

RCM



JULY 1981
49115

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THE WORLD'S LEADING

CONTROL ENTHUSIAST



RCM MODELER



VOLUME 18

NUMBER 7

USPS 509190

ISSN 0033-6866

JULY 1981



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This Months Cover

Alluring Miss Tracy Write displays a Bob Holman P-47 with an O.S. .90, flaps, retracts, bomb drops and Kraft Signature radio. Model weighs 11 1/2 lbs. Aircraft built by Brian O'Meara. Ektachrome transparency by Roy Toma.

RC MODELER is published monthly by R/C Modeler Corporation, Don Dewey, President. Editorial and Advertising offices at 120 West Sierra Madre Boulevard, Sierra Madre, California 91024. Telephone: (213) 355-1476. Controlled Circulation postage paid at Los Angeles, California and Sierra Madre, California. Contents copyright 1981 by R/C Modeler Corporation. All rights reserved. Reproductions in whole or part, without written permission of the publisher, is prohibited. All prices appearing in this magazine are subject to change without notice. All subscriptions will be taken at the prevailing rate. Postmaster: send address changes to R/C Modeler, P.O. Box 487, Sierra Madre, CA 91024.

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SUBSCRIPTION RATES: The United States \$24.00 per year. \$47.00 two years. Single copies \$2.25 U.S. each. Foreign subscription including Canada and Mexico \$32.00 for one year (no two year foreign). For further information, see subscription ad. Change of address notices, undelivered copies and orders for subscriptions are to be sent to P.O. Box 487, Sierra Madre, California 91024. Allow 6 weeks for new subscriptions and changes of address. Back issues available: \$2.50 U.S.

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FROM THE SHOP

Don Dewey



John Brodbeck and Carl Goldberg with the prototype of Carl's new Eagle trainer, K & B .40 in the nose.

RCM's two Dicks are quite a pair. Sometimes they seem to disappear and I don't even know they are gone until they return with lots of enthusiastic words about what they were involved with.

Recently they returned from a local flying field after a session with Carl Goldberg and John Brodbeck. Carl had the prototype of a new trainer that will be introduced later this year and had asked our guys to come out to fly it and comment on it. John was there because Carl's airplane, which he has named "Eagle," uses a K & B .40 engine.

Our guys flew the Eagle, discussed the quick, easy to build concept, and made their comments. That, in itself, was no big thing. The part that got them turned on was that Brodbeck flew the bird. For the first time in 23 years, John was flying a R/C airplane and doing a damn good job of it. There is just no substitute for talent!

Then, after our guys returned from the Weak Signals Twenty Seventh Annual R/C Expo in Toledo, I had to put up with some more of their ravings — not about the show, this time it was the Space Shuttle landing. Somehow they managed to obtain fully accredited press credentials to attend the landing at Edwards Air Force Base. Oh well, at least it kept them out of trouble for one day.

* * *

In our efforts to stay abreast with the trends of activity in R/C, we closely follow the club activities as reported in newsletters. For years the major activity has been the casual Sunday flying. As flying skills improve, the need and desire for group participation events become important. Fun fly contests have now replaced the pattern contests of the earlier days for most of the R/C clubs.

We have received a letter from Horace Cain, AMA Dist. VI Vice President, advising of the following Fun Fly program that starts with qualifying contests in each of the four states in District VI and progressing to the regional championships.

A.M.A. Club Team Fun Fly State and Regional Level

All A.M.A. clubs in District 6 may send 1 or 2 teams consisting of 2 main fliers plus a maximum of 2 optional back-up fliers per team to their State Championship Fly Off. Contact your State Contest Director listed below for further details. Preregistration is requested 3 weeks before State Meet to aid the state meet set up. Registration and fees will also be accepted the day of the State Meet. Entry fees are to be used for host club expenses, trophies, and prizes. We have a goal of at least 4 rounds each day. The six highest scoring teams will be eligible to compete at the Regional Championships, September 26th and 27th (place not yet final).

4



For the first time in 23 years, John Brodbeck is flying an R/C airplane. The craft is Goldberg's new Eagle.

Regional Contest Director is District 6 Vice President Horace Cain, 525 Weidner Road, Buffalo Grove, Illinois 60090. No substitution of team members will be allowed from the beginning of State Meet to the end of the Regional competition. Forming of teams will be the responsibility of each club from its membership only.

Rules are the same for both State and Regionals. Teams must be A.M.A. members and hold an F.C.C. license. All A.M.A. safety rules apply, plus local field rules as outlined by your Contest Director. Mufflers are mandatory. Each flight will consist of 5 items flown in this order: (1) Bomb Drop; (2) Loops; (3) Limbo; (4) Touch and Go; and (5) Landing. No restarts after take-off and no fly-bys. An attempt will be counted when the plane is on its heading and within 200 feet of its objective. Only 2 members of a team will fly each round. If a change of fliers is made, it must be cleared with the Contest Director before the start of a new round. All flight scores count. Detail descriptions of the 5 items may be obtained from the contest coordinators.

Illinois:

Champaign, Illinois, August 22nd, Noon and August 23rd, Champaign County R.C. Club, Contest Director: Jack Murray, R.R. 4, Champaign, Illinois 61820. (217) 643-7440.

Indiana:

Plainfield, Indiana, August 22nd, 10:00 a.m. and August 23rd, Plainfield Screaming Eagles R.C. Club, Contest Coordinators: Dave Bloomer, 860 Longfellow, Plainfield, Indiana 46168; or Larry Ross, 1541 Oubert, Plainfield, Indiana 46168, Contest Director: Leo Dickey.

Kentucky:

Lexington, Kentucky, August 15th, Noon and August 16th, to page 202



Goldberg's Eagle is one clean machine.

SUNDAY FLIER

Ken Willard



Fascinating! Absolutely fascinating. About two and a half years ago, give or take a few months, my friend Bert Williamsen, a retired United Airlines captain, came over to my house and said, "Take a look at this." He tossed up a small balsa glider, and it sailed smoothly across the lawn and landed on the other side.

"What do you think of it?" he asked.

"Glides nicely," I opined.

"Recognize the model?"

"Not really, but it does look somewhat familiar."

"Take a closer look."

So I did. In profile, the fuselage was a scale Boeing 727. In planform, it was anything but a 727. It was a canard!



Bert had been making some studies, and had a theory that changing the supporting surfaces of the 727 into canard configuration would result in higher efficiency. The idea was, and still is, intriguing.

A short time later, Ilon Kroo, a graduate student in aeronautics, let me fly his tailless biplane glider. You may recall the photo of it which I published; it was fitted with an .049 engine to get it up to gliding altitude. During these flights, Ilon mentioned in passing that he was studying various configurations for full scale aircraft to see if efficiency could be improved. In the course of his studies, he analyzed a canard conversion of the Douglas DC-9. An interesting coincidence with Bert's 727 model experiments.

All this got me interested in canards as something different to discuss with all of you (remember how we beat the downwind turn theory to death, but it won't die?). Also, the Star Cobra design in the December 1980 RCM elicited a very heavy mail response. So I rambled on some more on canards.

And here's what finally made it all so fascinating --- not just that canards are involved, but the widespread simultaneous efforts that were, and probably still are,

taking place. John Bottomley of Idmiston, Salisbury, Wiltshire, England, wrote to me. Here's his letter.

Dear Mr. Willard,

Further to recent articles and correspondence on canards and tandem wing aircraft in R/C Modeler magazine. Please find the enclosed copy of "Aerospace" --- containing my article on "Tandem Wing" aircraft. It was intended as a broad based resume on past developments, plus details of work I did whilst studying for my M.Sc. at Cranfield Institute of Technology. Any part you may wish to reproduce would need to be cleared by the 'Editor of Aerospace'; but I guess the old Xerox copy to interested parties would be okay.

My own particular interest lies with the designs by Msr. M. Delanne --- one day I shall get around to building a 1/4 Scale Arsenal Delanne 10C2. I was, therefore, very interested in the mention of an article on Delanne which I didn't know about. I wonder if it would be possible to "scrounge" a copy of the "Air Trails," October 1950, article on Delanne.

Finally, and please forgive the cheek; you couldn't pop a couple of R/C Modeler decals in with it.

Yours sincerely,
John Bottomley
England

I didn't have time to get a clearance from the Aerospace Magazine editor so I could give you the whole story, but suffice it to say that John made a long, very technical analysis of possible canard versions of full scale aircraft. His comparative study of the BAC One-Eleven Series 500 in its current configuration as contrasted to a modified canard version showed a definite advantage, overall, to the latter. As I said --- fascinating!

• • •

In the March issue of RCM I asked two questions and solicited your thoughts. Wow! I never knew how much interest there was in canards, their history, and their performance. Thanks to all of you who wrote in; there isn't any way I could publish all of your thoughts, but most of you will see immediately that others were thinking along the same lines. I've picked out some of the most representative replies --- and some of the most absurd. Here they are.

The first question was, "Why is a canard called a canard?" The first letter in response came from my old friend Drew Allen.

Ken:

It was interesting that just a day or two

before receiving the latest RCM, I was reading "Rothskellers Historical Anthology of Word and Phrase Origins," Sir Hartford Manley, ed., Burnham and Sons, London, 1958. In the comments on Canard (pg. 42) we discover the following.

In 1926, two Frenchmen, Henri Duteuil and Jacques Boyer, were experimenting with an aircraft design in which the horizontal stabilizer was placed ahead of the main wing, creating a normal appearing aircraft except that it was to fly in a manner which made it look as if it were tail first.

