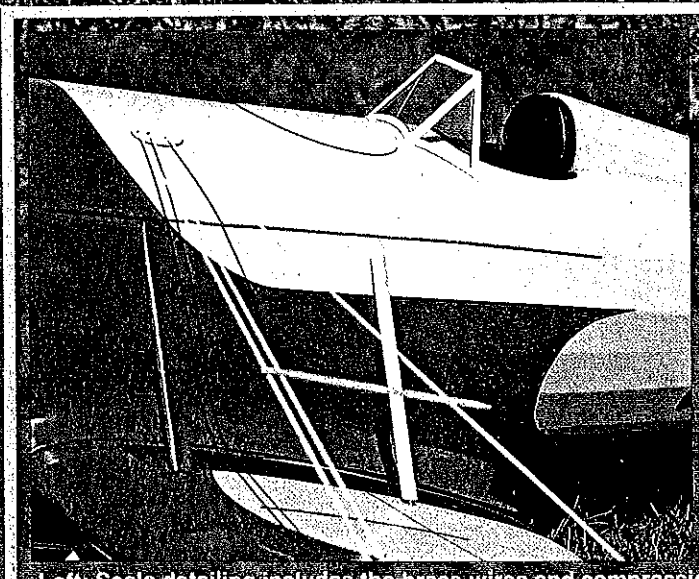
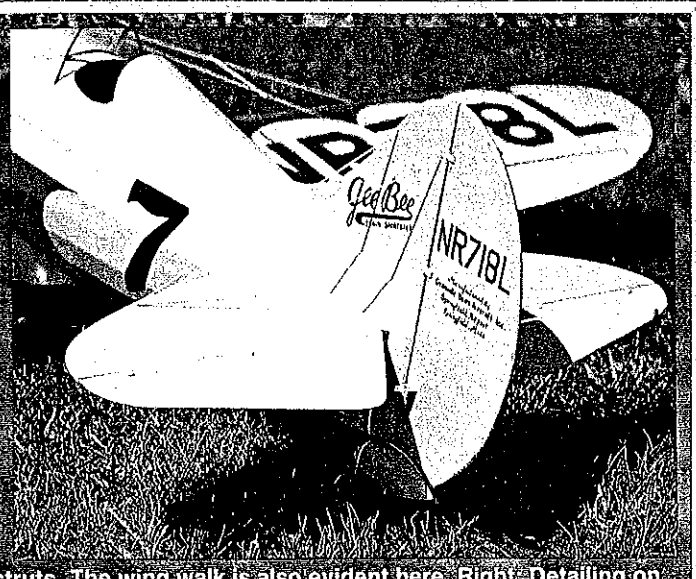
PLAN #581
PART 1 OF 2

Flaglor's Gee Bee Model Y Senior Sportster

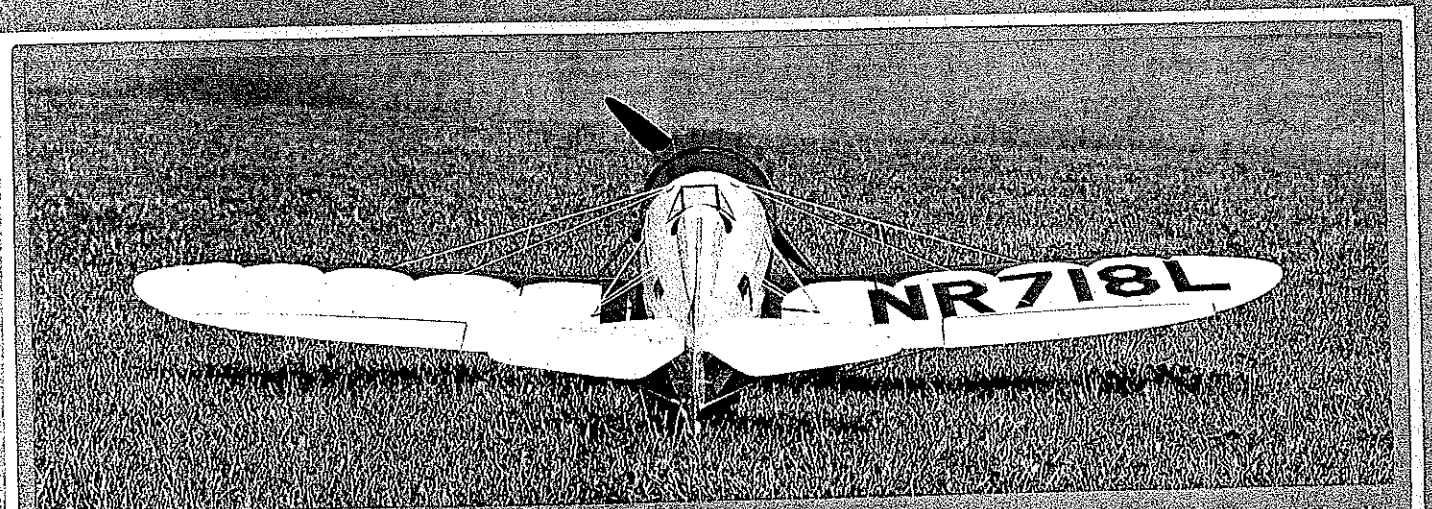
The Nats at Westover provided a unique experience for many modelers when they were able to get a close look at a replica of one of the most famous of the Golden Age racers. Also present was the Scale model presented here as the first of a two-part series.

■ Henry Haffke

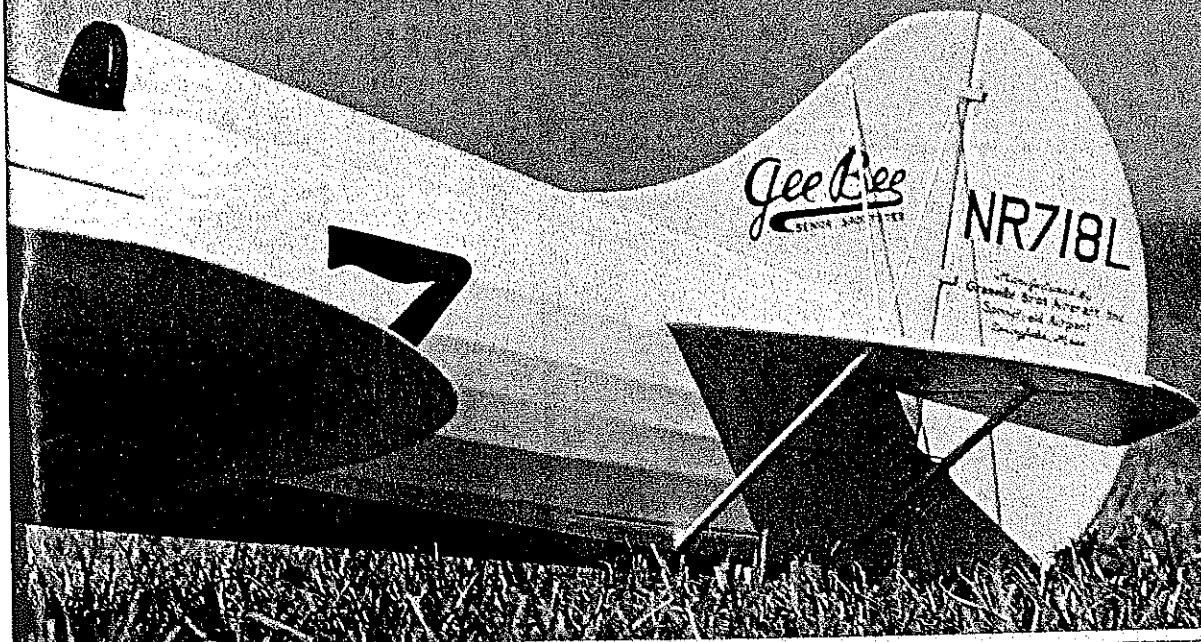


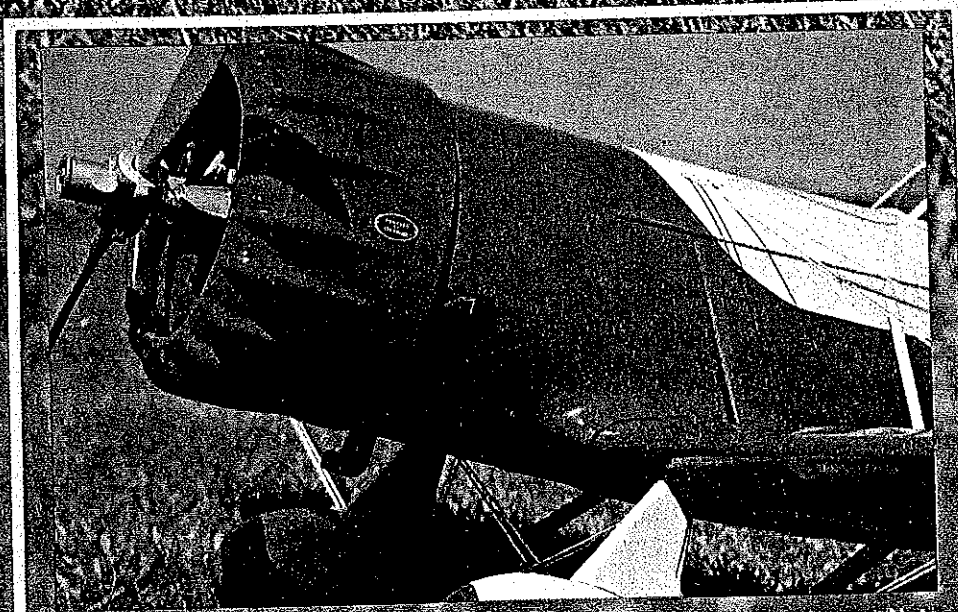


Left: Scale detailing includes the brace wires and compression struts. The wing walk is also evident here. Right: Detailing on the tail feathers includes the original lettering, scale rudder and elevator hinges, and the tiny fairing for the tail wheel.

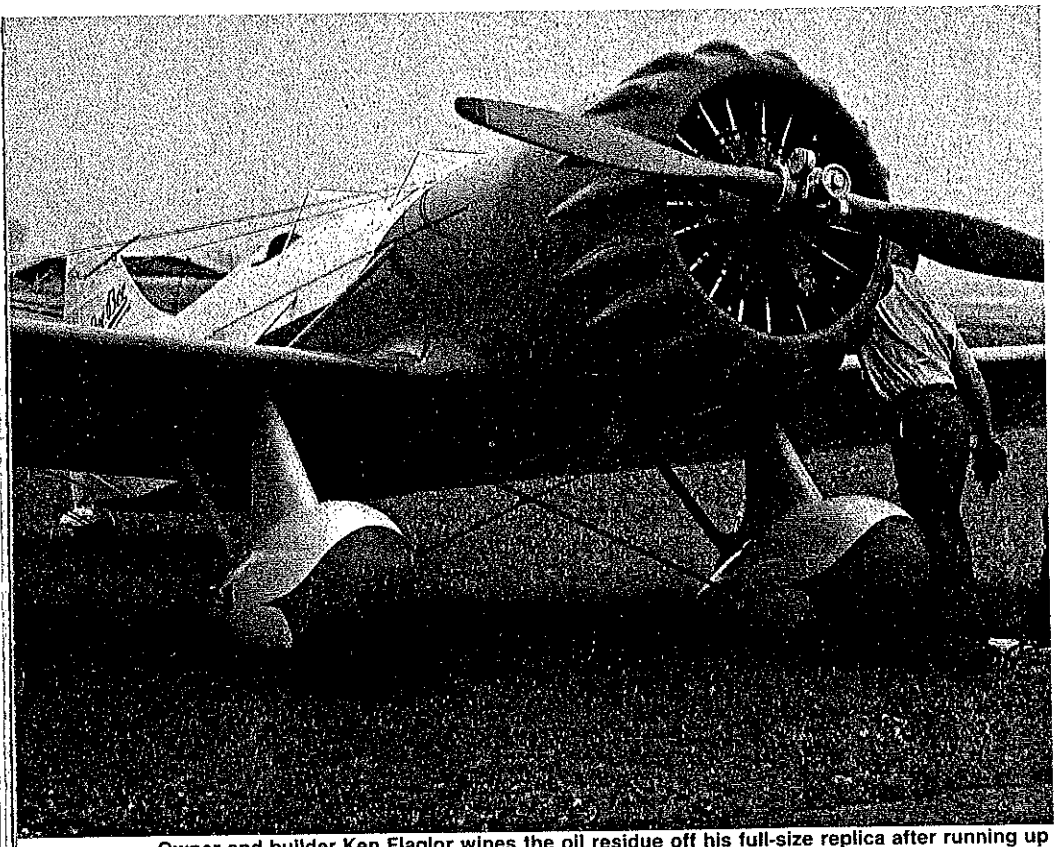


Big picture: The model shows off the lines that made the Senior Sportster one of the most appealing of all the Granville brothers' creations. Above: Large control surfaces and plenty of wing area make the model of the Model Y such a pleasure to fly.

