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Pictorial

JULY 1950

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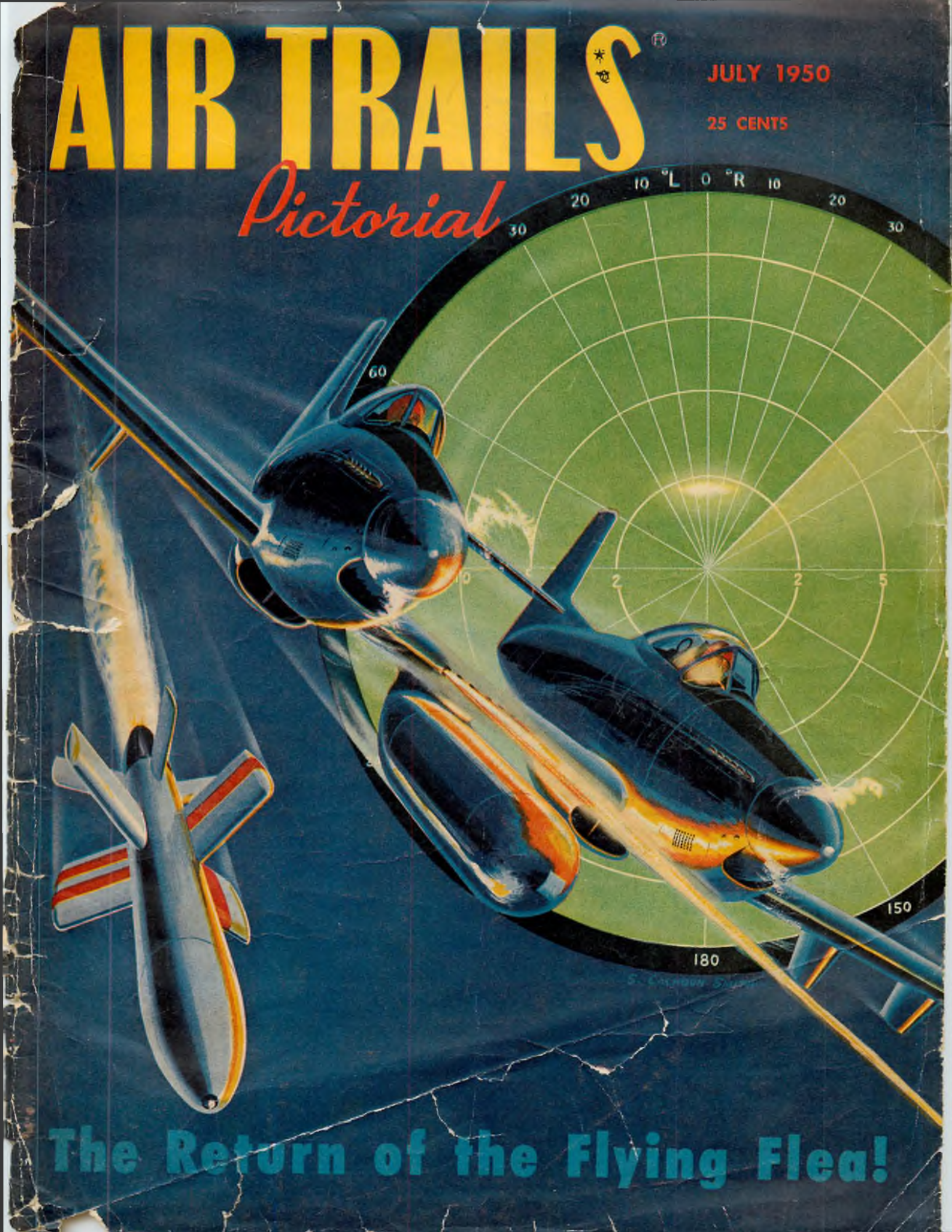

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First Officer Delta Air Lines

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AIR TRAILS Pictorial

JULY, 1950 • VOL. XXXIV, No. 4

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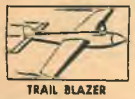
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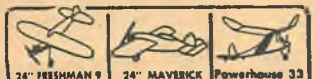

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The Readers Write

OL Trips ATI . . . As an avid reader of Air Trails and an equally avid citizen of Opa-Locka, I would like to call your attention to the correct spelling of our city. In your article on the Miami Air Maneuvers which take place annually at Opa-Locka, your writers rendered it Opa Loca. Zounds, sirah, this won't do!

The late Glenn H. Curtiss, who built and named our city, called it Opa-Locka after its ancient Indian name Opatishawauka-locka, which roughly translated means a high, dry spot in the middle of a big, wet swamp. The swamp is long since drained, and the tishawauka deleted from the middle of the name, with the hyphen to commemorate its passing.

Jay Tylen Bush, Opa-Locka, Fla.

"The Batwing Man" . . . You've mentioned Roy Grant's batwing act several times, but you've never said exactly what feat the "Red" bat performs. How about letting us in on it?

I enjoy your magazine very much, especially the air race articles.

"Dooley" Phillips, Bandera, Tex.

• After bailing out, Roy Grant "The Batwing Man" extends his wings and glides around making turns until he reaches about 1,500 feet altitude, whereupon he folds the wings, opens his chute and lands. By tossing out handfuls of flour from a sack he carries he leaves a trail for spectator to follow.

Top Ace of World War II . . . Could you tell me who was the top ace (in number of planes shot down) of the recent war?

Larry Chadd, North Platte, Neb.

• The top U. S. ace of World War II was Maj. Richard I. Bong of the AAF who had over 40 planes to his credit. A Russian pilot, Lt. Col. Alexander Pokryshkin, is credited with having shot down the most enemy planes. His reputed score: about 70.

Report from Japan . . . I have been reading Air Trails since Bill Barnes, but the present magazine is the best yet. The new planes are something to write home about; they certainly go over big with the Japanese modelers. Incidentally, some of the boys are very good although around Kokina and Yahata there's not much room for real model flying, free flight, that is.

There are quite a few engines on the market with glow plug as well as spark ignition. At present I own only one Japanese make, an .055, but plan to get several more before I leave for Guam. The prices here are quite low for the quality obtained, seems odd but these supposedly inferior makes operate better on their odoriferous fuels than our American makes. The fuel smells like liquid shoe polish, but as it works well I've not investigated too closely. . . .

You're doing a fine job for aviation, and might be gratified to know that the stack of Air Trails disappears at PX in 1 hour.

Lt. Melville T. Letau, APO 323, c/o P.M., San Francisco, Calif.

Visited XB-19 Regularly . . . I enjoyed the May issue so much I thought I'd better let you know. Especially liked the article on the B-19 because I was stationed at Davis-Monthan AFB for about 16 months and used to spend much of my spare time visiting the storage area containing all the famous planes, and the B-19 was my favorite among them. I guess if I'd still been in the AF I'd be one of the guys that did the dismantling, because my MOS was 555 (sheet metal).

I have a habit of making faces out of front-views of 3-view drawings, and on Page 27 of the May issue I had a field day. I even named them. The Schroeder 50 is "The Chinaman," Ibbs Special 22 is "Booh," P.A.R. is "I'm Mad," and the Pitts 8 is a masterpiece which I call "Bored Spectator."

Eugene J. Schwarz, St. Bernard, Ohio.

The Right Emphasis . . . That article on "The Daddy of the Super Bombers: XB-19" brought back memories of the first time I saw the giant gentleman in flight.

You have just the right emphasis on model aircraft, and just the right amount on actual planes. Keep Air Trails the way it is—it's perfect.

Rex E. Ward, El Segundo, Calif.

Movie Jet . . . In the movie "Chain Lightning," starring Humphrey Bogart, they had a jet plane similar to the Barrier Buster in a recent issue of Air Trails. I would like to know if the Air Force has a plane like the one in the movie or if movie makers just had this one built. I know they don't have one that will go as fast as the one in the movie, but I liked the way it was built. I think that the planes in the future will look like this one. (Prophet!)

James Beddingfield, Tuxedo, N. C.

• The jet plane shown in "Chain Lightning" is not a model of any existing aircraft. Built by the studio, it was not flown, only taxied with the aid of Jato bottles. All flight shots were either done by using a projected background or were actual flight shots of a North American F-86, the configuration of which is somewhat similar, from afar, to that of the movie jet plane.

Color Pics of Planes . . . Some time ago you sent me quite a few airplane pictures when I wrote to you, requesting names and addresses of aircraft manufacturers from whom I could obtain pictures of planes for use in my course of identification for our Civil Air Patrol Cadets. The response from manufacturers wasn't as good as I expected, and then I received the pictures from you which illustrated a number of airplanes and also made my class a success. This is my first opportunity to thank you for helping me. I appreciate it very much.

Lt. Bernard J. Minardi, Adjutant, Maywood Sqdn. 611-5, Chicago, Ill.

• While the supply lasts, Air Trails will be glad to send similar sets of color pictures to any CAP unit or model club making the request on official stationery.

Fancy New Airliners . . . It is a shame that "no fancy new airliners" are seen in Texas (see letter from Robert Conklin in recent issue in which he bemoans failure of vaunted postwar "Air Age" to appear).

However, any and all Texans are welcome to visit Miami, Fla., where National Airlines' postwar Douglas DC-6 Luxury Aircraft during the winter season flew 9½ hours per day to bring those frozen people in the North to Florida's sun and sand.

Harry C. Archer, Engineering Dept., National Airlines, Miami, Fla.

Showcase

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

Vic Stanzel's new "mono-line" Tuffy has made its debut. This prefabbed "jiffy-built" sport job was specially designed for the Stanzel monoline single-line elevator control. It has a 24" wing and all parts are ready to be glued together; sells for $1.98. Feature of the single line system is that the stab automatically returns to neutral when you release pressure on the plastic slider knob which travels back and forth on the twisted wire line actuator for "up" or "down." . . . Berkeley is breaking with its $4.95 T-28 model of the new AF trainer. Kit has scale aluminum cowl, plastic bubble canopy and turtle deck. . . . The newly developed Tommy Handlereel is a plastic reel-handle combo that has been tested to 320 lbs. pull without damage. Adjustments are provided for line length and sensitivity of control. Included are special line clips which remain attached to flying wires without hindering flying. Handle snaps out of way across reel during flight. Lines can be reeled up and secured in 30 seconds. $1.75. . . .

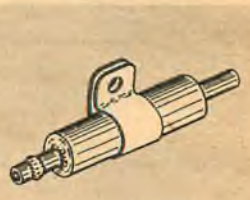
Vic's Tuffy

Handlereel

Something long awaited by the speed merchants who whittle their own is the type of item now available from Linkous Mfg. Co. and properly termed the "speed pan." It's a light metal bottom for Class B speed jobs and is ready for engine installation, no machining necessary. The SP is drilled and tapped to fit either the McCoy 29 or Dooling 29 engine. Front end is shaped to fit 1½ inch spinner. Affair weighs but 4 ounces. Price, $2.75. Class A size expected soon. . . .

Ready-formed speed pan

A. Pedu offers a "dive-valve" to cut down on power crashes with free flight models. Device works with all types of engines and on all models. Manufacturer says it's fool-proof and can be added to your present models with no trouble. Sells for $1 on money-back-if-not-satisfied deal. . . . Now for the really unique see the PAL 55 twin made by Pal Engineering Ltd. Engine has a displacement of .55 cubic inches, weighs 15.02 ounces. Priced at $62.50. . . . "Glo Engine Handbook" by Bernard B. Winston and Jack Bayha is a new 64-page, 6 by 9 inch book selling for $1 which is the first American work of its type on glow engines. Subjects covered range from the selection of the engine to its use, care and operation. Contains numerous drawings and data on all engines, *glow plugs*, fuels, batteries, propellers and accessories. Information on motor installation in planes, cars and boats is included. Complete, yet not technical, modelers will find answers to glow engine questions here. . . . New, two-color 64 page catalog (#21) has just been issued by America's Hobby Center. More than 250 models are listed.



Anti-crash

Glow Stuff

Showcase

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

Something really different in the way of free flight models for the smaller engines is Henry Engineering Co.'s Dakota. This "Veco" job is a prefabricated bipe for .035 to .074 cu. in. Good feature is its considerable wing area which will be of help to novice flyer from the adjustment standpoint and cut down on so many power dives we witness these days by some over-powered half-A free flights. The Dakota is priced at $2.25. . . . Similar to saws long used in certain trades requiring fine work, the Zona razor saw is a new aid for modelers. It's about as thin as a razor blade and has very fine teeth. Cuts balsa smoothly and notches formers, can be used for cross-cutting thick and thin sheet balsa and hardwood. Also cuts metal such as thin wall brass and aluminum tubing, angle and sheeting. $1. . . . Garday Model Lab's props are now priced at 15c for the "babies": 4.75/3, 5/3.5 and 6/3; 20c for the 7/4, 8/4, 9/6 and 10/6. These Garday props have hot-fuel proof wax finish and a blade pattern suitable for both U-control stunt and free flight. . . . A preconstructed 32-inch wing is the novel feature of the Rhody Special control line sport and stunt model made by WCL Specialties. RS has precut fuselage, die-cut teakwood side panels, formed gear, hardware. For A, B and small C engines. Sells for $3.95. . . . PDQ Products has announced a Baby Clown for the A/2 motors. Wing area is 136 square inches, wing span is 23 inches. $1.50. For stunt and sport flying. . . . A mini team racer is Midwest Model's Baby Buster. Takes motors under .10 cubic inch displacement. Completely prefabbed with cut or formed parts. Modeled along the lines of the Goodyear trophy winning Buster. Sells for $1. . . . Simplex-Pal is Russell Brothers' new model handle and reel priced at $1.50. Has three-way adjustment, flexible cable leads, retractable stake pin, line guid and lock, takes 120 lbs. $1. . . . Pope Metal Products' Monitor Pylon Control sounds like something that many clubs could work with for some real flight experiments. Four years in the development, it permits full control by the flyer from outside the circle. Works with lines up to 70 feet; you can stand or sit while flying. Unit is precision made, has ball bearings. Gears and links are first quality affairs. All parts are heavy steel or cast aluminum. Has been planned to work with all types of control models, large or small, jet or reciprocating engines. Unit is priced at $23.95. . . . Consolidated's Hell-Razor record-holding speed job with magnesium alloy pan now available as Cl. A, $5.95; B, $6.50; C-D, $6.95.

Dakota Bipe

Some Saw

Baby Buster

Russell's Pal

Development Highlights

● Swedish jet fighter SAAB J-29, powered by one 5000-lb.-thrust de Havilland Ghost engine. According to Swedish reports plane recently reached 950 mph.

● Design study by Boeing of jet transports. Three variants presented here based on B-47 configuration. Six-jet model at bottom is for transoceanic service; it features Stratocruiser's double-deck fuselage. Top one is equipped with external wing-mounted fuel cells.

● Blackburn Y.A.5. British warplane specially designed for anti-submarine action. Temporarily fitted with an R.R. Griffin engine; future models will have turbine.

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Read these typical reports of graduates now profiting from their Northrop training*

- *Paul B.:* "I am employed in Rocket Motor Design."
- *K. A. S.:* "I went to work the first Monday after graduation as an Experimental Technician in fuel cells."
- *Edward W.:* "I was hired immediately upon graduation. During the two years I have had several raises and a promotion. I am now working directly with the Project Engineer, in the new airplane Project Group."
- *Frank M.:* "Gene M. and I have been here at the Proving Ground for three weeks now. We have seen missiles and the V-2 rocket fired." (These two men were assigned to guided missile research as their first positions after graduation from Northrop.)
- *Douglas E.:* "I am in the Stress Group. My first job was to design the loading jigs for applying the torque loads in the (name of aircraft) static test."
- *Melvin H.:* "N.A.I. has an accurate idea of what is required of the new engineer. The practical end of our training has shown itself in a number of ways. Those of us with our technical school background have a definite edge in our work."
- *Allen B.:* "A wire offering immediate employment arrived a week after the interview. I am in Engineering Design."
- *Robert B.:* "I wanted to let you know how much I appreciate your help in securing this position. I work in the Missile Flight Test and Analysis Department."

*Names abbreviated here out of respect for personal privacy. Record on file in N.A.I. Graduate Placement Department.

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air notes | AVIATION TODAY AND TOMORROW

Fuel in the Air: New steps in aerial refueling techniques have been disclosed. North American, it's reported, is building for the Air Force air-to-air refueling equipment for the RB-45C. This will provide USAF its first data on refueling of a multi-jet airplane in flight. Also under test is air-to-air refueling of Republic's F-84 Thunderjet fighter. Object is to develop the most efficient equipment for the nine flying tanker squadrons called for in current AF plans.

One aerial refueling unit on operational status has been engaging in long-range aerial refueling practice missions over Europe with an American bombardment group in England.

Radar Eyes: A new radar sight for jet fighters which automatically aims all of a plane's guns, rockets, and bombs was announced by the Air Force after its recent gunnery contest at Las Vegas, Nev., in which some teams used the new device. The sight, known as the A1-C, produced by the Sperry Corporation, can be used in day or night against any target that reflects a radar beam. It is installed in the nose of the plane, along with the guns. The pilot simply keeps the target inside a circular pattern of light, and the sight releases bombs automatically at the proper time.

Time Telling: An old military custom, the 24-hour clock, is finally making headway among civilian flyers. CAA adopted 24-hour time telling this spring and now gives out its information to pilots and others based on this standard. Most airlines are adopting the standard for convenience.

Jets for the Guard: The Air National Guard, which is gradually converting from wartime planes to jets, expects by the end of this fiscal year to have as many jet squadrons in operation as it has fields from which they can operate safely. The Air Guard already has 116 F-80's and 79 F-84's in use. The program calls for equipping some units with F-86's and F-94's, subject, of course, to USAF's available procurement funds.

Navy's Aerial Labs: A converted Douglas airliner to help perfect blind flying techniques that will enable carrier planes to operate from flattop decks in all sorts of weather and around the clock, is being operated by the Navy at Patuxent, Md. Known as "Project Delta," the aerial lab is a revamped DC-4 with cockpit and cabin remodeled. Forward half of cabin has been turned into a workshop, and a removable dashboard section was created to permit a succession of new instruments to be quickly installed for testing.

What the Navy is after is a modified ILS, omni-range, and DME (Distance Measuring Equipment) system for installation on carriers and carrier aircraft which would make possible all-weather flight operations in fog-bound North Atlantic and Arctic waters—probably the major theater of operations in another war.

Across the country at El Centro, Calif., another type of flying experiment station run by the Navy is probing a different problem of future air war: bailout and escape systems to save the crewmen of crippled planes.

Some 400 volunteer jumpers in the Navy's Parachute Experimental Division regularly bail out of fast planes to test various escape techniques. Among improvements thus developed is an "extended skirt" version of the standard parachute, which has additional cloth at the bottom of the canopy to slow a fall about 20 percent.

Another is a "deployment bag," which pays out the shroud lines before the canopy opens, reducing shock to a minimum. Also under test is the "laundry-chute" trapdoor device by which flyers will make their exit through the bottom of the cockpit instead of out the top.

New Look in Races: The National Air Races will take on a decidedly new look when Labor Day rolls around. Gone will be the traditional Thompson, Bendix, and other races for old-type surplus military planes. Racing events will be limited to long-range straight-away jet contests and closed-course racing around the grandstand by midget planes. This drastic overhaul of the classic National Air Race program reflects safety needs pointed up by the Odom accident last year.

Jet divisions of the historic Bendix and Thompson events will be continued, with service planes making the cross-country speed dash for the Bendix award, and the Thompson classic being flown by military pilots over an FAI 100-kilometer course, in competition for possible world records. The Goodyear midget races will continue, but under new sponsorship, and an additional small-plane event for the 350-500-cubic-inch class may be arranged.

Return of the Blimp: The slow-flying, lighter-than-air blimp, which flew on coastal patrols during World War II, is making a comeback in military circles as one of the Navy's best weapons against the submarine. Navy has announced it plans to buy four blimps, costing about $4,000,000 each, out of its fiscal 1951 money. "In certain phases of anti-submarine warfare the lighter-than-air ships are more effective than heavier-than-air planes," Navy explains.

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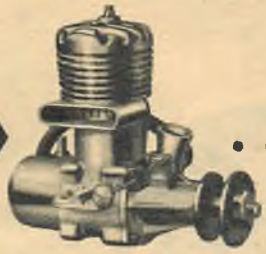

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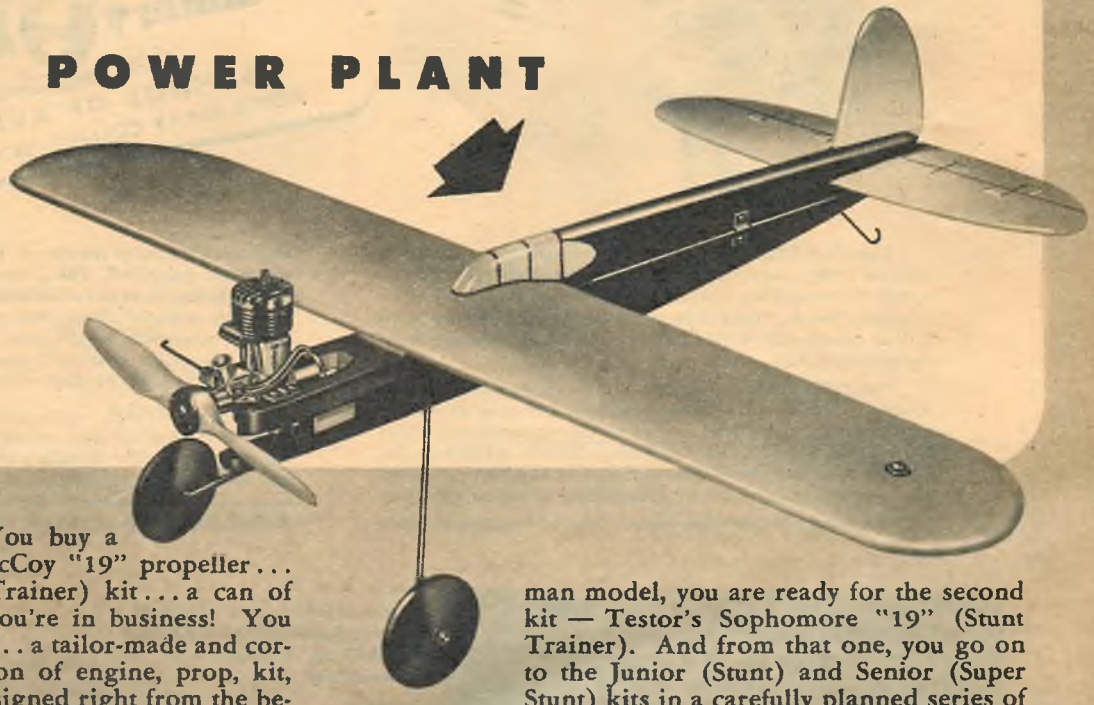

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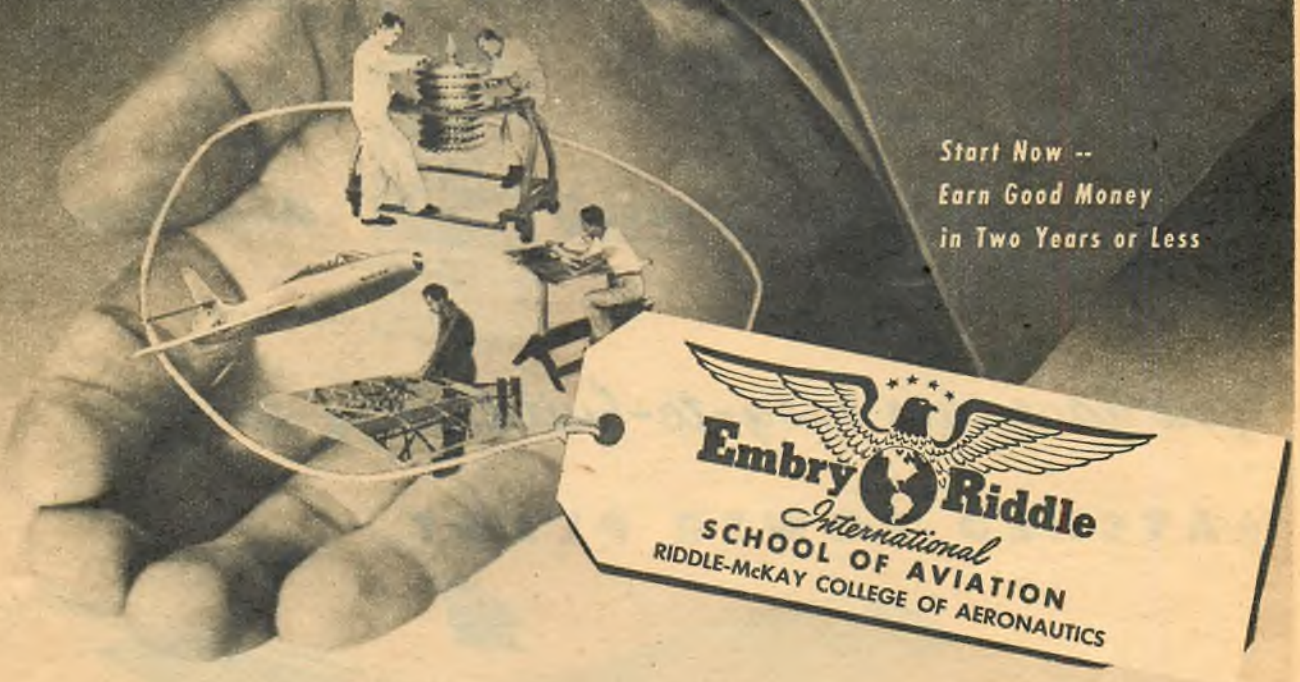

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TRAIN IN MIAMI -- AIR CAPITAL OF THE WORLD

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JULY, 1950

The Flea Flies Again

One of the most famous and unconventional of the "home-builts" reappears in two improved versions

By A. R. WEYL

Henri Mignet, designer.

SIXTEEN years ago a French amateur designer of ultra-light aircraft, Henri Mignet, caused enormous interest by evolving an unconventional aircraft named Pou-du-Ciel (i.e., "sky-louse"—politely mistranslated in England as "flying flea"). It was of extremely unconventional design, having a variable-incidence wing, without ailerons, to act as elevator; and it was of very primitive construction. Its designer half-seriously claimed that anybody who could nail a box together could construct it, and that anybody could teach himself to fly it.

Aerodynamically, this remarkable vehicle could have been described as a virtually tailless aircraft with the wing divided by a wide slot-gap into front and aft surfaces of about equal size. The peculiar arrangement could equally well be called a "close tandem" aircraft, or a biplane with abnormal forward stagger and small gap. It was, in fact, a "flying slot" as long as a slot effect was present and a tandem or "tailplaneless" when the flow through the slot gap was no longer effective.

The original Pou-du-Ciel, the H.M. 14, caused a sensation among those enthusiasts who believed in flying for fun but could not afford it. All over the world it started a popular-flying movement. Hundreds of these little aircraft were built and many, but not all, took the air. The Air League of Great Britain, under the enthusiastic leadership of Air Commodore Sir Adrian Chamier, achieved the considerable feat of getting the Pou and all other ultra-light aircraft liberated from airworthiness regulations and given permanent "permits to fly" against adequate third-party insurance.

The movement, however, came to grief after a number of fatal crashes had proved beyond doubt that the type was deficient in safe-flying qualities. All the accidents showed an identical symptom—a nose-dive from which the pilot could not recover; moreover, the majority of the victims were skilled and capable pilots.

It took much effort and time to determine the exact cause of the trouble, which was undoubtedly aerodynamical. Mignet himself, on the basis of daring and skillful experiment in the air, lost no time in discovering a quick and satisfactory remedy. But when he came forward with it and offered proof that the Pou was now safe, he met skepticism and even

---

The author is a member of the executive committee of the Ultra Light Aircraft Association. Presented through the cooperation of "Flight" magazine, London.

The Flea Flies Again

● Folding wings of the three-place H.M. 300 simplify hangaring problems. Just hook the plane to a car and drive it into the garage.

● The Mignet H.M. 294, rechristened Butterfly, was built in Argentina. This single-place machine is powered by a 35 hp Aeronca.

open animosity. Heated arguments for and against Mignet's formula and aims had caused so much nervousness that the Pou-du-Ciel was condemned once and for all. Looking back, one feels that both the official mind and public opinion were gravely in error, and that ultra-light aeronautics suffered unfairly as a result. Engineering progress should not be mixed up with unsubstantiated prejudices.

It is true to say that M. Mignet himself was not entirely without fault in the matter: likable as he is in person, he is a genius and typically French, besides being an artist in temperament. (By profession, he is a research engineer who has acquired great merit in the development of radio tubes.) To be a genius means to be misunderstood, and Mignet preferred to play the role of an aeronautical jester; he pretended to be an amateur, and a timid, ham-fisted creature at the controls of an aircraft. In fact, he was (and still is) an exceptionally gifted and experienced aeronautical scientist, a very able designer and constructor of unorthodox aircraft, and a skilled experimenter (he constructed and operated his own wind tunnel); that he is a pilot of skill and courage is obvious to all who have seen him fly.

And he possesses a strong sense of humor which is apt to express itself in wit (an attribute usually disagreeable to experts and authorities). Furthermore, he has a strong will that is disinclined to humble itself before those in power. All this may help to explain the sad pre-war history of the Pou.

Actually, the fatal design-deficiency of the original H.M. 14 arose from the fact that in such a design the vital slot-effect disappears at small angles of incidence. In this condition the wing combination behaves as a single-wing system of pronounced camber; it is unstable at the normal c.g. position, and the aircraft tries to assume a stable attitude. This means that it tries to fly inverted. The pilot is unable to prevent the tendency, as the front wing (which acts as elevator) becomes ineffective in the absence of slot effect. This also has a connection with the fact that most of the victims were skilled pilots: they sensed that the elevator produced little effect and instinctively put the stick further forward in an effort to fly faster (as would have been correct with a conventional aircraft); this very action produced the catastrophe.

Mignet quickly realized the true position after participating in full-scale wind tunnel experiments at Villacoublay in 1936; and he came to the conclusion that a sure remedy could be achieved by excluding the possibility of flight at small incidences. He tried three different design solutions in succession ("conjugated wings"; auxiliary conjugated elevator flaps in the after wing; and strongly reflexed airfoil section in the after wing), and thus insured that no nose-dive could commence or be sustained without producing a tail-heavy pitching moment with the increase of speed.

Mignet fully achieved his purpose in the same year and demonstrated several modified "flying slots," besides publishing in detail the modifications

● Front view of the H.M. 300. The ferocious look caused by grillwork & engine cowling earned it name of Wild Beast. Engine 125 hp.

● Side view of the single-seater H.M. 294, showing the slot created by the stagger of two wings which gives it remarkable stability.

● First of the Flying Fleas, the H.M. 14 at Orly, France, in 1935. Engine is a 2-cycle, 2 cylinder, Aubier & Dunne, developing 17 hp.

which were required to make the H.M. 14 safe. But it was already too late.

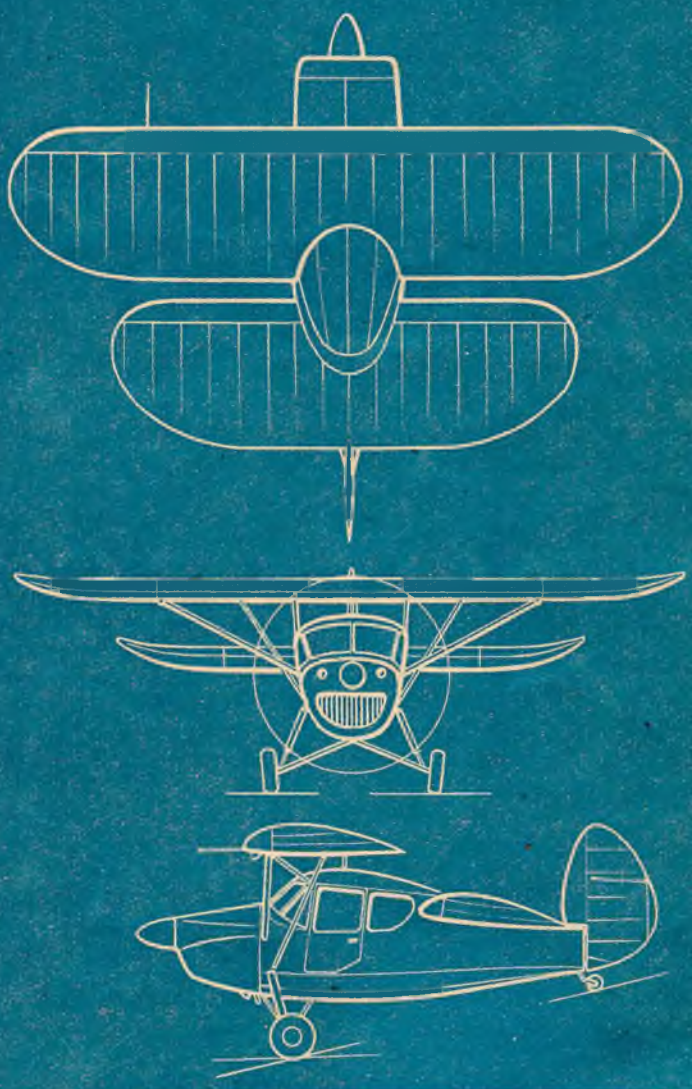
One has seen little acknowledgment that, after the introduction of these remedies, no further fatal crash occurred in any Pou-du-Ciel or derived aircraft, and that in 1938 a Mignet two-seater "flying slot" qualified for the French Certificate of Airworthiness (passenger transport) after more than 500 hours of actual flying trials in the air.

Today, Mignet works in Argentina. It is, perhaps, significant that this jesting preacher in a desert of aeronautical procrastination has now proceeded from his "Sky Louse" to a "Butterfly" (H.M. 294) and to a "Wild Beast" (as he calls it), the new H.M. 300. But he still labels his "flying slots" proudly and with justification "Los Aviones mas Seguro del Mondo" ("the Safest Aircraft in the World").

The two new types are built to the typical Pou formula, with two-control system, variable-incidence front wing as elevator, missing ailerons, and all. H.M. 294 is a single-seater with an American-built Aeronca engine of 35 hp; H.M. 300 is a three-seater with a 125 hp Continental flat four. Under construction is a two-seater with an 85 hp engine in the class of the Ercoupe or Luscombe Silvaire personal aircraft. In the design stage, M. Mignet has a high-speed single-seater of exceptionally low weight.

In both new types shown in the accompanying photographs the outer portions of the wings are foldable for transport and housing, as will be seen from the view of an H.M. 300 under tow. A characteristic of all Mignet aircraft has been their extreme simplicity. The designer has found it hard to work in Argentina, and the nonavailability of some materials and accessories has made the two prototypes heavier than they were intended to be. Nevertheless, both aircraft perform well, though the engines are second-hand and somewhat deficient in output.

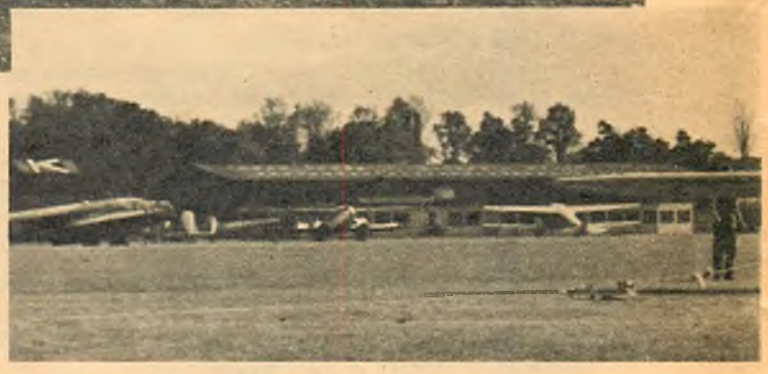
Unbiased (or, more correctly, rather skeptical) passengers in the persons of professional aeronautical engineers have given (*Continued on page 77*)



● H.M. 300. Clearly shown is extremely short moment arm.

