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VOL. 12, NO. 6
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SCALE RC MODELER

DAGO RED
1/5 SCALE

TOLEDO '86

J-3 CUB, PART II



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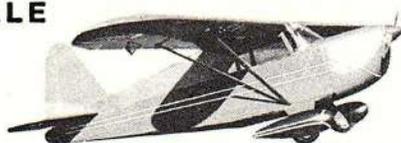
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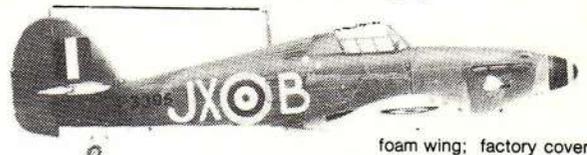
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SCALE R/C MODELER

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AUGUST/SEPTEMBER 1986

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COVER:

The cover plane this edition is a Vought A-7 Corsair built from a JET HANGAR HOBBY kit. This vintage jet attack-fighter is still in everyday use with the U.S. Armed Forces.

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EDITORIAL

AS I R/C IT . . .

WHERE ARE THE NEW SCALE KITS?

This year's Toledo Show offered further proof that the new scale kit gap is widening. Many new low-end sport kits, with their familiar shoulder wing, sheet-sided fuselage, open framework wing, depending on strength from the plastic covering are available. They're cheap to produce, easy to build, but have a shortened lifespan (I suppose so that they will sell more kits?). To me, they have as much charisma as a rusty crowbar. Oh sure, they make great secondary trainers, but they offer little to the more dedicated modeler who wants his planes to **look** like real aircraft rather than toys.

So where are the new **scale** offerings? They weren't at Toledo, at least not from most of the leaders in the industry. BYRON ORIGINALS continues to be the only large firm which can be depended on for new scale kits at reasonably frequent intervals. Top Flight has their new Douglas Skyraider in the developing stage, but it's been several years since they released their Cub. Now, these companies should be applauded for their dedication to the scale modeler because they are the first to admit that scale models are only a very small part of their total profit picture . . . and that **sport** models and **accessories** are the major profit center for many.

Another scale kit offering is Carl Goldberg's "Anniversary" Cub. It's as easy to build as a sport model and flies easily, yet it looks like a real airplane. So, it **can** be done if the companies really want to.

Unfortunately, to some members of the modeling community, scale is often equated with difficult building procedures and squirrely flying habits of the planes, but that's not so at all . . . Goldberg's Cub is as easy to fly as their Eagle, and it certainly builds as rapidly because it shares its building materials and techniques.

One of my standing jokes every time I see Joe Bridi (an award-winning international scale modeler, by the way) is: "Hey, Joe, when are you bringing out a new scale kit?" To which Joe always answers: "When I can start making some money on them." That's not the answer I want

to hear, but I'm sure that, for him, Joe is telling it like it is. Joe is presently very successfully marketing a line of inexpensive sport models and gliders.

So where can a dedicated scale modeler turn for kits and plans for a new scale model? Well, fortunately, the cottage industries which abound in this hobby are very adequately taking care of our needs . . . the Toledo Show was packed with small companies showing some great new items for the scale fan.

A word of caution, however. If you see an advertised product which appeals to you, take the time to call the company and inquire if they actually have the product in stock. Many small companies **pre-advertise** their products hoping to assemble and ship the kits or products. If the item you're thinking of ordering is a high-ticket item, and you pre-order to get in on the shipping rotation, be sure to ask the company if your funds will go into an escrow account so that you can get them back if it takes an excessive amount of time to get your goods. These companies aren't out to cheat you, but many of them just don't have the manufacturing expertise or the financial base to fund a start-up manufacturing plant.

If the product you want is advertised by an importer or distributor, ask them if the product is in stock, or will it be drop-shipped from another location, maybe even from overseas? If they reply that it is, I'd have to suggest that you only send the money if the company has the product in stock and can ship it out to you within a few days. If, however, you're not in any real hurry for your order, most of the time, you'll eventually get it. All states have mail order protection regulations, so check **your** local postal service on this if you encounter problems.

And how about going with plans? There are many very good, some great, plans companies on the market, from many small firms to large companies . . . and quite a few of them offer excellent scale plans. If you don't like to scratchbuild, you might ask around, because there are some firms which will kit the plans **for you**, and other folks who will even **build** the plane for you.

A properly-built plane can provide

years of enjoyment for the owner, and the initial cost is very often offset by all this enjoyment. In my personal stable, I have planes that I have built, others that I've had parts made for me or painted for me, and some that I've purchased already finished . . . and I love them all the same. (The one built by someone else **does** fly better . . . no warps!)

On yet another note, the ducted fan movement is picking up momentum, with many new products being offered by those companies specializing in fans as well as those offering all those very important accessories. BYRON ORIGINALS has their new BD-5 Jet almost ready for announcement. Marc Jensen tells me that they hope to introduce it at the upcoming Jet Rally '86.

Also, please watch for the new "Ducted Fan Special" now being prepared by **Scale R/C Modeler**. It will bring you in-depth reports about all of the top jet folks, both manufacturers and modelers. Should be out around July 15.

How are the 4-strokes doing in **your** area? In the scale section, they seem to be starting to be retired in favor of the more reliable large 2-strokes being made expressly for model work and some of the new industrial types . . . Quadra has a **raft** of new sizes. As Henry Ford (and some un-identified modeler) said: "Parts are parts are parts." Diesel conversions make great scale engines . . . quiet and powerful ones.

Recent editorials have produced a rash of replies, some in favor of comments made in this column, some against. Some of the more printable ones are included in this month's "Letters To The Editor." Good or bad, I really enjoy hearing from you, because that's the only way we have of knowing what's on the minds of modelers all over the country (and, yes, the world), and it tells us how well **Scale R/C Modeler** is in tune with your desires.

Just remember please, that an editorial is only the opinion of **one** person and does not reflect editorial policy for the contents of the magazine. And, everyone is entitled to his or her opinion!

Thanks for all the responses . . . keep them coming!

Norm

HOW TO COPE WITH THE PRESS

Be Nice To Your "Newsie"

By Robert Celeste

Look . . . we need each other! Your club, especially during its annual meet, needs the press. And the press, with its insatiable appetite for local and national news, needs your club and its events! But first, let's talk about what the "press" really is. Here's how I rate those "press" categories:

Working Press

Anyone who earns his or her living by covering events in any way . . . pen, pencil, or camera, is a member of the working press, and this includes people who work for television stations or radio stations, local newspapers, and national magazines. They usually have credentials.

Stringers

Many legitimate magazines and other publications cannot afford to have reporters everywhere, so they have "stringers" throughout the country to help them with coverage of distant events. Stringers should have ID papers of some sort showing their association with the publication of note.

Contributors

These very worthwhile persons are usually very knowledgeable independent workers who opt to augment their income by submitting articles to the modeling press and other publications. The difference between a "stringer" and a "contributor" is that the stringer is *assigned* to the meet or event, while the contributor *hopes* that his story will be accepted and published. So, what do you do about the press? Well, here are some of your options:

Have your club's press secretary set up a table or booth at which all members of the working press must sign in and receive identifying badges or ribbons (you might furnish inexpensive day-glow-type vests with the word PRESS on them). A printed sheet with both safety guidelines for the reporter and points on respecting the need for the contestants' total concentration on his aircraft in all phases of competition should be handed out and signed for at the

time of registration. This might be a good time to have each reporter sign an insurance waiver, if your club's lawyer or insurance company deems it to be necessary or desirable.

The next step is to inform every one of your flight line crew exactly what is expected of them, so that everybody will be playing by the same rules.

Is it T.V. coverage you think will do a lot for your meet? All right . . . savvy club officials might invite local T.V. personalities to the field in advance of the meet (about two weeks is good) and set up special interviews with them and let them take all the pre-pix they want with club members and nearby prospective contestants. Now your club will be using the television folks for what they do best . . . *advance publicity* about your upcoming event! You'll get lots of coverage about your event in the local and area stations and newspapers, and increase your draw of paying (hopefully) local spectators, and it won't cost you a dime!

We happen to think that your most important publicity will come from the modeling press . . . the model airplane fans' "bibles" . . . *model magazines!* Whatever is printed about your meet and your club will not only be read and re-read avidly as soon as it comes off the press, but it will live on forever (you know we'd rather die than throw away even one model magazine). Some of us even cut out and frame a favorite picture or two.

If you want spectacular coverage, you must be prepared to allow the working press reasonable access to the flight line and the judging areas. Most of these people will cooperate with each other so that each can get the photos he needs. In order to get

those terrific double-truck (two-page spread) color pages, the photographer *must* get in close. He knows that he may be in danger of getting hit by an aircraft, but that's part of the job; remember . . . he's signed that insurance waiver, and anyway, he's in no more danger than the pilots themselves, or the line crews and personnel or judges. It's a trade-off . . . if you want sensational pictures of your meet, you must allow the working press to be at the flight line. Most of them are modelers themselves, and are usually very careful not to get in the contestants' way or to distract them.

Now for a word about the "hobby" photographers and video cameramen . . . Many of us may have started out that way, and maybe it's only fair for them to be allowed to capture some of the action and beautiful model aircraft at your meet . . . but they shouldn't be allowed to interfere with the working press, who, after all, have a job to do for you and themselves. Maybe a special *intermediate* zone just ahead of the spectators, but still not right at the flight line could be set up for them . . . just an extra set of ropes and flags with a member of the line crew or two to secure the area.

Professional photographers will adhere to the rules provided that they can complete their assignment. The coverage you will receive in the national magazines is worth literally thousands of dollars in "free" publicity for your next year's event. So be nice to us, O.K.? And we wouldn't mind a nice "press party" at night, even if it's only pretzels and beer, or complimentary tickets to the awards banquet (we don't really eat much!). □



Letters

This editor looks forward to any rebuttals of my opinion as stated on the editorial pages of this magazine . . . a privilege I cherish, even though I fully realize that some readers may not agree with certain parts or even **any** part of it. I will readily admit any mistakes I may have made in any articles prepared for publication. The recent article entitled: "Miss America and The Masters" prompted replies, both pro and con. The article on "Carrier R/C" received much favorable comment and will probably be done next season with this magazine as one of the potential sponsors. The controversy over the "R/C Kite Killer" article still rages, and last month's "stand **way** back" scale Cessna Target Drone received several favorable comments about the girl in the photo . . . while most letter writers hated the plane . . . oh well, you can't win them all!

One letter we received the other day was from Michael Cameron and is much too long to reproduce in its entirety, so I thought I'd give you the highlights, as Mr. Cameron made some valid points:

"Dear Mr. Goyer," (after this, it sort of went downhill for the editor)

1. He'd like to see pure scale, because that's why he has purchased the magazine since day 1.
2. Thought the "Conversations With Bob Davis" was dull. Thought it was worth half a page at most.
3. Hated the coverage of the IMS Show in Pasadena. Wasn't the least bit interested in the pictures.
4. Didn't think BYRON ORIGINALS' "Pipe Dream" belonged in a scale magazine.
5. Liked the photographs of the SE-5, but didn't like the personal background information on Mr. Holland, the builder, and his Hornet engines.
6. Disliked the "Scale Around The World" article featuring two 40-powered models from Italy, but liked it because, at least, it was short.
7. Liked the full scale photo of the Cessna 206 on floats, but wanted 3-views and thought the aircraft was too common to feature.
8. Wanted to assure us that he was really on our side, just didn't want us to become just another magazine, and wanted much more on

pure scale in an informative, professional, journalistic manner.

We would like to thank Mr. Cameron for his letter, his comments, and his desire for us to "get on the stick" and make the magazine the way he wants it to be. The only comment I will add to this is an invitation for him to submit articles to **Scale R/C Modeler** on a regular basis, so that more articles to his liking can be published. This job is not as easy as it appears, even though I do enjoy it tremendously, and I encourage readers to send in articles whenever they can. . . . I would truly love to receive much more input from readers than we normally do. Mr. Cameron's phone number is: Area Code (513) 424-0097 or (513) 424-5616.

We did receive a very nice letter from Kent Walters with his side of the "Scale Masters" story. In **Scale R/C Modeler's** opinion, Kent is one of the most realistic pilots in the world, and his continued above-average flying scores are the reason for his winning the Scale Masters Championships so many times . . . he just plain deserves it! Here's his letter:

Dear Norm,

As you might expect, I specifically have had a number of thoughts in response to your editorial regarding the Scale Masters Championships and prior winners not competing again with the same model.

You may recall your comments on this matter are similar to those of your predecessor a few years ago although you admirably have remarked in a candid manner why you feel that way for selfish reasons as a magazine editor.

As for your earlier article describing the last Scale Masters Event, I personally had no problem with your method of covering it. Those that have been in the winners' circle previously at the Scale Masters level have indeed had plenty of coverage and opportunity for themselves and the modeling community to get acquainted. However, I did not agree with the statement that "all the top winners were the same very familiar aircraft we've been seeing for years" assuming we are talking about the top five at the Scale Masters level of competition. Some of these folks

deserved more limelight than what was provided for their accomplishment. I nevertheless agree there will be many other models at any Scale Masters event which are of high quality and worthy of any magazine coverage provided them, particularly those that have static scores which may, in fact, have exceeded those in the final top five winners circle. The primary difference between many of these very beautiful airplanes and the top five competitors at a Scale Masters is found on the other side of the coin in the "not so photogenic" flying scores. This aspect of scale competition is not as easily described or proportionately appreciated by readers (through personal experience) since it must be seen to be fully appreciated in the heat of a Masters level competition.

It is for this reason that I have my biggest problem with your proposal to qualify the model and not the modeler. As long as scale competition continues to divide emphasis of scoring between static and flying, such a recommendation as yours will leave the Scale Masters Championship eventually handicapped in its ability to provide participants with the highest level of skills in both building and flying. The present biggest difference in scoring category at a Masters is found to be primarily in the flying since static quality has rapidly approached a high level of accomplishment across the majority of those competitors qualified to attend the Scale Masters. Such has not comparably been the case in flying as may readily be witnessed at some of these events. Those that have truly mastered their aircraft in flight over a period of time are the individuals that have the greatest opportunity to win it all! However, your "Miss America" Scale Masters approach would surgically and methodically remove these experienced pilots after proceeding a number of years down this proposed path as they in turn become sufficiently expert to win with a particular aircraft only to have to retire it and start all over.

Nevertheless I am also very interested in hearing of the responses you receive from the other scale competitors in the recreational community. The few other **competitors**

that I have recently spoken to about this would have me believe that "they would not feel satisfied had they indeed won the Scale Masters without having competed against the best available," including people like Tom Cook or any others that eventually serve as the "mountain to be scaled." It is perhaps this primary reason why I have continued for so long on the campaign trail. It would be all too easy to simply retire as a winner. I too would like to have taken a year or two off just to have a change of pace (vacation) like too many other modelers occasionally do and sometimes need. I too grow tired, and your proposal frankly sounds personally inviting in spite of an instinctive spirit to compete as enhanced by past Scale Masters Championship environments. In retrospect, I can certainly testify that a portion of that spirit would be dissipated if Tom Cook and several others were no longer a regular participant. Similarly, I would suspect others would be haunted with this same diminished spirit if the Scale Masters were not an open competition as originally conceived with regional qualifiers.

In spite of any earlier forecasts, I will not have my new Corsair ready

for competition this year due to problems in acquiring the desired retractable gear systems on a timely basis not to mention the needed air time prior to competing with a new "mount."

In conclusion, I think it is important to maintain the highest level of competition and allow past Scale Masters Champion aircraft and pilots in the running rather than retire them from competition no longer to be challenged or tested by others. The Scale Masters was intended to determine a champion of champions on a year to year basis. Evidence would suggest this has been very successful and well received by its relative growth into a World Class Event. Anything less would compromise the program and still ultimately leave the nagging question: Who would have won if . . . ?

Sincerely,

Kent Walters

1980 U.S. Scale Masters Champion
1982 U.S. Scale Masters Champion
1985 World Scale Masters Champion

Dear Norm,

I just received my latest **SR/CM** and was prompted to write you in response to your request for input concerning first place winners. I can

see both sides of the story. If you build a winning model, go for all you can get with it, until someone comes along with a better one. On the other hand, you did what you set out to do, so hang it up for display and try your hand on another creation. If your new one is a winner, good/great for you. Your first or previous win is now a solid fact. The second or next win confirms your skill. On, ad infinitum.

I think you have the beginnings of a rule change that could help encourage more modelers to be competitive. For instance, the annual Toledo Show does not allow or permit a winning model to compete at the following yearly event. Having been a competitor at this yearly event since 1968 until I moved to Arizona, I feel I can speak first hand in favor of it. I entered a different model at the show and didn't place at all until 1974, when I took First Place in S.O. Scale. I was in the winners' circle through 1978 with a new model each year. Enclosed is a copy of a listing of my winning models, three of which are currently in the Shannon Air Museum at Fredericksburg, Virginia. All of them earned First Place trophies at various local contests also.



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I favor having to build a new model for each year's event if you intend to play the contest circuit each year.

Let's hear some more about this.

Sincerely,
Dick (Richard G. Barron)
11506 Ohio Avenue
Youngtown, AZ 85363

STINSON RELIANT SR9, 1st in Stand Off Scale at "Toledo" 1974.
CURTISS HAWK P6E, 2nd in Stand Off Scale at "Toledo" 1975.
CURTISS GULFHAWK 1A, 1st in Stand Off Scale at "Toledo" 1976.

Dear Mr. Goyer,

I read with interest your piece on R/C Carrier Operations and I think it's a great idea! There are only two problems with it: Money and labor. Someone is going to have to pay for and build the "carrier." Then it has to be stored, transported, operated and maintained.

Even setting aside the cost of the flight deck, you have to consider the cost of the aircraft. Most model airplane pilots are normal guys with average income. Those who can build and fly a Corsair (and there aren't many) are not likely to risk smashing it up in a "controlled crash" without someone else supplying the airplanes.

I know what I'm talking about, because my company, Super Ships, built and maintained an air-capsule aircraft carrier which we made available to a local R/C airplane club. Two members eventually did fly on and off the flight deck with high-wing trainers although they did not attempt an arrested landing. I don't fly R/C planes myself, but I can understand what these pilots were fac-

ing and can salute their skill and courage.

Of course, I did not write this letter just to blow smoke. We no longer have that carrier, but if you can find a sufficient number of willing and qualified pilots we will **build** and supply a new aircraft carrier. I propose a full ship scaled to the aircraft with arresting gear and catapults. The only catch is that the pilots must be willing to operate over water.

Let me know if you can find enough qualified pilots.

Yours,
Peter Shreeves
360 Macedoniard
Ardmore, AL 35739

P.S. If you don't believe me, ask Loren Perry! (Perry is Editor of **Scale Ship Modeler**.)

Dear Mr. Judge,

Like the editor mentioned in the reply, I also think you jumped to conclusions that were not in the article. And like the article right under that, don't think "the sky is falling."

Being a physics teacher, let me remind you of the limits of a rocket which does not apply to a plane. The reason we took out the gyro was (1) the 3 oz. reduced the height from 500 ft. with an F10 or F15 to 300 ft. and made the flight really hectic, (2) the flight was of such short duration it was not necessary. Instead we built a vertical wind tunnel and set trim tabs so the rocket didn't roll. Now 300' and 500' is about as far as some of my students could throw a rock! When we dutifully checked in with the FAA Tower at West Palm Beach International (in name only) Airport, the director had to **look up** procedures for any rocket

penetration of controlled airspace. Everything was progressing fine UNTIL I mentioned the altitude and weight of this rocket and its dimensions. You can imagine the tension when a man making \$34,000/yr. who had just spent seven minutes getting two other staff members to find out what the procedure was for something LESS massive than a bird strike!! Without losing his temper, let me say he, at least, mailed us some FAA stuff regarding flights at least 3,000 ft. high before regulations even begin. All other rules regard **intentional** rocket flights aimed at any flying vehicle only, or around airports (of any size).

You are right in stating that we did violate the "rules" of the NAR Nos. 4 and 13. We had every intention of making the rocket one pound but couldn't. We use \$50 Micro servos as well as the Micro rcvr. and smallest battery pack. How many of your customers use this flight pack to minimize danger to spectators? And, by the way, the article never mentioned "explosive" warhead, if you really read it carefully and without bias. Warhead is a term we used for the dye-spraying system we used to try to mark the kite target which we also abandoned because it was unnecessarily complicated.

I should also mention that we developed our own engines before we knew about Aerotech engines. We had to have a 2-2½-lb. thrust device for 8-12 seconds. But it was heavy and they were a mess to make. I did not mention this since kids would see the \$18 tag on F10s or F15s and try to fool around with dangerous chemicals. We also built an engine-thrust graph recorder to be sure

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FREE CATALOG

U.S. ARMY USES R/C MODELS TO DROP SCALE CHUTES

Use Of R/C Models With On-Board Computers For Parachute Drop Testing Saves Taxpayers Big Bucks

By Jack Buckley

The small plane wobbles and bumps down the unpaved runway, its four horse engine revving to the max. It climbs and circles the drop zone. At about 300 feet a parachute canopy pops open.

If you think there are some errors in the preceding sentence, you're wrong; you're thinking too big. Small, in this case, means a model size plane and parachute, part of a program the U.S. Army Natick Research and Development Center has underway to save money.

Heading the project is Dr. Calvin Lee, a research aerospace engineer in the Aero-Mechanical Engineering Technology Division, who is tasked to think small in order to save big. His proposal is to use small size canopies to predict the performance of full size parachutes. This capability would enhance Army airdrop R&D work and save the Army money on fuel, aircraft maintenance and crew costs. A remote controlled model airplane, weighing 85 pounds, with an 18-foot wingspan, is used for the model parachute tests. It carries three to 30-pound payloads which can be ejected using a model size parachute, scaled down to anywhere from one-half to one-quarter the average size of a conventional full-scale parachute. The plane was designed and constructed by John Buckley, a top ranking sport parachutist, who works as an experimental airdrop rigger at the Natick Center. John Lanza, an electronic specialist at the Center, built a lightweight (two pounds) on-board computer to monitor the performance of model parachutes as they are dropped.

Dr. Lee has designed and constructed 1/2- and 1/4-scale model parachutes for testing using the model airplane. Testing is being done at the 2,000-acre Ft. Devens Training Annex at Sudbury, Massachusetts. By using the computer on the payload, the canopy opening force, ac-



Aero-Mechanical Engineering Laboratory, AMEL, research aerospace engineer, Dr. Calvin Lee, project officer, watches John Buckley, experimental airdrop rigger, also AMEL, make final tuneup before a test drop from an 18-foot

wingspan model airplane. Buckley had fabricated the model plane while John Lanza, an electronic specialist, built an on-board computer for monitoring performance of model chutes being dropped.



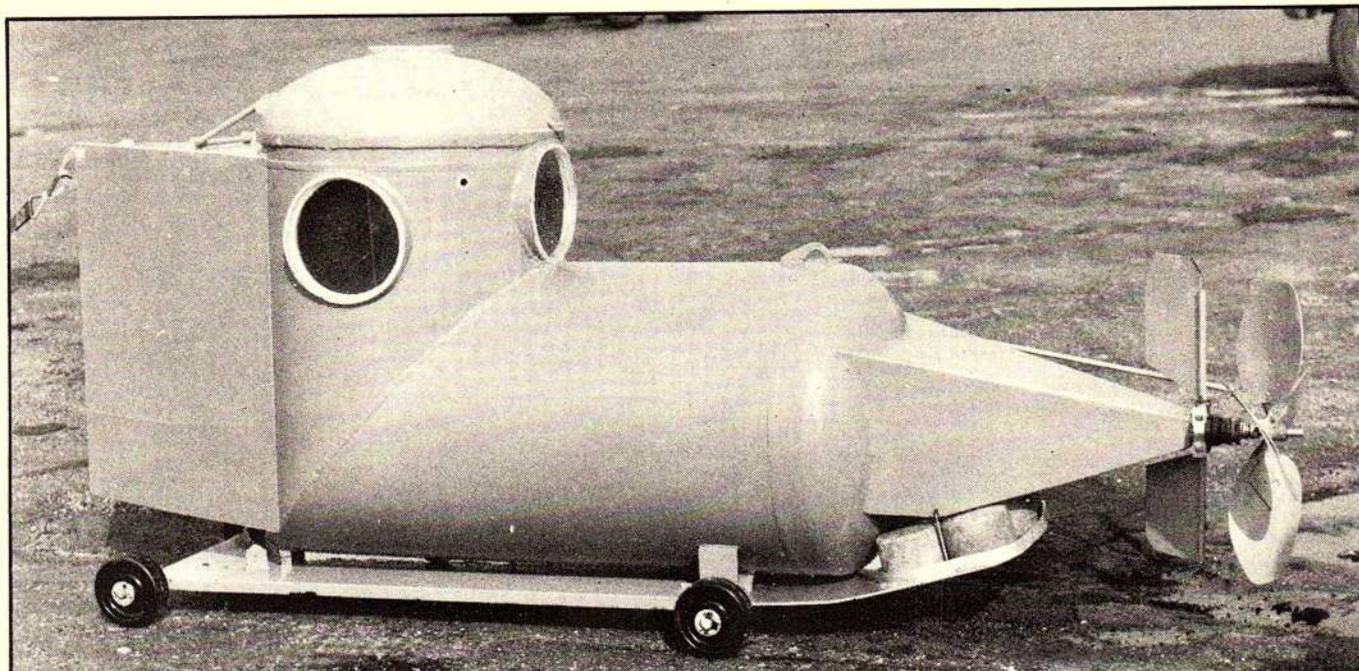
Making its run over the drop zone, a radio signal activates the drop release mechanism and a 30-pound load is on its way to the ground.

celeration, and motion of the model parachute are measured. Good performance correlation between full-scale and model parachutes has been obtained and is being used for AMEL airdrop R and D work. Lee estimates the model test system—at the rate of 50 tests per year—would save the Army \$300,000 annually over conventional test methods using full scale planes, parachutes and cargo. Costs for one drop testing using the model airplane is \$60.00 while one airdrop using military aircraft is \$6,000—100 times greater. □



The one-quarter to one-half scale parachute gently eases the miniature cargo to a soft landing.

The estimated cost of one airdrop using conventional military aircraft, parachutes and cargo is approximately \$6000 while the cost for one drop test using the model airplane and chute is \$60—an estimated yearly savings of \$300,000.



This is a one-man "dry" experimental submarine researched, designed and built by students of Mr. D. O'Neil's Science Class in Florida. (Editor's note: I'll bet the ABSENTEE rate in THIS teacher's class is zero!)

of what we had for power before we left the ground. We also had walkie-talkies linked to a member always near a telephone in case of any injury. We also have a camera that films every flight for scientific as well as safety purposes so we would never repeat any mistake. Later, the flight angle, which is also filmed, allows us to convert the film to reconstruct the physics of the flight. We have never left any item behind after any flight, be it trash or a spent engine or piece of chute wadding. Can you say this about any model event?

To convince you of our range of expertise I am including a B/W photo (produced for this letter) of our pedal-powered one-person, dry, atmospheric submarine which displaces only 1300 lbs. and is capable of 230 feet depth. We also have a practical recumbent bike which we made last year. We are working on a practical R/C mower that is made from readily-available components such as R/C gear and steered by slaved electric screwdrivers; also shifted and braked by these and is fail-safe. Our physics computer software is now published and used by several universities. (Microcomputing, June '80). We do all our own photo processing, even movies (16mm). We do all our own TIG welding and machining. We do not consider anything we do as "juvenile antics." It is not uncommon for mem-

bers to cover all 15 libraries within 25 miles of us here (public and university) before we start to make a move. How many purchasers of glow engines know the first thing about them? (The only time I got one to run right, a gust caught my free-flight and I lost the tip of my finger.)

If I was a Libyan terrorist, I would walk into your shop, buy a 1/4-scale model or the Pipe Dream, put as much 40 percent nitro in it that would take off, buy your Estes ignitors, an electronic throttle, pay by cash and conduct my activities from a long way away using binoculars. Do you have these items in your store? Shame on you! Just to supply "the usual bunch of loonies?" The frugal terrorist wouldn't be too interested in an \$18 F10 Aerotech, would he? (Let's address the ethical question.) No, it isn't manufactured for this PURPOSE, but it can be used for this. The cord that goes from the wall socket to a lamp isn't intended to strangle a rape or burglary victim but IT IS THE MOST-USED WEAPON.

I agree with you that our model is not scale and compared to the FW-190 of the same issue it looks far out of place. It was sent in only to the publishers after the true-jet Flogger story. These are made as targets to train our pilots. I thought it appropriate he know about our rocket. He (the editor) called me and wanted to publish it. We were embarrassed since it was so outclassed. It was not intended to be scale, although it could be considered an average of about 10 rockets.

I suggest you get off your high horse, stop trying to invent dangers that don't exist, and see dangers

where they do exist. You will be happy to know that a Mr. Miller of the N.A.R. was equally upset by the article. How you can call 5,000 members "National" is a little beyond me. Especially when you consider every Estes rocket has a membership form in it. I respect that they are trying to be "dads" to half the modelers who have no dad to help them understand the dangers of rockets and support them and get them off on the right foot. I have had to do the same thing for our guys. They are very smart but some do have strange ideas from watching Rambo and Schwartzenegger movies. Have you written to the movie industry yet? Do you know that a guy in Arkansas built a multi-barrelled electric motor (Toyota starter) powered mini-gun like the GE one in Rambo (II)? And now many folks have tried making a bazooka based on the high-tech weaponry movies so popular.

D. O'Neil

Correction:

In a letter received from Bob Fiorenze, he has called our attention to the following mistakes we made in transcribing the audio tape sent us from which we put together the article in Scale R/C Modeler.

- 1) Fascal polyester #700
- 2) 7 DV OS Carbs, not 7 DZ
- 3) Lean run, not bad run
- 4) .020 head shims, not .002"
- 5) R-8 Rossi plugs, not R A plugs
- 6) Fiorenze, not Fiorenzi.

We regret any inconvenience these errors may have caused.

Sincerely,
The Editor

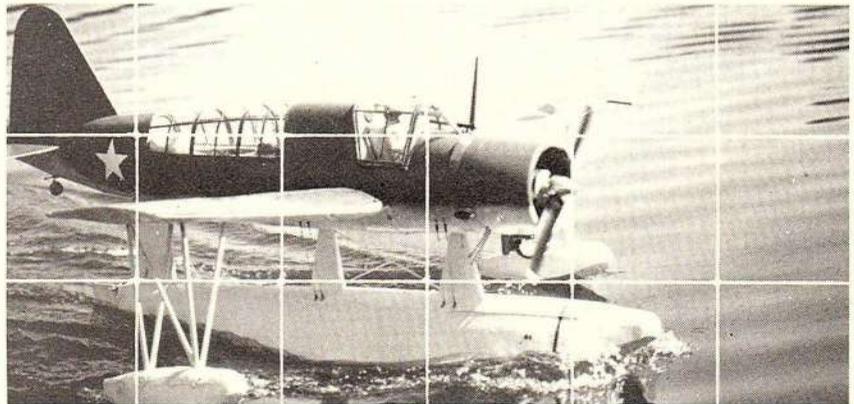


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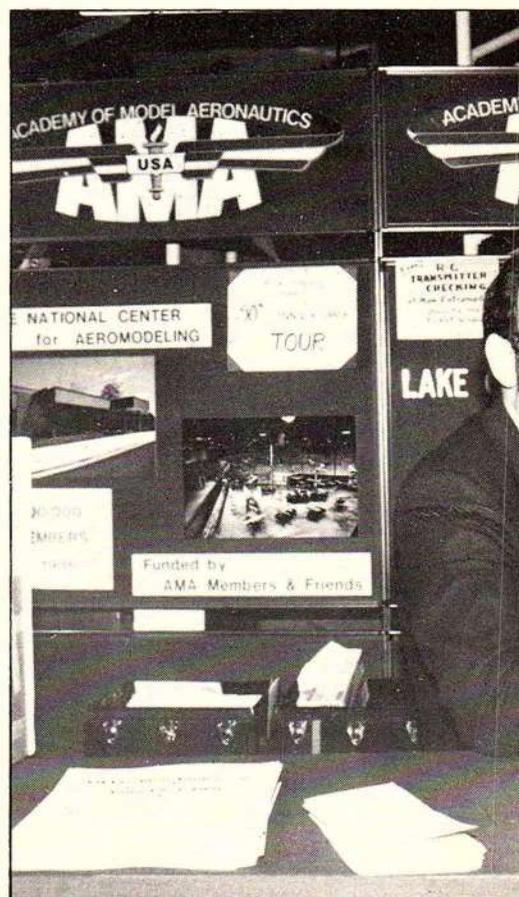
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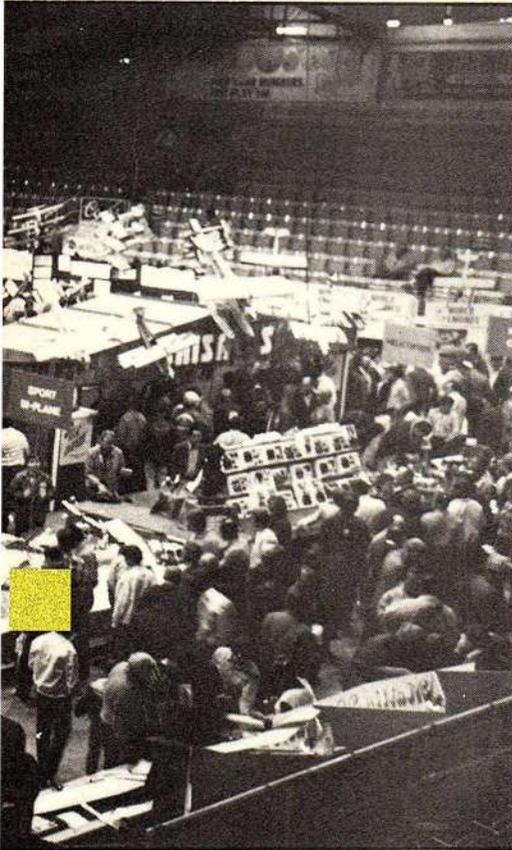
Mitigating circumstances have prevented me from attending the renowned Toledo, Ohio, Model Show, but I always read every word about its developmental stages and its history as well as the events of each year's show. This year, I was determined to be there, and I succeeded.

