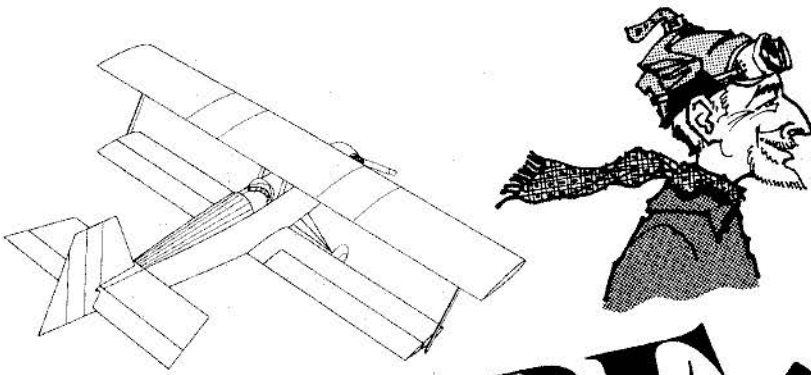
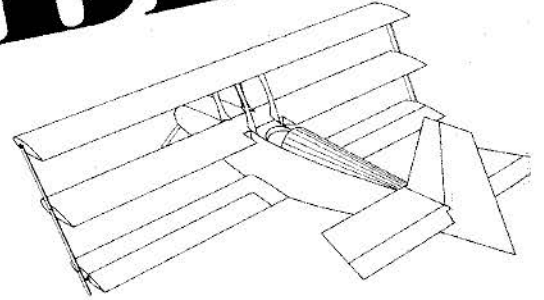


By Howard Schutt



TRIPLE BIPE

A "Modern Scale"
Chameleon That
Flies Like A Pattern Ship



The WW I Nieuport, Fokker, and Sopwith triplanes were fascinating, unique machines. Highly aerobatic, they required a lot of flying skill and had nasty ground handling traits. Models of these tripes, many at 1/4 scale, are seen often at fly-ins, but are seldom flown. Pictures of model triplanes in magazines frequently included the words, "just before it crashed" in the captions. I wondered if a model triplane could be built,

utilizing up to date design and materials knowledge, that would have excellent flying and ground handling characteristics, so that it could cope with less than ideal conditions. I visualized a ship with simple lines, squared-off wingtips like the Ultimate Bipe, lightweight, relatively easy to build, but still highly aerobatic.

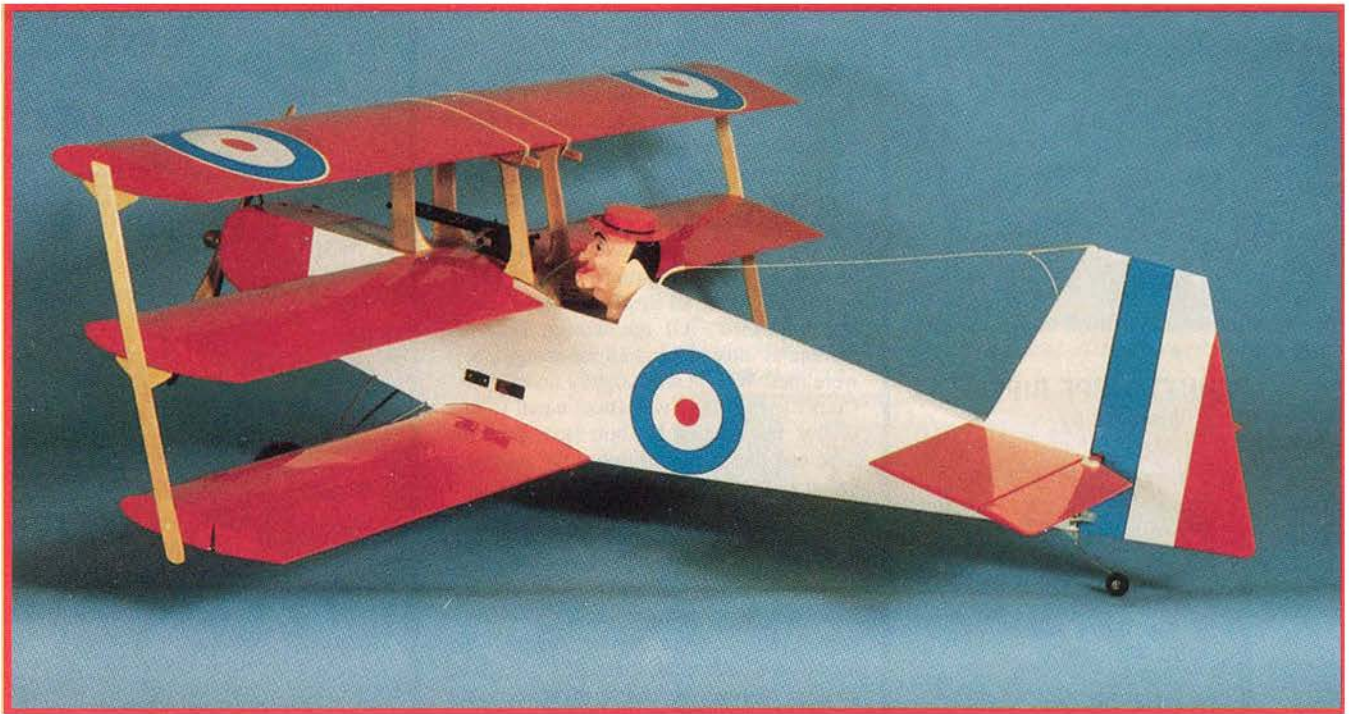
In response to an urgent plea from our club newsletter editor, I whipped up a bit of instant history, "The Schutt Triplane —

The Best Kept Secret of WW I." He promptly utilized it to fill up some space. **That** did it! I **had** to design, build, and fly an extraordinary triplane model to get off the hook.

The EAA has published a great deal of information on full scale biplane design and models with $\pm 10\%$ modifications of home-built bipes abound in TOC competition. Why not blend this with the lessons learned from the best R/C pattern



Configured as a biplane, just after take-off. Top speed with a .90 2-stroke engine is high. Photo by Sam Snyder.



