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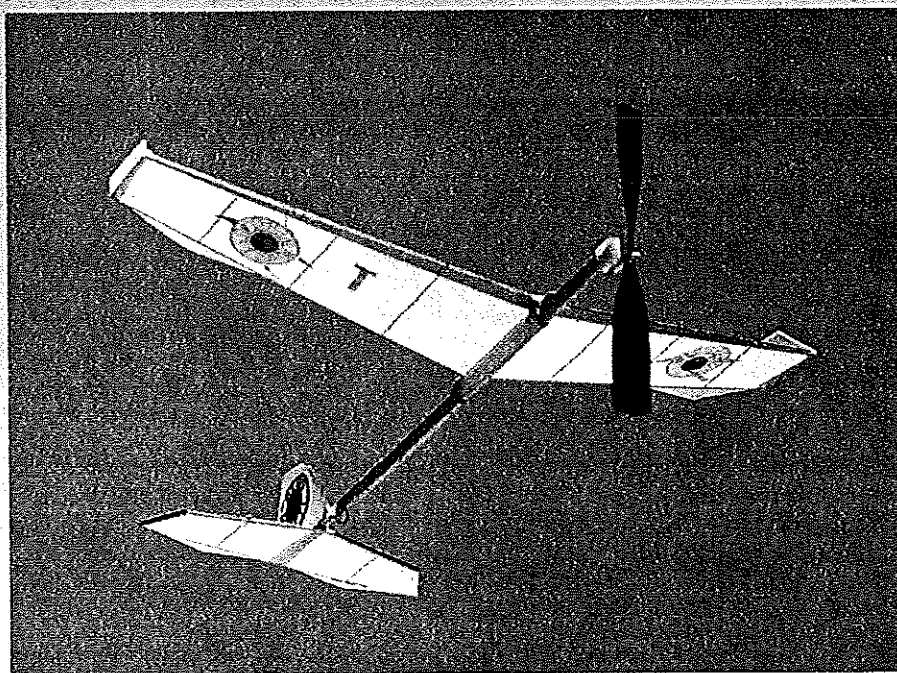


AERODACTYL

■ Bill Warner



The Aerodactyl can be built by novices from six to 60. It will do a minute outdoors, can fly indoors if lightened up a bit, and can be built with a tissue-covered wing or an all-sheet wing. Plan to build one of each!



Aerodactyl with plastic shopping-bag covering attached with contact cement. Text details covering options.

CONSTRUCTION

Tissue-Covered Version: Build on a flat surface that you can stick pins into, such as Celotex "Building Board" from a lumber yard. Get a couple of photocopies of the plan—one to build on and one to cut up for patterns. Tape one copy of the plan to the board and then tape a wrinkle-free layer of clear plastic wrap over it to prevent glued parts from sticking.

Using a Model Knife: Use care with your model knife. Always check where the knife will go if you slip, and make sure your fingers or thumb are not in the way. You should always cut away from your fingers. *Never cut toward meat!* Retract the blade when you lay the knife down. A piece of cardboard or an old phone book makes a good surface to cut on.

Pay special attention to how you slant the knife from side to side, or you may not get a square (90° to the table) cut. It is always better to make several light cuts along a line than to try and cut all the way through at one swipe, especially when you are cutting across the grain.

Pin Your Parts Down: Pin the $\frac{1}{16}$ tapered leading edges (LEs) down on top of the plan. It is OK to stick pins through them, as they are wide. Doing the pins at an angle will help keep the parts down. Then pin down the $\frac{1}{16}$ square TE (trailing edge). The $\frac{1}{16}$ square will split if you try to stick pins through it, so "X" them in pairs over the top of the stick so that the angles formed by the pins hold the wood down snugly.

Double Gluing: I recommend using

Testors #3506 "Green Tube" cement for wood models. Wood is porous, so you should give it one coat and let it soak in. Assemble the parts with a second coat for strength. Wipe off the excess with a piece of scrap.

Glue on the $\frac{1}{16}$ square balsa "ribs" that connect the LE and TE. They are shown on top, which adds strength and does not seem to affect the performance much.