Now, back to the show, the static displays were the best I have ever seen! Here's a list of some of the winners:

Category	1st	2nd	3rd
Military Sport Scale Plane	William Carper Jackson, OH P6E Curtis Hawk	Don Parks Davison, MI FW-190-D9	Hal Parenti Westchester, IL SM-79 Savio Marchetti
Non-Military Sport Scale	Mike Barbee Columbus, OH SNJ-2	Alvin Ozminski Lapeer, MI Lake Buccaneer	Joe Mientkizwicz Waterford, PA 1929 Waco Taperwing
Precision Scale	Dennis Crooks Big Rock, IL TBM-3A Avenger	Cliff Tacie Mt. Clemens, MI Savoia Marchetti SM-81	Larry Gordon Fenton, MI Grumman Wildcat F4F-3
Directors Award for Achievement	Orest Drobey Winnipeg, Manitoba Canada Westland Lysander		
Best of Show	Dennis Crooks Big Rock, IL TBM-3 Avenger		

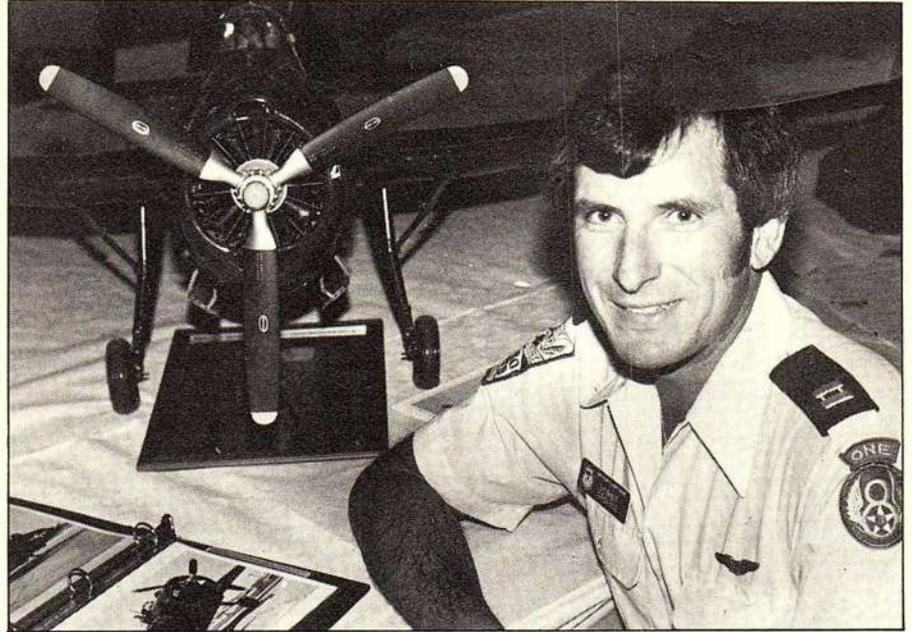


The World's Biggest Model Exposition Gets Better Every Year! Scale R/C Modeler Staff



From the day the Toledo Show opened, the Sports Arena was jammed with thousands of modelers. Even this time exposure showed very little movement, because . . . you couldn't!

Dennis Crooks and his "Best Of Show" Grumman "Avenger" complete with folding wings.



The AMA booth was promoting their 50th Anniversary Tour to be held this year at the NATS. Vince Mankowski AMA General Manager, announced that all modelers who will be attending the NATS should plan to stay for those 50th Anniversary ceremonies which will be held on the final weekend of the event.

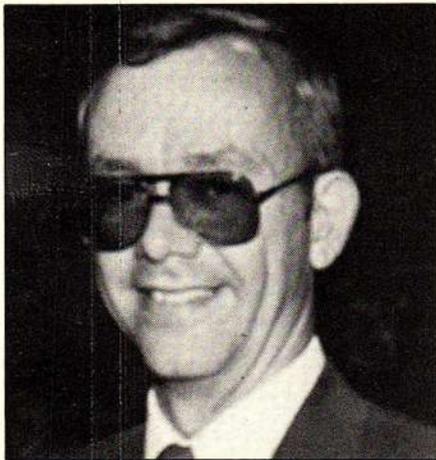
Jim Martin and son operated two booths, one for Hobby Lobby, and one for Graupner of Germany. A complete product line, from ARFS to props, is available from Hobby Lobby, along with some great European scale kits.

The Lysander by Orest Drobey was so beautiful it just cannot be described. On it, there are *thirty-two hand-formed metal parts* in the landing gear fairings alone . . . definitely of museum quality, and Orest Drobey does indeed sell his aircraft to museums, and whatever they pay, his aircraft are worth *every penny!*

I was glad to see Dennis Crooks win "Best Of Show" and the "Precision Award" with his Avenger. Both Dennis and his very dedicated wife work very hard to promote R/C modeling, and they travel great distances to show and fly their aircraft to that end. They deserve awards for that too!

Alvin Ozminski, of Lapeer, Michigan, won second in "Non-Military Sport Scale" with this Lake "Buccaneer" from Tiger (formerly Mr. G) glass and foam kit.

Quality of detail around the cabin and engine nacelle were excellent.

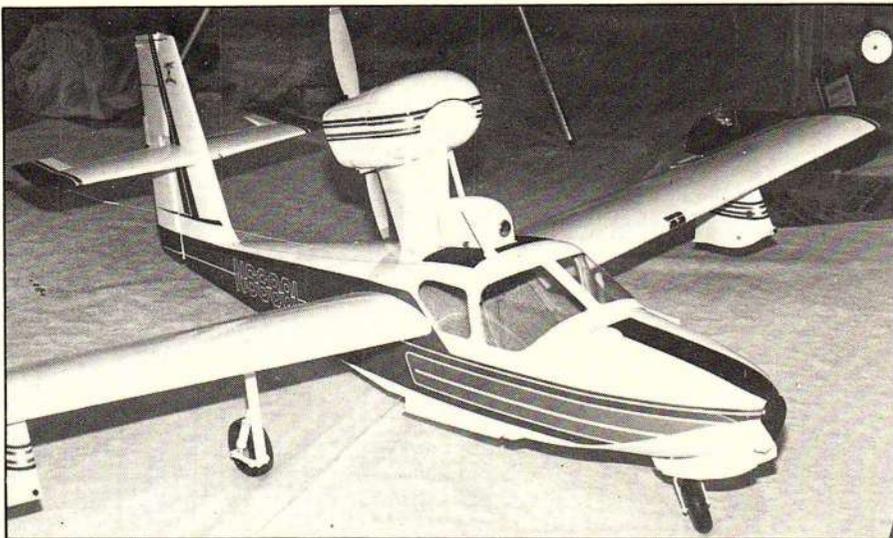


Co-Director of The Toledo Show was Rick Letterman who was also a judge in scale.

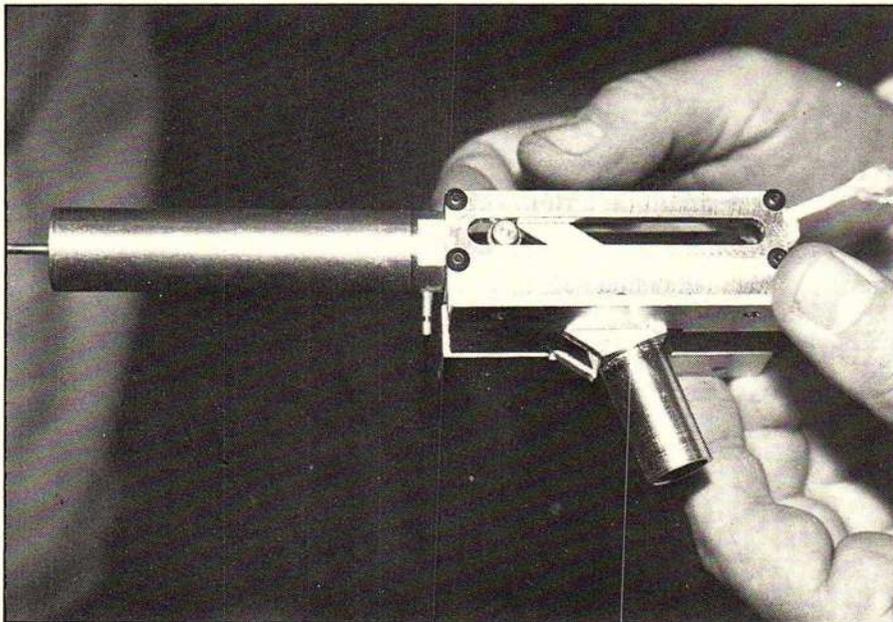


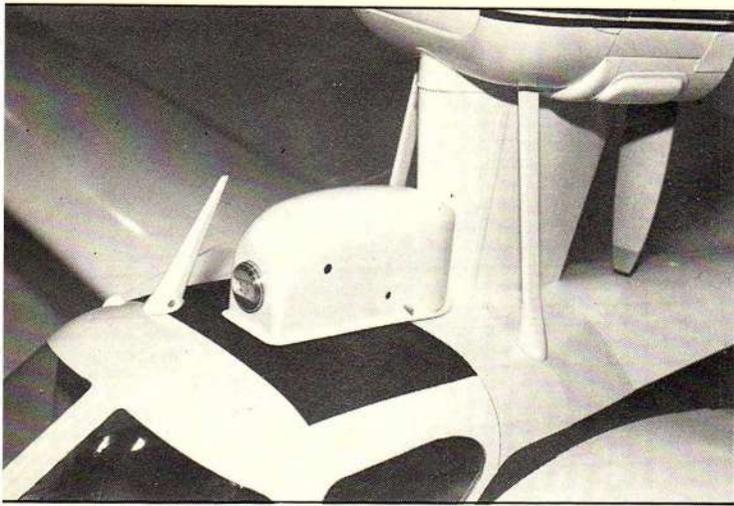
His Co-Director, Wayne Yeager, of Romulus, Michigan, contributed his 100 percent effort. Both directors deserve a "Well Done" Award.

This "Stinson 108" on floats by Flightmaster scale landing gear fittings, spring-loaded in the same fashion as its full-scale counterpart.



Dave Platt holds new retract which can be adjusted for different angles so it can be adapted to a variety of aircraft.





The Holmans (of Bob Holman Plans Service) were in attendance, and TWO of the top prize winners, The Westland "Lysander" and the Grumman "Avenger," were constructed utilizing Bob Holman Plans!



In the Royal Products booth, Dave Andersen was kept busy all weekend showing Royal's many new products. A Royal P6E "Hawk" won First Prize in "Sport Military Scale," as built by Bill Carper.

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Cliff Tacie's Savoia-Marchetti SM-81 is familiar to our readers, and Larry Gordon's excellent Wildcat was in giant scale and very well done.

Mike Barbee and his flying chum, William Carpenter, both won their categories, with an SNJ-2 for Mike and a Royal P6E Hawk for Will.

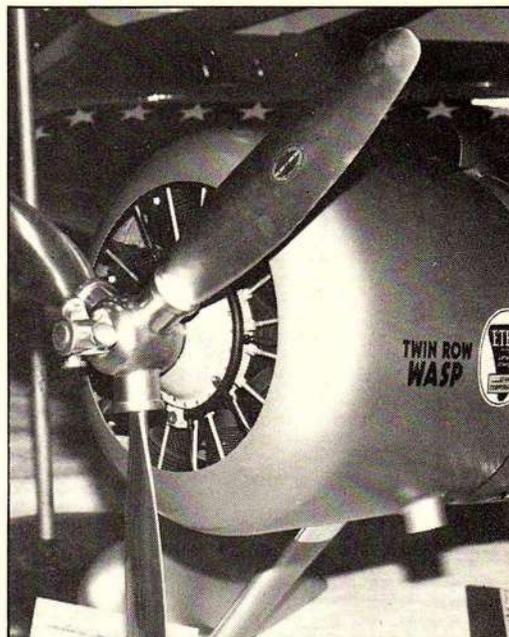
(Continued on page 82)



Larry Gordon of Fenton, Michigan won Third Place with this giant scale Grumman F4F-3 "Wildcat." The ships in the precision scale category were the best in years, I was told.



First place was won in "Best Military Sport Scale" by Bill Carper with this Royal Curtiss P6E "Hawk." Bill hails from Jackson, Ohio.



Racers still remain "tops" in popularity with giant scale builders, as this Pesco "Special" from Hostetler plans, as built by Jim Dever.

Join the Jet Age Air Force!



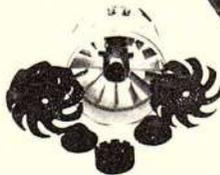
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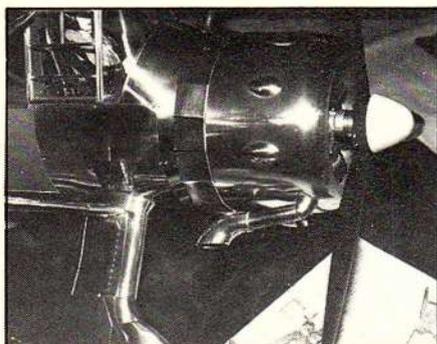
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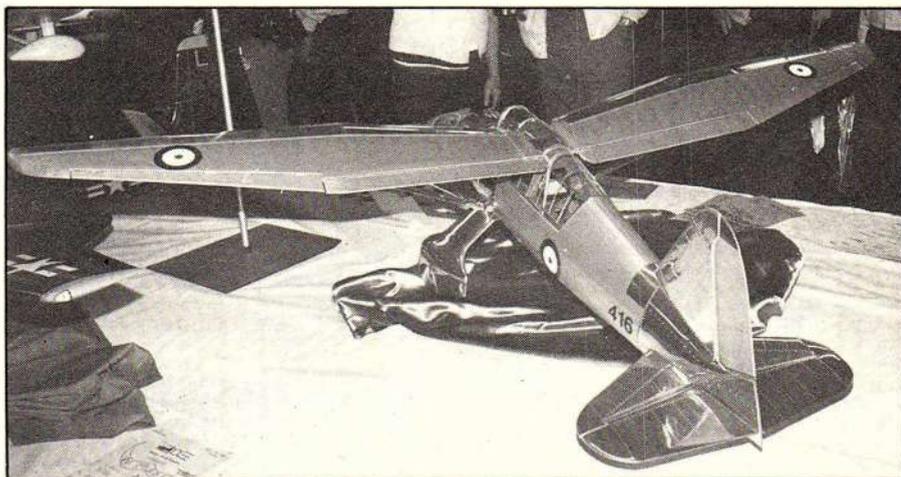
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Mike Barbee won First Prize in "Non-Military Sport Scale" with his Nick Zirolu AT-6 decorated in "Sky Typers" colors. This team was started in the late forties at the Flushing, New York Airport and are now located at Long Beach, California (where they typed a great big "Welcome" sign in the sky at the opening of the 1984 Summer Olympics). These aircraft are SNJ-2s . . . notice the different-shaped rudder. They like this model because of their larger gas tanks.



Orest Drobey's meticulous Westland "Lysander" received the "Technical Achievement" Award. Aluminum hand-shaped parts were veritable works of art. Bob Holman Plans Service has these plans in stock.



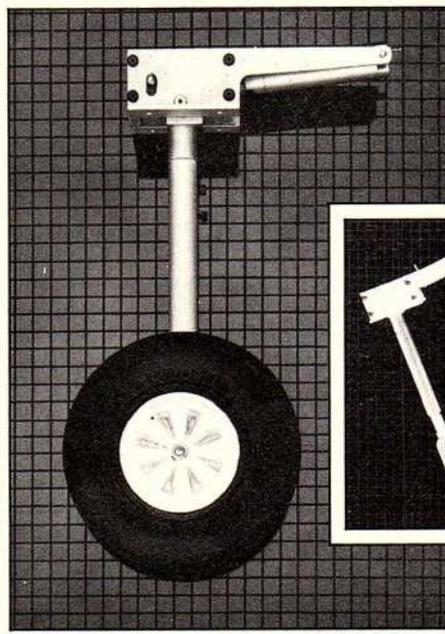
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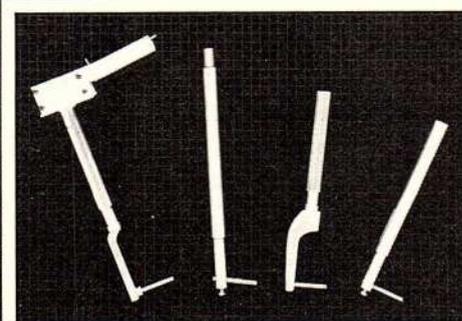
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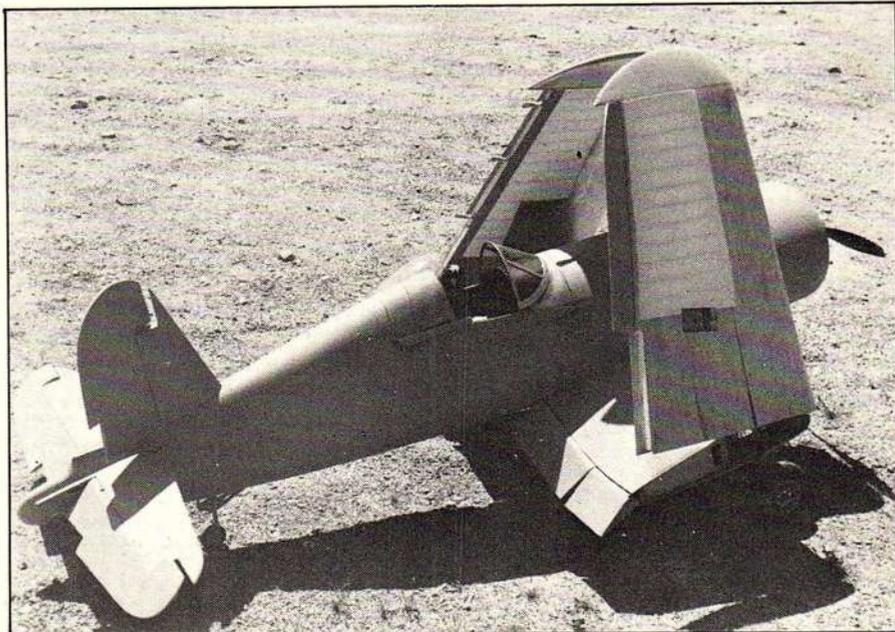
PRODUCT REVIEW... UPDATE

BYRON ORIGINALS CORSAIR

The big project for the past four months here has been Byron's Corsair. We intended this aircraft for Scale Masters competition, so SR/CM builder, Lee Byers, is going all out on this one. Some little-known facts about Corsairs which are coming to our attention as we build our model are the use of *four* chain-driven tail wheel doors. I had never noticed this in any picture I'd ever seen. We're fortunate in having a full-scale Corsair practically at our doorstep where we can check each detail. The air intakes for the supercharger on the wing roots are set way back into the wings, and the vanes are directed back towards the fuselage. The canopy track is on two levels and drops about two inches as it gets ready to close. The wheel doors are mounted to the gear and have rubber gap seals at the top which fold against the wing any way they can. We rebuilt the Quadra head so that the plug and wire are enclosed within the cowl, and Byron's patented Purrr'powr was rotated to enable the exhaust to exit from scale areas. We intend, after testing, to have the wings fold via hydraulics, so we re-designed the hinges. Kevlar, graphite and Flex Zap are really coming in handy for this application.

But the big difference is the change to aluminum covering for the wings so that we may have authentic dings, and dents and weathering. Litho sheets worked just right for this, but we also learned that you cannot cut them with shears because that stretches the metal and then the edges won't lie flat. We now scribe and break for a clean edge.

The landing gear was re-worked slightly so that scale height could be achieved to simulate a full-scale Corsair at rest. We substituted lighter springs and also changed a few angles so they would have the right degree of toe-in and camber. The Robart struts are really nice to work with because they are so well made, with plenty of metal available for minor re-shaping for this application. At this time, our plans are to use an early U.S. Navy scheme with medium gray, with light blue dusted on the top. There isn't a large selection to choose from because the F4U-1s did not have a variety of

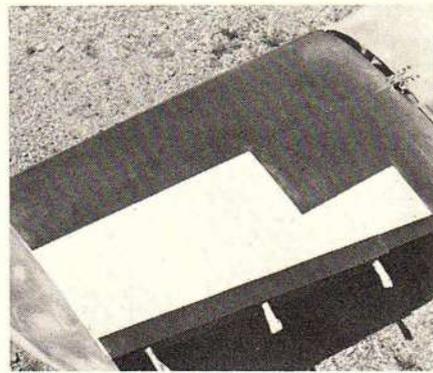


We haven't decided on a pilot yet. This one looks great because of the "real" clothing he's wearing. Made by MGA Enterprises, P.O. Box 864, Forest Hills, NY 11375, whose mannequins are very realistic and authentic-looking.

paint schemes as did their later Korean War brothers. Byron Originals' model is an F4U-1 (A, B or C). The later dash 4s had different shapes on fuselage and canopies, as well as the all-metal wing.

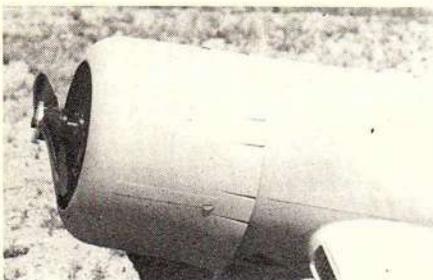
OS 90 DIESEL CONVERSION

We want to report complete success on our OS 90 diesel conversion. It pulls the heavy (18 pounds) Cub easily with an 18/6 prop turning about 7200. The engine idles so slowly that we had to increase it to get better gliding characteristics. The 16-ounce tankful of diesel flies the Cub almost twice as long as when we use glow fuel, and it's very quiet.



Wings are being covered with sheet aluminum to allow for authentic dings and dents to show correct weathering. Printers' litho sheets, scribed and broken, were used, and thin "Hot Stuff" held the metal to the wood easily.

We're now installing SIG floats on the bird for summer flying, and we know that the OS 90, diesel-ized, will have more than enough power. We're using the concentrate mixed with aromatic lamp fuel and all the foul odor complaints disappeared. I can now fly at 3,000 feet, take it down to sea level, and *not* have to spend half a day adjusting the carb. The diesel is so easy . . . I adjust it to sound right, and then just leave it alone . . . it's not the least bit critical on carb setting. It sure gave new life to my discarded OS 90 . . . it made a great scale engine out of this orphan-sized mill. Bob Davis is on the right track . . . give him a call, he is very knowledgeable about engines and he can solve your problem.



The cowling is clean-looking without that protruding spark plug. (We re-shaped the head, using a smaller Honda plug ... reduced the Q-50 by almost 1.5 inches). Runs just fine.



Robert "Tony" Hill painted his Knights Of The Air "U-2" like those of the U.S. Air Force in the early sixties . . . a dramatic flat black with red lettering.

U-2

Robert (Tony) Hill has completed the Knights Of The Air "U-2" and finished it in dramatic (authentic) flat black. Hill used a Turbax II with a K&B 6.5. The long-winged bird weighs in at 9 pounds, flies great, no problems, and Tony likes it so much he says that it's only the first of a long line of jet fighters he's going to build. He's using the U-2 as a trainer, and it's ideal for that. When he encountered building difficulties at the onset, we immediately received a set of revised plans as soon as we notified Knights, and all of the minor questions we had with the original kit have been corrected. We like to see a company take legitimate suggestions, act on them without delay and re-do their kits to give the average builder fewer problems when constructing their plane.

MRC TRAINER HAWK

Received a note from Dick Camille who is now living in the Palm Springs area. He reports that the MRC Trainer Hawk is a great first plane trainer. A local modeler helped him get started, and now he flies the plane by himself. He's even interested in going for the larger 40-powered foam Cessna marketed by MRC. For a busy person, these various Cessnas make good training planes.

ME-109

The monstrosly huge ME 109 from Three Stars Company in Sausalito is now underway, with that great Atlas Dynamics 50 G used for power. As soon as the retracts arrive, the big bird will be flying in a matter of weeks. Unlike the Corsair, the Luftwaffe had a multitude of great color schemes, one of which should make this Emile a real head-turner.

RUSSIAN "ANT"

Ed Erfurth has successfully flown the big Russian "Ant" cross-country

plane, and is now installing long-range tanks for his planned long-distance flights this summer. As a thought, has anyone tried using the plastic mylar "bladder tanks" in which inexpensive (cheap) boxed wine is shipped? They're strong, light, and don't require venting. They can be filled through the rubber cap, and any connections can be siliconed right through the cap. Put the bladder tank in a soft flannel bag insert in the wings or fuselage, and you have a ready-made 5-liter tank. Besides which, just look at all the fun you'll have emptying the box!

COMPETITION PROVEN SCALE PLANS from GOLDEN ERA

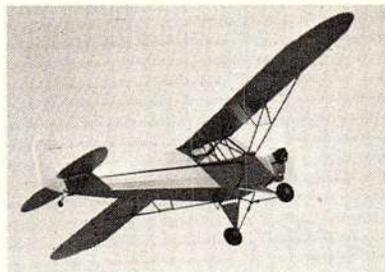
Vickers 151 "Jockey" Mk.II. 1/5 scale model was featured in the Feb. 1986 issue of **Scale R/C Modeler** magazine. 78" span, 1,000 sq. in. 10-12 lb. For .90-1.20 4-stroke engines. Plans \$29.95



Aeronca LC. 1/4 scale model was featured in the March/April 1986 issue of **Scale R/C Modeler** magazine. 108" span, 1,580 sq. in. 14-15 lb. For 1.20 4-stroke engines. Plans \$29.95



Piper J-3 Cub. 1/6 scale model was featured in the May 1986 issue of **Scale R/C Modeler** magazine. 72" span, 704 sq. in. 3.5-4.5 lb. For .20-.45 4-stroke engines or electric power. Plans \$14.95



SAAB Viggen. Model design by Col. Bob Thacker was featured in the July 1986 issue of **Scale R/C Modeler** magazine. 1/10 scale, with 45" span, 67" length, and combined wing/canard area of 1380 sq. in. 13 lb. Designed for a Byrojet fan and Rossi .81. Fiberglass and foam construction. Retract installation shown. Plans \$19.95 (Available 8/1/86 — Fiberglass fuselage and foam wing cores—call for prices)



GOLDEN ERA MODEL SERVICE

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INTERVIEW WITH TOM RUNGE OF ACE R/C MODELS

SRCM: Mr. Runge, can you give us a brief history of Ace R/C?

Runge: My involvement with the company goes back as far as I can remember because my dad started the company back in 1953, when I was only six years old. You might say that I've been exposed to R/C modeling since 1953. I first got involved actively with R/C when I was twelve, and I've been flying ever since. My involvement with the business went to full-time in 1971. Before that, I was finishing school, then I did a tour with the U.S. Air Force, but I always touched bases with my father and the business whenever I was around because I was always very interested. From 1971 to 1980, I was learning the ropes

of the business, then in 1980, my wife, Donna, and I bought the business.

SRCM: What direction is the business taking at this time . . . in the percentage of sales for electronics, craft kits, and as a hobby distributor?

Runge: At this time, about 50 percent of our sales are a direct result of our own products, and the balance from other manufacturers with ACE as the distributor. As far as the mix of the electronics we manufacture and the kits we sell . . . we are noticing an increase in the kits and the electronics support systems line we manufacture.

SRCM: Would you tell us the history of the ACE Silver Seven Circuit?

Runge: The Silver Seven design has been in existence for some time now, and some people are wondering why we don't come up with a more modern radio. Well, we found that our Silver Seven design was so far ahead of its time when it was released that it's still considered a very modern transmitter because it has all the features . . . it's just maybe not in a modern-looking package. . . . It doesn't have the "porcupine" packaging of some of the competitive units.

SRCM: Is there any significant difference between your design and some of the new imported "whistle and bells" units?

Runge: Yes, I'm sure that there are some significant technological differences, perhaps in the way in which we go about the electronic design. What it comes down to, is that we believe we have one of the most dependable RF links . . . it's a good, solid RF link . . . and that includes FM and PC-type radios. As far as we're concerned, the rest of it is only icing on the cake, and we'll continue to strive to have dependable RF links as the most important feature of our product.

SRCM: This RF link you refer to . . . the direct contact from the transmitter to the modeler's aircraft receiver . . . is this a patentable design or circuit?

Runge: No, it cannot be patented.

SRCM: What about the receiver in your system?

Runge: Again . . . our Silver Seven receiver design has been out for some time, and it has proven itself in the field. We're also working on other designs in order to be compatible with the 1991 environment, but the biggest problem we're facing is that we have a tough act to follow with the acclaimed dependability of the Silver Seven Series. If we can get a receiver in either AM and FM with the operational characteristics of the Silver Seven, and be able to operate in the narrow band environment, then we'll know we've got it.



Tom and Donna Runge, photographed at their ACE booth at the IMS Show in Pasadena in January of this year.

Since 1953, ACE Has Been Serving The Modelers Of America With Innovative And Quality Products

By Sara Rogers

But that's a very tough job.

SRCM: Do you buy circuitry from individuals, or are most of the circuits designed and tested in-house?

Runge: We don't do much design in-house . . . almost all of our designs are done by a couple of engineers out-of-plant who do it on a "moon-light" basis with a royalty situation.

SRCM: How does your transmitter work with other receivers, and how does your receiver work with other transmitters? Does that break the strong RF link you spoke of?

Runge: Well, no . . . our transmitter will work with any AM receiver, and our receiver will work with any other transmitter as long as the frequencies are the same. Any system is only as good as the weakest link. That is . . . if it's matched with another radio with a poor output transmitter, or a poor operational receiver . . . nothing will be gained.

SRCM: How do you see the hobby going as far as accessories are con-

cerned? I see that your display booth has about twenty or more electronic and electrical accessories. Is this an expanding part of ACE's business . . . and are there any new products on which ACE is working at this time?

Runge: Well, we see this as the backbone of our electronic business . . . all of the support equipment . . . and the "goodies" for the modelers. Essentially, all modelers are gadgeteers, so we'll continue to supply them with all of the gadgets they want and need . . . of the good quality and dependability for which we've become famous.

SRCM: What are some of these "goodies" you refer to?

Runge: Well, we have two new options for the Silver Seven transmitter, including a new glider and helicopter option. We're working on several new chargers, specialized type chargers, a variable-rate high-output-type charger, and some car and boat-type chargers for the elec-

tric propulsion units.

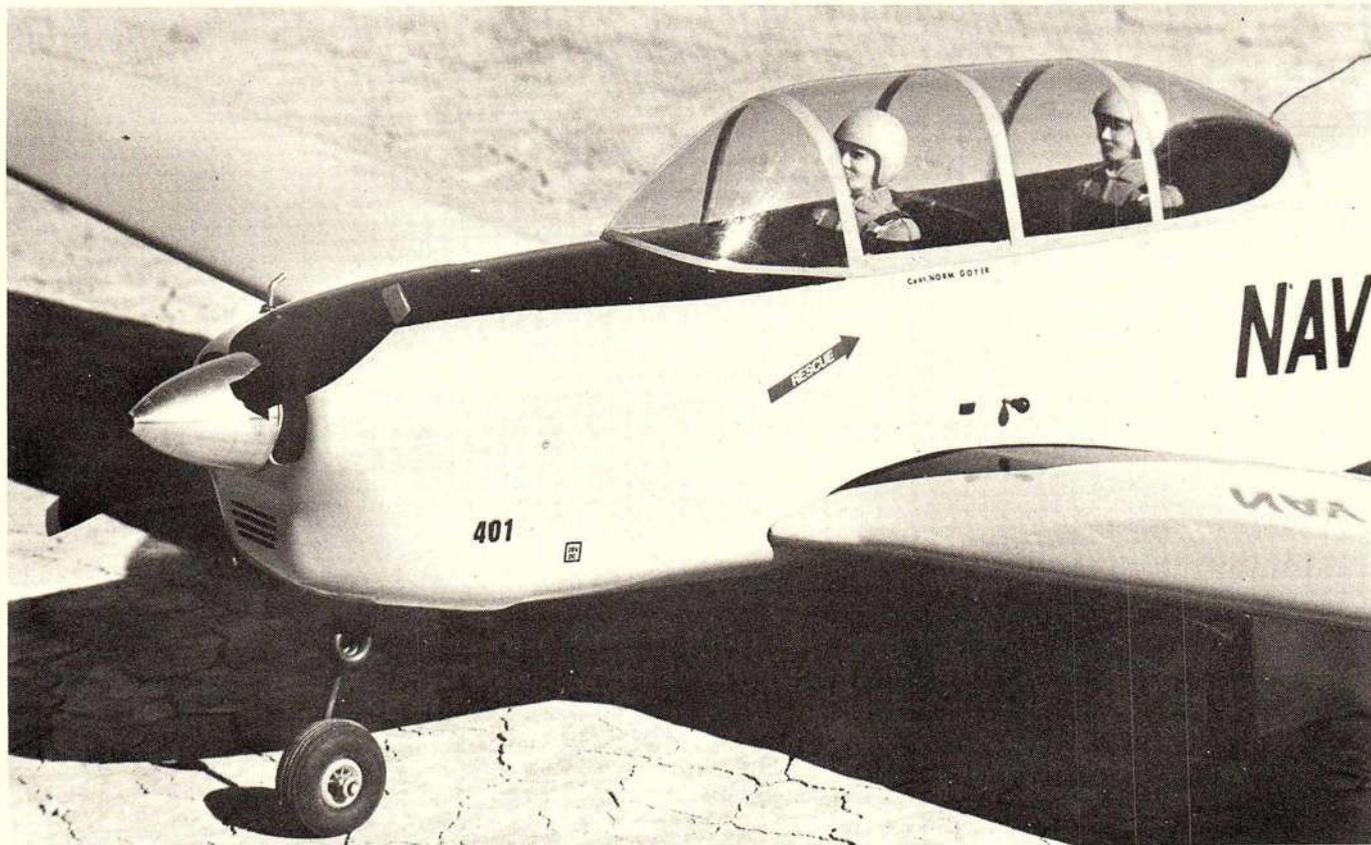
SRCM: It appears that ACE is in the electronic field for good . . . and you're actively working on many new units from narrow-band radios, to accessories.

Runge: Absolutely . . . and we'll continue to grow. Even though we might not be the leader in sales for the R/C modeler, we find ourselves in the unique position of continuing in R/C because, essentially, we're the only U.S. manufacturer of radio control equipment left out here, and, fortunately, we find ourselves being contacted repeatedly by other types of industry for remote-control applications for industrial use.

SRCM: Are you getting involved in any way with the military and their drones?

Runge: Yes, we have contracted for some R/C equipment for drones.

