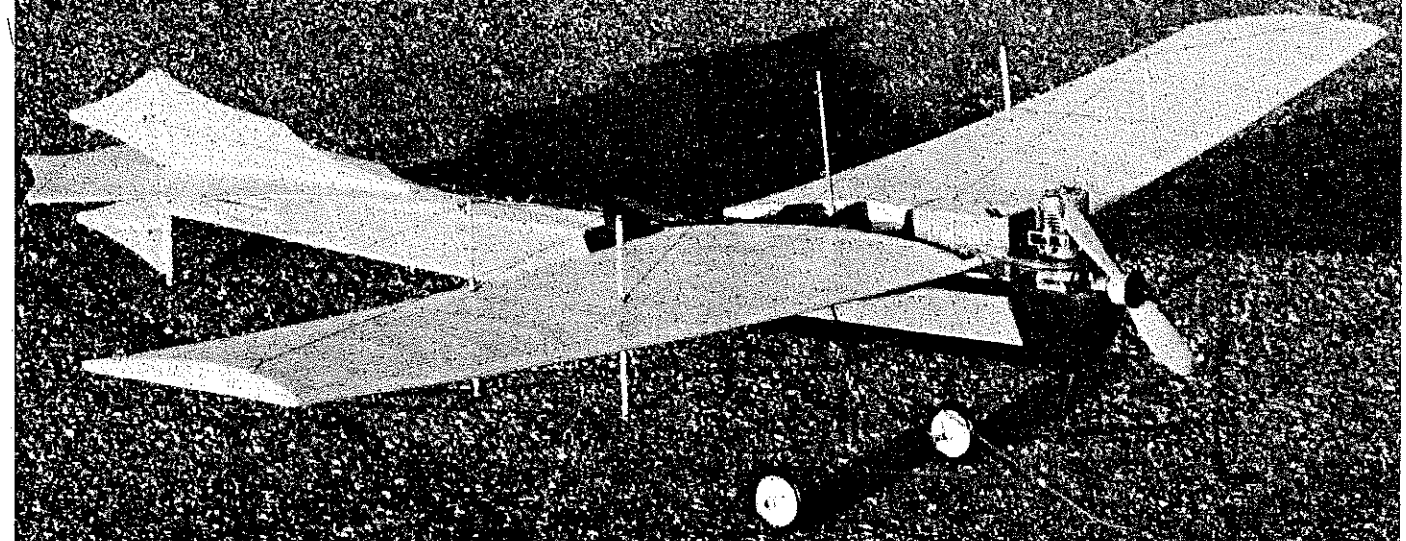
#625

Antoinette



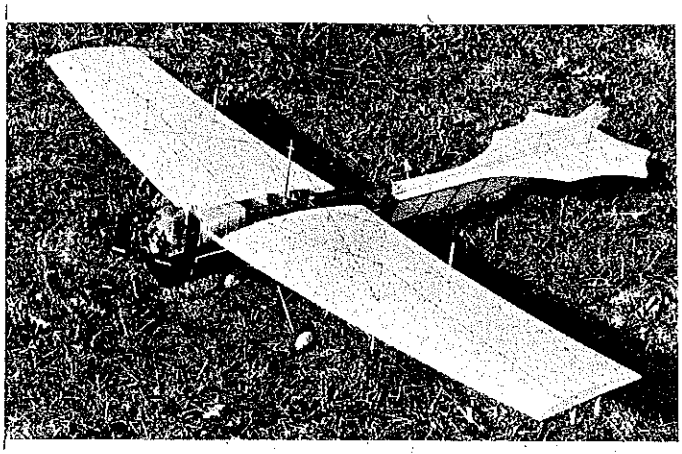
This airplane is one of the few pioneer designs that is adaptable to Control Line flying. When coupled with an engine in the .25 size range, it is a well behaved classic that is certainly a picture of grace and elegance on the ground or in the air. ■Dave Haught

OF ALL THE AIRCRAFT designs from the pioneering days of aviation, the Antoinette is among the most graceful. Her creator, Leon Levavasseur, obviously put his training as an artist into the design. The long, slender fuselage and gently curving tail assembly somehow blend beautifully with the double-tapered wings. The design was very clean and simple for those days, when her competition often looked like overgrown kites with strange appendages.