The efforts of the two Frenchmen were being financed by a wealthy American sportsman, William Jacoby, who was present to watch the first flight attempt. The day before the first attempt, the group had spent some time together in Mr. Jacoby's favorite pastime, hunting. During the hunt, the Frenchmen and the American each learned a few words of the other's language. Jacques Boyer was quite impressed that the word "canard," which to him meant the waterfowl they were hunting (duck) could also mean a rapid stooping action with a lowering of the head and upper torso. Some event connected with the word that afternoon created considerable mirth and firmly planted the word in the minds of both men. That was to prove fortunate the next day as the two men were watching Duteuil attempt the first flight of the new aircraft. As it gathered speed, for some unknown reason it swerved sharply to the right, heading toward the spot where Boyer and Jacoby were standing. The quick witted Boyer yelled "Canard" at Jacoby, who promptly ducked, falling to his face on the ground as the propeller just grazed his body. The quick witted thinking of Boyer had saved Jacoby's life through the fortuitous use of one of the few words which Jacoby understood. As the incident was discussed among aviation men of the day, the term "canard" came to be applied to any aircraft with the horizontal stabilizer placed in the fore part of the plane rather than the usual rear placement.

I hope this furthers your understanding of the term. Your articles on the subject have been interesting, and perhaps you will find this to be also.

Cordially,
Drew Allen

Boy, that really sounded authentic. The general idea was enhanced by this letter from Rich Kotzyba of Phoenix, Arizona

Dear Ken,

I've been following your articles on canards and, as a devout advocate of the

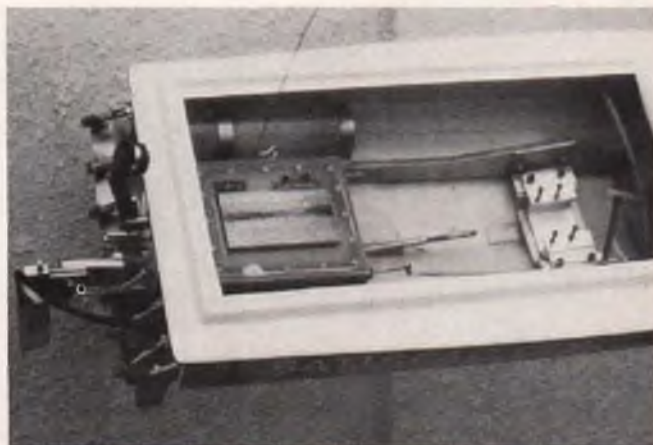
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POWER BOATING

Howard Power



Bev Power shows Steve Muck's new Streaker for the 7.5cc Mono Class.



General internal arrangement in Steve Muck's Streaker.

For the past few years, out here in the west, the favorite hull used in the 7.5 cc monoplane class has been the Westcoast Marine X40 designed by Frank Ward. Other hulls have been available, but the racing record of the X40 is by far the most impressive and, up to now, the X40 has pretty well dominated. This situation, however, is about to change because of the recent release of a new hull design by Steve Muck.

A couple of years ago Steve Muck designed his Streaker series of deep vee hulls for competition in the monoplane classes. His original hull design had excellent straightaway speed but, quite frankly, it had some peculiar characteristics when you tried to go around corners very fast. The hull cornered very well but every once in a while the hull would perform the quickest barrel rolls known to man. There was no predicting when this would happen and it happened so fast that you couldn't

take any corrective action. The 10 cc Super Streaker hull showed this characteristic less often than the 7.5 cc Streaker, but it sure was disconcerting to know that you really couldn't completely trust the hull in a close, all-out race.

Many of us who were running this hull tried all sorts of changes in hardware to try to iron this little bug out of the boats. We tried different turn fins, rudder shapes and placements, anti-spin fins on the right rear corner, weight, and even large anti-roll trim plates on the outside portion of the hull bottom. Some of these things helped but every once in a while the darn thing rolled over and played dead. We were trying to watch the boat carefully in the turn to see what was causing the roll. It was noticed that the roll occurred when the nose of the hull dropped hard in the turn and a wake was crossed. This observation lead us to consider the possibility that the outside chine strake of the hull might be catching

enough in the wake to trip the hull and cause the roll. Out came the Dremel tool and off came the outside strake. They don't call me a hacker for no reason at all. I started strake removal on our Super Streaker at approximately 8" from the stern so that by the time 12" was reached the strake was completely gone. You will have to fill in the hull with micro-balloons and glass tape on the inside or you will have a nice hole in the bottom when you do this to your hull. Remove the strake all the way up to the bow on both sides of the hull.

After this modification we took the hull to the NAMBA Nationals in Tacoma to see if we really fixed anything. To make a long story short, it worked and Bev was able to win the 10 cc monoplane National championship with the Super Streaker.

After discussing these results with Steve we went on to other projects. It was the first of this year that we received a call from **to page 183**



Port view of hardware details.



Starboard view of hardware showing anti-spin fin.

ENGINE CLINIC

Clarence Lee



At the time of this writing (late March) the April issue of RCM is in subscriber's hands and on the newsstands. This was the issue in which I expressed my opinion on the topic of whether long stroke engines develop more lugging power than short stroke engines. This was a subject that had been making the rounds of several of the modeling publications and club newsletters. I have received quite a few favorable comments regarding the article and so far no one has written in taking an opposite point of view. I spoke from personal experience having built many engines with different bore/stroke ratios over the years. I did not go too far into the technical explanation as to why long stroke engines do develop better lugging power at lower rpm and short stroke engines develop more horsepower at higher rpm other than to say that horsepower is a function of torque times rpm and long stroke engines develop their maximum torque at lower rpm and short stroke engines at higher rpm. Several readers have written in to ask exactly why this is.

This month I had intended to expand a little on the technical explanation of this subject. While kicking around the idea of exactly what to say I received the latest issue (March) of Hot Rod Magazine. Hot Rod Magazine is the world's largest automotive magazine. In Hot Rod Magazine the Executive Editor, C.J. Baker, writes a monthly column called "C.J. Talks Tech." The format is the same as Engine Clinic where C.J. Baker answers readers problems related to their automobiles. C.J. Baker is considered one of the country's top authorities in the automotive field.

Quite by coincidence a reader of Hot Rod Magazine writes to C.J. this month with a to the point question regarding bore/stroke ratios. I thought C.J.'s answer would be of interest to any skeptics out there who may have not been in agreement with what I had to say. C.J. also gives the technical explanation that several of you have asked for. The following is a reprint of the question and answer.

To Bore Or Stroke?

Although I've worked on cars for years, one question still stirs my curiosity. If two engines are identical in every way, and each engine's displacement is increased by an equal amount, one by boring and the other by stroking, which one would yield more low-end torque?

*Ernest Smith
Citrus Heights, California
Good question, Ernie. The answer is the*

torque gain at low rpm, but the bored engine would probably produce more horsepower at high rpm. To understand this, let's oversimplify things and say that torque is the ability to do work. We'll also define work as force times distance. Assuming equal combustion pressure in the cylinder of each engine, the stroked engine will have force applied over a greater distance, hence more torque. And since torque is also the radial measurement of force times distance (such as a torque wrench measuring a force in pounds applied at a specific distance in feet), the downward force of the piston now acts against a longer lever (the crankshaft throw) on the stroked engine. Again, more torque.

The problem with stroking is that for any given crankshaft speed, the piston speed (or distance the piston must travel per rotation) goes up, which puts higher inertia loads on all of the reciprocating assembly, thus lowering the rpm at which the engine will eventually self-destruct. Boring allows extra power from burning more mixture without lowering the peak operating speed of the engine appreciably, and since horsepower is torque times rpm, boring gets the nod for high rpm horsepower.

This past month I received a nice letter from Bob Cooper. Bob is now the distributor for the Quadra engine. As you can see by Bob's letter, he invites anyone with problems related to their Quadras to write directly to him. So, if you are experiencing problems with a Quadra, you can write direct to the manufacturing source. I think Bob may be sticking his neck out but he has asked for it. Bob wrote in regards to my answer to a reader who asked about Quadras "Pulse Induction." In my answer I stated that the Quadra was of reed valve induction. Actually it is not, but piston ported, i.e., the piston opens and closes ports in the sleeve, the same as old time model engines. An explanation is in order as to why I thought the Quadra was of reed valve type intake.

When the Quarter Scale thing was just getting its feet off the ground several years ago, I obtained a Quadra from a fellow here on the West Coast who was modifying the chain saw engines for aircraft use. He was one of those come and go operations that only lasted in business a few months. The engine I received had a block of aluminum containing a spring bronze reed valve between the carburetor and cylinder casting. I wondered about this at the time, due to the engine also using piston porting, but concluded that the purpose of the reed valve was to allow the piston to open the intake

later closing timing. Late closing timing means fuel can be blown back out of the carburetor at low rpm. The purpose of the reed valve would then be to stop this fuel blow back at low rpm. This seemed to fit in with the "Pulse Induction" the reader who wrote in inquired about. Evidently this reed valve was an after market add-on that the fellow modifying the Quadra for aircraft use was installing on his own. But I did not know this at the time and thought this was part of the factory engine. Although I have seen later engines without the reed valve, I figured it was dropped by the factory as not really necessary.

As far as "Pulse Induction" — I asked Bob in my return letter to him exactly what Quadra was referring to and as of this writing have not received a reply. How about it Bob, I'm still waiting to know what "Pulse Induction" is myself.

Dear Clarence:

I am confident that over the years on countless occasions, possibly to the point of repulsion, you have heard the following comment, "Oh Clarence, I have been reading your column for years . . ." In my case it is true as I have learned a lot from the many topics you have covered on engines and maintenance.

