Designer and bird.

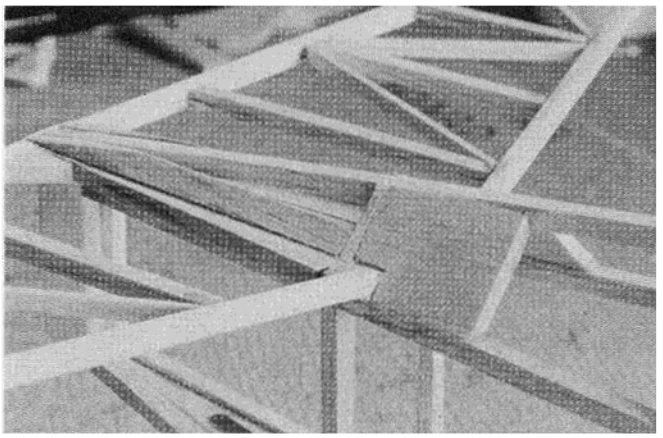
COMET RED RACER

A nostalgic classic from the 1930's

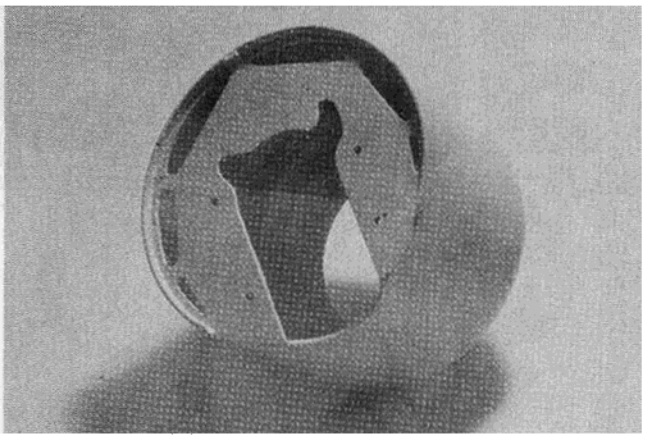
By Col. John A. deVries

They just haven't gone back far enough! The "Old Timer" modelers, with their ignition engines and ancient free flights, have created a fascinating class of R/C models. With a collector's item spinning the prop they've added radio control assist --- to keep from having to chase their late 30's free flights. But --- there was a time, before Maxwell Bassett cleaned up the Nats with an internal combustion engine, when 99% of all model airplanes were powered with **rubber bands!** Oh, there were a few "giant" models propelled by compressed air "engines" and a few with CO_2 power plants. However, most kids growing up in the Depression days relied on the kit

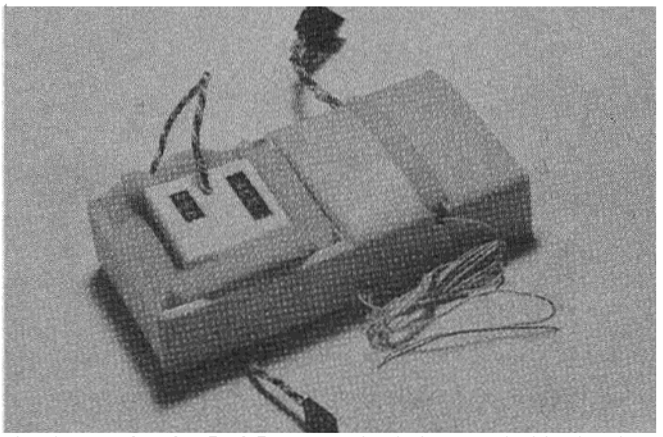
Detail from December, 1932 Comet Model Co. advertisement --- showing enlarged portion dealing with the original, rubber powered Red Racer.



