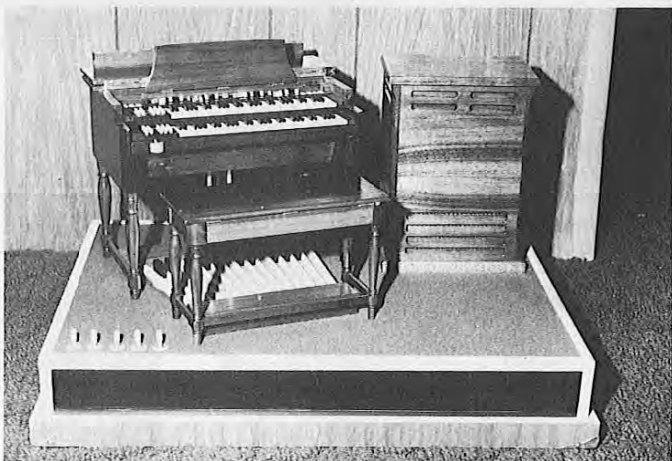


Just two typical boats—among dozens. At top is the famous *Titanic*, at bottom, the destroyer *U.S.S. Melville*. Below: Scale model of a Hammond organ by Olaf Eriksen. Keys and pedals are movable. Cassette is tied in to play five organ melodies. Sixty thousand visitors went through the museum in its first year.



Olaf then created a duplicate model of the Hammond Organ with all keys and pedals movable. Tied in was a Cassette tape unit set up for five organ melodies. Its value of \$2,200 is almost the price of the real thing. He developed a live all-metal steamer in 3/4 inch scale valued at \$1,800 and, to top all his projects, he put together a working electrical guitar fashioned from 20,000 match sticks.

Another Hook Mountain specialist is Oswald Thalman, also of Parsippany. Whereas most modelers work on small items, Oswald gets his kicks from enlarging models and thus has scratch-built the famous *Constitution* (Old Ironsides) into a five-foot-long, six-foot-high masterpiece. Taking some 4,000 hours of time over a two year period, plus almost \$500 in supplies, this ship catches eyes. All details are flawless. Oswald's main reason for putting his model on display was to liberate the kitchen table at home. But he has already plunged into a similar size model of the *Spanish Galleon*.

Even businessmen find time during the wee hours to work off their frustrations. Such is the case of Jack Campbell of Verona, N.J. who recently placed on display a clever replica of the Hudson River boat, the *Keansburg*. This beauty is in 1/4-inch scale, took some 750 hours, and is valued at \$1,500. Life-like with fifty miniature figures

throughout the model, one almost expects the paddle wheels to start up and the model to sail away.

Other exhibits throughout the museum area, which attracted over 60,000 people during the first twelve months of operation, fall into various categories. A complete selection of scale plastic-model airplanes finished with delicate airbrush painting was completed by Al Wegner. Plastic scale tanks in all scales occupy two show cases. Di-O-Ramas are constantly being placed on exhibit.

Three contests a year are held in the museum, covering model cars, motorcycles and trucks. Each event is run during a different period and two or three cases devoted to all the entries. An HO train village is glass enclosed in the very center of all exhibits and is surrounded by a variety of cabin cruiser boats and craft supplies. Train models representing all sizes from "N" up to Standard help show the history of model railroading to all visitors. A push-button recording gives a five-minute talk about the various displays.

(Free copies of the "HOOK MT. JUNCTION CHRONICLE" are available upon request, from Rich's Hobbytowne, 13 Hook Mt. Rd., Pine Brook, N.J. 07058.)

Many trainers have been designed but few of them have been created specially for the beginner with little experience in building or flying RC. The J.A.M. Trainer is a lightweight model powered with an inexpensive .09 motor. Since it is light and low powered, it will fly slowly giving the novice flier time to react with the proper control actions. It will not tend to destruct itself if a crash should occur.

The model is an all-balsa type and does not require covering over "open areas." The only building techniques that might challenge a beginner are: plywood cutting, sheet balsa joining and wire bending. Some special instructions will be given on these techniques.

If you build the trainer carefully, and read some of the fine material available in magazines and books on learning to fly radio control, you have an excellent chance of learning to fly the trainer without help. But if you can obtain help from an experienced RC flier, by all means do so. Have him make the first flight or two to check out and trim model. Then let him give you a few flying lessons. The trainer is inherently stable and, therefore will fly by itself without control. If it is balanced right and the surfaces are warp-free and set at the angles shown on the plan, the trainer should fly straight ahead and gain altitude at a reasonable rate with motor peaked out. Unless you have ideal runway conditions, the first flight should be from a hand-launch. Don't try any turns until you have plenty of altitude. Remember that without an elevator, the model will lose altitude when you make turns. Four points are of extreme importance to the novice who is by himself.

