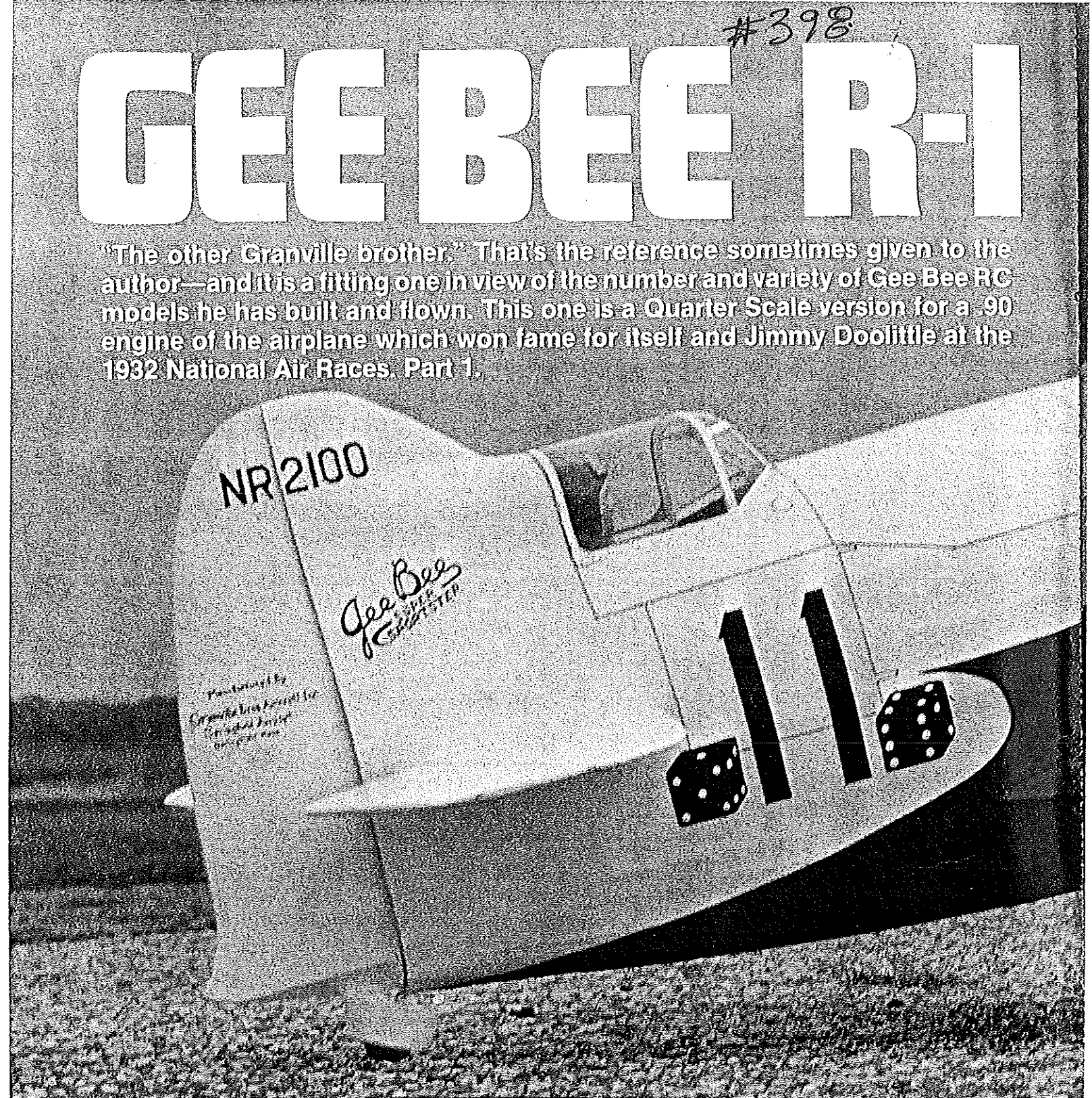
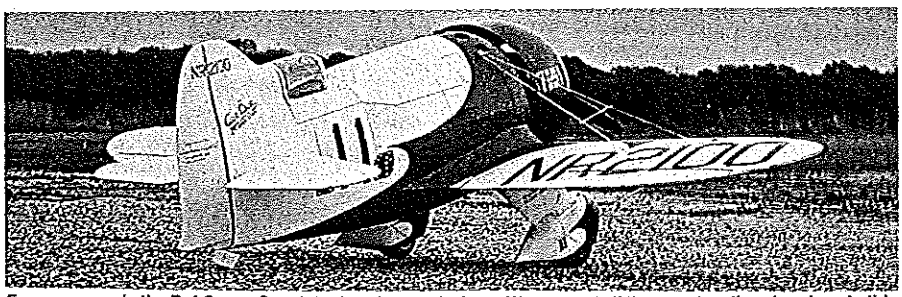
#398

GEE BEE R-1

"The other Granville brother." That's the reference sometimes given to the author—and it is a fitting one in view of the number and variety of Gee Bee RC models he has built and flown. This one is a Quarter Scale version for a .90 engine of the airplane which won fame for itself and Jimmy Doolittle at the 1932 National Air Races. Part 1.





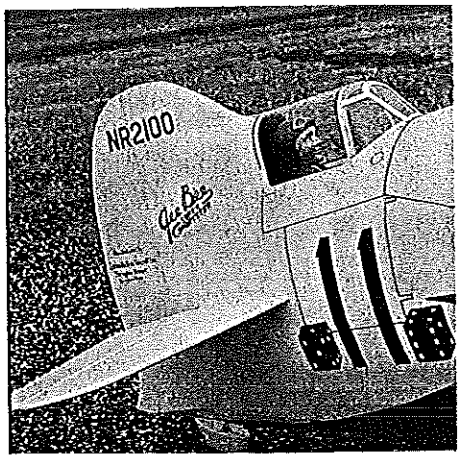
From any angle the R-1 Super Sportster is a dream airplane. We present all the construction drawings in this issue. Part 2 will describe the important construction points in words and pictures.

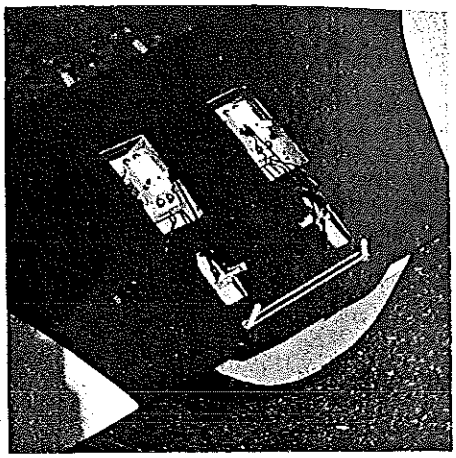
Henry A. Haifke

SuperSportster

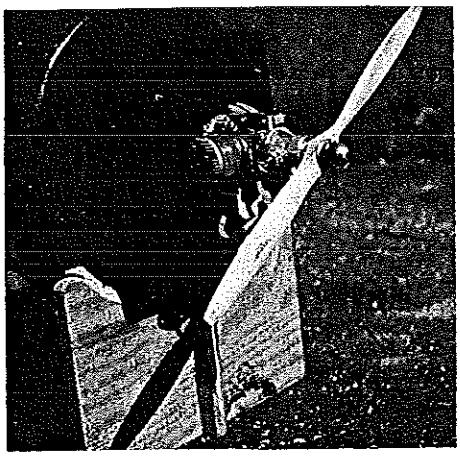
Like the bumblebee, they said the R-1 couldn't fly. But the R-1 does fly, and it flies well. Author found that the dimensions and moments are no different than the good-flying Gee Bee Model D and E Sportsters.

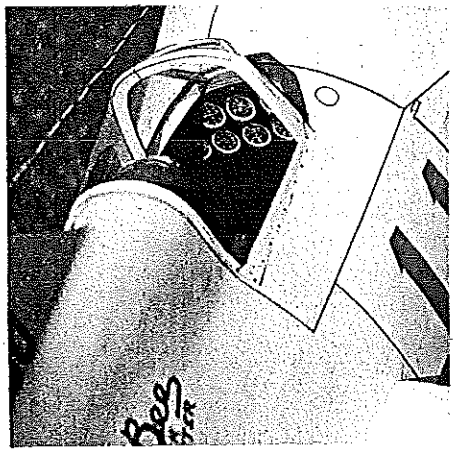
Designer/Author Henry Haifke, left, holds the Quarter Scale Gee Bee R-1 while Howell W. (Pete) Miller looks on. The R-1 was Pete's first project as chief engineer for the Granville brothers.



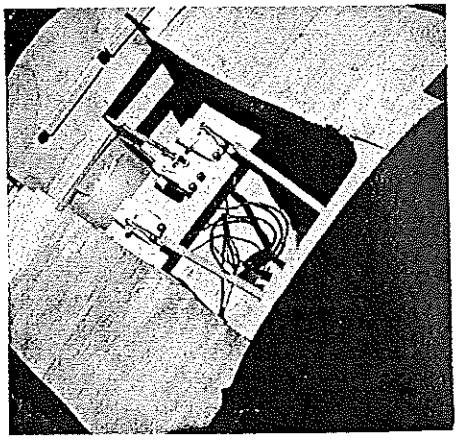


Close-ups of the tail and front ends (left and middle pictures) vividly show how a good finish and trim add to realism, as does the pilot figure. Right: With wing removed, we see the two aileron servos, one for each side, which are connected to the receiver with a Y-cord—also the front-of-wing hold-down dowels and the nylon bolts at the rear (with a looped rubberband to keep the bolts from falling out).





Left: Webra .91 engine (with Martin Industries carburetor and muffler pressure for fuel tank) goes on an Edson mount and then on a ply box—painted black for better visual concealment. Author uses a 16-4½ Rev-Up prop. Middle: Author vacu-formed cowl from ABS plastic. Ply ring epoxied inside cowl is for mounting to firewall. Attaches with three sheet-metal screws, positioned with two alignment pegs. Right: Close-up of cockpit.



Left: Exhaust extensions underneath the engine are made of plumbing materials, attached to a Slim Line muffler. Middle: More detailing. Note panel lines and louvers. Right: Ace Atlas servos used for rudder, engine and elevators. Also visible is back side of Sullivan 16-oz. tank.

FIFTY YEARS AGO, at the 1932 National Air Races, a unique aircraft appeared which amazed all who saw it. It looked so different from other flying machines that most everyone decided it wouldn't fly. It was called the Bumble Bee, the Flying Milk Bottle, and other such uncomplimentary nicknames (my model has been called "the flying pickle barrel," and one of my friends calls it "Fat Albert"). It not only flew, but it made aviation history by winning the prestigious Thompson Trophy and setting a new world speed record for land planes of just under 300 mph.

This aircraft, the Gee Bee R-1 Super Sportster, caught everyone's fancy. It has probably become the single most written-about aircraft in air racing history. Unfortunately, the many stories about the R-1 and the other craft built by the Granville brothers are filled with inaccuracies, misconceptions, and sensationalistic nonsense. Thus the Gee Bees have a poor reputation with aircraft buffs, and it is considered an accomplishment when a model Gee Bee flies well.

