U.S. Navy PAGE RACER

Curtiss Hawk AE-3

By TED SCHREYER. . .This small scale R/C model is an accurate version of the Navy's biplane fighter that was modified to a monowing in order to compete against the Army in the Thompson Trophy Race in 1930.

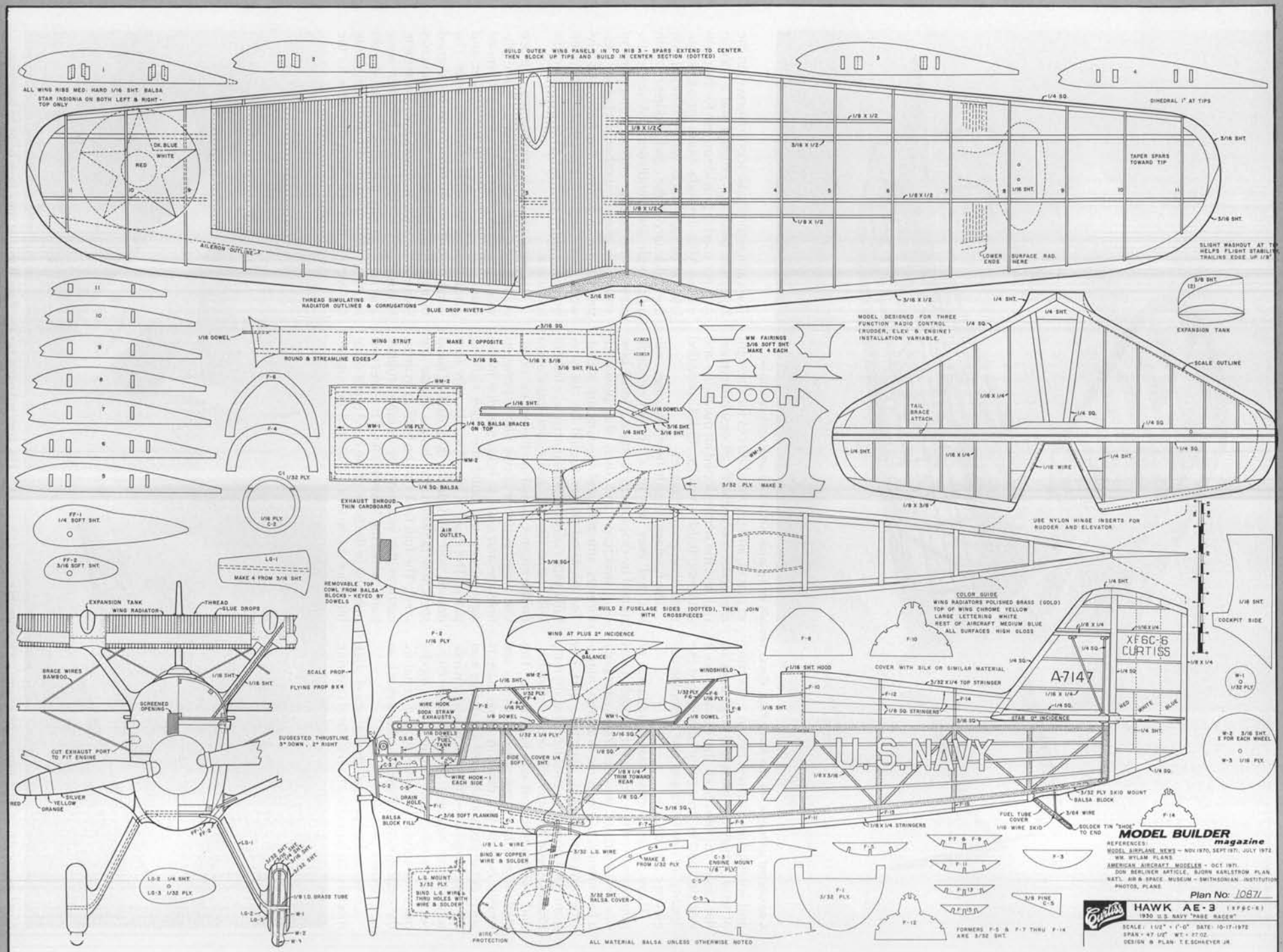
• Is there an aircraft with more personality, historical "pizzaz," or natural features for a really great scale model than the Curtiss Hawk AE-3 (XF6C-6), also known as the "Page Racer"? Probably. But this streamlined racing machine with the classic lines, Navy colors, polished brass wingskin radiators, teardrop wheelpants, bullet nose, and stable aerodynamic planform certainly ranks up there with the best.

