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APRIL 1949

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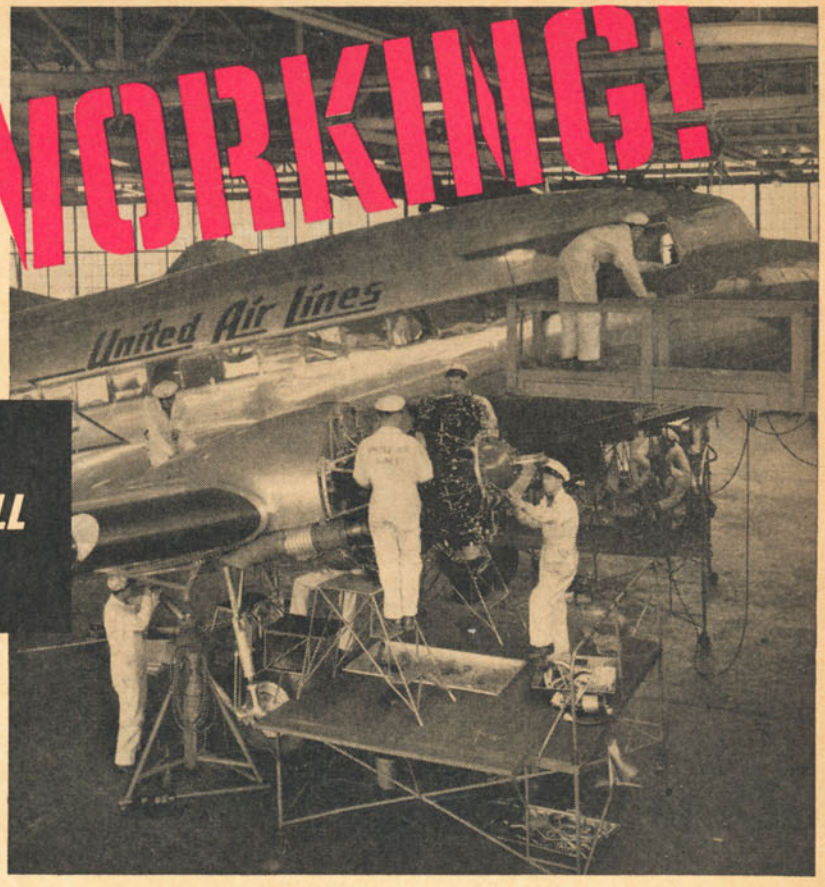

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AIR TRAILS Pictorial

APRIL, 1949 • VOL. XXXII, NO. 1

The subject of this month's cover is the Chance Vought XF7U-1 Cutlass, Navy's new shipboard fighter embodying the latest in aviation science—such as the delta-shaped wing, afterburners to give engines extra power boost, and Metalite sandwich construction. Speed, over 600.

THE READERS WRITE:

New Sailplane Records

Sirs:

I'm glad you were able to make use of the information I sent you on the X-1 (in your February letters column). Perhaps your readers will be interested in some new and important events in the field of soaring.

The sport of riding the rising currents of air in sailplanes has recently received an additional boost with the establishment of two U. S. altitude records. On January 1, 1949, John Robinson, of Altadena, Calif., reached the highest altitude yet attained by an American glider pilot when he soared his single-place white and red sailplane "Zanonia" above the towering Sierra Nevada Mountains, between Bishop and Muroc, Calif., to an absolute altitude of 33,300 feet. His free flight altitude, counted from the height of his release from the tow plane, was 24,000 feet—6,500 feet higher than the official U. S. altitude record established on July 4, 1939, by Robert M. Stanley, of Buffalo, N. Y.

Robinson rose to this height on updraft generated by the "standing wave," a comparatively little-known meteorological phenomenon found in the lee of high mountains and caused by the bounce of a strong wind spilling over the range. This new soaring technique holds a promise of altitudes well above those reached by Robinson, as strong lift produced by the "standing wave" has been traced to altitudes of oven 40,000 feet. In order to survive in the rarified atmosphere of this altitude, Robinson's sailplane was equipped with oxygen, which he had to use for three hours. The record is still considered unofficial, pending homologation by the Soaring Society of America and approval by the National Aeronautic Association.

Another sailplane altitude record—for two-place gliders—was established by William Briegleb and Dr. Thayer Smith on (*Continued on page 9*)

Letters to the Editors

All communications to the Air Trails editorial offices should be sent to Air Trails, Box 489, Elizabeth, N. J.

IN THIS ISSUE:

DEPARTMENTS

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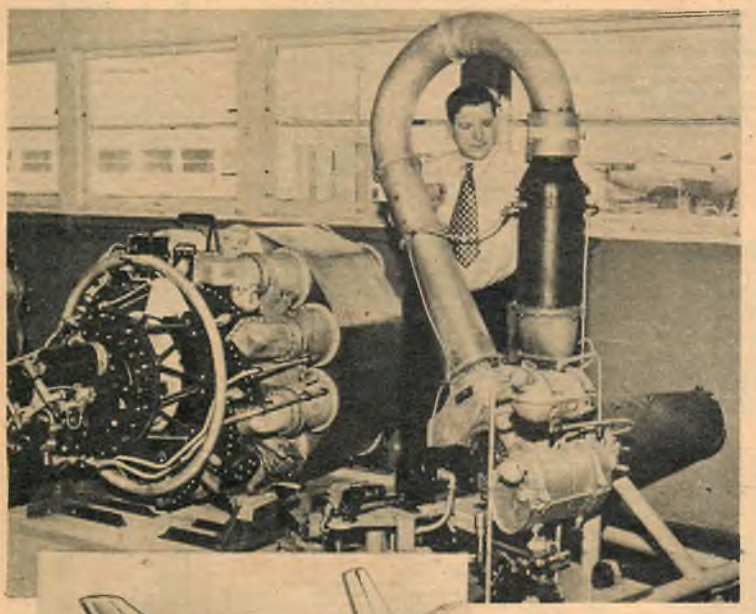

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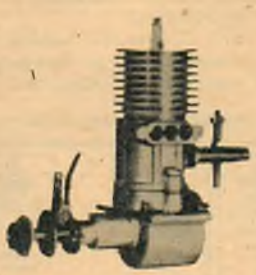

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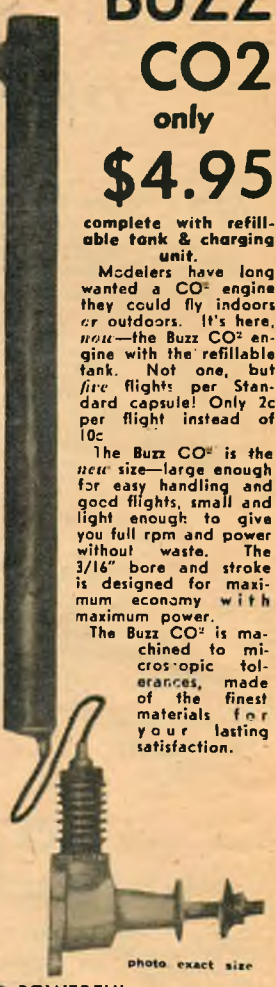

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The Readers Write

(Continued from page 4)

September 10th, last year, when they soared to the height of 14,800 feet over Mojave Desert, between Victorville and Palmdale, Calif. The record has just been officially recognized by the Soaring Society of America and the N.A.A.

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Circular Wing

Sirs:

I noticed in a recent *Air Trails*, a picture of my circular airplane which you credited the development of to Mr. Charles Zimmermann. Please correct your mistake. I started to develop the circular wing in Chicago in 1926. The first verified, wind tunnel test was made at the University of Michigan in 1929, with the large Circular Wing model, and the picture you show of my circular wing was built in Chicago in 1934, and my second Circular Wing was tested in 1936. Enclosed please find test results of this machine.

Mr. Zimmermann came first in contact with the short aspect ratio, or circular wing idea while he was examining my test results at N.A.C.A., on my flying wings and circular wing.

S. P. NEMETH, President,
Nemeth Helicopter Corporation.
Chicago, Ill.

Sirs:

I noted with interest your spread on "Development of the Flying Flapjack," by Douglas Rolfe and may be able to add a little to the "flapjack's" history.

On August 12, 1931, I filed for a patent on the basic principle of a circular flying wing. The patent was granted on Nov. 8, 1932. Charles H. Zimmermann's first N.A.C.A. report on low aspect ratio, including the circular wing, was published May 5, 1932 (Report No. 431, "Characteristics of Clark Y Airfoils of Small Aspect Ratio"). An act of congress requires that all aeronautical patent applications be referred to the N.A.C.A. for evaluation prior to granting the patent. Zimmermann's Report states that: "A survey of the results of previous investigations of the effect of varying the aspect ratio . . . revealed a scarcity of data for aspect ratios less than 3." Therefore, it was necessary for the N.A.C.A. to run low aspect ratio tests before the patent application could be evaluated. Such tests would be ordered by the N.A.C.A. administration without necessarily telling the technicians the fact they were for a patent application evaluation. In any case, the preliminary search for conflicting patents did not turn up a Zimmermann patent, though the "Doughnut" wing patents and the Cheranovsky "Parabola" releases were evident, as well as Bill Stout's 1919 low aspect ratio diamond-shaped wing which Rolfe should have included in your historical spread.

Therefore, without detracting from Zimmermann's noteworthy contributions to the development of the circular wing, there is some question as to whether he can be considered the "father of the disc wing in this country."

Nor did Zimmermann design and construct the first circular prototype. In 1933, after receiving an unfavorable evaluation from the Director of Aeronautical Research of the N.A.C.A. . . . I commenced building a single seater in our basement and two-car garage with the spare time and pay an elevator job afforded. The "Uniplane," as I named it, was completed in September, 1934, and test-flown over the next two years at Stinson and Harlem Airports, Chicago. So far as I know, the Uniplane was the first true, all-wing flying wing to fly in this country and one of the first to have a simplified, two-control system. The craft was so easy to handle that I taught myself to fly it and did all the testing, although I had had but a total of one hour dual in a Cub and no solo.

● Nemeth's circular wing plane, 1934 (left); Johnson's Uniplane, 1936 (right).

By 1936, the Uniplane had survived 6 forced landings and two crackups and was unsafe for further testing. Promotional efforts had been in vain and even the Dept. of Commerce $100,000 development program rejected application for aid, although the Uniplane had met virtually every requirement the program was seeking, such as inherent spin-proof characteristics, low landing speed, steep glide angle, simplicity of control, low-cost structure, and economical storage size. The design was rejected because of "poor visibility!"

I might make a correction or two relative to the Rolfe spread: The "1934 Flying Saucer" drawing of the disc wing over the conventional fuselage is the Steven Nemeth design that was flown at Curtiss Airport, Chicago, in the early thirties. Mr. Nemeth now is president of his own helicopter company in Chicago. It should not be ascribed to Zimmermann. Undoubtedly, it was the first true circular wing to fly.

Beside the Stout diamond wing, Rolfe should also have included the Dr. Snyder-Hoffman "Arup," which was undoubtedly the most successful low aspect ratio job in the thirties. It was a parabola or half circle with the diameter the leading edge, instead of the trailing edge as with Cheranovsky's. It was demonstrated at the National Air Races in Chicago in 1932 or 1933 and production was only frustrated by a fire that was considered suspicious. The Arup had a semblance of a fuselage above the wing roots and it might be debatable whether it could be designated a true all-wing.

RICHARD BURTON JOHNSON

Berkeley, Calif.

Showcase

Try your nearest hobby shop for items presented here. Write the manufacturer if you can't find it.

Some Sport→

The Sportsman stunt model by Custom Model and Supply Co. (Box 384, Great Bend, Kan.) was job flown by Bob Arnett to victory in the '48 National meet. Fuselage is pre-shaped from basswood. All wing ribs and parts are ready-cut for fast assembly. Arnett has used ship in all engine classes. Low wing and symmetrical section performs well inverted. $4.

←Rite Cement

A new oil-proof, water-proof adhesive is the Formula 11 model hobby cement put out by Bob Roberts' "Rite-Pitch" Propeller concern of Gary, Ind. Made especially for balsa and covering work, the firm is also readying a Formula 22 brand especially for hardwoods, plastics, metals and other hard surfaces. Formula 11 also used for model boats and trains.

Shooting Indoors→

A new, casual, and yet completely informative book on how to make indoor pictures with still cameras is Eastman Kodak Company's "Picture Taking Indoors." Far from being a dry presentation which features "fact" to the exclusion of "fun," the 50-page affair is simply written in easy-to-understand language and is liberally illustrated. Price is only 25c.

←Flying Milk Bottle

Since 1919 the Cleveland Model & Supply Co. (Cleveland, Ohio) has been offering model enthusiasts many different types of kits. Latest from the concern is its ¾-inch scale flying models designated as the Master ("M") series. In the M set is Lowell Bayle's Gee-Bee, the 1931 Thompson Trophy race winner of famed "milk bottle" design. $1.75 without liquids.

Electrifying→

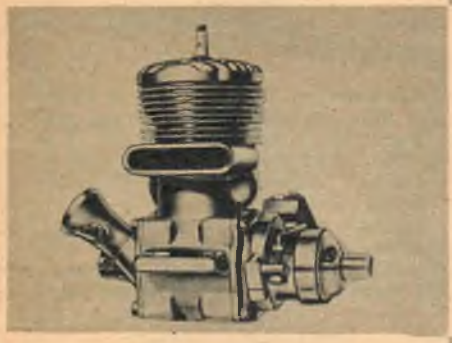
New electric motor boat drive unit from Dumas Products (2222 N. Farwell Ave., Milwaukee 2, Wis.) consists of complete electric motor, 6-inch brass drive shaft, 5-inch brass shaft housing, rubber coupling, outside metal strut, copper hookup wire and three-bladed high-pitch prop. Motor turns up 2,500-3,000 rpm from small Burgess 6-volt battery. $4.00.

Showcase

Price and specifications are checked carefully, but are subject to change. Mention "Air Trails" when ordering.

Some Stunt→

Designed by Francis McElwee, noted East Coast flyer and contest winner, the Stuntmaster is new stunt control-line kit by Scientific Model Airplane Co. (218 Market St., Newark 2, N. J.). For engines from .23 to .60 displacement, the model comes with carved fuselage. Has 40-inch wing span, 27-inch length, tapered wing. It's a midwing ship with open cockpit.



←We're Drooling

In the big engine field (the Class D's) you can always detect the Dooling 61 by it's powerful roar. This motor has bore of 1.015" and stroke of .750". Displacement is .607 cu. in. Has disc rotary induction valve, ball bearing main shaft, roller bearing connecting rod. Weighs about 14 oz. (Dooling Bros., located at 5452 W. Adams Blvd., Los Angeles 16, Calif.)

Free Booklet→

A great aid to all model builders—plane, boat and train—is the Plastic Wood cellulose fibre filler put out by Boyle-Midway Inc., 22 E. 40th St., New York City 16. Concern has fine free booklet, "Slick New Tricks for Building Better Model Planes," which is yours for the asking. Plastic Wood handles like putty, won't chip, crack or split. Comes in tube or can.

←Famous Fokker

The famous Fokker D-8 is the subject of Miniature Aircraft Corp.'s latest kit offering. Outfit is located at 83 Low Terrace, Staten Island 1, N. Y. Fokker has 39" span, is on 1½" to foot scale. Takes Class B or C engines. Model can be flown free-flight or as control job. All parts printed on balsa. Silkspan, axle wheels, all parts are furnished. $4.95.

Power Tool→

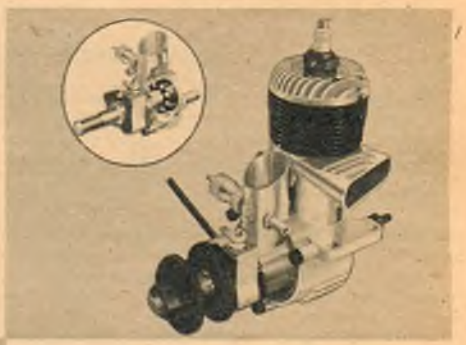
Model makers, hobbyists and home craftsmen will find the Combo-Kit distributed by United Hobby (2354 W. Madison St., Chicago 12, Ill., or 1620 Hall St., Dallas, Tex.) of much help. Sells for $29.50. Contains electric drill with ¼" capacity, hand grinder drill stand and special steel arbor for use with polishing bonnet or sanding discs, many accessories.

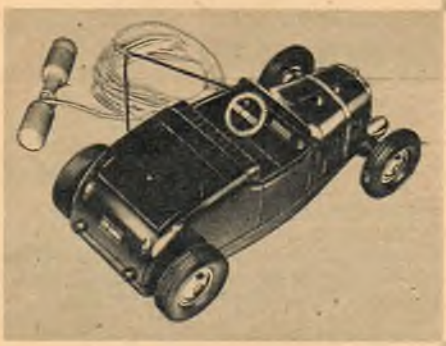
Showcase

See your hobby shop for the items shown here. Both the price and specifications subject to change.

New O&R Engine→

A brand new addition to a famous line of engines is Ohlsson & Rice's new .29-cu.-in. displacement job featuring a rollerized main bearing. Bore, .760; stroke, .660. As ignition motor, costs $13.95; as glow plug job with fuel, $12.95; as engine "pak" with fuel, $11.95. Especially designed for U-control. Address: Emery at Grande Vista, Los Angeles 23, Cal.





←Hot Rod

All American Hot Rod is name given to this all-metal die-cast race car made by American Products Co. (3757 Wilshire Blvd., Los Angeles, Calif.). Finished racer comes with bridle and control line for whip-racing. Can be converted to fast power racer by installing almost any make of drive unit and Cl. A motor. Length 9⅛"; width 4¾"; height, 3¼".

Magic Pilot→

Remote hands-off control in sailboating sounds like fun. R. S. Wentworth (42 Broadway, New York City 4) has Magic Pilot deal for your sailboat for $3.95. You are able to sail a boat away from you, have it turn and come back. The 24/250 sloop kit sells for $12.50. Completed sloop with Magic Pilot control available at $25. They supply everything but the wind.

←V-2 For You

Guided missiles on a model scale are available from Walsh Products (209 N. Maple Ave., East Orange, N. J.). Concern has V-2 rocket which climbs to 200 ft. Complete with launching stand, rocket comes ready to "fly" for $2.95 ($3.50 as C.O.D. deal). Rocket can be fired many times. You'll need open area with soft ground to cushion landing impact.

Fighting Ship→

A veteran of 19th century wars is the frigate Essex which was built in 1799 at a cost of $139,000 and presented to the U. S. by the good citizens of Essex County, Massachusetts. Model Shipways (476 Main St., Fort Lee, N. J.) has model kit complete with fittings for $11. Mahogany hull is $1 extra. Plans and instructions alone $1.25. Firm's 1949 catalog, 15c.

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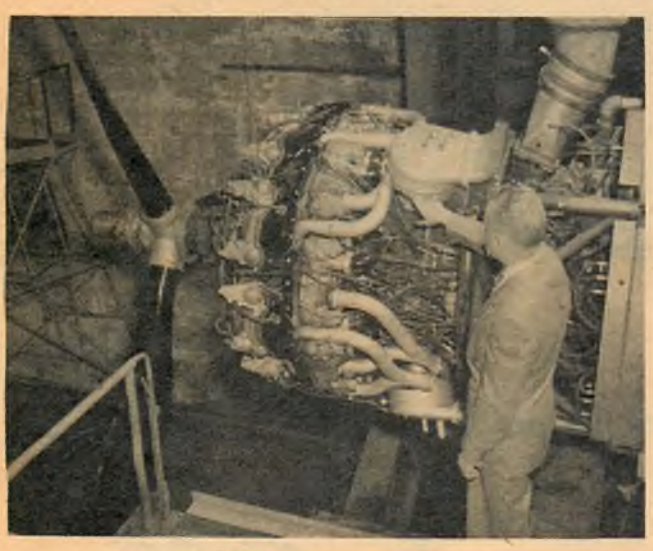
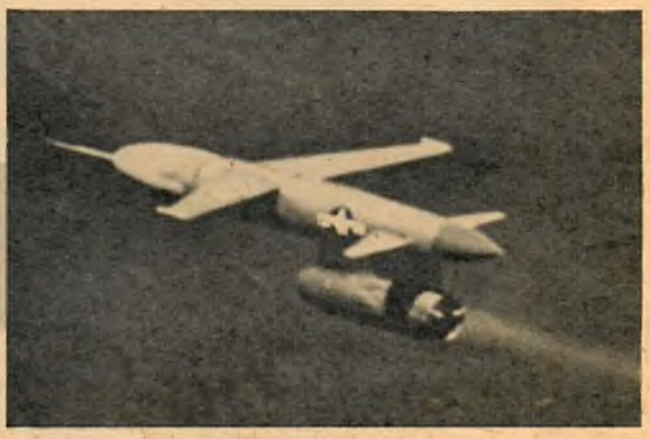


● Wright Turbocyclone compounded 18-cylinder engine built for the Navy by Wright Aeronautical Corp. Exhaust gases actuate superchargers which are geared to crankshaft converting wasted gases into useful energy. Fuel consumption cut 20%. Output is 3,200 hp.

● Five-engined B-17. This Flying Fortress owned by Wright Aeronautical Corp. is used for testing of the company's T-35 turbo-prop engine, the Typhoon. It is mounted in bomber's nose section, formerly occupied by the navigator. Engine develops over 5,000 hp.

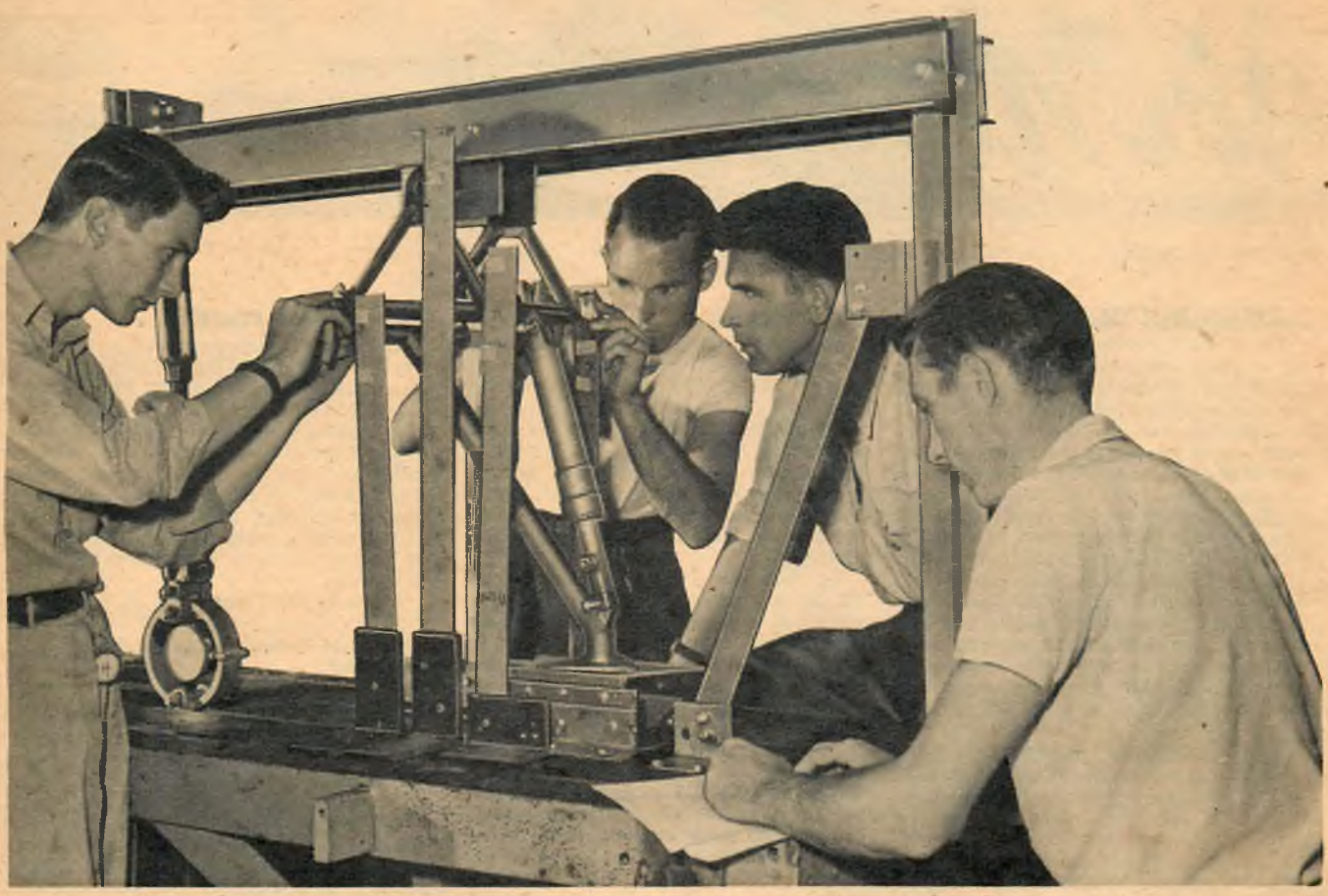
DEVELOPMENT HIGHLIGHTS



● PTV-N2, Gorgon IV, guided missile built by the Glenn L. Martin Co., for the Navy. Missile is launched from an F-61 Black Widow. Power plant, located on underside, is a ram-jet. Craft used mainly for testing of propulsion unit. PTV means Propulsion Test Vehicle.

● Beechcraft Model 45, Mentor. Plane was privately developed by Beechcraft as an economical primary and basic-advanced trainer for the services. 185-hp engine assures low fuel consumption, while performance is comparable to types now used in military services.

● Air Force's latest transport, the C-122, designed and produced by Chase Aircraft Co. Aircraft was developed from the XCG-18A glider. Has two Pratt & Whitney R-2000-11 engines, 1,450 hp each. Can be used as assault craft for airborne troops. Speed 250 mph.



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Air Notes

AVIATION TODAY AND TOMORROW

Jet-Propelled World:

The United States and Great Britain are at about the same level of jet fighter plane development and production, and Russia's program, though its exact status is unknown, can be assumed to be at least equal to ours, according to an official of General Electric's Gas Turbine Division. England and Canada have an unchallenged lead in commercial jet aircraft with turbojet and turboprop planes either now flying or being readied for flight in both countries. There's no activity along this line in the U. S., but this country is apparently far ahead in supersonic flight research and holds the lead in the multi-engine jet bomber field, with Boeing swept-wing B-47, North American B-45, and others.

Cadet Training Increase:

Beginning in April, USAF is increasing its aviation cadet training program from three to eight classes per year to permit more efficient use of aircraft, personnel, and instruction schedules. Total enrollment will be larger than in any previous peacetime year, but the size of each class will be reduced.

First Flights:

USAF's newest research aircraft, the swept-wing semi-tailless Northrop X-4, has started its flight test program at Muroc AFB. The X-4 has two gas turbine engines, is designed for stability and control investigations at high subsonic speeds. Patterned after Northrop's big Flying Wings, it uses elevons in trailing edge of wing for elevator and aileron action. It is 20 feet long, 15 feet high, has a 25-foot wing span, tricycle landing gear, a pilot ejection seat.

Other planes undergoing early flight testing are: McDonnell XF-88, newest USAF jet fighter, at Muroc . . . Martin AM-1 Mauler, whose recent carrier landing and take-off tests have made it the most powerful plane ever to qualify for aircraft carrier operation . . . new Navy jet carrier, the swept-wing Chance Vought XF7U-1, being tested at Patuxent River, Maryland . . . Chase Aircraft's Model C-122 transport.

Flight in planes powered only by ram jets has been demonstrated in a Lockheed F-80 Shooting Star . . . Rockets for extra take-off performance by even the largest transports have been successfully tried on the Navy's giant Constitution.

Self-Starter for Jets:

The first successful self-starter for jet and turboprop engines has been developed by the Navy. The main component of the new system is an 88-pound small gas turbine, from which highly compressed air is bled to operate a high-speed air turbine starter unit attached to the main engine. Outside storage batteries and heavy auxiliary power units are eliminated.

New Planes:

More may be heard as 1949 advances of several recently announced military planes. One of these is Beech Aircraft's Model 45 Mentor, a primary and basic-advanced trainer, which, as this is written, is being readied for a tour of the country for demonstration and inspection by the military forces. Unlike the other new USAF and Navy aircraft, the Mentor was developed with private financing.

Another new Air Force trainer is the TX-30, a single-engine low-wing conventional monoplane, which has been completed in the mock-up stage by Douglas . . . For the Navy, Douglas has built a fast new high-speed twin-jet fighter, the XF3D; also a powerful new version of the AD-2 Skyraider, the Navy's standard carrier attack airplane. In addition to increased speed, a new Wright R-3350-26W engine provides important take-off, climb and range improvements over earlier model AD's. AD production for the Navy is expected to continue, with advanced models coming off the line each year.

British "Eggbeaters":

Helicopter progress in Great Britain is highlighted by test flights of the Cierva Air Horse, largest helicopter yet to fly. The big 'copter has three rotors driven by a Merlin engine. It is designed to carry a load of three tons, has accommodations for 24 passengers and a two-man crew . . . Cierva also is developing a baby brother for the Air Horse, the Skeeter, a diminutive two-seater.

Besides these, two other makes of helicopters are being manufactured in England. One is the Fairey Gyrodyne and the other the Bristol Type 171. The Gyrodyne holds the world speed record for rotor aircraft—124.3 miles per hour.

One British firm is building a new jet helicopter to have a lifting rotor driven by ram jets mounted at the blade tips. A second 'copter using jet drives in another form is in early design stage.

Versatile Vampires:

The British government has released information on three new versions of Britain's high altitude jet fighter, the de Havilland Vampire. The new variants are the Mark 5, for the RAF; the Mark 6, for Switzerland; and the Mark 50, for Sweden. The new versions show increased operational versatility. The characteristics and war load of a ground-attack aircraft have been added to previous functions as high-altitude interceptor and long-range fighter. In Marks 6 and 50, a more powerful engine, the D.H. Goblin 3, increases the rate of climb by 700 feet per minute and the service ceiling by some 3,000 feet.

The Vampire is in use with the British, Canadian, Australian, Indian, Swedish, Norwegian, and Swiss air forces and the Royal Navy.

New Power Plants:

The nation's most powerful jet engine, Pratt & Whitney's JT-6B Turbo-Wasp is being installed in Grumman F9F-2 Panthers built since the first of the year. The new engine, which gives 5,000 pounds of thrust (about 9,000 horsepower) at 650 miles an hour or more, is developed from the British Nene. Americanization process included incorporation of domestic metals, parts and accessories. Use of scarce strategic metals is kept to minimum.

Another new engine is the Wright T-35 Typhoon, a powerful turboprop which has been undergoing flight tests for USAF.

Airliner Alterations:

Some airlines are pondering the Douglas Company's proposition to modify and modernize DC-3's, extending their use beyond present CAB limit . . . Martin 2-0-2 made into a cargo version is offered with gross weight of 43,000 pounds, maximum payload of 15,000 pounds, and shortest take-off runway requirements of any postwar transport.

Hoist for Cargo Planes:

Powerful hoists for cargo airplanes testify that air freight has long since passed the flowers-and-jewelry stage. A new type of hoist now being built by Westinghouse for the largest cargo planes will lift a one-ton load at 50 feet per minute.

100,000-Pilot System:

The recently reorganized National Flight System's aim of training 100,000 new private pilots in 1949 may turn out to be just a dream, but if it should work, it would provide a much-needed shot in the arm for civil aviation. NFS, the organization headed by movie star-flyer Dick Powell, has trained some 5,000 pilots in the last two years under a different setup. On a new regional basis it hopes to enroll approximately 1,000 local operators. NFS membership fee of $245 for three years includes first eight hours of flight and mail order lessons up to private rating, plus 15 percent discount on plane rentals and service at NFS airports. Membership must be paid in advance by cash or note, which promises to cut down on drop-outs.

More Jet Wings:

Air Force strategists apparently look for Northrop's mammoth jet-propelled Flying Wing bombers to play an increasingly important part in the nation's air defense. To the 30 B-49 jet wings ordered originally in fiscal 1948, USAF is adding 10 more jet wings, obtained by conversion of reciprocating-engine B-35's. The B-49 is the world's longest ranging jet bomber, and its performance has been praised by many leading air officers.

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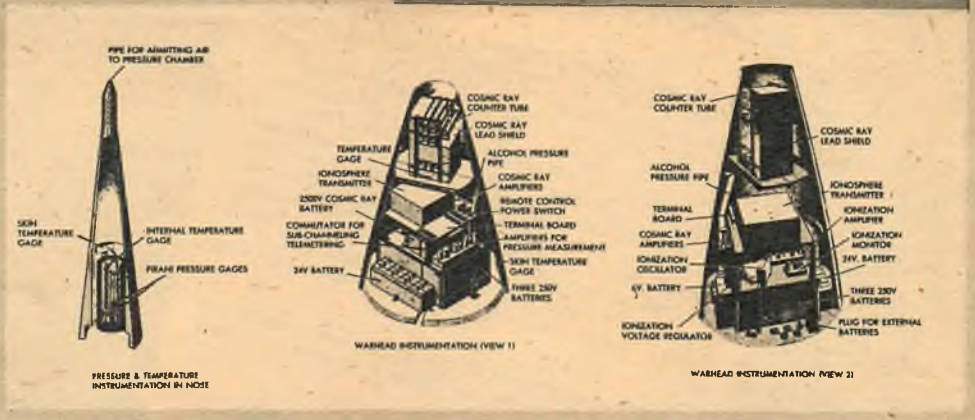
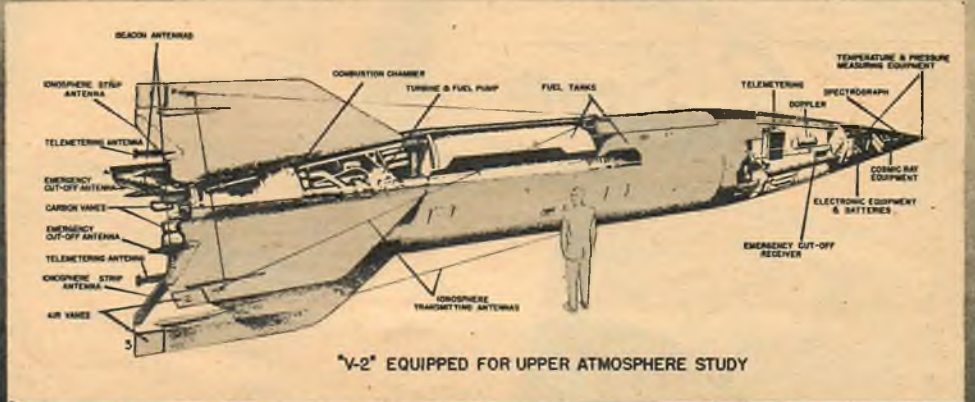


A FORMER weapon of destruction is now serving as an aerial probe to wrest scientific secrets from the upper atmosphere. At the Army Ordnance Proving Grounds, White Sands, N. M., scientists have been sending up into the ionosphere German V-2 rockets equipped with scientific instruments located in what used to be their deadly warhead. Highest altitude reached by the V-2 was 114 miles. Telemetering equipment communicates to the ground data obtained on: cosmic rays; thickness of ionized layer of atmosphere affecting radio communication; the sun's spectrum in ultra-violet region—to obtain better knowledge of its structure; temperatures; and pressures. Much information thus obtained has until now been based only on theory. Diagram above (left) shows nose section of V-2 with instruments. Directly below nose comes "warhead" instrumentation shown in cutaway.



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Located on the famed Los Angeles Municipal Airport, adjacent to the school, is the huge plant of North American Aviation, producers of war-time P-51's and B-25's and postwar bullet-swift jet bombers and *still expanding* to keep pace with its peace-time orders. Off the perimeter of the airport is the famous Douglas Aircraft factory, producers in war of the C-47 transport and swift A-20 fighter-bombers. Today its production lines hum with the manufacture of the renowned DC Series of airliners, while its research and experimental departments work ceaselessly to develop such revolutionary sonic ships as the D-558 Skyrocket.

Within a few miles of California Flyers is Lockheed Aircraft, famed for its P-38's, Hudson bombers, Constellations and P-80 jets. Anchored in the Los Angeles Harbor is Howard Hughes' mammoth wooden troop carrier seaplane. And in nearby San Diego is the home of Consolidated-Vultee's giant new airliner.

Yes, Southern California leads the world in aircraft manufacture. But that's not all. Los Angeles is the western terminus of most of our major airlines—United, Western, Pan American, TWA, American and such important freight lines as Santa Fe and The Flying Tigers. Ten percent of the private plane owners in America live here. 556 airports dot the countryside. And 8,500 private aircraft are able to fly virtually every day in the year in Southern California's clear sunny skies.

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APRIL, 1949

Are Supersonic BIPLANES next?

By ALAN POPE

IF YOU have a secret love for those old two-wing jobs, the ships that were almost the only ones in the sky from 1914 to 1925, don't give up hope of seeing them again. Much evidence we have at the present time indicates that biplanes may be back. Not in the old strut and wire form we remember so well, but in a modern 1950 version, capable of not less than 1,000 miles an hour, and, if you want a top limit, probably not more than 2,000.

What am I hinting at? Well, supersonically a very special type of biplane with very special airfoils and a very special gap between the wings appears to be promising in the range given above. Here's the complete story:

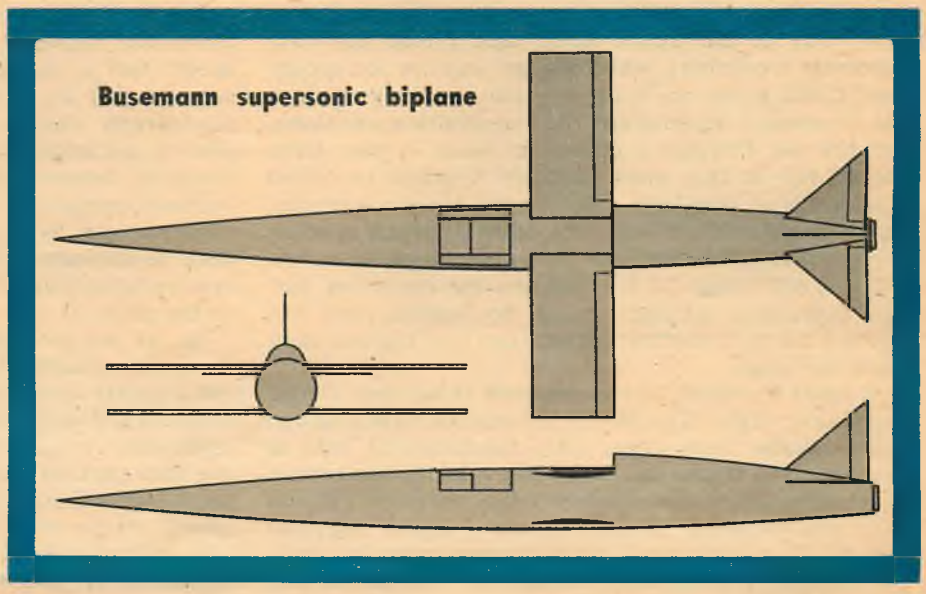
As you have read in Air Trails many times (Sweepback—The Supersonic Shape, by Richard G. Naugle, February 1948, *et al*) an airplane traveling at supersponic speeds will have shock waves at leading and trailing edges of the wings, and from the nose of the fuselage. Their presence is explained by the fact that the air ahead of the wings is "unwarned"—the wing is moving faster than its pressure waves—and it violently collides with the air instead of gently pushing it aside. Naturally, these shock waves are not free, by a long shot. For a very thin wing of about the size needed for a pursuit plane they require about 7,000 horsepower at 1,000 miles an hour at sea level. The reason they use all this power is that besides making a high pressure region over the front of the wing which tries to hold it back, the shock waves make a low pressure region over the back of the wing which effectively sucks it back. (The subsonic wing doesn't act that way: it has low pressure regions on both front and back which cancel out.)

Now then, sometime around 1935 Dr. Adolph Busemann (a German supersonic expert now in this country) considered the problem and came up with a biplane reflection system that mirrored the high pressure waves of the upper wing onto the back of the lower wing where they cancelled out the normal low pressure region. The lower wing similarly improved the upper wing.

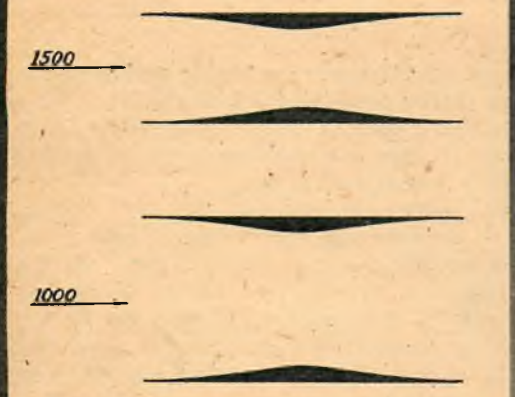
Through lack of equipment and time the Busemann biplane was not then widely tested—and indeed was not then needed. It has not been thoroughly tested yet. But the principle is sound, and appears far-reaching in the speed range given above. Early doubts that the air would go between the wings at a supersonic rate have apparently been dispelled by recent tests. An Italian supersonic expert (also in this country) told me not long ago that he felt the Busemann biplane had very great promise. Since he had run some wind tunnel tests on it his opinion is more than a guess.

The Busemann biplane will differ from the older biplanes mainly in the gap between the wings (which will be small by old standards) and the fact that for best results a given gap is right for one speed only.

● The author, Mr. Pope, is Associate Professor, Daniel Guggenheim School of Aeronautics, Georgia School of Technology, and has contributed articles on wind tunnel procedure in past issues. At right is artist's sketch of supersonic biplane configuration proposed by Adolph Busemann. As the article points out, theory behind this design presents interesting possibilities. One drawback to such craft would be that a moment's study or a photo would indicate to "enemy" observers the exact speed at which the biplane was designed to operate. Varying gap for different speeds for the Busemann "bipe" are sketched on the next page together with some of the supersonic airfoils now under consideration or test. Whatever the ultimate result, this design is of special significance.



• Supersonic airfoil shape is still unsettled. These being considered. Leading edges, left.



• Size of gap for supersonic biplane sets speed. Top, 1,500 mph; bottom 1,000 mph

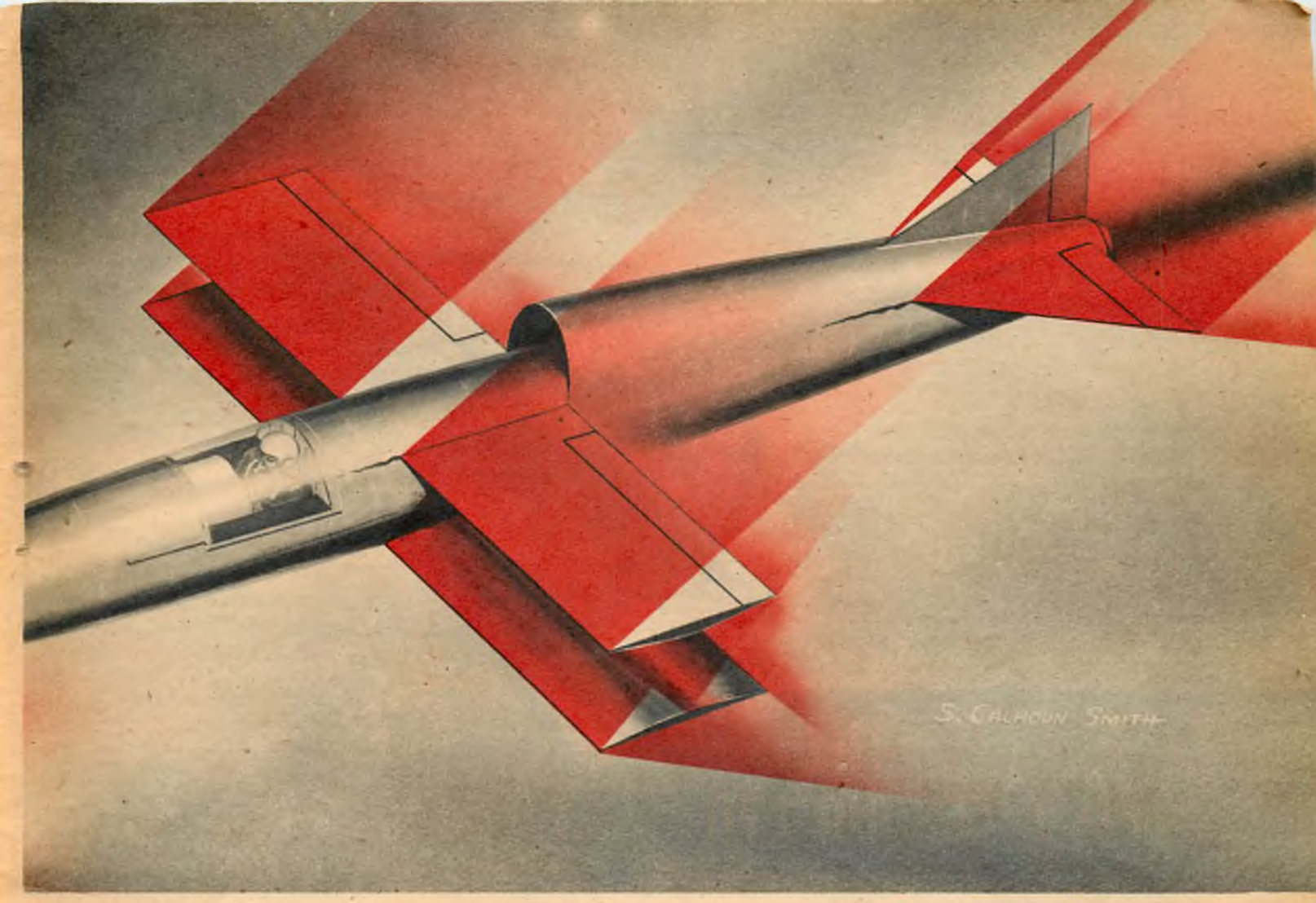
That is, the waves cancel only at what is called the design Mach number. For example, the right gap for a 5-foot chord will run about 1.25 feet at twice the speed of sound (1,522 mph at sea level, 1,324 mph at 40,000 feet). Thus the biplane is fairly critical, although near the design speed the waves nearly cancel.