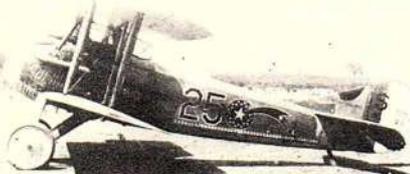
The ACE T-34 has been a good seller for ACE, as it serves many functions . . . from sport-scale, to a fast aerobic sports aircraft.



Bill Effinger suggests:

Plan 'N Pattern Sets

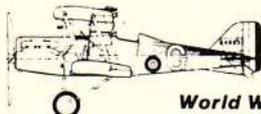
Plan 'N Pattern Set #RCQS-8.....\$27.95



"SPAD" C-XIII World War I

1.3 - 3.1 Engines; 79 1/4" Wingspan—2120 sq. in.
This new design offering makes a beautiful R/C replica of the WW-I era. 2120 sq. in. of area, it's a big aircraft, a capable flyer, it captures the imagination.

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World War I

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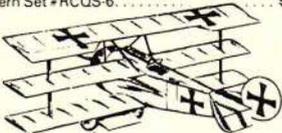
.78 - 2.2 Engines; 80 1/2" Wingspan—2220 sq. in.

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W.E. Technical Services

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Atlanta, Georgia 30328

SRCM: Now, you've stated that your R/C airplanes are one part of your business that's starting to grow.

Runge: Over the last years, we've found ourselves going away from the small airplanes, and going into the mainstream of the forty and sixty-size models, with our T-34, followed by our 4-40, our 4-60; and our 4-120 and 4-45 which will be released later this year. These are all designed for the four-cycle engines.

SRCM: I notice that your airplanes in the 4-40 series don't have foam wings... is this a trend?

Runge: Well, for this type of airplane, we certainly could have gone to foam-type wings, as we do have that manufacturing technology... but to keep the airplane lightly loaded, we opted to go to built-up wings.

SRCM: If these are trainer-type airplanes, do you think that the people who purchase them will have the ability to build them?

Runge: The instructions are as complete as we can make them, and still be simple to understand so that an entry-level modeler can build them. They're more than just trainer airplanes... I'd classify them as sport airplanes which just happen to work out great as trainers!

SRCM: How do you classify your T-34?

Runge: Oh, definitely not a beginner's model... it's a scale-type sport plane for someone who's looking for a sport plane that flies well, is fast... and also looks like a real airplane.

SRCM: I understand that Bud Atkinson designed this model for ACE. Does ACE have any plans to bring out Bud's 1/4-scale version of this T-34 model?

Runge: The large aircraft is one that we're looking at, not particularly in the scale field, but, as I mentioned, we are planning a 4-120 for later on this year. This one has a 1300-square-inch wing, with an 8.5-foot wing which, while it is not "scale," does look like a real airplane because of its sheer size. This model will be reasonably-priced, and will fly quite well.

SRCM: I'm an average modeler, and say that I go into a hobby shop and see an ACE Olympic 5 radio unit; and some foreign competitors. I elect to buy the ACE. Have I made a good decision?

Runge: What you're probably asking is: Why should you pay more for an ACE radio than for a cheap foreign radio? Well, the answer is

that you can wave the flag all you want to, but there are still a lot of people out there who prefer to buy American products. And the owner of one of our radios can call us on the phone anytime and talk directly to the factory that made that radio... to the people who designed it... and to the people who work on them all the time... so... they can get a problem solved *without* a trip back to the factory.

SRCM: How much is turn-around time for repairs?

Runge: Normally, we run around one to two weeks.

SRCM: What about the selection of components that go into your radio units?

Runge: We try to select quality components that will do the job well. Of course, we're always price-conscious, but we do look carefully at quality versus price. We don't use surplus components... only all first-run top-quality products.

SRCM: One of the things I like about your units is the metal case. Are you sticking with metal cases for your equipment?

Runge: No, not at all... because we're a low-volume manufacturer, the metal cases allow us to do short runs without mass tooling expenses, and lets us make custom modifications for specific needs for the modeler... and the metal also lends a solid feel and rigidity to the case.

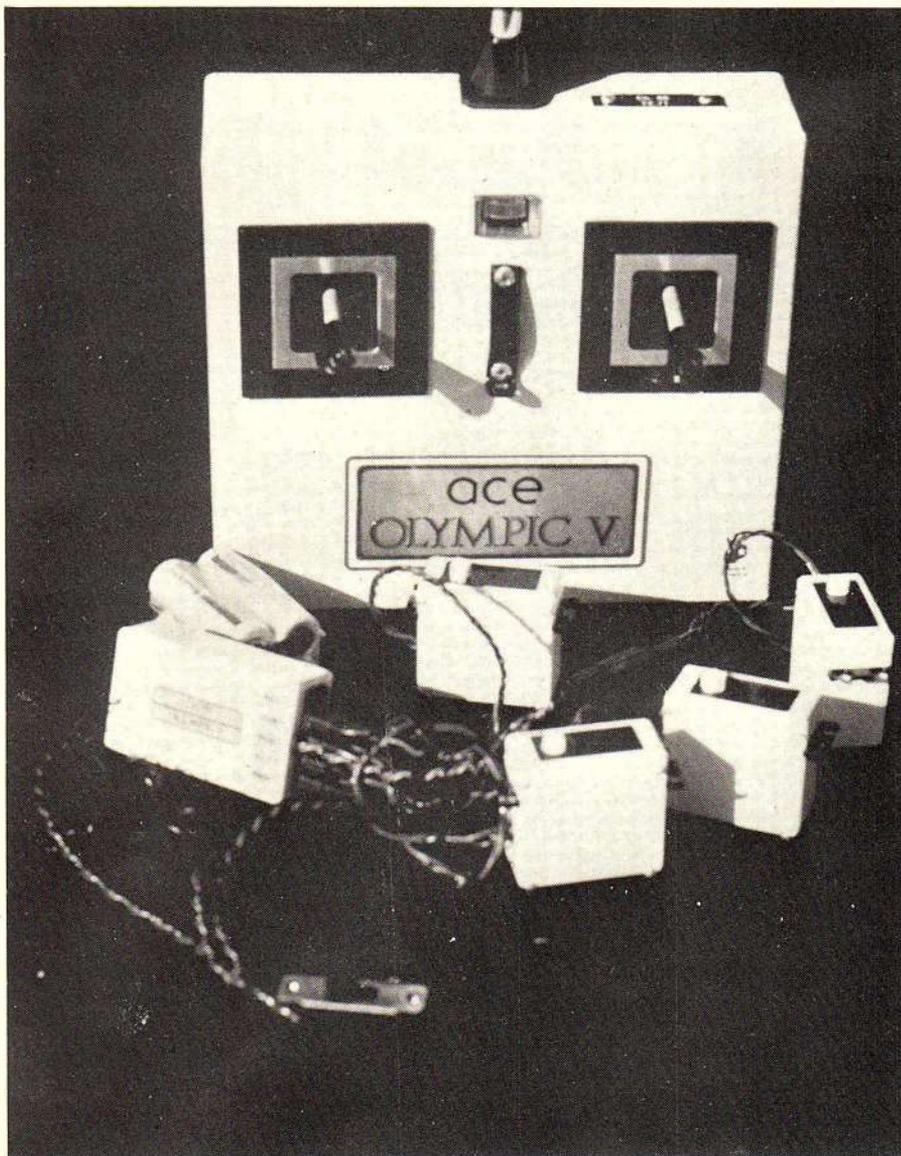
SRCM: If you were a modeler... with your knowledge of electronics... and knowing all of the possible problems... what frequency would you purchase?

*Runge: In our experience, there has not been a number of frequencies that have a reputation of *not* being good. In certain areas... some frequencies *do* have some local interference problems... but it *hasn't* been generalized throughout the country.*

SRCM: Do you think that the lower frequencies on the band are as stable as the middle and the higher frequencies?

Runge: Well, we fly Channel 12, the lowest frequency in the Kansas City area all the time, but I understand that, in some areas, Channel 12 is too close to the audio of Channel 4 TV. Again, it's always a matter of the RF link, and of the overall quality of the equipment. We sell a lot of Channel 12 units, and they're not experiencing any difficulty.

SRCM: Does ACE R/C have any



The ACE Olympic 5 has Silver Seven circuitry in a simplified form . . . it still

retains the servo-reversing, and other options are available as well.

plans for expansion in other directions at this time?

Runge: One never knows, but, at the current time, we have at least six more airplane designs on the boards, and the new narrow-band equipment is also top priority . . . as is all of the support equipment . . . besides which, we are continually looking for new ways to serve the hobby industry.

SRCM: Are you searching out for any manufacturing or components to be built in the Orient?

Runge: No, not at this time . . . we are still dedicated to carrying and marketing domestic products.

SRCM: Do you think that U.S. trade policies are helping or hurting your business?

Runge: Well, I haven't been hindered in any way, but we certainly haven't been helped either.

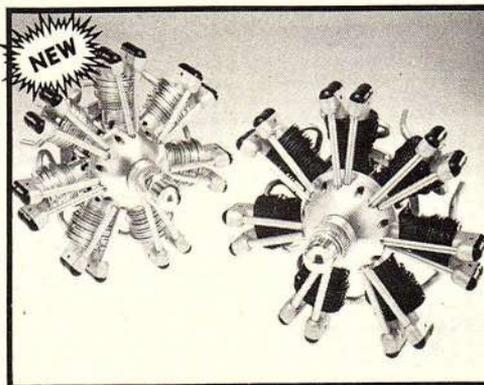
SRCM: An ACE radio going overseas must cost a lot more than one coming into the United States . . . is that what you're referring to?

Runge: I don't think that it's really a matter of the duties . . . the basic problem is apparently the cost of raw goods. It costs us more to buy the raw componentry for a servo before we even trim a gear off the mold than it does to buy a completely-built servo from the Orient, including duties and transportation. Even if we had zero labor costs, ours would still be more expensive than theirs.

SRCM: Thank you, Tom, for sharing ACE's many years of service to the modeler with our readers. ●

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Plans Services Are Expanding

The Scratch Builder Now Has Almost Unlimited Sources For 3-Views or Documentation Of That Unusual Scale Aircraft By Pete Chaput

Scale Modelers use plans more than *anyone* else.

The quest for that *unusual* aircraft is often not found in a kit, so we must sometimes turn to the plan dealers to find the exact ship we're looking for.

During the past nine months, *Scale R/C Modeler* has had the opportunity to review plans from a number of plans services, and here is our opinion of some of them:

BOB HOLMAN PLANS P.O. BOX 741-SM SAN BERNARDINO, CA 92402

Bob has been in the plans business for many years, selling his own plans as well as those of Brian Taylor and the Jerry Heaton plans. Masters winners have used Bob's plans for their contest models. At this year's Scale Masters Championships, *two* out of the top three aircraft were made from Bob's plans . . . Kent Walters and Dennis Crooks. Bob also has all of the English M.A.P. plans, and he stocks most of them. For \$3.00, Bob will send you a catalog which is illustrated with some very unusual plans. And, with today's new enlarging copy machines, you can make any scale plan the exact size you want it to be. In addition, Bob has partial kits and complete kits of some of his plans. Bob's fiberglass work is great, and because he's a scale model builder himself, the wood he chooses for the plan is just right for that application. (Look for several of Bob Holman's plans, from his collection, in this issue of *SRCM*).

HOBBY HORN 15173 MORAN STREET WESTMINSTER, CA 92683 (714) 893-8311

Hobby Horn now has the Hal Osborne collection . . . a great variety of planes in many different sizes, and every time *Scale R/C Modeler* runs a reprint of a Hal Osborne plan, we're flooded with calls and letters from interested modelers. Their drawings are extremely precise and well done.

24 *scale r/c modeler*

CLEVELAND MODEL AND SUPPLY CO.

This company is the veritable grandfather of the scale modeling plans firms. Ed Packard has been in the business since 1919, and he has the largest number of unusual plans of any firm around. Ed has enlarged to giant size many of his plans . . . some are rubber scale, and others are scale free flight, but they can all be converted to R/C scale without any problem. If you're looking for a certain unusual aircraft, and haven't been able to find it anywhere else, Cleveland will probably have it for you. We suggest you send for a catalog in which all of their planes are illustrated.

GOLDEN ERA MODEL SERVICE ROUTE 3, BOX 158 WOODLAND, CALIFORNIA (916) 662-3698

Golden Era is a relatively new plans firm with only four listings at this time . . . but those are *excellent* . . . Jim MacDonald's Aeronica LC and Vickers "Jockey," John Eaton's lightweight "Cub," and Colonel Bob Thacker's SAAB 37 "Viggen" Fan Jet. Regular readers of *Scale R/C Modeler* will recall seeing these plans featured in recent issues.

SIMCOE R/C AIRCRAFT MFGS. 614 S. COLUMBUS GOLDENDALE, WA 98620

Simcoe has purchased the Scratch-A-Plane firm, and is now marketing these plans plus some *new* additions. The Cessna MW-1 (seen in this issue) is only one sample of John Kusky's wares. These plans are very professionally printed, and are inked on mylar for the original, with all plans shipped rolled neatly. Simcoe offers not only plans, but also partial kits, accessories, cowls, etc., for the plans which they market. Just give John a call and tell him what you need . . . they have a good three-color brochure listing all their planes and their prices.

SCALE MODEL RESEARCH 418 E. OCEANFRONT S. NEWPORT BEACH, CA 92661

This company boasts the KOKU Japanese fan collection with its exact-scale outlines and details. Bob Banka, owner of Scale Model Research, also has a large collection of color photos gathered from all over the world by professional photographers. *Scale R/C Modeler* often calls upon Bob for assistance with photos of desired aircraft.

SCALE PLANS AND PHOTO SERVICE 3209 MADISON GREENSBURG, NC 27403 (919) 292-5239

These people have *over 1500* photo packs, and offer plans enlarging services.

MIKE BEAULIEU'S PLAN SERVICE 84 UNIVERSITY ST. PRESQUE ISLE, MAINE 04769 (207) 768-3471

Mike Beaulieu's plans are well known to readers of *Scale R/C Modeler*, as they've been features for the past several years, in fact, Mike's plan for the Fokker D XXI by Tim Farrell appeared in our last issue, and *all* of Mike's plans are very carefully checked over by the builder before they're released in order to assure their accuracy.

W.E. TECHNICAL SERVICES P.O. BOX 76884-A ATLANTA, GEORGIA 30328

This firm is well known to long-time modelers as the founder of those wonderful Berkley Models, since sold to SIG Models. Many of the Berkley designs are still flying today under other banners. Bill Effinger is a draftsman, and he prides himself on continuously up-dating his plans through the input from interested modelers. His plans are blueprint copies, done with pencil so that changes can constantly be made to the existing drawings. (This should present no problem whatever to the builder.) Bill has compiled an extensive collection of unusual R/C ships, and he'll send you a list for only \$1.00. (My first successful R/C



Vol. 12/1



Vol. 12/2



Vol. 12/3

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TOM THUMB SKY TRACINGS
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Tom House, owner of Tom Thumb Sky Tracings, has three plans which are all quarter-scale and very well

executed. Regular *Scale R/C Modeler* readers know about Tom's Monocoupe 90 AL plans, and those for the Single-Hole Peitenpol, and Tom also has a Two-Hole Pitts which is very well designed.

DOUG MacBRIEN
29 TRUBY STREET
GRANBY, MA 01033

Doug has the gigantic Vought Kingfisher which was featured several issues ago in *Scale R/C Modeler*, and these plans are very complete. Contact Doug for details.

What can you expect for your money? Well, I think that most modelers are interested in *VARIETY*. Many manufacturers put out very good scale kits, but because tooling up for a kit, and printing up boxes for it, etc. are all such an expensive proposition, those kit manufacturers have to make sure that there's a viable market out there before they'll go to all that investment . . . in fact, most large firms do extensive marketing research to try to find out just which kit stands the best chance of being successful. And that's undoubtedly why you see so many look-alike .40-size trainers and Cubs and Mustangs. And that's probably why many model firms only bring out a new scale kit *every other* year or so. So . . . what do you do if you want to build a *very* different scale model . . . one which you won't see at every meet? You research the plans services for one which is just the *right one for you!* As we mentioned earlier, some of these plans companies even have corresponding cowls and other parts to make the

airplane you're scratchbuilding easier to finish.

Prices of plans vary from \$20.00 . . . up to \$50.00 for a 1/4 scale size set. Some have more detailed instructions on the plans than others. Ask around, and look at someone else's plans to see if you like the style in which the plans are printed. They range from professional press printing, to blueprinting of pencil drawings. *How* they're drawn doesn't make as much difference as its *detail*, and the *accuracy* with which they're drawn.

The Experimental Aircraft Association has a pretty good rule of thumb. . . . Don't buy plans for an aircraft unless there's a full-size plane flying around, with at least 100 hours on it." A plan may look good on paper, and the model may build easily, but when you firewall the throttle . . . you'd better hope that it's a good design.

If any of our readers has had experience with a plans service, either good or not so good, and they'd like to tell us about it, we'd certainly welcome you to write to us so that we might evaluate the information and see if we can help. We've had only *good* dealings with Bob Holman, Bill Effinger, Bob Banka, John Kusky, Tom Houle, Doug MacBrien, John Eaton and Mike Beaulieu, and these folks all put out very good to excellent quality products. While we've not yet had personal contact with the other firms mentioned here, neither have we ever heard anything negative about their products or business dealings.

So, keep us posted . . . we need your feed-back!

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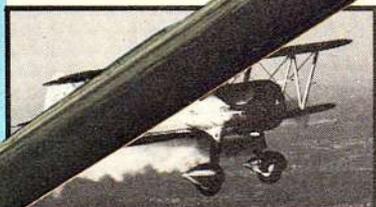
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These two racing versions were photographed at the QSAA Meet, and are from a proposed kit from Consolidated. Joe Zimmerman says that the P-39 is a real sweet model to fly.

BELL'S P-39 The Dainty Little "IRON DOG"

**The Much-Maligned Flying Cannon Was The
Most Advanced Fighter Of World War II.
But It Didn't Live Up To Its Press Releases.**

By Roger Edwards

How did such a pretty, dainty little fighter get labeled with the less-than-complimentary nickname of "Iron Dog?"

Well, you could say that the pilots who flew them, and fought with them would have preferred a *different* aircraft. When Bell Aircraft in Buffalo, New York, was started in July of 1935, its founder, Lawrence D. Bell, and the several other former Consolidated Aircraft employees there, elected to remain in Buffalo rather than move to sunny Califor-

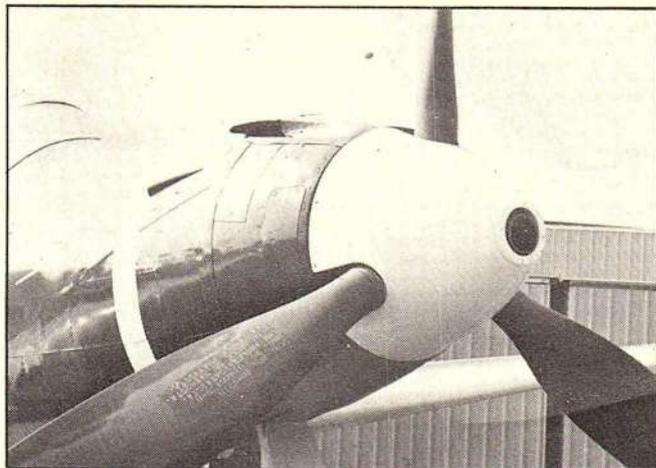
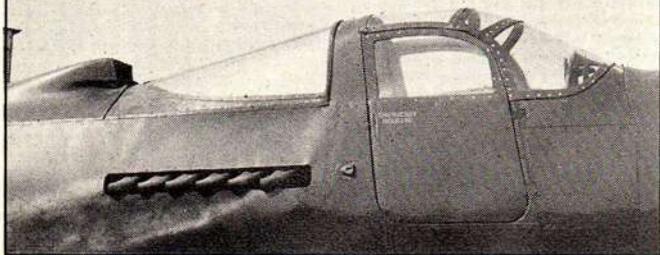
nia. The new company made mistakes, but in all fairness to the Bell folks, the input which they were receiving from the Army was not very much on target, for example, in the instance of eliminating the supercharger from the Allison V1-1710 engine.

In some circles, the P-39 was also called the Flying Cannon because it was built around the requirement to have cannon installed and firing through the prop shaft.

Armament for the first Cobra was

the Oldsmobile 37mm cannon with 20 rounds in its magazine, flanked with two .50 caliber guns, synchronized to fire up to 400 rounds apiece. Empty weight was 3995 pounds, and gross weight, 5550 pounds. At gross; she could hit 390 mph at 20,000 feet, reaching that level in five minutes. But when the Army ordered the supercharger removed, these specs fell apart. At one time, Bell wanted to add a gasoline-fueled, liquid oxygen auxiliary rocket in the aft fuselage which would burn for two min-

The auto-type door, exhaust stacks, and engine cooling inlet are evident in this right side view. The P-39 even had roll-down windows.



The business end of the bird. Hole in the middle of the spinner is for the 37mm cannon. Top holes are for twin 50s.

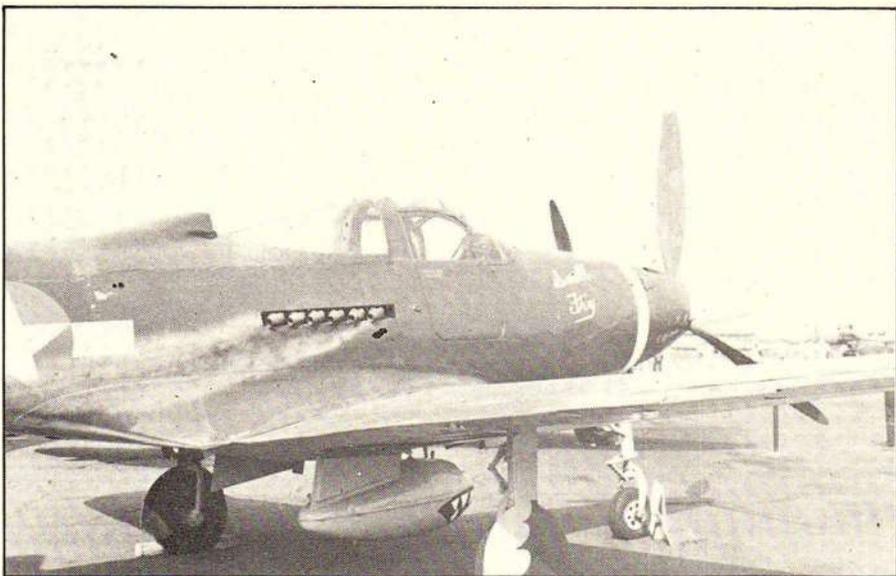
utes and thus boost the rate-of-climb to 7500 feet per minute. The Army declined the proposal.

Then the forward fuselage was strengthened with two aluminum box beams to provide the necessary rigidity to keep the long extension shaft, which extended from the mid-ship-mounted engine to the three-bladed prop, from flexing.

All of the bearings and universal joints under the pilot's seat gave off an awesome whine, and many a pilot had secret doubts as to whether he'd return home with his manhood intact.

It was the original flying "brick outhouse." When the test model took to the skies in April of 1938, many first-event-of-its-kind records were made . . . first cannon firing through the prop shaft . . . first mid-mounted engine . . . first tricycle gear . . . first bubble canopy . . . first car-type door for easier access to the cockpit . . . first car-type, roll-up windows for ample cockpit ventilation, among the many.

The aircraft had performed spectacularly at the Army Air Corps Trials, but no one mentioned the fact that neither offensive or protective armament had been installed yet. In other words, because of its light weight without any armament, the "Aluminum Gazelle" became an "Iron Dog" after all the guns, cannon, ammunition and armor plating were installed. But, because at this time in our country's history, fighter planes were in very short supply and time was at a premium, questions were never raised under certain testing conditions, or backs were turned. The British were desperate for fighters, so they bought a batch of P-39s, but soon after the planes were put into service in England, the first group met with disasters of several kinds . . . most of them crashed with heavy loss of British pilots . . . mechanics couldn't service them



This rear quarter shot shows gear doors and aux. tank. This hard point was also used for a 500-lb. bomb. The Iron Dog made a very respectable dive bomber.

properly . . . and those models had a bad habit of getting into dangerous flat spins from which their pilots could not recover. And, at altitudes above 25,000 feet, the lubricants froze, making the guns, oil-cooler doors and landing gear functions unreliable. The aptly-named P-39D (for Dog) was withdrawn from British service and replaced with Spitfires.

Undaunted, the U.S. Army stuck to its guns, and supplied several of our squadrons with Cobras . . . employing them for ground attack, and, with the aircraft's massive center-line firepower, it made a very efficient tank and train destroyer. Because its center of gravity carried most of the weight, the plane could literally turn in its own length. The P-39 was also a stable gun platform, making it an efficient dive bomber, in spite of the fact that its mixed armament was a nightmare to deal with, as the cannon, the two calibers of machine guns all had different

ranges and trajectories . . . bore-sighting for converging fire was almost impossible. This aircraft would have been a natural for computer-controlled firepower, but unfortunately, computers had not been invented yet.

Regardless of the rosy press releases by both Bell and the Army, Bell's "Wonder Fighter" fell far short of everyone's expectations. When, on December 7, 1941, America ran out of options, it had to go with the P-39, in spite of all its imperfections. The Army had assigned the Bell to three pursuit squadrons, one based at Mitchell Field for the defense of New York, the 16th Squadron based in the Panama Canal Zone, and one to the 31st Squadron based in Baer Field, Indiana. When the dash D was introduced, the finalized form of

the P-39 was established. It was powered by an Allison V-1710-59 with automatic boost, one 37mm T-9 cannon firing through the hollow prop hub, two .50-caliber guns in the nose, and two .30-caliber guns in each outer wing panel. In addition, a center-line rack permitted the Bell to carry either a 500-pound bomb or a 170-gallon fuel tank. A small fillet was also added to the vertical stabilizer for better lateral stability.

During the early months of the war, the Airacobra was used extensively in the Pacific and the Aleutians. Pilots in those locations soon learned of both, the good, and the bad qualities of their airplanes. They were great as ground-support aircraft, and packed a mighty wallop if they could fly close enough to score a hit on the Japanese fighters. Their usual technique was to dive through a formation with guns blazing, then continue diving to elude the enemy. The heavy P-39 could easily out-dive their adversaries, and no matter how much the "Iron Dog" was maligned, it certainly was **STRONG!** The pilots in the Aleutians were plagued by the problems caused by the extremely cold weather, especially by the lack of heat in the cockpit of their airplane. With the engine mounted in the rear of the craft, they were even denied any small amount of residual heat which might have seeped back from a front-placed power source. All that managed to find its way into the cockpit was bitter cold and lots of water. In spite of all its problems, the P-39 was used up until 1947, with many of our allies, including Russia, obtaining over 5,000 of the Iron Dogs. The



The sleek lines of the P-39 are evident in this photo of a restored N Model. The photos of the full-scale ship are

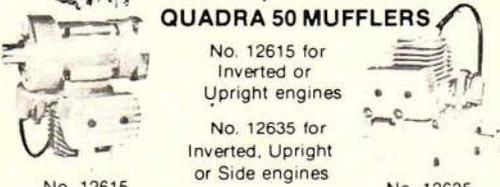
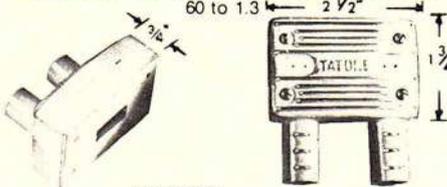
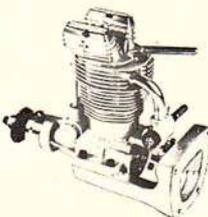
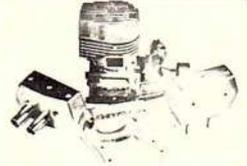
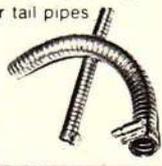
courtesy of Bob Banka of Scale Model Research, 418 E. Oceanfront "B," Newport Beach, California 92661.

Russians called them the "Little Shaver," Russian slang for ground-attack-missions. In actuality, the Soviet Union received over half of all the P-39s ever built. Most of these ships were ferried directly from Buffalo, New York, via the Bering Strait, directly to Russia. It seems that, even *forty* years ago, the Kremlin insisted on keeping outsiders away from Russia to be sure that they couldn't possibly see anything which might endanger the USSR's interests.

The last production model of the Iron Dog was the P-39Q, of which 4,905 were produced. Even the U.S. Navy purchased some Airacobras . . . these had been modified to conventional gear because, at that time, the Navy did not consider the original iricycle landing gear suitable for carrier operations. Unfortunately, or fortunately, the prototype suffered serious landing gear problems in

their carrier qualification tests, and therefore the Navy did not wait for the problems to be resolved as their new Hellcats and Corsairs were beginning to arrive into inventory. Sadly, one lone Bonita now lies on the banks of the Patuxent River, waiting for someone with enough interest, time, and money to rebuild this unique aircraft.

The end of hostilities did not mean the end of the Airacobra, because racing enthusiasts saw the sleek little bird as a natural air-racer. So in 1946, three Airacobras were entered in the closed-course, unlimited air races at Cleveland, Ohio. During the pre-race trials, Jack Woolams' red-and-black P-39 Cobra I, the NX-92847, spun out of control and crashed into Lake Ontario, killing its pilot. The cause of the accident was never positively identified, but it's believed that when a lighter-weight wind-screen was substituted for the heavy

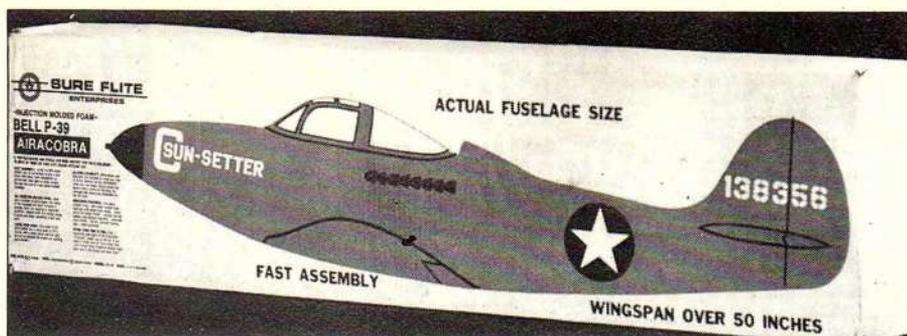
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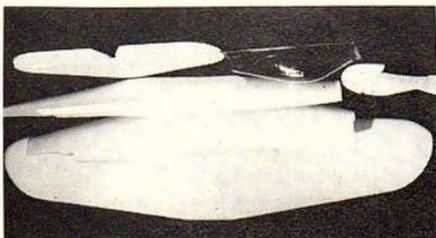
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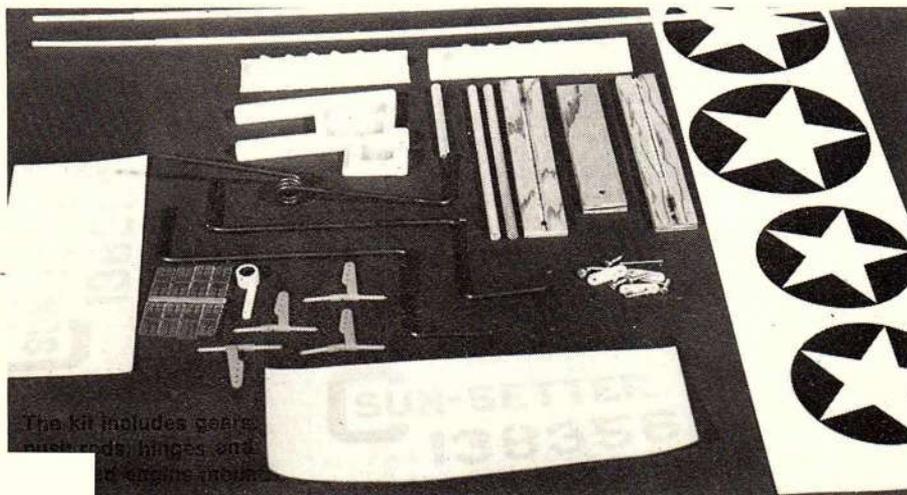
The Sure Flite Kit of the P-39 has been around for years, and is one of the better-flying low wings in the series.



bullet-proof glass one, the air pressures of the high-speed racing caused the canopy to collapse onto the pilot.

The airframe of the Cobra II had been strengthened with stringers along its fuselage, and, in spite of this precautionary measure, a side

All components are molded expanded foam and are easily covered, assembled and flown. Foam is also easy to repair in the field. The best part? Under \$50.00 for a good scale kit.



window on Jack Demming's aircraft failed, but he was able to land safely.

The big race of the event was the Thompson Trophy on Labor Day of 1946. Tex Johnson piloted his yellow and black Cobra II around the thirty-mile course for ten laps at an average speed of 373.908. This was the first time that *any* Bell P-39 ever finished among the winners, as the heavy iron of the later races proved too much of a challenge for the Iron Dog from Buffalo, New York.

Today, the Airacobra and its larger-engined sister, the P-63 Kingcobra, are very much in demand by Warbird collectors. In my opinion, it is by far the prettiest aircraft produced by any nation during World War Two.

For years now, the P-39 has been available in kit form from several companies. The most popular has been Top Flight's model, and those who have flown this version, all attest to its flying qualities. As the quarter-scale meets on the west coast, two large P-39s, painted as Cobra I and Cobra II of the Cleveland Races have been seen. Joe Zimmerman, of Consolidated Products in Seal Beach, California, will be kitting a fiberglass-fuselage, foam-wing version of these aircraft in the near future.

The kit in this review has been around for years, and is available at a surprisingly low cost . . . the Sure Flite Airacobra. This all-injection-foam ship is a natural for a first-time scale project. It is so stable that it can be flown on three channels. The layout is ideal for a simple-to-fly model. Good dihedral,

(Continued on page 70)

Left - **ATLAS 25** c.c. Mercurio (1.5 cu.in.) 2 cycle, glow plug, 2 HP, weight 2.2 lbs.

Center - **ATLAS 50 G.** (2.8 cu. in.) 2 cycle, glow plug, 4.9 HP, weight 4.25 lbs.

Right - **DART 46** Reed Valve (2.8 cu. in.) 2 cycle, glow plug, 5 HP, weight 4.12 lbs.