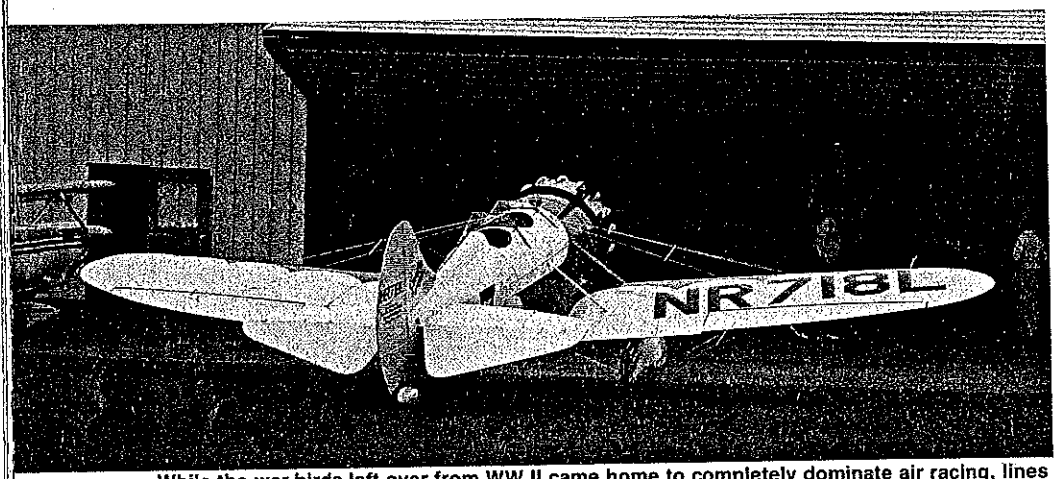




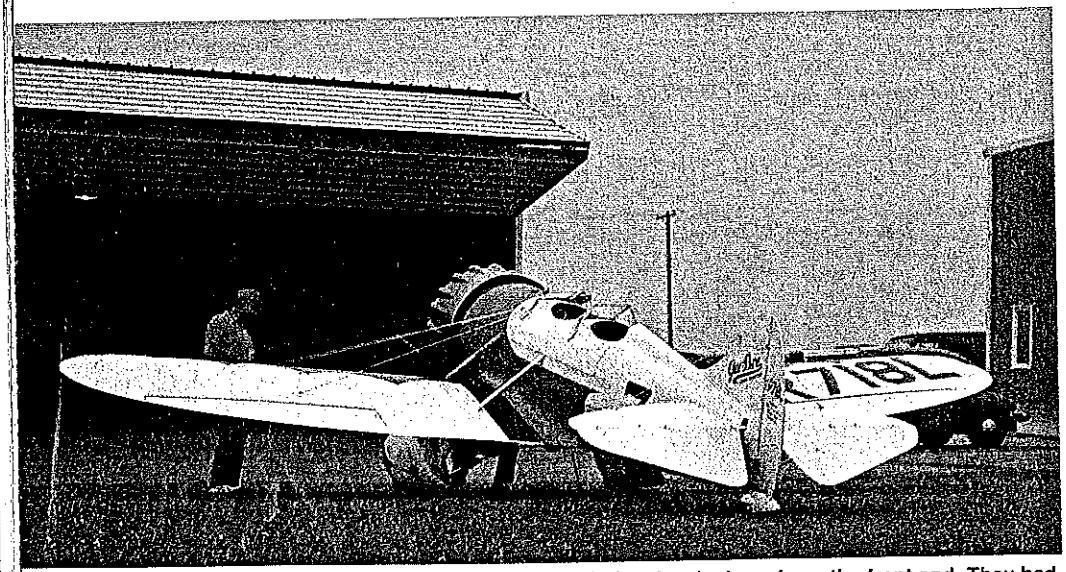
Here we see the static display scale prop and cowl with rocker arm bumps. Note the small plate that says "Powered by Lycoming" and the single exhaust stack.



Owner and builder Ken Flaglor wipes the oil residue off his full-size replica after running up the engine. With all the time he has invested, Ken keeps the Model Y in immaculate condition.



While the war birds left over from WW II came home to completely dominate air racing, lines like the Sporster's will keep the Golden Age racers in the hearts of aviation fans forever.



Sid Clements looks on while Ken (underneath the plane) wipes down the front end. They had been listening to the Gee Bee's big Lycoming engine make music at its hangar in Kenosha, WI.

I BUILT MY FIRST model Gee Bee in 1975. Since that time I have designed and built no less than 10 different Gee Bee models. They have all been very rewarding planes that were a lot of fun to fly. All have been flown in Scale meets all over the east; their contest record has been very successful, to say the least.

Building my first Gee Bee models got me involved in a search for documentation, as very little was available on most of these aircraft. The 1931 Thompson Trophy-winning Gee Bee Model Z "City of Springfield" and the 1932 Thompson-winning Gee Bee R-1 (and its sister ship, the R-2) could be very well documented; much has been published on these sensational aircraft.

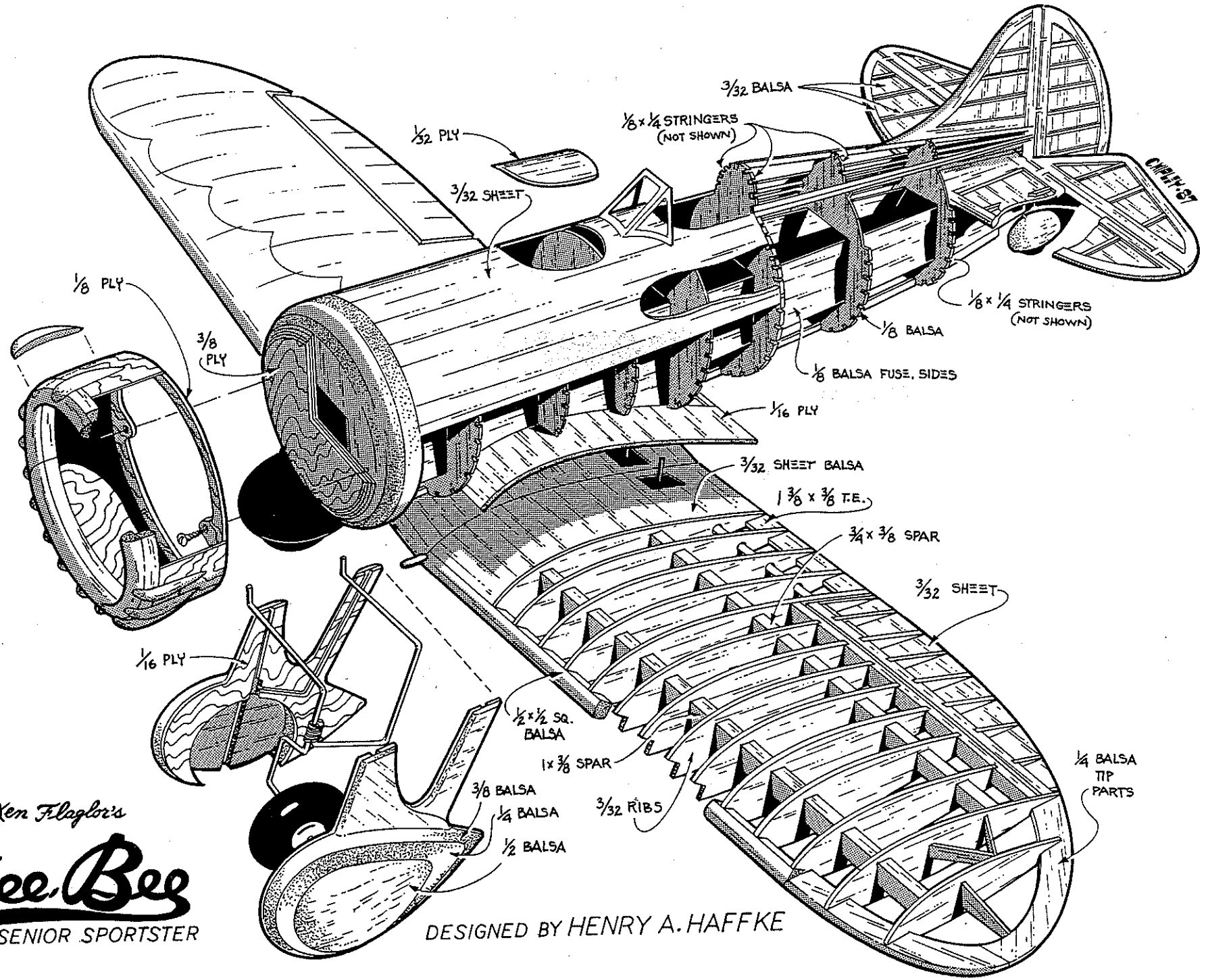
My first Gee Bees, however, were of the earlier Sportster series. Almost nothing could be found in the way of photos and information on these obscure aircraft. After nearly two years of hunting, I located Bob Granville, and he put me in touch with his brother, Ed. They were the only living members of the original five Granville brothers who built those fabulous airplanes in Springfield, MA in the early Thirties.

From these two men I was able to get many photos and much information on the little-known Sportsters. Ed passed away a short time after I came in contact with him, but his wife continued to help in the search for material. Bob Granville and I became good friends, and he attended several model meets with me over the next few years. Bob put me in touch with others who could add to my collection of Gee Bee material.

As time went on I began to see that much of what had been written about the Gee Bee aircraft was grossly inaccurate. I had thought of writing a book on the earlier Sportsters, which was an interesting story in itself. As my firsthand information increased and I realized the terrible injustice that had been done to the Gee Bee aircraft and the men who built them, I decided that the real story should be told.

I decided to write the entire story of all the Gee Bees. I talked to Bob Granville about this and asked him if he would like to co-author the book with me. I wanted to start the book with some background on the five brothers in their younger days and thought he could do better at this than I could. He agreed, and we started to hunt up more information. Bob put me in touch with more people who were involved with the Gee Bees in differing capacities. I got to know people who had owned various Gee Bees, people who had worked in the Gee Bee factory, pilots (both men and women) who raced them, and even pilots who had accidents in Gee Bees. I gathered a mountainous pile of information.

In the course of my research I came in contact with a man who was planning to build a replica of a Gee Bee, and then another, and another, until I had quite a list of people who were in various stages of building a full-size replica. Among the Gee Bees that were under construction was a Model Z, R-1, R-1/R-2, Model D, Model E, and several Model Ys. I corresponded


3/32 BALSA
1/8 x 1/4 STRINGERS (NOT SHOWN)
1/32 PLY
3/32 SHEET
1/8 PLY
3/8 PLY
1/8 x 1/4 STRINGERS (NOT SHOWN)
1/8 BALSA
1/8 BALSA FUSE. SIDES
1/16 PLY
3/32 SHEET BALSA
1 3/8 x 3/8 T.E.
3/4 x 3/8 SPAR
3/32 SHEET
1/16 PLY
1/2 x 1/2 SQ. BALSA
1 x 3/8 SPAR
3/32 RIBS
1/4 BALSA TIP PARTS
3/8 BALSA
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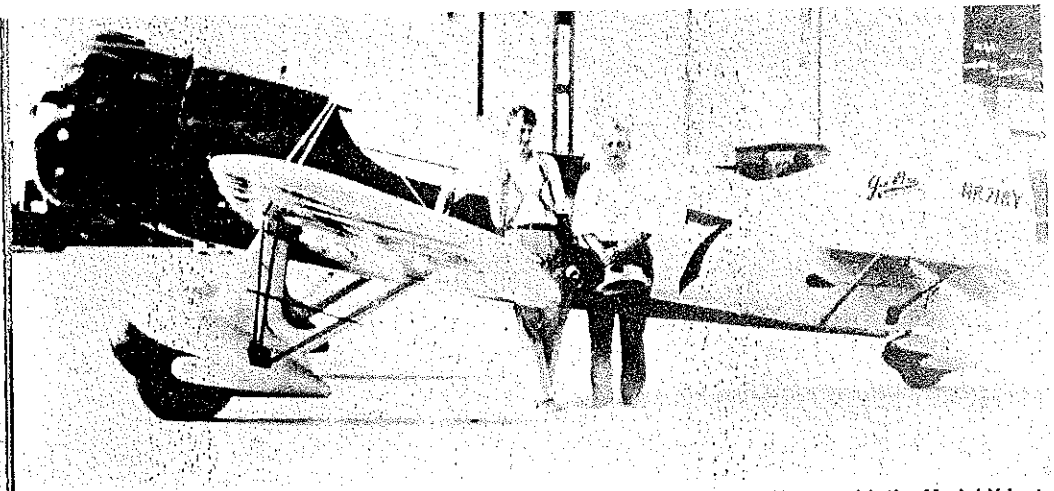
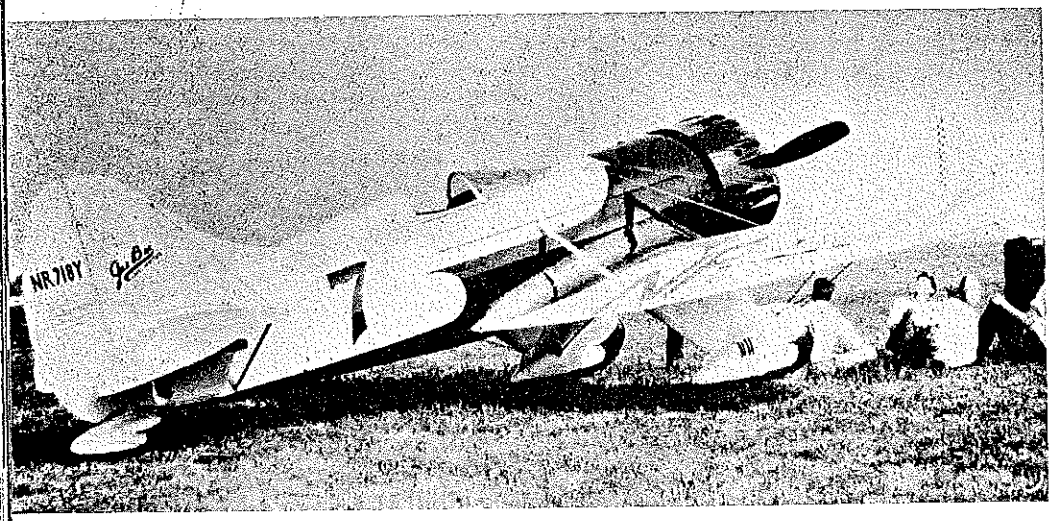
1/2 BALSA
Ken Flaglor's
Gee Bee
SENIOR SPORTSTER
DESIGNED BY HENRY A. HAFFKE

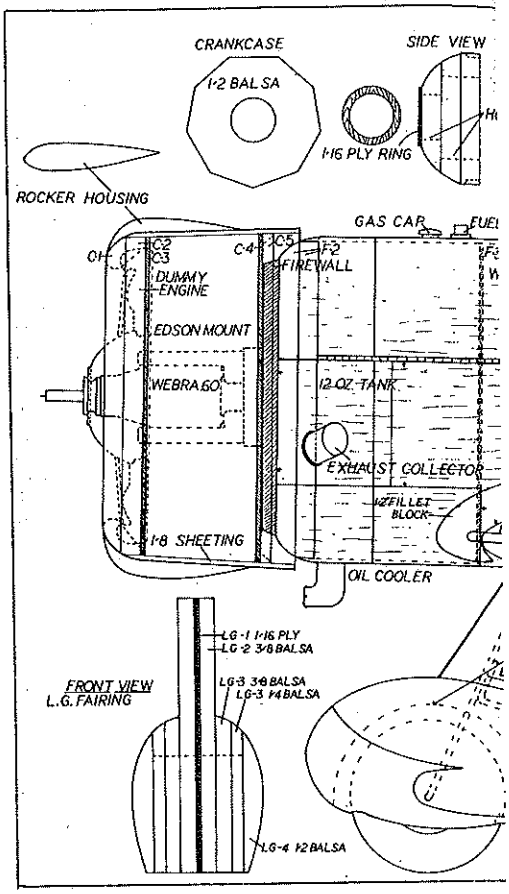


This rare photo shows Bob Hall (wearing the parachute) and Art Knapp with the Model Y just after installation of a Wright Whirlwind engine. Ken's replica is finished as the Gee Bee appeared at this time, prior to fairing in the landing gear and installing the long windshield.



