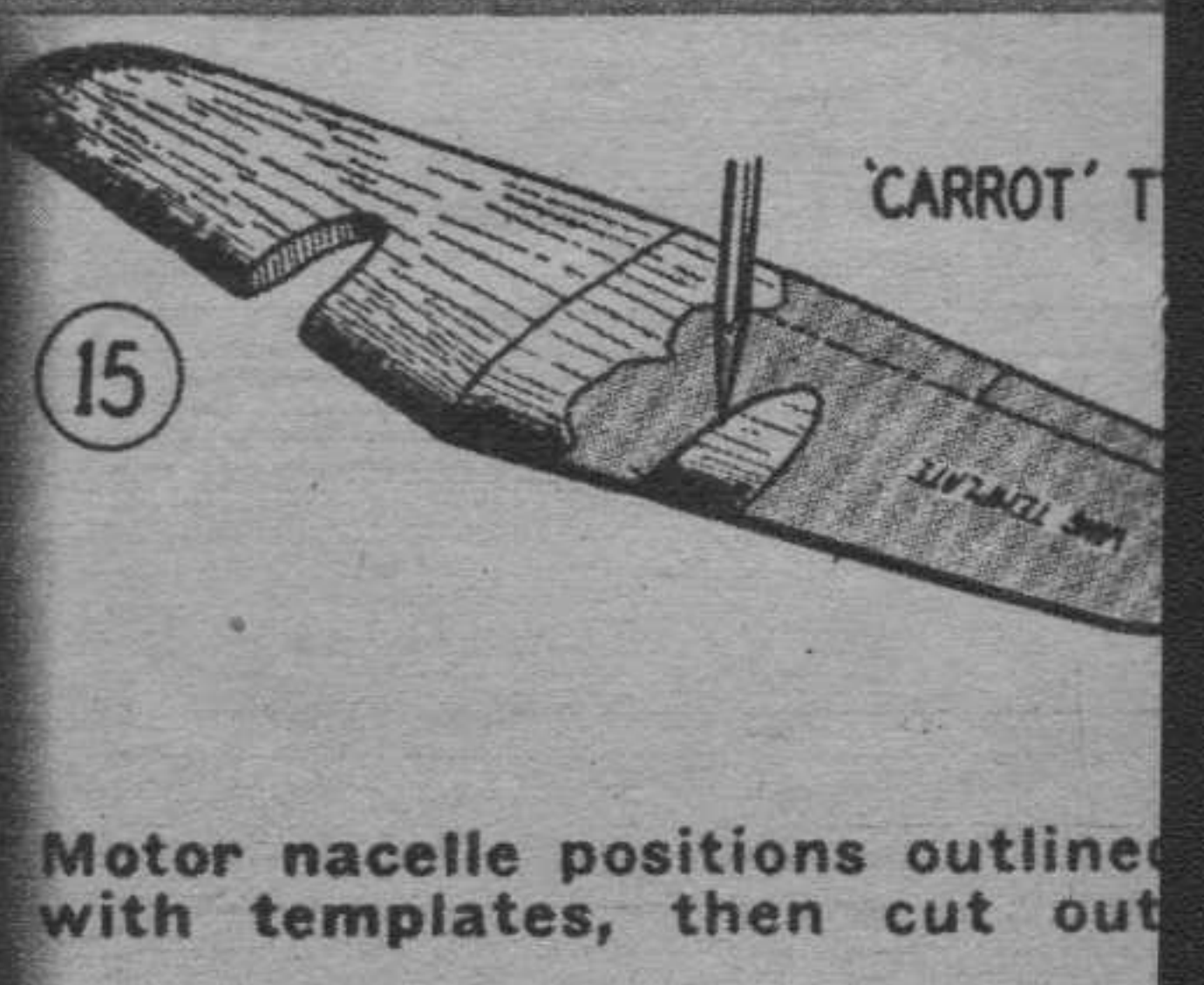
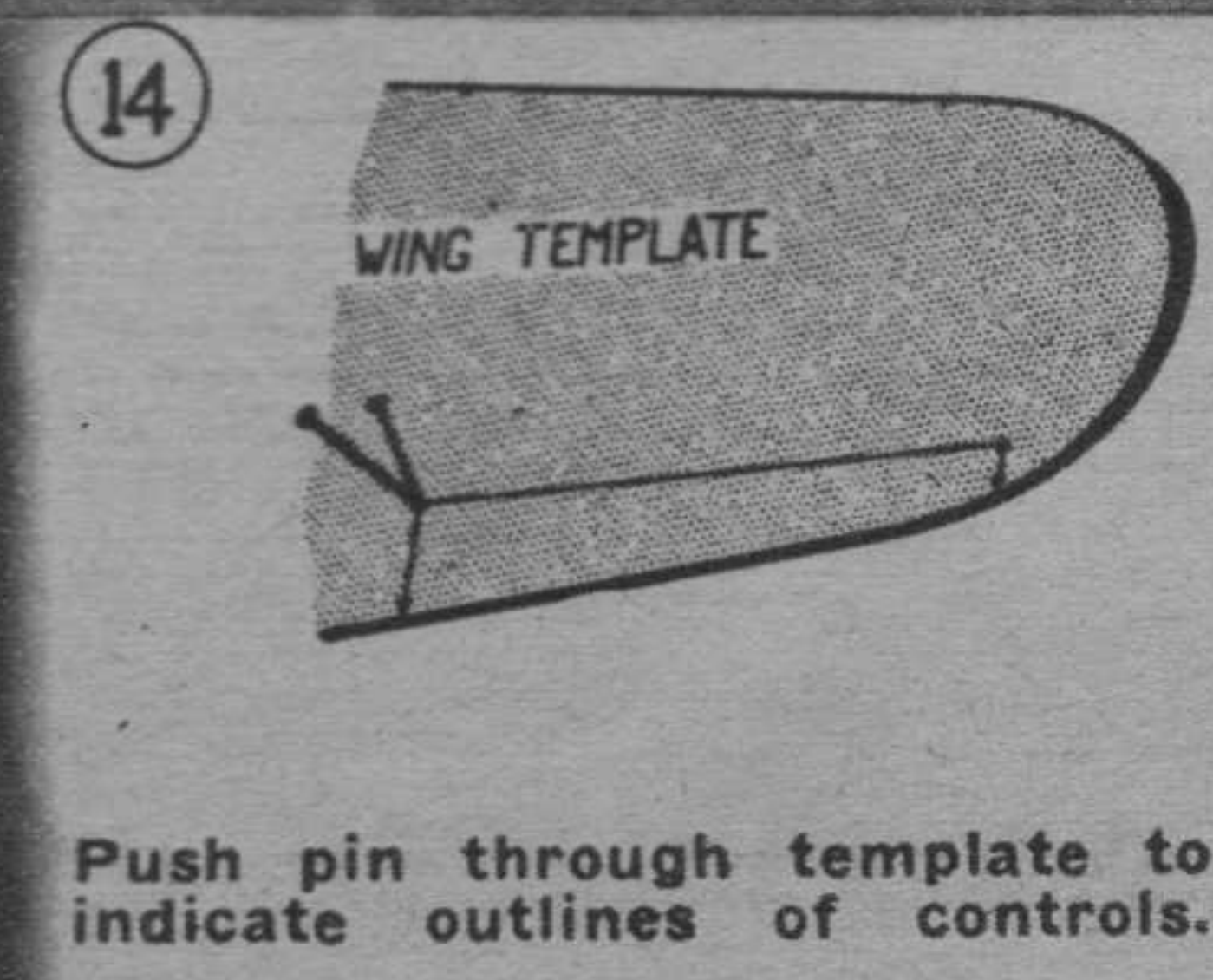
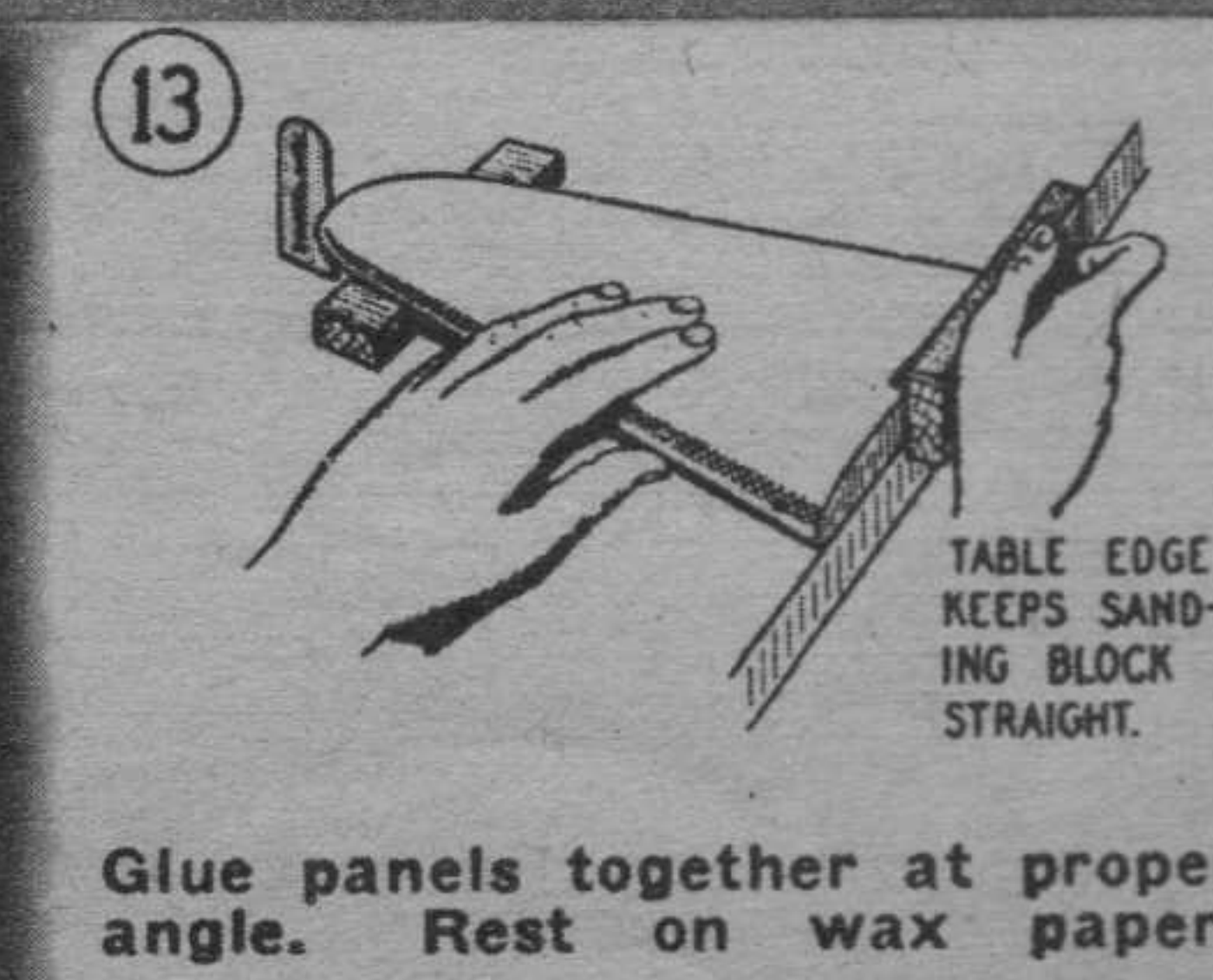
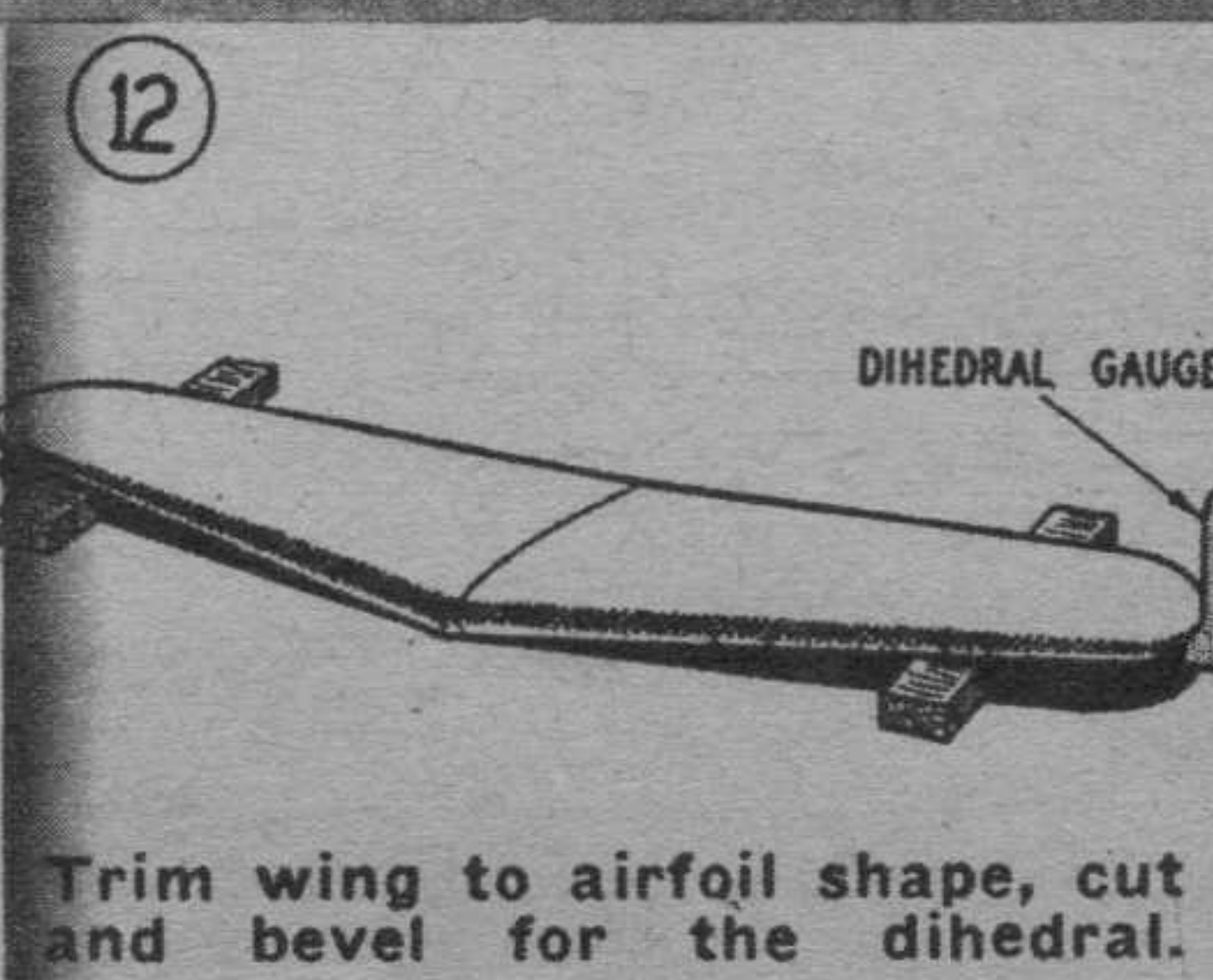
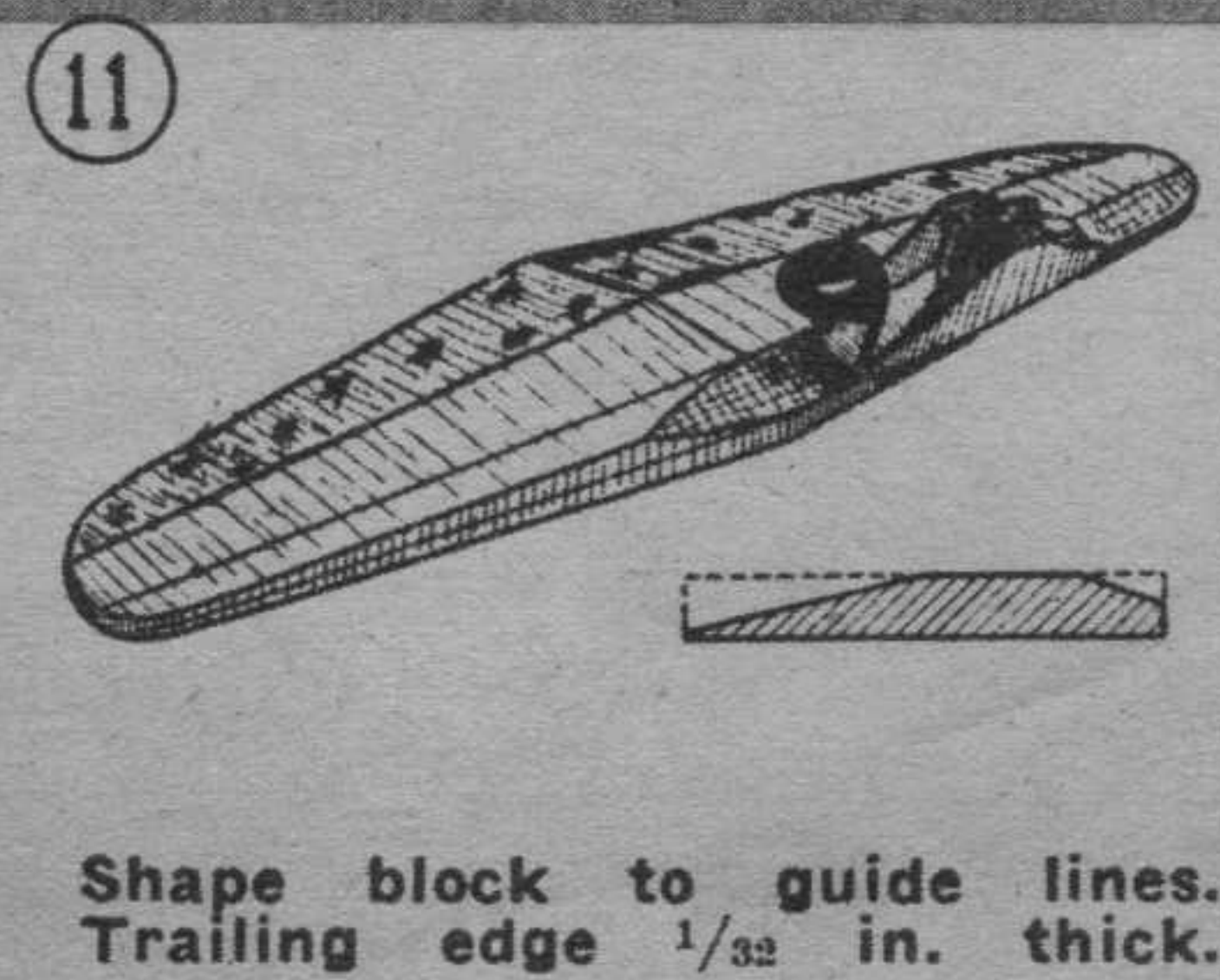
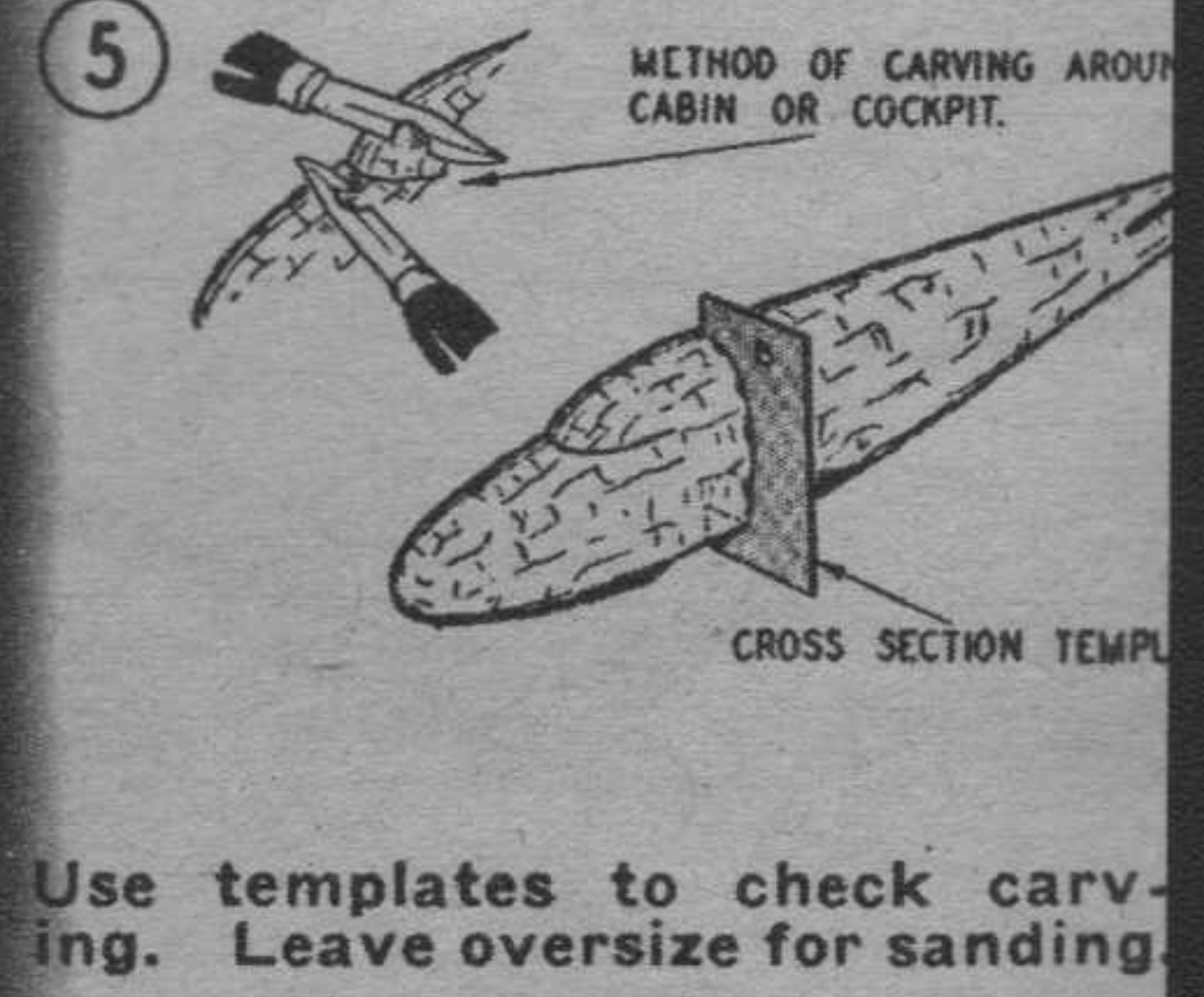
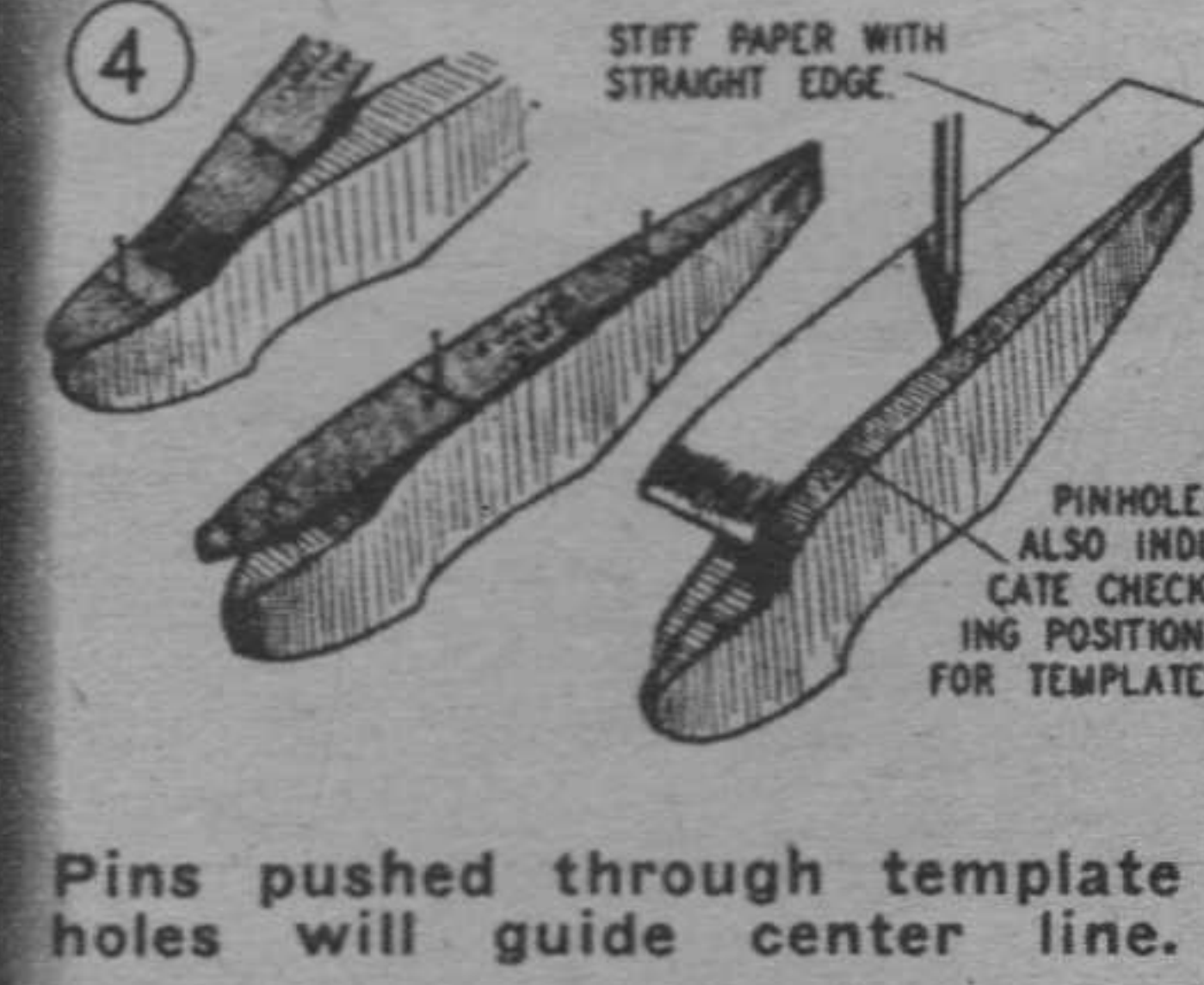
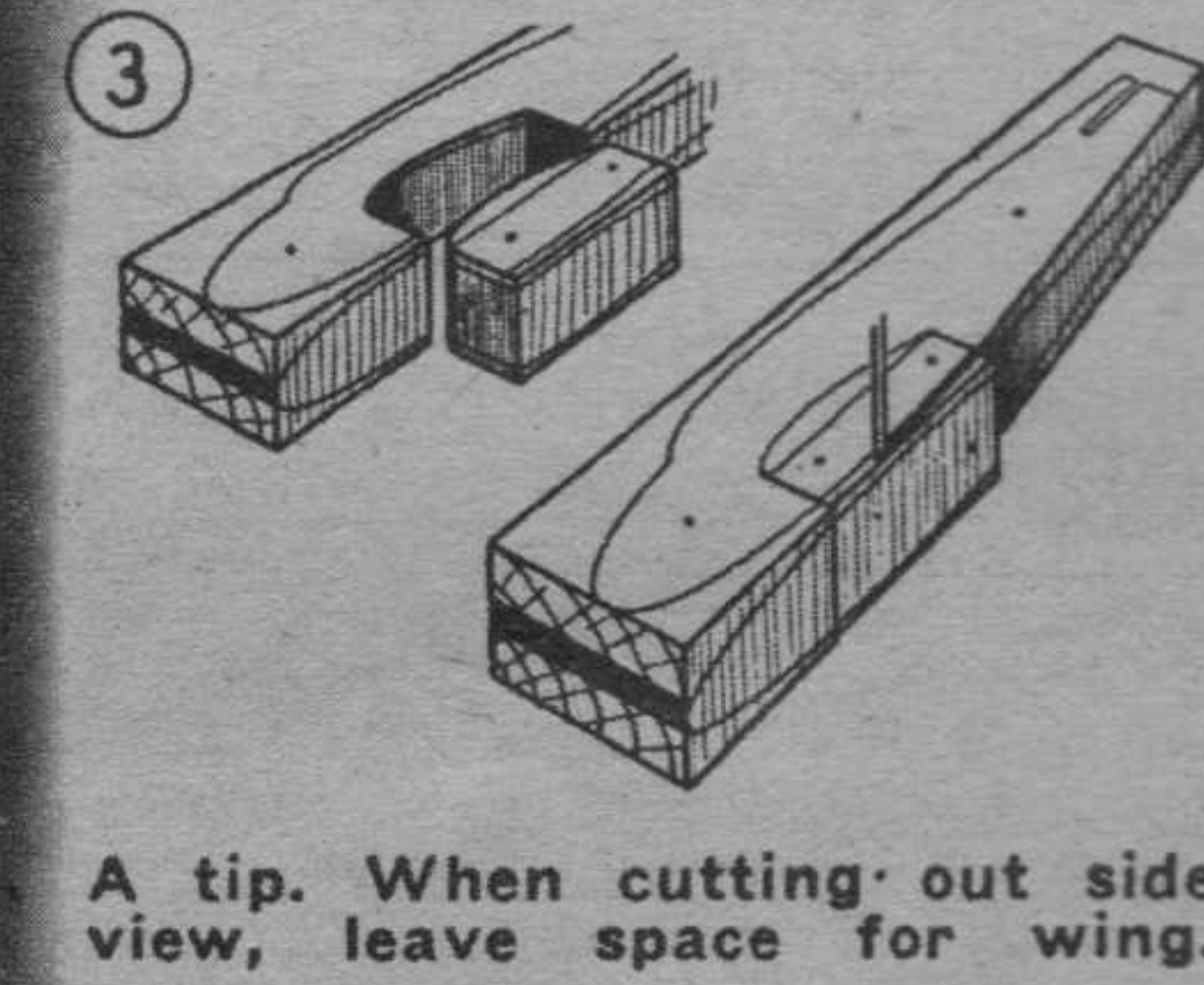
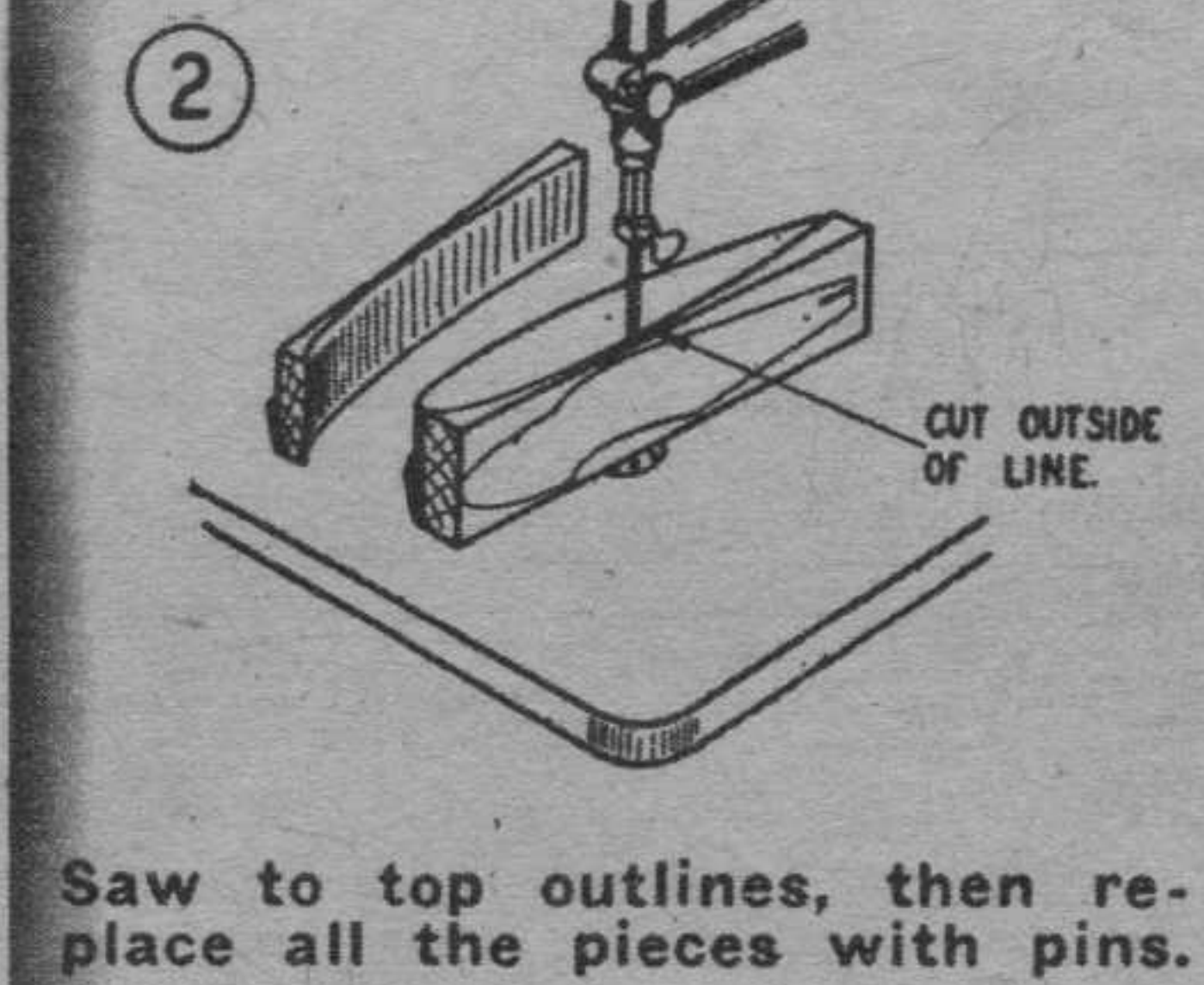
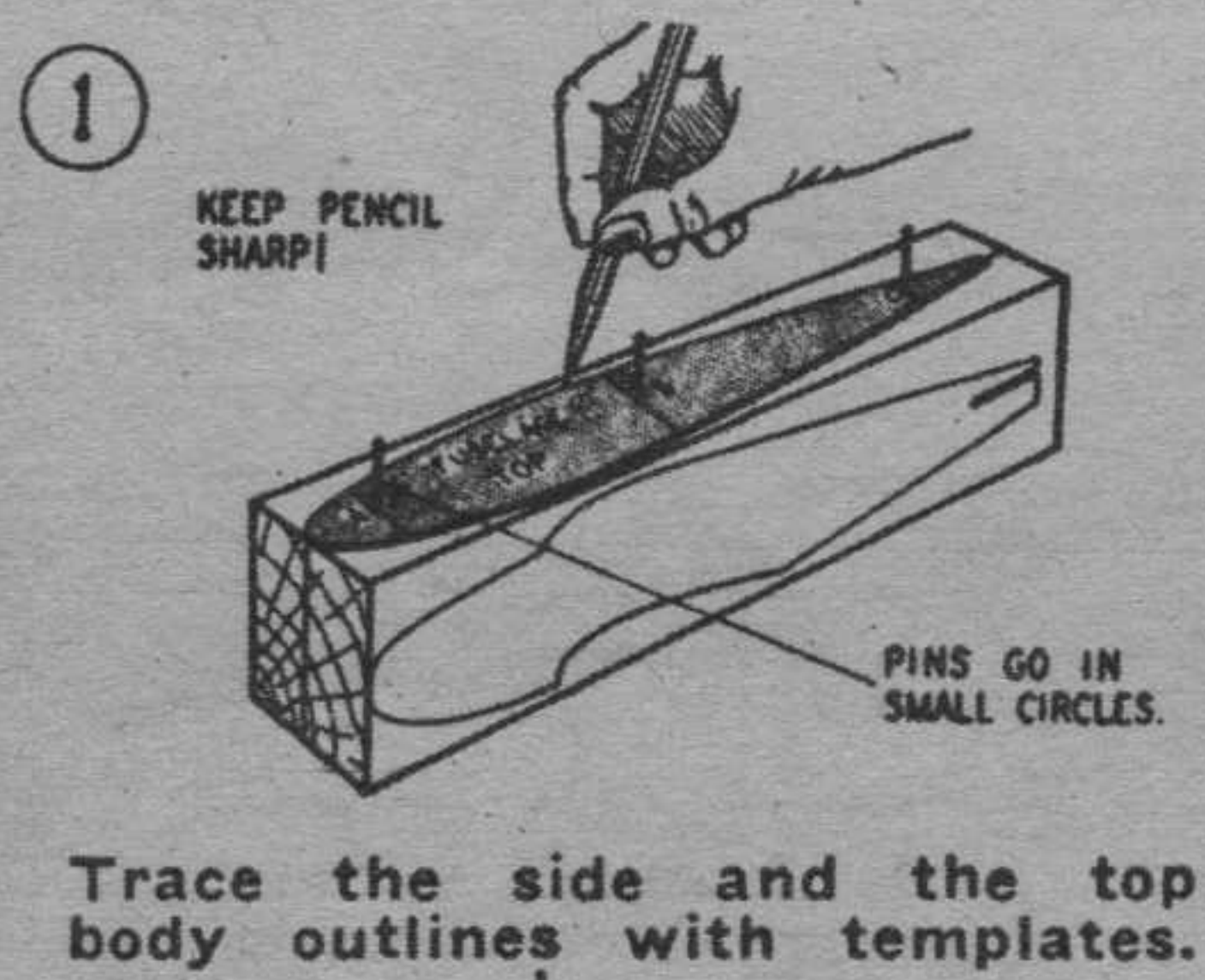
Some of the men to thank for job. Com. Flores, charge navy model project; Al Lewis of Air Youth, Academy Model Aeronautics; Paul Garber, U. S. National Museum, who drew up original plans.