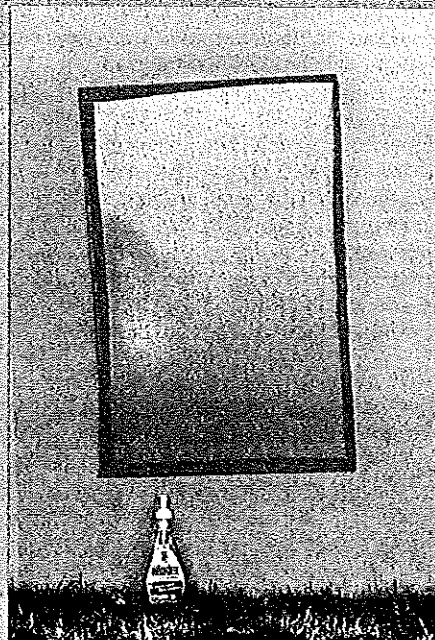
Cut the winglets (which cut down on the wingtip drag) from $\frac{1}{32}$ sheet, paying attention to the grain direction (shown on the plan by the little wavy lines), and glue them to the wingtips.

When the wings are dry, sand a very slight bevel on the LE and the TE of each so they match up when the dihedral ("vee" of the wings designed to level the wings automatically in flight) is glued in (Fig. 1). With one wing flat on the board, raise the tip of the other three inches and glue the center together. Sand any rough places and parts that stick up past where they belong with your sanding block, and reglue any weak spots.

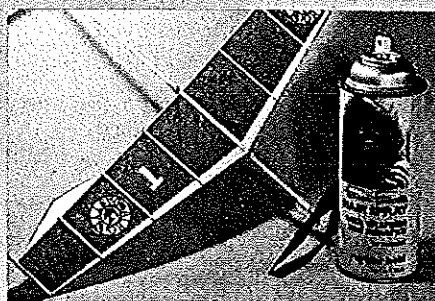
Fuselage: The last four inches of the fuselage is tapered—the $\frac{3}{8}$ -inch height diminishes to $\frac{1}{8}$ inch. This gives the stab (horizontal stabilizer) a negative angle, which controls the angle of the wing. No angle, no lift.

Bend a sewing pin with needle-nose pliers to form the rear motor hook, and install as shown on plan. Glue it well, wrap with thread, and rub glue into the thread.

The plastic nose piece of the propeller assembly should fit snugly without glue on the front of the fuselage.



Tissue glued over a cutout in a cardboard box is pre-shrunk by spraying with water using a Windex sprayer.



"Alligator-skin" tissue is made by wadding up tissue, ironing, and spraying with clear or hair spray.



Krissy Enns stretch-winds her model using a 5:1 winder, which is easy for younger kids to hold and turn the crank.



Krissy shows how to launch the Aerodactyl. Let the prop go...wait one second before launch.

The Empennage (Tail Feathers): Cut the stab and the fin out of light $\frac{1}{32}$ balsa sheet, paying strict attention to the grain direction shown. Glue the fin to the *side* of the fuselage. When dry, use your sanding block to even up the angle you cut on the rear of the fuselage to provide a square seat for the stab. Glue that part on the taper as shown; make sure it is 90° to the fin, and not tilted.

Covering the Wing: Tissue must be shrunk or "pre-wrinkled" to prevent it

shrinking and warping your wing. "Alligator-skin" wrinkled tissue is the easiest: just wad up the tissue into a ball a few times and then iron it out flat. The little wrinkles in it will allow some shrinkage to take place without transmitting the pull to the light balsa structure.

Preshrunk tissue is my favorite, however, as it looks neater. Cut a hole out of the side of a big cardboard box about an inch smaller all the way around than your tissue. Glue the tissue over the hole,

pulling out the wrinkles as best you can. Spray it with water, using an old Windex sprayer or similar item.

When it is dry, spray a coat of clear lacquer or lacquer hair spray on to help render it airtight and water resistant. You can spray alligator-skin covering, too, after it's on the plane, but skip the water-shrinking step.

Prepare a piece of tissue about an inch larger all around than the wing and glue it to the bottom of the wing only, using a UHU glue stick or similar on the LE, TE, and winglet bottoms (but not the "rib" sticks). Thinned white glue (60% glue, 40% water) brushed on will do a good job, too.

Pull the wrinkles out with your thumbs before the tissue is stuck down permanently. The excess can be trimmed off with light strokes of your sanding block held at an angle to cut the tissue along the sharp edge of the wing. Don't weaken the balsa by sanding off wood as well as tissue, though! Even scissors can be used, in a pinch.

Carefully scrape away the tissue right at the center of the wing at the LE and TE and glue wood-to-wood onto the wing mount stick or "slider" (Fig. 2). As it dries, make sure the wing is level and straight in relation to the mount.