Triplane is easily assembled with "interplane" struts bolted into ends of wings. Ailerons are on bottom wing only.

ships? Extrapolation of all this to a triplane configuration would involve a lot of calculations and assumptions on my part. Considerable research was done to determine the optimum positions, sizes, and shapes of the wings and tail surfaces, plus the track width and location of the main wheels.

However, I still had some doubts whether any triplane model would be suitable for extensive, everyday flying under adverse runway and wind conditions. So, concurrently, I designed and built components to be able to fly it also in a biplane configuration, using one larger top wing to replace the middle and top wings of the tripe. This required more calculations and layouts aimed at having the centers of lift, weight, and drag the same in both set-ups.

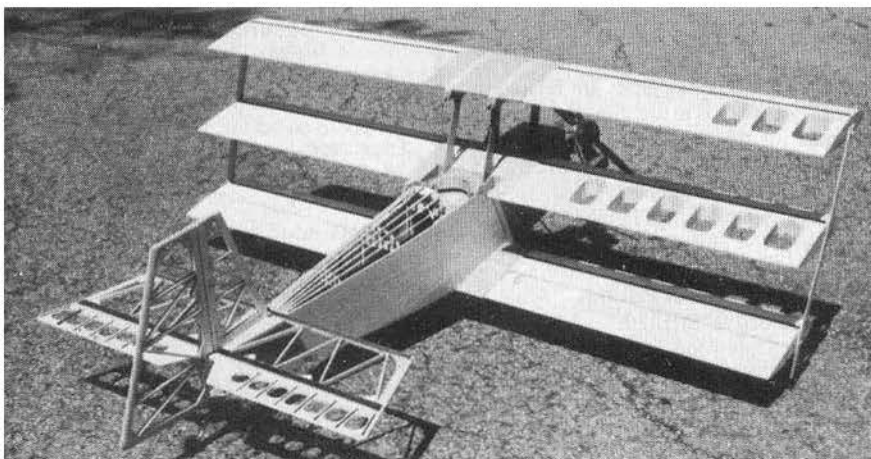
Now I can hear you saying, "No way, Jose, I'm not about to build four wings for

one model." Fear not, Clyde, and read on; there's a way to construct four lightweight wings from blue foam as easily as two built-up balsa wings for a conventional biplane.

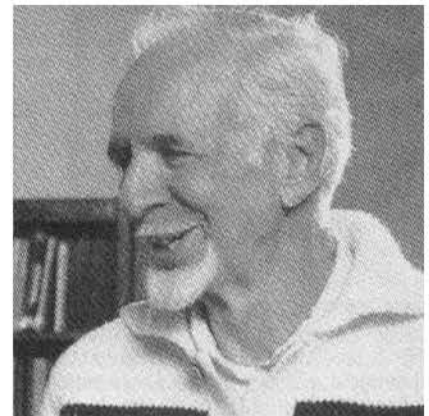
Proven features to achieve flight stability and straight-line tracking are incorporated in the design: a long tail moment arm, large tail surfaces, adequate vertical separation and stagger between the wings. These, combined with a wide-track main landing gear located at the ideal fore and aft point, plus a steerable tail wheel, optimize ground handling. A large rudder is employed for sure-fire stall turns and intentional snaps. The 6" deep fuselage (needed for separation of the lower and mid-wings of the tripe), plus plywood cabane and interplane struts, create the ample side area up front so desirable for knife-edge flight. The design includes semi-symmetrical wing airfoils and built-in lightness for both aerobatic

capability and non-critical low speed flight, particularly in turns. The wing design is especially light for minimal roll inertia, so that rolls can be started and stopped quickly on command. The tail surface and rear fuselage construction is also very light to reduce the need for nose weight usually required on biplane models.

The goal was to produce an easy to fly, forgiving ship that avoids the problems encountered in flying many scale models, such as high or low speed stalls followed by a rapid snap into the ground. Additional goals were to have no changes needed in the

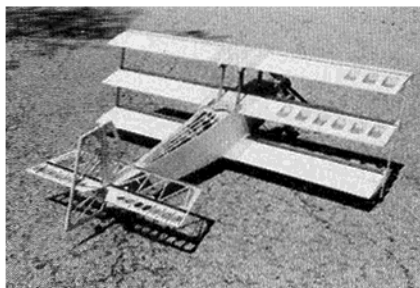


Uneven density and weight of pink foam used for mid and top wings was corrected by cut-outs rather than adding weight in opposite tip. Density of Dow blue foam does not vary.



ABOUT THE AUTHOR

Howard Schutt was an on and off modeler for 35 years before becoming involved in R/C sport flying, continuously for the past 17 years. Originally a machinist, toolmaker, and then manufacturing engineer, Howard spent most of his 42 year career with General Electric as Manager of Manufacturing Engineering at various plants. Now retired, he lives in Tyler, Texas.



SCHUTT TRIPE-BIPE

Designed By
Howard Schutt

Sport Triplane — Convertible to Biplane

TRIPLANE

WINGSPAN

48 1/4 Inches

WING CHORD

7-3/16" Top, Mid, & Bottom

TOTAL WING AREA

1040 Sq. In.

AIRFOIL

Semi-Symmetrical

WING PLANFORM

Constant Chord

DIHEDRAL EACH TIP

0 Inch

OVERALL FUSELAGE LENGTH

41 1/2 Inches

RADIO COMPARTMENT SIZE

(L)8" x (W)3 3/8" x (H)4 1/2"

STABILIZER SPAN

24 Inches

STABILIZER CHORD (incl. elev.)

7 1/2 Inches

STABILIZER AREA

160 Sq. Inches (Approx.)

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT

7 7/8 Inches

VERTICAL FIN WIDTH (incl. rud.)

8 Inches

REC. ENGINE RANGE

.60-.90 2-stroke

.90-.120 4-stroke

FUEL TANK SIZE

14 Ozs.

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Throt., Ail.

BASIC MATERIALS USED IN CONSTRUCTION

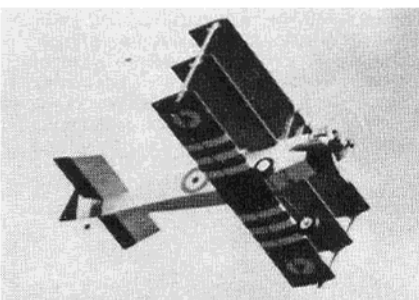
Fuselage Balsa & Ply

Wing Blue Foam, Spruce & Ply

Empennage Balsa & Epoxy-Graphite

Wt. Ready To Fly . 127 Ozs. (7 Lbs. 15 Ozs.)