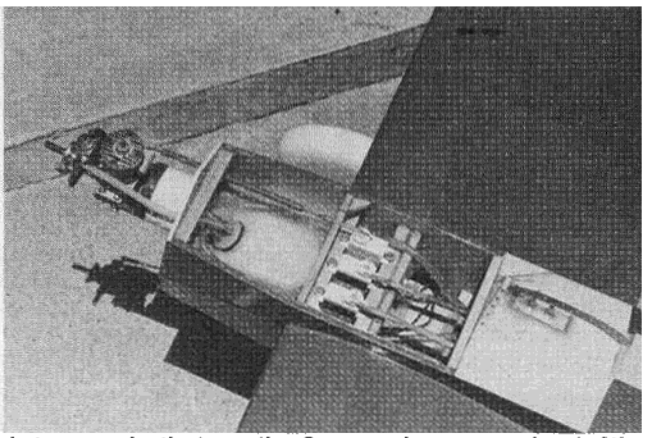
Red Racer R/C tail construction detail. Since the model is covered, assembled, MonoKote attachment strips are needed below the rudder. Note that the stab fairing has yet to be added.



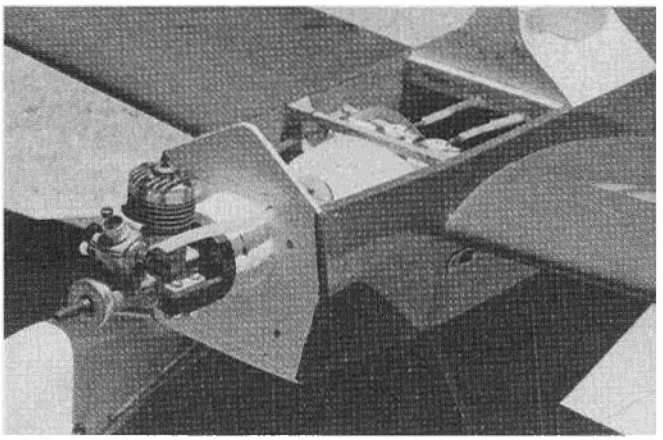
Rear view of the Red Racer's cowling. Angular section duplicates the fuselage firewall --- the plywood cowl mount.



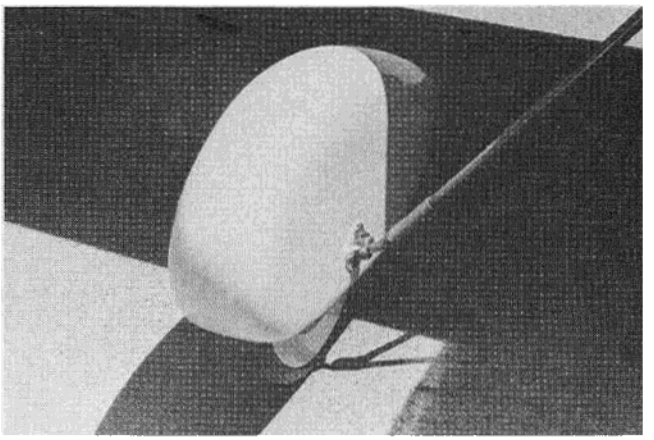
Radio tray for the Red Racer --- the balsa box holds the tiny Cannon 5 channel receiver and an Ace 250 mah battery. Everything's wrapped in foam to keep it from rattling around in the fuselage. Plenty of room underneath the servos for the radio box!



Lotsa room for the teeny tiny Cannon micro servos ahead of the wing spar. Home-made tank replaced by 2-3 oz. Sullivan "bubble" tank. Extra plumbing allows for positioning of fuel filler tubes inside "cockpit."



Front of Red Racer R/C fuselage with cowling and upper hatch removed. Note the plywood discs, used to moved the engine and its mount so that prop clears the front of the cowl. Also, note that the outer Nyrods are epoxied to the structure.