I am quite sure that there are a lot of people who take great pleasure in jumping all over you every time you slip up, or a misprint appears in your column. I am sure you are going to get some feedback on a statement made in your December column answering Dennis Buday's questions relating to pulse induction on Quadra engines. Quadras are piston port induction and not reed valve, so be prepared.

Clarence, I would like to offer any assistance I can in support of your fine efforts especially in helping the large scale modeler. I receive many engine related questions weekly from modelers all over the world. I would be more than willing to answer related questions if you would care to forward them to me, or you may possibly consider advising your many readers to send their inquiries directly to my attention for response.

I have been an avid RiC modeler for many years and have a sizeable engineering staff with considerable expertise from which to draw.

Let me know your thoughts on this, and should there be anything I can be of assistance on please do not hesitate in contacting me.

Sincerely,
R. Cooper
Quadra Marketing Manager
TML, P.O. Box 549,
Huron Park, Ontario
Canada N0M 1Y0

In the February Engine Clinic a reader inquired about running an O.S. .60 Four Stroke engine inverted. Although I have spent quite a bit of time running the O.S. .60FS I had never tried running it inverted and asked that any readers having done so to let us know of any problems encountered. A gentleman from New Guinea was in Los Angeles at the time and stopped by the RCM office leaving me a note that he had contacted O.S. in Japan. O.S. stated that it was okay to run the engine inverted but it should be turned to the upright position between flights to allow the excess fuel/oil to drain out the breather hole. Thank you to the gentleman from New Guinea for this information. I can't publish his name as I am unable to make out the signature on the note.

Two other readers wrote in who had information or experience running the O.S. .60FS inverted that I am sure fellows contemplating this type of installation will be interested in reading.

Dear Sir:

In a recent column you expressed the opinion that the O.S. four-stroke .60 would be difficult to run in the inverted position. Dennis Bryant, that great British scale modeler has built a DH Tiger Moth around that engine, and the inverted engine is completely cowled. I wrote Dennis and asked him if he had encountered any problems using this installation.

He replies: "My Tiger has proven to be a very popular plan and is still performing well with the O.S. four stroke. It weighs nine pounds, and I use a 12/16 prop with straight fuel. There are no problems with inverted starting; in fact, it is easier to start inverted, as it is not necessary to prime the exhaust pipe or flip it backwards. One choke with the throttle half closed, and it is away first flick."

Dennis went on to say, "There seems to be a lot of doubt about running four strokes inverted. When a photo of my Tiger Moth was published in the model magazines I received many phone calls and letters asking if I had problems, and there was always surprise when I said no. One rather rude fellow refused to believe it until he had witnessed the Tiger in flight and even then he suggested I had modified the engine in some way but could not say how. Another said that oil would build up in the crankcase because the breather would be too high. Of course it doesn't, so what is it about four strokes that causes all the mystery?"

I hope this information will help correct any misconceptions about this engine when

run inverted.

Yours truly,
Nino Campana
Ontario, Canada

Dear Clarence,

A couple of issues ago you asked for some input by any of your readers who ran the O.S. .60 four stroke inverted.

I installed mine inverted in a Pica Waco. The fuel tank was installed per plans.

Starting was reliable with an electric starter. Priming was not required as occasionally the plug would even load up.

Once started and leaned out to the proper mixture, it both idled and throttled well using 10% nitro with a 13/16 prop. The needle valve settings seemed more reliable if done after the motor was warmed up for a minute or so at moderate throttle.

In the air the engine was fine with one big exception --- stunt maneuvers. Anytime the plane was inverted (engine upright) it would over-lean and die. The only cure I found was a compromise mixture setting rich enough to let the engine run upright. Naturally this meant less rpm when the engine was inverted in normal flight.

I think another problem resulted from this rich mixture compromise. During spin maneuvers with low throttle the engine would die. It would not die if full throttle was maintained. I thought I could cure this problem by blocking off part of the air inlet on the cowl to keep the motor warm enough to keep firing at idle during spin maneuvers, but no luck. Incidentally, this engine appears to run so cold inverted with the "compromise mixture setting" that 2/3 of the cylinder intake was blocked off without any sign of overheating. I finally tried 15% nitro fuel, but it still overloaded at low throttle during spins. I don't think the spin itself was the cause because it often quit on final landing approaches also.

So, I finally gave up and re-mounted it upright. I can lean it out all the way without worrying about flame-outs during inverted flight. Even inverted spins at low throttle are okay.

I experimented with props and fuel (13/5, 13/6, 14/14, 14/6: 10%, 15% 25% nitro). I get excellent stunt performance from the 8 lb. plane with a Zinger 14/6 on 25% nitro. I know the manufacturer says 10% maximum nitro, but so far (20-30 flights) I've had no overheating. Tach shows 7300-7400 rpm. (Question: any problems other than overheating I should watch out for with 25% nitro?)

The Saito four cycle provides for both muffler pressure and a modified intake "manifold" to assist inverted running. I don't know if these would cure the problems I ran into during stunt maneuvers, so I sure would like to hear from any Saito owners who have tried them.

In a nutshell, I found the O.S. .60 four stroke flies inverted as long as you don't plan on inverted stunt maneuvers.

Sincerely
Steve Spears
Los Angeles, California

Stephen, your problem with the engine dying during stunt maneuvers sounds like a tank position problem to me. If the engine is dying lean during inverted maneuvers, your tank needs lowering. This, in turn, becomes a higher position during inverted maneuvers which would, in turn, keep the engine from leaning out. This same problem would occur with any conventional two stroke engine. Thanks for sharing your experiences with us.

Our last letter this month requires no answer. Although a sad note is involved, due to the death of the writer. I found his "Oracle Rating" humorous and thought those who have not seen this would enjoy it also.

Dear Clarence,

I thought you might be interested in an article that was written for our club bulletin by Tom Ryan. I am just a new modeler (over 50) and I took a night school class that was taught by Tom, and he was a great admirer of yours. He said your articles were worth more alone than the price of the whole R/C Modeler Magazine.

He was founder of the Richmond Hill Model Airplane Club and the owner of Ryan's Hobby Shop and was a wealth of help and information.

Yes, I said was; he passed from us suddenly last Sunday, and this was his last article. I enjoyed it very much. Hope you get a chuckle out of it. Keep up the good work.

Sincerely,
Ernest Sutton
Ontario, Canada

Oracle Rating

Oracle Gr. 1. This is the basic form of Oracle. The qualifications needed are two consecutive years of R/C flying or three years of vocal non-flying. Past participation in U/C or free-flight may be accepted for partial credits.

He does not read Clarence Lee.

Oracle Gr. 2. This is a transition stage in the Oracle development. He is now beginning to realize that he is not as smart as he thought he was as a Gr. 1. He, after some severe setbacks, is now being more humble. A Gr. 1 is never humble.

He is beginning to read Clarence Lee.

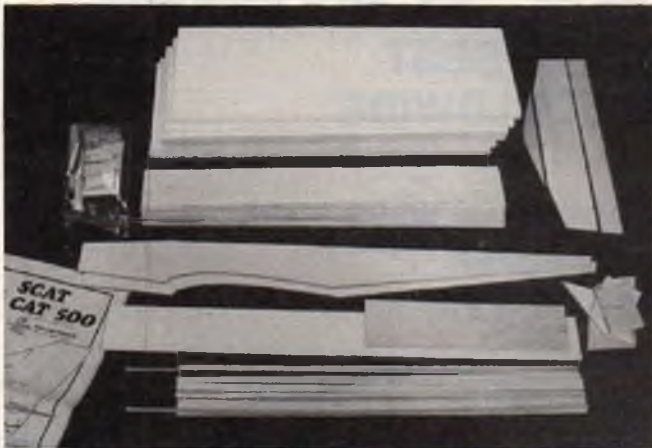
Oracle Gr. 3. We are now approaching the status of the complete flier. This Oracle not only builds beautiful models from kits, he also, on occasion, builds from magazine plans! All his planes fly well. When arriving at the R/C field, he is never found to have left his transmitter at home. When on occasion something does not work well, he has a learned and profound explanation ready. His demeanor is that of self-assurance, with a dash of humbleness.

On occasion he writes to Clarence Lee to correct Clarence's mistakes.

Oracle Gr. 4. He is the complete flier. All his planes are perfect and he flies them beautifully. He never has to explain what went wrong because nothing dares to. Not having to explain his non-existent flying and

RCM PRODUCT REVIEW

Flite Line Models SCAT CAT 500



SPECIFICATIONS

Name	SCAT CAT 500
Aircraft Type	Formula 500 racer/sport
Manufactured By	Flite Line Models 3207 34th Street Lubbock, Texas 79410
Mfg. Suggested Retail Price	\$41.95
Available From	Both Mfg. & Retail
Wing Span	51 Inches
Wing Chord	10 Inches
Total Wing Area	500 Square Inches
Fuselage Length	37 Inches
Stabilizer Span	16 Inches
Total Stab Area	76 Square Inches
Mfg. Rec. Engine Range19-.40
Recommended Fuel Tank Size	4-6 Ounce
Recommended No. of Channels	3 or 4
Rec. Control Functions	All., Elev., Throt., (Rud. opt.)
Basic Materials Used In Construction:	
Fuselage	Balsa and Ply
Wing	Foam, Balsa, and Hardwood
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	Yes
Instruction Manual	No
Construction Photos	No

RCM PROTOTYPE

Radio Used	Westport International Variant
Engine Make & Displacement	K & B .40
Tank Size Used	4 Ounce
Weight, Ready to Fly	56½ Ounces
Wing Loading	16.3 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Overall kit quality, rapid and easy assembly, excellent in-flight characteristics.