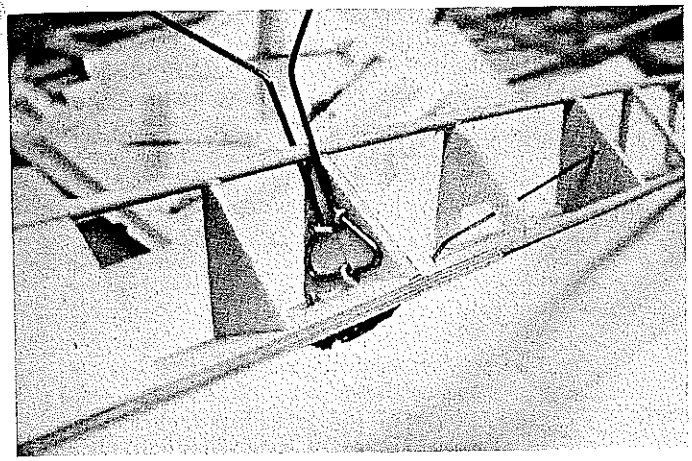
Pioneer designs don't often transition well into the Control Line field, being hindered by a lot of drag, thin wing sections, and very fragile airframe structures. They are elegant in the air, though, and building the Antoinette has long tempted me.

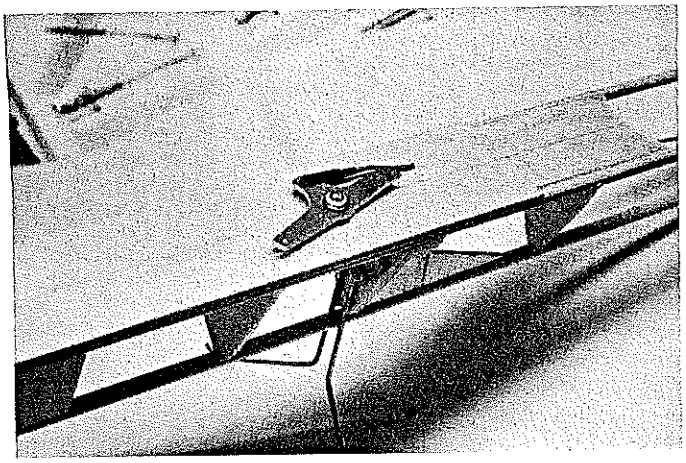
Making a successful crossover from dream stage to the Control Line circle can be credited to the discovery, or rather the rediscovery, of the dowel. A set of Bill Hannan's Rubber Scale Antoinette plans has hung over my building bench for several years now. It was while daydreaming about these plans and repairing a broken Tinker Toy dowel that the light came on. Due to a very minimal airframe, the Antoinette needed rather hefty spars in the stabilizer and rudders. The dowel would work!

And what about the wire outlines of the original? Why not use wire for the dowel, too? I had a bundle of 1/16 aluminum welding rod that I use for prebending landing gear wires before making them up from hard wire. It is solid, light, and bonds well to wood if cyanoacrylate (CyA) and microbal-

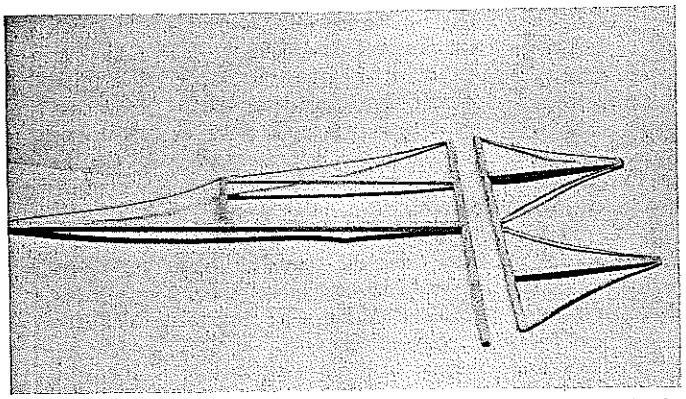


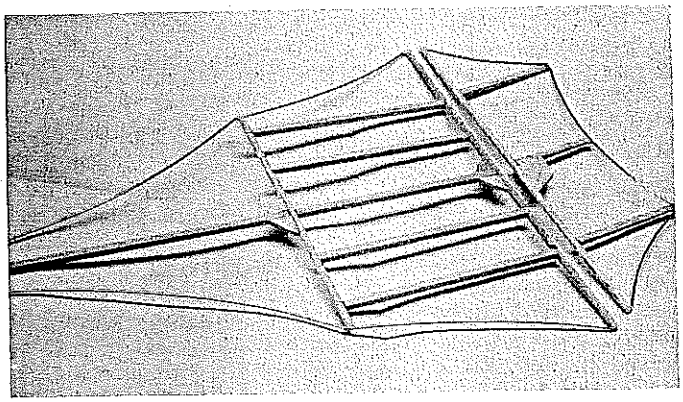
Top: The Antoinette shown on the ramp. The full-size plane probably never had the benefit of a paved runway, as aerodromes were then quite primitive. With this model a clean surface is required to keep the wires and skids from snagging and causing all kinds of problems while attempting to take off. Above: These two views show the unique combination of angles and complimentary curves that make the Antoinette such a nice looking model. The fragile appearance is deceiving. With its plywood and dowel structure, the Antoinette is really quite rugged.