NR 718Y is shown here as it appeared at the 1933 Chicago International Air Races. This version incorporated all the final modifications. Note the differences in the landing gear faring.

This is how NR 718Y appeared when it first rolled out of the Granville's shop in 1930. Power at that time was provided by a 215-hp Lycoming engine which accounts for the smooth cowl.



with each of these men and decided that a chapter of my book would describe them and their replicas.

In 1982 my research had spanned a period of eight years, and I was still searching for details. Early in October of that year, I opened my mail one evening and found a set of photos of the complete structure of a Gee Bee Model Y, ready for covering. The note with the photos read, "Dear Henry, thought you would be interested in seeing these pictures of my project." It was signed, Ken Flaglor.

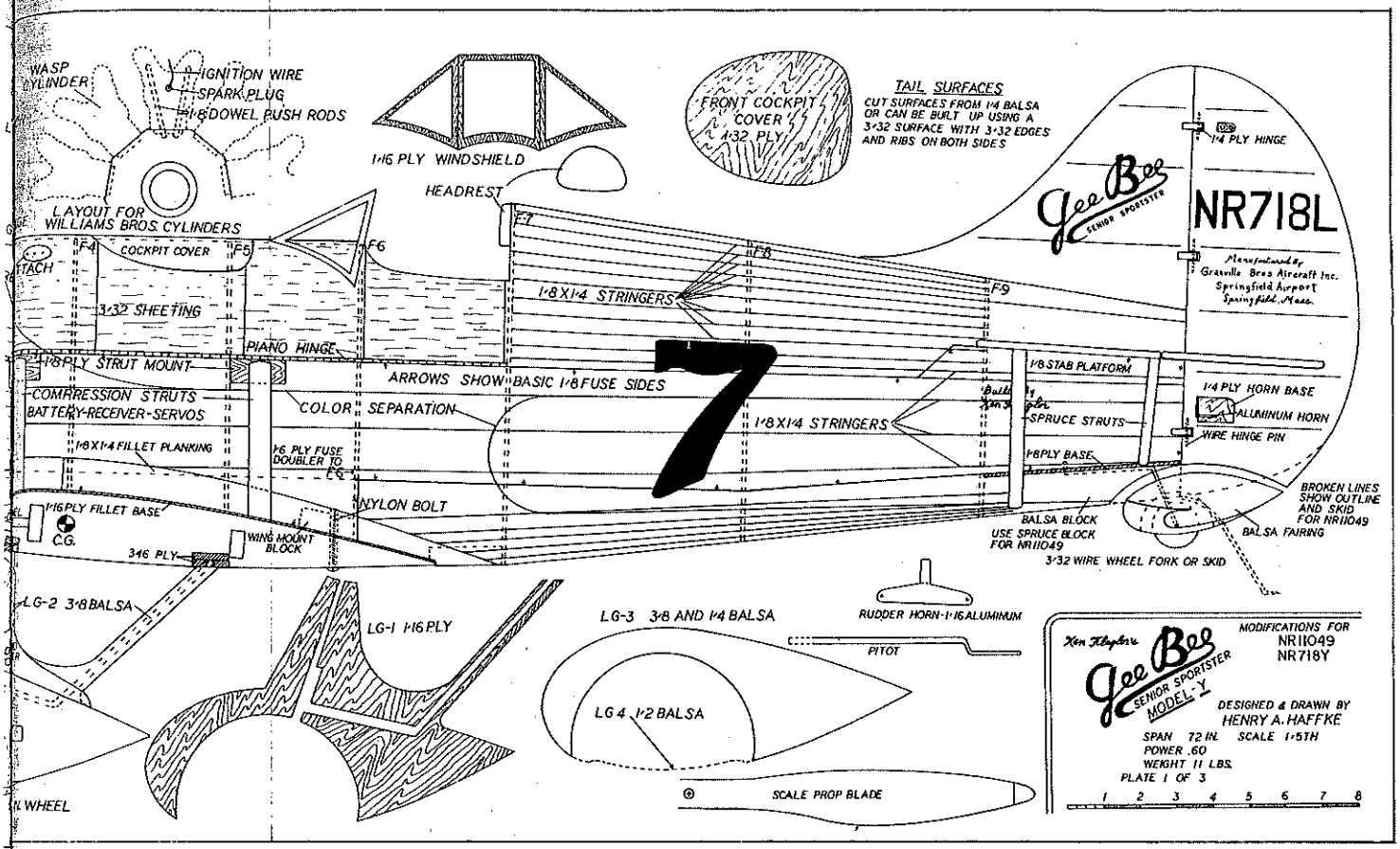
I knew of Ken as the designer of the Flaglor Skooter, but I had no idea he was building a full-scale Gee Bee. He had gone much farther with his project than any of the others I had been talking to. I immediately contacted Ken and made arrangements to meet him the following week. He gave me the entire history of his project as we looked the plane over from top to bottom.

Ken has a super background in the aviation field. He learned to fly in gliders in 1948 and soon qualified in powered planes. He bought a glider and a Waco UPF-7 for a tow plane. The Waco was destroyed in 1955 while Ken was towing a glider; fortunately his injuries were not serious. While hunting for a new tow plane he found a Fleet 16-B biplane. He did a lot of work on it, including the installation of a 220-hp Continental engine. The aircraft became an excellent tow plane. Ken's brother named the plane the Flaglor High Tow. Ken received the Best Workmanship award for the High Tow at the 1957 EAA Convention. He later sold the craft, and it is still towing gliders on Long Island, NY.

Ken's next project was building a Cherokee glider. He installed two go-kart engines on it for power. In 1967 this led Ken to design an original aircraft called the Flaglor Skooter. The Skooter was a neat little aircraft powered by a VW engine. Ken became very well known for this aircraft; he still sells plans for it.

Ken's next project was a Monett Sonerai II. He flew this for some time while considering what to do next. He wanted something special. It had to be a two-place craft so he could share it with others. It had to be nice to fly, and it had to be a challenging project. Since his early days of building models,

*Full-Size Plans Available . . . See Page 170



Ken had had a liking for the Gee Bees, especially the Model Y. Building a Model Y would suit Ken nicely for a new project.

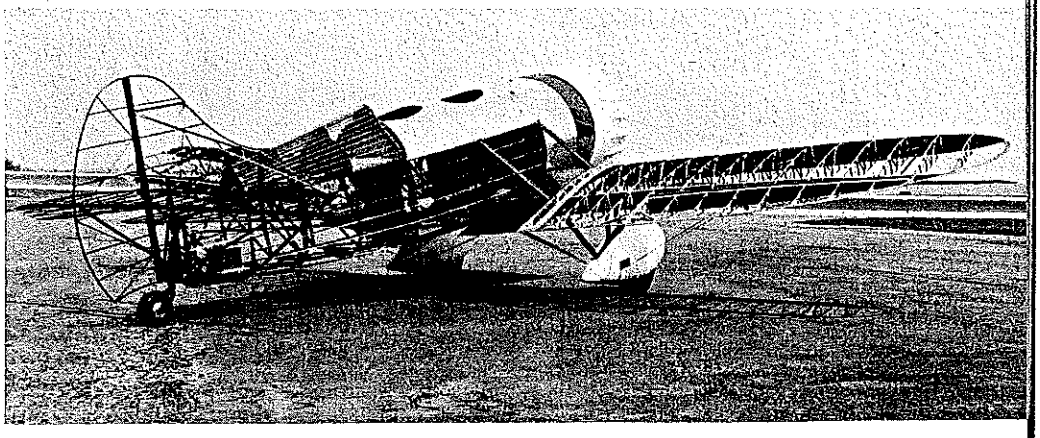
The Model Y was undoubtedly the best-flying of the Gee Bees. Many who flew it praised its flying characteristics. One of the two model Ys that were built won the National Aerobatic Championship in 1932. It was a fast plane, frequently raced; in fact it won more races and made more money than the more familiar Gee Bee racers. The Model Y was flown in the Thompson Trophy Race twice and finished in the money both times.

The Granville organization has always been known as a race plane builder, although they only built three racers, one of which was modified into a fourth. They built the racers after seeing the excellent performance of their sport airplanes in many competitions. Times were hard, and they saw the possibility of winning some of the prize money for themselves.

Granville Brothers Aircraft had started in business building a sport biplane which the oldest of the brothers, Zantford "Grannie" Granville, had designed. After building several of the Model A biplanes, a single-place low-wing sport plane, the Model X Sportster, was built. The Sportster was an immediate sensation, and several wealthy pilots wanted one. A total of eight of the little Sportsters was built. Four were built with various in-line engines, including Cirrus and Menasco power plants. The other four were built with Warner radial engines. The in-line-powered models were designated Model X, Model C, and Model D Sportsters. The radial-engined craft were called Model E Sportsters.

The Model Y was born when Grannie decided that a two-seat version of the Sportsters would be a good venture with more sales potential than the single-seat job. The first Model Y was designed to take power plants of from 215 to 400 hp; it was built with a Pratt & Whitney 300-hp Wasp. The plane was a delight to fly and was very fast.

South Jersey's "Test Pilot Supreme," Sid Clements, checks out operation of the control system before putting up a test flight.



The completed structure of Ken Flaglor's Model Y replica, ready for covering. Note the battery placed at the rear of the fuselage to help get the center of gravity in the correct location.

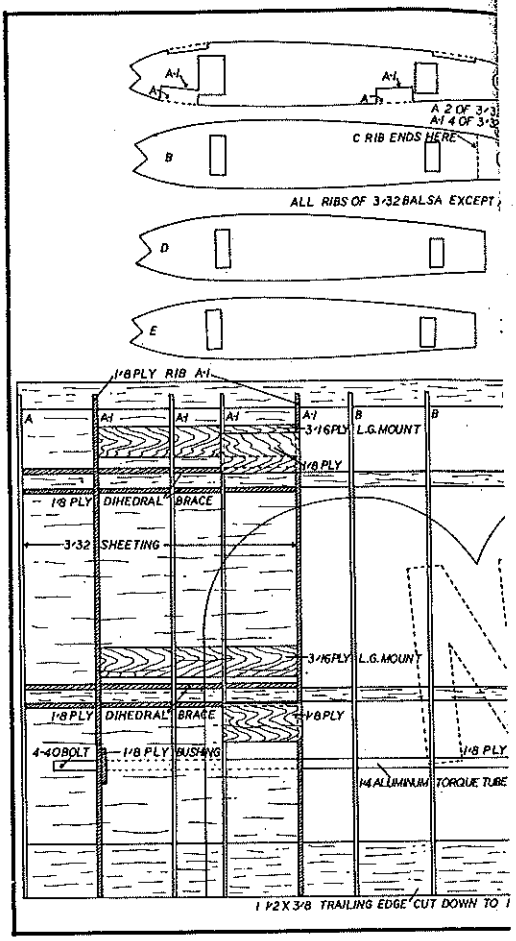
Members of the Granville family pose with Ken Flaglor and his Gee Bee at Westover Air Force Base. L-R: Gladys Granville Jones, youngest sister of the famous Granville brothers; Dr. Norma Granville, daughter of Zantford (Grannie) Granville; Ken Flaglor; and Hiram Jones, Gladys' husband. Hiram did most of the welding work during construction of the original Gee Bees.

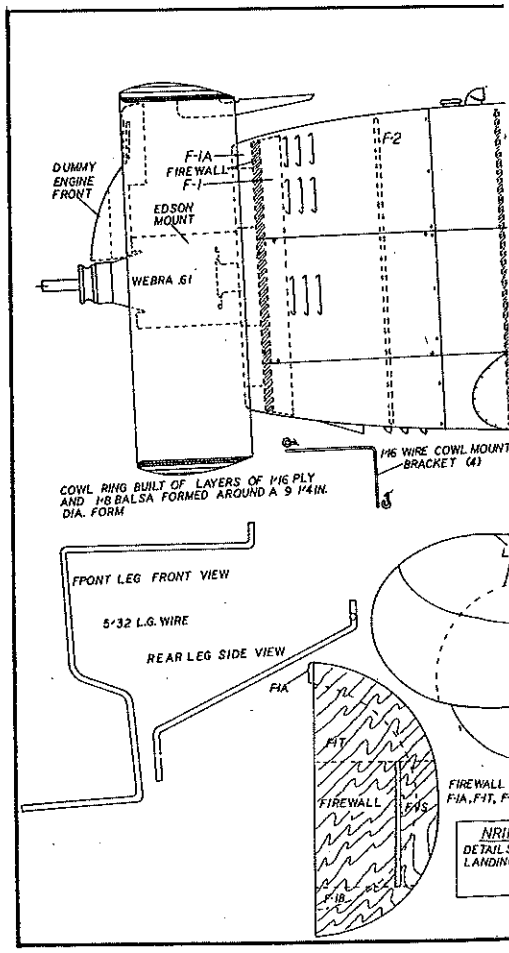
The second Model Y was built for the Cord Automobile Company as a test bed for their new 215-hp radial engine. This Model Y was acquired by Art Knapp in 1933 and modified for the 1933 Chicago International Air Races. A 440-hp Wright Whirlwind was installed for power, the landing gear were faired in, and a long racing windshield was installed over the closed forward cockpit.