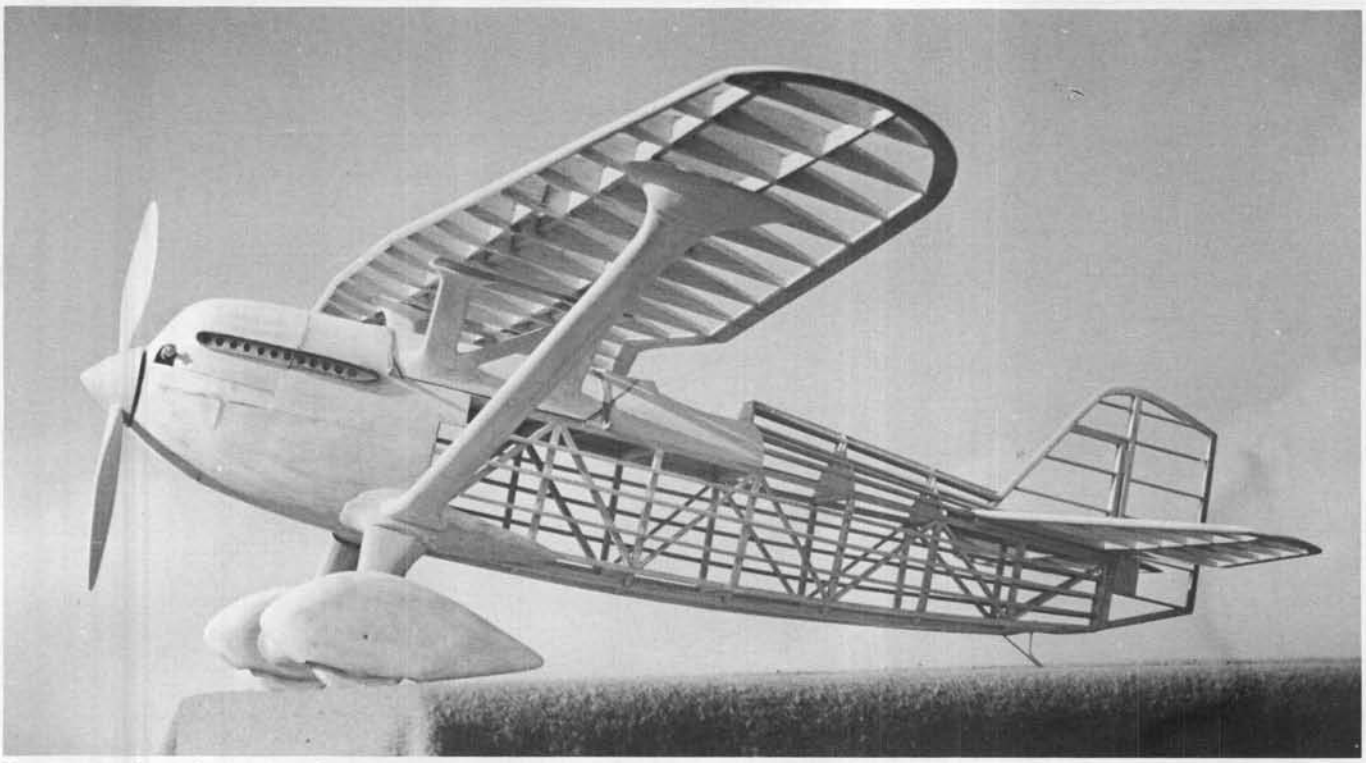
The Page Racer, despite its sleek looks, was actually a standard Navy fighter biplane that was given a quick but extensive reworking into a racing monoplane to compete with the Army and civilian racers in the Thompson Trophy Race scheduled for September 1, 1930, in Chicago. By removing the lower wings, streamlining everything hanging out in the breeze, installing a 740 hp Curtiss Conqueror engine, and using external radiator skins on the wing, the Hawk AE-3 could do well over 220 mph. Capt. Arthur H. Page flew the XF6C-6 in the Thompson and was well in the lead after 17 laps with only three to go when his plane veered off course and crashed. Capt. Page, who died as a result of the crash, had been overcome by carbon monoxide from exhaust fumes and lost control of the racer. Despite a tragic ending, the Page Racer became popular with modelers, and at least two companies, Cleveland and Lindberg, put out kits of the plane.