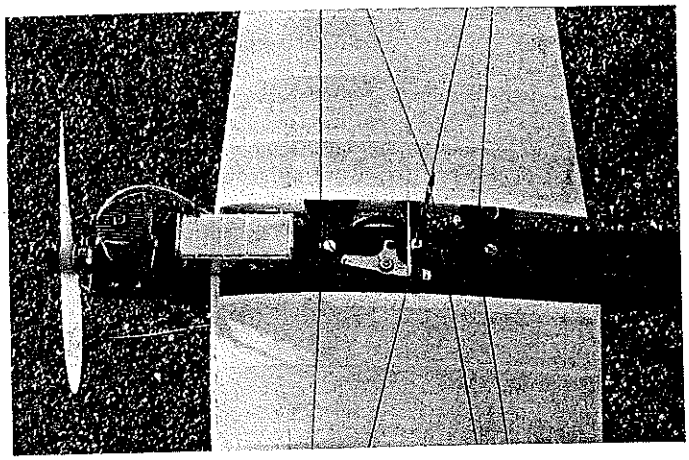


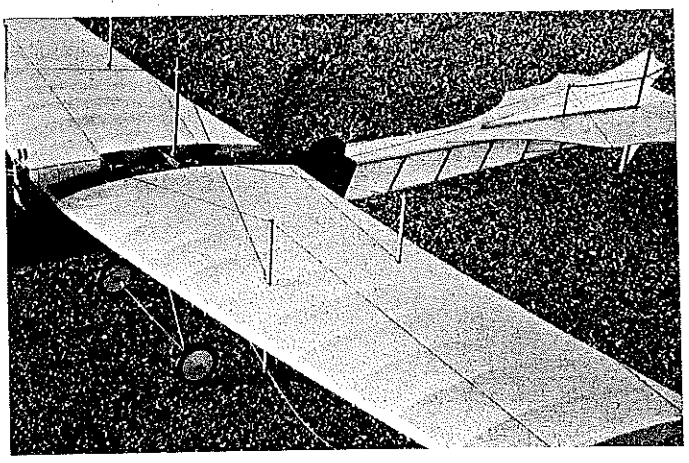
Left: From the bottom the landing gear mount former is clearly seen. J-bolts hold it securely to the former, which is well anchored to the key structural element of the fuselage plate. The pushrod enters the fuselage proper and travels inside to the tail. The last sheet former serves as a bushing through which the pushrod passes. Right: Bellcrank mounts don't come any simpler than this! A plywood plate forms the top of the fuselage to which the engine, tank, and bellcrank are directly mounted. The longerons are dowels notched into the edge of the plywood plate.





Left: The rudder/fin and stabilizer/elevator share the same method of construction. Here the only dowels used are for the rudder post and fin post. Right: The stabilizer/elevator is shown here ready for covering. The spars are dowels, the ribs are made of balsa, and the outlines are aluminum wire—quite an unusual combination but effective and to scale. Remember, the tail structure, especially the elevator, is subjected to great stress in flight. Don't omit the gussets and horn mounting plate, as they are necessary for the structural integrity of the airplane.





Left: This is the business end of the Antoinette. The wings bolt to the fuselage with the long screws visible here. The cut-down bellcrank nestles comfortably between the main spars. The center rigging post is mounted on a plywood bridge that spans the the wing roots and clears the bellcrank. The fuel tank is attached to the top of the fuselage plate and looks quite at home here. Right: The rigging is quasifunctional. However, it adds significantly to the rigidity of the model and greatly enhances its appearance. Drag is easily overcome with the .25 engine and the Antoinette's light wing loading. Hardwood dowels serve as king posts located halfway out the wing's span. The center post wires attach to the base of the king posts, while the wires that originate at the wing roots attach to the tops of the king posts and terminate at the wing tips.

loons are used at the joint. A small notch in the ends of the dowels helped hold the wire and strengthen the connection. The Tinker Toy concept was born. Several test joints were made and destroyed—with impressive results. *Eureka*!

The Antoinette plans that had hung so patiently on the wall were quickly snatched down and blown up. The model presented here is about twice the size of the Hannan plans. I selected the elevator option shown on his drawing that gave a decent-sized surface and made a few other minor concessions for a simple and rugged model. The results have been very satisfying. If you want a quick-building, unusual Scale model, this would be a good choice. You can bet you won't see many others on the field.