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THE 1/8 AIR FORCE 19th BIANNUAL SCALE R/C FLY-IN

**Outstanding Planes, Flying And Weather Make
For A Super Successful Meet**

By Robert Celeste

Pilots came from thousands of miles away . . . Colorado, Illinois, Texas, New Mexico, Nevada, Utah, and of course, Northern and Southern California to the beautifully prepared field of their hosts . . . the AMPS, the Arizona Model Pilots Society.

Each year, the Civil Air Patrol gives out an independent award to the aircraft which their judges rate as best, in the calls. This year's winner: Frank Gray and Jerry Pitzel's gorgeous Byron Mustang modified to the Reno Air Race Winner, "Dago

Red." The model was flown by veteran R/C pilot Jerry Kitchen, but minor gear and drive problems prevented it from achieving its fullest potential. ("Dago Red" is explored in detail elsewhere in this same issue.)

The same team of Gray, Pitzel and Kitchen blew the socks off the spectators with another Byron Model, this one a Quad 50-powered stock Staggerwing Beech. This large-scale aircraft is a tremendous aerobatic flier and sure looks great with its gear up and the two sets of wings flashing through its maneuvers. I'll bet this sight caused more than one modeler who witnessed it to call in

an order to Byron the next morning. Sure is a great combination . . . the Beech Staggerwing and the Quadra 50! The plane did Lomcevaks and even knife edges. Kitchen is a terrific show pilot! The team won "Best General Aviation" Award with this aircraft.

"Best Jet Flight" Award was won by Guy Laine with his Byron F-16 done in U.S. Air Force Airshow Team Thunderbirds colors. Guy flew the Falcon very realistically, and showed its low-speed handling capabilities (which are shared by both the model *and* its full-scale counterpart).

The tongue-in-cheek award for "Best Infidelity To Scale" was awarded to Glen Overlander with his Goldberg Skylane. Actually, the judges readily admitted that the Cessna 182 by Carl's Boys is really a good-looking scale ship, but they

This Byron Originals "Staggerwing" Beech put on an aerobatic show that would make the pattern boys green with envy. Owned by Frank Gray, Jerry Pitzel and flown by Jerry Kitchen, the plane and pilot easily won "Best General Aviation" Award.



The Curtiss "Helldiver" is not an often-modeled bird. This one by Bill Miksel from South Elgin, Illinois features all working flaps, canopies and dive brakes and is powered with an OS 108.





The Grumman "Wildcat" built by Eldon Wilson of San Angelo, Texas, features his own-designed-and built scale retracts. Eldon won the "Gray Eagle" Award for the third year and finally retired it. The oldest contestant entered, he did the flying himself. The "Hellcat" in the photo is by "Mr. Hellcat" himself, Rick Meyers of Hollister, California. Rick LOVES Hellcats, and builds only that big Grumman fighter.



Dan Parson's DeHavilland "Hornet" is a flying fool. It grooves, and those twin engines, screaming, coming out of the 100 mph PLUS dive, are something to hear. Scale R/C Modeler will feature the plans in an upcoming issue.



Don Lien and Mike Mann had their new FW-109 on display . . . it's a pretty one. Both the short-nose and the long-nose models are available. Glass-work is especially good.

GRUMMAN F6F HELLCAT

"Make It Strong, Make It Simple, Make It Work" Grumman's Design Philosophy

By Norm Goyer

Plans by Brian Taylor and 3-Views by Al Bentley via
Bob Holman Plans

Full Scale Photos by Mike O'Leary, *Air Classics*



When Pearl Harbor was attacked in 1941, the Grumman Wildcat was then the most modern naval fighter aircraft in operation. It was a slow, strong, slightly-obsolete mid-thirties design which was found to be in no way a match for the superbly-engineered Zeros which could literally fly circles around them. Had the Wildcat pilots not been the superior fliers they were, they would not have survived those encounters with the sleek Zeros.

With these facts firmly in mind, back in Bethpage, Long Island, William T. Schwendler, Grumman's Chief Engineer, was perfecting their *new* fighter, the Hellcat. The goal? Make the aircraft superior to the Zero in *all* aspects including fire-power, climbing ability, maneuverability, ease of flight, forgiving for the new "green" Navy pilots, and above all, reliable enough to be able to take the punishment of combat and come back to fight the next day, *and* the next. Grumman called this the "Schwendler Principal" . . . design every part to be strong enough to do its intended job, then *double* its strength. With this tremendous safety factor, all of Grumman's fighters easily passed the Navy's stringent tests . . . as it was, the Hellcat surpassed all of the initial design parameters by a wide margin. A big bonus was that the Hellcat was easy to produce.

In actual combat, Navy pilots found the Hellcat to be a stable gun

platform, easy to aim and keep control of while on target . . . a very forgiving aircraft which was easy to fight with. The Hellcat's ability to take punishment was legend in the fleet. It also proved to be the most reliable of any of the Navy fighters . . . an unbelievable 90 percent to 95 percent of all Hellcats remained operational, ready for instant combat . . . a record which, to this day, has never been equaled by any other naval aircraft.

If you were to ask someone in the know if there was *one* airplane which could be credited with winning the war in the Pacific, chances are very good that your answer would be: "The Hellcat." Although six different models of Hellcats were developed by Grumman, only two of them reached the production lines . . . the F6F-3 and the F6F-5.

All Hellcats had the typical Grumman shape . . . chunky fuselage lines, medium aspect ratio of the tail feathers, no-frills tapered wings with square tips, and a distinctive "double-chin" style cowling which held an extra-large airscoop for super-efficient engine cooling. To complete this unusual Grumman design, a very high cockpit compartment gave the Hellcat a "humpback" effect when viewed from a side profile. This intentional placement of the cockpit put the pilot ten feet off the ground, giving him excellent forward visibility. And all of the Grumman aircraft featured cockpit-cage construction to keep the pilots alive in case of a

The "hump-back" look of the "Hellcat" is due to the high placement of the cockpit which sits ten feet off the ground, affording the pilot excellent

visibility. All Grumman aircraft were designed with the safety of the pilot uppermost in mind.



Taylor's plans are well known for their wealth of detail and exact scale outline. This modeler went all-out with skin and weathering detail.

minor crash or botched carrier landing . . . Leroy Grumman was a former test pilot, and he valued the life of every pilot who would fly a Grumman-designed aircraft.

While the Mustangs had elegant lines and the Spitfires had beautiful elliptical wings, the Hellcat, though not sleek and sexy, had strong, macho lines of functional, tough, geometrical shapes and were easier to build because of it. Pretty or not, according to each person's taste, the Hellcat worked so well that when the war ended, it had a "kill" ratio of 19 to 1, a record which has never been equaled.

Grumman's *Wildcat* had a wingspan of 38 feet; was 28 feet, 9 inches long; a wing area of 260 square feet; and was powered with a Pratt & Whitney 1200 hp engine. The *Hellcat* was a much *larger* aircraft, having a span of 42 feet, 10 inches; a length of 33 feet, 7 inches; and a height of 13 feet, 1 inch. Its powerplant was a double-row Wasp engine by Pratt & Whitney with a total takeoff power of 2000 hp and a cruising power of 1975 hp . . . just about *double* that of the *Wildcat*. Its armament was six .50-caliber Brown-



page, which is unfortunate because any full-scale aircraft which is a joy to fly usually makes a fine-flying model if the weight is kept within limits and a powerful, reliable, idling-capable engine is installed. Heavy, low-wing, fighter-type models will glide well and can be successfully landed dead-stick. Both full-size and model-size craft are much easier to

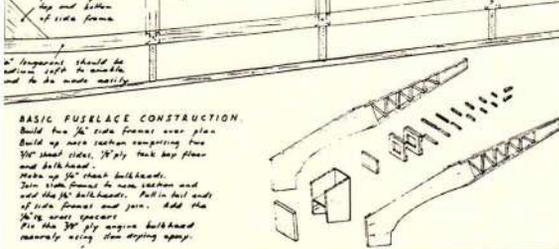
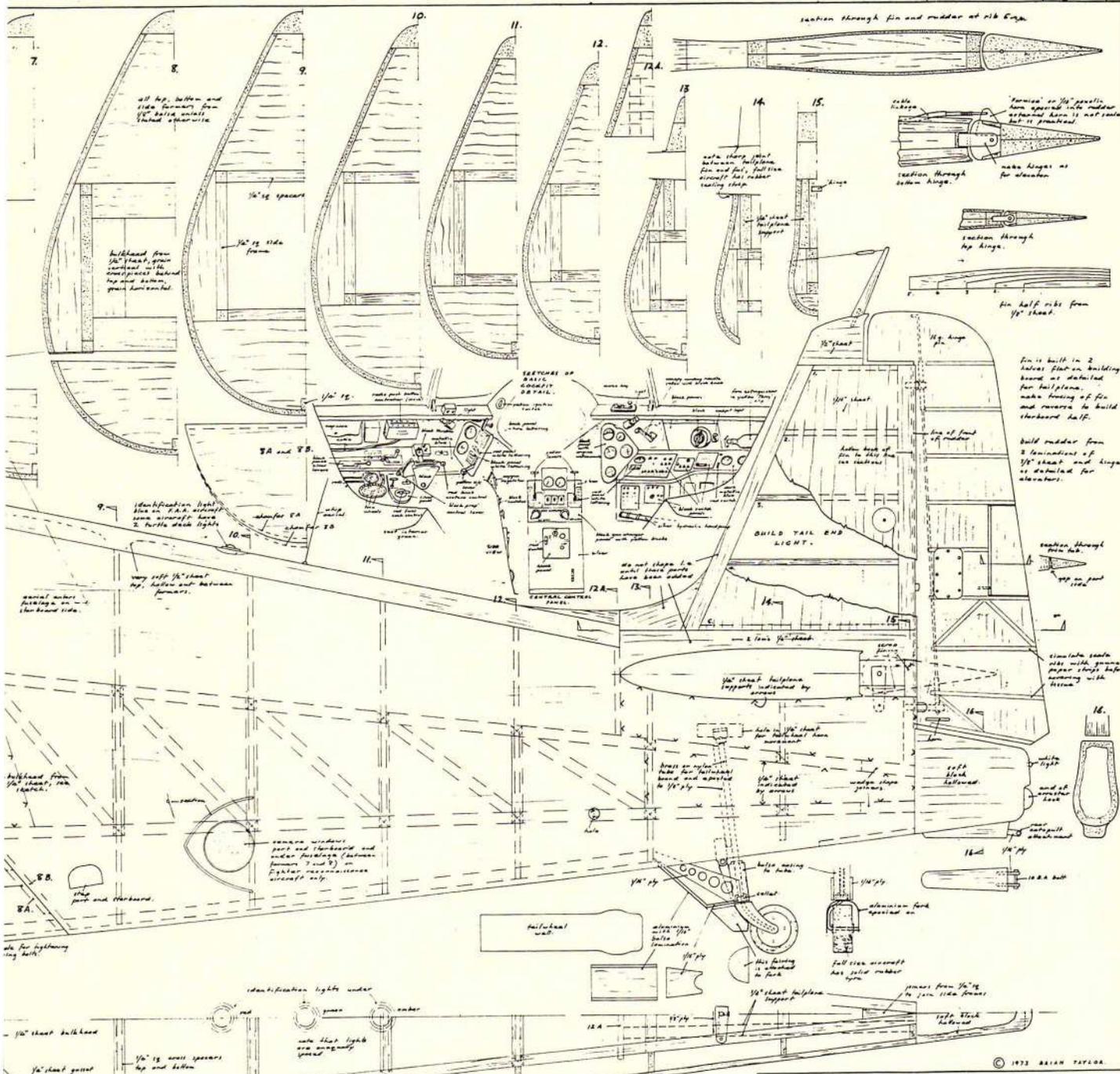
handle in an approach with 1/3 to 1/2 power, keeping the speed up and controlling air flowing over the tail surfaces.

JEMCO has had a 60-size Hellcat available for about fifteen years, but, in our opinion, it's a little small to get in all of the detail needed for a successful scale rendition.

Brian Taylor of England produced

excellent plans for a Hellcat about ten years ago, and they are now available from Bob Holman Plans of San Bernardino, California. Bob has the plans in stock, and he has also put together an excellent partial kit containing an excellent fiberglass fuselage, with a very strong cowling and belly pan also made from glass.

(Continued on page 81)



The prototype model weighed 25 lbs complete and balanced at the correct C.G. without ballast. All wood used is medium soft balsa unless stated otherwise.
 Recommended control surface servos with CG as indicated on diagram.
 Ailerons 1/8" up and down.
 Elevators 1/8" up and down.
 Rudder 1" up and down.

SCALE 1/8" = 1'0"
 SHEET 1 OF 3.
 FOR MULTI-CHANNEL RADIO & 10cc ENGINE.
 Grateful acknowledgment is given to the FLEET AIR ARM MUSEUM, at R.N.A.S. Yeovilton, Somerset, for permitting the measurement of their Hellcat.

CRUMMAN F6F-5

by Brian Taylor.

LIGHT-WEIGHT PIPER J-3 CONSTRUCTION ARTICLE AND FLYING TIPS, **Part II**

By John Eaton

At long last, the second half of the Cub tour. A few issues have passed since the first part but I can explain everything. First, however, I have a few things from the first installment to clear up. There was a lot of interest in the first article, most of it positive, but some people gently pointed out to me that I didn't bother to say what size the model is. The answer is 1/6 scale, with a span of 70.4 inches and 701.9 inches of wing area. I have two Cubs flying now which weigh 3.6 pounds and 4.8 pounds. Some people wanted to know the address of Aviation Publications,

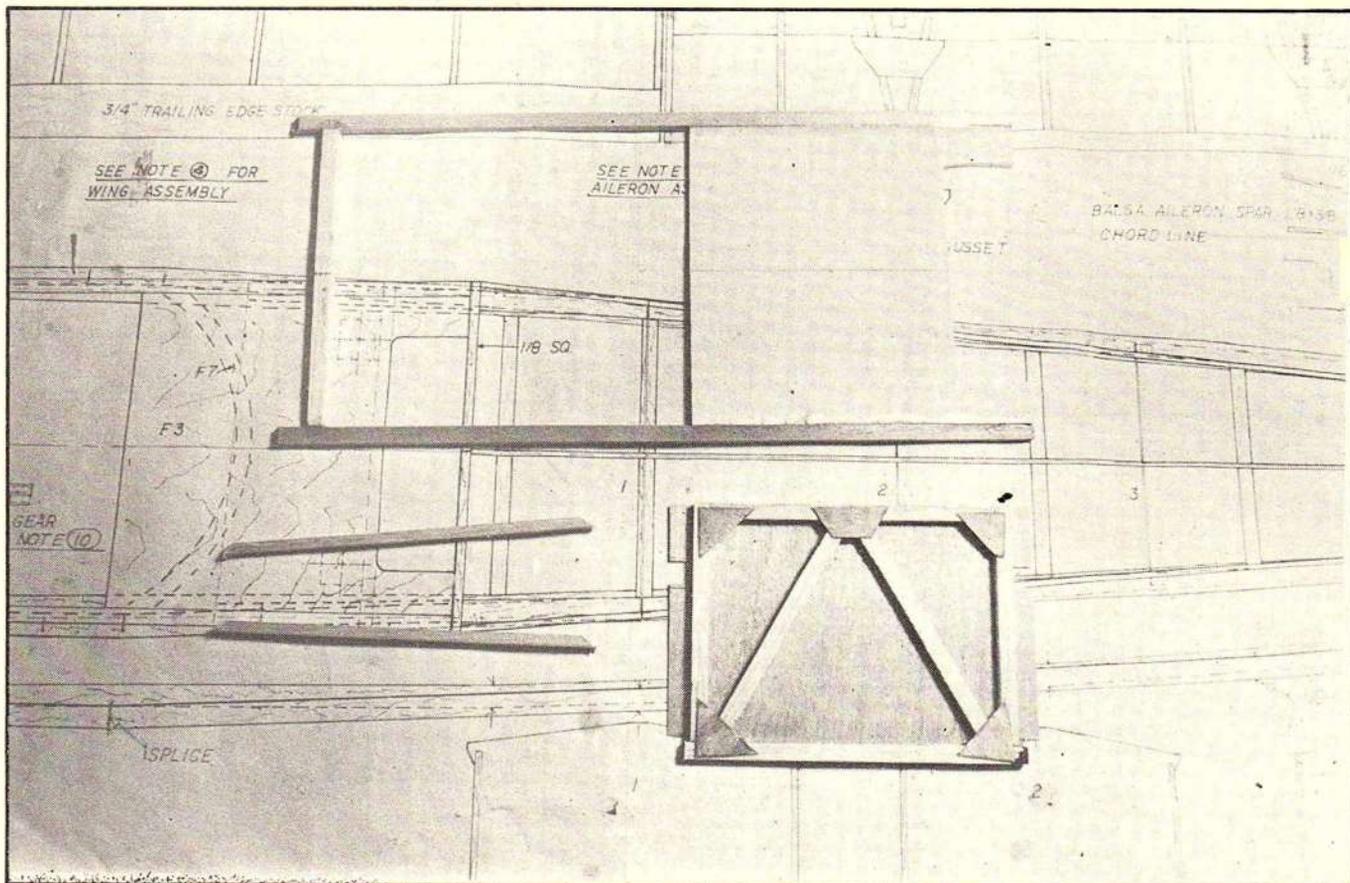
This Bulkhead F5 and upper cabin parts used for the electric fuselage.

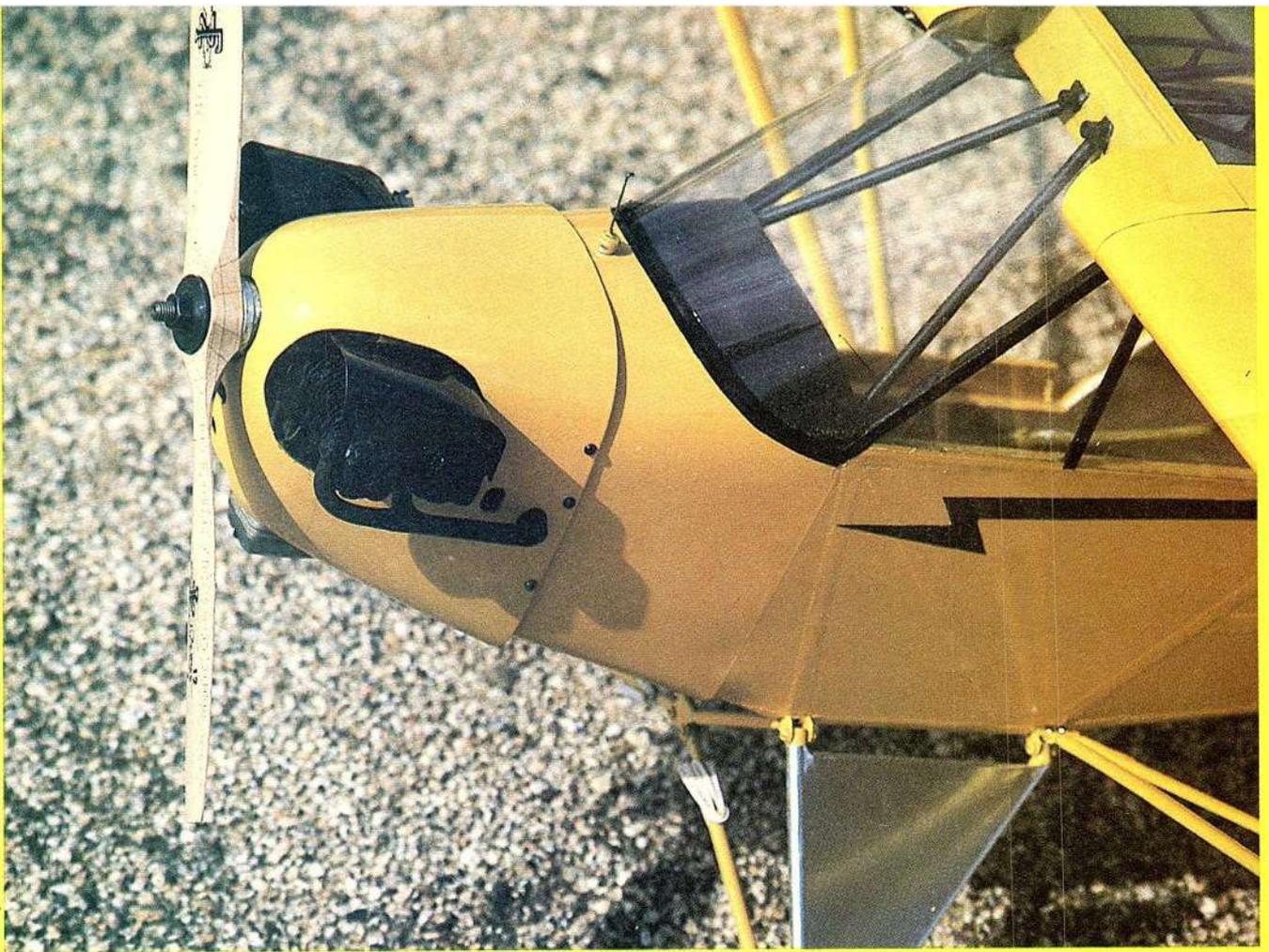
the Cub manual publishers. They are at P.O. Box 357, Appleton, Wisconsin 54912. As to the scale landing gear drawings, the text was a little unclear, however the drawings do say the landing gear is available separately. I apologize for the confusion but in my defense I would mention that all those people who have ordered plans also received seventeen pages of assembly notes and photos which I did not mention in the article, and drawings of a template for the boot cowl, rudder cable fittings, and aileron bellcrank fittings have been added to the plans.

One last item, and then I'll move on to the fun stuff. I said there would be a photo of the wing failure in the article. Well, there isn't. There is a photo of the test just prior to the failure, but I forgot to take the

picture of the break before I gave that airplane to Stan Lawrence, and he won't give it back. In any event the break was a little boring to look at, so I think it's no real loss.

As mentioned in the first article, the Cub fuselage started life as an open cockpit design, with a parasol wing. This leads to complications in the model because there isn't much structure to attach the main spar to using methods normally seen in models, unless you thicken up the window framing, spoiling the scale appearance. To get around this problem I used music wire, brass tubing and bolts to provide a cabane structure that has strength in tension and compression between the fuselage and the main spar. The bolts at the trailing edge of the wing tie into bulkheads and diagonal bracing that car-





John Eaton finished his J-3 model in the same colors and condition as the plane in which he solo-ed . . . one which has been in his family for many years. (Note the authentic silver gear fairings.)

The electric version did not have engine detailing on the cowling . . . a weight-saving effort which was used in other areas as well.



The 40-powered Cub performs scale aerobatics with ease.

ry the loads back down to the rear fuselage. This makes the wing center section a part of the fuselage framing. The rear fuselage upper stringers carry no loads. They only hold up the covering to fair in the rear fuselage behind the cockpit.

All of the fuselage sheeting is 1/64 plywood. This material weighs about the same as 1/16 balsa sheeting and is very strong. I have built an .049 powered pylon racer with a fuselage made entirely of this material and so far it has survived a midair, an impact with the far pylon, three dunkings in the lake, and numerous high energy unscheduled landings, all with no major repairs. 1/64 ply is a very durable material. It is also very easy to work with, as it cuts easily with scissors. No sanding is required, and it glues very well with CyA adhesives. The firewall attachment is a good example of how to build with 1/64 ply. Ply sheer plates fit on the fuselage longerons, above and below the fuselage framing, and these butt against the firewall, as do the 1/64 ply crutch sides that fit inside the fuselage side framing. A glue fillet is formed between these ply parts and the firewall. The boot cowl is next wrapped around the outside of the firewall and fuselage and is glued with CyA. This forms a box which is very strong and light. There are no firewall gussets. The boot cowl does that job, and the requirements of strength and scale appearance are satisfied in the same structure. No dead weight is added. The bulkhead behind the cockpit (F-5) is another way to use 1/64 ply, where a sandwich is formed by sheeting both sides of a balsa truss work. This structure is similar to honeycomb construction. The balsa truss keeps the ply from buckling under compression.

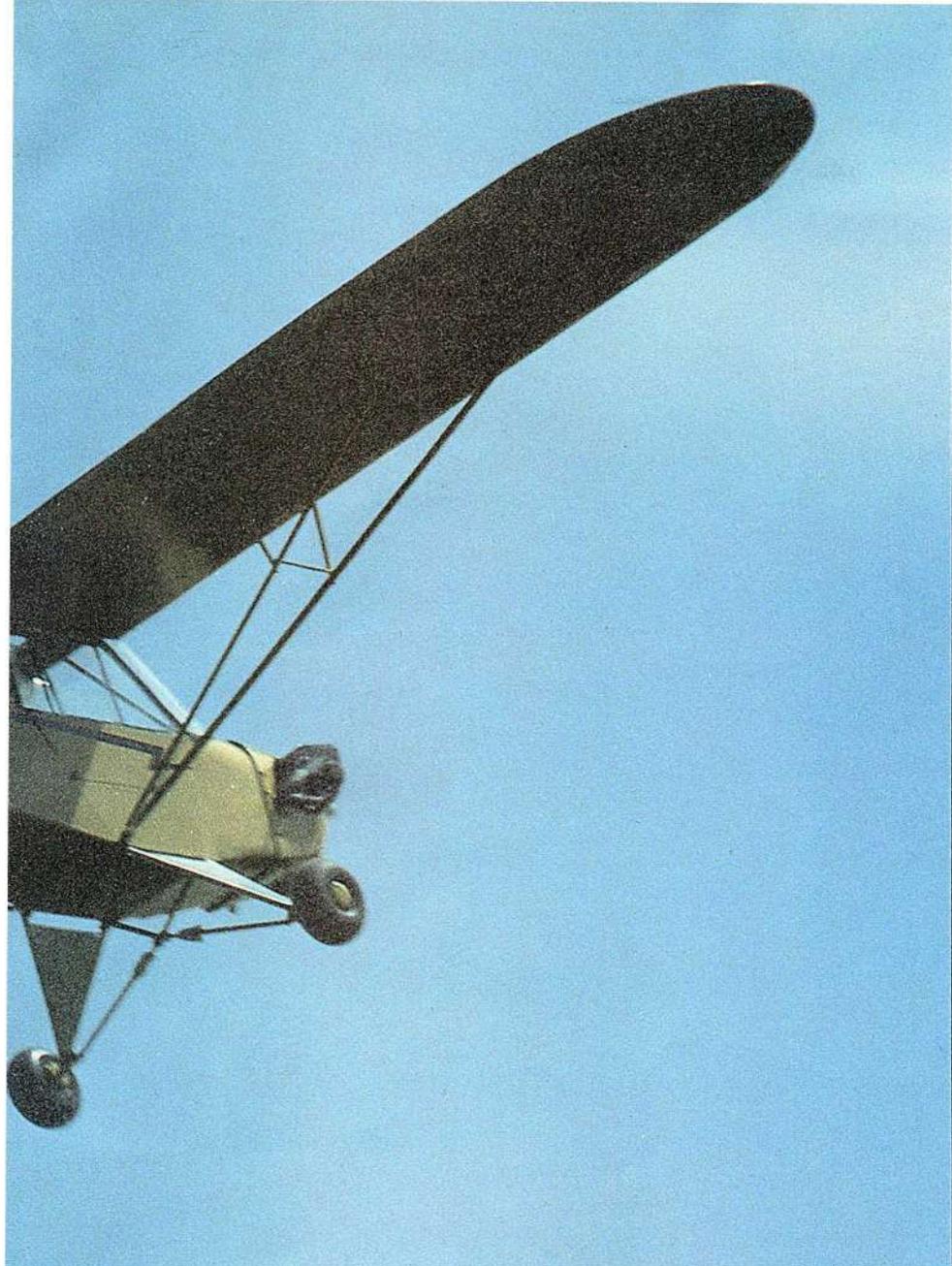
The 1/64 ply crutches and the baggage compartment shelf are also structural members that double as scale features, although for minimum weight you may want to cut out much of the crutch ply aft of the door frame on both sides and underneath, leaving only about 3/8-inch on each side of all balsa framing, as the center areas are lightly loaded. I did this on the electric version. 1/64 ply is also used to make the gussets for all fuselage crossmembers between the lower longerons, to improve the aft fuselage's ability to handle side loads. I believe that if you keep the glue joints from flexing in a "stick" type frame you can elim-

inate glue joint failures as the breaking forces will be spread through the entire joint and not concentrated at a single point as they can be if one side of the fuselage moves relative to the other. If a joint is made properly you should see some bending of the balsa crossmember parts before any breakage occurs. Perhaps the balsa will break some distance from the joint.

In a correctly designed steel tube fuselage no tubing is loaded from the side. The forces are always straight on, either pushing or pulling, never bending from the side. Much lighter tubing can be used with this type of design. Because models are often overbuilt to simplify construction (lower parts count) you frequently see this rule violated. Another example of overbuilding is when sheeting is used to replicate open framework construction. The

reason for sheeting a fuselage is not strength but to facilitate alignment during construction. In building a full size airplane a fixture called a jig is built. Once the fuselage is built it comes out of the fixture and the jig stays on the factory floor it is bolted to. So I ask you, if it doesn't make sense to fly a full size airplane with the jig still on board, why do we fly models that way where problems due to excess weight are even more certain to cause performance deterioration because of the lower Reynolds number we are forced to work with? In the case of an all metal airplane appearance may be the reason, but I think balsa sheet is not a very efficient material because its strength is undirectional, and it is not suited to stressed skin construction methods. Structure must be added to make it strong enough in all directions.





From a crashworthiness standpoint extra weight in the tail (or the wing tips) is especially bad. Essentially the more weight you add to make the airplane strong, the more you have to add weight to make the airplane strong. The heavier airplane will have to fly at a higher speed, and will therefore have more energy to dissipate when it hits the ground. You can see that ill effects are doubling up here. It is a no win situation. Another way to look at it is this: If all the weight of your airplane were concentrated in the firewall how far could you drop it without breaking it? Quite a distance and damage will be very slight because there is no secondary collision as there would be if weight were concentrated in the tail. Maneuverability is another good reason to keep excess weight out of the extremities of the airplane. If you want a scale model

to handle like its full size counterpart, mass must be concentrated in similar areas of the structure. In the Cub, for example, a typical loaded weight would be about 970 pounds with full fuel and a 180 pound pilot. The engine and propeller weigh about 160 pounds, the fuel 72 pounds. That means the rest of the airplane weighs only 535 pounds. A large part of that weight is in landing gear, seats, instruments, and cockpit area structure. One person can easily lift a complete covered wing panel when it is removed from the fuselage. Most of the mass of the airplane is concentrated in the cockpit area, not at the extremities. If you build a model Cub that has heavy wings and tail section parts, it will not fly like a Cub, even if it is very light overall. Control response will be slow because inertia effects will be too great. Since the Cub has a fairly slow roll

rate due to the long untapered wing, it may well be hard to get the airplane to roll well, and worse yet once it starts rolling the inertia will cause it to keep on rolling. In rough air stability will be reduced because dihedral effect will have less correcting ability, and pitch stability will suffer because the horizontal stabilizer will be overtaxed as well. These inertia-maneuverability relationships are why you don't see many successful fighters with wing mounted twin engines.

Those of you building electric Cubs will have no problem getting the mass concentrated in the cockpit, courtesy of the battery pack. I think that people who fly electric really think of airplanes mostly as things that are built to haul batteries around. I know I found myself thinking this way as I designed and flew the electric Cub. At the start of the project I knew nothing about electric models, and I did a fair amount of studying to make some sense out of all of it. You tend to become a technician, surrounded by digital VOMs and all sorts of wiring stuff. You will learn all about batteries, and duration becomes the central object in your life. You will be harassed because your airplane is too quiet, but the quietest time is when you taxi back after a dead stick landing. Then the only sound you hear is the silent gnashing of teeth from the stinkpot fliers.

The very low vibration levels of electric motors allow you to reduce weight, and the weight of the electric system forces you to keep weight down to get good flight performance. I reduced the structure of the Cub fuselage by changing all longerons to 3/16 square balsa, by going to one layer of 1/64 ply on F-5, and by substituting thinner plywood for the sheer plates behind the firewall. The bottom sheer plate is 1/64 ply with a big hole cut in it for the battery escape door. A battery escape system was recommended by Dwight Holley of Holley's Silent Flight in Connecticut, and I think it's a good idea. The system shown on the plans will accommodate up to fourteen 900 mah cells. On one occasion the system worked when I landed in the weeds short of the runway, out of power. I have made further requests of the battery escape system. When the batteries are out of gas, they are out of gas. It took me a while to get the hang of that. In normal conditions the battery pack is held back against a stop by a No. 64 rubber band. When the airplane stops too rapidly the battery pack slides for-

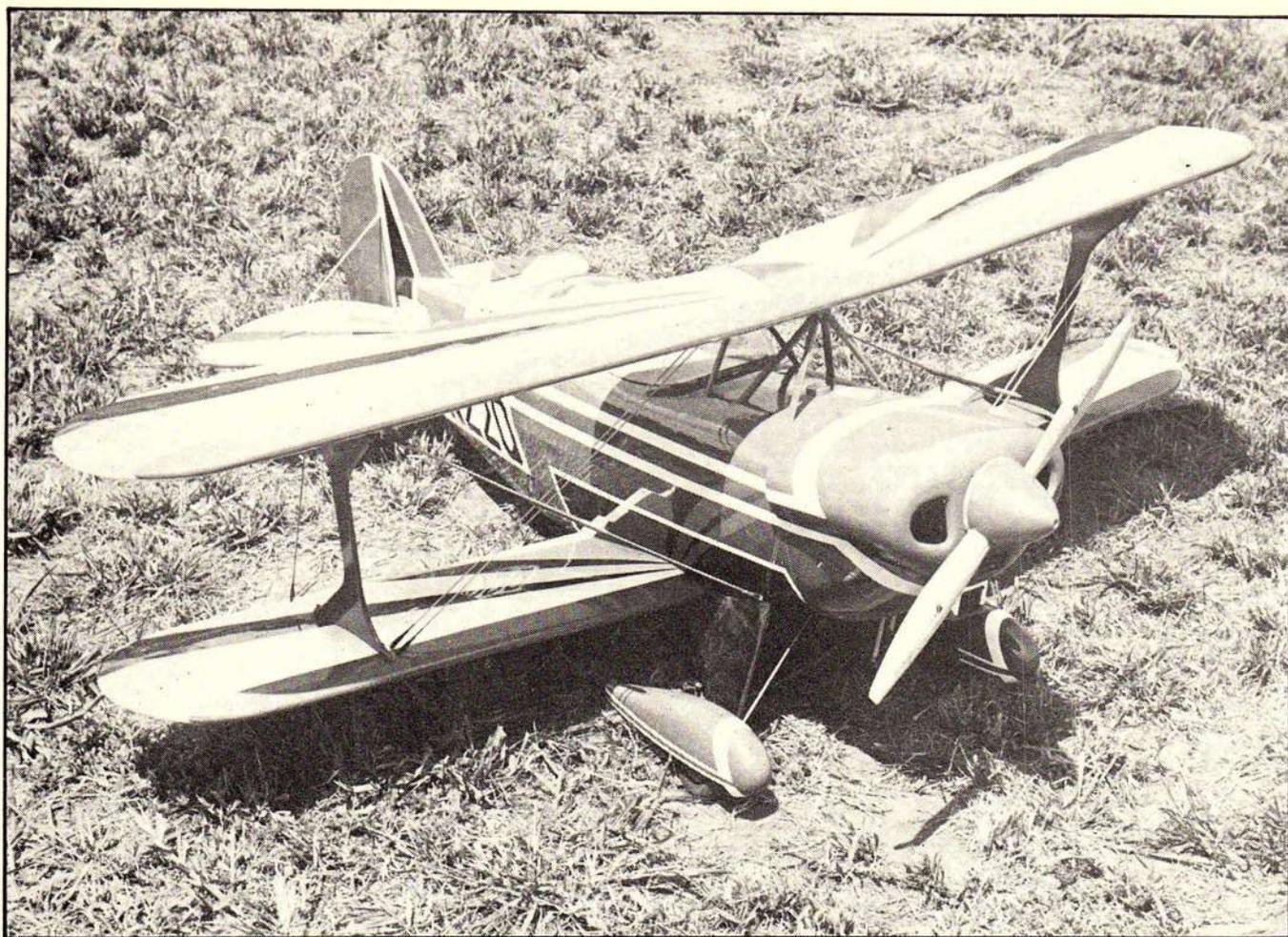
(Continued on page 54)

QUARTER-SCALE

PITTS

S2-A





Like Mustangs And Cubs, Modelers LOVE The Pitts. This One Is All Balsa, And Is A True 1/4 Scale Size

By Tom Houle

You'd think a body would tire of the Pitts Special after all these years. Yet every time I see one parked and looking like it's going 150 mph on the ground I get sorta glassy-eyed. A Pitts has the kind of lines (and performance) that you just never seem to get enough of.