Sanctioned By



Right—What model builder doesn't see. Cadets (Naval Air Station) learn to identify friend and foe. Can you identify teacher's ship?

Drawings reproduced from the booklet "Scale Model Aircraft Construction Procedure" printed by the U. S. Office of Education. Captions condensed from booklet.





Dr. Robert Hambrook, senior trade and industrial specialist, Office of Education, is credited for the idea.



Dr. Wright, who heads Board of Education building program, and Dr. Studebaker, Com. of Education.



Special step-by-step method permits the inexperienced to do an expert job. Model on board is the Kittyhawk.

Uncle Sam

Aviation comes to the public schools! Thanks to the navy's request for 500,000 models and work of Dr. Hambrook, the nation's school system has become officially interested in model building, that basic course in air youth training.

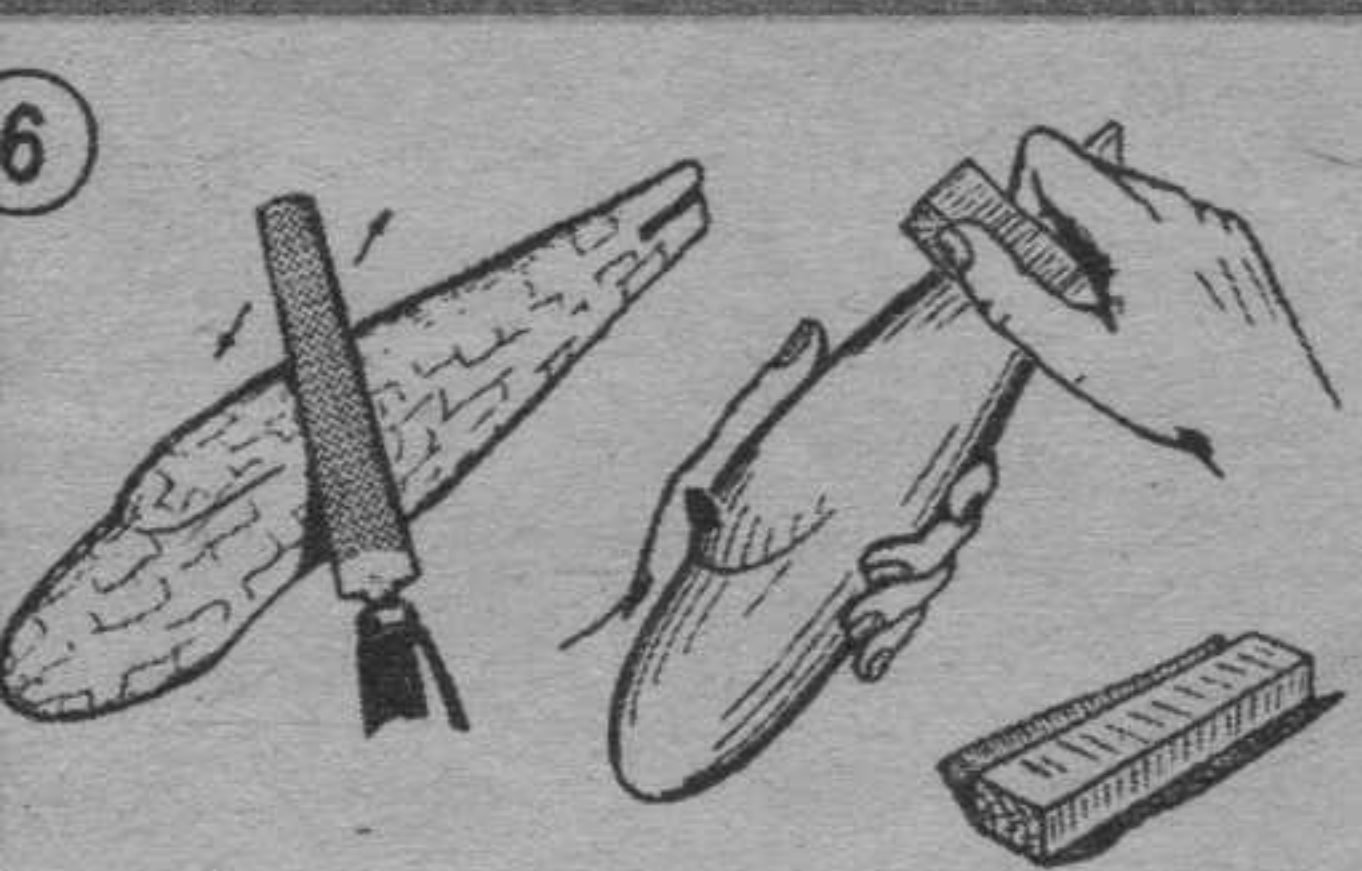
WHEN Dr. Robert W. Hambrook, senior trade and industrial specialist in the Office of Education, got word that the navy needed 500,000 accurate scale models of war planes for purposes of aircraft recognition training and gunnery sighting practice, he envisaged a way of providing that immense number of models and putting aviation into more than 26,000 schools throughout the nation. Long a champion of model building as an aid in aviation training for American youth, Dr. Hambrook called in a committee of experts and formulated a program whereby pupils in grade and high schools would build the majority of models needed.