Construction

The fuselage is a good place to start. Here again, the dowel plays a major part in the construction. Cut out the ¼-in. plywood fu-

selage plate, and position it over the top view of the fuselage. Take a pair of ¼-in. dowels, and cut them to the length needed for the top longerons. Trim the rear ends of both dowels at an angle so that they come together as shown, then glue them together at the rear and also to the fuselage plate.

Cut and install the balsa cross members. I found that a ¼-in. round file was an ideal tool for making quick, perfect joints. When the glue has dried, mark and drill the mounting holes in the plywood plate with the engine set in place. Flip the engine over, and install the blind nuts. Drill the hole for the bellcrank and the slot for the pushrod.

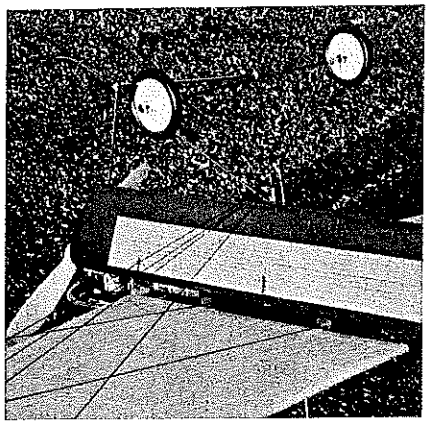
Pin the fuselage top to the plan again, upside-down this time. Cut out the nose block and carve it to a triangular cross section. Using the round file, groove the bottom to fit the ¼-in. dowel bottom longeron.

Make all the A formers from ⅛-in. balsa and one B former from ¼-in. ply. Bend the main landing gear strut from music wire, and bolt it to former B with J-bolts. Cut the end post dowel to length, and glue it to the end of the top longerons, making sure it is standing squarely.

Glue the nose block to the fuselage plate, locate the formers, and glue in place. Trim the bottom longeron dowel to length, and glue it into the nose block groove and all of the formers. When this has dried, add the balsa uprights to the sides. They too will need to be fitted, using the file to ensure that each piece is snug. Add the 1/16 sheet pushrod exit plate, and remove the finished fuselage from the building board.

Install the bellcrank and pushrod. I used a 3-in. bellcrank cut down to fit. The pushrod must be able to pass freely through the fuselage plate and the fuselage formers. The last A former was used as a pushrod bushing by drilling a 3/32 hole for the pushrod, giving a close fit which allows the pushrod to pass, but not bow, under air loads.

Bend up the tail skid wire, as well as the nose skid, brace, and axle wires. Bind and solder the wires where needed, and glue them securely where they attach to the fuselage. Planking the forward fuselage sides and a good sanding will finish the fuselage assembly.



On the original Antoinette, its water-cooled engine required large and cumbersome side-mounted radiators, simulated here in the scaled-down model by balsa strips. Also observe how the flight control wires converge neatly at the base of the landing gear strut.

Tail, elevator, and stabilizer. Begin with the rudders since this will be a new frontier. Cut the two dowel vertical strips, and, using a razor saw, notch both ends to fit the aluminum wire. (Aluminum welding rod can be bought at most welding shops for a few cents per length.) Cut and file the ribs from 3/16 hard balsa. Groove one end to fit the dowel and the other to fit the wire. Sand the ribs to a wedge section and glue them to the dowel.

When both are dry, bend the wire to the outline on the plan. The tissue covering will provide only a slight additional curve. When you like the fit of the wire, glue it in place. (I set the wire, dusted the joint with microballoons, then fused the joint with a drop of CyA.) After curing for a few minutes, sand and reglue the joint. Repeat this process for the other rudder.

The elevator is just a larger version of the rudder process. Add the balsa gusset for the elevator horn, and sand it flush with the elevator section.

The stabilizer is a bit more complicated. Cut the three dowel spars to length, and notch them for the wire. The center rib and five 3/16-sq. ribs are cut and grooved on both ends. Pin the rear spar over the plans. Glue the five ribs in position, then the next spar, the center rib, and finally the front spar. Bend and fit the aluminum outlines, and glue them on. Complete the tail assembly by constructing the fin, which should be no problem after you have the hang of the technique.

Wing. To cut out the ribs, I made two plywood templates and stacked rib blanks between them. Use straight pins to hold them together as a unit, and carve to shape. Unpin, and repeat the process for the other wing panel. The root and tip ribs are cut out of thick sheeting in the conventional way.

Use your round file to groove the leading and trailing edges to fit the dowels. Yes, you did read that right: The leading and trailing edges *are* dowels, ¼ in. for the leading edge and 3/16 in. for the trailing edge. These make for very strong wings and give you preformed edges at the same time.