WE DIDN'T LIKE THE:

No complaints. This is a hard to fault kit.

than this on the finishing and equipment installation phases of construction.

Construction:

The wing is a balsa sheeted foam core design. The foam cores which are semi-symmetrical, have tip wash-out built into them. We used 3M #6060 spray adhesive to apply the 1/16" sheet balsa wing skins. The ailerons, leading and trailing edge pieces, and tip pieces are all of pre-cut or shaped balsa. The wing halves are joined at the proper dihedral angle by virtue of the pre-cut hardwood landing gear block which recesses into the wing bottom and also serves as a wing spar. The dihedral angle isn't given on the plans, nor is it required, as the hardwood block is cut at the proper angle. The produced dihedral angle is about 2°. The manufacturer suggests that a strip of fiberglass cloth be applied to the wing center section, which we did and also strongly recommend. We used a 4" wide strip of four ounce fiberglass cloth on both the top and bottom of the center section joint.

All tail surfaces are constructed from pre-cut 3/16" sheet balsa.

The fuselage is assembled by first pinning the 3/16" balsa top
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The Scat Cat 500 is kitted by Flite Line Models, 3207 34th Street, Lubbock, Texas 79410. It was designed by Reilly Wooten for Quickie or Formula 500 racing with a .40 cu. in. size engine. The Scat Cat can also be built for sport flying purposes, utilizing any engine in the .19 to .35 cu. in. size range. It is available at normal retail outlets and direct from the manufacturer at a retail price of \$41.95.

The Scat Cat is packaged in a 34" x 10½" x 3½" sturdy corrugated box that is adorned with an attractive three color label. The kit contents are neatly and carefully packaged and all small parts and hardware are enclosed in a plastic bag. The plan sheet is 22½" x 36" and has all necessary assembly instructions printed on it. The manufacturer states that the Scat Cat is not intended to be a beginner's kit, and that it is aimed at the modeler who has had some assembly experience. On that basis, we found the plans and instructions to be well thought out and presented. Any RC'er who has progressed beyond the beginner phase should not have any difficulty in building a Scat Cat. We found the parts fit, plan sheet accuracy, wood quality, and machine cutting, to be excellent.

The hardware package is average and includes pre-formed landing gear legs with nylon retainer straps and self-tapping screws, one nylon control horn (as the use of a controllable rudder is optional), aileron torque rods with clevis couplers, a nylon tailskid and self-tapping wing attachment screws.

The Scat Cat is, without question, one of the finest Formula 500 type racing kits currently available. Being a foam wing type it is also one of the quickest to assemble. Flite Line Models claim that the Scat Cat may be assembled in six hours and we have no reason to doubt this claim, if rapid assembly glues and adhesives are utilized for construction. Most builders will, however, spend more time

RCM PRODUCT REVIEW

Svenson Models TWINNY



The Twinny is a .20 size sport biplane that uses four channels and is an excellent aerobatic trainer. The kit is marketed by Svenson Models here in the United States and comes in a box 2" x 8" x 36". The box contains a very neatly packaged assortment of balsa, accessories and plywood. The accessories of the Twinny are complete, they include the usual landing gear, nylon hinges, etc.; but also included are wheels, fuel tank, nylon engine mount, blind-nuts and starlock wheel collars, a very complete package. Included in the kit is a supplement sheet that identifies the die-cut parts by number. Building is carried out in the sequence of the numbers shown on the plans.

Construction:

The plans are 32" x 46" and in full size. A four page set of building instructions in four languages (English, Dutch, French and German) is included that directs the building of Twinny step-by-step, number by number.

The quality of all the material is satisfactory, but the die-cutting of the plywood parts is poor. The parts match to plans, and the parts fit was good with little fitting required. Construction is simple for those modelers who have built one or two models before.

The stabilizer, dorsal fin, rudder and elevators are die-cut to size and require only assembly and shaping to an airfoil shape.

The fuselage construction is all straightforward and results in a very strong structure when completed.

The wings are primarily balsa and are built directly over the plans. The lower wing contains the ailerons and dihedral.

After the wings and fuselage are built, use a Robart Incidence Meter and set the incidence as shown on the plans. Make sure you have it right, because it will affect the flight performance drastically.

SPECIFICATIONS

Name	TWINNY
Aircraft Type	Sport Model Biplane
Manufactured By	Svenson Models 4941 Seaford Circle Irvine, California, 92714
Mfg. Suggested Retail Price	\$79.50
Available From	Direct from Mfg.
Wing Span	40 Inches
Wing Chord	6 Inches
Total Wing Area	480 Square Inches
Fuselage Length	31 Inches
Stabilizer Span	17 Inches
Total Stab Area	72 Square Inches
Mfg. Rec. Engine Range15 to .25
Recommended Fuel Tank Size	3 Oz. (supplied)
Recommended No. of Channels	4
Rec. Control Functions	Rud., Elev., Throt., Ail.
Basic Materials Used in Construction:	
Fuselage	Balsa
Wing	Balsa
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (4 pages)
Construction Photos	No

RCM PROTOTYPE

Radio Used	Litco
Engine Make & Displacement	O.S. .20
Tank Size Used	3 Oz. supplied
Weight, Ready to Fly	45 Oz.
Wing Loading	13.5 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Instruction book complete with step by step construction, ease of construction and excellent flying.

WE DIDN'T LIKE THE:

Poor die-cutting of plywood, soft and improper location of landing gear.

Our major criticism of the Twinny is the landing gear. The wheel centers are too far back, making the airplane nose-over easily on landing. Also the gear material is very soft. We would suggest that a new landing gear be made up of 1/8" or 5/32" piano wire using the old ones as a pattern. Also move the wheels forward so the center of the wheels are in line with the top wing leading edge.

A modification to the kit that we recommend would be the installation of a steerable tailwheel in place of the tail skid. All that is required is a tailwheel bracket, 1/16" piano wire and a 3/4" to 1" tailwheel. Also if you are going to use built-up pushrods, make a hole in bulkhead F-15 to clear the pushrods.

Covering:

Super MonoKote maroon and yellow, and yellow trim MonoKote were used to finish Twinny. A full roll of maroon MonoKote plus about one foot of yellow was required to cover the plane. The engine, tank and cockpit compartments were given a coat of epoxy then painted with Formula-U polyurethane. Yellow Formula-U was used to paint the cabane and wing struts. All major parts were covered prior to assembly. When installing the fin and stab, be sure

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COSMIC COYOTE

The Cosmic Coyote is a sport pattern aircraft with a "racey" look. But don't let the sleek Formula One Racer's appearance fool you, for underneath this streamlined cosmetic veneer, lies a typical sport aircraft, in regard to flight characteristics. The Cosmic Coyote is designed to be powered by engines of .40-.45 cubic inches of displacement. A conventional .40 will haul it around the sky in fine style, while the installation of a more powerful Schnuerle type engine will produce a real swift and nimble "hot dogger." Being an avid Formula One flier, I have long yearned to build a sport aircraft

By Bob Wallace

with a "racer" look. I think that the Cosmic Coyote, with its cheek cowls, wheel pants, and clean lines accomplishes that goal. The basic airframe is, however, pure "Sunday Flier." The Cosmic Coyote is not intended as a beginner's or advanced beginner's project. It is, however, well within the capabilities of any RC'er who has had a reasonable amount of four control function building and flying experience. If you're tired of the usual box fuselage, constant chord wing, sport designs or the sport pattern aircraft that fly fine but don't

resemble any known full size aircraft, then the Cosmic Coyote should be of interest to you.

Conventional construction methods and techniques are employed and all parts and materials are readily available, or can be fabricated. The cheek cowls, on the Cosmic Coyote shown in this article, were scavenged from "deceased" Formula One aircraft, that "the ground leaped up and grabbed." If you know a fellow RC'er who flies Formula One, it's a good bet that he will have several of these cowls in his "can't throw it out/may need it some day" junk box. The existing openings in these old

Bob is an avid Formula One flier and has created a sport aircraft that doesn't look like the "run of the mill" sport aircraft. Using a sport type .40 engine, it will perform in fine style.

COSMIC COYOTE

Designed By: Bob Wallace

- TYPE AIRCRAFT**
Sport — Pattern
- WINGSPAN**
55½ Inches
- WING CHORD**
10¼ Inches (Avg.)
- TOTAL WING AREA**
572 Sq. In.
- WING LOCATION**
Low Wing
- AIRFOIL**
Symmetrical
- WING PLANFORM**
Semi-Elliptical
- DIHEDRAL EACH TIP**
1¾ Inch
- O.A. FUSELAGE LENGTH**
40 Inches
- RADIO COMPARTMENT AREA**
(L) 12¼" x (W) 2¾" x (H) 2½"
- STABILIZER SPAN**
19¼ Inches
- STABILIZER CHORD (incl. elev.)**
5½ Inches (Avg.)
- STABILIZER AREA**
98 Sq. In.
- STAB. AIRFOIL SECTION**
Flat
- STABILIZER LOCATION**
Top of Fuselage
- VERTICAL FIN HEIGHT**
6¼ Inches
- VERTICAL FIN WIDTH (incl. rudder)**
7¾ Inches (Max.)
- REC. ENGINE SIZE**
.40-.45 Cu. In.
- FUEL TANK SIZE**
8 Oz.
- LANDING GEAR**
Conventional
- REC. NO. OF CHANNELS**
4
- CONTROL FUNCTIONS**
Elev., Ail., Throt., Rud.

- BASIC MATERIALS USED IN CONSTRUCTION**
- Fuselage Balsa, Ply, Fiberglass
 - Wing Foam and Balsa
 - Empennage Balsa
 - Wt. Ready To Fly 71 Oz.
 - Wing Loading 17.8 Oz./Sq. Ft.

cheek cowls can easily be filled in and cowl reshaped to suit your needs. The other cowl alternatives are to purchase the commercially available ABS plastic type or to fashion them from fiberglass cloth and resin or from balsa.