Wing Loading 17 1/2 Oz./Sq. Ft.



C.G., the control surface throws or trims between the tripe and the bipe set-ups, plus quick and easy change-overs at the field.

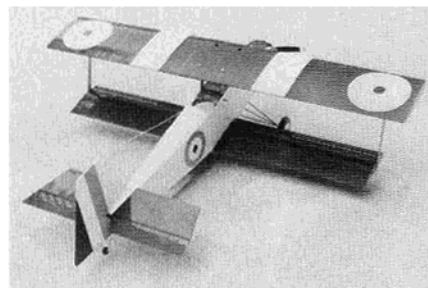
An estimate of the vertical center of drag made it clear that the thrust line should be placed as high as possible. However, priority was given in the layouts to the correct placement of the vertical centerline of the engine carburetor relative to that of the fuel tank, to provide ideal fuel feed conditions without a pump.

The results of all this were better than I had expected. All the design features worked as intended and all the design goals were met! Weight was slightly under 8 lbs. Construction effort was about equal to that on my .60 powered Skybolt bipe. Both the tripe and the bipe configurations are much easier to fly than the Skybolt and are about equal in this respect to my Dirty Birdy and very light Mach I. Like these two old pattern ships, both the tripe and the bipe arrangements are so stable they will fly hands-off in a straight, level line for a considerable distance. Neither have any bad habits and both track through verticals so straight that my aerobatic maneuvers are much improved. During the first weeks of flying them I kept repeating out loud, "I just can't believe they fly that well!" More on this in the trimming and flying section at the end of this article. But this is not a model for the beginner. Care must be taken during construction to mount and align the multiple wings correctly, although this is not difficult to do. You should have some prior building experience and be proficient in flying an advanced trainer or a low wing sport ship before starting this one.

Detailed instructions included
with plans.

CONSTRUCTION APPROACH

Since lightness is so important to achieve fine flying qualities, a lot of design effort was directed to build in strength **only** in those areas required for handling, flying loads under all conditions and "normal" runway mishaps, including poor landings, but not out-and-out crashes. Using precision scales, I've found in both kits and in my previous scratch-built designs that efforts to remove weight using lightening holes or otherwise cutting away material from thick, heavy structural components are relatively futile. My answer is to use thin, lightweight materials for the base airframe parts, and add light, high strength reinforcement pieces such as thin birch plywood, spruce and epoxy-graphite strips in highly stressed areas. With CA glues this is now quick and easy to do and the weight of the CA is insignificant. I like to call this "Schutt's Simple Selective Strength". 1/64" and 1/32" birch plywood is easy to cut with scissors and .007" thick epoxy-graphite can be torn lengthwise along the fiber lines in an instant. Great stuff! Another rather new material to exploit is extruded, fine grain polystyrene foam, which has quite high compressive and shear strength. This text will concentrate on the application of these



SCHUTT TRIPE-BIPE

Designed By
Howard Schutt

BIPLANE

WINGSPAN

56 1/4" Top; 48 1/4" Bottom

WING CHORD

9 1/2" Top; 7-3/16" Bottom

TOTAL WING AREA

881 Sq. In.

AIRFOIL

Semi-Symmetrical

WING PLANFORM

Constant Chord

DIHEDRAL EACH TIP

0 Inch

OVERALL FUSELAGE LENGTH

41 1/2 Inches

RADIO COMPARTMENT SIZE

(L)8" x (W)3 3/8" x (H)4 1/2"

STABILIZER SPAN

24 Inches

STABILIZER CHORD (incl. elev.)

7 1/2 Inches

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160 Sq. Inches (Approx.)

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STABILIZER LOCATION

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VERTICAL FIN WIDTH (incl. rud.)

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REC. ENGINE RANGE

.60-.90 2-stroke

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FUEL TANK SIZE

14 Ozs.

LANDING GEAR

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REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

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BASIC MATERIALS USED IN CONSTRUCTION