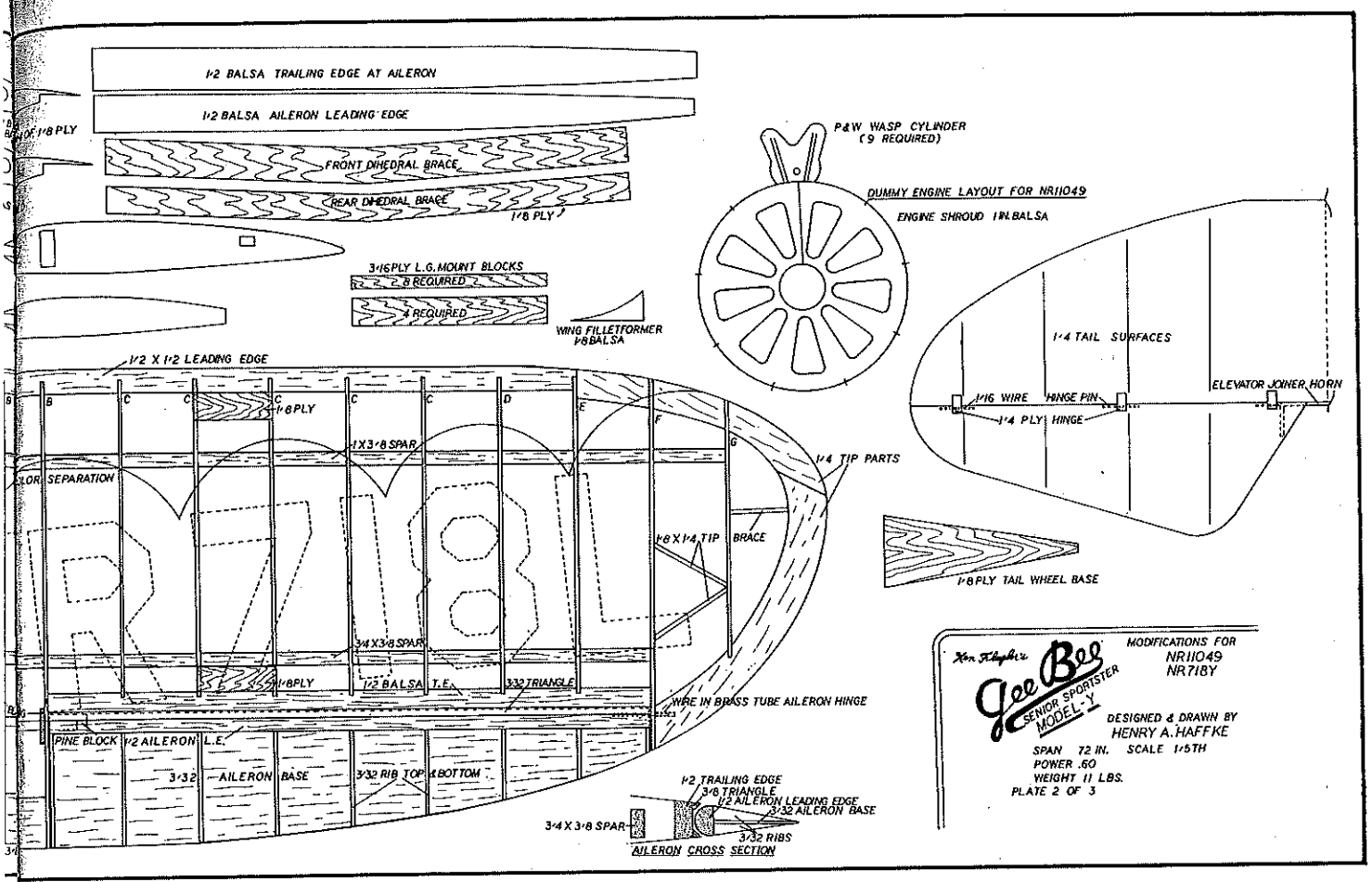
The modified Model Y was flown by Florence Klingensmith in the final race of the Chicago event. She crashed into the side of a hill after veering off course. Accounts of the accident told of fabric ripping off a wing, the aircraft breaking up in the air, and other such things. I have spoken to two eyewitnesses, and their story is much different. One of the witnesses was on the field and had a close view while the other (a well-known columnist for a model magazine today) was in the spectator stands.

They agree that Ms. Klingensmith was leading the race, and the plane was really moving. The fabric was bulging up between the ribs on top of the wing as she came around the near pylon. There was a loud pop when the fabric split between the inboard rib and the center section of the wing. This wouldn't throw the aircraft out of control or cause it to crash. After rounding the pylon the plane leveled out, flew off the course, and crashed into a hillside quite some distance away. The pilot was killed. It

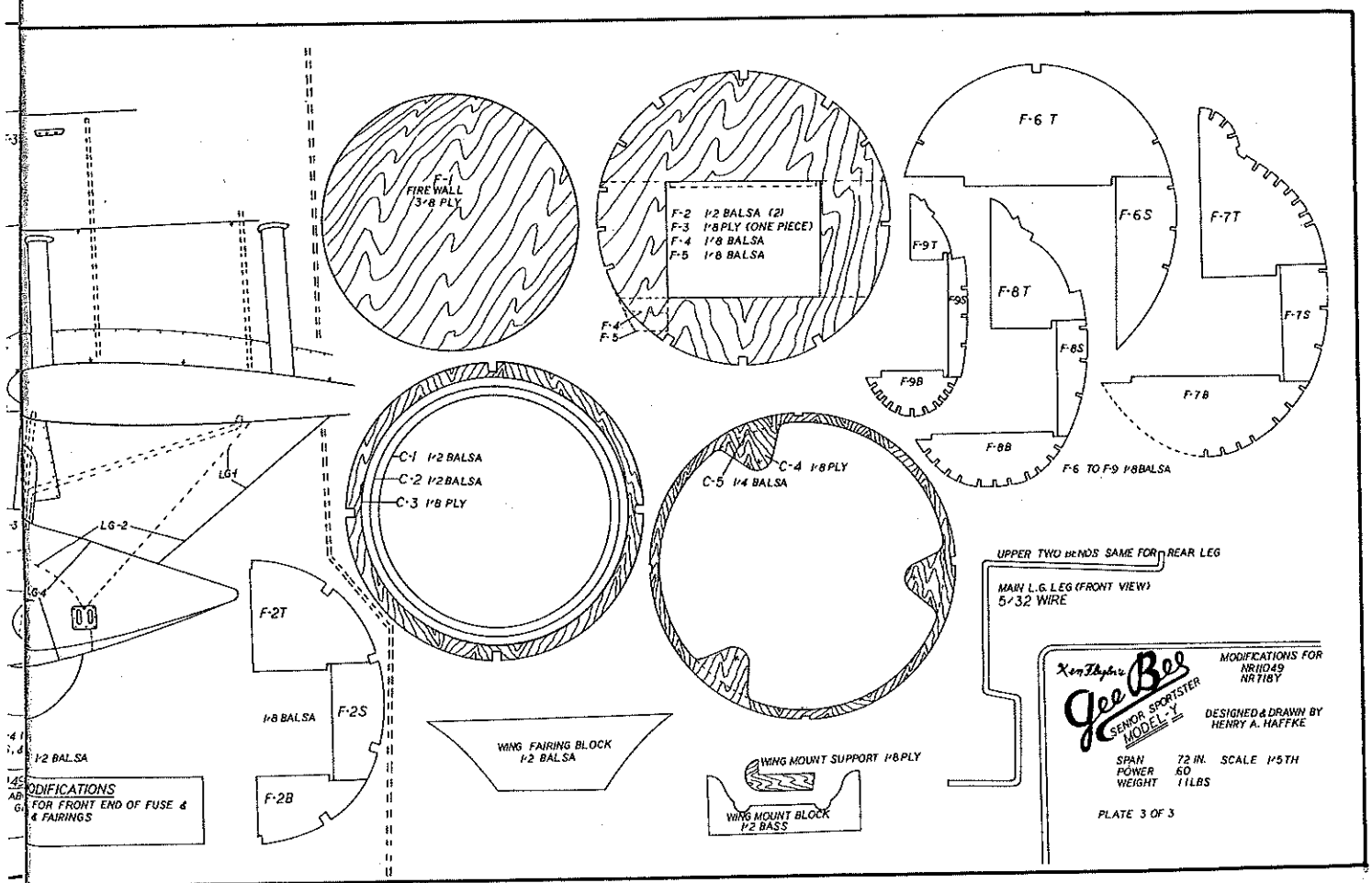
Two proud builders stand with their creations. Author Henry Haffke is on the left, and Ken Flaglor is on the right. Ken says he's always liked showing his Gee Bee to modelers because they can appreciate all the time and effort he had to put into it more than just about anyone else.







Full-Size Plans Available . . . See Page 170



is possible that she fell victim to fumes in the cockpit, since a closed canopy had been installed before the race.

Bob Hall, who had worked for the Granville Brothers as an engineer, was involved in the modifications done to the Model Y. He had flown it many times. He told me that once during a race he hit a pylon and knocked off 2½ feet from the lower wing. He continued on and landed without any trouble.

The first stock Model Y met its end a few months later. It was being flown near Flushing Meadows after a complete refurbishment. The engine threw a prop blade. The resulting vibration tore the engine out, and the Gee Bee spun into a marsh. It was later destroyed by vandals.

Ken spent all of his spare time on his Gee Bee until it was completed. When I saw his project I was amazed at how much he'd done with the meager information he had to work with. His ability to figure out things about various parts of the aircraft was unbelievable. Some builders are good at welding, others at woodworking, or finishing an airplane; Ken could do it all. He is an amazing craftsman, and his Gee Bee is the most beautiful plane I have ever seen.

Ken decided to finish his Gee Bee like the second one—as it had been modified for the 1933 Chicago races. He liked the cowl with the rocker arm bumps, and he liked the original open landing gear fairings. The plane was finished in the original colors, Tucson Cream and Madrid Red. Ken has been questioned as to whether the plane was accurate; the prototype raced with closed landing gear fairings. I have one photo which is a bit fuzzy, but clearly shows the aircraft right after the installation of the Wright engine and before the wheel fairings were closed in. The picture proves that Ken did, indeed, finish his replica accurately.

Ken started building his Model Y in January of 1977. Work progressed slowly, since he worked on it during the slow months of his business (Ken ran a glass service). He made the first flight on July 4, 1984. It flew beautifully, needing only some brace wire adjustments to trim it out. The first few landings were plagued with landing gear dampening trouble. After some experimenting, Ken installed McPherson automotive shocks, and the problems disappeared.

Ken flew off the required number of hours to qualify for cross country flight. During these flights the plane had the forward windshield removed and the forward cockpit covered over. This was the way the prototype was flown in races; covering the forward cockpit cuts down on drag. Once the required time was in, Ken flew the Model Y to Oshkosh. He came home with the Champion Replica Trophy as well as the Northern Illinois Aero Club Best Aircraft Trophy. After Oshkosh, Ken flew to the National AAA Fly-In at Blakesburg, IA. The Model Y received awards for Best Civilian

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Safety/Preston

Continued from page 22

"The horror of running from a six-pound plane doing 50 mph is unbelievable. I could hear it coming and thought; "If this thing hits me I'm done for." It hit me in the center of the small of my back—and I mean full force! As I was falling, I wondered if I would ever pick up my son again or even be able to walk.

"I was lying on the ground some 12-15 ft. from the place where the plane had struck me and found that I could still move my toes. However, the fuel tank had opened up and poured nitro into the wound. Take my word for it, that hurt!

"At the hospital, they dug spinner chunks out of my back. My wife said she could see my vertebrae. The unbreakable prop had broken when it chopped the back tip off my L-4 vertebra, and my smaller left hip bone was also broken. The wound was so deep that they were afraid that my kidney might have been damaged; fortunately, that turned out not to be the case.

"A week-and-a-half later, I am walking and can even carry my son slowly, but it might be awhile before I can wrestle hay bales.

"The cause of the crash was receiver failure. I am a Ham radio operator and performed some tests on the transmitter. When I turned the transmitter on first and then the receiver, all four servos would swing 10° right—and that was all the response I got. The only moral of this story I can think of is:

"• When you fly on the wide-open prairie, bring a pickup truck to hide behind.

"• Never, ever fly alone! If you do and you get hit, you're finished. Think of your family!"

The other photos included with Andy's letter showed what was left of the model. Needless to say, it was subsequently trashed. I don't think I need to add any comments to Andy's very complete account of his accident, other than to echo his message:

NEVER FLY ALONE!

Gee Bee Y/Haffke

Continued from page 32

Replica, Most Rare Monoplane, Greater NY Chapter Choice, and Best Workmanship by an Owner.

The following year Ken returned to Oshkosh and was again awarded Champion Replica. He left Oshkosh before the meet was over and embarked on the long trip to Westover Air Force Base for the AMA Nats. Since Westover is near Springfield, where the Gee Bees were built, the visit of the Model Y was an historic occasion. Modelers from all over the country were delighted to see Ken's magnificent replica.

I took Ken on a tour of the Springfield area. We visited the museum in Springfield that houses the Gee Bee display. I showed him where Springfield Airport had been; it's the parking lot of a shopping center now. The original hangar is still there, and the spot where the factory had been is marked by a clump of evergreen trees. We drove to the New England Air Museum, where we got a look at an original Gee Bee: the second Model A Biplane is housed there. We met the director of the museum

and looked at the replica Gee Bee R-1 that they are building from the original factory drawings.

During the next few days at Westover I was able to introduce Ken to several members of the Granville family who came to the Nationals. Ken met Gladys Granville Jones, who was the youngest sister of the five Granville brothers, and her husband, Hiram. Hiram was one of the original factory crew and did most of the welding on the original Model Ys. He also met Norma Granville, the daughter of Zantford Granville; and June Dakin, the daughter of Tom Granville. They were all very pleased to see Ken's beautiful Gee Bee and enjoyed meeting him. I'm sure the plane brought back some old memories for Gladys and her husband.

I will never forget the thrill of seeing Ken lift off from Westover AFB that bright Sunday morning as I stood with Gladys, Hiram, Norma, and their children. It was a beautiful sight to see a Gee Bee over Springfield again. Thank you, Ken, for that wonderful experience.

To be continued: Next month, construction details.