To be fair and state the problem in its proper light, we must also note that sweepback looks very promising in the 1,000-2,000 mile-per-hour range. But it gives out at the upper limit, and (from the data currently available) when we get engines for speeds over 2,000 miles an hour we will probably use not the Busemann biplane nor the sweptback monoplane, but the old familiar rectangular wing. It may have cut-off tips so that more properly it would be called a trapezoidal planform. Before we leave planforms, the triangular form with the point forward appears a good competitor for the Busemann biplane in the same speed range. If we tack on the condition that the supersonic airplane must be landed, and not hooked on to a mother plane, then the biplane may have the edge.

It must be noted that sweepback is no cure-all for supersonic flight. The wrong amount of sweepback is much worse than none. The fundamental rule is twofold: (1) if possible, keep the velocity component perpendicular to the leading edge subsonic (if you can't you probably shouldn't have sweep at all); and (2) by all means never let that perpendicular component equal the speed of sound. For example, a wing with 45° of sweep will have an "effective" speed of 636 miles an hour when the plane flies at 900 mph, and its drag will be relatively low. At 1,075 mph the perpendicular component will be 761 (the speed of sound at sea level, standard air) and the drag will be extremely high. Probably less power will be needed to fly the 45° wing at 1,250 than 1,075! A wing without sweep would probably be better at 1,075 mph than one with 45° sweep.

The need of a particular gap for each speed of the Busemann biplane, and the existence of a difficult speed for a sweptback monoplane indicate that secrecy may be very difficult to maintain. A single photograph might be a dead give-away as to a plane's performance, and we can even picture an invading bomber fleet adjusting its speed to embarrass oncoming interceptors. It may be more advantageous to drop one's speed 100 miles an hour than to increase it 200. Variable gap for the biplane and variable sweep for the monoplane are definitely in the picture.

So far we have said little about the wing profile: its cross-sectional shape. At the present time you can get a pretty good argument going among a group of engineers if you come out strongly for one type of supersonic wing section. The trouble originates in the fact that an approximate theory which neglects secondary effects "proves" that a symmetrical "diamond" shape wing would have the least drag. When you go into the problem a little more thoroughly, including the secondary effects, it develops that the



diamond shape probably shouldn't be symmetrical, but should have its maximum thickness back of the midpoint.

Now both of the above conclusions have neglected the skin friction drag—and if you put that in, there is evidence that a section composed of two circular arcs would be best of all, unless, of course, the wing has sweepback, when the old familiar subsonic profiles become about as good as anything. So you see that depending on the viewpoint, one can pick almost any airfoil. The biplane, by the way, just needs a curved channel between the wings as shown in the sketch. Possibly it could be improved by a little curve on the outside.

The ultimate selection of airfoil section depends on what is now a very hot subject: will the boundary layer be laminar or turbulent in supersonic flow under full scale conditions? Laminar flow has roughly one-tenth the drag of turbulent flow and normally would not be remotely expected, under the conditions of size and speed a supersonic airplane will have. But it has become apparent that the heat transfer that takes place in the boundary layer at supersonic speeds will help preserve laminar flow—in fact the head of one of the largest supersonic tunnels now in operation told me that turbulent flow was hard to create on a supersonic model. If this phenomenon extends to full scale it will be an immensely important benefit.

Every study on fuselage design has indicated that small cross-sectional area is a must for the supersonic airplane: so much so that for a specific storage space a needle shape appears quite probable, say a fuselage three feet in diameter and forty-five feet long, very pointed at the front. Such a needle-like affair would need about 10,000 horsepower at 1,000 miles an hour, or 13,500 horsepower if you increase the diameter to 3½ feet. (The figures are for sea level. At 50,000 feet they would be 1,517 and 2,050.) Thus designers are scratching their heads both over fuel consumption and storage space. I have heard men say of a new fuel, "I don't care how much it weighs—how *big* is it?"

Sound information on the type of engine the supersonic airplane will have is not yet entirely available. The current feeling is that the turbojet may be used until 700 or 800 miles an hour, but probably not much faster, while most of the early supersonic flying will be done with the new ramjet engines. The reason for this conclusion is simply that the turbojet's compressor is hardly needed at those speeds, let alone higher ones.

The action of the ramjet may be described as follows: We are all well aware that the airstream presses upon the forward parts of the airplane. A simple forward-facing opening will show a pressure rise that rapidly increases with speed. Thus while the pressure rise is insignificant at 100 miles an hour, at 1,500 miles an hour enough pressure is available to yield a compression ratio of approximately 6 to 1—about what a car motor has. Thus by simply furnishing a tube for the air to enter and a passageway inside that slows the air down, we have the "compressor" without needing a (*Continued on page* 77)

We Fly THE CESSNA 170

By WILLIAM WINTER

Big sister ship of Cessna 140, the 170 proves well deserving of its popularity

A GOOD many years ago, as aviation history goes, Clyde Cessna sent home a postcard from Paris. Decorated with a hastily rendered ink sketch by the future manufacturer it showed an automobile towing an airplane with folded wings. Scrawled underneath was the comment, "Someday it will come to this—no fooling." That was back in the days when the pioneer early birds still were thrilling the world with their races and exhibitions.

Clyde Cessna has not been with the company that carries his name for many years—no more than the Lougheed brothers are with Lockheed, or Eddie Stinson with Stinson, or Curtiss and Wright with Curtiss-Wright. However, the modern Cessnas uphold the tradition of two decades and more ago when the Wichita firm already was famed for its efficient aircraft. The new tapered-wing 190 and 195, an Airmaster motif in metal, even maintains a faint familiarity of line that goes back to its ancestors of the late twenties and early thirties. All of these modern Cessnas, the side-by-side 120 and 140, the 170—which we fly this month—and the big 195 prove that Cessna engineering has not lost the touch for achieving peak efficiency in cabin airplanes.

Even before the Cessna 170 hit the market, it was generally conceded that the rumored four-place would become a major contender in that field. First photographs suggested that the 170 was a genuine big brother to the then 85-hp two-place 120 and 140 which, in view of their creditable record, enhanced rather than handicapped the prospects of the $5,475 four-place. Moreover, the family likeness suggested that the 170, too, would be a rugged, conservative, sound airplane with a nicely rounded-out performance. And that is how the 170 stacks up today in the bitterly contested four-place market.

It is not difficult to see where the 170 fits in among this competition. At the upper end of the four-place price spectrum in the general neighborhood of $10,000 are found the Navion and Bonanza, or even the still more costly but five-place 190 and 195. Both the Navion and Bonanza are low-wings that make a strong play for speed. Along about the middle of the spectrum is the Stinson, the big post-war seller, and the Bellanca, Luscombe, and so on. Fading down into the more economical brackets are encountered the Aeronca four-place and, at the very bottom price rung, the Piper Family Cruiser. Having examined and flown the Cessna 170 we judge it to be right down Stinson's alley, with as much play for both more

expensive and less expensive markets as smart salesmanship can manage.

The 170 was flown at Meriden, Connecticut, where the Meriden Aircraft Corporation is distributor for Cessna, and for Continental in Connecticut, Vermont, and Massachusetts. John P. Leo, sales manager, made the sample sales spiel and rode with us when the 170 was put through its paces. Leo rode on the left side during the demonstrations, then switched seats while we imitated his smooth technique.

The South Meriden Municipal Airport proved to be a 3,000-foot-plus strip when we first glimpsed it from a rented Champion. At one end stood the maintenance building and service shop, then the administration building, and finally some hangars. Parked along side the hangars was a row of about six airplanes, the whole not taking up more than several hundred feet beside the strip. This is mentioned because it has some bearing on the landing performance of the 170.

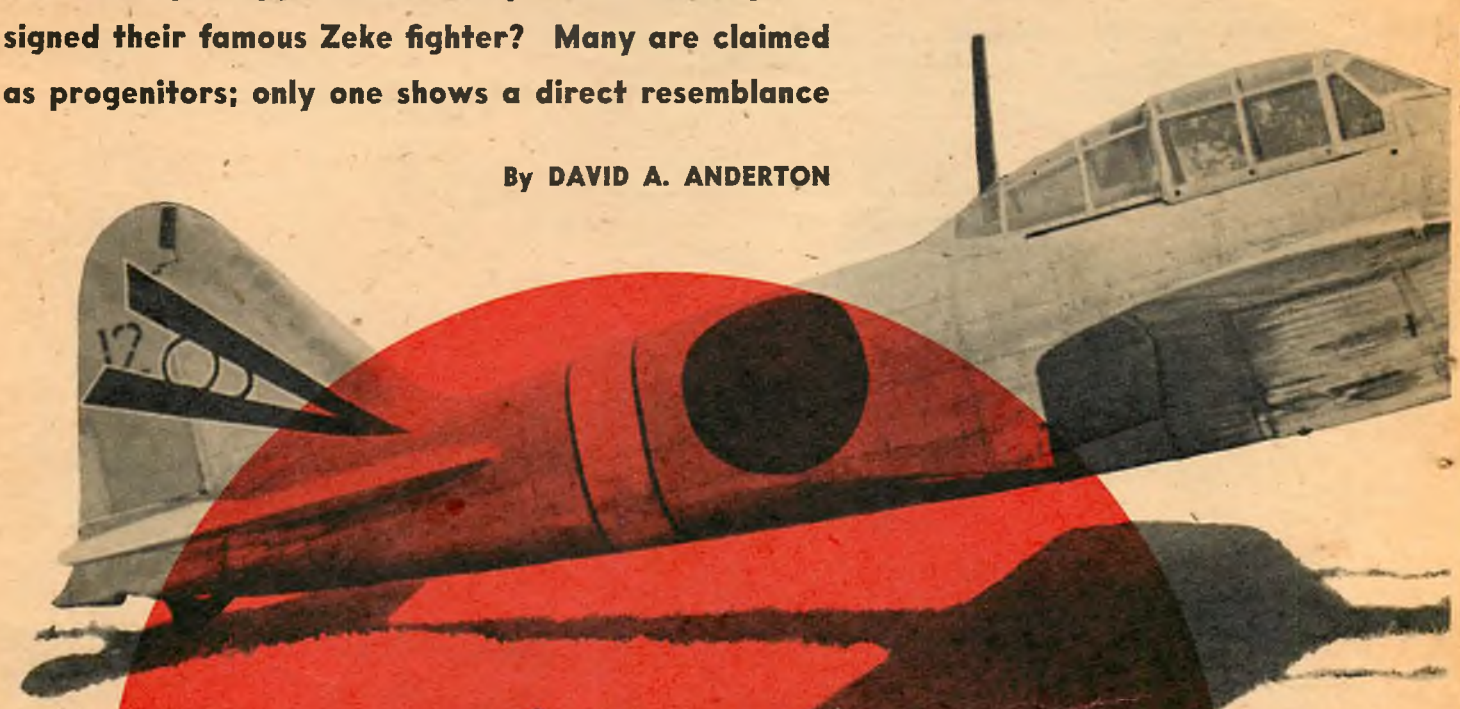
Cessna, you quickly find, is proud of a number of design and technical fine points on the 170. The cowl swings open easily to reveal the 145-hp Continental, supported on the same type of mounting that held the big liquid-cooled engines of wartime fame. One immediate advantage is that downward slanting tubes do not obstruct access to engine or accessories. The baffle which covers each side of the engine, hiding the cylinder heads from view (*Continued on page 90*)

● Stable as a rock is the Cessna 170, but alive and responsive. Easy to fly, it does not present problems to lightplane pilots.

● Latest 170 differs from its predecessor, shown here, by having tapered wings, single wing struts, dorsal fin, better performance.

Did the Japs copy an allied airplane when they designed their famous Zeke fighter? Many are claimed as progenitors; only one shows a direct resemblance

By DAVID A. ANDERTON



THE GREAT "Zeke" MYSTERY

THROUGH the angry skies over Pearl Harbor blazed tiny fighters, long, sleek and silvery-gray. No recognition expert could have named them; their shapes were new and strange. On that day, the Japanese served notice to the world that they had abandoned their antique biplanes and angular monoplanes. Moving in complete secrecy, they had designed, built and used a striking force of one of the sweetest airplanes of all time. Those little fighters were the aces in the sleeve, the rabbits in the hat, the cats in the bag. They were Mitsubishis, Type 00, the biggest mystery ship of the Second World War.

Aside from the usual connotations of the words "mystery ship," there was little that was unusual about Zeke, as the Type 00 were called. Probably no other airplane, before or since, has had the distinction of being so often claimed by the American aircraft industry as almost one of its own.

At one time, it was quite the practice to announce that "this is the airplane that the Japs copied for their Zeke." Stated sometimes accusingly and sometimes boastfully, the announcement was always based on the rather faulty reasoning that: 1) Zeke was a small, light fighter, and a good aircraft; 2) our model is a small, light fighter and a good aircraft; 3) therefore, the Japs copied our design. With variations one way or the other, the announcement and the accompanying logic have been attributed to Chance Vought Aircraft, to Major Seversky and his P-35, and to Northrop. In last year's Senate investigation, it was extended to the Hughes' racer (the latter pronouncement was made by Mr. Hughes himself).

Maybe now is as good a time as ever to try to settle, once and for all, just who was responsible for inspiring the boys in the aircraft engineering department of the Mitsubishi Heavy Industries Corporation.

The best way to approach any mystery is to become thoroughly familiar with the facts and past history. Once this is accomplished, the next step is to list the clues and sort them over. Here the first process of selection and rejection begins, and here the threads of the clues begin to weave themselves into the whole cloth of the solution. The story of Zeke begins, for us, early on a Sunday morning in December, 1941, and goes backward and forward from there.

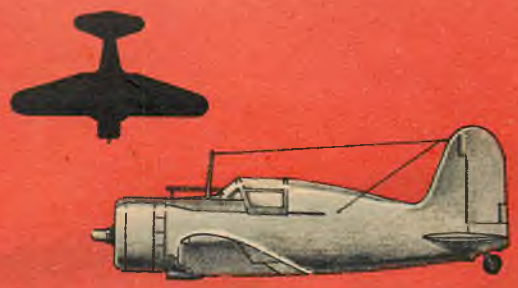
Pearl Harbor was the beginning and end of many things in Naval and aerial warfare; one of the big surprises pulled on that black day was a fast, maneuverable, little fighter to become known by the nicknames of Zero and, later, Zeke. In the brief attack on Pearl, one of the planes brought down by ground gunners crashed near a highway going out of Honolulu. This was the first fighting contact between Zeke and any American forces. (The only picture I have seen of this aircraft showed it to be in rather fair condition, considering that it had piled into the ground. For some reason, the first engineering analyses of Zeke were still four months off, waiting on a bit of tough luck for a Jap pilot in the Aleutians.)

In the spring of 1942, some Jap bombers, escorted by Zekes, took off from their carrier in the North Pacific to hammer an American outpost in the Aleutians. During the resultant fracas, one Zeke was

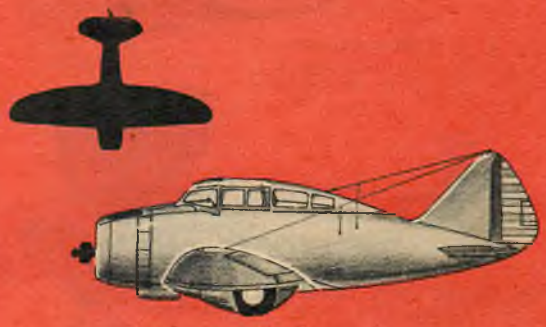
hit, and the pilot began to look for a place to set her down without killing himself. He saw a long, flat stretch, and prepared for a dead stick landing. But he made one mistake, or perhaps had it made for him. His landing gear was extended when he touched the ground. Maybe this was because he had extended it himself, or because the hydraulic system had failed and dropped the gear. What the wheels found was not solid earth and short grass, but the boggy muskeg of the Arctic, an agglomeration of mud, moss and brush. The wheels sank deeply, the plane overturned and the pilot's neck was broken. Five weeks later a Navy search party found the aircraft. Thus was the first flyable Zeke acquired for flight testing, the initial step in a long series of tests and combat evaluations.

It was an awful shock to the American people and to the American aircraft factories to learn that the little yellow men had turned out something that was really first class. And, following along with our usual policy of not giving the enemy credit for doing anything bright, it was immediately opined that Zeke was only a copy of something that we had turned out long before. It had to be that, because everybody knew the Japs were not capable of original thought. It was this little quirk of the American mind that started the whole works. Anything that was good had to be copied from us. We knew that the Japs had Pratt and Whitney license rights, and that they also had Hamilton Standard propellers (or copies) on the planes that had been shot down.

Somebody must have been after United Aircraft, because it was the third member of their team, Chance Vought Aircraft, that suffered the first damning accusations of having sold out to the Japs. The hotheads that screamed these statements were never aviation experts, or even recognition-wise. To them, an airplane was an airplane, and the Zeke looked just like the old Vought export fighter, Model V-143, which had been sold (*Continued on page* 72)

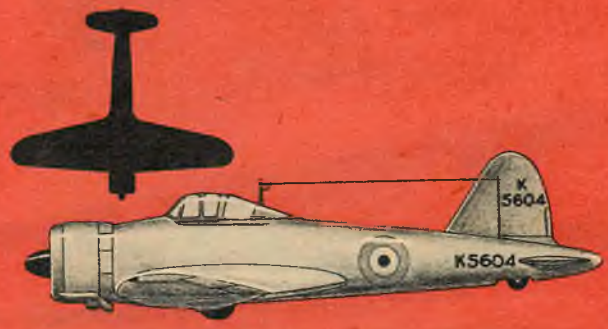


● Vought V-143 of 1937 was never a service aircraft. One model was sold to Japan. Its only resemblance to Zeke: both are low-wing fighters with radial engines.



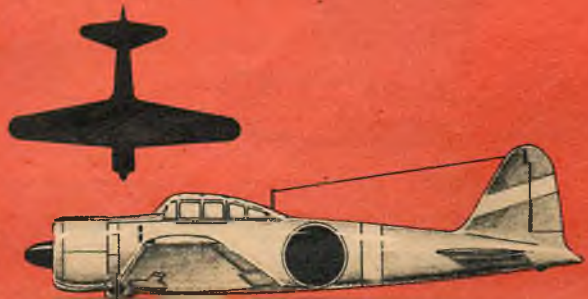
● Seversky P-35, standard Army fighter of 1938-'39. Japan had a few. Here again resemblance is slight. Typical of U. S. fighters of this era, the P-35 was stubby.

● Vultee Vanguard. Here similarity to Zeke is closer. Vanguards served with Chinese air force. Points of resemblance are: landing gear, not shown here, and rudder.

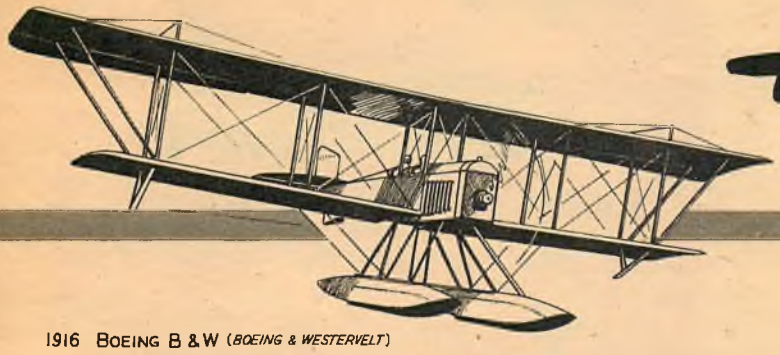


● Is this the culprit? Gloster F.5/34 has a marked resemblance to Zeke: long fuselage, wing planform, cockpit enclosure, control surfaces, and forward set of wings.

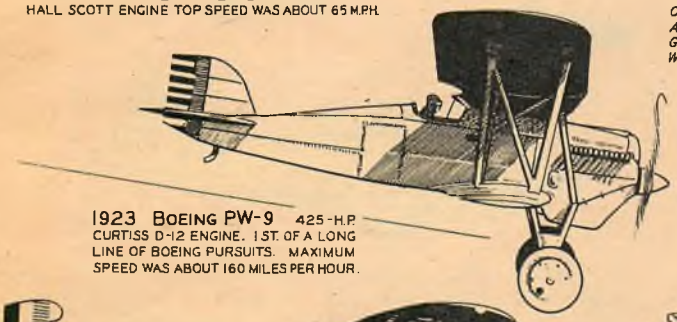
● Early Zeke, bearing designation 11, was closest in span to the Gloster. During war, plane underwent five airframe modifications; latest model, 52, had 36' 2" span.



Air Progress

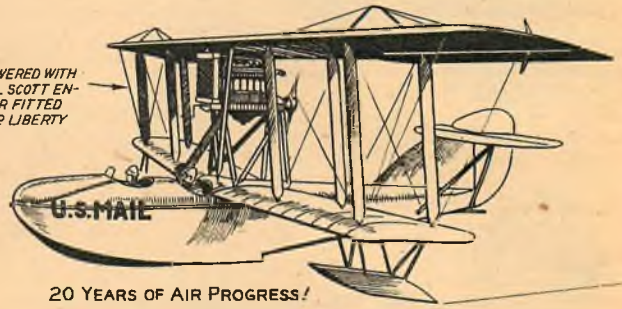


1916 Boeing B & W (*Boeing & Westervelt*)
FIRST BOEING-BUILT AIRPLANE. WITH A 200-H.P. HALL SCOTT ENGINE TOP SPEED WAS ABOUT 65 M.P.H.

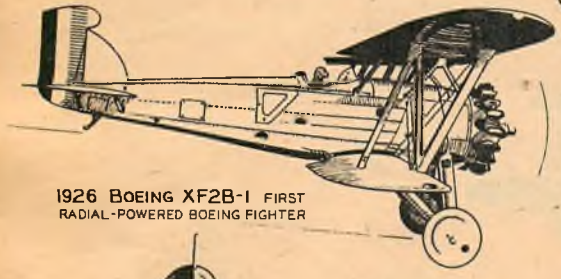


1923 Boeing PW-9 425-H.P. CURTISS D-12 ENGINE. 1ST. OF A LONG LINE OF BOEING PURSUITS. MAXIMUM SPEED WAS ABOUT 160 MILES PER HOUR.

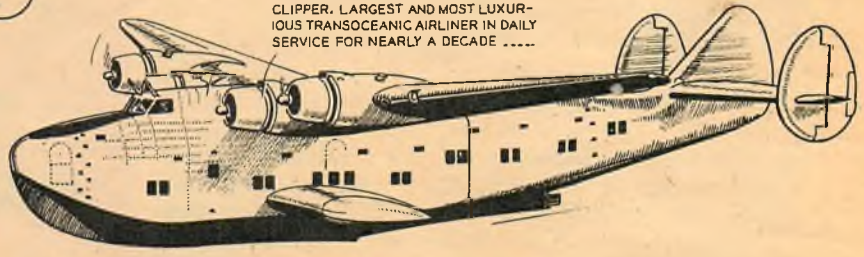
ORIGINALLY POWERED WITH A 200-H.P. HALL SCOTT ENGINE BUT LATER FITTED WITH A 400-H.P. LIBERTY

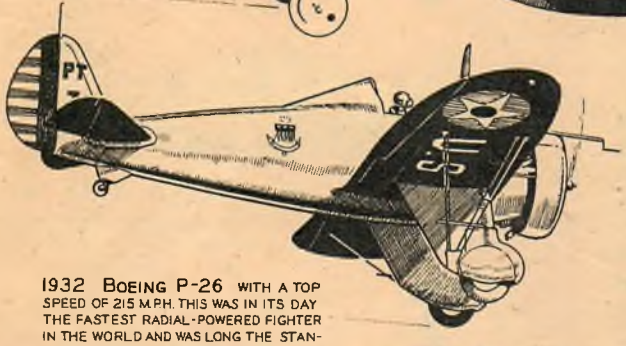


20 Years of Air Progress!
ABOVE, BOEING'S FIRST FLYING BOAT, THE 3-PLACE B-1 PRODUCED IN 1919, AND, BELOW, THE 1938 GIGANTIC B-314 CLIPPER, LARGEST AND MOST LUXURIOUS TRANSOCEANIC AIRLINER IN DAILY SERVICE FOR NEARLY A DECADE .....



1926 Boeing XF2B-1 FIRST RADIAL-POWERED BOEING FIGHTER





1932 Boeing P-26 WITH A TOP SPEED OF 215 M.P.H. THIS WAS IN ITS DAY THE FASTEST RADIAL-POWERED FIGHTER IN THE WORLD AND WAS LONG THE STANDARD SINGLE-SEAT FIGHTER OF THE A.A.F.

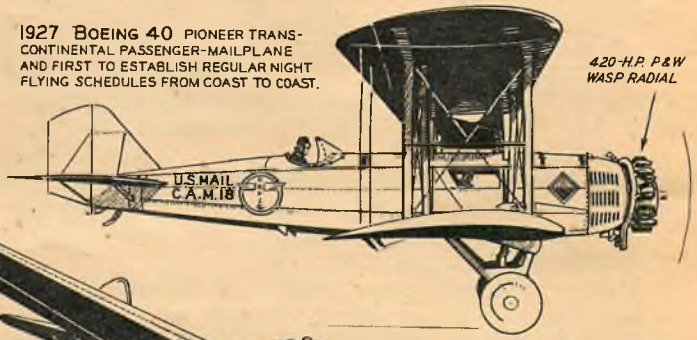
DOUGLAS ROLFE

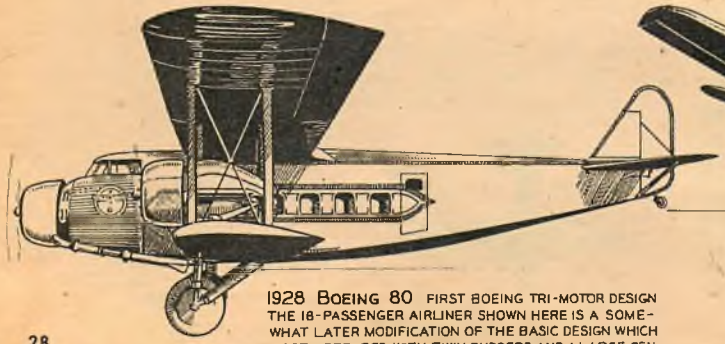
Bill Boeing built his first airplane in 1916 with the assistance of Conrad Westervelt. The B-W, as the plane was designated, was produced by a company which Boeing formed the same year—the Pacific Aero Products Company—the name of which was soon changed to its present title, Boeing Airplane Company. In 1919 Boeing produced the B-1, a three-place flying boat which flew the first international airmail route (between Seattle and Victoria) for nearly seven years. The company soon branched out into a bewildering variety of designs, most of which were the best of their kind in the world. Pursuits, mailplanes, giant flying boats, transports, and bombers rolled out

1925 Boeing Mail-Carrier
FIRST SPECIALLY-DESIGNED MAILPLANE PRODUCED BY THE BOEING COMPANY.

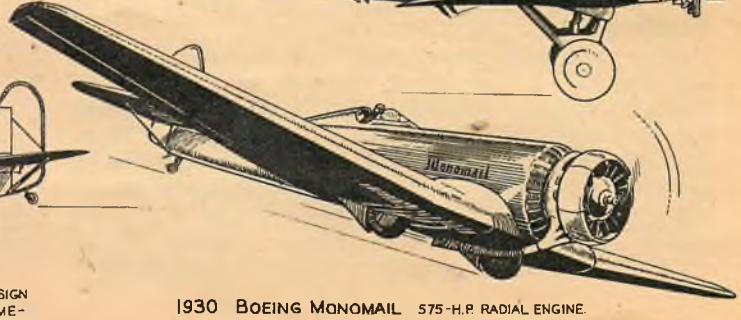
1927 Boeing 40 PIONEER TRANSCONTINENTAL PASSENGER-MAILPLANE AND FIRST TO ESTABLISH REGULAR NIGHT FLYING SCHEDULES FROM COAST TO COAST.

420-H.P. P&W WASP RADIAL





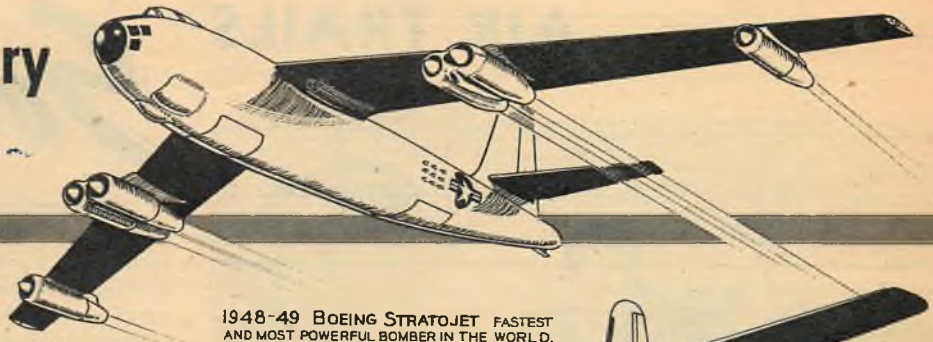
1928 Boeing 80 FIRST BOEING TRI-MOTOR DESIGN THE 18-PASSENGER AIRLINER SHOWN HERE IS A SOMEWHAT LATER MODIFICATION OF THE BASIC DESIGN WHICH FIRST APPEARED WITH TWIN RUDDERS AND A LARGE CENTRAL STABILIZING FIN. CRUISING SPEED WAS 115 M.P.H.



1930 Boeing Monomail 575-H.P. RADIAL ENGINE.
THIS ALL-METAL CANTILEVER LOW-WING MONOPLANE INDICATED A DEFINITE APPROACH TO PRESENT-DAY DESIGN.

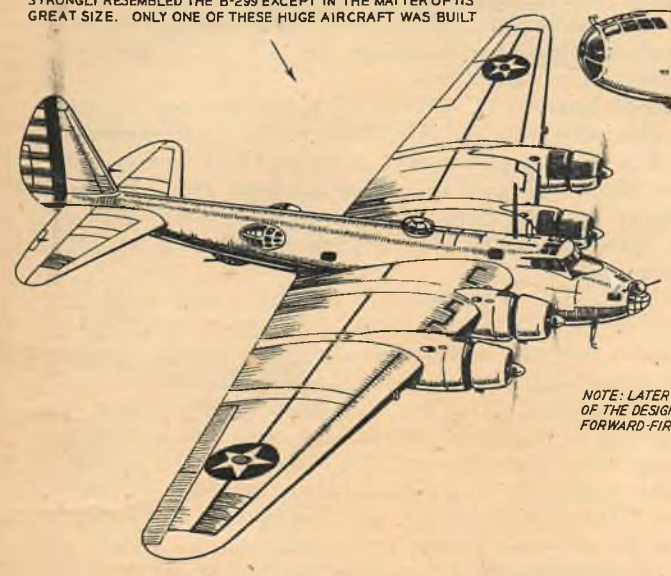
The BOEING Story

By DOUGLAS ROLFE

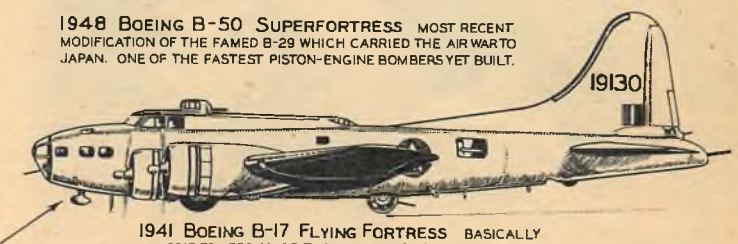


1948-49 BOEING STRATOJET FASTEST AND MOST POWERFUL BOMBER IN THE WORLD. COMPARE THIS DESIGN WITH THE 1916 BOEING!

1937 BOEING XB-15 GRANDPAPPY OF ALL "SUPERFORTS." TO COME THIS HUGE EXPERIMENTAL EXTRA LONG RANGE BOMBER STRONGLY RESEMBLED THE B-299 EXCEPT IN THE MATTER OF ITS GREAT SIZE. ONLY ONE OF THESE HUGE AIRCRAFT WAS BUILT

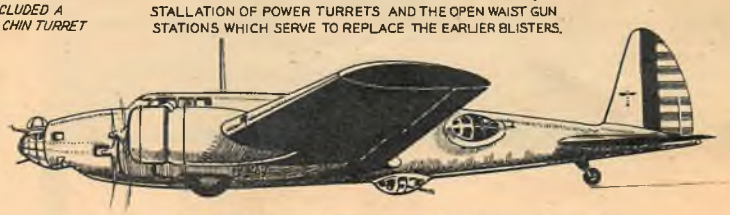


1948 BOEING B-50 SUPERFORTRESS MOST RECENT MODIFICATION OF THE FAMED B-29 WHICH CARRIED THE AIR WAR TO JAPAN. ONE OF THE FASTEST PISTON-ENGINE BOMBERS YET BUILT.



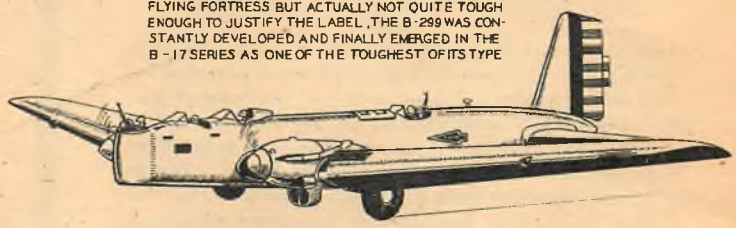
NOTE: LATER REFINEMENTS OF THE DESIGN INCLUDED A FORWARD-FIRING CHIN TURRET

1941 BOEING B-17 FLYING FORTRESS BASICALLY A MODIFIED VERSION OF THE B-299 DESIGN. MORE OBVIOUS EXTERNAL DEVELOPMENTS ARE THE LARGE DORSAL FIN, INSTALLATION OF POWER TURRETS AND THE OPEN WAIST GUN STATIONS WHICH SERVE TO REPLACE THE EARLIER BLISTERS.

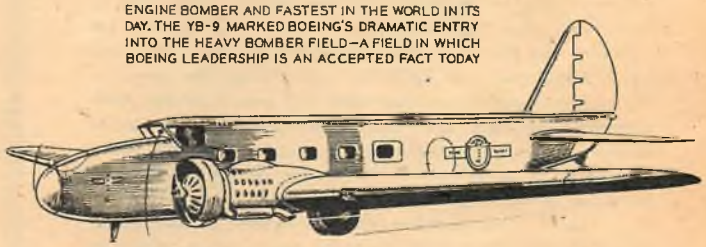


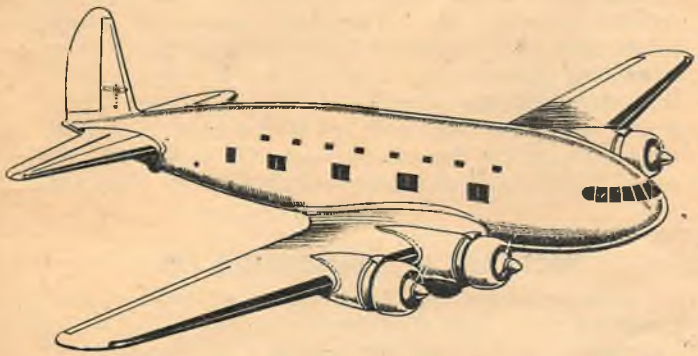
of the expanding Boeing plants. One design alone, the Boeing Monomail, may be said to have changed the whole picture of aviation. This sleek, streamlined all-metal monoplane was years ahead of its time, and since its production Boeing leadership in the transport field has rarely been surpassed. Boeing also developed the extra-long-range bomber to a point where today their B-50 stands practically alone in this field. The wartime achievements of their famed B-17's and B-29's will long be remembered. Today, like most aircraft manufacturers, Boeing is engaged in the problem of jet-powered flight and has already made notable contributions in this field.

1935 BOEING 299 DIRECT ANCESTOR OF THE FLYING FORTRESS BUT ACTUALLY NOT QUITE TOUGH ENOUGH TO JUSTIFY THE LABEL, THE B-299 WAS CONSTANTLY DEVELOPED AND FINALLY EMERGED IN THE B-17 SERIES AS ONE OF THE TOUGHEST OF ITS TYPE

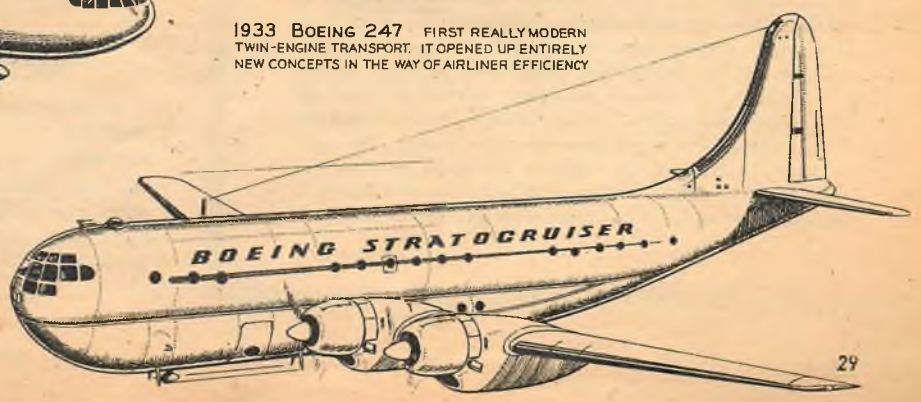


1931 BOEING YB-9 FIRST ALL-METAL TWIN-ENGINE BOMBER AND FASTEST IN THE WORLD IN ITS DAY. THE YB-9 MARKED BOEING'S DRAMATIC ENTRY INTO THE HEAVY BOMBER FIELD—A FIELD IN WHICH BOEING LEADERSHIP IS AN ACCEPTED FACT TODAY





1933 BOEING 247 FIRST REALLY MODERN TWIN-ENGINE TRANSPORT. IT OPENED UP ENTIRELY NEW CONCEPTS IN THE WAY OF AIRLINER EFFICIENCY



1939 BOEING 307 STRATOLINER (*ABOVE*) WORLD'S FIRST HIGH-ALTITUDE COMMERCIAL TRANSPORT WITH FULLY PRESSURIZED CABIN. DEPICTED HERE IS THE BASIC DESIGN. PRODUCTION MODEL DIFFERED IN HAVING A LARGE DORSAL FIN INSTEAD OF THE B-299 TYPE RUDDER ASSEMBLY AS ILLUSTRATED.

1947 BOEING STRATOCRUISER (*AT RIGHT*) THIS HUGE 60-114 PASSENGER DOUBLE-DECK TRANSPORT POWERED WITH FOUR 3,500-H.P. P&W ENGINES IS ONE OF THE LARGEST, FASTEST AND MOST LUXURIOUS AIRLINERS OPERATING ANYWHERE IN THE WORLD TODAY

AIR TRAILS

HIGH-FLYING SONG BIRD

● Concert tours by personal plane are a sure indication that the airplane is here to stay. Well known Metropolitan mezzo-soprano, Mona Paulee, and her accompanist husband, Dean Holt, wouldn't think of any other method of transportation, as their Beechcraft Bonanza, Mona-Dean II, has carried them safely and speedily to every section of the country where Miss Paulee has given concerts. Fast cruising speed of the Bonanza gets them there well ahead of time, and its quiet cabin even permits the singer to practice while her husband flies the plane. Dean Holt is not a newcomer to the flying game. During the war he was with the Air Transport Command flying C-54's and has accumulated over 3,500 hours of flying. The Beech is the couple's second airplane—the first was a surplus AT-6 purchased by Capt. Holt soon after his discharge. Mona-Dean II is not used solely for business. It flies the Holts frequently on vacations—to Miami for swimming, Canada for skiing or any other part of the country which may strike their fancy. One problem that ownership of the plane solved for them is that of wardrobe maintenance. Gone is the constant worry of wrinkled expensive dresses which must be packed in trunks when traveling by train and pressed upon arrival at destination, often only an hour before Miss Paulee's appearance on stage. Special clothes-bags with hangers and zippers are carried in the Bonanza and the dresses emerge fresh and unwrinkled on landing. No matter how circuitous is the route to the cities of their appearance, no tedious waiting and changing of vehicles is necessary. Mona-Dean II carries them straight as an arrow.

Solo Club

THIS month's hangar-flying session promises to be a most fruitful meeting. Quite a few members, following up on the suggestion that discussion and exchange of information are a means of helping each other in particular and private flying in general, have contributed some really worthwhile reports. One of these deals with a unique but working plan in California for reducing the cost of flying. Another concerns a successful club in Ohio. Others suggest some excellent ideas for building the Solo Club into an organization with a bite.

Hollis Sanders (C-667833 F.I.), has the floor. Hollis, incidentally, is an old Air Trails reader from the days of Bill Barnes and works as a flight instructor for the Martin School of Aviation, Box 986, Orange County Airport, Santa Ana, California, who operate the Orange County Flying Club that figures in this discussion.

"You spoke of an operator renting a ship at $6 an hour or less," begins Sanders. "I am going to tell you about a new and novel club organized locally. While the responsibility of ownership and upkeep is reduced for the individual under this plan, each member is required to pay strict attention to the safe and sane flying under the rules of CAA, State, and the School. I can vouch for the airworthiness of these aircraft. The flight manager is a CAA designated flight examiner for all rates except instructor, and is a member of the Sheriff's Aero Squadron for this county.

"Since I was an employee," continues Sanders, "I can verify these solo rates as being near the minimum allowed for the employees on a straight operating cost. If you can circulate these rates in the column it might help spread the scheme among other operators."

On the club's flight line, the Martin School lists an Aeronca 7AC, at $4.95 a solo hour; a Piper J3C, for the same figure; an Ercoupe 415C, at $5.75; Piper Cruiser 100, $7.25; and a Stinson 150 for $10.75. Almost apologetically, the school explains that compensation insurance and payroll taxes make it necessary to charge $3.50 an hour for instructor's services. Now how are these low plane rates possible?

Stating that their purpose in setting up this amazing scheme is to provide a reasonable means by which pilots may keep up their flight proficiency, thereby advancing interest in aviation, the school explains that the ships are ones which are of an age where depreciation has been reduced to the very minimum, thus reducing the cost of operation. However, the oldest of these "old" airplanes (*Continued on page* 103)

INCREASE IN MEMBERSHIP FEE

Because of the increased cost of fabricating the sterling silver Solo Club lapel emblem, it has been necessary to increase the cost of life membership to 75c. Members are requested to advise friends who are eligible of the new cost of membership card and wings. Membership application appears with the runover section of this column.

● Air Force C-54 demonstrating rocket-assisted (Jato) take-off. Taken with Eastman Kodak 616 Monitor with Super XX film, 1/400 sec., f/4.5. Yellow filter used in bright afternoon sun. By Edgar Deigan, commercial aviation photographer, New Rochelle, N. Y.

AIR TRAILS Air Pix PHOTO COMPETITION

CONTEST RULES

This competition is open to all photographers—amateur or professional. Payment of $10 will be made on or before publication to those whose photographs appear.

Entries may be concerned with any phase of aviation, and should be glossy prints *not less than* 5 x 7 inches in size. Prints should be well wrapped and protected in the mails by stiff cardboard. Entries must be accompanied by name and address of photographer. Mail to Air Pix, c/o Air Trails, Box 489, Elizabeth, N. J. Because of the large number of participants, entries will not be returned.

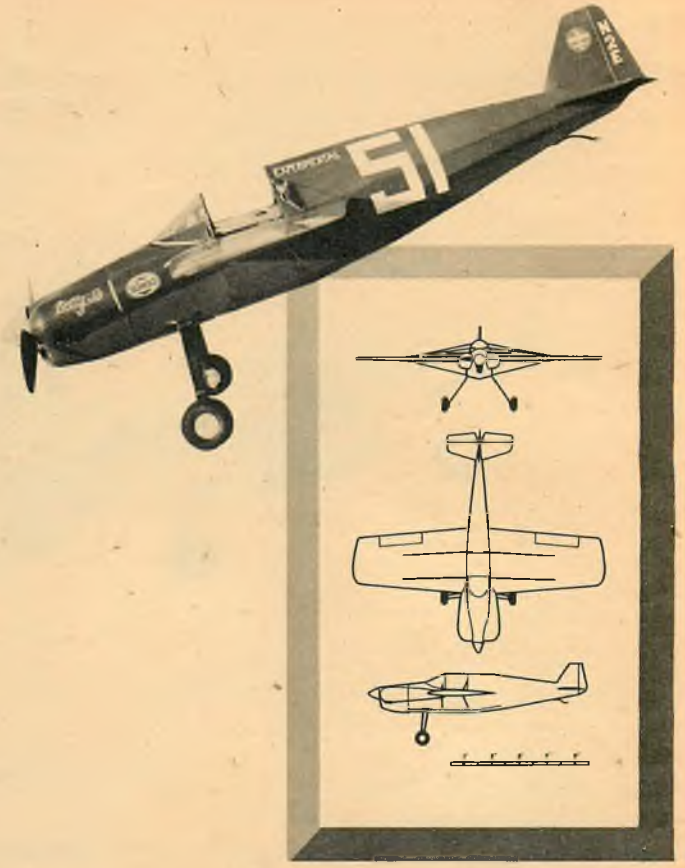
Include full data on subject, camera and film used, exposure, lens setting, and conditions under which picture was made. List equipment for enlargement, printing paper, and all other pertinent information. Air Trails does not assume responsibility for entries. The editors regret they cannot enter into correspondence concerning contributions.