First, remember that control stick motion is reversed when model is flying toward you. Novices should fly "over-the-shoulder." Keep your body pointed in same direction as the model is flying and you won't have to reverse your thinking when it comes toward you. As you gain confidence, try flying toward yourself facing the model. Then, practice making the model fly in horizontal figure eights in front of you.

Second, the most difficult problem for a novice is overcontrolling and getting into a spiral dive. If you are flying with rudder-only control, your problem is simple: give opposite rudder. If you also have motor control, slow motor to idle. If you have elevator control, *don't touch it* until the wings are level; then give up control. The rule is level the wings first. If you give up-control when you are in a spiral dive, you may tighten the spiral and more than likely spiral into the ground.

Third, to lose altitude or to limit the zoom after spiral dive with rudder-only control, you turn right or left. With practice, you will be able to spiral down at any rate you choose and kill the tendency to climb rapidly when you end spiral by applying opposite rudder. Climb or zoom results from extra speed that builds up during spiral dive.

Fourth, first flights should be made in calm air. In any case, you must learn to fly the plane in an area upwind from where you are standing. This will give you a fair chance at landing nearby if engine fails.

Construction: The most important thing in construction of a flying model is a flat work surface. The surface should be a minimum of 12 x 30" and preferably made of soft pine. A drawing board is an excellent work surface. A 2 x 12 x 36" pine plank also is excellent; it should be planed or thickness sanded to provide a really flat surface. A narrow flush door from your lumber yard is an economical solution. Success depends upon the wing and tail surfaces being flat, warp-free and well aligned.

Instructions

1. Use Titebond or Sigbond cement for general assembly work and for laminating doublers and bulkheads. Carefully pin, weight down or clamp laminations together while the cement is wet to prevent curling because of moisture in cement. Wipe off with wet cloth any cement that oozes out when you clamp or pin pieces together. This will make sanding much easier.
2. Use epoxy cement (Hobbypoxy Formula II) or Titebond for cementing things that will be subject to raw fuel—typically, firewall and other plywood pieces used in fuselage. Don't overuse epoxy as it is relatively heavy.

FOR NOVICES OF ALL AGES.

JAM Trainer

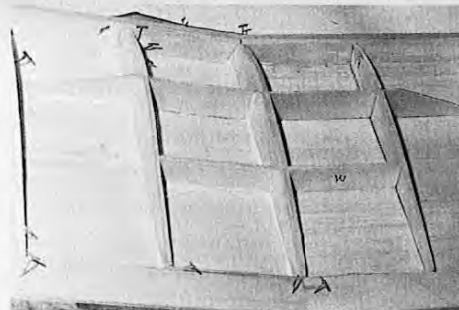
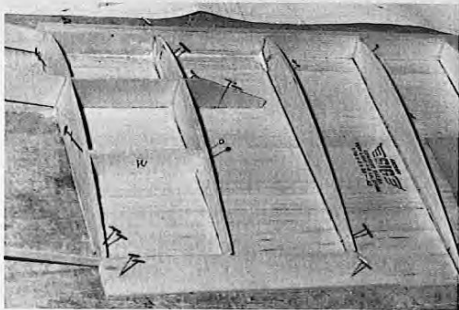


Practicing for hand launching is Alan Smith. Designer George Wilson proved his design for the novice the hard way by checking out trainee Alan.

A RUGGED ALL-SHEET-BALSA RADIO CONTROL DESIGN FOR .09 POWER AND RUDDER AND ENGINE CONTROL.

GEORGE A. WILSON, JR.

Photos by George A. Wilson, Jr. and E. J. McCarty



Top, left: Right wing panel with dihedral braces installed. The bottom sheeting is put down, after which it is extremely easy to glue edges, ribs and braces in place. Above: This is how the wing will look after the left and right panels are joined. Top sheeting is yet to go in place. Left: Top sheeting, consisting of butt-joined pieces according to the diagram on page 24, is readily attached with glue and T-pins. Sheet for right panel will have to be matched to fit at the center rib before it is put in place.



3. Use thinned epoxy (Hobby Pox Formula II) to coat areas subject to raw fuel (typically, the motor and tank areas). Thin 1 to 2 (thinner-to-epoxy) using epoxy thinner, dope thinner or isopropyl alcohol (90% pure, not rubbing, alcohol). Only one coat of epoxy is needed but flow it on generously.

4. Patterns made from heavy cardboard, Micarta, Bakelite or metal are helpful if you are hand cutting many similar pieces such as ribs. When only one part is required, pin plan down over carbon paper which has a piece of heavy paper under it, then trace over piece on plan with pencil. Carbon copy then can be cut out and used as pattern.