Accurate plans for fifty different models, fifty accompanying template sheets and how-to-do-it charts were volunteered by a model manufacturing company long experienced in such work. To place the project in the hands of school teachers throughout the country, the Office of Education decided to do the material up in kit form. The decision as to what schools were to build the models was left up to the superintendent of education in each State. After due consideration of shop facilities in schools of his State, each State superintendent made his allocation.

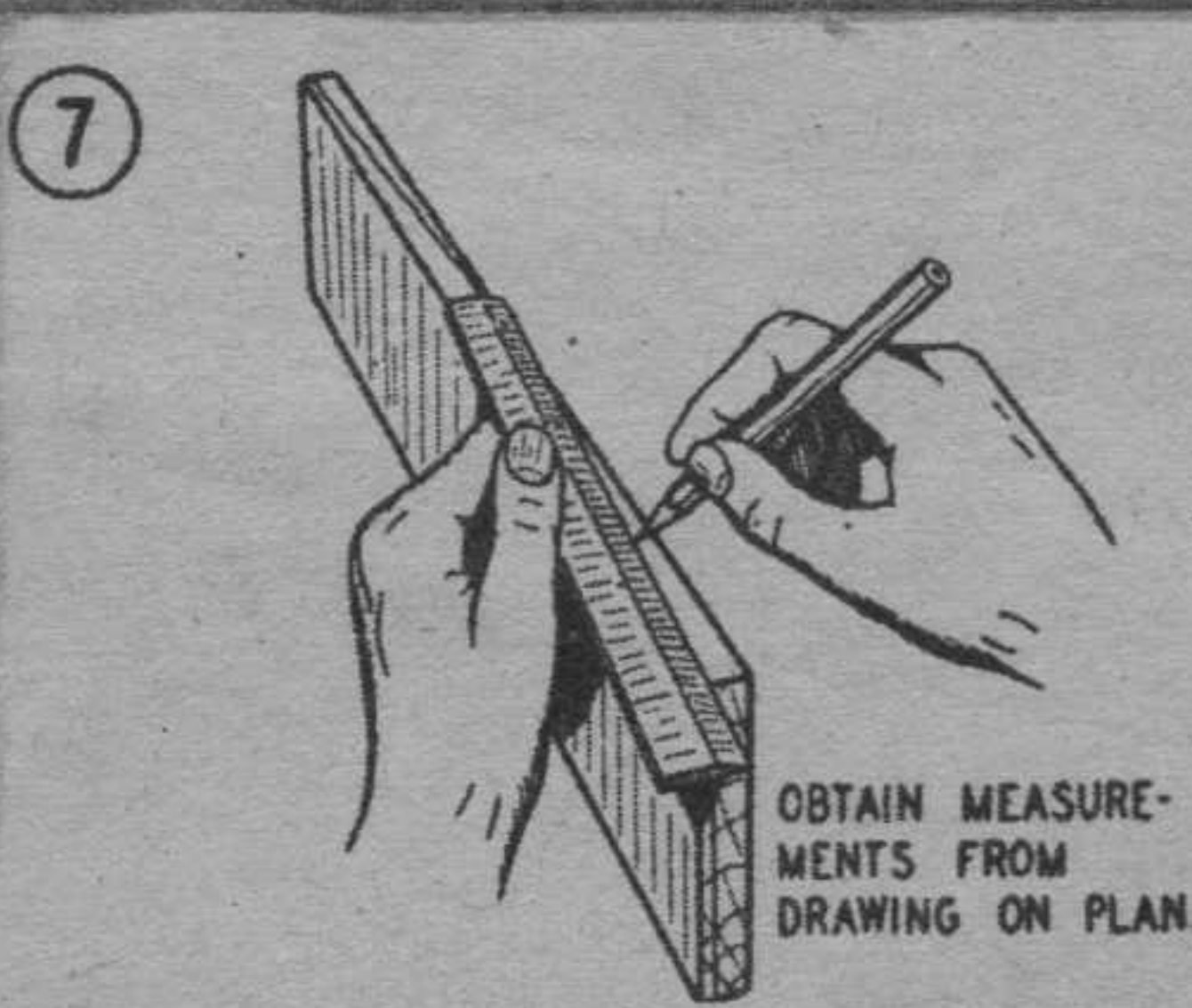


Stuyvesant High students, New York, indicate interest in modern subject.

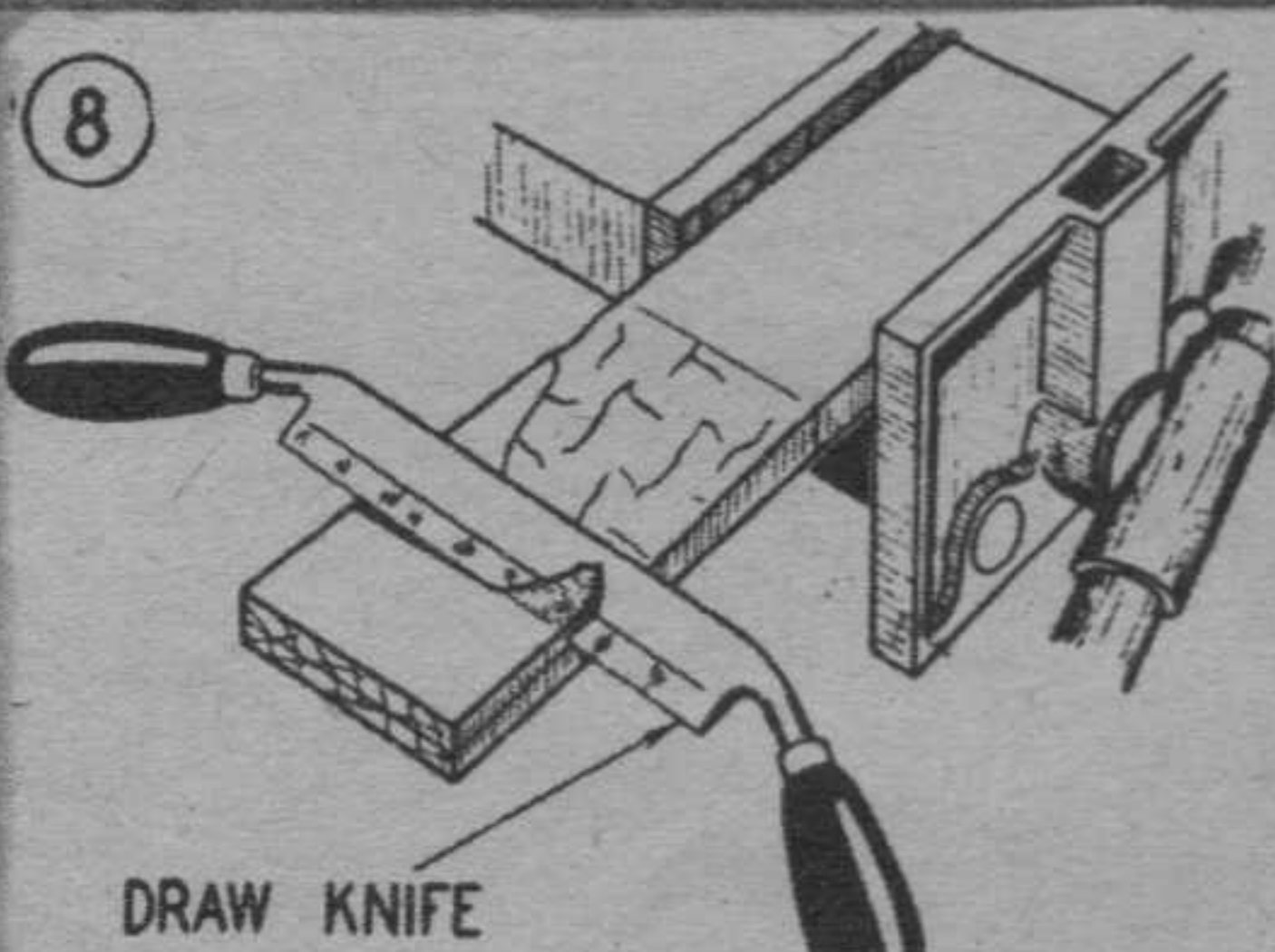
TEXT BY AL LEWIS ★ ★ ★ PHOTOGRAPHS BY HAROLD KULICK



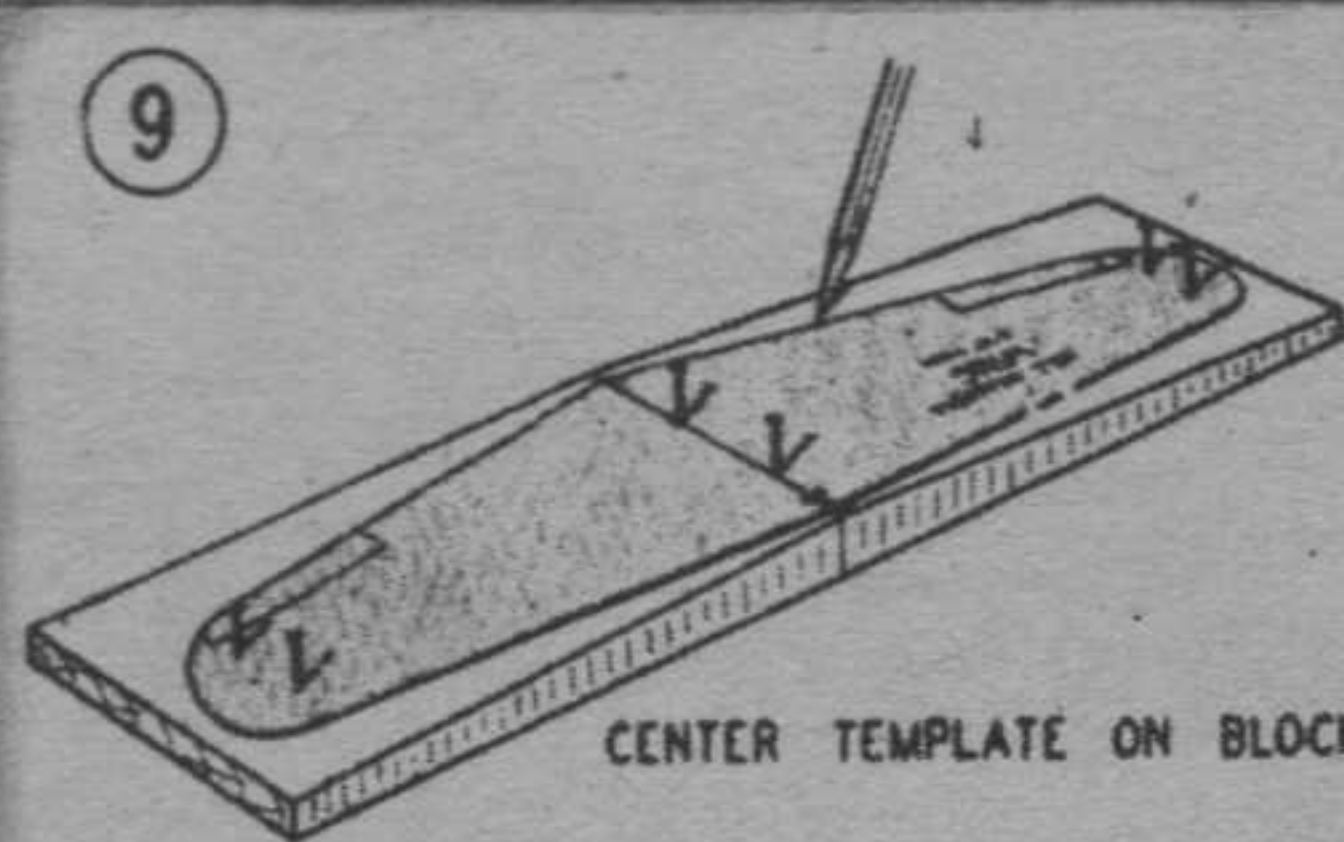
Rasp, coarse sandpaper block or bumps. Finish fine paper.



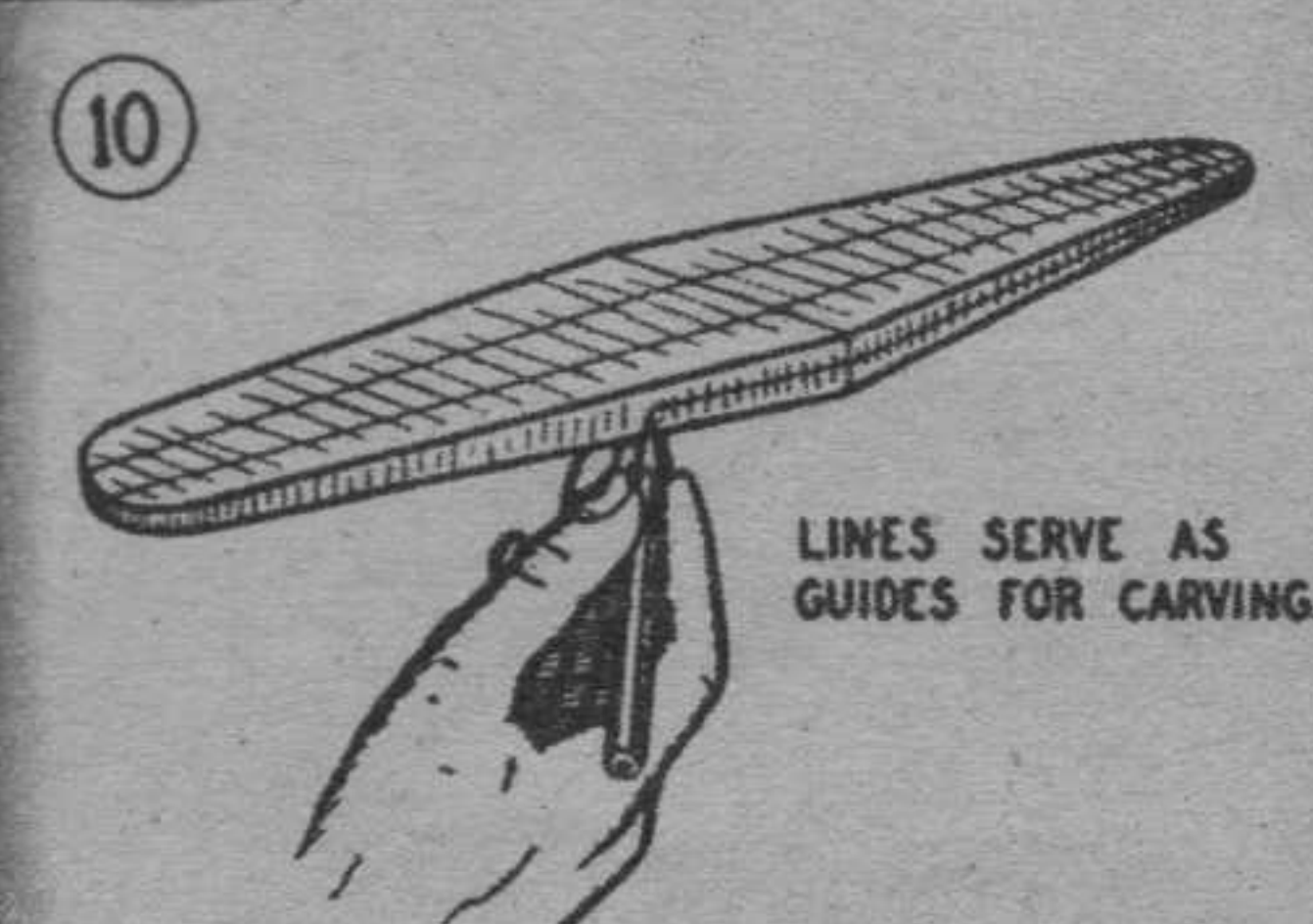
Tapered wings marked clearly.



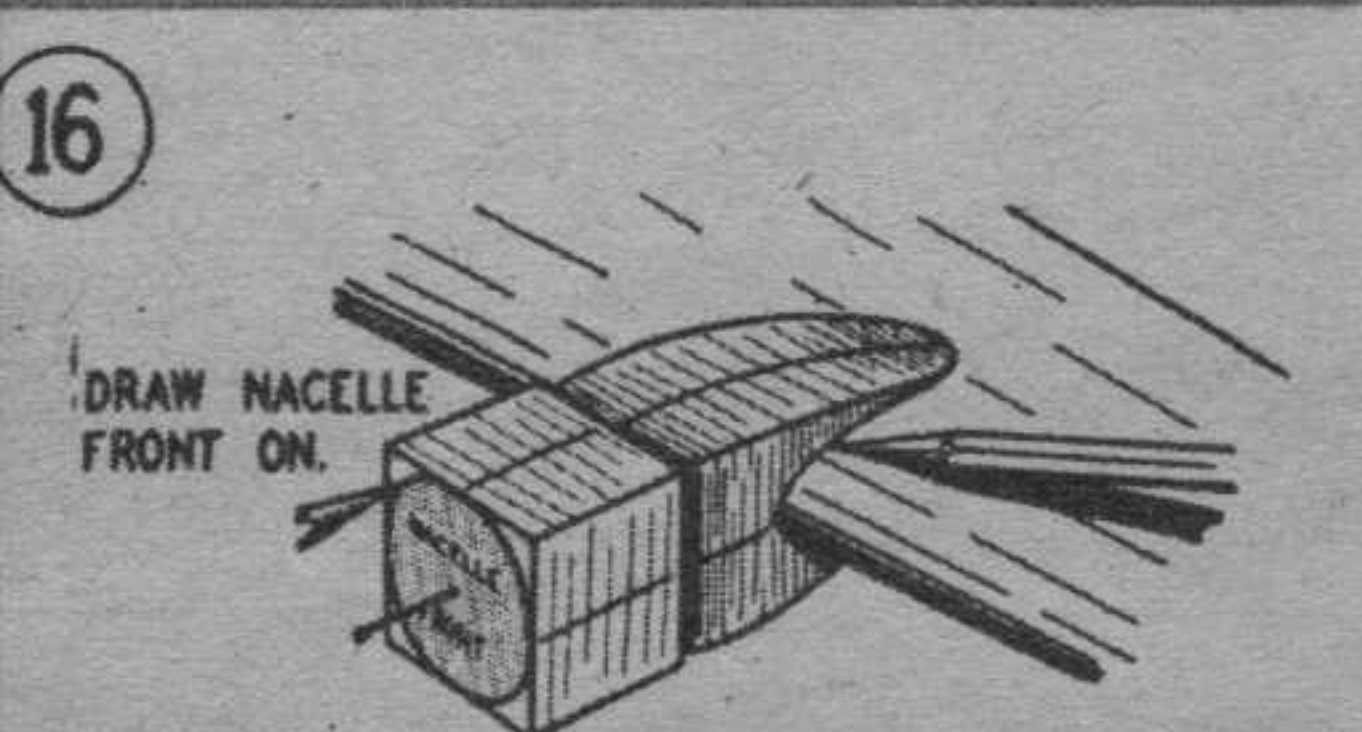
DRAW KNIFE
Shave away surplus wood, sand.



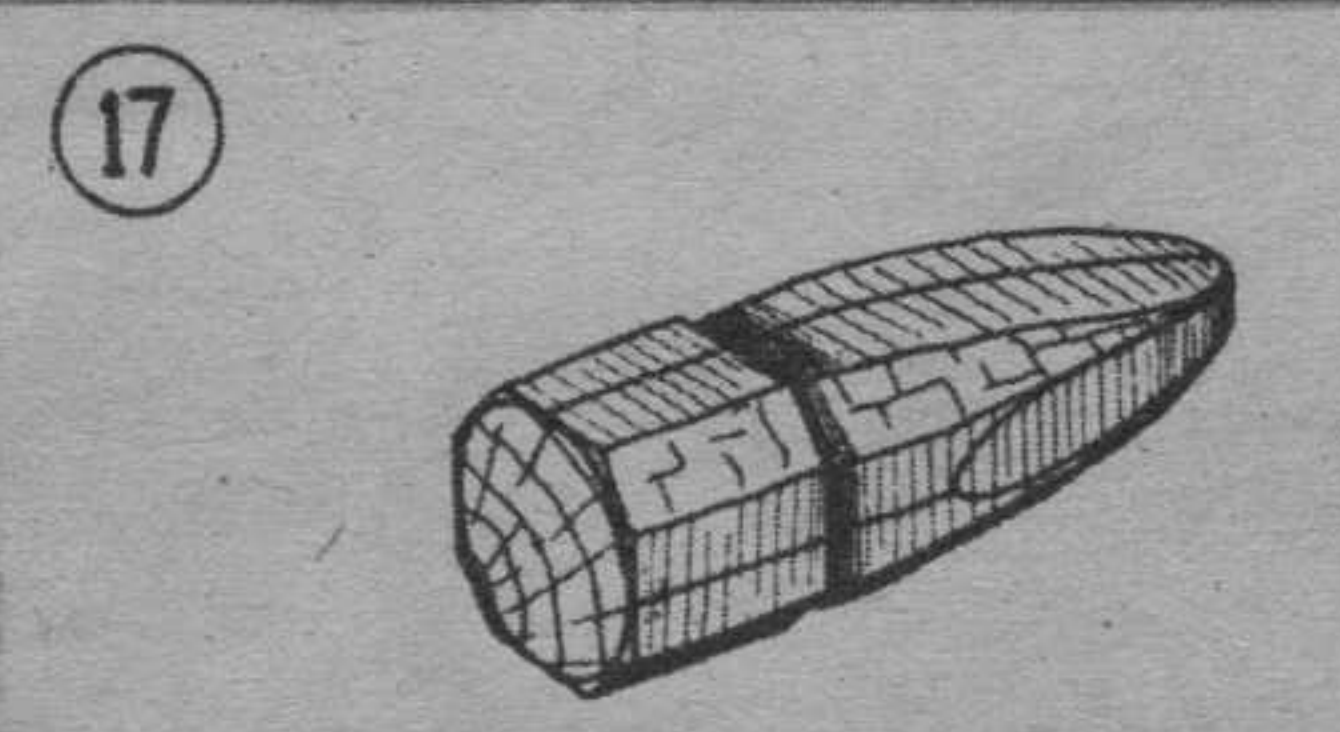
Mark wing outline by template, cut out with jig, coping saw.