●. North American F-86A taken at North American plant, Inglewood, Calif., by George Burns, Long Beach, Calif., with 2¼ x 3¼ Speed Graphic. Exposure: 1/1000 sec., f/4.5. Enlargement by 2¼ x 3¼ Federal enlarger on F-3 Kodabromide glossy paper.

Goodyear Round Up

PART III

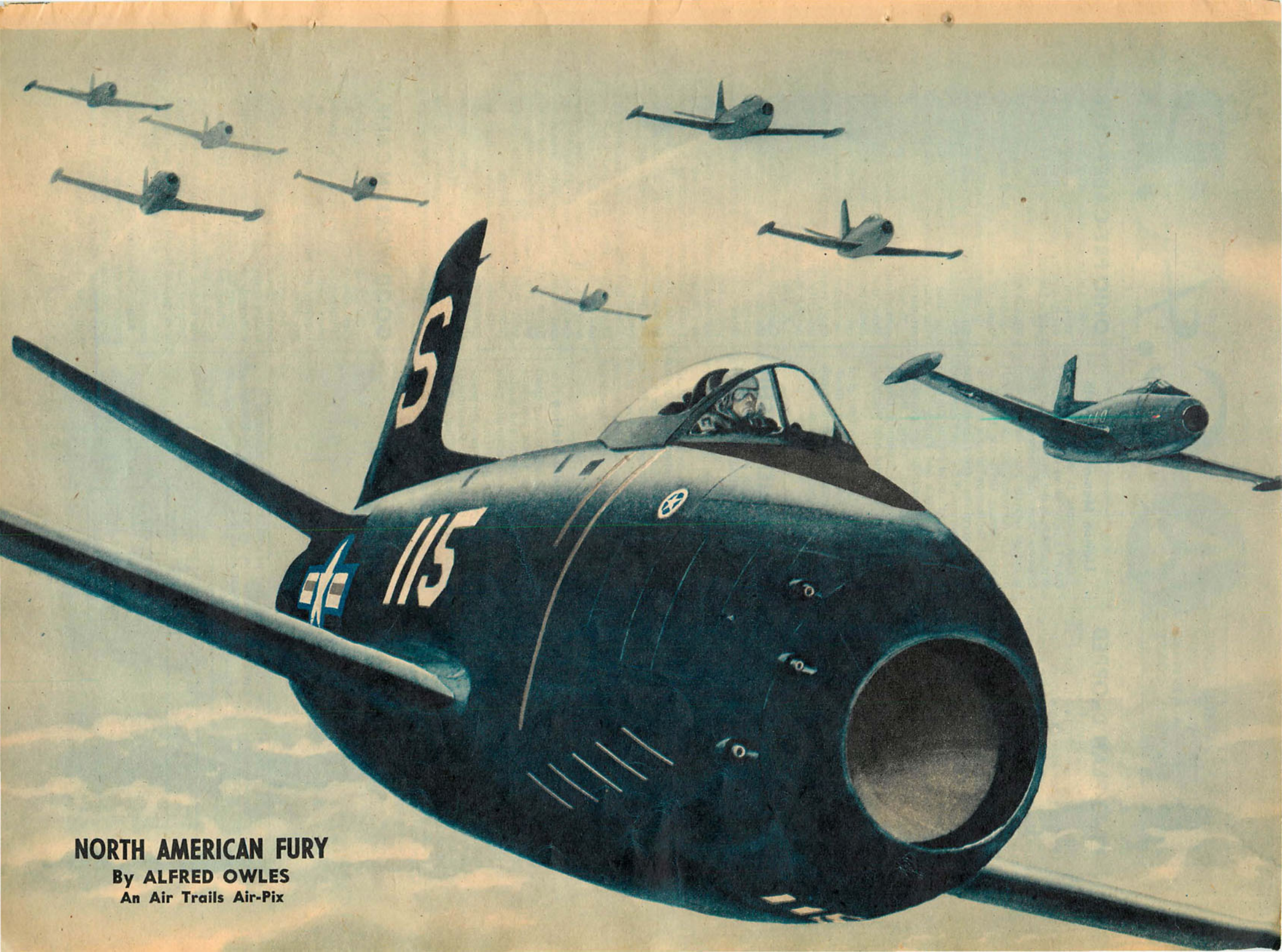
THOSE who intend to build and enter a Goodyear Trophy racing plane for the first time in the 1949 National Air Races will be interested to know that the National Aeronautic Association, Washington, D. C., has available for distribution a booklet on rules covering official specifications for the midget racers. Three-views of a typical Goodyear racing craft are included. The booklet lists a number of do's and don't's on the 190-cu.-in. engines, gives minimum permissible weight of plane, wing area, center of gravity location and limits, landing gear and propeller specifications, strength factor, vision, pilot and flight requirements, as well as a host of other useful information to the prospective builder. The pamphlet was prepared through joint efforts of the National Aeronautic Association, Goodyear Trophy Race Committee and the Professional Race Pilots Association.



● "Betty Jo," built by Carolina Aviation, Greenville, S. C., flown by Skip Sheldon. Span 16' 6", length 16' 4". Speed is 138 mph.

● Dixon Special, flown by Charles Bing. Span 17' 5", length 16'. Blue, white trim. Sixth in semi-finals and 8th in consolation race.

● Baker Special. Rebuilt Ben Howard's "Pete," flown by Ray W. Baker. Span 18', length 16' 7". Yellow and red. Took 6th in first heat at 122.6 mph. Plane was damaged and not flown again.



NORTH AMERICAN FURY

By ALFRED OWLES

An Air Trails Air-Pix

CIVIL AIR PATROL NEWS HIGHLIGHTS OF SENIOR AND CADET ACTIVITIES FROM COAST TO COAST

C.A.P.

PT-13 PLAN DROPPED

A plan to use 410 two-place open cockpit Stearman PT-13's in the Civil Air Patrol has been abandoned. Upon inspection it was found that the surplus aircraft would have to be completely rebuilt to be put into flyable condition.

Announcing cancellation of the plan, which had been hailed enthusiastically, National Headquarters CAP officials explained the situation as follows:

In January, 1948, National Headquarters heard that the PT-13's could possibly be made available to CAP as Class 0-1-Z, which means they could be used for ground training only and not be flown.

In February, Headquarters felt that perhaps they might get the planes classified 0-1-A so that CAP could fly them. With passage of Public Law 557, establishing CAP as a civilian auxiliary of the AF, CAP Headquarters requested Headquarters AF to give the planes to CAP so they could be used in flying activities.

A detailed inspection of the aircraft, however, revealed they would have to be completely rebuilt to be made flyable. Thus CAP Headquarters requested AF Headquarters to relieve the Patrol of accountability for the planes. It is hoped that a suitable liaison-type plane which can be utilized in the CAP program will be made available.

AVIATION IN SCHOOLS

National Headquarters CAP has found by experience that the subjects most likely to be adopted in high school curriculums pertaining to aviation are those dealing with physics, mathematics and history since these subjects rate credits in every high school course.

Aerodynamics, meteorology, navigation, and history of aeronautics are those which rate highest. Other subjects relating to aviation which appear in high school courses are civil air regulations, power plants, structures, orientation, servicing and operations, human factors in flight, and social implications of aeronautics.

Liaison Man-of-the-Month

Capt. James L. Nollkamper, AF-CAP Liaison Officer for the Wyoming Wing CAP, is the kind of fellow who believes that just because a state is not as heavily populated as some others is no reason why it shouldn't have a strong Civil Air Patrol.

Capt. Nollkamper after a recent intense recruiting drive added nine new Squadrons and a new Flight, and is going right ahead recruiting additional Squadrons and Flights.

The new Squadrons are located at Pinedale, Jackson, Cody, Powell, Greybull, Worland, Riverton, Lowell and Rawlins with the new Flight at Big Piney.

As the AF-CAP Liaison Officer of the Month, even National Headquarters is amazed at how much Capt. Nollkamper has accomplished in Wyoming.

PATROL MEMBERSHIP

Projected strength of the CAP by the end of this year will be 220,000 or 150,000 Seniors and 70,000 Cadets, composing 132 Groups, 685 Squadrons and 190 Flights.

Projected strength by the end of 1950 envisions 300,000 membership, or 200,000 Seniors and 100,000 Cadets made up of 175 Groups, 900 Squadrons, 240 Flights.

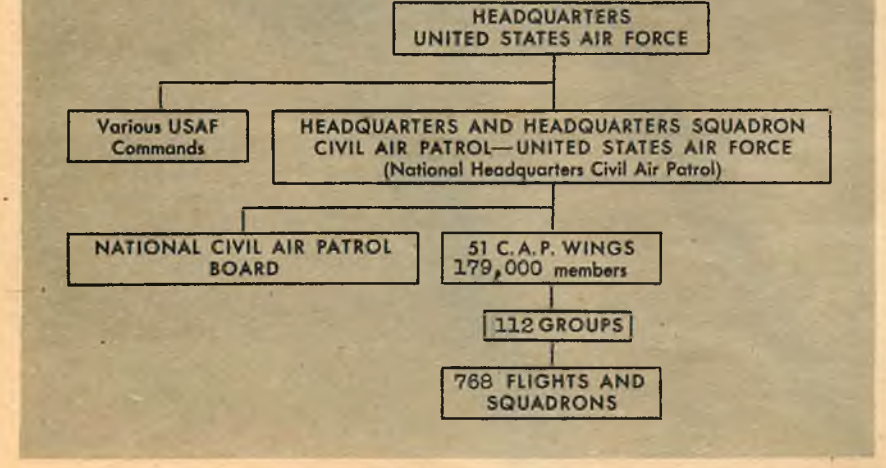
At the end of 1948 there were 179,000 CAPers made up of 134,000 Seniors, 45,000 Cadets, 112 Groups, 600 Squadrons and 168 Flights.

Mobile Radio Station

Wisconsin Wing boasts equipment probably not to be found elsewhere in CAP, a mobile tractor and trailer truck which houses a complete radio station and living quarters.

The equipment is the private property of Lt. Col. W. W. Plankington of Milwaukee, special projects officer of the Wisconsin Wing. Col. Plankington has traveled more than 130,000 miles in CAP work.

ORGANIZATIONAL CHART OF CIVIL AIR PATROL



OHIO PRE-CADET CLUB

What's to be done with 10- to 14-year-old boys and girls who have an overpowering ambition to study aviation and a burning desire to ride in a plane?

The simplest answer is—"Start a Rocket Club," and that's just what CAP squadron 515-B at Bucyrus, Ohio, did some 18 months ago.

In sponsoring such a club, the Bucyrus Squadron does not have official sanction from National Headquarters CAP, or for that matter from the Ohio Wing. The rules for actual CAP membership are strict.

Today more than 30 young fellows participate in the Bucyrus Rockets. More than 50 orientation flights have been made, with parents' consent, of course; military training procedures and leadership have welded a sense of obedience, respect for commands, honor and integrity into a feeling of teamwork in the Rockets.

A varied program, guided by the Cadets of the Bucyrus Squadron, keeps the Rockets busy. Drills, rifle marksmanship, basic principles of flight theory, navigation, meteorology, power plants and installations are some of the subjects covered. Model plane building and flying have just been added and radio telephone procedures and Morse Code are also entering the program, as is a study of airfields, taxiing signals, fire prevention, first aid, and traffic control.

So that Rockets are readily distinguishable from CAP and CAPC, a uniform honoring the Navy has been adopted. It consists of blue denim dungarees, blue shirt, white T shirt, and white sailor cap with special insignia of the Rocket unit placed on the brim. The insignia is a blue background with gold wings and a blue slanted rocket between the wings.

Ratings similar to other military organizations are given to Rockets who show outstanding ability and accomplishment. The red Marine Corps stripes are used to designate rank, and are worn on the blue shirt sleeves.

GOOD WORK IN CALIF.

Cadets of the Inglewood Squadron, First Group, California Wing CAP are mighty proud boys and girls, having been highly commended by local authorities for outstanding work in an oil fire disaster in that area.

An explosion of crude oil storage tanks threw burning oil on a nearby trailer camp and attracted the usual thousands of curious with consequent jamming of traffic.

While the entire local CAP assisted in the disaster, eight Inglewood Squadron Cadets broke up major traffic jams, diverted cars and pedestrians who kept filtering into the danger area, and earned the gratitude of local police and the community.

Eight Cadets signalled out for special praise were Joe Bellante, Edward Slepicks, Ben Owens, Kenneth Church, Tod Cornell, George Huber, Bill Herrich and Charles Faulkner.

NEWS

JOIN THE CAP CADETS! MEMBERSHIP OPEN TO ALL BOYS AND GIRLS BETWEEN THE AGES OF 15 AND 17

EMERGENCY PLANS

Under mobilization conditions of any future emergency the role of the CAP in the over-all defense plan of the U. S. Air Force will be to continue as a permanent AF auxiliary, according to National CAP and AF officials. In event of emergency, CAP would assist the military in the following ways:

Maintain a pool of a minimum of 100,000 carefully selected Cadets trained in ground and preflight subjects as a source of personnel procurement for the Air Force.

Provide anti-submarine patrol along the sea frontiers of continental U. S., Alaska, Hawaiian Islands, if required by the AF or the U. S. Navy; and provide patrol service along the southern border of the U. S.

Operate an auxiliary radio communications net within the CAP geographic boundaries.

Participate in search-and-rescue service as an auxiliary of Air Rescue Service, MATS.

Provide courier, mail, and light transportation services.

Provide flights for radar tests, tow target flights, and non-combat reconnaissance flights.

Provide other emergency operations as ordered by National CAP Headquarters.

Pending the adoption of a Civil Defense program, CAP will also render assistance to civilian agencies, as follows:

Provide anti-sabotage patrol; aerial reconnaissance to assist ground traffic control agencies during periods of emergencies; patrol of transportation and pipeline facilities, public utilities and natural resources; fly emergency missions for Federal and State agencies and for war industries; assist in providing emergency communications facilities for devastated areas.

FLIGHT NURSE UNIT

The possibility that large areas of the U. S. might need hurried evacuation in event of atomic or bacteriological attack—plus the desire of Registered Nurses in Oregon to participate in CAP—has resulted in the nation's first CAP Flight Nurse Unit.

Nearly 30 professional nurses of the Portland, Oregon, area are receiving schooling, patterned after the wartime Flight Nurses School at Bowman Field, Ky. The unit is under the supervision of Oregon CAP Wing Flight Surgeon Maj. Cecil Ross.

The curriculum is divided into two classes per night, one night each week. The first class consists of medical lectures covering the history of aero-medical nursing, work of flight nurses in World War II, aero-medical psychology, care of injuries of patients in flight, and other technical instruction in the care of wounded.

In addition the nurses' unit is given 25 hours of CAP work, which includes military customs, organization of the National Defense Establishment, basic navigation, camping problems, survival, crash procedure, communications.

CAP RADIO BLANKETS NATION

NEW WINGS

National Headquarters CAP has announced the new CAP pilot and observer emblems, and the aeronautical rating program by which emblems for the various ratings can be obtained. These new emblems are:

COMMAND PILOT

SENIOR PILOT

PILOT

SENIOR OBSERVER

OBSERVER

NETWORK USES OVER 3,000 TRANSMITTERS

More than 3,000 radio transmitters are now being used regularly throughout the United States by Cadets and Seniors of the Civil Air Patrol, providing the nation with a valuable network of radio communications that would be indispensable in event of an emergency.

In outlining the comprehensive radio communications program, National CAP officials anticipate that within the next 12 months more than 6,000 transmitters will be in use to completely blanket the nation with its largest and most effective semi-professional radio network.

An extensive training program for Cadets interested in radio is now in full swing in practically all Wings, Groups and Squadrons. The training incorporates not only "book learning" in the techniques of radio, but plenty of actual operating experience in disasters, emergencies and regular CAP work and operations.

The network of communications centers in National Headquarters at Bolling Field, Washington, D.C., and spreads throughout eight regions, every state and thousands of communities, as well as Alaska and Hawaii.

One of the serious deterrents in perfecting the communications network has been the lack of crystals for the radio sets. This has been solved by the operation of a crystal grinding laboratory at National Headquarters under direct supervision of Maj. Arthur D. Rhodes, Asst. Chief of Staff in charge of all CAP communications.

At present crystals are being ground for 2374 k.c The crystals are first machine-ground as near to 2374 k.c.'s as possible, and are then hand-ground and tested to close tolerance. During the short period the lab has been in operation, hundreds of crystals have been ground, tested, cased, and dispatched to the Wings for use in the national CAP communications network.

(*Continued on page* 107)

Join the Civil Air Patrol! Anyone over 15 is eligible. Fill out and mail this form. Air Trails will forward it to your state CAP Wing Headquarters.

C.A.P. News, c/o Air Trails • Box 489 • Elizabeth, N. J.
I am interested in joining the Civil Air Patrol.

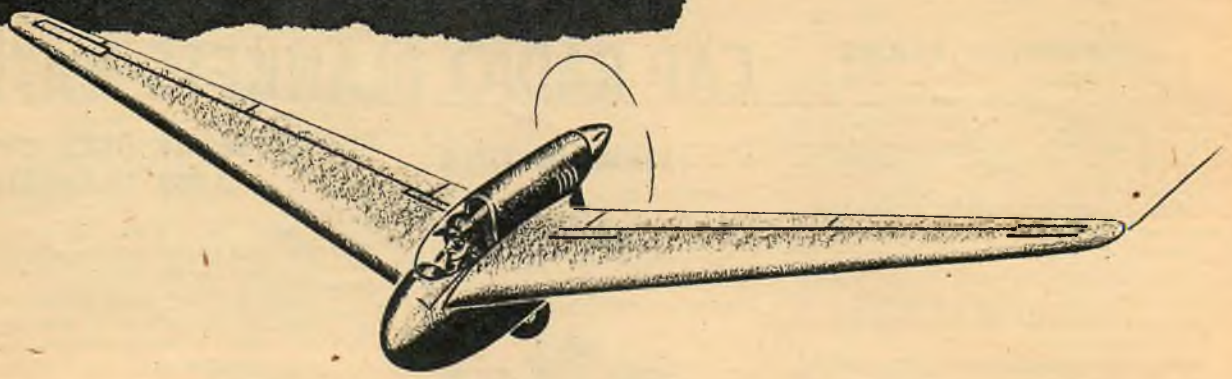
Name (print) ..... Age.....

Address .....

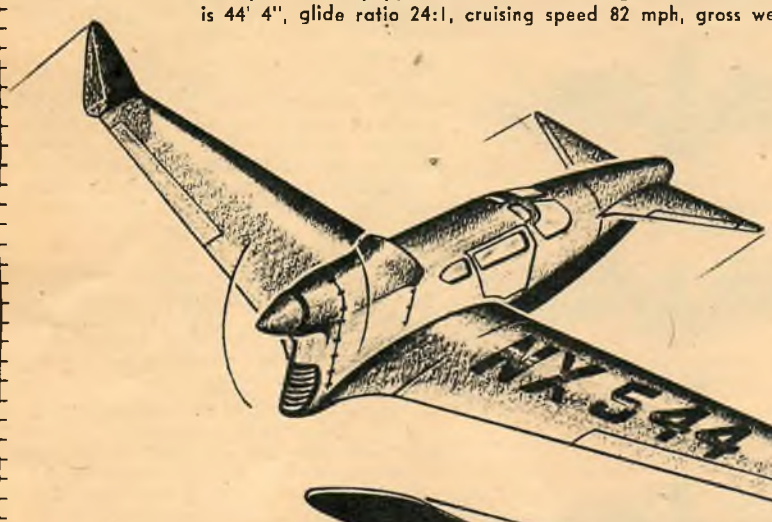
City ..... Zone..... State.....

(449)

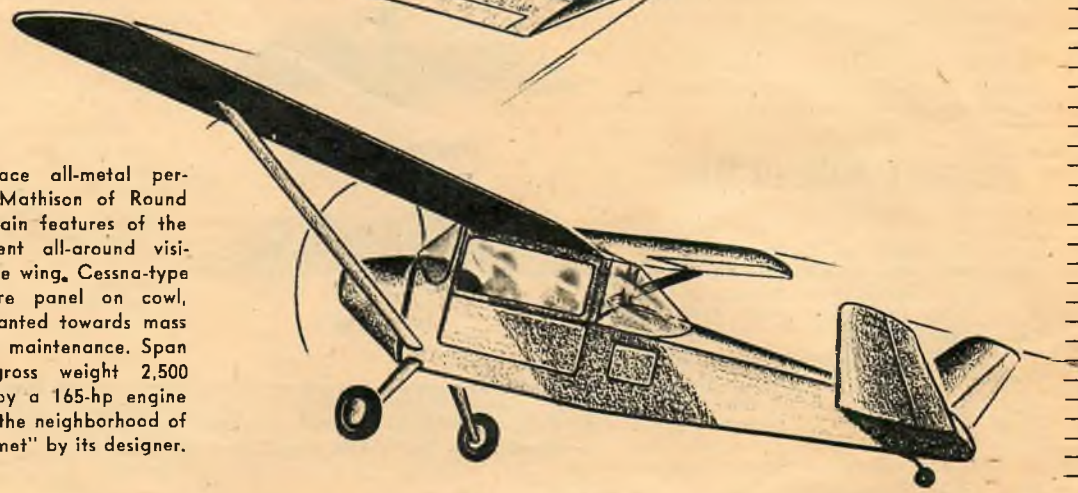
Airmen of Vision
DESIGN COMPETITION



● First prize, submitted by James Soot, East Moline, Ill.—the JOS 245, auxiliary powered sailplane designed in 1945 by Mr. O. Jenko of Switzerland. This interesting flying wing sailplane will be built by Mr. Soot as soon as a small 26-hp air-cooled engine is available. The plane is equipped with either folding or retractable propeller to cut down drag. Span is 44' 4", glide ratio 24:1, cruising speed 82 mph, gross weight 585 lbs., sinking speed 2.3 ft./sec.



● Second prize: a canard personal plane by David Fetherston of Champaign, Ill. Has capacity for four passengers and is powered by a 175-hp engine. Propeller is equipped with device which stops it in vertical position to insure safety in the event of a bail-out. Up-turned wing tips serve as rudders which split open fanwise to create drag and furnish yawing moment in turns. By pressing both pedals both rudders split open and act as air brakes as in early Beechcraft biplane.



● Third prize: four-place all-metal personal plane by K. A. Mathison of Round Hill, Alta., Canada. Main features of the design are: its excellent all-around visibility, the Luscombe-type wing, Cessna-type landing gear, anti-glare panel on cowl, and V-tail. Design is slanted towards mass production and ease of maintenance. Span is 36', length 25', gross weight 2,500 lbs. Plane is powered by a 165-hp engine and has a top speed in the neighborhood of 150 mph. Is named "Comet" by its designer.

Air Trails has opened its columns to those who are interested in presenting plans for aircraft of the future.

Rules governing the competition are:

1. Three-view sketches of the proposed aircraft will be required. These should be not less than 8½ x 11 inches for the entire three views.

2. Sketches of the complete airplane in three-quarter front and rear position should be included.

3. Photos of a model of proposed design may be included.

4. Information on power plant(s), estimated performance, dimensions, and explanations of any unusual features are required. Data as to age, occupation or schooling is welcome.

5. Entries will not be returned and for that reason those participating should retain copies of all material submitted.

6. The editors regret they cannot enter into correspondence concerning designs submitted.

7. Designs may be of any type: commercial aircraft, military planes (fighters, bombers, troop transports), planes for the private flyer and single-place sporting craft.

8. Mail entries to Airmen of Vision, c/o Air Trails, P. O. Box 489, Elizabeth, N. J.

9. The entry each month judged by the editors as the most practical or of the greatest significance will receive an award of $25. Awards of $5 will go to runners-up.

OFFICE IN THE AIR

To Robert G. LeTourneau an airplane is an integral part of his business, serving him as a flying desk

By IRVING WALLACE

ROBERT G. LeTOURNEAU, America's Number One flying executive, has flown the equivalent of ninety times around the world. He bought his first airplane, a single-engine Waco, in 1937. After escaping death in an automobile accident in which five people were killed, LeTourneau decided that air transportation was not only faster, but a good deal safer. Since that time, he has traveled an average of 250,000 miles each year in his privately owned planes—a total of more than 2,250,000 miles.

LeTourneau, now recognized as one of the world's greatest mechanical geniuses, was forty years old before his work won any special attention. The story of his rise from the sale of a combination tractor and scraper for a few hundred dollars in the late twenties, to an annual production total of over $40,000,000 in eighteen years' time, is one of the most colorful in American industry. Wherever you see airports, highways, dams, or canals under construction, or even a mountain being moved, it is better than a fifty-fifty bet that you will find machines on the job bearing the LeTourneau name. Over one-half of the world's earth moving equipment is made in LeTourneau's six plants—four in the United States, one in England, and another in Australia.

One of the world's most original industrialists, LeTourneau gets most of his inventive ideas while flying between his factories. When his thoughts take on a dreamy pattern he takes out pencil and paper and soon a sketch for some new machine starts to take form. He spends at least one hundred hours of each month in his "flying office." More than half of his flying is done at night, so that he can conduct his business at his various factories during the daytime. His five planes include a Lockheed-12, a Lockheed Lodestar and a Douglas A-26. These have regular office equipment, including special drafting boards.

Pilot Jimmie Mathews, who pilots the Lockheed-12, told about one rough flight. "I remember one trip on which the boss couldn't use his drawing board," Pilot Mathews smiled. "We were flying from Peoria to Schenectady for an important meeting. It suddenly got rough. We flew contact, with moderate to heavy turbulence, the entire trip. The plane was never really under any dangerous strain, but nevertheless it received quite a pounding. We were tossed about so much that my map case kept bouncing up into my face. I could see the boss holding tight to his seat, a funny boyish grin on his face. He'd keep saying, 'We'll make it, (*Continued on page* 80)

● Many ideas for his gigantic concern are born when LeTourneau is aloft in one of his planes. He's more at ease there than in a car.

Model Matters

NEWS, VIEWS, COMMENTS, PHOTOS FROM MODEL CLUBS AND BUILDERS IN NORTH AMERICA AND OVERSEAS

• Payment of $2 to $5 is made on or before publication for photos of unusual interest sent exclusively to AT. No photos can be returned.

• Triple threat: Mrs. Ruth Linnemeyer, a Herkimer CO_2 engine and a Powerhouse model. She beat all the boys with 9:47 o.o.s. flight at Long Island meet.

• B-29 Superfortress "Enola Gay" by D. Little, Capetown, South Africa. Markings of this plane which dropped 1st A-bomb are from A.T. photos.

DOPE CAN

CONDUCTED BY VAL A. LUCE

THE Nationals will return to Olathe! The Olathe, Kan., Chamber of Commerce, and the Olathe Legion Post No. 153 (Earl Collier), will re-sponsor the 1949 Meet.

Tom Poor, President of the Olathe Chamber of Commerce, has announced, "We were pretty green at running the 1948 Nationals. We couldn't foresee everything that happened. We know a thousand things now we didn't last year. The 1949 Nationals will be as far ahead of 1948 as the 1948 Nats were ahead of previous contests. Everybody here who had anything to do with the Meet last year is contributing that experience to make the 1949 meet the absolutely outstanding meet in model history."

Jess Hall, Contest Manager for 1949, says, "When I think how much we learned from having the 1948 Nationals here I wonder that we presented a good show at all. Everybody seemed to be pretty well satisfied within the contestant ranks. We're expecting over 2,000 contestants this year, and those 2,000 are going to know they've competed in the Olympics of model aviation when the six days of the 1949 meet are over."

Hall announced that the sanction from the AMA has been received for a six-day meet from July 26 through July 31, to be held at the Olathe Naval Air Station.

While he could not make the official announcement, Hall said that the Navy would probably unveil some of its planes before the contestants and spectators at the 1949 Nationals, an exhibit that will develop into one of the thrilling news stories of the year. The meet is running the extra day to fit this to-be-announced added attraction into the program.

Ed Marshall, Commander of the Earl Collier Post No. 153, American Legion, said, "We're preparing to accommodate at least 100,000 spectators during the meet, and when I say accommodate I mean just that. We have already had a meeting at which 750 farmers have unanimously cheered the news that the meet will return. They were most enthusiastic because the July date is just after wheat is harvested, and just before the corn gets too high to give the model boys maximum recovery of their planes. Olathe farmers are still finding an occasional plane which we are returning to the owner. I think we've found all but six from 1948, and we intend to try to beat that next meet."

The Navy said that they, too, had learned much from 1948. Captain Campbell Keene, Commanding Officer, said, "We hope to have more comfortable housing, better workshop facilities, and, if possible, furnish even better timers, for the contestants in 1949."

Captain Keene indicated that the entire support of the Navy, the Naval Air Training Command, and the Naval Air Reserve Training Command is backing this year's meet. Observers from the Naval Air Stations Dallas and New Orleans will be present throughout the meet with a view toward having subsequent Nationals at these bases.

Contestants will again be housed and fed at the Naval Air Station at the prevailing mess-rate. Last year, this was $1.05 per day, plus a 35 cents linen charge. These rates will be approximately the same in 1949, Captain Keene said.

Indoor portions of the meet will be held in the vast Kansas City Municipal Auditorium, which this year will be prepared for even more ideal indoor flying than last. (*Continued on page* 96)

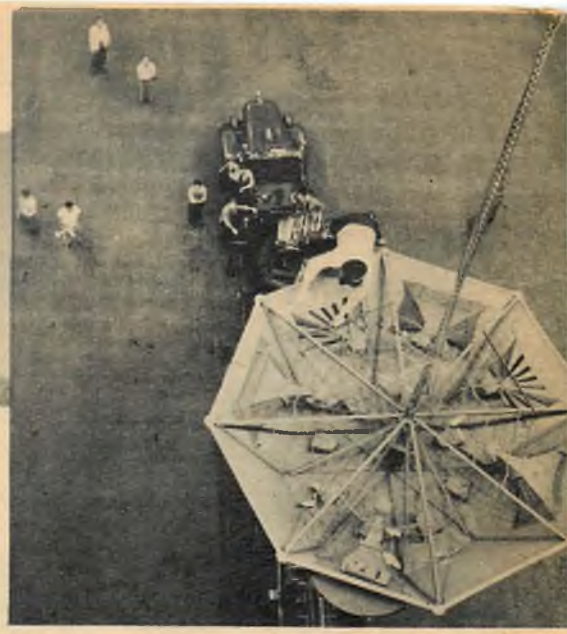
• First state championship meet ever held at Reading, Pa., sponsored by Exchange Clubs last fall. Drew 375 entries who received 159 trophies!

• Family affair (l. to r.): Robert McClary, J. P. McClary, Jr., and Pop. Richard, 8, kneeling. All are members of Queens City Aero Club.

• Robert S. Nevin, Baltimore, Md., built this Martin M-B-1 in 2,100 hours. Span is 36". All controls really operate from complete cockpit.

• Capetown's D. Little made the Lockheed P-80A, Hawker Sea Fury, and Goodyear-built Corsair F2G-1.

• Typical scene at Long Island Invitational Meet run by Screamin' Demons.



• Kansas City firemen cautiously retrieve indoor models "hung up" in speakers at National meet. 1949 contest again will be held at Olathe, Kan.

REPORT FROM WASHINGTON

By RUSSELL W. NICHOLS
EXECUTIVE DIRECTOR, ACADEMY OF MODEL AERONAUTICS

ALTHOUGH no official notice has been received as yet, word from our good friends in England indicates that plans for the 1949 Wakefield International Competition already are being made.

Present indications are that the meet will be held in England sometime during the month of July. Exact location and date will be published as soon as they are received from SMAE. Rumor has it that an "International Model Airplane Week" is being planned in conjunction with the Wakefields, which, together with the expected large number of teams competing, will most assuredly provide our U. S. Wakefield team with both keen competition and an extremely enjoyable visit to England.

Plans have been developed by Wakefield chairman, Frank Zaic, for the selection of our United States team for 1949. Uppermost in the minds of everyone concerned is the desire to give an opportunity to qualify to every interested model flyer in the United States. Anyone wishing to register as a contestant in one of the regional 1949 Wakefield qualification events should send a letter to AMA Headquarters immediately stating this fact and enclosing a registration fee of one dollar.

These requests for registration must be received by AMA Headquarters not later than April 1, 1949. All registration fees received will be held in a special account for use in defraying expenses in conjunction with the qualification meets. Any funds remaining will be placed in a general Wakefield budget to cover the travel expenses of our team.

Immediately following April 1, all applications received will be listed according to the geographic locations of the contestants and these will be used in determining the locations for the Wakefield qualification meets.

In the event the nearest qualification meet to any one flyer is held in a city located more than 250 miles from his home, the dollar registration fee will be refunded to him in the event he is unable to enter. However, if the contest is held within a 250-mile radius from his home, and the contestant does not enter the meet for reasons of his own, his dollar registration fee will not be returned but will be included in the general 1949 Wakefield budget. Additional information can be obtained at any time from AMA Headquarters or from your Wakefield chairman, Frank Zaic, 203 E. 15th St., New York City 3.

Don't forget, your intentions to participate in a Wakefield qualification meet must be made known to Academy Headquarters before April 1, 1949.

A letter from the Federal Communications Commission in Washington has been received by AMA Headquarters concerning the use of radio-control equipment at the 1948 Nationals in Olathe, Kansas.

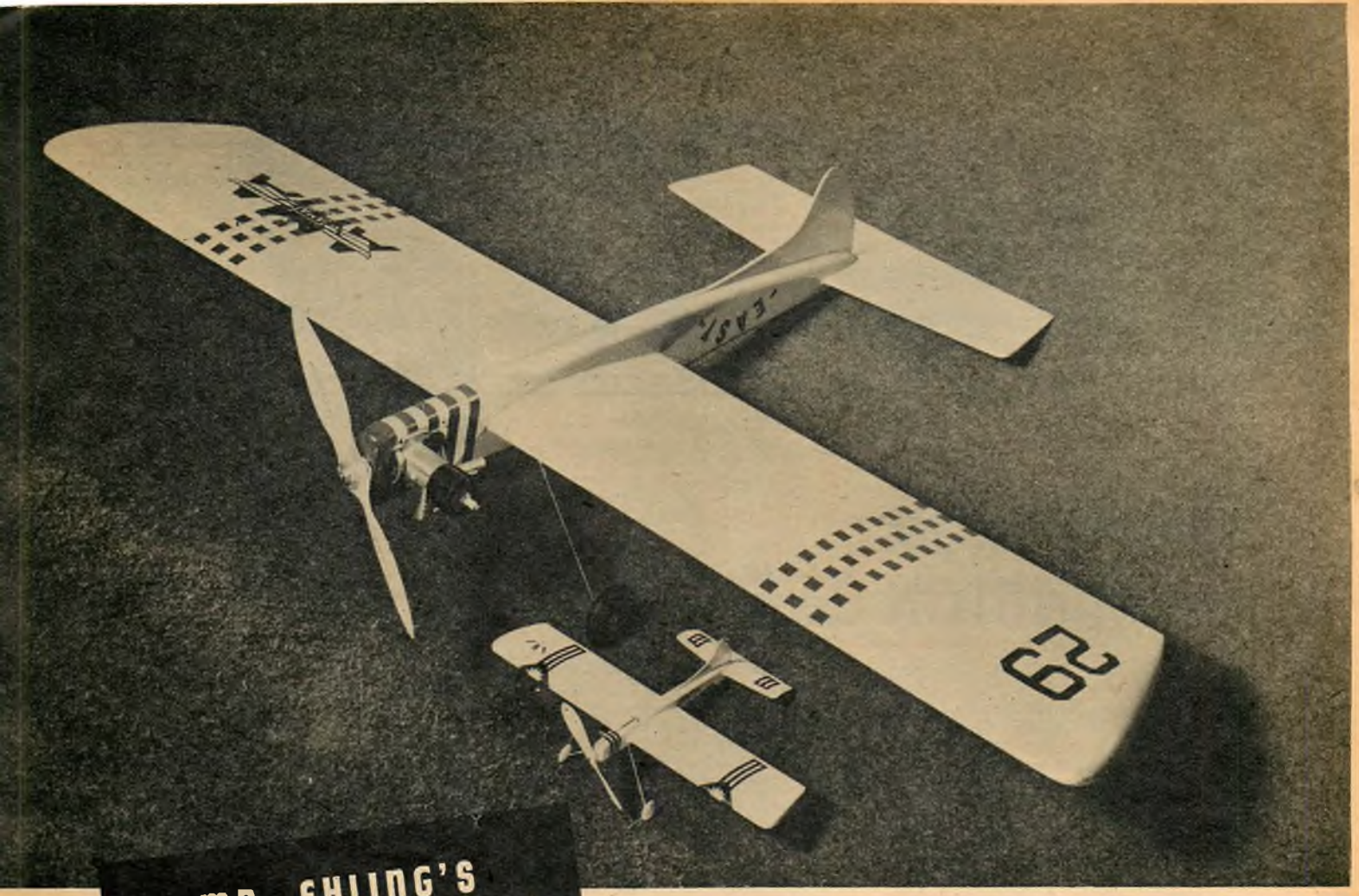
Quoting from the letter, "Observations made during the National Model Aircraft Meet at the Naval Air Station, Olathe, Kansas, August 4-8, 1948, inclusive, reveal a number of irregularities in connection with the use of amateur stations for the purpose of remotely controlling model aircraft by radio. It is (*Continued on page* 94)

• Wilfred T. St. John, Winnipeg, noted modeler, has devoted lifetime to helping young builders. One of his Fokker scale models is in Smithsonian.

• Mrs. Arthur J. May, Bismarck, N. D., with stunt model designed and built by hubby who serves as member of Air Trails Model Aviation Advisory Council. Bismarck modelers are active in Missouri Slope Airplane Modelers Assoc. which helps set up small clubs in outlying communities. Latest is at Mott, N. D.

• D. Little's Lockheed PV-1. He worked on real ship as instrument repair man with South African AF. Has modeled since World War I.

• James Wilson, Hopemont, W. Va., turned out this English R.E.-8 1917 job. Finished in green. Photo made with Rolleicord, Super XX.



MR. EHLING'S "Easy" STUNT MODEL

● Big and Little Easy (E-1 and E-7 on chart, pg. 42). Campus CO_2 powers small version; Ohlsson 60 is used on Cl. D stunt ship.

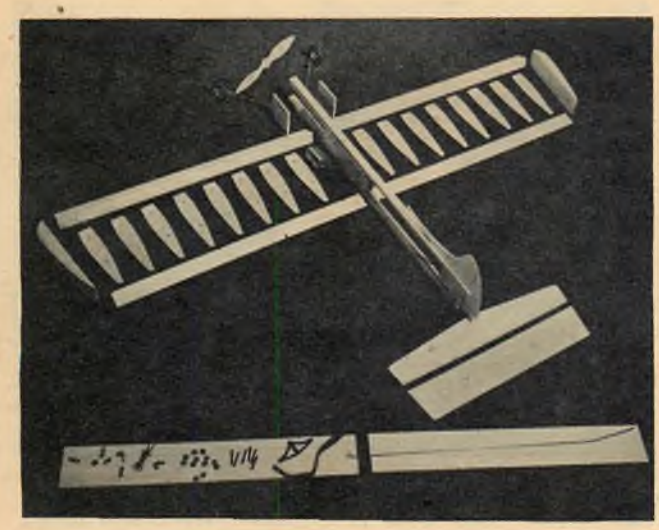
Try this remarkable quick-built method for turning out control-line stunt ships. Mass production methods result in good looking, sturdy plane for all types of aerobatics

SUPPOSE you wanted to turn out 24 control-line stunt models for use as Christmas gifts. You wanted an original design and, if possible, something other than a flat, slab fuselage. That was the problem facing Frank Ehling last December, and the Easy is his solution.

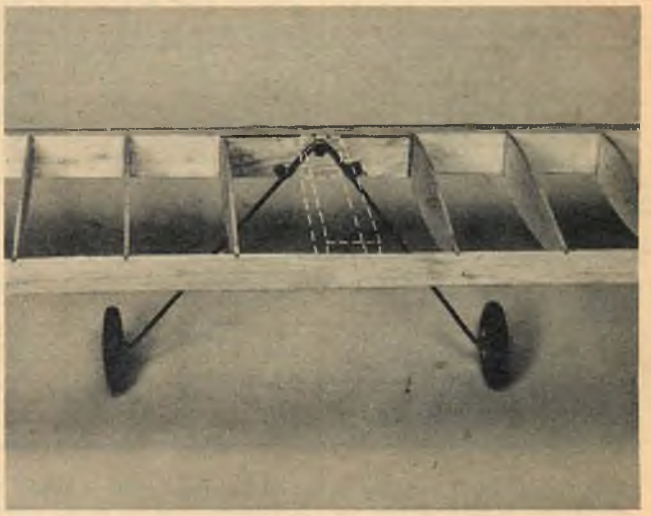
So remarkable is this method of quickly building an attractive, good flying stunter, that Air Trails presents it for the consideration of all modelers. The various steps are illustrated in photo form by the Smith-Coda team of aviation and model aviation photographers.

Wing is constructed around center block which is sized to fit between motor bearers. After block dimensions are determined from motor mount spacing, the wing is constructed around it. Fuselage longerons are cemented at the front, then slipped over the block and drawn together and cemented at the rear.

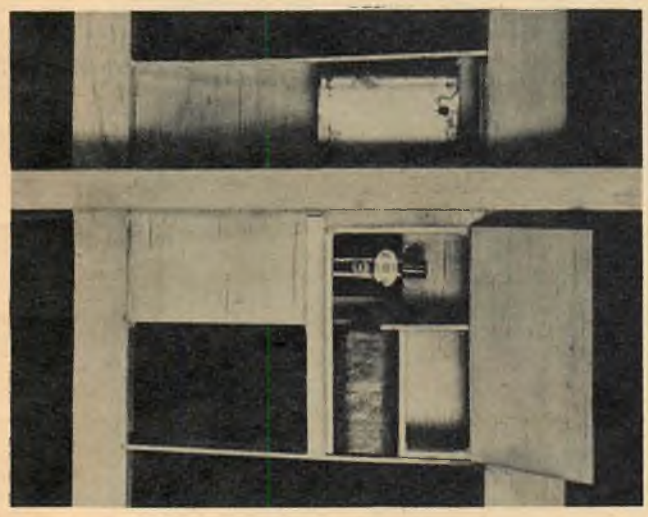
● Mount engine on bass bearers (left); cement these to balsa longerons (#5); don't cement wing block ("N" length) to bearers.



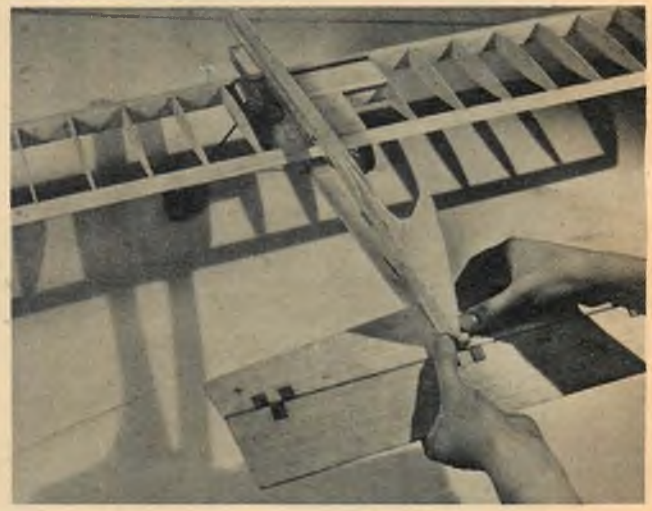
● All parts of Easy are displayed here. Note wing center block between longerons which determines height of symmetrical airfoil. Maeco tanks are used on all but smallest version, where Campus tank is in wing against fuselage and running parallel to leading edge.



● Wing is constructed after airfoil dimensions have been determined. Landing gear is bolted to plywood cemented to rear face of leading edge. Fuselage-wing block is then cemented securely in place (as in dotted lines). Fuselage pieces cemented against this.