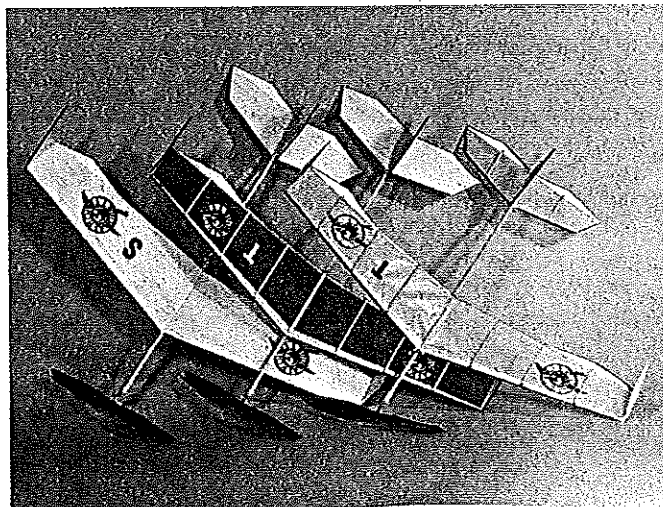
Pull off the nose assembly and roll a couple of small rubber bands onto the fuselage, leaving a space between them to set the slider down on top of the fuselage. If they are too loose, wrap them around the fuselage another time or two. You may have to make your own small rubber bands by tying off the end of a larger one and snipping off the extra. Roll them up over the ends of the slider to hold the wing at



Having fun! The Enns family of Watsonville CA built Aerodactyls on Saturday and flew them Sunday in this mass launch.



A proud Krissy shows off the model she built with a little help from Grandpa. Guess who's the proudest?



The Aerodactyl is a good "test bed" for trying out different types of wing construction and covering techniques.

about the place shown on the plan. (Fig. 3). *Do not glue the slider to the fuselage!*

Control Tabs: If you can find any old ATM (Automatic Teller Machine) receipt cards from a bank, they are lighter, stiffer, and of a better quality stock than normal a 3 x 5 card. Cut out the tabs and glue them to slightly overlap the TEs of the wing; stab, and fin. Don't try to glue along the thin edge!

Finishing Touches: Glue the tabs (5) as shown on the plan to the wings, stab, and fin.

Put the prop assembly on and oil the shaft where it goes through the prop and the nose bearing. Move the shaft to a position where the prop spins freely. Notice the "one-way" device on the very front to allow the prop to freewheel in the glide, reducing the drag.

To cut vibration from an unbalanced propellers, spin the prop a few times. If the same blade always goes to the bottom, weight the high blade with some tape. Adjust the size of the tape until neither blade goes down consistently.

All-Sheet Version: Cut out the wings, using the same outline as for the tissue wing, except with a little in-curve at the root (center). *Important:* Keep the grain direction on the wood running parallel to the LE. Mark the wings so you don't make two left ones!

Dampen the top of the wing to get it into a camber (curve) and glue the "A" formers under the wings, about four inches out from the root (Fig. 4). Take care to get them 90° to the straight TE and not to the angled LE! A pin at each end of the former will help.

Note that the winglet for the all-sheet wing has a curve at the bottom to fit the top of the cambered wingtip. Pin down the slider piece to the board and glue root former B to its center (Fig. 5). Glue one wing *halfway* over the root former.

Block up the wing tip 1 5/8 inches. A few pins stuck through the edge of the wing root can help hold it to the former until it is dry. Add the other wing, propping it up 1 5/8 inches at the tip as well.

When dry, a 1/2-inch-wide glue skin can be wiped along the join. A glue fillet should also be wiped along the underside where the wing meets the former. The wing is attached by rolling up the rubber bands on the fuselage up over each end of the slider. If the wing rocks, tighten the rubber bands.

Flying: Hold the model out and sight under the wings and tail. Steam any

accidental twists you may have in your wings or tail parts out over a teakettle, twisting in the opposite direction from the warp.

Make up a couple of 15-inch loops of 1/8-inch FAI Tan II rubber strip (which will provide high power, but a short motor run), and a couple of 21-inch loops (for low power but long runs), useful for low-power test flights and long runs when you are trying to lose your model in a thermal (bubble of rising warm air). Experiment with them both.

Tie a square knot or whatever you can tie to form the loop. Chewing some saliva into the knot before pulling it tight will prevent tearing. Have a friend stretch the loose ends while you wrap thread around them and tie that. Snip them off a little way out from the thread wrap.

Pour a few drops of rubber lube in a Ziploc bag and massage your motor in the bag. Wipe it with a clean rag if it gets too sloppy. You can use Son of a Gun from auto-parts stores, castor oil, glycerin, green soap or a commercially-available rubber lube. Pinch the hook on the prop shaft nearly shut with pliers, or close the gap with a drop of glue to keep the rubber from coming out of the hook.