The design was born in 1942 as a 55-hp single seater; the two-seat S-2A was conceived in 1964 by Curtiss Pitts. The first certified S-2 machine was christened "Big Stinker" after Betty Sketton's "Lil Stinker" of the early fifties. It made its debut as N22Q at the 1966 EAA Fly-In in Rockford. N22Q now resides at the EAA Museum in Oshkosh

where I shot about a hundred color prints to thoroughly document the red, black and white paint scheme—one of the most attractive Pitts color schemes I've seen.

Incidentally, for those who care about such things, the only difference between an S-2 and an S-2A is hp. The S-2 had a 180 hp Lycoming where as the S-2A has 200 ponies and a constant speed prop. N22Q is actually an S-2 but it's a moot point since the airframes are identical.

The upper wingspan is 20 feet and the lower span is 19 feet. In quarter scale this works out to a 60-inch span—small enough to fit most cars but large enough to fly like a real Pitts. Total wing area is 1,050 square inches with a flying weight of 16 lbs.

I used the comprehensive S-2A drawings published by M.A.P. in their September, 1974 issue of *Aeromodeller*. I highly recommend these

drawings as support data if you intend to do any contest work. Although we didn't do it, the drawings are complete enough to accurately detail both 'pits if you so desire. There are all kinds of color schemes you can do from all black to all red or white and everything in between—but for my money "Big Stinker" looks the best.

When I drew up the initial plans I intended to use the new Enya 1.20R four-stroke. We were shooting for 23-24 ounces/foot wing loading. We felt that the Enya with this loading would yield good vertical performance. We came in at 14.5 lbs. which increased the loading to 29 ounces/foot—marginal at best for the Enya. Structurally I tried to stay with simple construction techniques. The wings use balsa ribs, sheeting and spruce spars. In retrospect I'm convinced that you can use 1/4 sq. balsa in place of the spruce spars. The wings on our model are far stronger than they have to be. The D-tube sheeted leading edges really stiffen the wings negating the need for spruce. Both wings are built in one piece for strength and lightness and they are both easily removed. The model cartwheeled on one of its first landings with absolutely no damage

The prototype of the "Big Stinker" is located in the EAA Museum in Oshkosh, Wisconsin . . . a tribute to Curtiss Pitts and Betty Sketton.

The Planes of **JAMES R. BEDE**

Aviation Has Never Met An Entrepreneur Like James Bede . . . His Designs and Business Dealings Left A Permanent Mark On Private And General Aviation

By Norm Goyer/BD-4 Plans By William Wendt Plans
BD-5J Photo Courtesy Marc Jensen, BYRON ORIGINALS

James R. Bede graduated from Wichita State University with a degree in aeronautical engineering and began his career as a performance engineer with North American Aviation in Columbus, Ohio, working on F4J Jet Fighters. In 1960, James R. Bede, and his father, James A. Bede, formed Bede Aircraft, Incorporated, and the 26-year-old Bede was named President and Chief Engineer.

The first effort of the new corporation was the BD-1, a low-wing, single-engine, two-place sport plane, designed for mass production to keep the price low. This new BD was the first small aircraft *ever* to be bonded with high-strength structural epoxies which, up to that time, had only

been used on supersonic aircraft. Utilizing a fiberglass landing gear and many interchangeable parts such as tail fins, controls, wing flaps and ailerons for economy in manufacturing parts, the wings could be easily removed and folded for car-towing and storage in the family garage.

The BD-1 prototype was first flown in May of 1964 with the younger Bede as test pilot. The design was subsequently FAA certified, and produced as the American Yankee, and later the Grumman American. Neither plane, however, is in production any longer, but these aircraft are *still* much sought after for use as inexpensive trainers and efficient two-place transportation "scooters."

In subsequent years, Bede designed the BD-2, a single-place aircraft, for the purpose of making a proposed 25,000-mile around-the-world-nonstop flight. Jim never made that

long trip, but he did set three world endurance records on closed-course circuits in the United States.

Jim Bede then designed the BD-4, a two/or four-place Homebuilt aircraft featuring bolt-together construction with good performance figures and ease of handling.

Jim's next design was the BD-5, a revolutionary single-place aircraft, available in factory or Homebuilt models; variations of which included a turbo-jet-powered version and a long-winged glider.

Then came the BD-6, a single-place aircraft very similar to the BD-4.

After which came the BD-7, a four-place pusher plane with retractable gear which looks similar to that of the BD-5.

Unfortunately, the BD-5 proved the undoing of Bede Aircraft, Incorporated. Hundreds of plans for the

(Continued on page 56)

Only the absence of door hinges give away the fact that this is a model . . . very realistic looking.





Full-scale BD-5J as flown by Bob Bishop under Coors sponsorship. This one was photographed at Shafter, California in May, 1986.

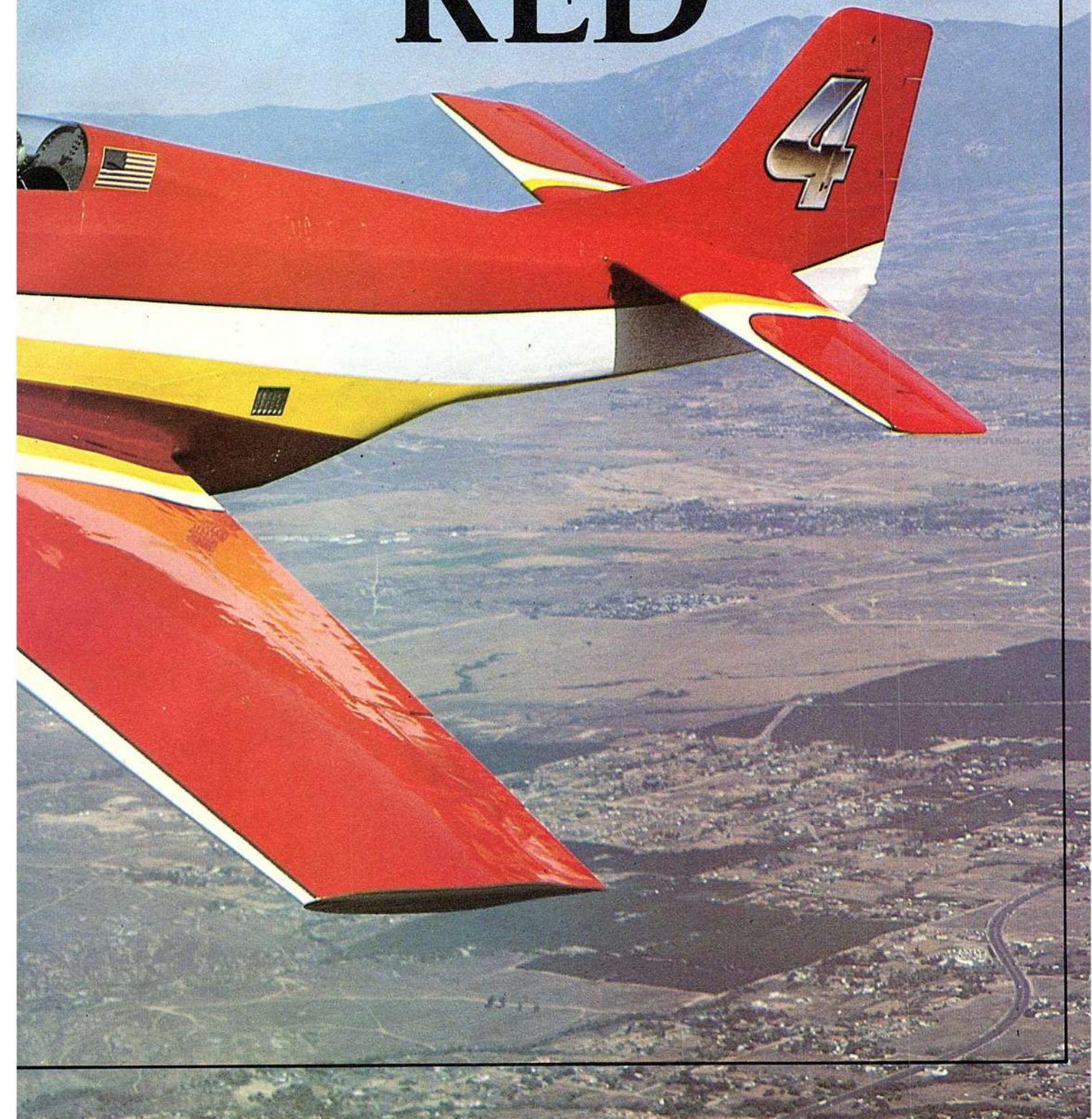


Kenny Bundt, from Byron Originals, holds the prototype for engine run-ups. Kenny says that the BD-5J looks and flies great.

INTRODUCING THE RENO AIR



RACES CHAMPIONSHIP RACER
“DAGO
RED”



Every detail of the racer's paint scheme was duplicated with hand-made decals via the photo process. Builders worked from the full-size aircraft based at the Chino Airport.



Frank Gray and Jerry Pitzel, members of the Quaker City R/C Club in Whittier, California, combined to produce this dramatic "Dago Red" Racer from a stock Byron Originals Mustang Kit.



"DAGO RED"

Two Enterprising Modelers Convert A Stock Byron Mustang To This Award-Winning P-51 Racer

By Norm Goyer, Frank Gray, Jerry Pitzel
Additional Photos by Michael O'Leary

When storm clouds started brewing over the world and international tensions slowly mounted in the late thirties, the popular sport of air racing was forced to take a hiatus, and the development of unlimited racing aircraft stopped for some time. Since then, very little effort has been directed to that purpose, and for a very good reason. With the coming and ending of World War Two, surplus military fighters in great numbers supplied a ready source of race-ready mounts. All you had to do was pay the surplus man, paint a number on the side of the aircraft, and you were a racer. The hotshots tried just about every fighter produced . . . some of them worked, some didn't.

Looking back among those aircraft, I remember the P-39 and the P-63 as slugs . . . they had racing lines, but didn't do too well. That is, except for one year when every other plane experienced mechanical failures of some kind or other, and the P-39s were the winners. And Corsairs didn't do that well either, until some savvy pilot/rebuilders started stuffing in "corn-cob" engines (four-row Prattis from C-124s which developed about 4,000 hp). Last year, when a re-worked "corn-cob"-engined Sea Fury developed problems, Steve Hinton, from Planes of Fame Air Museum, in Chino, California, running second, maneuvered right up and won first place.

You may remember when Steve, piloting the "Red Baron" Mustang, experienced engine problems, and the plane disintegrated when Steve crashed-landed the bird in the desert. Two facts emerged from that incident . . . 1) Steve is one great pilot! and 2) Boy, does he have guts!

It's been the Mustangs which have dominated unlimited racing for years, dating way back with the Paul Mantz "Special" in the late forties. In recent years, The Reno Air Races have

been seeing a parade of exquisitely-modified Mustang winners including "Dago Red," "Jeannie," "Strego," and "Stilletto." In the "beautiful" department I'd say that "Dago Red" is certainly right up there, with its red and yellow paint job and the chrome tips on its clipped wings!

In the R/C model arena, other than the stand-off scale Nosen, the largest kitted Mustang is the BYRON ORIGINALS. Now, scale modelers know that certain changes must be made to the BYRON Mustang to bring it into the winning static score range of 90. But the patented BYRO Drive will swing a *scale* four-bladed prop, and *that's very* important to scale modelers (and to scale judges).

Having seen the full scale "Dago Red" at a local airshow, Frank Grey and Jerry Pitzel, members of the Quaker City R/C Club of Whittier, California, decided to joint-venture an R/C model version. They went to Chino and photographed the full-size "Dago Red," purchased a BYRON ORIGINALS Mustang and BYRO Drive, then swapped the Quadra 35 for a Quadra 50. Now this necessitated some changes in the BYRO Drive in order to swing the four-bladed prop. But we'll let Jerry Pitzel tell the story:

"To convert the BYRON P-51 to a "Dago Red" version, there were some *major* changes in the design and outline we had to do to make it scale. First we had to straighten out the forward nose section to have flatter sides. We then had to modify the belly air scoop to bring it in line with the profile that "Dago Red" and other Mustangs have. We changed the tailfeathers to match the full scale version so that the judges would not mark us down for outline deviations. We also moved the landing gear forward to keep the ground contact geometry accurate. When "Dago Red" had been converted from a

stock P-51 fighter, they had removed 20 inches of wing on each side. This meant removing four inches from each wing in our 1/5th scale version. "Dago Red" also had under-cambered chromed wing tips which we duplicated with fiberglass. While we were experimenting with the tips, we also had a functional four-bladed prop chromed, and we fly the plane with it . . . it looks really great in the air too. We then tackled the aft fuselage where it had been cut down to accommodate the tiny canopy and lowered turtle deck. We made these corrections in balsa with glass covering. We used the aft end of the BYRON canopy *reversed* to get the proper canopy shape for our model. We also duplicated the exhaust system for that authentic look.

All changes were made *with constant reference* to the measurements and photos of the full scale ship. When the structure was all converted, the plane was masked and sprayed with Dupont two-part epoxy paint. The exact duplicated markings were applied to the aircraft using photographic techniques, with the exception of those on the left landing gear fairings, on which we named our own helpers and ground crew."

Was it worth it? . . . Just look at the crowds that this plane draws, compared with the attention to your basic stock Mustang. Even though they might be extremely well done, people are getting used to seeing the standard World War Two paint scheme on P-51s. Almost no one does modified racing versions, so the "Dago Red" really gets a lot of attention.

For their efforts, Jerry Pitzel and Frank Gray's gorgeous "Dago Red" was awarded the very prestigious Civilian Air Patrol's "Best Civilian Aircraft of 1986" Award at the 1/8 Air Force Fly-In in Phoenix, Arizona, this year.

Congratulations, Jerry and Frank!

PIPER J-3

(Continued from page 43)

ward, and the plywood bow raises the aluminum escape door. I mounted the Adams speed controller in the escape door so it gets good cooling but is moved up out of harm's way when the door opens up. The batteries also get some blast air through the door in flight although cooling is no problem with the cabin door open.

The wing structure is unchanged from the gas version. I covered both Cubs with Cub Yellow Colortex, which I like very much. In order to keep weight down I did not paint the electric airplane, and I built only a light cowl with no dummy cylinder detail. I used the wire landing gear detailed on the main plans. The basic fuselage structure weighs 9½ ounces versus 12½ for the other version. The airplane covered and ready to fly but less radio gear and all power components weighs 34 ounces. The radio equipment added 5½ ounces

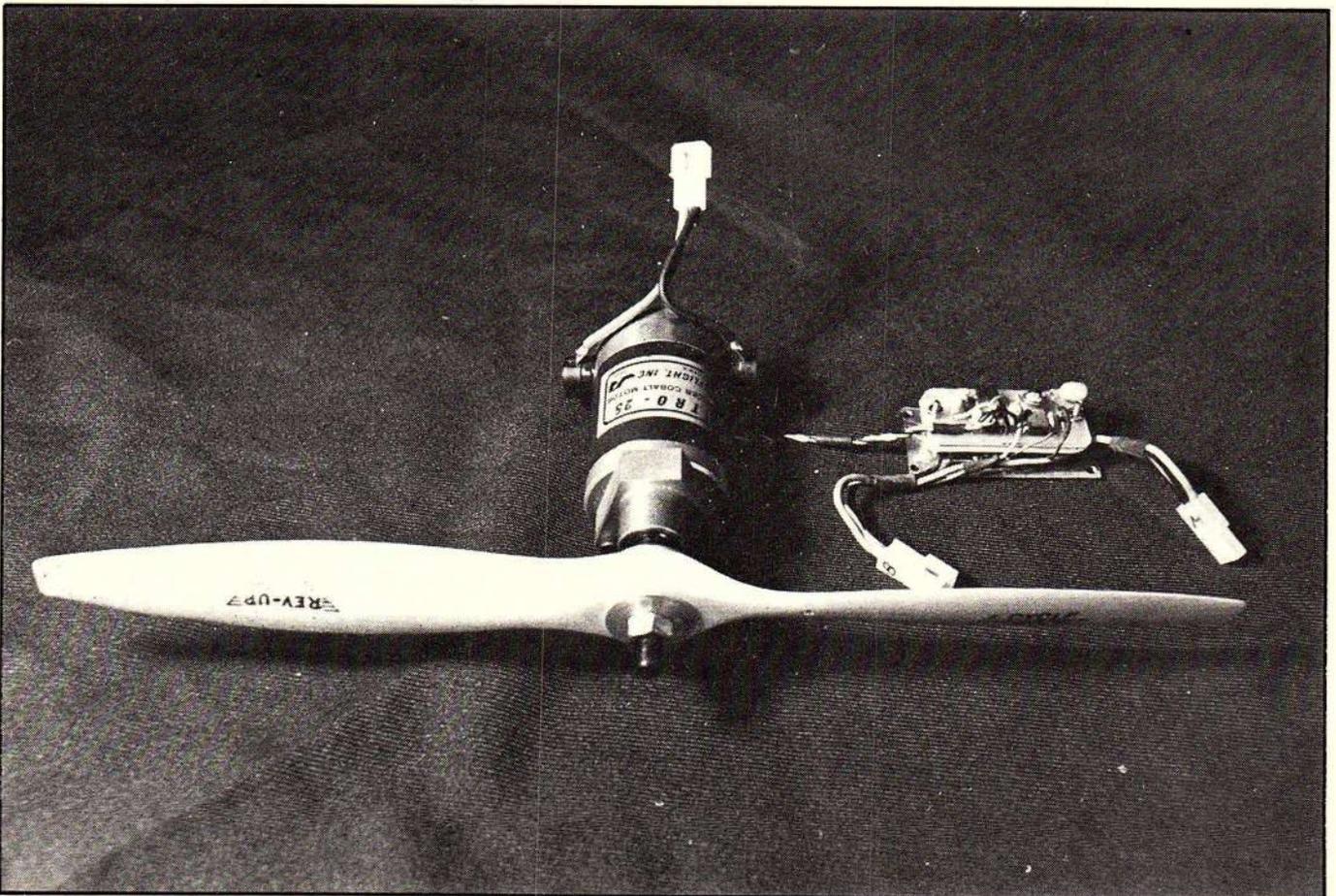
using micro servos except for the ailerons, which are actuated by a 1.1 ounce Airtronics 94462 servo. After installation of the Astro 25 Cobalt motor and mount, the Adams ETC 1-A speed controller, and a 14-cell 900 MAH Sanyo battery pack the airplane weighed four pounds, 11 ounces. As a coincidence, the other airplane finished for scale competition also weighs four pounds, 11 ounces, with the OS 40 4-cycle.

Initial flights were made with a 12-7½ propeller, and it was obvious from the start that power was not going to be a problem. Climb-out was very positive and level flight at moderate speed was easy at half throttle. It was difficult for me to tell what battery reserve was available at first, because at partial throttle there was no apparent rpm drop until the battery was low on charge. I learned to increase rpm occasionally to see what I had left. Another problem I had at first was that I wasn't sure how high an amperage I could use to charge my batteries with the Astro Flight Dual Charger Dwight had recommended. The instructions did not mention whether it is okay or not, but the only way I can get a 6-amp charge rate (3 amps per 7 cells) is to have my trusty Volvo idling. I used a digital voltmeter to peak the batteries for a

maximum charge, but at first my charge rate was too low and I quit charging too soon, leading to a couple of 3-minute flights after the initial four-minute flight. Batteries also do not seem to reach full capacity until a number of flights, so as my knowledge and the battery capacity improved so did the flight times. With the 900 mah pack I soon recorded an 8½-minute flight done at about 1/3 throttle, with a 12-6 prop. No aerobatics were done on this flight and no soaring. I consider this an acceptable flight duration, but I did put together a 14-cell 1200 MAH battery pack that weighed about 10 ounces more than the 900 MAH pack. Initial flight times were over ten minutes. The first flight was in a schoolyard, as part of a class our club was doing for 4th and 5th graders. Boy, were they hooked, watching the Cub fly around, doing loops and stall turns and spins. The take-off, however, was a revelation to me, and I was cautious to get some altitude before I got exuberant. At 5 lbs, 12 oz., the new weight, takeoff was no longer instant, and stalls were much more sudden, with more pronounced wing drop. The airplane had definitely lost much of its buoyancy. I was glad I had put on the 12-7½ prop. I don't know how long I flew,

(Continued on page 66)

Astroflight geared Cobalt 25 motor and Adams Speed Controller which only weighs 1.4 ounces and replaces a servo . . . a good trade-off.



WHO'S WHO IN SCALE...

JACK DORMAN

Jack is a retired U.S. Air Force Pilot who's been modeling all his life. He shares the home town of Northampton, Massachusetts with SRCM Editor, Norm Goyer, but now enjoys the climate of sunny Florida as his home. Jack is very active in the Scale Masters Championships and is one of Dave Platt's model aircraft builders. He's currently campaigning a Platt "Zero" with good static and flying scores.

NICK ZIROLI AND NICK ZIROLI, JR.

This father-and-son team is well known to scale modelers around the world. Besides being prolific designers, they also find time to build models for the movies. The Fokker Triplane in "Neighbors" was built and flown by Nick, Sr. and they introduced a new giant scale are known for their great flyability quali-"Stuka" at the Toledo Show.

WALT MOUCHA, SR.

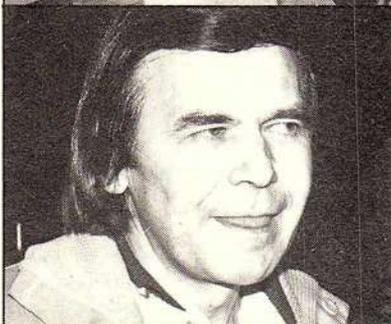
Another legend in the giant scale modeling community, Walt is part of the design team of Balsa, USA, and is responsible for most of that company's giant scale aircraft, such as their "Sopwith" and "Fly Baby." Walt's designs are known for their great flyability qualities. Menominee, Michigan is Walt's home.

OREST DROBEY

Mr. Drobey is a sheet-metal auto-body expert working out of Winnipeg, Manitoba, Canada. Orest's latest masterpiece is an 80" Westland "Lysander" made with plans from Bob Holman. This master's scale model planes are of museum quality and feature unbelievably intricately shaped metal parts. His last year's "Bellanca" on floats was another masterpiece.

WILLIAM CARPER

Bill hails from Jackson, Ohio, and won "Best Military Sport Scale" Award this year at the Toledo Show with a Royal P6E Curtis "Hawk." Bill's acute attention to detail on his ever-popular Curtis won over all those judges. Bill and Mike Barbee worked as a team at the 1985 Scale Masters Competition.



JAMES R. BEDE

(Continued from page 49)

5, and many raw-material kits were sold by Bede, as the quoted performance figures for this little speedster were out of sight, but a suitable engine was never found in time to salvage the plane or the company. Even today, in 1986, there are BD-5s all over the country in various stages of completion. Those which *were* finished had a very poor safety record, as some of the people who were attracted to the aircraft did not seem to have the high level of expertise in building or flying this sophisticated little craft, and many BD-5s crashed because of engine failure and/or pilot errors.

As a matter of fact, back in 1974 when all these kits were being sold, Si Campbell, my Chief Flight Instructor at Apple Valley Aviation, a retired Air Force Colonel with several tours of flying duty in Vietnam, predicted: "In 1975, the BD-5 will fall out of the sky." As it turned out, he was right on target (as he most always was). But it was not a design fault which caused the problems . . . it was simply a revolutionary product which was too far ahead of the necessary hardware (the engine) for the project to be successful.

Now, ten years later, the aviation

industry is *rediscovering* the BD-5 J. The Coors Silver Bullet, piloted by Bobby Bishop, is making the airshow circuit, and a Budweiser crew is building a team of them for exhibition flying.

I recently met with Bob Bishop at Shafter, California, and asked him about the BD Jet *he* flies. He said that it's strictly a hands-off plane, and that it's real fun and easy to fly. He also said that, after they tufted the wing and reformed the sheet metal to the design airfoil, all handling problems disappeared, and they had an easy-flying aircraft. Its up-graded French minijet engine is proving reliable and has been increased in power since its inception in 1975.

There's an in-depth coverage of the BD-5 in *Scale Radio Control Modeler's* "Ducted Fan Special" which is due out on the newsstands about July 15. BYRON ORIGINALS has their prototype flying, and it should be a great seller for them . . . advance photos and reports from Kenny Brian, the R/C pilot, are super.

Jim Bede's most successful venture was the BD-1, and it was actually produced and sold, not by Bede himself, but by other manufacturers. Originally, the *complete* cost of the BD-1 was \$2,500 and many people sent in their money for one, but that wasn't the way it turned out . . .

unfortunately, the 125 Lycoming GPU engine proved to be unacceptable to the FAA, so Bede couldn't deliver. American Yankee, the firm which finally manufactured the BD-1 as the AA-1, sold the aircraft for \$6,000, but most of those who had sent their \$2,500 to Bede requested their money back rather than pay the hefty difference to get their airplane.

The BD-1 was a great little, beautifully-designed airplane, and it still is . . . But this story is about the *BD-4*, a *very* successful Homebuilt which caught the eye of modeler/designer Bill Wendt of Lake Havasu, Arizona, so I'll let *Bill* tell his story:

"I first became acquainted with Robert Hoey when I saw a picture of his full-scale BD-4 in *Sport Aviation*. I wrote to him, and he has been very helpful in providing scale detail as well as letting me have the thrill of flying with him. When I took the model over to his place to take pictures of the planes together, he took more pictures than I did. He is one fine gentleman.

As you can tell from some of the construction, the model started to be the tri-gear version. However, after problems with the steering and after seeing the pictures of Bob's I changed to the tail dragger. There is also a picture of my head inside

Mother and daughter are both doing well.





A New Era in Building Simplicity and Performance

The Corsair has long been admired for its colorful history, unique design and superb flying characteristics . . . yet avoided by modelers because of its difficult-to-build fuselage and bent wing configuration. Byron Originals has solved this building problem with its engineering talents and fiberglassing expertise. This is the perfect project for the sport flyer who has always wanted to fly the Corsair but not build it, yet it has all the potential needed to be a winner in the toughest of scale competition.

F4U-1 Corsair

1/6 Scale



Specifications

Wing Span: 85"
Length: 68 1/2"
Ready-to-fly weight: 23 lbs.
Wing Area: 1230 sq. in.
Wing Loading: 43 oz./sq. ft.
Channels: 5 with retracts
Power: PurrrPow'r Performance
Package (or equivalent 2 cycle engine.)

Superb Flight Characteristics

The Byron Corsair, when teamed with PurrrPow'r (or equivalent), is fully aerobatic, flies light on the controls and exhibits a super crisp response. It lands slow and handles extremely well on the ground.

Precise, Warp-Free Construction

Until now, building this famous "bent wing" warbird was a major scratch-building project requiring countless hours of cutting, aligning, gluing, sanding, and strip sheeting. Thanks to our unique fiberglass fuselage/wing assembly, Byron Originals takes you well beyond the tedious task of performing magic with balsa and plywood. In its place, we offer you a precise, warp-free, state-of-the-art fiberglass component with superior strength to weight ratios.

Exceptional Scale Detailing . . . Unbelievable Scale Potential.

Like its full scale counterpart, the Byron F4U-1 sports built-up fabric covered rudder, stabs and elevators. Easily sheeted outer wing panels combine with fiberglass wing tips to insure fast and accurate wing assembly.

Panel lines, cowl flaps and numerous other scale details are standard in the Corsair's hand-crafted fiberglass components. The bent wing is designed for easy installation of Robart 100° Rotational Mains. Our usual comprehensive hardware package included.

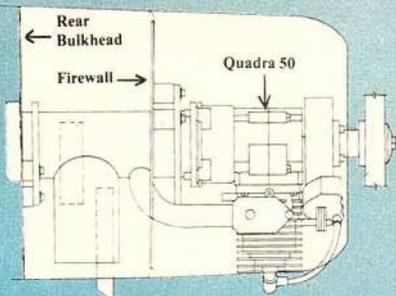


Order Information

Order No.	Description	Price*
6130140	F4U-1 Corsair Kit	\$339.00
2630086	Robart Rotating Mains . . .	\$199.95
—Kit sold only with Robart Mains—		
Options		
6030377	5 1/4" Block Tread Tires w/hub (ea.)	\$ 12.40
6030389	Custom Retractable Tailwheel	\$ 32.00
6030388	Pneumatic Support Equipment	\$ 43.50
6030307	Spinner, Backplate, Bolt . . .	\$ 9.00
6130135	PurrrPow'r w/Engine	\$275.00
6130123	PurrrPow'r less Engine	\$ 72.00

*Shipping Costs: Kit and Robart Mains \$16.00, PurrrPow'r with engine \$5.00, PurrrPow'r less engine \$3.00. All other items when shipped with kit, no shipping charges. Ordered separately, \$3.00 per item. (AK, HI, and overseas, call for shipping.)

VISA and MasterCard Welcome.



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(PurrrPow'r Performance Package includes Q-50 engine, PurrrPow'r muffler mount, cast manifold, spinner, backplate, 18x10 prop, prop adapter bolt and all necessary hardware.)

Call or write for complete details and test data.

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- CS-5 CHANCE VOUGHT F4U-5NL CORSAIR
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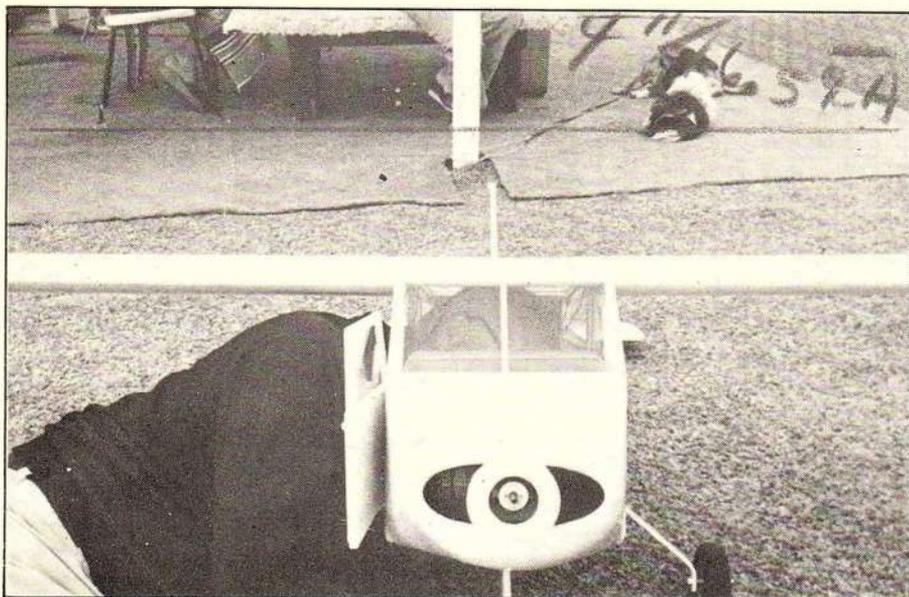
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There are advantages to building in 1/4 scale. Of course, if Bill sneezes . . . but let's not even think about that.



The first Bede. This BD-1 was to have sold for \$2500, but that included a non-certified GPU Lycoming engine which the FAA would not certify. Later sold through American Yankee as the AA-1 for \$6,000 complete with certified engine. Choice of engines has always been a problem for Bede. LACK of an engine was the downfall of the BD-5.

the door of the model where I was making some adjustments. Thought you might appreciate this one, it illustrates one of the advantages of giant scale.

The model has been flown successfully with both a 1.2 4-cycle Enya and a 1.6 4-cycle OS twin. I prefer the 1.6 because it gives you that extra edge of power for most of the aerobatic maneuvers. The flaps are optional, but really add to the realistic flight. The trim change necessary when the flaps are used is very slight. As a matter of fact, I didn't notice any change on the first few flights until I realized that I was unconsciously making the adjustment.

The construction notes included will give you most of the material needed for your article, but here are a few random thoughts:

1. Notice the flying stab (stabilator).
2. Cowl and pants available from T&D Fiberglass.
3. The fuselage door provides great access to equipment.
4. The BD-4 is a very simple plane to model and can provide excellent static points with a minimum of work.
5. Very easy field assembly. Just plug in the wings and fasten two bolts.
6. Large cowl will accommodate almost any engine.
7. Easy to transport for giant scale.
8. Notice in the pictures how the fuselage is assembled with just two basic boxes. The cabin area is a perfect rectangle. Constant wing chord built around a thin wall aluminum tube similar to the full-scale BD.

