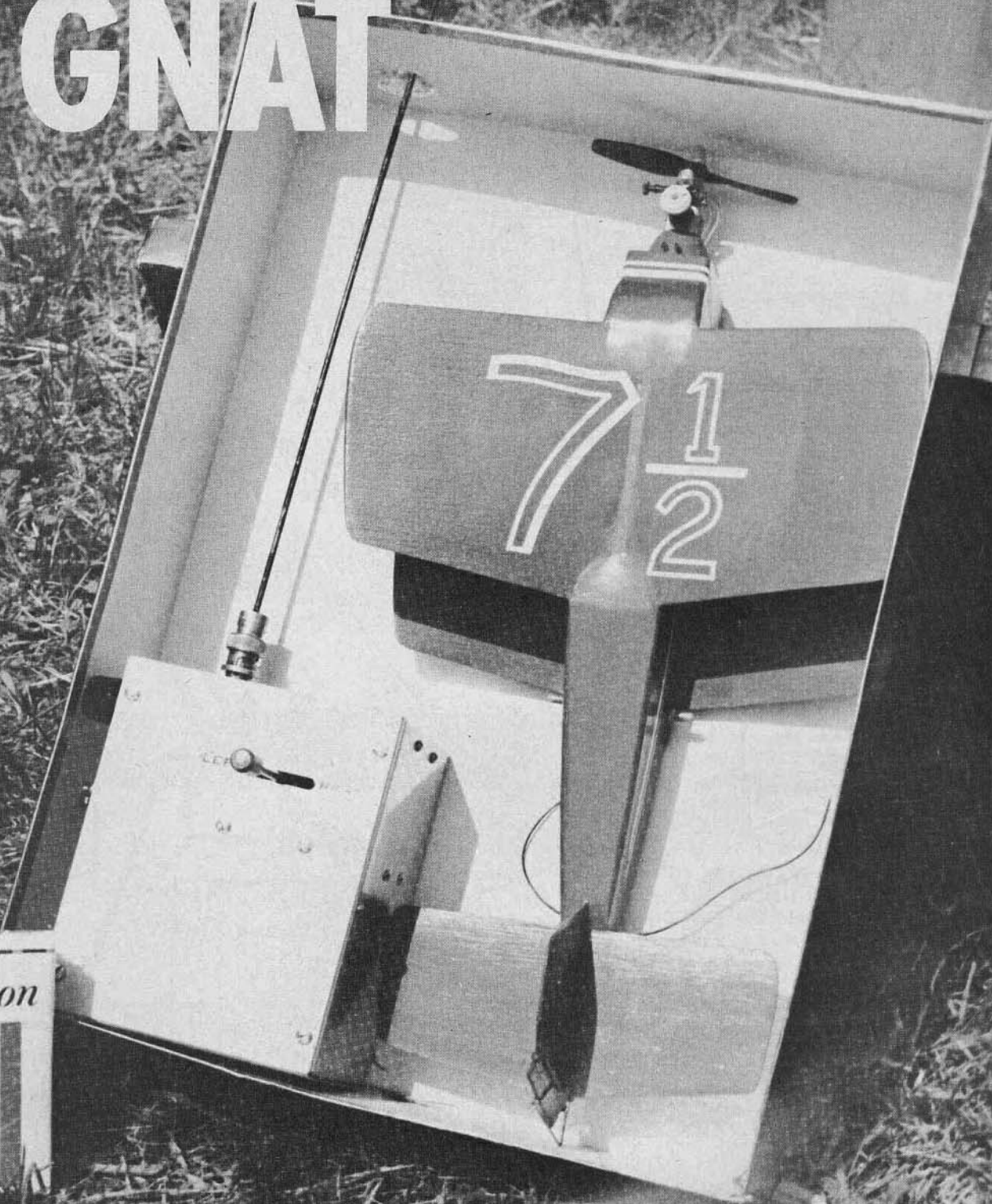


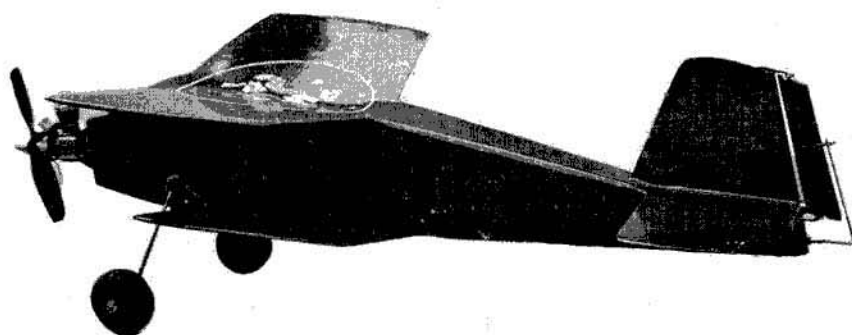
# the GNAT



**By Dan McClain**

FULL SIZE PLANS FOR  
**The World's Smallest Biplane**

7½" Span for .010's and Proportional Rudder



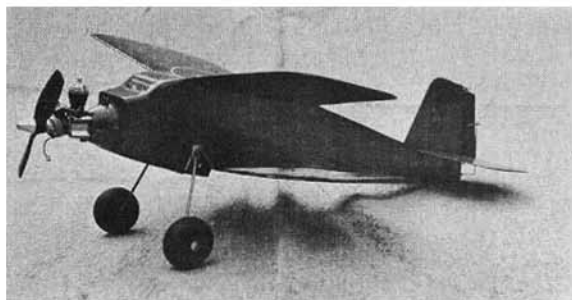
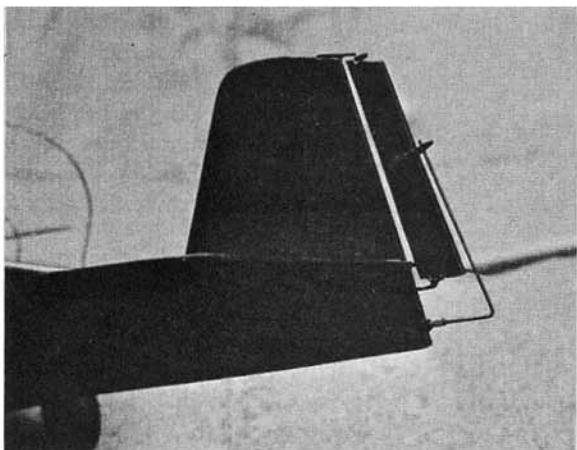
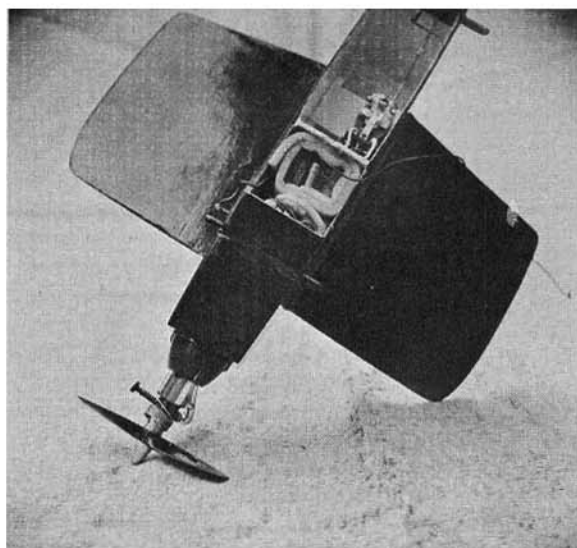
Put down your fly swatters boys! This Gnat is an R/C bomb. Although pocket size, the 'lil bug will show you a hot time with its proportional rudder.

The Gnat was designed almost as a joke for a club contest given by the Valley Forge Signal Seekers, Inc., this past May. A prize was to be awarded for the smallest R/C ship on the field. I knew full well that the unpredictable could happen, and the winning ship would be at least a clipped wing "School Boy", or someone just might try to duplicate Ken Willards efforts and clip his ¼A down to that fantastic eight inch span. My way was clear. If I wanted to guarantee myself at least one win this year I had to start with an eight inch span and clip down from there.

Many, many sketches and drawings later, the Gnat was born. The deep dihedral stagger wing biplane was designed with the intent that it be stable, light, and easy to build.

Building time is short. The first ship was ready for its finish after a few construction hours. The next day saw it ready for test gliding. With a minor incidence change, the little ship settled into a rather decent but very fast glide path. I added weight to simulate the receiver, battery and control linkage weight, then tried again. Same glide, just a little faster. The next question was, how would it respond to power-on flight? I ran a tank of fuel through the Tee Dee .010 and timed it very carefully. I figured the next tank had only about thirty seconds left and I launched the tiny ship into a strong breeze. The irate insect turned on its side and proceeded to inscribe thirty foot diameter circles at about eighty miles an hour (well, it seemed like eighty miles an hour)! Less than two minutes later it was lost out of sight in the clouds high overhead.