5. Choice of covering method is up to you. The modern Mylar film-type coverings (e.g. MonoKote) are easier to learn than the traditional silk or paper and dope method. Cost may be a bit higher if you use MonoKote. MonoKote tends to be lighter than silk and colored dope.

Plywood Cutting: Outlines of plywood pieces are traced onto plywood or templates made from the plan, and are tacked to the plywood as cutting guides. Thin plywood (1/32" and 1/16") is best cut with an X-acto knife that has a heavy blade. Make several firm strokes with sharp blade and the plywood will part cleanly.

Sheet Balsa Joining: When large balsa structures are made, it is necessary to join standard-size balsa sheeting together to make larger sheets. Typically, a standard 1/8 x 3 x 36" sheet is not large enough to make fuselage side for this model. In the case of 1/16" sheeting that covers wings and tail surfaces, it may be necessary to make one or more splices to obtain large enough sheets.

When joining sheets of balsa together, the edges should be checked and straightened (if necessary) before cementing. If gaps are left or the edges are forced together, stresses may be built in that can cause warps. Check edges using true straight-edge—Sig Manufacturing sells inexpensive aluminum straight-edges. (Most yard sticks are no straighter than your balsa!) Take the smallest possible sliver off the edge to true it.

A popular method for joining balsa sheets is by means of a strip of masking tape. Lay two sheets on work surface with sides to be joined tightly together and place piece of 1" masking tape over full length of joint. Pick up the balsa pieces and carefully fold them back-to-back using tape as hinge. Apply cement to one of butt edges and replace sheets on your work surface tape side down. Wipe off glue that oozes out of joint and pin sheets down until dry.

Wire Bending: Don't make music wire bends too sharp or the wire will break at bend. Use vise with rounded edges or clamp the wire between pieces of hardwood (maple, oak, birch, etc.) in vise, or use C-clamps. Short end is clamped; long end is pulled by hand until the desired bend is obtained. A tap or two with hammer may be required for right-angle bends.

The wire is cut off using a file or grinding wheel. Do not try wire cutters or a hacksaw; music wire is too hard for these tools. File a notch halfway through the wire with square or triangular file. Edge (not center) of notch should touch cut-off point. File light groove around opposite side from notch and then break the wire by bending it at notch. It will snap easily. Clean rough end with file.

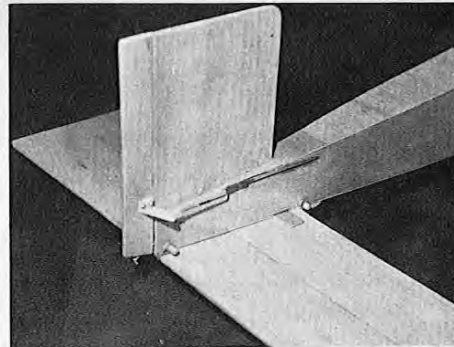
Fuselage: It must be square and true so that wing and tail will be properly aligned when they are attached to fuselage.

1. Cut two top and bottom side pieces from 1/8" medium-weight balsa sheeting, the heavy outlines on plan. Cement top and bottom pieces of each side together. (See instructions for joining sheet balsa.)

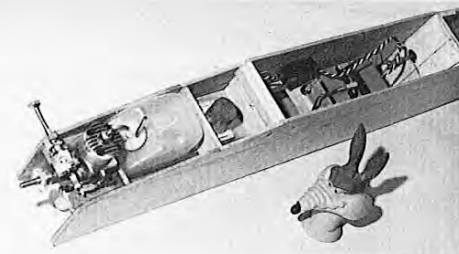
2. Cut out doublers and bulkheads. Note that Bulkhead Number 1 is made up on three layers: plywood outside and balsa center. Carefully cement three layers together; clamp them together while they dry.

3. Mount the nosewheel bearing on Bulkhead Number 1, but coat the area under bearing with epoxy before you tighten screws. Also coat nuts with epoxy so they don't loosen.

4. Cut out tank compartment floor and plywood fuselage bottom pieces. Cut the motor bearers to correct length.



Above: Tail assembly before covering with Silkspan. Surfaces are squared off to reduce tedious details. Fin is permanently attached, stabilizer is held on with rubber bands to minimize damage. Top, right: Installation showing Enya 09, Sullivan SS-3 tank, battery and radio compartments. Clyde the pilot is ready to go aboard. Right: Portrait of the classic tricycle gear which insures straight tracking and easier piloting technique on both takeoffs and landings.



5. Cut wing and stabilizer hold-down dowels to length and round their ends using coarse sandpaper followed by fine sandpaper.

