Mac's Minnie

This aroused great interest among many modelers who have seen it. We present the plans here. Even if you don't want to make an exact copy you can get general dimensions from Minnie and alter her appearance to suit you.

Since we'd had very good results from previous mid-wingers, we felt a 2-footer of this style would be a good choice. The large open cockpit worked out well; it is plenty large to take any equipment we want to put in. As the plans were sketched Minnie looked more and more like a diminutive Goodyear racer, so we added a plastic canopy, pilot, and cheek cowls to further the illusion. Engine was side-mounted to give the model an exceptionally "clean" look from the side as well as top and bottom.

Power plant had to be the little Cox .020. At the outset we wondered whether this engine would have the pep to carry a model of 9 to 10 oz., and afford decent• As described last month, our initial experiments in the field of Quarter-A sized R/C plans were with a tiny mid-winger. climb and performance. The Pee Wee acted and sounded so peppy on a test stand that we made the nose practically a glove fit for it; a larger engine couldn't be installed even if it were required. It turned out that any worries as to the potency of the engine were groundless. It pulls the plane along at a lively clip. The side mounting produced no problems at all, and as we had hoped, most of the engine exhaust oil dribbles down the right side of the fuselage, rather than going over the top with a possibility of leaking into the forward hatch or under the wing.

Since ,we covered both escapement and proportional control systems in the previous article, we won't go into that here. The fuselage was made wide and deep enough to carry any equipment we thought might be needed: if you have ideas for something else in this line, better check to make sure you can get it in. If not, widen or deepen the fuselage to suit.

In the model shown, proper balance was achieved with the R/C parts ar-ranged as follows: Deltron R109 receiver (less case and Gem relay) mounts vertically against bulkhead 2 on 1/2" thick foam rubber pad. Single Eveready 505 22-1/2 V B battery with Acme No. 4 holder goes under the forward hatch. Gem-escapement mounted at rear of cockpit just below former 1; when heavier Price relay-actuator was installed, this had to go forward some. If you use other equipment, shift things around to get the right balance—it's a lot better to do so than add weight to nose or tail!