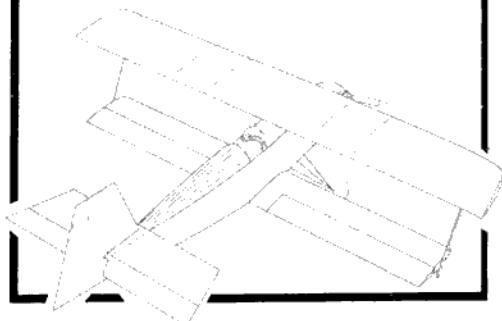
Fuselage Balsa & Ply

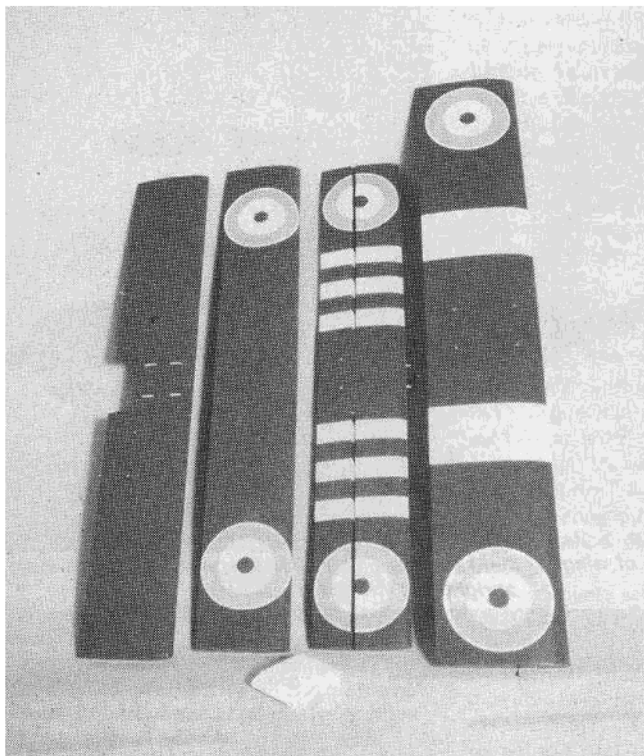
Wing Blue Foam, Spruce & Ply

Empennage Balsa & Epoxy-Graphite

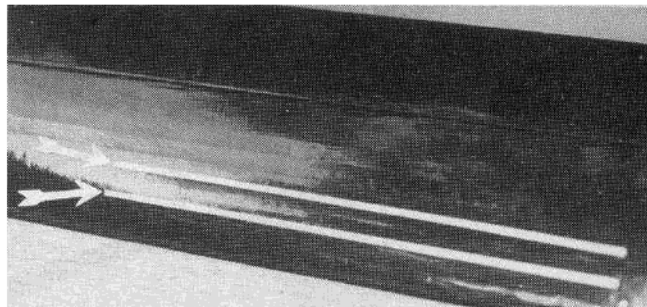
Wt. Ready To Fly . 121 Ozs. (7 Lbs. 9 Ozs.)

Wing Loading 19 3/4 Oz./Sq. Ft.

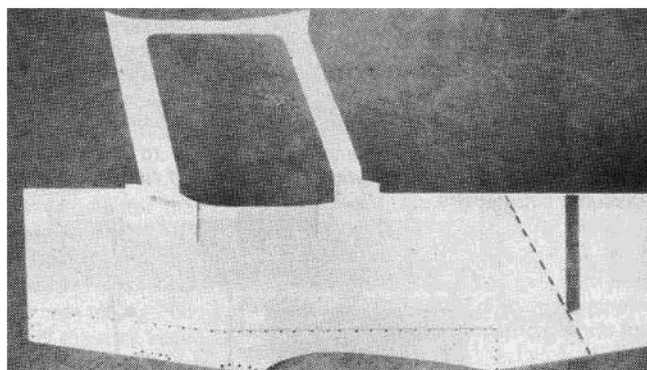




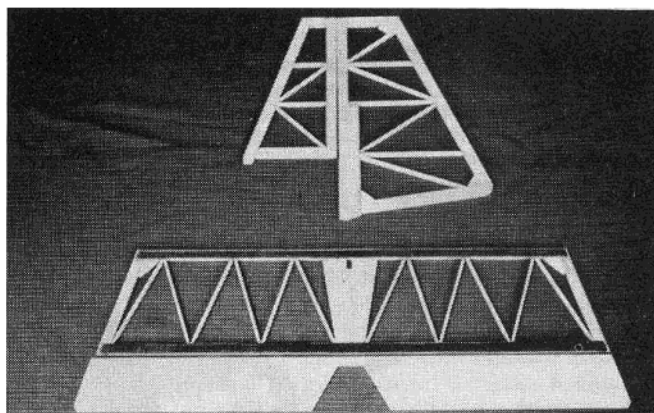
Not to fear multiple wings. Easily built from blue foam. Small piece fills mid wing space when set up as a biplane. C.G. or trim changes are not needed when changing from tripe to biplane.



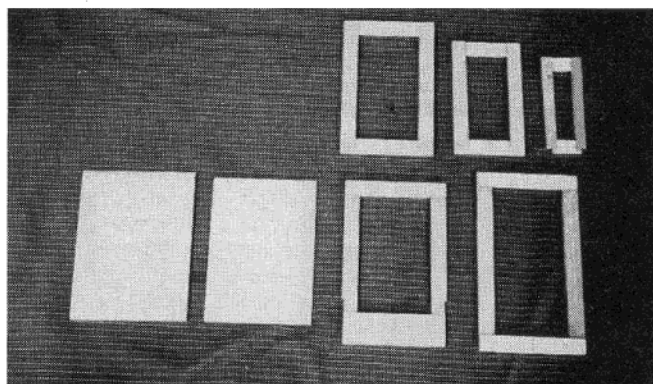
Turbulator strips on leading edge of bottom wing, plus sealed hinge line, enhance aileron control at low speeds and high angles of attack.



Dash line at right is aft end of 1/32" ply doubler. Dotted lines show outline of 1/16" ply secondary doubler, with cut-outs for landing gear mounting blocks. Tripe cabane shown inserted in ply pockets, locked in with dowels.



Black strips on front and rear edges of stabilizer are epoxy graphite. Very strong, torsionally stiff structure, avoids external bracing commonly used for such large, light stabs.



Firewall pieces at left, built-up fuselage formers at right.

lightweight materials and techniques, along with brief descriptions of some unique design approaches utilized to simplify construction, assembly, and alignment. If you are a scratch-builder much of this can be applied to advantage on other models. A complete step by step construction article is provided with the full size plans.

Wings:

These are hot-wire cut from Dow SM extruded Styrofoam, commonly used as wall cavity, foundation, and commercial freezer insulation. This blue foam was available in our small city only in the 3/4" thickness used for wall sheathing. The 1 1/2" thickness needed was secured from a specialty firm in Dallas. 1/8" deep, 3/8" wide grooves for spruce spars on the top and bottom of each wing were cut with a hot wire imbedded in a guide block. The 3/4" wide strip type ailerons, cut from the foam

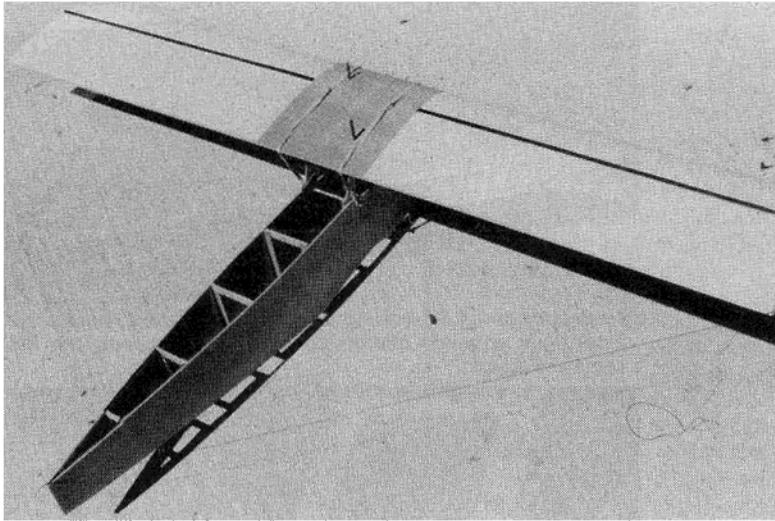
core, are used only on the bottom wing. These provide plenty of roll control. My friend and flying buddy, Charles Bell, machine cut these for me. If you do not want to bother to find a source for this foam and cut your own wings, they are available, with the spar slots and ailerons cut out, from Charles. Send a SASE to H. Schutt, 3514 Bain Place, Tyler, Texas 75701, for details and prices.