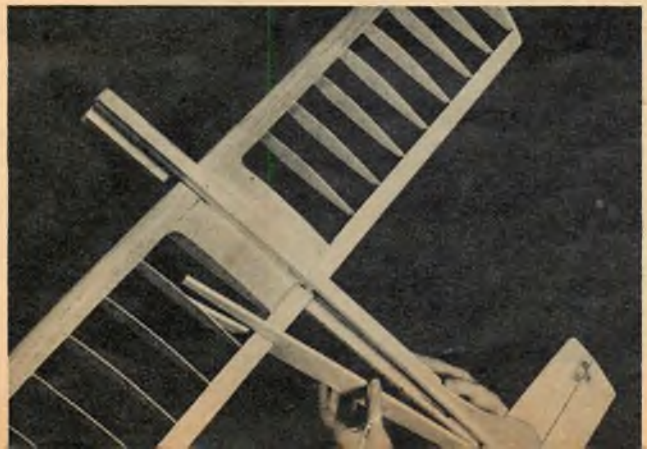


● Fuel tank and ignition components (if glow plug engine is not used) are attached in wing next to fuselage. Cut down center ribs to make planking flush with airfoil shape. Tank is mounted on outer wing in relation to the direction in which the model will be flown.

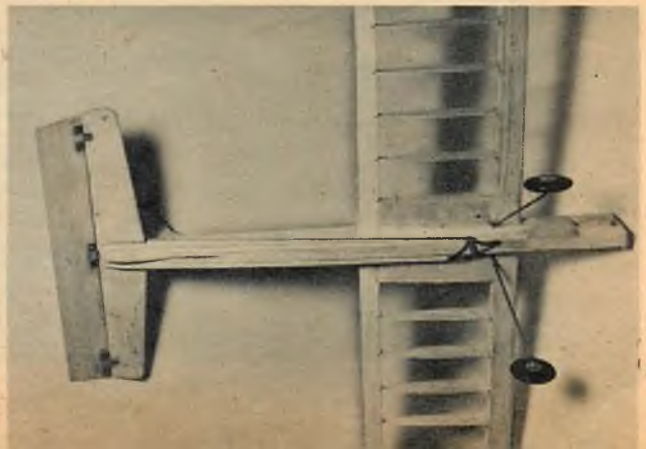


● When wing is assembled, fuselage front is fixed by cementing plywood in place. Longerons are slipped over wing, bent together at rear and cemented. Tail surfaces are then attached. Longerons are slotted to take rudder for distance "L." Fit dorsal fin on top.

● Next step is to add fuselage side pieces. Two sections are used for each side. These meet at the wing center. Wood thickness varies as indicated on chart. After sides are attached fuselage corners are sanded round. Add control system, mount motor.

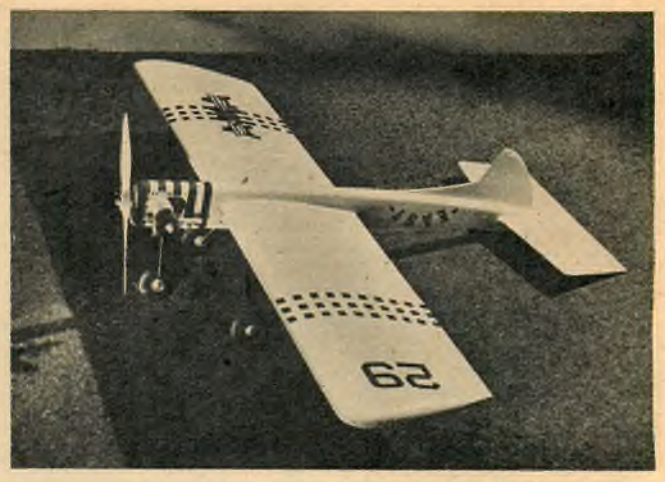


● Bellcrank is attached to fuselage bottom as shown. Push rod is connected to elevator horn. Note extra wing tip rib (on plans) which is added to carry control-line guide. Model is covered, doped. Use Jap tissue on small Easy. Decorations are decal sections.

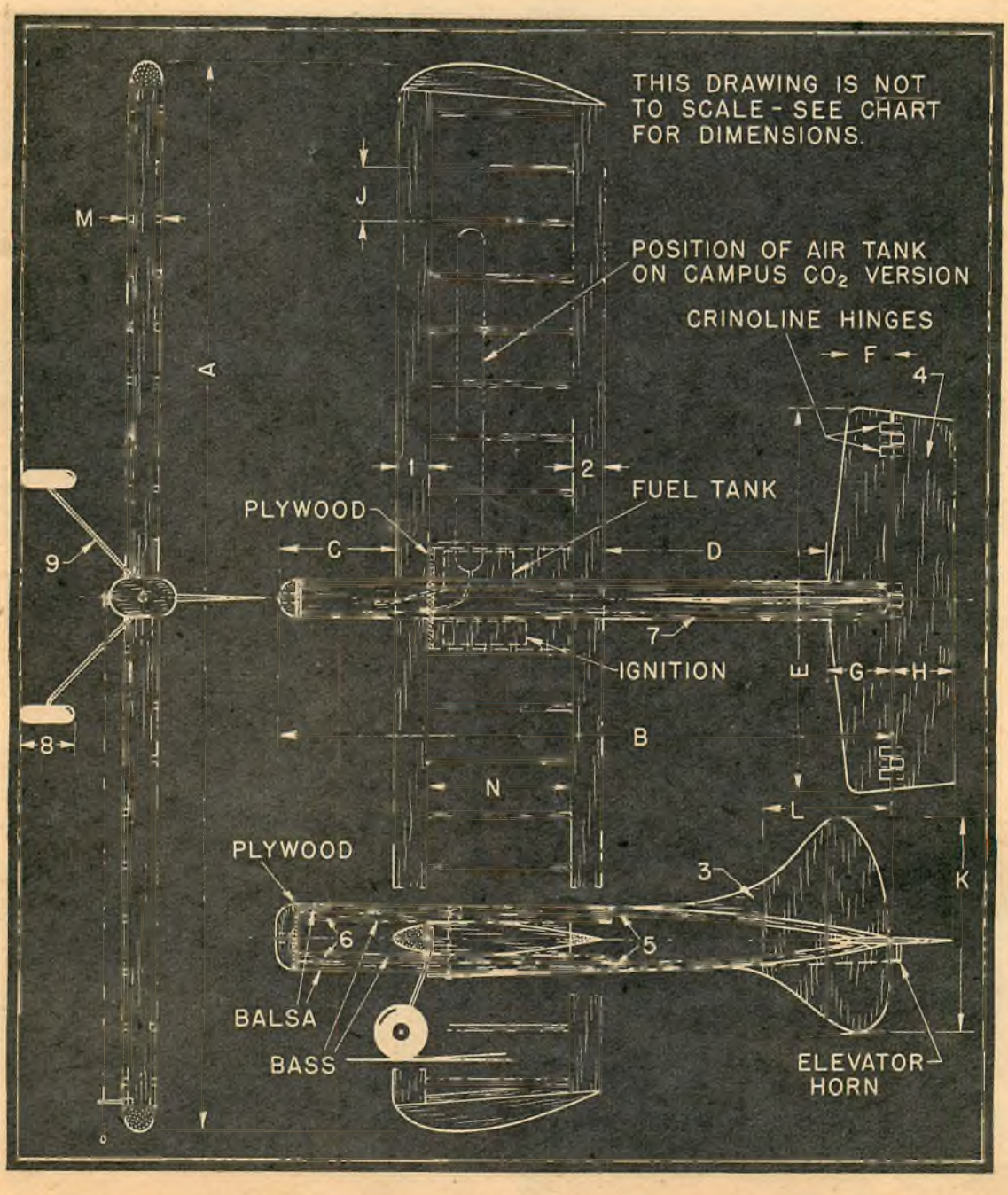


MR. EHLING'S "EASY" STUNT MODEL

	E-1 A-100	E-2 0-.09	E-3 .09-.199	E-4 .199-.299	E-5 .299-.36	E-6 .36-.49	E-7 .49-.65
1	15/32"SQ.	11/16"SQ.	13/16"SQ.	15/16"SQ.	1"SQ.	1-3/16"SQ.	1-1/4"SQ.
2	7/32"X3/8"	1/4"X1/2"	5/8"X1/4"	5/8"X3/4"	3/8"X1"	1/2"X1"	5/8"X1"
3&4	1/16"	3/32"	1/8"	3/16"	3/16"	1/4"	1/4"
5&6	3/32"X1/4"	1/8"X5/16"	3/16"X5/16"	1/4"X5/8"	5/16"X7/8"	3/8"X3/4"	3/8"X3/4"
7	1/32"	1/16"	3/32"	1/8"	3/16"	1/4"	1/4"
8	5/8"	3/4"	1"	1-1/2"	2"	2-1/4"	2-1/2"
9	.040"	1/16"	3/32"	3/32"	1/8"	1/8"	1/8"
A	12-1/2"	20"	26"	32"	38"	45"	50"
B	7-1/4"	13"	16-1/2"	21"	24"	29"	32"
C	1-1/2"	2-3/8"	3-1/8"	3-7/8"	4-1/2"	5-3/8"	6"
D	2-3/4"	4-5/8"	5-7/8"	7-3/8"	8-3/4"	10"	11"
E	4-1/2"	7-1/4"	9-1/2"	11-1/2"	13-1/2"	16-1/4"	18"
F	1/2"	7/8"	1"	1-3/8"	1-1/2"	1-7/8"	2"
G-H	3/4"	1-1/8"	1-1/2"	1-7/8"	2-1/4"	2-3/4"	3"
J	1-1/4"	1-1/2"	1-3/4"	2"	2-1/4"	2-1/2"	2-3/4"
K	2-1/2"	3-1/2"	4-1/2"	5-1/2"	6-1/2"	7-1/2"	7-1/2"
L	1-3/4"	2-3/8"	3-1/2"	4-3/8"	5-1/8"	6"	6"
M	1/2"	3/4"	15/16"	1"	1-1/8"	1-3/8"	1-1/2"
N	1-3/4"	2-7/8"	3-5/8"	4-1/2"	5-5/16"	7"	8"
TREAD	3"	6"	8"	9"	10"	11"	12"



● Large size (E-7) Easy above has added wheel which is helpful to new stunt flyers. Can be removed when operator becomes proficient. Wood sizes in table above are approximate—can be varied slightly. Before planking center section of wing, don't forget to bring out fuel line from wing tank. This stunt model can be basis for your own original design. Plans shown below are half-size for Campus motor.



Radart

By FRANCIS McELWEE

● Radio-controlled Radart shown above with first antenna set-up used by designer McElwee. Range was limited so radiator was raised as seen in photo at left. Fran holds controls.

A noted stunt flyer turns to radio-control with remarkable results which you can duplicate. Here is his story and model

HERE is a model designed for radio flying, which is not merely a converted free-flight. It employs structural features proven through the years in the free-flight field. Simplicity and ease of adjustment are paramount. Much thought went into the design, and if it's to be your first radio-controlled ship, it is suggested that the plans be followed very closely.

In the past six months, in the neighborhood of 200 flights have been put in. The ship has been well proved, both for its strength and consistency in flight.

General specifications are: wing span—60″; area—4 sq. ft.; length—42″; weight—4½ lbs.; power—Drone diesel; prop—10″ dia., 6″ pitch.

A high wing loading (18 oz. per sq. ft.) plus a Clark "Y" wing section makes the model fairly fast so it can be flown in stiff winds. This has been proven many times when the author flew this model out of small ball-fields in windy weather. This is a great help in the operator's judging for close landings as the glide is fast and steady and the descent is at a good, even, steady rate.

FULL SIZE PLANS

Working drawings of the Radart will be available from Air Trails Full Size Plan Service in about 30 days. See plan announcement in next issue for complete details.

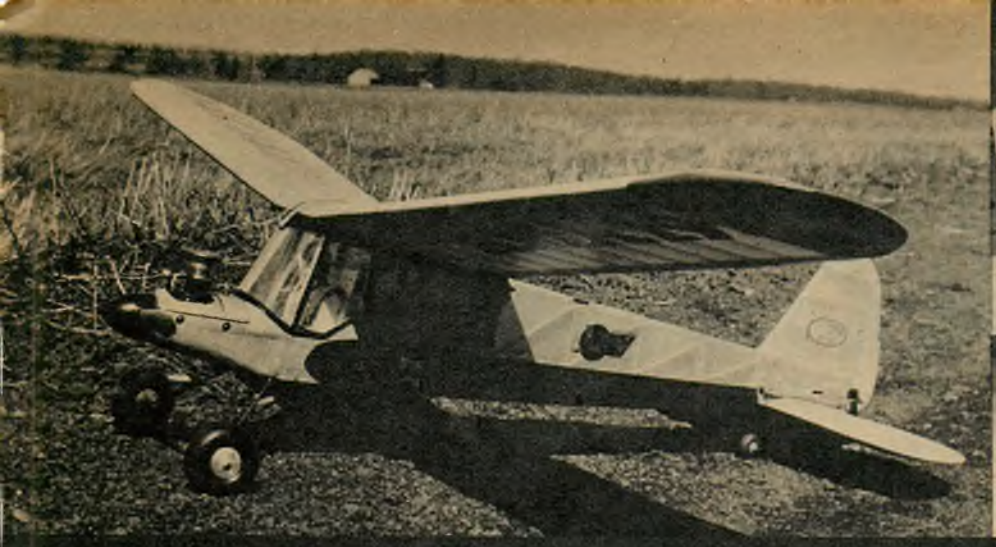
The fuselage, while a box, has a slightly different construction than usual and efforts were made to retain real plane looks. The radio equipment has to be accessible and the fuselage has to be able to take the beating that it is subject to through continuous flying under varying conditions.

It is built around a crutch, which also separates the receiver from the batteries, for crash protection, and has so called skyscraper mounts for ease of power adjustments. The rudder is permanently attached so the ship is always in trim. No electrical or mechanical connections are taken apart. Wing and elevator are adjustable and keyed. Down thrust is built in. A long rubber motor for the escapement was deemed necessary and one winding is usually sufficient for the day's flying. To rewind, it takes but a minute to take the elevator off (four rubber bands) and wind the motor through the opening below the rudder.

The wing and elevator are conventional, though constructed extra strong for violent maneuvers and to resist warping.

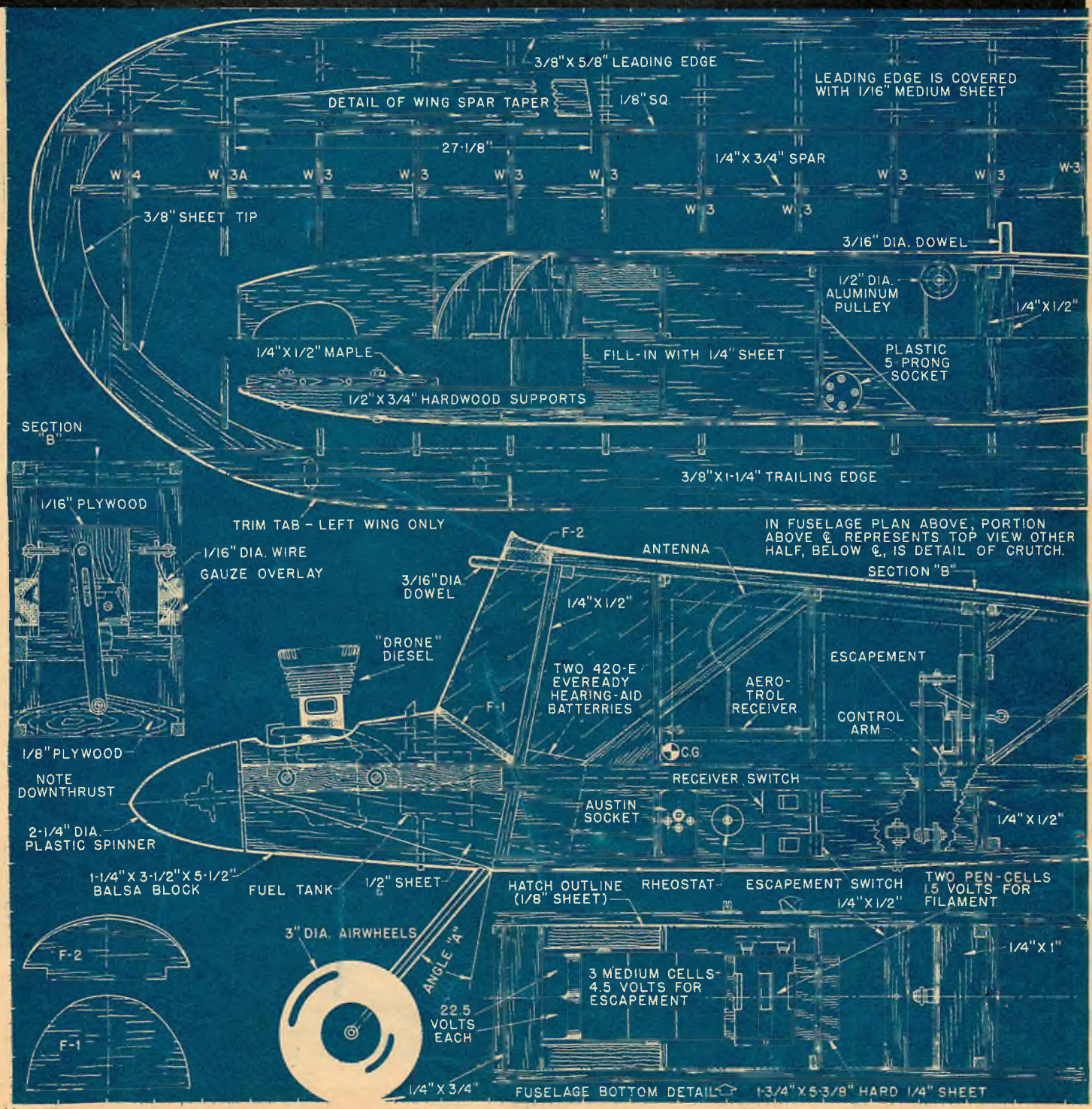
The radio is a stock Aero-Trol unit and no trouble has been experienced to date. Anyone who can wire up an ignition engine can follow the Aero instructions without difficulty.

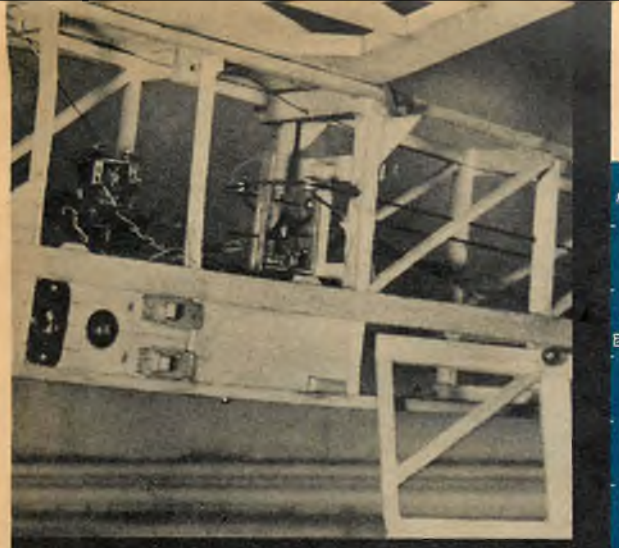
The power used is the older version Drone diesel. This engine has power to spare and had to be slowed down with the free-flight choke and a small, inefficient propeller to give the (*Continued on page* 83)



● Radart is controlled by Aero-Spark "Aero-Trol" unit and powered by Drone diesel engine fitted with Drone free-flight device. Ship did well at '48 Nats.

● McElwee's power department. Single strut gear changed to double as on plan.





● Radio setup in aft section of cabin. Rudder is actuated by pulley arrangement.

1/8" X 3/8"
1/16" SHEET
3/16" X 1/2" SPAR
S-1 S-1 S-2 S-2 S-2 S-3
1/4" SHEET
3/8" SQ. TRAILING EDGE
1/4" SHEET
1"
"SPADE" BOLTS
1/4" PLYWOOD FIREWALL
WASHERS ON AFT SIDE OF FIREWALL
BEND LANDING GEAR TO SHAPE DIRECTLY OVER FULL SIZE PLAN, THEN BEND STRUTS FORWARD TO MATCH ANGLE "A" IN SIDE VIEW.
1/4" HARD BALSA DIHEDRAL BRACE W-5
REAR (MAIN) STRUT
1/8" DIA. MUSIC WIRE
COVER CENTER SECTION WITH 1/16" MEDIUM SHEET
1/4" X 3/4" X 4" CENTER SPAR PIECE
S-3 2 REQ'D.
S-2 6 REQ'D.
APPROXIMATELY 9/16" RUDDER MOVEMENT.
W-3 W-2 W-1 W-1 W-1
1/4" HARD BALSA DIHEDRAL BRACE W-6
ALL 1/8" SHEET
S-1 2 REQ'D.
FISH LINE
3/16" DIA. DOWEL
1/8" X 1/2" CROSS BRACES
1/8" SHEET
1/4" X 1/2" HARD BALSA CRUTCH
2"
1/4" DIA. PULLEY
RUDDER HORN
3/8" SHEET GUSSET
1/4" SHEET
TRIM TAB
1/16" DIA. WIRE REINFORCEMENT
R-4
1/4" SHEET
THIN BRASS OR ALUMINUM
RECEIVER HOOKS 4 REQUIRED
W-3 22 REQ'D.- 1/8" SHEET
W-3A
R-3
1/4" SQ
3/8" SQ
REAR RUBBER HOOK
LOOP FOR WINDER
R-2
R-1
1/16" SHEET
RUBBER LINE - ONE LOOP OF 1/4" FLAT, 15" LONG.
1/8" X 1/4" DIAGONALS
CLOTH HINGES
1/4" SQ. LONGERONS
3/16" DIA DOWEL
1/8" PLYWOOD
1/4" X 1/2" CRUTCH
1/8" X 1/2" UPRIGHTS
1/16" X 1/2"
SECTION "C"
1/16" DIA. MUSIC WIRE
3/16" DIA. DOWEL
1/16" DIA. MUSIC WIRE REAR HOOK
1/8" X 3/8"
1-3/8" DIA. SPONGE RUBBER TAILWHEEL
RADIO RUDDER
COVER WITH GAUZE & CEMENT WELL
W-2 2 REQ'D.- 1/8" SHEET
BIND TAILWHEEL FORK ON.
W-4 2 REQ'D.-1/8" SH
R-4
R-3
W-1 3 REQ'D. - 3/16" SHEET
1/8" PLYWOOD
R-2
W-5 1 REQ'D. 1/4" HARD SHEET
ALL RUDDER RIBS CUT FROM 1/8" SHEET. ONLY ONE OF EACH SIZE REQUIRED.
R-1
W-6 1 REQ'D. 1/4" HARD SHEET
DRAWN BY PAUL PLECAN

Solid Stuff:

AIRSPEED AMBASSADOR

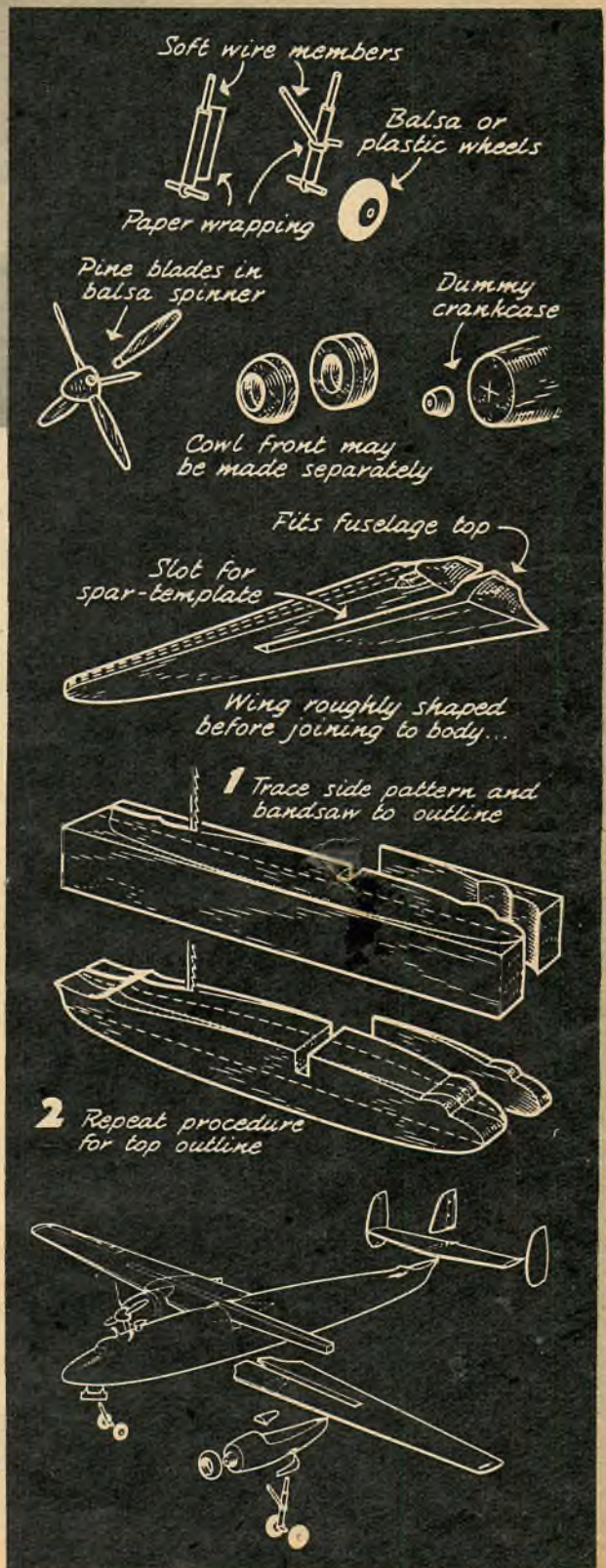
By H. A. THOMAS

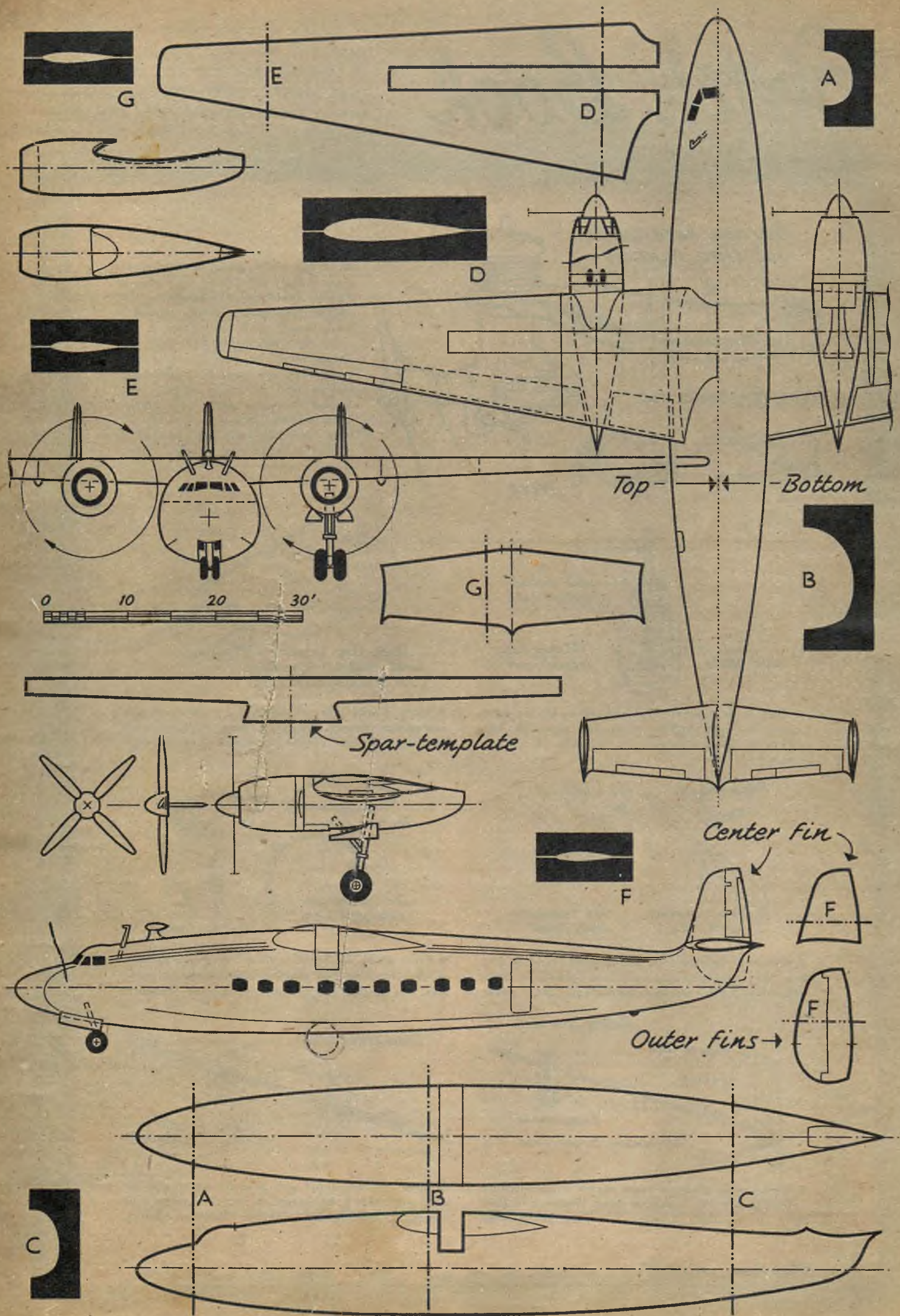
Britain's bid in the transport field is exemplified by this slick beauty

THIS new medium-range airliner typifies the serious bid England's aircraft industry is making toward getting its share of orders from the world's airlines. Slightly larger and more powerful than the Convairliner, the Ambassador is an exceptionally clean, flush high-wing craft. It does not resort to extremely high wing loading to achieve speed but gains it through aerodynamic refinement. The resulting wide range of high cruising speeds at economical power output would seem to make it a most desirable airliner. It has a pressurized cabin and other comforts for its forty passengers and is designed for efficient loading and low maintenance. A unique feature is the method of lowering the dual-wheel gear by gravity and air resistance. Air-braking propellers (pardon, airscrews) are employed.

Two 2,610-hp Bristol Centaurus engines propel the Ambassador though the design will accommodate 3,000-hp engines. A high cruising speed is attained at less than half the available power.

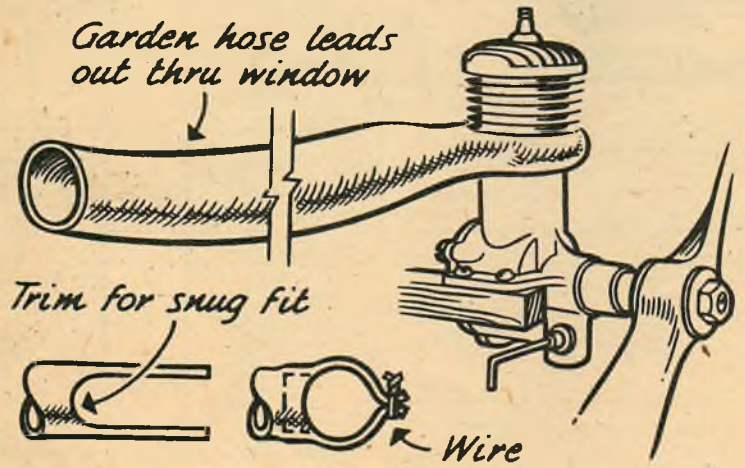
The job of shaping the entire solid replica of the Ambassador will be made easier if the balsa stock is carefully selected. Soft, grainless, though not pulpy wood is best for all parts. Cut the body block to over-all dimensions then transfer the outlines of the side view to it and saw it out. Repeat the procedure for top outlines. With a sharp pen knife, shape the fuselage to approximate contours and check the templates during the sanding. The spar-template is rather long to serve as a better guide (*Continued on page* 80)



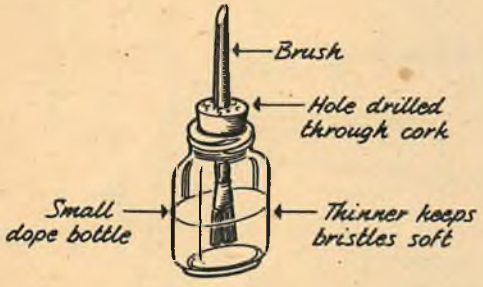

G
E
D
A
D
E
Top
Bottom
B
G
0
10
20
30'
Spar-template
Center fin
F
F
F
Outer fins
C
A
B
C

Sketch Book

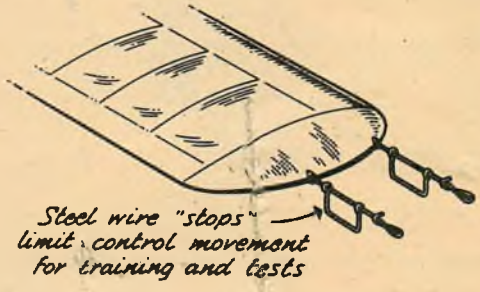
HAVE YOU DEVELOPED SOMETHING NEW IN CONSTRUCTION, CONTROL, OR FLYING THAT MIGHT INTEREST OTHER MODELERS? SEND A ROUGH SKETCH—WE'LL REDRAW IT AND PAY $2 FOR EACH ONE ACCEPTED



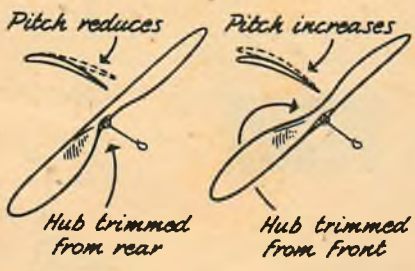
● Modelers who persist in running engines indoors can benefit from idea of Bernie Zapotowski, Wilkes-Barre, Pa., who attaches garden hose to exhaust to send fumes, smoke and much of the noise right out the window. With new "hopped-up" glow fuels in wide use, experimenters are cautioned against operating their motors in closed rooms. Serious illness can result if the warning is not heeded. Since engines usually perform much differently outdoors than in, it's better to do most testing outdoors.



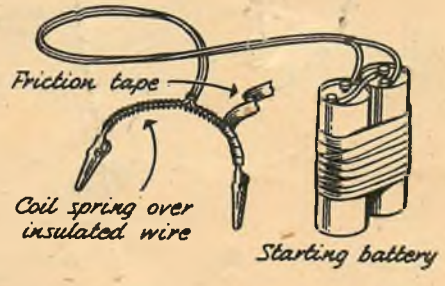
● Keep model brushes clean and soft by storing permanently in small bottles of thinner, says Jim Triplett, Ames, Iowa. Cork remains on handle when in use.



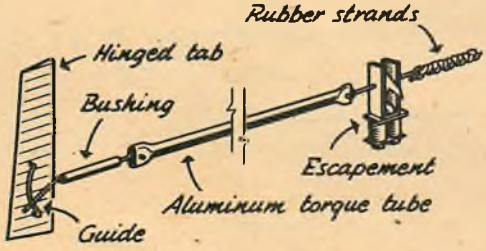
● Many control jobs are smashed by beginners who over-control. Kenneth Nygren, Bayside, N. Y., suggests wire clips to limit control movement. Remove later.



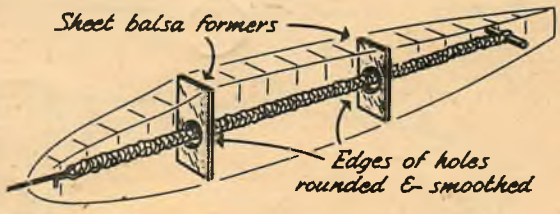
● Comes a reminder from Harry Jarvis, Fond du Lac, Wis., that manner of shaping hub on light rubber props determines if pitch increases or decreases under power.



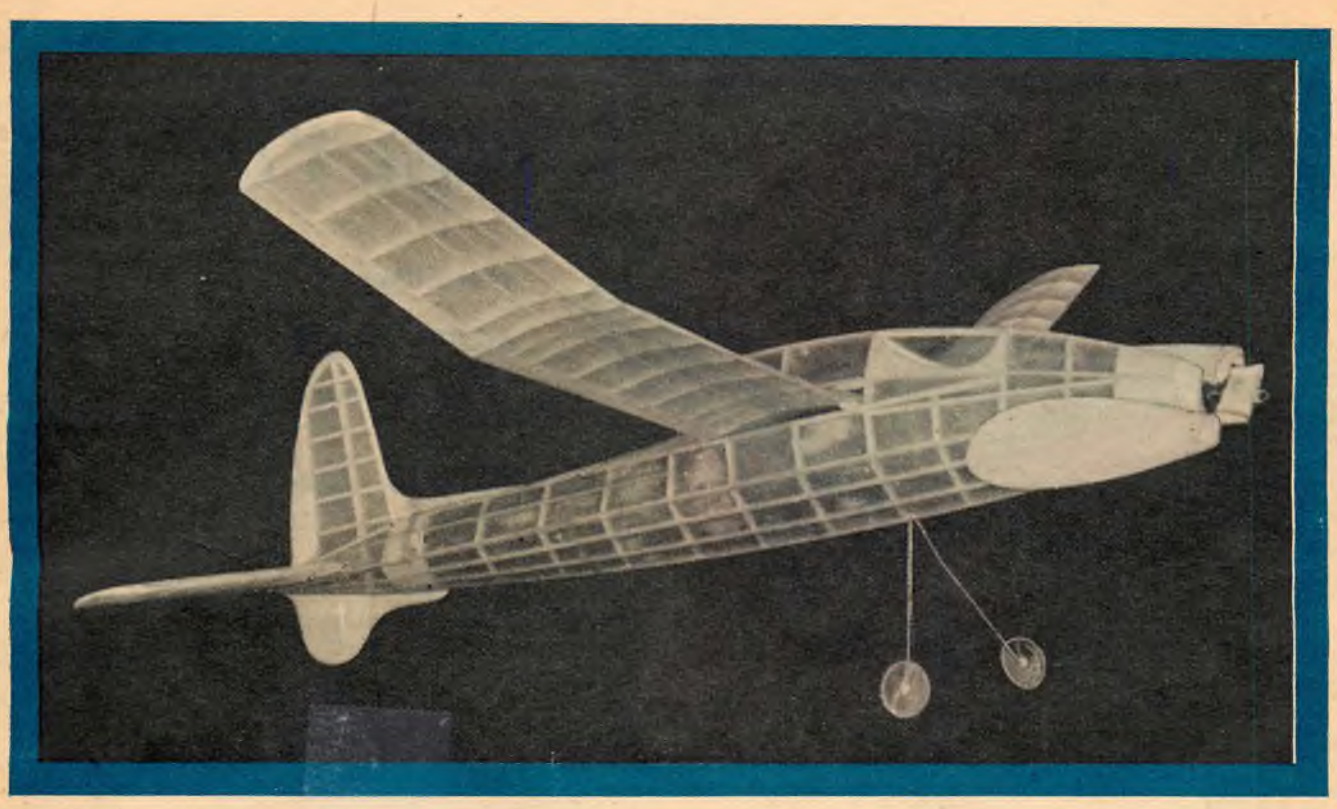
● Eddie Westwood, Tacoma, Wash., has solved problem of clips touching and shorting out booster batteries. Steel coil spring, bound across leads, does the trick.



● Workmanlike system of radio control is submitted by J. Diez Luckie, W. Somerville, Mass. Positions of bent shaft, in rotation, determine rudder tab settings.



● Larger rubber models with powerful motors can be fitted with sheet balsa formers to reduce vibration and lashing in flight. By Bill Leinweber, Calgary, Alberta.



Catamount

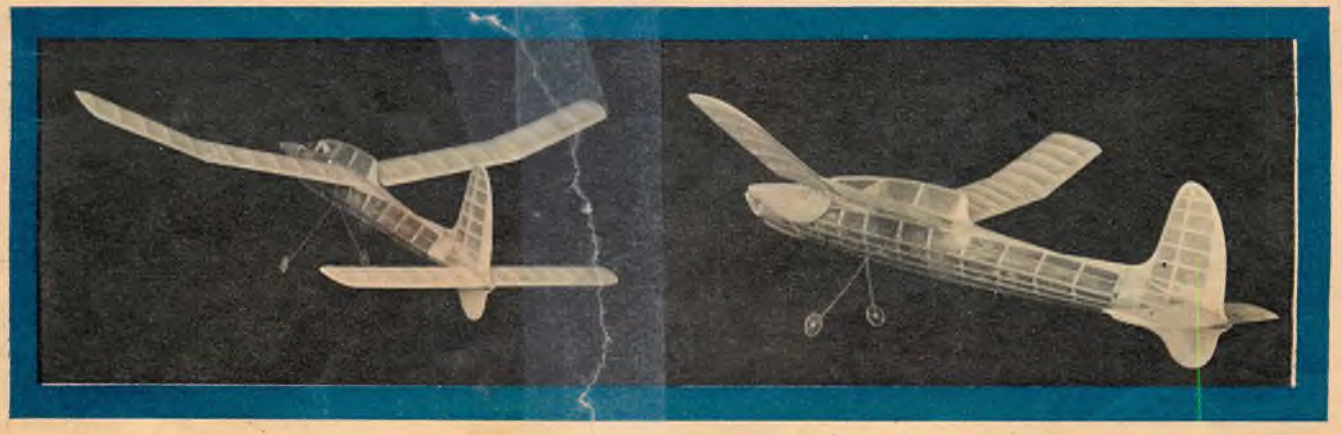
By DICK EVERETT

Here's a new and novel Wakefield model by one of America's best-known contest flyers

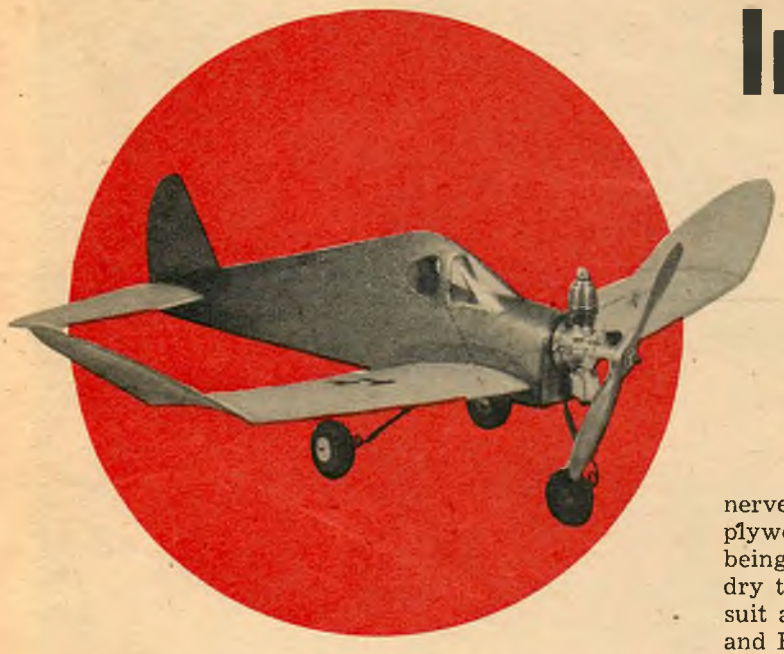
WHEN it was announced that a Wakefield event was to be held last year, renewed interest throughout the world was evidenced. Inasmuch as the rules for this event are entirely different from our American regulations, it is necessary to design a model expressly for this meet. Wakefield models must have 200 square inches of wing area, plus or minus five percent, which gives a leeway of ten square inches on either side. In other words the model must have from 190 to 210 square inches of wing area as viewed from above.

Models are checked so closely in the finals that one year Dick Korda had to cut a 1/16" strip from the chord of his winning model's horizontal tail before he was allowed to fly it. Roy Wriston had to cement some pennies to his '36 entry to bring it up to weight. Gordon Light had to remove the covering from the center section of his '35 winner to meet the '36 rules. When the rules were printed, the "plus 5 percent" was deleted through an error, and inasmuch as the rules were distributed, they had to be followed. To win the Wakefield event, (*Continued on page* 75)

● See the full-size working drawings on center plan section (pages 54-55-56-57-58-59) of this issue for the Catamount Wakefield.



Infant Pursuit



Heralding the age of smaller engines this K & B powered ship is forerunner of brand new class

By DON R. JAMES

WITH the release of the K & B Infant Torpedo, thousands of model builders now have what they've been waiting for since the appearance of the first gas engine. With a displacement of .0194 cubic inches and a weight of one ounce, this little power plant should win a place in most every modeler's heart. Despite its small size, the Infant Torpedo is one of the easiest starting engines I have had the pleasure of owning.

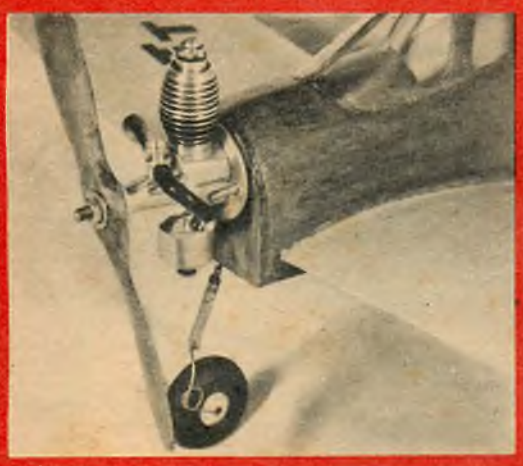
The basic Infant Pursuit has been flown with rubber and CO_2 power, showing excellent performance with both. The CO_2 version was lost o.o.s. a year ago. This ship is ideal for the Infant Torpedo as it is just the right size and is exceptionally stable. Ready to fly, the ship weighs 3 ounces, which makes it resistant to light thermals (if flying out of sight worries you, color dope can be added to increase weight further).