Radio Technique/Myers

Continued from page 35

Sacramento, CA 95826. His telephone is (910) 362-1962.

2) Pete Waters, doing business as Kraft Midwest, 117 East Main, Upper Level, Northville, MI 48107. Telephone (313) 348-0095.

If I hear of other people similarly equipped, I'll pass it on. Yes, this is an invitation to send me your name, address, and type of business. (My next column may look like a classified ad!)

As I said once before, when we talk of narrow-banding transmitters, we are really talking about suppressing THE POWER TO INTERFERE. Old, wideband AM (OWBAM) transmitters have more power to interfere. Eventually, we'll have to get rid of all of them. The plan is to be rid of them by 1991. Why? Because they cause more trouble than they are worth!

Policing the narrow-band channels: So, who is going to make sure that the RC12-34 band is really occupied by narrow-band transmitters, starting in 1988, and that nobody shifts an OWBAM set on to a new RC channel? YOU ARE, my friend! And if you don't do it, no one else will.

You, the user of RC channels, are expected to police the use of those channels. Unfortunately, no one gives you the authority to FORCE anyone to do the right thing. You have to do it by persuasion. This makes your situation similar to that of the Hams among us. Hams have to police the use of Ham bands by convincing other Hams to use them properly. In the case of a non-Ham doing bad things, they may have to call in the FCC.

ITS ALL UP TO YOU!

The windbag. For a change of pace, I think you might like to learn of a different kind of aircraft, the Windbag. Modeled after a real ultralight, the Windbag makes use of an *inflatable wing* made from rip-stop nylon. The thing which makes it different from Luther Hux's machine is the absence of any strings to shape the wing. A fiberglas bow shapes the leading edge, and air pressure, combined with the cut of the cloth, does all the rest.

Frank Sailor, of Farmingdale, NY, brought his Windbag to me for its test flights. I was totally unprepared for what followed. On the first attempt, the plane ran a long way down the runway without showing any interest in flying. On the next attempt, I lifted it off with "Up elevator," and it departed in a steep climb and right-hand bank, making like a U-Control model (back to the ground). I am pleased that the videotape proves that I at least had the presence of mind to shut down the engine halfway through the arc.

Having established that we did not have enough control authority to deal with engine torque at full power (Frank had mounted a .61 where the kit called for a .40), we next set up for all the control motion possible. The next takeoff was made at part throttle and with full Left bank-control input. (Usually, one holds Right rudder to correct for torque, but this is a pusher, and there is no rudder.) After the liftoff, I reduced power until a left turn appeared, and the flight proceeded with that power setting.

The resulting climb was agonizingly slow, but it was a climb. In level flight, at this power setting, the controls were quite effective. It seemed to fly like a lethargic airplane. Very little "aileron" stick motion was required to produce a turn. I used "elevator" to hold the nose up in a turn (this is a canard configuration). Later experiments showed that an 11 x 6 propeller turning at 10,000 rpm produced the right flight speed; which I estimate to be about 40 mph.

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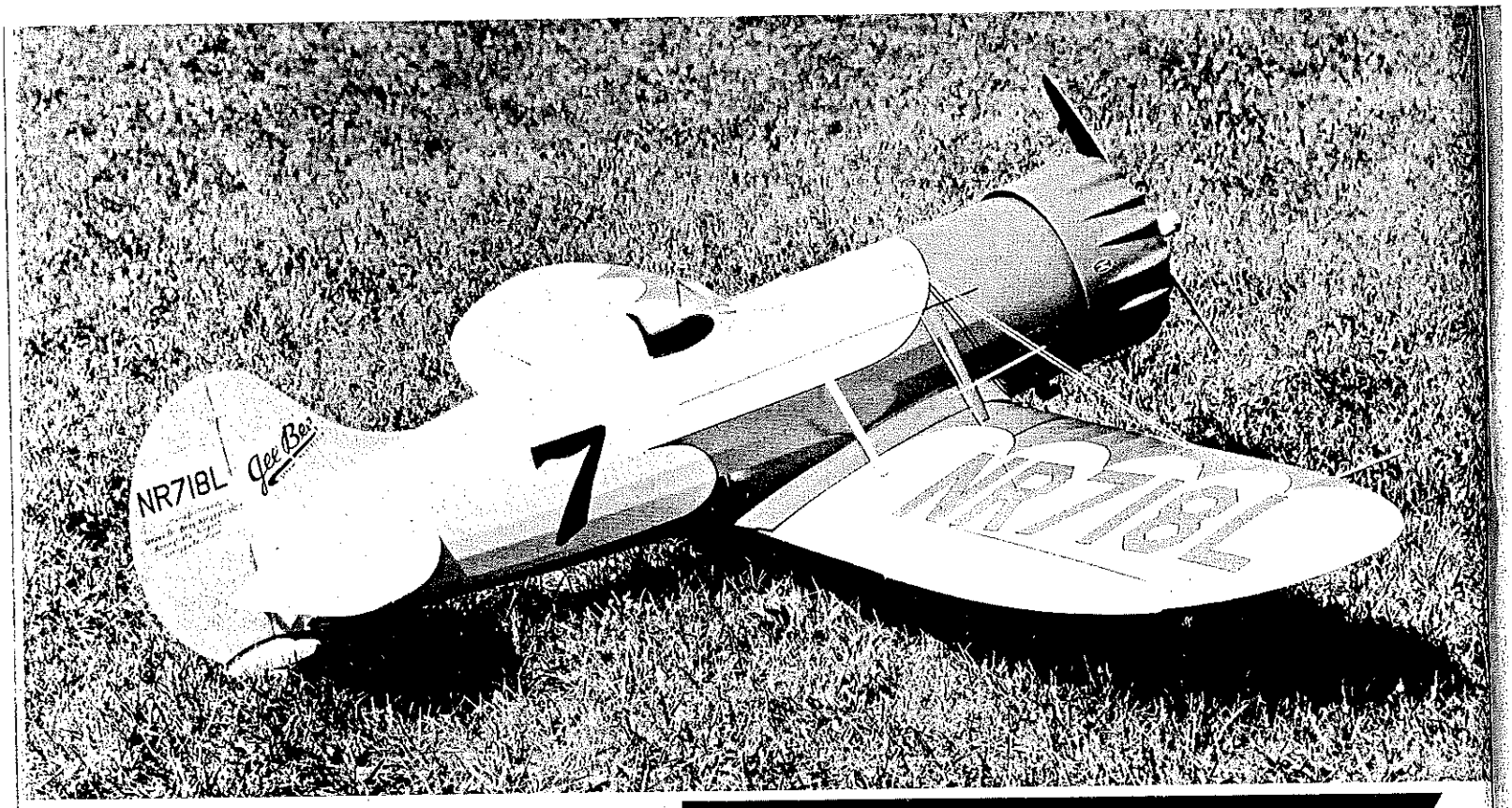
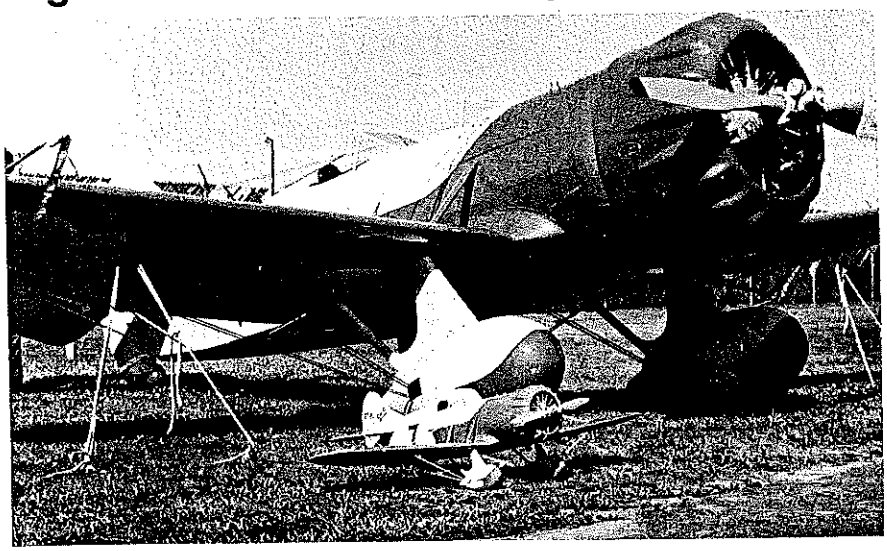
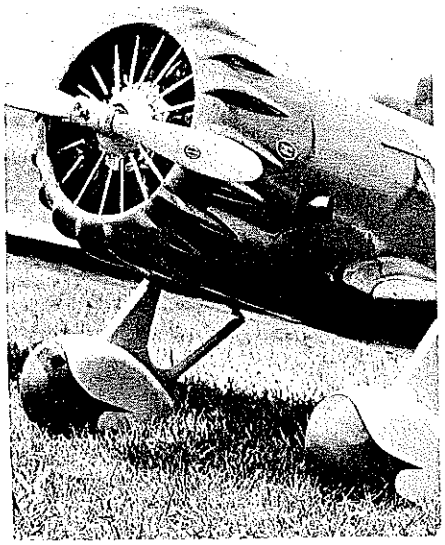


Ken Flaglor's Gee Bee Model Y

After having covered the history of the full-size plane, this month America's premier Gee Bee model builder takes us through the construction from start to finish. For four-channel radios and a .61 engine. Part 2 of 2. ■Henry Haffke

MY FIRST GEE BEE model, built in 1975, was a Model Y. I found it was the best-flying model I had ever piloted. Since that time I have built three more Model Ys; two have been quarter-scale size. When I saw Ken Flaglor's replica, I decided to build a model of it, too. I spent a day with Ken and his beautiful machine, photographing the aircraft inside and out. I'm sure I have a pic-





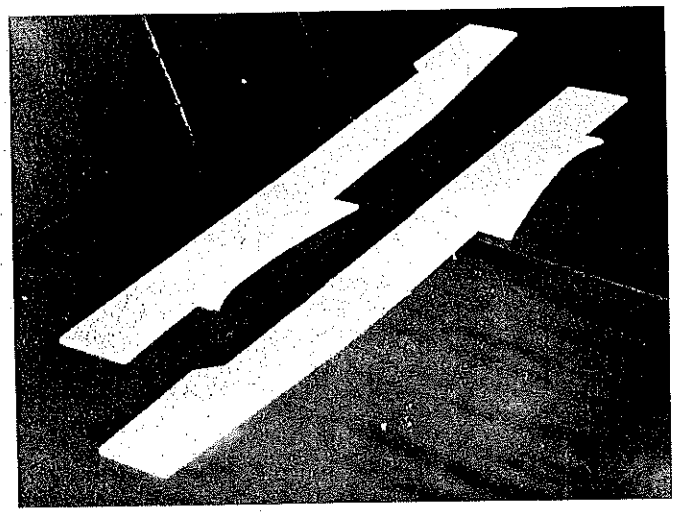
Top: After an unfortunate crash at its contest debut, Haffke rebuilt his latest Model Y to the immaculate condition seen here. Except for the addition of some more minor detailing, it's ready for competition again. Above Left: How's this for documentation? The ⅛-size Gee Bee nestles underneath Ken Flaglor's replica at the 1985 Nats. Above Right: The beautiful front end is what gives this model a great part of its appeal. As it is here, the model lacks brace wires, oil cooler scoop, spark plugs, ignition wires, pitot tube, aileron balances, and the appropriate prop.

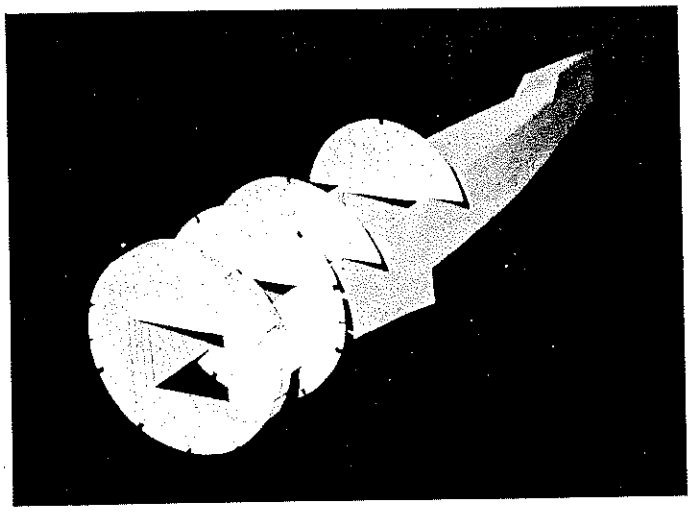
ture of every nut, bolt, and screw that can be seen without taking the aircraft apart!

When the AMA Nats was first held in Springfield, MA, I had flown three models of various Gee Bees in competition there. Springfield is not only the birthplace of the Gee Bees, but the area is my childhood home as well. With the Nats scheduled there again in 1985, I decided to build two new Gee Bees for competition. Both would be models of Ken's Model Y. One would be for Sport Scale, and the other would be fully detailed for FAI Scale competition.

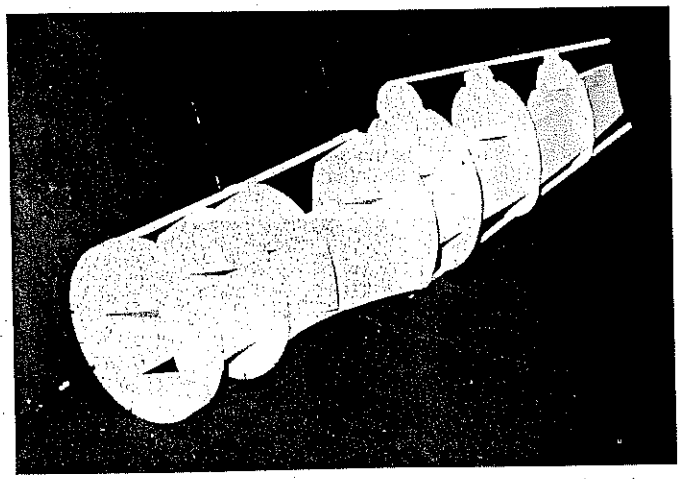
Using the stack of photos I had taken and my other research, I was able to produce a good set of scale drawings. I cut two sets of all the parts, put two fuselages together, and started on the cowls. It took me over two months to finish the cowls and dummy engines. At that point I realized I would never get the two models completed in time for the Nats. I concentrated on the Sport Scale model and spent some late nights getting it ready.