The Gee Bee R-1 was the masterpiece of a small, dedicated group of men who were desperately trying to make a go of their aircraft business during the hard times of the 1930s. The five Granville brothers were from the farm lands of upper New Hampshire. All were mechanically inclined, and each was a master at his particular craft. The young man they had hired as their chief engineer was

CHUCK WOOD by Hank Clark

Howell W. (Pete) Miller, fresh from New York University's School of Aeronautics. (Bob Hall, former Gee Bee engineer, had left the year before to form his own company.) This proved to be a team which would establish aviation records and rock the aeronautical world with the planes they produced in their tiny shop, a former dance hall on the edge of Springfield Airport in Springfield, MA.

The R-1 was Pete Miller's first project. The team wanted a plane capable of winning racing's biggest prize, the Thompson Trophy Pylon Race. The other big event at the National Air Races was the Bendix Cross-Country Race, so two ships were built, nearly identical in appearance, but each aimed for one event. The R-1 had the bigger engine of the two, for polishing the pylons in the Thompson; the R-2 had more fuel capacity and a smaller engine for the California-to-Cleveland Bendix Race.

Zantford (Grannie) Granville, eldest Granville brother and head of the company, laid out the basic design of the new racers with Pete Miller. Grannie's idea was to build an airframe behind the big Pratt & Whitney radial engine that would streamline the engine and fuselage in the most efficient way possible. This was the genesis of the teardrop-shaped Gee Bee Super Sportsters; they are actually slightly larger in diameter than the engines about one-third of the plane's length back from the nose.

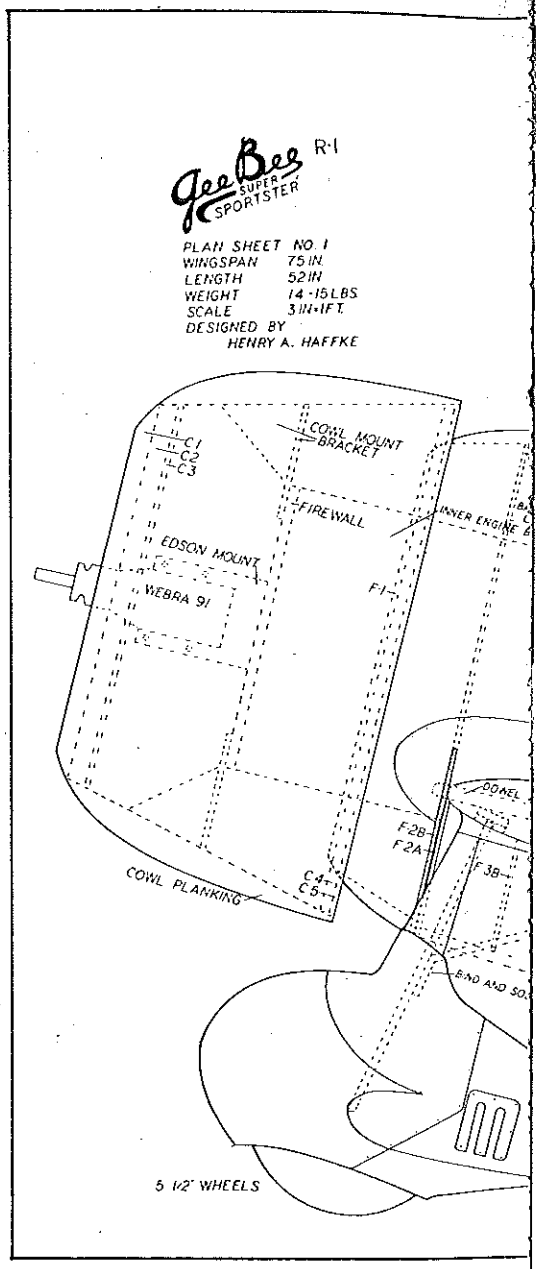
To prove the idea, a model was built, and an extensive program of wind tunnel testing was carried out by Pete Miller and one of his professors at New York University. Tests proved the basic concept completely. Readers may have heard that the Gee Bees were designed in a slapdash style; there are stories that say they were built from chalk sketches on the workshop floor. This is the type of unfounded story that has burdened the Gee Bee aircraft with an undeserved reputation for 50 years. They were actually marvels of the technology of their time. Pete Miller's evaluation of the design and performance of the craft was the work of a master. His calculated estimate of the R-1's top speed was less than 2 mph from the actual speed it attained.

The R-1 was built without a vertical fin and very little rudder area. The wind tunnel tests had shown that the "bob tail" would be adequate though marginal. Russell Boardman was to pilot the R-1 in the Thompson Race, and he made the first test flight on a clear Friday, taking off from the grass strip in front of the Granville shop. When he landed at nearby Bowles Agawam Field, he told the waiting Granvilles, "You boys sure build airplanes." His only suggestion was that he would like a little more rudder and fin.

That night, Zantford and his youngest brother, Bob, cut out the parts for the rudder and fin additions. They were installed the next day. Bob told me that he had gone to church that morning instead of coming straight out to work on the R-1. He really caught the dickens from Grannie when he arrived at Bowles to finish the doping of the new tail section.

Russ Boardman was to make another test flight on Monday. Russ climbed into a Model E Sportster to make the hop from Springfield to Bowles. He was quite a pilot, and was always putting on a show; one of his favorite tricks was to loop on takeoff. He'd done it many times in the larger and more powerful Model Y Sportster. This time, however, with a 110-hp Warner engine rather than the 300-hp P&W Wasp Jr. he was accustomed to, Boardman ended up in the woods across the street from the runway, on his back. His injuries were not really serious, but they were enough to keep him out of the Thompson Trophy Race.

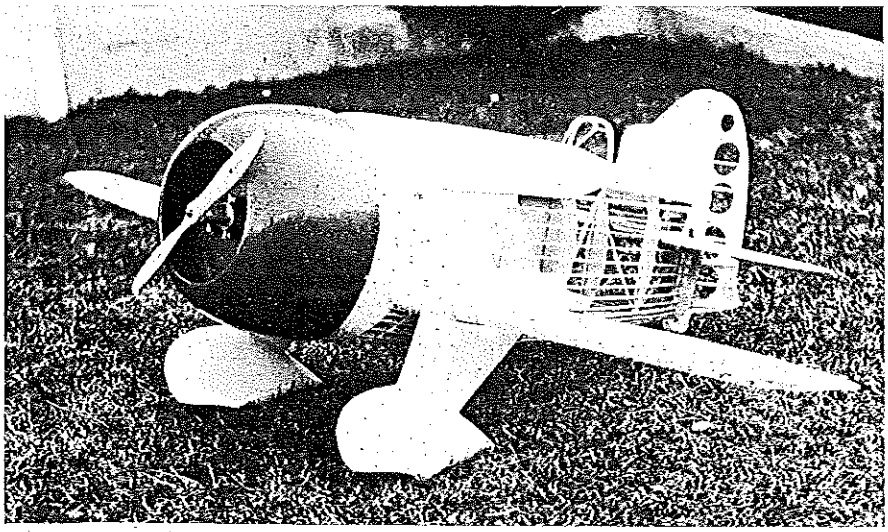
Grannie heard that Jimmy Doolittle had a landing accident in his Laird racer, so Jimmy needed a plane for the Thompson. He called Doolittle and offered him the R-1. Jimmy flew to Bowles Agawam Field in his Shell Lockheed, and he went over the R-1 with Grannie and the rest of the brothers. After a lengthy discussion and thorough examination, Doolittle buckled himself into the big racer and fired it up. He took off and disappeared over the horizon. Several hours later, Grannie got a telegram which read, "Landed OK Cleveland—Doolittle."



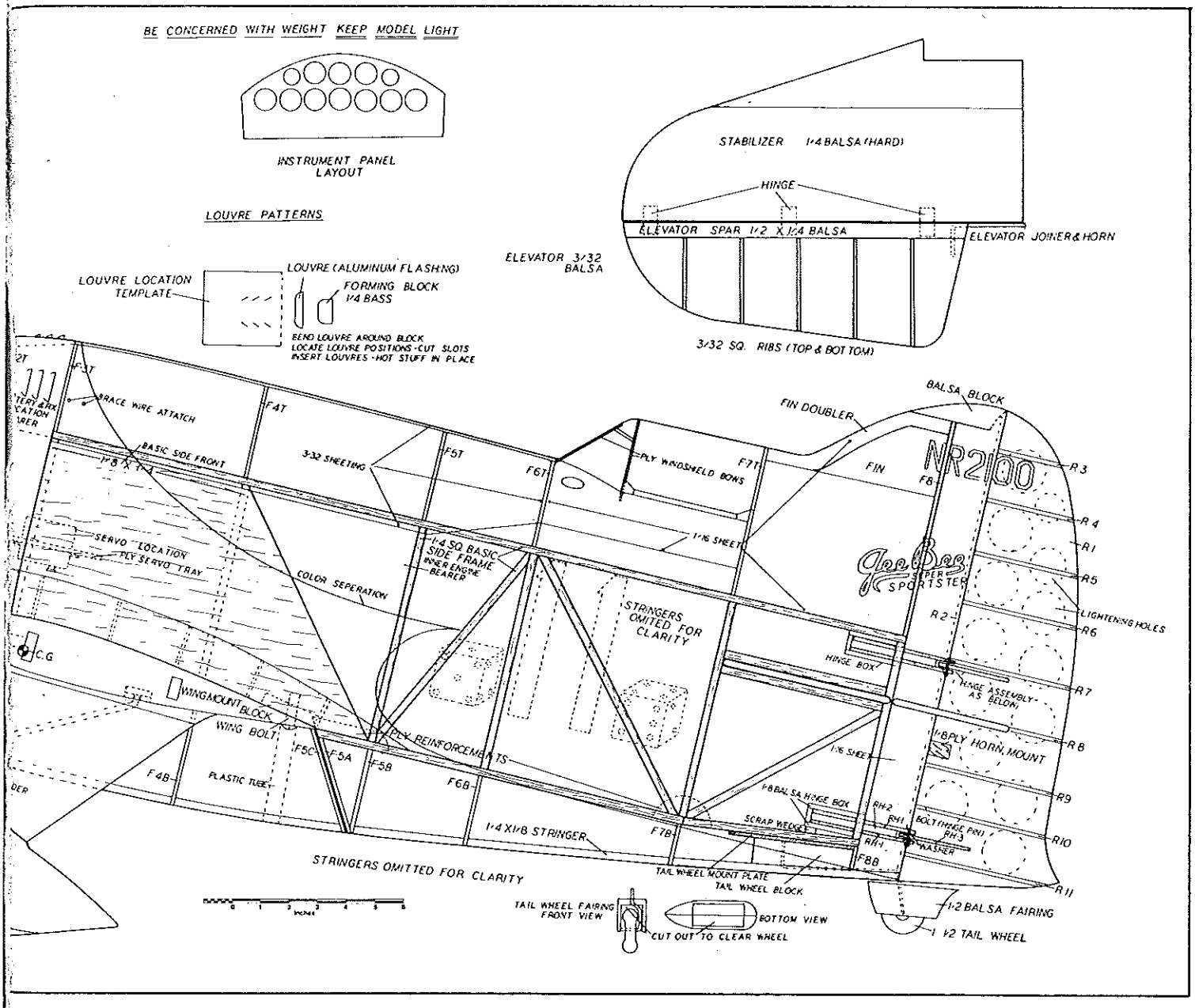
On race day, the R-1 topped the field and set a new world speed record in the Shell Speed Dash, as well as a new closed-course record during the Thompson Race. Doolittle flew the R-1 back to Springfield after the races; it was to be his final race, as he planned to retire. His comments on the ship, as reported in the Cleveland and Springfield papers, were full of praise.