The forward location of the landing gear is intended for flying from grass fields. If you are fortunate enough to have access to a hard surfaced take-off and landing area, the landing gear can be moved aft or reversed. This will reduce the tendency for the aircraft to "bounce" on landing. This is a minor point, but still one to consider.

If you have read this far, you must still be interested in perhaps building a Cosmic Coyote, so let's move into the construction details. Since this is not a beginner's design, the assembly portion of this article will not be in a step-by-step or part "A" to part "B" sequence. The builder will need or have access to a hot wire foam cutter. No other special tools or equipment are required. As an alternative to the foam wing, a built-up wing could be designed and utilized: using the foam wing templates as rib guides. As with any R/C aircraft construction project, the builder should first study the plan sheet thoroughly before starting assembly.

CONSTRUCTION

Wing:

As mentioned, a "hot wire" foam cutter is required to cut the cores. The wing is symmetrical and sheeted with 3/32" balsa. The 2" thick expanded bead polystyrene foam, used for the wing cores, is readily

available through building supply outlets. It comes in 2' x 8' sheets and sells for about \$4.00 per sheet. This foam is available in several densities so be sure to specify the lightest type (1 lb./csf).

The foam wing blanks are cut to the basic plan outline and the airfoil is cut, using the root and tip templates as guides for the hot wire cutter. If this is your first attempt at cutting foam wing cores, and the assistance of a fellow modeler with foam cutting experience is not available to you, the foam cutting guide book listed in the RCM anthology book section of this magazine is heartily recommended.

After the foam cores are cut they should be lightly sanded with a long sanding block to remove any high spots or minor ridges and vacuumed clean. Be sure to save the foam core block scrap pieces as they will be used in the balsa wing skin application step.

The 3/32" sheet balsa wing skins are prepared by gluing the sheet seams as indicated on the plan. A cyanoacrylate glue such as Custom Model Products' Fast Bond is ideal for this step, as well as most other balsa to balsa construction phases. The wing skins should be 1/4" oversize all around, to facilitate easy application. Sand the skins smooth and vacuum them clean. The wing skins may be adhered to the wing cores with either contact cement or epoxy. 3M brand spray type contact cement was used on the aircraft shown and, if you elect to use this method, both the wing skins and the foam cores should be given an even, uniform coat of adhesive. Allow both the cores and skins

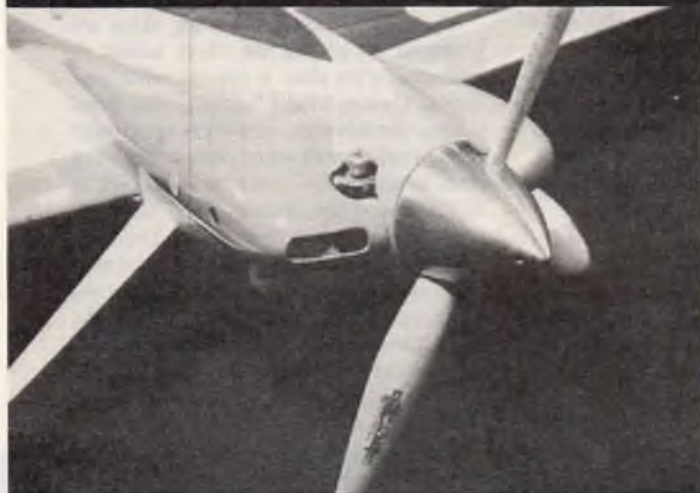




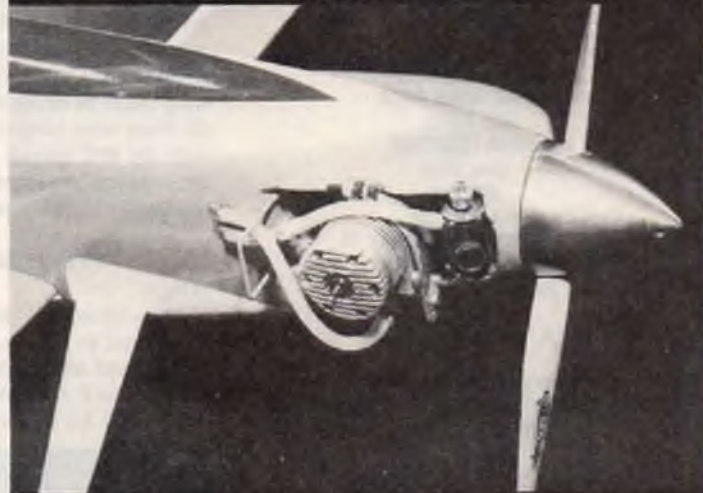
The Coyote builds into a beautiful sport model capable of most any maneuver.



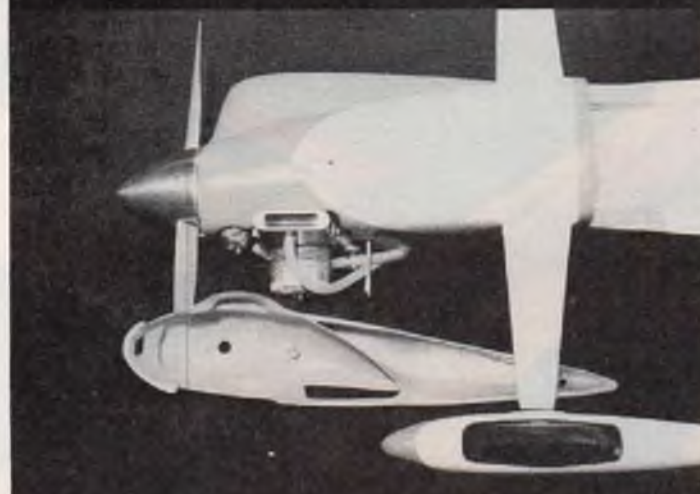
Cockpit detail adds realism to a well built model.



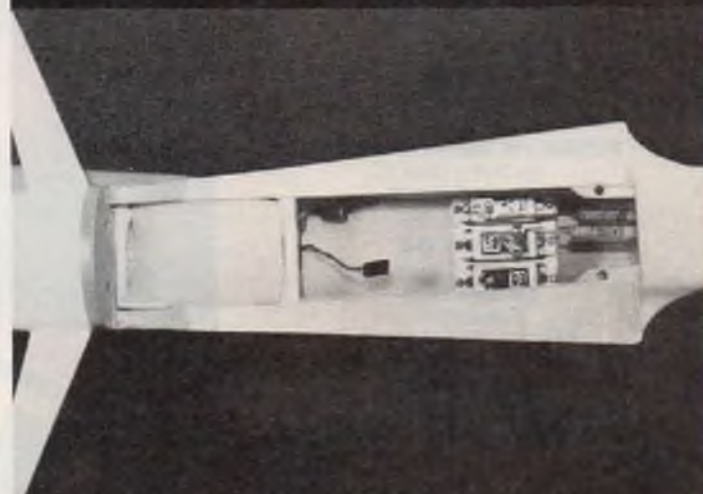
Excellent cowling arrangement hides the engine.



Note wire bracket for cowl hold-down.



Du-Bro muffler cut off short to completely fit inside cheek cowl.



Very neat servo installation. Plenty of room for most any radio.

to dry until they are dry to the touch (about 15 minutes). Avoid applying the skins to the foam cores too soon as solvents in the glue can be trapped and ultimately damage the foam. Apply the balsa skins to the foam cores and sandwich them in the scrap foam block pieces that they were originally cut from. Place a flat board over the sheeted cores and weight it down with something heavy such as a tool box. Allow the sheeted cores to dry overnight.

The excess wing skin sheeting is now trimmed and sanded with a long sanding block so that the balsa/foam exposed edges are smooth and straight.

The 3/8" x 3/4" balsa leading edges and the 1/2" x 3/8" trailing edge cap are now glued in place with either epoxy or aliphatic resin type glue. Tack glue the wing tip blocks and aileron/trailing edge stock in place. Cut and sand the wing panels to their proper outline and airfoil. Remove the tip blocks, hollow them out as shown, and re-glue permanently in place. Do not glue the tip blocks permanently to the aileron/trailing edge piece as these strips are now removed and the ailerons are cut from them. Install the aileron torque rod/horn system and hinges. Reinstall the trailing edge pieces and the ailerons. (If you intend to use film type covering on the wings, it is suggested that the ailerons be left removable in order to simplify covering them, before installing them permanently in place.) Block up the tip of each wing 1/4" on a flat surface and sand the center section to the proper dihedral angle. Glue the two wing halves together with either epoxy or aliphatic resin type glue making sure that the wing is "true" with no warp or twist being built-in. When dry, the center section trailing edge should be cut and sanded to the outline shown on the plan. The center section should be reinforced with a 4" wide strip of 6 ounce fiberglass cloth and thinned epoxy.

The servo well is now cut and lined with 1/16" sheet balsa. Install the hardwood aileron servo mounting beams. Fine sand the entire wing and set it aside for now.

Tail Surfaces:

The tail surfaces are all cut from 1/4" sheet balsa and shaped as indicated on the plan sheet, which is self-explanatory.