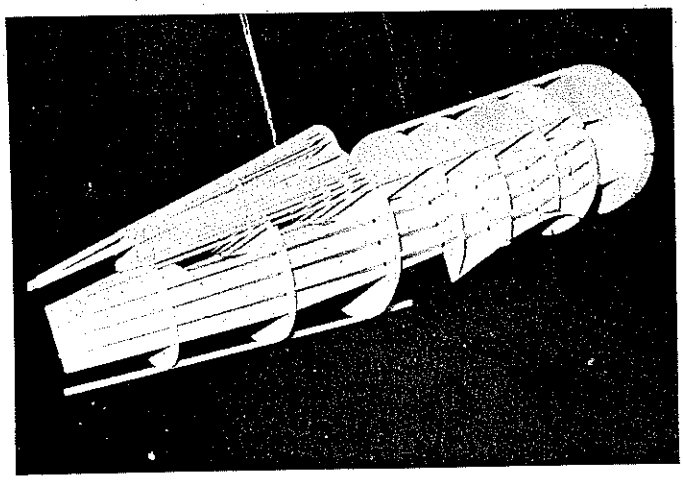
My good friend Sid Clement agreed to do the test flying for me. Sid is a master pilot who has flown my other Gee Bee creations. I didn't have the Model Y quite finished on the Sunday before the Nats when Sid and I took it out for test flying. I had installed an



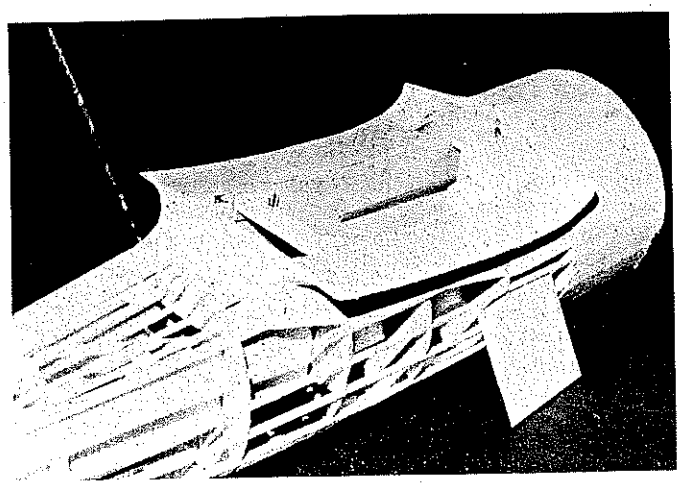


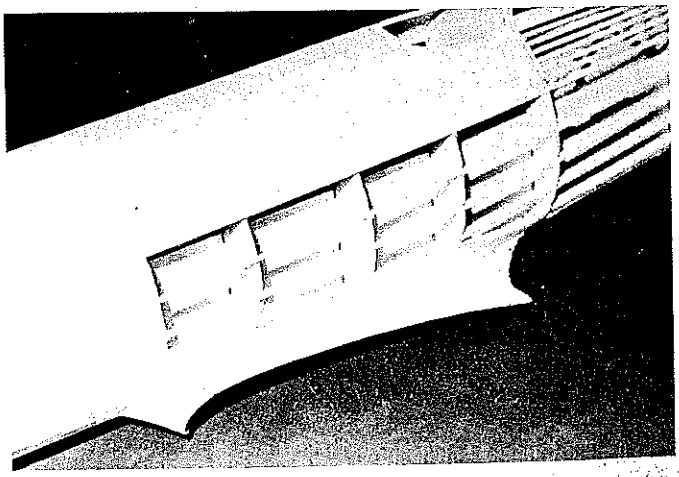
Left: The basic fuselage sides are of ⅛-in. balsa. Note the stab platform at the rear of the two sides, and the plywood wing saddle doubler. Right: After the first few bulkheads are glued to the fuselage sides, the structure begins to take on the Gee bee's familiar barrel shape.



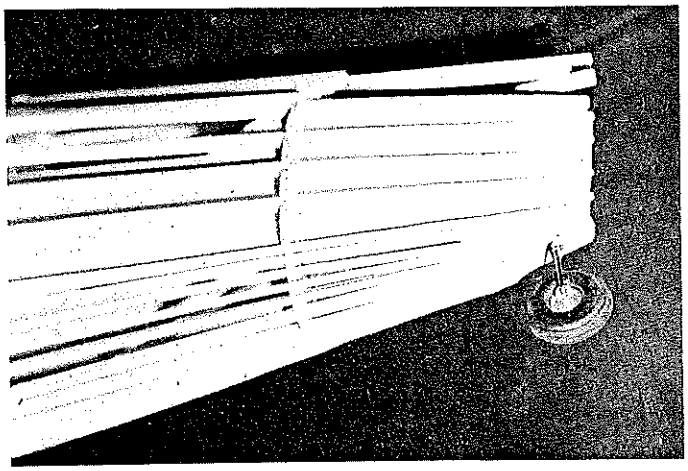


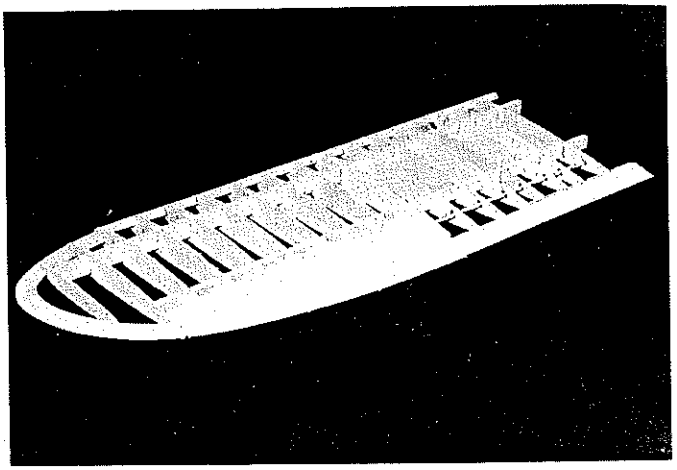
Left: If you've got a good eye you may have noticed that there is one more bulkhead shown on the plan (forward of the cockpit) than there is here on this early fuselage. Right: Top and side stringers in place. The bottom stringers will be added after the wing and fuselage are joined.



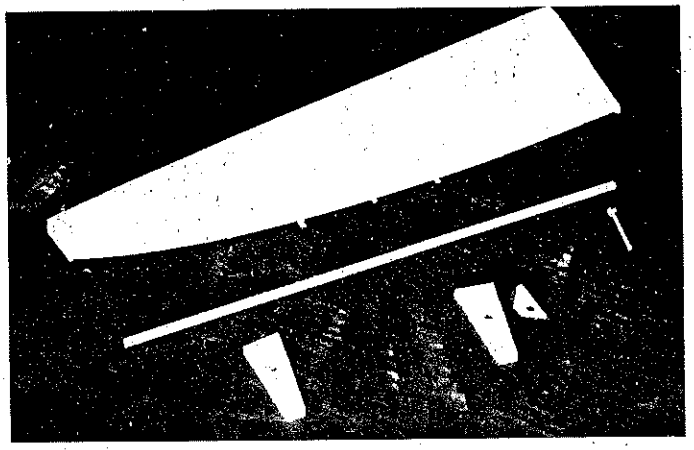


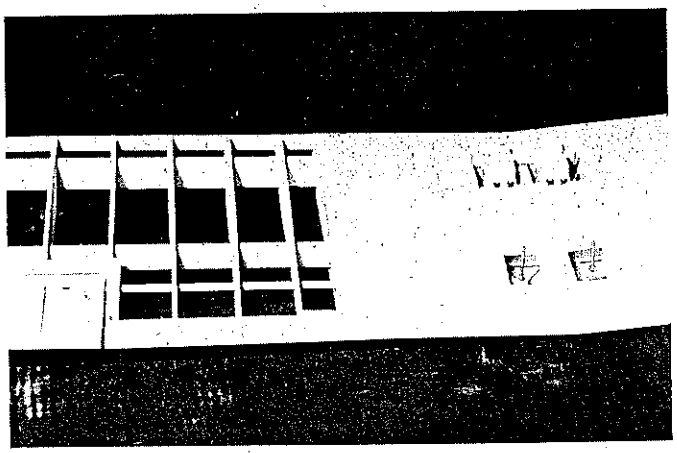
Left: Details to see here include the direction of the grain in the wing fillet bases, rear fairing block, wing hold down block, and fuel tank location. Right: The completed wing fairings are built up of blocks forward and aft, and have ⅛-in. planking over the fairing bulkheads.



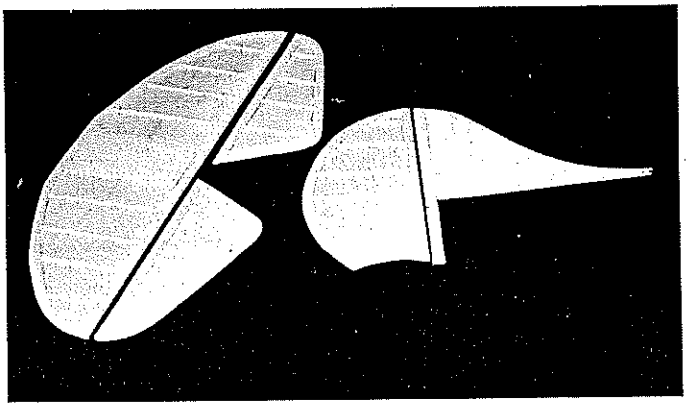


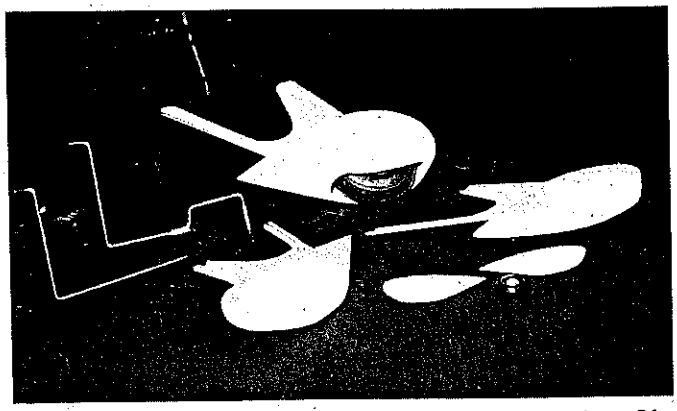
Left: After all bottom stringers have been glued into place, the tail wheel is installed as shown. Right: Construction of the left wing panel has been completed and it is now ready for final shaping and sanding. Note the aluminum torque rod that is used to actuate the aileron.





Left: After the wing is built, the aileron is cut free of the trailing edge. A torque rod bolt will become the servo crank, and sections of nylon control horns are embedded into wood housings to serve as the bearings. Right: The center section contains the required two aileron servos.





Left: Tail surfaces are built up starting with a 3/32 sheet balsa base, then adding 3/32 ribs and edges to both sides to form a realistic surface. Of course, a simpler version could be made by cutting the surfaces out of 1/4-in. sheet balsa. Right: The completed landing gear assemblies and main gear strut. Note the brass tube bushing on the axle of the gear strut. The fairings shown here match those on Flaglor's replica.

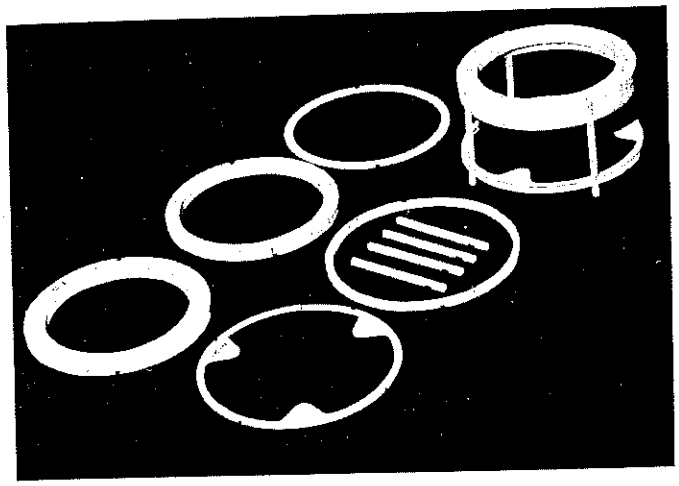
old .60 that was very reliable, but as it turned out this non-Schnuerle engine didn't have quite enough power. After several attempts to get the model unstuck, we tweaked the engine to the max, and I gave the ship a hefty shove. Sid brought it smoothly into the air, made a few turns, and handed me the transmitter, saying, "It doesn't need anything." It flew beautifully, but there wasn't enough power to do many maneuvers.

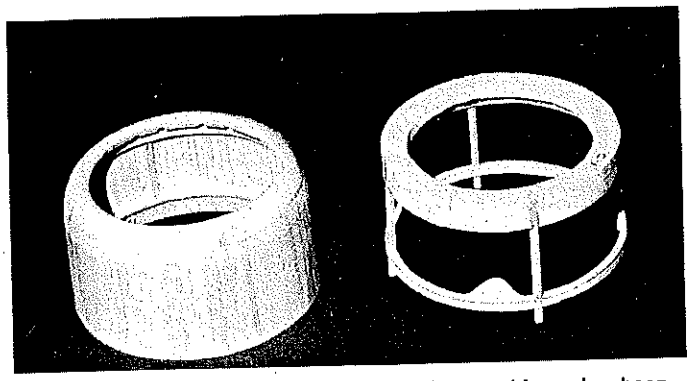
Sid and I discussed the power situation. I had a new Webra .61 that had never been run, and Sid felt that this would do the job. I hated to change engines at this point, since the dummy engine was made to fit the older .60. The next night I ran the Webra for a couple of hours on my test stand, and installed it. Thanks to the Edson adjustable engine mount, it went in easily. Then I got a pleasant surprise: The dummy engine fit better over the Webra than it had over the original engine. The muffler also fit with no alterations.