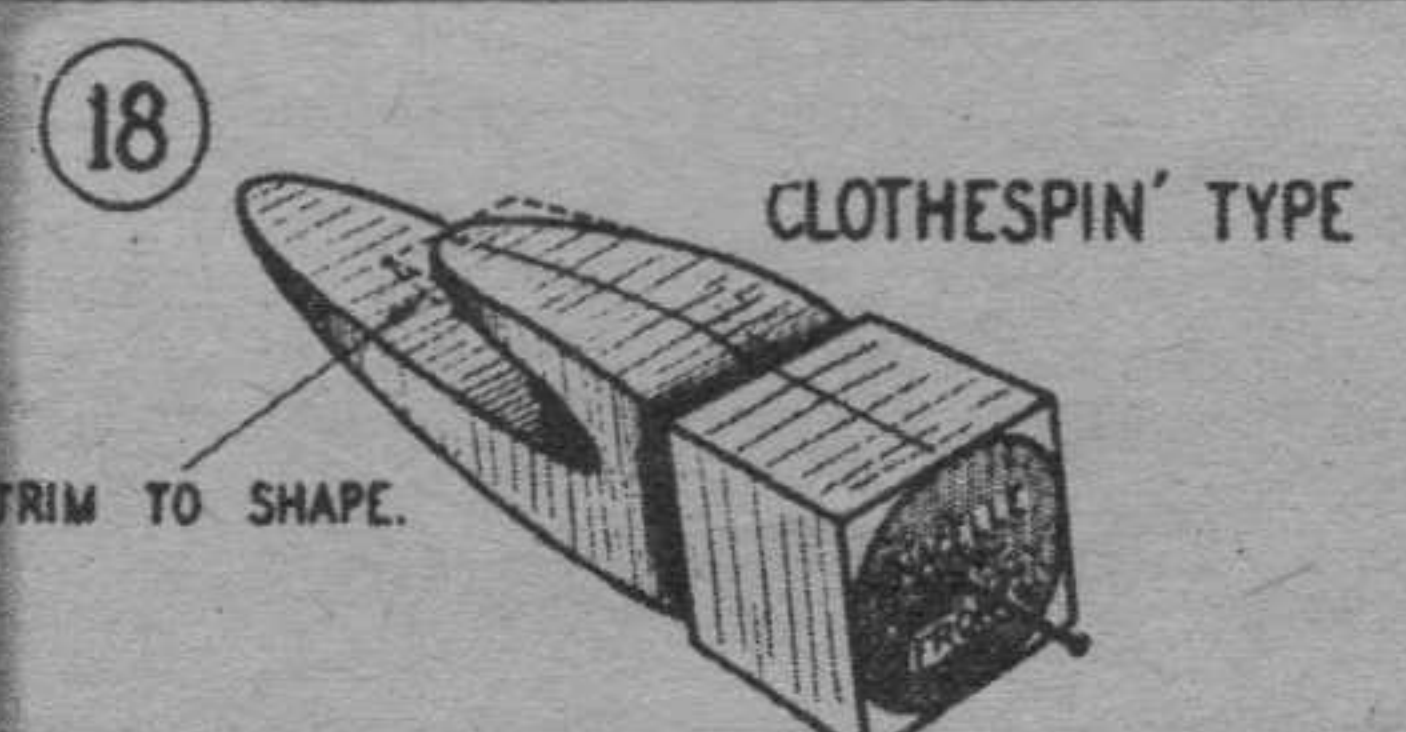
Guide lines on top, front of wing insure proper shaping.



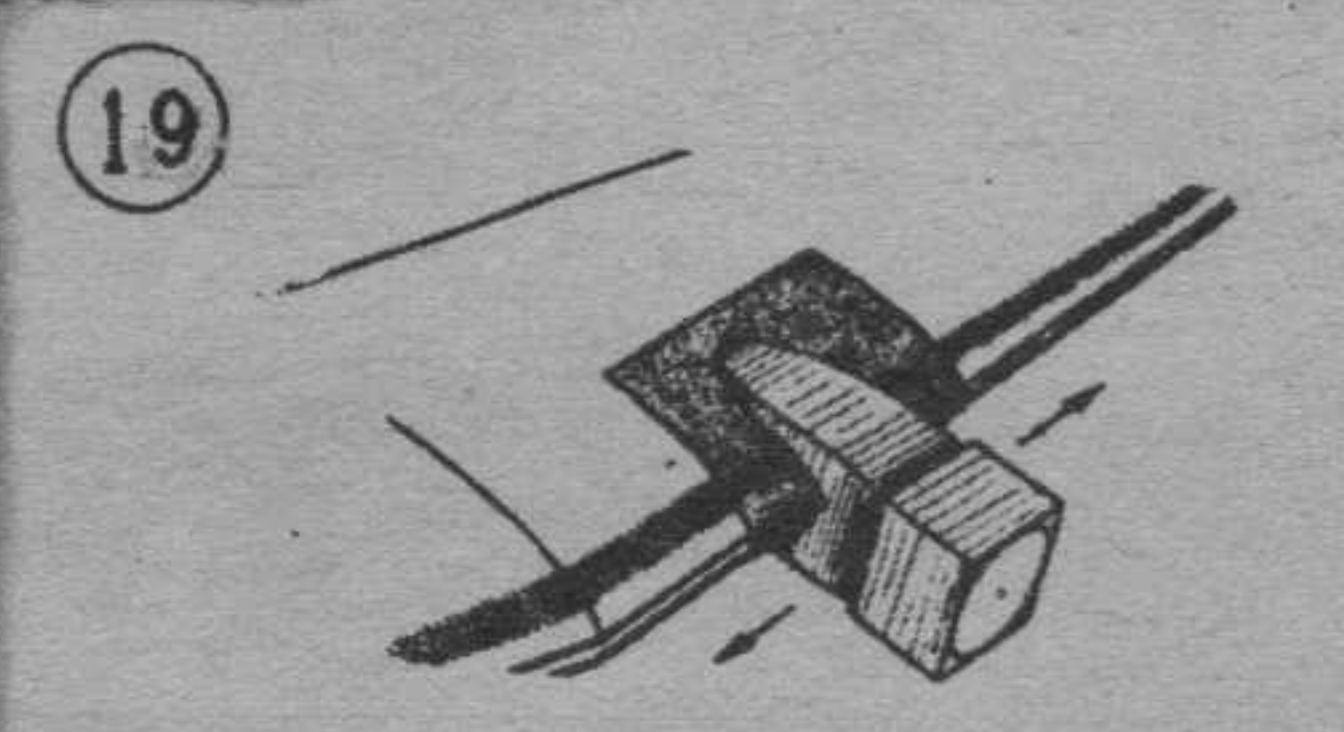
Nacelles carved like fuselage. Trial-fit, mark wing outline.



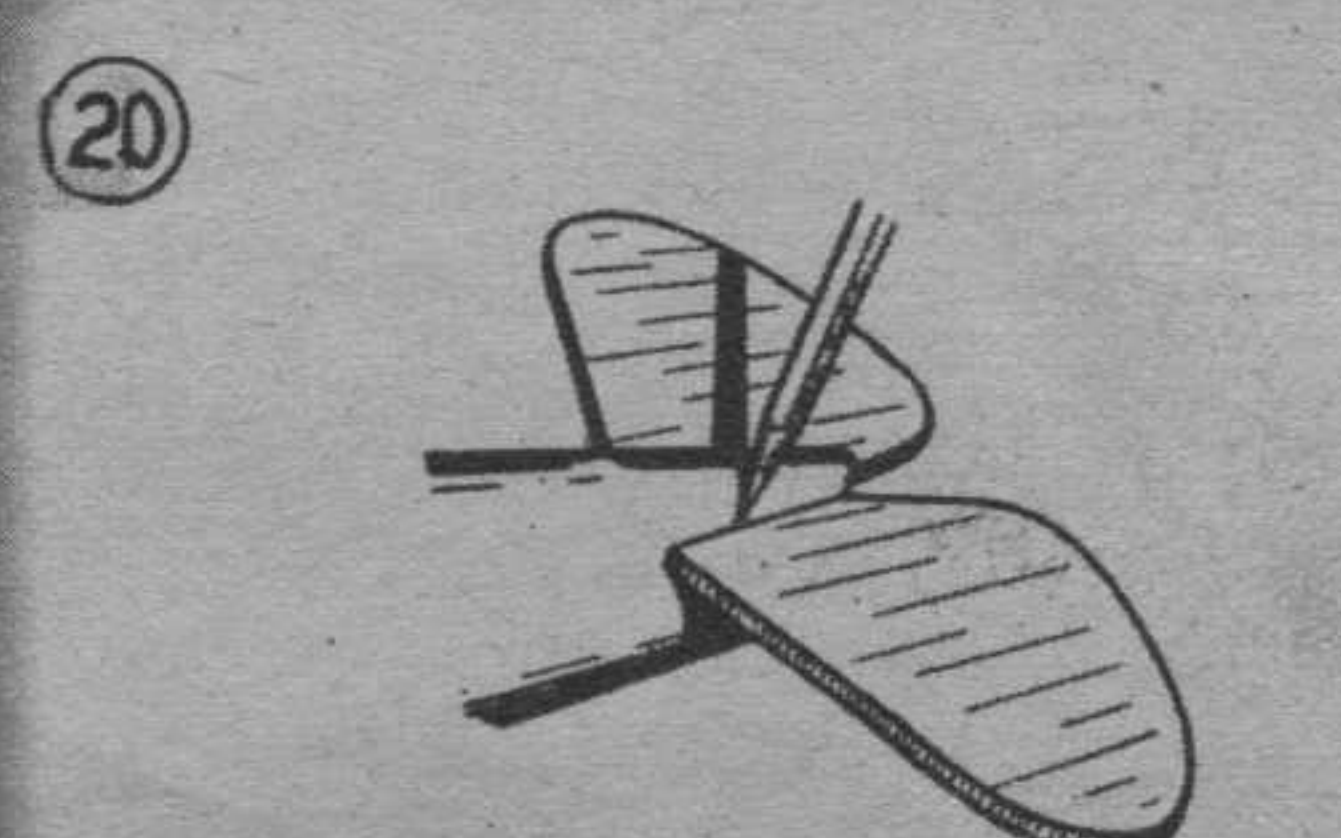
Carve nacelle as shown, leave untouched part that fits wing.



Clothespin-type nacelle cut out to fit wing. More difficult.



Clothespin nacelle sanded thus to fit over wing. Good trick.



Cut out stabilizer, fit in body slot, mark the outlines shown.



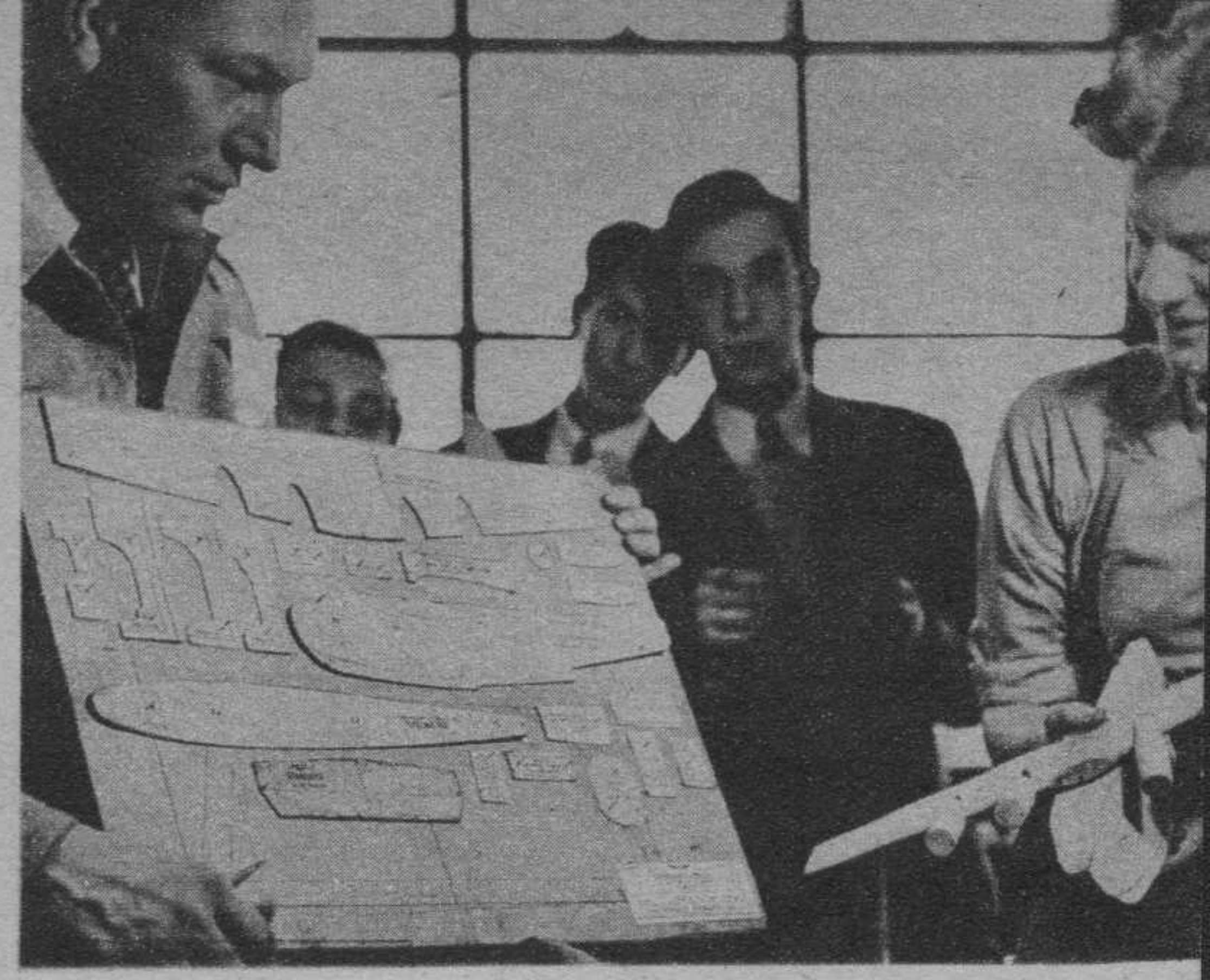
Only trusted students, instructors handle power tools. Ships: PBV-5s.



Sixty girls in aviation club at Girls Commercial High, B'klyn, do their part.



You do it this way. Perspective drawings help instructors and students.



With thoroughly worked out template system it is virtually impossible to make mistakes.

To make certain that the navy training centers received only absolutely accurate models, each school was obliged to set up an inspection committee composed of model-plane experts, woodworking craftsmen, aviation technicians and others. As each modeler (the participating student) completed a model which met the rigid requirements, he became a Cadet Aircraftman. This is an honorary rank conferred by the navy's Bureau of Aeronautics. The certificate of rank bears the signature of Admiral John H. Towers, chief of the Bureau of Aeronautics, and the local superintendent.

After having any three types of models accepted, including a scout bomber or an observation plane, the student advanced to the rank of Ensign Aircraftman. More models, including additional types, qualified the builder in turn for Lieutenant, Junior Grade, Aircraftman; Lieutenant Commander; Commander, or Captain. The last required the specified types of plane models of five nations.

Any wood that can be whittled and sandpapered was O. K.'d for the

project. Woods such as pine, ash, poplar were most widely used. Many schools made permanent templates for the use of the model builders—some of the more ingenious using straightened tin cans to conserve the metal supply. Many modelcraft dealers throughout the nation contributed technical advice to their local schools.

Obviously this project would focus national attention on aëromodeling and result in an impetus to the activity. Even before the project was well under way, many schools had written NAA's Air Youth Division in Washington asking for information on continuing programs in which students could participate—programs to include the building and flying of models, aviation theory and experiments. Not only has the entire field of model aircraft building been stimulated to even greater activity, but hundreds of thousands of new recruits will continue on in aëromodeling. The schools will realize what vast interest in aviation exists among our youth, and, like Britain, Canada and Russia, will foster that interest with active courses and progressive instruction.

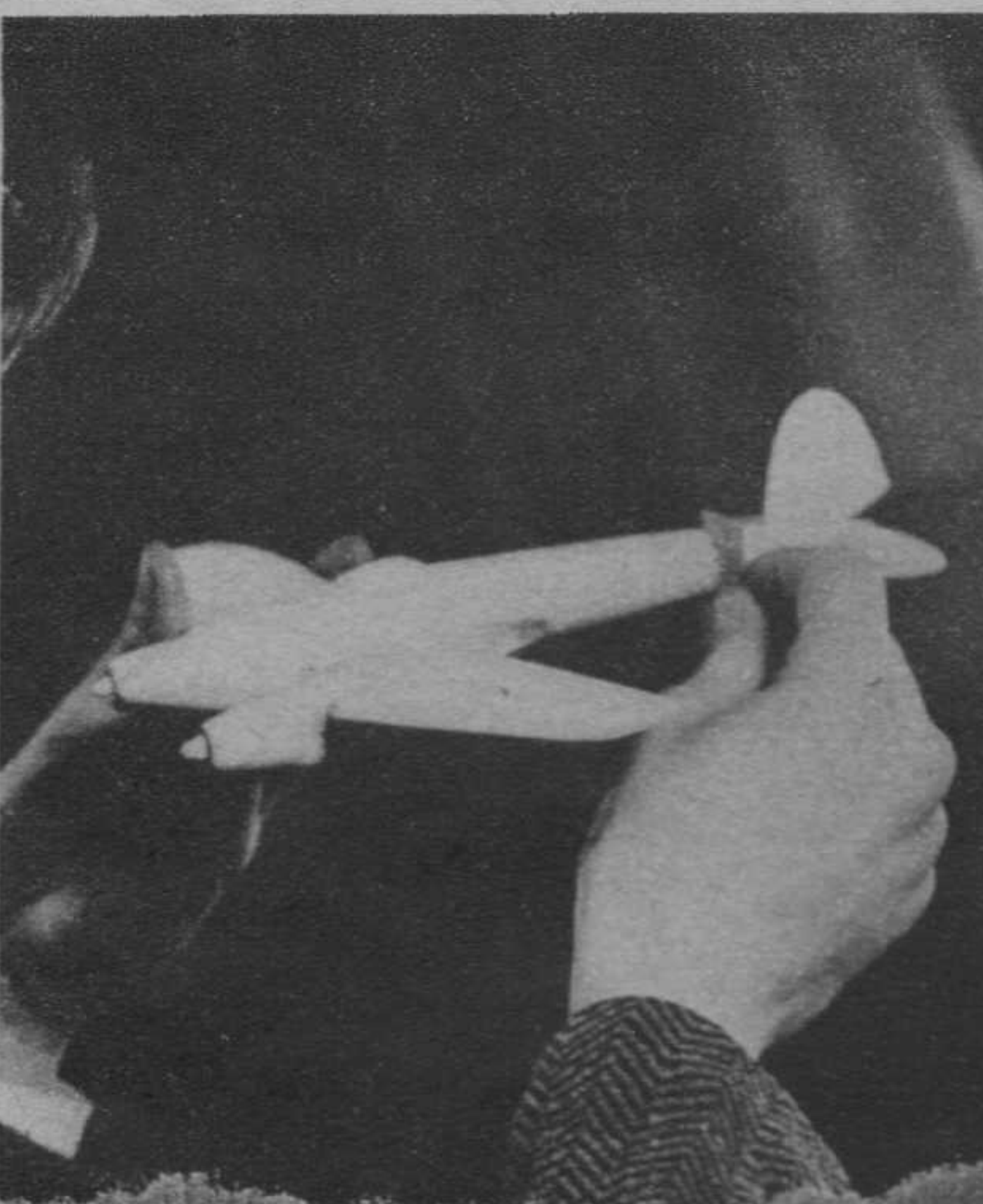
To insure exact dihedral, pupil uses wing jig. Wing is of Heinkel III.