The foam halves are joined and the spars installed with epoxy. 1/2" diameter dowels are inserted vertically at the attachment bolt locations. A continuous piece of 1/64" birch ply 8" wide is contact cemented to the top center section, then bent around the leading edge and onto the bottom of the wing. 1/8" sheet balsa is applied to the wingtips and 1/8" square balsa is glued to the trailing edge. Sanding this extruded foam lightly produces a very smooth finish.

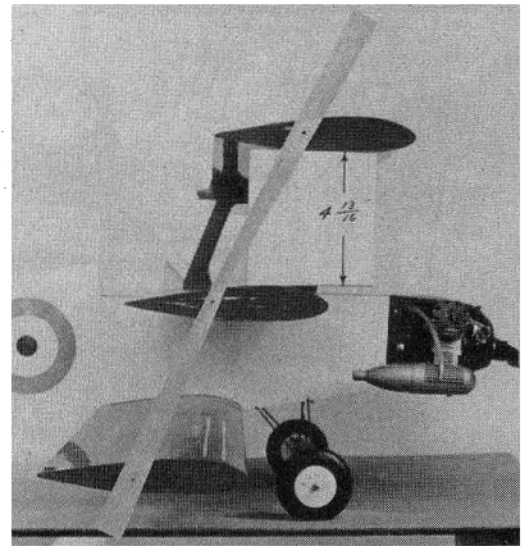
A thin coat of white glue smeared on the leading edge increases dent resistance. With this foam there is no need to coat the rest of the wing with ply or balsa! Just cover it with a low heat plastic film. This yields wings which are quick and easy to build, light in weight, but strong and with adequate crush and ding resistance. 1/8" balsa was glued along the front of the ailerons and 3/16" balsa on the lower wing cutout to provide secure anchors for the hinges. This is to insure that no aileron flutter or failure occurs during high speeds or violent maneuvers.

Wing Struts:

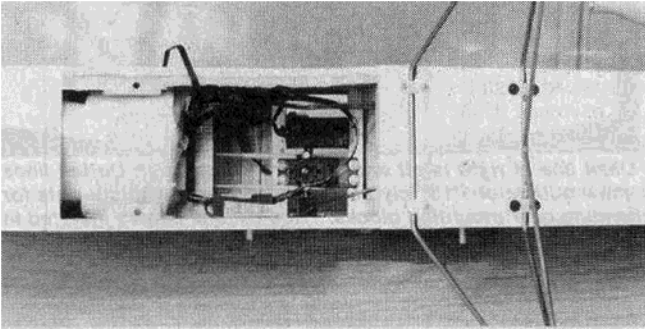
The cabanes are made from 3/32" ply. Those for the biplane set-up have blocks on top to receive wing bolts. Those for the triplane set-up have spruce strips extended along the top for rubber bands, which reduces construction effort a bit. I originally assumed (wrongly) that I would be flying



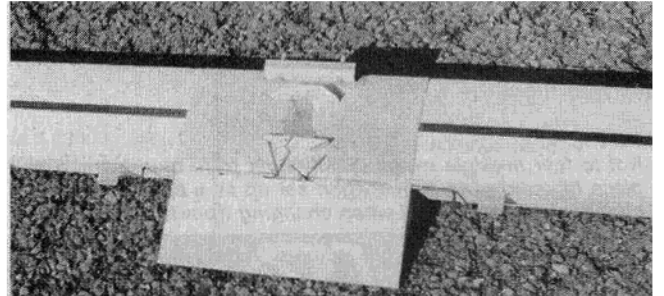
Mounting top wing of biplane configuration to cabane struts with bolts. Measuring equal string length from tail end of fuselage to rear tips of wing, assures squareness.



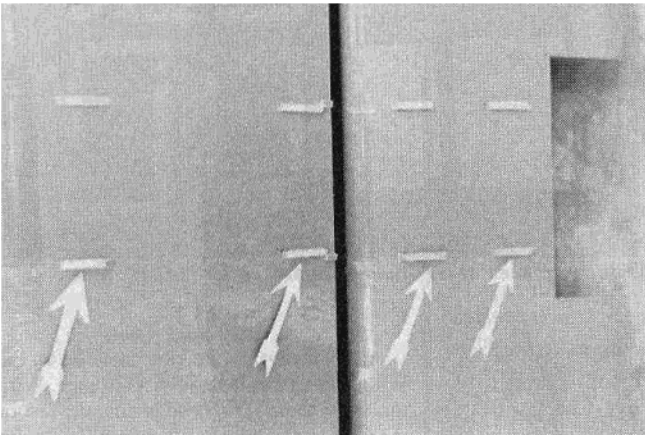
Card stock gauge is used to space tripe wings evenly at right and left tips.



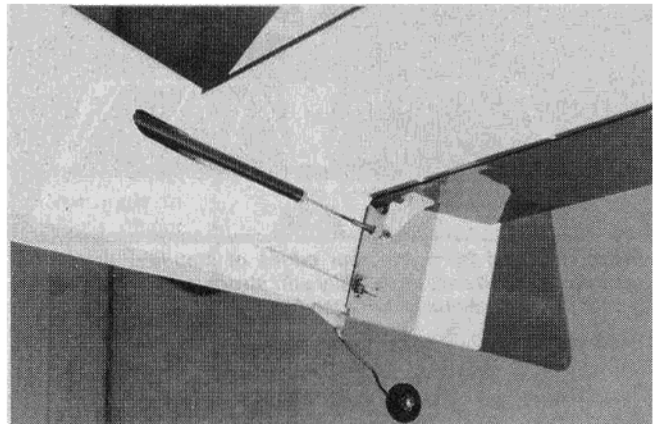
Rudder servo and pull-pull cables. Note radio receiver at left is held in place against balsa shelf with Velcro.