To wind by hand, attach the rubber to the prop shaft hook and have a friend hold the other end of the rubber motor, leaving a little half-inch loop at the end. Stretch it double or triple its length, and wind the propeller about 200-300 turns clockwise for a test flight, walking in slowly to distribute the knots evenly.

Be careful hooking the rubber on the rear hook, as it is easy to bump the tail tabs out of adjustment. Gradually increase the number of turns you put in as the flights improve due to your trim adjustments after each try.

If you are using a mechanical winder, have your partner hold the model instead of the end of the rubber, pinching the rubber on the prop shaft hook while you

Continued on page 52

Aerodactyl

Type: FF Rubber sport/trainer

Wingspan: 15 1/4 inches

Rubber motor: One loop 1/8 Tan II
15-21 inches long

Construction: Built-up or solid
balsa.

Covering/finish: Tissue and lacquer
or hair sparay

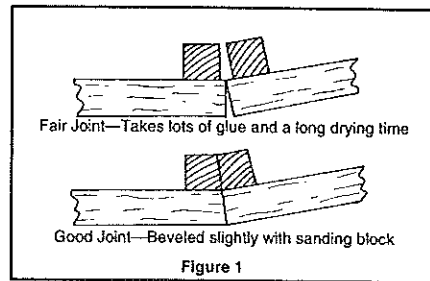


Figure 1

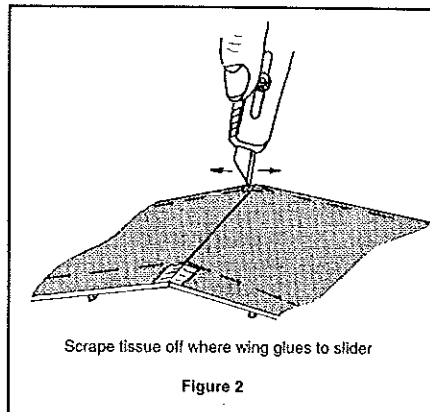


Figure 2

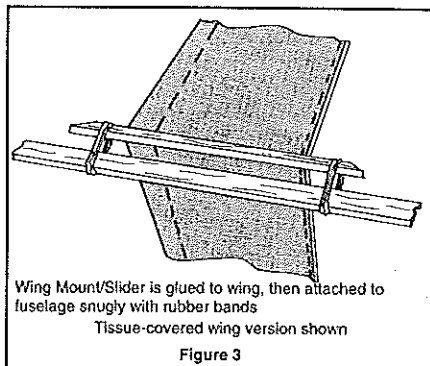


Figure 3

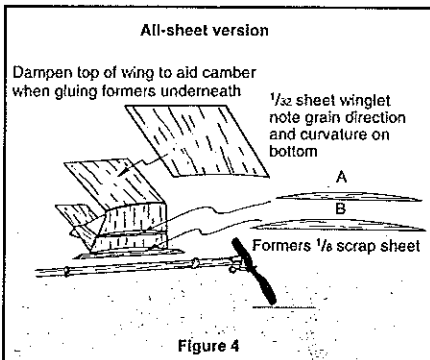


Figure 4

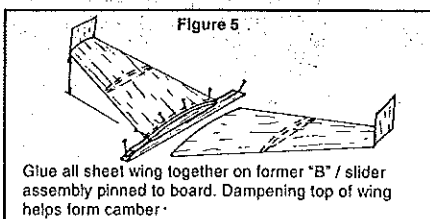


Figure 5

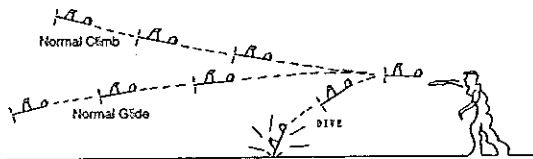
Troubleshooting Chart

No wind blowing; model launch normal

The Problem

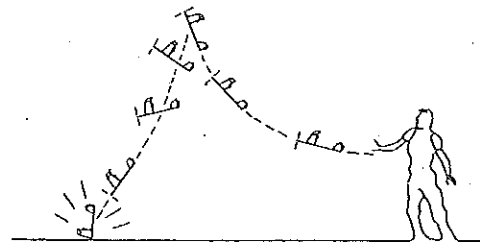
What might fix it

1. Model Dives straight in.



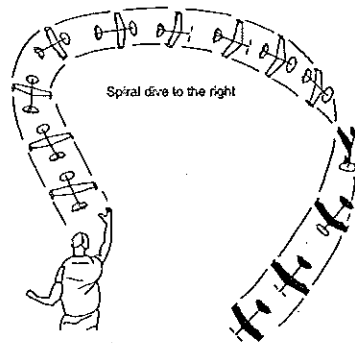
1. Move the wing forward a bit.
2. Add a thin shim ($1/32$) between the fuselage and the front of the slider.
3. Bend the elevator tabs UP a little.