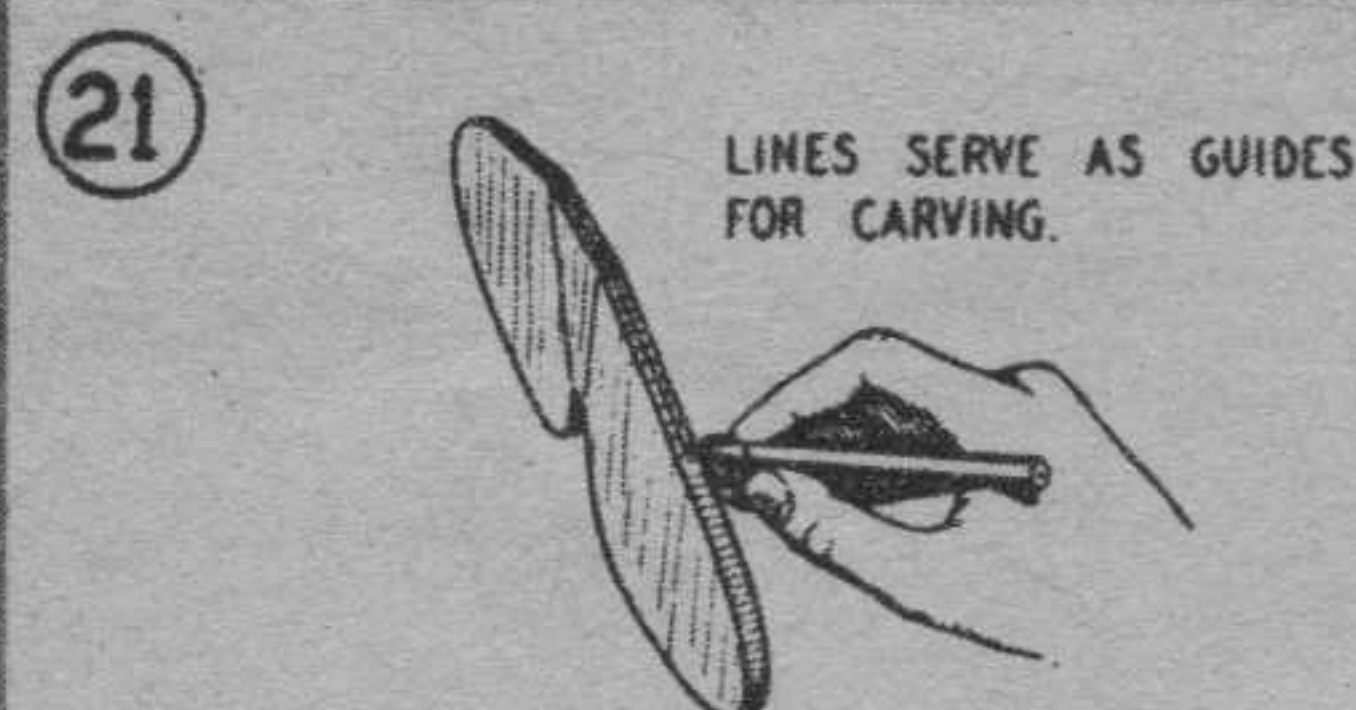
Dull black paint is used so reflections won't distort outline from distance.



Start it right! Accurate alignment gives correct view to the observer.

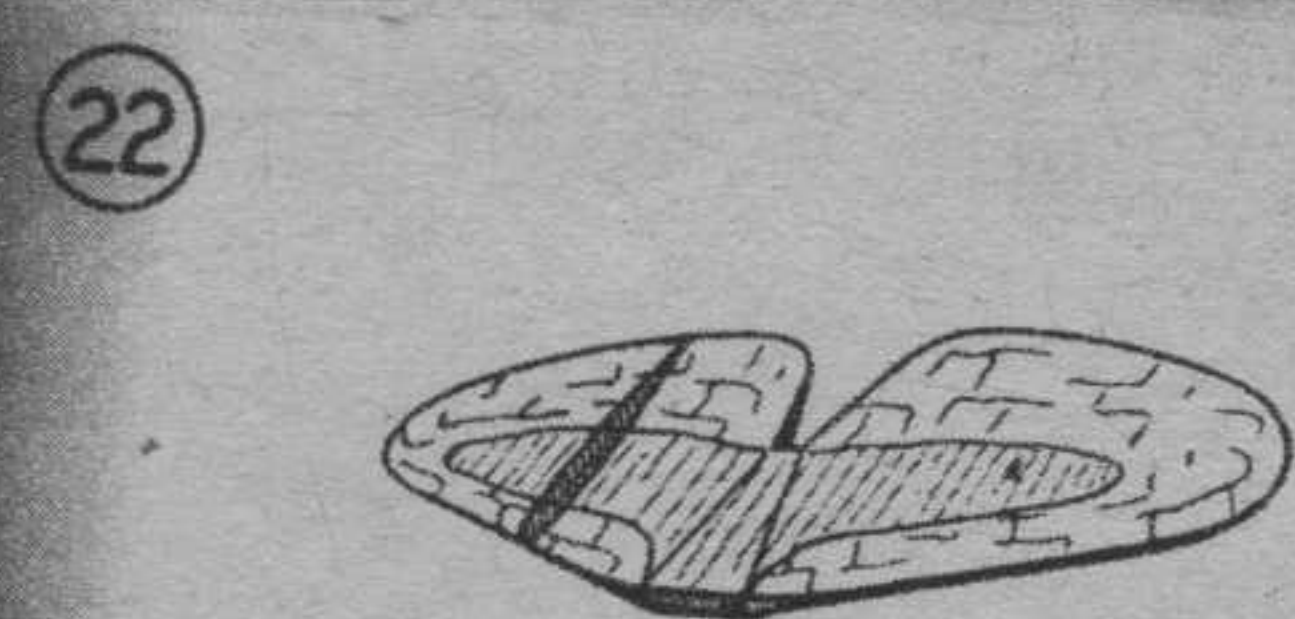


"Yep, that looks right." Famed Spitfire is shown here step by step. Appears simple.

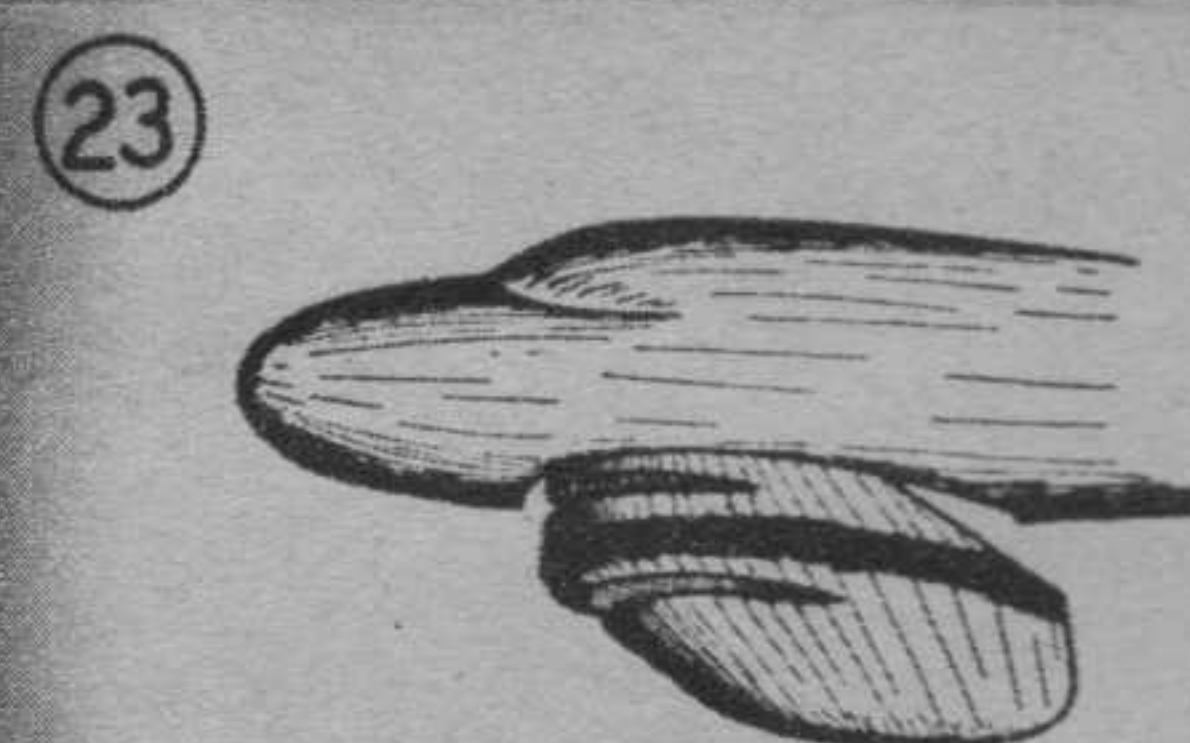


LINES SERVE AS GUIDES FOR CARVING.

Next draw center line around thin edge of the stabilizer.



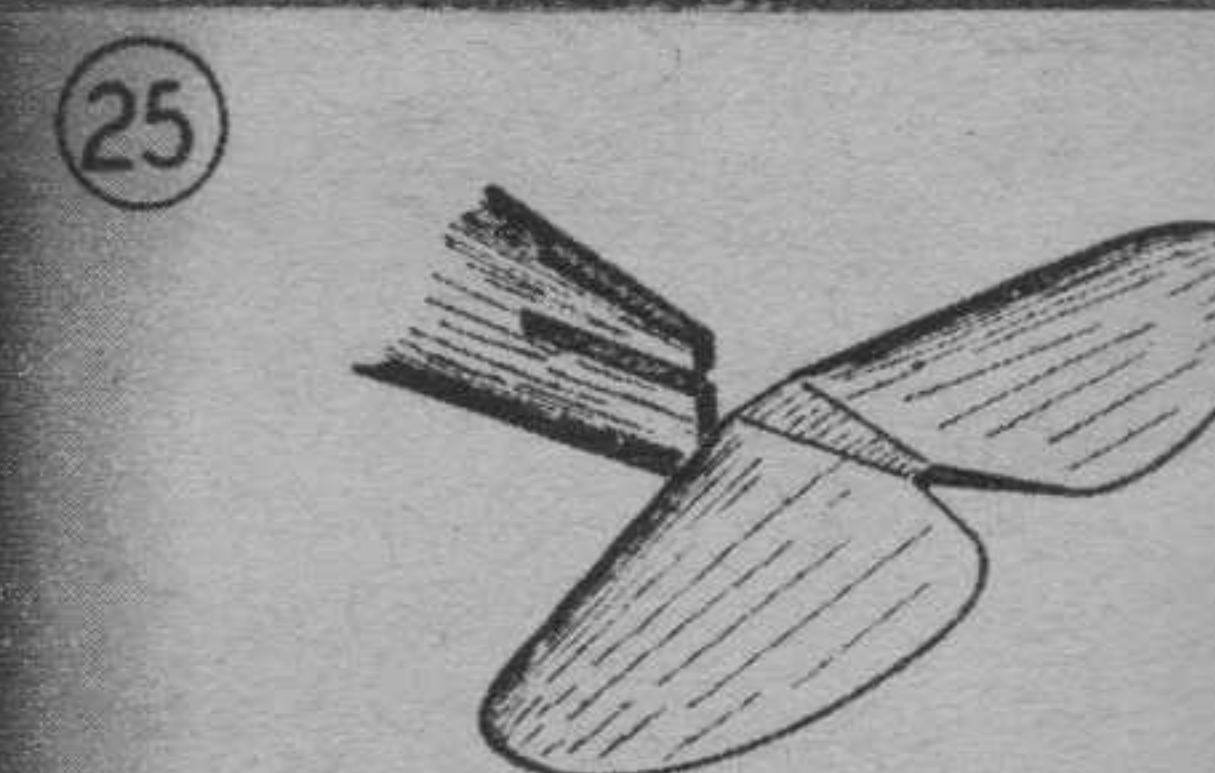
Shape tail to streamline by cutting away wood, then sand.



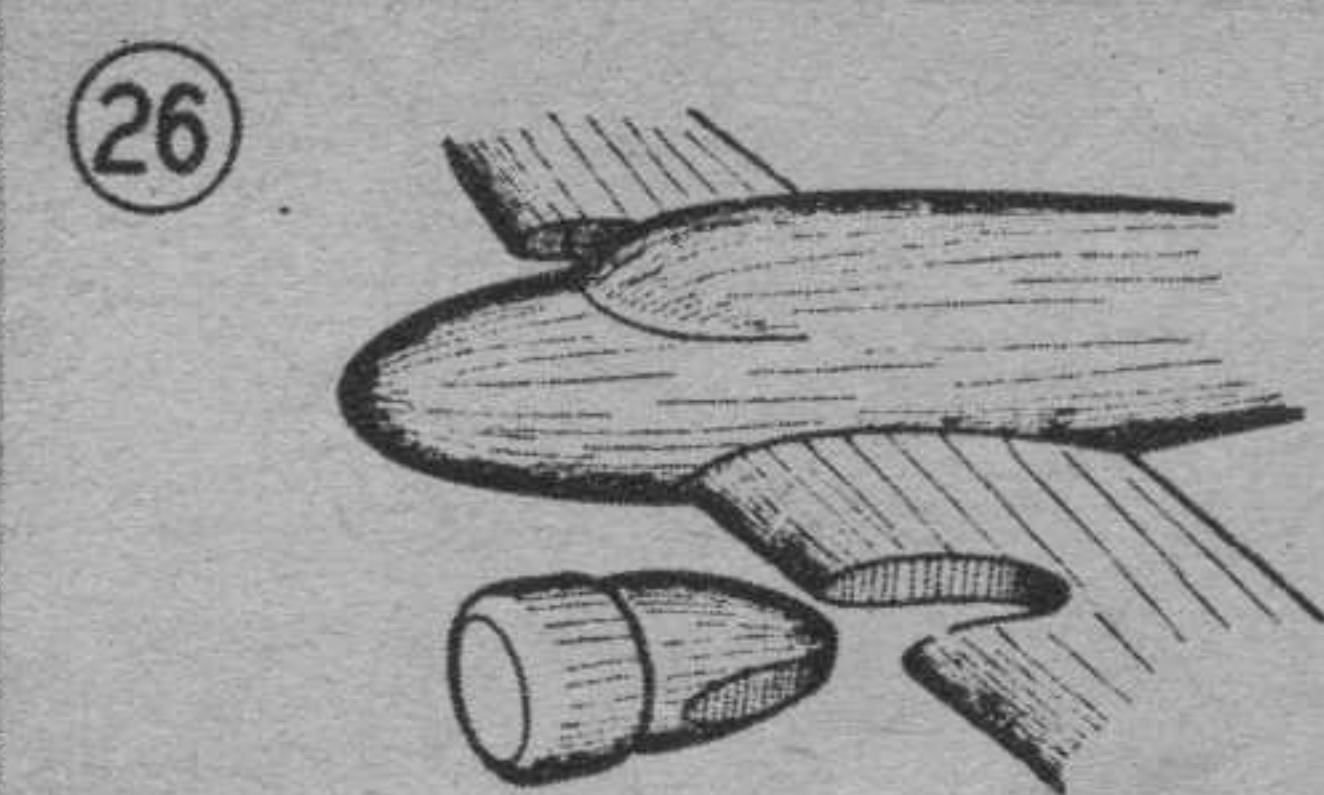
On low-wing model trim body to fit wing. Glue wing in place.



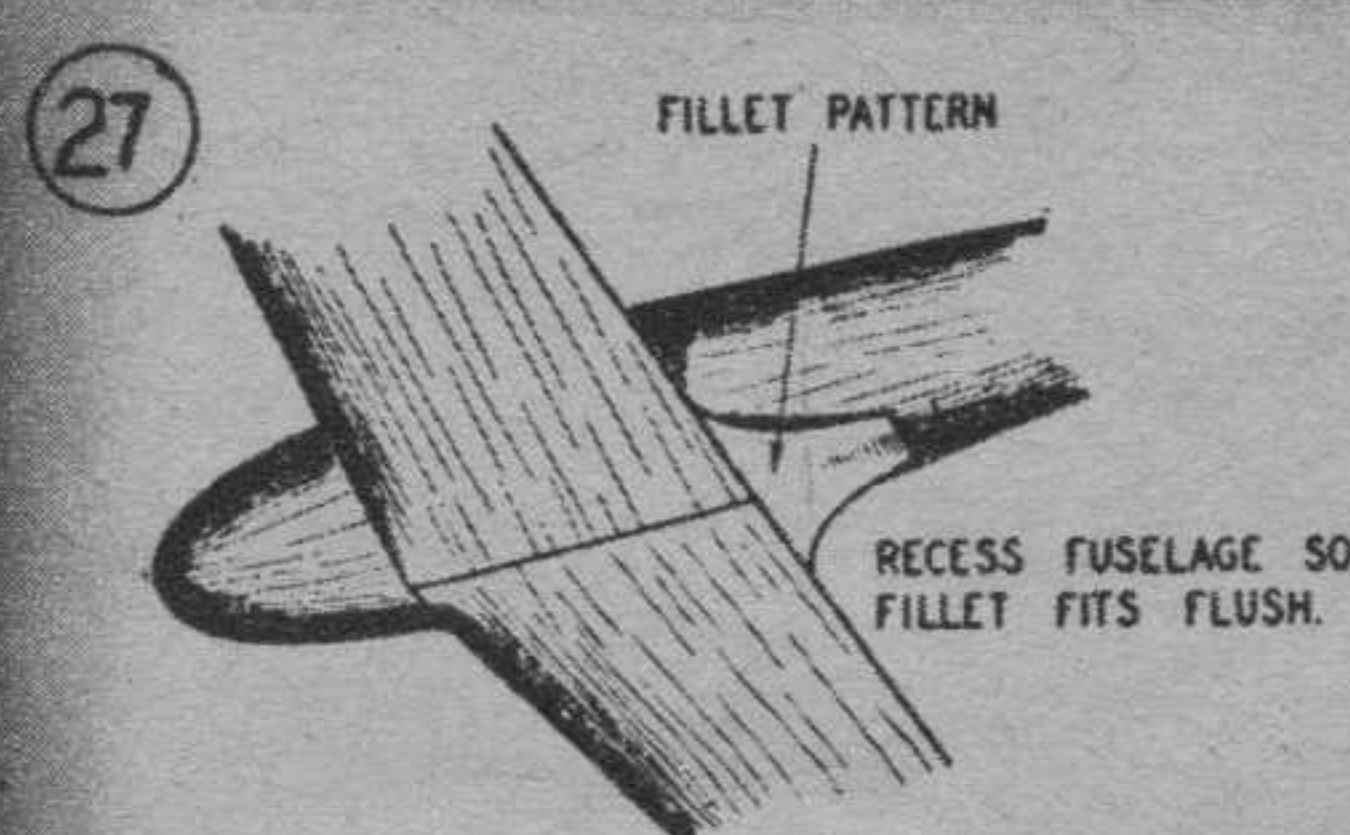
On midwings remove bottom section, fit wing; glue, trim.



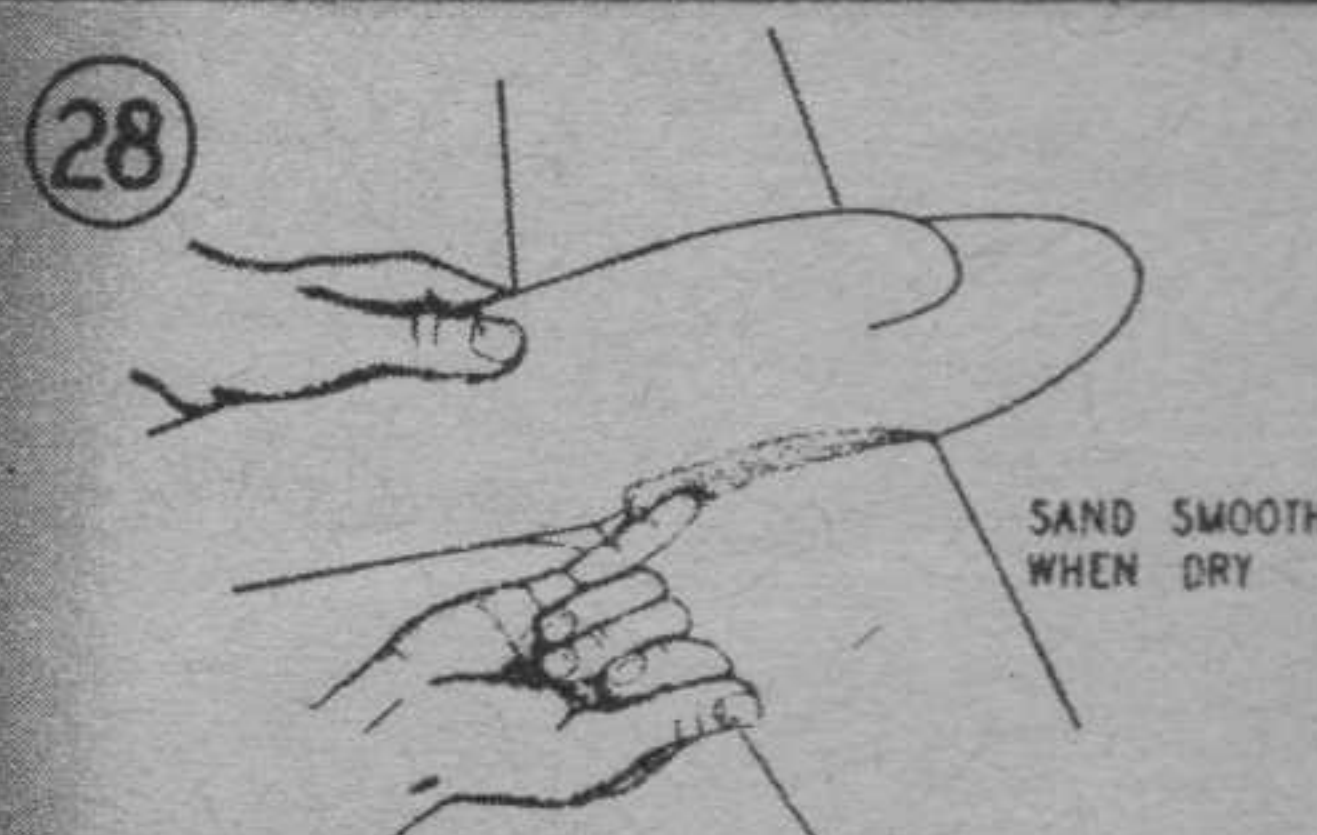
When stabilizer is glued to fuselage, line up with wing.