Aileron linkage wires and tube hinges are glued in, plus ailerons are trial fitted to bottom wing prior to extending the 1/64" ply to trailing edge of center section. Servo was later moved forward as shown on the plans.



1/8" sq. balsa strips locate mid and top wings of tripe in same position during assembly.



Elevator pushrod has no bends, very positive control. Pull-pull cable attachment to rudder is shown below it.

the biplane arrangement more than the tripe, so that I would not be fussing with rubber bands too often. Note: The top wings are far removed from the oily exhaust, so the rubber bands can be reused many times. Either attachment method is suitable for either configuration, your choice. The interplane struts are 1/16" ply and are attached to the wings with small nylon bolts.

Fuselage:

1/8" x 6" x 36" balsa sides are used. Sheets this size are available from Balsa USA if you don't want to join narrower pieces. 1/32" birch ply doublers extend to

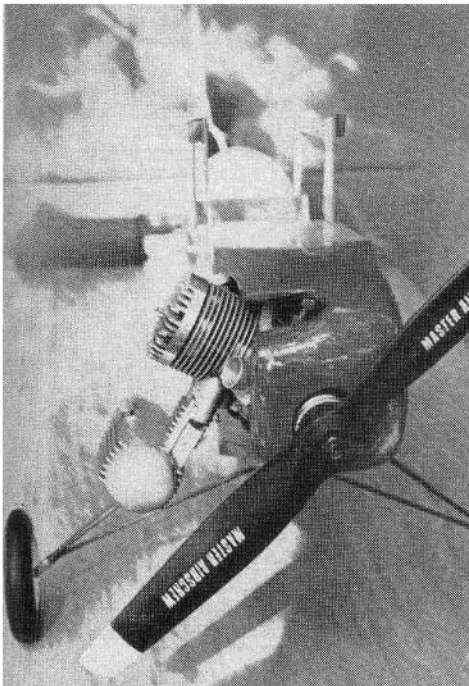
the area just aft of the bottom wing. 1/16" birch ply secondary doublers about 1" wide extend from the firewall aft to the rear of the bottom wing to spread out the forces generated during hard landings and to strengthen the attachment area for the bottom wing. With the use of these localized structural additions and CA glue the weight of these large side assemblies is held to 4 1/4 ozs. each. Plywood pockets are added to each side to receive the removable plywood cabanes. Formers are built up from balsa strips to align the grain of each piece in the optimum direction. The rest of the fuselage

construction is mostly conventional.

The top of each fuselage side is a straight line from the firewall to the tail. All of the wings and the stabilizer are set at 0 degree incidence to this line.

Empennage:

The lightweight stabilizer, fin, and rudder are built up from 1/4" x 1/2" balsa edge pieces and 1/4" x 1/8" balsa internal members, most of which are diagonals to provide torsional rigidity. Epoxy-graphite strips .007" thick are added to the top and bottom of the front and rear edge pieces of the stabilizer. This adds great strength but



Angled engine keeps thrust line high, and center of carburetor at best level relative to fuel tank.

only 1/4 oz. of weight, including the CA used. This eliminates the need for external bracing wires. Be **sure** to sand off the glossy surface of the epoxy-graphite so that the CA will bond to it securely. 1" diameter holes were drilled out of the tapered balsa elevator stock. This doesn't remove much from the overall weight, but it is at the end of a 31" long moment arm and thus has a four times greater effect on the amount of weight needed in the nose.

Covering And Finishing:

I chose the lightest, easiest ways that I could visualize to do this. EconoKote was used on the bare foam areas of the wings and MonoKote on the balance of the plane except for the cockpit area, the fuel tank hatch cover, cabane and interplane struts. These plywood or 1/64" plywood faced

parts were finished with ordinary daub-on, wipe-off wood filler, followed by a coat of clear polyurethane from a spray can.

Engine And Radio:

Since I had a Webra Blackhead .61 2-stroke, non-Schnuerle engine on hand, I installed it, even though it had seen extensive use and was pretty well over the hill. It required 4 ozs. of lead, bolted to the bottom of the engine mount as far forward as possible, to bring the C.G. to the desired position.

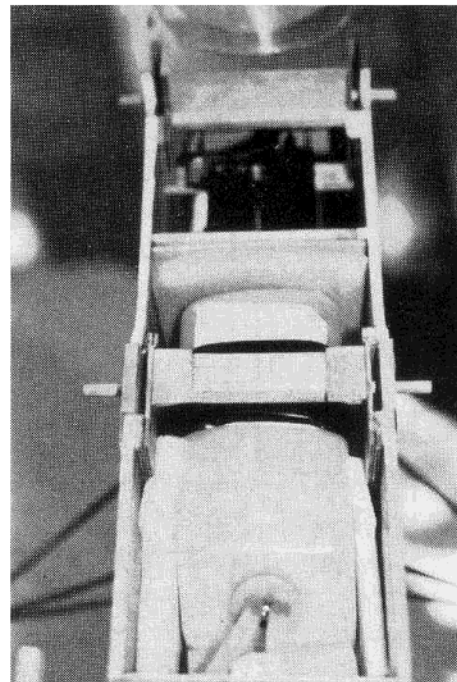
I used one of my trusty old Airtronics Championship radios with four standard servos. Recommended throws are shown on the plans for both high and low rates, as well as the exponential settings used on this radio for aileron and elevator. If you do not have exponential capability in your radio you should set the low rate aileron and elevator throws at about 80% of those shown (for the first few test flights).

Flying:

The biplane set-up was chosen for the first flight to minimize the risk of unexpected behavior. On take off into the wind, with all throws at low rate, a tad of up elevator was held while advancing the throttle slowly. As I brought the stick back to neutral and tail came up, the plane accelerated straight down the runway for about 40 feet and took off in a straight, shallow climb without any control input on my part. The wide track landing gear and the large tail surfaces were doing their job well! Two clicks of down trim were required for level flight. High rate was then used on all controls for aerobatics and landings.