Fuselage:

Start by cutting the fuselage sides out of 3/16" sheet balsa and all of the plywood and balsa formers. Mark the location of each former on the fuselage sides. Glue the 1/4" square fuselage pieces to the fuselage sides as shown along with the 3/16" sheet wing saddle doublers. Be sure you are making a left and a right hand side! Install formers F3 and F4. This step is made much easier if the

fuselage sides are pre-moistened (on the outside) with warm water and ammonia, to make them more pliable. Sand the aft end of the fuselage sides to the proper beveled angle and glue them together after first checking the symmetry of the fuselage over the fuselage plan top view. Glue formers F5, F6, F7 and F8 in place.

The engine mount should be attached to F2 with 6-32 machine screws and blind nuts, after it has been drilled and tapped to accept your engine. Install former F2 with the engine mount attached, in place.

Glue the 3/8" triangle stock pieces behind former F2. The 1/8" plywood nose ring (former F1) is now installed. The fuselage top is sheeted with balsa as indicated on the plan sheet. Cut out the cockpit opening.

Glue the 1/8" balsa sheet instrument panel and cockpit floor in place. Install the hardwood wing hold-down blocks and 1/32" plywood wing fairing plates.

The finished wing should be used to hold the fairing plates in their proper position for gluing. This will insure that a good wing to saddle fit is obtained. The leading edge of the wing should now be drilled and the 1/4" hardwood dowels glued in place with epoxy. Use the dowel holes in former F3 as guides to properly locate the dowels.

The landing gear plate (LG1) and the tail surfaces are now glued in place. Install the elevator and rudder pushrods along with the throttle control cable as it is easier to do this before the bottom sheeting and blocks are glued in place. After assuring yourself that the control rods and throttle cable function in a smooth frictionless manner, the bottom sheeting and nose block are glued in place.

The fuselage is now carved and rough sanded to its approximate contour. The opening to accept the engine is now cut in the fuselage right side and the engine is installed. (Be sure to seal all engine openings to keep dust and dirt out.)

Install the spinner back plate and use it as a guide in contouring the nose portion of the fuselage.

Install the check cowls. The left side cowl is glued in place permanently while the right side cowl is removable. Particular attention should be paid to the proper inner cowl cooling baffle and openings. The cooling air outlet opening for the engine should be at least three times larger than the intake. It is also recommended that a small angle deflector (1/64" plywood) be installed inside the cowl at the inlet, which will direct at least one half of the incoming air over the head of the engine. Studying the photos of the cowl should help in regard to this construction phase.

The removable check cowl can be

attached in a variety of ways, however, the method shown is simple and works well. The cowl is "pinned" to the fuselage at the rear by using two small pieces of brass tubing which telescope together. The larger diameter piece of tubing (3/16" long) is glued into the fuselage side and the smaller diameter piece (about 3/8" long) is epoxied inside the cowl. The cowl hold-down is made out of 1/16" music wire which is bent into a "U" shape and fastened to the engine mount. The cowl is held securely in place by a Dzus fastener which locks onto the wire loop.

The fuselage fillets tail wheel bracket, can now be added. Bolt the wing in place and install the wing bottom block and contour it to the curvature of the fuselage.

The fuselage should now be fine sanded in preparation for finishing.

Finishing:

The finish of the aircraft is left to the builder since each of us has a preferred method or technique. The aircraft shown in the article was finished with one coat of polyester resin over the entire aircraft to seal the wood grain. After sanding, two additional coats of K & B Super Pox primer were sprayed on and sanded after each coat. An additional coat of highly thinned out primer was sprayed on and wet sanded. The color coats were K & B Super Pox and a final coat of K & B Super Pox glossy clear was sprayed on after the trim lettering and decals were applied.

Our ready to fly (less fuel) Cosmic Coyote weighed in at 71 ounces.

Flying:

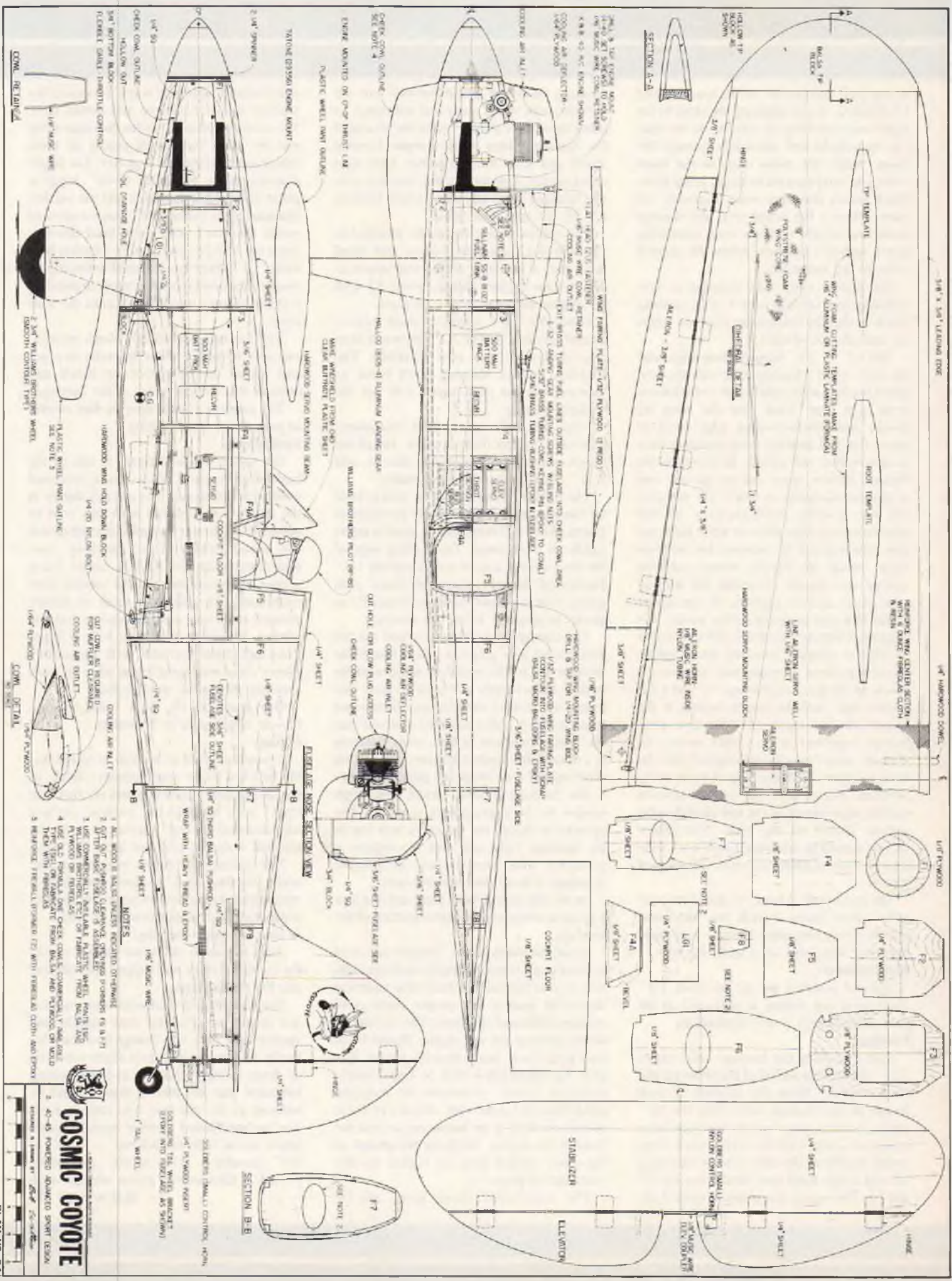
It would be nice to be able to report that the first test flight went without a hitch; as the saying goes "it flew hands-off from the start, with no trim or control surface adjustments being required." To be truthful, it didn't work out quite that way!

The initial test flight was performed under less than ideal weather conditions -- temperature in the mid-twenties with a gusty wind of about 15 mph blowing -- well ... at least it wasn't snowing!

After the usual radio and engine check, the Cosmic Coyote was topped off with fuel and the engine started.

The take-off and climb-out were, in fact, just about perfect; nice and straight and smooth. The only trim change necessary for hands-off straight and level flight was a bit of down elevator. Further in-flight testing indicated that the aileron travel could be reduced as the roll rate was rather quick. The recommended control surface travel limits are as follows: aileron — 3/16" to 1/4", elevator — 5/16" to 3/8", and rudder — 3/4". Dimensions given are for each

text to page 173



COSMIC COYOTE

1. ALL WOOD IS BALS OR GROSS REFINISHED OTHERWISE
 2. 1/8\"/>

NOTES

1. ALL WOOD IS BALS OR GROSS REFINISHED OTHERWISE
 2. 1/8\"/>

3. USE COMMERCIALLY AVAILABLE PLASTIC SHEET POINT TIPS
 4. USE OLD PLYWOOD ON CHEEK CONE, COMMERCIALLY AVAILABLE
 5. REFINISH THE SMALL SQUARE F2 WITH FIBERGLASS CLOTH AND EPOXY

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 2. 1/8\"/>

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PLAN NO. B4

FLYING LOWE

Don Lowe



Last time we began our saga of pattern flying by discussing techniques involving the take-off and wing-over. I certainly don't intend to cover every maneuver in the book, but I will select those typical ones that most must fly, or form the basic elements of other more complicated maneuvers. If you haven't read the preliminaries, I suggest that you go back several months and read the introductory material. Maybe one of these days we can publish all of this in a single manual.