THE BRITISH DO IT—

Why Can't We?



AN American youngster of 15 approached a glider club in his vicinity with the idea of joining. He was a model builder and through his hobby became deeply interested in flying. He was obsessed with a desire to take an active part in aviation. Too young to engage in power flying, he turned to gliding since the minimum age for motorless flight is 14 years.

Financial considerations played an important part, for like most folks he had the impression that gliding is considerably cheaper than power flying. Through his model flying experience he was acquainted with thermals and effects of air currents on aircraft. It was only natural that he expected to qualify without difficulty, and in short order experience the thrills of soaring flight.

Imagine his surprise and sorrow when he was informed by the secretary of the glider club that an initiation fee of $100 was required, that he would have to pay regular aero-tow charges of $1.50 for every thousand feet of altitude desired whenever he flew, and that monthly dues of $5 must be met. And this did not include his week-end food and lodging expenses at the glider site—some 75 miles from his home city.

This lad was a bright boy with a good head for figures. He calculated that the cost of sufficient experience to qualify him for a private glider license was comparable, if not in excess, of that necessary to obtain a similar rating for power-plane flying.

And there hangs the sad tale of the alleged American gliding movement. Right now it is a costly sport for the well-heeled few, whereas it could quickly become an inexpensive form of flying for the masses if it were set up on a mass-participation basis.

Look at the English. On their austerity-struck isle they have trained some 15,000 boys in glider flying and are currently turning out 2,000 young glider pilots each year through the Air Training Corps, a volunteer youth organization, affiliated with the Royal Air Force, and similar to our own Civil Air

● First flight. The inexpensive primary trainer is used for short, straight hops after the student has learned rudimentary control.

● Though Air Training Corps does not teach soaring, training will enable boys to join glider clubs and taste thrill of sailplane flying.

Patrol. How do the youngsters benefit from this training? It's the old story of "learning by doing" against "learning by rote." Glider training prepares them for the future. If they choose aviation as their life work, they enter it prepared with an understanding not only of flight but what makes flight safe.

America has failed to "air-condition" its youth. U. S. organizations comparable to the ATC like the CAPC and Air Scouts have concentrated on marching and the dry study of aviation with a "forbidden" sign curtailing actual flight experience. True, CAP talks of gliding for Cadets, but official sanction or funds have not been forthcoming.

Last year one American community, Elmira, New York, decided to do something about flying for the teen-agers. It raised sufficient money, through business, civic organizations and individuals to provide glider training for 15 boys and two girls between 15 and 18. Schweizer Aircraft Corp. furnished gliders and an instructor and Elaerco, the local airport operator, supplied the tow planes at a reduced rate.

● Fifty-two glider schools provide training to Cadets who attend week-end courses with traveling expenses, food and lodging paid.

● Ground skims teach stick control before student is airborne.

The only cost to the youngsters was a token 25c per tow. In a single year all were ready to solo, and this summer all are expected to qualify for a private glider pilot rating.

Other communities could follow this example. Several towns could pool interests if necessary, and all use a common glider site.

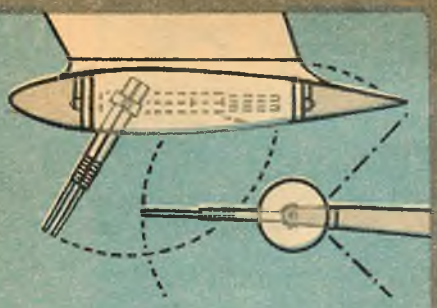
According to CAA, we have 3,143 glider pilots in this country, of which probably one half are inactive, ex-military glider pilots who exchanged their military rating for civilian. This is in a country of close to 150 million population! England with not many more than 50 million has 9,000 registered glider pilots and 45 glider clubs.

The British do it—why can't we?

● Cheaper than U.S. aero-tow method is that of launching by a winch. Auto-tow is also used.

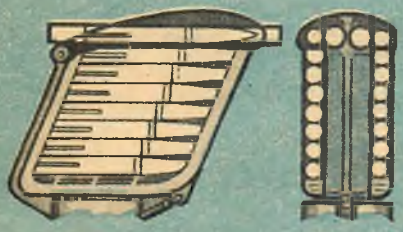
● Slingsby Tutor launched by winch. This method is used for the advanced student. It requires much more alertness than auto-tow.

● In summer months civilian glider clubs run 12-day training courses. Cost is $45. Students qualify for soaring certificates.



● Twin 20 mm cannon in rotating wing tip turrets have uninterrupted field of fire. Radar-aimed, fired by remote control, retract into turrets.

● Power units are Allison T-40 twin turbo-prop engines, each twin developing 5500 hp, and weighing 2500 lbs. Fuel consumption is reasonable.



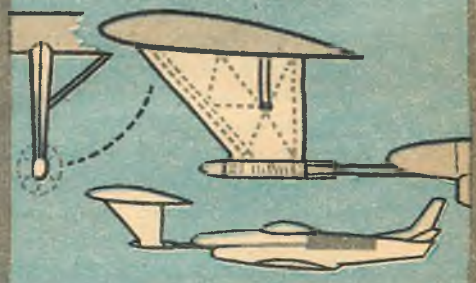
● Air-to-air missiles will be the main armament of bomber. Radar controlled and fired from launchers mounted atop of magazine turrets, they're equipped with homing devices.

● Tractor landing gear, now tested on B-36 will permit operation from smaller fields. Foot print pressure of each track is 56 lbs. per sq. in. as against 180 lbs. of standard gear.

Next Step in Big Bombers?

● Together with reversible propellers and track gear, the parachute will allow tomorrow's big bomber to considerably shorten its landing run. Chute first used on troop gliders.

Recently the Air Force announced serious consideration is being given to the souping up of the B-36 in order to increase its speed as well as range. The modifications are to include a swept-back wing and tractor turbo-prop engines. Since present-day jet escort fighters possess less than half the range of the Big Bomber, and the bomb-bay parasite fighter did not prove practical, final solution will probably be to tow fighters by means of a rigid boom into the combat zone, where they would disengage and protect their charges. The boom will serve also as means for refueling the fighters. Drawings by Frank Tinsley.



● The AF is testing the possibility of towing escort fighters with rigid link gear. Device has horizontal spring boom catcher, is streamlined, retracts into wing when not used.

● With the advent of jet power, new fields open for those men who've been trained to maintain this type of engine.

Your Job in Aviation:

A. & E. MECHANIC

JERRY WHITE looked up at the silent R-1830 engine on the DC-3 in disgust. Gas poured in a stream big as a pencil through the gurgle valve in the bottom of the impeller section. He had put the mixture controls in idle cut-off. That should have stopped the flow. Yet there it came, a steady baffling rivulet.

Jerry trouble-shot that stilled Pratt and Whitney for almost an hour. "Must be the cloverleaf valve is leaking," he muttered once. So he lapped in the valve. No good, the gas continued to run. He changed the carburetor. Still no good.

Jerry plunked the seat of his pants on the cold concrete, to think. He remembered the advice of a school instructor, given the first day he had enrolled four years earlier: "An engine mechanic—a good one—requires analytical ability."

Those were big words. But Jerry pondered them a few minutes. Then he pulled out a pencil heavy with grease and began sketching the R-1830's fuel system. "I had to figure out what had happened," he would tell you. From his sketch he calculated the fuel pump diaphragm had ruptured. Turning to the engine manual, he studied the diagrams briefly. Now he removed and disassembled the fuel pump. Sure enough, the diaphragm had split. Shortly the engine was ticking pretty as ever.

Jerry grins when he thinks of that experience. He's a smart mechanic, and he knows his education really began only when he walked away from an approved school clutching an A & E certificate. For instance:

On one job the locking ears on an oil filler cap came loose, allowing the ear portion to drop into the accessory case. A spot weld had broken loose. The rpm dropped suddenly after a take-off. Two screws, helping hold down the rocker arm supports to the head of No. 4 cylinder, had pulled out. The rocker arm shaft was broken.

Jerry knows about such incidents. He knows, too, tragedy might have resulted. He read about them in a CAA report. Yeu see, this White fellow is smart. The education boys say he has an intelligence quotient of 116. That's near tops not only for an airline mechanic, but plenty good for any kind of a private job or civil service.

You might call him a three-year man. Out of school three years, that is. Fifty-one weeks working for that certificate. Then on to the engines. Right now he's capable of tackling a good many jobs confident he will do them well. He wasn't a "finished" engine man when he graduated. Like a lawyer or doctor, he had to develop skill and confidence. The schools teach Jerry and his kind the important fundamentals.

Jerry's job is safety—keeping these power plants ready to run, and no guesswork about his handiwork. Being a crackerjack of a workman, he can repair engines in every sense of the word. He can service them, maintain them in periodic service, and overhaul them from rocker arm to crankshaft.

Jerry's lucky, for he combined aircraft and engine studies. Having the "A", too, he can "sign off" any job connected with engine or aircraft. Otherwise, he'd have to stick to the engine—"from the fire wall forward," he says. As it is, his choice of jobs includes virtually everything—on the airlines, with a

freighter outfit, for a corporation or for an individual.

Young Mr. White certainly knows his way around, but he was an awkward lad a few years back. Perhaps uncertain would be a better word. The day he walked into his first class, for instance. Jerry's instructor started him and his classmates off easy. Simply mentioned the courses of study that lay ahead; that was enough to puncture his ego. Golly, they seemed formidable.

"The thing looked too massive," thought Jerry, meaning all the engines, instruments, tools, the airplanes outdoors awaiting overhaul, half-covered wings in the fabric shop. All those items summed up aviation for Jerry that day.

Then he plunged into mechanical drawing—care and use of tools—math—riveting—welding—elements of electricity—ignition—carburetion—engine overhaul—operation and testing. . . . Carefully, his instructors explained how each subject was related to aircraft, and to his chosen field of work. Gradually the light began to dawn. After a few weeks J. W. got the picture. He could make a passably good mechanical drawing after a time, and at last, after 250 days, could overhaul the biggest engine in the big room. He wasn't ready to tackle one of the giant 3500 hp plants on a Stratocruiser alone, but he would be soon. That meant he was rapidly gaining both skill and confidence.

He got better on the job. Dozens of engines, of various sizes and shapes, have passed under his critical eyes and thinking fingers. He will not say "no" to any job now, provided he has the tools he needs.

And he won't just stand still.

Being a really skilled workman, Jerry's looking forward to advancement. It may be a better job with his company, or come from some technical improvements. There's plenty in the reciprocating engine field to challenge him. With the bigger engines come new solenoids, changing styles in vacuum pumps, larger starters and generators. He's not what you would call an electrical installer, yet some of these gimcracks come within his jurisdiction. These things are part of the engine dress—always changing. He may be fiddling, too, with automatic feathering devices. Maybe you've heard of them on the Convairs—if an engine loses power on take-off, the prop feathers instantly.

Said a school official the other day: "An engine mechanic must be skilled in the use of precision and measuring tools. He replaces worn or defective parts with new, precision-made parts." Jerry does those things, but he works as much with his head as his hands. That DC-3 started him developing what you might call a "trouble-shooting philosophy." Both the airlines and the Civil Aeronautics Board recognize the importance of "philosophy" and propose to put it to work in White's behalf.

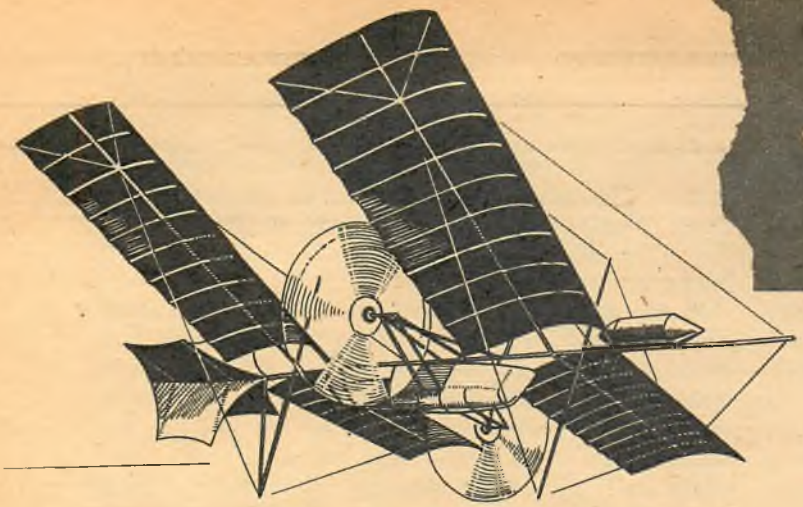
Airlines make a practice of passing along to Jerry and his coworkers part of the savings when they think up money-saving procedures. That's only one reason the lines are interested in making Jerry a better mechanic. What does that (*Continued on page* 68)

If you had to select the one most important man in aviation, you'd be smart to pick the mechanic whose work keeps planes in the air

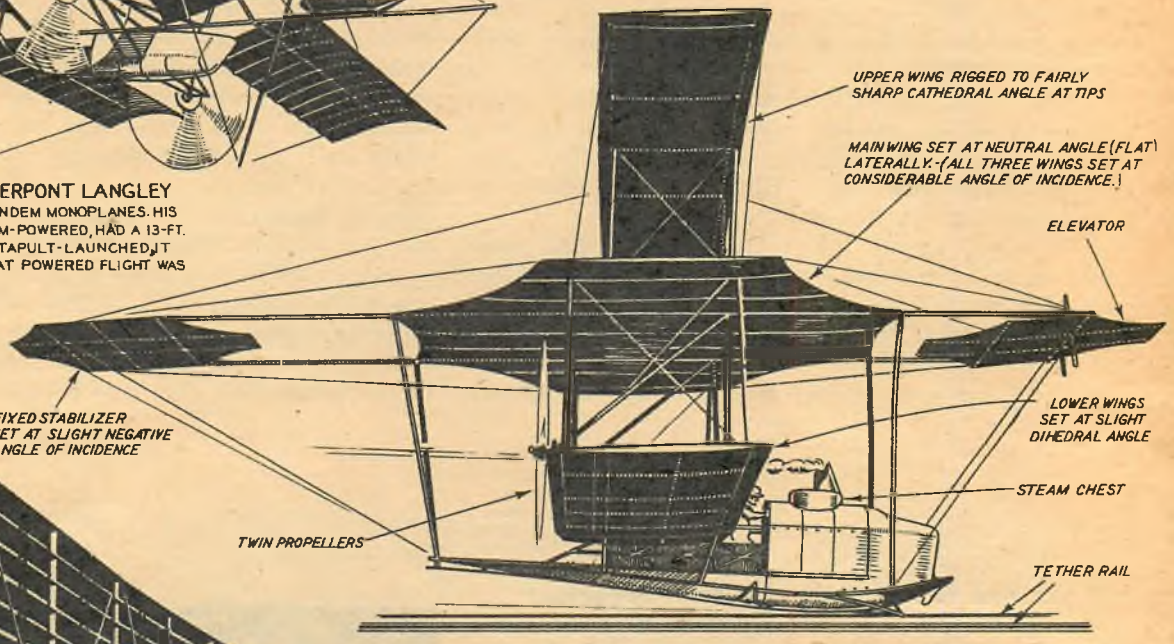
● Private aviation offers a variety of interesting jobs on all types of aircraft for those holding both A(irplane) & E(ngine) ratings.

● Airline work means steady employment since continual maintenance is necessary on the ships that ply the skyways on schedule.

Air Progress

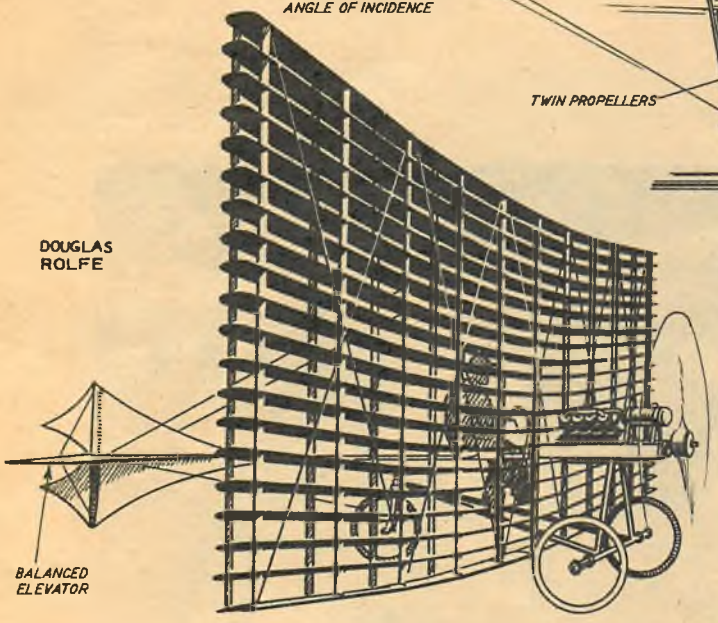


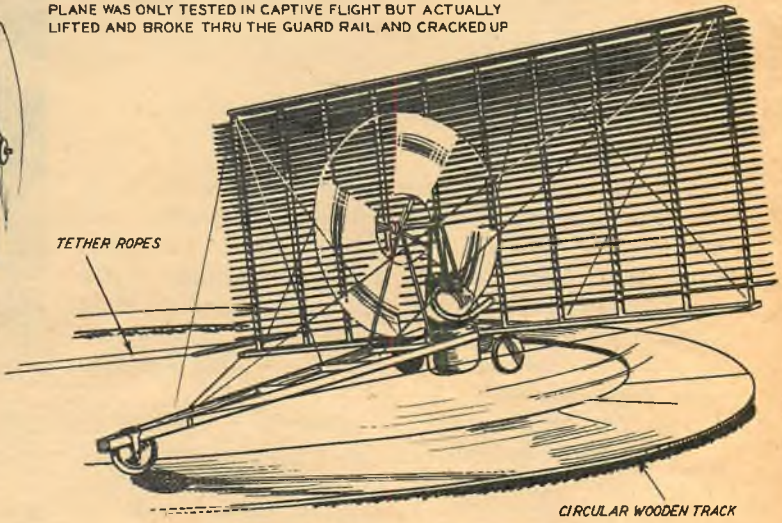
▲ 1890-96 SAMUEL PIERPONT LANGLEY EXPERIMENTED WITH LARGE-SCALE TANDEM MONOPLANES. HIS MODEL NO. 5, SHOWN HERE, WAS STEAM-POWERED, HAD A 13-FT. WING SPAN AND WAS 16 FEET LONG. CATAPULT-LAUNCHED, IT ESTABLISHED BEYOND QUESTION THAT POWERED FLIGHT WAS PRACTICABLE . . . . .



1894 HIRAM MAXIM U.S. BORN ENGLISH INVENTOR ▲ AND SCIENTIST CONDUCTED EXPERIMENTS IN FULL SCALE LIFT WITH THIS CURIOUS DESIGN. POWERED WITH A 350-H.P. STEAM ENGINE THIS LARGE (110 FEET LONG, 3 1/2-TON) MULTI-PLANE WAS ONLY TESTED IN CAPTIVE FLIGHT BUT ACTUALLY LIFTED AND BROKE THRU THE GUARD RAIL AND CRACKED UP

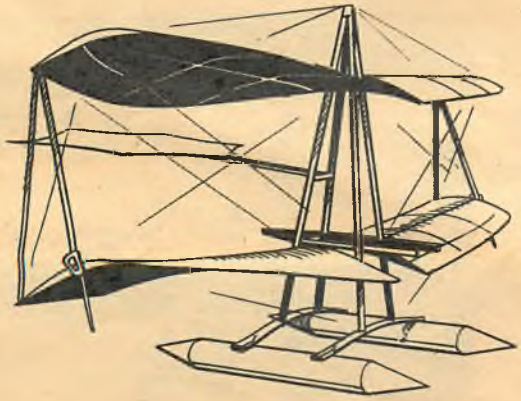
DOUGLAS ROLFE





▲ 1893 HORATIO PHILLIPS IS GENERALLY RECOGNIZED TODAY AS THE FATHER OF THE SCIENCE OF AERODYNAMICS.- USING THE STEAM-POWERED ▶ FLYING TEST BED SHOWN AT RIGHT HE DEMONSTRATED THE INHERENTLY SUPERIOR LIFTING QUALITIES OF CURVED AIRFOILS. FULL SCALE GAS-POWERED DESIGN ILLUSTRATED ABOVE APPEARED MUCH LATER. PROBABLY DID LITTLE MORE THAN MAKE SHORT HOPS

1897 GALLAUDET CONTINUED EXAMINATION OF THE CURVED OR CAMBERED WING ON NUMEROUS MODELS - ONE OF WHICH IS SHOWN HERE. ▶ IN 1917 GALLAUDET BUILT AN UNCONVENTIONAL BUT QUITE SUCCESSFUL TWO-PLACE BI-PLANE WHICH HAD A CENTRALLY LOCATED PROPELLER THAT ROTATED ABOUT THE FUSELAGE.



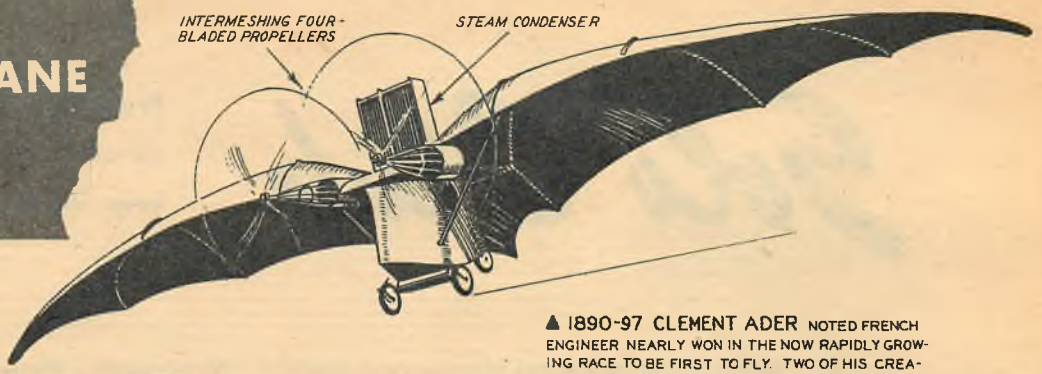
In the last issue the very early and generally futile efforts of man to produce an "aeroplane" capable of actual flight were described. In the pre-flight era now being considered, it is interesting to note that within the space of these short thirteen years more was accomplished than in the entire preceding 400 years. One who helped things along was Chanute, a brilliant and successful structural engineer, who did not turn to the study of aviation till late in life. Although he made definite structural contributions, Chanute never attempted to produce a powered airplane as he felt, quite rightly, that the problems of control should be solved before power was applied.

As this period drew to a close there were no less than three separate designs on the verge of successful flight, and the squab-

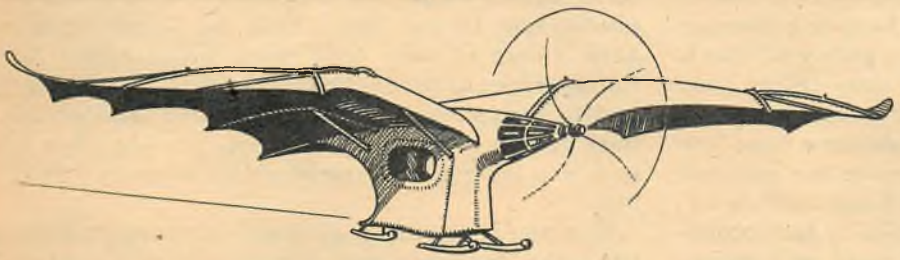
DEVELOPMENT OF THE AEROPLANE

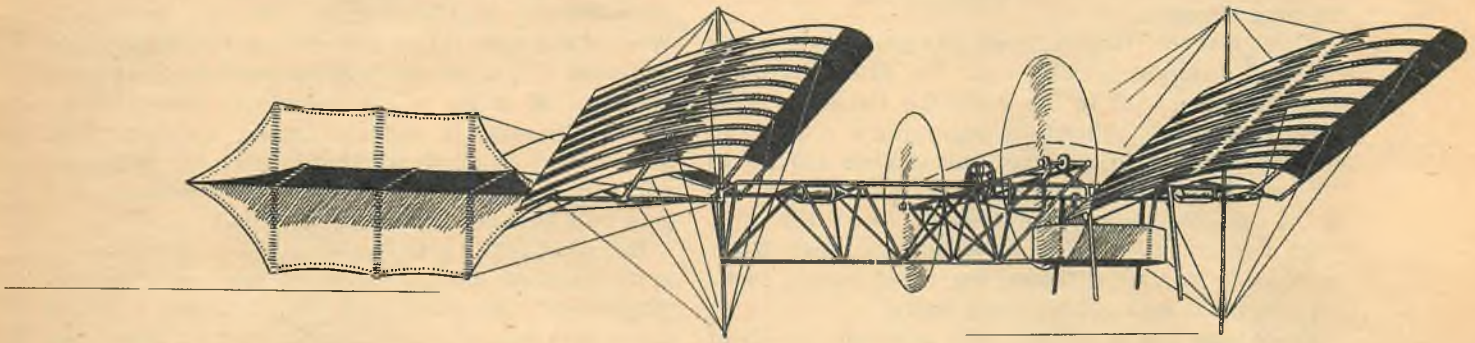
Part 2 (1890-1903)

By DOUGLAS ROLFE

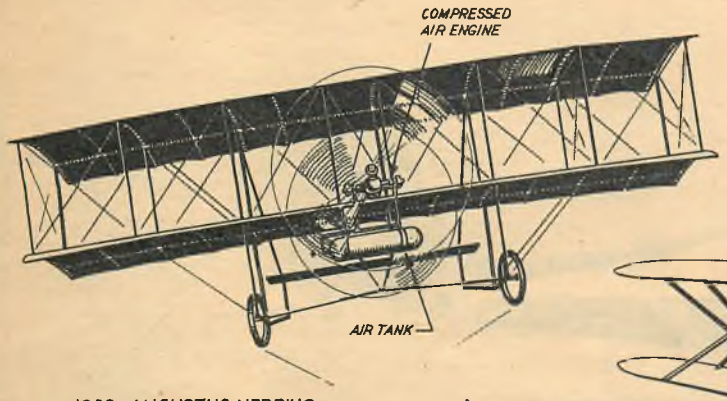


▲ 1890-97 CLEMENT ADER NOTED FRENCH ENGINEER NEARLY WON IN THE NOW RAPIDLY GROWING RACE TO BE FIRST TO FLY. TWO OF HIS CREATIONS ARE SHOWN HERE. THE "EOLE" (AT LEFT) ◀ HAD A WING SPAN OF 46 FEET AND WAS POWERED WITH A 40-H.P. STEAM ENGINE. ADER'S LAST DESIGN, THE "AVION", SHOWN ABOVE, WAS WORLD'S FIRST TWIN-ENGINED AIRPLANE,— IT MIGHT WELL HAVE BEEN WORLD'S FIRST PRACTICAL AIRPLANE TOO BUT, LACKING ADEQUATE LATERAL CONTROL, IT CRASHED AS SOON AS IT LEFT THE GROUND ON THE INITIAL TRIALS. ADER LIVED TO SEE THE AIRPLANE IN WIDESPREAD USE AND HIS PREDICTION THAT MASTERY OF THE AIR WOULD EVENTUALLY MEAN MASTERY OF THE WORLD MAKES SENSE TODAY

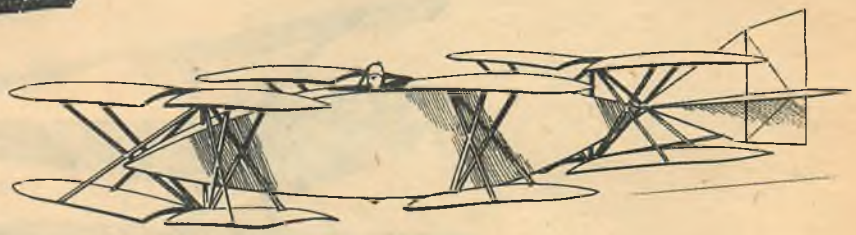




1903 ANOTHER NEAR FIRST WAS THIS FULL SCALE ▲ LANGLEY "AERODROME" PATTERNED AFTER THE SUCCESSFUL PROTOTYPE MODEL NO. 5 BUILT IN 1896. LAUNCHED BY CATAPULT OVER THE WATERS OF THE POTOMAC IT FOULED THE EXTREME END OF THE LAUNCHING GEAR AND PLUNGED INTO THE RIVER. DESPITE THIS DISASTER THE LANGLEY PLANE RANKS ONLY SECOND TO THE WRIGHTS' FAMED BIPLANE IN IT'S PLACE OF IMPORTANCE IN THE AMAZING HISTORY OF AIR PROGRESS



1898 AUGUSTUS HERRING, ONE-TIME ASSO- ▲ CIATE OF THE GREAT CHANUTE, SPLIT WITH HIM ON THE QUESTION OF THE TIMELINESS OF INTRODUCING POWER AND BUILT THIS FULL SCALE CHANUTE-TYPE BIPLANE POWERED WITH A COMPRESSED AIR ENGINE. IT DID NOT FLY BUT CLEARLY WAS THE INSPIRATION FOR CURTISS AND OTHER LATER AND MORE SUCCESSFUL PIONEERS



▲ 1896 OCTAVE CHANUTE PIONEERED IN STRUCTURAL DESIGN (HE IS LARGELY RESPONSIBLE FOR THE INVENTION OF THE BIPLANE TRUSS) AND ALSO IN MOVABLE CONTROLS. THE DESIGN SHOWN HERE IS NOTEWORTHY BOTH FOR THE INTERESTING FUSELAGE AND THE RIGID "X-TYPE" WING TRUSS INTRODUCED BY THIS PIONEER...

ble as to who did make the first flight lasted for years. The Langley full-scale plane patterned after the much earlier and successful flying models and powered with the world's first radial-type gasoline engine (5-cylinder Manley) made several abortive attempts at free flight, all of which ended in disaster. Despite this it was long believed that Langley built the first successful airplane. Another claimant to the throne was the Frenchman, Ader. He produced a number of steam-powered monoplanes, the last one of which actually got off the ground but crashed. Again, for years many people considered Ader the first to fly.

Just before the end of this period the Wrights were engaged in their exhaustive gliding experiments which resulted in a 3-dimensional control system, and the stage was set for true flight.

▲ 1895 OTTO LILIENTHAL WAS TOP EXPONENT OF GLIDING FLIGHT DURING THIS PERIOD AND WAS EXPERIMENTING WITH POWERED FLIGHT BEFORE HIS DEATH IN 1896. MOST OF HIS GLIDERS WERE OF THE TYPE SHOWN HERE WITH NO PROVISION FOR CONTROL BEYOND SHIFTING OPERATOR'S POSITION

Solo Club

Draw up a chair and join the pilots' session about to start; Solo Club is for all who've been checked out on planes and gliders

TO an airman the aeronautical charts are a modern wonder of the world. When you have no passengers on a long cross country you have plenty of time to ponder on the things you see, the story-telling place names. Everything appears on the chart.

Recently, headquarters took a lightplane from New England on a southwesterly course to the midwest. The course was remarkable for wild and desolate terrain, yet it was a course characterized by such prominent landmarks that check points could be forgotten for long stretches.

There was the Hudson River, like quicksilver in the reflected sunlight, easily seen for fifteen minutes over the nose. Off to the right the Catskills, snow topped and hazy. Ahead the beginning of a ridge, an appropriate, but to a plane, meaningless barrier to the long State of Pennsylvania, a ridge that vanishes in the distance toward Harrisburg. Down the ridge some twenty miles or more stands the High Point monument, at the northwest corner of Jersey, looking like the front sight on a rifle barrel.

From here you launch out over a barren woodland that stretches in all directions for scores of miles. Northeastern Pennsylvania is about the most unhospitable spot in the East. Even semi-cleared areas have a crop of bare dead trees, woods carpet the rolling ridges as far as the eye can see. You do your best to keep stream beds within gliding distance, for there lies an occasional farm. Son, you shouldn't be here, you tell yourself, and why didn't you file a flight plan?

Now you appreciate the miracle of the chart. Hamlets, even buildings that would pass unnoticed in more heavily populated areas, take on significance. West of the twin ridges that hem in Scranton to east and west is another desolate highland reaching maybe 30 or 40 miles to the north and almost as far ahead. Beyond it vaguely appear the beginnings of the Bald Eagle Ridge that starts near Williamsport, on the west branch of the Susquehanna, and goes on a beeline all the way to Altoona.

But what really gets you about the next checkpoint is its complete unimportance for any other purpose. "Buildings," the chart says. When finally you look down, sure enough, there is a deserted ice-house, and nowhere, except for a wind- (*Continued on page* **80**)

HOW TO BECOME A SOLO CLUB MEMBER

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 75¢, to Solo Club Membership Committee, Air Trails Pictorial, Box 489, Elizabeth, N. J.

Proof of qualifications as a Solo Club Member:

1. CAA Airman Certificate, number and rating.....
2. F.A.I. license and number.....
3. Evidence of: Service in Army, Navy air forces, either as a rated pilot or having received flight training including solo time (attach).

Applicant ..... Age.....

Street..... City or Town.....State.....

The Civil Air Patrol is the civilian auxiliary of the United States Air Force. It deserves the support of every citizen. Membership is open to any American boy or girl 15 years of age or older of good moral character. Those under 18 are classed as CAP Cadets, those over 18 are Senior Members. If you would like to join the CAP write a letter to Air Trails (Box 489, Elizabeth, N. J.) indicating your interest, and your communication will be forwarded to your state's Patrol Wing Headquarters. Wing HQ then transmits it to the Group, Squadron or Flight nearest your home. For latest news of the CAP read this monthly Newsletter which is prepared in Washington, D. C., and New York City.

Civil Air Patrol Newsletter

Rescue Kit Worked Out

Portland, Ore.—This state isn't taking any chances with safety in search and rescue work. Portland Squadron's Maj. Hugh L. Angle has a list of "must" items that all search and rescue planes in Oregon's CAP now carry: a small axe, a knife, first-aid equipment, pocket compass, waterproof matches, small amount of rations and 100 feet of rope. In addition, pilots and observers are cautioned to be dressed properly for survival, such as good stout shoes, light warm clothing and gloves.

"Nick of Time" Squadron

Indianapolis, Ind.—Gibson County formed a Squadron, and immediately was faced with emergency rescue and disaster work as a result of floods. With a seaplane loaned to the Squadron the newly formed unit carried the rural mail carrier over his route delivering mail to marooned families, food and other supplies to families who had no other way in which to receive such essentials.

Getting 'Em to Meetings!

New Orleans, La.—CAPer's don't fool when they say "Be at the CAP meeting on time." Capt. C. A. Richardson, Training Officer for the Shreveport Squadron, missed several meetings in January. He was told if he didn't show up at the next meeting he'd be brought to the session by ambulance. When he called one evening to say he couldn't attend, an ambulance and two burly policemen arrived at his home. Before he could protest he was slapped into a stretcher, newspaper photographer bulbs flashed to prove by pictures how it was done, and the entourage of cars roared off to the meeting. There was some consolation for Capt. Richardson: it was his birthday and he was presented with a huge birthday cake at the CAP meeting.

Paranurses Make Jump

South Meriden, Conn.—You'll be hearing more and more about the paranurses of Group 4 of this Wing. Not long ago four of the group of 10 attached to Group 4 of the Wing made a jump over Hartford and CAP and the nurses landed on Page One of the local newspaper via news stories and photographs. It was the first jump for two of the nurses. The paranurses volunteer for the jumps in connection with cooperative disaster and air search and rescue work between the AF and CAP.