6. Trim two fuselage sides with sandpaper until they are exactly alike.

7. Install doublers on inside of fuselage sides *making sure you have left and right side!* To avoid warps, pin sides down to your work surface while glue is drying.

8. Using ballpoint pen, mark location of bulkheads on inside of one fuselage side.

9. Lay sides of fuselage on work surface so that their bottom edges butt against each other. Match ends of both sides and pin both sides to work surface. Now, extend bulkhead locations all the way across unmarked side.

10. Install motor bearers on each side with Titebond cement using front two bulkheads to help position bearers. Install bottom parts of Bulkhead 2. Clamp or weight side assemblies while cement hardens.

11. Cement fuselage sides to Bulkheads 1 (firewall), 2 and 3. Square assembly by installing tank compartment floor and bulkhead above. Pin bottom of fuselage sides down on your work surface. Check that bulkheads are square with sides and accurately aligned with marks on fuselage sides. Allow cement to harden thoroughly before trying to move this assembly.

12. Mark centerlines at bottoms of Bulkheads 1 and 3. Draw a straight line the length of the fuselage down your work surface. Cover surface with waxed paper and then pin fuselage assembly to work surface, aligning centerlines of Bulkheads 1 and 3 with line on the work surface. Pull rear end of fuselage together over opposite end of line. Cut scrap of 3/16" balsa to fit between rear ends of fuselage sides as shown on plan. Cement rear end together and pin it down carefully centered over the line on the work surface. Allow to dry.

13. Add centerlines to Bulkheads 4 and 5. Cement them in

place maintaining their alignment over the line of work surface. Allow to dry.

14. Remove the assembly from plan and add the bottom plywood and balsa sheeting. *Don't* add top sheeting until the control rods have been installed and fin is installed.

15. Apply a coat of epoxy to insides of motor and tank compartments. Flow epoxy on, making sure surfaces and joints are thoroughly sealed.

16. Add radio mounting bearers and balsa braces in front of these bearers.

17. Add inner frame around opening under wing, cross braces at Bulkheads 2 and 3, and triangular external doubler at rear end of fuselage.

18. Add main landing gear mounting parts.

19. Drill holes for wing and stabilizer hold-down dowels, fit dowels. Don't glue dowels into fuselage until fuselage has been covered.