2. Model stalls—nose goes up first, hesitates slightly, then drops to a dive; like a roller-coaster.



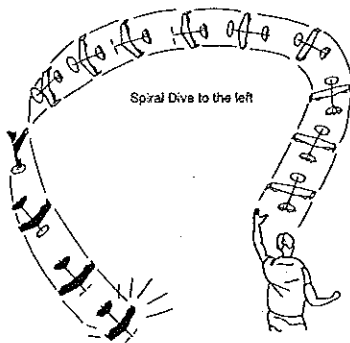
1. Move the wing back a bit.
2. Add thin shim ($1/32$) between the fuselage and the rear of the slider.
3. Bend elevator tabs DOWN a little.
4. Increase the turn by bending the rudder a little more.

3. Spiral dive to the right. Model raises its left wing—pilot's left—and finally crashes to the right.

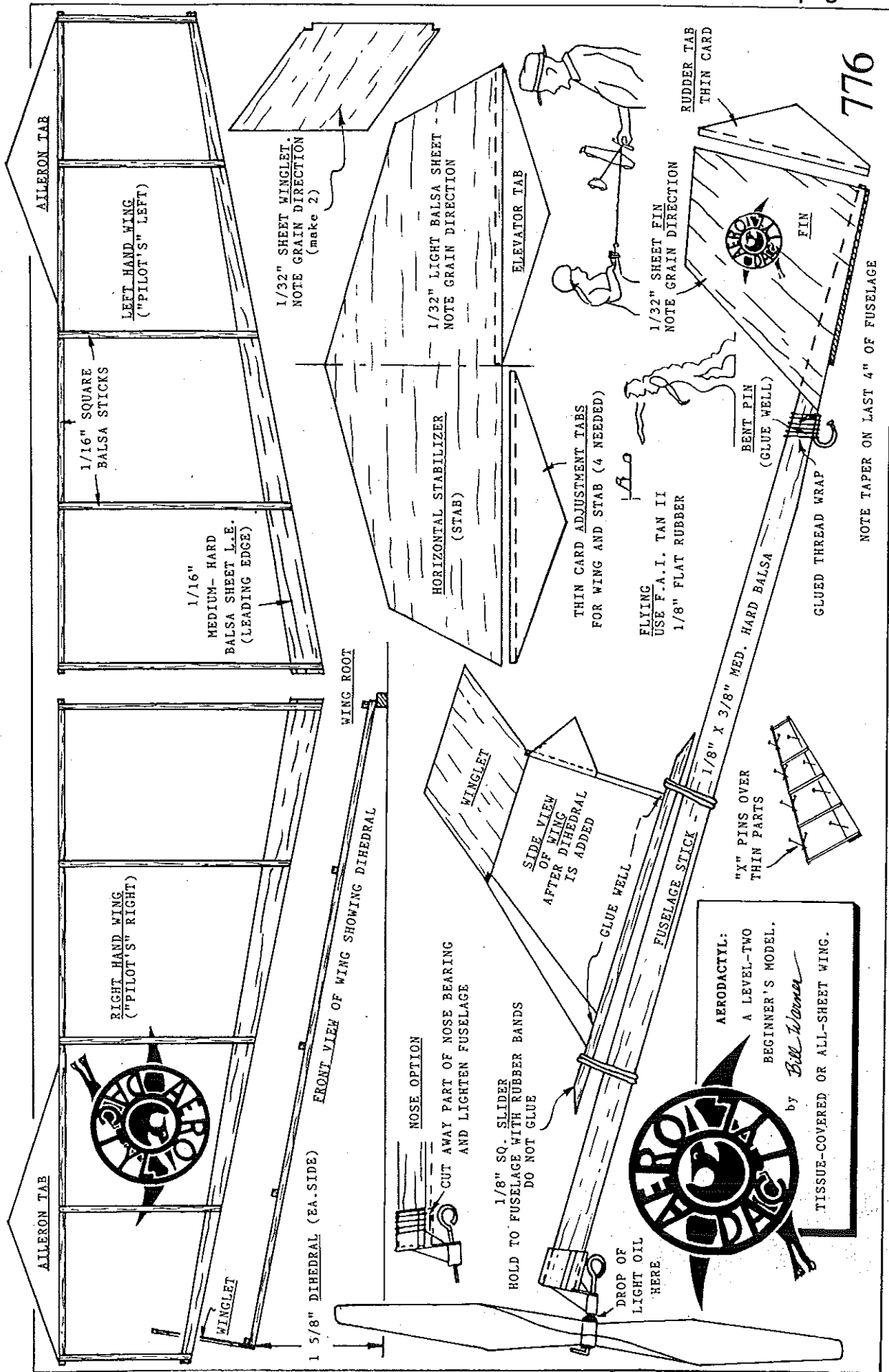


1. Hold model out and close to one eye to sight under wings to check for warps. Breathe heavily on the warped surface to apply a little moisture, and twist in the opposite direction. Recheck.
2. Bend rudder to the left a little.
3. Apply remedies for simple dive if needed once the flight path is straight.

4. Spiral dive to the left. Model raises its right wing—pilot's right—and finally crashes to the left.



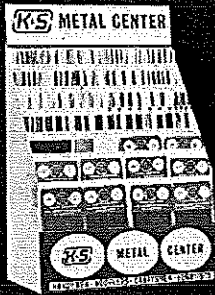
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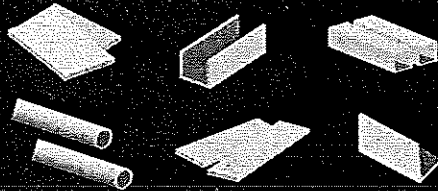
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NOTE TAPER ON LAST 4" OF FUSELAGE

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101	3/32	.35
102	1/8	.35
103	5/32	.40
104	3/16	.45
105	7/32	.50
106	1/4	.55
107	9/32	.60

ROUND BRASS TUBE (12")

125	1/16	.45
126	3/32	.55
127	1/8	.60
128	5/32	.65
129	3/16	.70
130	7/32	.75
131	1/4	.85
132	9/32	.90
133	5/16	1.00
134	11/32	1.05
135	3/8	1.15
136	13/32	1.35
137	7/16	1.45
138	15/32	1.55
139	1/2	1.65
140	17/32	1.80
141	9/16	1.90
142	19/32	2.10
143	5/8	2.20
144	21/32	2.40

COPPER TUBE (12")

117	1/16	.45
118	3/32	.55
119	5/32	.60
120	1/8	.60

SOFT BRASS FUEL TUBING (12")

121	1/8	.70