Let's talk a bit about axial rolls, either single roll or three rolls. The ship will roll best and with least help, if it rolls fast. Unfortunately, a 1 second roll isn't going to score well so learn to do a single roll in about 2 seconds and 3 rolls in 5 to 6 seconds. It's best to set up the ship so that the maneuver can be performed with full stick deflection. It's best to have a dual rate aileron system so that low rate will give you the correct full stick roll rate required. The important thing

to understand in rolls is that you must use elevator (plus aileron) to hold altitude (both up and down) and the elevator timing and amount controls both heading and altitude. As you roll, you must feed in up and down in a smooth increasing and decreasing fashion to make it look like it's "on a string." You can't blast it quickly when momentarily upright or inverted since it will look "jerky" and "humpy." The very best technique would be to blend in both rudder and elevator in the fashion of a slow roll but that's difficult to do in a two second roll. It would help if we reviewed the basics of control in a roll.

As the ship rolls (which is commanded by the aileron) the rudder and elevator will switch roles as a function of aircraft attitude. For example, when the wings are vertical the elevator acts as a rudder and the rudder becomes the elevator. So you can envision that it's impossible to roll using only aileron and elevator with no elevator influence on

heading unless quickly blasted when upright or inverted. If the rudder were blended to counter the elevator induced heading effect, then a perfect roll could theoretically be accomplished; so we compromise.

Okay, let's go through the maneuver. As in most maneuvers "balance" it in front left and right. A properly performed single roll will be inverted directly in front. Similarly, in a 3 roll maneuver you will be inverted in the second roll directly in front. So begin the maneuver like all others by calling it, followed by 50'-100' of straight absolutely level flight. The roll timing is measured from the instant it begins the roll (or rolls) until level again. Like always, give the maneuver the same straight and level exit that you gave the entry, and call complete. Begin the roll with full aileron (stick) deflection. As it rolls past vertical, slowly blend in down elevator which will reach a maximum when inverted and will be similarly blended out to the second vertical (3/4 point). If you are going for three rolls, you will begin a slow application of up elevator past the 3/4 vertical point to maximum when level and blend out to the first 1/4 vertical point of the second roll, etc.

You can see that timing is important. If you begin elevator application too soon or too late or too much or too little at any point, heading and/or altitude will be affected. You will learn to do this maneuver fairly mechanically (after a few hundred) so that you don't think about the elevator timing. It's important to understand all this, however, in order to straighten a rolling circle that isn't supposed to be one! This maneuver, like all others, will be a lot easier if the ship is properly trimmed as we have previously discussed.

While we are rolling, let's look at the 4-point roll. To properly perform this maneuver you **must** use the rudder (plus elevator and aileron). This should also be a 5-6 second maneuver. Set up the maneuver like the axial rolls. The timing should be positive but not jerky. It looks best if the time required to roll to a point approximately equals the hesitation at the point. Begin by applying aileron and simultaneously blend in opposite rudder to hold the nose up. Now the rudder used in this fashion will try to pull it off heading, so add a little up elevator to counter until at the point (vertical). Now roll to inverted adding down elevator and simultaneously release the rudder. Hesitate inverted, roll to the next point by mixing rudder in the same direction as aileron and hold in a bit of down elevator until vertical again. Hang on to the rudder while vertical, hesitate, continue the roll to
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GIVE IT A WHIRL

John Gorham



Last month I finished by saying that I would report to you on the helicopter activity in some of the major national trade shows. Little did I realize that the deadline for this column material would occur right in the middle of getting all our paraphernalia ready to load in the van to head off to Toledo. At least, this time, I will not be doing the driving but I shall fly in later to attend the show. Hope to see you there.

Helicopter Radios

We have not yet received much detailed information on the latest helicopter radios. However, I have now had the opportunity to, at least, see a few of them and I hope to be able to be flying some of the more advanced ones shortly. One of those I have had the good fortune to handle is the "JR Unlimited Series" helicopter radio. There really isn't any feature that you could have to fly a R/C helicopter which is not included with this radio.

For example, apart from being extremely well made and obviously precise in operation, here are some of its features:

- Dual rate switching in the pitch axis.
- Dual rate switching in the roll axis.
- Tail rotor compensation with respect to throttle, variable in size and in rate (this feature is also switchable).
- Throttle hold (this enables the flier to instantly switch the throttle setting to a pre-set position while remaining in control of collective — very useful for practicing autorotations).
- Inverted flight switch — this switch reverses rudder and pitch control and reverses collective while keeping throttle sense the same.
- Throttle/collective mix — this enables an electronic relationship to be set up between throttle and collective, rather than the mechanical arrangements which we now have to fiddle with.

While I still hold to my view that there is no real need for more than a simple four channel radio in order to learn and have a lot of fun with R/C choppers, I'm even more convinced now that these more advanced radios will improve and ease flying of the more advanced flight patterns and aerobatics. By the way, these radios also contain many other functions which are common both to fixed wing and helicopters, such as servo reversal and servo throw variations, etc.

Competitions and Meetings

Now to the news on competitions and fun fly meets. Dwight Booth of Janesville, Wisconsin, recently reported on a helicopter meet held last August. The reason I am including it at this late stage is because there



was the astounding number of 63 helicopters at the meet, with 33 of them entered in two classes of competition: Intermediate and Beginner. The meet was held at Token Creek County Park in Madison, Wisconsin, on August 22nd and 23rd, 1981. This year, however, there will be three classes of fun competition: Beginner — can just about get off the ground, Novice — partial hover and ground work, Intermediate — constant hover and obstacle course for precision hover. The plans are not completely defined yet but I'll try to get them in this column as soon as I hear, for those of you within driving reach of this area. Thanks, Dwight, for the information.

On the subject of informal meetings, Tom Kuerer organizes a number of these in Pennsylvania and the idea is for the chopper pilots to get together in an informal manner to "give their secrets away" and help any newcomers that come along. Usually these meets are attended by 15 or 20 fliers and it is

gatherings such as these which are essential to keep the helicopter movement going.

One of the more avid correspondents to my column is Robert Bruce Cousins of Corpus Christi, Texas. Robert now says it won't be long before he is really getting around the sky in all respects and getting back again to boot. The photo you see is of Robert hovering his "F-28 Enstrom" fitted with a "K & B .61." He points out the interesting illusions that it could be an R/C pilot flying a model from the rear of a full size helicopter about to fly into the rear of an R/C helicopter pilot. Thanks for your interest and for your regular letters, Robert.

Now, for this month, I will finish up with a brief description of the activity which is planned for the 1st North American Helicopter Championships to be held in Grand Bend, Ontario, Canada, in July, 1981. The competition schedule is as follows:

July 12: Novice — Advanced; July 13: Advanced — Novice; July 14: Novice — Advanced; July 16: Registration F.A.I. and Scale; July 17: F.A.I.; July 18: F.A.I.; July 19: F.A.I. and Scale.

As you see the competition takes place over a seven day period. There are basically three categories of competition. The first



one, taking place on July 12th through 14th, is the Model Aeronautical Association of Canada's version of Novice and Advanced maneuvers for the R/C helicopters and these are as follows:

Novice:

- Stationary hover (eyelevel)
- Fore and aft hover (eyelevel)
- Left and right hover (eyelevel)
- 4 meter hover for 5 seconds

Advanced

- Top hat
- Pirouette
- Hovering 'M'
- Hovering circle
- Constant heading figure 8
- Knot
- Loop
- Roll
- Horizontal eight

We have had to limit detailed descriptions of each maneuver from this column or we would take up the whole magazine. We'll give full details later, however. The second category is the F.A.I. recently agreed World Championship maneuvers and these, again using heading only, are as follows:

Required Maneuvers

- Hovering 'M' (K factor = 6)
- Hovering circle (K = 6)
- Horizontal eight (K = 8)
- Rectangular approach (K = 6)
- Landing (K = 6)

Optional Maneuvers (select four)

- Double Pirouette (K = 8)
- Top hat (K = 8)
- Swiss hovering circle (K = 9)

(This is a tough one — meaning hovering nose in and then make the helicopter fly sideways through 360 degrees facing you all the time.)

- Shovel (K = 9)

(Send to the C.D. for the literature to understand this one.)

- Loop (K = 8)
- Split 'S' (K = 8)
- Pilot promenade (K = 8)
- Pirouette (K = 6)
- Stall turn (K = 6)
- 540 degree stall turn (K = 8)

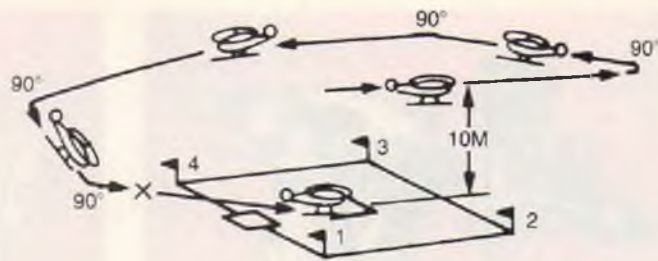
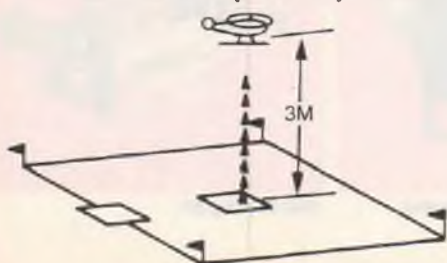
(I used to call this my "double whammy!")

- Autorotation (K = 9)
- Immelman (K = 8)
- Cuban eight (K = 9)
- Roll (K = 9)
- Belgium stall turn (K = 9)

Finally, on July 19th will be the F.A.I. Scale R/C Helicopter competition and the required maneuvers for this will be as follows:

F.A.I. R/C Scale Helicopter Maneuvers

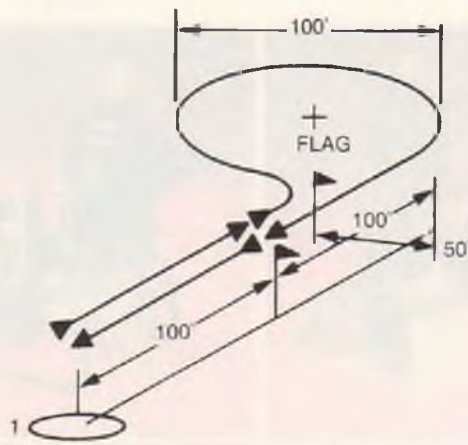
- 5 Second stationary hover (eyelevel)



Lift off from helipad to an altitude of 2 meters constantly heading into the wind and maintaining this position for five seconds and then descend smoothly to helipad and land.