9. Two servos coupled together for the flying stab.

There is one picture showing the interior upholstery made by my wife, Donna. It is a copy of the interior of the full scale. How's that for a supportive partner? Since the picture was taken, she has added upholstered door panels and a cover for the servos behind the seats.

BD-4

The BD-4 is a scale model of the homebuilt airplane designed by Jim Bede. The "full size" BD-4 is a 4-place (or 2-place), high wing, metal and fiberglass airplane. It combines high performance with ease of construction. These features also carry over to the model. The plans of the model show the tail dragger version, however, there is also a tri-gear version of the full size plane for those who prefer "trikes." The model is an extended wing version which increases the wingspan and the length of the ailerons. The original BD-4 had a wingspan of 25 feet 7 inches which was extended to 28 feet 11 inches on some of the homebuilts. This is explained in the May 1981 issue of the EAA magazine *Sport Aviation*.

The plans contain adequate instructions for the experienced "scratch-builder." The following additional information is included for those who prefer the "1-2-3" step instructions. However, this still assumes that you have previously built R/C models. If you need more help, don't hesitate to write me or call. I'm always interested in models being built from my plans.

Most of the sequence of the following steps can be changed to suit your own building procedures, but please read through all of it before starting. In each of the steps you must refer to the plans or the information not make sense.

FUSELAGE:

The fuselage sides are flat on the BD-4 with a break just behind the cockpit area (look at the top view). This makes for easy construction, but requires that each side be made in two pieces. The forward part of the fuselage is almost a rectangular box and should be put together first.

1. Construct the framework of fuse sides (each side in two pieces—front and rear of the "break"). The door can be put in either side for access to radio equipment and fuel tank.

2. Glue each front side to its lite ply doubler. The doubler, which goes on the inside, is outlined in Xs on the plane fuse side view.

3. Assemble the fuse front section with firewall and cross pieces.

4. Add rear sides after sanding to fit at the "break." Complete fuse frame.

5. The 13/32 brass tube stabilator bearings are epoxied in place when the stab is added to the fuse in order to assure alignment. Cover fuse side area around stab location with 3/32 sheet balsa. Install stabilator and complete as shown on the plans.

6. Install push rods to tail surfaces and tail wheel. Use carbon fiber push rods (arrow shafts) with 4-40 clevis rods. Support push rods where necessary to eliminate any play. Golden rods can be used (push-pull) on the tail wheel.

7. Cover sides and top (where indicated) with 3/32 sheet. Use 1/8 lite ply on bottom where indicated.

8. Glue cowl to former and fit to fuse.

9. Install landing gear.

10. Assemble pants and wheels and attach to landing gear with axle and 4-40 bolts.

11. Install engine, tank and radio (use heavy duty servos). The engines used in the prototype include a 1.2 4-cycle Enya and a 1.6 4-cycle OS twin. Because the larger 2.2-2.3 chain saw type engines weigh more it may be necessary to add weight to the tail. Keep the CG as indicated—at about 28 percent of the chord. Total weight with the smaller engines should be about 15 pounds when completed.

12. Fill, sand and prepare surfaces for covering. Cover with your favorite covering material (and paint). We used Sig Koverall on the prototype.

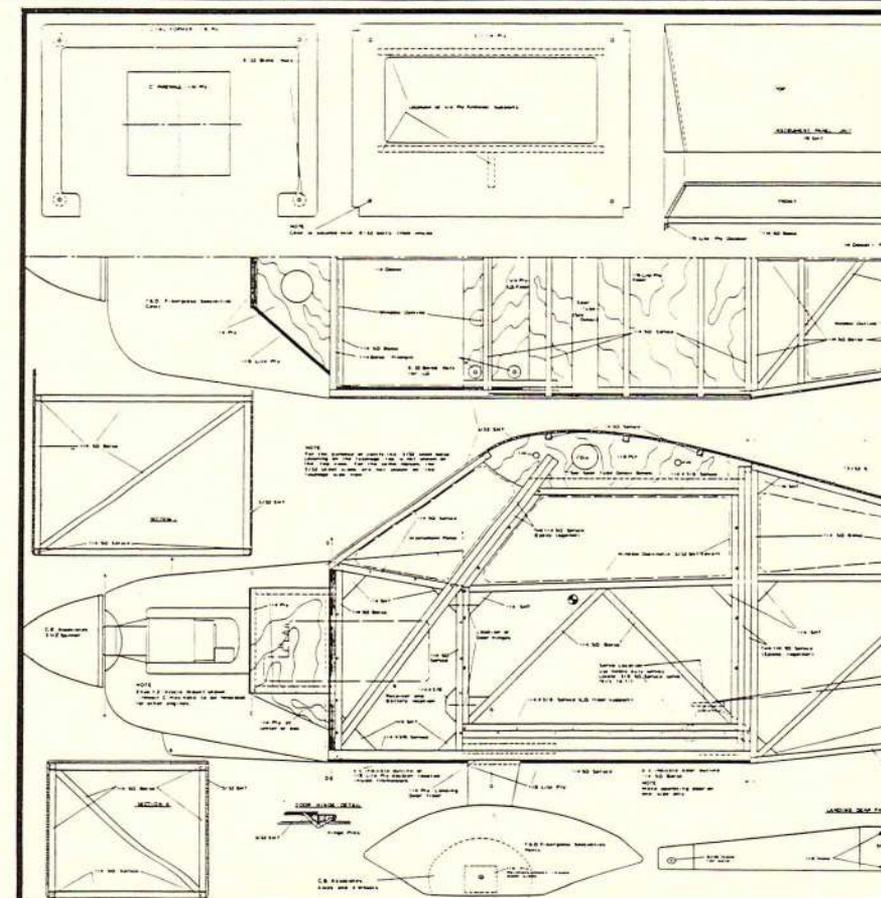
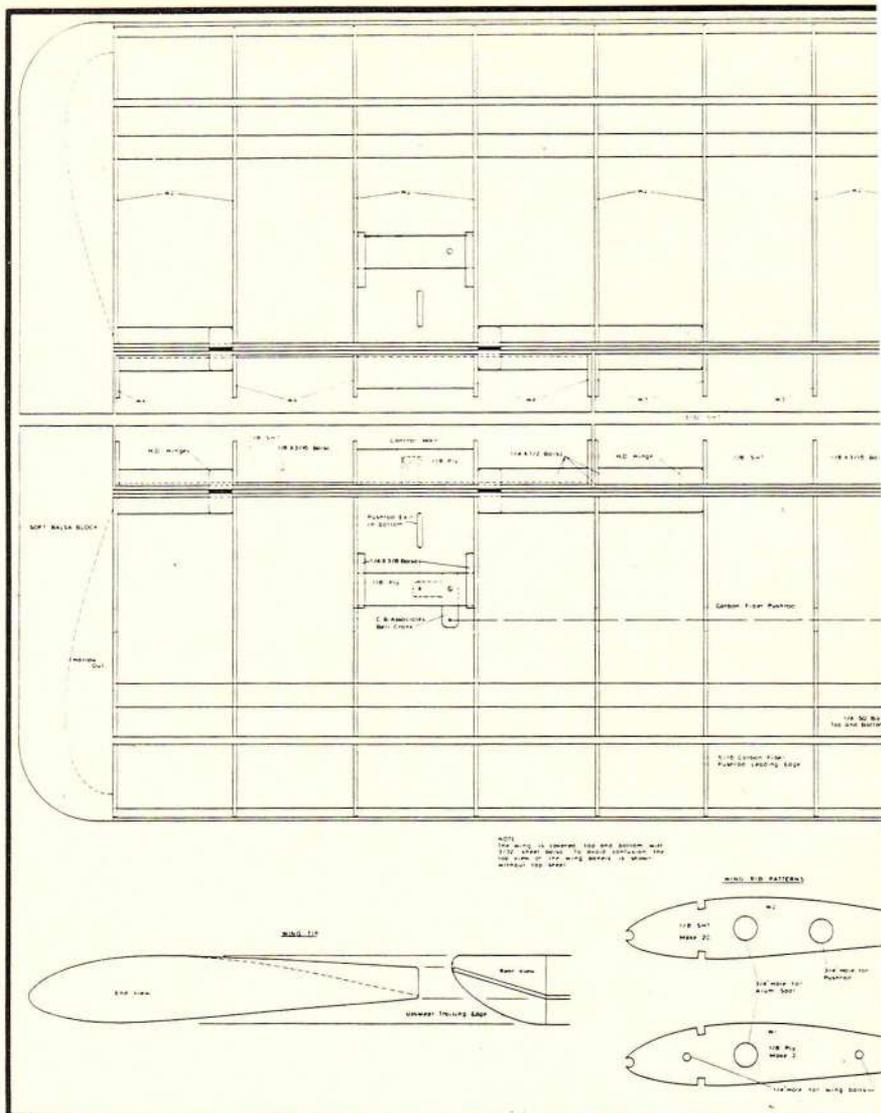
13. Add pilot (prototype used William Hawke 1/4 scale), and other details as desired. Bill Wendt Plans can provide a good photo pack of pictures of the full size BD-4 showing the cockpit and other detail.

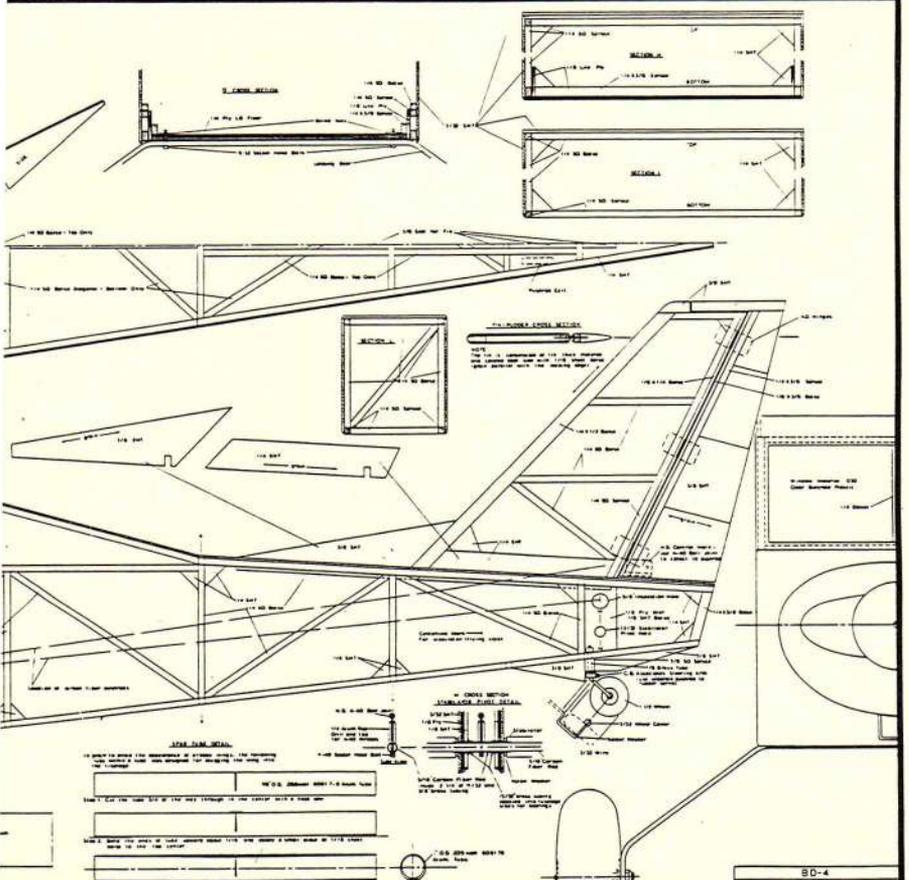
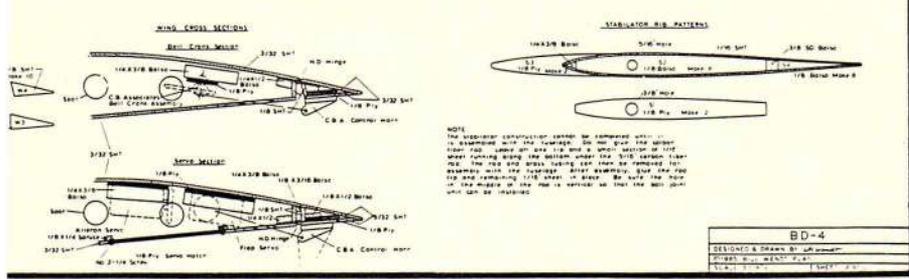
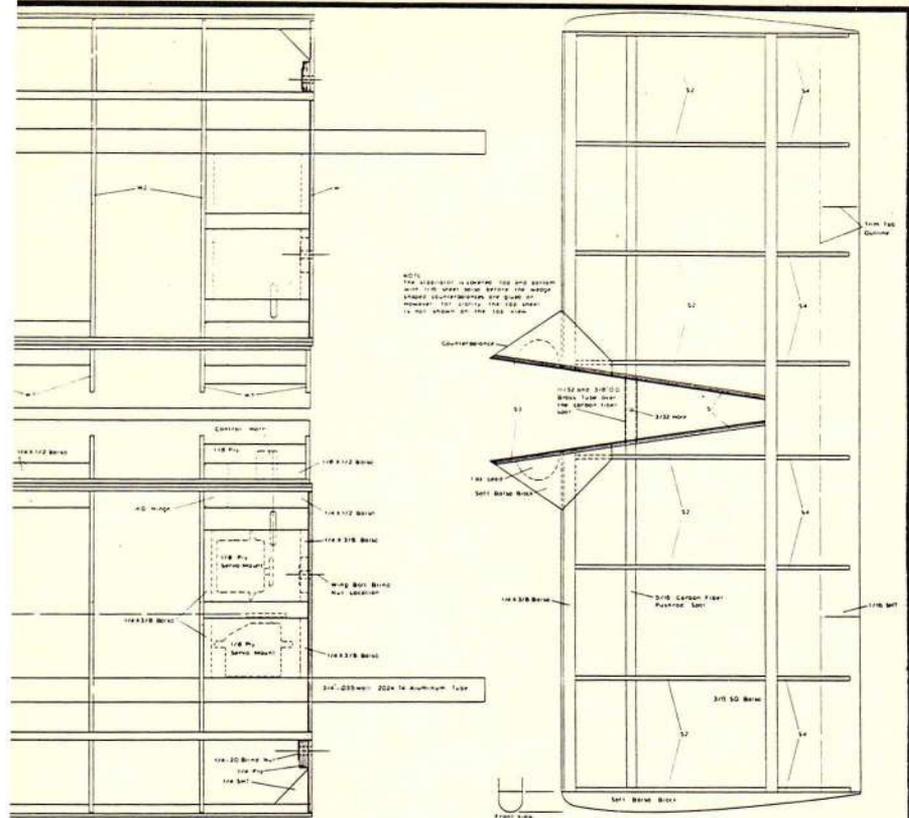
14. Check CG, incidences and alignments. No warps. Check radio installation and servo linkages. The prototypes used about 1/2 inch throw each way on the ailerons, 7/8 inch each way on the rudder, 3/8 each way on the stabilator trailing edge and 30 degrees for full flaps.

WING:

1. Cut ribs. It's easier to cut the arrow shaft hole in the leading edge of the rib if it is cut or drilled before the rib is cut out. Thin brass tubing with the edges sharpened makes a good tool for cutting holes in balsa wood.

2. Splice leading edge arrow shaft spars to length needed for each





panel by inserting a two-inch-long dowel and epoxy.

First Wing Panel:

3. Rough sand the aluminum spar (sanding helps the glue to stick better) and thread balsa ribs onto it. The ply root rib will be added later when the wing panel is fit to the fuse. No glue yet!

4. Place plans on your wing building board. Place 3/32x4 balsa sheet on plans for the aft part of the bottom sheet covering.

5. Place ribs and spar onto the sheet with ribs at their proper station. Block up the ribs at the main spar so that the aft part of the ribs will lay flat.

6. Fit leading edge arrow shaft into front of ribs. No glue yet!

7. Now start at one end of wing and glue the leading edge and main spar to the ribs and bottom balsa sheet. One section at a time. CA glue works well for gluing the ribs to the spar and arrow shaft if you have a good snug fit.

8. Glue 1/8 sheet to end of ribs.

9. Glue 1/4 square top spar to ribs.

10. Glue balsa block aileron hinge supports in place.

11. Glue 1/8 ply bellcrank platform and supports in place.

12. Remove wing panel from plan and add 1/4 square bottom spar.

13. Repeat steps 4-12 for other wing panel.

14. Make wing spar tube assembly for fuse. Follow directions on plans.

15. Put wing spar tube assembly into fuse (no glue yet). Fit wing and check alignment. Carefully remove wing panels and securely epoxy tube to fuse.

16. Plug in wing panels and add root ribs (ply—two piece) to wing spar stubs. Allow for 3/32 balsa sheet fuse sides which are added later.

17. Install 1/4-20 blind nuts in ply ribs which will secure wing panels to fuse sides.

18. Install aileron and flap servo mounts, bellcranks, pushrods and control horn rods.

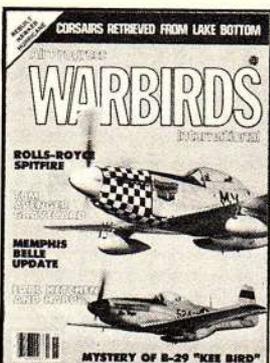
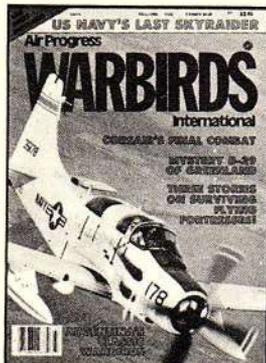
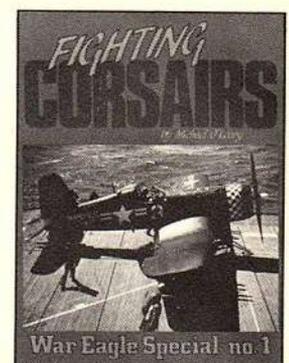
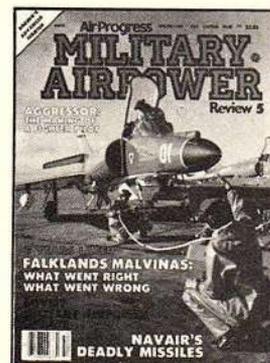
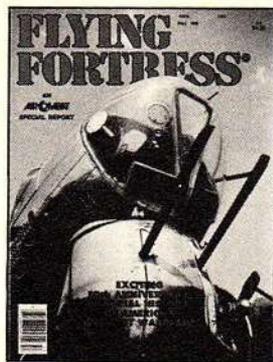
19. Install hinges in wing panels.

20. Build ailerons and flaps, leaving top open until ailerons and flaps are attached to hinges.

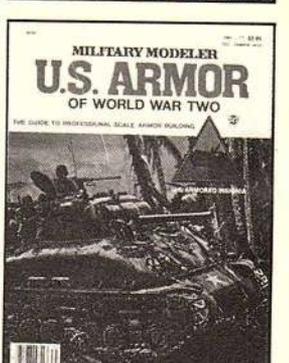
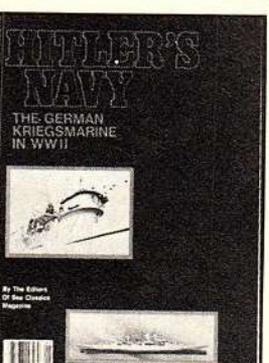
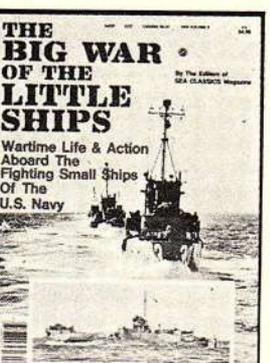
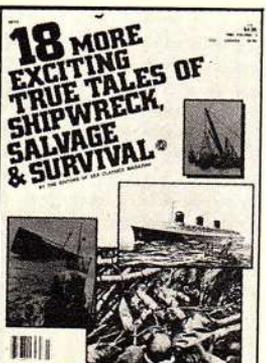
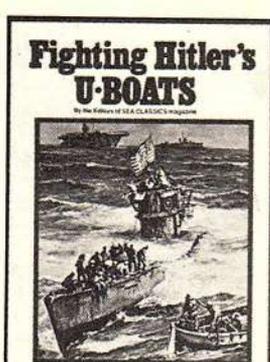
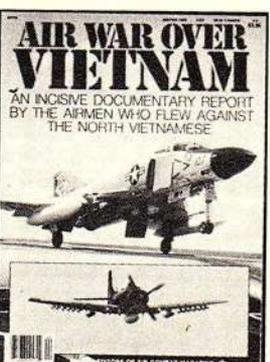
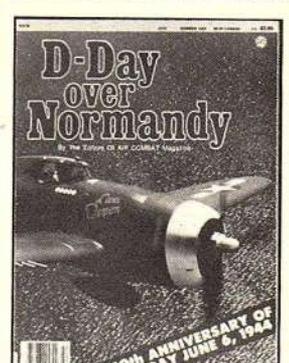
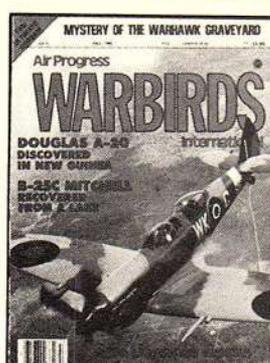
21. Glue ailerons and flaps to hinges in wing panels. Add remaining balsa hinge supports. Add top balsa sheet to ailerons and flaps.

22. Soak and warp wing bottom leading edge sheet balsa. Glue in place and sand leading edge to fit top sheets. Make sure that any necessary splice between sheets is at a rib and that the aft edge of the

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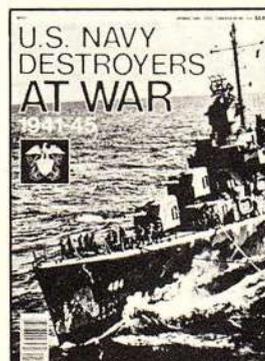
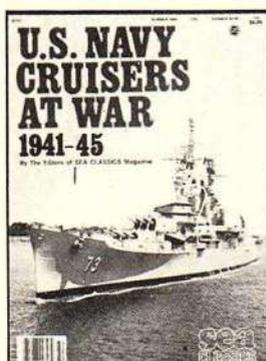
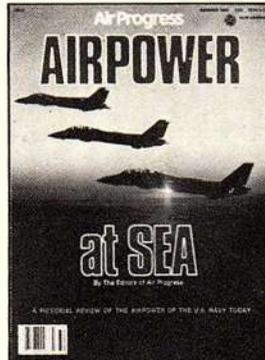
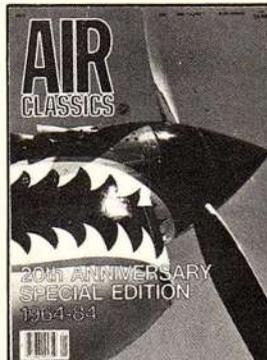
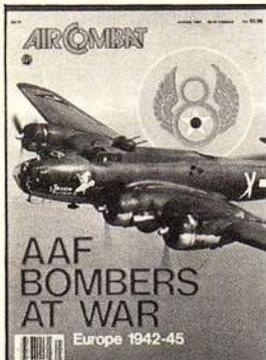
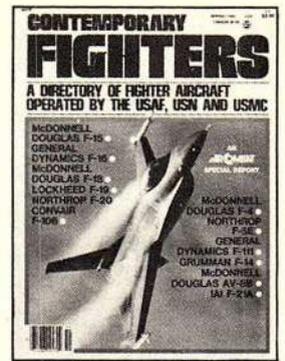


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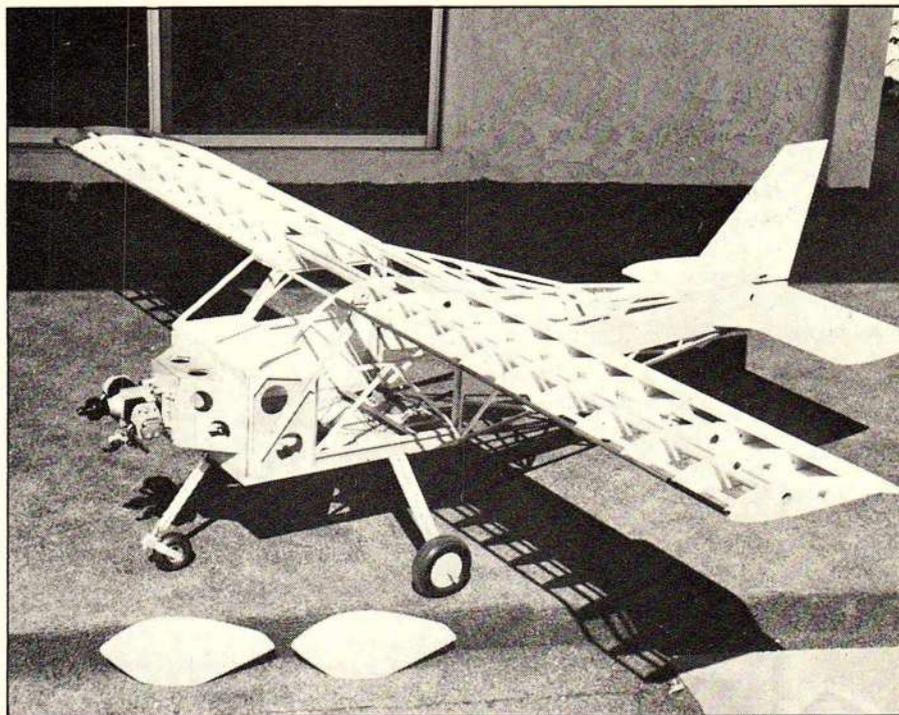
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Construction shows that model started out as a tri-gear, but Bill's love of taildraggers won out in the end.

sheet is at the middle of the 1/4 square spar.

23. Repeat for top leading edge sheets.

24. Make 3/32 sheet balsa panels to cover the remaining top and bottom of each wing half. Caution! Balsa weight varies! Weigh balsa sheet in advance before making up the balsa panels. Join sheets together. Be sure to stagger any necessary end joints. End joints should be cut diagonally.

25. Glue balsa doublers (cross grain) inside at control rod exits. Glue 1/8 ply control horn supports in place.

26. Glue balsa filler strips between ailerons and wing panels at the hinge line as indicated on the plans. Run 400 sandpaper between ailerons, flaps and wing panels to free them up (leave gap thickness of sandpaper).

27. Add top sheeting.

28. Cut and fit hatches for servos in bottom of wing panels.

29. Cut, shape and fit wing tips. Glue to wing panels.

30. Fit control horns on ailerons.

TAIL ASSEMBLY:

The fin, rudder and stabilator (flying stab) are easy to make and use. However, the stab requires assembly with the fuse before completion of either. There are several methods of installing stabilators. However, the use of the carbon fiber push rod spar, brass tubing and the

ball joint control horn (as shown on the plans) is both simple and lightweight.

The stabilator is actuated with two servos connected together with a servo doubler (C.B. Associates type). This provides more power and an extra degree of reliability.

When aligning the stabilator for test flying, it is very important to keep the incidence at 0 degrees for neutral. The alignment point on the fuse, shown on the plans, should coincide with the leading edge of the stab.

It is important that you follow the instructions on the plans concerning the installation of the carbon fiber spar. A section of the 1/16 sheet balsa covering must be left off and the spar must be removable until the stabilator is assembled with the fuse.

LIST OF MATERIALS:

- 8—1/4 sq. x 48 Spruce
- 6—1/4 x 3/8 x 36 Spruce
- 1—1/4 x 1/2 x 4 Spruce
- 14—1/4 sq. x 36 Balsa
- 4—1/4 sq. x 48 Balsa
- 2—1/4 x 3/8 x 36 Balsa
- 2—1/4 x 1/2 x 36 Balsa
- 1—3/8 sq. x 36 Balsa
- 8—1/16 x 3 x 36 Balsa
- 5—3/32 x 4 x 48 Balsa
- 28—3/32 x 3 x 48 Balsa
- 2—1/8 x 3 x 36 Balsa
- 1—1/4 x 3 x 36 Balsa
- 2—3/8 x 3 x 36 Balsa
- 1—1/8 x 12 x 18 Aircraft Ply
- 1—1/4 x 12 x 18 Aircraft Ply
- 1—1/8 x 12 x 30 Lite Ply
- 1—1/4" x 24 Wood Dowel
- 2—2024 T3 3/4" 00 x 035 Wall 48" long Alum Tube

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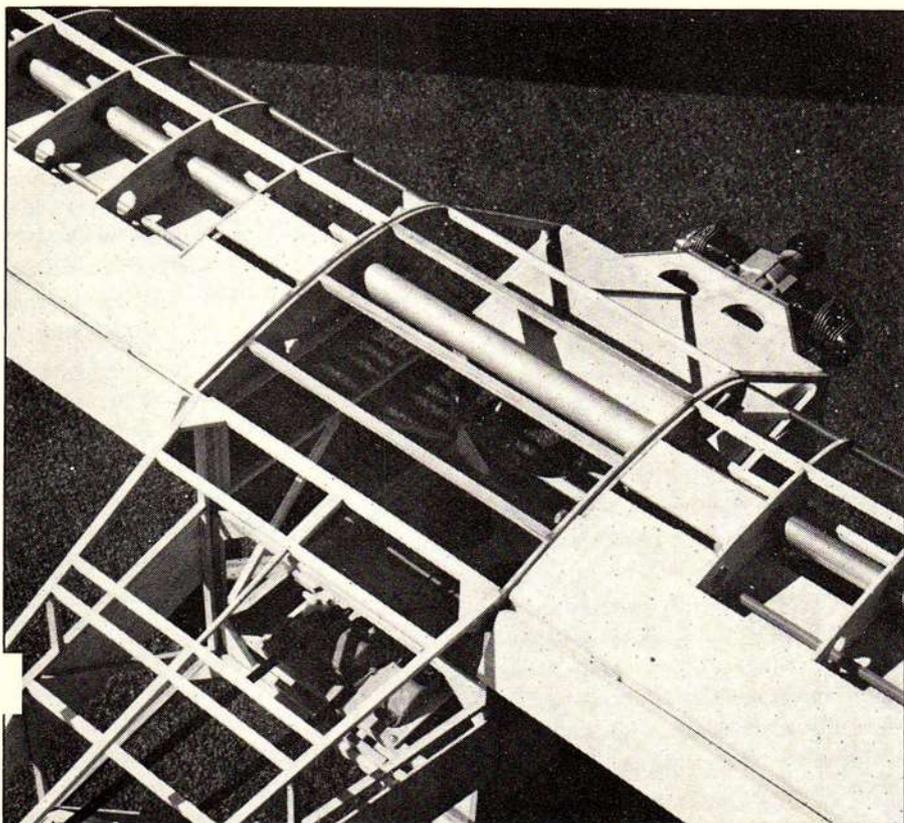
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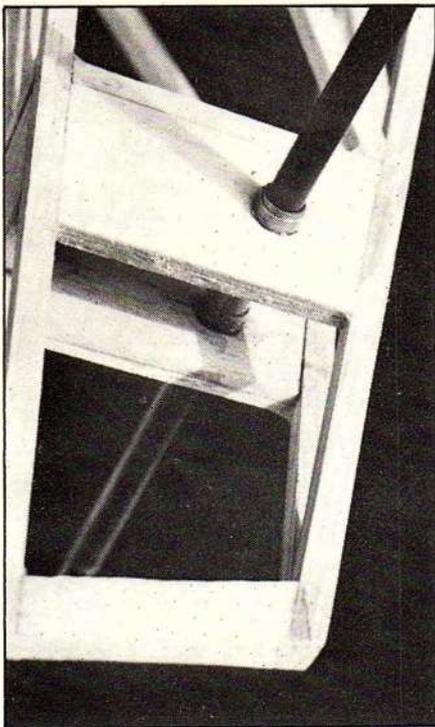
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WHERE TO FIND IT:

The following is a list of sources that I used for some of the special components and accessories for the BD-4.

PANTS and COWL—T&D Fiberglass Specialties, 30925 Block, Garden City, MI 48135

CARBON FIBER PUSH RODS (Arrow Shafts)—Ace R/C, Inc., Box 511, 116 W. 19th Street, Higginsville, MO 64037

PILOT—William M. Hawke, 7148 Lasting Light Way, Columbia, MD 21045

WHEELS, AXLES, CONTROL HORNS, BELL-CRANKS, STEERING ARM—C.B. Associates, Inc., 21658 Cloud Way, Hayward, CA 94545

ALUMINUM TUBES, LANDING GEAR MATERIAL—Aircraft Spruce and Specialty Co., Box 424, Fullerton, CA 92632

PHOTO PACK—Bill Wendt Plans.

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PIPER J-3

(Continued from page 54)

but it was a good while. After the landing I taxied back to the classroom which was no short distance and still had a good reserve of power left. I felt like the Pied Piper of Hamelin, with a taxiing Cub instead of a flute, 14 young boys (and one girl wearing an Oakland A's cap) following behind whooping and hollering. It was great fun, and something only a quiet electric airplane could do. All I had to take to school was the airplane and the transmitter.