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RECTANGULAR BRASS TUBE (12")

STOCK NO.	SIZE	PRICE EACH
262	3/32 x 3/16	1.60
264	1/8 x 1/4	1.80
266	5/32 x 5/16	2.00
268	3/16 x 3/8	2.20

BRASS STRIPS (12")

230	.016 x 1/4	.40
231	.016 x 1/2	.45
232	.016 x 1	.65
233	.016 x 3/4	.55
234	.016 x 2	1.20
235	.025 x 1/4	.50
236	.025 x 1/2	.55
237	.025 x 1	.95
238	.025 x 3/4	.80
239	.025 x 2	1.85
240	.032 x 1/4	.55
241	.032 x 1/2	.60
242	.032 x 1	1.05
243	.032 x 3/4	.85
244	.032 x 2	2.00
245	.064 x 1/4	.85
246	.064 x 1/2	1.25
247	.064 x 3/4	1.70
248	.064 x 1	2.20
249	.064 x 2	3.50

SQUARE BRASS TUBE (12")

149	1/16 Square	.80
150	3/32 Square	.90
151	1/8 Square	.95
152	5/32 Square	1.10
153	3/16 Square	1.30
154	7/32 Square	1.40
155	1/4 Square	1.60

BRASS STREAMLINE TUBE (12")

122	Small	1.20
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SHEET METAL (4" x 10")

STOCK NO.	SIZE	PRICE EACH
250	.005 Brass	1.50
251	.010 Brass	1.50
252	.015 Brass	2.00
253	.032 Brass	3.70
254	.008 Tin	1.00
255	.016 Alum.	1.10
256	.032 Alum.	1.50
257	.064 Alum.	2.25
258	Asst. Brass	3.00
259	.025 Copper	4.00

BRASS ANGLE (12")

171	1/8 x 1/8	.65
172	5/32 x 5/32	.75
173	3/16 x 3/16	.65
174	7/32 x 7/32	.70
175	1/4 x 1/4	.70

BRASS CHANNEL (12")

181	1/8	.80
182	5/32	.90
183	3/16	.75
184	7/32	.75
185	1/4	.80

SOLID BRASS ROD (12")

159	.020	.15
160	1/32	.15
161	3/64	.20
162	1/16	.30
163	3/32	.45
164	1/8	.65
165	5/32	.90
166	3/16	1.00
167	.114	.50
168	.081	.50
169	.072	.30

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Aerodactyl/Warner

Continued from page 49

wind from the rear. Have him/her hold the tail out of the way so that if the motor snaps it will not harm these important surfaces.