Cut out the dihedral braces and rigging blocks. Pin down the leading edge and lower spars. Fit in the ribs, but not the root ribs, and then the trailing edge. Fit the top spars and rigging blocks. Repeat the entire process for the other wing.

When everything is dry, fit the dihedral braces and the root ribs, block the wings up, and add the 2 in. of dihedral under each tip. Glue on the wing tip weight, and drill the rigging post holes.

Final sand the wing assembly, and drill the mounting holes in the center section. After positioning the wing on the fuselage, use a pilot drill to match drill the mounting holes into the fuselage for the wood screws that will hold the wings in place.

Covering and finishing. Give all the parts several coats of clear nitrate dope to adhere the tissue. I used heavyweight silkspan on the wing and fuselage and lightweight silkspan on the tail assembly. Cover the fuselage first, working from front to rear. Leave the section between the fuselage and tail skid open. The wings are covered in the usual manner.

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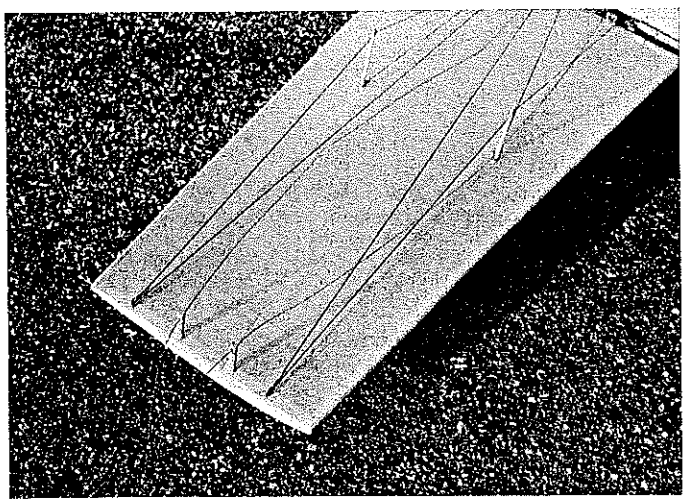
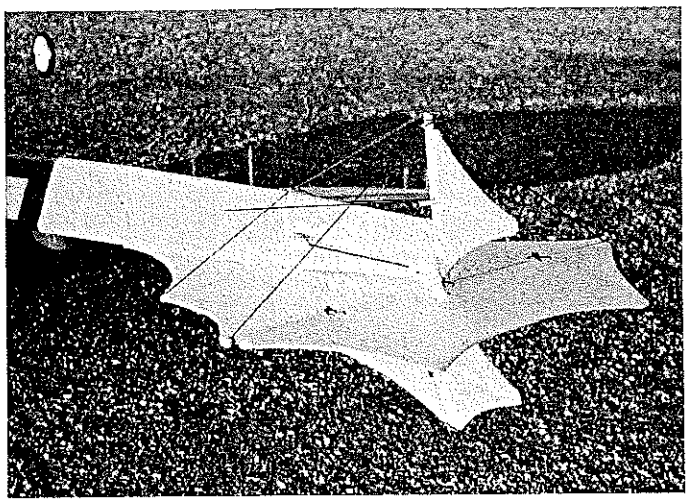
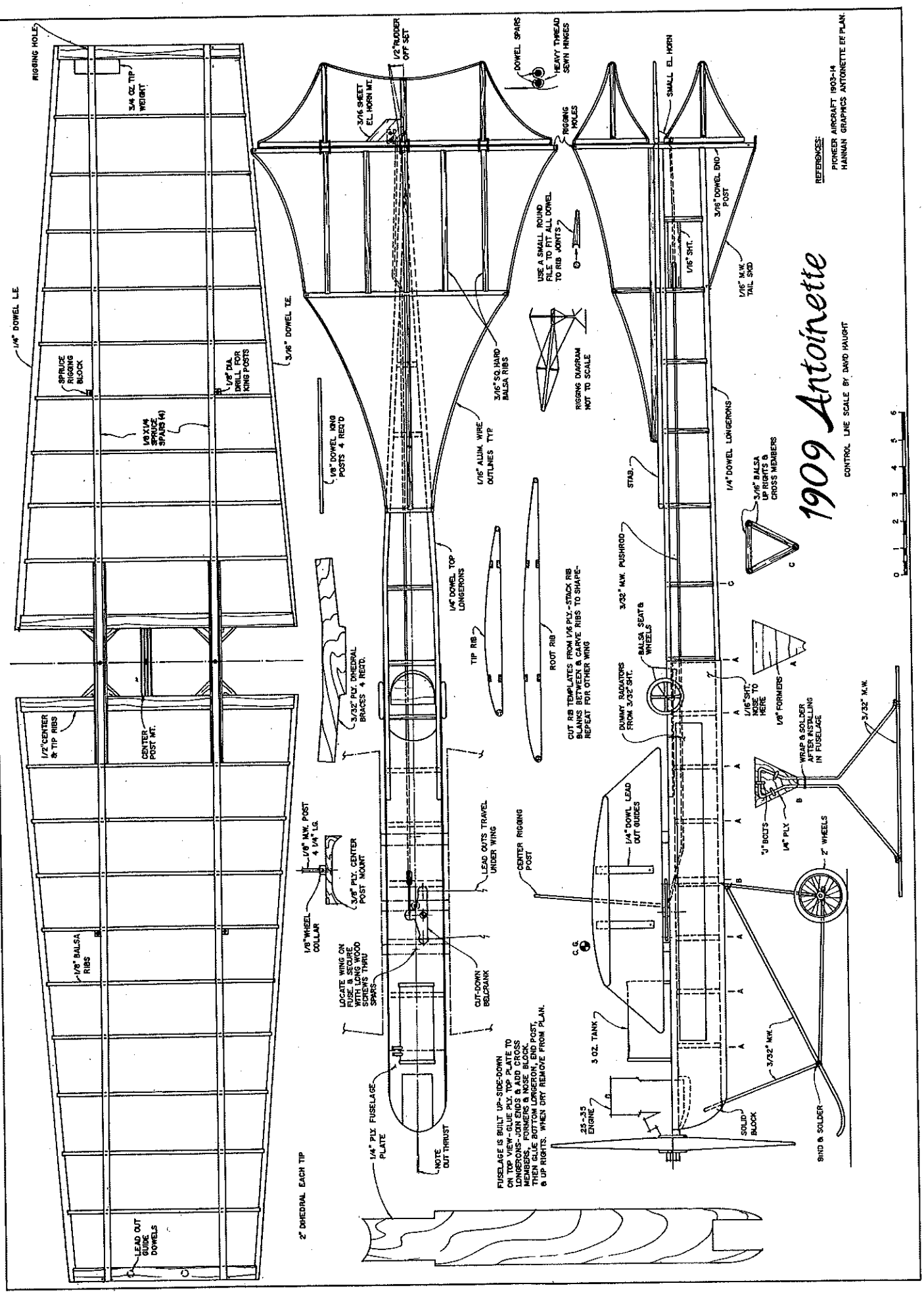