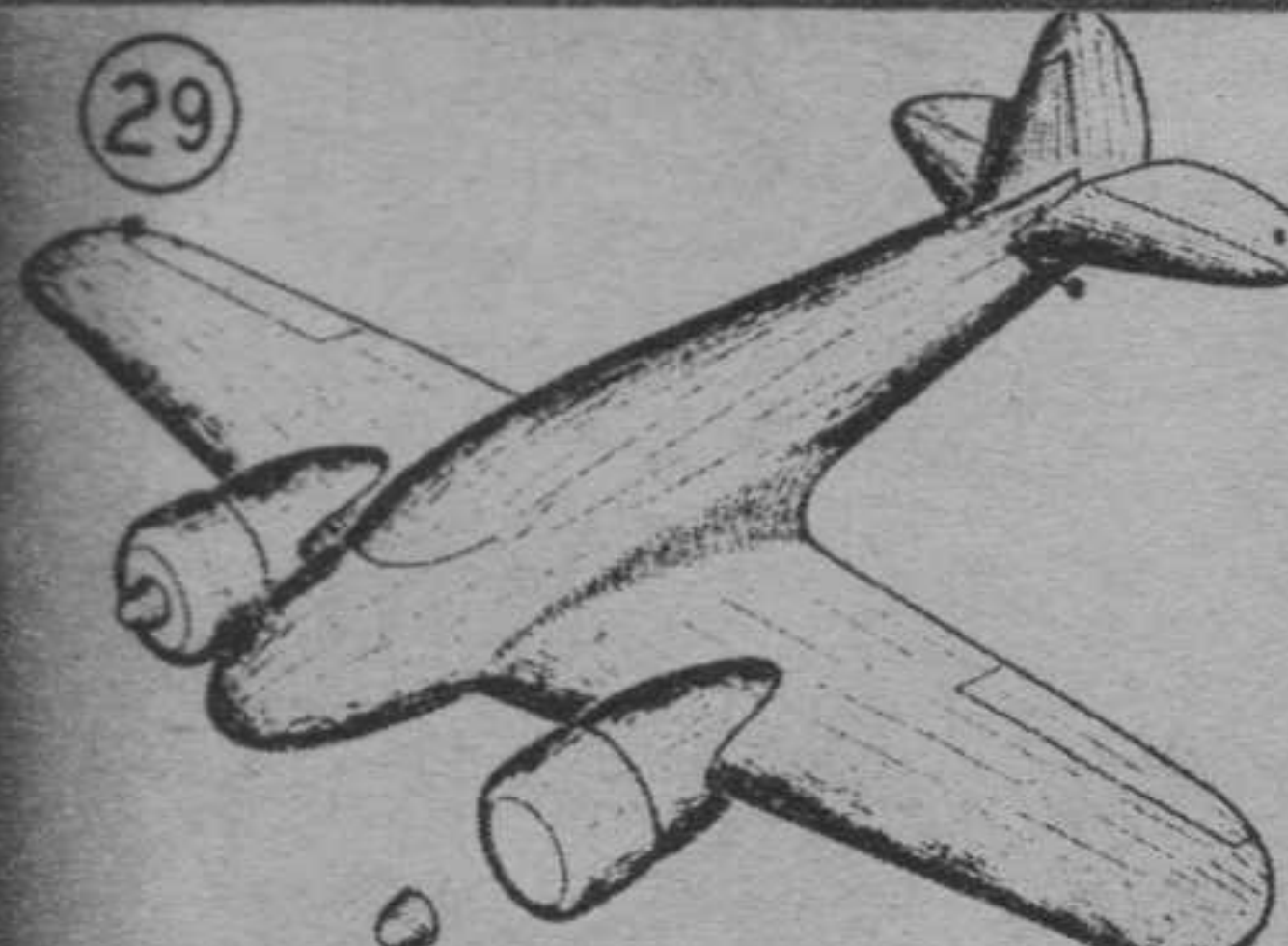
On multimotored jobs, glue any nacelles in special cut-outs.



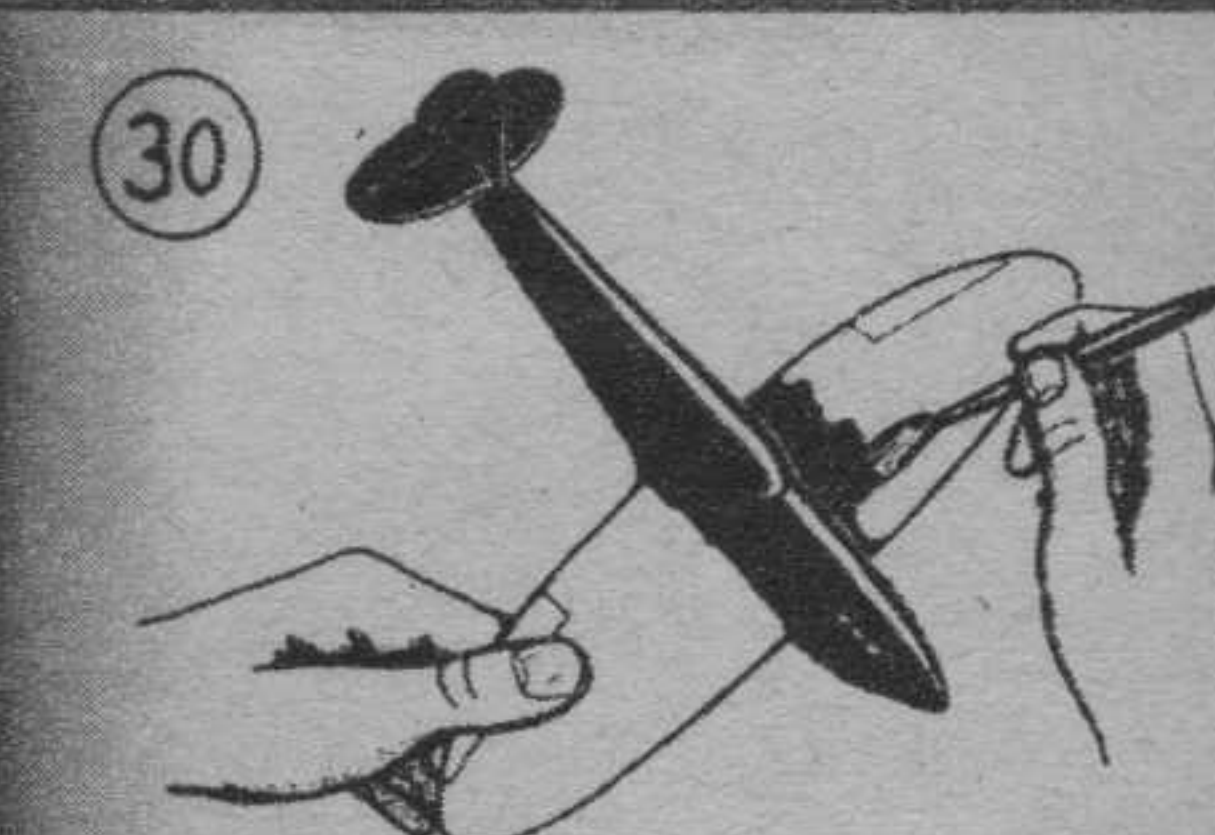
Post-card-weight paper fillet is glued on low-wing models.



Fillet top made with plastic wood. Several applications.



Now we are ready for all final details, spinners, exhausts.

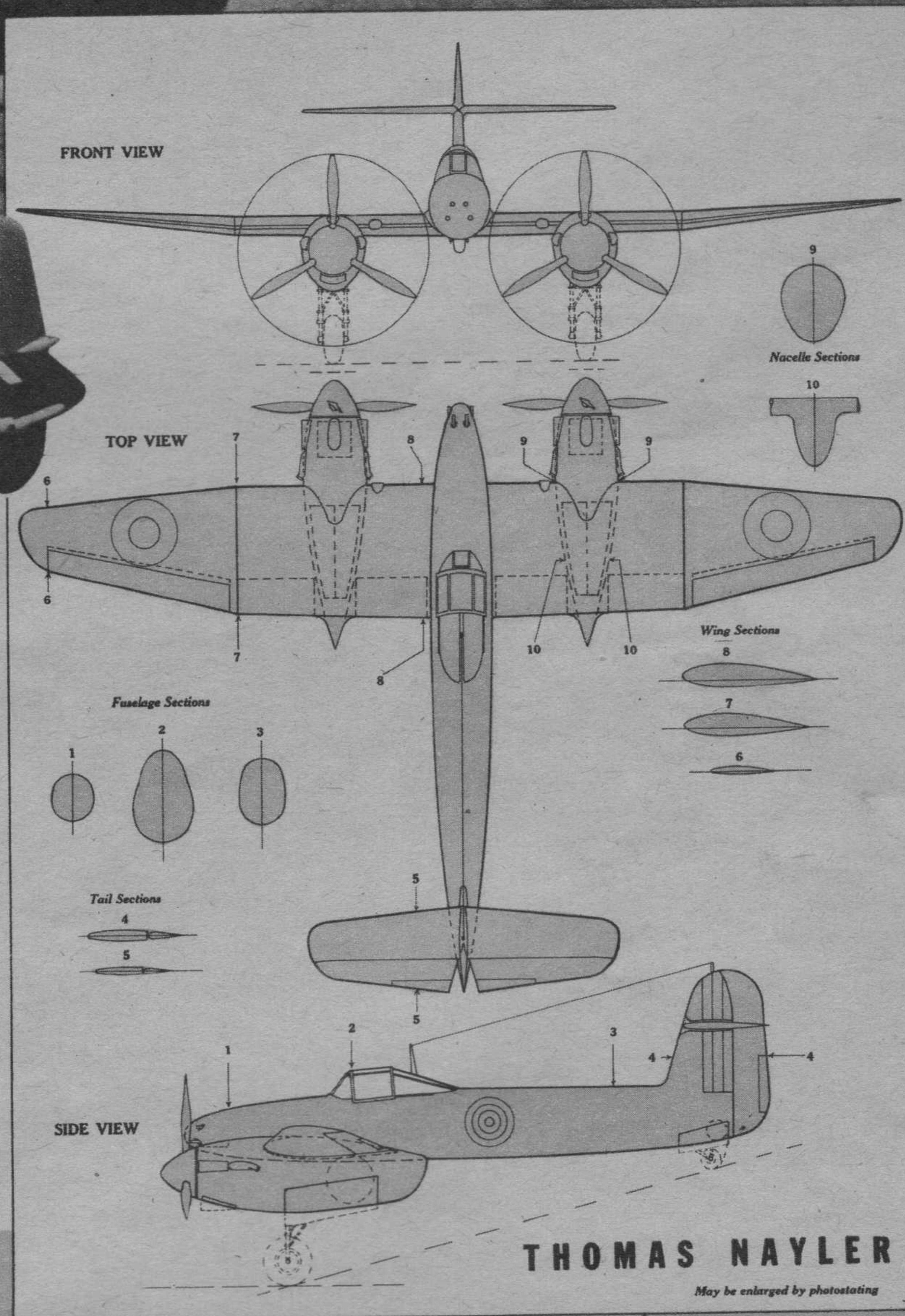


Now comes the flat black paint. For own home use paint gun.

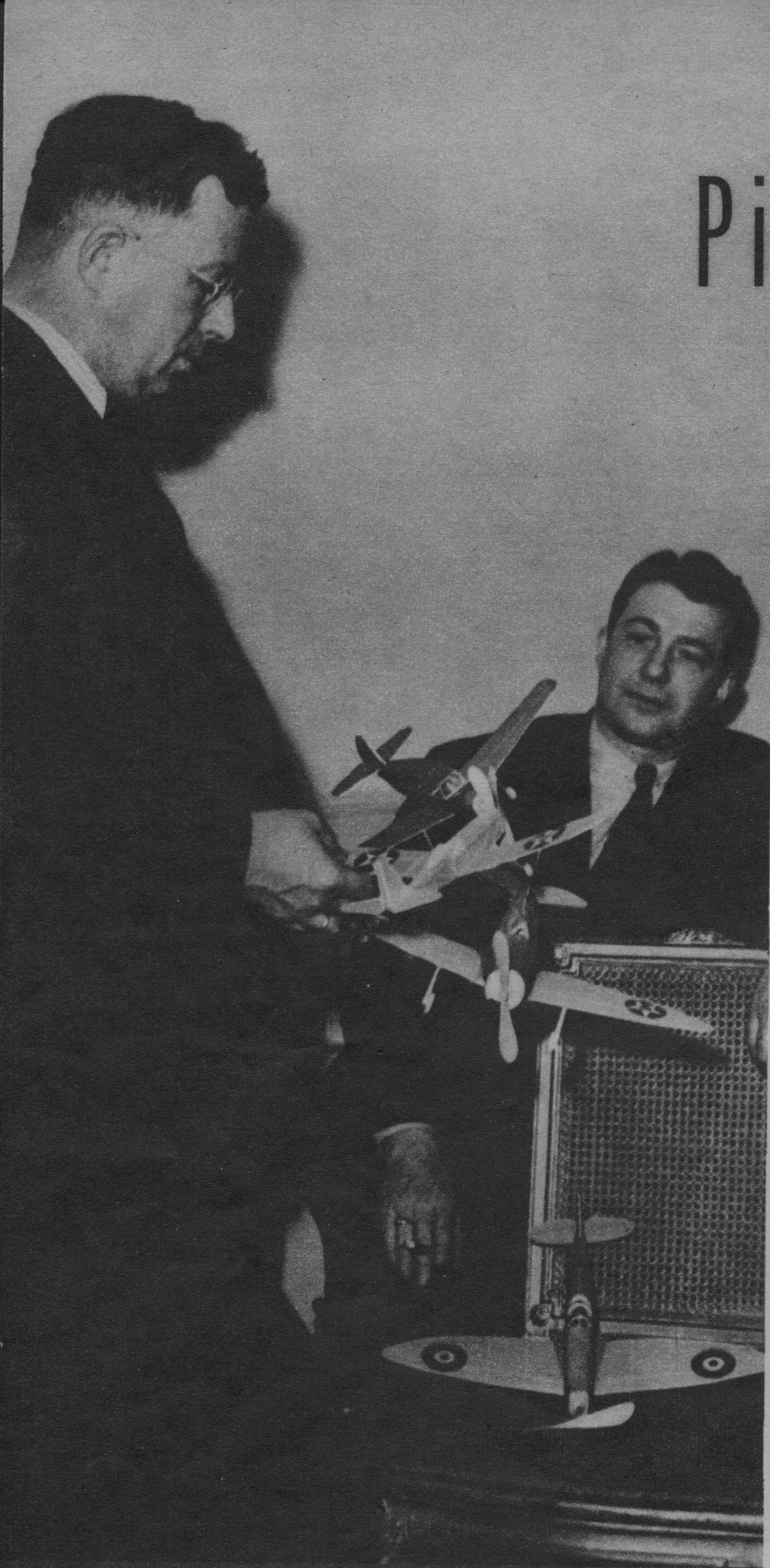
Westland Whirlwind

BRITISH FIGHTER

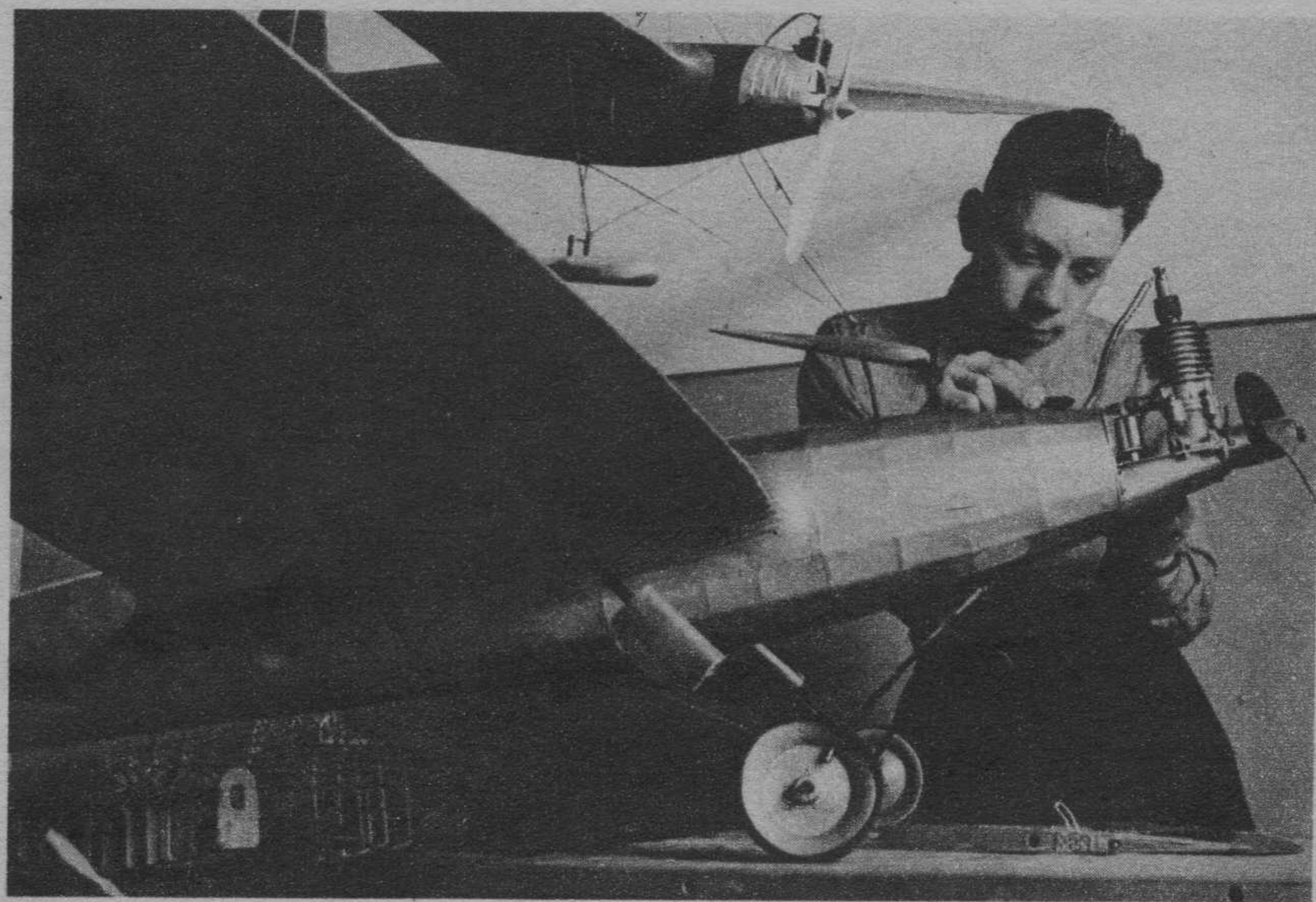
Best-kept secret of the war was the Westland Whirlwind, first tested before the war. Armed with four 20-mm. cannon, it is a long-range fighter. Whirlwinds were part of the escort of the first great daylight raid on Cologne, when they protected the bombers as far as Antwerp. Engines are Rolls-Royce Peregrines of 850 h. p. each. Span is 45 feet, length 32 feet 3 inches, height 10 feet 5 inches. The stabilizer is set high on fin, clear of the slipstream from the twin propellers.



Pinch-Hit Materials



Above—Paul Guillow recently talked before model manufacturers on his use of varied materials. Pine strips, cardboard formers worked beautifully. Below—Hardwood and small nails were all we had in 1927. This picture of a Los Angeles contest was taken that year. Second from right is Bill Atwood, noted motor designer, "Lindy" of the meet.



Hardwood and other "substitutes" are an old story, balsa a luxury, to Russian and German model builders. Construction follows real plane practice quite closely.

Though we need vital priorities on model materials, government approval had not been given when we went to press. Meantime, if you run short, here are real tips from old-timers.

"SOAK all strips for fifteen minutes in boiling water," the directions sheets used to say when you started the fuselage sides. That was prior to 1928. Now, thanks to Hitler and Hirohito, there is a strong possibility that we will once again be using hardwood and wire nails and gosh-knows-what—if we want to go on making models. Please don't think this means you should become a balsa hoarder. 'Tain't patriotic and, for quite some months, such doings won't be worth the time and thought.

Most manufacturers have ample stocks of that good old balsa and the makings of many a swell model are on the production line. Everyone in the know believes that those all-important priorities will be forthcoming now that the schools are becoming interested in model airplane building courses as a starter for aviation training of American youth. But just in case the pinch begins to hurt in the meanwhile, let's face realities and see what we are going to do about this challenge to the traditional ingenuity of you modelers.

"We did it before and we can do it again" might be our motto. Pine and bass were used, without a squawk, with widespread success in the past, and models so built weren't difficult to make. Yes, and they flew, too. Flew *well*, in case you're asking. At the risk of giving away his age, the writer recalls his first model, built from kite sticks. (Will the gentlemen in the back rows please keep their seats?) Before a model dealer put in an appearance at a nearby town, our local carpenter shops were haunted by model builders with pine planks fresh and hand-picked from the lumber yards. The carpenter charged two cents per each for ripping the plank into strips. Then, as now, fuselage sides were made by pinning strips directly onto the plan. Crosspieces were fastened in place by pushing thin wire brads—ten cents a box at the hardware store—through the longerons into the crosspieces. Outside of such tricks as not putting top and bottom crosspieces at precisely the same station as the side pieces—the nails would meet—the idea was pretty much the same. Perhaps you older fellows remember trying paper napkins, brown wrapping paper, and regular household tissue; shellac and varnish; reed and bamboo.