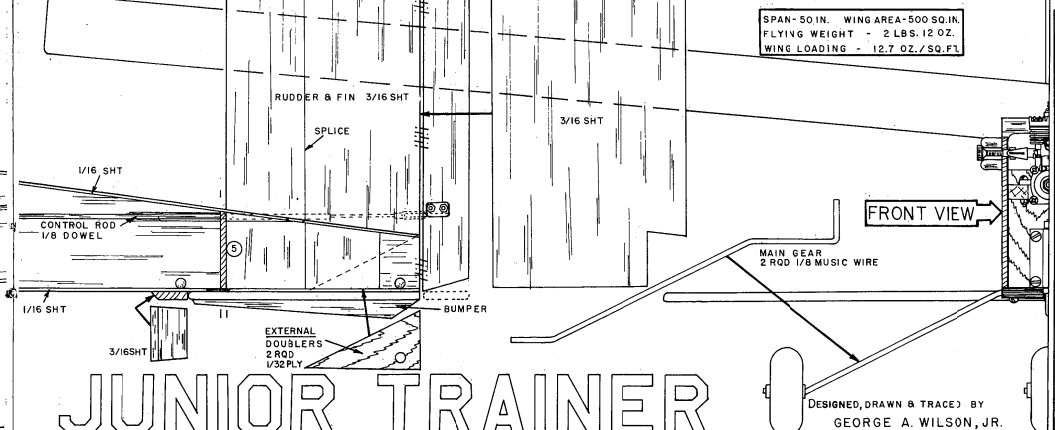
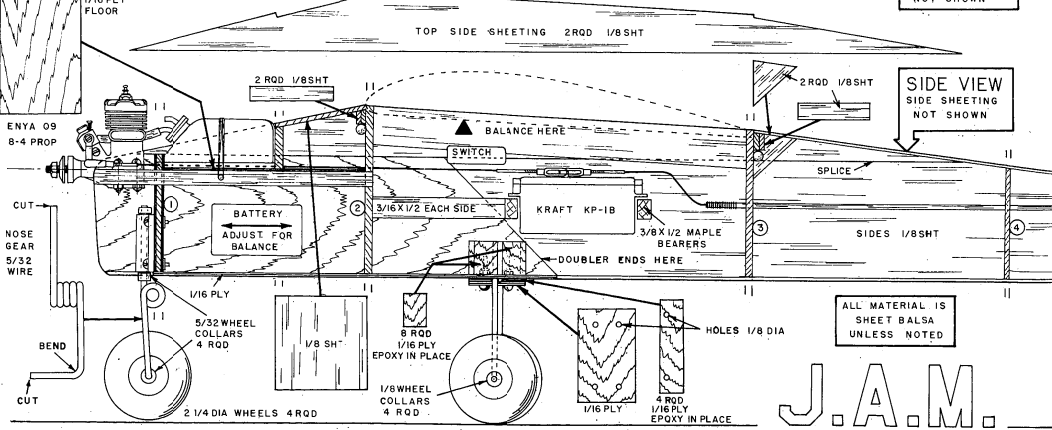
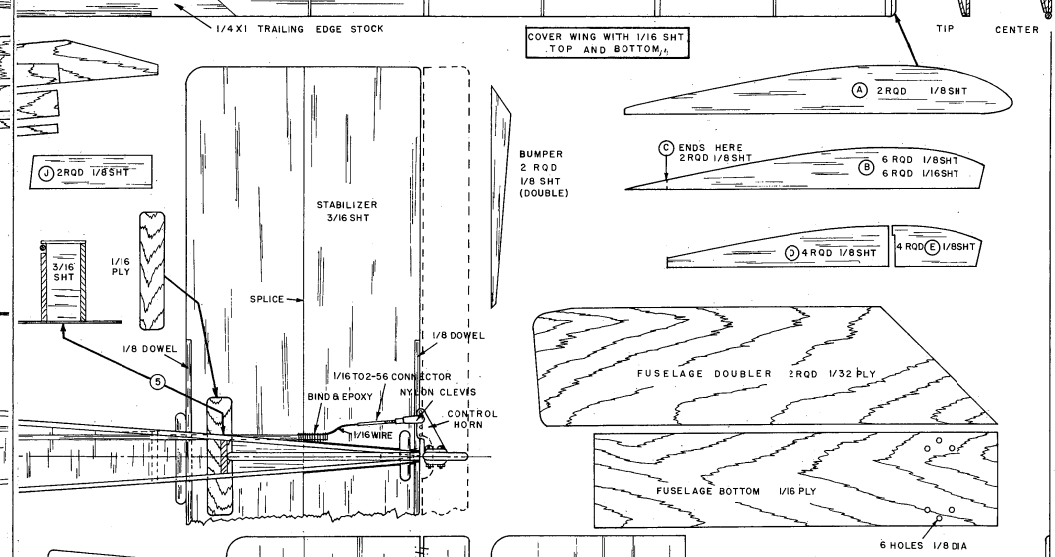
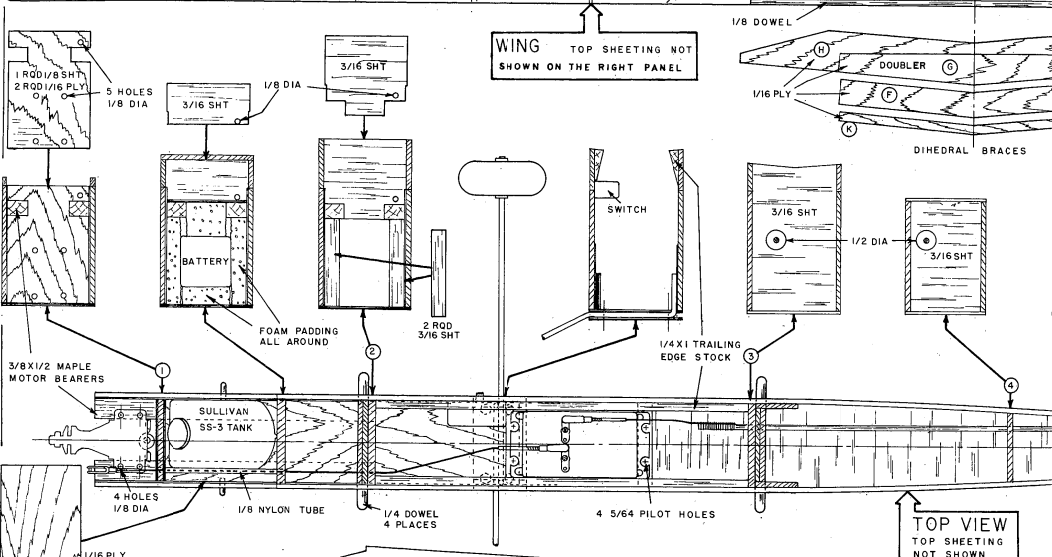
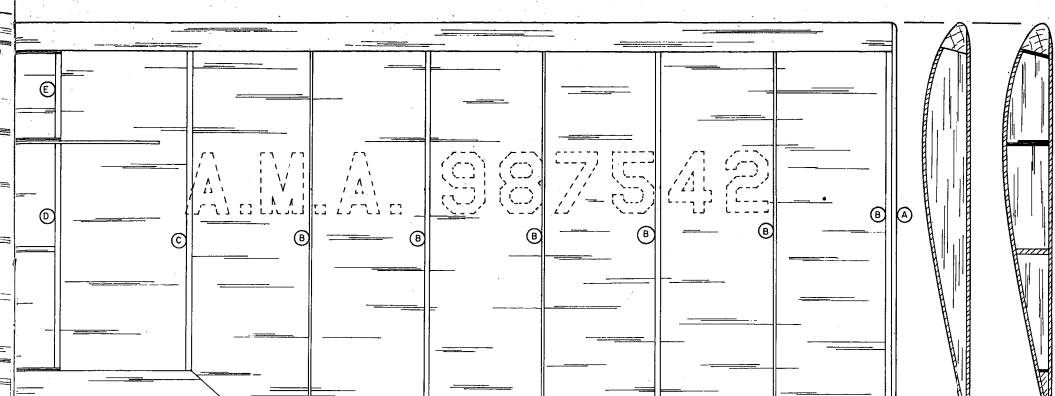
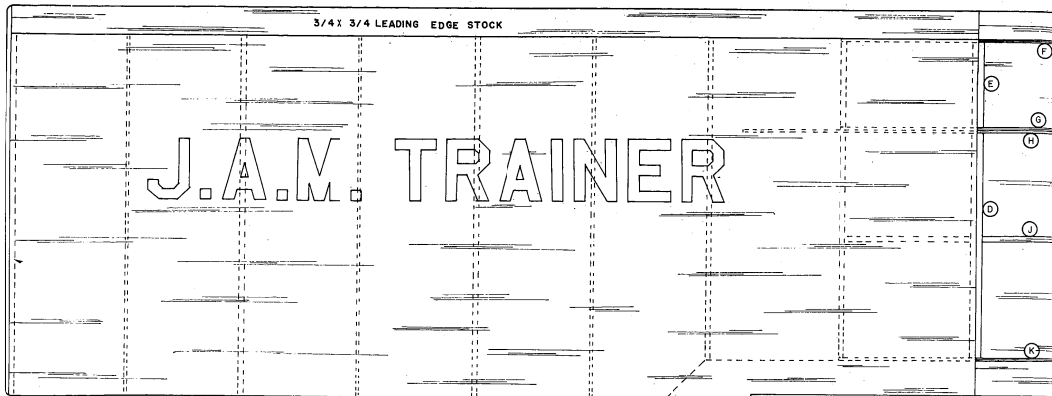
20. Add top sheeting after all control rods and fin are installed. (See tail construction section).