Left: Dowels set into the thick wing tip serve as lead-out guides for the heavy cables. Their length helps to compensate for the Antoinette's ample dihedral. Right: Under the tail are a host of hidden details: the sewn elevator hinges, tail rigging, tail skid, and elevator horn attachment.


1909 Antoinette
CONTROL LINE SCALE BY DAVID HAUGHT
REFERENCES:
PIONEER AIRCRAFT 1903-14
HANNAN GRAPHICS ANTOINETTE EF PLAN.
RIGGING HOLE
3/4 OZ. TIP WEIGHT
1/4" DOWEL LE
3/16" DOWEL TE.
SPRUCE RIGGING BLOCK
1/8 DIA. DRILL FOR KING POSTS
1/8 X 1/4 SPRUCE SPARS (4)
1/2" CENTER & TIP RIBS
CENTER POST MT.
1/8" BALSA RIBS
LEAD OUT GUIDE DOWELS
2" DIHEDRAL EACH TIP
1/2" RUDDER OFF SET
3/16 SHEET EL. HORN MT.
DOWEL SPARS
HEAVY THREAD SEWN HINGES
RIGGING HOLES
SMALL EL. HORN
3/16" DOWEL END POST
1/16" SHT.
1/16" M.W. TAIL SKID
USE A SMALL ROUND FILE TO FIT ALL DOWEL TO RIB JOINTS
RIGGING DIAGRAM NOT TO SCALE
1/8" DOWEL KING POSTS 4 REQ'D
3/16" SQ. HARD BALSA RIBS
1/16" ALUM. WIRE OUTLINES TYP.
1/4" DOWEL LONGERONS
STAB.
3/16" BALSA UP RIGHTS & CROSS MEMBERS
3/32" M.W. PUSHROD
1/4" DOWEL TOP LONGERONS
TIP RIB
ROOT RIB
CUT RIB TEMPLATES FROM 1/16 PLY - STACK RIB BLANKS BETWEEN & CARVE RIBS TO SHAPE - REPEAT FOR OTHER WING
3/32" PLY DIHEDRAL BRACES 4 REQ'D.
BALSA SEAT & WHEELS
DUMMY RADIATORS FROM 3/32 SHT.
1/16" SHT. NOSE TO HERE
1/8" FORMERS
WRAP & SOLDER AFTER INSTALLING IN FUSELAGE
3/32" M.W.
1/8" M.W. POST 4 1/4" LG.
3/8" PLY CENTER POST MOUNT
1/16" WHEEL COLLAR
LOCATE WING ON FUSE & SECURE WITH LONG WOOD SCREWS THRU SPARS
LEAD OUTS TRAVEL UNDER WING
CUT-DOWN BELCRANK
CENTER RIGGING POST
1/4" DOWEL LEAD OUT GUIDES
"L" BOLTS
1/4" PLY
2" WHEELS
C.G.
3 OZ. TANK
25-35 ENGINE
1/4" PLY FUSELAGE PLATE
NOTE OUT THRUST
FUSELAGE IS BUILT UP-SIDE-DOWN ON TOP VIEW - GLUE PLY TOP PLATE TO LONGERONS - JOIN ENDS & ADD CROSS MEMBERS, FORMERS & NOSE BLOCK. THEN GLUE BOTTOM LONGERON, END POST, & UP RIGHTS. WHEN DRY REMOVE FROM PLAN.
SOLID BLOCK
BIND & SOLDER
3/32" M.W.
0 1 2 3 4 5 6