Author's wife, Sumi, with the AE-3. The Hawk is another example of a good-looking and good-flying small scale R/C model.

When contemplating designing the Hawk AE-3 as a lightweight radio controlled model, a number of problems surfaced. For one, the model engine would be enclosed by the cowl, so a way to get air in and out of the cowl was needed. And the high wing on struts was a design problem specially when this unit had to be removable for access to the inside of the fuselage where the R/C equipment is located. But the thing that bothered the most was how to simulate the wingskin radiators without incurring a lot of unwanted weight. These problems were given a lot of thought, and what seemed to be the best practical answer to each situation was chosen, although other ways of doing it might suit you better. The saying, "a lot of ways to skin a cat" applies. Sorry, Garfield!

The original model was strong enough for fun flying and light enough to fly well and have a floating glide, but with rudder-only R/C control, the landings on tarmac sometimes went over on the nose. And landing in the tall grass saved the spinner


BUILD OUTER WING PANELS IN TO RIB 3 - SPARS EXTEND TO CENTER. THEN BLOCK UP TIPS AND BUILD IN CENTER SECTION (DOTTED)
ALL WING RIBS MED. HARD 1/16 SHT. BALSA
STAR INSIGNIA ON BOTH LEFT & RIGHT - TOP ONLY
DK. BLUE
WHITE
RED
DIHEDRAL 1" AT TIPS
TAPER SPARS TOWARD TIP
AILERON OUTLINE
LOWER ENDS SURFACE RAD. HERE
SLIGHT WASHOUT AT TIP HELPS FLIGHT STABILITY. TRAILING EDGE UP 1/8"
THREAD SIMULATING RADIATOR OUTLINES & CORRUGATIONS
BLUE DROP RIVETS
MODEL DESIGNED FOR THREE FUNCTION RADIO CONTROL (RUDDER, ELEV. & ENGINE) INSTALLATION VARIABLE.
EXPANSION TANK
WING STRUT
MAKE 2 OPPOSITE
ROUND & STREAMLINE EDGES
WM FAIRINGS 3/16 SOFT SHT. MAKE 4 EACH
SCALE OUTLINE
TAIL BRACE ATTACH.
1/16 WIRE
1/4 SQ. BALSA BRACES ON TOP
3/32 PLY MAKE 2
USE NYLON HINGE INSERTS FOR RUDDER AND ELEVATOR
EXHAUST SHROUD THIN CARDBOARD
AIR OUTLET
REMOVABLE TOP COWL FROM BALSA BLOCKS - KEYED BY DOWELS
BUILD 2 FUSELAGE SIDES (DOTTED), THEN JOIN WITH CROSSPIECES
COLOR GUIDE
WING RADIATORS POLISHED BRASS (GOLD)
TOP OF WING CHROME YELLOW
LARGE LETTERING WHITE
REST OF AIRCRAFT MEDIUM BLUE
ALL SURFACES HIGH GLOSS
COCKPIT SIDE
COVER WITH SILK OR SIMILAR MATERIAL
EXPANSION TANK
WING RADIATOR
THREAD
GLUE DROPS
BRACE WIRES BAMBOO
SCREENED OPENING
CUT EXHAUST PORT TO FIT ENGINE
RED
SILVER
YELLOW
ORANGE
SCALE PROP
FLYING PROP 8X4
SUGGESTED THRUSTLINE 3° DOWN, 2° RIGHT
WING AT PLUS 2° INCIDENCE
BALANCE
WINDSHIELD
WIRE HOOK
SODA STRAW EXHAUSTS
SIDE COVER 1/4 SOFT SHT.
WIRE HOOK - 1 EACH SIDE
DRAIN HOLE
BALSA BLOCK FILL
3/16 SOFT PLANKING
1/8 L.G. WIRE
BIND W/ COPPER WIRE & SOLDER
L.G. MOUNT 3/32 PLY
BIND L.G. WIRE THRU HOLES WITH WIRE & SOLDER!
WIRE PROTECTION
3/32 L.S. WIRE
MAKE 2 FROM 1/32 PLY
C-5 ENGINE MOUNT 1/8" PLY
3/32 SHT. BALSA COVER
ALL MATERIAL BALSA UNLESS OTHERWISE NOTED
XF6C-6
CURTISS
A-7147
27
U.S. NAVY
STAB 0° INCIDENCE
1/8 X 1/4 STRINGERS
3/32 PLY SKID MOUNT
BALSA BLOCK
3/64 WIRE
SOLDER TIN "SHOE" TO END
FUEL TUBE COVER
1/16 WIRE SKID
FORMERS F-5 & F-7 THRU F-14 ARE 3/32 SHT.
3/8 PINE C-5
W-1 1/32 PLY
W-2 3/16 SHT. 8 FOR EACH WHEEL
W-3 1/16 PLY
MODEL BUILDER magazine
REFERENCES:
MODEL AIRPLANE NEWS - NOV 1970, SEPT 1971, JULY 1972. WM. WYLAM PLANS.
AMERICAN AIRCRAFT MODELER - OCT 1971. DON BERLINER ARTICLE, BJORN KARLSTROM PLAN.
NATL. AIR & SPACE MUSEUM - SMITHSONIAN INSTITUTION PHOTOS, PLANS.
Plan No: 10871
HAWK AE-3 (XF6C-6)
1930 U.S. NAVY "PARE RACER"
SCALE: 1 1/2" = 1'-0" DATE: 10-17-1972
SPAN = 47 1/2" WT. = 27 OZ.
DESIGN & PLAN: T.E. SCHREYER JR.