21. The edges of opening under wing should slant inward so that wing lies flat. Trim top inside of Bulkhead 2 to fit leading edge of wing. Wing should rest on sides and have clearance at leading edge. Sponge plastic seal may be added around edge of opening to help keep oil from entering fuselage.

22. Landing gear struts are bent as shown on plan. Wheels and nose gear strut are held in place with wheel retainer collars.

23. When the motor is installed, make it point as far to the right as the play in the mounting holes will allow. This "right thrust" will make the model fly straight under full power.

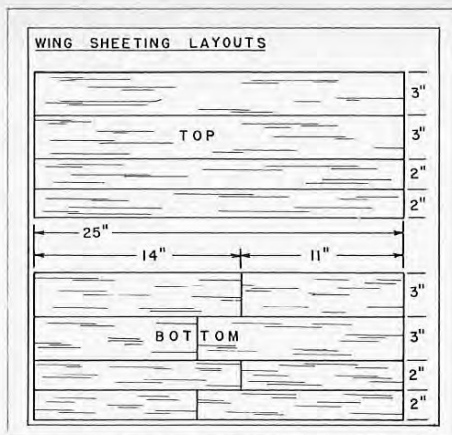
Wing: Make your four sheets of 1/16" balsa 25 x 10". The 10" ends of these sheets are trimmed at right angles with the long sides. Two 3" and two 2" sheets are combined to make the 10" width; if sheets are slightly under 10" wide it is O.K. But 25" length should be exact. When you join 2" or 3"



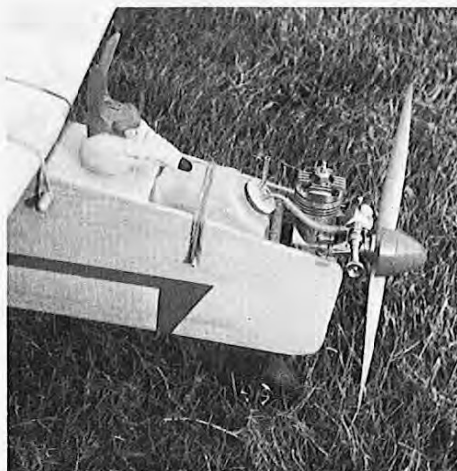
J.A.M.