Table of Weights

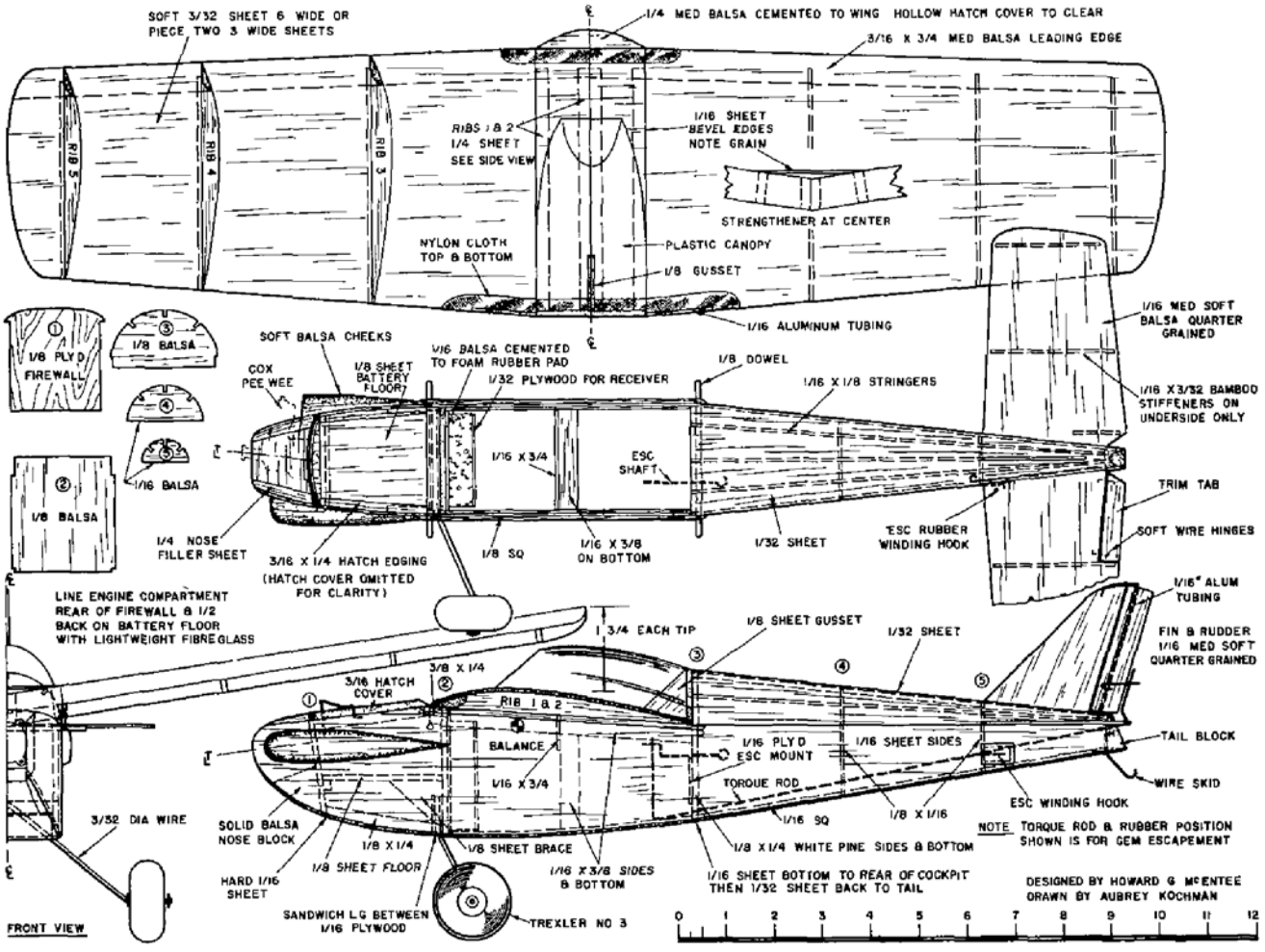
Fuselage with tail surfaces, landing gear (no wheels), hatch cover, but no engine, radio gear, torque rod or dope	1.95oz.
Same, but with one coat filler-----	2.07
Same, but completely papered (includes two coats clear dope used to put paper on)	2.18
Same, 7 coats aluminum dope on fuselage, 2 of dyed dope and 3 of clear on stab	2.40
Same, but with wheels, engine and Prop	3.50
Wing finished but no dope ------ .. _	1.15
Same, 1 coat filler	1.27
Same, papered (inc. 2 coats clear dope)	1.36
Same, with 2 coats dyed dope, 4 coats clear, 7 of aluminum on center section	1.58
Same, with pilot and canopy—finished wing ready to fly	1.78
Complete plane ready to fly, less all radio equipment	5.28
Lightest possible radio installation	3.10
Fiberglass added to nose of fuselage, see text	1.00

There is plenty of room in the battery hatch for more than one battery or cell. Directly below it is a large space that could be used if what you want to put there doesn't weigh too much.

Weight should be paramount in the

builder's mind *every moment* he is working on a plane like this. Use soft balsa throughout (unless otherwise noted on the drawings); be sparing with the cement. We have included a table of weights to show what various parts ought to scale, and what papering, doping and finishing will add. Shoot for a finished weight of no more than 9 oz. The plane has a wing area of about 100 sq. in., not counting the part blanked by the fuselage; 9 oz. will thus give a wing loading equivalent to about 13 oz. per square foot. This sounds light by larger R/C plane standards, but things are certainly nowhere near as efficient in this small size.