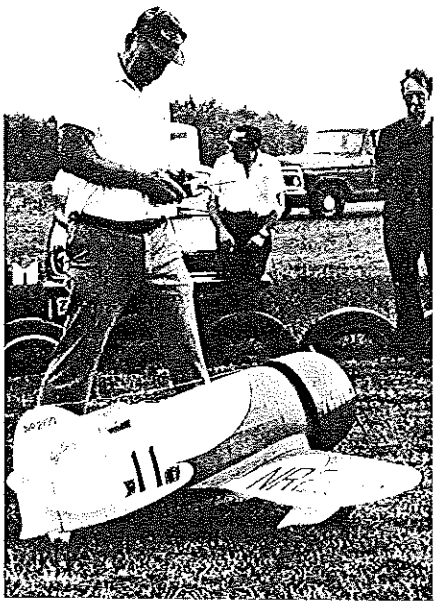
In more recent publications Doolittle is described as having damned the racer, calling it unstable and touchy. After a considerable time, I was able to contact Gen. Doolittle personally. His reports to me are very different from what has been written in history books. He has told me that it was an honest ship to fly, and that it flew very well if not ham-handled. He felt that it might have been a bit tail heavy, resulting in some pitch instability. He reported good stability in other cases.

After the 1932 successes, thoughts turned to winning again in 1933. This time it was to be Russ Boardman's turn. The R-1 was given a bigger engine, and more rudder area was



We snatched this picture from next month's construction section to show what the completed and assembled framework looks like just prior to covering. Looks good even in bare-bones stage.



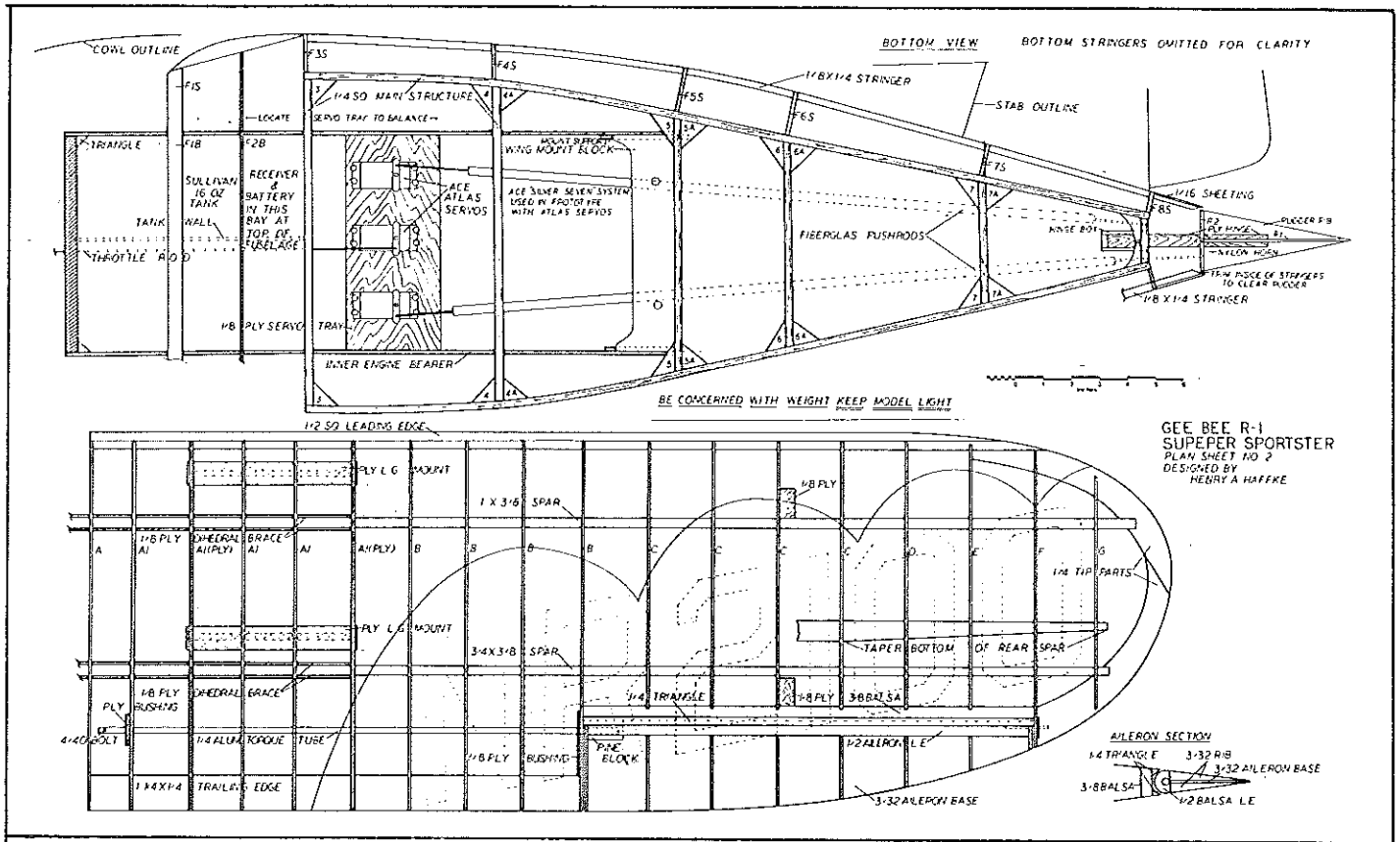


Test Pilot Sid Clements checks out the R-1's controls prior to the first flight.

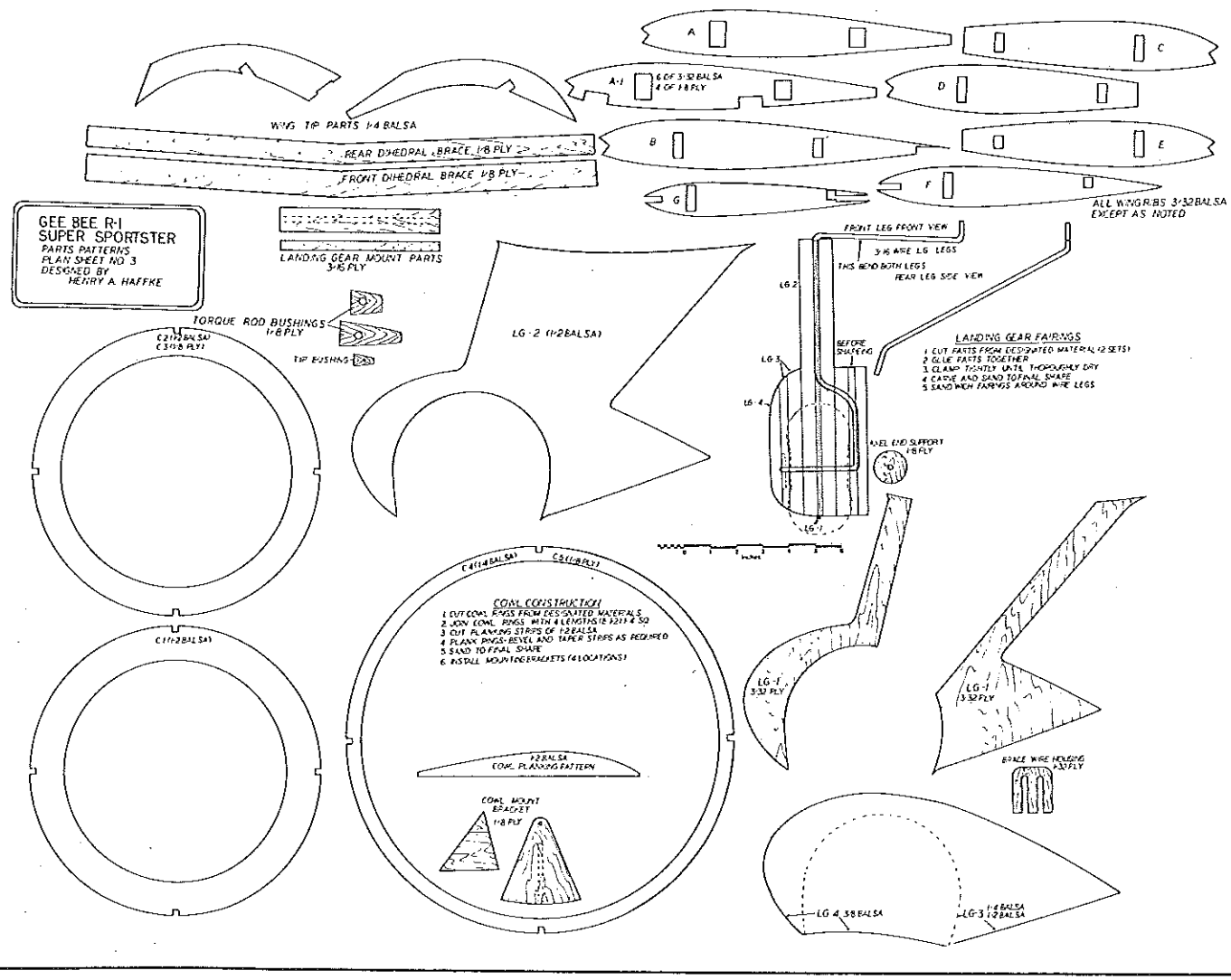
added. Boardman flew the re-engined R-1 as well as the R-2 (now equipped with the R-1's old engine) many times during the summer of 1933. He flew them into and out of tiny Springfield Airport and had no trouble at any time with either craft.

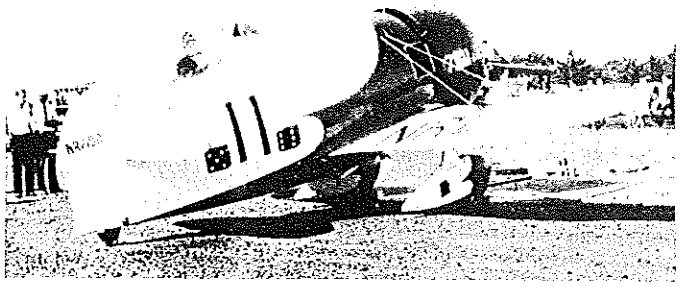
Since the 1933 races were to be held in California rather than Cleveland, the Gee Bee

Three Gee Bees and their pilots snapped at the Bealeton Contest. Joe Gallagher (L) flew the Model E Sportster, Henry Haflke (C) the model D Sportster to far right, Sid Clements the R-1. Henry designed all three of these model Gee Bees (and others). Another Granville brother?