Macon Strip for $15

Marietta, Ga.—The state, noted for its originality can now tell you, via Capt. Cleveland A. Hyatt, CO of the Macon Squadron, how to take $15, borrowed equipment and two days' work and make a 3,000-ft. long by 300-ft. wide sod runway, in effect creating your own airport. The land was donated, the $15 used for fuel for borrowed airport building equipment was raised by donations, and the two days' hard work was done by—well—you guess who.

Flying Time as Prize

Boston, Mass.—Pittsfield Squadron has developed a merit system for Cadets. Merits or demerits are given, according to W/O Gloria DiPietro, Commandant of Cadets. At the end of each month the Cadet with the most merits is awarded one hour free flying time, such time counting toward the decorations of Observer's Wings. Another development by this up and coming Squadron is an L-4 model made by Cadet Hugh Olsen which is used at Sunday night classes.

What good does publicity do? Ask the newly organized Framingham unit. When the first meeting was held in the State Armory, preceded of course by adequate promotion, more than 100 enthusiastic boys and girls clamored for application.

Cadets Produce Recruits

Cut Bank, Mont.—The state is having great success in recruiting new Cadets. Here's how. Each Cadet is asked to bring into the CAP one friend as a Cadet. Wide publicity is given to the Summer Encampment openings to Cadets. The CAP ground school program is being integrated into the local high school curriculum. At least once a month each Montana unit holds "open house" for all young men and women and their parents to visit the local unit and observe a meeting.

Encampment Qualifications

Cheyenne, Wyoming—Wing CAP has formulated a unique system by which to pick Cadets for the summer encampment program, on the basis of two requirements as follows:

(1) Each Cadet must be a member of CAPC at least three calendar months; a passing student in school and a good citizen as well as coming up to CAPC regulation requirements.

(2) A point system awarding 50 points for each attendance at CAPC functions; 10 points for average scholastic standing; 10 points for good citizenship; 10 points for military etiquette and 20 points for attainment in CAPC.

Mercy Mission Successful

Birmingham, Ala.—Alabama is mighty proud of CAP Lt. Marvin D. McCrary and W/O Knizeley of the Mobile Squadron. The Red Cross placed an emergency call one night for delivery of blood plasma for a man suffering from a rare disease 203 miles away in Mississippi. It had to be delivered within three hours. In a plane borrowed from the Mobile Air Service, the two CAPers made the trip, arrived in time, and a life was saved.

CAP'ers in Australia

Little Rock, Ark.—Arkansas has two CAPers, both air-minded girls who are now telling their friends, "What's 13,000 miles?" The girls, Jacqueline Satterlee and Sara Shonk are Little Rock CAPers who went to Australia to visit a girl friend who had been in Little Rock. Both are pilots and while in Australia were made members of the Royal Australian Aero Club, flew Tiger Moths, had a grand time. Both are lieutenants in the CAP.

Milder Mercy Missions

Sioux Falls, S. D.—The state CAPers were grateful that last winter didn't bring the heavy snows of a few years ago. Even so, when the snow is only three or four feet deep instead of ten and twelve, well, it's still snow. So, instead of calling their missions of mercy "Operation Snowbound" this year, the Wing termed them "Operation Snowbound, Junior Grade," to indicate a milder winter than usual. Scores of missions were flown in zero-zero weather, and aid was extended to hundreds.

Snowbound Xmtr

Reno, Nev.—has a CAPer who really knows when the snow's so deep he's snowed in. While snow is far removed now, last winter James Campion joined the Reno Squadron as a communications man, operating the highest CAP transmitter in the U. S., on Peavine Mt. at 8,272 ft. Mr. Campion had to have his supplies flown to him when the snow got eight feet deep, and the Reno Squadron did the chore.

Cross Country with C.A.P.

● Encampment time again! Cadet Mary Gardner of Iowa, at Rapid City SD AFB.

● Cadets get briefing on use of chute before hop to Maxwell from Orlando field.

● Lt. Col. Robert P. Taylor, survivor of Bataan "death march," new CAP Air Chaplain.

● Cadets Hambley, Buss and de Carolis view Navy Special Devices NY jet exhibit.

Rhode Island had all units drilling in preparation for the entire Wing's appearance in Memorial Day exercises in Providence. In addition, the Wing is now forming an official R. I. CAP Band.

Texas' Northeast Group established a joint aviation training program at Perrin for high school CAP Cadets . . . Dr. Scott Wysong, new CO of the McKinney Squadron, placed the Squadron on active duty at the local airport recently for a "flying farmers" day . . . Mineral Wells Squadron found out how to pay expenses in getting an L-4 to its city for CAP loan; it held a giant square dance . . . The San Antonio Squadron searched diligently for a lost National Guard plane, finally gave up the search when the pilot was located in Mexico.

Michigan Wing Commander Col. William M. Joy was recently named to a four-year term on Detroit's Aviation Commission.

Oklahoma's Seminole Squadron received a whole truckload of equipment including a new L-4J plane, radio equipment and field telephone sets . . . Maj. Gen. F. S. Borum of Tinker AF Base presented Air Medals to three Oklahoma CAPers, James E. Dossey, Glenn S. Ramsey, Allie R. Walker who served on CAP anti-submarine patrol in the last war . . . Idabell Squadron is performing a unique service for busy doctors and businessmen in that community who go a-hunting, by providing a free airplane messenger service in dropping messages to the hunters.

South Carolina is on the lookout for firebugs, the kind of person who deliberately goes out to the woods with the intention of starting a fire. Only recently two officers from the Sumter Flight, Lieutenants Woodward and Pratt, spotted a "bug" who took to cover when the plane's shadow passed over him. After discovering the firebug they also spotted six big forest fires, reporting four of them to Fire Rangers by "message drops." . . . The Wing is now publishing a mimeo monthly, called "Wheels Down," with editor Rushing and staff of Beckham and Faust. With the paper published for the first time since 1941, Col. Pride Ratterree, Wing CO, hopes it will help the Wing achieve its 1,000 Cadet goal this year.

Official commendation from the forest service of the Dept. of Agriculture has been received by the Mississippi Wing for its outstanding aerial patrol work over thousands of acres of valuable experimental timberland, spotting several fires that might have completely destroyed the prized timber.

Wyoming has activated a new Squadron at Evanston, with Lt. David Lewis as CO. The Squadron immediately set out to recruit every boy and girl between 15 and 18 in the city, hoping to make the Squadron the largest in Wyoming.

Hawaii challenges all other Wings claiming they have the Cadets with the longest and shortest names in the Civil Air Patrol. Example, Cadet Laura L. K. Ng of the 493d Cadet Flight, Waialua, Oahu, with the shortest surname in CAP. Also, Cadet Gilbert Mahoaokahoaokulani Supe, Jr., member of 497th Cadet Squadron, Hilo, with the longest. Challengers are requested to pronounce the names correctly.

Missouri Wing has nominated Maj. Gen. Lucas V. Beau, Nat. CAP CO, as "CAPer of the Month," for his personal message to the Wing, excerpted as follows: "The only faltering portion of CAP is the Youth Program for Cadets. We've got to impress the need of youth, and train them at 17-20, not 30. We must have 100,000 Cadets. All civic organizations are interested in helping Youth Programs. Sell them on CAPC. I can't visit each of the 1,110 CAP units personally. When you do something, tell us. We aren't trying to get ahead of you at National. We want to help you. Don't sit in your backyard and talk about your problems. Pass the buck, UP. We don't like it but it's the thing to do. We do not want to and never will militarize CAP. It's a civilian auxiliary to the AF and we want to keep it that way. I'm proud of our accomplishments. Let's keep up the good work." . . . Capt. C. H. Petersen, former Tr. Off. for Kansas City Squadron 2 is the new Commandant of Cadets for the Wing.

The best position of any Wing in the U. S. for enrollments in both Cadets and Seniors, proportionate to the State's population, is held by Wyoming, with 1,031 membership of which 360 are Cadets. (Note to other Wings —can you top this?) Two new flights have been activated in the state, Lusk and Torrington.

California's Santa Rosa Squadron, which is in Calif. 6th Group, has a Command Pilot, only one in the Group, 1st Lt. Herbert McCarter . . . One California CAPer wrote and asked why *Cross Country with CAP* didn't carry more news about the activities of the Calif. Wing. That's easy. To Calif. and any other Wing or Squadron: send it in, we'll do our best to use it. We're as proud of CAP as you.

Washington Wing lost a very able liaison officer, Capt. Douglas G. Tilley, when he was stricken with polio last summer. Brought to Walter Reed Hospital in Washington, D. C., Capt. Tilley has now recovered and has been assigned as CAP-USAF Liaison Officer for the National Capital Wing.

Missouri's Joplin Squadron is stepping right along with its Cadet program, under stimulus of a new CO, Lt. Lee Culbertson. . . . Jefferson City Squadron has been activated, with Capt. J. J. Jacobus as CO, 51 members of whom 45 are pilots. . . . Also activated is the Nevada Flight, headed by Maj. Henry Burkle, AF veteran, which hopes shortly to become a Squadron. . . . Kansas City Squadron's Cadet Pat Campbell made her solo flight on her 16th birthday.

★ ★ ★ ★ ★ ★

JOIN THE CAP

If you're 15 or older you should check into the CAP. Fill out and mail this coupon to Air Trails, we'll forward it to your state wing that in turn passes it on to your nearest unit.

★ ★ ★ ★ ★ ★

C. A. P. NEWS c/o Air Trails
Box 489, Elizabeth, N. J.

I'm interested in more information on the CAP and would like to hear from my nearest unit.

Name .....

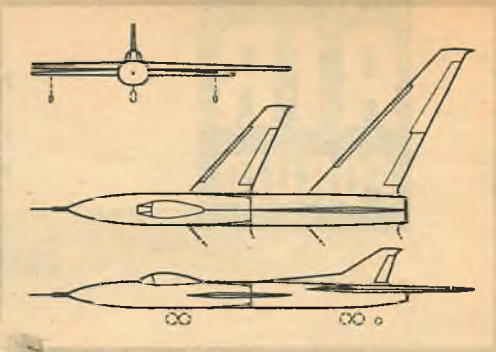
Address .....

City (and Zone) .....

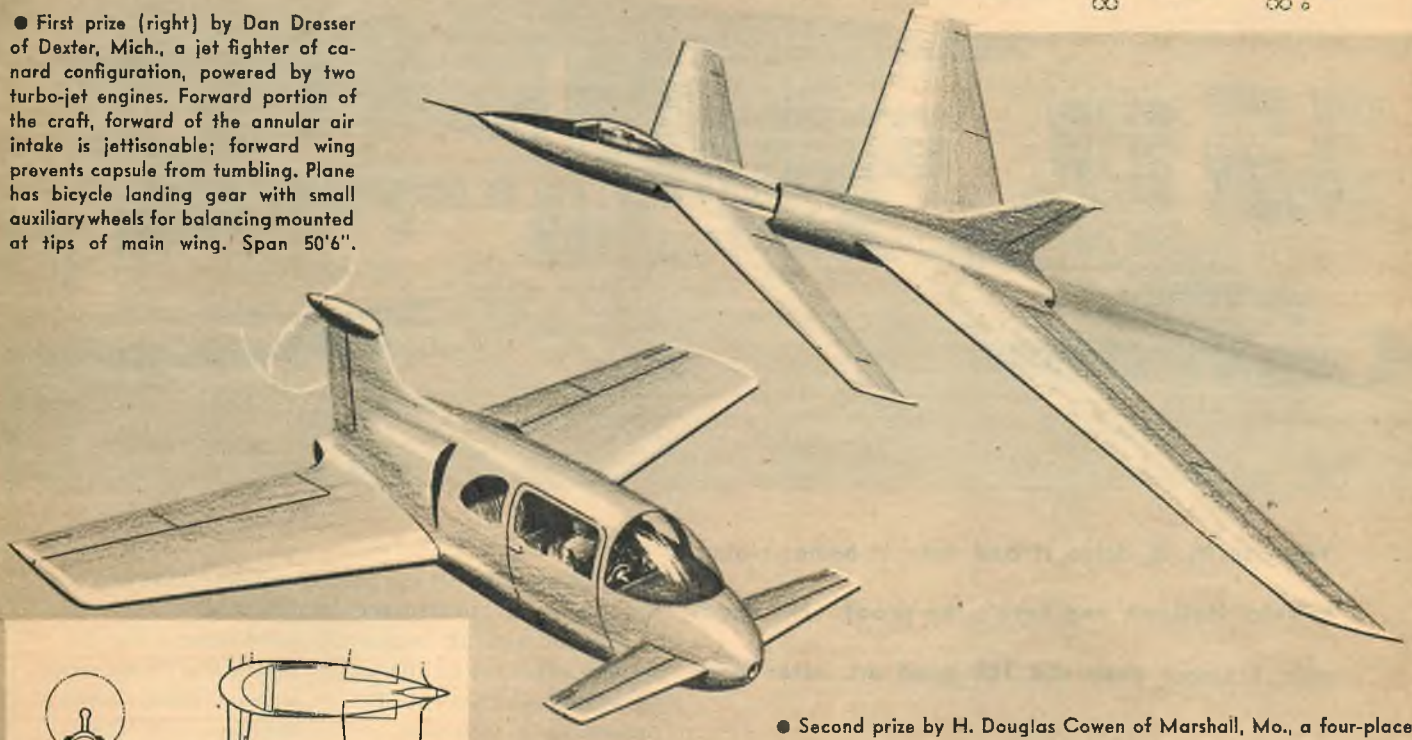
State ..... Your Age .....

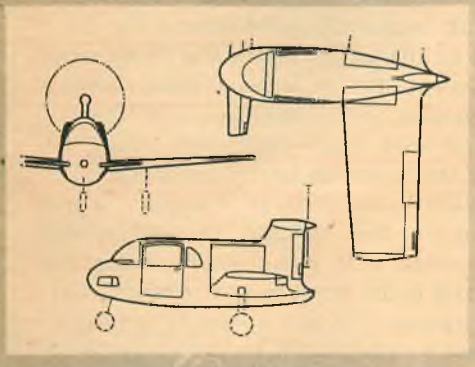
Air Trails, July '50

Airmen of Vision
DESIGN COMPETITION

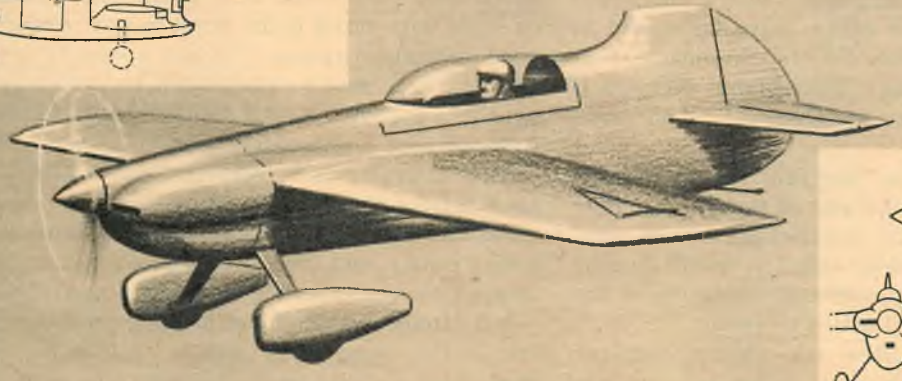


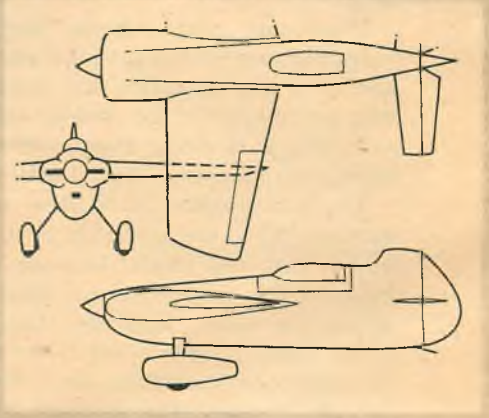
● First prize (right) by Dan Dresser of Dexter, Mich., a jet fighter of canard configuration, powered by two turbo-jet engines. Forward portion of the craft, forward of the annular air intake is jettisonable; forward wing prevents capsule from tumbling. Plane has bicycle landing gear with small auxiliary wheels for balancing mounted at tips of main wing. Span 50'6".





● Second prize by H. Douglas Cowen of Marshall, Mo., a four-place canard personal plane. Engine is located in rear behind passenger seats and drives a pusher propeller through vertical extension shaft and gear. High location of propeller permits the fuselage to be only one and a half feet from ground. The engine is 175 horsepower.





● Third prize, a small racing plane of 190 cu. in. class by Duncan Ferguson of Hempstead, L. I., New York. The little ship is of all-metal stressed-skin construction, with dural landing gear. Under the formula set up for this type of racing craft, forward and downward vision of plane is somewhat restricted. Span 18 ft., length 15'8".

Air Trails has opened its columns to those who are interested in presenting plans for "aircraft of the future." Rules governing the competition are as follows: 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. Give sketches of the complete airplane in three-quarter front and rear positions. Photos of a model of the proposed design may be included. Information on power plant(s), estimated performance, dimensions, and explanations of any unusual features are required. Data as to age, occupation or schooling of the entrant will be welcomed by the editors and judges. Designs may be of any type: commercial aircraft, military planes (fighters, bombers, troop transports), planes for the private flyer and single-engine sporting or racing craft. The entry each month judged the most practical or of the greatest significance will receive an award of $25. Payments of $5 will go to the runners-up. Entries will not be returned and for that reason those participating should retain copies of all materials submitted. Mail entries to Airmen of Vision, c/o Air Trails, Box 489, Elizabeth, N. J. The editors regret because of large number of entries they cannot enter into correspondence on A of V.

AIR FORUM

Here is a new department where the designer, engineer and pilot are invited to speak their piece on matters of general interest to all air fans. This month's subject: roadable aircraft

You can fly it, drive it and take it home, claims Wismer Holland, and here's the proof. His roadable Ercoupe once did 100 road mi. after dark

NEARLY everyone likes to point out what is wrong with personal aviation, and a few even try to do something about it. Lots of meetings, conventions and assemblies of airplane owners, manufacturers, CAA personnel and others have been held to try to work out a solution for the predicament in which private flying stands. They blame everything from the lack of airports to the CAA rules and regulations.

If someone could whisper the real reason for this private flying slump into the ear of the flying public and in a way to make that public realize it is true, then a demand for the obvious solution would become so strong as to bring about a change of design in the lightplane industry—and it could be done!

The real reason is because the present airplane does not have enough utility. It is *not* because airplanes cost too much, because they are dangerous, because they are too hard to learn to fly, because they climb too slow, land too fast and require more space than a tennis court to operate from. No, it's simply because they don't have the utility necessary to warrant the average flyer's desire to own an airplane.

The average flyer will not fly after dark. He will not fly in bad weather. He will not watch his plane rot when "tied out" in the weather. He will not pay hangar rent for a plane he can use so little. In other words, the average flyer just won't own an airplane and put up with all the inconveniences that are present in the private airplanes of today!

Yes, the aircraft companies have done a fine job of selling airplanes to airport operators and flying school personnel who accept all such inconveniences and expenses as a necessary evil—because they are intimately associated with these conditions every day. But try to make the "average flyer" accept them!

The real solution to all these problems is "a good roadable airplane!" Not straight up and straight down airplanes, ships with cross-wind landing gear or ships with blind flight instruments *et cetera,* but a good, efficient airplane that can go safely, anytime—after dark, in bad weather—can be driven home and kept in a garage. And it can be built *now*—we don't have to wait another ten years!

The aircraft manufacturers have been building good airplanes for many years, but they never have given the private owner an airplane with any more utility than it had twenty years ago. True, they have stepped up performance by adding more horsepower—but Monocoupe had performance many years ago, and so did many other planes. Quick take-off, fast cruise and slow landings are good, but such desirable characteristics don't solve the hangar problem nor the weather problem.

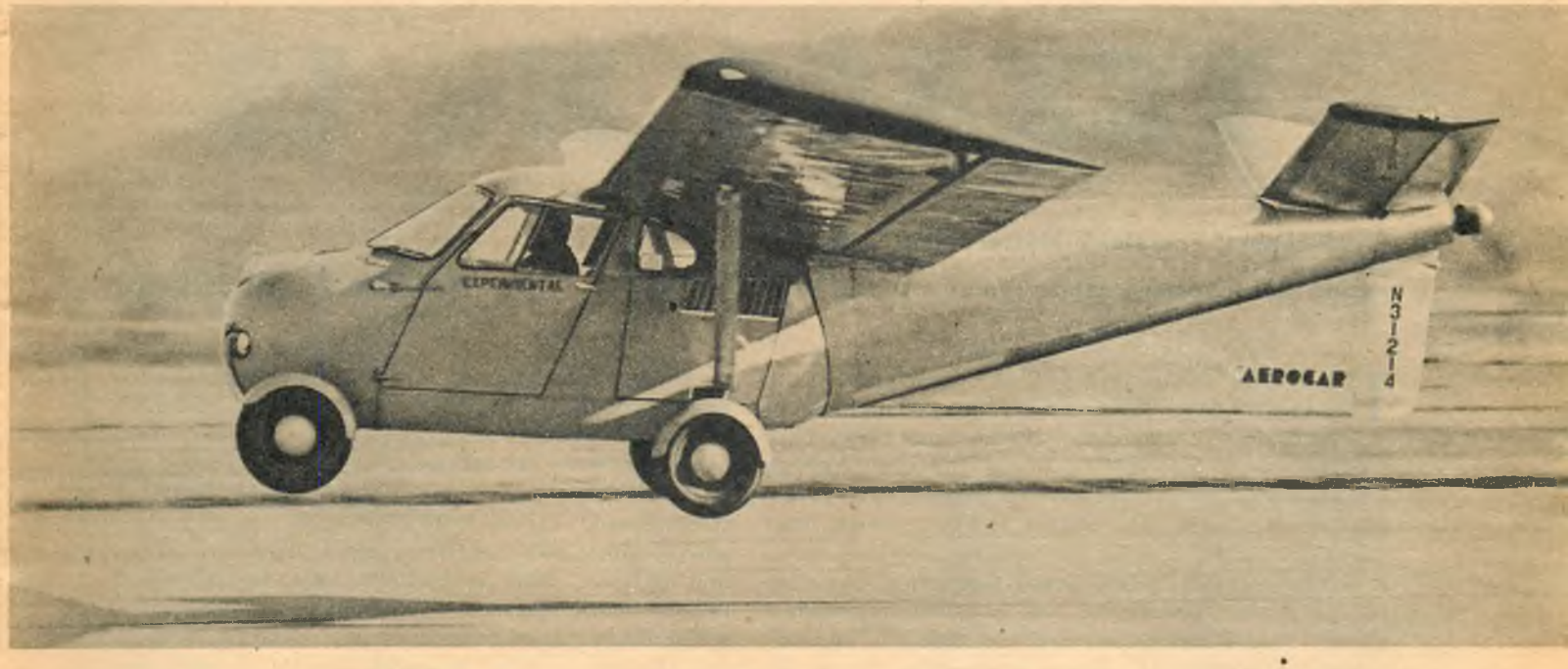
Private flying would have been much more popular if the manufacturers had developed "roadable airplanes" instead of sticking blind flight instruments, and other expensive accessories into their planes to give the pilot the illusion that he can fly safely in bad weather and after dark. Very few operators will even rent their planes out to an "average flyer" for a night flight.

A few thousand hours of my own flying experience have convinced me that night flying and instrument

flying never will be safe for the *average* pilot. I have been weathered-in time and again, sometimes for a week at a stretch, in different parts of the country and have noticed that the smart pilots sit and wait or leave the plane and take a train or bus—even though the plane may be equipped with all aids to navigation. For the average flyer, the airplane becomes as useless as snowshoes in Florida when the sun goes down or when the ceiling is on the trees.

This may sound stupid, but the private airplane doesn't really belong to its owner; it belongs to the airport nearest his home or the airport where storage is cheaper. That airplane is like a fine motorboat which is available for occasional pleasure rides in good weather, but must be left at some distant site to run up rent or be tied out at the mercy of the elements and souvenir hunters at some far-away lake. I have had gas and parts stolen from my planes when tied out, and wing tips damaged when hangared, and I know what is in the minds and hearts of those who own them and suffer such inconveniences and expense.

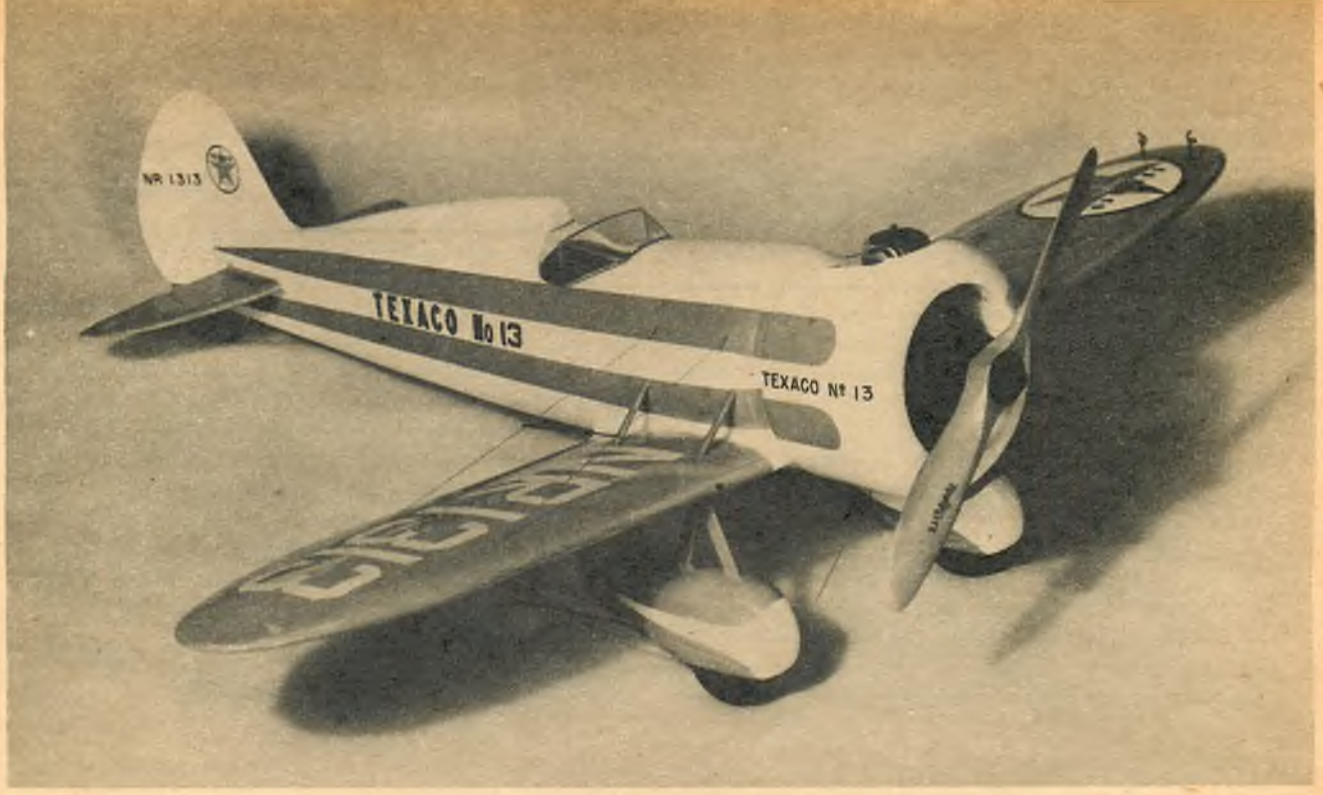
For years, I have studied the problems of roadability for airplanes and devised methods for folding their wings. Many engineers say it is impractical to carry the wings along on the highway and then home—but, I have driven my Ercoupe (complete) through the heavy tourist traffic of Miami, Fla., and through the narrow streets of downtown Mobile, Ala., and other places with as much ease as you would a car. Mrs. Gladys Pennington and Ellen Gilmour drove it 100 miles in five hours after dark in a heavy rain and crosswind from Jacksonville to Daytona Beach, Fla. This is no speed record, but it does prove that the complete airplane can be driven safely on the highway, and it must be (*Continued on page* 61)



A plague on AT's Clubster, cries Molt Taylor of Washington; the Aerocar is the answer, says he

THE "Aerocar" above, designed by Moulton B. Taylor and built by Aerocar, Inc., Longview, Washington, is a new all-metal "Flying Automobile." The automobile section of the prototype has already completed more than eight months of road work with thorough satisfaction, and the flying unit is at present undergoing flight tests with equal success. Conversion from automobile to aircraft may be accomplished in one minute. The flight component may be left at home or at the airport, or if preferred, may be towed behind as a trailer on retractable wheels set in the leading edge of the wing.

In the air, the Aerocar has a cruising speed of more than 100 mph and on the road a top speed of 50 mph. A 100 hp Franklin engine powers both components; the flying unit by means of a drive shaft from the automobile through the tail. The propeller is at the rear in pusher position. The Aerocar seats two and has a 14 cu. ft. baggage compartment. Service ceiling is 12,000 ft. and air range over 300 miles. Wingspan is 30 ft. and length 21 ft.; while as a car-trailer combination on the ground the length is 24 ft. Maximum road horsepower is 30. (*Continued on page* 62)



TEXACO No. 13

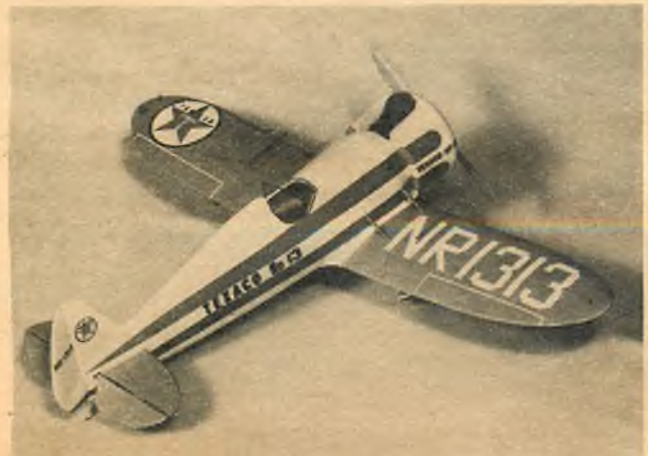
Frank Hawks' Travelaire Mystery Ship, a famous racing plane, comes back to life as a U-controller

By WALTER A. MUSCIANO

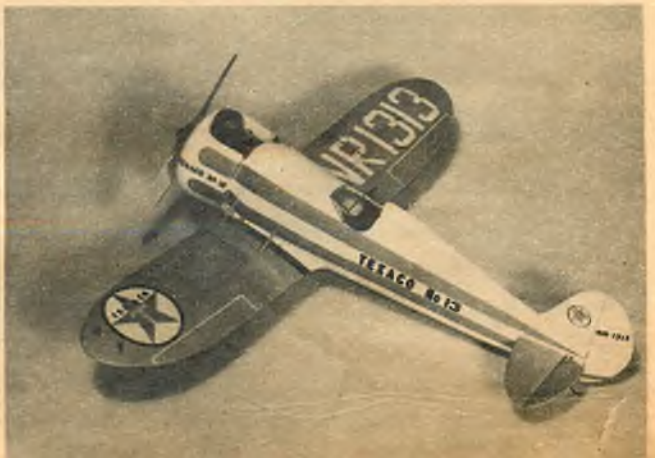
THE almost legendary figure of Commander Frank M. Hawks remains in the memory of all persons interested in aviation. His famous Travelaire "Mystery Ship" established many inter-city records, and its design set the pattern for many future racing planes. It was in this Wright R-975 powered craft that Commander Hawks first attained world fame as a record smasher. The Texas Company sponsored the craft, so "Texaco No. 13" was an appropriate name. Frank Hawks selected the "No. 13" and obtained the double "13" license number to "thumb his nose at superstition."

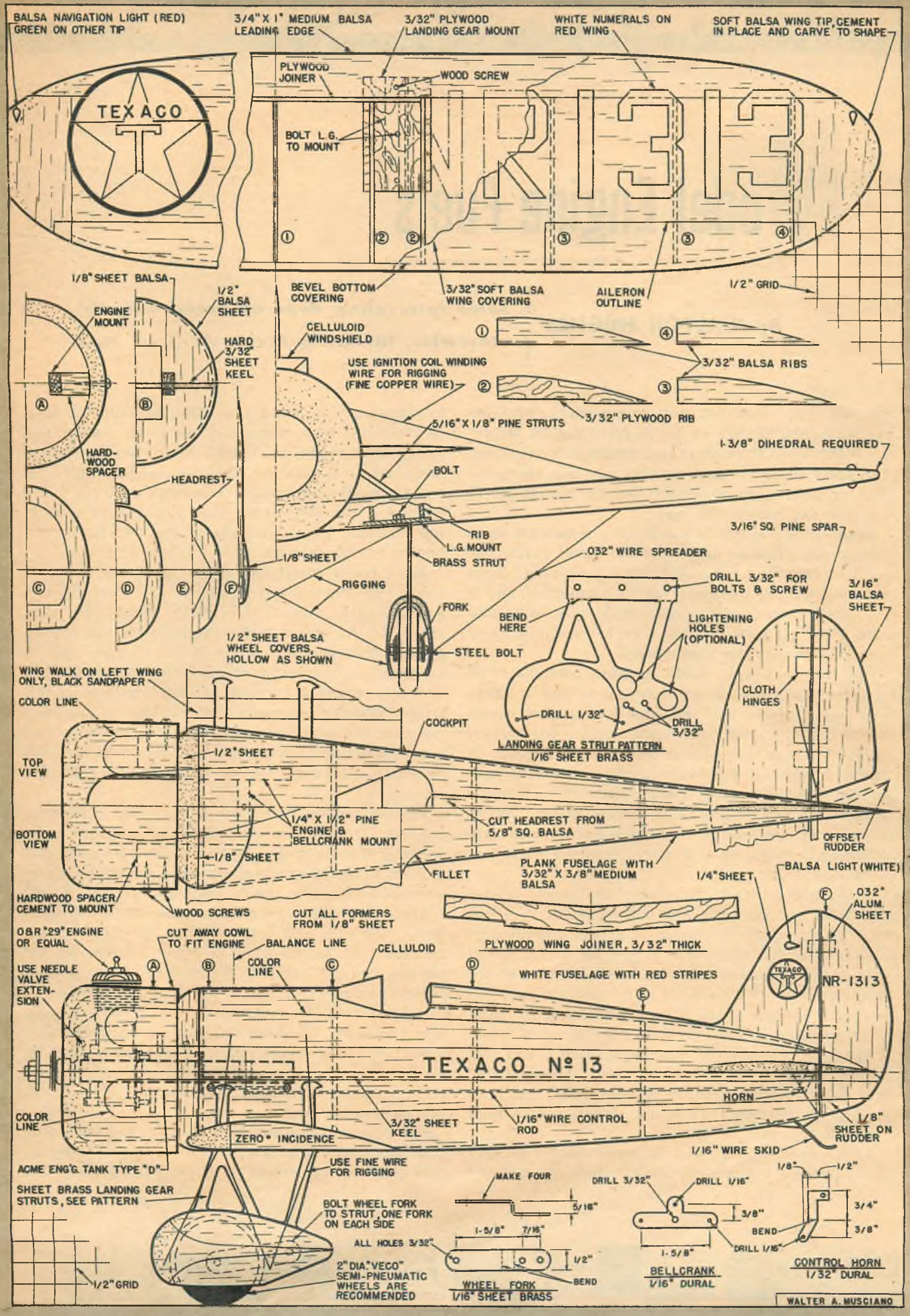
These are some of the flights made by Hawks in his famous speed plane: On August 6, 1930, a westbound U.S. transcontinental record of 14 hrs., 50 mins. and 43 sec. was established in a flight from New York to Los Angeles. By returning in 12 hrs., 25 mins. and 3 sec. on August 13, he set a new eastbound coast to coast record. Flying from London to Rome in 5 hrs. and 20 mins. and then from Rome to Paris in 4 hrs. and 32 mins., both on April 22, 1931, two European records were smashed. Another record was made when Hawks sped from London to Dublin in 1 hr. and 40 mins. on April 30, eight days later! And once again the Texaco 13 burned the skies in a flight from London to Berlin on May 12. (*Continued on page* 82)

● Could you ask for a prettier plane? Color scheme is red wing with white numerals, red stab, white fuselage with red trim, black letters.