The triplane configuration flew exactly the same way except that it was slower, being a higher drag arrangement, and it needed an additional two clicks of down trim. This one difference in trim between the two set-ups was eliminated by repositioning the top wing of the biplane slightly. This change is incorporated in the plans.

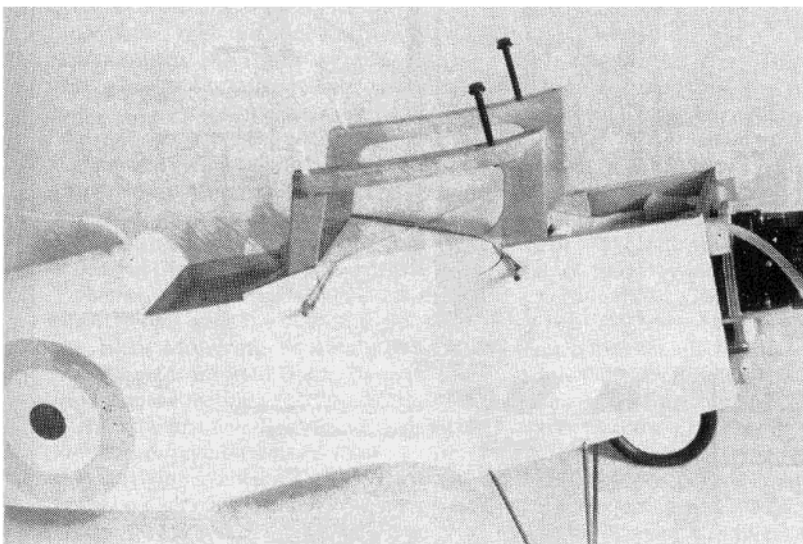
The hands-off flight path held at a constant level without trim changes in the



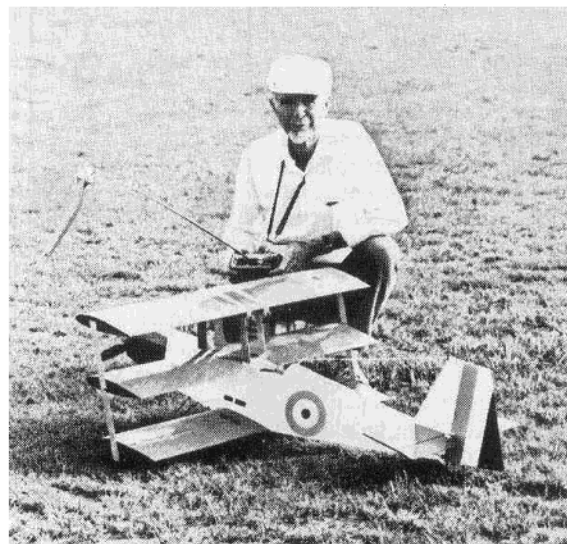
Room for 14 oz. tank plus foam isolation. Note four pockets and locking dowels for removable cabanes.

35% to 100% power range of the old Webra .61. Take-offs required a touch of up elevator to lift off the runway and neither set-up had any tendency to nose over. This shows that the wheels are positioned as far forward as possible. However, full up elevator should be held if you slap the throttle up suddenly for a short take-off or after touching down in rough grass. Most landing approaches are best with a little power on until just before touchdown. Realistic three-point landings are easy under favorable wind conditions; two wheel landings are preferable in strong, gusty, or cross wind situations. Aileron turns are fine, with no need for rudder input.

Full control is maintained in sharp turns at lower power. I'm uncertain how much the simple turbulator strips on the bottom wing



Filler piece in place under biplane cabanes. Always secure dowels from vibrating out.



Author and his triplane after the 90th flight. No problem operating from rough grass.

contribute to this trainer-like capability, since these ships have never been flown without them. Snap rolls are quick. Snap and roll control is exceptionally precise due to the low inertia of the outer wing sections. Stall turns are a joy, extremely positive with the large rudder at full throw. Both set-ups spin very well. Spins to the right are extremely rapid and tight at full rudder and aileron throw; left spins are less so. Releasing the sticks stops the spin quickly. Tight maneuvering is possible for round and square loops, split S's, Cuban Eights, and the like. Moderate down elevator is necessary for inverted flight, more on the tripe than on the bipe.

After the first few flights I no longer used low rate on aileron and elevator, as very smooth flying is obtained with exponential travel on high rate. Without exponential on rudder I find it best to use low rudder rate in only two situations: (1) level knife-edge flight and (2) taking off in a strong cross wind. The large fin-rudder area makes the model weathervane into the wind during the first part of the take-off run, and I over-control at high rate. This characteristic is handy during cross wind approaches, as the ship will track a straight path without use of rudder. When landing in a strong cross wind on a paved runway, have full throw ready on the rudder to counter the turn towards the wind as soon as the main wheels touch. Taxi with full up elevator and full rudder throw (which includes tail wheel action) in cross winds.

The first series of flights were made with the C.G. at the aft position shown on the plans. Our paved runway was bounded by rough ground and ditches, so that strong cross winds produced some nasty turbulence near the ground. The lightly loaded tripe was pitched around (the bipe to a lesser extent) during the flare, resulting in some hard, bouncy landings. Adding a 2 oz. Higley Heavy Hub to the prop shaft moved the C.G. to the forward position shown. This helped the models to bore through the turbulence and land at higher speeds, but still stick to the runway after touchdown. However, it did decrease aerobatic agility, so it was not used when winds were favorable.

The worn, anemic Webra Blackhead, with an 11 x 7 prop, flew the ships well enough so that even the tripe could climb well in knife-edge. Performance in up verticals fell off rapidly, though. After 34 flights this old .61 started to run erratically. Several in-flight shutdowns disclosed that the glide on both the tripe and the bipe is not too bad. Just keep the nose down a bit to maintain a safe speed.