Completed airframe for the Navy Page Racer reveals its relative simplicity and nostalgic looks.

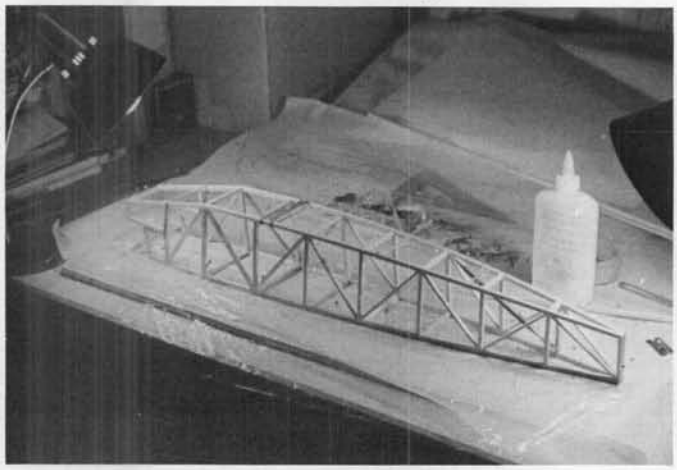
and wheelpants, but resulted in a covering of seeds, chaff, dry grass and bugs stuck in the castor oil film from the exhaust. So it was decided to stray even further from the "purity" of free flight and add control to the elevator and engine.

There is an almost overabundance of information on the AE-3, even though it was one-of-a-kind and was destroyed after only a few months of life. Scale drawings, magazine articles, photos, sketches, and kits from days gone by constitute the sources. Photos seem to offer the most reliability, and the Smithsonian can help there. The Wylam and Karlstrom scale drawings are similar overall, but differ in some aspects such as the juxtaposition of the rudder and elevator hinge lines, the extent of the windscreen and headrest, and fuselage cross sections around the engine. This model does not sport a lot of detail, but certainly the opportunity is there to add as much as one desires.