● Construction is not difficult. Fuselage planking is made easy by absence of curves; metal shop can help out on landing gear.




BALSA NAVIGATION LIGHT (RED) GREEN ON OTHER TIP
3/4" X 1" MEDIUM BALSA LEADING EDGE
3/32" PLYWOOD LANDING GEAR MOUNT
WHITE NUMERALS ON RED WING
SOFT BALSA WING TIP, CEMENT IN PLACE AND CARVE TO SHAPE
PLYWOOD JOINER
WOOD SCREW
BOLT L.G. TO MOUNT
TEXACO
NR1313
BEVEL BOTTOM COVERING
3/32" SOFT BALSA WING COVERING
AILERON OUTLINE
1/2" GRID
1/8" SHEET BALSA
1/2" BALSA SHEET
ENGINE MOUNT
HARD 3/32" SHEET KEEL
CELLULOID WINDSHIELD
USE IGNITION COIL WINDING WIRE FOR RIGGING (FINE COPPER WIRE)
3/32" BALSA RIBS
3/32" PLYWOOD RIB
5/16" X 1/8" PINE STRUTS
1-3/8" DIHEDRAL REQUIRED
HARD-WOOD SPACER
HEADREST
BOLT
RIB
L.G. MOUNT
BRASS STRUT
1/8" SHEET
.032" WIRE SPREADER
3/16" SQ. PINE SPAR
RIGGING
FORK
STEEL BOLT
1/2" SHEET BALSA WHEEL COVERS, HOLLOW AS SHOWN
DRILL 3/32" FOR BOLTS & SCREW
3/16" BALSA SHEET
BEND HERE
LIGHTENING HOLES (OPTIONAL)
WING WALK ON LEFT WING ONLY, BLACK SANDPAPER
COLOR LINE
COCKPIT
CLOTH HINGES
DRILL 1/32"
DRILL 3/32"
LANDING GEAR STRUT PATTERN
1/16" SHEET BRASS
TOP VIEW
1/2" SHEET
BOTTOM VIEW
1/4" X 1 1/2" PINE ENGINE & BELLCRANK MOUNT
1/8" SHEET
CUT HEADREST FROM 5/8" SQ. BALSA
OFFSET RUDDER
FILLET
PLANK FUSELAGE WITH 3/32" X 3/8" MEDIUM BALSA
1/4" SHEET
BALSA LIGHT (WHITE)
.032" ALUM. SHEET
HARDWOOD SPACER, CEMENT TO MOUNT
WOOD SCREWS
CUT ALL FORMERS FROM 1/8" SHEET
PLYWOOD WING JOINER, 3/32" THICK
O&R ".29" ENGINE OR EQUAL
CUT AWAY COWL TO FIT ENGINE
BALANCE LINE
CELLULOID
USE NEEDLE VALVE EXTEN-SION
COLOR LINE
WHITE FUSELAGE WITH RED STRIPES
NR-1313
TEXACO Nº 13
HORN
COLOR LINE
3/32" SHEET KEEL
1/16" WIRE CONTROL ROD
1/8" SHEET ON RUDDER
ZERO° INCIDENCE
1/16" WIRE SKID
ACME ENG'G. TANK TYPE "D"
USE FINE WIRE FOR RIGGING
SHEET BRASS LANDING GEAR STRUTS, SEE PATTERN
BOLT WHEEL FORK TO STRUT, ONE FORK ON EACH SIDE
MAKE FOUR
5/16"
1-5/8"
7/16"
ALL HOLES 3/32"
1/2"
BEND
WHEEL FORK
1/16" SHEET BRASS
DRILL 3/32"
DRILL 1/16"
3/8"
1-5/8"
BELLCRANK
1/16" DURAL
1/8"
1/2"
3/4"
3/8"
BEND
DRILL 1/16"
CONTROL HORN
1/32" DURAL
1/2" GRID
2" DIA. "VECO" SEMI-PNEUMATIC WHEELS ARE RECOMMENDED
WALTER A. MUSCIANO

Model Engine Fuels

By WALTON HUGHES

Some interesting dope on fuels, hot and otherwise, including the home-brew stuff

EARLY gas modelers had a very simple problem with their Brown or Gwin-Airo Mighty Midget engines. In those days fuel meant just one thing, "S.A.E. 70 oil and a good straight gasoline," to quote from an instruction sheet put out by Bunch Model Airplane Co. before the war.

However, the situation has become somewhat more complicated. Europe developed the diesel during the war and then came the American glow plug. With ether, castor oil, methanol, nitro compounds and a few other ingredients to deal with, most modelers have given up mixing "home brew" and buy their chemical soup at the hobby store.

Fuel for two-cycle model engines contains some material that burns to produce power and a lubricating oil. Table I lists the more widely used model engine fuel or power ingredients. Taking the various possible fuels as they appear in the table, straight or unleaded *gasoline* should be used in model engines because tetraethyl lead breaks down into corrosive chemicals at extremely high temperatures. Model engines are designed to run much hotter than auto engines and corrosion is greatly increased when you use a leaded gas.

Naphtha is a petroleum product that might be described as an extremely low-test gasoline. It is less volatile and causes knocking in a high-compression engine. Cleaners' naphtha is suited for use in model engines, but painters' naphtha is not because of the addition of oil. *Kerosene* is very common and has been used in some of the European diesel fuels. *Benzol* or *benzene* is a by-product from the distillation of coal. It is used for cleaning clothing and can usually be purchased at large paint supply stores. Most paint removers consist of benzol and wax, and because of the latter ingredient should not be used in model engines.

Methanol, methyl alcohol, or *wood alcohol* are different terms for the same liquid which is produced by distillation of wood and more recently has been synthetized. It is commonly used as a paint and shellac solvent and as an anti-freeze. Do not confuse methanol with grain or ethyl alcohol used in liquor and for medical purposes. The *ether* used for model engines is the same thing that puts you to sleep in the hospital, but is usually a cheaper grade and known as motor ether.

The nitrated materials used for glow fuel are relatively new chemical compounds. They are hard to get and little general information concerning their properties has been made available to the general public. *Nitrobenzene* is the oldest of these and is produced by the action of nitric and sulphuric acid on benzene and the resultant chemical is a yellow liquid. Many nitro compounds explode at low temperature and must be handled carefully. Glow fuel mixtures are less dangerous than the unmixed nitro derivatives because the oil deadens the explosive properties.

Modelers sometimes run into trouble with their engines "freezing up" at high speeds. This often happens when a sport engine designed for operating at 7,000 to 10,000 rpm is operated on a small-diameter low-pitch propeller just to hear it "scream." Excess heating under these conditions causes the oil to break down into gum and actually glue the piston in the cylinder. As we mention so often, a great deal of trouble can be avoided by reading the manufacturers' recommendations for fuel and propeller.

Table II lists the common oils used in model engine fuel. Number 70 motor oil can be obtained from motorcycle shops and airports. Castor oil is made by pressing beans or seeds of the castor-oil plant. Several types are available; Baker's AA or the "degummed motor grade" is good.

Synthetic oils are now produced for high temperature lubrication and are used in a few commercial fuel mixtures. Selection of (*Continued on page* 78)

Fuel	Maker *	For Ignition	For Glow-Plug	For Diesel	Free Flight Sport	Free Flight Contest	U-Control-Sport	U-Control-Speed	U-Control Stunt	Ring Engines	Lapped Engines	For Comp. Ratios of:	Methanol Base	Gasoline Base	Other Base	Motor Oil Lubricant	Castor Oil Lubricant	Synthetic Oil Lubricant	Other Lubricant	Maker's Remarks
Blue Blazer Glow No. 1	FL		X		X		X		X	X	X	5:1 to 10:1	X		X		X	X	X	low viscosity drag; for low humidity
Blue Blazer Glow No. 2	FL		X		X	X	X		X	X	X	7:1 to 18:1	X		X		X	X	X	high percentage combustion; for high humidity
Blue Blazer Ignition	FL	X			X		X		X	X	X	4:1 to 12:1	X		X		X	X	X	reduces condensation moisture and aldehyde destruction
Diesel Glow	FL			X	X	X	X	X	X	X	X	Up to 22:1			X		X			for diesel engines; additive to heat glow or ignition fuels
Drone Diesel	RP			X	X		X		X		X	Any diesel				X				ether & petroleum oil; can be tailored by adding No. 30 oil
Dyna Glow	RP		X		X	X	X	X	X	X	X	All	X				X			nitrated methanol base with degummed AA castor oil
Hell Razor Racing	CMEC		X		X	X	X	X	X	X	X	All	X				X			25% castor oil
Hi Rev Spitfire	FL	X			X	X	X	X		X	X	Up to 12:1	X		X		X			favors relative humidity less than 60%
Infant Glow	RP		X		X	X	X	X	X	X	X	All	X				X			heavily nitrated
Infant Thimble Glow	FL		X			X		X		X	X	7:1 to 16:1	X				X		X	for .02 to .29 engines
Nitro-X	MMA		X		X	X	X	X	X	X	X	All	X				X			nitrated alcohol, AA castor oil
OK Cub Glow	HT&MW		X		X	X	X	X	X	X	X	6.5:1 to 9:1	X				X			developed for Cubs, all OK engines and motors of similar compression ratios
O&R No. AA	O&R		X		X	X	X	X	X		X	6:1 to 12:1	X				X	X		for ultra small engines; detergent against carbon, sludge, varnish deposits
O&R No. 1	O&R	X			X	X	X	X	X		X	5:1 to 8:1	X				X	X		also contains Benzol; recommended as "hot" fuel for O&R engines
O&R No. 2	O&R		X		X	X	X	X	X		X	6:1 to 10:1	X				X	X		for glow plug lapped engines; recommended as "break-in" fuel for O&R engines
O&R No. 2 Economy	O&R		X		X		X		X		X	6:1 to 10:1	X				X	X		compounded for "Sunday" flyer and general sport flying
O&R No. 3	O&R	X			X	X	X	X	X	X		12:1 to 18:1	X				X			three parts methanol, 1 part castor oil, plus other ingredients
O&R No. 4	O&R		X		X	X	X	X	X	X		6:1 to 18:1	X				X			for glow plug, piston ring engines; 25% castor oil
O&R No. 4 Economy	O&R		X		X		X		X	X		6:01	X				X			for g. p. piston ring engines
Power Mist Hi-Thrust Glow	FL		X					X	X	X	X	7:1 to 18:1	X		X		X		X	for medium and high compression engines when relative humidity is above 50%
Power Mist No. 6 Hornet Special	FL	X			X	X	X	X		X	X	9:1 to 15:1	X				X		X	"cool" fuel for Bunch Tiger and Hornet engines when relative humidity is 55% to 75%
Red Devil Glow	RP		X		X	X	X	X	X	X	X	All	X					X		nitrated all-round fuel
Rever	RevP		X		X	X	X	X	X	X	X	All	X				X			Not for use in single spot cyl. weld engines
Royal Spitfire Ignition	FL	X				X		X		X	X	4:1 to 10:1	X				X			also an additive to other fuels
Sky Ranger Gas	RP	X			X		X		X	X	X	All		X		X				for any type ignition engine
Sky Ranger Glow	RP		X		X	X	X	X	X	X	X	All	X				X			said to be first glow fuel sold
Spitfire Glow	FL		X					X		X	X	9:1	X		X		X		X	peak performance when humidity is below 60%
Standard Silver Label Power Mist	FL	X						X		X	X	8:1 to 16:1	X		X		X		X	favors relative humidity above 40%; marketed in 1930
Super Atomic	SP	X			X	X	X	X	X	X	X	All	X				X			speed ignition fuel; now nitrated for glow operation
Super Diesel	SP			X	X	X	X	X	X	X	X	All								petroleum base lubrication
Super Duper	SP	X			X		X		X	X	X	All		X		X				said to be first gas & SAE 70 fuel marketed
Superflite Racing Glow	MCP		X			X		X	X	X	X	6:1 to 12:1	X				X			decarbonizer added; said to be first Canadian glow fuel
Superflite Standard Glow	MCP		X		X		X		X		X	Up to 8:1	X				X			same amount castor oil, less nitro methane than Superflite Racing Glow
Super Glo-Gas	SP		X		X		X		X	X	X	All		X		X				nitrated gasoline base fuel; does not affect dope, cement or plastic tanks
Super Glow	SP		X		X	X	X	X	X	X	X	All	X				X			gum free; may also be used in ignition motors
Supreme Gold Label Power Mist	FL	X						X		X	X	9:1 to 18:1	X		X		X		X	favors heavy atmosphere with relative humidity above 50%, temperature above 60°
Testor's "39"	TCC	X	X		X	X	X	X	X	X	X	All								recommended by makers of McCoy engines for all engines
Thimble-Drome	LMC		X			X		X	X	X	X	Wide range	X				X			recommended for high rpm engines in both cars and planes

*FL-Francisco Laboratories; HT&MW-Herkimer Tool and Model Works; LMC-L. Cox Mfg. Co.; MCP-Moro Craft Products Co.; MMA-Midwest Model Aircraft Co.; O&R-Ohlsson & Rice; RP-Ranger Products; SP-Sportco Products; TCC-Testor Chemical Co.; CMEC-Consolidated Model Engineering Co.; RevP-Rever Products. (All data supplied by manufacturer.)

OTHER FUEL INGREDIENTS OF INTEREST TO MODELERS:

- **Castor Oil Lubricator (SP):** refined, heavy base, gum-free castor oil for added lubrication to methanol base fuels, for break-in or in original formulas.
- **Hot-Rod Castor Oil (FL):** treated to blend and remain in suspension mixed with petroleum oil.
- **Nitrol Ultra-Glow Concentrate (FL):** 40% nitrated concentrate for tailoring glow fuels; may be used as straight fuel in some glow engines.
- **O&R No. 30 Plus (O&R):** a nitrated blending agent to increase the nitrate content of O&R fuels.
- **Power Mist Crankcase Castor Oil (FL):** for use in all 2-cycle and 4-cycle engines; viscosity 25 and 45; may be left in crankcase with gumming oxidation; does not blend with gasoline or petroleum oil.
- **Power Mist Fortified Castor Oil (FL):** treated to blend and remain in suspension mixed with gasoline.
- **Super-Charged Castor Oil (FL):** nitrated castor oil additive; blends with alcohol or gasoline.
- **Super Seventy Oil (SP):** pure SAE No. 70 motor oil.

By PETER FRANKLIN

SKYLARK

If you've been avoiding free flights because of complicated structures, here's an A/2 that's easy

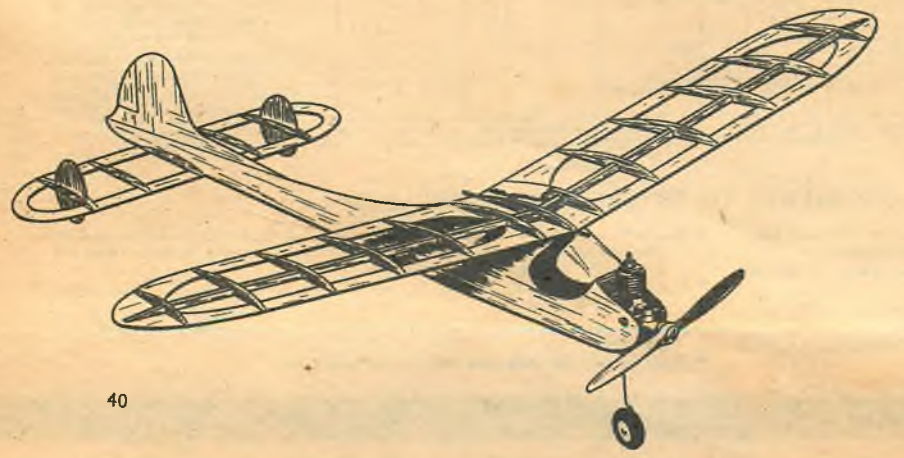
"HOW simple can you design a half-A free flight and still have good performance and eye appeal?" was the idea behind Skylark. Perhaps we were influenced by the prefabrication trend of control-line kits. Could the fact that we had recently purchased some very nice, light quarter-grained 4" wide sheets have had anything to do with it? At any rate we decided to forget about the traditional "stringer-cement-tissue" type of construction and explore the possibilities of sheet balsa.

Excessive weight would be the result of all-sheet covering, so the Sky-Sail tissue wing construction and stabilizer are a compromise. But both are much more quickly made than if the usual construction were used. Don't take our word for it, try building the Skylark yourself. Select four sheets of light, quarter-grained 1/16" x 4" x 36" sheets at your local hobby shop (1/20" thick may be used if a very light model is desired). Enlarge the plans using the scale reproduced on the border of the drawings.

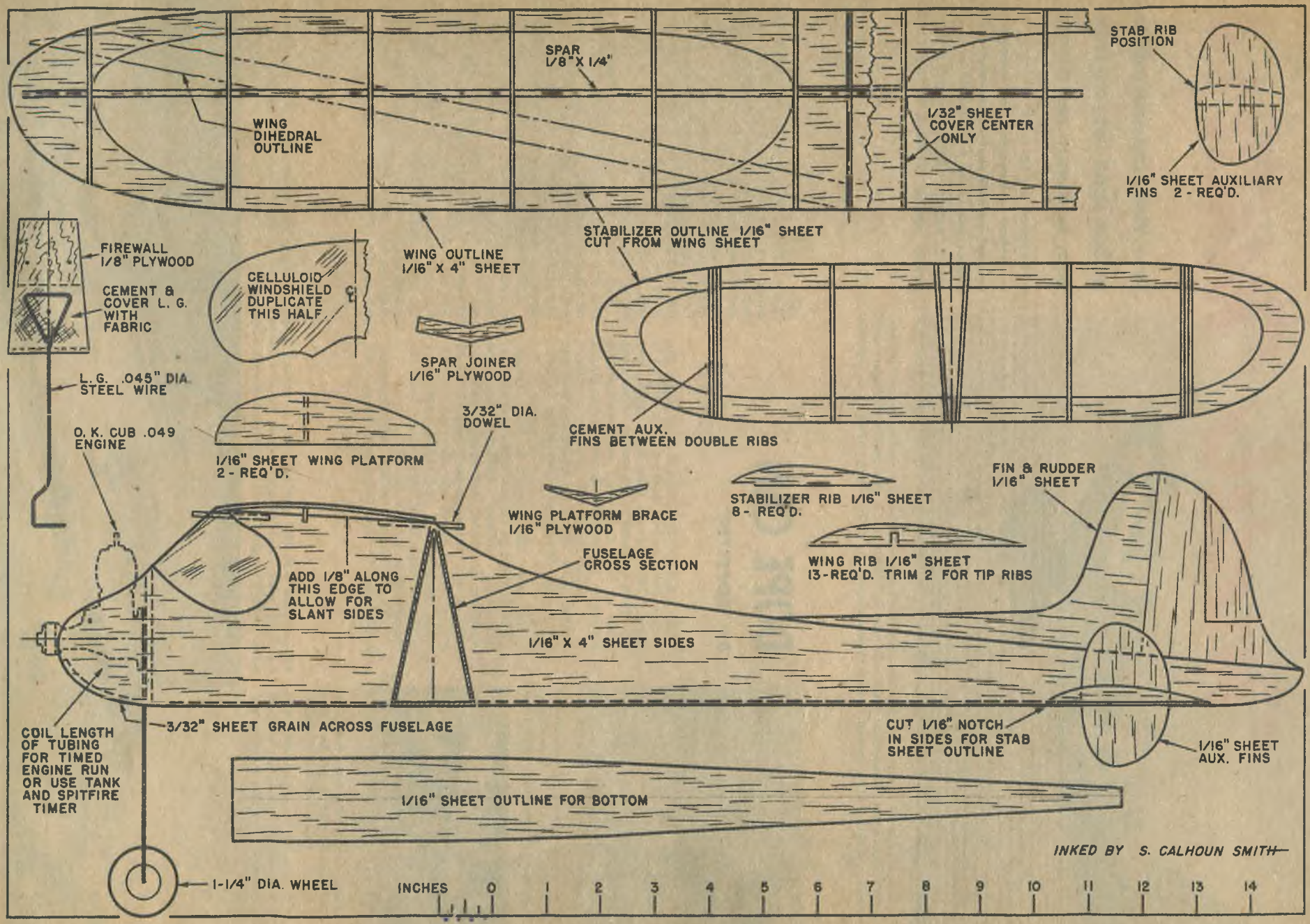
Both the wing and stabilizer are constructed in the same manner: the outlines are cut from sheet which takes the place of the customary leading edge, tip, and trailing edge. Note that the stabilizer outline comes out of the piece cut from the inside of the wing panels. If the area of the stabilizer looks small in proportion to the wing area when compared to most free flights, we have allowed for this in the design by providing an extra long tail moment arm (longer fuselage) and used a high-lift airfoil to make the small stabilizer more effective.

Most free flights carry a lot more stabilizer area than is necessary for proper longitudinal stability. Twenty-five to thirty percent of the wing area is ample in most designs providing an average length moment arm is used.

Join the two wing spars at the center and cement the 1/16" plywood spar joiner in position to form the dihedral angle of the wing. Allow ample time for drying and then lay the spar on one wing panel and cement in place. When dry, block up this panel so that the other half of the spar can be cemented to the other wing panel. Don't spare the cement on the center section joint. Now cement the ribs in position, add the 1/16" plywood spar joiner in position to form the dihedral angle of the (*Continued on page* 75)



● "S" stands for "simplicity" and "Skylark." This little beauty is a real contest contender with an .049 and as such is an expert's delight. With the smaller motors you'll get lazier and more realistic flights. She will fly well with an Infant if you use 1/20 inch thick sheet balsa instead of the 1/16 inch stock recommended for the "bigger" engines. Three sheets make up main section of the fuselage; stabilizer cuts out of one wing panel. Plasticize dope when covering to prevent any warping.


SPAR
1/8" X 1/4"
WING
DIHEDRAL
OUTLINE
1/32" SHEET
COVER CENTER
ONLY
STAB RIB
POSITION
1/16" SHEET AUXILIARY
FINS 2 - REQ'D.
FIREWALL
1/8" PLYWOOD
CEMENT & COVER L. G. WITH FABRIC
CELLULOID WINDSHIELD DUPLICATE THIS HALF
WING OUTLINE
1/16" X 4" SHEET
STABILIZER OUTLINE 1/16" SHEET
CUT FROM WING SHEET
SPAR JOINER
1/16" PLYWOOD
L. G. .045" DIA.
STEEL WIRE
O. K. CUB .049
ENGINE
1/16" SHEET WING PLATFORM
2 - REQ'D.
3/32" DIA.
DOWEL
CEMENT AUX.
FINS BETWEEN DOUBLE RIBS
WING PLATFORM BRACE
1/16" PLYWOOD
STABILIZER RIB 1/16" SHEET
8 - REQ'D.
FIN & RUDDER
1/16" SHEET
FUSELAGE
CROSS SECTION
WING RIB 1/16" SHEET
13-REQ'D. TRIM 2 FOR TIP RIBS
ADD 1/8" ALONG
THIS EDGE TO
ALLOW FOR
SLANT SIDES
1/16" X 4" SHEET SIDES
COIL LENGTH
OF TUBING
FOR TIMED
ENGINE RUN
OR USE TANK
AND SPITFIRE
TIMER
3/32" SHEET GRAIN ACROSS FUSELAGE
CUT 1/16" NOTCH
IN SIDES FOR STAB
SHEET OUTLINE
1/16" SHEET
AUX. FINS
1/16" SHEET OUTLINE FOR BOTTOM
INKED BY S. CALHOUN SMITH
1-1/4" DIA. WHEEL
INCHES 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Model Matters

• You've read about the tremendous stresses placed on models during a stunting competition, now here's visual proof. Snapped by Warren Timmons at 1/5000 sec. is William Hoyle's Minnow scale coming out of dive at high speed. Hoyle is student at University of Okla. Print made by R. U. Gullable.

News, Views, Comments and Photos from Model Clubs and Enthusiasts in America and Overseas

• Payment of $2 to $5 is made on or before publication for photos of unusual interest sent exclusively to AT. Photos should be at least 4" x 5" on glossy paper. Retain negatives; no photos can be returned to the sender

• Unassisted take-off as demonstrated by Johnny Acker of L. A. Aeromodelers (Inglewood, Flightmasters). Movo diesel.

• Fiesler-Storch (German) free flight diesel-powered 48 in. job by Ferber (Belgian). Photo—Adrian Castellani.

DOPE CAN

BY "DOPESTER"

THE rules makers, those lads with the slide rules and a worried look, are at it again. Mind if we take them aside and tell them to relax? No matter what they come up with they can't get ahead of the American contestant. Somebody is bound to out-think them and produce a super-wonder ship which fits the rules, but has a material advantage over other contenders.

This time the subject is team racing. The latest set of regulations covering that interesting activity comes from the Academy of Model Aeronautics and consists of six mimeographed pages. Since five of those pages are devoted to how races shall be run, and but a single page to the airplane itself, let's review here the requirements for the model.

A lot of "musts," "shalls" and "cannots" boil down to the following: your team racer can be powered by any engine from .201 to .300; it still must have at least 125 square inches of wing area and a 1 oz. fuel tank; as before the fuselage must be completely cowled except for the plug tip, though new is the requirement that minimum fuselage depth (from pilot's head) be 3¾ inches, minimum width (at the pilot's shoulders) be 2 inches; the pilot must be 1/10 scale—if you turn up with a smallish-sized dummy, you'd better bring along the head off the guy you copied!

Per usual, the racer must resemble a full-size racing aircraft, and it had better be strong since it'll be subject to a 20-G pull test. Landing gear may be fixed or retractable, no dollies. The model must have an engine shut-off or speed control.

AMA's team racing committee under the chairmanship of John Young of Hagerstown, Md. (to think of a member of the old N. Y. Aeronuts club serving the cause of control line flying!) has done an excellent job. Any phase of the sport that calls for two models to fly in the same circle at the same time is bound to end up with a lot of pages of rules. If you or your club want to try team work you can secure a set of the complete regulations from the

• Rubber job revamped into 50 in. gas model: AT's Grumman Widgeon 2 Forster 29's by Hans Messmer, N. J.

• U-controlled B-36 built and flown by K. Shimizu, Tokyo. Has 9-foot span, weighs 24 pounds, 4 oz. Power is six Jap-made "Hope B" engines. Photo by Hidemasa Kimura, Tokyo.

• Mighty nice model and mighty nice photo of same by John E. Pierce of Charlotte, N. C.: Art Chester's "Swee' Pea." Took 1st in appearance

AMA in Washington. Send 10c in stamps.

You'll find that race starts may be one of three ways: mechanical-release race horse start (which means "stooges"); hand-release race horse start; and flying start in which all contenders need two-speed engine control. In a "flying start" the first model in the air acts as a guide for the following planes and after all are flying stacked one above the other the starter waves them off. Some sight! And if it doesn't work—some site!

Line lengths are fixed at 60 feet; .012 inch diameter wire up to 30 ounces, .001 added for each 3 ounces of model's weight over 30. While a lot of us may never summon up enough courage to go out and risk our models and reputations in team racing, the event is bound to have a big influence on control line flying. Any zooty-looking team racer with a somewhat smaller engine makes a fine sport flyer or Sunday ship. Our prediction is that manufacturers will begin to recognize the event and start prefabbing more kits that fit the team racing event, or can be flown single-o for "oh's" and "ah's."

The addition of team racing to the Plymouth Internationals means that the event will filter down to the smallest Plymouth meet before long. About the only thing left to put the event over in a great big way is for someone to invent a fool-proof (and fuel-proof) system which would enable entrants to start their engines every time without delay. We know the Californians have such operations down pat, but observation of team racing in other sections of the country leads us to believe that what America needs most is not a good 5c cigar (because we're smoking one as we tap this out) but more modelers who can start their engines at will (no jokes, now).

Like every other form of air-modeling, team racing requires that you get your equipment in good working order at home before you venture out on the contest field.

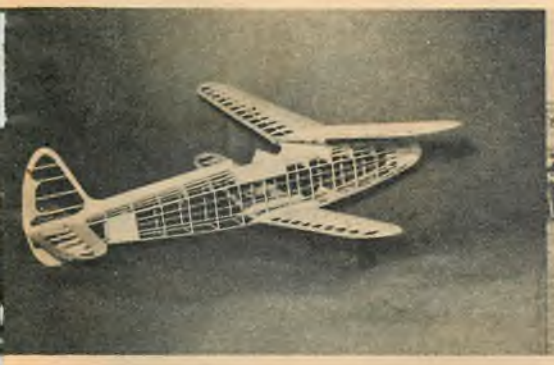
Getcha Brass Knuckles, Boys! Here comes that old argument, again: f.f. vs. U-control. E. C. Linthicum at the University of Kansas says he has one to score for the free flighters. And his authority for stating that a control line model is not an airplane: Clark B. Millikan, one of America's *(Continued on page 85)*

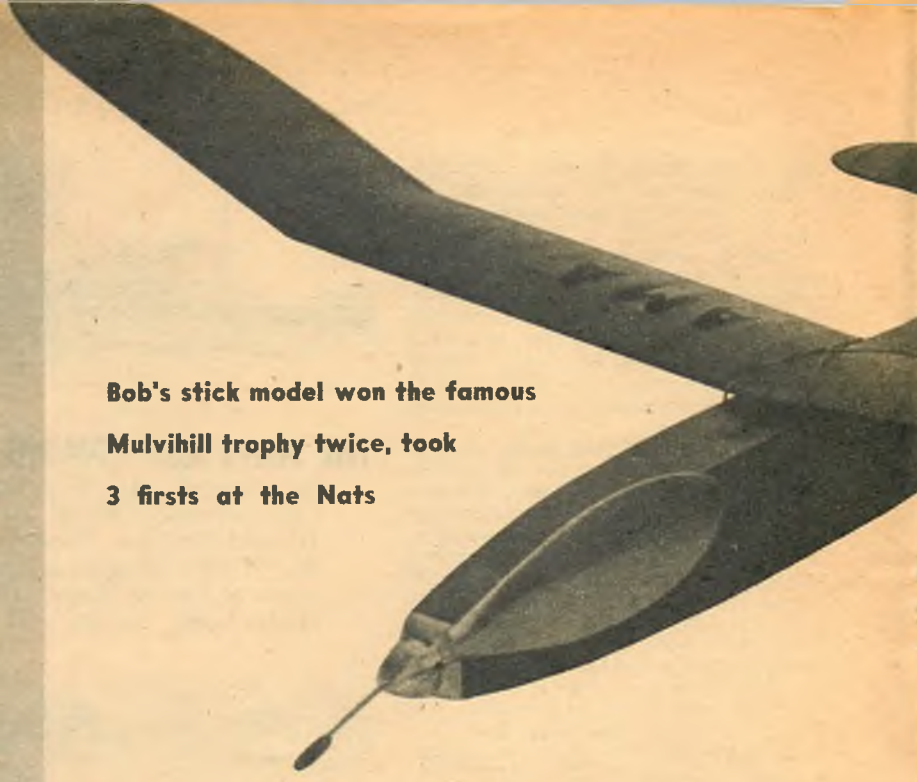
THE NATS ARE COMING, MATE — and this is where you'll be "aboard" July 25 through 30. Main site of the 1950 National Championship Model Airplane Contest will be NAS, Dallas (Grand Prairie), Texas. Indoor events will be run off in Fort Worth's Will Rogers Memorial Coliseum. As during the past two years at Olathe, Kans., the Navy will provide housing for male contestants; meals will be available at reasonable prices.

INTERNATIONAL PAA-LOAD FLIGHT, THE FIRST, was made last March 11 when Ray Matthews (above, right) of Oklahoma City sent his Arden 19 powered "Crowbar" model winging across the Rio Grande river from Laredo, Texas, to Mexico carrying a Lord Elgin watch which eventually will be awarded in Wakefield.

PLYMOUTH INTERNATIONALS (THE FOURTH) have been set for August 14 through 21 in Detroit, Mich., with the control line events again scheduled for Belle Isle Park (below) An array of awards includes 127 trophies and $7,000 in savings bonds. New this year to the Plymouth contest is team racing event.

• Fine 38 in. span rubber-powered sport-contest biplane by Charles Wood, Seattle, Wash. Wing area is 230 sq. in., and overall length, 32.5 in.





Bob's stick model won the famous Mulvihill trophy twice, took 3 firsts at the Nats

By BOB BIENENSTEIN

• BB is a member of the Detroit Balsa Bugs, in '37 started with solid models. He won the Stout indoor trophy in '47 at the National meet. He took he Mulvihill trophy below) twice. He's 23.

THIS stick job was designed with one thought in mind: the need for a consistent contest model that would fly in all kinds of weather and hold up with the best of them. The ship has been thoroughly proven and has lived up to all the requirements. Its contest record is proof enough of its ability to snare top hardware at any meet. Most impressive wins were the taking of first place for three consecutive years at the Nationals, plus capturing the famed Mulvihill trophy twice, which is a record in itself.

There have been two changes made since the original model took to the air. A sheet leading edge on the wing was omitted since it proved unnecessary. We also incorporated a tail pop-up which was found to be more effective.

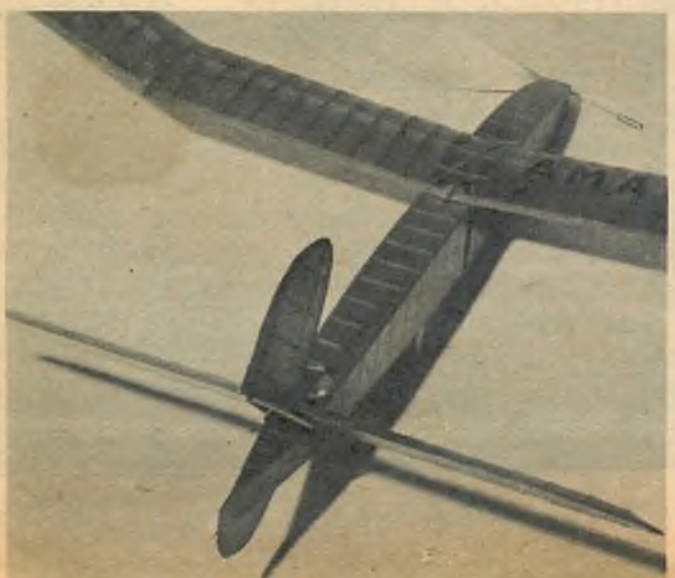
The Challenger

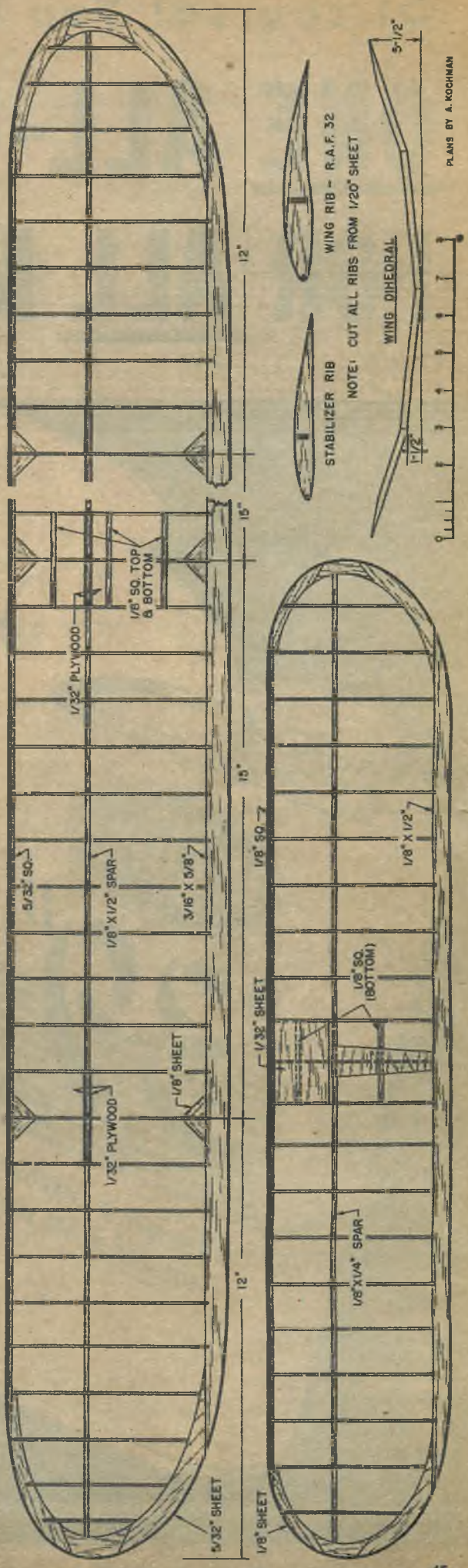
It is also simple and fool-proof. (We can thank Dick Korda for that one.)