To hook up the wound motor, grip the rubber about an inch from the winder hook and let the winder dangle, letting a loop unwind to make it easier to hook it on the model. Give the winder to your partner instead of dropping it on the ground where it will get lost or stepped on.

Launching: Bend the left-hand (as seen by an imaginary "pilot" in the cockpit) aileron tab down about as far as a nickel is thick, and bend the rear of the rudder the same amount to the left. This should give you a left-hand climb under power, with the "down" aileron keeping the left wing from dropping too much. Are the elevators and the right aileron flat?

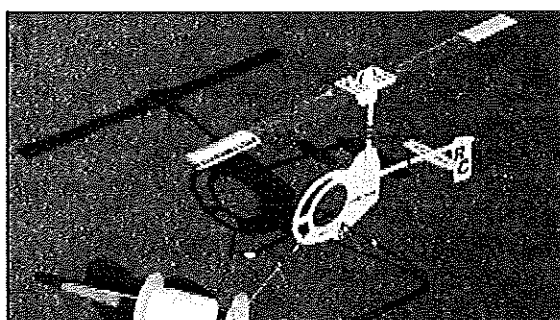
Hold the model *under* the wing, not behind it, using the hand you write with. The other hand holds the propeller. Check the prop hook area and pull any knots backwards away from the hook so they won't bind and stop the prop from turning.

Release the prop, count one second, and then toss the model lightly forward to get up to flying speed with the nose just a little above the horizon. Never *throw* the model hard or aim it too high, as it will stall for sure.

Important: Carefully note what the model does (dive, climb steeply, then dive, roll right, spiral dive left, etc.). If you are not sure exactly what the plane did, you will not know what to try to change to fix it. Refer to the Trouble-Shooting Chart for suggested remedies to problems.

Cautions: No model is worth getting hurt for. Never run out into the street to save its life when a car is coming, and never take risks climbing strange trees. Throwing a weight on a string over the branch and yanking until the model falls works sometimes.

When chasing models in tall grass, etc.



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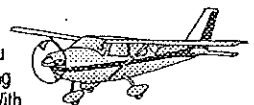
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beware of disease-causing ticks. Wear trousers tucked into your socks and spray your sock area with a repellent such as "Deet."

Sun block should be always be used when you are out flying to prevent skin cancer later on, and take plenty of water with you on hot days. Have fun, but don't take stupid risks.

Where to get the stuff to build and fly Aerodactyls: If your local hobby shop doesn't have what you need, write Peck-Polymers, Box 710399, Santee CA 92072, or call (619) 448-1833 about a materials package Sandy Peck has put together with the stuff to build both of the models in this article.

More Information: There are a few fine beginner's books available, plus many excellent plans and good sources of supplies, clubs, and information. I try to keep track of these in my computer, and have more than 200 listings with my comments on each. To get a copy, send a dollar (to cover printing) and a legal-sized envelope with 52 cents postage on it to Bill Warner, 1370 Monache Ave., Porterville CA 93257.

Materials Needed to Make Both Models:

- Four sheets 1/32 x 3 x 18 light balsa
- Two 5 1/2 to 7-inch plastic propeller assemblies
- Two 1/8 x 3/8 x 18 tough "B" grain balsa, medium hard
- Four 1/16 square x 18 hard balsa sticks
- One 1/16 x 3 x 18 medium-hard balsa sheet
- One sheet of model tissue
- One tube Testors Green Tube Cement for Wood Models (#3506)
- 25 feet of FAI Tan II 1/8-inch flat rubber

The above materials, which will allow you to build and fly both the tissue- and sheet-covered models, may be obtained from Peck-Polymers, Box 710399, Santee CA 92072; Tel.: (619) 448-1818; fax (619) 448-1833, for only \$10 including postage. Mention that you want the "materials kit for the Aerodactyls mentioned in *Model Aviation*."