Now that you're all fired up and rarin' to go, better take a deep whiff from a dope bottle to steady your nerves. The firewall A is cut out first, using 1/16" plywood. Former B is next, 3/16" hard balsa sheet being used. Cement both together and set aside to dry thoroughly. If you are building the Infant Pursuit as a CO_2 job, F and G are cut out instead of A and B. For a rubber job, X and Y are required.

The two fuselage sides are next on the program. Medium 1/16" sheet balsa is used, and don't forget to leave the "excess" portion intact on the top of the nose section. Don't use quarter-grained wood for these sides, as it resists bending and may split (you can detect quarter-grained balsa by its "speckled" or "flaky" appearance).

Cut out the wing and stabilizer slots as indicated by the cross-hatched areas. Now apply an even coat of dope to the *left* side of one and the *right* side of the other and lay aside to dry. While the sides are drying, cut the fuselage bottom from 3/32" medium stock and the keel from medium-hard 1/8" sheet. Cement together, making certain that the keel is centered on the bottom piece.

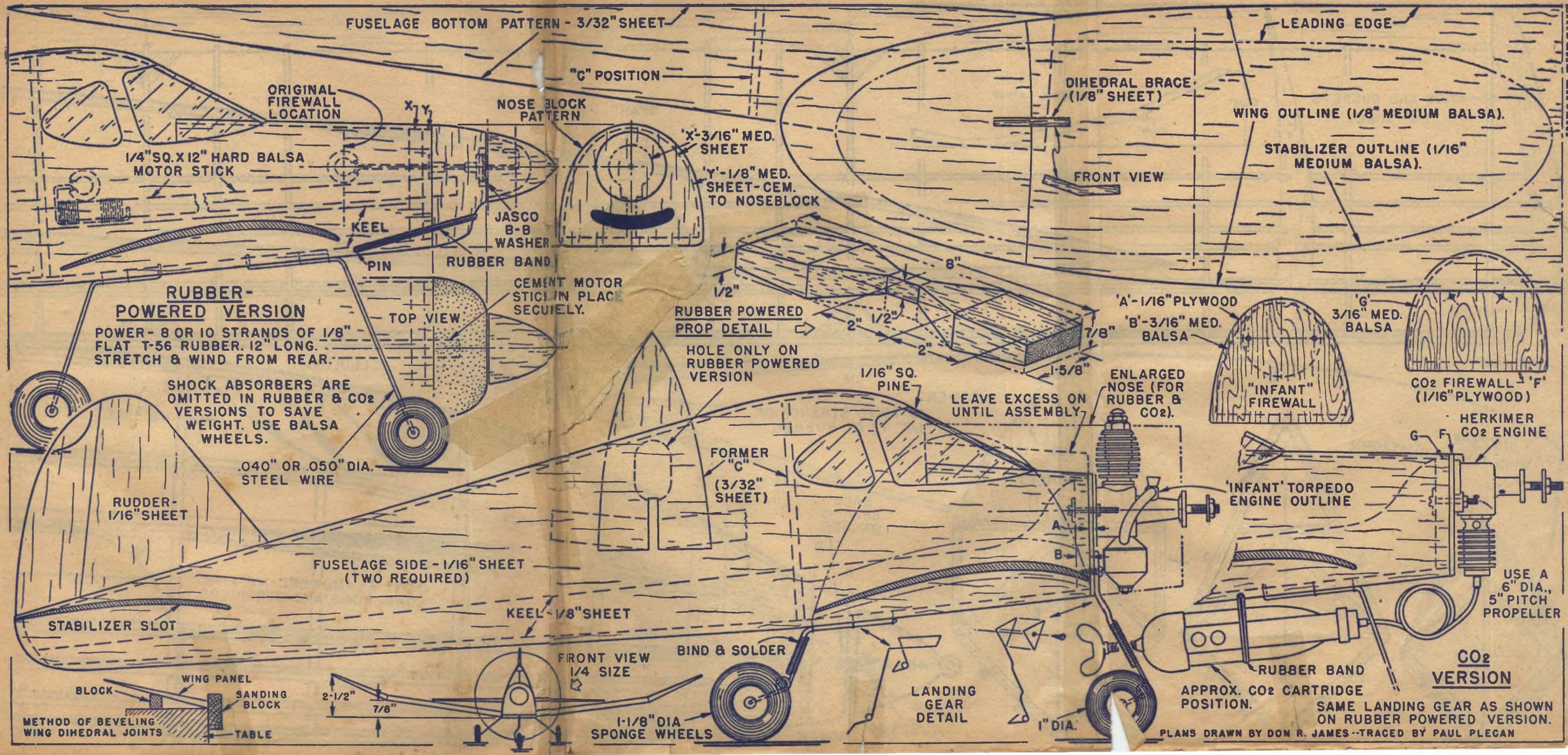
If you haven't done it already, drill the two holes in the firewall (this doesn't apply to the rubber job, of course). The 1/2" or 3/4" long #3-48 machine screws are threaded into these holes from the back. A plywood or sheet metal "washer" is used under the screw head to keep the screw from (*Continued on page* 78)



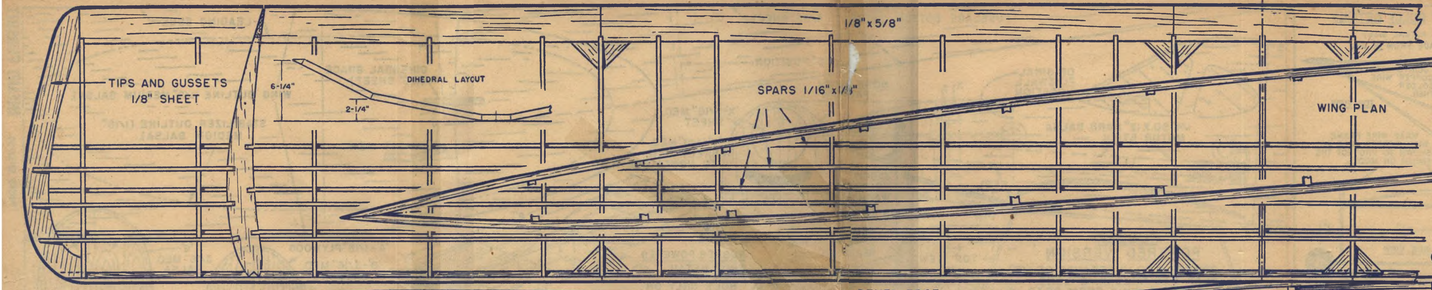
● Compactness of new Infant engine is evident in this closeup of the Pursuit's nose section.

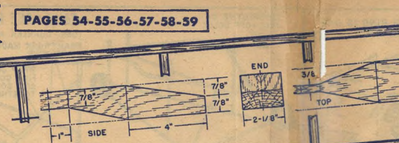
FULL SIZE PLANS . . .

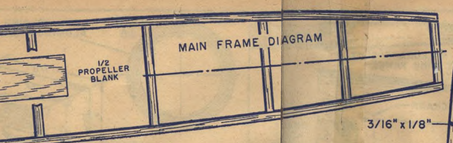
● The Pursuit is also adaptable to powering by Herkimer's CO_2 engine or by T-56 rubber. See plan for details concerning various types of power.

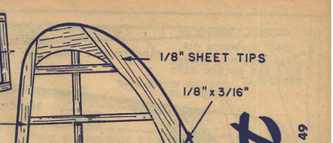

FUSELAGE BOTTOM PATTERN - 3/32" SHEET
"C" POSITION
ORIGINAL FIREWALL LOCATION
X
Y
NOSE BLOCK PATTERN
'X'-3/16" MED. SHEET
'Y'-1/8" MED. SHEET-CEM. TO NOSEBLOCK
1/4" SQ. X 12" HARD BALSA MOTOR STICK
KEEL
JASCO B-8 WASHER
PIN
RUBBER BAND
CEMENT MOTOR STICK IN PLACE SECURELY.
TOP VIEW
RUBBER-POWERED VERSION
POWER - 8 OR 10 STRANDS OF 1/8" FLAT T-56 RUBBER. 12" LONG. STRETCH & WIND FROM REAR.
SHOCK ABSORBERS ARE OMITTED IN RUBBER & CO2 VERSIONS TO SAVE WEIGHT. USE BALSA WHEELS.
.040" OR .050" DIA. STEEL WIRE
RUDDER - 1/16" SHEET
STABILIZER SLOT
FUSELAGE SIDE - 1/16" SHEET (TWO REQUIRED)
KEEL - 1/8" SHEET
BIND & SOLDER
FRONT VIEW 1/4 SIZE
1-1/8" DIA SPONGE WHEELS
WING PANEL
BLOCK
SANDING BLOCK
TABLE
METHOD OF BEVELING WING DIHEDRAL JOINTS
2-1/2"
7/8"
RUBBER POWERED PROP DETAIL
8"
1/2"
2"
1/2"
2"
7/8"
1-5/8"
HOLE ONLY ON RUBBER POWERED VERSION
1/16" SQ. PINE
FORMER "C" (3/32" SHEET)
LEAVE EXCESS ON UNTIL ASSEMBLY
ENLARGED NOSE (FOR RUBBER & CO2).
A
B
LANDING GEAR DETAIL
1" DIA.
DIHEDRAL BRACE (1/8" SHEET)
FRONT VIEW
LEADING EDGE
WING OUTLINE (1/8" MEDIUM BALSA).
STABILIZER OUTLINE (1/16" MEDIUM BALSA).
'A'-1/16" PLYWOOD
'B'-3/16" MED. BALSA
"INFANT" FIREWALL
'G' 3/16" MED. BALSA
CO2 FIREWALL 'F' (1/16" PLYWOOD)
HERKIMER CO2 ENGINE
G
F
'INFANT' TORPEDO ENGINE OUTLINE
USE A 6" DIA., 5" PITCH PROPELLER
RUBBER BAND
APPROX. CO2 CARTRIDGE POSITION.
CO2 VERSION
SAME LANDING GEAR AS SHOWN ON RUBBER POWERED VERSION.
PLANS DRAWN BY DON R. JAMES--TRACED BY PAUL PLECAN
INFANT PURSUIT
PAGES 51-52-53

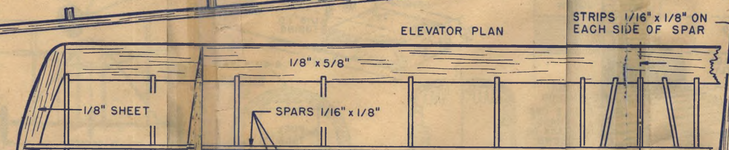
PAGES 54-55-56-57-58-59

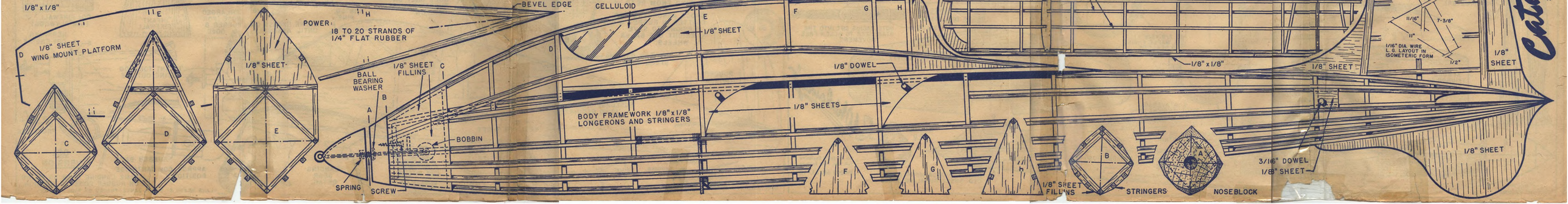






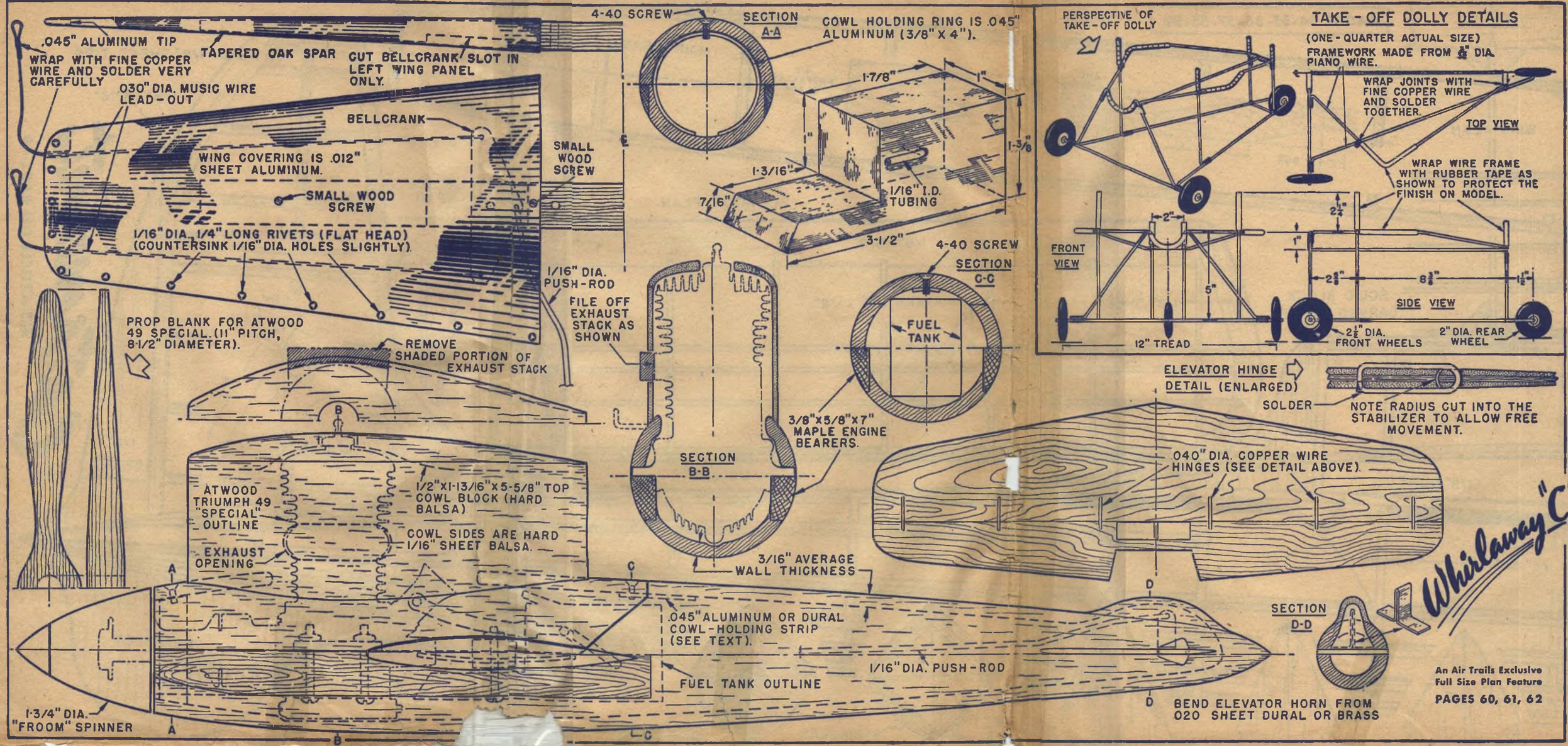


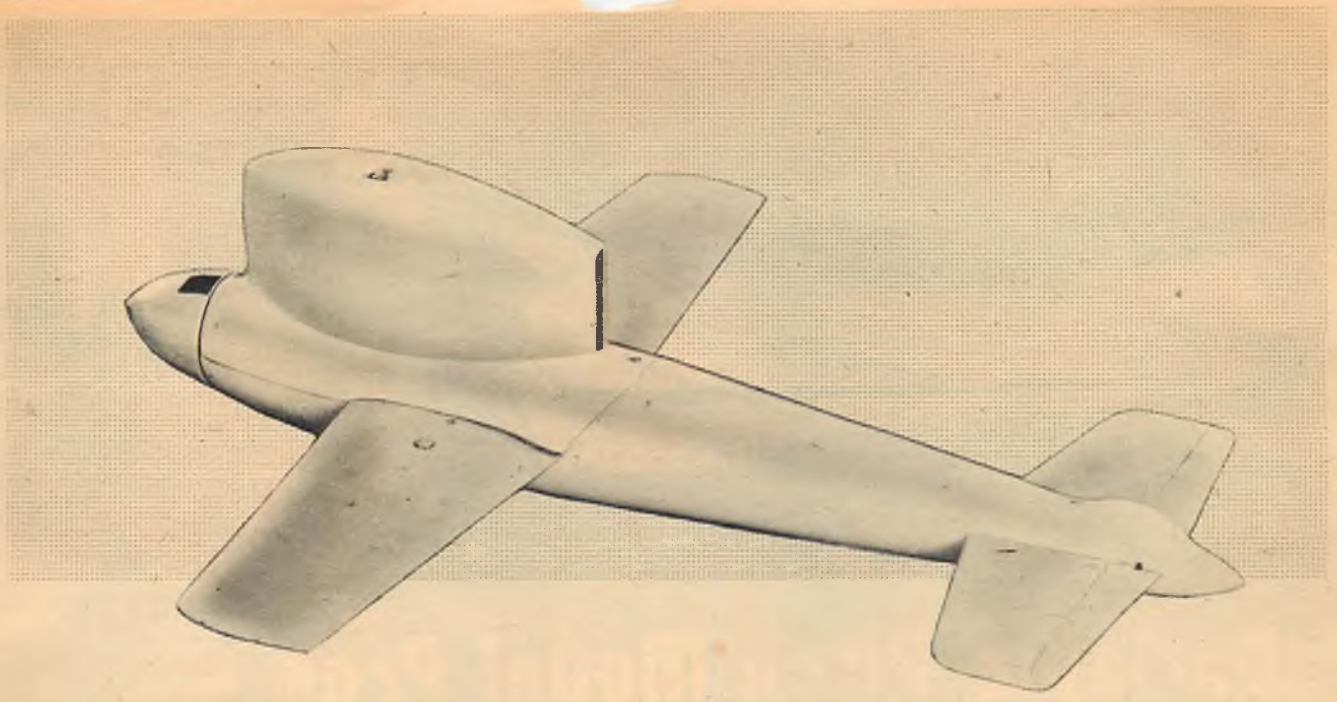




Catamount

SEE ARTICLE ON PAGE 49


.045" ALUMINUM TIP
WRAP WITH FINE COPPER WIRE AND SOLDER VERY CAREFULLY
TAPERED OAK SPAR
CUT BELLCRANK SLOT IN LEFT WING PANEL ONLY.
.030" DIA. MUSIC WIRE LEAD-OUT
BELLCRANK
WING COVERING IS .012" SHEET ALUMINUM.
SMALL WOOD SCREW
SMALL WOOD SCREW
1/16" DIA. 1/4" LONG RIVETS (FLAT HEAD) (COUNTERSINK 1/16" DIA. HOLES SLIGHTLY).
1/16" DIA. PUSH-ROD
FILE OFF EXHAUST STACK AS SHOWN
PROP BLANK FOR ATWOOD 49 SPECIAL. (11" PITCH, 8-1/2" DIAMETER).
REMOVE SHADED PORTION OF EXHAUST STACK
ATWOOD TRIUMPH 49 "SPECIAL" OUTLINE
EXHAUST OPENING
1/2"X1-13/16"X5-5/8" TOP COWL BLOCK (HARD BALSA)
COWL SIDES ARE HARD 1/16" SHEET BALSA.
1-3/4" DIA. "FROOM" SPINNER
4-40 SCREW
SECTION A-A
COWL HOLDING RING IS .045" ALUMINUM (3/8" X 4").
1-7/8"
1"
1-3/8"
1-3/16"
7/16"
1/16" I.D. TUBING
3-1/2"
4-40 SCREW
SECTION C-C
FUEL TANK
3/8"X5/8"X7" MAPLE ENGINE BEARERS.
SECTION B-B
3/16" AVERAGE WALL THICKNESS
.045" ALUMINUM OR DURAL COWL-HOLDING STRIP (SEE TEXT).
FUEL TANK OUTLINE
1/16" DIA. PUSH-ROD
A
B
C
D
PERSPECTIVE OF TAKE-OFF DOLLY
TAKE-OFF DOLLY DETAILS
(ONE-QUARTER ACTUAL SIZE)
FRAMEWORK MADE FROM 1/16" DIA. PIANO WIRE.
WRAP JOINTS WITH FINE COPPER WIRE AND SOLDER TOGETHER.
TOP VIEW
WRAP WIRE FRAME WITH RUBBER TAPE AS SHOWN TO PROTECT THE FINISH ON MODEL.
FRONT VIEW
2"
2-1/4"
1"
5"
2-5/8"
8-3/4"
1-1/2"
SIDE VIEW
12" TREAD
2-1/2" DIA. FRONT WHEELS
2" DIA. REAR WHEEL
ELEVATOR HINGE DETAIL (ENLARGED)
SOLDER
NOTE RADIUS CUT INTO THE STABILIZER TO ALLOW FREE MOVEMENT.
.040" DIA. COPPER WIRE HINGES (SEE DETAIL ABOVE).
SECTION D-D
BEND ELEVATOR HORN FROM .020 SHEET DURAL OR BRASS
Whirlaway "C"
An Air Trails Exclusive Full Size Plan Feature
PAGES 60, 61, 62



WHIRLAWAY "C"

By DON W. NEWBERGER

America's speed champ presents his National winner with new metal wing

I WOULD like to say that I developed this ship after many years of experimenting, but I can't. Bill Atwood had just finished a sample model of his Triumph 49 Special and gave me the opportunity to use it. In the short space of a month, just before the '48 Nationals, I built and flew the model which took first at Olathe, Kansas, with a speed of 136.21 mph.

The construction of this plane is somewhat different in that it includes a metal wing. But it is not difficult.

The fuselage is circular in cross section and is made by turning it to shape on a wood lathe. If you have no lathe, any woodworking shop will do it for you for about two or three dollars. It is made of white sugar pine, chosen because it is lightweight and strong. After it has been turned it can be hollowed out to the required thickness of 3/16". Slots for the motor mounts are then cut into the bottom half of the fuselage. The mounts are made of maple.

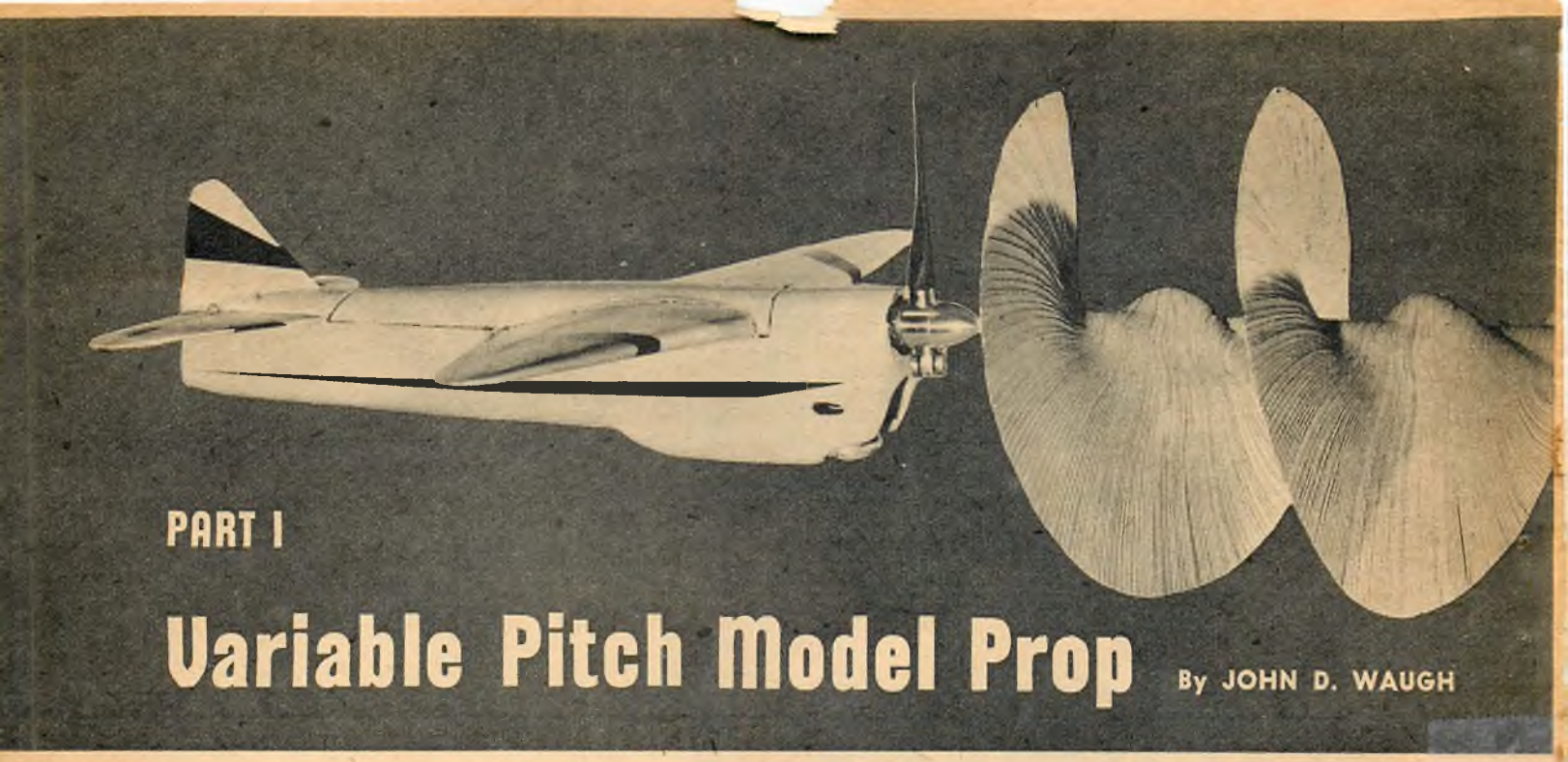
Before the mounts are installed in the plane, line up motor and drill four holes in mounts. Make a tin plate, put bolts through and solder the heads to the plate. These can now be put in the mounts and the mounts glued into the lower half of the ship. After glue has dried, the top half is fastened on to the bottom half with Scotch Tape, and the motor mounts rounded off to conform with the outside contour of the fuselage.

A hole is cut into the top half of the fuselage so that the engine may protrude. The cowling is built while the engine is in the ship, and is made of three parts, the sides being of 1/16" sheet balsa. The top of the cowling is a solid block of balsa cut to the required shape as shown on the plans. The top of the cowling is fastened to the engine with Scotch Tape, then the sides of 1/16" sheet balsa are glued on. The air inlet and outlet slots are already of predetermined size; they run from the top of the cowling to the fuselage.

After the cowling has dried, the fuselage top may be cut off as shown on the plans. The cowl ring should be glued to the bottom of (*Continued on page 109*)

● Fuselage is white sugar pine; wing formed from .012" sheet aluminum; power by Atwood; winning speed was 136.21 mph.

☆ AIR TRAILS PARADE OF WINNERS—Another National Meet Prize Plane



PART I

Variable Pitch Model Prop

By JOHN D. WAUGH

Is the v.p. prop the next step in model speed flying? Here's the authentic story

As tethered model aircraft have advanced into the speed range occupied by modern light personal aircraft, capable flyers have recognized a need for the increased propulsive efficiency obtainable only with a variable-pitch propeller similar in function to the type common on large aircraft. Although the performance requirements of models differ somewhat from those applying to full scale airplanes, the same propeller action is required. The latter require low propeller pitch for full development of horsepower for a safe take-off and good climb, and then high pitch for a faster cruise and economical top speed. High speed models often have a critical take-off, and thus need low pitch. They are not required to climb or cruise in the manner of their full scale counterparts, but do need an increase in pitch to obtain the higher speeds of which they are aerodynamically capable.

In the absence of a practical variable-pitch propeller design, model propeller selection has generally followed these lines. A flyer first uses the propeller recommended by the engine maker to develop the full power of the engine on the ground; it does develop power, but the airplane doesn't go anywhere. The flyer then selects higher-pitch propellers which hold the speed of the engine down and reduce power output. To pick up speed, he crops the diameter, trims the blade area, and files the blade thickness down. At least the propeller now possesses the high pitch which is basically necessary before high speed can be obtained, even if excessive modification does reduce the aerodynamic efficiency of the propeller. Trimming the blade area is not such a bad practice but cropping the diameter excessively deludes the modeler, who gets higher speed sometimes, not due to better efficiency, but due to the reduced area and consequently higher engine speed.

After obtaining a fair propeller by this trial-and-error method, the speed flyer must still be a wizard or have a good crystal ball to set his engine correctly because the average engine speed increase, exhaustively checked in a wind-tunnel, is 2,500 to 3,500 rpm, from static to a full speed of 110 mph. This engine speed increase is advantageous if the flyer is able to set his throttle and timing so the engine "comes in" rather than misfires due to its load change requiring a fuel supply and timing change. By having a clean airplane, considerable experience with an agreeable engine, and much trial and error with propellers, only skillful juggling of all the variables produces winning speeds.

The situation isn't desirable because it generally limits the average of flight speeds of any group of airplanes and prevents the best utilization of the power available in any number of excellent engines. Further, the performance of winning combinations could be increased if a propeller permitted high engine speed without the aerodynamic losses produced by excessive modification and then automatically increased pitch to provide the high-angle path of propeller advance necessary for top speeds.

How the present fixed-pitch propellers limit speed is illustrated in Fig. 1 which compares the design, or geometrical pitch, to the effective pitch, or the actual propeller advance in one revolution. The difference is noted as slip, which is natural since the propeller screws into air, an elastic medium composed of freely moving molecules 800 times less dense than water. Natural though it is, slip or inefficiency must be reduced if top speed is to be increased.

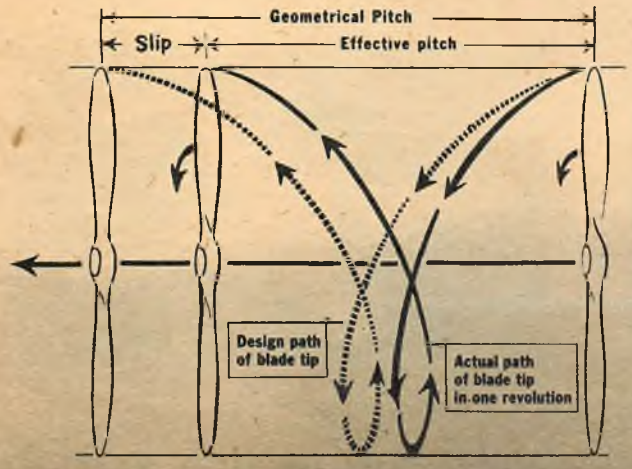


FIG. 1

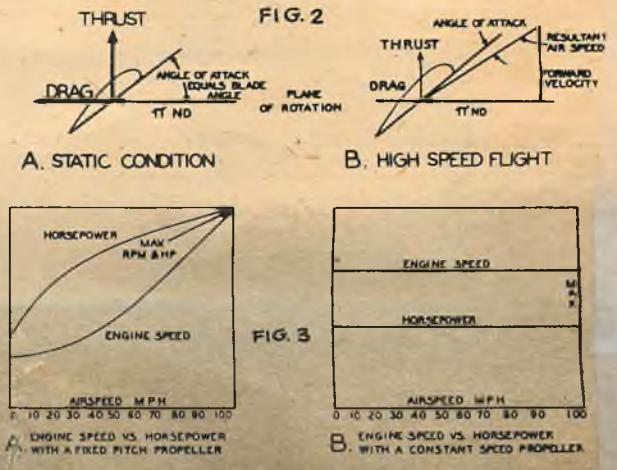


FIG. 2

FIG. 3

The aerodynamic actions which govern propeller efficiency, hence influence slip, are shown in the airfoil drawings A and B in Fig. 2. Here the airfoils represent two operating conditions of a fixed-pitch propeller designed to absorb the rated power and rpm of the engine at the top flight speed of the airplane. These design conditions indicate a high-pitch propeller. Drawing A shows that the static condition produces a high thrust and high drag and the angle of attack is equal to blade angle. The angle of attack is the angle between the blade and the "relative wind," or resultant of the forward velocity of the airplane and rotational velocity of the propeller. With no forward velocity, the angle of attack is so high that engine speed and power are held down due to the high drag, or torque. Propeller torque consists of the total aerodynamic drag, and drag is high with high angle of attack and low with low angle. Thus, just as a wing must have a low angle of attack for the best L/D ratio, a propeller must have a low angle of attack, between 1 and 3 degrees, for the best efficiency.

Without a variable-pitch propeller, which goes to a low pitch for take-off, the airplane will struggle into forward speed without the benefit of full power through rated rpm. As the airplane gains speed, the angle of attack of the propeller decreases due to the inflow velocity increase and the decrease of the angle of attack. In actual practice the familiar pick-up whine of engine speed increasing may be heard. Assuming that fuel metering and timing adjustments permit full power development, the airplane will steadily increase speed, the angle of attack will decrease and the ideal condition at B will be reached as propeller torque equals engine torque and efficiency and speed are highest.

Graph A, in Fig. 3, illustrates the behavior of engine power and speed in the instance just described. Operation at any point between take-off and the design flight condition is inefficient because the propeller does not have the correct pitch or angle of attack for all the various points. It becomes obvious that an excessive spread of engine speed exists between zero and top speed. Further, the graph shows that full power is not developed until high engine speed is reached. Since the maximum condition of power and engine speed are not attained except at top design air-speed, it is apparent that, unless the engine fuel and timing adjustments, made before take-off, are able to meet the changing load, full possible speed with a fixed-pitch propeller is seldom attained.

Graph B in Fig. 3 illustrates the ideal goal where rpm and engine power follow an even output curve from static to top speed through the use of a constant speed, variable-pitch propeller. To satisfy this ideal condition the variable-pitch propeller must go to a low enough pitch setting to permit full development of engine speed, thus full power at the static condition. This will produce the correct low angle of attack and high thrust with low drag at take-off. Propeller torque will remain in close relation to engine torque, holding the engine speed constant from static to top speed as pitch automatically increases. Fuel and timing adjustments to maximum power will not change because the increasing pitch of the propeller will keep the load on the engine virtually constant. Benefits to performance start with jump take-offs, rapid attainment of a higher speed than obtainable with a fixed-pitch propeller, and unfaltering engine speed in (*Continued on page 86*)

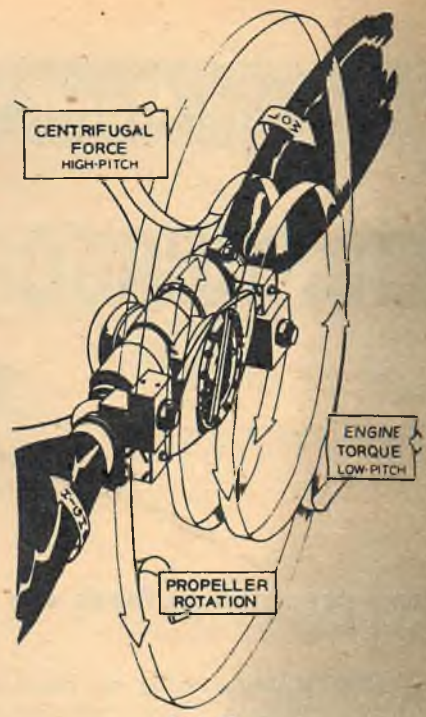


FIG. 7

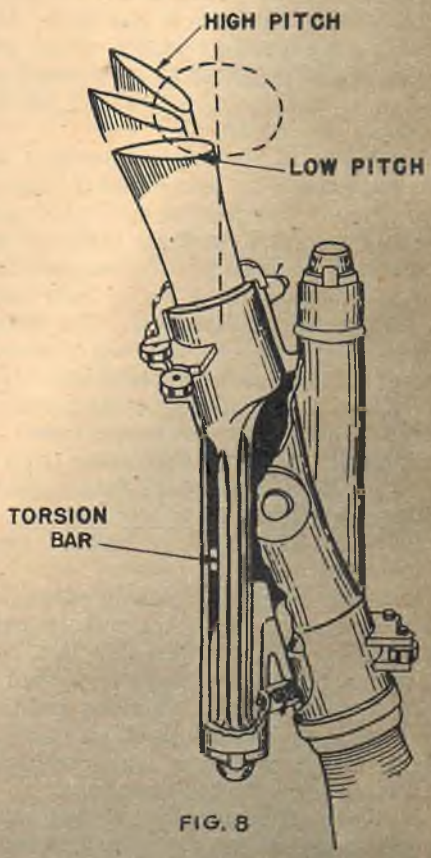


FIG. 8

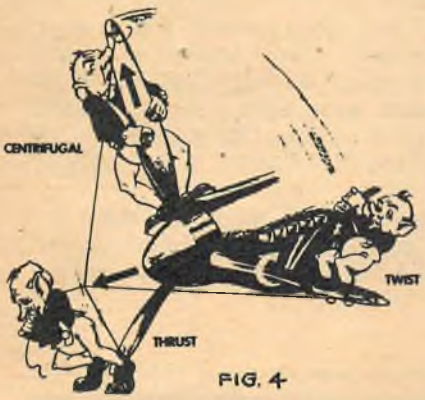


FIG. 4

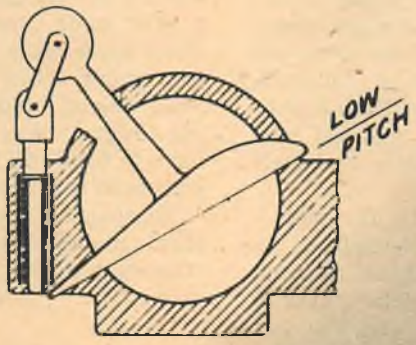


FIG. 6

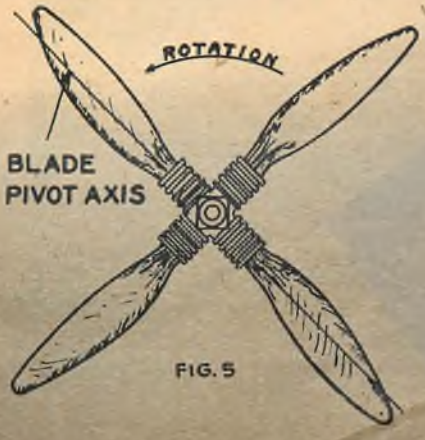


FIG. 5

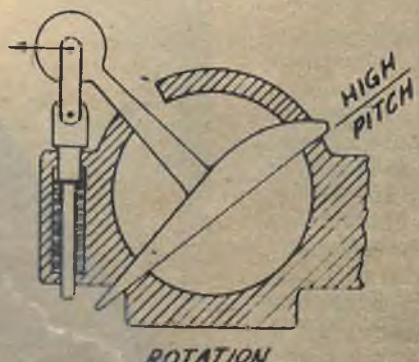


FIG. 6A

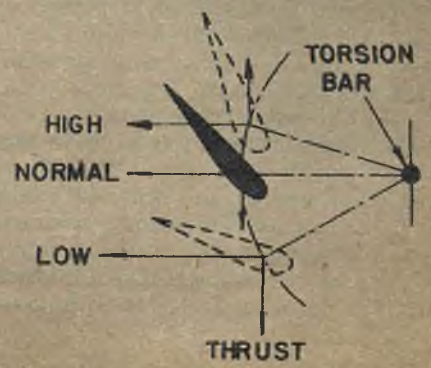
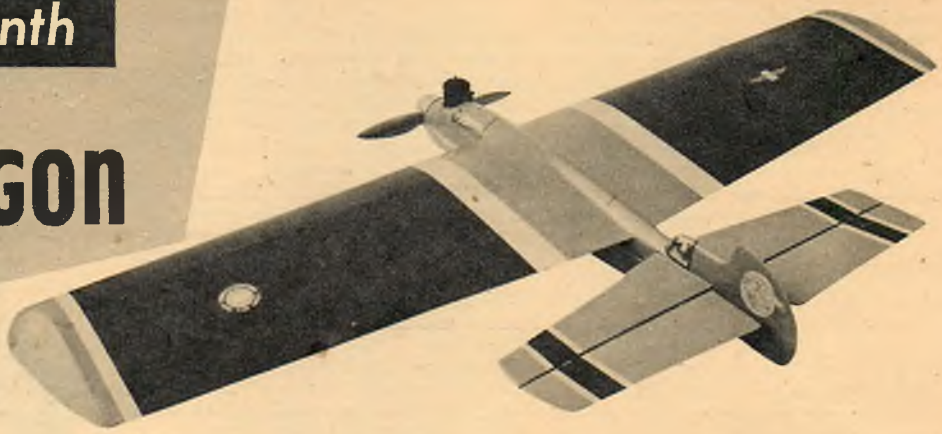


FIG. 8A

Model of the Month

STUNTWAGON



Navy precision methods are reflected in ex-gob deBolt's latest control-line kit model

MODEL manufacturing has come a long way since its early days. Now, manufacturers make surveys, study the competition, carefully gage prices. That is good business in any field. But then there is always an exception which, while proving the rule, nevertheless manages to be a howling success. This brings us to Harold deBolt and his Stuntwagon, our model of the month.

Priced at $7.50, the Stuntwagon is the kind of a kit that should be opened on a large clean table for, like a newly dug post hole, all that comes out will not fit back in again without tamping down. Whereas there are ingenious prefab jobs that have been refined down to a handful of parts, their appeal lies mostly in their ultimate simplicity. The Stuntwagon is different. The number and kinds of wood, prefabricated, sheet, or strip, is overwhelming. It is being whispered about that deBolt is Ecuador's greatest friend (that's where the balsa comes from)! Now don't get us wrong, the Stuntwagon is far from being just a bin of balsa. It is a highly specialized design for a highly specialized field. It is the kind of kit you get into with well designed, large, powerful models that spell modern stunting.

The plan—deBolt's own handiwork, by the way—says the span is 58 inches and the area a respectable 667 square inches! The ship is a compact, streamlined job of short-coupled design. The tapered wing mounts at the shoulder position and the tail surfaces have more area than many wings. A nice touch is the profile of the rudder block which is shaped to form the pilot's canopy.

While the Stuntwagon has about as much prefabrication as the design permits, it is remarkable for the variety and grades of hand-picked wood. The manufacturer claims that nothing but prime Grade A balsa is used and that even this is hand-picked after it arrives from South America. The quality appears to bear him out. There are no wire or metal parts, or glues. DeBolt's policy is to leave these to the dealer, who stocks all such items. This is one manufacturer's opinion, of course, and other kit makers have equally good reasons for not seeing eye to eye with this concept. However, when you get into big models that call for many materials it is a favor to the builder, in Harold's opinion, to let the purchaser buy his own accessories, like bellcranks, push rods, and so on, or to let him use what he has on hand as it is needed.

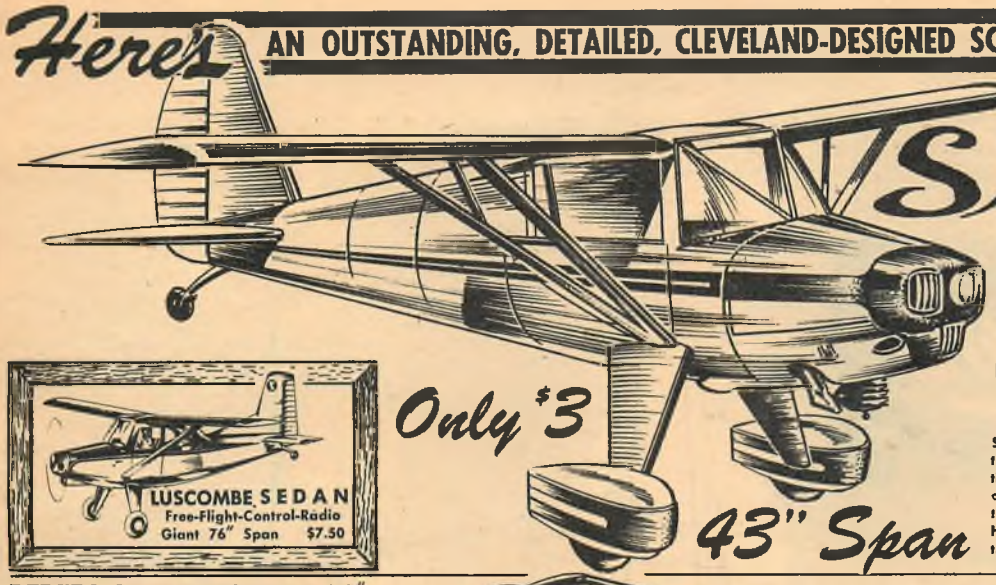
The fuselage bottom is a nicely prefabricated piece about 30 inches long and three inches wide. It is shaped and hollowed. The ¼"-thick side pieces are cut out for the wings. The big fairing block that fits over the wing needs only final cross-sectional shaping. Wing tips are cut out, as are the ribs for the tapered wing. The vertical tail block, including the cockpit, needs but final shaping; it is cut to profile and tapered front to back. The 1" x ½" leading edges are contoured. After that you can count 18 pieces of sheet balsa—four of them four inches wide; 17 assorted strips, and a fistful of other parts, such as motor mounts. Any impression that a bundle of wood is tossed haphazardly into a box is totally wrong. Every piece is clearly intended for some particular part.