I took the model across the street to the flying field, where there were quite a few folks flying, and got it ready for another test. This time everything was flawless; I couldn't believe the difference in two engines of the same displacement. The entire flight was super, and the landing was as good as everything else. I returned to the shop and spent the rest of the night on the detailing.

I didn't get everything I wanted done, but felt that the model was respectable enough to take to the Nats. The Model Y was entered in Sport Scale, my Gee Bee R-1 in Giant Scale, and my Model D in FAI.

However, when it came time to fly the Model Y, my luck ran out. I had been out showing Ken Flaglor around Gee Bee coun-





Left: Two sets of cowl parts are seen here. One cowl frame has been assembled, while the other is spread out to show all the pieces. The top row (front rings) contains two balsa rings and one ply ring, and the lower row contains two ply rings and the four spacers. Above: The planked cowl on the left has been sanded to its final shape.

try the night before while the models were static judged. We went out early the next day, assembled the Model Y, and took some pictures with Ken's replica and my model together. When I got to the flight line with the Model Y, I was eager to fly, since it had done so beautifully on test. As soon as I started my takeoff run, I knew something was wrong; the model jumped into the air, bounced back down, and lifted off. It lurched in the air, and I corrected, then corrected again as I fought to steer it over the grass at the edge of the runway. A few seconds later (thanks to radio failure) it was completely out of control. It rolled over on its back, but I fought it upright. Then it went into a spin and hit the ground.

I was mightily disappointed, but the biggest jolt was yet to come. When the static scores were posted, I found that the Model Y had earned the highest static score of the event, with a 97.

I didn't get a chance to start on the repair job for over six months. I had to rebuild the front of the fuselage and one wing panel while the radio was being repaired. It was the middle of the contest season, but I flew in three contests with the repaired Model Y. I was still gun-shy from the events at the Nats, and did a poor job flying the Gee Bee in the first two events, but still managed to come in second. By the third contest I was comfortable again; I flew the model the way it should be flown, and took first by a wide margin. In the short time that I have had this model I have enjoyed it immensely, and I'm looking forward to the flying I will do with it in the future.

The plans presented here include details for building all of the Model Y variants. The first Model Y, NR11049, had a ring cowl; it's shown on Plate 3 of the drawings. The landing gear of this aircraft differed from the others. Dashed lines on the fuselage drawing show the variation in the aft end, which had a tail skid rather than a faired tail wheel. The second Model Y, NR718Y, had two distinct configurations. The original had a smooth cowl and open gear fairings. The plane appeared at the Chicago Air Races in 1933 with a bump cowl, long windshield, and fully faired landing gear legs. Ken Flaglor's replica, NR718L, is the main subject for the drawings, with all details shown for his aircraft. All stringers and ribs are exactly to scale, and all markings are shown in the exact positions they appear in relation to ribs and stringers.

Correct colors for the aircraft are as follows: NR11049: white with red trim and black pinstripe separating the colors; NR718Y: (original) cream with red trim and black pinstripe;NR718Y: (1933) white with red trim and black pinstripe; NR718L: cream with red trim and black pinstripe.

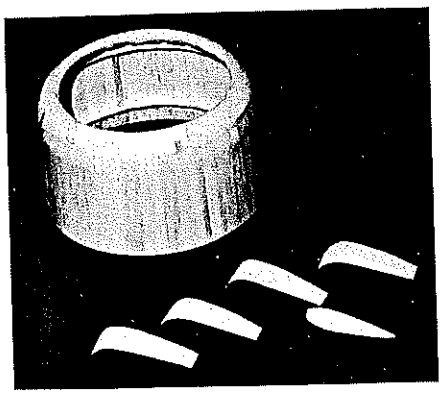
Choose your version, cut out the parts, and start construction.

Fuselage. Prepare the ⅛-in. fuselage sides; they are marked on the drawing with the small arrows. Note that there is a platform for the stabilizer added to the top of the aft end. If you are building NR11049, you will note that there is a slight difference in the front end of the sides, as shown on Plate 3 of the drawings. Also note that the forward fuselage bulkheads are different; they are shown next to the drawing of the fuselage front end. The ply fuselage doublers are laminated to the basic sides and extend from F-6 to the front end of the sides. Be sure you make a right and a left side.

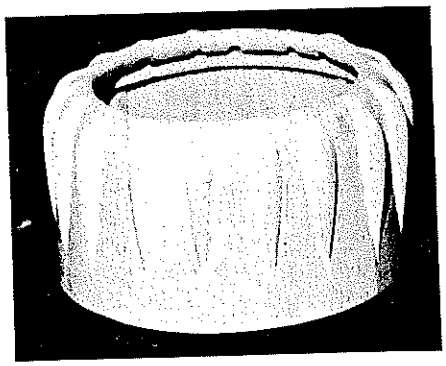
Start the fuselage structure by gluing the ⅛-in. ply F-3 and the ½-in. balsa F-2 bulkheads in place. Make sure you keep everything square at this point, and let this assembly dry completely before proceeding. The remaining fuselage bulkheads are added now, and the tail brought together and joined. Install the top and bottom center stringers, and then alternate the remaining stringers, gluing one on one side and the matching stringer on the other side as you progress.

Prepare the firewall by mounting the engine and making the required holes for the fuel lines and the throttle linkage. Locate the firewall against F-2, but don't install it yet. Make a compartment for the fuel tank between F-2 and F-3, and install the tank. The top and front of the fuselage can now be sheeted or planked with ⅛-in. balsa. I prefer planking, but sheeting works well here, as there are no compound curves. This completes the basic fuselage structure.

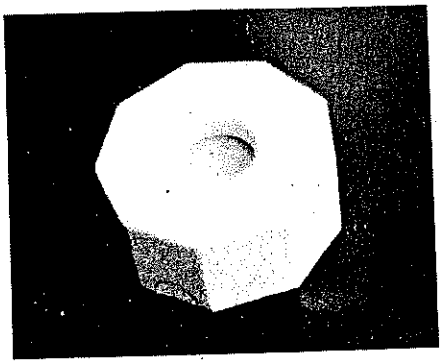
The cowl is built by assembling the series of rings which have been cut from the mate-



The shaped cowl and some of the rocker arm bump blanks (one of which has been shaped). You'll need 18 of the rocker bumps.



The completed cowl after the addition of the rocker bumps. Filler forms smooth fillets around the bumps. Notches visible inside the cowl are necessary for proper cylinder fit.



The crankcase blank consists of three layers of ½-in. balsa. The cylinder bottoms have been traced onto the blank and those areas cut out to accommodate the cylinder halves.

rials shown on the plans. Glue C-1, C-2, and C-3 together, and glue C-4 and C-5 to each other. These two sets of rings are joined with ¼-in.-sq. balsa strips cut to the length shown on the plans. Note that there is a slight taper from the front to the back of the cowl. Make sure that you keep this taper, even when you glue the ¼-in.-sq. balsa joiners in place. It is a good idea to build a cardboard jig to keep the shape during assembly. Trace the side view of the cowl on cardboard, making two patterns. Join these at a 90° angle to each other by cutting a slot halfway from the front to the back on each side and sliding them together. Using this to line up the structure will assure the proper shape. Allow the cowl structure to dry completely before planking it with ⅛-in. balsa strips. I built my dummy engine before planking the cowl, and got everything to fit perfectly before doing the planking.

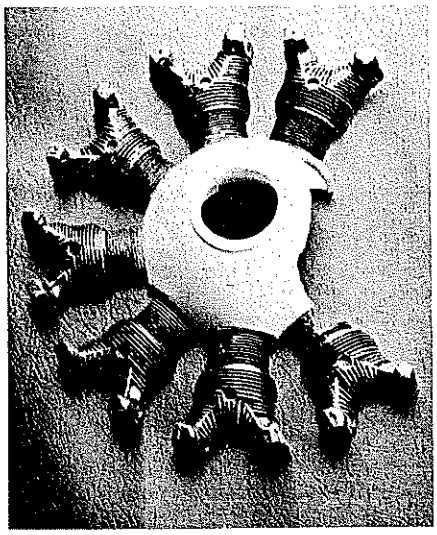
You can build the entire front end with the engine secured to the firewall and the dummy engine in place. The cowl is lined up and attached to the firewall with sheet metal screws through the mounting tabs on C-4. After completing this unit, the firewall can be fitted to the front of the fuselage and epoxied in place against F-2. Doing it this way allows you to line it up for a perfect fit of the cowl to the fuselage.

After planking the cowl, carve and sand it to the final shape before adding the cowl bumps. This is time-consuming, as the bumps go around the front of the cowl curve. Each one must be carefully fitted in place. I cut the blanks for the bumps on a band saw and carved and rough sanded the tops to shape before gluing them in place on the cowl. If you have built your dummy engine, you can glue one of the bumps exactly where they belong at the top of each side of each of the cylinders.

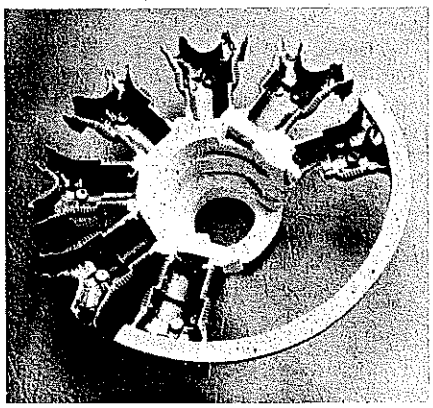
When the cowl is completed with all bumps in place, final sanding and finishing can be done. The cowl and dummy engine assembly is a big job, but I feel that it is the most impressive part of the model.

The dummy engine as I have done it is really not all that much work. Make the crankcase by gluing three layers of ½-in. balsa together as per the patterns shown. Use Wasp cylinders from Williams Brothers, using only the front half of each cylinder. Draw a curve by tracing the bottom of each cylinder on the nine flat sides of the crankcase. Cut away the wood inside these curves so that the cylinder halves will fit into them. Shape the crankcase and fit it to the engine, making the necessary cutouts for the carburetor and needle valve. When this fits properly, the cylinders can be epoxied into place in each cutout in the crankcase.

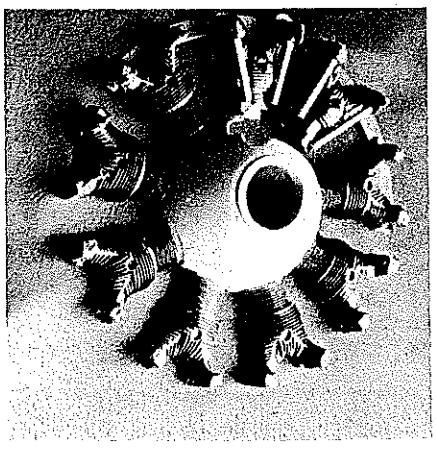
While this is drying, the 18 pushrods can be cut to proper length from ⅛-in. birch dowel stock. Make a point at one end of each pushrod so that it can be pushed into the crankcase. Sand the pushrods smooth, and tack glue them to a piece of scrap balsa for painting. This is much easier than trying to paint them after assembling the dummy engine.



First the crankcase is shaped and cut out to accept the .61 engine, then the Williams Bros. plastic cylinders are glued into place.



Back of the dummy engine has a ply curve that is used to hold the removable cylinders.



Complete dummy engine except for the pushrods, spark plugs, and ignition wires.

You will want to make two of the cylinders removable to allow cooling air to come in over the engine in flight. This is done by gluing a plywood curve between the two cylinders on each side of the missing ones, and making up the two removable cylinders with a ply insert behind each cylinder (see plans for more detail). A sheet metal screw through the ply curve and into the ply insert behind the cylinder will hold them in place while the model is on display.

Wing. Cut all ribs from the proper material, and stack them on short pieces of spar stock. Sand the stack of ribs to the final shape. Select hard balsa for the spars.

Make two spacer blocks of scrap material 7 to 8 in. long to support the spars during wing construction. Mark all rib locations on each spar. After sliding the ribs onto the spars, support the spars on the spacer blocks, one of which is placed between two of the A-1 ribs and the other between Rib D and Rib E. When the ribs are in their proper positions, glue them in place.

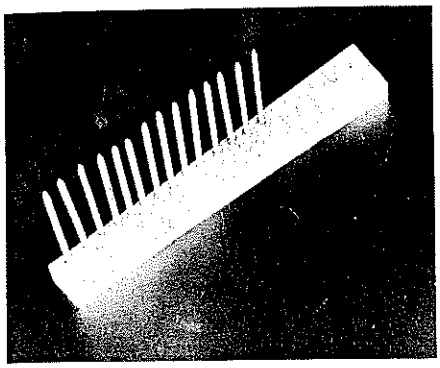
Glue the 12-in. piece of square leading edge into the notches in the front of each rib. Cut the ½-in. trailing edge to shape at the aileron block, and notch it for the ribs. Glue this in place. Cut down 1½ x ⅜-in. trailing edge stock to a 1⅜ in. width, and glue it in place between ribs A and B. Cut the tip parts from hard ½-in. balsa, and glue in place. Add the ¼ x ⅛-in. tip rib braces.

Using a couple of pieces of scrap 1/16 sheet as spacers, tack glue the ½-in aileron leading edge to the wing structure. Glue the 3/32 aileron base to the leading edge. Glue the half ribs to the top and bottom of the aileron base. Add the ⅛-in. ply plates to the top and bottom of the wing for brace wire, and to the top of the wing for compression struts. Make up the landing gear mount blocks from the 3/16 ply parts, and epoxy them in place. The wing panel can now be sanded to its final shape.

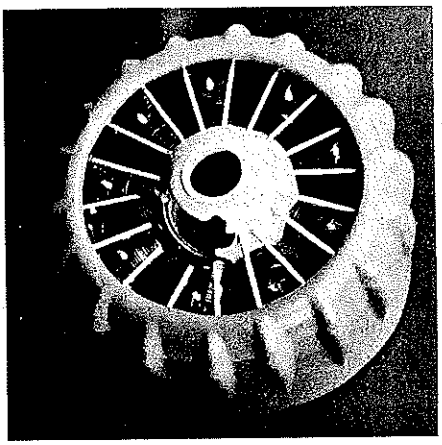
Cut the aileron free of the wing structure, and glue the ⅜-in. triangle pieces to the top and bottom of the trailing edge between ribs B and F. Carve the leading edge of the aileron to a round shape. Install a pine block in the inboard end of the aileron leading edge. Carefully drill this to take the end of the aluminum torque rod. Make the ⅛-in. ply bushings for the torque rods, and glue them in place on ribs A-1 and B as shown on the plans. Make up the ¼-in. aluminum torque rod and fit it to the aileron. Drill through the pine block and torque rod from the underside, and secure them with a sheet metal screw. Fit the brass tube and wire hinge into the other end of the aileron and wing tip.