Number Two was built the following week-end, and the R/C equipment was installed. With the contest only a week away I didn't want to risk another powered flight, so I did a lot of controlled gliding. I used a miniature transmitter, compatible in size with the Gnat (3 x 4 x 5 inches), designed and built by my close friend, Ed Hejna. Number Two was a bit heavier and I found myself throwing it like a baseball in order to get altitude for



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some 'stick time'. The  $\frac{1}{4}$  inch total rudder movement seemed sufficient to turn the ship in its fast glide. So, when my arm developed its 'Charley horse' I decided to pack it away for the next weekend.

There was quite a stir at the contest when I showed the Gnat for the first time. All the flying stopped as I filled and primed the .010 for its first flight. The crowd gathered as the engine ran up to peak RPM's. I asked to have someone launch it for me and jabbed it into the CD's hand. (I knew Ken Miller to be a good dart shooter) — "Just chuck it like a dart, Ken." The tiny ship shot forward, then up, and stalled in the face of the 25 MPH breeze, but kept plugging away dancing on its tail. The rudder response was good and I could handle the wind with little difficulty. More down thrust, or a set of wheels to create some low drag, would solve the problem. The engine died finally, the ship stalled and almost fell to the ground. Not too spectacular a flight but sufficient to win the event. The landing gear and wheels added to the all up weight, but straightened out the powered flight. The GNAT will snap roll on full rudder and bends corners like a hot rod. Smooth, stable and FAST best describe it. How far down have I clipped the wings? I'm down to  $7\frac{1}{2}$  inches and still trimming. How about you?

There are no special building instructions. Just apply your usual good building techniques and **keep it light**. Check incidence and alignment carefully and be sure the rudder and associated linkage is 100% free of binds and as light as possible. A Hobbyoxy finish is recommended to eliminate warping.

Good Luck, and, take a youngster flying with you next time.