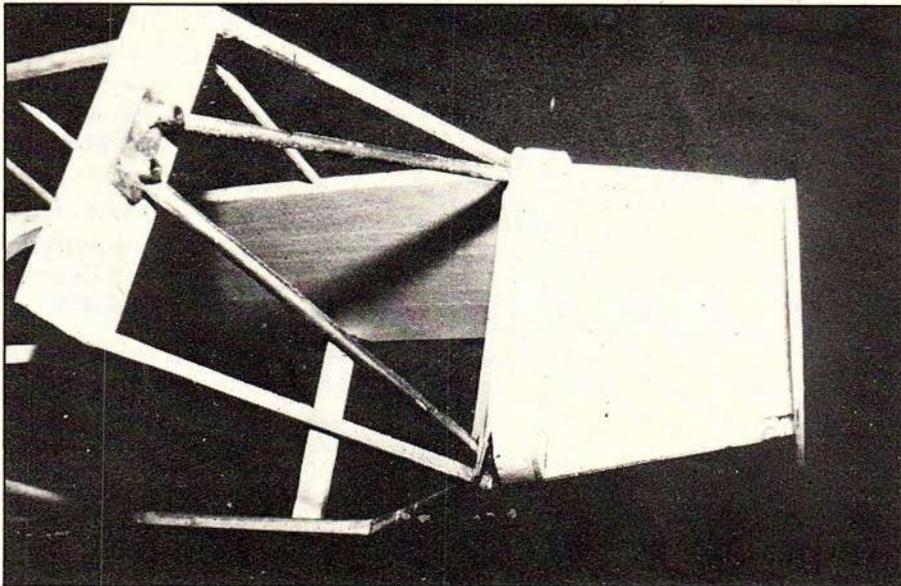
I flew the big battery electric airplane a few more times, with flights easily over 11 minutes on days that were windy and power-demanding, black clouds and lots of sink. For duration flying the big batteries are definitely the thing, and the airframe and power available, especially using the 13-8 propeller, are adequate. I think a 15 minute flight might be possible with no thermalling, but in my opinion the Cub wasn't really flying like a Cub anymore. It was saying "I will work harder, I will work harder," like Boxer the horse in Animal Farm, but it wasn't having much fun, and I have to confess I wasn't either. So I put the 900 MAH pack back in and on the climb-out I could almost hear the Cub's exuberance, "Free at last."

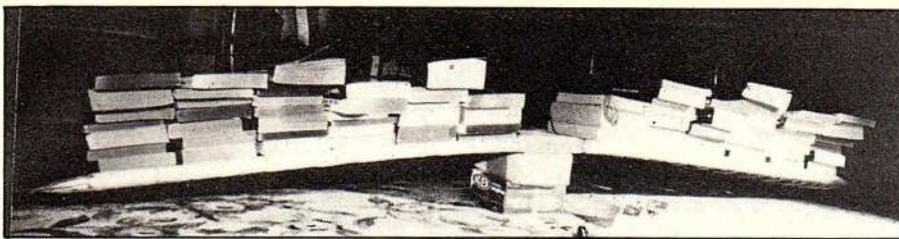
Electric scale flight is a lot of fun, though it is a different thing to do than scale gas powered flight. The smooth linear throttle response from stopped to full power is something

I find very agreeable compared to glow engines, which usually are a little testy about which rpm they want to run at, especially at low power. This is very nice during landings. It is also nice not to have to clean up an oily mess after you fly, and you never have to adjust the carburetor either. Dwight Holley was very helpful and enthusiastic, and he made a successful electric airplane much easier to put together. You need help like that when you get started with electrics, because the literature has by and large not kept up with the technology, though Bob Kopski's articles in the AMA magazine are quite good, especially the series of articles that led to his regular column. I really studied them. The Astro Flight Cobalt 25 geared motor is a fine piece of machinery, precision-made and very durable. Electric motor power output is a little different in that as you go to larger propellers, the motor will keep on pulling more amperage and producing more thrust. Rpm will drop some as you do this, but not as much as with a 4-cycle engine. This can be a fool's paradise because it will go on until the motor overheats and fails, so you must be careful not to use a larger than recommended propeller.

The Astro Geared Cobalt 25 can turn up to a 13-8 propeller. Rpm is about 6600 and the amperage will be 26 amps at full throttle. The downside is that your battery pack will not last very long. If my E=IR is correct, the 900 MAH battery pack will put 25 amps out for something like two minutes maximum with ideal conditions, which you will not be operating under. That kind of power is only good for short bursts, but it's nice to know it is there. The electric motor seems to have about

The cockpit cabane structure had to be strong, but it MUST be light.





Wing Test. As can be seen, the wing construction is light but still very strong.

the same static rpm as my OS 40 when both use a 12-6 propeller, and the power seems very similar.

With the 12-6 or larger propeller and the 900 MAH battery the electric Cub can loop from level flight and will do slow rolls. When the battery is fully charged climb is very good at full throttle. Power for level flight at minimum speed is about 1/3 throttle. If you do aerobatics you will probably have a duration of three or four minutes depending on your level of enthusiasm and assuming you are using a 12-7½ or smaller propeller.

The other Cub, well, on the other Cub I must confess I turned into a scale pig (me, not the airplane). It is painted with acrylic enamel. It has pinked tape, 80 feet of it, made from strips of Colortex fabric. It has the scale landing gear. It has a cowling replete with cylinders cast from epoxy. And in almost wretched excess, it has a servo to operate the trimming stabilizer in flight, and a big fat regular size Futaba S-28 at that, because I didn't know for sure how much force would be applied by air loads. With this last item I intend to score mechanical option points. I refuse to let Warbirds get all the free points!

The pushrod that moves the stabilizer is the only pushrod control in either airplane. I used cables to keep weight down, and in the process discovered that in cable systems that have no pulleys the control centering is much better than with pushrods or flexible-cable-in-housing systems. I assume this is because there is less friction in the system. I used plastic covered braided wire fishing line, 50 lb. test, for all control runs except where pulleys were located. In those areas of the aileron circuit a lighter weight, more flexible cable was used. Cable tension need not be any more than that required to remove all slack. Any more tension will only increase system friction especially if pulleys are used. I spliced in nylon insulating connectors about every 20 inches of cable length to avoid radio interference problems. The ends of the cables are passed through a 3/16-

inch long small diameter brass tube, through the bellcrank, and then back into the tube which is then crimped. If you are using uncoated cable I recommend you solder the free end to the tube after you crimp it. With plastic coated cable soldering is not necessary. Do not use monofilament

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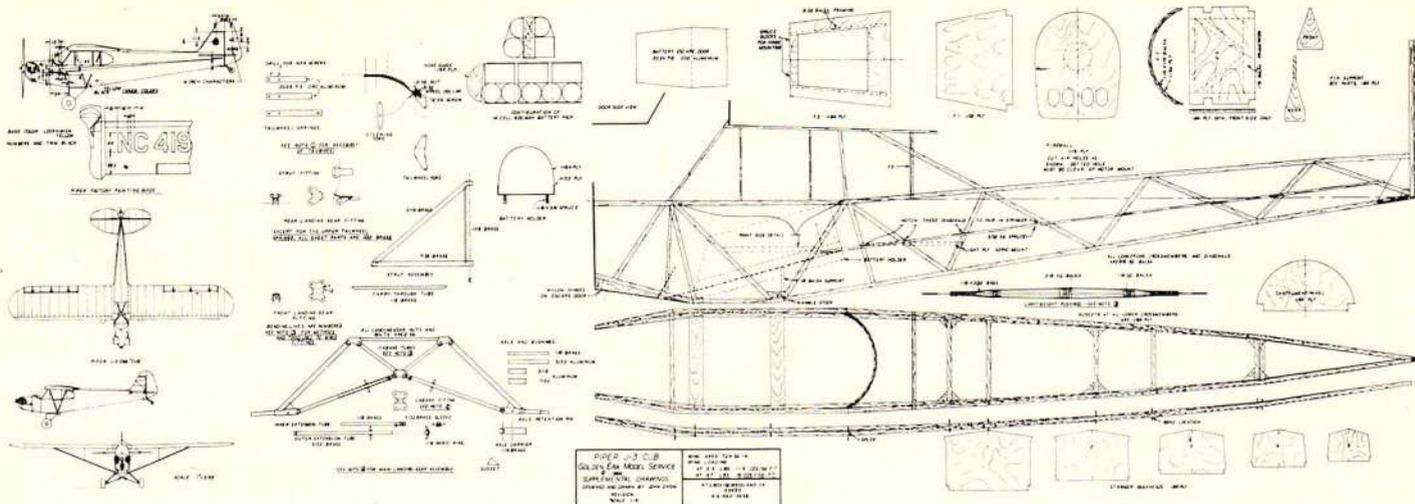
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for your control runs. It is too flexible and when you get the stretch out, system friction will be very high.

If you chose to use pushrods, you may want to use the design I used on the stabilizer trim system. It is made from four lengths of 1/16 by 3/32 brass spaced apart with square balsa at three points, wrapped with string at these points and at the ends which are drawn down tight over the threaded wire end. It weighs 1/3 ounce. Arrow shafts and balsa pushrods weigh around 2/3 ounce at a similar length.

The scale operating landing gear is fully detailed on the plans and the notes that go with it. I am very happy with how it works, as it really takes the bounce out of landings. I have made one or two poor landings with the electric Cub with the wire gear and it looks just like a basketball being dribbled. The Trexler tires do get a bounce going. Eut says that's how Du-Bro came up with the name Low Bounce for their solid tires, because they don't bounce like Trexlers can. Well, the scale gear takes care of all that without being "wallowy" when you taxi. To set up extension strut tension, once again the books come out. Before installing the landing gear on the airplane, put ten pounds of books on the top of the landing gear. You have the proper rubber band if the extension struts just start to move when you roll the gear forward on the wheels.

Other items on the plan are the painting guide and three views. The three views are based on the lubrication chart drawings which I have verified as quite accurate when compared to actual Cubs based near my home. I have added exterior details. The painting diagram is adapted from the Piper factory drawing, which was kindly sent to me by Mike Lutz of Garden City Park, New York. Thanks, Mike. You must keep in mind that the Cub you are modeling

may or may not be the same, as these drawings were not well distributed in the field. The usual method employed by fabric shops was to save the old envelope and copy the markings from it. This also applies to inspection cover locations. In addition, marking regulations have changed with the years. The stripe shape and location will almost never be right, and the factory drawings will only be a good place to start unless you're working from an old photograph. The average factory fabric job lasted 10 to 15 years, under the best of conditions.

Tracking down the Cub Yellow, or Lockhaven Yellow, color can be difficult, as it is only found at aircraft paint stores, and then mostly in enamel or dope forms. I matched color chips to get the color in acrylic enamel which I prefer to use. The Sherwin Williams number is JX 5912. I used yellow Colortex, sprayed on a dust coat of acrylic enamel silver, and then two light coats of the yellow. Very little silver will stop any transparent tendency of the color coats. If you don't do this you will have to put on a lot more yellow. A silver coat was always used as a base on grade A fabric, to keep the sun from rotting the material. Too little silver will drastically shorten the life of the covering.

Another area to watch closely when you are covering your model is the sag between formers on the upper fuselage stringers. All Cubs are different here. Some have a little sag, and some have a lot. You can control this by how much you shrink the fabric. Don't overdo it.

I have really been enjoying flying my two Cubs, and that plus the fact that I built two of them since I wrote the first part of this article, is the main reason I was so slow in getting the second part done. I wanted to get enough flying done to let the models teach me their ways. This proved to

be time-consuming even after the airplanes were completed because the Winter weather out here in California hasn't been too good unless you are a duck.

If I wanted anything in flying qualities from my design work, it is gentle handling near the stall, which is what you find in flying the full size airplane. At a weight of 4 lbs, 12 oz. or less you will achieve this kind of performance with this model. At the higher weight I flew the electric Cub, over 5½ lbs., I feel it had lost its gentle nature in the stall, and the airplane was beginning to demand respect in a tight turn.

I have varied CG locations from 1/4-inch aft of the main spar to one inch aft with good results. As you move the CG aft elevator sensitivity, of course, increases but there will not be a handling problem with the CG in that range and these locations are easy to achieve without any extra nose weight, even with servos aft of the cockpit.

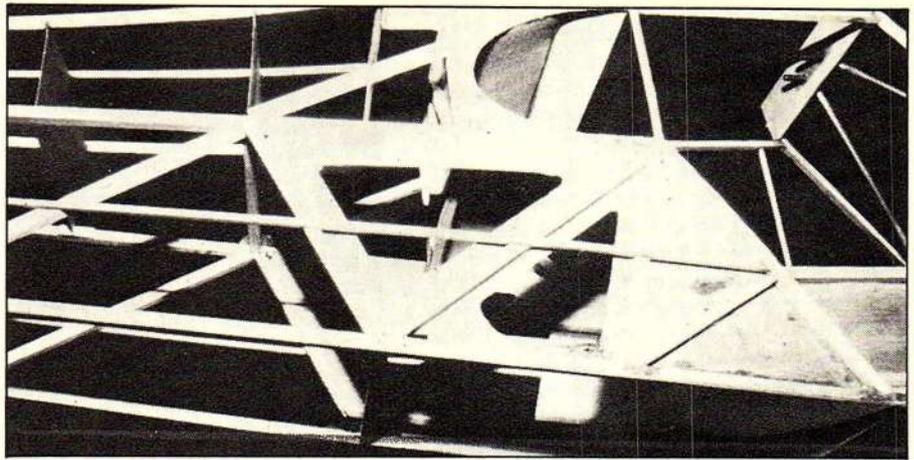
The OS 40 powered Cub flies very much like a 65 hp Cub. After a short run it climbs off the runway in a fairly level attitude. It does climb too fast at full power, so throttle back after liftoff. The airplane tracks well on the takeoff roll. If there is a crosswind, you will have to keep the upwind wing down a little on the roll, and then let the ship weathervane into a crab after liftoff. Maintain a climb to a safe altitude. As a first maneuver you might like to try a power-off stall. Throttle back to a low idle and raise the nose about 20 degrees above level. Maintain that attitude as speed pays off by adding up elevator until you run out. Keep your heading by using the rudder, not the ailerons. They will only cause trouble near the stall. Oops, the nose fell through the horizon and the wings wagged a little. Relax the up elevator and add a little power. You are flying again.

Next we'll do a stall turn. At half throttle, fly away from your standing position. Raise the nose to a vertical attitude. Just before the airplane stops, kick full left rudder and hold some right aileron so that faster moving outside wing doesn't roll you off heading. When you are almost headed straight down, center the rudder, throttle back and pull out smoothly at the same altitude you started at. If you are too low on the pullout, start the maneuver with more power. If you whip stalled take some aspirin and use rudder sooner. If you ruddered it over the top at too high an airspeed and made a U turn instead of a stall turn, shame on you!

A loop is simple, right? Well, maybe not. Actually, the loop is a very good way to check your rudder trim. The rudder is a very powerful control on the Cub. Turns can easily be made with the rudder alone, and a lot of aileron can be required to correct for a rudder trim problem. If the airplane loses its heading or rolls during the loop, check your rudder trim. A little bit of right rudder must be added during the first half of the loop, but not much, so if you set the rudder trim to get a straight loop and then adjust the aileron trim during level flight to stop any rolling tendency you will be in pretty good shape. A final check, provided your ailerons have equal travel in both directions, is to see that roll rate is the same both ways. If your rudder trim is correct it will be. As a final note on the loop, if you notice your wings are not level in the inverted position, you can fix it with aileron at that point, but the real culprit, provided you started with your wings level, is improper rudder during the climbing part of the loop.

Spins are probably the funnest and easiest maneuver to do. At about 1/2 throttle, bring the nose up to a 45 degree attitude. Just before you think it's going to stall, use up the rest of the up elevator and add full left rudder and full right aileron. Down goes the nose, and the airplane rotates, not rolls, to the left. Center all controls and idle back the engine. The spin has probably already stopped, but you may want to add a little right rudder. When the rotations stop smoothly pull out with elevator. Add some power and come in for a landing.

Oh oh, you're a little high. Let's do a forward slip to lose the extra altitude. Add full downwind rudder, and then add enough opposite aileron to maintain a ground track to the runway. Remember that crossed controls lead to a spin, so keep the



Electric fuselage showing crutch "lightening" and upper cabin structure. Lower 1/64 ply not installed yet.

nose down and the speed up a little, but don't dive. The object is to use the fuselage like a speed brake.

Okay, at about five feet now, relax the rudder and level the wings. Watch that nose attitude, it may try to drop more than you thought it would. Settle on down to a wheel landing and roll out straight ahead. To make a good three-point landing, you will probably need to add just a touch of power during the roundout to ensure you have enough tail power to get the tail wheel down first and avoid a bounce. This is not easy to do perfectly in a Cub. You may get a little crowhop, but no matter. You are not moving very fast. If you are a hot Cub pilot you taxi back with the tail up. Hotshot!

Well, it's been fun, but I'm out of word count and have to go. But before I do, I have a confession to

make. I took the electric equipment out of the Cub and (temporarily) bolted on the OS 30 2-cycle engine. The airplane now weighs 3 lbs. and 8 oz. I took it out to the field and disgusted all those people who had become proud of me for being a dedicated scale pilot. I admit it, I became a hot rodder. I took off in three fuselage lengths, climbed to altitude in short order. I did a loop and noticed I had to pull the nose through from the inverted attitude. I did another loop, but this time I didn't pull it through. I flew away in level inverted flight with very little elevator holding the nose up. I know it was sick, but next I did an outside loop from level inverted flight, finishing at the same altitude I started at. This is not Cublike, I know it, and I am thoroughly ashamed. But it sure is fun.

Frankly, I am amazed at the interest in the Cub, and I know that because of this interest "The Cub is Safe," and will be for a long time to come. See you later and thanks. ●

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"IRON DOG"

(Continued from page 31)

trike gear, engine on its side for easy adjustments, and best of all, it's AFFORDABLE!

By employing a wide choice of finishing methods, the modeler can make his P-39 look very good. The simplest manner is to paint the ship with Formula U. This method is fast, and it will seal the foam from dirt and fuel. You will still be able to see the grain of the foam, however.

Another method is to take sheets of GM-grade silkspan, and make a thinned-down mixture of water, white glue and micro-balloons. Then dip the sheet of GM silkspan into the mixture, let the surplus drain off, then lay the wet paper on the wing. This will result in an easily-sandable, smooth surface which will take any finishing method. Three-quarter-ounce glass cloth or silk can be substituted for the silkspan if you wish. The glass will form itself around complex curves without wrinkling. Another method is simply to cover the plane with Econocoat or low-heat Colortex. But BE CAREFUL, or you could have a puddle of melted plastic, and no airplane left. The Byron kits are also constructed of molded foam. Byron recommends Econocoat or glass and epoxy.

This kit from Sure Flite has been around for years, and can be bought for under \$50. Any Sport 40 engine will power this gentle fighter, and if you bust it, a little epoxy or the foam sealer and Zap from Pacer will get your Iron Dog back in the air again fast.

We plan to cover the test P-39 with Goldberg's Colortex, paint it olive drab, and apply the decals supplied with the kit.

A K&B 40 model 4011, with an Ace Olympic 5, will control the second of our All-American Specials.

Just because this aircraft is made of molded foam and is inexpensive, don't pass up this great little scale trainer from Sure Flite. And would you kindly let us know if you have any other successful covering techniques?

R. Edwards, SR/CM

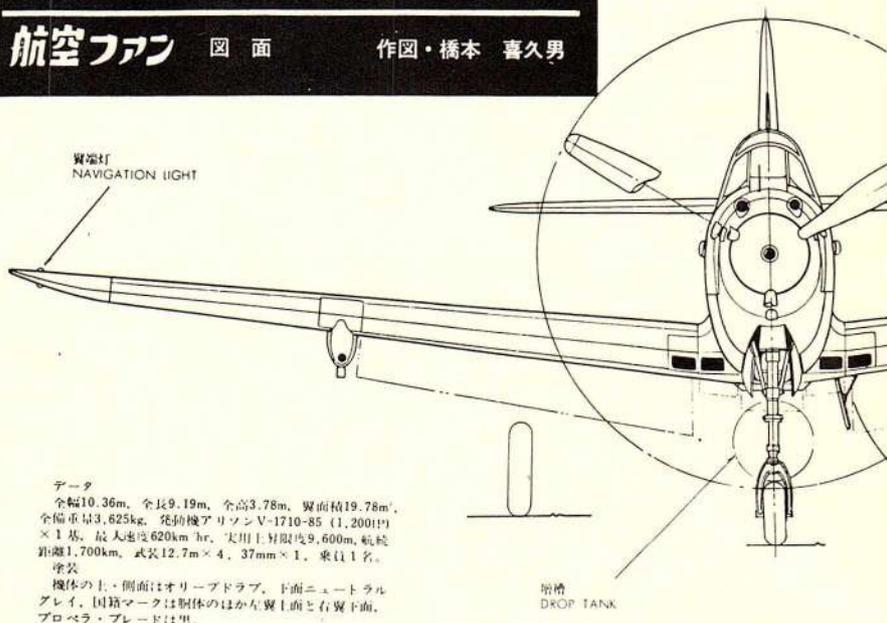
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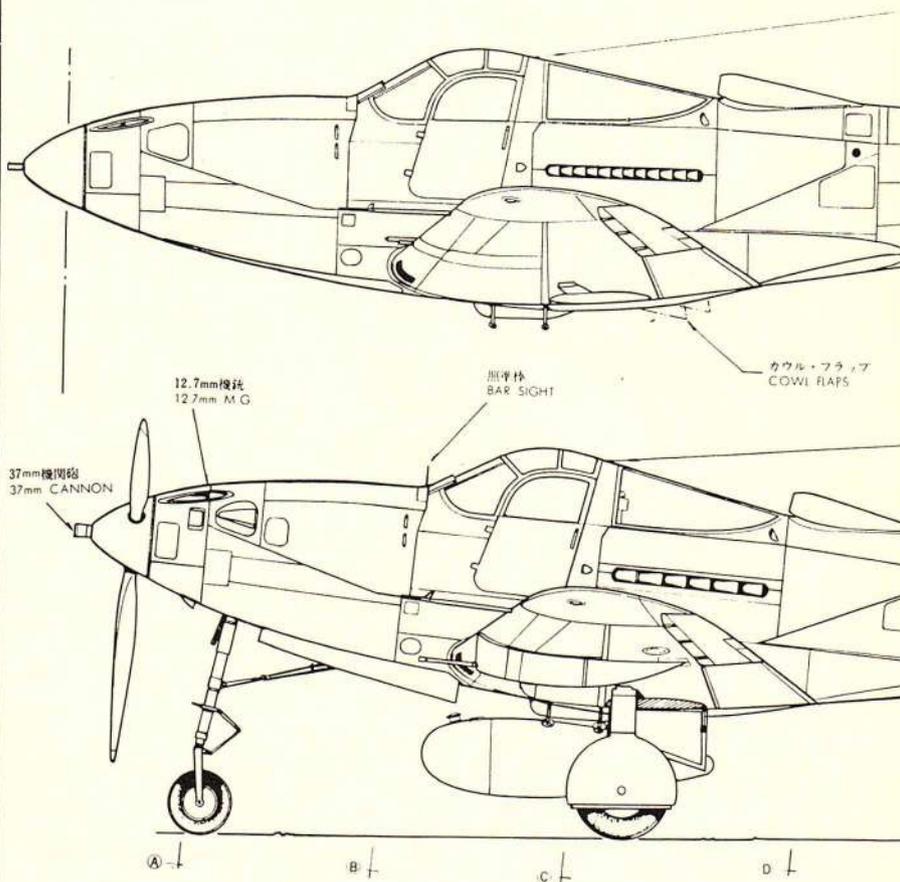
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ベル P-39Q エアラコブラ戦闘機

航空ファン 図面 作図・橋本 喜久男



(P-39Fの側面図)



THE KOKU-FAN DRAWINGS

SCALE $\frac{1}{32}$

0 1 2M

丸窓は黄色
YELLOW TOP

エルロン
AILERON

ヒト一宮 (左翼)
PITOT HEAD (PORT WING)

ランディング・ライト (左翼)
LANDING LIGHT (PORT WING)

ガンポッド
GUN POD

12.7mm機銃
12.7mm M G

カウル・フラップ
COWL FLAPS

フラップ
FLAP

エンジン エア・インテーク
ENGINE AIR INTAKE

ステップ
STEP

航法灯
NAVIGATION LIGHT

タブ
TAB

エルロン
AILERON

THE KOKU-FAN GROUP
JSS
JAPAN SUPER SCALE PRODUCTION

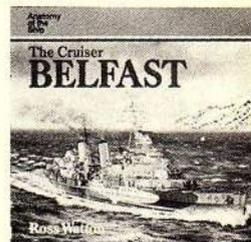
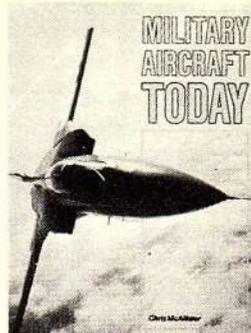
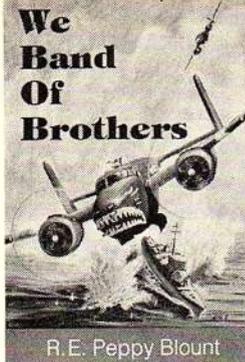
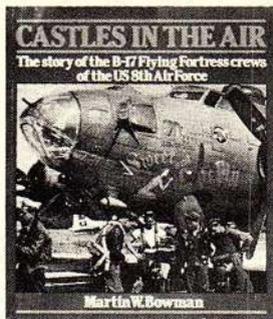
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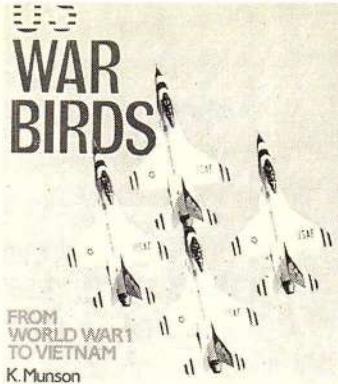
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1/8 AIR FORCE

(Continued from page 35)

just didn't know who else would be good-natured enough to accept it. Glen showed the troops how much fun scale can be by flying his Cessna over and over again, all weekend, and bringing it home in one piece.

George Normington totalled his giant scale AT-6 in a spectacular crash late Saturday afternoon. (Ed. comment: As our models get larger and heavier, the crashes seem to be getting more "scale"-looking too, with the ultimate destruction of the aircraft usually a result of the in-flight failure of some component.) Services were held by George and friends over the smoking hole in the desert and local jackrabbits were seen packing up their housewares and moving to New Mexico . . . they've had enough of our goings-on!

"The People's Choice" Award is always an interesting one, because it often goes in the opposite direction from where you think it will be awarded. The winner this year was the really big "Betty Jo" F-82 Twin Mustang, owned and flawlessly flown by Jerry Kikkert and Billy Hemple. Colonel Bob Thacker, who flew the original full-scale "Betty Jo" (named

after his beautiful wife) in its record-breaking nonstop flight from Honolulu to New York (that record still stands), was in attendance, and heartily approved the award. The real Betty Jo still allows Colonel Bob to "play" with his "toy planes" even after all these years! Who says wives aren't supportive of our hobby?

"Best Military Fighter" was won by Gary Porter of San Diego, California, with his Byron F-16 meticulously done in two-tone gray camouflage.

It is very interesting to note that, at this fly-in, Byron Originals models won *four* out of seven awards! That's got to tell us something!

Another interesting aircraft seen at the meet was a very nice Helldiver, complete with all the options, owned by Bill Miksel of South Elgin, Illinois. His big bird was powered by an OS 108 swinging a 17/6 prop at 7,000, and weighed 15 pounds. The scale is 1.5 to 1.7. Servos did the motivating job, and the belly was kept from dragging by Robart struts on Dave Platt retracts. Bill belongs to the Fox Valley Aerial Club out there in Illinois.

The "Gray Eagle" himself, Eldon Wilson of San Angelo, Texas, has been modeling for *fifty* years, and in R/C since 1951 (that's thirty-five years, folks!). He has won the "Gray

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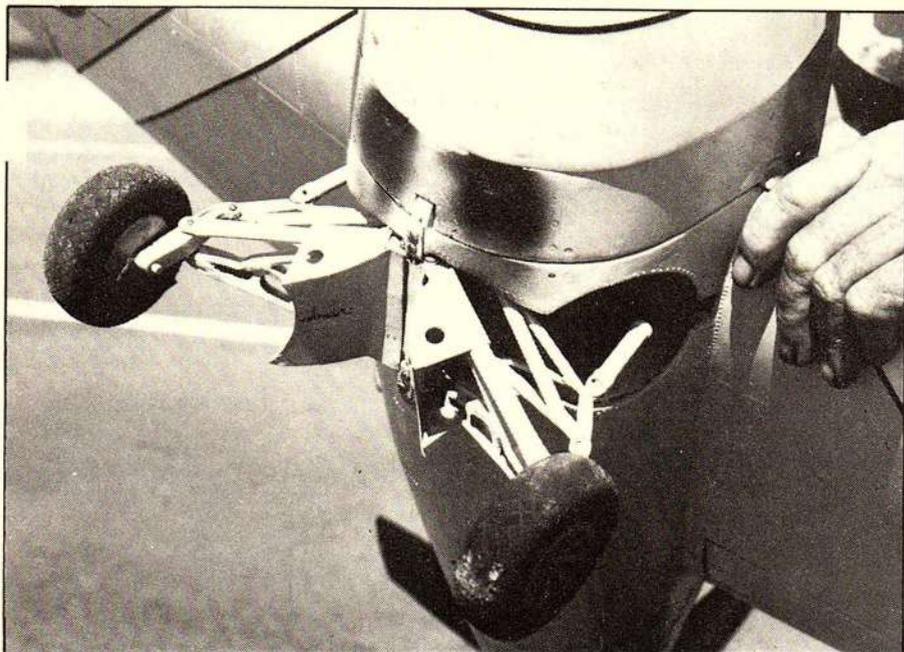
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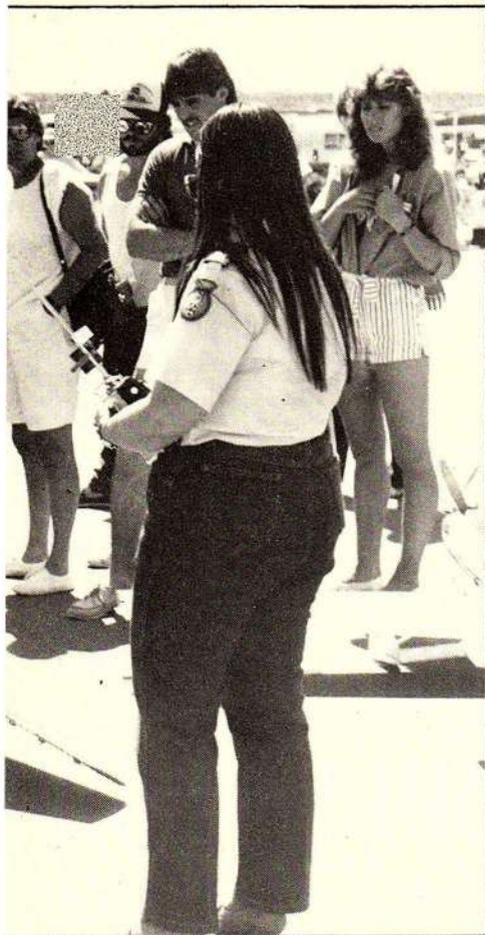
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The Grumman "Wildcat" built by Eldon Wilson of San Angelo, Texas, features his own-designed-and built scale retracts.

Dennis Crooks and his dedicated Crew Chief spent hours demonstrating the R/C-controlled folding wings of his "Avenger." Spectators loved it.



Eagle" Award, which is given to the oldest contestant who builds and flies his airplane at the contest, so many times that he finally retired it, because no one ever shows up to beat him at it. Eldon told us that he likes to design, build and fly his own aircraft, and also fabricates *everything* in the airplane including the gears, canopy, glass, instrument . . . everything, *himself*. He even consulted with a Grumman engineer to help him design the complex Wildcat landing gear. Now, that's dedication!

Rick Meyers, "Mr. Hellcat," from Hollister, California, brought another one of his very scale F6Fs and flew it extremely well. Sometimes it's good to really specialize on *one* aircraft so that you get to know the performance of that model and its systems.

Over this very pleasant weekend, 190 registered contestants flew their model aircraft, and over 4,000 spectators enjoyed an ideal Scale R/C Fly-In. When the flying was over on Saturday evening, everyone gathered at the Satisfied Frog, a local watering hole, and an excellent (eat all you want!) western meal was enjoyed by hundreds. After the food came an excellent program of prizes, followed by entertainment featuring Al Casey And His Friends on the bandstand. After the show, Al got an offer to be the featured performer at Chippendale's in Hollywood, but he had to turn it down because they couldn't find a bikini to fit him.

As is obvious from this report, a great time was had by all. These fly-ins are held twice a year. Watch this magazine for the dates, and make sure you get to the next one . . . you'll have a blast!

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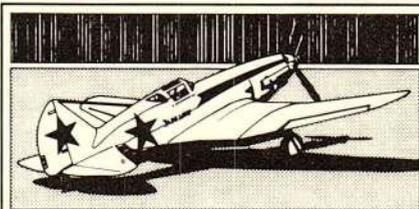
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PITTS S2-A

(Continued from page 47)

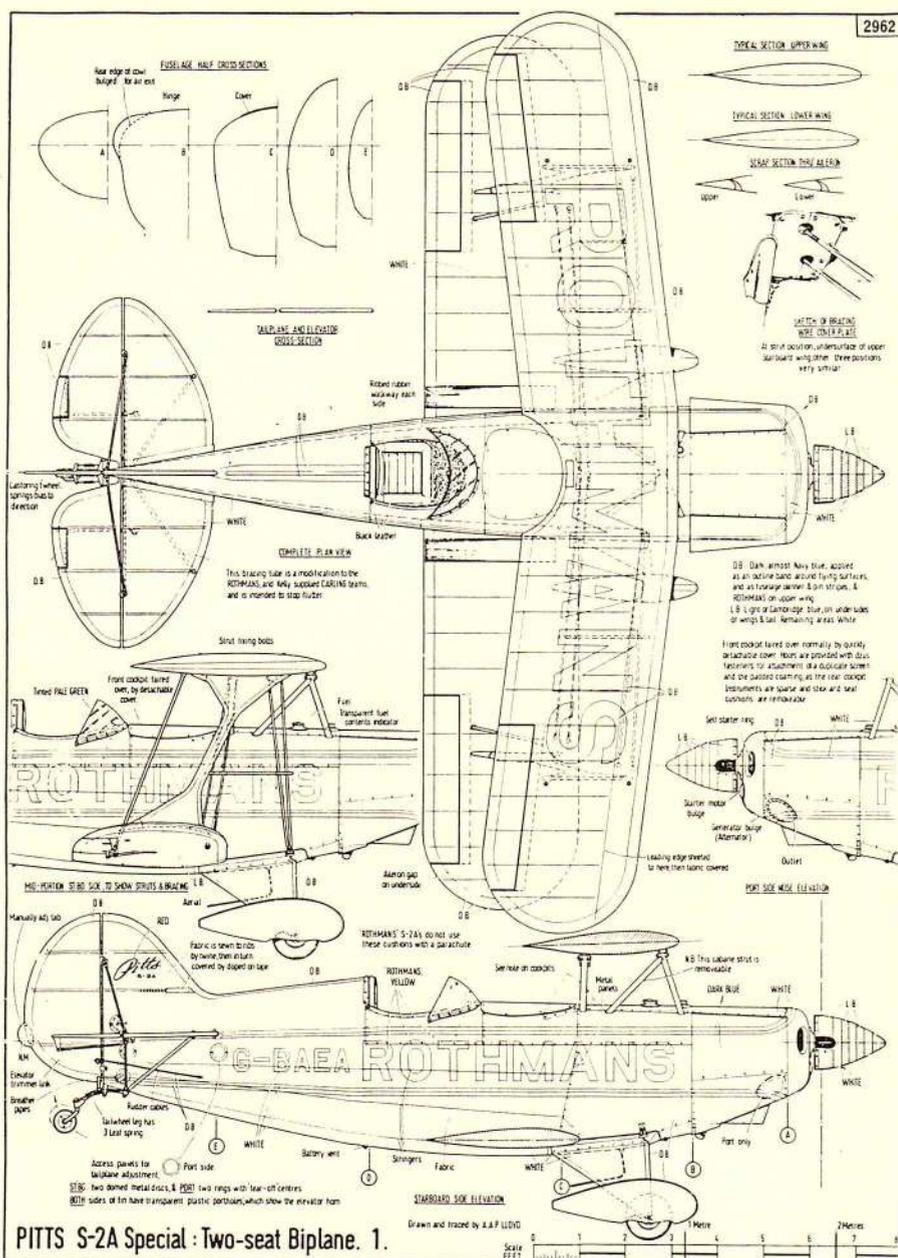
simulate the aluminum skins on the original and spruce strip to replicate the side stringers. The sides are canted in just like the steel tube space frame.