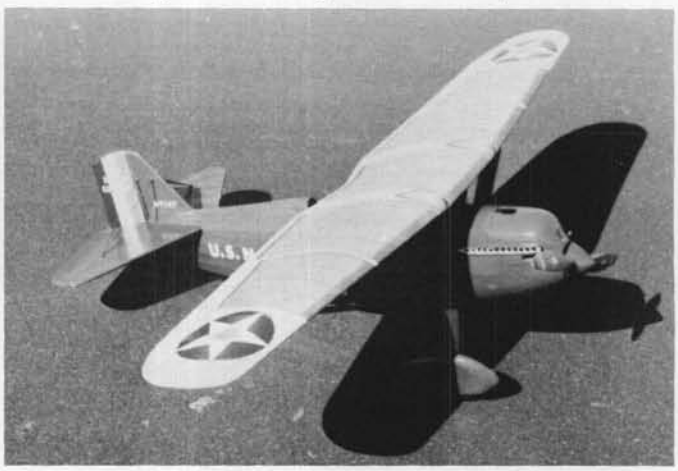
Construction is basic balsa wood stick model with balsa blocks and sheet covering in places, and plywood pieces for strength; the model covered with silk or similar material; and the whole doped for durability and authentic finish. An O.S. .15 R/C provided more than enough power.

The fuselage is made from two sides constructed over the plan (shown shaded), joined by crosspieces to make a long, box-like structure, and then the plywood, formers, stringers, and sheeting are added. The plywood pieces should be cut carefully, especially the nose pieces, as a tight fit will ensure strength and a good foundation for the engine. In making the engine cowl, use waxed paper or plastic film in between fuselage and cowl to keep the glue in the right place, and build the cowl right in place. The cowl is keyed in place by four dowels and held down by a rubber band stretched between the hooks inside the cowl. The fuel tank can be held in foam to cushion the vibration by another rubber band across the lower hooks. The screened opening in the front of the cowl is not scale but is needed to let air in to cool the engine. The carburetor intake scoop (shown on the Karlstrom plan) was omitted and a hole in its place used to provide an exit for the cooling air. Also, the soda straws used to simulate the exhaust stacks were extended into the inside face of the cowl and left open to help with the ventilation. When completed, the entire engine compartment should be given a number of coats of fuelproof dope to prevent the balsa and plywood from getting saturated. The drain hole is to allow excess fuel or exhaust drips to escape.

The wing mount is constructed in place on the fuselage ala the cowl. Set the plywood pieces in place, add a few 3/16 square balsa strips longitudinally for support, and plank the outside with 1/16 balsa sheet. The wing mount pieces WM-2 can be aligned by temporarily setting in the upper notches some of the wing spar material. Since there is not much working room between wing and fuselage top, the wing mount should be in an almost-finished condition before the wing is attached. Also, the same for the



Fuselage construction is typical box-type stick assembly.



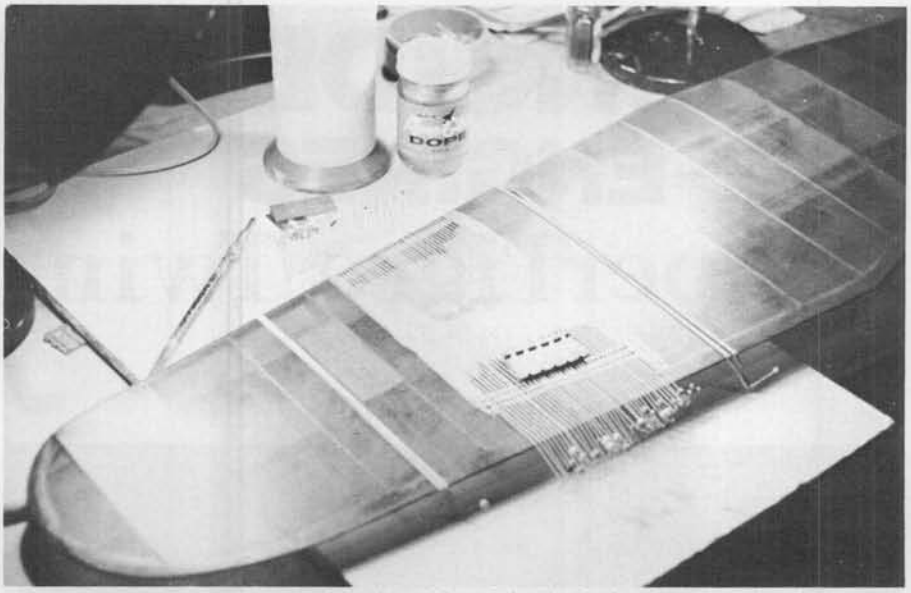
The assorted parts for the Page Racer as they look prior to covering.

wing.