JUNIOR TRAINER

DESIGNED, DRAWN & TRACED BY
GEORGE A. WILSON, JR.



Wing sheeting is made by joining 2 and 3" wide pieces of 1/16" sheet, 36" long. Or 6 and 4" sheets may be used if available. Note staggered joints in bottom sheeting which uses leftover 11" lengths from the 36" long top sheeting pieces.



Clyde Coyote ready for takeoff. Note accessibility of removable tank which is held in place by rubber bands. You'll need more rubber than that to hold on the wing—the two bands shown were for picture taking purposes—and by now George was kinda tired.

sheets lengthwise, stagger joints; don't join two or more sheets at same place. Make left- and right-hand wing panel as follows:

1. Mark rib locations and location of the rear edge of wing leading edge on the two bottom 25 x 10" sheets.

2. Trim leading and trailing edge pieces to length. Slant ends of these pieces to match dihedral angle using a template made from the plan.

3. Cut out plywood dihedral braces. Note that main brace is double thickness at its center.

4. Cut out wing ribs.

5. Pin bottom sheets to the work surface. Do not glue them to each other at center until dihedral angle is added (See Step 14). Note: Each wing panel (Steps 5 through 7) may be built separately if your building surface is too small for both sections.

6. Cement leading edges to bottom sheets; pin firmly in place.

7. Cement outer, full-length ribs in place. Cap ribs are added later (see Step 17). One panel is removed from the work surface at this point—let cement dry first!

8. Cement forward dihedral brace in place on panel still pinned to work surface.

9. Cement front sections of center ribs into panel pinned to work surface, and add main dihedral brace and its doubler. Slant center rib to match dihedral angle.

10. Cement rear sections of center ribs into this panel and add trailing edge piece.

11. Trim center ends of one of the top covering sheets (25 x 10") to fit dihedral joint.

12. Cement top sheeting onto panel pinned to the work surface. Don't leave any pins inside! Relocate the pins as necessary to positions around the edges.

13. Unpin finished panel after it is dried and pin unfinished panel to work surface.

14. Cement finished panel to unfinished panel at bottom sheeting, leading and trailing edges, and dihedral braces. Block up finished panel, keeping it true and square, and allow assembly to dry thoroughly.

15. Cement in place the front and rear sections of remaining center ribs and trailing edge.

16. Trim top sheeting as necessary at dihedral joint to obtain nice fit. Cement top sheeting in place again being careful not to trap pins inside.

17. Add cap ribs and protective dowels at center of trailing edge.

Tail Surfaces: It is important to keep weight to a minimum; use soft balsa to make these surfaces. If tail is heavy, extra weight will have to be added in the nose to balance; this increase in weight should be avoided.

Cut the pieces of vertical and horizontal tail surfaces from 3/16" balsa and join as indicated in section on joining balsa sheets. Rudder is hinged using figure 8 stitching, and heavy nylon thread.

Add 1/8" balsa strips to each side of the vertical fin (front part of the rudder) to support top covering of fuselage. Install vertical fin by cementing it to bottom of fuselage and cementing short bridges of top sheeting on each side of it, to center it and hold it upright. Check that fin is vertical. Add protective dowel and plywood doublers at front and rear of stabilizer. This protects the soft balsa from the rubber bands.

Control Installation: Plans show installation of a Kraft two-channel radio system. Similar systems can be used but check their dimensions and relocate the mounting brackets if necessary. Also check which is rudder and which is motor servo, being sure to hook control rods to correct sides of servo output arms; right stick motion should give right rudder; forward stick motion should give high motor. Control rods and clevises should work freely. Bend wires as necessary to minimize binding.

The battery is mounted in foam plastic. Move it forward or backward to achieve balance point indicated on plan.

Switch is mounted on side of fuselage opposite exhaust stack on motor. This minimizes amount of oil from exhaust that seeps into fuselage around switch opening.

CHECK OUT AND FLYING: 1. Flying surfaces should be free from warps. If warps exist, remove them by heating surface in oven until really warm, then twist in a direction opposite warp. If you hold about equal and opposite twist while surface cools, warp should disappear. Another method is to apply thin clear dope to surface and twist as before. Hold in the twisted position until the dope is real dry.