You can build both 'pits open or do as we did with N22Q and close up the front 'pit. We vacuumformed a canopy from 1/16-inch polycarbonate plastic; a pattern for the mold is shown on the plans if you want to pull one yourself. Ditto for the two-hole canopy, although I measured a T&D Fiberglass canopy for their 1/3 scale Christen Eagle and if it's cut down, it is a very close fit. I will supply rear cockpit canopies for a nominal sum if the demand warrants it. Write for pricing.

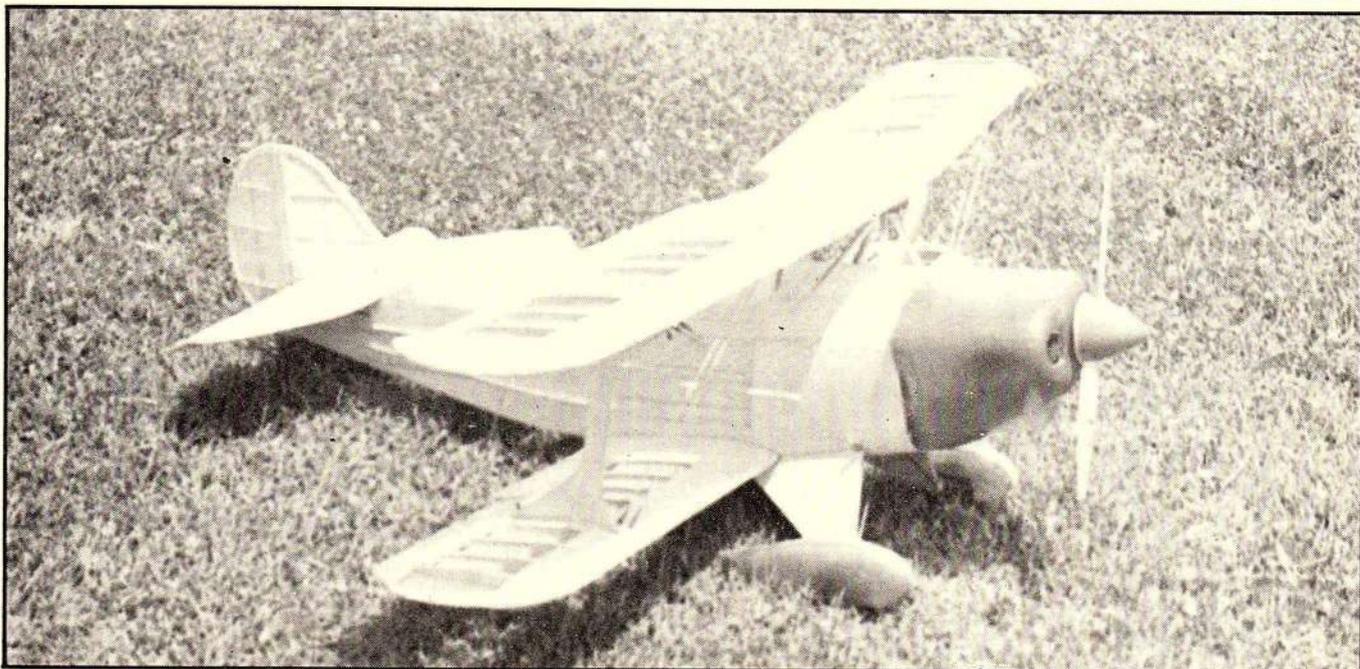
The cowl was molded to my drawings by Fiberglass Master and will fit your project perfectly if you stick to the plans. It is a fantastic piece of work and worth the \$17 you'll pay for it. The Enya 1.20R fit horizontally with room to spare. If you use a Quadra you'll have to invert it. In fact, unless you can get flying weight below 12 lbs, you'll have to use a 2.0 inch Quadra or equivalent.

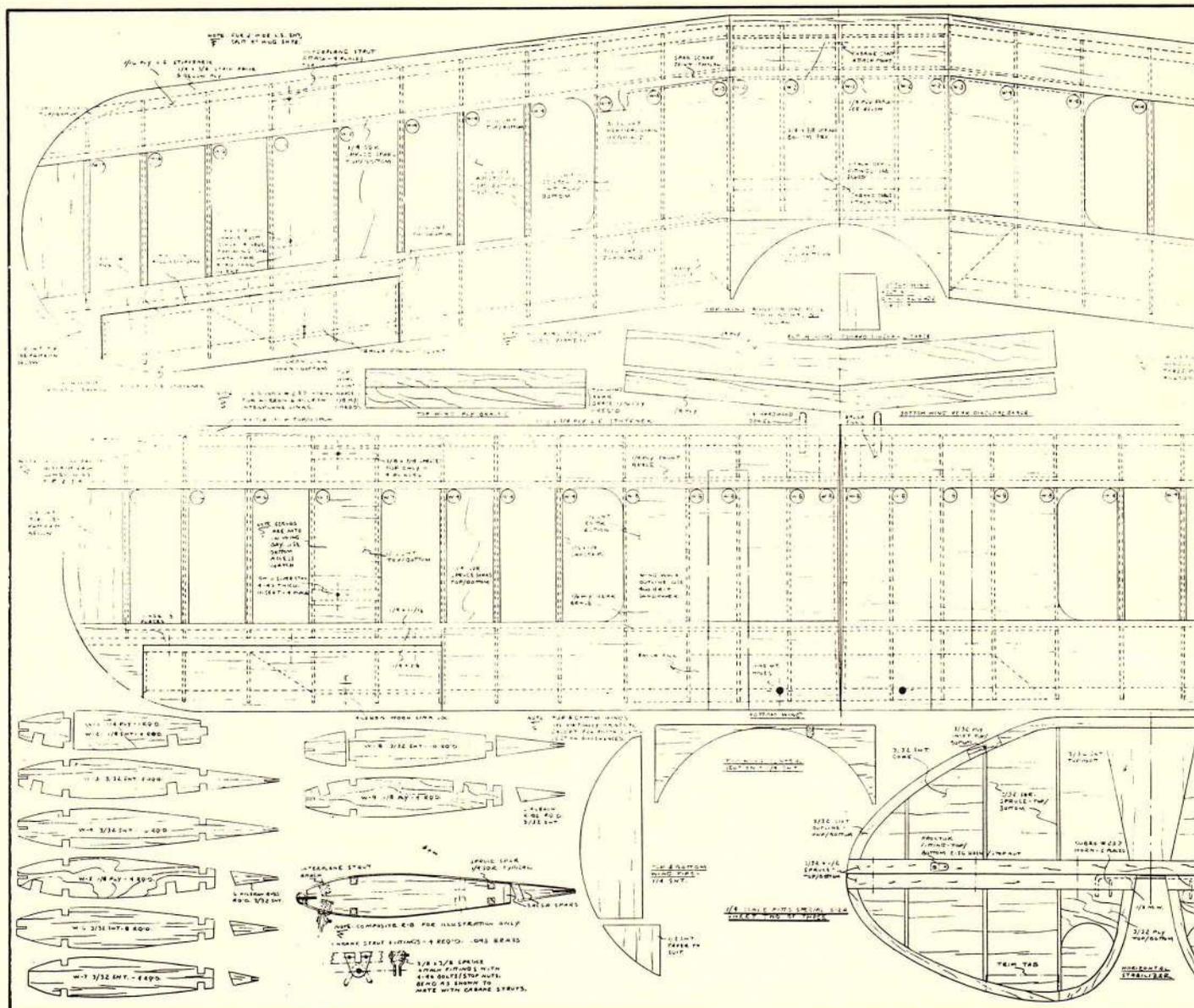
Don Schreiber built the prototype and went all out on the covering and detail. He used Super Monokote to keep the weight down and managed to duplicate N22Q down to the

The all-balsa construction is evident in this uncovered view of Tom's S2-A. For smaller aircraft, many believe that balsa is the better medium.



PITTS S2-A Special: Two-seat Biplane. 1.





This was easily done since the Enya plywood mount only had to be shortened 1/2 inch to put the spinner in the same location. Of course we also put in a new Kraft tank and gas lines too. The inverted Quadra required only a minimum amount of

cowl trimming underneath. Incidentally, all the pix show the bird with the Enya installed.

Marv Anderson, local giant scale builder/pilot and IMAA activist, agreed to do the test flying with the Quadra. The engine was fired up,

Marv taxied out and within 50 feet the Pitts was in the air. The Quadra had moved the C.G. 5/8 inch forward which turned out to be just right. Marv did run in some elevator down trim and this is all he did. In his words, "She's a pussy cat, flies beau-

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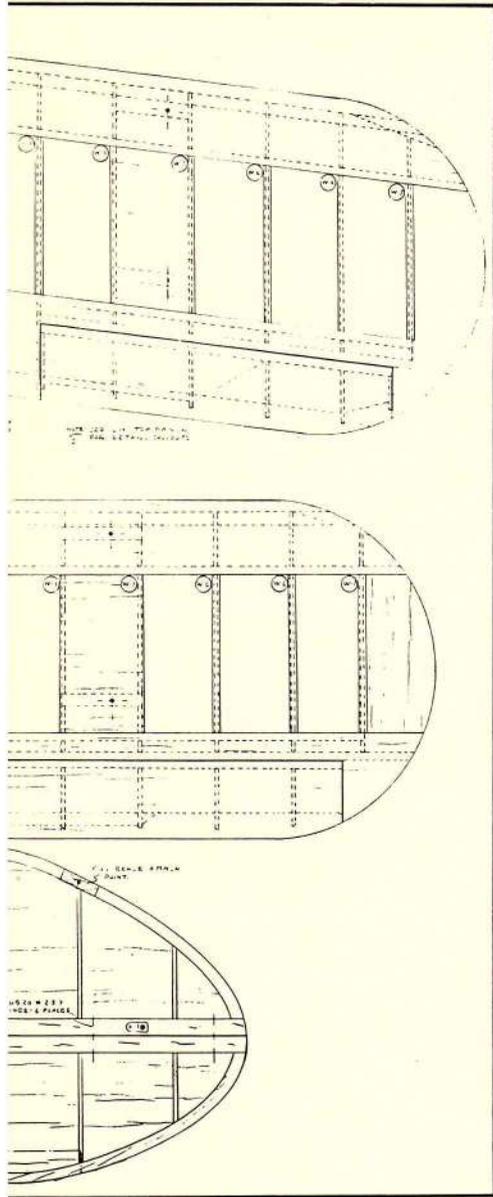
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Tom Houle is proud of the flying abilities of his Pitts S2-A. Its aerobatic capabilities match those of its full-scale counterpart. Looks like Tom has his own flying field right there on his farm in Wisconsin. Tom says that the snow goes away in June and returns in July but ten days a year of great flying weather isn't bad. (Just kidding, Tom.)



her paces—loops, axial rolls, hammerheads, even a knife edge was tried. He noted that the barn door-like rudder is really effective and that you gotta carry some power on final. Like the real one, it doesn't glide too well. We are satisfied that it's fully capable of meeting the needs of the sport or serious aerobatic pilot. We revised the stabilizer setting on the plans from zero to one-half degree positive to eliminate the need for elevator trim. The *new* balance point is there too! Other than the two-three inch Quadra series, the OPS 30 and twin cylinder powerplants would also work. The cowl is wide enough to accept most twins.



This top view shows the distinctive black-and-white paint scheme, and the covered front cockpit (flown that way for solo work).

tifully, but think what she'd do with a three-inch Quadra!" He likened its flying characteristics to the Great Planes Aeromaster—a compliment indeed.

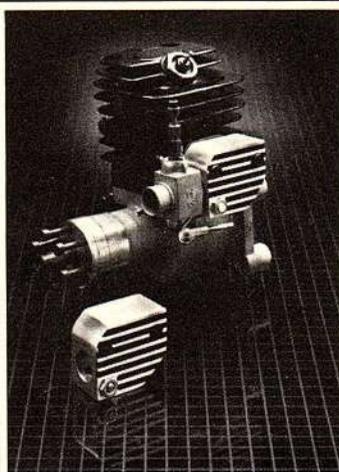
Some guys just never get enough! Marv really put the Pitts through

Give the Pitts a try if you think you can stay ahead of her. You won't regret it. And keep in mind too, while most Pitts have a reputation for awful ground handling, the Tom Thumb Pitts is a "pussy-cat" on the ground and in the air.

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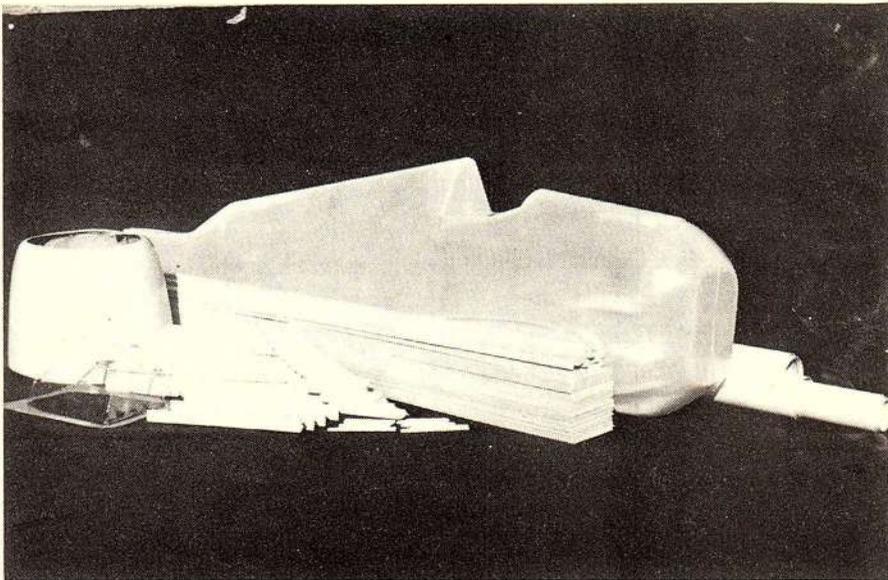
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GRUMMAN F6F HELLCAT

(Continued from page 39)

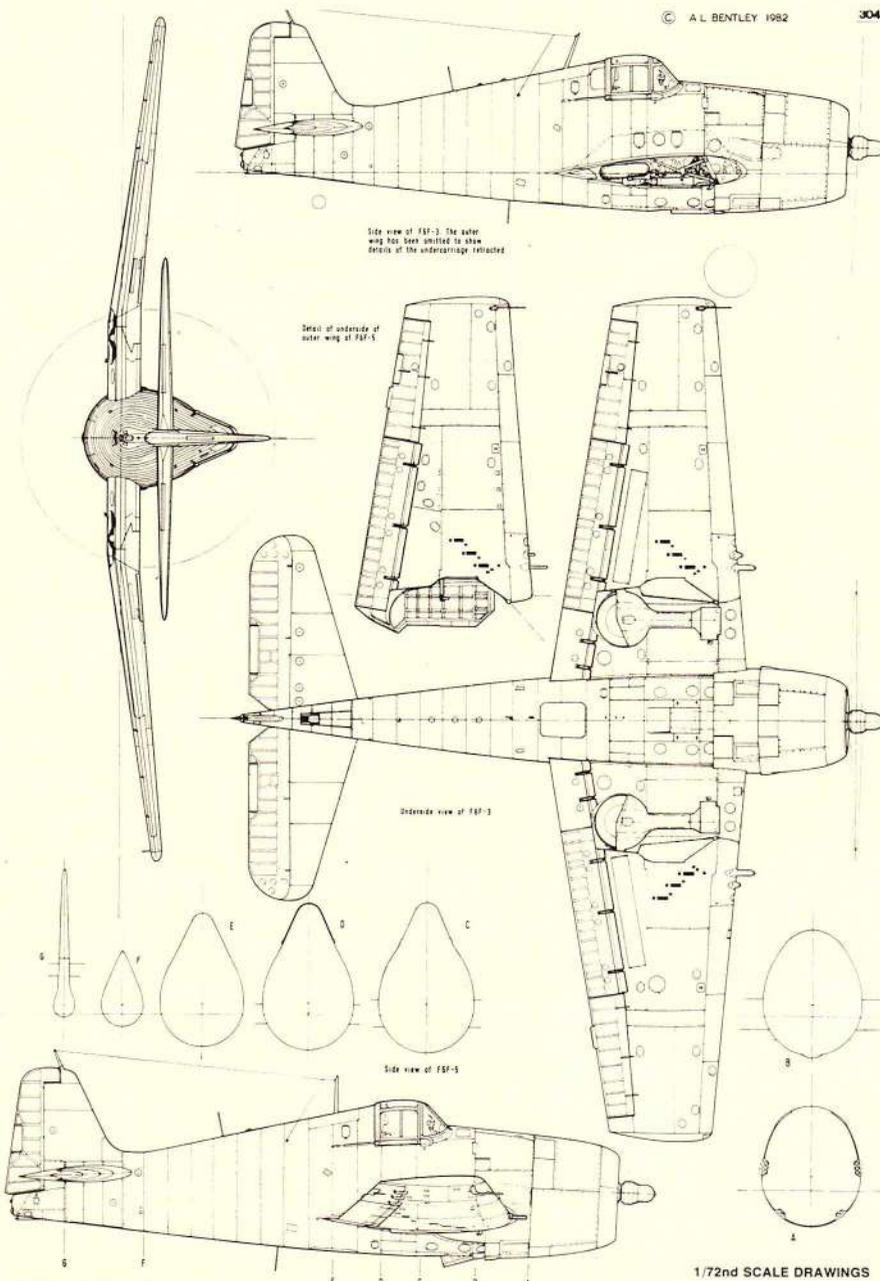
The wood and glass work received in the Bob Holman Kit were excellent. All wood was chosen in the right weight for the job . . . ribs were hand-sawed to shape.



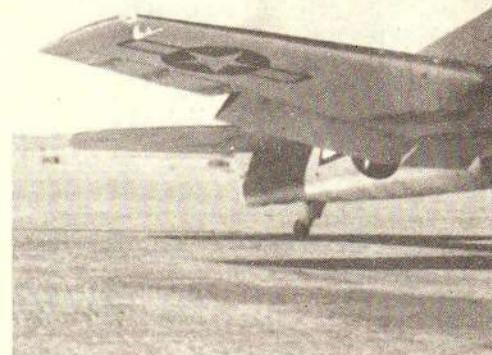
Bob also supplies a good-quality wood kit with machine-cut wing ribs and other wooded parts and pieces ready to install.

Those of you who follow the Scale Masters Contest are undoubtedly aware that there are always some Brian Taylor/via Bob Holman plan aircraft in the winners' circle, such as Kent Walters' legendary SBD, and Dennis Crooks' beautiful wing-folding Avenger, among others. (See *SRM's PLANES OF THE MASTERS Special*, Summer 1986, Page 97.)

If you're a dedicated scale builder, you must start with truly scale plans, and Brian Taylor Plans are that. You won't put one of his scale aircraft together in just a few hours, or even a few weekends, but then, any model worth having is going to take extra time and effort if you plan to make it into the winners' circle, and it had better be true scale because our scale judges *know* what the full-size aircraft look like, and they're getting better all the time. At the recent Toledo show, the winners' circle boasted an excellent Hellcat from Brian Taylor plans.



1/72nd SCALE DRAWINGS

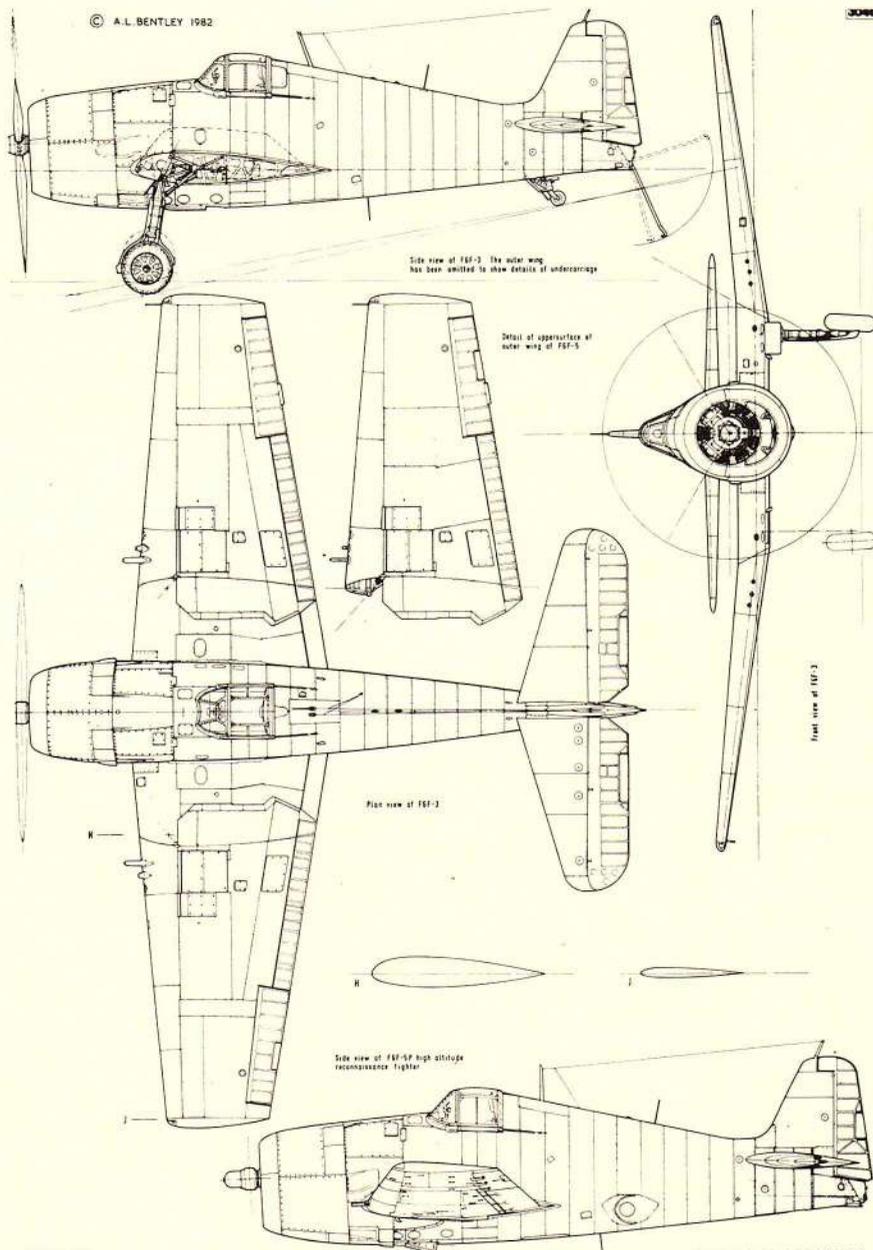
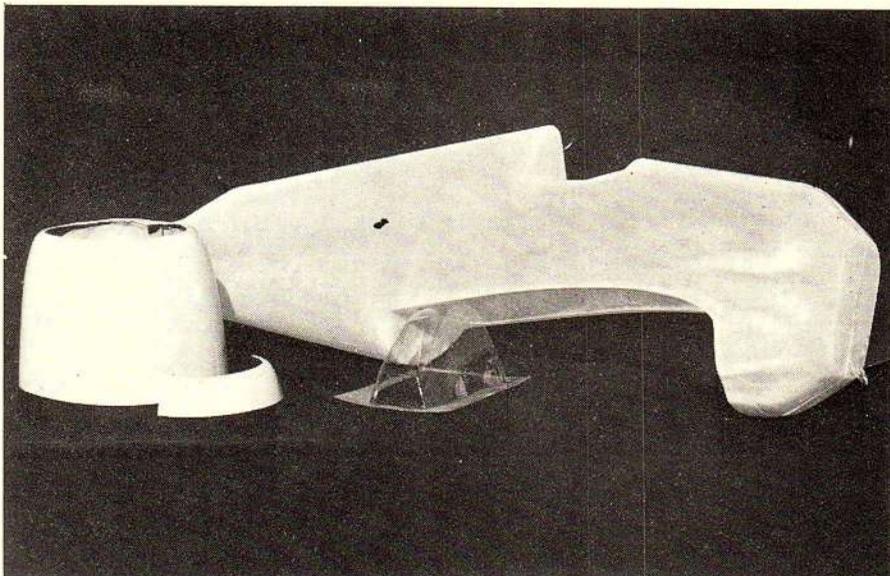


Published plans by Brian Taylor feature a built-up fuselage; if the builder prefers, Bob Holman's kits have glass part to save time. The workmanship is very good.

For extra help, you Southern California modelers out there are lucky to have, close by, The Planes Of Fame Museum in Chino, California, which has a very nice flyable Hellcat on static display.

For added information and finishing help, I find that a large, coffee-table-size hard-cover book entitled: "The Great Book of World War II Airplanes" by various authors, illustrated by one of the greatest airbrush artists of all time, is the ultimate assistant for us scale modelers. It contains over 400 full-color illustrations by Rikyu Watanabe which are masterpieces of detail, and all are suitable for framing. The book is published by Zokeisha Publications Ltd., 106/641 5th Avenue, New York City, NY 10022. This thick volume has sections devoted to the P-38, the P-51, B-17, Hellcat, Corsair, Spitfire, Mosquito, Lancaster, Bf-109, FW 190, Stuka, and the Zero. Its illustrations are *so real* that it's hard to imagine the amount of time and work put in by the talented artist who did these over 400 superb illustrations . . . each one better than the last. Get it if you can . . . it will be a very useful addition to your aviation library. ●

The "Hellcat" isn't a long, sleek, beautiful aircraft . . . it was designed for one purpose only: to be a better fighting machine than the Zero . . . and it was!



BENTLEY

TIMMAN HELLCAT

1/72ND SCALE DRAWINGS

scale r/c modeler 81

TOLEDO '86

(Continued from page 17)

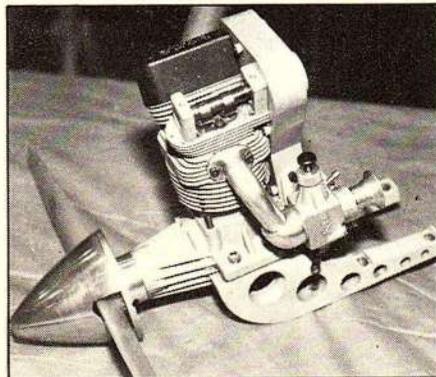
A very good Lake Amphibian (one of my personal favorites) made by Alvin Ozminski from a Mr. G Kit, came in second with his seldom-modeled but attractive aircraft.

A photo portfolio is presented, showing some of the products, personalities and highlights of the show.

Congratulations to the "Weak Signals" Club and the Show Directors, for a very difficult job, extremely well done!



Giant Scale Helicopter, like this Bell from Schluters, has enough room to detail the interior. Notice the excellent Medivac area in the body of this big Bell.



K&B's new four-stroke with four valves will be released in about 12 months.

Jackscrew Linear Operating Electric Servo

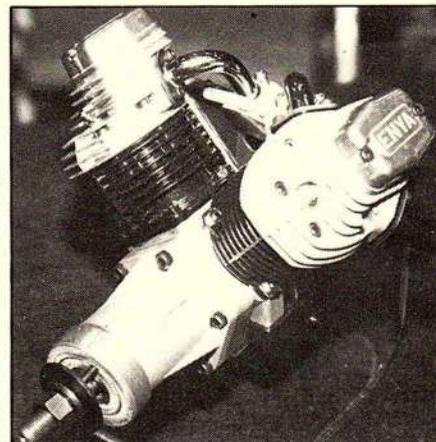
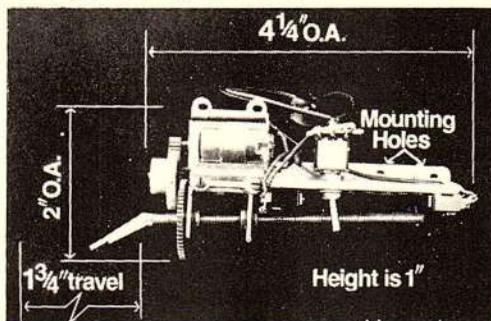
- Operates landing gear, flaps, doors & accessories
- Up to 10 lbs. of thrust **POWER**
- 1 3/4" travel gives scale operating time for landing gear

(at 9 volts the Jackscrew will deliver 7 lbs. of thrust with 1 3/4" travel in 8 seconds.)

For FREE brochure & performance data, write

Janaco

11323 Cotillion
Dallas, TX 75228



The new Enya four-stroke V Twin features twin carbs to properly set up each cylinder. Looks to be about 240-size.

R & M 1/4 SCALE SPECIALISTS ANNOUNCES:

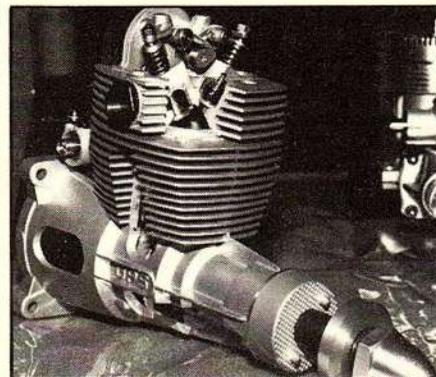
- A Growing **New Concept** in Building that Rare **Giant Bird**
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- AAA Grade Woods Used Throughout
- Send Us Your Plans and We Will Cut Those Complex Curves **and Costs.**
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OPS also had a new four-stroke with a belt drive to the cam on the head. Foreign engine manufacturers are really doing a lot of research on this segment of our hobby, and they're coming up with some great new products.

Polk's Sensible Costs bring you multi-dollar savings + top quality



2 CHANNEL DIGITAL PROPORTIONAL RADIO CONTROL

With 2 high torque servos. Battery box. Receiver. And switch harness. Available on 75 MHz only. F.C.C. approved.

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Features: Servo reversing. Mixing. Dual rate. Metal case. Open gimbles. And new 72 frequencies. 3 servos. Dry system. Only

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1991 Narrow Band

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\$30.00

AA NICAD BATTERY
4.8 NICAD PACK
9.6 NICAD PACK
HUMP BACK NICAD PACK
FLAT NICAD PACK
D.C. Multi-Field Quick Charger

NEW! HIGH TORQUE INDIRECT DRIVE SERVO



with 42 in/oz torque available for only **\$9.00** 10 servos **\$85.00**

Futaba type connector **\$2.50**
Specs: centering 1/2 deadband. 0.10 ms. 36 degrees. Size = 1 1/2 long. 3/4 wide. 1 7/8 high. And weighs 1 1/2 oz. per servo. Water resistant fiberglass case

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6-10 amp, 12V with proportional reverse for boats. **\$18.00**
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Both with plug to fit Challenger radios

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- Charger for 6V-12V w/circuit breaker
- 750MA for gel type or wet batteries
- LED lights shows selected voltage

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ARISTO STARTER

High torque-50lb on 12V battery. The biggest daddy of all starters. One year guarantee.

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HEAT SEALING IRON

- Constant heat thru "thermoknob" control
- "wipe clean" long life teflon glides over material without marring
- cone nose for hard to reach areas
- "Up sweep" front prevents "digging"
- Versatile for all heat sealing
- One piece long life plated handle/jointing plate
- Stand included
- Only 11 ozs.



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- Wide nozzle included
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- Adjustable air intake
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ENGINE TEST BLOCK

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- Mounting bolts
 - Retaining pins
 - Pins
 - Locking bolts



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PREBENT PUSH RODS

- Prebent end to fit servo arm/wheel
- Double prebent ends 10 for **\$1.00**
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- Advanced integrated circuitry
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LOCKING GLO PLUG CLIP SET

Secure grip design resists engine vibration **\$4.00**



2 CHANNEL PISTOL GRIP WHEEL R/C ON 27MGHZ



2 channel pistol grip wheel r/c on 75 MHz. Easy handling for high speed racers with 2 high torque servos. Battery box receiver. And switch harness.

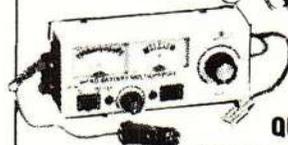
\$64.95

COUNT DOWN TIMER

Up to 99 minute count-down to remind you of flight limits. Small size will fit on radio strap.



\$8.00

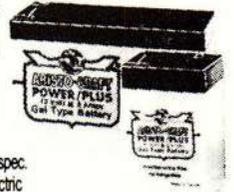


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for nicads, w/motor tester and auto shutoff

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The highest quality industrial spec. Battery good for powering electric powered models. And the large size fits any field box for starters and panels can be used in any position. And is smaller than comparable motorcycle batteries

12V 6 amp **\$20.00** 6v 4 amp **\$10.00**



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For power starts of any engine size.



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500 MA, highest quality Japanese battery. No limit at this price. **\$1.25**
(12 needed to convert Nos. 2000 & 302 FX)



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HUMP BACK NiCd PACK

For R/C cars and boats **\$20.00**
7.2V 1200 M.A. also flat 7.2



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CHARGER

For Aristo radio systems, transmitter and receiver **\$6.40**



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