"For some time it had been evident that a super stunt model was needed," deBolt told us in answer to a query about the origin and development of the Stuntwagon. "Modelers were asking for good looking designs. While good looking, this stunt job would have to fulfill all the requirements of today's specialization in this field.

"It soon became evident that there was more to a stunt model than good looks," continued deBolt. "Giving a model good looks (*Continued on page* 88)

● Dmeco's Stuntwagon kit has large assortment of selected wood.

Here's AN OUTSTANDING, DETAILED, CLEVELAND-DESIGNED SCALE GAS MODEL — THE



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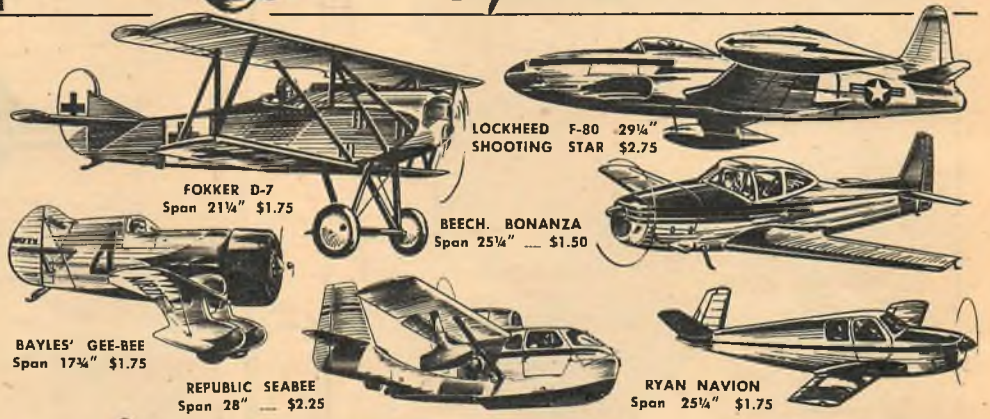
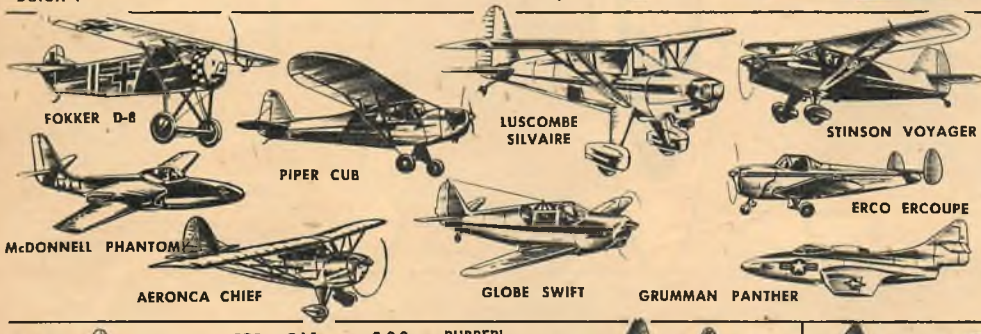
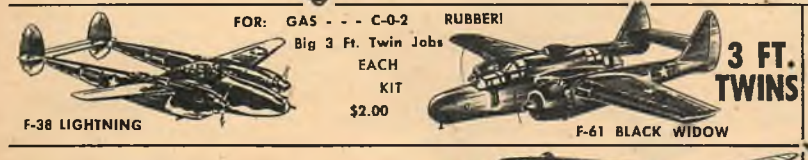
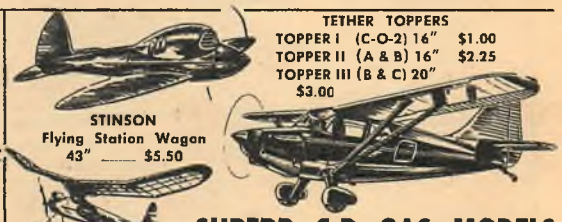




ONE-DOLLAR "IT" KITS — ARE FINE SCALE FLYERS

These one-dollar kits have won deserved popularity everywhere, as they build true scale, flight engineered models. They are made especially for the modeler who will not compromise on quality and realism, but who wants simple construction, low price, and contest performance. Almost all "IT" models are of 30" wingspan, a convenient and efficient size, They may be powered with a variety of rubber: CO2, glow plug, and jet motors (depending on the design chosen). More airplane for less money just cannot be found.





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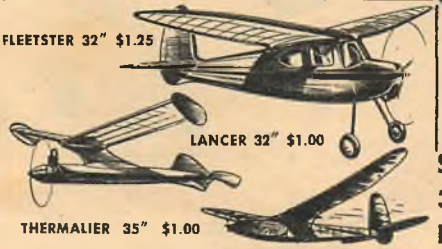

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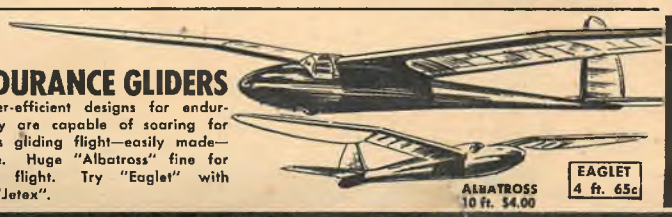

HOW TO ORDER: SEE YOUR LOCAL HOBBY DEALER FIRST. HE HAS THESE MODELS AND OTHER CLEVELAND DESIGNS AS WELL. If you are then unable to get C-D's, do not accept substitutes or imitations, but order direct, including 25c for packing-postage. Minimum order $1.00. No C.O.D.'s. Special Delivery in U.S.A. is 25c extra. (Ohio residents: add 3% sales tax). Military men stationed outside continental U.S., Possessions, Canadian and all foreign customers, add 20% for special handling, etc. in addition to 25c packing-postage charge.
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● Product of Grumman Aircraft Engineering Corp., the F9F Panther is being built in two models. The F9F-2, powered by a Pratt & Whitney JT-6B Turbo Wasp (Rolls Royce Nene) and F9F-3, powered by Allison J-33.

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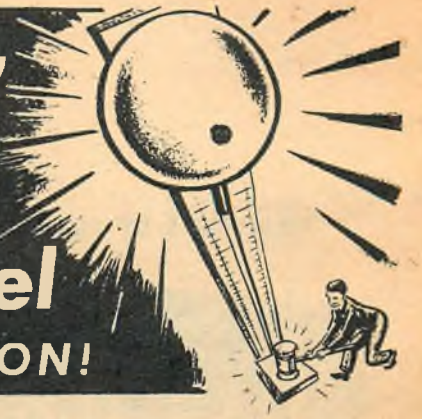

Comet has always been known for sensational models and values—but this new Piper Cub Control Gas Model tops 'em all! So completely pre-fabricated that it's the simplest, easiest model you've ever built! And performance—wait 'till you fly it—it's a "honey" in the air! But the biggest news of all is that low price—only $2.95! Don't walk—run to your nearest Comet dealer and get this newest Comet "bell ringer"! Wingspan 35½"; Kit No. T15, suitable for Class "A" and "B" engines.

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Reduces building Time to the absolute minimum!

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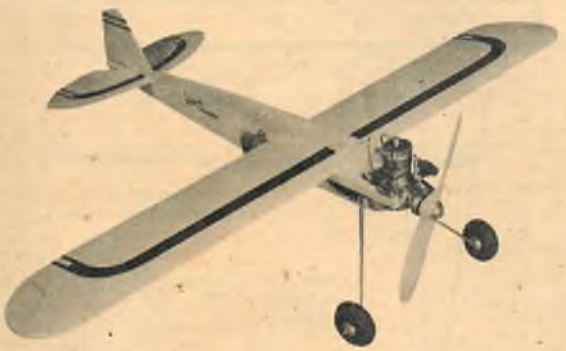

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What a sensation the Comet Rookie Trainer created when it hit the market! A marvel of simplicity and accuracy, easily built and flown by the beginner, yet its performance thrills the experts! An amazingly complete kit with many shaped and drilled parts. Suitable for class "B" and "C" engines; wingspan 35½", Kit No. T6 **$2.95**

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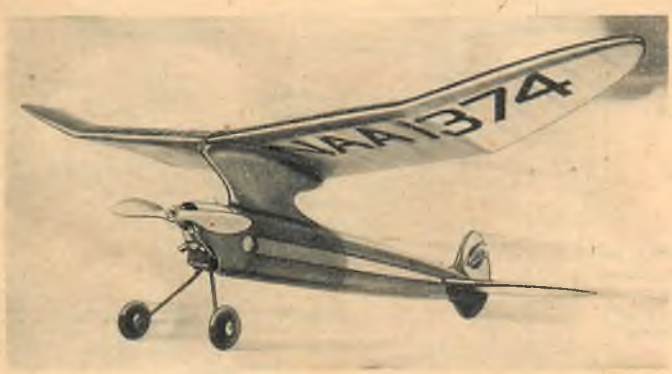

COMET ZIPPER GAS MODEL

Here's the daddy of them all—Comet's famous free flight gas model which has been setting 'em on their ears since 'way back when! Many shaped and finished parts, many features no one has ever been able to duplicate. A big 54" wingspan model, suitable for "B" and "C" engines; Kit No T10 ..... **$5.95**

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DRAWINGS BY FRANK ZAIC

RECORD REVIEW

This month's record setters: Robbers' Class B h.l. glider; Gene Rosenthal's speed model

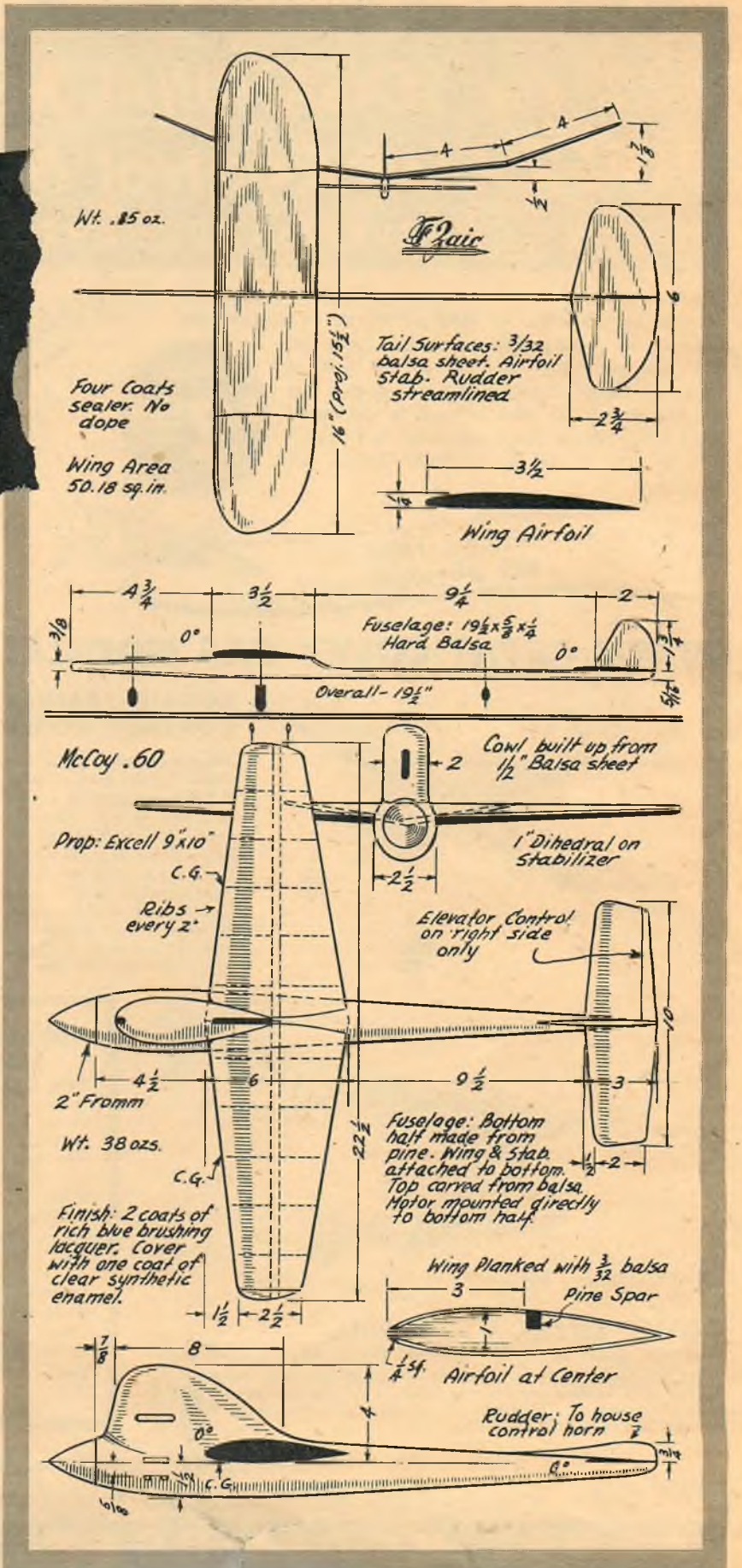
A NATIONAL open class outdoor hand-launched glider record of 18:17.0—a total of the best 3 of 9 attempts—was set by Harvey S. Robbers, Sr., Oakland, Calif., with the model (top) sketched by Mr. Zaic. Actual time on 3rd flight was 12:37.5 which was recorded as a flat 10 minutes under existing A.M.A. rules.

Gene Rosenthal, Miami, Fla., twice cracked the national junior Class D speed mark with the McCoy 60 powered craft shown. The first record was 113.88 mph made when the model weighed 34 oz. Two months later young Mr. Rosenthal upped his mark to 116.84 mph with the model's weight increased to 40 ounces.

In order to publicize the advancement of model air science and the latest developments in model aircraft design, construction and performance, Air Trails has established the Record Review and has enlisted the services of Frank Zaic, noted aeromodeling author and draftsman to handle the sketches.

Air Trails invites all new record holders to participate in this feature by submitting detailed 3-views of new record-breaking models. A token payment ($10 or more) is made for all data supplied on those planes which are selected to appear.

The 3-view drawings should be prepared on graph paper. Give all dimensions, materials and finishes used, plus other pertinent information. Do not send material until you have received official confirmation of your new record from Academy of Model Aeronautics' headquarters in Washington, D. C.



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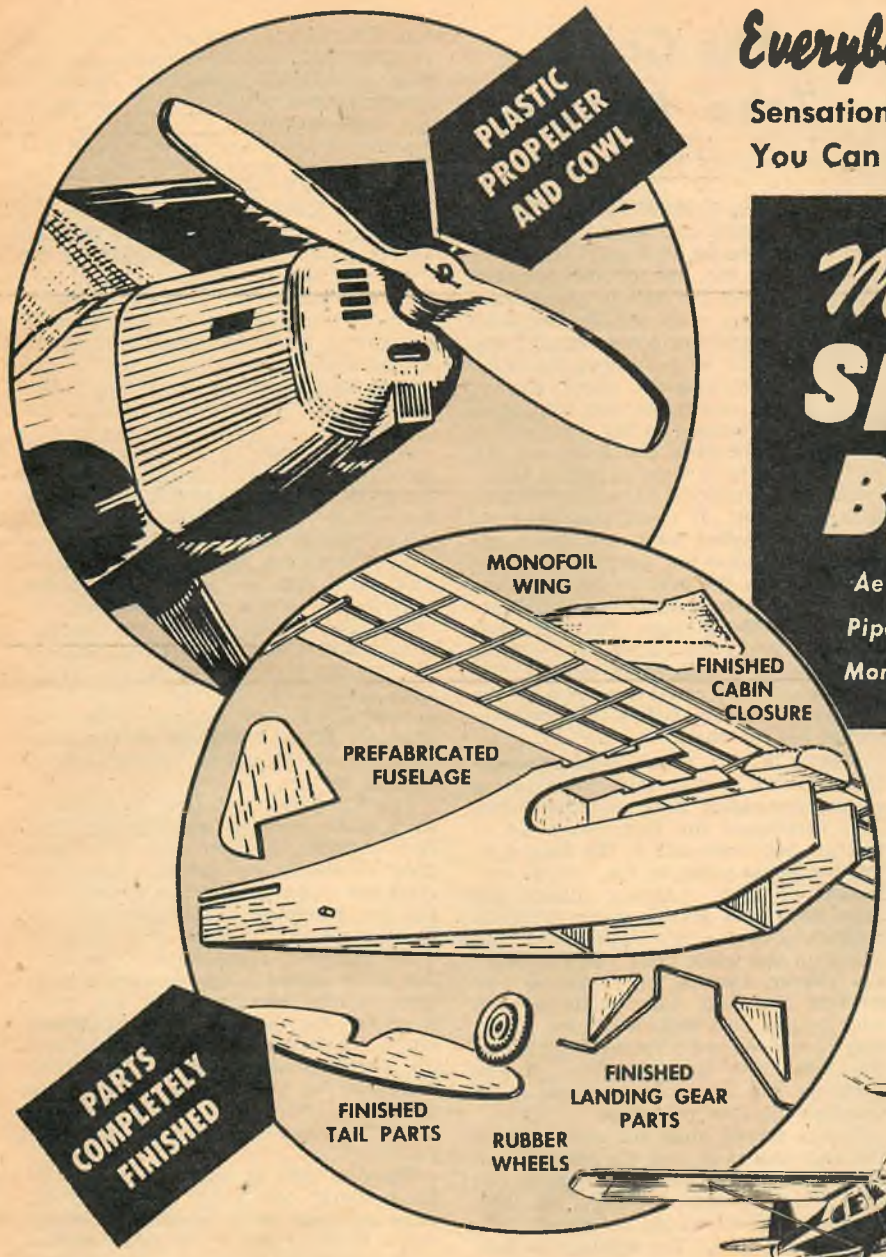

Monogram's SPEEDEE-BILT flying models

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Get them now — the wonder kits for forty-nine. A revolutionary new idea — a master-stroke of design — that clicks with beginners and old-time builders everywhere. Every part of the three new SPEEDEE-BILT KITS is completely finished, including molded plastic props and cowls. Every part fits — they go together in a jiffy — to make the most realistic rubber flying models you ever saw — with little work and lots of fun.

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Prizes! Cash!

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1st . . . $50.00. 2nd . . . $25.00. 3rd . . . $15.00. 4th . . . $10.00. 5th to 10th . . . 6 Piper Cub Control Line Kits, each $4.95. 11th to 21st . . . 10 Junior Whirlwind Control Line Kits, each $2.95. 21st to 50th . . . 30 Pirate and Prowler Contest Flying Model Kits, each $1.25.

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See the picture of SPEEDEE-BILT parts above. Balsa wing has leading and trailing edges, all spars, and top planking built in. Fuselage is prefabricated with sides, bulkheads, cowl block, molded plastic cowling and transparent cabin closure completely finished. Tail parts and landing gear are completely finished too — nothing to cut out, bend or shape. Rubber motor and molded plastic prop with something new in metal bearings, eliminating all hooks and wire parts, and Decal numbers, can be installed in a few seconds. Get SPEEDEE-BILT KITS at your dealer today. If no dealer near you, add 25c for packing and postage from nearby dealer's stock and mail order to address below.

MONOGRAM MODELS, INC. 225 N. RACINE AVE. CHICAGO, 7

The Great "Zeke" Mystery

(*Continued from page 27*)

to the Japs for $100,000. After all, they both were small and light. They both had radial engines in front followed by a pilot and the rest of the fuselage. They both had the tail in the normal place. Anyone could see the airplanes were alike, and obviously, Vought was as guilty as the jelly-smeared kid in the pantry. Unfortunately, there weren't any aviation experts around who could say, or who wanted to say, that such a comparison between the Zeke and the V-143 could have been extended to include the Seversky P-35, which was also sold to Japan. It could also have included the Vultee Vanguard which operated in China, the Curtiss-Wright 75 fighter which got over to Java and the Dutch, and in fact, many fighting planes of the 1936-1941 period. But there was the story going the rounds, and getting more elaborate with every telling. The only people who could deny it were the annoyed Vought officials, and nobody would believe them.

Finally in May, 1944, a popular weekly magazine ran a fair, illuminating article comparing Zeke and the V-143. This mentioned the fact that a lot of aircraft had been sold to the Japs during the years prior to the "moral embargo" of 1939. (Among others, the Japs were sold sixteen Seversky P-35 aircraft, and the prototype DC-4, the one with the triple tail.) To the average reader, capable of reasoning and straight thinking, the article proved once and for all that, while the V-143 may have been one airplane from which the Japs drew ideas for Zeke, it was certainly not the only one, and most certainly not the prototype.

Things stayed quiet for awhile, until the war was over, and the records and documents of Germany and Japan began to be unearthed. Then, in 1946, a nationally circulated columnist said in his daily stint, "The mystery of how the Japs developed the Zero is now in Government files, seized from the Japs, and proves no great mystery. The Japs bought the original Zero from an American company, Chance Vought, a division of United Aircraft. They modified it, and Chance Vought people claim it is not their plane; but avation experts say it gave the Japs a big lift toward developing the Zero." Accompanying this statement was a picture of the Zeke, captioned "The Japanese Zero, a modification of U. S. fighter plane."

Nothing could be further from the truth. Take a look at the drawings of the V-143 and the Zeke if you don't believe that. (The Vought data came from a United Aircraft advertisement of April, 1937; the Zeke picture from the mass of available information, and of couse they are both drawn to the same scale.)

About now, a few words on the philosophy of aircraft recognition are in order. In general, the ability to recognize any plane is based on knowing the side and top (or bottom) views, since from the front, most single-engined aircraft look pretty much alike. Further, most aircraft are observed in quartering shots from below or above, and these show more of the side and top than they do the front. For these reasons, only the side views and the plan silhouettes have been drawn to illustrate this article—the front views are unnecessary.

Okay, if Vought didn't do it, who did? Was Seversky responsible? Here's another chance to compare drawings. The Japanese Navy used, at one time, the Seversky fighters mentioned before. Under their system of designation, the P-35 was referred to as Type 98; they were also called Dick in the U. S. Army-Navy code name system. The chances are pretty good that they were never operational against Allied forces although they just may have seen action in previous engagements against the Chinese.

A quick glance at the drawings will show that there is no similarity between the P-35 and the Zeke; Major Seversky has enough to his credit without having to ring in foreign designs.

Next in line is the Vultee Vanguard. This little ship was originally ordered by Sweden; when war broke out, the order was transferred to the British. Somewhere along the line, the Chinese got into the act. One of the few available pictures of the Vanguard shows it decked out in the insignia of the Chinese Air Force. Whether or not these ever saw action against the Japanese is hard to say.

The Vanguard and Zeke do begin to show some common points of recognition, though. In plan view there is a great similarity, but actually, these aircraft are quite different in weight, size and performance. One point worthy of mention is the landing gear on both these ships—it could have come from the same model. The arrangement is very nearly identical, and the wide tread and the angle of sit on the ground are common features of both Zeke and the Vultee product. But in side view, there can be no mistake—contrast the sleek, long lines of the Jap's fuselage with the close coupling of the Vanguard.

There is still another American airplane which conceivably could have had some influence on Japanese aircraft design. Curtiss, like many other United States manufacturers of aircraft and machinery, did a fair-sized export business before the war broke it up. Among the items available for foreign sales was the CW-21, a tiny interceptor which was sensational in a small way, but which failed to attract attention here. The models after that were the Hawk 75, with fixed landing gear, and the Hawk 75A, which was sold to France. In this country, essentially the same ship as the 75A was being sold to the USAAF as the P-36, and the development of this airplane into the far-famed P-40 series is now history. In any event, the Dutch in Java ended with some Hawk 75A types, but Zeke was already in production by that time. Any new features absorbed from the Hawk could only be added in the form of

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Page 39—Bill Johnke, TC; E. C. Christie, TR

modifications to the production types. Curtiss also seems to be exonerated.

Having brought Hughes' name into this once, let's see what the reason was. The story behind the statement that his racer inspired the Zeke probably came from the machinations that led to the Vanguard. Dick Palmer, who was most responsible for Hughes' racer, later became vice-president of Vultee aircraft. In that position, he probably had a great deal of influence in molding the lines of the Vanguard.

We've previously seen that there is some similarity between Zeke and the Vanguard; there is also some similarity between the Vanguard and Hughes' racer. However, it is a well-known fact that a racer is a racer, and a fighter is a fighter. The design of each is unique and different from the other. And time has shown that racers do not get into military service—there just isn't room in their insides for fuel, radio, instruments, armament and self-sealing tanks. Can you name a racer that made the grade, unmodified?

All that we have done up to now is eliminate all of the possibilities considered. This is not helpful in solving the mystery. But maybe somewhere there lurks the single act that set in motion all the wheels and gears that eventually ground out the Mitsubishi Type 00 in 1940.

For this, we go far back into aviation history, to a period shortly after the first World War. The year 1920 had seen the keel-laying of the world's first aircraft carrier to be so built, at the Asano shipyards of Japan. The Japs were being faced with the unique situation of having a carrier ready before they had a carrier-based air force. So in 1921 they invited over a British mission to reorganize, equip and train the Imperial Japanese Naval Air Service. Thirty officers and enlisted men of the RNAF spent three years over there in discharging their duties, and a variety of the latest British military aircraft were purchased. From then on, the Japanese were very friendly with the British, Italians, Germans, United States, and the French. (The last-named were chosen as the group to reorganize and train the Imperial Japanese Army Air Service.)

So, since the British were the ones who were doing the training, it was logical that the fighters used should be British-inspired. In fact, the first Jap shipboard fighter was the Sparrowhawk III, designed specifically by Mr. Folland, at that time with the Gloster Aircraft Company. When the Mitsubishi Heavy Industries Corporation started its aircraft division, a Mr. Smith, from the Sopwith Company in England, was engaged: under his guidance, many types of military aircraft were built. One of these was designated the Navy Type 10 fighter, and was the standard Naval fighter until 1928.

That year saw the Japanese desirous of expanding their growing military air services even more, and so, in the quaint English of Mr. N. Matsumura, quoted in a monthly aviation periodical of about 1936, ". . . big plans for the improvement of shipboard fighters were considered and the competition test was held for their adoption as equipment machines. Shipboard fighters from European countries and of home designs were put to test and finally the Gloster 'Gambet' fighter was adopted, the construction rights of which were imme-

diately purchased." This fighter was replaced in 1932 by the Nakajima Type 90, but not before it had seen action against the Chinese and had even shot down an American-exported Boeing (presumably similar to the P-12 series) in what Mr. Matsumura calls the first air combat in the Orient.

These devious meanderings through the ancient history of the short-lived Imperial Japanese Naval Air Service have a point, as do the seemingly indirect approaches of fictional detectives. This historical interlude has been presented here so that it could be kept in mind during the following paragraphs, for which we move to England, in 1934.

That year, the British Air Ministry issued a type specification for an RAF fighter; it was this specification that fathered the Spitfire and the Hurricane. It also fathered the Gloster F.5/34, which is now thrown into the ring of contenders for the title of Zeke prototype. Here, at last, is a machine which does bear a great resemblance to Zeke, particularly in front and rear quartering views. This ship flew in 1937 for the first time, but by then, both the Spitfire and the Hurricane were in production, and the Air Ministry did not order the F.5/34. There were only two built, according to the British magazine Aeroplane Spotter, and these two are still in use as aircraft rigging trainers.

(Thanks to the great courtesy of the Gloster Aircraft Company, Ltd., of Hucclecote, Gloucestershire, much authentic data for the F.5/34 were furnished, including a factory three-view and apparently, one of the only photos they had of the ship.)

Compare the two drawings of these aircraft—look at the common spinners and identical power plant installations, the rise of the fuselage to the full-vision canopy, the wing well forward, with the main spar about at the cockpit's leading edge.

There is great similarity in the aerodynamic sizes of these two ships, also. The table compares the dimensions and the performance. Things to note are the almost identical weights and wing loadings; the close comparison in top speed figures; the similar flaps and in fact, all surface controls. The more one looks at these two aircraft, the more one finds alike. Try it yourself—look at the two drawings and study them carefully. Then ask yourself whodunit?

Before you come to any conclusion, think back through the Japanese aircraft designs of World War II. Honestly now, were any of them cold copies of our airplanes, or anybody's airplanes? You know they weren't. As a matter of fact, the Japanese military aircraft designers showed a lot of original technical thinking. Remember Betty, a 70-foot span, carrier-based, medium bomber? A jack-of-all-trades, she could show her heels to a lot of our fighters on the deck. How about Dinah, probably the fastest recco job in the business? And the rugged end-of-the-war fighters George, Jack, and Frank? Any one of them was a dangerous adversary. And ask Task Force 58 about Baka, a true guided missile, utilizing a cheap, expendable control system.

Now look up some of the Japanese pre-war designs; those of the early and mid-thirties will do. Do you recognize the thinly-disguised Boeing and Curtiss and Junkers copies? Do any of them

show any unique features? Those were the ships on which we based our fundamental precept that the Japs were a race of copyists, and, based on that evidence, it certainly seemed true. But along in the late thirties, apparently the Japanese were ready to go out on their own. Somebody started the ball rolling, and Zeke was evolved. Or was he copied, too?

It's hard to say. The years during which Zeke was being designed were years of transition for the Japanese Imperial Air Services. They knew of the impending embargo, and of the war to follow; they had to start being independent. But whether Zeke was the last design they copied, or the first design they dreamed up, who can say? In either event, it's a cinch that the Gloster job was in there as an influence. It may have been a subtle influence, due to Jap familiarity with Gloster's practice and designs. It may have been a strong influence, if any Japs got information on the actual F.5/34 before the embargoes. Here are some of the facts; the rest remain hidden to my knowledge. Was Zeke the last copy, or the first original?

AIRPLANE PERFORMANCE AND CHARACTERISTICS

Manufacturer	Gloster	Mitsubishi
Basic designations	F.5/34	Type OO
Common name	—	Zeke
Modifications	—	I
Span over-all	38′/2″	39′/5″
Length over-all	32′/0″	30′/3″
Height	10′/2″	—
Gross wing area	230 sq. ft.	248 sq. ft.
Aspect ratio	6.33	6.28
Normal gross wt.	5,400 lbs.	5,555 lbs.
Engines	Mercury IX	Sakae 12
Prop dia.	10′/6″	10′/0″
No. blades	3	3
Built-in fuel	68 gals.	141 gals.
External (drop)	—	87
Max. speed	315 mph	326 mph
Climb rate @ S.L.	2,100 fpm	2,750 fpm
Time to 10,000′	5.1 min.	3.8 min.
Time to 20,000′	11.0 min.	8.5 min.
Service ceiling	32,500 ft.	38,500 ft.

Catamount

(*Continued from page* 49)

besides having a good model, you must meet the rules.

The first test flights of the Catamount were very pleasing, but as power was added it was found that it was necessary to add downthrust and right thrust. Since the model had a natural tendency to glide to the left, no attempts were made to fight it, as we do not think it advisable to fight forces which are naturally built into the model, even though they might be entirely accidental.

It was deemed necessary, nevertheless, to fly the model to the right under power. The reason for this is that no matter how you try, you cannot get as smooth a power flight to the left with torque, as you can to the right, against torque. The first few flights were not very long, since the model was flown at ¾ power. But the required smooth right turn under power and the very tight lift glide were easily adjusted into the model. The three models which were built flew very much the same and have turned in times that were comparable. Frank Parmenter's averaged a very fine 5:26.4, while Charley Folks' averaged 3:19.

The Catamount was carefully designed to meet all Wakefield requirements. To squeeze in a few square inches of wing

area the wing was run through the fuselage. The power flight is a combination of the fast climb of ships of this country and a long motor run such as the fellows in England use. Since the take-off is watched very closely, a two-wheel fixed landing gear was used with but one innovation, that of plastic wheels for a modern touch.

For construction purposes, the drawings which appear on pages 54, 55, 56, 57, 58 and 59 should be covered with wax paper to prevent the cement from sticking to it.

Build two basic sides of the diamond, cutting four each of the various uprights, so that you will have enough to join the two sides when they are dry. It is best to build the two sides on top of one another so they will match. When the two sides are dry, separate them with a razor blade and join them, using the extra pieces which have been cut for this purpose. They can easily be held together and in line with small rubber bands while the cement is drying.

The ⅛" sheet wing platform should be cut to shape and carefully cemented in place. Take care when doing this, for the future alignment of the model depends entirely on this platform. Line it up carefully with the two side longerons. The top of the platform should be parallel with them.

The rest of the fuselage, in the form of top longeron, fairing strip, stringers, sheet fill-in for nose and cabin, and plastic for windshield, are applied at your leisure. The nose block should be laminated from ¼" sheet and faired into the fuselage. Two large face bushings are used for the shaft bearing in the nose block. The landing gear is in two pieces bent as shown, cemented and wrapped with thread, and cemented again to provide the strength necessary to stand up under the strains of landing and taking off. When all these parts have been added and the cement is dry, the entire fuselage should be sanded.

To construct the wing, first cut 29 ribs to shape from 1/16" sheet balsa, medium hard. Notch them for spars and leading edge and sand them smooth. Trailing edges are from regular ⅝" Jasco trailing edge stock, but for those who do not have it, it can be cut from ⅛" sheet and tapered before cementing into position. The entire wing, with the exception of spars and gussets, is built flat. When the outline is dry, dihedral is put in, cementing the gussets in place at this time to reinforce the joints. The spars are added and overlapped ½" to provide a simple, strong, neat joint. The wing, when dry, is sanded smooth.

The horizontal tail is constructed in much the same manner as the wing, with the following exceptions. The spars are 1/16" square, and two special ribs are used at the center section for the covering. The vertical tail construction is the familiar cap strip type for a light, streamlined shape. The outline, including the rudder, is first cemented together and the spar put in place. Then 1/16"x⅛" strips are cut to size and cemented into place. When this first side is dry, ribs for the other side are cut and added. When dry, the leading edge, trailing edge and rudder are faired and sanded to shape.

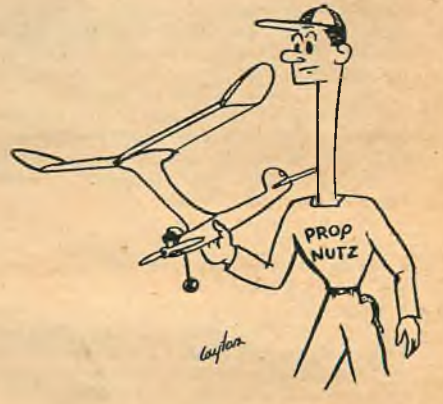
The tail surfaces are joined to the fuselage before covering so that the fairing can be made easily. The original model was covered with colored Jap tissue. The fuselage was covered red and the wing and tail yellow. For those who use Silkspan, it is advisable to dye the white tissue before covering. This is done with a small packet of dye purchased from the neighborhood dry goods store. It is advisable to cover the model with the Silkspan wet, to eliminate wrinkles. Particular care should be given to the color used, for the model must be easily seen when high in the air as well as among trees and grass. Use a color which is in contrast to the blue sky and green foliage. Covering should be applied with dope, allowed to dry, and three coats of thin dope carefully brushed on. If Silkspan is used, four drops of castor oil should be added to each ounce of dope used, so that covering does not become brittle with age.

The propeller is carved from a tough block of balsa ⅓"x2¼"x16". The block outline is cut on a small jig saw to shape. The carving is done with a very sharp knife. The underside (concave side) is carved first, cupping the blades ⅛" at the deepest part. This should be sanded smooth before the other side is cut. The finished blade thickness should be a little on the thin side—a maximum thickness of 3/32" about halfway out to the tip is ideal. The hinge can be any of those available commercially or can be made from sheet brass. The original hinge was from ⅛" dural with a .042" hole drilled through it at the proper angle. Both the butt of the hinge and the wire should be securely wrapped with thread to provide a very strong folder.

The prop is sanded smooth with fine sandpaper and covered with silk for strength, then doped with several coats of thin dope for a slick finish. The prop shaft is bent from 1/16" music wire and a Jasco bobbin is used for the rubber attachment. A stop is necessary so that the prop will stop in the same place each flight, so a small flat-headed wood screw is inserted into the nose block until it misses the end of the prop shaft by approximately 1/16".

The 18 to 20 strands of T-56 ¼" flat rubber has about ten inches of slack. Before the lubricant is applied, the motor should be well washed with water to remove the fine powder which is usually on the rubber.

Since the stab is cemented to the fuse at zero degrees to the reference line, it is necessary to insert a ¼" square block of balsa under the leading edge of the wing for the proper incidence for a good climb and glide. When first gliding the model, take particular care to notice any tendency for the model to circle with the rudder set straight. If the model shows the slightest tendency to circle, adjust by moving the rudder in this direction until a smooth, tight, flat circle is obtained.



Are Supersonic Biplanes Next?

(Continued from page 23)

single moving part! When apparatus is provided for squirting fuel into the passage for burning, the engine is complete. As the speed increases so does the compression. This would be good except that the heat of compression finally results in a temperature high enough to melt the passage without burning any fuel! This situation, probably around 2,500-3,000 miles an hour, may limit the speed of flight with ramjet power.

I have seen experimental ramjets fly, and believe me, the noise they make is impressive. On a supersonic flight it would, of course, arrive *after* the plane.

One big difficulty with the ramjet is that its power falls off as the air gets thinner with altitude. Thus at around 22,000 feet the ramjet's power is down to half the sea level value, and at 50,000 it has dropped to 15%. Roughly it is similar to an unsupercharged engine. The fact that the power required to fly an airplane is much less at high altitude is no help if the power available is much less too.

If speeds faster than around 2,000 miles an hour are wanted it is probable that they will be achieved with either rocket power or a nuclear engine. The rocket will operate independent of the atmosphere and it is assumed that the nuclear engine will too. Getting out beyond the thick air has the added advantage that the compression and heat will be far less destructive.

With the tremendous requirements of power it is obvious that the problem of attaining long range is very serious. Here a phenomenon not developed by the subsonic airplane becomes important to the supersonic one: *aerodynamic efficiency improves with altitude.* Thus a supersonic flight will consist of a climb to high altitude, a run at that altitude and a glide to the destination. Part of the glide will probably be made subsonically. From a practical standpoint the climb to altitude may be quite a barrier. Flight endurances currently being expected range from 4½ minutes of full throttle operation for the Bell X-1 to as "much" as 20 or 30 minutes. Time spent in climb is so expensive from a range standpoint that continuing the "mother plane" procedure used for the X-1 seems quite promising.

From a "miles per gallon" standpoint the supersonic airplane has intriguing possibilities: the economy may be surprisingly good. The data so far released is not complete enough for a good check, but better than 10 miles per gallon seems possible in the early type supersonic ships, and more later. How much more? Well at about 18,000 miles an hour (a pretty good head of steam, we must admit) the centrifugal force developed by curving around the earth can equal the "airplane's" weight, and no lift is needed. Further, since such a speed is impossible inside the atmosphere, the plane will be outside the atmosphere where no drag develops, and powerless flight with limitless range can be realized.

To return to the more immediate future, we have yet to consider the fuels to be used in the supersonic

power plant. Basically nearly anything will do: gasoline, kerosene, fuel oil, or any of several more potent chemicals. On my desk is a German design that was to have used powdered coal! The plan was to saturate the coal with gasoline and fire it simultaneously with jato units. By the time the jatos gave out the plane was supposed to be at about 500 mph, the fire was supposed to be roaring, and from then on the operation was direct ramjet. Upon landing a foamite device put the fire out before the airplane burned up, since a protective layer of cooling air would no longer be available. While this ship never passed the preliminary design stage, the claim was made that the power plant had been tested and found satisfactory. One cannot help but smile at the return of the stoker, or "fuel consumption, six tons per hour."

In closing, don't sell the supersonic airplane short. No problem has arisen that indicates high supersonic flight is either impossible, improbable, or even ridiculously uneconomical. Just keep one weather eye aloft for the needle-like fuselage and short wings, and don't wait until you *hear* it to look!

Infant Pursuit

(*Continued from page* 50)

pulling through if the engine is mounted too tightly. (The holes are drilled undersize in the firewall assembly in order to permit threading the screws into the wood for greater holding power). This assembly is now cemented to the fuselage bottom. If the keel was cut out accurately, the firewall assembly will be properly aligned. Former C is cut from medium 3/32" sheet and cemented in place.

We are now ready to attach the sides. Cement them to the bottom and pin securely. When dry, cement the top edges of the two sides together aft of the windshield, making sure that everything is properly aligned. For a better joint, the top edges of the sides can be beveled slightly. Now bend the "excess" portion of the nose down around the firewall assembly and cement. Trim the second side to obtain a neat joint and cement it down also. (Moistening the nose sides will help in bending them to conform with the curve of the firewall assembly.) Check over all seams and joints and add cement if necessary. Remember, in spite of its minute size, that it *is* a gas job and will be subject to vibration and rough handling.

After cementing the 1/16" square pine windshield brace in place, set the fuselage aside to dry. Later on it can be sandpapered, using No. 320 wet-or-dry paper (use dry). Cover fuselage with yellow Jap tissue, using clear Aero Gloss dope as an adhesive. Aero Gloss is the most fuel-proof finish on the market, I have found. Make a pattern of the cabin outline by the "trial and error" method, and when satisfied with the fit, transfer to thin celluloid. That takes care of the windshield and side windows. We now have a completed fuselage.

The wings are cut from firm but not heavy 1/8" sheet balsa. Again, we don't recommend the use of quarter-grained wood. Cut out all four panels, then bend in the camber. This can be accom-

plished by breathing heavily on the top surface and simultaneously bending it with the fingers. The slight moisture in your breath will cause the top surface to swell slightly, aiding in the job. For the best performance, remember to sand the wing to the cross-section shown. Bevel the ends of each wing panel for dihedral as shown in the lower left hand corner of the full size plan. Cut the slots which receive the dihedral braces and cut the latter from 1/8" hard sheet. Insert a brace in one panel with cement and slip the tip over it. Ambroid is recommended for these joints, due to its great strength. Set wing panels aside to dry.

The stabilizer and rudder are cut from medium 1/16" sheet. Sand smooth and bevel edges before covering with yellow tissue. Cement the stabilizer into its slot and cement the rudder in position on top of the fuselage. If the wing panels are dry, they may now be covered with yellow tissue and slipped into the slots in the fuselage sides. Remember to apply Ambroid to the butt end of each wing panel before slipping into place. The butt end should rest against the keel.

This brings us to the landing gear. This unit is very efficient in operation and is quite simple to make. The perspective sketch on the plans might be misleading in that it shows the main gear as one piece of wire. This sketch is only intended to clarify over-all assembly. The main center portion is bent from 1/16" dia. piano wire and the axle-spring part is bent from .040" dia. wire. Joining these is accomplished by wrapping with fine copper wire and soldering together. The nose gear is made in much the same manner. Note that the nose gear strut is attached to the firewall by means of a small metal plate which is held by a small wood screw (and generous cementing). Make small wire staples from fine wire to secure the main landing gear strut to the fuselage bottom (cement or Ambroid alone will not do). When cement is dry, cover with a small piece of tissue for further reinforcement. The sponge rubber wheels are secured with a drop of solder or any method you usually employ. Using sponge rubber wheels is an important factor in bringing the center of gravity to its proper point.

If you really want high performance in the rubber and CO_2 versions, keep the weight as low as possible. Wing construction can be lightened through use of 3/32" or even 1/16" sheet balsa and the fuselage bottom reduced to 1/16" thickness.

To get back to the Infant-powered version, two finishing coats of clear Aero Gloss are applied, with red and blue trim. Bolt the engine on. Adjustments merely consist of slight right rudder together with 1/8" wash-in in the left wing panel to produce a wide right-hand circle in the glide. Add left thrust on power flights until the model climbs in left circles.

With this ship, powered by the Infant, you should log plenty of time. Give the tank a good shot of fuel, flip the prop, and away she goes. For fuel I use 4 parts "Supersonic 100" to 1 part O&R "30 plus." On a 30-second engine run your ship should average from one to one-and-a-half minutes.

Although individual construction may vary quite a bit, the balance point of the original ship was between 2¼" and 2½" back of the leading edge.

Airspeed Ambassador

(Continued from page 46)

for wing thickness taper. It is cut out, sanded and cemented in position. Wing sections come next. These need only be roughly shaped before being joined to the body and the spar-template. Draw guide lines for leading and trailing edges for reference during the sanding. Smooth the wings with a small sanding block to gain more uniform trailing edges.

The only tricky part of the nacelles are the cut-outs for the tapering wing. The joints, so long as alignment is correct, need not be perfect; they can be filled smoothly with dope-talc putty prior to finishing the model. Cut off the cowl fronts, add the dummy crankcases and re-cement the hollowed front sections back in position.

The tail group is simple to shape and assemble. Sight from front, side and rear before the cement hardens to assure perfect alignment. Next step is to go over the entire model with the dope-talc putty, filling any crevices which the wood-filling is not apt to cover. Use one of the commercial fillers or mix talc, dope and a little thinner for the important wood-filling operation. Experiment a bit to get the correct proportions of these ingredients. Too little thinner makes the filler needlessly hard and difficult to sand; while too much thinner renders it so soft the finish coats are likely to dissolve it. Apply two generous coats and when they dry thoroughly, sand them with medium-fine paper. A third coating is smoothed with very fine emery paper.

The four-bladed propellers are made by fitting soft pine blades in balsa spinners. If you can locate small plastic or rubber wheels of proper size you can avoid the chore of carving the six wheels required. The gear struts are made of paper clip or other soft iron wire, wrapped with paper strips for realism. Landing gear doors of aluminum sheet, antenna masts and the streamlined loop antenna housing are finally added.