GEE BEE R-1
SUPEPER SPORTSTER
PLAN SHEET NO 2
DESIGNED BY
HENRY A HAFFKE

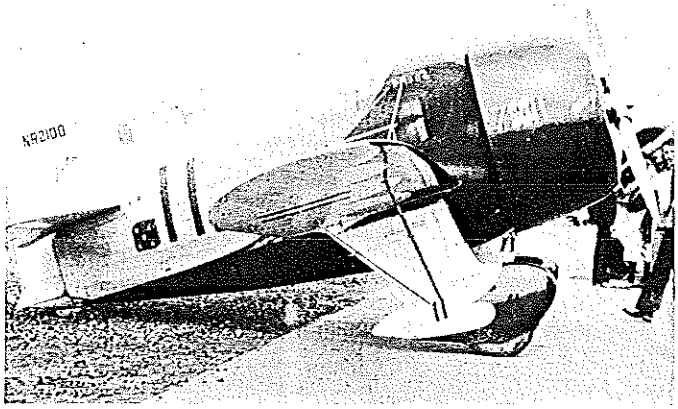




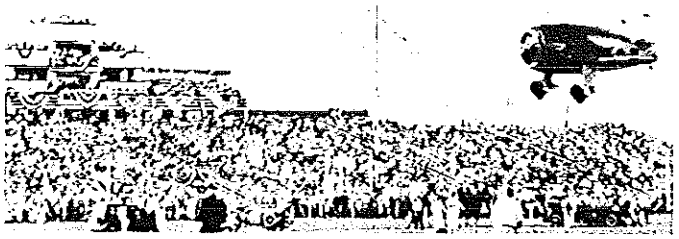
Grannie runs-up the engine in the original R-1 layout. Russell Boardman made the first test flight with it this way—no fin, small rudder.

Zantford (Grannie) Granville leans on the wing of the R-1 in this picture which was taken soon after the vertical fin was added.

Bumblebee, flying milk bottle—it's easy to see why the R-1 has these nicknames from this view. Author says that many people have misconceptions about the flying traits of this famous airplane.

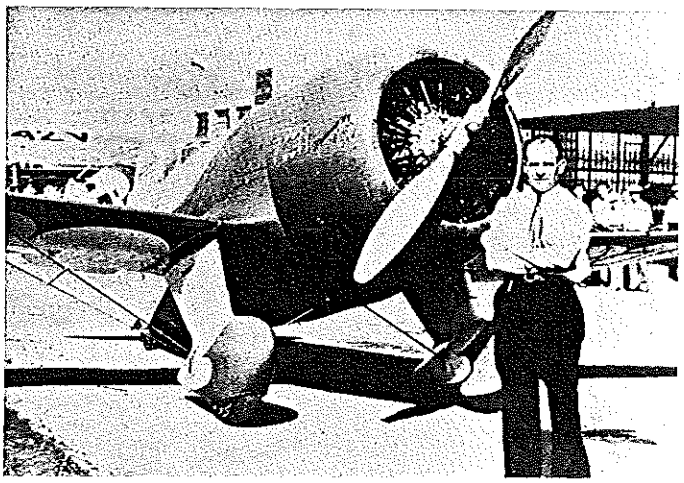


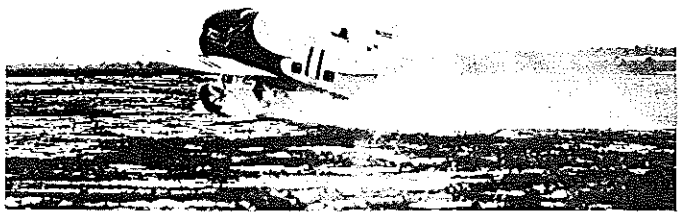
With Jimmy Doolittle at the controls, the R-1 flashes by the grandstands at Cleveland in 1932. Won Thompson Trophy Race, Shell Speed Dash.



Jimmy Doolittle poses in front of the Gee Bee R-1 Super Sportster. Notes don't say when or where this was taken, but judging by the interest of onlookers, we guess it must have been after big Cleveland wins.

Doolittle takes off on the record-setting flight. From the dust being kicked up, looks like it might be a grass field. Failure of brakes to hold in wet grass led to the retirement of the Granvilles from racing.

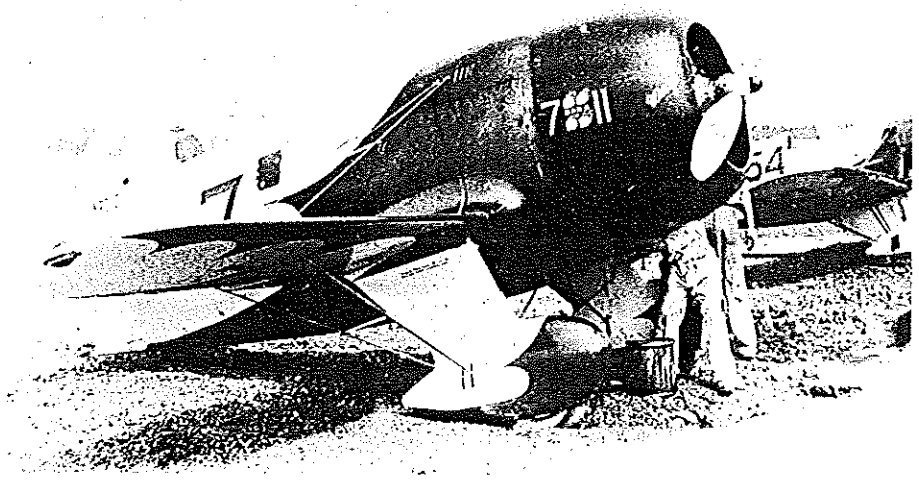




crew planned to have both ships fly to California in the Bendix Race. Boardman landed the R-1 in Indianapolis for a refueling stop and found the R-2 there, although it was supposed to have gone on. The R-2 was out of the race due to the collapse of an aerol strut and resulting wing tip damage.

Boardman was very upset and had words with the R-2 pilot while the R-1 was being refueled. He boarded the R-1, started his takeoff roll, and pulled the ship off the ground before he had used up half the runway. As he left the ground, a gust of wind hit him and flipped the nearly-stalled R-1 on its back. It hit inverted and skidded down the runway. Boardman was alive when he was pulled from the wreckage, but died the next day in the hospital. The Granvilles had lost their old friend, Russ Boardman, and they were out of the 1933 races.

The R-1 was rebuilt with an extended



Sister ship of the R-1, the Gee Bee R-2. The R-2 has the same airframe as the R-1 but smaller engine and more fuel capacity. The R-2, thus, could be built from plans presented here.

fuselage and was mated with the old R-2 wing, still in storage in Springfield since the R-2 was reworked in 1933. This final Gee Bee racer was known as the R-1/R-2 Long Tail Racer. It was readied for the 1933 Chicago International Races, and a pilot from the West Coast was engaged to fly it. Test flights showed good handling and very good speed.

Pete Miller felt that this was the fastest racer they had ever built. It's a shame it never really had a chance to show its stuff. During the second flight, the ground was very wet from a recent storm. The pilot was having some difficulty getting the ship on the ground, since it floated at low speeds. He made several passes. Finally he touched down, but he had too much speed. The brakes were useless in the wet grass. The R-1/R-2 skidded into the ditch at the end of the field and tipped up on its nose. The big Hornet engine was still ticking over, and as the ship nosed up, the prop hit the ground and flipped the entire plane over the ditch. It came to rest on its "feet," but damage to the wings and prop made it impossible to race at Chicago. This ended the racing of the Granville organization; there was no money left.

Other products of the Granville and Miller imaginations were to fly, most notably the QED that Jackie Cochran flew in the MacRobertson Race, and the fabulous Time Flies built for Frank Hawks. But the end of the Long Tail Racer ended the days of Springfield, MA as the home of the fastest land planes in the world.

I was born in Springfield, and spent many evenings as a young boy watching the activity at Springfield Airport. It was big entertainment in those days, when 10¢ for a movie was hard to come by. We lived less than a mile from the airport. My father would load us all into the car after supper and drive us to the airport for an evening of plane watching. There was a parking area with benches next to the Granville shop where we could sit and watch. I can still remember those evening trips, but I can't say that I remember the specific aircraft. They were all just airplanes to me then. I'm sure, however, that I saw many of the different Gee Bees fly.

After getting involved in RC many years ago, I decided to build a model of one of the Gee Bee planes. There were no plans or kits. I finally decided to design one of my own, and I selected the Model Y Sportster, a red-and-white beauty with two seats and a ringed radial engine. Material on it was very sketchy, but I finally got a set of none-too-accurate three-views and drew the model. It flew so well that I was attracted to the other Gee Bee designs. I made a layout analysis chart of the various Gee Bee aircraft and discovered that their proportions are not nearly as bad as everyone seems to think. Their shape gives the illusion that they are very short.

I have designed, built, and flown models of all of the Gee Bee Sportsters over the past eight years: two Model Ys, a Model D, and the R1/R2 in 56-in.-wingspan size; and a

Continued on page 128

repairing Helicopters to replacing airplanes.

There is an important lesson to be learned as Helicopters become more popular at local flying fields, though, and that is to always be aware we are sharing the sky with other aircraft. I would recommend when other aircraft are being operated to agree upon specific flight patterns and areas beforehand and maintain adequate separation. I still feel that Helicopter operations and fixed-wing operations in general do not mix simply because of the high degree of concentration we heli-pilots require for safe operations. Sometimes even a moment's diversion can allow things to get out of hand.

Fly safely. See you next month.

Dave Chesney, P.O. box 16612, Greensboro, NC 27406.

Gee Bee R-1/Haffke

Continued from page 30

Model Y, a Model D and Model E in Quarter Scale. The Model Y Quarter Scale (*Model Aviation*, May 1981) was the best flying RC ship I have ever flown.

When it came time to do the most famous of them all, the R-1, I felt that I knew something that few other people did. The layout chart had shown me that the dimensions and moments of the R-1 were no different from the Model D and E Sportsters, and they were exceptionally good-flying planes. My smaller model of the R1/R2 had a wing loading of over 60 oz., and it still flew great. Pete Miller had told me that the fuselage created some lift, which helped explain what seemed like an impossibly high loading. Some figuring showed me that if I could build a Quarter Scale R-1 at under 15 lb., the wing loading would be a respectable 35 oz. or so. I felt that I could hit this weight easily, since my 90-in.-span Model Y weighed just under 15 lb., and the Quarter Scale Model D and E Sportsters had weighed around 11 lb.

I felt that the best three-views of the R-1 were those done by Harry Robinson of England, so the plans were scaled from them. I did everything I could to keep the weight down; in fact, I went too far. More about that later.

The model was built and readied for test flying. Once again I called on Test Pilot Supreme Sid Clements to take the bird up on its first flights. I used the Ace Silver Seven radio I had won at the Bealeton (VA) Scale Meet, and Ace kindly replaced the small servos with their heavy-duty Atlas models. *(Editor: Never fly a Quarter Scale model with standard servos!)* On test day a large group of club members from the South Jersey and Clayton clubs showed up to watch the flight (ever notice how this always happens on the first flight of a new model?)

Sid checked the engine and looked over all the controls. The tank was topped off, the engine restarted, and the bird placed in position at the end of the runway. When Sid opened the throttle, the R-1 leaped forward, and the tail came up right away. After a much shorter roll than we expected, it was in the air. After a short run upwind, Sid put the bird into a gentle 90-deg. left turn.