The fuselage should be completed with the landing gear wires in place and then sanded and covered and doped. After which the landing gear fairing can be shaped and glued to the sides of the fuselage. The wheels are made by sandwiching plywood and balsa. The wheel assembly is then chucked in an electric drill (use a 1/8 machine screw and nuts to hold wheel) and turned down with sandpaper to the required cross section. Always wear eye protection when using a rotating tool. Epoxy in a piece of 1/8 i.d. brass tubing as an axle bearing. The landing gear legs and wheelpants are epoxied to the landing gear wires, but don't forget to put the wheels inside the pants before gluing.

The wing is built in two outer wing panels on the plan, then when complete and dry, the center section spars and ribs are put in place while the tips are blocked up one inch each. A great deal of care must be given this operation to assure that the parts all fit correctly, that there is no twisting built into the wing (with the exception of a small amount of washout in the wingtips), and that things are square fore and aft. The entire wing is then sanded and covered and given a few coats of dope. The near-scale dihedral even though looking "flat" is sufficient to provide stability and need not be increased.

The wingskin radiators are simulated by thread glued or doped on the silk covering, after which small glue droplets are added to represent the rivets, and the whole unit given a number of gold dope coats. This looks good and adds little weight. First the corners of the radiators are marked on the wing surface by soft pencil or felt pen. Then glue or dope thread on for the radiator perimeters using masking tape to hold the ends of the thread while the radiator part is being glued, after which a very sharp blade is used to cut off the surplus thread. Once the outlines are done, the long parallel lines of thread can be stretched over the wing from front to back and glued in place, and when dry the excess ends cut off. Since there are a whole lot of radiator sections with similarly spaced corrugations, a jig was made by putting small nails in two lines about a foot apart and stretching the thread back and forth over the wing from nail to nail. Make sure the wing is held down firmly, space the threads, and use fast-drying glue to tack down the front and rear locations of the threads, then carefully dope the threads to the radiator section, and cut off the excess. Try a number of different thread types to find which is better for doping to the covering as some thread gets fuzzy or tends to unwind. It's not necessary to have a heavy thread. The rivets were made from an old bottle of Sig yellow glue with the applicator tip allowing just a small blob to appear and be deposited for each rivet.



Method for simulating the wing radiators uses thread that is glued or doped on the silk covering. Glue drops simulate rivets, and the whole area is given a number of gold-color dope coats.

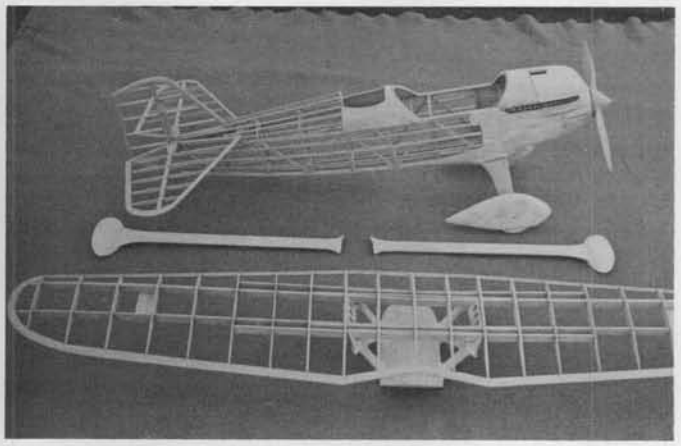
Another very important part of the construction process is the assembly of the wing onto the wing mount. Cut holes in the wing covering on the bottom so the wing mount pieces fit into the wing, and with the wing mount held solidly in place on the fuselage, line up the wing from the three directions; front, top, and side, and rear if that gives you a better perspective. If things don't line up properly, trim and shim the wing mount ends so they do. Probably having the stabilizer attached to the fuselage will help in getting the wing on right. Small pieces of silk can be doped around the wing mount fairings to seal the holes.

The tail pieces are built in the conventional manner and covered with silk and given a few coats of dope preparatory to mounting on the fuselage. The wing struts need to be finished in place while the wing and fuselage are together to make sure the end fairings fit snugly to wing and fuselage. These wing struts are held in place simply by dowel or bamboo keys that can't come out as long as the wing is tight on the fuselage. Many flights were made and no problems were encountered with the struts.