Control surface and other prominent outlines may be ruled with dark gray dope after the silver finish has been applied, or, for a more realistic effect, they may be scored accurately with a bluntish edge. A razor blade, for instance, makes too fine a cut. Apply masking tape for outlining windows in black. Tires, propeller blades and cowl interiors are also black. Trim stripes may be added in a bright color to complete the Airspeed Ambassador.

Office in the Air

(Continued from page 37)

Jimmie.' When we landed at Schenectady with a few minutes to spare, he jumped out, patted a wing, and with a twinkle in his eyes, said, 'Better take a look at the wing bolts; that trip was a little rough on them.'"

Most of the production equipment in the six LeTourneau factories was designed by the fertile mind of the man who has created earth-moving machines

that do jobs fifteen to twenty-five times faster and as much as one hundred percent cheaper than previous methods. A company catalogue lists machines with such names as Angeldozers, Bulldozers, Sheep's Foot Rollers, and some named after the inventor: Tournacranes, Tournapull, and Tournatrailers. One of his prides is the Tournapull, which will scoop up seventy-five tons of dirt and carry it away at twenty-five miles an hour. Through LeTourneau's applied genius, construction methods have been introduced that have slashed costs—thus saving millions of dollars—and yet giving more and better highways, irrigation projects, power dams, and air bases.

Robert Gilmour LeTourneau was born sixty years ago at Richford, Vermont. The LeTourneau family moved westward to Portland, Oregon. At the age of fourteen Bob quit school to work in a foundry. This lasted four years. Then he drifted down to California, where he worked at a variety of jobs—from cutting redwood trees to greasing automobiles. In time he managed to save enough money to buy a half interest in a Stockton automobile repair shop. It was while working as a one-tool garage mechanic, that Bob became a welding fanatic. The art of oxyacetylene welding captured his imagination, and he used the torch on every repair job. The garage went broke.

One day he watched some men leveling land for an airport by pulling a cumbersome scraper with a big tractor. The smell of the freshly cut earth inoculated the young man with the dirt-moving fever. Tractors and large scrapers immediately stampeded his imagination. Right then and there, he decided to become an earth-moving machine builder.

Personally directing the operations of six large factories doesn't keep LeTourneau from enjoying himself. His hobby is addressing conventions, schools, church groups; in fact, talking to any kind of an audience that wants to hear him. Each weekend he delivers from three to seven lectures in all parts of the United States and Canada, flying in his own airplanes. He is a popular speaker, as indicated by the 2,500 invitations on file. Some dates are booked years in advance. There is no record of any other man in the nation flying so far to so many continental out-of-the-way places as has Mr. LeTourneau.

He places the utmost confidence in his pilots, and never questions their decisions. Occasionally, if the pilot is undecided in regard to the weather, he will resort to his best salesmanship to convince the man that they should get under way, as he is always in a hurry. He would rather fly 500 miles out of the way than be delayed.

Jimmie Mathews has worked for LeTourneau three years. He is a graduate of the C. P. T. Flight Officer Course, Pilot Training School at Burlington, Vermont. Pilot and co-pilot of the Lodestar are Royce Barnwell and Chapman Marston respectively. Barnwell is a veteran of the Air Transport Command, having made seven round trips across the Atlantic and twenty-three round trips across the Pacific, flying a 4-engine Douglas C-54, during the recent war. Marston was a Naval aviator in the Northwest Pacific area. D. A. Ramsey and Morris M. Perkins recently joined the LeTourneau pilot staff. They were the former personal pilots for Gen. Jonathan Wainwright.

Near his factory at Toccoa, Georgia, air-minded LeTourneau established a special flying school for missionaries. He reasoned that with the help of small planes, missionaries would be able to reach sections previously inaccessible, and also visit more often the remote places which are accessible only on rare occasions because of the hazardous terrain.

Two courses are offered by the school: the Private Pilot Course, and the Instructor's Rating Course. Requirements are few for admission to the flying school. Foreign missionaries on furlough, as well as student missionaries preparing for foreign mission fields, who are at least eighteen years old, are eligible for admission.

His pilots discovered that Mr. LeTourneau could tell them, within five miles per hour, the ground speed of their plane. They know he has flown over the United States so much that by merely looking out the window he can determine what state, and often what section of the state, they are flying over. So they have developed their own question-and-answer game: After Mr. LeTourneau has been asleep or engrossed in his work for some time at his desk, they will ask him about their location; if he fails to answer correctly, the millionaire executive must personally serve coffee and doughnuts to them at their next stop.

During August of each year, various LeTourneau employees, without regard to position with the company, are flown to a recreational camp sponsored by Mrs. LeTourneau at Winona Lake, Indiana. At other times during the year, the president's planes are made available to executives of the company for business, hunting, and for pleasure trips.

LeTourneau has faced danger a number of times during his ten years of flying. But these experiences have failed to dim his zeal for the air. "I can't help but feel safe as I fly across the country," LeTourneau said. "Especially when I recall some of the close calls I had in automobiles down on the ground."

One time while making a landing on a Canadian airport, LeTourneau's plane nosed over on its back. LeTourneau crawled from the wreckage, rubbed his hands together and, when he saw no one was injured, said to the pilot: "You fellows stay and get the plane fixed up; I've got to get going as I'm due to make a speech in town in ten minutes."

Mrs. LeTourneau often flies with her husband. On one of these trips, over the airport at Anderson, South Carolina, it was discovered that the landing gear could not be operated either electrically or manually. The pilot, in radio contact with the ground, reported their trouble. As the plane circled the airport with its fuel supply running low, LeTourneau admitted he felt a bit peculiar inside as they looked down and saw the red-crossed ambulances arrive—wondering whether these were to be their next conveyance. The pilot brought the plane down a few minutes later, sliding on its belly along the turf—and no one was hurt.

One evening LeTourneau was the principal speaker at Banff Springs, Lake Louise, in the Canadian Rockies. He was booked to speak before a graduating class in Fort Worth, Texas, the next morning at ten o'clock. At the end of the evening meeting he motored to the Calgary airport, ninety miles away. The

plane took off after midnight, cleared customs at Great Falls, Montana, and stopped in Cheyenne, Wyoming, for gasoline. Upon realizing they would lose an hour by flying from Mountain into Central time, LeTourneau telephoned Fort Worth that he would be a little late: He hurried back to the plane, carrying hot coffee and lunch to his pilots, who were refueling the ship for a quick get-away. On the same morning they left Calgary their plane roared down over Forth Worth at 10:45 o'clock. The reception committee was waiting with a motorcycle escort.

As they rushed toward the auditorium, with sirens screaming clearance ahead, a member of the group commented on the dangers of night flying. LeTourneau, who is always "alerted" to go to the defense of aviation, pointed at one of the men riding on a motorcycle, and said: "Speaking about danger . . . it's a lot more dangerous riding one of those things than riding in your own plane."

The hazards of aviation are of little concern to the flying multi-millionaire. Even though he is a religious man and believes that he will not die until the Lord gets good and ready to receive him, he insists that his planes be kept in the very best mechanical condition.

Each new flight still has the quality of adventure for Bob LeTourneau, though he has flown past the two-million-mile mark. When he finds a worried passenger aboard, he gets that person's mind off his fears and puts him at ease by explaining what is going on in the plane and pointing out the places of interest below. He finds relaxation in helping his crew. More than once a welcoming committee has come up to the plane to ask a greasy-faced man where they could locate Mr. Robert LeTourneau, and be answered with a broad smile: "Oh! Hello there. That's me!"

Radart

(*Continued from page 43*)

climb desired, which is very shallow. The slow climb gives a smoother looking flight as it goes gracefully into and out of turns. No space nor weight is needed for ignition when using a diesel and no flight timer is needed; vary your fuel supply to limit the engine run. However, any class "B" engine would do; a "C" would be much too large for this type of flying in this particular ship. In the way of contest performance, the first day this ship was flown by radio, it took second in a meet on Long Island. A month later, with plenty of practice in that time, it took first in the Mirror meet.

Unable to attend the Nationals, I lent the ship to Leon Shulman, who with no former experience with this craft, took fifth at Olathe as a team entry.

Everything is stock equipment and the plane was constructed on a kitchen table in a two-room apartment. No special tools are needed other than those the average gas-model builder might have.

For those who desire to get to work immediately, the plans are marked off at 1" intervals to facilitate enlargement by the graph method. However, Air Trails' full size plans will save you all this work.

To start on the fuselage, cut out the outer mounts of hardwood (maple is

fine) and glue the ¼" x ½" hard balsa crutch longerons to them. Lay these down to the board and complete the crutch using ⅛" x ½" balsa cross-pieces with the ¼" x ½" pieces where shown. Fill in the forward part of the crutch with ¼" sheet—this to be flush with the bottom. This protects the receiver from the batteries should the model hit an obstruction in flight.

While the crutch is drying, cut the uprights of ⅛" x ½" to proper length. Cut the ¼" square on top and bottom, for the upper longeron and crutch respectively. Cut out the upper cross-pieces and notch them at each end for the ¼" square longeron. Notice that some uprights and cross-pieces are ¼" x ½" for extra strength. Remember to recess uprights and cross braces where necessary to accommodate the hatches on the side and bottom of the fuselage.

Start gluing the uprights in place. Notice the overlapping joints. Use a right triangle to make them perpendicular to the crutch. Small triangles of ⅛" sheet pinned in place work nicely here and speed up the operation. A special angle should be made to get the firewall on at the correct angle. Complete one station at a time by gluing the cross-piece on—again notice the overlap. After all the stations are in position, the two ¼" sq. longerons are glued in place. Check the fuselage for squareness before the glue sets and correct if need be. The last upright is a ⅜" square, which is also the fin's trailing edge, so make doubly sure this one is at right angles to the crutch.

When thoroughly dry, remove the crutch from the bench. The lower part is now completed in the same manner. Note the last lower station (C) is ⅛" plywood and the 1/16" diameter wire tail wheel fork is sewed on with thread before gluing into place. Three strips of 1/16" x ½" fill-in around this former strengthens it.

The firewall is ¼" plywood cut to shape shown. Bend the two legs of the landing gear of ⅛" diameter wire and bolt these to the firewall with "spade" or "J" bolts. The gear is bound at upper and lower ends with brass or copper wire and the legs are filled in with solder. The original ship wore out one landing gear (seen in the photographs) —this one was a single ⅛" length with cross brace. However, it finally snapped at the fuselage from bending so many times. So this new gear was put in and works better.

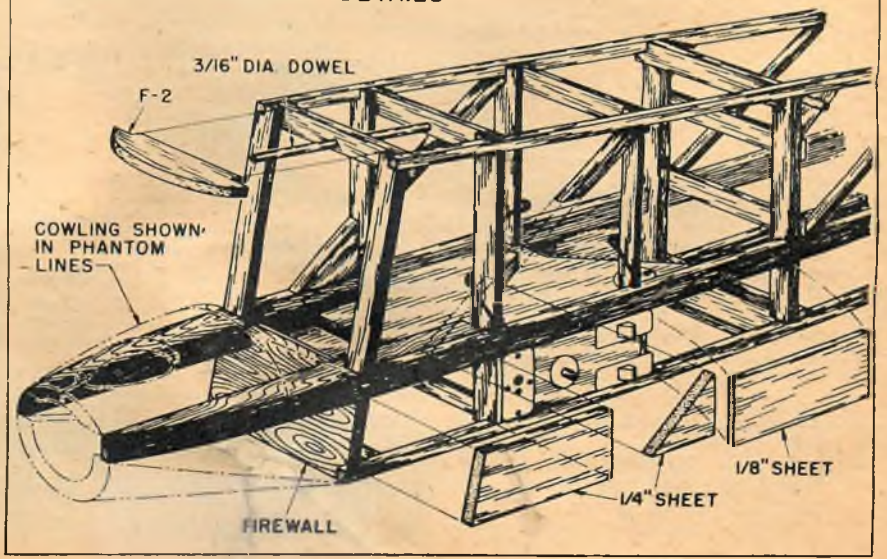
The firewall is glued in. Fill in the side panels behind it with ¼" sheet. The rest of the lower sides back to station B is ⅛" sheet fill-in. The ½" sheet sides of the cowl (the triangular piece) is glued in, securing the gear and motor mounts. The lower cowl block may also be glued in at this time.

The ribs of the fin are cut from ⅛" sheet. Fill in the last top space of the fuselage with ⅛" sheet and glue R-1 to it. Center it exactly; no off-set is used. Put in the remaining ribs and the ¼" sq. leading edge. The tip is ¼" sheet as are the trim tab and the radio rudder. The original used cloth, U-control type, hinges on the radio rudder and these proved very satisfactory. In any event, this rudder must be very free. Secure the horn into the rudder before putting the latter in place.

Windshield formers F-1 and F-2 and the dowels and dowel gussets can be put in place. The small box, on which the escapement is bolted is made up of ⅛" x ½" with 1/16" sheet plywood on top. This is glued with two ⅛" x ½" backing strips at station B. The control arm is 1/16" aluminum and is attached to ⅛" plywood. Install both these units and also the two sets of pulleys. These were turned from an aluminum bar. However, hand made wooden ones should work okay. The two large ones are mounted on a 1/16"-dia. wire glued to the ¼" x ½" uprights. Bandage gauze works out nicely here. The two rear ones are on a 1/16"-dia. wire, on a sheet of ⅛" plywood. Attach the fish line back around the large pulley, through the center of the two small ones and out to the rudder horn. Do not attempt to make this too tight; in fact, for best results leave it on the loose side. Glue in the rubber rear hook and when dry, the rudder control can be tried out. These should not be binding or skipping. Two strands (1 loop) of ¼" T-56 flat rubber wound about 250 times is sufficient for many flights. The rudder should have a definite snap to its movement.

The hooks for the receiver are glued in, again using bandage gauze. The five-prong female plug is glued in on the ¼" sheet triangle, first soldering the

FUSELAGE ASSEMBLY DETAILS



wires to it. Bind the wires with thread at the base of the plug and coat with glue before inserting. These wires go to the necessary batteries, plug-in, rheostat and switches. Follow Aero's instructions on the wiring.

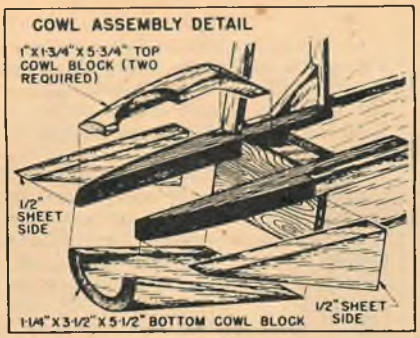
The 45-volt supply (two 420-E Eveready hearing aids) is soldered in series and then installed. The lower ¼" x ¾" behind the firewall holds them in place. As these batteries should last 100 hours or so, they are semi-permanent. They may be changed by cutting out this lower piece. The rest of the batteries, three mediums in series (4½ volts) and two pen-cells in parallel (1½ volts) are bound with rubber bands into a tray (¼" x 1¾" x 5⅜" balsa). A metal battery box was used for the pen-cells while the mediums were bound together with Scotch Tape and had soldered connections.

The receiver is suspended on three small rubber bands across the hooks. The antenna is run back through the fuselage and is glued in.

The lower battery hatch cover is ⅛" sheet while the side panel is built up of ⅛" x ½". Two wire prongs hold one side and one bolt at the other side keeps them in place.

The inside mounts of ¼" x ½" maple can be bolted in place and holes drilled for the engine. About five degrees *left* thrust was used in the original. It's believed that due to the high cabin, Radart acts like a pylon ship, therefore goes to the right under power.

The fuel tank is made of thin brass or tin. The size shown gives about six to seven minutes with a Drone, depending on the needle valve setting. It's best to run the Drone slightly lean. A half size tank is suggested for early hops.



The cowl may be completed around the engine. The upper cowl is a solid block, hollowed out, and then split down the middle and fitted around the engine in that manner. Secure with dress-snaps or any method you like.

The elevator is standard construction so little need be said. Notice, however, that it is attached at a 3° plus angle. This is very important as is the 5° plus angle for the wing. Taper the spar tips to ¼" (taper starts 3" from tips). Taper equally, top and bottom.

The wing ribs are cut out of ⅛" sheet, while the three center ones are of 3/16" sheet. Assemble on the main spar and trailing edge. The leading edge is ⅜" x 1" and after the 1/16" sheet is glued in place, it is shaped down to the sheet covering. A very neat airfoil section is retained in that manner. The wing has 5" dihedral under each tip. The left aileron is merely a trim tab to help trim the ship to straight flight.

Use a heavy grade of celluloid for the windshield. The rest of the ship is covered with a fairly heavy grade of silk, which is dyed first so little colored dope is necessary. Eight heavy coats of clear dope make it practically puncture-proof. The frame is strong enough to take this much doping.

Make sure the C. G. is where indicated and wing and elevator are mounted at angles shown. The completed weight will be around 4½ lbs. The spinner is optional. It was used at first but hand flipping with a spinner was annoying so the nose was rounded off and the spinner eliminated.

Hand gliding is permissible, if done with care. The original had six ounces of lead in the nose under the engine to balance it. It is suggested that the radio be turned on for the first flights, as a retrieving precaution.

The rubber motor is wound about sixty turns on a 4 to 1 drill. Pull the rubber back and down through the space under the rudder. Then put the stab on. Four ¼" flat x 3" rubber bands do nicely here. The stab and wing should be keyed to assure alignment.

Insert your meter in the plug, set the Aero-Trol for 1.3 mils and check for plate drop by transmitting a signal. Switch the escapement switch on and check the rudder movement. If any trouble at all exists, correct before attempting to fly.

One more item before the first flight should be a distance check on the ground. With everything set as for flight, have an assistant walk the ship away from you. I've checked mine as far as two blocks away and it functioned perfectly.

A Vibra-tak is handy for your early flights to assure the same rpm's every flight. On the Drone, a 10"-dia. 6"-pitch

prop gave the performance desired. An 11" x 6" will give a slightly greater climb needed for hot days. With the 10" x 6", the Drone should be adjusted with the free-flight attachment to 6,000 rpm.

Again check the rudder while the engine is running. If not perfect, don't launch. If okay, have the ship hand-launched into the wind. Because of the weight, this takes quite a heave. As the ship has a right turn tendency, have the rudder in neutral going left, that is, left rudder is first. Do not use the rudder, unless needed, until the model has climbed fifty feet or more. About a minute's engine run is used for these early flights.

When doing a left turn, you'll probably find that you'll hold rudder for approximately 180° to 270°, then neutralizing to complete a 360°, using right rudder to stop the turn. To the right, the rudder was held for perhaps 45° to 90° to complete the 360°, again opposite rudder is used for the pull out.

If held in a turn, right or left, you'll find it will start to lose a good deal of altitude for the first two or three turns but will then maintain that altitude, although in a near vertical bank. Of course, don't do this maneuver low for the first time. Opposite rudder will stop the spiral almost immediately and a rapid zoom and a stall will occur unless the plane is put in a shallow turn near the top of the climb.

With practice, you'll learn to anticipate the need for rudder movement. As you learn the characteristics of your ship, your judgment will improve.

Loops may be attempted by lengthening the spiral and applying opposite rudder and when straightened out, neutralizing. If enough speed has been gained, it'll go up and over. However, on many occasions it'll roll out on top in a fair Immelman.

This model has been flown in very high winds which had grounded other free-flight flying. It also has flown on exhibitions out of ball parks, stadiums and race tracks.

Perhaps a word on the transmitter setup would help. My early setup had the antenna much too low and range near the ground was very poor. When raised up to about nine feet, it cured all my transmitter troubles.

The Aero-Trol transmitter was fastened to a 3/8" x 6" x 11" plywood with wood screws through the back cover plate. The "B" batteries (Burgess 45—135 volts) and the "A" (1½ volt Burgess 4F) are directly below it on a base board of 3/8" x 6" x 6" plywood. Two wood poles (½" x ¾" x 7') slide in two braces on back. These support the dipole antenna with a hook at the end. For ease of transportation, these poles come apart in the middle with a telescopic joint, made up by wrapping sheet tin (from a tin can) around the lower half, this being held in place with two small bolts through it and the pole.

This whole assembly slides down a 1" sq. x 66" pole which was first driven in the ground. This puts the antenna up the desired distance and control near the ground in the distance is good.

A small micro-switch with about four feet of wire, put in parallel with the micro-switch on the transmitter allows the operator to move around while flying the plane. Bring another blue lead (—45-volt) through the switch and ground to the back cover under one of the screws securing the transmitter.

Variable-Pitch Model Prop

(Continued from page 65)

contest and particularly aerobatic flight.

The usual observation at this point is, "This is all very fine, but how can you make a miniature variable-pitch propeller that will act like the big ones that took years and vast sums to develop?" After the problem and its proposed remedy, just described, were examined by engineers in the full-scale propeller industry, the theory and general construction requirements were arrived at by elimination, deduction and study of all previous accomplishments in one particular area of full scale variable-pitch propeller design.

Elimination took place when miniature power plants were studied. Their abnormally high rpm, short propeller shafts and varying size timer cases made any sort of controllable propeller obviously out of the question. In fact, any connection between the high-speed propeller and stationary engine housing, which would be necessary if a third control line could be rigged, would present immense difficulties if not an impossible situation.

Deduction of the propeller type which had a chance for success was easy. It would have to be a type with no connections to the engine, and flexible in basic design to be applicable to a number of different engines with correspondingly different shaft sizes, speeds and powers. The only type meeting these requirements is the "thrustifugally" operated, fully automatic propeller. This type of propeller is, in effect, autodynamic in that pitch change takes place solely due to natural physical forces of thrust and centrifugal force acting on the propeller to change blade pitch as changes in flight speed take place.

A study of all previous full scale automatic propeller accomplishments was conducted to see what physical forces were used, their most practical combination, and what sort of mechanical structures resulted. This study also surveyed the nature of the forces and how they varied to cause pitch change. A summation of the principal, and largest, forces is illustrated in Fig. 4.

The following forces and their characteristics formed the basis for the theory of operation formula finally selected:

Centrifugal force is the most powerful of those which act upon a propeller. It is the natural result of a given weight being rotated and can only be alleviated by a decrease in speed or weight of the whirling object. This force is proportional to the square of the rpm and is independent of horsepower or airplane speed. Even the very light wooden model blades have an outward pull of several hundred pounds acting on them at high rotational speeds. All this means that a bearing problem of the first order is present whenever a blade is to be rotated for pitch change.

Centrifugal Twisting is a function of centrifugal force and is important in model variable-pitch propeller design. Principally, it means that the propeller blade positioned at an angle in the plane of rotation is acted on by a couple which

tends to twist the blade to a lower pitch. Large propellers, such as the Hamilton Hydromatic, use this force to help effect a blade movement to low pitch. Our experiments have shown it is present in small propellers and helps effect a change to low pitch. No problem or detriment is posed by its presence.

Thrust is developed by the propeller as it translates engine power into propulsive work. The propeller gives momentum to a mass of air which in turn acts to force the propeller forward. This action is perhaps the most important single factor in automatic propeller design and operation for the reason that the progressive decrease in thrust against the propeller from static to full speed flight, provides an excellent pitch changing force.

Torque is a function of engine power being translated into thrust by the propeller and is directly proportional to engine power and inversely proportional to propeller rpm. Thus, as acceleration takes place, torque tends to rock the engine and airplane in a direction opposite to propeller rotation. As rotational speed is attained, torque subsides. This change in magnitude of force, so necessary for automatic propeller operation, was utilized in one large automatic propeller design.

Counterweight Force is also a function of centrifugal force and is highly important in automatic propeller operation. A counterweight consists of a weight on an arm attached to the blade and turned at an angle to the propeller axis of rotation. Depending on the counterweight angle, the distance of the weight out on the arm, and the amount of the weight, the twisting effect of the counterweight and the blade toward high pitch may be varied.

A review of the methods by which these physical forces were employed to make full scale propellers operate automatically, for possible application to model requirements, revealed the following principal types and the forces used:

Wickwire-Spencer ..... Torque vs. Counterweights
Schwarz ..... Counterweights vs. Springs
Eclipse-Bendix . Thrust vs. Springs
Le Parmentier .. Thrust vs. Centrifugal Force
Delavaud ..... Thrust vs. Torsion Bar
Everel Single Blade ..... Thrust vs. Centrifugal Force
Aeromatic ..... Thrust vs. Counterweights

The Wickwire-Spencer propeller, experimentally developed during the war, employed engine torque through a cross bar to turn the blades to low pitch and was counterbalanced toward high pitch by counterweights attached to the blade shanks. How this was done is shown in Fig. 7. When this scheme of operation was tried in model form, it was found entirely impractical because single-cylinder engines deliver their power in a series of high frequency jerks. Each explosion would cause the propeller blade to wobble due to the linkage from the engine shaft directly to the blade.

The next schemes of operation found to have limitations were those typified by the Schwarz and Eclipse-Bendix types. The Schwarz was a German two-position propeller used before the war on engines up to 550 hp. As shown in the illustration of the Schwarz, Fig. 6 and 6A, a coil spring linked to a blade counterweight held the blade in low pitch for power on take-off and climb and until the propeller was turning fast enough that counterweight force could overcome the spring and snap the blade

into a high pitch. The Bendix propeller, experimentally constructed in the 1930's, employed thrust to shift the whole propeller forward on its shaft against a series of coil springs. At static, when thrust is highest, the propeller would move forward while links to a stationary plate caused the blades to rotate at low pitch. As thrust subsided with forward speed, the compressed springs would force the hub back, rotating the blades to high pitch.

The theoretical as well as practical drawbacks of a spring balanced against another variable have been demonstrated. It is virtually impossible to obtain constant speed because the release of the spring's energy does not coincide properly with the decrease in thrust. Mechanically, the friction and complicated structure necessary to accommodate springs is not feasible for model construction.

The next group of propellers studied were the ones which employed thrust by inclining the blades at an angle to their pivot axes. The first of this group was the Le Parmentier, Fig. 5, a French propeller built in 1921. The blades were inclined rearward in the plane of rotation with respect to their turning axes so that thrust would cause them to be forced forward of the plane of rotation and describe an arc of a cone in reducing their pitch. This propeller changed pitch, but not enough to be classified as a constant speed type because centrifugal force on the blade alone was insufficient to restore the blade to high pitch progressively in the plane of rotation after thrust decreased with forward speed.

The next propeller to employ the blade lag angle scheme was another French unit, the DeLavaud, Fig. 8 and 8A, which introduced a torsion bar that was intended to assist blade centrifugal force to return the blade to high pitch. After a fashion, this was like the previous spring arrangements in that the torsion bar would store energy as high thrust caused the inclined blade to cone forward to low pitch about its pivot axis. Subsidence of thrust did permit the torsion bar and centrifugal force to restore the blade to high pitch; but inability to regulate the release of torsion bar energy, and mechanical difficulties, prevented the propeller from leaving the experimental stage.

In 1937 the single-blade propeller was introduced at the New York Air Show. This was probably the most significant development to that date as far as model work is concerned. We shall discuss that propeller and work out the specifications for a variable pitch model prop in the second part of this article.

(To Be Continued)

Stuntwagon

(Continued from page 66)

usually adds weight to it, and weight is a definite handicap in stunting. The first model was laid out as an ignition low-wing, and it looked sharp from both the standpoint of appearance and design. It had the Stuntwagon's tapered wing, cockpit-tail, and short moment arms. But it had some bad characteristics, although it was highly maneuverable. I enlisted the aid of George Willson and we both went to work. By Nationals time of 1948 we had the first basic Stuntwagon design pretty well licked;

it was this ship that I used at Olathe."

Typical problem was a tendency of the model to slow down in consecutive maneuvers that were tightened up close to the minimum turning radius, but now the Stuntwagon is considered a match for any pilot in the country. DeBolt explains the design analysis like this: glow-ignition for high power-to-weight ratio and less trouble on the field; drop off gear for light structure, more speed, less damage on crack-ups, less prop breakage; large wing area for low loadings, tight maneuvers without loss of speed, quick recovery from abnormal positions, and good maneuvers with the least amount of power; short moment arms, doing away with dead weight and shortening turning radius; clean lines for a low drag coefficient; rugged construction to stand the rigors of high-speed maneuvers, such as square corners, and for long life. The deBolt approach is best pointed up by the history of his new but sturdy company.

When Harold was of tender age, he had an uncle who built his own lightplanes. Said uncle had worked with Glenn Curtiss on the historic "Red Wing" and "June Bug," and the huge flying boat "America." Uncle steered young Harold into model building, the first creation being a single-pusher with Christmas paper covering. In high school, at Geneva, N. Y., Harold started a model club and in 1934 won a free trip to the Akron Nationals. After that it was all gas. He remembers losing several of his Blitzkrieg free-flights during 1939. In 1941 his Thunderbolt—a planked, silk-covered pylon—swept all classes at a Buffalo meet with single flights of 21:30 in A, 52:40 in B, and 34:30 in C.

MYSTERY AIR FORCE

Here's the correct line up of the Mystery Air Force quiz which appeared on pages 30 and 31 of the March issue of Air Trails. Score yourself as follows: 6-7, passable; 8-9, fair; 10-11, good; 12, you're a super-spotter.

1. Bell FM-1
2. General Airborne XCG-16
3. North American XP-64
4. Boeing XB-15
5. Laister-Kauffmann XCG-10A
6. Convair XP-81
7. Vultee A-35B
8. Ryan PT-25
9. Vega B-34
10. Beechcraft AT-10
11. Seversky BT-8
12. North American O-47A

In 1943 the Navy decided his modeling experience, plus that in the experimental departments at Bell and Curtiss, fitted him for a "job" at Patuxent River, Md., naval equivalent of the AF's Wright Field. With other modelers he formed the first Navy Model Club, the Patuxent Model Engineers. The old barracks and work shop that was set up for the club proved the forerunner of the Navy's hobby program.

Like many of the other recently organized post-war manufacturers, Harold had decided in the service that the only work that would make him happy would be kit manufacturing. With a small nest egg saved during his Patuxent hibernation, plus separation pay, Harold left the Navy just before Christmas, 1945, and within a month had formed the deBolt Model Engineering Co. The first kit was the famous Bipe. This kit was put out singlehandedly by Harold, with some assistance from Pop during his scarce spare time.

"The Bipe is typical of all that we have, or will, produce," says Harold anent the deBolt approach. "It was conceived in 1942 as a sport model which I could fly anywhere during my travels. Two wings meant double the area for the size. First powered with a Brown Jr., it now has worn out three engines on more than 1,500 flights. Development took place at Patuxent where the fellows tried several versions. It became a "hot" stunt model for those days. As another example of this development work, it took over a year of work on fifteen versions before we were satisfied with the New Bipe kit that is available today."

In the beginning, of course, deBolt did all the designing and most of the development work. Nowadays, Dmeco is a far cry from the one-man operation launched in early 1946. Dad deBolt is production manager, presiding over shop personnel. Other help assembles the kits. There is an office with bookkeeper and typist. Outside of tool design and fabrication, Harold is kept busy working up new designs and doing the drafting. When the day's work is done, he goes home and builds experimental models. "Sometimes I wonder if there is anything in life besides models," he has been heard to remark.

In between, deBolt pecks out answers to questions from modelers on props, fuels, engines, and kits. As a hobby he simply adapts the old postman's holiday idea, which in this case is to fly models in competition. DeBolt always

seems to end up in the winner's circle, be it at the Mirror Flying Fair, Philadelphia Circus, Plymouth, or the Nationals. He is particularly proud of the Speedwagon because of its success in the hands of the juniors. Juniors placed within the first five places six times at the Nationals, and five times at Plymouth, taking three firsts when flying Speedwagons. Like the Stuntwagon, the speed job was developed over a long period of time. DeBolt flew it for two years before putting it on the market.

Dmeco has enthusiastic plans for 1949. The tiny firm that opened its doors three years ago now has more than 100 distributors and outlets in such countries as Canada, Italy, South Africa, and the West Indies. A considerable amount of "barter" business is done with our English friends who are not permitted to send money out of their country. Now under development are several new designs, among them a Sportwagon, Jet Wagon, Speedwagon 50, and perhaps a trainer. "There doesn't seem to be any limit to what can be done in the control-line field," thinks deBolt, "and the model builders always want something new."

We Fly The Cessna 170

(*Continued from page 25*)

when you first open the hood, likewise is quickly detachable. By removing a row of Phillips screws that run around the rear of the cowl, inside the engine compartment, the entire cowl may be lifted off without detaching the propeller. The sales patter emphasized this, so we'll pass it along that savings in time mean lower maintenance costs.

The single-leaf spring landing gear is another big talking point. On the four-place Cessna, this tough piece of metal—really two pieces, because the gear does not run through the fuselage—weighs 60 pounds with wheels. By now everyone is familiar with this characteristic landing gear of the Cessna line—it is on the big 190 and 195, too—so no further comment is necessary. Suffice it to say, that there is nothing to get out of order or to maintain. This type of gear offers some real advantages in handling the airplane and is a positive safety feature.

The interior of the cabin provides plenty of leg room but its width was more closely measured out. Unlike the designers of new automobiles, airplane engineers pay a heavy performance penalty for bath-tub cockpits. However, it cannot be said fairly that the cabin is narrow. The instrument panel is arranged neatly and is pleasantly simple. Upholstery on this job was gray with green trim; the floor is carpeted. The three-foot wide door on each side of the cabin, Cessna believes, makes it as easy for ladies to get into and out of the cabin as with an automobile. While the wide door is a good deal, we should realize that all airplane people are pardonably optimistic when they describe airplanes in auto terms. Both seats are mounted on tracks, permitting easy adjusting for leg length, and slide back to permit entry to the front seats.

A hand hold is built in above the instrument panel. Once seated you can grasp this hold, and release the

catch beneath the seat, to pull yourself forward into comfortable flying position. Behind the rear seats is a baggage space for 100 pounds of luggage; above the compartment is a shelf for hats and other small objects.

In view of the fact that a number of four-place airplanes must make reductions in gasoline when four people are carried with baggage, it is surprising that Cessna doesn't make more noise about the 170's ability to tote a full load of 37½ gallons, four people, and 100 pounds of baggage. While the manufacturer does state that no such reductions are necessary, they apparently take it for granted that this performance on 145 horsepower is customary. Airline-type vents, one on each side of the cabin at the upper corner of the windshield, provide ventilation when and how you want it. Both rear seats can be removed for handling freight. This feature will appeal to flying farmers and ranchers who view an airplane as a vehicle with utility, along with cars, trucks and tractors.

The price tag of $5,475 f.o.b. the factory on the ship we flew did not include turn-and-bank, the G.E. two-way radio, the sensitive altimeter or the clock. The transmitter is 12-watt and the loudspeaker is mounted in the cabin roof.

Before getting into the flying report, it would be well to run over the specifications and performance of the 170. Its span is 36 feet, gross weight 2,200 pounds, empty weight, 1,200 pounds, useful load one-half ton. Mental arithmetic indicates that the average passenger weight is in the neighborhood of 170 pounds, unless the ship is slightly overloaded according to the specifications. For instance, deducting 50 pounds of baggage would bring passenger weight up to an average of about 180 pounds.

Cessna claims a top speed of "over 140 mph" and a cruising speed of "over 120 mph." Inasmuch as Cessna truthfully understates their performance, these figures are reasonable. On an 18-mile speed course between Meriden and Hartford this 170 had a two-way average of 127.25 mph, at 1,500 feet and 2,450 cruising rpm, considerably better than the "over 120" claimed. Climb is given at 690 feet per minute at sea level. A four-hour cruising range means a distance of about 500 miles, or 400 miles if you play it safe. Fuel consumption should be less than 10 gallons an hour. Service ceiling is 15,500 feet.

The average lightplane pilot will have no trouble flying the 170. The literature says, "just get in, push the throttle, and be on your way." You can buy that. The 170 struck us as being no more difficult to fly than the smaller 140, so this statement takes in most two-placers.

The side-by-side wheel controls are spokeless and underslung in shape. Above the point where the wheel supports vanish through the panel, is a shock-mounted panel with the more important instruments: on the left, the ball-bank and airspeed indicators; in the middle and a trifle lower, the vertical speed indicator; and, to the right, the altimeter and tachometer. The compass peeks out from the center, at the top of this panel, through a small hole. At the extreme right is a small face for fuel pressure. For Cessna to

claim full use of 37½ gallons of gas, CAA required a pump to insure against fuel failure in a nose-high attitude on the last 2½ gallons. However, the engine will function without the pump. The ammeter, oil pressure and oil temperature, and so on, are mounted beneath the main panel, squarely between the wheel supports, where they don't speak unless spoken to. Along the bottom edge of the entire panel are the by-now familiar Cessna-type switches for ignition, lights, and so on.

A raised section of the floor—much like the hump over the drive shaft on some autos—supports the fuel-selector switch, the trim wheel and the flap handle, all three being easily seen and handled from either seat. Fuel is carried in two wing tanks with gages mounted at the top of the cabin against each wing root. The trim is a largish wood wheel, as on the 140, and is rolled in the direction of desired trim. The flap handle has a disengage button at the end which is easily worked by the thumb when the handle is grasped. The handle gives noticeable clicks as it goes by the three flap positions. On this particular airplane toe brakes were fitted on the left side only. Having scanned the interior, a glance over the nose preparatory to starting gives a startling good view of the ground. Offhand, it is to be doubted that any but the tricycle-geared ships offer a better view when taxiing. Starting is the commonplace operation of turning on switches and pulling the throttle button. Shut-off is by means of the mixture control button which is pulled out to lean when the ship is back to the line. After a few revs the engine dies. A solid, almost vibrationless feel of the engine is immediately noticeable. Taxiing is easy and pleasant even in confined areas. The parking brake is released by depressing the brake pedals and pushing in the brake button on the panel. To park, the button is pulled out with the pedals depressed.

Take-off is almost exactly like the Cessna 140. Except for a short field take-off, the tail is not raised, the ship being allowed to fly off from a three-point position. There is no feel of settling after the ship leaves the ground, hence no need of easing forward to allow the airplane to pick up speed. The 170 accelerates steadily and smoothly to its good climbing speed of 90 mph. It literally will fly itself off the ground and right on out when it is ready. You can pull up the flaps suddenly and the ship does not drop dangerously. In fact, the drop is barely noticeable. One-forty pilots are familiar with this characteristic.

While the Cessna flaps do not have the severe braking action or the extra steep, slowed descent of the Stinson they do have the advantage of not upsetting trim, or of letting the ship settle when pulled in, important considerations in aborted landings.

But once airborne, there is little comparison possible between the two Cessnas, or with any other smaller lower-powered lightplane for that matter. The 170 flies beautifully hands off, climbing, cruising, or gliding, all with use of the trim wheel. Used to the rattling two-place tandems, some of which have an infuriating tendency to wander all over the sky during that never-ending climb while you wrestle with the map in getting organized, we found even this portion of the ride in the Cessna like riding in an expensve automobile. Setting up cruise is important on this airplane. You attain 200 feet

"I got the plans for America's newest fighter plane, but did I ever get tired of eating breakfast food just for the box tops!"

above the desired cruising altitude, then dive slightly to pick up speed. As you reach the intended cruising speed in the dive, trim until the airplane will fly hands off, throttling back if the tach goes over 2,450 rpm. Then level off. If you don't set up cruise, you are apt to climb another 1,000 feet trying to get trimmed for level flight out of your climb. The whole operation is quite simple and takes only a matter of seconds.

The relationship of trim and inherent stability proved to be the outstanding impression of the 170. One thing that startles any flivver plane pilot in trying one of these more powerful ships is the strange sensations felt on throttling back. Actually, there is nothing to feel, but your senses play tricks. To begin with there is the better speed range (ratio of top to minimum speed) on these bigger ships. When you throttle back to slow fly you have the absurd, fleeting impression that the airplane is suspended motionless in the air. Your so-called feel suggests that you are approaching a stall and, of course, you are not. These heavier airplanes ride so smoothly when throttled back that you revel in the good sensation. The 170 can be maneuvered safely while slow flying at approximately 50 mph. If the altimeter slowly drops, just touch the trim wheel and the airplane holds altitude hands off. It is as steady as a rock but alive and fully responsive. Coming back to the airport and slowing up for the approach, getting the flaps down when air speed sinks under 80 mph, is a relaxing experience. Naturally, other comparable airplanes behave very much the same, but these are things you always notice after stepping out of a 65-hp job.

Leo very competently demonstrated a short field landing, a short-field take-off, and the 170's amazing resistance to a ground loop. Once he purposely leveled off a good three feet off the ground to demonstrate the ability of the gear to absorb shock and, incidentally, of the tendency of the airplane to stay on the ground when dropped in. That the 170 was dropped in on this landing could not be doubted. A slight tail buffeting had become noticeable as he held off the ship.

Recall the description of the field with its short row of airplanes at the one end, and you will be interested in the landing roll. On all his landings the airplane had slowed and been turned before reaching the last parked ship. Once Leo went heavy on the rudder making the 170 swerve around with plenty of ground speed. It went right around in a level turn that normally would have been a ground loop. Both tires scuffed up turf throughout the turn. Cessna's flexible gear behaved beautifully. We heard of one student who dropped a 140 from so high that the wheels hit the wing struts, yet the ship was not smashed, nor the gear broken. Leo's short field landing was an impressive business. Slowed down to 60 on the approach, coming in low, and adding more and more power as the nose came up and speed dropped off close to the field, he had the ship down and stopped in what could not have been much more than the distance required by a slow landing in a trainer.

These demonstration pilots, of course, can make things look easy, for it takes practice and considerable familiarity

TRIXTER BABE $1.00

The Trixter Babe is our latest control line job. Lou Andrews, International Stunt Champion, designed it and Lou says it will do anything in the book.

Designed for use with the K & B Infant Engine, it has a 20" wingspan and is 15" overall. The weight, less the power plant, is one & a half ounces. It has been tested outdoors on 15 - 20 foot lines.

The Trixter Babe goes together rather easily as the parts are nearly all cut to size. The plan includes full size drawings of the model, step-by-step building instructions, clear illustrations and directions for installing the control system, a simple method of making a gas tank good for 4 or 5 minute runs. The flying directions include drawings that show how to do the various stunts.

The Trixter Babe makes a good trainer as well as a stunt ship.

IT'S A BUY AT $1
at your dealer or $1.25 if ordered by mail.

Other Trixter and Trixter Invert Kits are priced at $2, $3, $3.50 and $4.50.

"Licensed under Jim Walker U-Control, United States Patent No. 2,292,416."

Made by Paul K. Guillow, Wakefield, Mass., U.S.A.

with the airplane to smoothly co-ordinate throttle with the changing approach. None the less, the performance was convincing proof of the capabilities of the 170. Short fields should not limit it.

It is difficult to convey an accurate picture of the performance of any of these four-place airplanes relative to competition unless a good cross-country with a number of stops is made with each ship. Impressions on just flying the 170 must be favorable. However, its prime purpose is not aimless sport flying but the practical and economical transportation of as many as four people, as is that of all the other four-seaters. The ideal evaluation would then consider comfort after several hours of continuous flying, be it hot, cold, or rough weather; cost of operation and maintenance; and point-to-point time. There are many other considerations, true, but these are the irreducible comparisons. Against its competition, the 170 will hold its own. When it comes to speed it will not compare with the more powerful, more expensive four-place airplanes but then it is a disservice, perhaps, to compare it with craft of almost double its price.

In ninety minutes of flying within a radius of 25 miles of the airport, the only objection we have to the 170 is the noise level. At that, the 170 probably is no more noisy than its rivals. The truth of the matter is that the trend to higher engine rpm in order to eke out a few more miles to beat a competitor has cost all manufacturers a disagreeable and corresponding increase in noise.

For its specific job of transporting four people, the 170 probably will rate high for its cross-country ability. It seems comfortable and is so stable that it flies better hands off in straight and level than when you hold the wheel, as we found out on the speed run to Hartford and back. Outside of minor corrections in heading in the haze, the ship was left alone as trimmed. Perhaps it could be pointed out that an average cruise of 127 mph on a 145-horsepower four-place airplane is good going. Nor is there any reason why this ship should be tiring to fly. Its performance suggests that fuel costs will be on the economical side. All in all, the 170 is the kind of an airplane you expect from Cessna.

Report from Washington

(*Continued from page* 39)

not intended that citations will be issued in this instance. However, it will be appreciated if your organization call the attention of its members to the following omissions, which appear to be quite prevalent, and emphasize that when amateur stations are operated for any purpose the applicable rules should be adhered to."

In all, six omissions were noted by the FCC officials who attended the contest. They are as follows:

1. No provision of any kind was made for the measurement of the emitted frequency.

2. In some instances amateur stations

were operated by unlicensed persons while licensed amateurs stood by, or were simply operated by unlicensed persons without a licensed operator in attendance.

3. Failure to identify the amateur station transmitting control signals.

4. Although the amateur stations were being operated as portable stations in Olathe, Kansas, for an over-all period of more than 48 hours, none of the licensees submitted notices of portable operation to the Commission's engineer in charge at Kansas City, Mo.