As he flew downwind, the tail began to flutter alarmingly. Sid immediately cut the throttle and lined up with the runway. He made a good approach, but the wounded bird couldn't flare completely, and it nosed over and broke the prop. The stab had broken on both sides of the fuselage, but the Coverite had held it together long enough to get back on the ground. The original built-up stab was replaced with a piece of solid 1/4-in. hard balsa.

Flight number two began with a beautiful takeoff, just like the first one. Sid climbed up to about 300 feet to feel it out, and after four or five minutes reported that he had no aileron response. He throttled back, and the ailerons came back. Every time he went to high speed he would lose ailerons. Finally, as he made a turn down to our left, the left wing folded, and the bird spiraled down to the ground.

This disaster turned out to be caused by using wood that was too weak for the wing spars. The wing structure is plenty strong, but I used a soft piece of wood to make the spars. Both spars had broken just outside the center section; the same had happened in the other wing. It was easy to see what had caused the loss of aileron at high speed; the wing would be forced upward, causing the torque tubes to bind. At a lower speed the wing would flex downward, and the ailerons would be freed. Fortunately, it was not a major repair job, but I was a little discouraged.

The big Bealeton Scale Meet was not far off, and I decided to get the R-1 back together. I started burning the midnight oil. The fuselage repairs were polished off in four evenings, but I decided I needed a complete new wing. This time I picked out the hardest spar material I could find. In another week I had the R-1 ready to fly again, although much of the detail work wasn't done. After working on it until 4 a.m., I went to bed and got up at six to install the radio. I had arranged to meet Sid at nine that morning for the flight.

This time the R-1 was not to be denied. The flight was beautiful from takeoff to landing roll. Everything was perfect. After making some camera passes, Sid took it up higher for some stalls, a loop, and stall turns. He then put in another flight in the same pattern he

would use at Bealeton. Sid and I had won the event for three years in Team Scale with my Howard Ike. We decided we were ready to try for another year. As I cleaned up the big bird to take home, Sid kept saying, "Don't change anything."

At Bealeton, the big Gee Bee drew a crowd even before I got it put together. No one seemed to believe that we would really try to fly it. We heard all sorts of skeptical comments right through the static judging. When flying time came, everything stopped and all eyes were on us. We really were going to try to fly that "dangerous" airplane. Well, Sid put in a flight just as perfect as he had before, to loud ovations on both takeoff and landing. The R-1 had placed second in static with an 89 (the model ahead had a 90), but the flight score put us solidly in first. For the fourth year in a row, we took the Team Scale honors home with us. The R-1 was really the star of the show.

The R-1 is really a joy to fly. Both Sid and I have flown it a great deal, and are now looking forward to this year. (*Editor: At the September 1982 Bealeton meet, Henry, Sid and the R-1 took first in Team Scale again.*) If I have whetted your appetite, get started on a Gee Bee of your own. It's a bird with a rich and exciting history—one you'll be proud to own.

(To be continued.)

Tournament of Champs/Lowe

Continued from page 79

$25,000; 2) Matt, Liechtenstein, $12,000; 3) Brown, Hamilton, OH, $9,000; 4) Frackowiak, Cincinnati, OH, $6,000; 5) Kristensen, Canada, $5,000; 6) Lowe, Altamonte Springs, FL, $4,250; 7) Radcliff, St. Mary's, WV, $4,000; 8) Helms, Pensacola, FL, $3,500; 9) Hoppe, W. Germany, $3,250; 10) Weitz, Henderson, NV, $3,000.

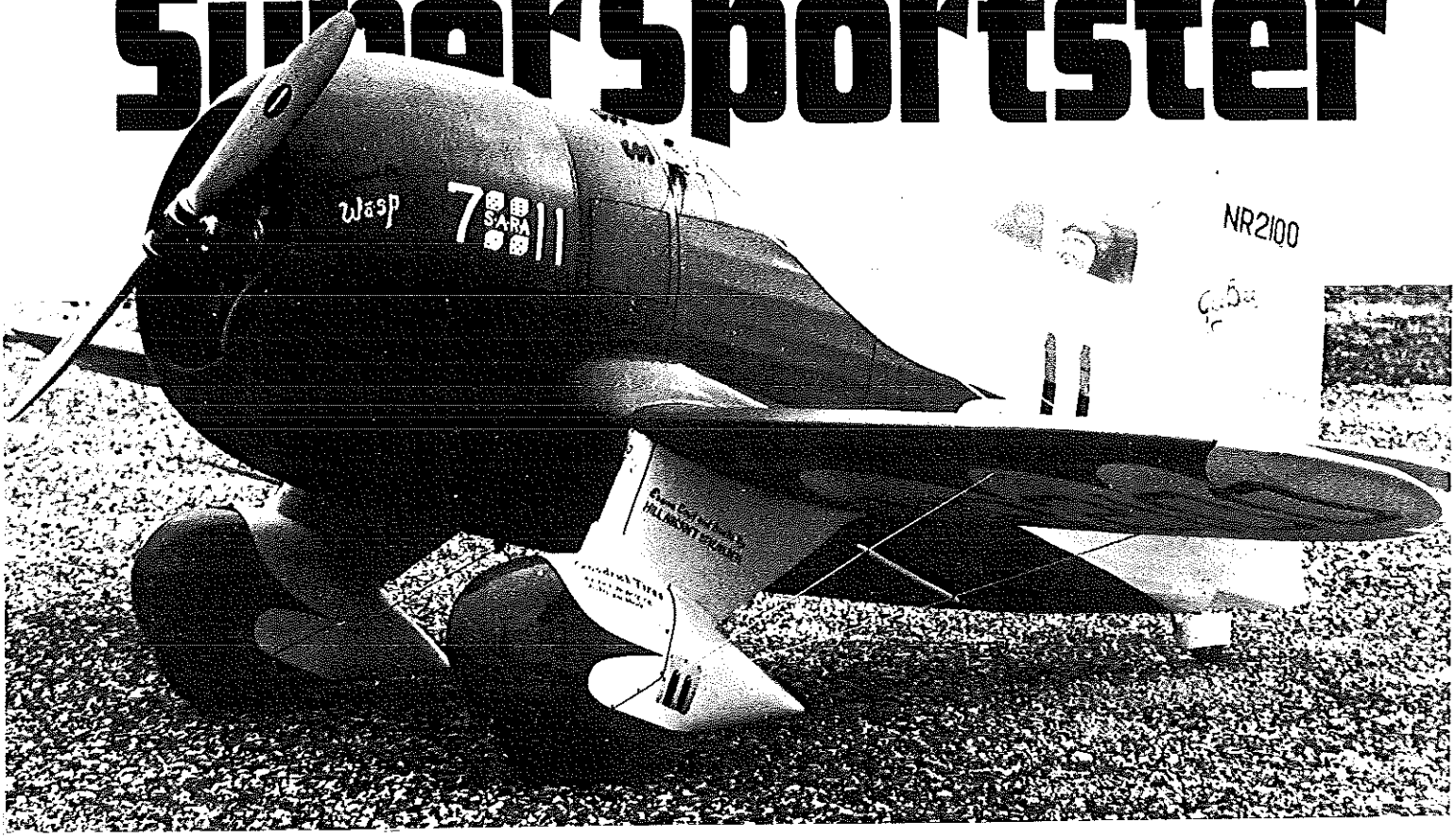
11) Gilman, Bakersfield, CA, $2,500; 12) Koger, Papillion, NE, $2,500; 13) Schweiker, W. Germany, $2,500; 14) Stricker, Baltimore, MD, $2,500; 15) Bonetti, Emerson, NJ, $2,500; 16) Naruke, Japan, $2,500; 17) Akiba, Japan, $2,500; 18) Bertaloni, Italy, $2,500; 19) Wilson, Fountain Valley, CA, $2,500; 20) Tracy, Australia, $2,500.

The effort in preparing for competition in Las Vegas is tremendous, both for management and the fliers. Certainly special thanks must go to Bill Bennett for making it all possible, to Mel Larson and his staff at Circus Circus for their great effort to make it so pleasant, to Phil Kraft (CD) and Jim Edwards (Chief Judge), and to the many who worked behind the scenes at the tournament, such as Sam Crawford, Marty Barry, Phil Rumbold, Betty and Suzy Stream, Pat Godfrey, Jackie Edwards, and many others.

Great performances by the Eagles Aerobatic Team, the Kalt Factory Helicopter Team, and the W. German Peter-Stuyvesant RC Formation Team added icing to the cake.

To me, the greatest enjoyment came from renewing acquaintances with old friends and making new ones—spending time with people like Jeff Tracy who, in spite of mechanical trials, was the epitome of good humor and fellowship. Communicating with Benito Bertolani and his wife was a source of much fun through sign language and limited English/Italian. Helping a few to sort out problems; technical discussions with modelers from all over the world; talking with twice World Champion Doc Brooke (now blind)—all were great joys. To me this was Vegas, and I hope it never ends!

GEE BEE R-1 Super Sportster



The author's model of the plane with which Jimmy Doolittle won the 1932 National Air Races appears to be ready for a flight, but we note that a scale-type propeller is in place rather than a flight prop. Do heed the admonition to avoid excess weight to assure good flight qualities.

IT MUST BE KEPT in mind throughout the building of this model that the less the weight, the better the performance will be. The prototype, which weighs 14½ lb., flies very well. With improvements that have been made in the plans and a little care in wood selection, the model could probably be built at 13 lb. Just be careful with major stress areas, like the wing spars and stab!

Construction is pretty straightforward, but the fuselage will need some explanation. I decided to use a structure very similar to the real R-1 to keep the model as light as possible. Follow these steps:

Cut basic side fronts from 4-in. balsa sheet of ⅛-in. thickness, and glue top and bottom parts together. Mark locations of ⅛ × ¼ uprights on side fronts, and glue uprights in place. Make sure to build a right *and* a left side!

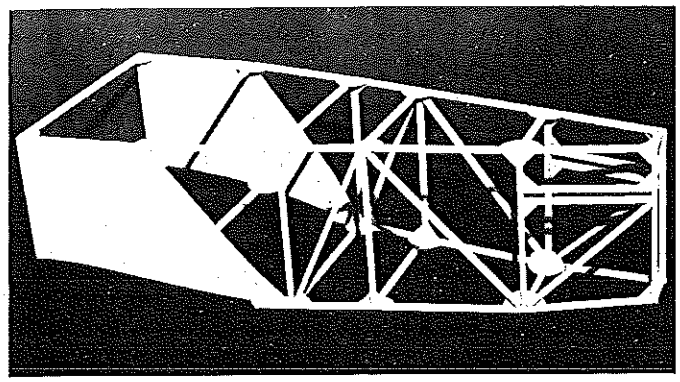
Pin one of the basic side fronts to the plan, with uprights up. Build up the basic structure from ¼ sq. balsa. Be particular about making good-fitting joints. Use a band saw, jig saw, or miter box to cut the pieces accurately. When cutting longerons, uprights, and diagonals for the first side, cut an exact duplicate at the same time for the remaining side. Allow to dry completely before removing from the plan.

Pin the other basic side front to the plan with the uprights down to build the opposite side. Allow it to dry completely before removing from the plan.