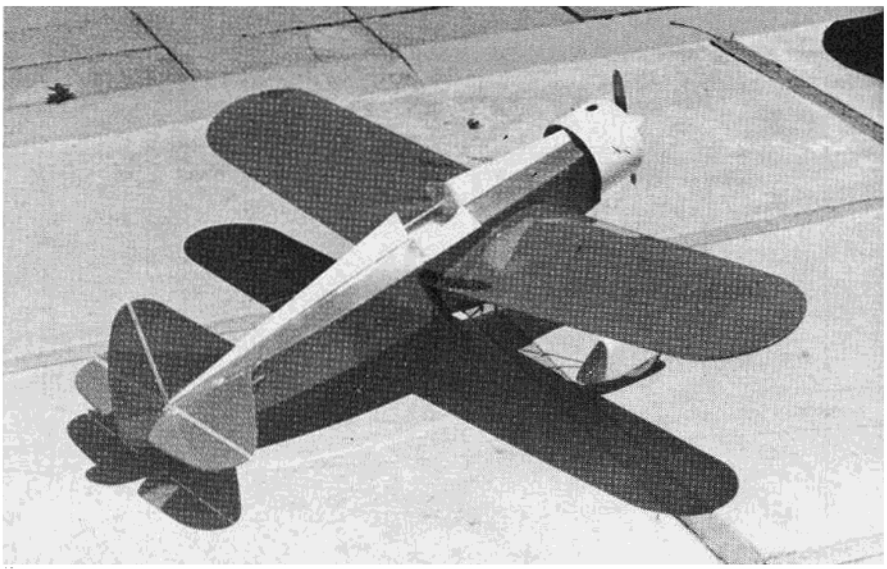


Close-up of Red Racer R/C wheel pant attachment --- a Fox flanged wheel collar. Axle projects through the wheel pant --- thus the single wheel collar retains both the wheel pant and the wheel. Also, look closely and see the outline of the 1/8" plywood wheel pant insert.

manufacturers to produce models that flew. And --- those kits cost 10¢. Most of us were scandalized when one of our favorite kit companies produced the "Red Racer" --- and charged **a whole dollar!**

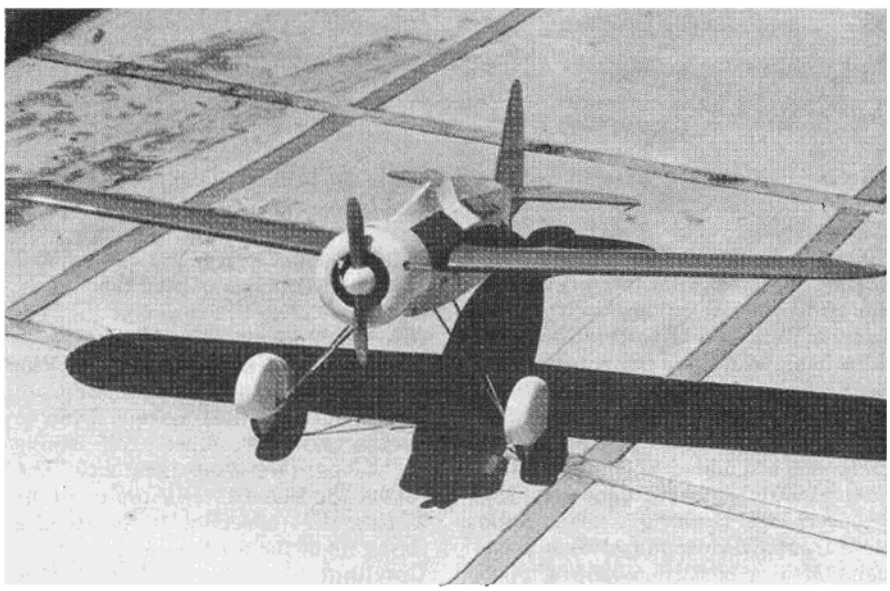
Bill Bishop, then President of Comet Models, knew what he was doing. In 1931, he designed the Red Racer --- and the kit was worth the price! That the model was a "good flier" was never in doubt. The kit was in production from 1932 until the balsa shortage of World War II stopped kit manufacture! Its twelve year run suggested something new and different in the way of "Old-Time R/C" to us. Why not adapt an old time rubber powered design to R/C --- specifically, the Red Racer.

In its original form, the Comet Red



de Vries' MonoKoted Red Racer R/C. All-up weight, ready to fly is only 23 oz. No special effort was made to keep the model light, except for the use of laminated balsa curved pieces in the wing and the tail structure. Except for the strengthening that R/C and engine power required, Bill Bishop's original design was followed as closely as possible.