Since we doubt if any beginners will build a plane of this size (and hope they *won't)* we will give only brief construction notes. After the two sides have been cut, we wet them well and blocked them up with about the same curvature they would have in the finished model. When dry, assembly was started by attaching the 1/16" square at the lower edge of each side, and the[1] vertical strips at formers 3-5. Then one side was laid flat and former 3 with its matching lower crosspiece, and bulk-head *2* were cemented on vertically (fuselage sides are flat and equidistant between these two positions). The



remaining side was added, fuselage set upright, and all other formers and cross strips back to the tail added, as well as tail block.

Note bulkhead 1, which acts as the firewall, is set at a considerable angle so that motor down-thrust is built-in. You can angle it to give the required right thrust if you want, but this makes it tricky to fit properly.

Turtle deck was applied in a single sheet; this was cut oversize, dampened thoroughly, bent over the formers till dry, then trimmed to exact size and fastened on. The bottom sheeting should be left off till you have torque rod and other parts all settled.

Landing gear wire was 1/16" dia.; even though it will have a bit more weight we feel 3/32 wire is a better choice. The wheels are placed far enough back so that the little plane will make nice ROG's; because of this rearward placement she can nose over easily if the ground is rough, so rather hard sheeting was used from nose back to LG with *lightweight fiberglass* halfway back. Fiberglass also lines the engine compartment, back of bulkhead 1, and runs 1/2" back on top of battery compartment floor. This aids tremendously in fuel-proofing the nose and also helps tie the whole works together.

As seen in the table, the fiberglass doesn't add too much weight either. The four holes through the bulkhead for the motor mounting bolts are most vulnerable to fuel seepage; they were therefore made a bit oversize and given two treatments with fiberglass resin, applied with a pipe cleaner. A lot of fussing to be sure—but we feel well worth the trouble if it will keep the fuel outside where it can be wiped off easily. And it really does!

The stab is made in a single piece and cemented right along the top edge of the side pieces; the fin goes into a slot in the turtle-deck sheeting; is cemented there and to the stab. Since we hoped to operate the rudder with high resistance escapement or actuators direct from the receiver output (without the usual sensitive relay and low voltage circuits) the rudder was given consider-able aerodynamic balance. It is pivoted about 1/3 back from the leading edge. A length of 1/16" dia. aluminum tubing runs all the way through; this is roughened with a file, then laid flat on a piece of wax paper, and the front and rear pieces of 1/16" thick balsa cemented to it. Make sure the tubing is absolutely straight before you do this; cut and bend the pivot wire that goes through it to be sure there will be no binding.

The wing is made of two matching halves which are cut, dampened and bent by hand to the approximate curve. The leading edge/"spar" is cemented in place, then all the ribs attached. Make certain you don't get any unwanted twist in the wings panels when you do this! Next, bevel the center ribs and cement the two wing halves together. We applied a sheet of 1/16" balsa with the grain running crosswise over the center of the wing, beveling the edges to get a smooth fit. The wing may break some-p/ace, but it never will at the center joint! Pilot and canopy were installed after all doping was finished.

All wood was sanded smooth, then a rather thin coat of balsa sealer applied to close the pores. Another light sanding followed, then light weight Jap tissue was put on all external surfaces. This adds quite a bit of strength, makes it possible to get a well-sealed surface without too many coats of dope. It also seems to prevent any warp age of the wings, which hold their shape perfectly.

The side view shows approximate balance point. If your plane is a bit different you can probably make sufficient correction with the trim tab on the stab. The plane seems to fly nicely on the Pee Wee plastic prop; if you prefer a nylon type, try either the Tornado 5-3 or Top Flite 5-1/4-3 (used as is or cut down to 5" dia.). The latter two will re-quire a bushing to fit the Pee Wee properly. Check all props for balance before you use them!

It will be seen from the weight table that the complete plane ready to fly, but less all radio gear and wiring, grosses about 5.28 oz. Total weight of the lightest complete. R/C installation (receiver less case and relay, Gem-escapement, battery and case, all wiring) was 3.10 oz., so our plane totaled 8.4 oz. in its lightest form. If you can hold it to 9 or even 9-1/2 oz., we feel you will still have fine performance.