Finishing the model was done by giving any bare wood a couple of coats of talc/dope to seal the pores, and the whole model at least two coats of clear dope if not already done. Here again there were different calls for the basic color of the aircraft with most sources saying "Navy blue," but the Smithsonian said "Royal blue." The photos give another impression of the light shade of blue than Navy blue. As a compromise, a medium shade of blue was mixed from "Bonanza blue" with about five percent black added to tone it down. Better mix more than you will use so there will be some left over for touch-ups later on. Also from the photos, the rudder stripe colors are reversed from the usual plan presentations. The upper wing is a bright yellow or yellow-orange, while the lower surface is blue. The radiators are gold, and the large lettering is

Continued on page 70

Side view of the Racer shows off to good advantage its markings. The rudder colors are blue, white, and red, in that order.



Upper wing is a bright yellow or yellow-orange, and the lower surface is blue. Radiators on top of wing are gold in color.

Inputs. . . . . . *Continued from page 32*

inside front of the transmitter case as additional insurance. (Photo No. 5) Sorry it doesn't show up too well in the photo (see arrow).

6. When you are ready to reassemble the transmitter, *carefully* slide the side panel almost into position, and reconnect the Ni-Cd pack. Then slide the panel back firmly into place.

7. When you turn the transmitter on, the monitor lamp on the front will blink on and off. Don't panic, this simply tells you that the memory settings have been lost. Turn the switch off, and back on again, and the system should operate normally. If not, pray that it's only the fuse and go back to Step 1! Don't neglect to set the ATV and Fail Safe before flying again.

There is at least one other area where you can go wrong. Futaba supplies some rubber feet to go on the transmitter back. Unfortunately, the screws they supply (which are intended to replace the standard screws holding the transmitter back in place) are too short. Be careful when substituting! If your screws are a little long, the end can contact a board or component inside and short the system out. (Yes, I've done that too!) The most likely spot is the upper right corner (viewed from behind).

My old Kraft Signature Series transmitter had room enough inside for my clumsy fingers and probably a stash of extra glow-plugs and a peanut butter sandwich. These new high-tech transmitters are a whole different ballgame. Unless you have a steady hand, some experience, and are very careful, you're better off leaving the access panel in place. I hope this information saves some of you some lost flying time. See you next month. •

Page Racer. . . *Continued from page 19*

white. A scale prop and spinner were carved out of soft pine to give a better look when on display, while the standard nylon prop and spinner were used when flying. When all the color doping is done and the lettering and other details have been added, give the model at least a coat of gloss dope, as the original aircraft had a high-gloss finish.

Before attempting any flying, make sure the flying surfaces are not warped and are pointing in the right direction, etc. Also, be sure the model balances at or near the point shown on the plan, shifting interior weights, such as battery pack, to achieve same. The model was tested by hand-launching into a glide over very tall grass. It should glide out without any tendency to dive or stall or turn. Once the glide is satisfactory, and with rudder and elevator control, it should be easy to crank in a bit of trim to adjust the glide, a powered flight is in order. Again, hand-launching was used to make sure the model was in the air and flying on the first powered flights. Once the model is trimmed out and the pilot has become familiar with the model's flying characteristics, takeoffs from a paved area can be tried. All takeoffs, hand launching, and landings must be *into* whatever breeze is blowing. Best of luck! •

Ichiban. . . . . . *Continued from page 53*

in left-hand circles, and use about 1/16 inch of right thrust to keep the diameter constant. Without it, torque tightens the left turn at the beginning of the flight, then the circle opens up as power runs down. And speaking of circles, you'll find you need a fair amount of rudder offset on this model 'cause the big canopy blankets the rudder quite a bit. Attach the rudder to the fuselage with a strip of tissue on the left side only, then glue a couple of pieces of copper wire on with white glue. The wire will do a good job of holding the rudder setting, while allowing it to be changed easily.

With the wing and tail incidence as shown on the plan (three degrees positive on the wing, zero on the tail), I needed about 1/8-inch downthrust with the model balanced as indicated. Three degrees of decalage produces quick recovery if the model hits the ceiling or is upset by turbulence, but requires a fair amount of downthrust to compensate. Some people prefer less decalage and a more rearward balance point, but I like the built-in stability of the setup shown. Also, an aft balance point on a low-wing model can make it a little hairy in pitch.

The final bit of trim is to add a whole bunch of wash-in (leading edge up, trailing