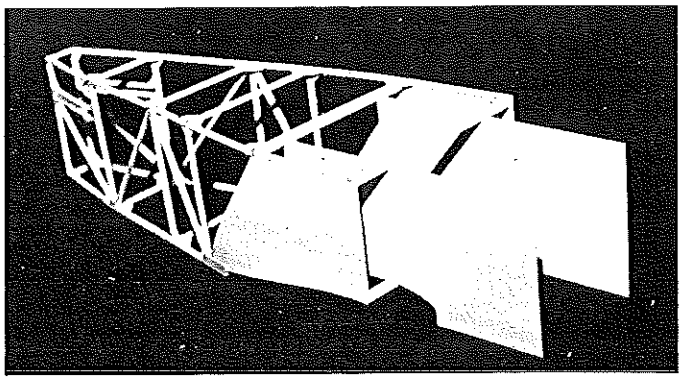
Cut 1/32 ply fuselage reinforcements, and epoxy them in place on the outside of the side structures. The ⅛ × ¼ uprights on the basic side fronts are on the inside of the structure.

Cut the cross members to the proper size as shown in the plan top view, and start by installing cross members at Stations 3 and 4. Pin members in place, and turn the structure upside down on a flat surface. Use a square to be sure the sides are perpendicular while the glue dries. Add the cross member at Station 8, clamping the tail together to hold it in place. Add cross members at Station 5,

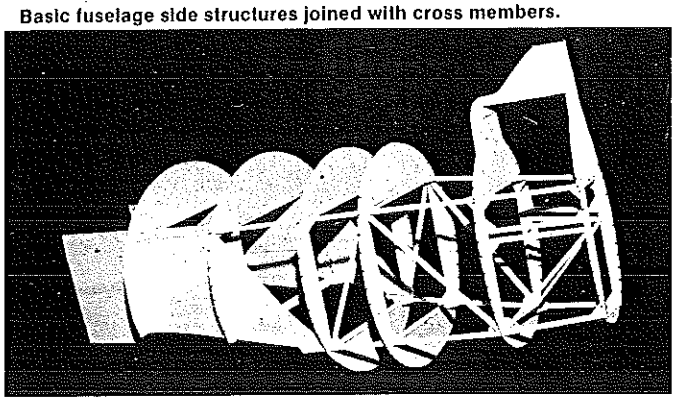
Some of the fascinating history of this famous airplane was shared with you in the previous issue, together with construction drawings and Hank Clark cutaway. We now conclude with construction details in words and pictures of this Quarter Scale RC model for a .90 engine. Part 2. ■ Henry A. Haffke



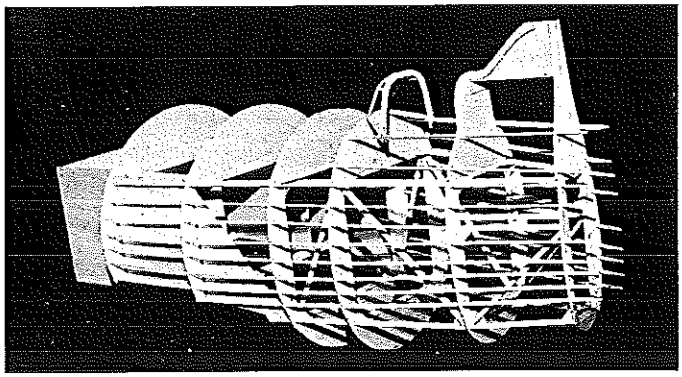
Basic fuselage side structures joined with cross members.



Inner engine mount structure sides installed.



Formers added to the basic fuselage structure.



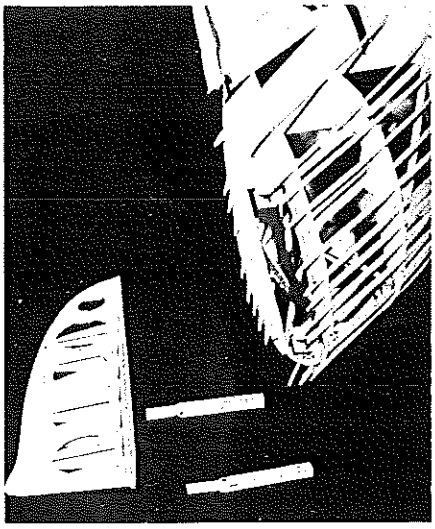
Install stringers in an alternating pattern to equalize their force.

then Station 6, and finally Station 7. It will be necessary to pull the sides together when installing cross members at Stations 5 and 6. You can do this by using strips of plywood about 10 in. long, which are placed outside the structure and rubberbanded together at the top and bottom. This step is probably the most difficult in building the model. An extra set of hands is a big help!

This structure exactly duplicates this section of the real aircraft structure.

Cut gussets from scrap balsa and install them at all cross member joints, top and bottom, as shown in the bottom fuselage view.

Install ply inner engine bearer sides as follows. Cut six lengths of ¼ sq. balsa to 7¾ in. Mark the center of each piece. Mark the centers of Cross Members 3, 4, and 5. Glue a 7¾ length of ¼ sq. balsa on the top of the bottom cross members and on the bottom of the top cross members. Center each one on the marks. Glue the ply inner bearer sides in place against the ¼ sq. ends. Cut short sections of ¼ sq. to fit snugly between



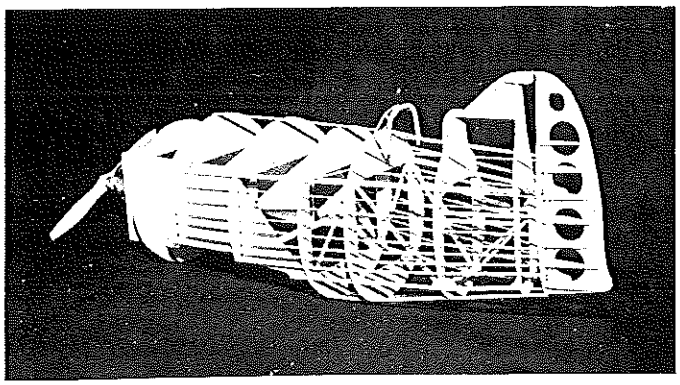
Rudder structure, hinge assembly, and hinge boxes at the rear of the fuselage.

the outer edge of the ply inner sides and the outside uprights. Glue these in place.

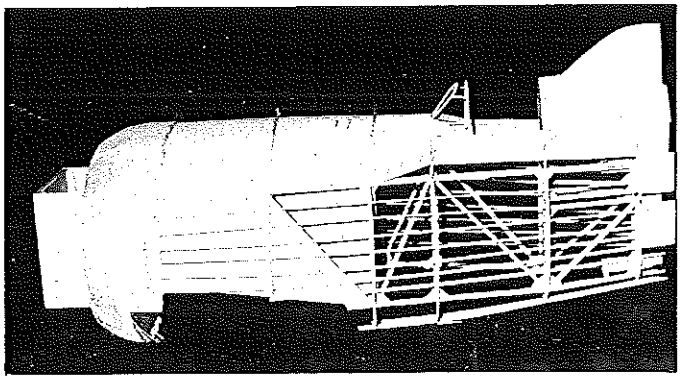
Glue the firewall in place between the forward ends of the inner ply sides. Use epoxy. Brace the firewall with triangular stock.

Glue the two halves of F7T and F8T together. Install fuselage bulkheads at F1, F2, F4, F5, F6, F7, and F8. Make sure all bulkheads are square to the longerons, especially F8. Install the fin between F7T and F8T. Glue the fin leading edge doublers to each side of the fin.

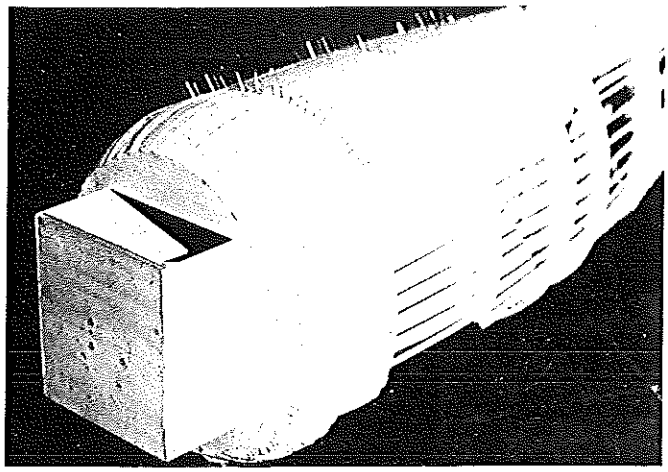
Install the top two stringers between F6 and F8. Note that the stringers must extend 1⅝ in. beyond F8 to form the rudder fairing. Make a gauge of ⅛ × ¼ × 1⅝ in. to accurately measure the cutoff point of all fuselage stringers. Continue the bottom stringer of these two forward, noting that this stringer drops down diagonally between F6 and F5. Install the forward portion of the stringer between F3 and F5 first, then add the diagonal between F5 and F6. It will be necessary to cut a slot in the forward end of the main fuselage longeron at F3 to accept the forward end of this stringer. Add the third stringer down from the top be-



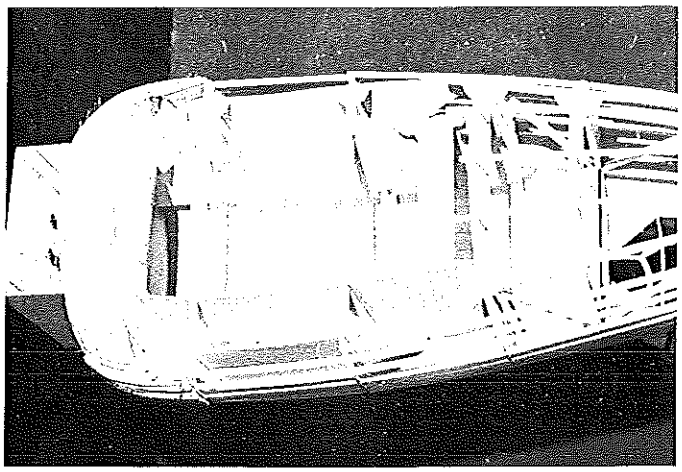
Nearly complete fuselage structure, engine temporarily mounted.



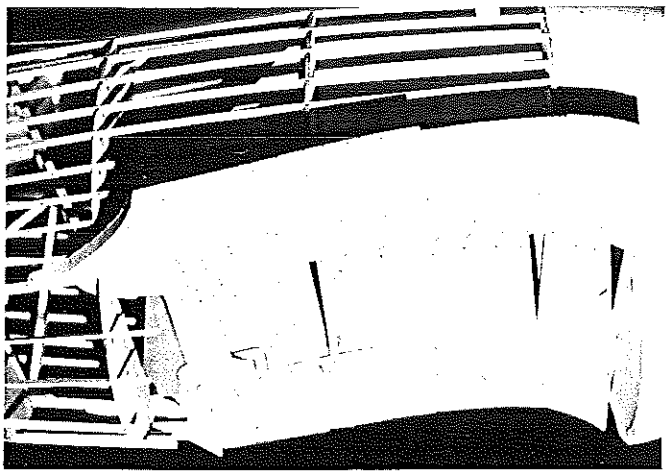
After putting on the stringers, the fuselage planking begins.