5. Several amateur station transmitters were observed to be operating outside of assigned amateur frequency bands.

6. Little or no effort was made to maintain a proper station log.

Under the present set of regulations, all operators of radio-controlled equipment should comply with the FCC regulations. These are known to every licensed amateur operator. However, both the comments contained in the letter and the terminology used in the letter clearly indicate the basic difficulties existing today in connection with the flying of radio-controlled model aircraft. The solving of these difficulties will open the way to a completely satisfactory means of RC operation. For example, the FCC refers to the "amateur station transmitting control signals." We are confident that the equipment used by a model airplane flyer to control his model is not even considered by him as a radio transmitting station. For all practical purposes he has in his hand a control box, or gadget, through which he controls the flight of his model.

Subsequent to the receipt of the above letter from the FCC, we in AMA Headquarters, together with C. O. Wright, Walt Good and Willis Brown, discussed the letter and the entire situation with officials at the FCC. We should like to make it very clear that each and every FCC official with whom we have talked has been extremely fair in his attitude and, we believe, is sincerely making an effort to assist the Academy in resolving our present problem in connection with radio-control. We appreciate the appearance of the FCC men from Kansas City at the National Meet last year and have been told that they were extremely helpful to many of the fellows there. The reporting of legal infractions observed there was of course mandatory on their part, and, we are certain, will serve the useful purpose of bringing concrete examples of our problems to the attention of FCC officials.

Fundamentally, the use of radio in connection with the controlling of model aircraft is one of transportation rather than of communication and it is therefore understandable that operators in the heat of competitive flying might overlook the transmission of their station identification letters as required by FCC regulations which are obviously intended to apply to the operation of radio stations concerned solely with communications either by voice or code.

It is our sincere belief that these matters will be straightened out in the near future and that we shall be able to concentrate on the technical problems involved in further experimentation and development in this all-important field of radio-controlled model aircraft.

Dope Can

(*Continued from page* 38)

Interest in the 1949 Nationals has intensified many fold in the Kansas City area as a result of the '48 meet. Many merchants have already expressed interest in adding to the $10,000 prize list.

The "hardware" for the 1949 event will have a completely distinctive design never duplicated before or at any other meet. When the winner takes his award he will have an "Olympic" trophy that will never be duplicated as his perpetual memento of the 1949 meet. It is planned that fourth place winners will receive permanent cups, with fifth to twelfth place winners receiving an equally distinctive award. Merchandise prizes will probably exceed any ever offered in the Nationals.

Flight conditions will be improved wherever a weakness appeared last year, Hall said. Even the weather will probably be more ideal for contest conditions by being two weeks earlier.

Timers will again be Navy personnel, many of whom served last year. Judging will be done by AMA leaders in the Midwest area, with specialists invited from any part of the country where they may be located.

"In other words," says Hall, "the things we learned last year will guarantee that this year's Nats will surpass any ever held anywhere. We want to assure every AMA member that we want to start the trend to make the AMA National Model contest the completely outstanding annual event in all modeldom—one in which every modeler, from any state in the Union, will find the toughest, finest, fairest competition in the world."

Entry fees will be the same as last year, and application blanks and information sheets will be available shortly from Academy of Model Aeronautics, 1025 Connecticut Ave., N. W., Washington 6, D. C. Send 10 cents in stamps with your request for application.

Housing for families and girl contestants will be available in Olathe to a greater extent and choice than in 1948, the Olathe committee said.

The Jackson County Sheriff's Air Patrol Squadron will spot, and a fleet of recovery cars is already assured.

Stuck on Sticks is Michael Borysoff of Buffalo, N. Y. It seems that the picture of Max Bassett's stick gas model in last May's issue tickled his fancy, to the extent of his wanting to build one. With the cross-section rule eliminated in free-flight gas, many of the models seen on the contest field at present are in reality stick jobs. A very popular practice is that of taking a stock kit job, such as the "Zipper," and making a simple sheet balsa fuselage for it in place of the oval, bulkhead-and-stringer fuse originally designed. Main requirement is that wing, tail and line of thrust be positioned exactly as they are on the prototype ship.

Loaded with dynamite is this question, which was apparently asked in good faith: "What relationship (in area) do models (gas) have in regard to wing, vertical fin and stabilizer?"

The answer to this one, which is as old as the gas model itself, has been fought back and forth with no definite solution. Essentially, the answer depends upon personal preference as to the flight

characteristics desired. In terms of wing area, stabilizer areas normally range from 25% to 50%. With the smaller stab, the C. G. is usually at about ¼ of the chord aft of the leading edge of the wing and performance resembles that of full scale aircraft, with a gradual, steady climb and reasonably fair glide. Tail surfaces are placed about 2½ to 3 times the length of the average wing chord aft of the C.G. At the other end of the scale, the C.G. with large, lifting stab is often at the trailing edge of the wing. Adjustment of this type is usually a little more difficult, but when done properly, the large, lifting stabilizer (frequently 3½ to 4 times the average chord length back of the C.G.) tends to keep the nose down in the climb and contributes to an extremely flat, thermal-catching glide. However, such ships, while practically unbeatable in calm weather, have been found to be erratic in a breeze. Average setup is a stabilizer with slightly lifting section, having an area of about 33% of the wing area and placed about 3 times the average wing chord length aft of the C.G., which in turn is usually placed at the 50% point of the wing chord. As to fin area, the correct amount varies with the design of the model—the idea being to use as little as possible (e.g. the "Interceptor"). Five to six percent is usually sufficient for the average pylon ship.

"What's Fine for a .29?" asks Jerry Tice, of Tom's River, N. J., who's looking for a simple speed ship for his McCoy. Wonder if he's considered American Hobby Specialties' "Zing"? It assembles easily and we're told that a few extra mph can be picked up by removing the canopy and adding a cowl. Even "as is" the ship will get up and go.

Kanadian Korner this month consists of a letter from Regina, Saskatchewan. How about the rest of you guys? Jim Zerr, our lone correspondent, more than holds up Canada's end with a swell letter. Active in CO_2, Jim reports flights of 3 to 5 minutes with his OK-CO_2 Powerhouse combo. An original design was lost o.o.s. By the time this is read Claude McCullough's "Pixie" and Hank Struck's "Champmaker" will have been

"Don't give me an argument about jet propulsion—you'll do better just flapping your wings!"

built and flown. He's also interested in Wakefield rubber jobs, and sketched his idea of what a rubber model should look like. Mmmmm, not bad at all! He'd like readers with similar tastes to write him, so if you're interested, he lives at 2120 Hamilton St. in Regina.

Tell Ya What I'm Gonna Do! Ya say you've no experience in control line? Ya say you've tried, and the most you've "flown" is ¼ lap? Tell ya what I'm gonna do! I'm gonna pass along the tip of Dick Kulaas, of the Decorah (Iowa) "Skymasters." First, you take a Vivell .35 with high-compression head and glow ignition. Then take a "Trainee," chop 6 inches off the wing tips, install the engine, snap on 50-foot lines and you're all set. Dick says that two club members with no previous experience, ages 13 and 14, got in flights of 20 to 25 laps, including take-offs and landings, without busting a prop or flipping the ship over. Flights were made with no assistance other than an experienced flyer in the center of the circle, who did nothing but give verbal instructions. Thanks to the powers that be at Luther College, the "Skymasters" have the run of the campus for flying.

Displacement Double-Check is recommended by a correspondent, who although signing his letter prefers to remain anonymous for obvious reasons. We'd heard of him before, so the impressive list of contest wins he gave us in order that we'd know he wasn't just batting the breeze was unnecessary. He reports specific instances of camouflaging large engines to look like small ones and the reaming out of small ones to obtain displacements in excess of those permitted for the class. He's not alone in the suggestion that displacements be checked; we know of at least one project going on right now designed to produce a simple means for making such checks. What's your idea?

"Uh-uh" Says Jim Walker, when asked if his proposed enclosure for control-line circles wouldn't cost too much. In a letter to Frank Greene, a copy of which Jim graciously sent us, he states that a 70-foot radius circle can be fully and adequately enclosed for less than $90—less than half of the $200 estimated by some. Jim feels that such an enclosure is the only positive means of protecting spectators at control-line speed events, and that it's needed to save the sport from being outlawed.

Boys' Clubs Grounded: The attractive little booklet, "Up From the Streets," sent along with the announcement of National Boys' Club Week, describes many of their activities. Mention was made in a previous column of their neglect of model aviation as one activity, and apparently this condition still prevails. You leaders could do the sport lots of good by approaching the local Boys' Club and offering to lend them a hand in getting started. They're doing a wonderful job; why not show them how they can do a better one?

Transocean Gets Hep: Taloa Academy of Aeronautics, a division of Transocean Air Lines, has announced a program on aeronautics, including full scale and modeling. Held each Saturday for 10 weeks, the course covers elements of aerodynamics, navigation, meteorology and airplane operation as well as model

building. Flights of the models built during the 10-week period feature the graduation exercises. No starting date is mentioned in the announcement of the course but if the boys around Oakland, Calif., where the course is being held have any idea of the score they'll welcome this opportunity. It's also a safe bet that should the first attempt prove successful, as it probably will, the course will be repeated. Requirements are that the boys be between 12 and 15 and have the backing of their parents or of a service club, such as Exchange, Rotary, Kiwanis, Lions, and so on.

Lucky, Lucky Pittsburgh! Through the generosity of James F. Hillman, President of the Harmon Creek Coal Corp., the flyers of Pittsburgh, Aliquippa and Washington, Pa., Steubenville and Liverpool, Ohio, and Wheeling, W. Va., have a field of several hundred acres. Twenty-two is the number to remember —it's 22 miles west of Pittsburgh on Route 22. James G. Schenck, 614 Ridgefield Ave., Pittsburgh 16, tells us about it and says that such things as a small building for contest supplies, a P.A. system and hard surfaced take-off runway will be forthcoming, provided you Contest Directors in that area signify by writing him that you're interested in running a meet or two there this summer. Those who attended the five free-flight contests and the radio-control meet held there last year are unanimous in saying that it's the best field in that section of the country. Mr. Schenck also asks that the flyers who would attend meets held there write to him as well. We're sure, for example, that the gang in Meadville and Erie plus the Clarksburg, W. Va., group will lend a helping hand in this case. It seems that Mr. Schenck needs this sort of visible proof of the desire for such a field in order to make a real model airport out of it. Here's your chance, flyers; do something!

Plenty of Snap in "Prop Wash," publication of the Rubber City Aeronauts of Akron, Ohio. We're not stretching a point when we say that their initial issue is a beaut. According to the publication, the RCA'ers fly everything, including indoor flimsies, and are about to advance to the dignity of being an incorporated group. Swell idea is that of their "Flying Circus," a group of hot-shot club members who stage demonstrations for such groups as the Air Scouts and Wing Scouts. At the request of Joe Andrews of Medina, Ohio, the boys made the trip over there to give him a hand in getting a club started. In addition to the talk given by Ray Yoho on club organization, Danny Mamay and Gene Kemmerline spoke on the subject of control-line flying, following through with flight demonstrations. Active in the club is friend Glenn "Pop" White, who contributed greatly to the success of the Wakefields, held there last year.

Doylestown Doings: Hitting on all cylinders is the Kiwanis Aero Club of Doylestown, Pa., whose "Prop Spinner News" reports a total membership of 78. The Doylestown Kiwanis Club appears to be the kind of sponsor a club dreams about but seldom sees. Take that banquet last November, for example—$50 Government Bonds, trophies and engines were handed out for achievements of various members during the year.

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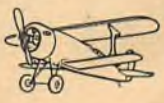

Laird Super Solution bipe for U-control. Has span of 26 inches. Takes Class A engine. Part of Plan 103.

Knight Twister—most popular of U-control ships. Takes B or C engine. Spans 30 in. 104 for this.

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Lil' Moe—control-line half of Multi-Moe combo. Good beginner's 18" speed job. C1. A or B. See Plan 102.

Wakefield—Claude McCullough's fine rubber-powered contest model of 40-inch span. On Plan 104.

Sizzler—hot rock U-control speed ship by Bill Seidler. Class D power, span is 22 inches. Part of Plan 103.

Cabin Pylon — attractive free-flight 52" plane for large A or small B engines. It's found on Plan 105.

Bojo Bipe — easily built, fast stepping control-line biplane for C1. B motors. Span of 30 in. Plan 101.

"Goat" — control-line trainer for Ohlsson 23 motor. Has span of 33". Just right for novice. 104.

Big Moe—free-flight biplane half of Multi-Moe combo. Take A or B engines. Span of 40". On 102.

Jet Job—world's fastest model powered by Dyna-Jet engine. Span is only 18 inches. Part of Plan 105.

Climax—Charlie Folk's national free-flight record holder for B or C motors. Span, 50". Ask for 101.

Hand Launched Gliders—take your choice: Fizzle is 12" Class A job; Sizzle is 18. Cl.B. Part of Plan 103.

Rubber Bipe—neat, easy-to-build rubber powered cabin biplane of 24" span for sport flying. Plan 105.

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Experience is the Best Teacher, to coin a phrase. In forming the Rockford (Ill.) Aero Aces, it was decided to dispense with the usual setup of officers. Club "brass," instead, is a Board of Directors consisting of Howard Heminger, Bob Lawrence, Hugo Anderson, Ken Youngman and Joe Yeazel. A free-flight club exclusively, the Aces are trying to stimulate activity by group building and flying. Offered to the prospective member are an excellent workshop and individual instruction, so if you're from the Rockford area and interested in free-flight ya oughta join. Even if you're not a millionaire you can still join, since there are no set dues; each member putting into the "kitty" only as much as he can afford, which is a break for juniors. Funds are used to add to the workshop, buy model supplies and help the juniors get to contests, Bob Lawrence sent us the news, saying that while some of the ideas represent a different slant, they're based on the experience of many years in various clubs. You can reach him at 836 Diamond Court.

Ritner on Top Again: Jack Ritner, who won the San Francisco Recreation Model Tournament last year, came through again last November with a first in the Class A hand-launched stick contest by virtue of an o.o.s. flight. Winner in the Micro (under 12) division was 11-year-old Fred Schulenburg. The Christmas holidays provided time to run off the Holiday Contest, which had 17 events scheduled. Latter included various types of hand-launched, catapult and towline gliders, as well as hand-launched pusher, stick and flying wing, R.O.G. stick, R.O.W. stick and helicopter. Pretty versatile bunch, aren't they? The Christmas Cup was awarded the contestant with the highest score, "disirregardless" of age.

On the Other Side of the Bay, we find via June Dyer's "Aeroneer" that punk weather all but wrecked the carefully-planned California State Free-Flight Championships, annual show of the East Bay Aeroneers. Although she doesn't say so, June worked her head off in meet preparations—she always does—and to have a gale show up with the contestants just doesn't seem fair. They'll be in

"The way things are these days I decided to put in bomb racks."

there pitching again this year, though. Good news comes from the report of 12:01 turned in by Don Foote in Class CD at the Gilroy "Jaycee" meet, which means that he's feeling more like himself again after being laid up in the hospital. Watch this guy during the contest season, mates; he'll take home lots of hardware!

Bouquet from Bristol comes from Clarence Wells, secretary-treasurer of the Bristol (Pa.) Aeromodeleers, who gives a pat on the back for the January issue. New club officers, in addition to Wells, include president Gordon Pearson and vice-president Tommy Spitzo. Door prizes, some of which are donated by the local hobby shop, are given at nearly every meeting and are a good method of keeping attendance up. Prospects of a contest this year are dim, however, due to present lack of a contest field and poor spectator attendance at last year's meet. If a field can be found, maybe the Exchange Club there in Bristol can talk local papers into giving the meet the publicity it deserves. The front page is none too good, say we.

New Twists by the Twisters: Harold Bunting, Senior Advisor to the Prop-Twisters of Greensboro, N. C., reports that their control-line contest held Nov. 21 was the best ever run by the club. Probably due to the introduction of new starting line procedure, the meet turned out fine. Proven by this contest, the new wrinkles were to be incorporated in their big Southeastern Championships. Principal awards were the Sportsmanship Trophy, won by Harold L. Roberts, and the Outstanding Contestant Trophy, which was shared by Ed Crawford and Norman Johnson. Mr. Bunting reports as unusual the acceptance of the AMA Precision Rules by the flyers. The Twisters are one of many clubs in this respect, we hear, and it just goes to show what happens when the rules are written by the flyers themselves.

Fresno Conks Bakersfield: The final challenge match between the Fresno (Calif.) free-fighters and the Bakersfield bunch resulted in a win for Fresno, so they keep the challenge trophy. Ocie Randall remarks in the "Fresno Model News" that what probably won for them was the use of regular ignition, rather than glow plugs as used by Bakersfield. Could this be an indication of a trend? At any rate, Ocie says that *all* of the Fresno crowd got in their 3 flights while Bakersfield suffered—mainly from an excess of power. High time went to Fred Bonar with 13:35 in Class C. Carl Randall topped the Fresno team effort with 11:52 with his B ship. Plans are already being "connived" for a return series this year.

Steed or Spunt? Which is the right term? In his editorial in the Augusta (Me.) Flying Maniacs' "Tale-Spinner," Stan Davis decries the practice of flying stunt ships in speed events, as is done in Maine. He pleads for development of true speed models, so that Maine can report some creditable times. Of course, there's no rule against it, but there could conceivably be a local one that the same ship couldn't be entered in both types of competition. Latest issue also reports that Vaughan Hodson, of Sanford, who is just about the hottest stunt man in the state, is in the hospital at Togus for a serious back operation

and is just about totally enclosed in a plaster cast. The Massachusetts flyers will remember Vaughan, who bowed only to Lou Andrews. Forecast is that he'll be out for a year; but let's hope he'll be in the circle before then.

Quandary à la Belgique is described by Jacques van der Meulen, Terneuzenlaan, 10, Ghent, Belgium, who would like to correspond with an American modeler. Due to his being forbidden to send dollars out of his country, Jacques asks for advice as to how he might obtain some decent model materials, so sadly lacking in Europe. Maybe a club here might help—stuff that's considered just about useless here would be highly prized by him, we're sure. Also he wonders whether there's a diesel made here weighing 175 grams, with a displacement of 5cc. and turning up 6,000-9,000 rpm. Off-hand, we'd say that the Drone just about fills the bill.

What's He In For? A. W. (Sandy) Murray writes us from the Police Station, Bridge of Allan, Scotland, thereby conjuring up all kinds of speculations. Seriously, though, Sandy writes that he's 18, a member of the Stirling Model Flying Club, and anxious as all get-out to have you guys write to him. Just about to be drafted, he hopes to get into the R.A.F., of course. His trade, for which he's in training, is that of Technician in the Post Office Engineering Department. Since he doesn't describe the job, we can't tell you what it is, but maybe there's a modeler or three employed by our P. O. Dept. who knows what he means. (Do you know, Vern Oldershaw?)

Solo Club

(*Continued from page* 30)

the Ercoupe and that was manufactured in August, 1946. All these ships are maintained at a high standard in the school's CAA-approved repair station. Assigned to the flying club, none of these planes is used by the school in their regular work and, if the success of the club requires it, more planes will be set aside for its exclusive use.

The Martin School of Aviation also turns over a large amount of its promotion budget to further reduce the cost of operation. Operations are on a strictly cash basis. This cash policy eliminates a major expense item, that of bookkeeping. While the profit is very slight, the school feels that "the advertising value and general interest will prove profitable to us in the long run and be mutually beneficial." What about membership rules? What does the individual pilot have to do?

First, there is a $10 membership fee, payable in advance. This fee covers club privileges for one year. It is not returnable unless a member is suspended due to an infraction of the rules, in which case the refund is prorated. This fee does not apply toward ownership of club planes and membership is not transferable. The club maintains the right to refuse membership or removal of membership. No substitution of ships is permitted; only those assigned to the club may be used. On overnight flights Mondays through Fridays a minimum of two hours flying a day is charged for. For overnight or all-day flights on weekends, the minimum charge is for three

hours a day. Tie-down and hangar fees are paid by the member making the flight.

Under the agreement which the member signs with the club, he is required to inspect and check the aircraft before take-off; to return the ship at the agreed time, weather permitting; to notify the flight office before take-off of the intention to fly anywhere but in the local flying area; to obtain weather reports before cross-country; to fly only where ceiling and visibility are above minimum VFR conditions; not to fly into or over a solid overcast or even one that is slightly broken; to land only at established airports except in emergencies; and not to allow anyone else to handle the controls closer than 1,000 feet to the ground. For any loss or damage to the airplane, or to other persons or property caused by failure in whole or in part to comply with these regulations, the member is liable. In other words, if the pilot flies the way all pilots should fly, which is with common sense, he has no worry about responsibility.

Let's boil down this scheme. The essential difference between the Martin School plan and the average club plan is that the members do not own the airplanes. Ordinarily, when a group forms to obtain cheap flying through a club scheme, they are faced with the purchase of a ship, and financing the depreciation and insurance on the same, to say nothing of maintenance and repair. In the case of the Orange County Club, the ships are provided at a low figure, so low in fact that it is doubtful if outright ownership would work further economies.

Now it is quite evident that only the progressive operator would push a scheme like this one. The same plan, or variations of it, offers opportunities for other progressive operators with an eye on the future. Some operators should take the ball and run with it if you make them a proposition. Some, of course, are not set up to handle a club deal. But get together with your operator. Talk to other local private pilots, including those who gave up on their flying. Talk up the Martin School plan.

Proof that even the smallest operator may be interested in progressive ideas was given when a small airport let the solo clubber and other private pilots use Champions at $4 an hour, and we-buy-the-gas. No charge is made for time on the ground, even away from home for a week or two. The pilot pays hangar fees. One trip we made took four days and 1,200 miles and the bill came to $52.00. This scheme may work only when the operator does not have all his airplanes in steady service. An idle ship does nobody good.

So, thanks to Hollis Sanders for this information, and good luck to the Martin School of Aviation, for giving a break to private pilots. If more operators see the light, private flying will find new energy.

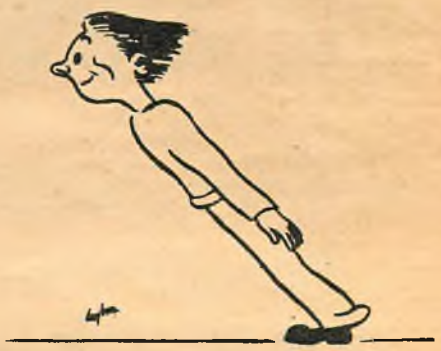
"I began flying at 17 as a cadet in the CAP when I was offered a flying scholarship which gave me eight hours dual," says D. W. Hamlin, C & I 139698, of Williamsport, Pennsylvania, who joined the Solo Club some months ago and now

MODEL TYPES — **by Cayton**

Side-winder advocate

Single-wheel landing gear advocate

Being an expert merely requires a little experience and a lot of good common horse sense!



Typical speed merchant

wishes to put a hearty okay on the articles and tell us something about himself. "That was in 1944. I built up 35 hours for a private by May, 1945. Then the Navy bundled me off. No flying for a while. Two days after I returned home from separation, I enrolled in a commercial course under the G.I. bill. Flew my head off for eight months for the commercial, then, between charter trips, built up time for a bona fide instructor's rating.

"That recent column on stalls was strictly okay," thinks D.W., "and I was surprised how many of us cannot accurately gage an approaching stall. In fact, I was amazed."

Apropos of this, Leighton Collins, member of the Non-Scheduled Flying Advisory Committee, advises the Solo Club of a new regulation tentatively drafted at a meeting of the Committee with Delos Rentzell, Administrator, CAA, which would shift the emphasis in flight training to more thorough and intensive instruction in stalls. Existing methods of pilot training have resulted in continuing stall-spin accidents and have, in effect, discouraged manufacturers from building stall and spin-proof airplanes. The committee felt that a student should be able to demonstrate that, in any aircraft, ailerons may not work at all or may actually work in reverse.

For instance, it sometimes happens that an attempt to bring up a low wing with an abrupt stick movement during a slow cross-control turn, may instead cause the plane to spin out the bottom. Provided that the plane being used could be caused to start out the bottom, the student would be required to demonstrate recognition of and recovery from a lateral stall induced by a fairly abrupt movement of the stick towards the high rear corner of the cockpit while in a tight, slightly crossed-control turn with power on. This isn't as complicated as it sounds. It shows for the first time that CAA is willing to face the skeleton in the closet, and revise its obsolete regulations, for it is the kind of stall and spin just described that is the real killer.

Checking in with some comments on flying above the border, Edward Heiereuk, Jr., Windsor, Ontario, Canada, tells us, "Ever since taking flying lessons I have wanted to join your club, but here in Canada we have a peculiar student pilot setup. We never get a student license but fly on the instructor's certificate. When a student violates a Civil Aviation regulation he receives not only official wrath but that of his instructor who has to account to the Department Inspector for our actions. Believe me, very few stray from the fold!"

Ed began flying with a charter and flying school called Interprovincial Air Services Ltd., and put in his dual on the Fleet Type 80, or Canuck, powered by an 85-hp American engine and generally resembling a T-Craft. According to Ed it is a nice airplane to fly and cannot be spun from a stall except with power and some vigorous rudder work. For other prospective Canadian members of the Solo Club who are worried about this license requirement, Headquarters will honor a brief note of testimony from your instructor.

George R. Reiss, a newspaperman with the Youngstown, Ohio, Vindicator, has information on the Jay-Cee Flying Club, of which Reiss is president. This

club was started ten years ago by a group of fellows who could neither afford to buy a plane nor pay out $8 an hour for pleasure flying. In the beginning the club affiliated with the local Junior Chamber of Commerce, who held the plane, but later pulled out and incorporated on its own.

Policy has been to select members who are mature and conservative and have pretty good jobs. Each member has a right to sell his membership, with the purchaser subject to a two-thirds vote of the membership. Present roster includes a steel executive who supervises a plant employing 9,000 people, a newspaperman, two school teachers, a proprietor of a furniture store, a five-and-ten-cent store manager, an insurance executive, a lawyer, and a plant foreman. An interesting sidelight is that one member has no vision in one eye, another but ten percent vision in one eye, and a third has an artificial limb. If this club sounds a little out of the ordinary with its caliber of membership, it is likely that any club, like this one, started by fellows with ordinary wallets, can be expected to grow with them.

Only three of the original Jay-Cee members are with the club today. Many have moved on to flying jobs and have no need of a club. One became an American Airlines DC-4 captain, another flies a twin Beech and Lockheed for an Akron rubber company, a third flew 54's on the Crescent route during the war. In ten years this club has had but three minor accidents, typical being contact of a wing tip with a car during taxiing. It now has its fourth airplane, a 1946 Chief, having started with a humble 50-hp Cub, then followed up with a 65-hp Cub, and an Aeronca Chief.

Charges are $2.40 a flying hour, which covers gas and maintenance. An additional two bucks goes for hangar rent. Insurance is covered by assessment. Experience here has been that carrying maximum coverage was too expensive and that, in view of the conservative kind of flying, personal liability and property damage are sufficient.

In the event of an accident resulting from failure of equipment, the club pays damage by assessment; in case of damage resulting from negligence or violation of CAR, the member is responsible. A safety board of officers determines responsibility and has the right to ground or suspend members for bad flying. Rules are simple: CAR prevails, members can sell out, duties of officers and the safety board are defined. Members register for time, using plane for day or two if they wish, but are limited on Sunday and holiday afternoons to an hour. Commercial pilots are not eligible, the membership feeling that they are not good club material, and eventually expect to be paid for flying instead of paying for it. Members may use plane for pleasure or business trips and there never has been a serious conflict over who had first choice of the ship. In ten years, the only battles resulted from members with reservations insisting on other members without reservations taking the plane. This "after you, Alphonse" attitude is indicative of the smooth working of this old club. Reiss passes on these tips: try to pick members who are honest, congenial, and conservative rather than hot pilots; keep the airplane in top condition; bear down on exhibitionists.

Pilots who like to take up passengers just for the ride will be interested in a medicated chewing gum called Trip-Eze. During the war both the Navy and the Air Force found that the use of hyoscine hydrobromide reduced the rate of airsickness in cadets with previous flight experience from 7.5% to .5%. Trip-Eze is a chewing gum base containing hyoscine and other ingredients found to attack the main factors in motion sickness, including physiological, psychological, and mechanical. This wonder gum is distributed by Multi-products Company, Inc., 1424 K Street, NW, Washington, D.C.

Before anyone moves that this meeting be closed, how about sending in snapshots of yourself and favorite airplane, preferably the one you soloed. If enough of you want to see your faces in print, and what the other fellow looks like, the Solo Club will print anything that won't break the presses. And you older members—wake up there, you in the back row!—how about letting us know how many landlubber passengers you take up for their first rides. If every private pilot among us took up a minimum of five "you'll-never-get-my-feet-off-the-ground" passengers, we wonder how many would break down and learn to fly.

SOLO CLUB MEMBERSHIP

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

To obtain sterling silver Solo Club wings and life membership card send coupon, with 75c, to Solo Club Membership Committee, Air Trails, Box 489, Elizabeth, N. J.

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_____

2. Evidence of service in AAF, Air Force, Navy air force, either as a rated pilot or having received flight training including solo time (attach).

_____

Applicant's Name (print)

_____

Address (print)

_____ _____

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_____ _____

State Your Age

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CAP Radio

(*Continued from page 35*)

Not long ago Maj. Rhodes and CAP Supply Officer Maj. Glannin A. Cloward completed regional communications conferences in New Hampshire, Washington, D.C., Springfield, Ill., Sioux Falls, S. D., Oklahoma City, Okla., Portland, Ore., Reno, Nev., and Marietta, Ga.

The conferences enabled Headquarters officials to explain to Wing Commanders and other CAP officials the proper procedures for setting up CAP radio stations, what the Air Force expects from CAP communications, and what the local CAP officials can expect from National Headquarters.

Net result of the conferences has been to perfect an efficient network of radio communications which is expected to operate without hitch in peacetime or during a national emergency.

CADET TRAINING?

When Marie Squier, prospective CAP Cadet in Boise, Idaho, wrote to Wing Headquarters with the question, "My mother wants to know why the Air Force is training Cadets in CAP—especially girls," she probably didn't expect to receive a 600-word letter that is a model of clarity, interest and sincerity.

Written by Capt. K. W. Claybaugh, AF-CAP Liaison Officer for the Idaho Wing, the letter tells more about the aims, purposes and philosophy of CAP than has often been written in entire books. The last paragraph is worth noting:

"These are the activities that the Air Force is sponsoring in the CAP program. It is not a military organization. It is an organization of civilians who band together to put their abilities to the greatest use in the service of the nation in case of an emergency—and incidentally, derive a good deal of personal satisfaction and enjoyment in the process."

N.M. FILM PROGRAM

New Mexico Wing CAP has started a project that will be watched with interest by other state Wings: the distribution of training and other Air Force films on a circuit to cover every Squadron by June.

Fifty-seven reels of educational and interesting features were assembled by the Wing Headquarters staff, and assorted into various combinations of 60 minutes each so as to enable local Squadrons to put on shows frequently for CAPers as well as friends, families, aircraft owners and prospective members.

Maryland Runs Search Mission

Maryland Wing CAP is stepping up its activities and recently held its first simulated air search-rescue mission.

Six aircraft participated from the Baltimore Municipal Airport which served as Base of Operations. The National Capital Wing assisted in the mission.

SCHOOL TRAINING

With the exception of a few states, all Wings today have high schools cooperating with the Civil Air Patrol in its broad educational program, National Headquarters disclosed.

Explaining that it favored the integrated type of air education program accepted by educators throughout the nation—aviation education from the first grade through college—National Headquarters said that it found a more pronounced interest and enthusiasm at the high school level.

"Boys and girls in high school are avid for aviation information, and the CAP encourages at least a one-year aeronautical course of instruction, conducted either by the local unit of CAP, or within the high school by school officials, whichever is more practical," Headquarters explained.

"We prefer high school instruction if at all possible, and then have the local CAP unit supplement that good academic training. After all, CAP is a connecting link in a complete air education course. While the high school is excellent for the academic training, CAP can provide the extra-curricular activities such as supervised airport visits and familiarization flights which most high schools are not equipped to perform, but which are highly essential if the boy or girl is to receive a complete air age education," it was explained.

National Headquarters CAP stressed the importance of CAP cooperation with the high schools, and credited the present successful programs with the splendid support received from the various State Boards of Education.

AIR TRAILS

ADVERTISERS' INDEX

April 1949

While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this April, 1949 index.

It is the practice of National Headquarters CAP in developing new courses of study in aviation, to submit such course to the top experts in education and to have them evaluated by persons in various educational fields prior to their use in the high school or local CAP unit.

CAP's National Headquarters is endeavoring now to work out a pool of about 100,000 Cadets in the United States. A number of states already have outstanding cooperative programs between high schools and local CAP units and as the program grows the 100,000 Cadet goal moves closer to realization.

States with outstanding CAP cooperative educational projects were listed as New Hampshire, Utah, Vermont, South Dakota, California, Georgia, Louisiana.

TEXAS WING LAUDED

One of the greatest search-and-rescue missions ever flown in Texas was handled recently by Capt. Helen R. Wheeler, Acting Deputy Group Commander, Texas CAP.

It all started when a privately owned Cessna was reported missing with pilot and three passengers. The Texas CAP used five flights and ultimately was joined by 24 planes from the Oklahoma Wing. Patrol planes flew a total of more than 250 hours.

While the missing plane with its occupants was located by another plane which had joined the search, Capt. Wheeler and Texas CAP received the plaudits and thanks of officials throughout the state.

PAPER WORK STEPS UP

Louisiana Wing CAP is trying something new, designed to improve Wing operations and at the same time increase membership.

Under the direction of Wing Commander Col. W. A. Prewitt, Jr., a new Squadron designated as Headquarters and Headquarters Squadron has been activated primarily to furnish competent personnel to handle Wing correspondence, records, and in general to assist the Wing Staff.

One of the first projects formulated by the new unit, meeting with considerable success, is a Wing Recruiting Office. This office assists in preparation of applications, including typing, fingerprinting and photographing. The new Squadron is under command of Capt. Harold de Montfort.

Twin Boost From Aviation Groups

Civil Air Patrol is gaining strong support each month, the latest boosters being National Aviation Clinic and the Air Reserve Association.

At the Sixth National Aviation Clinic, a specific bill was adopted encouraging cooperation with CAP, which stated "this program is important to the development of private flying and civil aviation as well as to military aviation and is worthy of support in all areas."

The Air Reserve Association adopted a resolution that "close cooperation with units of CAP in all areas should be maintained by Reservists and by chapters of ARA."

Whirlaway "C"

(Continued from page 63)

the fuselage; also the short piece of aluminum that holds the back of the cowling down is glued in. After they have dried, the cowling is set on the bottom half and two holes are drilled to accommodate two 4/40 bolts. Next, the .045 cowl ring and short piece in back of the cowling are tapped out for the 4/40 bolts.

The stabilizer and elevator are made of 1/16" three-ply plywood and the elevator horn is made from a Baker Gadget. The Baker Gadget is wrapped directly around the elevator as shown on the plans. The hinges for the elevator are made of .040 copper wire. Six of these are required, three on each side. The detail of the hinges is shown on the plans. These hinges must be installed on the stabilizer and elevator before the final operation of soldering is made. To install the stabilizer, a groove 1/16" thick must be made in the top half of the fuselage and the stabilizer is glued directly into the slot. Now the control rod hook-up is installed on the control horn. A slot in the top half of the fuselage is made so the control horn may stick through and a fairing block is added. The top half of the fuselage that the cowling is not attached to may now be glued on.

The wing is made of one very hard 3/8" x 5/8" x 12" oak spar which is tapered to shape as shown on the plans. A slot is cut into the left side of the spar for the bellcrank. The covering of the wing is .012" sheet aluminum. The next step in the wing construction is to make a paper pattern of the wing top and bottom. Lay this directly on the aluminum and cut out around the pattern. After the sheet aluminum is cut out it is a very easy matter to bend in the leading edge so the trailing edges of the aluminum just meet to make a symmetrical airfoil. The trailing edge is now riveted together. The wing tip is made of .045" sheet aluminum inserted between the top and bottom wing skin. The wing panels are held onto the spar by small wood screws.

The take-off dolly is made of 3/32" piano wire. All of the joints are wrapped with copper wire and then soldered. Be sure to do a good job of wrapping and soldering so that the dolly will not come apart. One pair of 2½" wheels are used for the two front wheels of the dolly and a 2" wheel is used for the rear. The parts that rub against the model are wound with rubber tape to prevent scratching the paint. Make sure that the dolly runs true on the ground; the rear wheel does not need to be offset any as this sometimes throws the model off the dolly on take-off.

The prop that is shown on the plans is 8½" in diameter with 11" pitch. This, I have found, works very well on the Atwood 49. It lets the 49 turn about 14,500 rpm on the ground. As always the diameter and pitch will depend upon the engine used. No two engines are alike, so a little experimenting with different diameter and pitch will have to be resorted to.

In a ship where [illegible]nol base fuel is used do not u[illegible]rcumstances use lacquer [illegible] the model. The paint tha[illegible]t Dulux. This paint w[illegible]nder a methanol bas[illegible]er.

The Last Word

Merci, Mates—for all those wonderful Christmas cards and season's greetings. So many came in from many countries we're forced to use this means of acknowledging them.

* * *

Contributors, Please Note: So many entries are received in the Airmen of Vision, Sketch Book and Photo Competitions that none can be acknowledged or returned. For that reason, be sure to keep duplicates on all material you send. The same policy applies to photos submitted to the Model Matters section. We're unable to return photographs, so don't send any unless you retain copies or have the negatives.

* * *

Speaking of Airmen of Vision: That monthly feature has attracted world-wide attention. Entries are received from all parts of the globe. Here's a photo of pioneer aircraft designer John K. Northrop congratulating Nick G. Stasinos (1st place winner, March).

William H. Melvin, Jr., Cincinnati, Ohio, made the local papers when he placed in the Vision competition and reports, "The honor you accorded me won me another promotion with the Ralph Jones Advertising Co."

* * *

Now, What's With May? The next issue is one you should prize. It gets off to an eye-opening start with the article, "Atom Powered Bombers," which updates you on accomplishments in the field of nuclear energy as power for aircraft. You'll meet young Stanley Hiller in the "We Fly the Hiller 360" story. Author Don Downie thinks it should be subtitled, "The Egg-Beater and I"! Hiller is only 24; he started his manufacturing career turning out model race cars.

We're not neglecting the model builders, either. Partial line-up of features includes the Pan American Pay Load winner of the 1948 Nationals—Herb Kothe's fine weight-lifting free-flight design; the Gay Lady V which has held numerous speed records and topped everybody in control flying at the last Nationals; a scale model for control-line fans of the DeHavilland-4 of World War I and post-war fame. Then there's a simpler, small flying job for less experienced modelers.

—The Editors

NEW

SUPER FLYING, SCALED-DOWN MODEL OF TESTOR'S SENSATIONAL TC-2 TRAINER . . . DESIGNED FOR USE WITH INFANT-TYPE, VERY SMALL BORE, GLOW-PLUG ENGINES

ONLY $1.98

ALL PARTS PRE-FABRICATED . . . ASSEMBLY TIME: LESS THAN 2 HOURS!

TESTORS

BABY TC-2

CONTROL LINE MODEL AIRPLANE KIT

IMPORTANT . . .

In order to attain maximum performance from the BABY TC-2, use a Testor 5½D x 3P wood propeller with .020 cu. in. engines or an 8D x 6P propeller on .099 cu. in. engines.

Testor's BABY TC-2 is an accurately scaled-down version of Testor's popular TC-2 TRAINER. It has been carefully engineered to meet the requirements of the beginner, and serves the purpose of initiating the novice into the exciting Control Line model airplane hobby. The BABY TC-2 is designed for use with the new, inexpensive, very small bore, glow-plug type engines and is also suitable for use with carbon dioxide type engines. The wing span is 18" and the overall fuselage length is 16". All necessary parts, except the power plant and propeller, are furnished in the kit. Wooden parts are completely pre-fabricated, and hardware and wire parts are precision shaped and bent ready for use.

The advanced modeler will find the BABY TC-2 suitable for use with glow-plug type engines of .099 cu. in. displacement. As the model flies much faster with this size engine, it is recommended that the novice use the smaller engines of approximately .020 cu. in. displacement until thoroughly familiar with the flight characteristics of the airplane.

The BABY TC-2 can be flown with conventional control lines *indoors!* Where space is limited, the airplane can be allowed to fly by itself with the controls locked in neutral position. This is accomplished by running a single wire from the wing to a heavy object located in the middle of the room.

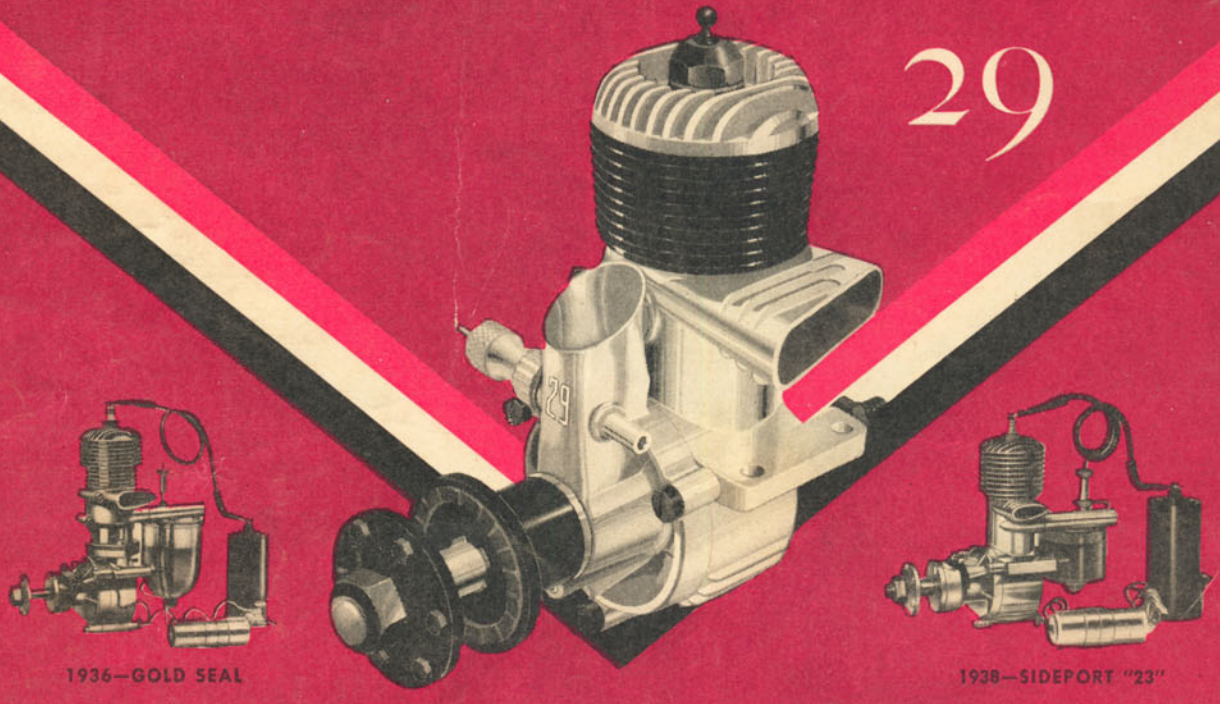
Can be flown indoors!

TESTOR CHEMICAL COMPANY (WOODWORKING DIVISION) ROCKFORD, ILL.

Ohlsson & Rice

present the Finest model engine ever built... the All-New

29



1936—GOLD SEAL

1938—SIDEPORT "23"

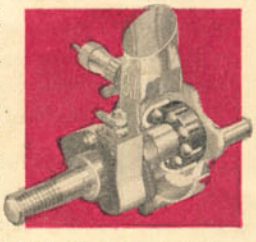
The new "29" brings modelers an engine not only with more power, but also with more *stamina* than any previous model engine of its size.

For the U-Control flyer here is a Class B engine that can *take* it (as well as dish it out). For the free flight enthusiast, here is the famous O & R power-climb, only *more so,* with smoother, more effort-free power. And for the hobbyist who prefers small racing cars and boats, here is an engine that makes these sports truly practical... by providing the stamina for heavy-duty operation.

Long before its announcement to modelers, the "29" proved itself worthy of the name Ohlsson & Rice. Many oldtimers will remember the "Gold Seal" and the original side port "23", engines which also introduced new standards of power and performance.

While these engines received the most severe power and endurance tests used at the time, such tests were child's play compared to the deliberate destructive punishment to which the "29" was subjected day after day... under tests that unfailingly search out any sign of weakness or wear in a model engine.

The result is an engine so durable that *sustained operation at 20,000 r.p.m.* could not break it down, so fine that even inner surfaces of the aluminum parts are polished! Hear the distinctive new war-cry of the "29" at your dealer's. It is the engine to see and own for '49, and many seasons to come.



ALL-NEW FEATURES OF THE ALL-NEW "29"

ROLLERIZED "CRADLED" CRANKSHAFT—More than 40 times the bearing surface!

AERATED CYLINDER HEAD—more efficient, long-life cooling!

STEELITE PISTON—Lightweight hardened drawn steel, not aluminum!

BRILLIANTONE FINISH—both inner and outer surfaces polished!

EBONIZED STEEL PARTS—Exterior steel parts hard-ebonized against rust and hot fuels.

R.P.M. 12,000 Bore .760 Stroke .660
Mounting lugs identical with "23" and "19."

AVAILABLE IN 3 POPULAR FORMS
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Engine Pak $11.95
includes O & R Racing Glow Plug

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includes O & R Racing Glow Plug

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