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___	RED MAX 12	16.18	11.33	11.00	10.11	9.06	347.55	___
___	RED MAX 15	17.23	12.06	11.72	10.77	9.65	390.21	___

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___	RED MAX 30	20.70	14.49	14.08	12.94	11.59	530.60	___
___	RED MAX 40	23.24	16.27	15.80	14.52	13.01	633.39	___
___	RED MAX 50	25.78	18.04	17.53	16.11	14.43	736.18	___
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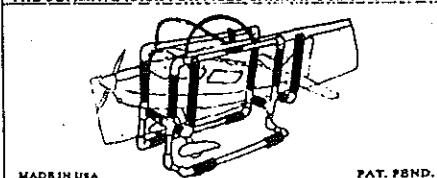


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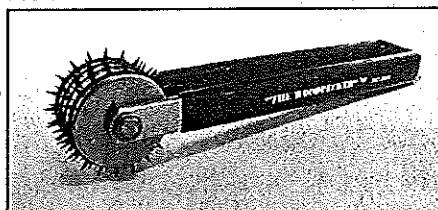
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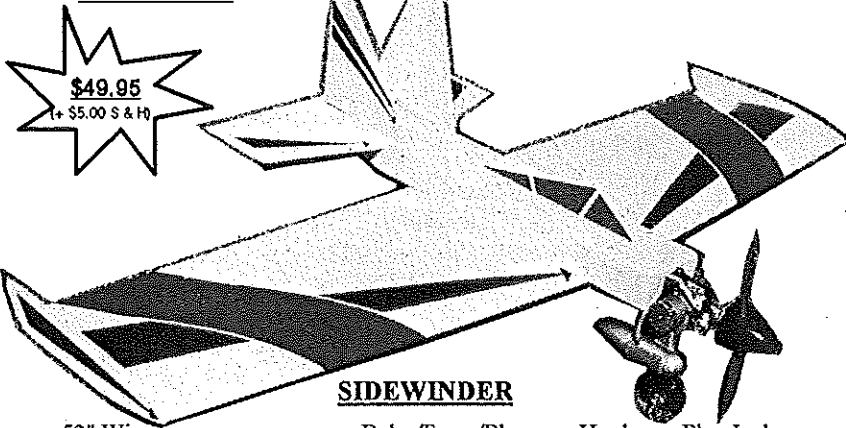
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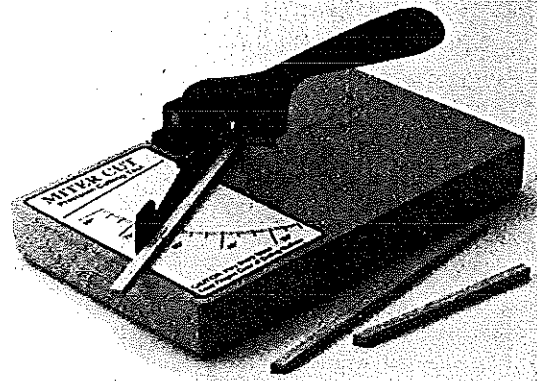
The Miter Cut allows the craftsman to make accurate cuts in both wood and plastic.

The adjustable fence swings through an arc of precise degree marks with a positive stop at 90°. This allows the modeler to make accurate repeatable cuts for tight fits on mitered corners.

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Sandy Peck says she'll throw in a free catalog worth \$4 too, which lists a lot of other stuff that any beginner should have: building boards, mechanical winders, rubber lube, and lots of kits and plans for beginners working their way up. Keep in mind that if you are reading about this offer in 1995, the price may be a bit higher.

Supplies You Can Find Locally:

- About 3 x 5 of thin card stock
- Rubber lube such as drugstore glycerin and green soap (mix together), castor oil, or Son of a Gun (auto-parts store)
- Spray can of clear lacquer or lacquer hair spray
- Glue stick: UHU or equivalent or white glue to attach covering
- Dressmaker pins
- An X-Acto 8B orange plastic flat model knife with a two-ended retractable blade (hardware or craft store). Use a single-edged razor blade in a pinch.
- Light oil, such as 3-In-One.

Useful (But Not Essential) Stuff

- Scotch tape
- Sanding block, approx. 1/4 x 1 x 6 with 100-grit garnet paper glued on one side and 220-grit on the other
- Mechanical rubber motor winder. Can be purchased or made from a Fiskars hand drill using a bent-nail hook with the nail head in behind the chuck jaws for safety. →

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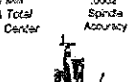


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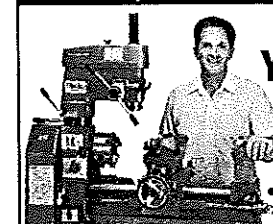
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