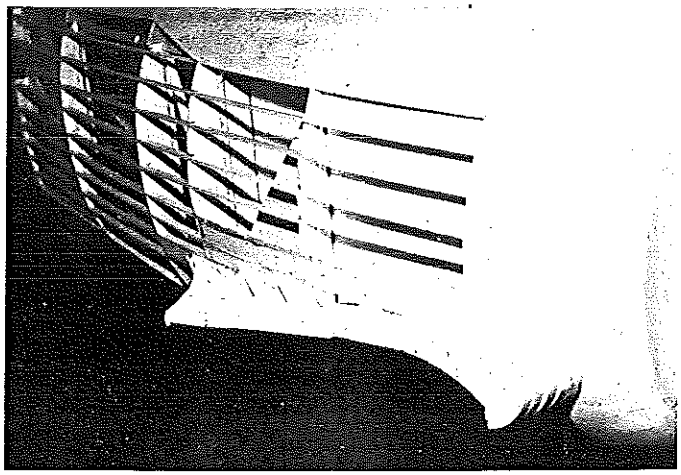
The front curved planking is from ½-in. balsa (not curved strips).



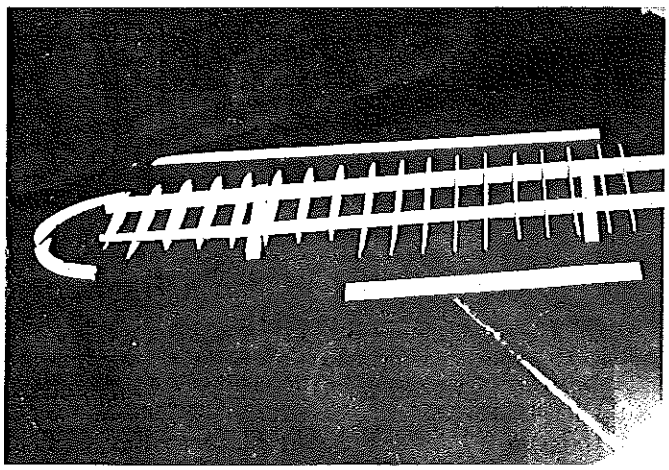
This view couldn't be seen in Hank Clark's cutaway. Examine carefully.



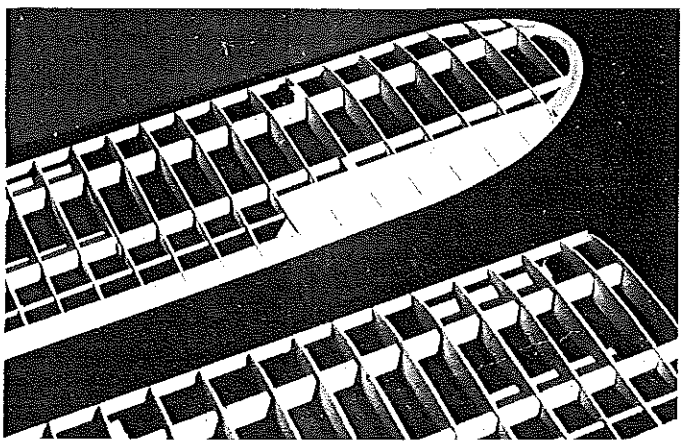
Wing saddle sheeting with rear fillet block.



The wing fillet has been built-up and is now ready for planking.



Wing parts ready for assembly.



Completed wing structures ready for joining and applying center section sheeting. note aileron torque tubes.

tween F5 and F8. The front of this stringer butts against F5 just below the diagonal.

Install side stringers alternating from side to side. All stringers must extend 1⅛ in. beyond F8.

Install the ⅛ ply tail wheel mount plate and the hardwood tail wheel mount block. Epoxy these parts in place. Drill the block for the tail wheel wire. Cut a groove in the block from the hole to the rear of the block, and epoxy the tail wheel wire in the groove.

Install Former F5A on the bottom diagonally so that it lines up with the wing saddle cutout and touches F5B at the low point. Install 13 bottom stringers, allowing them to extend 1⅛ in. beyond F8 as with the previous stringers. An extra stringer is now added between the bottom stringers and the side stringers, on each side. Cutouts for this stringer must be made, and it will be necessary to taper down the ends of this stringer where it joins the fuselage longeron at F5 and F8.

Build the rudder structure by gluing R1 perpendicular to and centered on R2. Add Ribs R3 through R11 where indicated on both sides of R1. Install the ⅛ ply horn base.

Build up the ply and balsa rudder hinges of specified parts, and hinge with bolts. Glue the hinge boxes together so as to fit snugly around the forward part of the hinges. Mount the hinge boxes securely in place in the main fuselage structure. Test-fit the rudder assembly, and glue the hinges to the rudder section. Do not glue the hinges into the hinge boxes at this point.

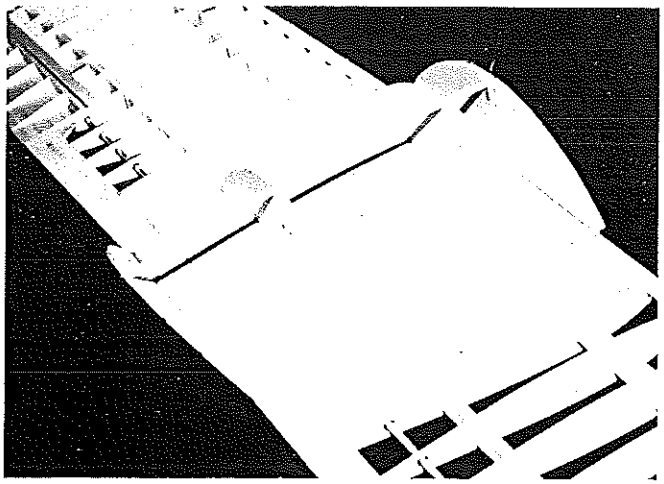
The sheeted sections of the fuselage are next. Plank the forward section between F1 and F3 with ½ in. balsa. Plank or sheet the section between F3 and F6 above the first stringer with 3/32 balsa. Sheet the aft section from F6 rearward with 1/16 balsa. It will be necessary to remove 1/16 in. from each stringer extending from F8 rearward

to install the sheeting for the rudder fairing.

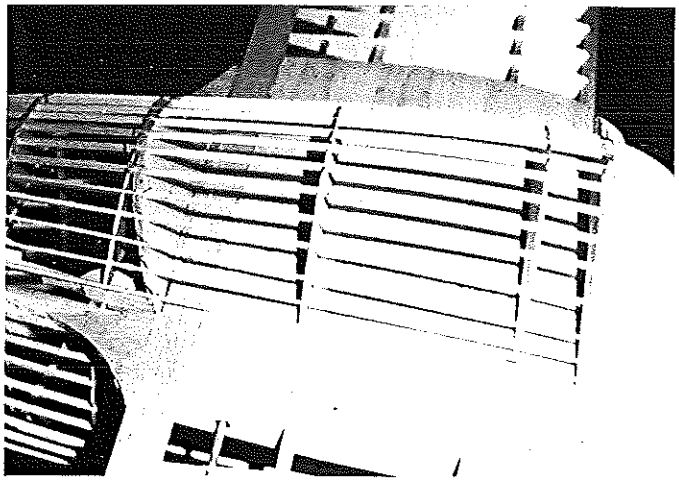
Stabilizer and elevator. The stab is made of ¼-in. hard balsa sheet. Cut it to shape, and sand the edges round. The elevator halves are built up from a 3/32 balsa base with a ½ × ¼ hardwood spar at the leading edge. Ribs of 3/32 sq. balsa are added top and bottom, and these are sanded to a taper at the trailing edge. The elevator halves are joined by one of the commercially-available horns, such as those made by Sig.

Wing. Prepare all ribs from the specified material, and taper the bottom of the rear spar as shown on the drawings. Mark the spars at the rib locations. Slide the ribs onto the spars. Support the spars on two leveling blocks between Rib A, A1, and the last two outboard Rib Cs. These blocks can be of any height as long as they keep the ribs clear of the work surface. Glue the ribs in place. Add the ½-in. square leading edge and the trailing edge. Add the ⅜-in. balsa block at

Say cheese! Henry Haffke poses with his R-1 before final detailing was put on. It's powered by a Webra .91 and uses Ace Atlas servos in conjunction with the Ace Silver Seven radio system.

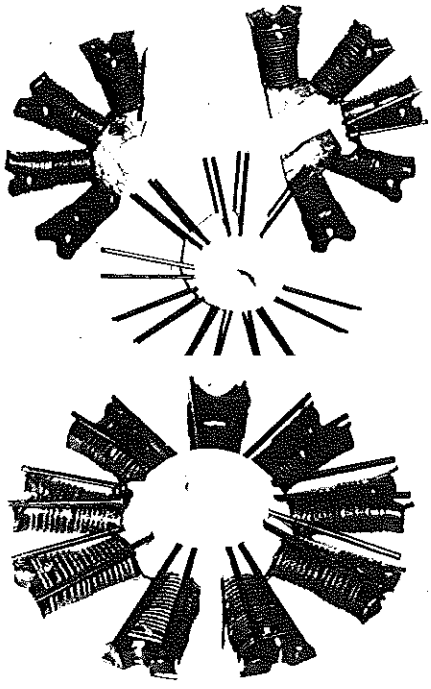


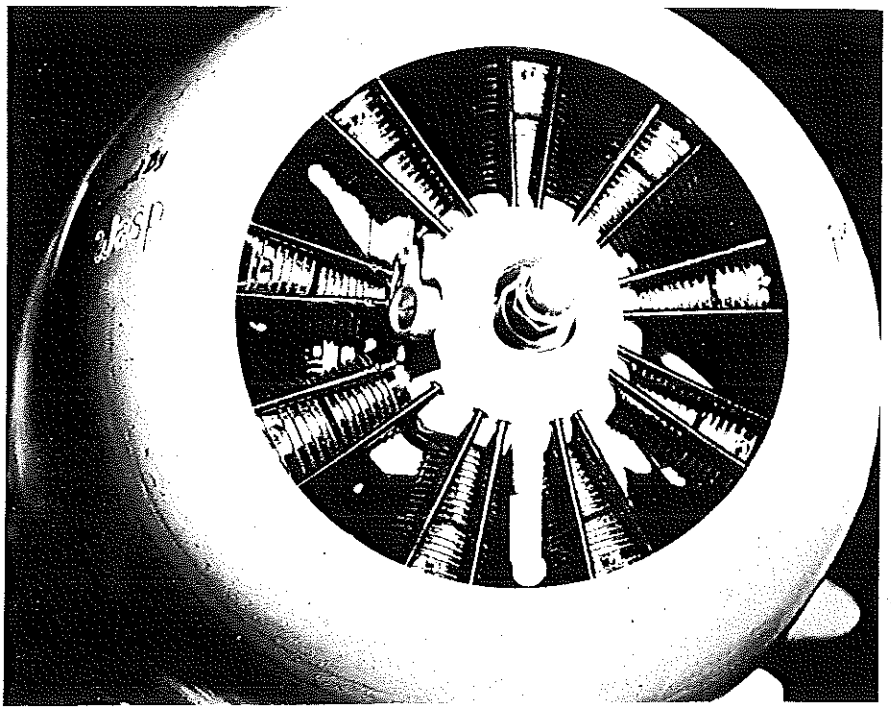
Bottom wing formers have been installed at this point.