With a little care and patience, you too can have a hardware collection. Let's go, and don't spare the glue.

Lay the drawing on a smooth soft board. Clear white pine, preferably. Make certain the board is perfectly straight, as this will assure you of warp-free surfaces.

The fuselage longerons should be straight-grained and medium hard 5/32" square balsa. Place them in their exact position on the drawing. Next, add the cross braces, placing the uprights in position first. When the first side has been completed, build the next side directly on top of the first. This will assure you of similar straight sides. When dry, separate with a razor. Now join the sides together, starting at the center and working toward the front and back. Then fill in the nose and tail sections. The nose block face of the fuselage is covered with 1/32" plywood to prevent it from splitting, as it takes quite a beating. The fuselage is now ready for sanding and covering. (*Continued on page 75*)





Of course! You know it makes sense...

ONE ALL-PURPOSE FUEL FOR ALL MODEL ENGINES

The giant Constellation roars down the runway at Chicago... and takes off for its non-stop flight to Los Angeles. It will fly at many different altitudes... it will pass through widely varying atmospheric conditions... it will fly at different speeds. *But: the same fuel will power the ship all the way from take-off to landing!* Logically, then, it is reasonable to expect *one* fuel — properly formulated — to meet the performance requirements of all model engines... regardless of when or where they are used. See for yourself. You will find that Testor's "39" does exactly this job... simplifies your control-line and free-flight flying.

- HALF PINT: 39c
- PINT: 75c
- QUART: $1.40

RECOMMENDED BY *McCOY* FOR McCOY AND ALL OTHER MODEL ENGINES

"Testor's '39' Model Engine Fuel has been tested by the makers of McCoy Engines for easy starting, all weather performance, power output, quality and quantity of lubrication. We have found Testor's '39' to be an excellent all-purpose fuel for both Glo and Ignition types of McCoy and all other standard Model Engines. We at Duro-Matic recommend Testor's '39' without reservation as a fuel that will assure the model builder high performance and extended engine life."

DURO-MATIC PRODUCTS CO.

(THE ABOVE STATEMENT APPEARS ON EVERY CAN OF TESTOR'S "39")

TESTOR CHEMICAL COMPANY • ROCKFORD, ILLINOIS

Latest... IN THE TESTOR-McCOY PROGRAM!

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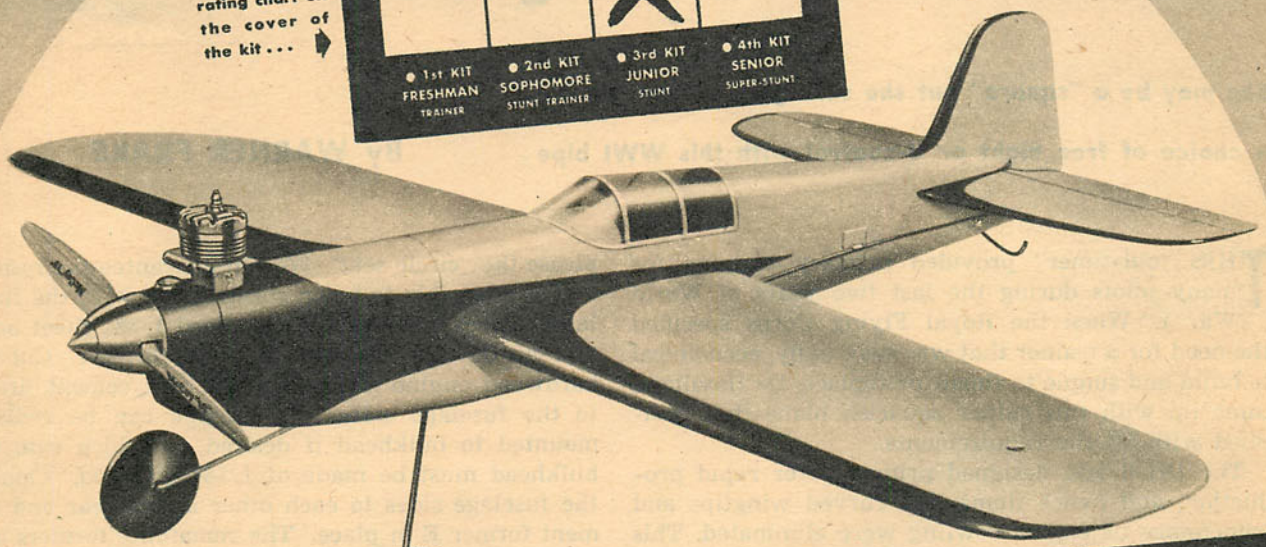
THIS TESTOR KIT IS RATED — AS INDICATED BELOW — IN ACCORDANCE WITH FOUR APPROVED ACHIEVEMENT LEVELS OF CONSTRUCTION AND FLIGHT PERFORMANCE:

● 1st KIT FRESHMAN TRAINER	● 2nd KIT SOPHOMORE STUNT TRAINER	● 3rd KIT JUNIOR STUNT	● 4th KIT SENIOR SUPER-STUNT
		X	

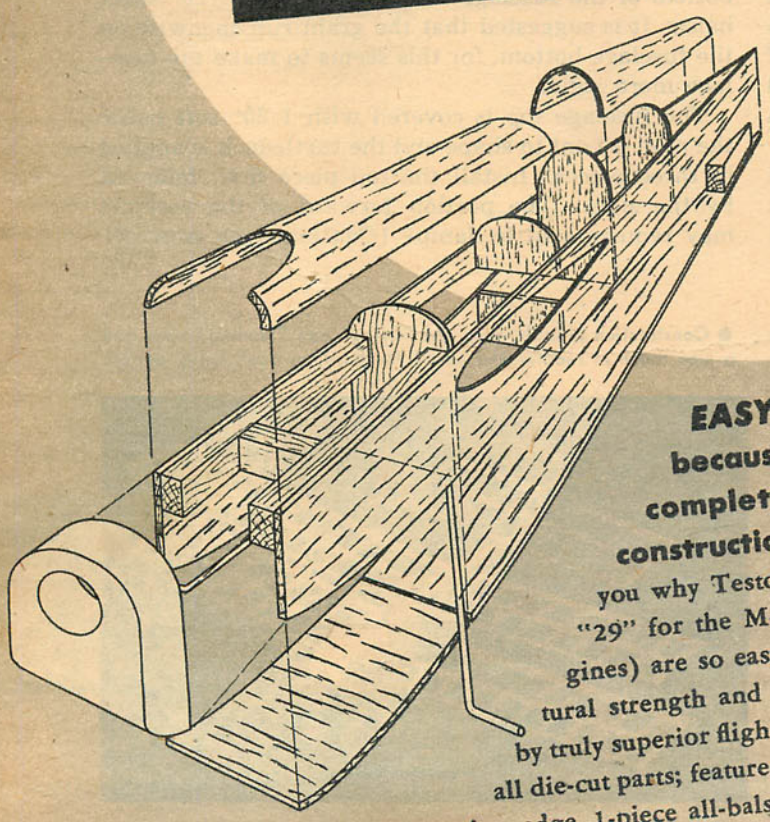


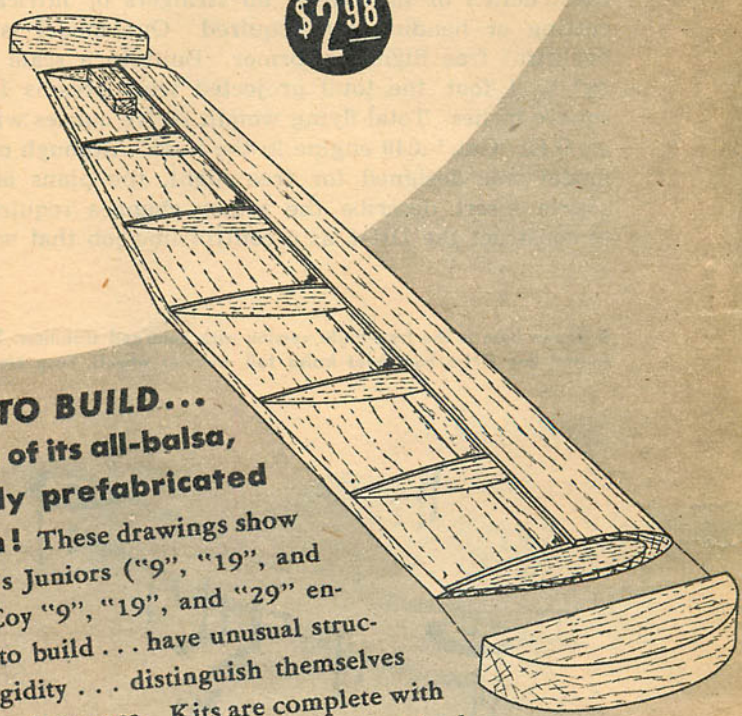
TESTORS

JUNIOR "19" SEMI-SCALE STUNT MODEL

FOR THE McCOY "19" AND SIMILAR SIZE ENGINES

$2.98





EASY TO BUILD... because of its all-balsa, completely prefabricated construction! These drawings show you why Testor's Juniors ("9", "19", and "29" for the McCoy "9", "19", and "29" engines) are so easy to build . . . have unusual structural strength and rigidity . . . distinguish themselves by truly superior flight performance. Kits are complete with all die-cut parts; feature a fully shaped fuselage top, finished leading edge, 1-piece all-balsa sheet covering. Get full details now . . .

TESTOR CHEMICAL COMPANY • ROCKFORD, ILLINOIS

De Havilland Trainer

She may be a "square" but she sure gets around; you've a choice of free flight or U-control with this WWI bipe

By WARNER FRAKE

THIS "old-timer" provided primary training for many pilots during the last two years of World War I. When the Royal Flying Corps specified the need for a trainer that was easy to fly, economical to build and simple to repair or replace, De Havilland came up with this rather squarish plane that complied with all the requirements.

The DH-6 was designed primarily for rapid production, and hence items like curved wingtips and empennage or engine cowling were eliminated. This plane was powered by the 80 hp French Renault eight-cylinder, V-type engine. In spite of its awkward appearance, the De Havilland 6 trainer was a very efficient airplane and, although not a combat plane, it was a decisive factor in winning aerial superiority for the Allies by giving many combat pilots their first taste of flying.

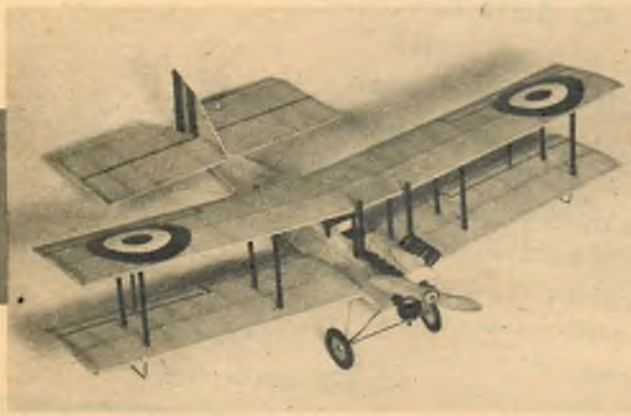
The novice model builder will welcome the angular construction of the DH-6; no stringers or intricate cutting or bending are required. Our model is a beautiful free flight performer. Built to a scale of ¾" = 1 foot, the total projected wing area is 168 square inches. Total flying weight is five ounces with an O.K. "Cub" .049 engine in the nose. Although our model was designed for free flight, the plans and article insert describe the minor changes required to construct the DH-6 as a control line job that will please the "circle set." We can guarantee the results.

It is advisable to begin construction with the fuselage. Select medium 1/20" or hard 1/32" sheet balsa and cut out the fuselage sides and formers. Cut the hardwood engine mounts to size and cement firmly to the fuselage sides. The engine can be radially mounted to bulkhead if desired, in which case the bulkhead must be made of 1/16" plywood. Cement the fuselage sides to each other at the rear and cement former E in place. The remaining formers and bulkhead are installed next.

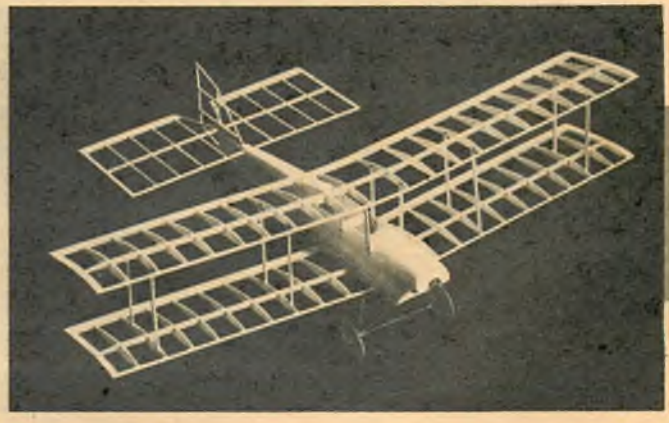
Cut the nose piece and cement in place. Bend the landing gear and bind and solder all joints lightly to avoid excess weight. The landing gear is mounted to the bulkhead and a hard 1/20" x ½" support. A strip of crinoline cemented to each side of these supports and passing over the landing gear strut provides an excellent method of attachment. Cover the entire bottom of the fuselage at this time with 1/20" sheet balsa. It is suggested that the grain run spanwise on the fuselage bottom, for this seems to make the fuselage more rigid.

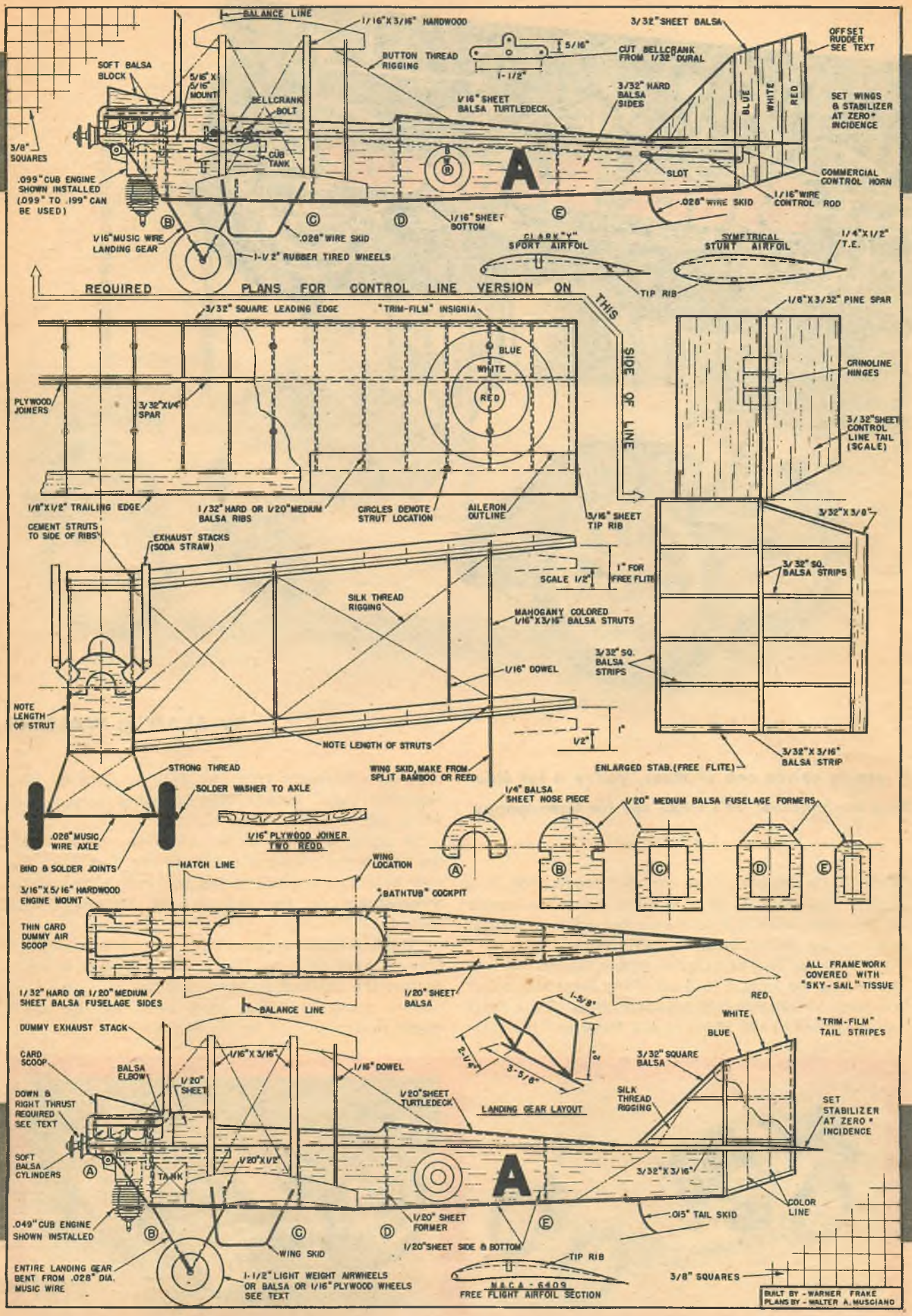
The fuselage top is covered with 1/20" soft balsa, the nose is bent to shape and the turtledeck is applied in three pieces. Install the top piece first, followed by the sides. The portion forward of the cockpits may require a little damp- (*Continued on page 72*)

● Shown here is the free flight version with enlarged stabilizer. The control line DH-6 has sheet balsa tail, heavier wheels, nose block.

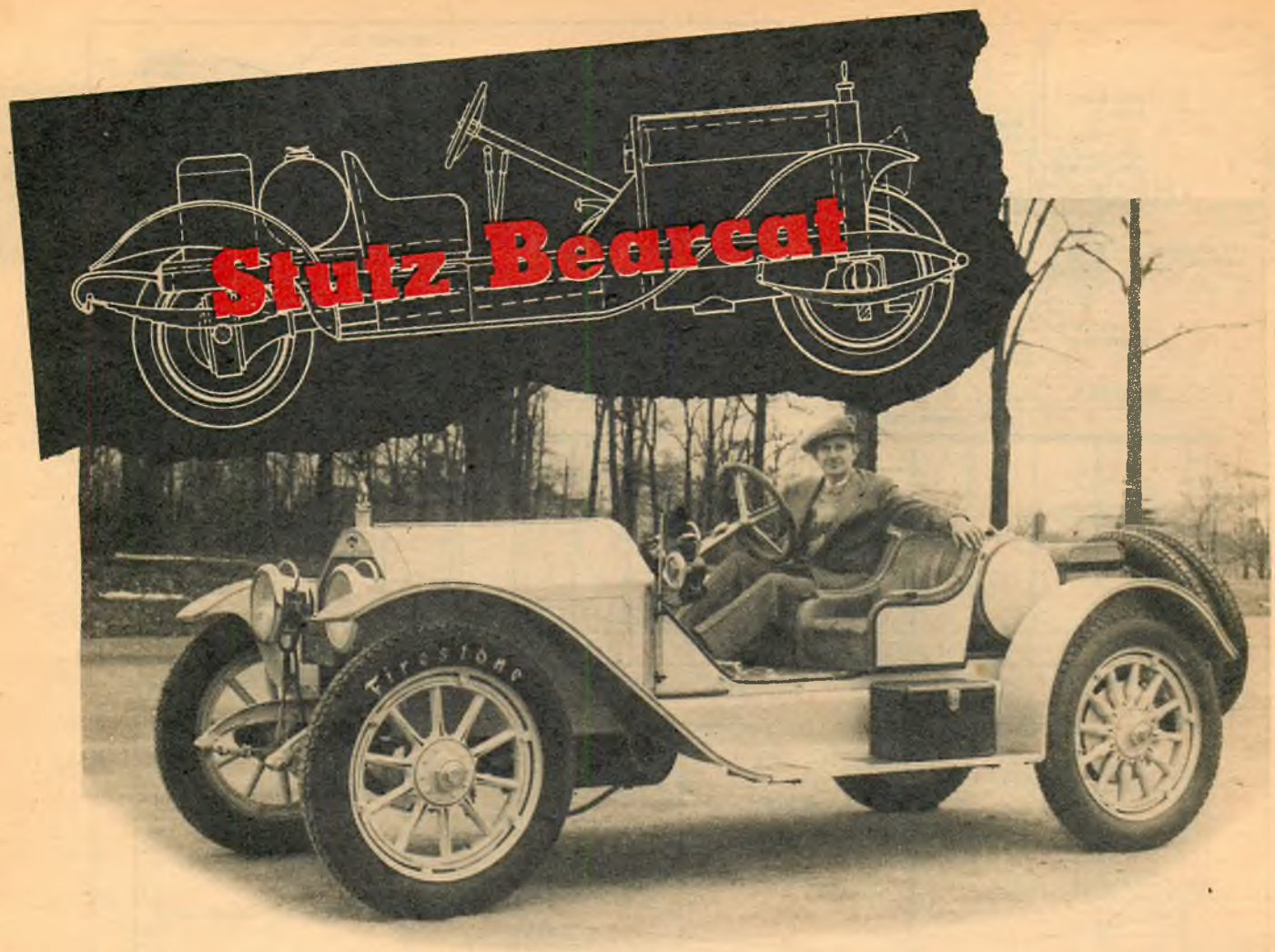


● Construction is fairly easy, the "flying" and "landing" wires add a nice touch of realism and aren't too hard, so don't leave 'em off.




REQUIRED PLANS FOR CONTROL LINE VERSION ON THIS SIDE OF LINE
BALANCE LINE
1/16"X3/16" HARDWOOD
BUTTON THREAD RIGGING
5/16"
1-1/2"
CUT BELLCRANK FROM 1/32" DURAL
3/32" SHEET BALSA
OFFSET RUDDER SEE TEXT
SOFT BALSA BLOCK
5/16" X 5/16" MOUNT
BELLCRANK BOLT
1/16" SHEET BALSA TURTLEDECK
3/32" HARD BALSA SIDES
BLUE
WHITE
RED
SET WINGS & STABILIZER AT ZERO° INCIDENCE
3/8" SQUARES
CUB TANK
SLOT
COMMERCIAL CONTROL HORN
.099" CUB ENGINE SHOWN INSTALLED (.099" TO .199" CAN BE USED)
1/16" WIRE CONTROL ROD
.028" WIRE SKID
1/16" SHEET BOTTOM
1/16" MUSIC WIRE LANDING GEAR
.028" WIRE SKID
1-1/2" RUBBER TIRED WHEELS
CLARK "Y" SPORT AIRFOIL
SYMETRICAL STUNT AIRFOIL
1/4"X1/2" T.E.
TIP RIB
3/32" SQUARE LEADING EDGE
"TRIM-FILM" INSIGHIA
BLUE
WHITE
RED
1/8"X3/32" PINE SPAR
CRINOLINE HINGES
PLYWOOD JOINERS
3/32"X1/4" SPAR
3/32" SHEET CONTROL LINE TAIL (SCALE)
1/8"X1/2" TRAILING EDGE
1/32" HARD OR 1/20" MEDIUM BALSA RIBS
CIRCLES DENOTE STRUT LOCATION
AILERON OUTLINE
3/16" SHEET TIP RIB
3/32"X3/8"
CEMENT STRUTS TO SIDE OF RIBS
EXHAUST STACKS (SODA STRAW)
SCALE 1/2"
1" FOR FREE FLITE
3/32" SQ. BALSA STRIPS
SILK THREAD RIGGING
MAHOGANY COLORED 1/16"X3/16" BALSA STRUTS
3/32" SQ. BALSA STRIPS
1/16" DOWEL
NOTE LENGTH OF STRUT
NOTE LENGTH OF STRUTS
1/2"
1"
WING SKID, MAKE FROM SPLIT BAMBOO OR REED
ENLARGED STAB. (FREE FLITE)
3/32"X3/16" BALSA STRIP
STRONG THREAD
SOLDER WASHER TO AXLE
.028" MUSIC WIRE AXLE
1/16" PLYWOOD JOINER TWO REQD
1/4" BALSA SHEET NOSE PIECE
1/20" MEDIUM BALSA FUSELAGE FORMERS
BIND & SOLDER JOINTS
HATCH LINE
WING LOCATION
3/16"X5/16" HARDWOOD ENGINE MOUNT
"BATHTUB" COCKPIT
THIN CARD DUMMY AIR SCOOP
ALL FRAMEWORK COVERED WITH "SKY-SAIL" TISSUE
1/32" HARD OR 1/20" MEDIUM SHEET BALSA FUSELAGE SIDES
1/20" SHEET BALSA
BALANCE LINE
1-5/8"
2-1/4"
3-5/8"
LANDING GEAR LAYOUT
DUMMY EXHAUST STACK
CARD SCOOP
BALSA ELBOW
1/16"X3/16"
1/16" DOWEL
1/20" SHEET
RED
WHITE
BLUE
"TRIM-FILM" TAIL STRIPES
3/32" SQUARE BALSA
DOWN & RIGHT THRUST REQUIRED SEE TEXT
1/20" SHEET TURTLEDECK
SILK THREAD RIGGING
SET STABILIZER AT ZERO° INCIDENCE
SOFT BALSA CYLINDERS
1/20"X1/2"
TANK
3/32"X3/16"
.049" CUB ENGINE SHOWN INSTALLED
.015" TAIL SKID
COLOR LINE
1/20" SHEET FORMER
1/20" SHEET SIDE & BOTTOM
WING SKID
TIP RIB
ENTIRE LANDING GEAR BENT FROM .028" DIA. MUSIC WIRE
1-1/2" LIGHT WEIGHT AIRWHEELS OR BALSA OR 1/16" PLYWOOD WHEELS SEE TEXT
NACA - 6409
FREE FLIGHT AIRFOIL SECTION
3/8" SQUARES
BUILT BY - WARNER FRAKE
PLANS BY - WALTER A. MUSCIANO

Stutz Bearcat



By ALAN S. WALTERS

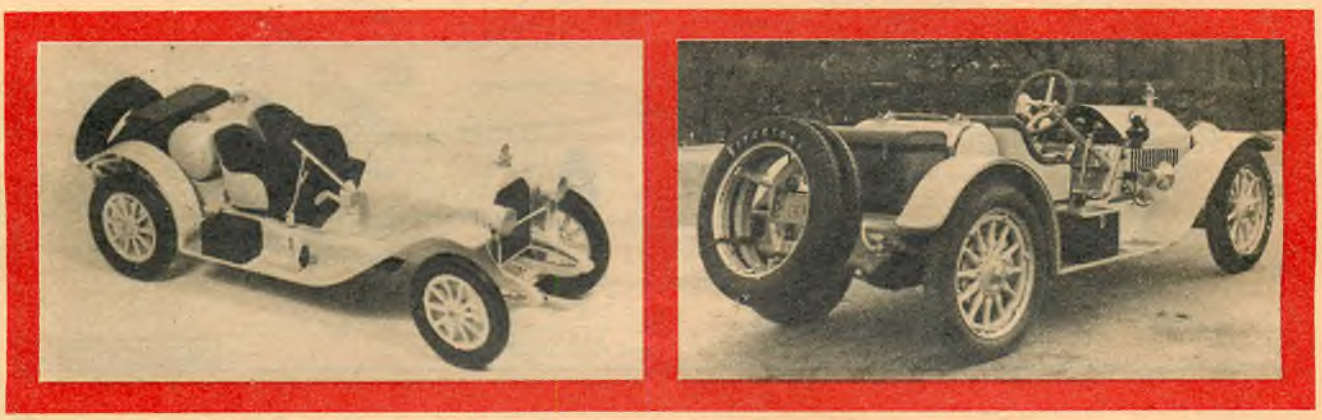
If you've driven one of these, you're a lot older than we figgered; let's make one for Grandpappy!

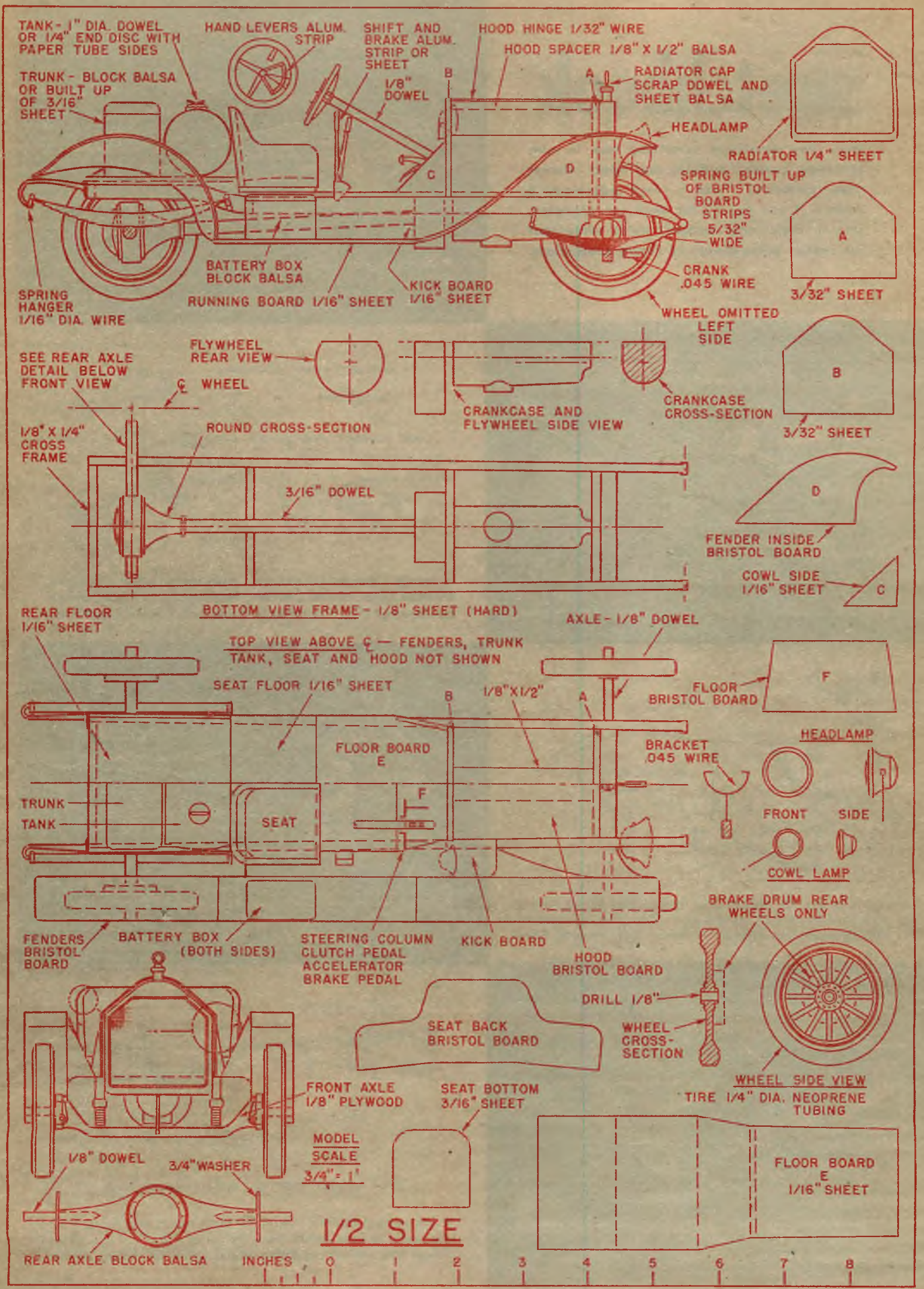
THE Stutz Bearcat, "the car that made good in a day," achieved its fame as both a fast two-seater for the open road and as a race car with no special attachments, motor work or souping-up.

Perhaps the best description of the famous Bearcat can be gleaned from a 1911 ad of the Ideal Motor Car Company of Indianapolis, manufacturers of the Stutz line. Headlined "500 Miles in 422 Minutes," the full-page advertisement from the July 12 issue of "The Horseless Age" details "the amazing record of a model car:

"A signal triumph for an American designer was the wonderful showing made by the first Stutz car ever built and entered in the 500-mile International Sweepstakes on the Indianapolis Speedway May 30th, 1911.

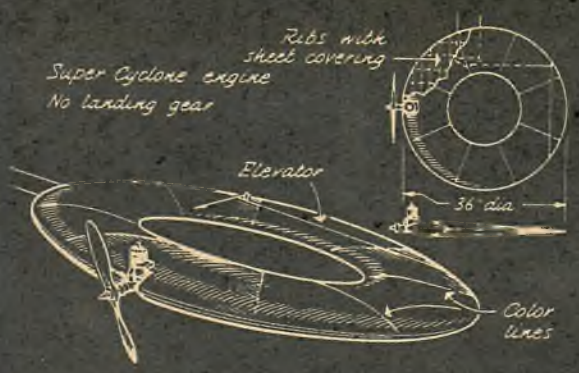
"The first Stutz car ever built, but by no means the first car ever built by Harry C. Stutz, was matched against the skill of the best engineers of two continents, many of whom have been working on a single design of car for (*Continued on page* 65)




TANK - 1" DIA. DOWEL OR 1/4" END DISC WITH PAPER TUBE SIDES
HAND LEVERS ALUM. STRIP
SHIFT AND BRAKE ALUM. STRIP OR SHEET
HOOD HINGE 1/32" WIRE
HOOD SPACER 1/8" X 1/2" BALSA
RADIATOR CAP SCRAP DOWEL AND SHEET BALSA
TRUNK - BLOCK BALSA OR BUILT UP OF 3/16" SHEET
1/8" DOWEL
HEADLAMP
RADIATOR 1/4" SHEET
SPRING BUILT UP OF BRISTOL BOARD STRIPS 5/32" WIDE
BATTERY BOX BLOCK BALSA
CRANK .045 WIRE
SPRING HANGER 1/16" DIA. WIRE
RUNNING BOARD 1/16" SHEET
KICK BOARD 1/16" SHEET
WHEEL OMITTED LEFT SIDE
3/32" SHEET
FLYWHEEL REAR VIEW
SEE REAR AXLE DETAIL BELOW FRONT VIEW
℄ WHEEL
CRANKCASE AND FLYWHEEL SIDE VIEW
CRANKCASE CROSS-SECTION
1/8" X 1/4" CROSS FRAME
ROUND CROSS-SECTION
3/16" DOWEL
3/32" SHEET
FENDER INSIDE BRISTOL BOARD
COWL SIDE 1/16" SHEET
BOTTOM VIEW FRAME - 1/8" SHEET (HARD)
REAR FLOOR 1/16" SHEET
AXLE - 1/8" DOWEL
TOP VIEW ABOVE ℄ — FENDERS, TRUNK TANK, SEAT AND HOOD NOT SHOWN
SEAT FLOOR 1/16" SHEET
1/8"X1/2"
FLOOR BRISTOL BOARD
FLOOR BOARD E
BRACKET .045 WIRE
HEADLAMP
TRUNK
TANK
SEAT
FRONT
SIDE
COWL LAMP
BRAKE DRUM REAR WHEELS ONLY
FENDERS BRISTOL BOARD
BATTERY BOX (BOTH SIDES)
STEERING COLUMN CLUTCH PEDAL ACCELERATOR BRAKE PEDAL
KICK BOARD
HOOD BRISTOL BOARD
DRILL 1/8"
SEAT BACK BRISTOL BOARD
WHEEL CROSS-SECTION
WHEEL SIDE VIEW
TIRE 1/4" DIA. NEOPRENE TUBING
FRONT AXLE 1/8" PLYWOOD
SEAT BOTTOM 3/16" SHEET
MODEL SCALE 3/4" = 1'
1/8" DOWEL
3/4" WASHER
FLOOR BOARD E 1/16" SHEET
REAR AXLE BLOCK BALSA
1/2 SIZE
INCHES 0 1 2 3 4 5 6 7 8

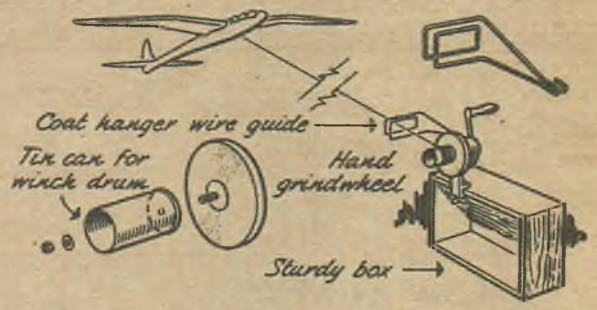
sketchbook

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. Due to their large number, we're sorry that we cannot acknowledge or return submissions.