Racer had a span of 15½" --- much too small for R/C. But, enlarged three times, it is an ideal model for the new teeny-tiny radios and .10 R/C engines. While we were on the nostalgia "trip," we decided to duplicate the construction of Bill Bishop's design as far as was humanly possible. 'Course we had to make **some** compromises (for instance, 1/64th ply fuselage doublers) to strengthen the structure for powered flight. Then, too, there are few modelers who retain the skill to bend curved bamboo wing tips around 100-watt light bulbs. So --- we substituted laminated balsa tips and the tail feathers' curved parts. Mr. Bishop's airfoil section resembled a Clark "Y," so we computer plotted a set of ribs, in the same number shown on the Comet drawings (which we acquired from John Pond's Plan Service). Col. Hurst Bowers (Herb Clukey's former partner in Flyline Models) doubled the number of wing ribs in the Red Racer he built from our prints. But, he covered his model with **silk** (in keeping with the era of the model) so he needed the extra strength.



Red Racer R/C, looking just like its rubber-powered "ancestor." New version is 3X, giving it a 46½" span. An eight inch, 3½" pitch prop, turned by an O.S. .10 Schnuerle engine powers the Red Racer R/C. Note the long brass tubing extension for the needle valve, through the cowling. And, the hole for the glow plug wire attachment, in the top of the cowling.

Built as shown in our drawings, our MonoKoted Red Racer, lacking only the radio installation, weighed 19 ounces! It seemed like a good excuse to acquire one of the Cannon Micro radio sets. So, our bird, ready to fly, scales-in at less than 23 oz. We're only using three of the Cannon servos --- and they're "lost" in the Red Racer's fuselage. Hurst, too, used a Cannon radio but there's ample room for many of the small servos on the market, for example, Kraft 12's and 18's, Ace's smallest, and Royal Products' Mini-Titans (all of which we've test-fitted to the drawings).

Since we're duplicating a rubber powered model of the 30's, construction is dead-on simple. We won't bore you with an extensive how-to description, nor include a bunch of redundant photos of a "stick and stringer" model. What follows covers a few suggestions and tips to simplify your construction of the design.

Wing:

The wing is built around a D-tube spar system, in two panels. The spar stubs are inserted through the fuselage, so it's a good idea to build the wing panels first. We purposely positioned the wing spar at 25% of the chord --- where the completed model will balance. Laminate the tips, add leading and trailing edges but don't glue the root ribs in place until the rest of the structure has "dried." Prop up the panels to the proper dihedral angle (1½" under each tip) and then epoxy the root rib(s) in place, perpendicular to the work surface.

Fuselage:

Construct a right and left fuselage side and then glue the 1/64" ply doublers in place. Very carefully locate and cut out the wing spar openings through the doublers, before adding the fuselage crosspieces. Note that the formers, forward of the cockpit, are doubled to provide a hatch for access to the radio and the fuel tank. The base of the hatch is a rectangle of 1/8" sheet balsa and the forward, upper fuselage, between stringers is inset with 1/8" balsa. The hatch is retained between the "instrument panel" former and the cowling. You can "pin" it in place with some 1/8" dowel if you wish. Balsa sheet is also inset at the rear of the fuselage to support the rudder and

elevator Nyrods.

Tail Feathers:

Laminate the curved portions and build the rudder and stabilizer flat on the workboard. Sand and hinge the stab/elevator and epoxy them in place atop the rear fuselage **before** adding the rear, upper stringer. Sand, hinge, and glue the fin to the top of the upper stringer.

Landing Gear:

Bend the struts to the patterns shown on the drawings. Solder the lower ends together with copper wire binding. Note that the plywood gear mounts were included as crosspieces in the bottom of the fuselage. The strut assembly is held in place with nylon gear straps. The model won't look like a Red Racer unless you duplicate the wheel pants from laminated sheets of balsa. We inset 1/8" plywood squares at the axle location in the pant sides so we could use Fox flanged wheel collars to mount the gear fairings.

Wheels:

Of course, the Red Racer could use commercially available wheels, but we chose to make 'em --- to save weight. With thanks to Tex Newman, who designed the "Dragonfly," we used his Hoover vacuum cleaner-tired wheels on the Red Racer. The wheels have a plywood core with plywood rims and a doubled 1/2" sheet balsa conical hub. A brass tube bushing keeps things running true and the tires are Hoover vacuum cleaner drive belts (Hoover part No. 49258) slipped in place after the wheels are painted.