Build the other wing panel just as you did the first, except build it upside down on the spacer blocks over the plans. When both panels are finished, they can be joined with the dihedral braces. Test fit the braces and the two panels together to make sure of a perfect fit at the joint before gluing. Use epoxy to glue the panels together, and block up the wing tips with two blocks of equal height between the ribs on each tip. This will keep the panels properly aligned while the epoxy sets. When the panels are dry, the center section can be sheeted with 3/32 balsa.

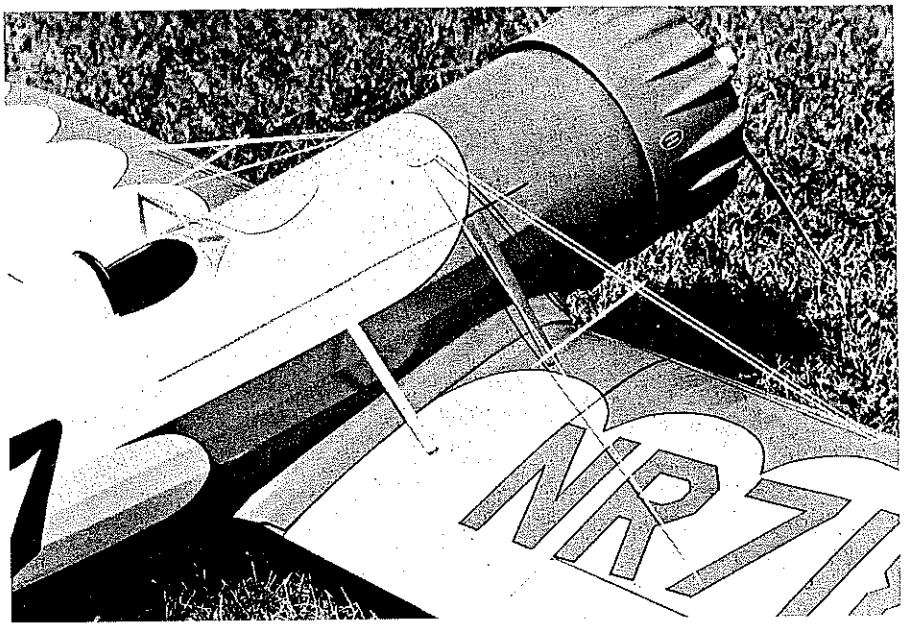
Fit the wing mount block between the ply fuselage doublers, and epoxy in place using the ⅛-in. ply mount supports on each side. Fit the wing to the fuselage after installing the dowel in the wing leading edge. Drill and tap the wing block for a nylon bolt. Fit the wing fairing block between the wing trailing edge and F-7.



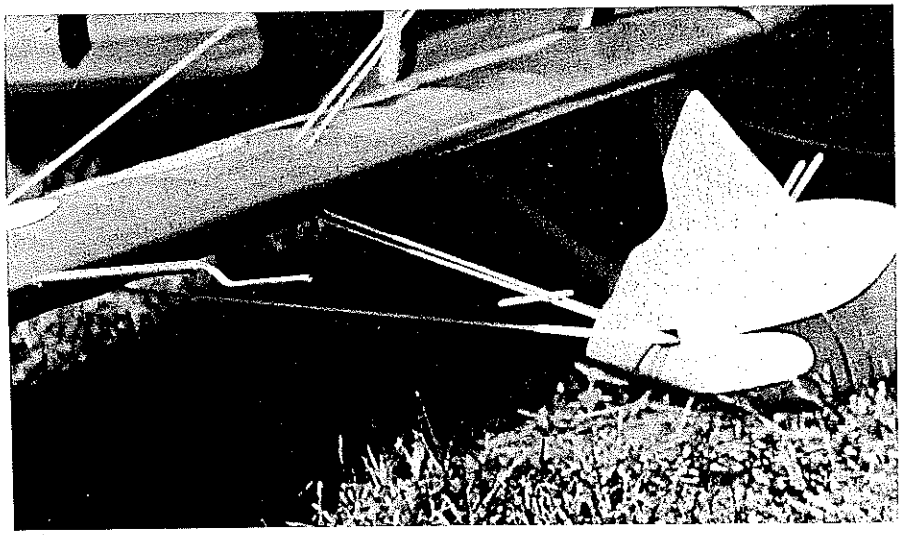
Glue the ⅛-in.-dowel dummy pushrods to a block of wood to make them easier to paint.



The finished dummy engine inside the completed cowl. When finished, the seamless cowl looks like molded fiberglass. This is true to scale, though, as that's exactly what Flaglor used on his replica of the Model Y.



Lacking only the addition of the fuel tank cap and the fuel gauge to make it complete, the rebuilt model is ready for the contest circuit again. The model always does well in static scoring.



A close look at the pitot tube, lower brace wires, spreader bar, and open landing gear fairings. You can't pick it out from this picture, but the spreader bars are a natural wood finish.

The fuselage can now be completed with the addition of the rear bottom stringers and the tail wheel mount. Also add the ⅛-in. ply strut mount plates.

The tail surfaces can be simply cut from ¼-in. sheet balsa, or they can be built up. If you prefer to build up the tail surfaces, as I did, cut the base parts of 3/32 hard balsa. Add ribs and outer edge parts of the same material to both the top and bottom of the base surfaces, and sand to final shape. Make ¼-in. ply hinges, as shown on the plans, for a realistic tail. You can, of course, use your favorite hinging system in place of those shown.

Use a joiner horn for the elevators. An aluminum horn can be installed in the rudder as shown.

Wing fairing. Cut two fillet bases of 1/16 ply with the grain running crosswise to the length. The fillet base is 12½ x 2 in. Fit the base to the wing fairing block behind the wing. Assemble the wing loosely to the fuselage. Insert the fillet bases between the saddle and the wing. Glue them to the saddle, making sure you don't get glue on the wing. Tighten the wing down to hold the fillet bases in place until the glue dries.

Cut ½-in balsa fillet blocks as shown on the side view of the fuselage, and fill in between the fuselage and the outer edges of the fillet bases with these blocks. Fit them to the fuselage curve at the wing/fuselage joint. Allow the glue to dry completely, and carve and sand them to the proper shape.

Cut three wing fillet formers from ⅛-in. balsa, and glue them in place between the front and rear fillet blocks. Glue three on the other side as well. One former should be against the rear of the front fillet block, and the other two spaced evenly from that point to the rear fillet block. Sheet or plank the fillet between the front and rear blocks. Sand them to the final shape when dry.

Landing gear fairings. Refer to the front view of the landing gear fairing, and cut the required parts from the proper materials. Laminate these parts together, and weight them heavily to hold them in place as the glue sets. Install a locating dowel in the front and rear of each set of wheel fairings. Tack glue the two fairing halves together, and carve and sand them to shape.

After they are shaped, the fairings are fitted to the landing gear wires and are tack glued in place.

Mount your radio components in the areas shown on the plans according to the manufacturer's instructions. The servos for rudder, elevator, and throttle can be mounted on a ⅛-in ply tray which is screwed to rails along the inside of the fuselage sides. The rudder servo should be mounted in the center of the three if you are using cables for connecting the rudder, which will be to scale if you installed the aluminum rudder horn. An arrow shaft pushrod is used for the elevator, and a flexible pushrod for the throttle.

Two servos should be used for the ailerons, as they are quite large. Servos are connected to the receiver with a "Y-cable." The battery can be located beside the fuel tank, and the receiver can go under the servo tray in the fuselage. The switch can be mounted in the aft end of the servo tray, and can be reached through the cockpit.

Finishing. There are many ways to finish a

model. For a Scale model of this type, a fabric covering will be the most realistic choice. I gave the entire structure a coat of Balsarite. I used Coverite's Permagloss material, which is available in the correct shade of cream. Permagloss is a woven fabric material of the same composition as that used on full-size aircraft, but lighter in weight. It is prepainted and fully finished as it comes off the roll.

Permagloss gives a realistic fabric look to the finished model, and results in a lighter finish than you could get with paint. Permagloss is also very durable and is impervious to fuel and solvents. I masked off the trim areas and gave them a coat of Primex. This prepares the Permagloss for painting and gives a much better adhesion. It also enhances the gloss of the painted trim. I used Black Baron Epoxy for the trim, and sprayed a coat of Black Baron Clear over it once the trim had cured.

Registration numbers were cut from Coverite Trimsheet material and applied in the exact position shown on the plans. Rudder numbers were also cut from Trimsheet material. Coverite Pinstripes were used to outline all registration numbers on the wing and rudder, and the racing number 7 on the fuselage sides. The Gee Bee logo on the fin was cut from black Trimsheet material. The printing on the rudder below the registration numbers was hand lettered with a drafting pen and given a coat of clear to fuel-proof the ink. The "Built by Ken Flaglor" lettering on the left side of the fuselage under the stab was hand painted.

The flying and landing wires are made of elastic cord; they add the final touch of detailing. The cord is threaded through the wing and wheel fairings and is made removable at the fuselage connect point. I made an oval plate with three holes for the wires, which were knotted behind the plate. A small rectangular balsa block was epoxied behind the plate, and a hook was installed in the balsa block. The fuselage opening was cut for the block to fit into. A wire hook pulls rubberbands looped around the hook in the first plate through the fuselage, and over the hook on the second plate.

Flying. The full-size Gee Bee Model Ys were wonderful flying aircraft, and so is Ken's magnificent replica. They were not racing planes as most people believe, but high-performance sport aircraft. NR11049 won the national aerobatics title in 1932, piloted by Russell Boardman.

This model flies better than any RC Scale model in my experience. If built straight and balanced where shown on the plans, it will surprise you with its fine flying characteristics. I find that its performance is superior to the quarter-scale Model Ys that I've built.

The model will start its takeoff roll with very little rudder needed to keep it going straight. The tail will come up after a short run, and slight back pressure on the stick will bring it gently off the ground. The mod-

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Centivoltmeter

The meter indicates centivolts, so what else would you call it? When the meter shows +478 cV, your battery pack has a terminal voltage of +4.78 volts. I'd be happier if the front panel were marked "cV" instead of "Volts." Either that, or an automatic decimal point should have been provided.

Since Accu-Tach 2 indicates numbers as small as 10 mV (= 1 cV), you can use it for "Peak Detection Charging" of nickle-cadmium batteries. To do this, you set up a charging rate that will get the job done in 15 minutes. Then you *watch* the battery terminal voltage. When you see the voltage rise above the expected value, then drop two centivolts below what it was a few seconds before, charging is complete.

I must caution you that *overcharging* at this high rate can ruin your battery. You must pay attention to what you are doing, and you should only do it when that battery pack is cool to the touch. The pack will get quite warm during charging, but it should never get hot. If it gets hot and stays hot, you know that you've just junked a battery pack.

One for the mix/match crowd: You can measure the control pulses coming out of your receiver, to determine if they are positive- or negative-going, so you can determine whether or not to use some substitute servos. Connect the Common lead to battery Negative. Connect the Positive Volts lead to the signal lead coming out of the receiver. (Push a pin through the servo pigtail, if necessary.) Now, if the voltage shows about 25 cV, you are looking at positive-going pulses. If it reads about 380 cV, you have negative-going pulses (very rare).

Expanded-Scale Voltmeter

I'm sure that most people will use the built-in resistors for battery tests, because that's the convenient way to do it. If you are using some unusual battery size, there are some alternatives available.

If your flight pack has less capacity than usual (such as the SR300 packs recommended for the Top Flite Wristocat), then put the scale switch in the "TX" position. The current drawn from the pack will be about 120 mA.

External shunts can be fitted to produce higher discharge currents. Why would you want them? It is customary to discharge-test nickle-cadmium batteries at a rate equal to one-half of the battery's rating. For example, you want to test a 1200 mAh flight pack by discharging it at a rate of 600 mA, and it should last two hours before the terminal voltage drops to 4.4 VDC. For other sizes of packs, consult the following table to find a resistor that can be connected to a GR plug so as to shunt from RX.TX to COM.

Shunt Resistor:	10 Ω/10 w	20 Ω/10 w	50 Ω/10 w	100 Ω/10 w
Radio Shack #	271-132	2 in series	271-133	2 in series
Type cells in:				
RX	1200 mAh	900 mAh	650 mAh	n.a.
TX	2400 mAh	1200 mAh	900 mAh	650 mAh

Note: Shunt resistors will get hot.

Gee Bee/Haffke

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el reacts to controls positively but gently. It is docile in the air, and will do about anything you care to try with it.

For those of you who will be flying your Gee Bee in Scale competition, I will be glad to share documentation material. Write to me for a list of available photos of all the Model Y variants: *Henry A. Haffke, 1038 W. Elmer Road, Vineland, NJ 08360.*

RC Aerobatics/Van Putte

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an MK Curare 40 with Rhom retracts and powered by a piped OS .46 VF rear-exhaust engine. He's building an MK Arrow 40 with a .46 VF up front this winter.

He wants to know, "Is there any advantage to running a 9 x 6 three-bladed prop on the .46 VF compared to the Master Airscrew 10 x 7 I've been running? Is the rpm going to burn my motor out or require lower-nitro fuel? I use 15%-nitro fuel."

To be honest, the only real advantage I've found in using three-blade props is that the lower prop diameter buys extra ground clearance. For really high-revving engines like the .46 VF, each prop blade can actually be operating in the wake of the blade ahead of it, thereby reducing its efficiency. The right three-blade prop will often give the same performance as the proper two-blade prop, but don't expect a major surge in power.

I may not be Clarence Lee, but I don't foresee an engine burnout problem or the need to try a lower-nitro fuel. However, that 15% fuel must cost a bundle. I've been using 5% for years and haven't really noticed much loss in power.

Tom goes on: "How does one determine the proper length of a tuned pipe? Where do you

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