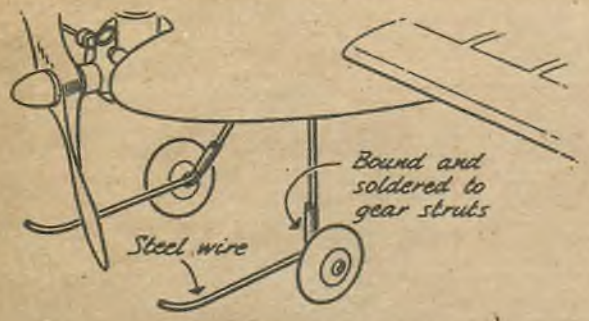


● Here's a "Flying Doughnut" that is a first-rate stunt job despite its odd configuration. Designer Don Maly, Milwaukee, Wis., says it "does all the stunt maneuvers." No gear; hand released.

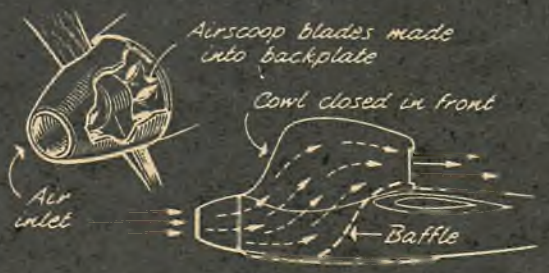
● Martin Dilly, AT fan of Kent, England, makes it easy for finder of his wandering model to notify owner. Transparent pocket holds self-addressed, stamped postal card. Practical, light, visible.



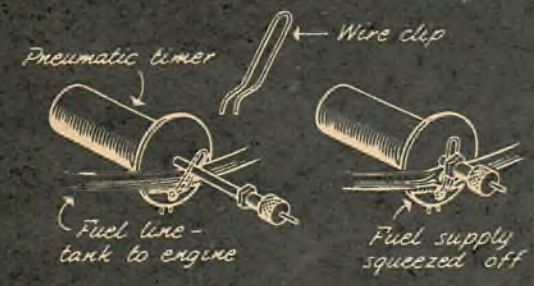
● Harold Osborne, Atlanta, Ga., sends towline glider winch idea dreamed up by James Costerlin, Binghamton, N. Y. Best suited for large size t.l.'s, it retrieves long line before it touches ground.



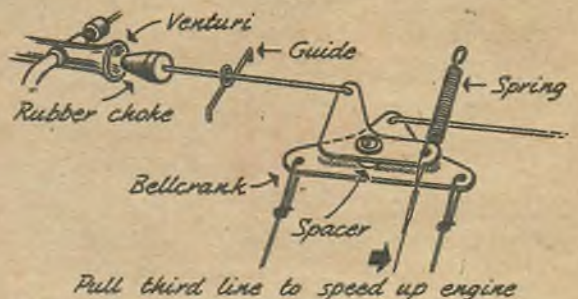
● U-control novice can reduce prop replacement bill by adding these wire skids forward of landing gear. Skids may be removed after training stage, says 13-year-old Roland Ruff, Stockton, Kans.



● Speed fan George Sims, Jonesboro, Tenn., adapts Art Chester's "Swee' Pea" cooling system to model use. Open-nose spinner is attached to backplate which has built-in airscoop blades.



● Henry Gerbrandt, Calgary, Alberta, Canada, comes up with this simple, light fuel cut-off rigged to plunger-type pneumatic timer. Wire clip can be improvised from a straight pin.



● This manual throttle control for team racers and flying scale jobs comes in from James Brock, Valpariso, Fla. Third line moves plunger into venturi, regulating engine speed by choking action.

Get the greatest value in Sport and Stunt

Flying with BLUE BLAZER

The improved, broad-range, economy glow fuel from the world's oldest, largest and best equipped racing fuel laboratories.

More revolutions per tank full — Lower fuel cost — Easier starting and fuel valve adjustment.

Blue Blazer, from the Francisco family of fine fuels, is backed by:

- *100 Official World Speed Records*
- *19 Years Specialized Racing Fuel Experience*
- *Highest Quality Ingredients*
- *Gallon-by-Gallon Purity Testing*

No other racing fuel manufacturer can match the record of Francisco Laboratories. For nearly two decades its fuels have consistently produced peak performance under all conditions, amassing an unsurpassed total of world speed records.

Francisco's production methods guard quality at every stage of manufacture. Ingredients are blended in small quantities — no bulk tanks to accumulate sludge and permit oxidation deterioration. Gallon-by-gallon testing means uniform quality — top performance packed into every can.

The care with which Francisco fuels are produced mean protection for your engine. You get longer, trouble-free operation as well as consistently higher performance.

For the utmost simplicity consistent with good performance, Blue Blazer is made in two types which give good operation through the entire range of engine compression ratios.

No 1

Favors medium and low compression engines. Relative humidity 60% or lower, not critical. Calorific heat value is higher than straight methanol base fuel; gives long duration of operation and more revolutions per tank full. Treated, degummed castor oil has less viscosity drag than cold pressed castor oil. Resists curdling, souring, deterioration. Non-sludge forming. Contains 5 chemicals, 3 solvents, 3 detergents, 2 alcohols and 2 nitrates. Packaged in pints.

LIST PRICE:
WESTERN **55¢**
EASTERN **60¢**

No 2

Most complete combustion in medium and high compression engines when relative humidity is above 40%. Snappy, clean, high percentage combustion in all engines. Contains Francisco's exclusive degummed treated castor oil and gallon-by-gallon purity tested alcohols. Also contains 3 solvents, 6 chemicals, 2 inhibitors, 3 detergents and 3 nitrates. Packaged in pints.

LIST PRICE:
WESTERN **65¢**
EASTERN **70¢**

Now Ready!

Francisco Laboratories' new booklet, "Contest Fuel at its Best," is now available for distribution. Packed with valuable information for all fuel users, it covers such subjects as major fuel troubles, selecting the proper fuel, four cycle engines, two cycle engines, methods of testing, engine care and many others. Send for your FREE copy today.

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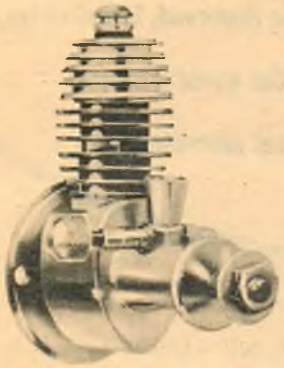
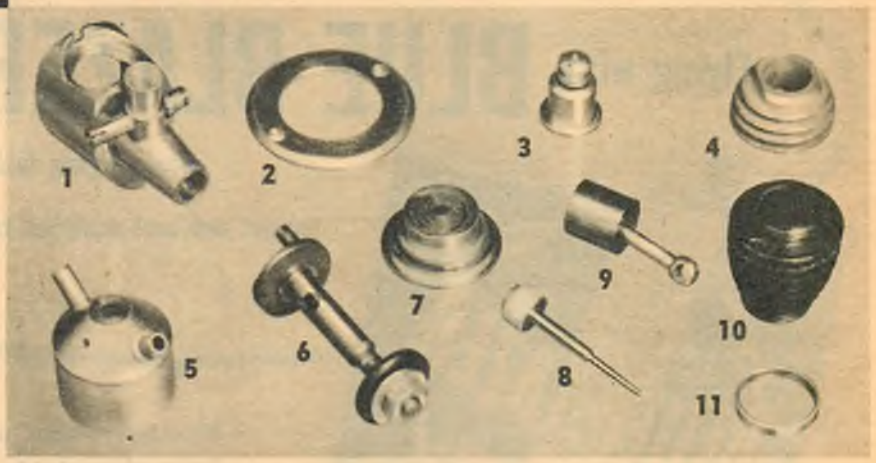
Maker of "Fuel of the Champions"

SPITFIRE • POWERMIST • BLUE BLAZER • NITROL • INFANT THIMBLE GLOW

Motor of the Month





Torp Jr.

Bigger than their Infant, but a peanut compared to K&B's big Torp, the Torp Junior gives you a fistful of power for the half-A class

DON'T confuse the newer K&B Torp Junior with the well-known Infant. They look very much alike but the Junior has a larger displacement and delivers over twice the power. The construction is the same, with the Arden type porting and a ball and socket connecting rod. All parts are machined from solid bar stock rather than being cast, and this results in a strong engine. A special glow plug is used to form the cylinder head in the same manner as its baby brother.

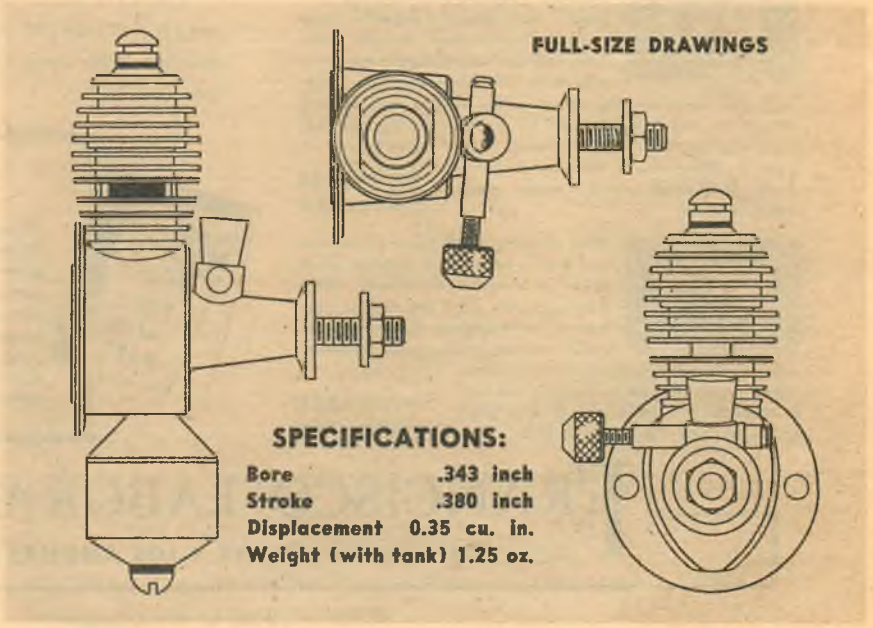
All the miniature fans will like this engine. For free flight the tank gives a one-minute run with a large propeller, and the engine pulls well at low speed. Control line, sport and speed fans should be well pleased with high rpm and good resistance to wear. Fuel suction is strong (3¼" fuel level test) and the engine will stunt for anyone who can handle such a small one.

During the test runs an outstanding feature was noticed: the engine can be operated at 13,000 rpm for several hours and still retain its good compression seal for slow rpm. The Torp Junior could very well fly in a speed contest and then go to work pulling a free flight.

A low-compression ratio and moderately cold plug require hot fuel for peak performance. Commercial AA or Infant varieties are good, or a standard blend hopped up with nitro concentrate will give gratifying results. Starting is more positive with a small prime in the exhaust as well as a drop in the intake. Open the needle valve at least two turns or it will *sput* but not start. The needle valve has a long slender tapered point and is relatively insensitive.

Very little break-in was required on the engine tested as it hit 13,000 rpm after five minutes' running. After fifteen minutes it would continue to run on a lean needle valve setting and appeared to be completely broken in but running was continued for five hours before the rpm test.

This report may be filled with some strange facts and figures that have little meaning to the average modeler. We (*Continued on page* 81)



SCIENTIFIC BLAZES the WAY

with the WORLD'S LOWEST PRICED CARVED FUSELAGE MODELS—

COMPLETELY PREFABRICATED

Think of it! Carved fuselage models for only $1.50! And just wait till you see them in action! Only then can you appreciate this terrific buy. Designed and built especially for the popular small bore engines, these Scientific beauties will outfly . . . outperform . . . outlast models costing three times as much.

ALL PARTS FINISHED
NO TOOLS REQUIRED

"TRU-CARVED" one piece fuselage

"TRU-FOIL" Ready Cut wing

"TRU-CUT" Tail Surfaces

"TRU-FORMED" wire landing gear and TRU-CUT Plywood firewall

Hardware: wheels, bell-crank, control horn, line guides, screws, etc.

"TRU-FORMED" wire control rod and decal

Windshield and Plastic Pilot Head

"LITTLE DEVIL"

Scientific's "Little Devil" is as beautiful in appearance as in performance. For loops, banks,, steep climbs, dives, "eights" . . . you'll find this model a top-notch performer.

SPAN	18 in.
LENGTH	12 in.
AREA	62 sq. in.
WEIGHT	4 oz.
ENG. DISP.	.02 to .09

featuring Jim Walker U-CONTROL
U. S. PATENT 2,292,416

$1.50

- EASY TO BUILD
- EASY TO FLY
- EASY TO CONTROL

"LITTLE BIPE"

Here's the hottest bi-plane on the market! Easy to build and fly, the "Little Bipe" will give you loads of pleasure.

SPAN	16 in.	AREA	80 sq. in.
LENGTH	11½ in.	WEIGHT	4½ oz.
ENG. DISP.	.02 to .09		

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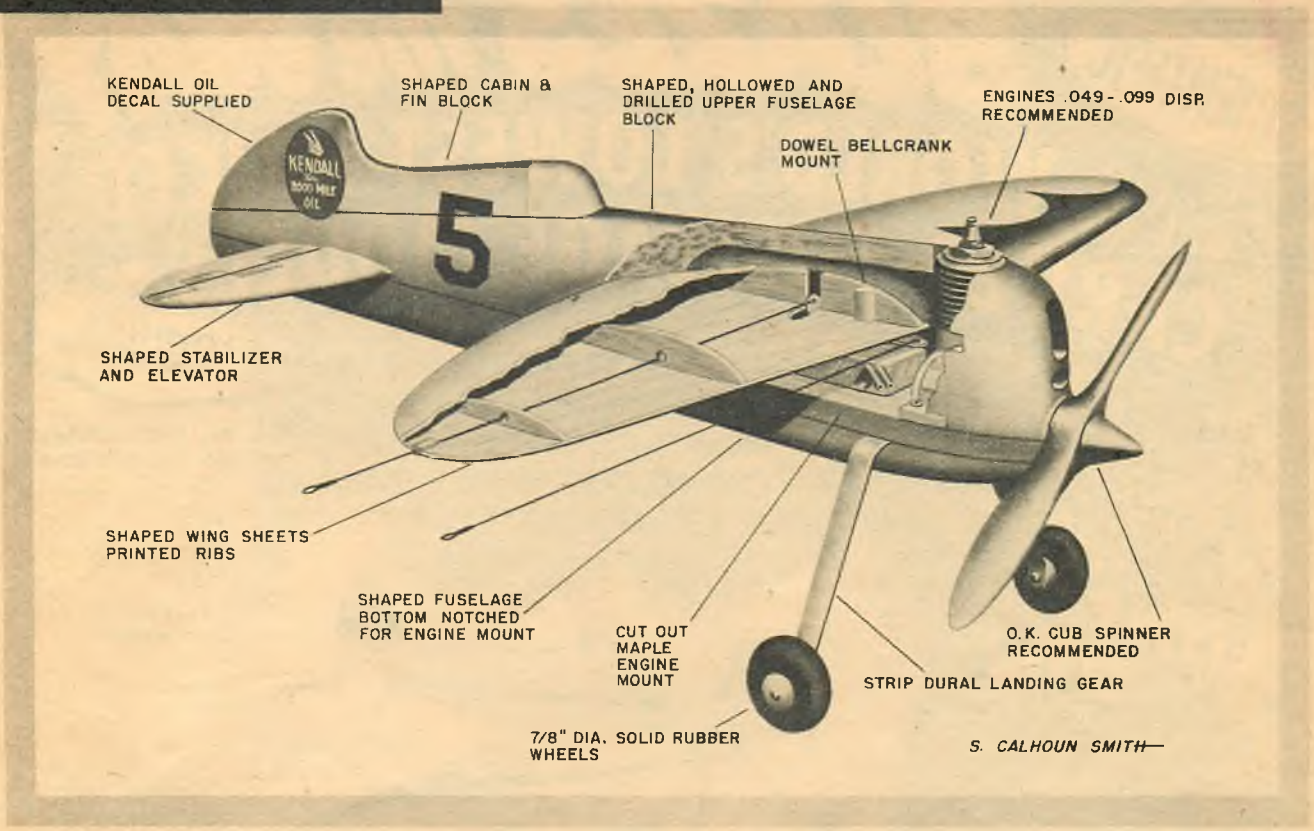


SPEEDSTER

Latest addition to the Dmeco family is a little job for half-A team racing, speed work or sport flying

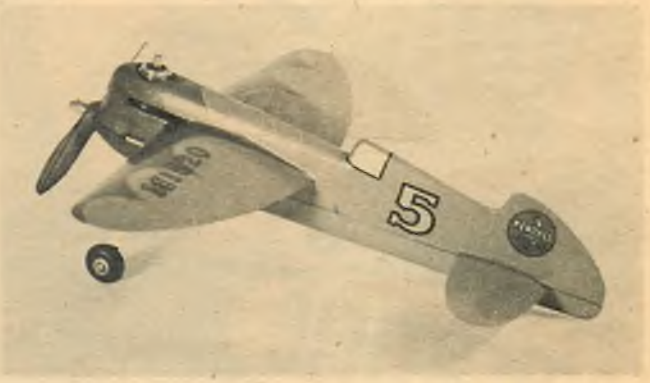
DMECO'S diminutive Speedster is short on size but long on possibilities. Priced at $2.25 and designed by Harold deBolt—the initials DMECO stand for deBolt Model Engineering Company, of Williamsville, New York—the Speedster's design purpose is half-A team racing and speed flying. But that's only half the story.

A ranking contest flyer himself, Harold deBolt wrings the last drop of performance from any of his kit designs. Inasmuch as the Speedster is a striking advance in prefabrication over the Stunt Wagon, reviewed earlier in this series, it may be judged that Harold is bowing to the universal trend to do as much of the model builder's work for him as is humanly possible.

The Speedster is a cute little plane that is certain to attract numerous flyers of all ages, and especially the young ones, to speed. Understandably, therefore, it is well prefabricated. We hasten to add, however, only to a point, for some hand work must be done. If the builder would learn a little of speed design, here boiled down to its basics, let him develop appreciation by doing a little of the work.

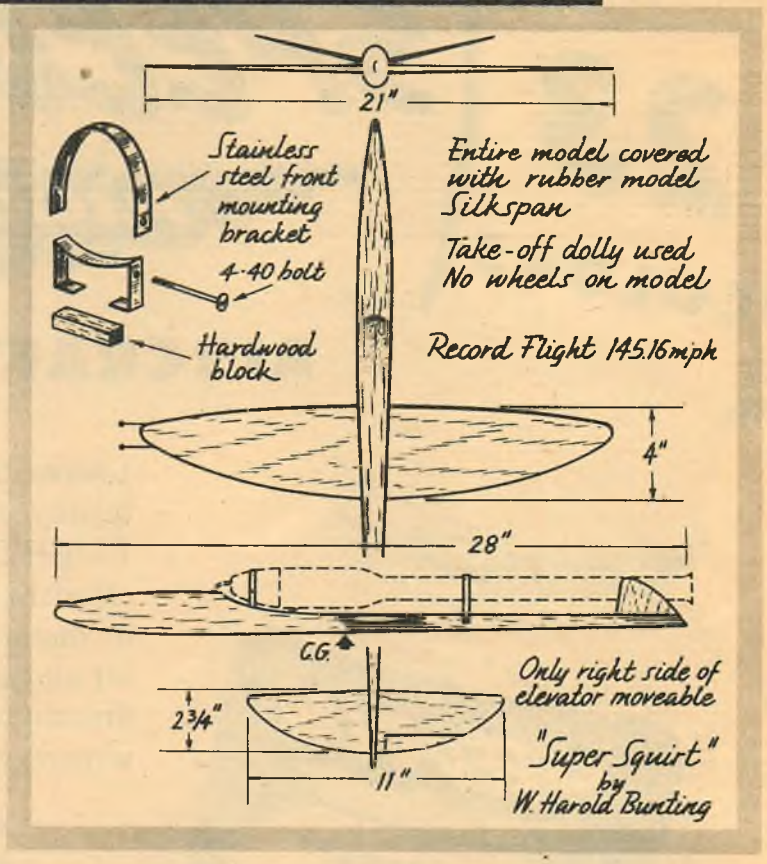
The instant impression on opening your Speedster kit is one of excitement; a feeling that the ship will practically fall together. Now what do you get for your money and how is it packaged?

Well, first of all, there's the fuselage. Like the usual speed job, it consists of an upper shell, a lower shell, and, in addition to both shells being hollow carved, the motor mount (*Continued on page* 67)

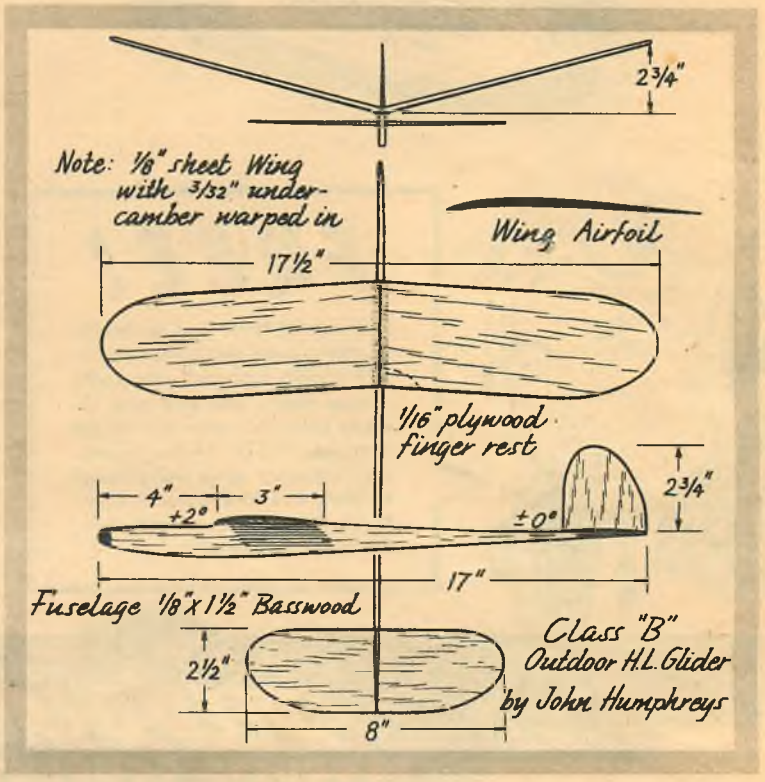


● The cockpit-that-fairs-into-the-rudder is fast becoming a deBolt trademark; this prefabricated model takes engines up to .09.

Record Review



● John Humphreys' glider (below) did 12:03.8 at the '49 Nationals, bettering the existing record. Rudder and stab are of 1/16 in. sheet balsa. Bunting's latest record holding Dyna-Jet powered speedster weighs 19 oz. without fuel; all surfaces at zero. Hardwood inserts in fuselage hold mounting brackets; 2nd, 3rd and 4th fin on Red Head turned off for mounting purposes. Wings built up of ½ in. leading edge, ¼ in. trailing edge, ½ in. dihedral; ⅛ in. ribs. Tank capacity 2.25 oz., runs 16 laps till dry. Max. width is 1.3 in.



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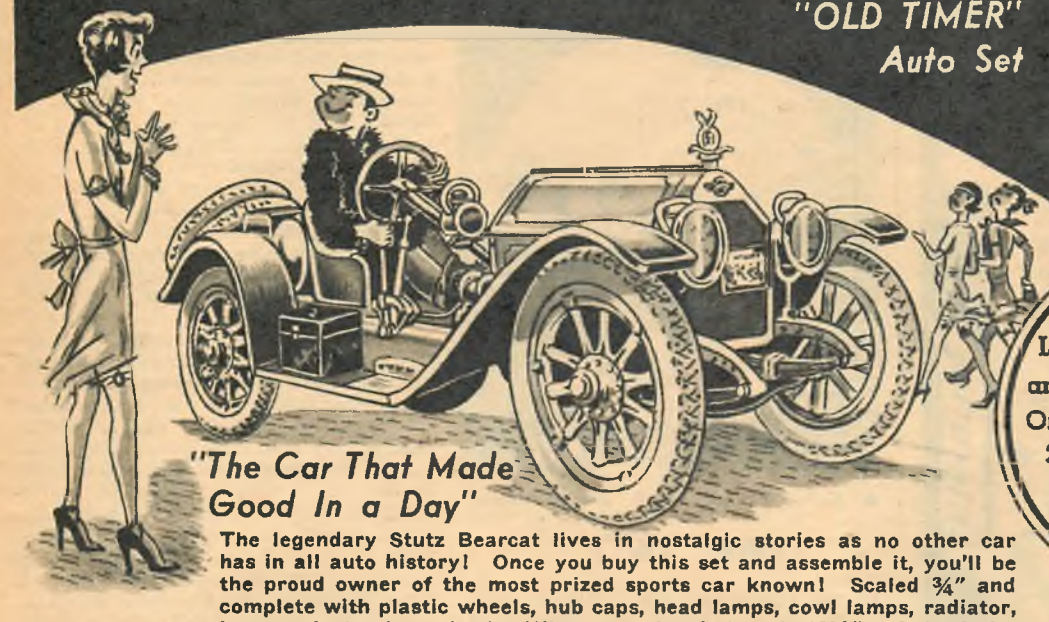

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The car a radio comedian made famous. Length 7½"..... $2.50

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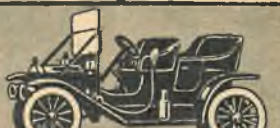
Forerunner of a great line. Engine was under seat. Length 8"..... $2.50

1910 Model T Ford
"Torpedo" roadster—the poor man's sports car! Length 8"..... $2.50



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Touring model, first to feature left-hand steering. 8"..... $2.95

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A little roadster that made a big name for itself. Length 7½".. $2.50

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Forerunner of the Nash. Revived name for small car. 6½"..... $2.50

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First of a proud line of luxury cars—a gem! Length 7"..... $2.50

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150 mph... PLUS!

● Author Harold deBolt, speed designer

PART TWO

IN our discussions last month we covered the installation of a pressurized fuel system in my 150 mph-plus speed model. As we stressed, the main requirement is "care"; you must work carefully and check your tank and connections thoroughly.

In operation the pressure fuel system is fool-proof since it telegraphs anything wrong. Procedure is this: Fill the tank through the outlet tube using the breather for a vent, then cap the breather and wire all tubes in place. For your first start with the system in operation, open the needle valve about one turn and prime the engine as usual, and it should take off in a normal manner. If it sounds lean or rich change your adjustment in the way indicated. Any change made should be very small as your range of adjustment is now restricted to about one-half turn only.

I hand-start all my engines with this deal as it is easy to flood them out with the pressure. However, you can use a starter by leaving the needle closed until the engine is turning fast in the starter and then slowly opening it until it fires. Once the engine is running and adjusted to its peak it should hold the peak for most of the tank on the ground. If you have to vary the setting from time to time in order to keep it peaked the chances are you have a leak some place. All leaks should be tracked down and corrected at once before a flight is attempted.

In flight the engine should pick up its usual rpm at the start and level out to its peak. If your adjustment is rich you will notice a leaning out on the last few laps, otherwise the flight will be constant during the entire run. The one thing not to do is to get too lean a run; so start off rich and gradually change your setting until you get peak speed. Once the peak setting is found your engine will run at that point every time regardless of atmospheric or any other conditions. Your first warning of trouble with the system is a change in needle setting. When this occurs you know it is time to do some checking. I have seen quite a few fellows try this system and their opinions have varied. They either like it a lot or else they think it is "for the birds." However, I have noticed that the ones who like it are the boys who are just a little bit more careful with their equipment, which would lead me to believe that the others are careless in their ways, and it simply will not work if you are careless!

That just about covers the design and mechanical end of the project, but you still must get it into the air in the most efficient way to obtain the best results. The first thing that comes to mind is the take-off device, and there are many of them. In our particular locality we are not fortunate enough to have smooth flight circles as most of our meets are held on small airports or some other temporary site. Under these conditions the ground is usually rough, making any kind of take-off hazardous. To get around this trouble I still stick to the old two-wheel "take-off gear," as it is the one way you can get off rough ground in a hurry. Our results with it have been very good when proper precautions are taken. We set the model down slightly on the up-wind side of the windward edge of the circle so that when it becomes airborne the wind is blowing directly against its side. This allows us about one-half lap to get the model under control before there's any trouble with the wind.

On extremely rough ground or high grass we have been using a piece of Masonite about 8 feet long which we bring to the meets. Usually we can manage to get into the air well within this 8 feet. There are many other good dollies but outside of those used by Tony Grish I have yet to see one that works consistently on rough ground.

Before actually going out to the meet or test flying I have made it a point with this model to check the engine out for power. I have one prop set aside with which I make this test while running the engine up in my test stand.

(*Continued on page* 62)

Roadables

(Continued from page 35)

remembered that this is a standard Ercoupe and not specially engineered for roadability. It has been driven over 50 mph with good control.

It is also a comforting thought to know that it is parked safely in my garage here tonight, and ready to fly anytime I want it. Yes, I feel like I really own this airplane and that same thought (if developed) will sell thousands of planes, maybe millions—for the efficient airplane that can be driven to the prospective owner's home and into his yard (complete) will be the one that sells and keeps selling!

Some spectators who have watched me fold the wings of my roadable Ercoupe have cracked, "Do you think an airplane owner would go to all that trouble to get his plane ready for the highway?" And those same spectators have crawled under their cars many times to put chains on the wheels in slippery driving conditions, and many have cursed and sweated with a flat tire and others have toiled with their cars when bogged down in muddy roads!

Brother, a flyer who has been grounded for several days, running up a hotel bill and hangar bill and jeopardizing his job if he doesn't get back on time—that fellow would be glad to fold his wings or do almost anything to get back to his destination! Many glider pilots tow their gliders considerable distances by auto and assemble them "on the spot" just for a few short hours of gliding pleasure.

Let's peep into the future: maybe 1955 or even sooner.

You have just landed at the Lancaster, Pa., airport and the attendant signals you the gas pit, but instead you park over to one side and tell him to fold your wings because you are going to drive on to Philadelphia since it is fogged in for the rest of the day.

While you are making a phone call or drinking a Coke, the attendant has readied your plane for roadability; you tip him and shift the propeller into neutral locked position and engage the power to the wheels—and drive to the Lincoln Highway and on in to Philadelphia. Your roadable plane is easier to drive and manage in traffic than pulling a house trailer with an auto.

In the meantime, other roadable planes are arriving at the Lancaster airport from Philadelphia and other fogged-in areas to unfold their wings for flight to destinations of better weather, while all conventional airplanes are grounded in the Philadelphia area.

After your visit is completed, you drive out to Wings Field or the nearest airport to you and take off for your home airport or any other destination on your itinerary. When you arrive at your home airport, the local operator is more than glad to fold your wings so that you may drive home to your garage. He is hiring more attendants because his business is growing by leaps and bounds due to the increased activity brought on by good efficient roadable airplanes.

Airports will pop up like mushrooms in every town and village-like gas stations along every highway—the roadable salesman's slogan will be, "Go where you want to go—when you want to go."

New Day

(*Continued from page 35*)

Writing the editors recently, "Molt" Taylor said, "When we saw the cover of the April issue of Air Trails we thought perhaps we had been able to sell you a 'bill of goods' on the true picture of what is wrong with the lightplane, and then I'll be darned if you didn't go and try to sell the public on a done-over Cessna.

"Anyway, what has it (the Clubster) got that half a million other lightplanes haven't got including the three planes sitting on our tie-down line that haven't been flown since last September? Making a plane go faster, or slower, or more comfortable has been tried in a million and one variations. Despite the combinations, no one has come up with the answer. As you know I have studied this problem for five years, and our opinion is that the difficulty is inherent in the concept of the airplane itself. No matter what you do to them they are still 'once-in-a-while' things. They must remain at the airport, and if you do dare to start out from point X to point Y, there is a good possibility that you won't make it enroute or be able to return if you are trying to keep a schedule. Add to this the disadvantage of not being where you want to be when you get there.

"It was with these practical facts in mind that we started out to try to do something about the private flying problem, and we were convinced that the solution lies in an airplane which is as practical for the drive to the movies as it is for a flight to Los Angeles (from Longview). I am being truthful with you when I tell you that the Aerocar fills this bill to the n'th degree. It is and does everything we set out to do. . . . We now know that the entire picture for private flying is going to take on a new color."

150 mph—Plus!

(*Continued from page 60*)

From experience I learned that the "60" should turn this prop (9/12 Tornado) 13,500 rpm on the test if I am to exceed 150 mph. Every time I have flown the model when the engine checked out at a lower figure my speed fell off.

The next step is to put the engine in the ship in a clean condition and to test run it for any pressure leaks before flying. If you do these things and keep your engine at its peak you know your flight is going to be your best, and you won't have to make those second and third flights.

As for experiments with the model during the year I have confined them to my second or third flights at contests instead of test flying in between the meets. Most of the testing has been done with props, and frankly the results were not very good although they did prove interesting. As an example I tried 9/13 Tornados which my engine turned 12,000 rpm on the ground; the speed fell off about 5 mph. I then trimmed the blade area to get the rpm back up to 13,500 and the speed climbed up to where it was. A stock 9/11 Tornado also lost 5 mph; however a 9/13 Rev-Up which is about the same pitch as the 9/11 Tornado but has more blade area brought me back up to the same speed. So as I look at it now an increase in rpm does not

give more speed and a loss of rpm does lose speed! It would seem that the only way additional speed can be had from this combination is to increase the rpm while using the same prop.

As for fuel, I have been using a blend made in small quantities by a local concern. It has an extremely high nitro content (about 50%) and yet tends to operate very coolly. They have done a great amount of research with it and really have something that I think is good. The one big step forward was the use of a synthetic oil which removes most of the trouble from heat. During the first of the season they still used castor and I ran into serious heating trouble, but once the synthetic was substituted the trouble disappeared. In fact, I used it without *any* doctoring under almost every conceivable weather condition without any loss in speed.