Stringers added, the under-wing structure is now complete.

How about a dummy engine for your Super Sportster? The left-hand pictures below show the author's dummy engine in preparation; the right-hand picture below shows the finished Pratt & Whitney Wasp in place. Such detailing really adds to the appearance.





Trophies won by the Quarter Scale Gee Bee R-1 Super Sportster as of mid-1982, with the R-1 forming a backdrop. Plans for the model are on four big sheets (*MA* Plan No. 398 for $22.25).

the aileron location.

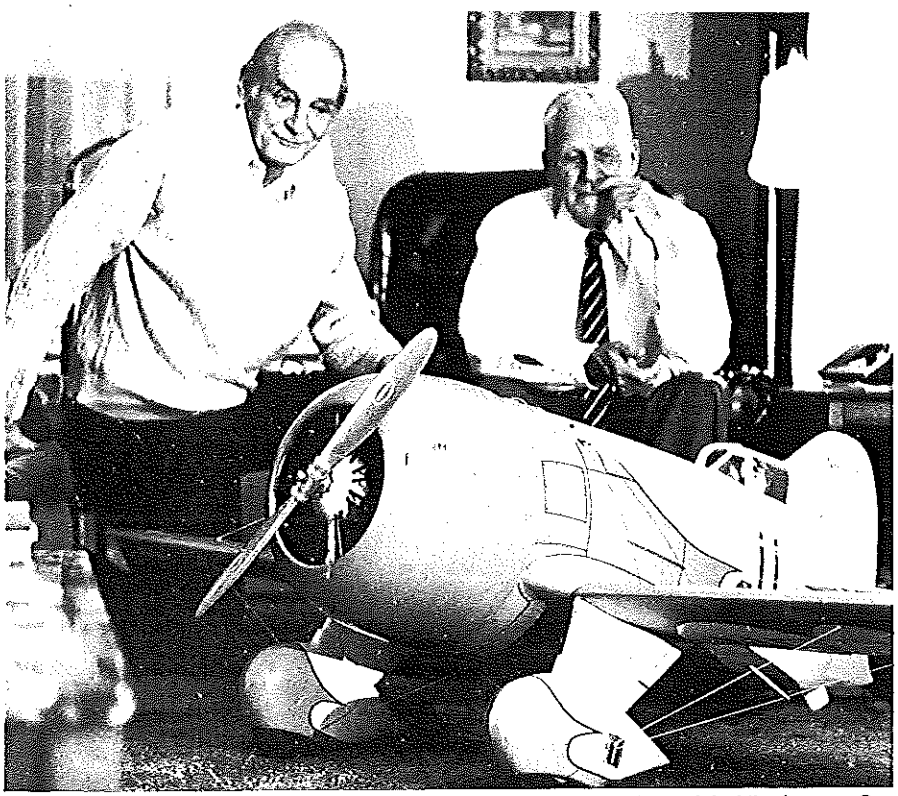
The tip parts are cut from ¼ balsa and added now. When this basic structure is dry, it can be removed from the leveling blocks. The second panel is built in the same manner, except that it is built upside down on the leveling blocks, so as to have a right and a left wing panel.

Add the ⅛ ply plates for attachment of flying wires. Flying wire plates are needed on both the top and bottom surfaces. The landing gear blocks are made from ply and installed in the cutouts in the inboard ribs as shown on the drawings.

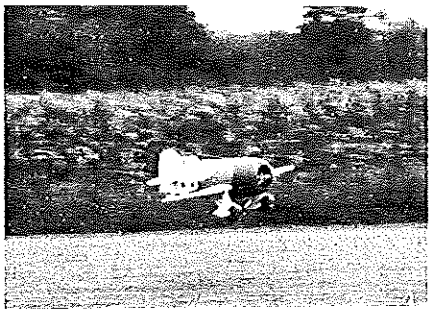
The ailerons are built by tack-gluing the leading edge of each aileron in place against the aileron block in the wing and adding the aileron base sheet. Half ribs are added to the top and bottom. After sanding to the final shape, the aileron is removed from the wing, and a pine block is installed at the inboard end of the leading edge to receive the torque tube. Drill the block at this time.

Torque tubes are made from ¼-in.-dia. aluminum tubing. They are held to the aileron with a long screw through the bottom of the aileron. A 4-40 bolt is installed on the inboard end of the tube. This becomes the aileron servo crank. Use a ply bushing where the tube goes through the final Rib B. A short piece of small tubing in the outer end of the aileron fits into a ply bushing at Rib F. No hinges are needed with this installation, since the aileron has bearing surfaces at Ribs B and F. The two wing panels are joined after aileron installation is completed.

Join the wing panels by sliding the dihedral braces into one wing panel and gluing them. When this is thoroughly dry, slide the other panel onto the dihedral braces and glue. Using the leveling blocks under one



Zantford Granville's son, Robert, left, admires Haffke's Quarter Scale model of the famous Gee Bee R-1 which his father and "Pete" Miller (right) designed in 1932. We are saddened to report that Robert Granville passed away while this article was being prepared for printing.



Pictures don't lie! The R-1 is an excellent flier, no matter what anyone may think.

panel to keep it parallel to your building surface, the other tip is propped up and leveled until the glue has dried completely. The center section can now be sheeted with 3/32 balsa. The wing is now ready for final sanding and covering.

Landing Gear. The landing gear parts are formed from music wire. The front and rear legs are mounted in the wing blocks with straps and screws. Bind the two legs together with fine copper wire and solder. The landing gear fairings are built up from layers of ply and balsa. Refer to the drawings to laminate the parts together. Clamp them tightly or weight them well until the glue is thoroughly dry. When dry, install a locating dowel in the front and rear of each wheel fairing. Tack-glue the two halves together, and carve and sand them to the final shape.

Install the wheels with a collar on each side, and sandwich the landing gear fairing halves around the wire legs. The halves may be glued together or held together with screws.

Cowl. Cut the cowl rings from the materials shown on the drawing. Join the rings with eight ½-in. lengths of ¼ sq. balsa. Make sure that this structure is square, so the cowl will be even and not sloped differently on one side. Cut planking strips as shown on the pattern, then glue in place. It will be necessary to taper and bevel some of the planking strips as you proceed around the frame. When completely dry, the cowl is carved and sanded to final shape. Install four mounting brackets to attach the cowl to the firewall.

Finishing. Since weight is a primary consideration, I decided to cover the model with Permagloss Coverite. This pre-finished fabric will give a real-plane look to the finished model. After final sanding of all structures, the craft was given a coat of Balsarite to seal the wood and prepare for

Continued on page 157

tanks is one of the skills needed for Control Line, so you might as well begin now. The tin-plate of a soft drink can is ideal for tank construction, provided that the paint on the outside and the lacquer on the inside is all scrubbed off using a wet Brillo pad. Lapping all of the joints and using a powerful electric soldering iron (I use a 60W iron, and it is only just powerful enough), plus lots of flux (and cleanliness) is the way to ensure no leaks.

Wait for a calm day to do the trimming flights. You will learn nothing in windy conditions except, perhaps, that you are a brave fool!

Any .20 cu. in. engine should prove acceptable. This size engine is inexpensive and widely available. When equipped with a muffler, it should be quiet enough to keep most of the populace content.

The sharp-eyed among you will have noticed that Midi-Slow is equipped with an old, smelly diesel—a MK III Oliver Tiger. The Oliver is a lovely old engine with impeccable manners, but it is far from common and not ideal for Stunt.

A good friend in the UK has built a Midi-Slow using a muffled OS .20 glow engine, and he reports that this combination is ideal. If you are intending to use such an engine, an 8 × 6 nylon prop and 52 ft. of .012 Pylon Brand lines will prove best and give Midi-Slow the flight characteristics I have found with mine.

Can I now fly Stunt? Well, the old saying about old dogs and new tricks has a lot of truth to it, but Midi-Slow has been a great aid for me in trying to prove that this saying is not always true. For the beginner who does not have any prejudices built in by many years of Control Line Racing experience, the transition from straight-and-level to flying the full AMA CL pattern recognizably, if not beautifully, should come easily with Midi-Slow.

Some of you may be thinking that Midi-Slow may be a perfect stepping stone, but boy is it ugly! Even I would not boast about its looks, but what do you build for a Stunt trainer? Beauty is about bottom of the list of concerns. Ease, speed, economy of construction, and flight performance are what you need—and Midi-Slow has these aplenty. Save that beautiful model plan for when Midi-Slow has done its job and you can fly Stunt properly. I have—and I'm glad I did.

Gee Bee R-1/Haffke

Continued from page 78

the covering. White Permagloss was applied to the entire airframe. The red trim was cut from bright red Permagloss using patterns made from the plans, and ironed over the white. Black pinstriping tape was used to separate the colors.

The markings really make the model, and they are not all that difficult to do. The registration and racing numbers were cut from blank sheets of Coverite's Graphics material and applied. Again, black pinstriping was applied around all of the numbers.

The Gee Bee logo on the fin, the dice on the cowl, and the numbers on the dice were also cut from Graphics material. All the other markings were painted on by hand.

The brace wires were made from elastic material available in most sewing goods stores. These were attached to plates which extend out from the sides of the fuselage. Each plate has three holes drilled in it, and each brace wire has a small hook made from a straight pin that fits in the holes. This makes wing removal simple.

The brace wires pass through holes drilled in the ply wire support plates in the wings, and through holes drilled in the landing gear fairings. A bracket in the center of the under wing structure was made from ⅛ ply for the wires to pass through.

Other detailing can be done as you prefer. I made louvers of aluminum flashing and installed them around the front end with cyanoacrylate glue. Panel lines were made with fine striping tape. The rivets were painted on. A Williams Brothers Quarter Scale pilot was installed in the cockpit. The cockpit enclosure was made from clear plastic. It is not difficult to make, since all the panels were flat. Wilhold RC/56 glue holds the clear plastic well, and it dries clear.

Flying. The R-1, somewhat surprisingly, flies like a normal large model. If it is built lightly and balanced where the CG is shown on the plans, you should have no problems. The wing loading is around 35 oz. if built under 15 lb. This is probably a false figure, since the aircraft gets substantial lift from the fuselage. Pete Miller once explained to me the lifting effect of the big fuselage at a positive angle of attack. Sid Clements and I really proved this one day when we tried knife-edge flight. The R-1 will fly around in knife-edge all day, with just a little top rudder, and none of the tail-low tendency you will see in most planes in knife-edge flight.

Let the model get a good head of speed on the takeoff run, and don't pull it into the air too soon. Let it climb out gently for a good distance before pulling up into a steep climb. The same goes for landings; keep up the speed, and landings are very positive. The R-1 has been looped with no problems, and is well-behaved in stall turns and wingovers. Dead-stick landings have never presented a problem. In fact, if you have built it to 15 lb. or less, you should be absolutely delighted with the R-1's flyability.

The Quarter Scale Gee Bee R-1 is a sure show-stopper wherever you choose to fly it. It is quite fast and not overly sensitive in spite of its seemingly radical design. Don't believe the stories about Gee Bees being terrible machines. Build one for yourself, and see how much fun it is.

Anyone who wishes to fly his R-1 in competition is invited to contact me for documentation. I have much material that I would be happy to share. Henry Haffke,

CHUCK WOOD by Hank Clark