Assembly:

Although it makes covering the Red Racer a tad more difficult, we glued it all together before applying the MonoKote to the fuselage top and bottom and to the tail surfaces. So --- cover the wings and the sides of the fuselage, trimming the MonoKote away from the wing-fuselage glue area. Prop up the fuselage, solidly, and slip the stub spars into the holes. Apply epoxy to the inside of the root ribs and block up the wing panels to the proper dihedral angle. When the epoxy has set, epoxy the spar joiners to the stubs, inside the fuselage. If you've cut the spar slots correctly, you'll have 1½° of positive wing incidence. The rest of the MonoKote is applied after adding the "covering strips" to the stringers of the aft fuselage.

Cowling:

We "turned" the front of the cowling, using a 1/4" power drill and sandpaper --- cutting the hole in its front later. The cowl front and the rear mounting plywood "plates" were spaced with four lengths of 1/4" square balsa strips and then the 1/16" sheet "wrapper" was "Hot Stuffed" in place. Epoxy and strips of fiberglass cloth reinforced the cowl/plywood mounting plate joint. In order to position the engine so that the prop drive washer was in front of the cowling, we "turned" some 1/4" plywood circles to which the Kraft engine mount was bolted. The cowl was mounted, using the system shown in our article in the June, 1982 issue of RCM ("Dead Center"). Our engine is an O.S. .10 Schnuerle, but engines of lesser potency can be used. Given the finished weight of the model and its feather light wing loading, a "hot" .049 might fly the bird at sea level, although that's a bit of conjecture (Bowers used an .06 "hummer").

Finishing Touches:

As you'll see in the photos, we mounted the servos ahead of the wing spar, with the flight battery and receiver in a padded box beneath 'em. We used semi-flexible Nyrods to push the tail surfaces and a cable throttle "pushrod." For the lightest possible model, thin cables to the tail feathers would be the way to go (and have the proper, "old-timey" look!).

There is not a lot of room, ahead of the wing spar, for a fuel tank. We used an old plastic bottle with Sullivan fuel tank hardware that fit the space, but a 2 to 3 ouncer will fit also. We made some strut fairings out of file-folder stock (strictly for looks) but left 'em off. We were afraid of the effects of the fairings when we flew the bird.

Flying:

We were happy just to make sure that the Red Racer would fly. With the stalky landing gear, taxiing the Red Racer is a chore, even though we have a steerable tail wheel. Lined up for take-off, however, the Red Racer is off the ground almost before it begins to roll. It's a neat little sport ship to putt-putt around the field on a Sunday afternoon. Not "darty" like many other small R/C models, the Red Racer retains its stability with a minimum amount of interference by the flier. With its 10 oz. wing loading, it is a calm-wind model and floats a tad on the landing approach.

Which leaves us with a couple of questions. Are R/C rubber powered designs of the 30's "Old Timers" within the spirit and intent of the Old Timer movement? And --- would you be interested in an R/C model of the Comet "Dipper?" Just happen to have "done" one! □

COMET RED RACER R/C

Designed By.
Col. John A. deVries
TYPE AIRCRAFT
Sport Old Timer
WINGSPAN
46½ Inches
WING CHORD
7⅝ In. (Avg.)
TOTAL WING AREA
318 Sq. In. (Approx.)
WING LOCATION
Shoulder Wing
AIRFOIL
Clark Y 12%
WING PLANFORM
Double Taper
DIHEDRAL EACH TIP
1½"
O.A. FUSELAGE LENGTH
33"
RADIO COMPARTMENT SIZE
(L) 4" X (W) 3½" X (H) 3½"
STABILIZER SPAN
15 Inches
STABILIZER CHORD (incl. elev.)
5" (Avg.)
STABILIZER AREA
71 Sq. In. (Approx.)
STAB. AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
8¼ Inches
VERTICAL FIN WIDTH (incl. rud.)
5½" (Avg.)
REC. ENGINE SIZE
.10 Cu. In.
FUEL TANK SIZE
2-3 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
3
CONTROL FUNCTIONS
Rud., Elev., Throt.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa, & Ply.
Empennage	Balsa
Wt. Ready To Fly	**23 Oz.**
Wing Loading	**10.4 Oz./Sq. Ft.**

From RCModeler Dec. 1983