Scale models look like a splendid out when the rubber shortage begins to hurt. This interesting photo taken in a British toy factory shows almost all German, English types.

BY WILLIAM WINTER

With the experience every modeler has today we should be able to go on till doomsday building top-notch models no matter what happens. Paul Guillow puts it this way: "So far as we can see, modelers need have no fears about being able to obtain good flying models. And as for the manufacturers, they need not worry too much. All this is predicated on acceptance of the substitutes (*remember, we are considering the long chance that balsa, et cetera, may become scarce—The Editor*) by our customers—the modelers." There you are, you guys. It's dumped right in your laps.

Mr. Guillow passes along some interesting dope for new ways and means of doing all sorts of things. For instance, he's tried cardboard formers on some of his experimental versions of standard kits. A little Republic flying model we saw was a wow, thin pine strips (glued together) and cardboard formers regardless. Joe Ott, too, specifies cardboard formers. Such formers work particularly well with crutch-type fuselages or when slipped over square foundation fuselages. Just remember to reinforce these ersatz formers by gluing to them a thin strip of wood. Cardboard wing ribs are a cinch and have all the strength in the world when reinforced with a thin strip glued along the side of each rib between the leading and trailing edges. There's a tip, men. Conserve that sheet balsa.

One possibility will be kits that substitute pine, bass, ash, or some other similar wood for longerons and spars. Wing ribs, wing tips, and similar parts will be stamped on balsa, as always. Cardboard can be used to advantage for bulkheads—and wing tips as well, for that matter. As a guide to the size hardwood strip to use for longerons, one twentieth to one twenty-fourth-inch square is about equal to one sixteenth-inch square balsa. The regulation cement may not work out too well with hardwoods, but you can trust cement manufacturers to do something about this in plenty of time—if we ever do use hardwood. However, there are some possible glues on the market that might work well with hardwood. But more of this anon.

When you get into three-foot models with one-eighth squares of hardwood, razor blades don't do so well. It's a much better idea to use a coping saw for cutting crosspieces. Ribs, too, are cut out in jig time with a saw. The saw blade should be removed from the saw frame and turned around so that the teeth cut the wood when the saw

handle is pulled down. Otherwise, the teeth catch on the upstroke and buckle the blade. We know it ain't right, but it works better.

We asked our friend the Traveling Salesman to give us the low-down on this material business. Followed a flock of earnest telephone calls between said Salesman and sundry unidentified persons (sources heretofore considered reliable). And this is where we began to learn the inside stuff. Did you know there is a Mexican balsa? Well, there is. It's called Bomba wood—we heard ten different spellings—or monkey wood. It's hard, strong, very light. Seems to be a cross between white pine and balsa. We'd say it should do well for longerons and wing spars. (Some kits already use it this way.) When we heard this we figured we had foiled the cargo-space problem. But, alas, there's a shortage of railroad cars, or something, from Mexico. However, we are still counting on getting the usual balsa.

How about paper? Silkspan is available in white only. You model dealers should be interested to know that reports of there being no silkspan aren't necessarily so. Delivery is slow—like everything else these days—taking about five to six weeks. Of course, there is no Jap tissue—hurrah! Whitfield says there is an American bamboo paper which is better anyway. And it comes in colors. It's a little heavy, though, which might limit it to large gas jobs. Asked about this, Whitfield said it doesn't absorb as much dope as the usual Jap tissue, hence might be used on smaller gas jobs as well without a harmful increase in weight. There is an "American tissue," white, which is adaptable to rubber-powered models—if we had the rubber. We can use it on gas jobs by double covering; that is, by using two layers of paper. If we remember correctly, Henry Struck pioneered double covering. Covered once, sprayed with water but not doped, then covered again, running the grain of the second layer at right angles to the first.

Straight from the feed box we got this tip. Air Associates, Bendix Airport, Bendix, N. J., have an airplane cloth that is O. K. for large gas models. It's made from cotton. As we go to press (the Salesman ran out of nickels for the phone) we are not sure how plentiful this cloth is. Individuals and dealers might drop Air Associates a line to check on this. For small models Christmas-grade wrapping tissue and household tissue can be pressed into service.

All this sounded interesting, so before the Salesman (getting hoarse

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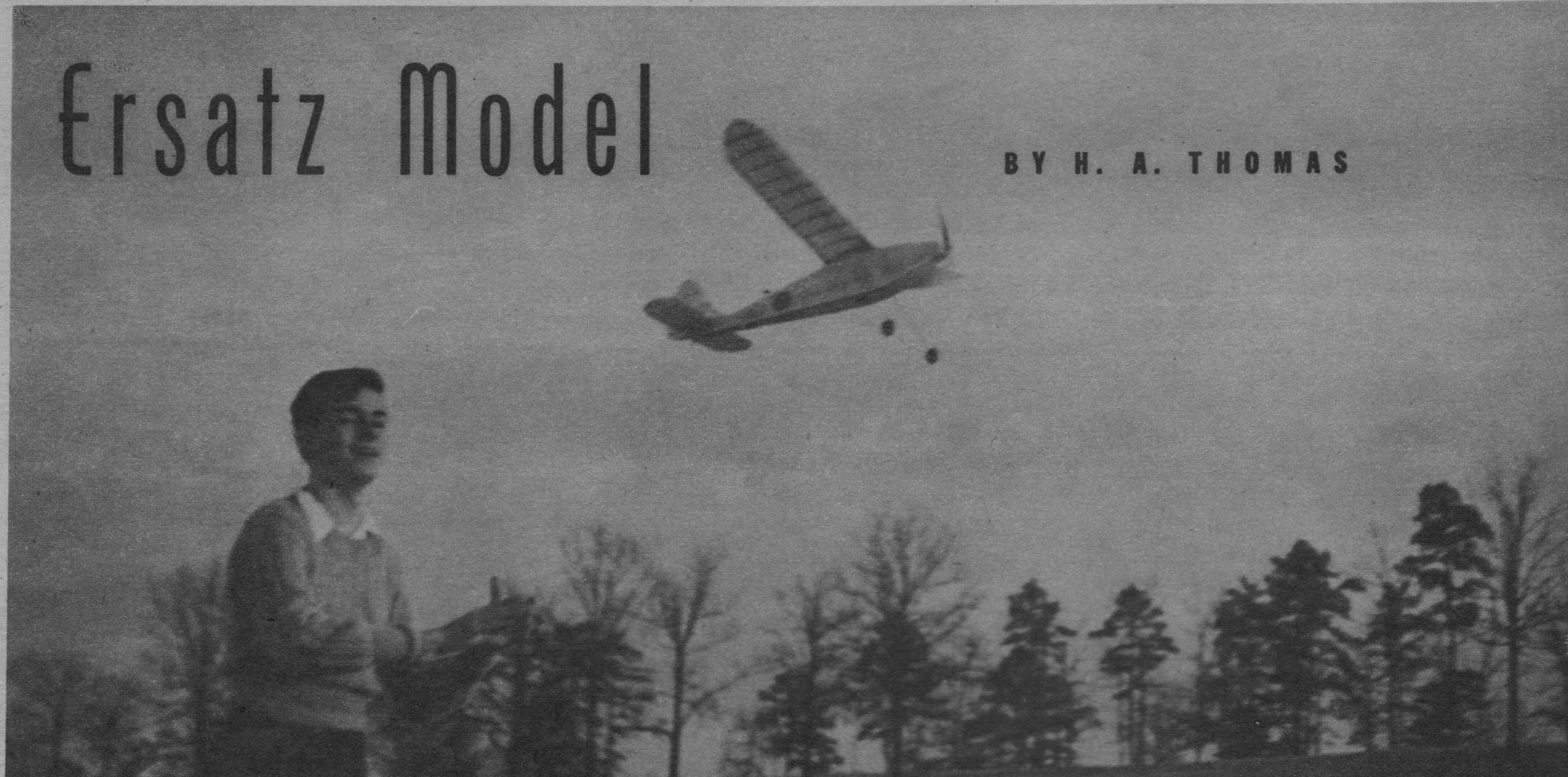
by this time) had a chance to hang up, we demanded all the gory details. "What do you want to know?" says he. "O. K., smarty," we came back. "Suppose we do have to use pine. What do we do for glue? Maybe cement won't hold so well."

"We won't be using hardwood, anyway, but if it will make you guys feel better, I'll get the dope on glue," he told us. More phone calls, more busy executives (he knows them all) rudely awakened at their desks.

LePage's—yes, the glue-and-mucilage LePage's—has a special cement for model airplanes. It will do the trick on pine or balsa. Price for one and one half ounces is ten cents. Comes in tubes. It's cloudy in appearance but dries clear. Then there is Ambroid, costing a quarter for one and one half ounces. Old-timers will remember Ambroid quite favorably. It's thickish and amber in color. Dries strong and has all the qualifications of the regular model cement. Works well on pine,

better on balsa. Your Salesman even tried Weldwood. Sure, you can use it on models. Pressure is required in drying, which makes it preferable for gluing up blocks. Frank Zaic once told us that he used Weldwood for a certain item and that it could be used widely, if time was allowed for drying. Retails at ten cents for about one and one eighth ounces; twenty-five cents for three and one half ounces. Buzz your local hardware store about all these items—if you have trouble getting cement. (Weldwood is made by U. S. Plywood Corp.)

Here we should assure you that there seems to be plenty of dope and cement. Some manufacturers are selling wholesale lots. Speaking of dopes, not necessarily liquid, we know of one chap (he fancies himself an authority) who pulled a prize boner with one of those prebalsa buggies. It seems white shellac was the rage for covering at that time. The technique was to coat the tissue with the shellac and then drape the moist paper over the frame. Once it had dried, the (Turn to page 57)



BY H. A. THOMAS

The proof of the pudding. Built from substitutes, our Ersatz job flies with the best of them. Balsa is easier to work with, but from any other standpoint pine is better.

Facts talk. Here's a little job with standout performance, though made from drawing paper, cane, wire, white pine. Some things we must have, but examples like this help.

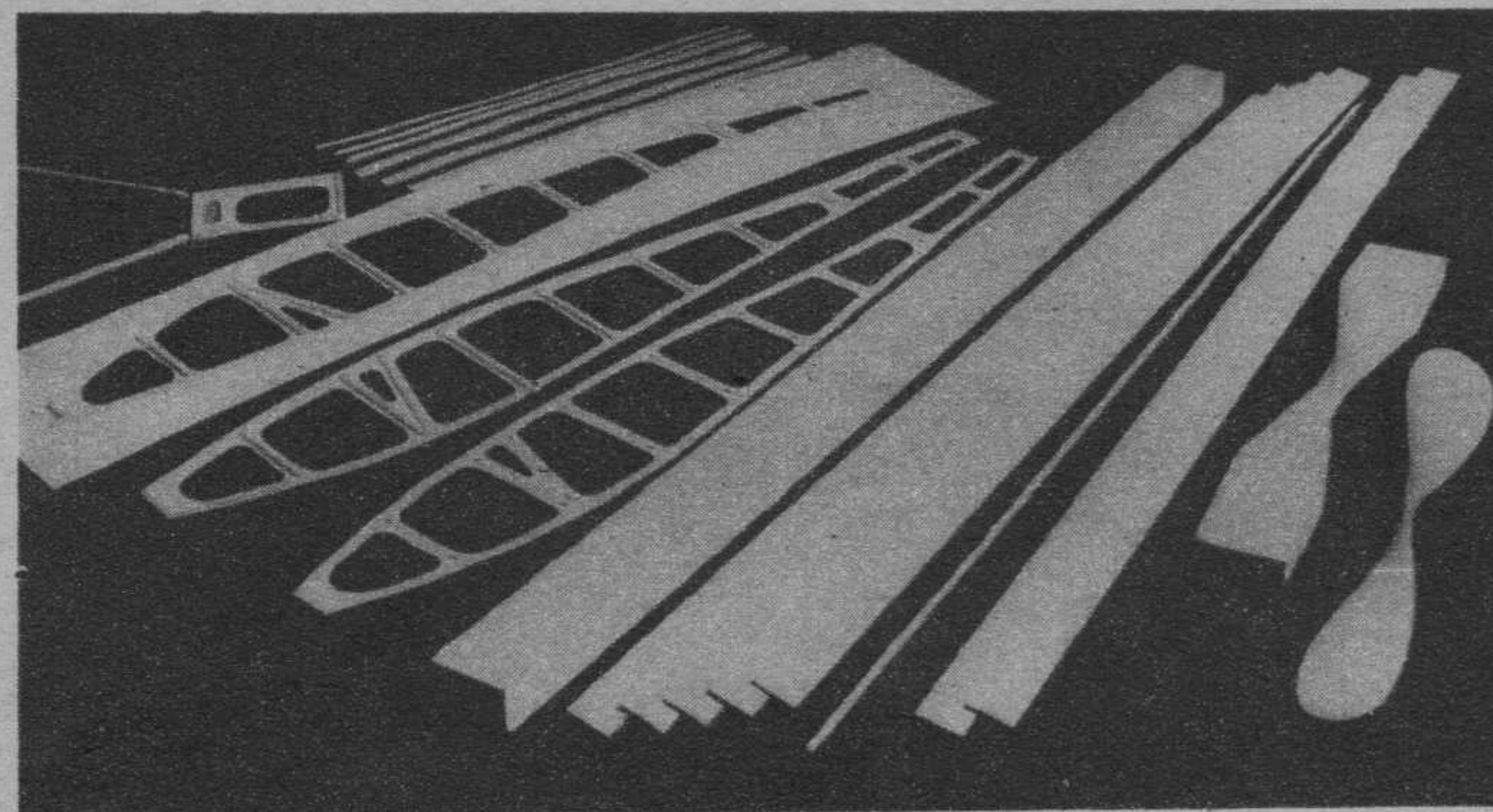
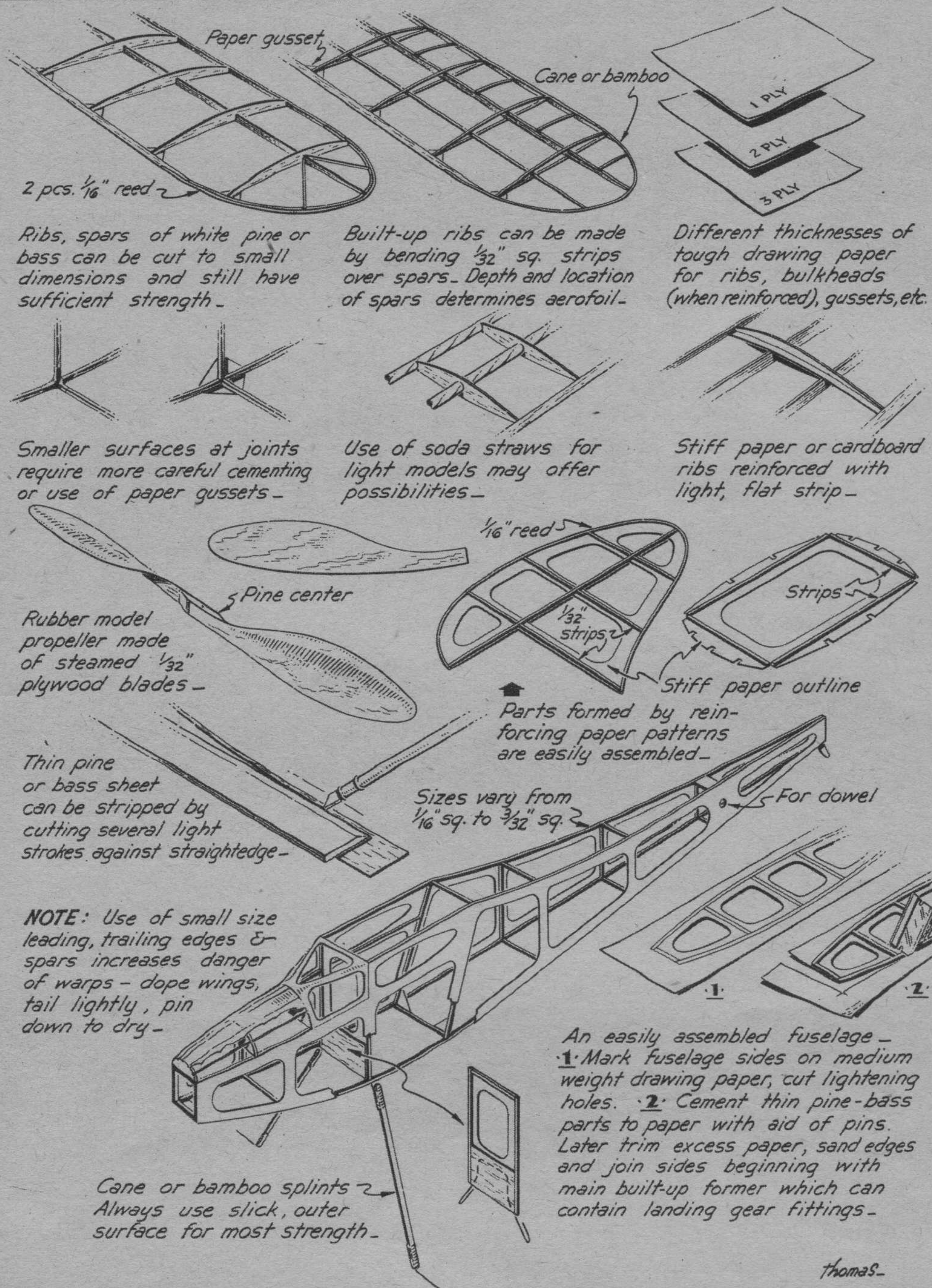
WHEN faced with serious shortages of essential war materials, German scientists have startled the world with their success in discovering or creating "ersatz" or substitute materials. These products range from synthetic rubber and gasoline made from coal to substitute foodstuffs. Somewhat similar conditions have made it necessary for the United States to launch a huge program of synthetic rubber production, with the prospect of many other heretofore plentiful materials being replaced by others.

A glance at the NAA's estimate of the amount of balsa required by model aviation for 1942 not only indicates the extent of model building today, but also shows how dependent we have become upon this unusual material. Although the great improvement made in design and performance is largely due to the use of this light but strong wood, at the same time it is causing us to build more hastily and carelessly without much regard for the strength-weight ratio of parts. We have always

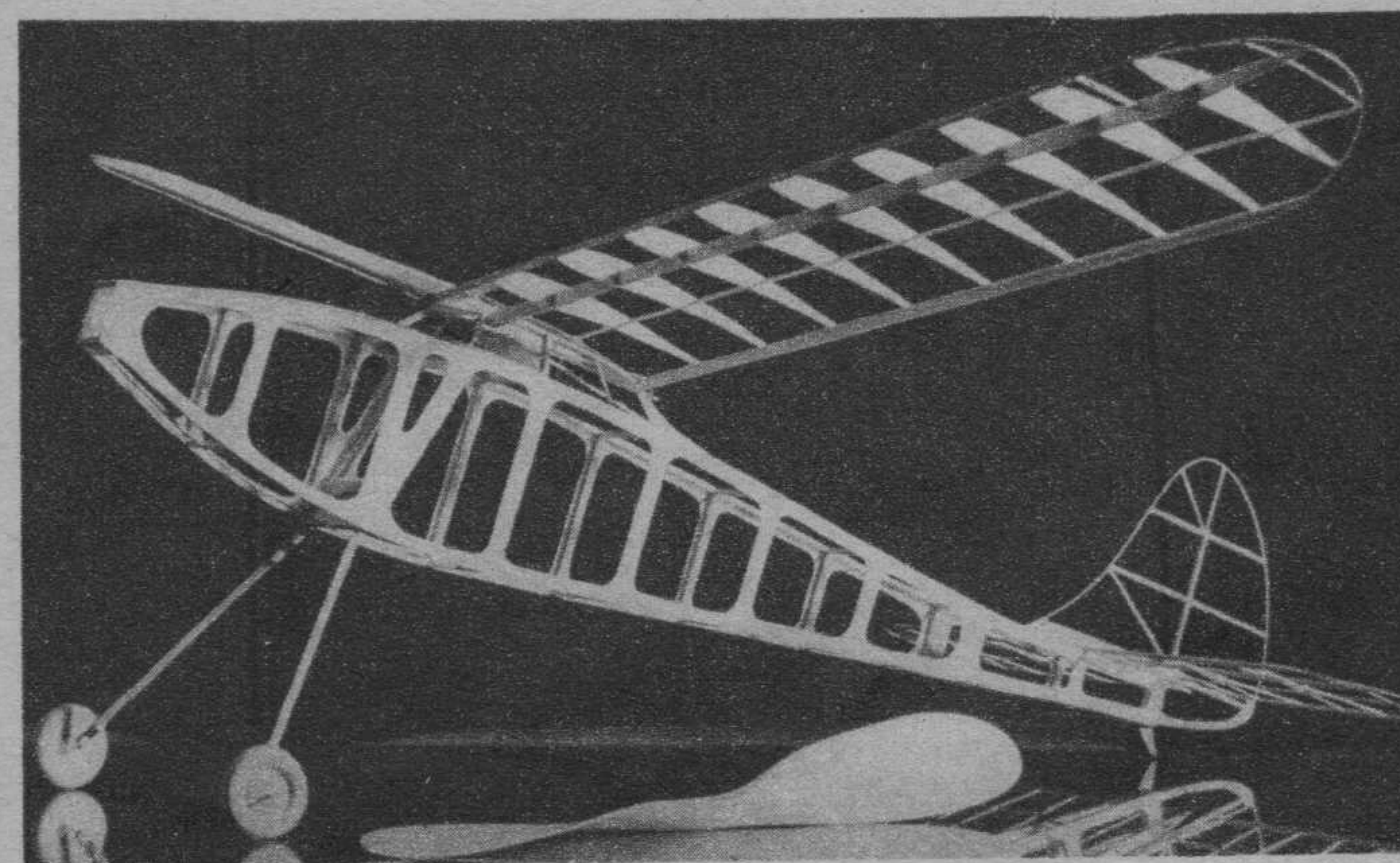
been assured our models would be strong and light if we built them of balsa.