1) Models must be replicas of models flown before December 31, 1935.

2) The model scoring is based on a combination of Mooney-style appearance/fidelity judging, and best single time of six flights.

3) The events are scheduled several times per season with a perpetual trophy awarded at the end of the Indoor season, as well as merchandise awards for winners of individual meets.

The last photo shows Mark Sexton's Senior ROG, and the required documentation. This model won the January 28, 1989 contest with a 2:43 flight counting as part of the score.

Pressure domes: Ed Whitten sent a clipping describing the Tokyo Dome, in downtown Tokyo, Japan. The dome encloses a professional baseball field, and is covered with a Teflon-coated fiberglass roof which is supported by air pressure. Ed's query is this: "Has anyone flown in air-pressure-supported domes? What is the effect on the models?" Comments, anyone?

ROG wheels: Jim Jones suggests that wheels for ROG events can easily be made very light and strong by the method shown in the figure. The method is to soak a long balsa strip ($\frac{1}{32}$ x $\frac{1}{64}$, for example) in water, and wrap it around a dowel of suitable diameter (½ in. for ROG Stick and ¾ in. for ROG Cabin) as shown in the sketch. After baking or air drying the balsa, make a single cut across the spiral of balsa, separating it into several circles and some scrap. Glue each circle at the cut, then insert a single spoke into the circle. The hub, or bearing, is made from a tiny piece of tubing—like that furnished with some kinds of cyanoacrylate glue.

Antoinette/Haught

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The tail assembly, however, calls for a different technique. First, cover one side of the surface, and let it dry completely. Next, trim the tissue to within ⅛ in. of the wire. Coat this excess tissue with dope, then lay the top sheet in place. Adhere the excess tissue directly to the other side and all around the edges. Let this dry, then lightly spray with water to shrink the tissue.

After the parts are dry, begin applying coats of dope. Once the dope has built up well and sealed around the wire edges, trim the excess tissue off to about $\frac{1}{64}$ in. from the wire. There you have it!

The final color of the Antoinette is natural linen. From the cockpit forward, the fuselage is painted medium brown. Finish off the wings and tail with five or six coats of clear dope.

Final assembly. Hinge the elevator to the stabilizer. For this job, I used the old-fashioned method for making sewn hinges. As the sketch on the plans shows, the basic technique involves creating a figure eight which sews both spars together. The plans and photos show the location. Four figure eight patterns are sufficient. Put two on each side of the ribs and two flanking the center rib.

Mount a nylon control horn to the elevator, then position and glue the stabilizer to the fuselage. The fin can be glued on next. Make sure the rudder post lines up well with the tail post. In gluing on the rudders, check that they have the same amount of offset.

The wing assembly is held to the fuselage with long wood screws. After aligning the wings to the fuselage, add CyA to the joints to lock the wing in place. Make the center rigging post and its mount and install them. Drill the inboard wing tip to receive the lead-out guide dowels, and glue them on. Run the cable lead-outs through the holes in the dowels, and hook them up to the bellcrank. Finish off the lead-out ends, and check the controls for proper movements. Make the final bend for the pushrod at the elevator horn to complete the control system.