The engine used was a McCoy 60 Series 20; the engine's design was not changed, no big bypass, no enlarged ports, stock compression ratio and stock venturi. I have done some work on it; most of the speed flyers in our club now work over their engines to some extent. We have accumulated a few machine tools among ourselves or have found a place where we can get the use of them. It is my belief that if you wish to fly at the present day record speeds you will have to do some work to your engines—the boys making those records do it, and so will the rest of us if we hope to equal their speeds.

Engine work has now become just about as important to a speed flyer as his prop work. However, there is no great mystery about it and anyone who is a good modeler can do it with ease. On the other hand, from what I have been able to observe at the local meets you still can make out very well with strictly stock engines if you do not play the big time!

As for my engine work, I find it to be as interesting as the model building end. It opens up a whole new field into which we can expand and also learn a great many things of help in other ways. Once you inject this work into speed flying you really make a complete sport out of it that can compare equally well with boat racing, auto racing or any of the other high speed sports.

The actual work I did to this particular "60" is quite simple and yet it gave me some additional power. First of all the engine was checked for alignment; I made sure the crankshaft lined up with the cylinder. This prevents undue wear to the moving parts and at the same time reduces friction. I also made a sincere attempt to balance the engine better; however, my results are a bit vague as I could not afford to have it balanced by the people who are equipped to do that sort of thing. Next I went to my dealer and obtained a piston which fitted my sleeve a bit better. I found one slightly larger by checking several with a micrometer. I also checked all the rest of the parts for fit, making sure they were tight, yet presented no drag. In my engine all were good and I did not need any replacements until after quite a few hours' running time.

The bearings appeared a bit rough to the feel so I replaced them with new ones obtained from the local bearing company. To finish the job off I went through the entire engine and polished all the surfaces. The ports were polished with jeweler's files and the castings with fine emery cloth followed by rub-

bing compound. Outside of my labor the additional expenditure amounted to less than $5, so from my standpoint it would seem that engine work does not become too expensive if one compares it to other modeling costs.

I believe that the real difference between our average flyers and the record breakers is *perfection*. I have noticed that every time I let something slip by as being "good enough" I have had trouble of one sort or another. It would seem that if we all would concentrate on one class or model until we have that combination absolutely fool proof, we would fly better and faster. It sure has worked that way for me personally. Let me give you a "check list" that might be used before every flight with a *speed model:*

1. Check engine for wear, replace any part that shows wear. Check the rotor clearance with a feeler gauge; make sure it has the proper tolerance.
2. Check the glow plug and replace it every third flight, or more often if necessary.
3. Make sure your power plant is spotless; don't allow a speck of dirt to remain on it.
4. Check your prop for balance. Check it for tracking on the engine. Check the spinner for traction; slight misalignment here means vibration and loss of power.
5. Check and clean the fuel tank as well as hoses. Repair any leaks or weak mounting clamps.
6. Clean your airplane well and keep it that way. Wax on the outside will help.
7. Bolt the engine in securely as well as the fuel tank. Make certain all hose connections are *secure.*
8. Check the control system, making sure it operates smoothly. Remove any kinks from the lead-out wires.
9. Assemble the airplane and be sure all hold-down screws are in good shape and that the parts fit properly.
10. Repair any breaks in the finish to keep oil out. Scotch Tape works well if you are in a hurry.

Stutz Bearcat

(*Continued from page 50*)

years, and he definitely made good.

"The Stutz car went through the race without a mechanical adjustment, without a relief driver, and averaged 68¼ miles per hour for the entire distance of 500 miles, including 13 stops for tires and fuel, surely a marvelous performance—500 MILES IN 442 MINUTES without the least sign of trouble, and after the race, when the car was taken down, part by part, to find out if any weakness whatever had developed in the mechanical construction, we found absolutely nothing we could do to make the car any better.

"Surely this was the most grueling test ever given a model car. Mr. Stutz built the car from the ground up in five short weeks, entered it in the greatest race ever run in the history of motordom, and staked his reputation that it would make good. The result more than justified his judgment, and well may a buyer of a motor car repose confidence in the product of such a designer and engineer.

"The Stutz car entered in the 500-mile race was absolutely a stock car, and not a special racer. We are building duplicates of the car entered in this race, in every part of which we use the best material known to man for the work it is to perform. Our claim is that it is not possible for anyone, no matter what price he asks for his car, to build a better motor car than the Stutz. A comparison of our specifica-

tions with those of other cars will convince the most skeptical that the time has come when an automobile buyer can purchase a car constructed throughout of the very finest material and workmanship at a moderate price.

"Duplicates of the car that went 500 miles in 442 minutes without a single mechanical adjustment can be bought for $6.000. We are making the Stutz car in three types: roadster, four-passenger and five-passenger. The finish and equipment of these bodies is the best that money and skilled workmanship can produce.

"We will have some excellent territory open for live dealers."

Floyd Clymer, the well-known West Coast automotive authority, says that "of all the sports cars built in the U. S., none was held in higher regard than the famous Stutz Bearcat." For the authentic material and exact dimensions of our model Stutz roadster, we are indebted to A. J. "Tony" Koveleski and Carmen A. Castellano of Hudson Miniatures. Mr. Koveleski, who is active in many old-time auto associations, owns one of the few remaining Bearcats that are in good operating condition. His Stutz, which showed at three recent old-car meets, took as many first-prize blue ribbons. In the famous Glidden Tour last year Tony's beauty rolled away with a 1st prize silver cup.

Construction plans are self-explanatory for the ¾ inch to the foot model. Additional details can be found on the photos.

Speedster

(*Continued from page 56*)

section of the bottom unit is ready-notched to take the maple crutch. This crutch is precisely cut, allowing for both the engine and for the placement of the tank. The wings go together Fireball style, with a bottom surface of sheet balsa, a handful of stiffening ribs, and the top sheet balsa surface.

Your kit provides both top and bottom surfaces cut to outline; the ribs are printed on sheet balsa. The stabilizer is die-cut to outline and the rudder—which, typically deBolt, includes the cockpit—is a nicely sawed-out soft balsa block. There's a strip of dural for the Cessna type landing gear—you do the bending—and miscellaneous hardware and small hard-rubber wheels.

As we said, the Speedster is the result of an all-out effort to achieve maximum speed with good looks for the Cub class engine. It should gallop on an .049, tear on an .074, and yowl on an .09. Compact to the *n*th degree, this little terror involves a number of interesting design points.

If you like to begin your construction with the lower shell, then the landing gear strip may be drilled at either end for the wheel axles—small machine screws bolted in place—bent to shape and screwed to the bottom of the maple crutch piece. The plans show the engine held down by two wood screws, on diagonally opposite corners. If this is good enough for deBolt it should be good enough for us. Certainly four screws will not let go, if you want to be doubly certain. The crutch is cemented to the lower shell.

The plans include a pattern for making one of those long narrow tanks the speed boys have developed; and the experience, both with type of tank and making of same, is good practice for the tyro. Or you can purchase one easily. For the dyed-in-the-wool speed demon, this special tank is probably a must. The tank is fitted into the lower shell, dropping into the long narrow hole that comes in the maple mount.

As to the upper shell, you just cement in place the cockpit-rudder block after rounding off, then cut in necessary notches or openings for such items as the stabilizer, engine lugs, cooling hole, exhaust holes, vent and filler holes. With wing and tail permanently in position, the top shell is held to the lower one by means of a hardwood dowel and a screw. The short dowel is cemented in the lower shell in such manner that a screw inserted in a hole in the bottom of the fuse, penetrates the dowel far enough to project into the top half of the body. A piece of plywood cemented across the top half shell gives the screw something to hang onto; thus, a couple of turns of the screw and the two halves are clamped neatly together or released, as the case may be. Dowel sheer pins maintain alignment.

To install the bellcrank, the wing must be made first and put into place. The procedure is simple. After making the wing and carefully cutting the fuselage shoulder-wing position openings to slide it through, you slip the wing into place, then attach the bellcrank from inside the top shell. A short length of ¼" dowel in the wing takes the woodscrew that holds on the bellcrank. You will find that a small Veco crank will require drilling two holes closer to the pivot point, and the removal of material from the forward end of the crank, at least, to clear the engine.

The forward line is outside the wing but the rear line passes through the wing. This means that the ribs should be properly holed before the wing is closed in. A small dowel, drilled for the lead-out, provides a bearing surface at the tip. A cut-out in the bottom surface enables the rear line to bend down for bellcrank attachment.

Some additional hollowing of the top block must be done. The pushrod, coming back through this hollowed portion, bends at a right angle to pass through a slot in the fuselage wall, thence via another right angle to pass back to the single elevator.

To make the wing, put down the lower surface, then the ribs and follow with the top surface. The two sheets are cemented together for about ¼" from the edge and held with spring paper clips while drying. Excess balsa is removed when dry, then wing is finished to shape. It is suggested that the beginner exercise caution in attaching the top surface. If possible permit the structure to remain flat on the bench while the top surface dries on it. Forcing of the top skin can produce a nasty warp.

What can you do with the Speedster? Plenty. This time of year, of course, it will permit a try outdoors at speed. The factory claims speeds of 60 to 100 mph, depending on the powerplant. It can be flown as a team racer with several fellows in the cen-

(*Continued on page 70*)

A & E Mechanic

(Continued from page 27)

word "philosophy" mean? That it's foolish for our Mr. White to depend solely upon trouble shooting charts in contrast to understanding the "fundamental physical laws, as well as the detail working principles of a given unit or system."

What Jerry does when facing an engine problem is to gather all data and symptoms, list all causes, eliminate improbable causes of trouble by reasoning and testing until the field narrows to one possible cause.

(Right now some schools are considering the possibility of four-month courses to teach airline maintenance procedures which would come after a student wins his A & E license. The lines want to learn and direct his attitude toward his job; expect him to study his relationship with the organization as a whole, learn the organizational structure. They will emphasize the study of hydraulic systems, as well as applied physics—heat, light, and sound.)

Now something new is being added. Jerry's pondering whether he's going to qualify as a specialist. Only two ratings are currently in effect—A & E. The CAB proposes six ratings in the specialist field—airframe, power plant, prop, radio, instrument, and accessory. Only third and sixth apply to Jerry, so long as he wants to work on engines. According to the proposals. White would have to have 36 months on prop overhaul (or 25 weeks in school plus 18 months' experience) to become a prop specialist, or 18 months' accessory

experience (or graduate from school approved in accessory overhaul) to qualify in "dressing" engines.

J. W.'s uncertain whether he approves this specialist idea. He's inclined to think the specialists first should earn the A & E licenses.

Around the corner Jerry catches a glimpse of opportunity that's bound to be romantic. He may not agree with the older hands, the boys who were around when Lindbergh hopped the Atlantic by dead reckoning, that aviation now is about where the automobile was 35 years ago. It's just beginning a new era—the jet era.

So far, only the Allison J-35 and the General Electric J-47-9 have been CAA-approved for civil use. How quickly can Jerry qualify as a jet engine mechanic—a designation sure to come? Because he has a technical education, understands the theory of maintenance and overhaul problems on the reciprocating jobs, it's only a step to the jet—say three months in school. What he needs to learn are the special tools required, and manufacturing and overhaul specifications. Then he needs to get his nimble fingers into their works.

You may not recall, but you've seen Jerry. He's the A & E mechanic you encountered in the airline shops, in a repair depot, anywhere an aircraft requires workmanlike repairs.

Jerry knows there is no substitute for experience, with one exception. "A young man one year out of school (A & E rating) is 'way ahead of the guy with eight years of experience only," he declares, "for he's got the benefit of studying under men who've accumulated that experience for him."

(Continued from page 67)

ter at once or the Speedster can fly around the pylon without a "pilot." On a short line it should really buzz.

Just for experimentation, we simplified one kit for this purpose by substituting a ¼" thick sheet balsa wing. A junior flyer put this together and he improvised an outside bellcrank location on the bottom of the wing. For extreme simplicity this is ideal, but, of course, such improvisations are out of the question if you want to realize all the performance that was designed into the ship. The off-center location of an outside bellcrank—and on this small size the weight of the bellcrank is proportionately high—may require a counterbalance on the outside tip.

Properly finished, *which is to say* well sanded, treated with sanding sealer, then doped with colored dope and fuel proofer, the Speedster has a scale appearance. Though it closely mimics the lines of other deBolt models, it does look like one of those Goodyear racers. Kendall oil decals point up the racer motif and Dmeco's own new decals add a snappy touch.

"He has the fuel concession on this field."

1950 NATIONAL CHAMPIONSHIP MODEL AIRPLANE CONTEST

Sponsored by the Exchange Club of Dallas

Academy of Model Aeronautics Sanctioned

Entry Fees: Basic fee, $1; for each event or class entered, 50c; late entry fee, $1. All fees must accompany each entry. Deadline for entries without late entry fee is midnight, July 11, 1950. Entries postmarked after that time will be accepted only on payment of additional $1 late entry fee.

General Data: Registration July 25th. Outdoor Competition July 26th thru 30th. Indoor Competition July 28th. Outdoor Events at U. S. Naval Air Station, Dallas, Texas (Grand Prairie). Indoor Events at Will Rogers Coliseum, Fort Worth, Texas. Exchange Club and AMA Contest Manager, John E. Clemens. Co-Sponsor and provider of facilities, U. S. Naval Air Station, Dallas. Officials to be chosen from nationally recognized AMA Officials, Exchange Club members, and members of U. S. Navy. Timing to be handled by Navy personnel.

Headquarters and Registration: 2114 Greenville Avenue, Dallas, until July 25th. From July 25th on, Headquarters will be at the Naval Air Station, Dallas. Advance entries should be made to John E. Clemens, 2114 Greenville Avenue, Dallas, Texas.

Housing: Housing is available for 1,200 male contestants in Navy Barracks on Naval Air Station just a short distance from all centers of activity. Barracks housing to be provided at very nominal cost in line with Navy policy of past years. Probable cost 35c linen charge for entire meet. Housing for others is available at the many Motor Courts, Hotels, and Tourist Quarters in and around Dallas. Many Courts available close to the flying site. No reservations can be made by sponsors at Motor Courts. Those desiring reservation at hotels in Dallas must have request in to Headquarters at least two weeks previous to arrival. The Navy Swimming Pool will be made available to contestants, so bring your trunks! A 24-hour guard will be provided in the barracks by the Navy. However, no responsibility will be assumed by the Navy for loss or theft. Navy Hangar space will be provided for a model workshop.

Meals: Both Male and Female contestants will be furnished breakfast and dinner at a charge of about $5.00. This charge covers both meals on July 25th, 26th, 27th, 28th, 29th, and breakfast on July 30th. Relatives may get meals without card for 50c per breakfast and $1.00 per dinner. Meals will be at Chance-Vought Aircraft Company, adjoining the flying site.

Prizes: All of the traditional and coveted Perpetual Awards will be presented, with, it is hoped, several new ones. All events will be covered with suitable awards, with the 1950 permanent trophies being designed exclusively for this one meet.

Victory Dinner: A Victory Dinner, at which all prizes will be awarded, will be a fitting climax to the 1950 Nationals. To be held July 30th evening.

Facilities: An ample number of flight circles will be provided on the ramp or runways for control-line flying. Prevailing breezes will allow free-flight models to use maximum length of field, with take-off area at extreme end of runway recently lengthened for use of jet aircraft. Recovery Jeeps and radio communication will be provided by the Navy. Intense publicity will insure all possible lost models being returned. A model supply shop will be provided at the hangar used for a workshop with all needed supplies available. Concessions will be provided so that food and drink will be available to all contestants and spectators.

Send to: John E. Clemens, 2114 Greenville Ave., Dallas, Texas.

Enclosed is check ☐; money order ☐; cash ☐—indicate which—for $ ..... Please enter me in the following events:

☐ Indoor h. l. glider	☐ Free-flight gas B	☐ U-control jet speed
☐ Indoor stick	☐ Free-flight gas C	☐ U-control team racing
☐ Indoor cabin	☐ Navy Carrier	☐ U-control scale
☐ Outdoor stick	☐ Free-flight R.O.W.	☐ U-control precision
☐ Outdoor cabin	☐ Radio-control	☐ Outdoor h. l. glider
☐ Towline glider	☐ U-control speed A	☐ Rubber flying scale
☐ CO_2 free-flight	☐ U-control speed B	☐ PAA-Load—Class A
☐ Free-flight gas A/2	☐ U-control speed C	☐ PAA-Load—Class B
☐ Free-flight gas A	☐ U-control speed D	

I hereby release the sponsors or directors of this contest, and the U. S. Navy, from responsibility for any claims of damage, loss, or injury resulting from any cause while attending this meet, and I also assume full responsibility for any damage or injury caused by myself or my airplane to any persons or property.

Name (print) ..... Signed .....

Address ..... City ..... State .....

Club Affiliation .....

AMA No. ..... My age .....

PARENTS' CONSENT, WAIVER, RELEASE (this parents' consent must be signed before entry of any contestant under 21 years of age)

As parent and/or natural or legal guardian of ..... a minor, I hereby give my full and unqualified consent to his (her) participating in the 1950 National Model Airplane Championships, and to his (her) accepting any and all awards whatsoever that he (she) may win, whether it involves travel or otherwise.

In consideration of their sponsorship of this Meet, I hereby release the Exchange Club of Dallas, the Academy of Model Aeronautics, the U. S. Navy, and any organizations and all persons connected with said meet, from all claims which may arise with said meet.

Signed ..... Address .....

Witness ..... Address .....

De Havilland

(*Continued from page 48*).

ening in order to bend without splitting. Use pins to hold this in place while the cement is drying. Round off the nose piece and sand the fuselage lightly with 3/0 sandpaper. Cut the cabane struts and attach to the fuselage sides, inside of the fuselage. Note the amount of overlap shown on the front view. Cement well.

The empennage is constructed by pinning the balsa over the plan and cementing all joints. Sand to shape carefully and cover with "Sky-Sail" tissue, using clear dope as the adhesive. Cover both sides of the stabilizer and fin. Pin to the work table and water one side at a time. Apply two thin coats of clear dope while pinned to the table. Cement the tail surfaces to the fuselage.

Cut the wing ribs from 1/20" medium sheet balsa and sand smooth. Either the NACA 6409 or Clark "Y" airfoil can be used. The former will increase the flight duration of your model. Select medium hard balsa for the spar. Pin the ribs over the plan and cement the spar in place. Four wing panels are required, two each of port and starboard. The addition of the medium balsa leading and trailing edge will complete the panels. Cut the two 1/16" plywood wing joiners (upper wing only) and join the panels to the required dihedral, using plenty of cement.

Trim the leading and trailing edges to their proper shape and sand the entire wing framework lightly. Cover with "Sky-Sail" or similar tissue. Pin to the work table and water and dope one section at a time. We applied two coats of clear dope.

Mount the upper wing at 3/16" incidence. Cut away a small patch of covering to allow the cabane strut to be cemented to the side of the rib; note the overlap shown in the front view. Do not spare the cement. When this is thoroughly dry, the lower wing panels are securely cemented to the fuselage sides at ⅛" incidence. Meanwhile the interplane struts can be cut and sanded smooth. Patches of tissue should be cut away on the bottom of the top wing and the top of the bottom wing at the strut locations.

It will be found that the wings are flexible enough to stand slight spreading apart in order to install the interplane struts. Again use enough cement for a secure joint. Bend the tailskid and cement in place. We used lightweight airwheels (Trexler) and found they

absorbed the shock of landings very nicely. A pair of 1/16" plywood wheels were tried and the flight performance was slightly improved; however, the landings were rougher on the model. We recommend the airwheels for sport flying.

The dummy engine and exhaust should be made as light as possible. Carve the cylinders from very soft balsa and paint black. Cement in place. The exhaust stacks are made from plastic or paper straws with a soft balsa elbow. Paint black and cement to the cylinder heads. Cut the cooler scoop from thin card and cement in place. Silk thread is used for rigging —though the rigging is optional.

DH-6 CONTROL LINER

The uppermost section of the plan illustrates the requirements for a control line model of the DH-6. Construction steps are identical with the free flight version except for the following items.

Using the sizes specified on the plan, construct the fuselage. Notice the heavier engine mount. Before the top covering is added, the control system must be installed as well as the fuel tank. Bolt the bellcrank to a piece of plywood which is securely cemented to both sides of the fuselage. Test the system. The "Cub" stunt tank should fit perfectly and the "Cub" .099" engine is ideal for this model, although most engines from .09 to .19 can be used. Instead of the sheet balsa nose, it is suggested that a balsa block be hollowed as shown for extra ruggedness.

The tail is entirely of 3/32" sheet. Hinge as shown and install any commercial horn of the size shown. Be sure to offset the rudder about ½" to turn the plane away from the center of the circle. This is very important.

Decide whether or not you intend to perform stunts and then build your wings. Notice that the stunt wing requires two 3/32" square hard balsa spars and a heavy trailing edge. All struts are made of hardwood (pine or spruce). Use hard balsa throughout for the wings.

The control liner can take about four coats of clear dope and three of colored. Wood filler can be used on the fuselage. The model may be colored all yellow or green fuselage and yellow wings and tail. Use rubber-tired wheels. Mount the control line guide on the outboard interplane strut on the inside of the circle. Fuel-proof the entire ship before flying and never fly with the model tail-heavy.

Cut the engine hatch with a sharp razor blade and install the engine with about two degrees of down thrust and one degree of right thrust. Our fuel tank is ¾" square and is made from very thin shim brass. This item can now be installed by working through the cockpit and engine hatch. Use 3/32" square strips to hold the tank in place.

We employed no engine shut-off device; the tank proved to be the correct size for enjoyable flying when allowance was made for an engine warm-up of about ten to fifteen seconds. The entire model including the cowl interior and bulkhead should receive a thin coat of fuel proofer (Comet is what we used).

The prototype DH-6 model did not sport a paint job, for reasons of saving on weight. We used yellow tissue on the frame surfaces and, with the addition of the insignia, the model presented a pleasing appearance. Only

the struts received one coat of reddish-brown colored dope to simulate mahogany. An infinitesimal amount of weight was required in the tail to balance the model correctly. Hand-glide the model over tall grass until a good glide is obtained. The first few flights should be carefully observed to note any erratic flight tendencies—then get ready for some real scale model flying.

Bill of Materials

Fuselage. 1 pc 1/20" x 3" x 36" medium hard balsa, formers, sides, top & bottom. 2 pcs 5/16" x 3/16" pine or spruce, engine mounts. 1 pc ¼" x 1" x1½" balsa, nose piece. 1 pc .028" music wire 18" long, landing gear. 1 pc ½" x ½" x 6" soft balsa, dummy engine cylinder.

Wings. 1 pc ½" x 2" x 36" medium balsa, ribs. 1 pc 3/16" x 2" x 4" medium balsa, tip ribs. 4 pcs 3/32" x ¼" x 12" medium balsa, spars. 4 pcs 3/32" x 3/32" x 12" medium balsa. leading edge. 4 pcs 3/32" x½" x 12" medium balsa, trailing edge. 1 pc 1/16" x 3/16" x 36" hard balsa, struts.

Empennage. 2 pcs 3/32" x 3/32" x 36" medium balsa. 1 pc 3/32" x ⅜" x 10" medium balsa. 1 pc 3/32" x 3/16" x 12" medium balsa.

Miscellaneous. Silk thread, "Trim-Film", 3 oz. clear dope, 1 oz. fuel proofer, 1 sheet yellow "Sky-Sail", wheels, cement, crinoline, bolts, nuts, washers, .015" wire.

CONTEST CALENDAR

June 11—Troy, Ohio, Free Flight Contest. J. M. Tootle, 1004 S. Walnut.
June 11—Beckley, Va., Modelers Contest.
June 11—Chicago, Ill., U-Liners Annual Contest.
June 11—Akron, Ohio, Society of Model Plane Engineers Contest directed by Akron Women's Chapter NAA.
June 11—Pittsburgh, Pa., Control-Liners Meet. L. J. Stoutenburg Jr., 21 So. Emily St.
June 17-18—Adelanto, Calif., 1950 Soaring Regatta (full scale). W. G. Briegleb, El Mirage Field.
June 17-18—Norfolk, Va., Middle Atlantic Championship Contest. S. A. Shoemaker, 211 Maycox Ave.
June 18—Beloit, Wis. Thermal Dusters Contest. Thermal Dusters MAC.
June 18—Bristol, Conn., Bell City Invitation Meet. G. W. Eddy, 17 First St.
June 18—Hammond, Ind., Aero-Hawks Control Contest. W. R. Lake, c/o Walter Toczek, RR 1, Griffith, Ind.
June 23-24-25—Detroit and Dearborn, Mich., Annual Michigan Exchange Meet. F. P. Sposite, c/o H. J. Clemens, 423 Penobscot Bldg., Detroit 26, Mich.
June 24—Toronto, Canada, T. Eaton Contest. De Havilland Airport.
June 24-25—Cincinnati, Ohio, Plymouth Dealers Contest. C. O. Doll, 2503 Fairview Ave.
June 24-25—Birmingham, Ala., State Miniature Air Carnival. B. G. Hill, 4 Bonita Dr.
June 25—Fresno, Calif., Record Trials.
June 25—Pittsburgh, Pa., Control-Liners Meet. J. Stoutenburg Jr., 21 So. Emily St.
June 25—Janesville, Wis., Whiffle Birds Meet. G. W. Sweet, 549 McKinley Ave., Beloit, Wis.
June 25—Bronx, N. Y. Model Knights Flying Fair. Art Hasselbach, 27 McDowell Pl.
June 25—Tyler, Tex., Annual East Texas Contest. D. W. Hogan, c/o Brooks Matney, 313 So. Bois d'Arc.
July 2—New Britain, Conn., Central Connecticut Meet. W. D. Russell, 385 Robbins Ave., Newington 11, Conn.
July 2—Jamesburg, N. J., Metropolitan Championships. Stephen Curtis, 129 King St., Staten Island 8, N. Y.
July 9—Pittsburgh, Pa., Control Meet. J. Stoutenburg Jr., 21 So. Emily St.
July 16—Watertown, N. Y., Annual Northern N. Y. Meet. W. D. Tracey, 270 Mullin St.
July 16—Akron, Ohio, Society of Model Plane Engineers Contest directed by Akron Women's Chapter, NAA.
July 29-30—Adelanto, Calif., Soaring Regatta (full scale). W. G. Briegleb, El Mirage Field.
July 30—Fresno, Calif., Gas Record Trials. Ocie Randall, 716 Waterman Ave.

Skylark

(*Continued from page 40*)

wing. Allow ample time for drying and then lay the spar on one wing panel and cement in place. When dry, block up this panel so that the other half of the spar can be cemented to the other wing panel. Don't spare the cement on the center section joint. Now cement the ribs in position, add the 1/32" sheet covering at the top of the center section and the wing is ready for covering.

The stabilizer is made in the same manner. Use the light rubber model weight of Sky-Sail paper for covering. Run the grain of the paper lengthwise, shrink with water and apply two coats of clear dope. Warping can be avoided by adding two drops of castor oil to every ounce of dope. This kills shrinkage tendency of the dope and doesn't pull the tissue so taut that the framework is pulled out of line.

Begin the fuselage by cutting out the two sides, and bottom. Cement the two sides together at the point from the rear of the wing platform, along the top edge, to the end of the tail. Cement the firewall in position. The firewall shown on the plan is in the proper location for the Cub .049 engine.

If other engines are used the firewall will have to be relocated slightly nearer the nose for proper mounting. The Skylark can be used with engines from .020 to .049 displacement. A real light version would be made by using 1/20" sheet instead of 1/16". An Infant would be the engine for that combination. For beginners and everyday sport flying we recommend the Torp Jr. or Baby Spitfire. High-powered contest performance results from the Cub .049, but very careful adjustment is necessary to control the large amount of power.

After adding the firewall cement the bottom sheets in position. Hold the two sides apart at the point where the windshield attaches and cement the wing platform brace in place, then add the wing platform itself. Locate the gas tank, engine, landing gear, and dowels for holding the wing, before placing the windshield in position.

The fin and rudder can now be attached. Sight carefully along the fuselage while it's drying to see that the shrinking action of the cement does not pull it out of line. While this is drying, fill in the front of the nose with scrap 3/32" sheet. The entire fuselage is then covered with tissue and given two coats of colored dope. We used red tissue for the wing and tail assembly with an all-yellow fuselage.

Mount the stabilizer and line up carefully with the rudder and sight along the fuselage to make certain that it doesn't dry out-of-line. The auxiliary fins can now be added, and here again watch for proper alignment.

Select a calm day for test flying. Before even trying test glides, check to see if the center of gravity is properly located at a point exactly at the center of the wing chord. Correct any error by adding small pieces of lead to either the nose or tail. Check the engine set-up. A small amount of downthrust will be necessary and right side thrust will be needed if the model is going to be flown against torque. For flying with torque no side thrust is needed, but the rudder tab is set slightly (1/16") to the left and the left wing is washed-out to compensate for torque.

Right or left side thrust can quickly be checked by placing the prop in a horizontal position and then taking a yardstick and measuring from the tip of each prop blade to the end of the fuselage. If the model seems nose heavy as a result of test glides even after you've made certain that the c.g. is correct, increase the wing incidence by adding small pieces of wood under the leading edge. Try the first test flights with the engine running rich to iron out flight adjustments and power-off, power-on conditions.

Challenger

(*Continued from page 45*)

The best way to start the wing is to make a metal template of the wing sections, using this template to cut out the ribs. These are made from medium 1/20" quarter grain sheet balsa. A good selection of wood will give you a strong and light wing.

Next, taper the trailing edge, and notch for ribs. Pin this to the plans. The spar should be straight and hard—⅛"x½". Mark off the rib location and then slide the ribs over the spar to their proper places. Put glue on all the notches and push the ribs down, making everything line up. Then add the tips, which are cut from 5/32" sheet. Glue on the leading edge. After this is done, glue all the ribs to the spar. When the wing is thoroughly dry,

remove it from the plans. Put the correct dihedral in, starting with the tips first. When this is complete, put in all the gussets.

The stabilizer is constructed the same as the wing.

Make the rudder outline first. Then place the ribs and spar in proper location.

After cutting the propeller block to proper outline, carve in undercamber; get a smooth job. Finish this completely before working on the front side of the blade. When the prop blade is finished, sand and give two coats of clear dope. The spinner is made from layers of ¼" hard sheet balsa glued to the prop center. It is best to clamp this until dry. Then carve to shape. When the prop and spinner are complete, cover the hinge and spinner with gauze. Give this several coats of glue. The whole prop is then covered with tissue. This will greatly increase the life of the prop, and give it a satin, smooth finish.

The tail pop-up dethermalizer is quite simple. Start by gluing the hold-down wire on the leading edge of the stab. This is one piece. By changing the angle of the wire, you will also change the angle at which the stab will pop up. There is no limit-string necessary with this arrangement. To align the stab, glue a piece of ⅛" square balsa under each side of the stab. This will prevent it from shifting and losing adjustments.

Power is supplied by 16 strands of ¼" T-56 50" long. This may vary with conditions. Ship is adjusted to turn to right. Power for climb and glide should be about the same, approximately a 300-foot circle. When the correct thrust adjustments are found, you can carve away or add to the nose block. Calculate all your adjustments carefully, and with thought, for your ship will fly no better than it has been adjusted.

Wind her up and let 'er go. Lots of luck.

P.S. Don't forget to light the fuse.

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The Flea

(*Continued from page 21*)

glowing reports about the flying qualities of the H.M. 300. Praised in particular are the amazing maneuverability and stability in all directions, and the fact that the aircraft cannot be made to spin. An aerodynamical investigation shows, indeed, that a flying-slot arrangement *à la* Mignet should be free from autorotation. Stalling takes place at about 40 mph indicated airspeed, but the Pou is free from normal stalling reactions—with the nose at about 45 degrees to the horizon the aircraft sinks on a practically even keel, the nose dropping very slowly. This is to be expected, since there is no downwash effect on a tail aft, and because there is no abrupt breakdown of the airflow over the wing. A flying-slot arrangement should actually be the more stable the higher the incidence, and be less sensitive to c.g. location.

POU-DU-CIEL DATA

	H.M. 300 Three-seater	H.M. 294 Single-seater
Engine	125 h.p. Continental	35 h.p. Aeronca
Span	24.65 ft	18.15 ft
O.A. width (wings folded)	15.2 ft	8.07 ft
Length	17.3 ft	12.5 ft
Height	7.4 ft	5.6 ft
Wing Area	194 sq. ft	108 sq. ft.
Weight empty	945 lb	396 lb
All-up weight	1,650 lb	618 lb
Wing loading	8.52 lb/sq. ft.	5.7 lb/sq. ft.
Power loading	13.2 lb/h.p.	17.6 lb/h.p.
Cruising speed	106 m.p.h.	81 m.p.h.
Endurance	4 hours	5 hours

Tight turns can be made without skidding or slipping, in spite of the absence of ailerons. Mignet hangs a plummet on a string from the cabin roof and shows that even in 45-degree turns it does not alter its position in relation to the cabin walls.

Last November both Mignet aircraft qualified for a Permit-to-Fly, and a Certificate of Airworthiness can be safely expected. The cruising speed quoted here for the H.M. 300 refers to the aircraft with a "best-climb" airscrew; at high speed no more than 85 hp is actually utilized.

(The writer is indebted to Henri Mignet and E. P. Zander for material which appears in this article.)

Next Issue!
"HERE COME THE HOME-BUILTS"

Engine Fuels

(*Continued from page 38*)

oil is controlled by heat resistance and solubility. Motor oil is used with gasoline, naphtha, benzene and ether but will not mix with alcohol. Castor oil, which can be used with gasoline, is a "must" in alcohol fuels if suitable synthetic oils are not available. The "burning" is as follows:

Fuel and air are mixed together in the carburetor of an engine and pumped by base compression through the by-pass and into the cylinder. On its upward stroke the piston squeezes the air-fuel mixture into a small space which ranges from 1/5 to 1/10 (in general practice) of the original volume. This fraction expresses the compression ratio, 1/5 corresponding to a ratio of five to one.

While compressed, the fuel is ignited and burns rapidly, producing a sudden increase in temperature and pressure which acts on the piston to produce power. High compression results in greater engine output up to the critical compression ratio. When compression is too great, a violent explosion takes place causing shock waves in the cylinder and excess vibration. This condition is called "detonation" and results in loss of power. Octane ratings were developed to indicate how well a fuel will resist detonation at high-compression ratios.

Ignition temperature is another characteristic affecting the action of fuel. Diesels use a fuel that will ignite at low temperatures so the heat of compression will start the explosion. Glow plug fuels also must ignite at relatively low temperatures. Spark ignition engines on the other hand require a fuel that will not ignite due to compression, otherwise burning starts before the spark plug fires and causes "pre-ignition" with resulting loss of power.

"Volatility" and "air fuel ratio" get together and create a big problem all their own. Air fuel ratio refers to the proportion of fuel and air required for an explosive mixture. When fourteen parts of air are mixed with one part of gasoline, a strong explosion will result when the vapor is ignited. This ratio can vary from 12 to 1 up to 16 to 1, but outside these limits very little power results. Some fuels have a very narrow or critical range while others offer greater latitude.

Volatility is a measure of how much fuel will evaporate into a fixed amount of air at a specified temperature. For example, alcohol at temperatures below 40° F. does not evaporate sufficiently to form an explosive mixture. For this reason ether is added very often to alcohol base ignition fuels for winter use.

Glow plug engines are sometimes hard to start in cold weather, but adding ether does not help because the nitrated chemicals do not reach the glow plug by evaporation. One solution is to put a few drops of fuel in the cylinder and turn the engine over to wet the glow plug. When the battery is attached a frying sound can be heard. This is fuel boiling out of the plug, and it fills the cylinder with enough vapor to start the engine.