2. Check angular difference between wing and stabilizer. Stabilizer should be flat against fuselage bottom, wings should be at angle shown in plans.

3. Model must balance at point shown on plan. Add weight in nose or tail as necessary. Do not attempt to fly with the balance any farther back than shown on the plan.

4. The control system must work well with and without the motor running. Be sure the controls operate in the right direction. Right stick for right turn; the rudder should move to the right. Forward stick motion for high motor speed (throttle opens).

The Trainer should weigh less than three pounds with an 11-oz. radio system and Enya 09 installed. If possible, have an experienced RC flier recheck your work before you attempt to fly, otherwise you can perform the recheck yourself. It is a docile airplane that forgives most mistakes. However, the better it is checked out, the easier it will be to fly.

The first flight can be made from a hand launch made straight ahead with motor peaked out at maximum speed. Allow model to gain altitude and introduce only enough turn to keep the model relatively close to you. After gaining a couple of hundred feet of altitude, back the motor speed down until model stops climbing. Check rudder trim; model should fly straight ahead with stick centered. Add trim in transmitter if necessary. After flight, adjust rudder clevis to amount of trim you put in while flying and recenter transmission trim control.

A tendency to climb too much or to stall under full power can be corrected by adding down-thrust to the motor. Put washers between the rear mounting ears and motor bearers. If model doesn't climb, add up-trim by putting a 1/16" shim between the front of stabilizer and fuselage. Low motor power can also be the problem if model doesn't climb. This can be caused by a poor motor (most likely, if break-in is needed), an improperly adjusted motor, bad fuel or wrong choice of propeller.

When you turn the model, it will tend to lose altitude. This is normal. Apply control (move the stick) very gently until you get used to what happens. If things happen too fast, pull motor control back to idle, center rudder stick and wait. If you have enough altitude, the J.A.M. Trainer will right itself and fly straight and level—what we mean when we say a model is "forgiving" of our piloting errors.

MATERIAL

Plywood: 1/16 thick (2 sheets—6 x 12" needed): dihedral braces, fuselage bottom, tank compartment bottom, firewall doublers, landing gear retainers. 1/32 thick (1 sheet—6 x 12" needed): fuselage doublers (front internal and rear external).

Balsa: 1/16 thick (8 sheets—3 x 36" needed): fuselage sides, fuselage top (front), wing ribs and tip plates, bulkhead doublers. 3/16 thick (3 sheets—3 x 36" needed): fuselage bulkheads, tail surfaces. 1/4 x 1 Trailing Edge Stock—(1—36" length): wing trailing edge, fuselage doublers (under wing). 3/4 x 3/4 Leading Edge Stock—(2—36" lengths): wing leading edge.

Hardwood: 3/8 x 1/2 Maple—(2—12" lengths needed): motor bearers, servo bearers. 1/4 Birch Dowel—(1—36" length needed): wing hold-downs, stab hold-downs. 1/8 Birch Dowel—(1—36" length needed): wing trailing edge reinforcement, stabilizer edge reinforcement, rudder pushrod.

Wire: 1/8 dia. music wire (1—36" length): main gear. 1/16 dia. music wire (1—36" length): pushrods.

Wheels: (3—2 1/4" dia.). Wheel retainers: (4—5/32 ID and 4—1/8 ID needed): 5/32 ID—nose gear and wheel, 1/8 ID—main wheels.



Designer and trainee. Alan must have been an apt pupil, judging by that smile on George's face. Your AMA decal numbers and, for painting, a simple trim job will suffice.

Nose gear mount: (1—Goldberg NB-1 or similar, complete with screws and blindnuts.)

Machine screws: 4-40 x 3/4 (8 needed): motor retainers, main gear retainers. Washers: 4-40 x 5/16 (12 needed): Use under all nuts and under heads of main gear screws. Nuts: 4-40 Aircraft Locknuts (8 needed): main gear, motor.

Nylon tube: (1/8 OD x 3/8"); throttle pushrod conductor. Tank—Sullivan SS-3. Surgical tube: (12" length): fuel line. Nose gear strut (Unbent). Threaded coupler (2-56 to wire)—(4 needed): pushrod ends.

Clevises (nylon type—4 needed): pushrods. Control horn (1 needed): rudder. Thread—Heavy Nylon for rudder hinges. Cements—Titebond or Sigbond; Hobby epoxy, Formula 11.

Finishing material: MonoKote as require or Silkspan (GM) (5 sheets needed). Clear butyrate dope (1 qt. needed), colored butyrate dope (4 oz. needed), butyrate thinner (1 pt. needed).

Motor (Enya 09 or similar). Control system (Kraft 2-channel or similar).