War conditions may never prevent us from getting enough balsa for our needs, yet the possibility affords us an opportunity to see what might be done without it. We can start with materials used in the earliest successful models: reed, spruce, pine, bass, paper, bamboo and others. By applying our knowledge of design and flight adjustments, by determining the dimensions of parts with respect to the strength required, we can build models of reasonable performance and exceptional strength with these materials. In addition, there are no doubt many other satisfactory materials close at hand which have not been "discovered" because balsa has been so plentiful and convenient to use.

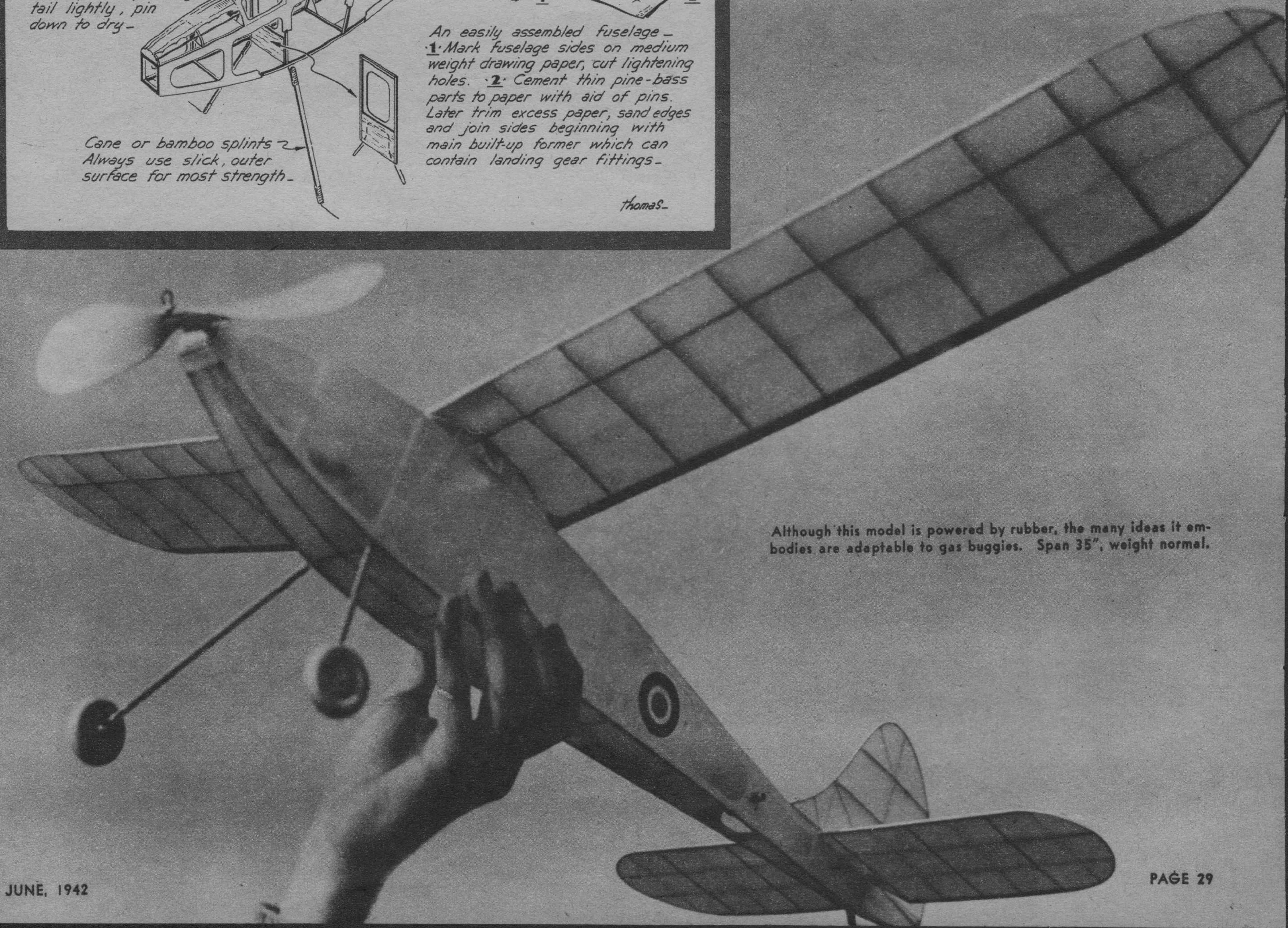
Our experimental model was built entirely from bits of drawing paper, cane, wire, and assorted sheets and strips cut from a 1 x 3 x 36" white pine board. The propeller was carved from a block of the same wood. Most lumber mills handle supplies of white pine, which is usually of even texture, is straight-grained, and can be cut, stripped, or carved without too much effort. Most of the substitutes for balsa will naturally be heavier but at the same time much stronger and can consequently be used in much smaller dimensions. These smaller sizes reduce the cementing surfaces at the joints and as a result these must be more carefully cemented and in some cases reinforced (Turn to page 53)



The author made fuselage from thin hard strips, glued on sheets of paper. Then the paper was trimmed, lightening holes cut.



Nothing the matter with this job. Looks neat and is far stronger. Hard strips will become available when, and if, balsa goes.

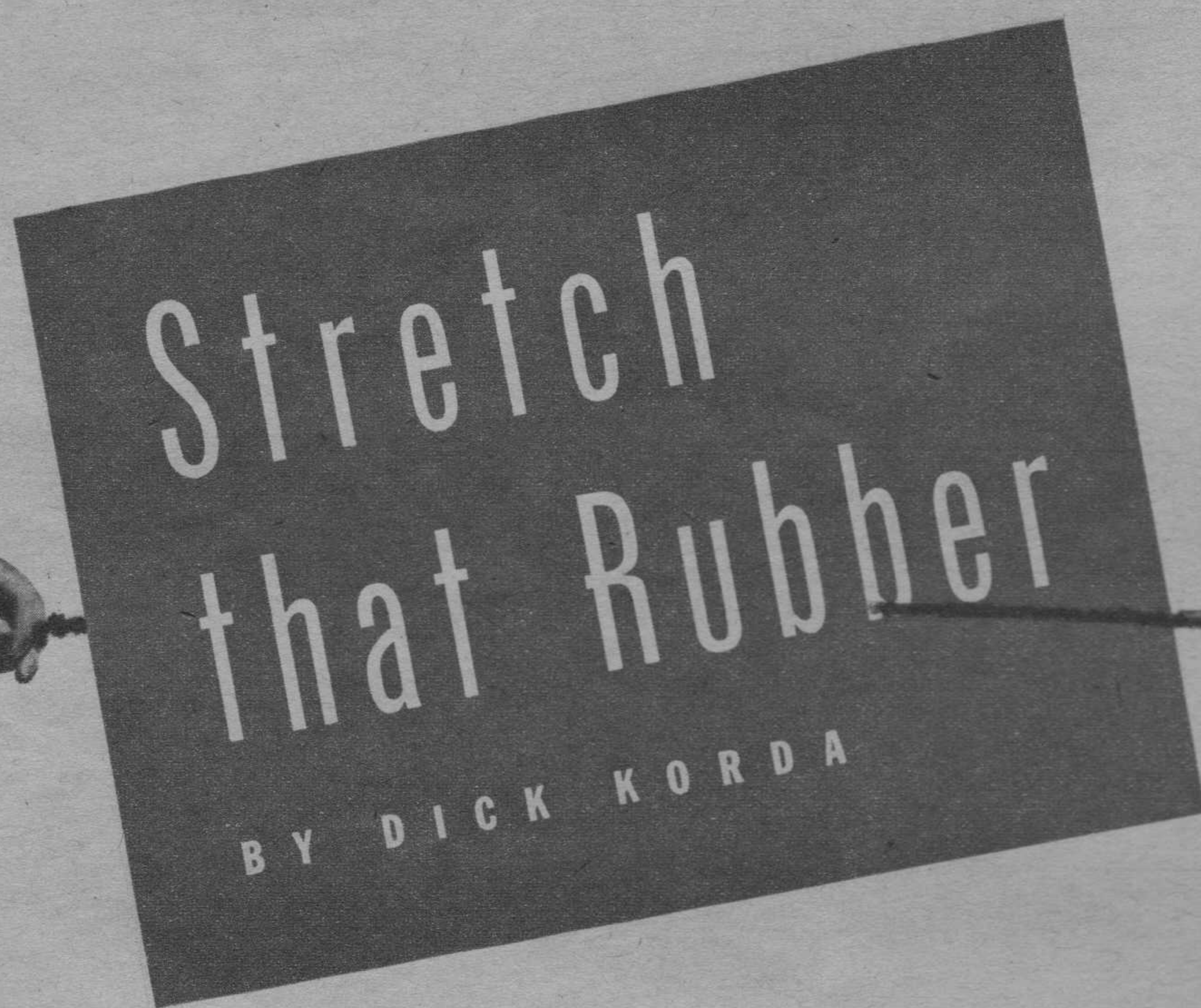


Although this model is powered by rubber, the many ideas it embodies are adaptable to gas buggies. Span 35", weight normal.

Maybe rubber IS scarce, but you can double the life of what you've got. Listen to the tricks of an old Wakefield winner!

THERE is one horrible sound that can be heard at every rubber contest without fail, and that is a sheared rubber motor tearing a fuselage to bits—with the resulting cries of “you can fix it!” That sound is going to be very expensive this year, not only in terms of money, but in the loss of precious rubber that cannot be replaced. Yet so many of these motors would not have broken had they been properly taken care of in regard to proper lubrication, handling, and breaking in. But the one thing that takes the biggest toll is the flier's willingness to take a chance on a motor that has been damaged through a collection of grit, cuts and improper lubrication. Here are some of the things that should be done, starting from the time rubber is purchased from the dealer until it has made its final flight of the day.

First of all, if it is to be stored for any length of time, put rubber in a coffee can or jar and keep it in a *cool*, dark place until ready for use. Then make up at least two motors for each ship, shake off all the grit and dust that may have accumulated, and lubricate with fairly thick lube about the consistency of sirup. Before putting the motor in the plane, check over the rear hook and prop hook or bobbin for any sharp



edges that will cut the rubber. If you use a bobbin, put a rubber band around the motor and pull the band against the bobbin after the motor has been hooked on. This will keep any odd strands from twisting off and getting pinched between the bobbin and prop shaft.

The main use of a bobbin is to keep the rubber running true and keep it from climbing up a regular prop hook and rubbing on the inside of the plane. The majority of the cuts at this point come from sharp edges on the prop hook, left by pliers when bending, and by having the lube rubbed off from handling when winding up the motor.

When breaking in the motor, which is the most important step in preserving rubber, always start off with *less* than half the turns it is capable of holding, then slowly bring the amount up with each flight until you have *almost* reached capacity turns. Save winding to capacity turns for contest flights where it is really needed. After breaking it in slowly this way, take it out and relube it once more. After all, you can excuse a fellow for taking a chance with a weak motor, but anyone who uses a motor without proper lubrication deserves anything that happens—and it will happen.

If the motor has been stored away between contests—never leave it in a plane any longer than it takes to complete your (Turn to page 50)



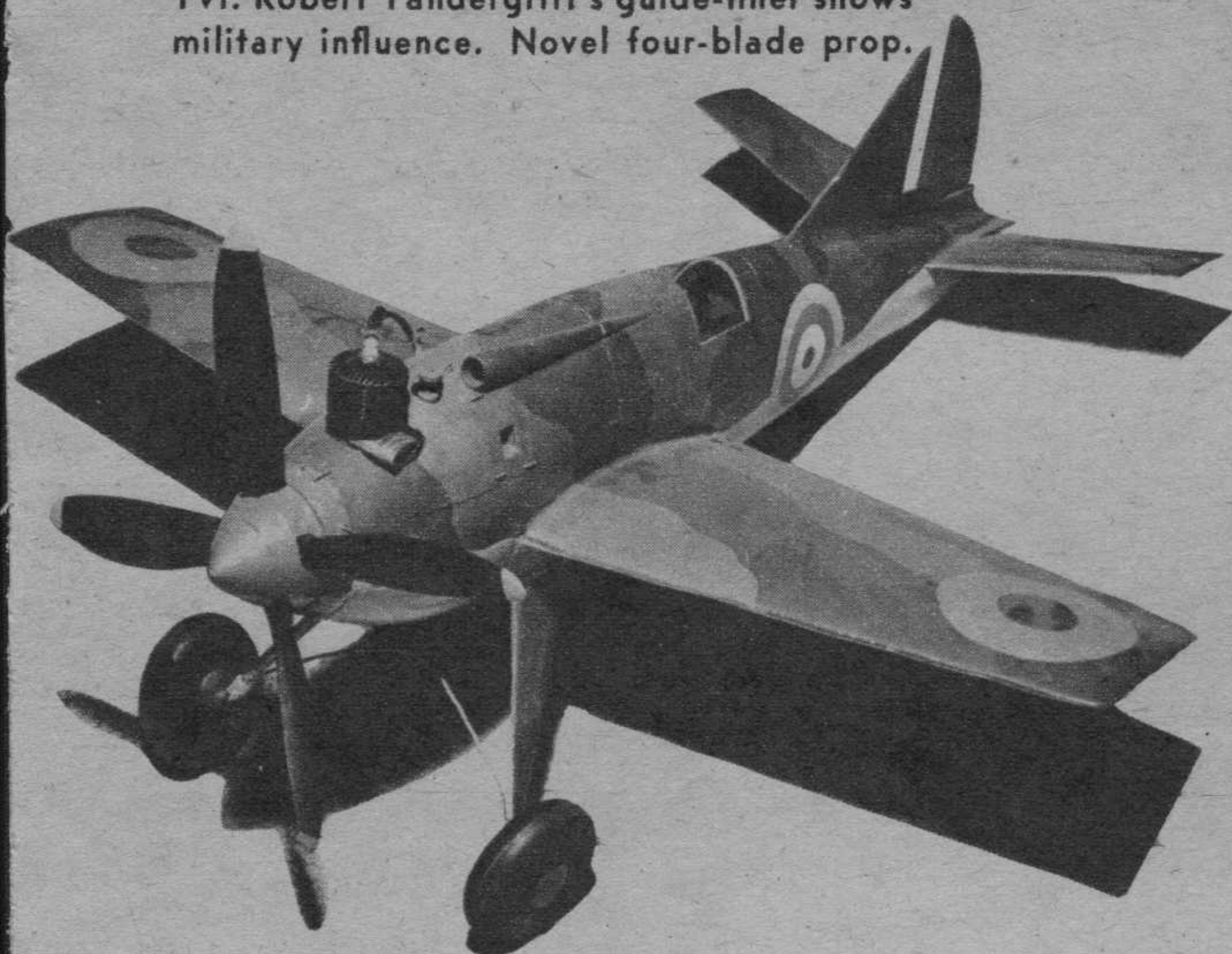
Down The Runway

CONDUCTED BY AL LEWIS

EXECUTIVE DIRECTOR

Latest roundup of official aeromodeling news as compiled by the AMA, official headquarters of American model aviation.

Pvt. Robert Yandergrift's guide-liner shows military influence. Novel four-blade prop.



The Wakefield Trophy, most famous modeling cup. Last won by Dick Korda, it's out of circulation till war ends.

AMONG the many Academy chapters which are turning to and aiding in America's "air conditioning" program is the Oklahoma City Gas Model Association. Members of the OCGMA instruct classes every Saturday morning from 8 a. m. until noon in the nine junior high schools of the city. The club is working in conjunction with the school board and the expert modelers instruct and assist in the building of model airplanes of all types as well as give practical lessons in aerodynamics.

It took a war to do it, but at last the gal modelers are officially recognized! The National Advisory Committee for Aeronautics wants to hire expert feminine model airplane build-

ers and fliers to work in the NACA laboratories at Langley Field, Virginia. Girls between the ages of sixteen and twenty-five are eligible and can obtain complete information from William R. Howell, Special Representative, Civil Service Board, Fort Munroe, Va. Their duties will consist of building and testing various types of models and assisting in many research projects under way at this government laboratory.

(Turn to page 64)

Ask Balsa Butch

Questions of general interest to model builders will be answered on this page; all others by mail. Inclose a three-cent stamp to insure receiving a reply.

Norman Vaty, Brooklyn, N. Y.—As for that wind tunnel, we suggest you build a model that will not be too large for tests. See the May, June and July Air Trails. Nothing much else we can say except that once you have built it, you're "on your own" as far as tests are concerned. If you're entering high school, Norm, fill your schedule with science and math courses. Follow the regular requirements to the best of your ability—but take algebra, intermediate algebra, plane and solid geometry, and trig, if possible. Also include biology, chemistry and physics. They'll all help you in your aeronautical future.

J. W. Meyer, Harvard, Ill.—Joe, we're going to stick our neck out and put ourselves right on the fire. Taibi had two flights with the Pacer and one with the Zomby at the Nationals. His last flight was with the Zomby, and was not appreciably better than his second flight with the Pacer.

However, he lost his original ship on the second flight, and having a Zomby at hand he flew it to complete his flights. After all, Sal designed the Pacer and—well, Leon and Sal fought it out in Sky-Scraper contests all summer (1941) and at the end of the tests the club members pronounced the ships a toss-up. So take your choice.

R. E. Shanahan, Buffalo, N. Y.—Sorry, there's no kit on the new Korda design. However, it isn't a hard job to scale up the magazine plans and build this swell ship that way. After all, it's not hard to build, and you'll learn twice as much about your craft if you follow this suggestion.

Jay Ocken, Minneapolis, Minn.—
Write to the Promotion Department,
inclosing 15 cents, and ask for the
plans of the Aeronca Tandem, shown
in the February issue of Air Trails.
It's a swell ship for any Class B en-
gine.

Pvt. Harold L. Thompson, Pendleton, Ore.—Hiya, Harold! Glad to hear from you again. We remember that day we met—you were in training at mechanics school and we were trying to fly in the face of violent police objections. Anyway, glad to see you've a little time to build, and I'm sure

Snuffy will fill the bill and probably give good honest P-40 pilots a few lessons in "getting up there." We're sorry about that idea of yours, but we tried it once with dismal results. Nuff sed. Most of the gas modelers in the New York area are pretty busy with defense jobs or in the air forces. However, with your address listed, we know you'll receive a batch of letters soon. (How about it, boys? Drop Pvt. Thompson a line at Pendleton Field, 34th Bombardment Group, 7th Bombardment Squadron, Pendleton, Ore. He's a modeler from way back, and is much interested in Class A and B gas jobs.) Write us again, Hal, and give us more dope on how Mr. Snuffy performed.

Raymond Schroeder, Sturgeon Bay, Wis.—Ray, we suggest as your first step in gas modeling you build a simple, conservative box-type model—something easy to make and adjust. It should preferably be slow, not tricky, and rugged. Oh, yes, we are told that in rubber autogiros, the rotor is not power-operated, but turns as the ship moves forward, by windmill effect.

W. A. K., Jr., Gardner, Mass.—Trim tabs are used for adjustment. When on a rudder they serve to give turn without turning the rudder proper.
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The Nightmare

BY ROBERT L. BROWN
& DALE IRWIN



Don't fret about wartime limitations on flight times. Get spin-dizzy with this control-line terror. It's patterned after the Manta fighter and has a Davis wing. Sensational!



Dale Irwin, designer, with Tiger Aero-powered Nightmare. Two wheels optional.

HERE'S a U-control racer that is causing unusual excitement among West-coast modelers. At the first appearance of the Nightmare in a local contest, the line of competing models was practically deserted. No, it wasn't a sudden Jap raid; it was because all contestants were crowding about to see Dale Irwin's spectacular new ship, a Davis-wing racer, equipped with the new "fluid" foil.

In flight, the job proved that it had a lot more on the "line" (instead of on the ball) than just looks. It was a flying demon.

Dale found a few available pictures of the Davis pursuit in a copy of Air Trails. Using these as a basis, he designed this racer. The drawing includes many improvements of design that should improve performance as well as looks.

The fuselage is quite unusual in construction. It combines some usual methods with some not so common. Cut out keels and formers; build the upper removable portion of the fuselage first. When finished it will help to jig and line up the remainder of the fuselage structure. Always cut the notches in the formers, keels, bulkheads, ribs and so forth a little too narrow rather than too wide. It is much easier to slice off a little than it is to build up the notch with splinters carefully glued and cut. (This latter process often assures a perfect covering job. Remember this the next time you begin to get sloppy in trimming ribs and formers.)

Notice that the shallow-notched keels, when pressed into the notched formers, automatically align the structure. The first step is to slide the two side keels into all the formers. Complete alignment with the top keel. Check vertical alignment of formers with a triangle.

Slide $\frac{1}{16}$ " flat base piece Z through slots provided in Formers No. 6 and 7. To this base attach formers 4A, 5, and 5A. Carefully line up the pilot inclosure.

Glue the first plank along the bottom of each side. (Turn to page 55)

Below—Meet Robert L. Brown, draftsman. Tricycle-gear irons out bumpy landings.

The peculiar planform of Manta gives added efficiency. Nightmare copies this.