A large variety of prepared fuels are available in this country. With the exception of gasoline and #70 oil, it is usually as cheap and far more convenient to use ready-mixed fuel. Diesel or glow fuel ingredients are hard to get and must be stored carefully to avoid danger of fire. Only for the use of those who cannot buy prepared fuels or those who want to experiment rather than go out and fly, a list of formulas are presented. We do not recommend the

Table I—Combustible Fuels

Fuel	Auto Ignition Temperature Deg. F.	Octane Rating	Maximum Compression Ratio	Air: Fuel Ratio Limits	Volatility
Gasoline	500-570	70-95	8	12-16	High
Naphtha	450-530	Very low	4.5	——	Medium
Kerosene	475-500	Very low	5.5	——	Low
Benzol	1075	100	10	5-26	Medium
Methanol	880	98	10	3.6-12	Medium
Ether (Diethyl)	370	——	——	2.7-7.7	High
Nitromethane	——	——	——	——	Medium
Nitropropane	——	——	——	——	Medium
Nitrobenzene	924	——	——	——	Low

Table II—Lubricating Oils

Oil	Solubility: Gasoline & Benzine	Solubility: Methyl Alcohol	Heat Resistance
Motor Oil	Yes	No	Fair
Castor Oil	Yes	Yes	Good
Synthetic	Yes	Yes	Excellent

Table III—Knock Suppressors

Compound	Relative Amount Required
Tetraethyl Lead	.0295
Aniline	1.00
Ethyl Iodide	1.55
Ethyl Alcohol	4.75
Benzene	9.80

"home brews" for the average modeler.

Ignition is the cheaper way to operate large engines. Formula #1 in Table IV is the old stand-by and is just as good as ever. You want a gasoline which uses benzol instead of "lead" to get a high octane rating. Great care should be used in selecting the motor oil because high temperature causes excess carbon and gum to form. A proper mixture will operate well in engines having good cooling capacity and a compression ratio of 8 or less.

Gasoline fuels start easily even in cold weather due to high volatility. If engine temperature is too high and causes too much gum and varnish, formula #2 may solve the problem. Castor oil will stand more heat and the amyl acetate dissolves gums and keeps the cylinder wall clean. This mixture is good for hot stunt engines because gasoline consumption is approximately one-half that of alcohol and a smaller tank can be used to get the generally accepted seven-minute engine run for contest work.

Racing engines operating on ignition perform best on formula #3. Alcohol makes an engine run cool and delivers more power at high rpm. Ignition engine fuels are sometimes hopped up by adding nitromethane or nitropropane, but this will only assist an ignition system which is weak to begin with. A good plug of correct heat range and hot spark will give plenty of power without expensive fuel ingredients.

Diesel engines operate well on formula #4. Ether is the chief ingredient of most diesel fuels because of its low ignition temperature (379°), and good anti-knock quality. Cheaper fuels such as formula #5 can be prepared by adding diesel oil or kerosene, but these materials increase the tendency to knock and cause hard starting. If you can afford it, use straight ether and oil. Ethyl nitrate and other additives have been utilized to decrease knock, but these are very difficult to obtain.

Glow plug fuels are the most complicated to mix properly. It's not only a matter of finding the best fuel but selecting the best mixture for a certain engine at specified temperatures and rpm. Start out with formula #6 and run the engine. Next, mix a small quantity of fuel having less nitrated material and compare performance with the original formula. By trial and error a proportion will be found that gives best results.

Once this balance is established, use the same propeller, glow plug and fuel mixture. High compression ratio, high speed and *hot* glow plugs (these have a *fine* wire element) all require less nitrates.

With an extremely high compression engine you can go back and use formula #3. This is a good trick for those who cannot obtain ready-mixed fuels or nitrated chemicals. Formula #7 is a good mixture but don't try this in an engine having a compression ratio above 8 to 1. Gasoline causes high engine temperatures, so more break-in time is required for formula #7 than for #6.

Fuel mixtures can be varied slightly to favor the condition of the engine. For break-in, it is advisable to add 10 to 20% more oil for extra lubrication and cooling. After engine is limbered up the standard mixtures or ready-mixed fuels are best. As your engine grows old and starts to leak and lose compression, it may operate better with extra oil again.

Some of the racing bugs go in for high compression to get more speed. This results in a tendency of their high compression engines to knock and may require the addition of some materials shown in Table III. Tetraethyl lead is very effective in water-cooled engines, but it is not recommended for the model airplane engine. Alcohol is the base of most racing fuels and can be improved by the addition of a few drops of aniline or ethyl iodide per pint of fuel.

Table IV—Home Brew

Ingredient	Parts
Ignition	
1. Amoco High Test Gasoline (or similar unleaded high-octane gas)	2-3
.#70 Oil	1
2. Amoco High Test Gasoline	10
Castor Oil	4
Amyl Acetate	1
3. Methyl Alcohol	10
Castor Oil	4
Amyl Acetate	1
Ether (for cold weather)	3%
Diesel	
4. Ether	2
#20 Motor Oil	1
5. Ether	4
Truck Diesel Fuel	2
#20 Motor Oil	3
Glow Plug	
6. Methyl Alcohol	2
Castor Oil	1
Nitrobenzene, Nitromethane or Propane	1
7. Gasoline	2
#70 Motor Oil	1
Nitropropane	1

Solo Club

(*Continued from page 30*)

ing spur track, is there a sign of life. No roads, no houses. Just you up in the sky and a tumbledown building in the mountains.

"About the article, 'The Flying Club Today' I was most interested in what you termed a 'poor man's club,' the Reading Flying Eagles, in which there is a $25 membership fee and $4 a month dues," says Russell A. Bender, Chambersburg, Pa. "We do even better. The Chambersburg Aviation Club has a membership fee of $15, with only $5 a year dues. We obtained our ship by sponsoring an air show last fall. Now we have 41 members.

"A minimum of 10 hours per month pays the ship's entire expenses and to date we have showed a net profit always exceeding $20 a month and running as high as $97 for the month of October. These are winter months and profits should double during the summer.

"Like other clubs, we sponsor breakfast flights, show movies, hold social gatherings, and many other activities. At the present time we are making plans to feed wildlife in the mountainous areas in case of a deep snow or blizzard. Our motto is 'Promote Aviation.' To practice what we preach we strive to create interest in aviation with non-flyers and the general public."

And there you have another proof that something can be done about the high cost of flying. All of us do not have access to a club and, in big cities it is hard for poor pilots—that's us—to even learn of each other, much less to get together. But in small cities and towns that have airports it is always possible to form a club. The city flyer would do well to get acquainted with other students and privates at some outlying airport. You can't cook up anything unless you mix. Thanks, Russ Bender. Seems to us that Pennsylvania is a pretty alert place when it comes to clubs. Chambersburg is no safari from Reading.

At this month's meeting we have a contingent of members from above the border who can't wait to tell us about the government aid now being extended to Canadian flyers. Phillis Miller, Vancouver, we'll make you spokesman:

"I registered under the subsidy training

scheme in January, 1949, and received a check for $100 from the government after I had completed tests for the license," begins Phillis Miller. "That's about one-third of the cost. The idea is to get people to fly, although, in my case, interest was there long before the idea started. Anyway, you must have 30 hours' flying, including at least 12 hours' dual. You must attend ground school and pass written exams covering engines, meteorology, theory of flight, airframes, instruments, navigation, air regulations. These tests are not very difficult or very long. Solo flying includes three hours of cross country.

"As to myself," explains Phillis, "I soloed in January of 1949 in a Cessna 140 at Vancouver-U-Fly Ltd., Sea Island, British Columbia. At the end of August I got my private and now have 27 hours solo."

Also from Canada, but from the eastern province of Ontario, comes H. H. Barr, who has 25 hours on a Cub. He wants to know if any of us know where he can procure a ship in the Driggs Dart class. If in fair shape, he would fix it himself. Otherwise he would like to lay his hands on plans for building a plane. For the benefit of Barr and other folks in the same boat, it is possible to get an X-license on home-builts, subject to reasonable requirements laid down by CAA for an interim period pending possible regulations to cover such airplanes. Write to the Solo Club, marking your letter "Home-Builts," and headquarters will forward all such correspondence to people who have the info.

"I would like to say that I enjoy reading our club column," states Irving Steinman, a student with 20 hours' time, 12 of them solo. "It makes me feel that someone takes an interest in student flying. So, for my fellow students and myself, 'Thanks.' I first soloed in June, 1949, on my 16th birthday, at Staten Island Airport, N. Y. The ship was a 65 hp Cub." One of these days someone will send in a picture of four generations of a family that soloed on Cubs!

With us today is a new member from the Canal Zone, a Navy boy who had the good break of getting a little multi-engine time (10 hours) on an R4D (DC-3) and an SNB (Beechcraft D-18). "I soloed at Norfolk Municipal, Virginia," says Ray, "then went through the Private Flight Curriculum at Wiggins Airways, at Hillsgrove State Airport, Providence, R. I. I finished my private course in 21 days, between February 9, 1948 and March 1. On leave at the time, I went through on the G. I. Bill."

Ray has 65 hours, including time on Champs, Cubs, Supercruisers, PT-17s, and a Seebee. He hopes to have his seaplane rating by the time he gets back to the States. After that he is going for commercial and multi-engine ratings. How about flying in the Canal Zone?

"All I can say for flying down here," says Ray, "is that it is strictly SNAFU. Private flying is in a rut and no one can help it. Flying in Panama really makes a guy enjoy and appreciate flying in the Estados Unidos." Yes, with all the beefs, we have a plenty better break than enthusiasts of most other lands.

Torp Jr.

(*Continued from page 54*)

will present an explanation on one special item in each engine report, so if you make a complete collection the figures will make sense and be of definite value for future reference. Let's dig into "base compression ratio" this month.

Most of us are familiar with "compression ratio," which normally refers to what fraction of the original volume the fuel mixture is squeezed into in the combustion chamber above the piston. Fuel and air enter an engine through a rotary valve or side port when the piston is traveling upward, and are trapped in the base when the valve or port closes.

Further movement of the crankshaft brings the piston down and squeezes the fuel mixture to a smaller volume, creating pressure in the base. Dividing the volume of the base with the piston down into the volume with the piston up gives the base compression ratio or how much the mixture is squeezed together in the base.

High-base compression is a desirable factor because it helps draw fuel into the base and pumps fuel through the bypass and into the combustion chamber with more force. High-speed engines must have high-base compression in order to force fuel into the cylinder fast enough to keep up with the rpm. Stunt engines also perform better with high-base compression due to a stronger suction when the piston is traveling upward.

Various methods used by engine designers to increase base compression include shortening the connecting rod to pull the piston down; squeezing the back plate and crank disk close together and making a flat rod; filling up dead space with counterbalance and metal on the rotary valve disk; and a short stroke designed to reduce diameter of base and clearance for rod.

Base compression alone is not a perfect indication of how well an engine is designed or built, but is one item to consider. Low-base compression may be offset by good port and bypass design or well-shaped piston crown.

Engine Data

Performance. Bare weight (less tank): 1.09 oz. Propeller—5½/3½ wood: 10,200 rpm; 5½/3 plastic: 13,100 rpm; 5/3 wood: 13,800 rpm. Fuel: AA and miniature types on the hot side. Fuel level test: 3¼" at 13,000 rpm.

Design. Displacement: .035 in.³. Class: 1/3 A. Stroke: .380 in. Bore: .343 in. Stroke bore ratio: 1.11. Compression ratio head: 4.75. Compression ratio base: 1.50. Port area intake .0115 in².; bypass .003 in².; exhaust .0368. Ignition: Special glow plug.

Construction Features. Bearings: crankshaft, aluminum; crankpin, aluminum; connection rod, aluminum and brass; ball joint.

Parts all machined from bar stock—no castings.

Torp Junior Parts Illustrated

Part		Material	Size (in.)	Wt. (oz.)
1.	Crankcase	Alum.		
	Needle valve body	Brass		.26
2.	Mounting flange	Alum.	1 3/32 O. D.	.03
3.	Glow Plug	Alum. body	No thread	.05
4.	Cylinder head	Anodized alum.		.07
5.	Gas Tank	Alum.	5/8 dia. 7/16 deep	.16
6.	Crankshaft	Steel (hardened & ground)	.1872 dia.	.16
	Drivewasher	Steel	1/2 dia.	.06
	Prop washer	Alum.	3/8 dia.	.01
	Nut	Brass	6-32 N.C.	.02
7.	Crankcase cover	Alum.	3/4 dia.	.07
8.	Needle valve	Brass	2-56 N.C.	.03
9.	Piston	Steel (hardened & lapped)	.3432 dia.	.10
	Connect. rod	Alum.	.348 long 5/8 long	
10.	Cylinder	Steel	.3435 bore 3/4 long	.22
11.	Spacer-cyl.			.01
	Total	weight with tank		1.25 oz
		without tank		1.09 oz.

Texaco No. 13

(*Continued from page 36*)

1931. With Hawks at the controls, this record flight took 2 hrs. and 57 mins.

We wish to express our appreciation to D. W. Stewart and the Texas Company for their cooperation in furnishing valuable data on the Travelaire Mystery Ship.

It is advisable to begin construction with the fuselage and empennage. Cut the keel from 3/32" hard sheet balsa and cut away for the engine mounts, control horn and bellcrank mount. Cement the engine and bellcrank mounts securely in place and add the ½" sheet with ⅛" sheet cemented to it at station B. Cut out the remaining formers and cement in place on the keel. The elevator and stabilizer are cut from soft 3/16" sheet and sanded to the cross section shown.

Add the spar, hinges and control horn (which is bolted and cemented in place) and cement the stabilizer to the top of the keel. Install the bellcrank, 1/16" control rod and .025" lead-out lines, and now the fuselage is ready for planking. Cement a vertical strip of ¼"x⅛"x1¼" to the rear of the keel in order to keep the planking strips ¼" apart, and fair into the rudder. A relatively slow-drying cement should be used.

Do not select rock-hard balsa for planking strips; use medium-soft balsa. You will find the fuselage of the "13" one of the easiest you ever planked, because there are virtually no curves from front to rear. When planking do not complete one whole side at a time. It is better to add one or two strips on each side as you work; in this way the fuselage will not have a tendency to bend out of shape. Let the planking dry for several hours and then sand smooth, using a sandpaper block. Clear-dope twice and sand again. The cowl can be turned on a lathe or carved with a sharp knife from medium balsa. This is installed later.

Cut the medium-balsa wing leading edge roughly to shape and cement the plywood joiner to it, obtaining the correct dihedral angle. This joint must be well cemented. Heavier plywood can be used but no lighter stock! Ribs No. 2 and the landing gear mount are now cut from plywood and securely cemented in place. The underside of the leading edge must be cut away where its path crosses the landing gear mount. While this is drying the wing covering can be cut out. Cement ribs No. 3 and 4 to the bottom covering and attach the covering to the leading edge assembly, completing one side at a time. Cement all joints well and set aside to dry.

We tried bending the landing gear from the more conventional music wire, but found it to be an almost impossible task without deviating from scale appearance. Therefore we used the sheet brass type which has worked well for us, and although it is quite rigid the airwheels or semi-pneumatic wheels will absorb the shock of normal landings on smooth surfaces. Brass was selected because, while it is relatively easy to work with, it is quite tough and stands abuse. You can have this cut out at a metal-working shop, or your school shop teacher might assist you. If you do it yourself you'll need a drill, saw and light file. A vise is handy to hold the job but is not an absolute necessity. It is best to make both pieces at one time. Cut the sheet brass roughly to shape and bolt the two pieces together. These can be bolted through the five holes which will later hold the landing gear forks

in place and also the landing gear itself.

Using the pattern on the plans, scratch the outline on the brass and drill small holes in the corners where the saw blade must change its direction. Now saw the struts to shape, being very careful not to make the struts too thin. When this operation is completed, file all edges smooth. Separate the two pieces and file and emery-paper the struts to a fairly streamline shape, but do not remove an excessive amount of brass.

Bend the flange on the landing gear to the correct angle to fit the wing dihedral and bolt it securely to the plywood support. Apply cement to the nuts to prevent the L.G. from loosening. Drive a wood screw into the front hole. Be sure to cut away the bottom wing covering for the brass strut flange. The four brass wheel forks are now cut to shape in a similar manner, and after being bent to shape they are securely bolted to the struts.

File off the ends of the bolts protruding from the nuts and solder the bolt end to the nuts. Install the wheels at this time, using a bolt as the axle which must also be soldered to prevent loosening. Cut the soft balsa wheel covers and hollow for the wheel and fork. Cement these securely to the brass strut. The lightening holes help hold the covers in place because the cement can reach both wood surfaces of the wheel covers. When dry, the covers are sanded to shape and several coats of dope applied.

The bottom covering trailing edge must be beveled to continue the upper camber line of the ribs; then the top covering can be added, with plenty of cement used. Add the solid wing tips and set aside to dry. Sand to shape and dope twice.

Cut the fin and rudder from ¼" medium sheet and be sure to add the ⅛" sheet to each side of the rudder in order to fair the fuselage into the rudder. See section F. Sand smooth and dope once. Cement this assembly in place on the fuselage and fillet with cement. (*Continued on next page.*)

"Aw, Grandpa, it was a natural for the Air Trails Sketchbook."

The wing can now be attached to the fuselage. Cut away the fuselage planking a little at a time until a good fit is obtained. A portion of the ½" and ⅛" sheet at section B must also be cut away to admit the wing leading edge. Apply liberal quantities of cement in this operation. Add the wing fillet and apply several coats of cement to the wing-fuselage joint. Cement the hardwood cowl spacers to the engine mount and screw the cowl in place. Add the headrest and fillet well.

The entire model should now be well sanded with very fine sandpaper. Sand the cockpit edge carefully in order to produce the required shape. The cowl can also be cut to make room for the engine cylinder. Wood filler must be applied in order to get a good finish. Three coats with sanding after each were required. The model is painted red and white and the markings are shown in the photographs and plans. The star is red on a white circle; the "T" is green and "Texaco" within the star is black. Paint all the white areas first and then mask them off and apply the red paint. We used "Trim Film" for the red fuselage stripes and license numerals (black on fuselage, white on wing) as well as the Texaco insignia. Ordinary colored dope was used as paint and after it was rubbed down we applied a coat of clear fuel proofer. This must also be applied to the engine mounts and cowl interior and over the "Trim Film."

With the addition of rigidly fastened control line guide, wing walk, pine struts, rigging, tail skid and celluloid windshield, the model is ready for flying.

The model must balance along the line indicated. The addition of lead weight in the nose or tail will remedy any unbalanced condition. We used .012" lines 50 feet long and flew from a concrete surface. Engines from .19 to .29 displacement are recommended. If you are a novice it is suggested that the landing gear be moved ½" forward of the location shown on the plans. This will make landing easier. Our Texaco 13 was by no means sluggish, and care should be taken not to over-control the craft.

Bill of Materials

Fuselage: 1 pc 3/32" x 2" x18" hard balsa, keel. 1 pc ⅛" x 2" x 24" medium balsa, formers. 26 pcs 3/32" x ⅜" x 18" medium soft, planking. 2 pcs 2" x 4" x 2¾" medium hard balsa, cowl. 1 pc 1/16" sheet dural, ¾" x 2", bellcrank. 1 pc 1/16" dia. music wire, 14" long, control rod. 1 pc ½"x4"x4" medium balsa, former B. 1 pc ⅝" x ⅝" x 7" soft balsa, headrest. 2 pcs ¼" x ½" x 5" hardwood, engine mounts.

Wing: 1 pc ¾" x 1" x 24" medium balsa, leading edge. 1 pc 3/32" x 2" x 12" medium balsa, ribs. 1 pc 3/32 " x 2" x 6" plywood, ribs. 1 pc 3/32" x 2¾" x 1⅝" plywood, L.G. mount. 2 pcs 4½" x 4" x 1/16" brass, L.G. strut. 4 pcs 3/32" x 2" x 24" medium soft balsa, wing covering. 2 pcs ⅝" x 2" x 3½" soft balsa, wing tips. 1 pc 3/32" x 7" x 1" plywood, wing joiner. 4 pcs ½" x 2" x 4½" soft balsa, wheel covers.

Empennage: 1 pc ¼" x 9" x 2" soft balsa, fin and rudder. 1 pc 3/16" x 3" x 18" soft balsa, stabilizer and elevator. 1 pc 3/16" x 3/16" x 10" pine, elevator spar. 1 pc 1/32" dural sheet, 1¼" x ¾", control horn.

Miscellaneous: nuts, bolts, screws, wheels, lead-out lines, 6 oz. white dope, 4 oz. red dope, Trim Film, fine soft wire, celluloid, fuel proofer, rubbing compound, sandpaper, cement, clear dope, wood filler.

Dope Can

(*Continued from page 43*)

foremost authorities on aerodynamics, a professor at Cal Tech and past president of the Institute of the Aeronautical Sciences.

Mr. Linthicum points out that Mr. Millikan in his book, "Aerodynamics of the Airplane," defines *airplane* as follows: "In order to be called an airplane the machine employed for these purposes must be heavier-than-air, it must, when in flight, have no material connection with the earth other than that afforded by the atmosphere itself."

"Now I ask anyone," says KU's ECL confidently, "does a control line model fulfill that definition? Except for the part 'heavier-than air'? Most of them are heavier-than-lead."

Mr. Linthicum of Lawrence (Kans.), you wound us f.f. fans deeply. We suggest that the matter be settled in a gentlemanly manner. Our seconds will call on your seconds. Fireballs at 20 paces!

As Simple as ABC. Norman F. Robinson, corresponding secretary of the Louisville, Ky., ABC (airplanes, boats and cars) MC noted with "horror" our May issue club directory which listed the ABC'ers as affiliated with the "Courier Journal." He brings us up to date, but fast.

The Louisville club stopped breathing during the last war. It was reorganized in '46 by several members of the old crowd including Bob McGee, Art Strobl, Charley Keeling, "Peewee" Houchens, Pete Geiser and H. O. Wise. The club is in no way connected with the Courier Journal, although the paper did sponsor a meet for the club in '47.

Membership varies between 60 and 100, which makes it a sizable unit. Last year the outfit purchased a group liability insurance policy which protects every active member operating any type of model vehicle anywhere. Norm reports that during the past two years the club and local hobby shops have sponsored all contests. Since the meets were successful, that policy will probably be continued. ABC members have put on flying exhibitions at a number of neighboring communities in Kentucky and Indiana, at a veterans' hospital and at Fort Knox. At one affair in '49, the club raised $200 for the local crippled children's hospital.

Another phase of the club's activity is instruction in model building which is given to a group of youngsters on an experimental basis; several rugged trainers to check out beginners on control line flying are being built. But in spite of all its good works, the ABCMC has seen one site after another closed to its members because nearby householders objected to the noise. To remedy the situation the club leased a field in an isolated area and is developing a complete model park with flight circles, car race track and a boat pond. A "big car" track is still maintained in a city park, but the planes and boats have been definitely hampered (the sound of an engine bringing squad cars from all directions).

The club operates on a dues structure of 50c a month from senior members, 25c from junior ABC'ers. A recent "grass roots" meeting brought in more than 100 pounds of grass seed for the new model park. In spite of financial restrictions, the club hopes to expand this year its contest, teaching and exhibition activities. In the offing is a television program.

Louisville modelers can reach Mr. Robin-

son at 1823 South 3rd St. Other club secretaries might like to contact him for more information on that insurance coverage.

More on Smoke Patterns. Remember our remarks about titanium tetrachloride as a possible smoke pattern-maker last month? Sailplaner-chemist Dave Malkemus of Austin, Texas, says that when handled properly there's no great danger from the stuff, but otherwise . . . !!! As far as he knows there is no other simple chemical suitable for the job which would be safer than titanium tetrachloride ("tilly"). Tilly looks and smells much worse than it really is, says Dave. If gotten on the hands as a liquid, it should be washed off promptly. It *must not* be allowed to get in the eyes or swallowed in liquid form. This means that vapors or smoke are not likely to hurt modelers or bystanders, but if the rag with Tilly should fly off from a wing tip into someone's face—definitely not good.

If used carefully and safely, the technique of securely tying a rag in the outside wing tip is okay, figures Mr. Malkemus. An alternate, and perhaps better method, might be the following: *securely* mount on the stunt plane a pointed tube about 1 inch long and 3/8 inch diameter with a vent hole of about 1/64 inch diameter at one end. Tube can be of iron or brass, but not aluminum. Vent hole should point out from model toward outside of circle. A stopper fitting snugly plugs the other end of the pointed tube which might well be mounted crosswise on the landing gear. Tube is filled with Tilly, the stopper secured, model gets airborne. Centrifugal force shoots a very thin stream of liquid out into airstream to make smoke pattern. The small (1/64") hole should be kept closed with a removable pin until the flight goes on.

Tilly can be obtained at various chemical supply houses. The "technical," not the chemically pure grade should be used. It sells for about $2 a pound. We underscore Dave's warning: handle this and any other similar chemical with great care. Try out any smoke pattern system with caution, away from spectators.

New California Club. Brisbane Power Modelers is the name of a new group meeting every Friday night at 7:30 p.m. at 458 Mendocino St., Brisbane. Bob Boomer, a former Detroit Balsa Bugs member, sparkplugged the Power Modelers. Officers con-

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sist of Wesley Eaton, pres.; Del Sterling, veep; Ira Romriell, pencil pusher; Russ Wilson, master of the money bags; and Dennis Sullivan, who plays the part of the Great John L. and bounces the non-believers (non-modelers, that is).

The club is an AMA group (that's good, that's good) and at last count has 24 members including Patricia Boomer and June Dyer, publisher, editor and printer of the "Aeroneer" modelplane bulletin.

Flying Area, Work Shop for Jersey Joes. Teterboro (N. J.). School of Aeronautics at Teterboro airport has offered portions of its school and airport facilities to model club members in New Jersey and the metropolitan New York area. Available on week ends at no charge is a meeting room, work benches and a flight area. Any groups around New York interested in taking advantage of these facilities should contact A. DiStefano at the Teterboro School of Aeronautics.

Maine Reports on Colorado. We get so little news from Colorado we were glad to catch a few comments by Howard Smith of the (Augusta, Me.). Flying Maniacs' "Tale-Spinner." Howie had been out to Lowry AFB for an armament training course. Reported he, "I did have a little chance to see the model world at Denver. We (in Maine) apparently aren't as far behind as we thought. Speeds are seldom over 120 mph due to the high altitudes, stunting hasn't gone into any terrific new maneuvers and scale is perhaps not quite as good as the average model in Maine.

"These are short-time observations, but the general problems seem to be the same . . . how to get the club membership to meetings and function better . . . how to get a sponsor for a contest . . . how to get more speed, etc. Model supplies were on the same slow side as we find them here. Kits were the same with a few exceptions in the stunt line where they were imported from California; fuels were the same old standbys used here; no engines other than those observed in own hobby centers; in general the same types of dopes, Sta, and Hep. Aero-Gloss was available in quantity, however." (We guess it's hard to get in Maine.)

"The clubs flew every Sunday in the local park with no opposition from the populace. Stunting seemed to predominate and it seemed that our own stunters do equally as well. Team racing has not received any attention and half-A was being dealt with in free flight.

"All in all the general picture seemed to be the same as our own local one: a group of eager modelers trying to get some fun out of their hobby."

Pennsylvania Puts Us Straight. "Who is this Harry Stephens who sent in the publicity concerning our club, the Bristol, Pa., Aeromodeleers?" queries Clarence Wells, secretary of the club. "He has not been a member of our club since 1948. The news itself was correct and I believe this came about by his sending newspaper clippings from our local newspaper which I insert weekly. No damage was done, however. What he did was comparable to someone in the Foreign Legion sending in reports on the activities of the Boy Scouts and stating that he is an active member of same."

Clarence, we think you're being a little hard on Cpl. Stephens. He didn't say he was a present, active member of the Aeromodeleers; neither did we. He merely sent along some clippings and a note about what a fine club you have, how Exchange was helping out, and hoped we'd give you fellows a plug. Which we did.

Speaking of Bristol . . . reminds us to tell you of a new Federation of model clubs that has been formed which included as charter members the Kiwanis Aero Jockeys (Quakertown), Newton MAC, Bristol Aeromodeleers, Hatboro Aeromodeleers and the Cloudbusters of Croyden. Hatboro is evidently outside Bucks County, Pa., in which the Federation operates, and there was some discussion as to whether the *club qualified* for membership. But as Clarence Wells pointed out, "Most of their members hail from Bucks County anyway, so why worry about a technicality—*we have enough technicalities in this hobby anyway.*"

This And Dat. John A. Targos, 616½ West 7th St., San Pedro, Calif., is looking for back copies of AT that carried plans and data for E. J. Weathers' Mystery Man model. If you've gottum, how's about getting in touch with Mr. T? . . . W. J. (Bill) Werback, 1230 Norfolk, Willow Run, Mich., tells us that the Low Speed Aerodynamics Research Association, an international organization of engineers and aeromodelers, has announced plans for the formal constitution of an American Section early this summer. A headquarters will be set up in this country to help coordinate research work by the LSARA.

Newton McLeod, West Peru, Maine, in answer to a question in Dope Can some time ago, advises us that the engine in the Lincoln Sport biplane was apparently anything light enough and powerful enough to fly the ship. In other words, there was no special powerplant, although he believes the preferred engine was the 3-cylinder Anzani. Also used was a 2-cylinder opposed Lawrance and the Henderson 4-cylinder engine. McLeod is looking for plans of the old Waco IO. Can anyone loan them to him?

From Tokyo, Dallas B. (PAA-Load Poppa) Sherman of Pan-American Airways writes, "A large number of PAA-Load models, both free flight and control line, have already been built and test flown here, and many more are in the design and construction stages. We are going to have some interesting models: an Air Force sergeant has a Class D controliner with the 3 pounds of payload carried inside the fuselage; an ex-aero engineer is building a pusher PAA-Load free flighter; and I've visited a Buddhist priest at Kyoto who is putting the finishing touches on his 'pod-and-boom' job! Of course, not all enthusiasm is headed toward PAA-Load; control line scale is high on the list, with a 14-foot-span Aeronca C-3 getting its final trimmings and several 6-engined B36 bombers already making the circles. We are going to have a gay season here in Japan!"

Half-A Teamless Team Race. Buffalo's Miniature Aircraft Engineers, better known as the Flying Bisons, ran off a half-A race in the State Armory not long ago which produced some mighty fine times and some mighty surprising awards. Ships were timed from takeoff for half a mile. Harold Keller, club prexy, took first with a flashy 62 mph performance. Harold (Corn-cob) deBolt was second with 59.5 mph; Norris Maltby, 3rd, 55 mph. Placing fourth through seventh were Bob Ackley, Fran Ptaskiewicz, Gord Greenley and Don Hobel. Everybody used Cub .074 engines and Speedsters, except Maltby and Hobel, who flew original jobs.

The first-place trophy, constructed from a thimble and a collar button, carried a cash award of 80c. Second place got a similar trophy, but no cash. Third received a broken prop; 4th, two eyedroppers full of fuel; 5th, 1 eyedropper full of fuel; 6th place got the eyedropper; and 7th received four tears direct from a crocodile.

Who Said That? A couple of our faithful readers wrote in to ask if we couldn't find some smaller type for Dope Can—claimed the magnifying glasses they were already using would work on an even smaller size face of type. Always glad to oblige, we shift over to something even smaller. How's that? Coming through clear and bright, fellows?

Well, to end up on an educational note we're answering some queries on how we make everything come out even in the book each month. (People who work on magazines always call their publication a "book"—don't ask us why, we just follow tradition.) It's all very simple. If we have too much space, we just keep adding items until it's filled; if we have too little room we just let the stories run along until we come to

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The Last Word

Cloudsterette. Alan B. Olson and his friend Jack Waterman of New Orleans found little wrong with "What's Wrong With the Lightplane Picture?" (April AT). In fact, they thought the Cloudster dream-ship would make a wonderful model for an .045 engine scaled 1 inch to the foot. Here's Alan and his model Cloudster. Performance averages 2-3 minutes from R.O.G. The team of Olson & Waterman builds nothing but free flight scale models powered with Infants, Torp Juniors and Spitfires. Some of their other ships equally as attractive as the AT lightplane, and all free flighters: Navion, S.E.-5, Aeronca Chief, Luscombe Silvaire and a Waco bipe.

Wot's in the Crystal Ball? We see many things. In the August issue, for instance, we see a grand yarn on the home-built aircraft—then (prewar) and now. We'll introduce you to the American Airmen's Association (representing the experimental and sport-plane builder) and its crusading president, George W. Bogardus. And to carry the "home builts" theme over into the model section, you get some super S. C. Smith plans for the "Flying Gazookus"—a real dilly of a free flight.

Model fans get a control line stunt ship that is almost out of this world—it looks a little like a space ship taking off for Mars. Bet you like it. For model aviation in general, and the novice flyer in particular, Air Trails presents a simple pair of rubber models to fit a new event. Keep your eyes peeled for that August issue—on sale around July 8.

—THE EDITORS

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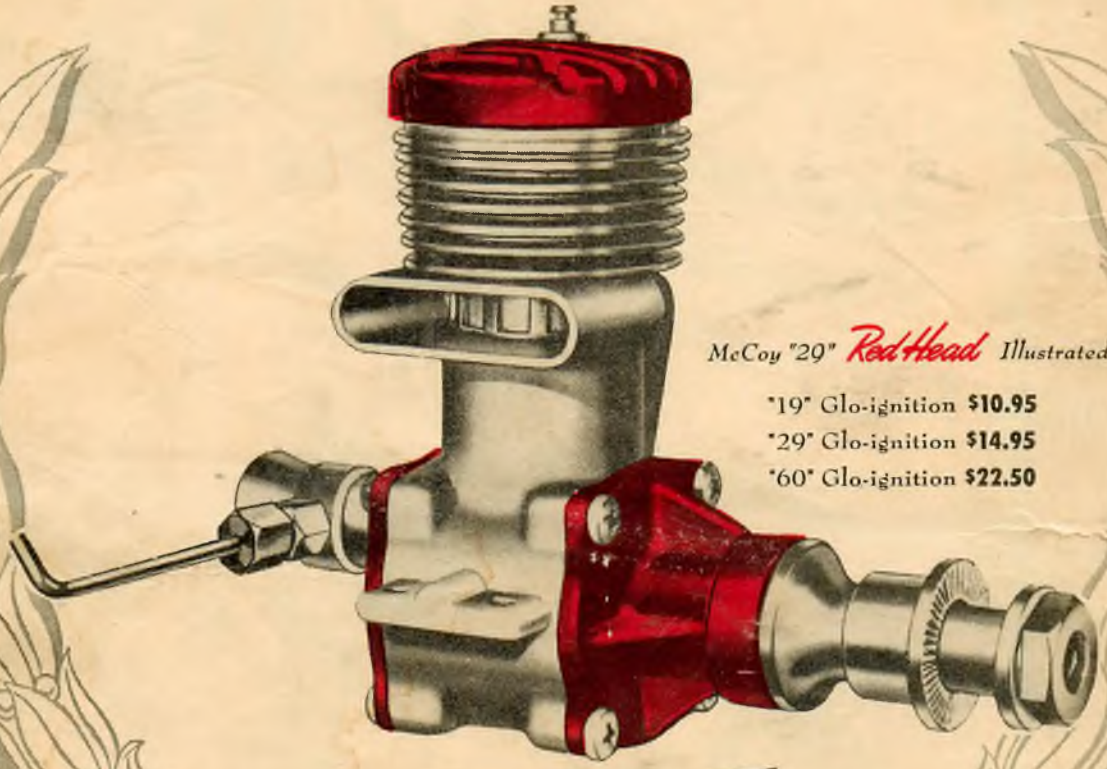

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