I re-engined the model with a new O.S. .90 2-stroke. This placed the C.G. at the mid-point of the range shown on the plans without using any nose or prop shaft weight. The only alignment change needed was to increase down thrust to 5 degrees. I have flown it this way ever since. Now very steep knife-edge climb is possible and up verticals are unlimited. With a 14 x 6 prop both the

Schutt Tripe — Bipe Bill of Materials

Foam		#50L740
1 — 1½" x 24" x 73" Dow (blue) SM extruded Styrofoam	12 — #64 rubber bands	
Balsa Sheet	2 — #32 rubber bands	
2 — 1/8" x 6" x 36"	1 — .030" x 2½" x 5" clear plastic sheet	
3 — 1/8" x 4" x 36"	1 — Goldberg #126 nylon tailwheel bracket	
1 — 3/16" x 2" x 48"	1 — 1" dia. tailwheel	
1 — 1/4" x 6" x 36"	2 — ¾" dia. main wheels, Williams smooth contour	
1 — 1/4" x 2" x 23" tapered elevator stock	2 — 1/8" wheel collars	
Balsa Strips	4 — 1/2" nylon landing gear straps	
6 — 1/8" x 1/8" x 24"	5 — #4 x 1/2" pan head sheet metal screws	
6 — 1/8" x 1/8" x 36"	5 — #2 x 1/2" pan head sheet metal screws	
2 — 1/8" x 1/4" x 48"	4 — #2 x 3/8" pan head sheet metal screws	
1 — 1/4" x 1/4" x 20"	4 — #4-40 x 1/2" socket head cap screws and washers	
1 — 1/4" x 3/8" x 32"	4 — #4-40 blind nuts	
3 — 1/4" x 1/2" x 36"	4 — #6-32 x 1" socket head cap screws and washers	
1 — 1/4" x 1/4" x 19" triangular stock	4 — #6-32 blind nuts	
Plywood	1 — Hayes AL-60 mount (if .60 engine used)	
1 — 1/8" x 6" x 11" Lite Ply	1 — 14 oz. fuel tank, Sullivan SS-14	
1 — 1/64" x 24" x 28"	1 — 18" fuel tubing	
1 — 1/32" x 6" x 41"	1 — 1/4" x 8" x 12" foam rubber	
1 — 1/16" x 6" x 31"	1 — 1/2" x 8" x 6" foam rubber	
1 — 3/32" x 10" x 14"	10 — hinges, Robart #308 steel pin hinge point	
1 — 1/8" x 4" x 9"	8 — hinges, Du-Bro #257 heavy duty	
Spruce	1 — 27" long pushrod and fittings for elevator	
6 — 1/8" x 3/8" x 48"	1 — elevator horn with bolts	
4 — 1/8" x 3/8" x 28"	2 — rudder horns with bolts	
1 — 3/16" x 3/16" x 30"	2 — 27" long x .030" cables, Sullivan #507, and fittings for rudder — as alternate use Kevlar cord	
1 — 1/4" x 3/8" x 6½" (CA two 1/8" x 3/8" pieces together)	1 — 12" long cable and fittings for throttle	
Hardwood or Soft White Pine	1 — aileron horn connector set, Du-Bro #103	
1 — 1/4" x 3/8" x 7"	2 — 1/16" threaded ball links, Du-Bro #190	
1 — 3/8" x 1/2" x 6"	2 — Kwik-Links with 4" long rods, Du-Bro #106	
1 — 1/2" x 3/4" x 3½"	1 — set of (2) solder Kwik-Links, Du-Bro #112	
1 — 3/16" x 14½" long dowel	1 — set of GMP instruments (optional)	
1 — 1/2" x 7" long dowel	1 — 1/2" x 12" MonoKote trim strip	
Music Wire	2 — rolls, low heat, film type covering	
1 — 1/16" x 6"	1½ — rolls, regular heat, film type covering	
1 — 3/32" x 16"	Other	
1 — 1/8" x 36"	1 — .60 to .90 two stroke Schnurle-ported engine	
1 — 1/8" x 17"	1 — propeller, 11 x 7 or larger	
Hardware and Accessories	1 — radio, 4 servos	
1 — 1/8" O.D. x 3/32" I.D. x 7" brass tubing	1 — Velcro strip, 1" to 2" wide x 12" long	
1 — 1/32" x 6" soft iron wire	1 — interested modeler	
1 — .007" x 2½" x 24" epoxy-graphite sheet — Twinn-K or equal		
2 — #10-32 x 2" nylon bolts		
4 — #10-32 x 1¼" nylon bolts		
6 — #4-40 x 1/2" nylon bolts--Sig #171 or Ace		

bipe and the tripe set-ups exhibit virtually constant speed going level, up or down. Maximum level speed is **high** for a multiple wing model and is achieved at 2/3 throttle, so full throttle is used only for up verticals. Snap roll command at full throttle results in two barrel rolls before it slows enough to snap. (The .90 overpowers the stall necessary in the snap maneuver.) Violent snaps and sharp pull-outs from down verticals with the .90 at full bore have thoroughly tested the strength of the structure.

Both set-ups produce an interesting "wind thru the strut" whistle at speed, more distinct on the bipe than on the tripe. The other end of the broad speed range permits an intriguing stunt: with the throttle set at a tick above idle, hold full up and both the tripe and the bipe configurations will mush along slowly in level flight. Extremely tight aileron turns and circles can be made in this attitude: they will not fall off into a snap or a spiral dive as long as the rudder is not used.

When our club lost our field with the paved runway we moved to a rough-cut hayfield. To avoid the cut grass and dirt as much as possible on take-off, I hold full up,

a little right rudder, and mash the throttle stick full ahead. ("Mash" is how it's said in East Texas, Clyde.) With the .90 the ship jumps off the ground in 8 ft. or less.

Having explored both ends of the power range, I feel that a good Schnurle-ported .60 2-stroke or a .90 4-stroke would be very adequate for sport flying. Larger engines improve the up verticals, shorten take-offs, eliminate carrying dead nose weight, and remove the temptation to lean out the engine too far.

I have now logged over 90 flights, 2/3 of them in the triplane mode, simply because the tripe is so unique and so much fun to fly. The tripe may look like a set of drunken stairs in the sky or venetian blinds gone mad, but its distinctive profile signals its flight attitude clearly throughout every aerobatic maneuver.

If this prompts you to build the tripe-bipe I think that you will experience extraordinary enjoyment with it, as I have. I can assure you that it will attract much attention at the flying field and at air shows. If you lie a lot about the authenticity of the tripe you might even be able to enter it in a stand-way-off scale contest! □