Moving on to the nose of the ship, epoxy the fuel tank between the engine area and the front spar. I used a Perfect brand rectangular fuel tank, which looks rather proper. The engine can be mounted temporarily with the propeller in place. Add the wheels and any scale details you desire. The side radiators should be installed before the rigging so you have room to work.

Rigging is optional—though essential if you really want to catch the full flavor of the Antoinette. I used heavy black fishing line to rig the original. The installation technique is straightforward enough, but difficult to explain. Studying the scale references and any photos you can run down before beginning will be a great help. Also, the photos on these pages will explain it better than I can.

The rigging is run through $\frac{1}{32}$-diameter holes drilled through the tips of the spars.

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Antoinette/Haught

Continued from page 161

The rigging points are indicated on the plans by dots. Drill the holes, and thread the line through them. Small lengths of aluminum tubing are slipped over the line and crimped on, keeping it taut and in place. Care needs to be exercised to avoid rigging in (introducing) warps. By the same token, any undesirable warps can be rigged out.

Before flying, check the balance point. It must be within ½ in. of the location shown on the plan. My Antoinette took 2 oz. of lead packed under the engine to make it balance. When I tried to fly it with the center-of-gravity (CG) one inch farther back, it was all over the sky. By moving the CG forward, the model is more stable and much easier to fly. Check your balance, unbolt the engine, and hollow out the nose block as required for the needed lead.

Flying. The model will quickly come off the tail skid and rotate. The skid will keep the prop out of the grass until you lift off. Once in the air, the Antoinette is in no hurry. Slow and steady she goes. While dihedral doesn't seem to bother her in medium winds, I wouldn't recommend subjecting her to a buffeting by strong wind. No doubt about it, the model's grace and elegance suit its name. The Antoinette is quite a lady.

CL Aerobatics/Fancher

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Directors JoAnn and Mike Keville did an excellent job making all the pieces come together for an exceptional episode.

The two-day competition/fun-fly consisted of two rounds each of both Old-Time Stunt (per the Garden State Circle Burner rules) and of the newly created Vintage Stunt event.

Vintage Stunt mandates entries which were designed at least 25 years ago. They receive appearance points according to a modified schedule and fly the current Stunt pattern. The rule which allows any ship 25 or more years old to qualify makes it possible for a flier to fly the same ship in both OTS and Vintage. They simply fly the 1952 pattern in OTS and the current one in Vintage.

Winners were determined by adding the scores from each day's flying in each event. However, the thrills of victory or the agonies of defeat weren't the dominant emotions at this event.

No, the prevailing reaction was the joyous reliving of Stunt glories of yesteryear by the several hundred participants/competitors, spectators, and honored guests alike who attended. Being a part of this coming together of people and planes of bygone eras was a special feeling for all concerned.

I didn't count them all (I'm sure someone did), but there were in the vicinity of 60 aircraft on the field. They ranged from Madman Yates' *Madman*, to Jim Saftig's *Zilches*, to Bill Netzeband's *Fierce Arrows*, to Ed Southwick's *Larks* and *Skylarks*, to Bill Werwage's *Ares*, and George Aldrich's *Noblers*. There were Palmer *Thunderbirds*, Still *Stukas*, Kenhi *Panthers*, and deBolt *Sportwings* and *All Americans*. Charly Mackey's *Lark* and an *El Conquistador* stopped by for a flight or two. *Electras*, *Barnstormers*, and *Ringmasters* put in patterns. And that was just for starters.

The airplanes were great, but the people were better! We had your basic legends in attendance. How about a lineup that included George Aldrich (flying a replica of the original *Nobler*), and Mr. Stunt himself, Bob Palmer, two-time national champion and designer of the incomparable *Thunderbird* and *Smoothie* among many others. Bob no longer flies, but was obviously in his element for an entire chilly day. No way was he leaving early!

Ed Southwick was there and brought along one of the two original *Skylarks* that graced the full-color cover of the Sterling kit. It still looked as good as new—beautiful. Dick Williams, Ed's teammate at the 1962 World Championships, was there. Mr. Monoline, Dale Kirn, attended along with the actual Monoline-equipped *Thundrbird* about which he wrote in *Model Airplane News* back in the late Fifties.

Many-time national Combat champ Riley Wooten wouldn't have missed it. Control Line aerodynamics wizard and designer of the incomparable *Fierce Arrow* series of full-Stunt flying wings Wild Bill Netzeband stopped by . . . and stayed. Charles Mackey not only attended (and watched Atlanta's Tom Dixon place second flying his *Lark* design), but brought along several "full-Stunt" kites which he and many others put through their paces throughout the day.

Joe Wagner, whose fascinating accounts of the early days at the Veco model factory graced these pages a year or so ago, came all the way from Pennsylvania to attend, as did the one and only

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