Rectangular Approach

Pilot moves away from starting circle. Model ascends to a point ten meters above the helipad. Model flies forward (upwind) at medium speed and constant altitude approximately 20 meters, makes a 90° left turn, flies cross wind straight and level another 20 meters, turns left 90° and flies straight and level downwind to a point even with the helipad. (All turns have a two to three meter radius.) At this point the model begins a uniform descent rate and flies forward (downwind) another 20 meters and makes a 90° left turn for his base leg, continuing constant rate of descent. Pilot makes a 90° left turn which will line the helicopter up with the starting circle and the helipad.



Straight Flight Out and Return

Lift off from helipad to eye level altitude. Helicopter flies forward 100 feet make a 90° left turn followed by a 360° turn to the right and then return in a straight line to the helipad. Hover briefly and then descend smoothly to the helipad.

At least one of the new European maneuvers is worth describing in detail since we, to my knowledge, have not performed it in this country to date. This is the "Belgium Stall Turn." It is described as follows:

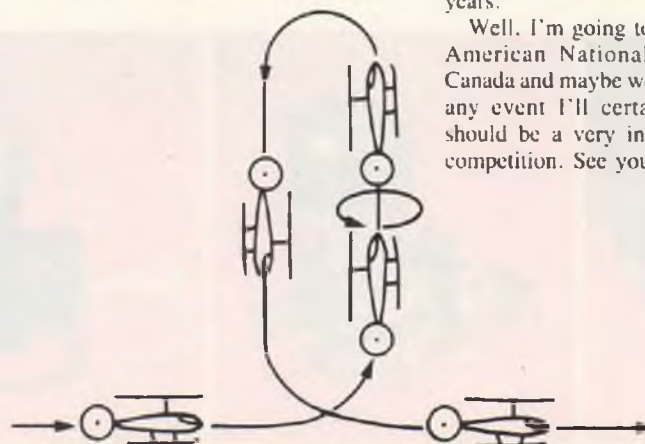
The model flies straight and horizontally for about 10 meters, then climbs vertically for about 10 meters, then performs an axial roll. During vertical flight it performs an axial roll. At the actual moment that the vertical climb ends, the model turns 180 degrees around its yaw axis; this is half a rotation so that the nose points downward. By diving and a horizontal recovery with a slow curve of 90 degrees, the model ends with horizontal flight for about 10 meters on the same heading and at the same altitude as at the start of the maneuver. (Got it? Now let's get back to trying our hover practice!)

Points will be subtracted for the following reasons:

1. The model vibrates, changes heading or altitude during the horizontal flights.
2. The 90 degree curves are too wide or too sudden.
3. The model is not precisely climbing or diving vertically.
4. The half roll is not in the axis of the vertical climb.

The sketch shows the required flight path and you can see from this how far the aerobatic capabilities of R/C helicopters have advanced over their short life of 10 years.

Well, I'm going to try to make it to the American National Championships in Canada and maybe we will see you there. In any event I'll certainly report on what should be a very interesting and unusual competition. See you next month. □



(BELGIAN' STALL TURN)



1949, 1959, 1971 progression of K & B engines; .020 Infant, .45 R.C., .61 R.C.



1952 Lee Sidewinder .32; horizontal piston engine.

MODEL ENGINES . . .

A presentation of selected examples depicting the development and evolution of model engines. The engines shown are from Clarence Lee's collection that were photographed for the planned Smithsonian Institute Seminar on model aviation. This important segment of model history is shared with our readers through the courtesy of Clarence Lee.



1934 Loutrel; designed by Louis Loutrel, predecessor of GHQ.



1936 Ohlsson Miniature; dural tin, 1st model.



1938 Dennyrite; manufactured by movie actor Reginald Denny.



1938 Brown Jr.; 1st production engine available to public in 1932-1933.



1940 Hiller Comet; designed by Hiller who later designed the Hiller helicopter.



1946 Morton M-5; scaled from Le Blond full size aircraft engine.



1946 Morton M-5; rear view, 5 cylinder 4 stroke cycle.



1946 Hornet .60; designed by Clarke Anderson and Walt Cave, manufactured by Ray Snow.



1946 McCoy .60; black case model.



1947 Dooling .61.

THE OLD, THE NEW, AND THE UNUSUAL

By Dick Tichenor



1917 Cave Cobra .60; race car engine designed by Walt Cave, co-designer of the Internet.



1947 Drone Diesel; 1st model designed by Leon Shulman.



1949 K & B Infant .020; 1st of the 1/2A engines.



1959 K & B .45 R/C; start of larger displacement engines for R/C.



1933 Aero .35; horizontal piston engine.



1947 Savage .60; designed for U-control speed by August Savage and John Piston, later to mfg. Aero .35.



1977 Hines .60; horizontal piston engine manufactured in Japan.



1968 H.P. .61; 1st production Schnuerle port R/C engine. Manufactured in Austria.



1919 Lee .45; handmade engine designed expressly for R/C.



1961 Veco .45; production version of Lee .45, SN #001.



1973 Ross .61; designed by Lou Ross. Ross also produced multi-cylinder engines.



1974 Kraft .61; produced by Kraft Systems primarily for the pattern competition market.



1919 Fitzpatrick .60; 100 made—super precision workmanship.



1980 OPS .60; latest "Big Red" model.



1977 O.S. .60 four stroke; 1st production four stroke glow engine.



1971 O.S. Wankel; 1st and only Wankel type model engine.

SOARING

Al Doig



The Big Sky Thunderbirds of Missoula, Montana, are a really rugged bunch of guys. Each year they hold a Polar Bear Glider Meet. It really takes fortitude to brave the February blizzards to fly gliders. I would like to draw your attention to the parka-clad group in the picture. Joel Froelich is the pilot-owner of the Snark flying wing being launched by Frank Wheeler. The polar bear's name is Corky. I thought you'd like to know what they fly in the frozen North. The winner, Wayne Van Meter, flew a Bird of Time; second was Randy La Voie and his Viking; third, Ed Lovrien with an Aquila. All were equipped with skis.

About once a year, whether I want to or not, I get to the cliffs at Torrey Pines, near San Diego, California. This March was no exception. I stumbled right into the middle of the monthly slope pylon race put on by the Torrey Pines Gulls club. The weather was perfect for R/C gliders, and hang gliders, with a fresh wind blowing directly into the cliff face. The air was full of hang gliders. Some of these clowns are now jumping off this 300 ft. cliff with their girlfriends piggy-back.

As you know, the program to select the USA FAI F3B team ended last September in Los Angeles with the selection of Carl Blake, Don Edberg, and Dwight Holley as the three team members, with Gary Ittner as the first alternate. Further, Sacramento, California has been chosen as the site for the World Championships, which will be held July 12th through 17th.

To help finance sending the U.S. team to the World Championships, fund raising campaigns have been held every two years. The fund raising campaign to support this year's team is underway, sponsored by the National Soaring Society. A patch designed by Neil Liptak is available again this year. The sale of these patches will probably be the only means of raising funds for this year's team.

These patches are available and may be obtained by sending \$5.00 to Ray Marvin, Co-chairman, Fund Raising Committee, 2781 S. Garfield, Denver, Colorado 80210.

Anyway the race commenced and the Gulls zinged back and forth along the face of the cliff. The whole thing ended rather



quickly. I asked Steve Neu why there were only half a dozen entries when obviously there were twenty or so airplanes present in the pit area. Steve told me the same story I've read in several newsletters. The Gulls Club has well over one hundred members. Probably thirty regularly participate in thermal contests. Probably fifty or more regularly fly at the cliff. Only six will turn out for a pylon race — the same six for the past year. They have tried fun flies, aerobic contests, etc., but nothing seems



This is a Polar Bear Glider Meet??? Missoula, Montana.



Bob Anderson shows aerobatic qualities of "Swallow."



Steve Manganelli and Steve Neu In one-class pylon race — Torrey Pines.



Steve Neu, Torrey Pines Gulls, launches Uki Profile pylon racer.



"Swallow" one-class pylon racer by Torrey Pines Gulls.



Scotty Jenkins and his #12 super speed job "Hyper Locus."

to work.

This year an all-out effort was mounted by three members. A one-class pylon racer was designed and a foam wing and wood kit was made available for just \$15.00. (Anyone outside the club who is interested in this semi-kit should write Steve Manganelli, c/o T.P.G., P.O. Box 17764, San Diego, California 92117.) This ship, called the Swallow, has a 470 sq. in. wing area and features an Eppler 205 airfoil. It has a flying stab and weighs in at 30 to 40 ounces. After all this work, the same six fliers are still showing up for contests and the other thirty-nine are still doing their thing at the cliff.

A few years ago a similar effort didn't get much more response. A class was established for modified Profile U-Control pylon racers. These ships were cheap, easily built, and flew quite well. Anyway — the guys who *do* participate in this facet of the sport have a ball. They would just like to get some new competition.

As I was standing near the edge of the cliff, a model screamed by so fast I couldn't even get my camera up. It was whistling like a banshee. It turned out to be Scotty Jenkins' "Hyper Locus." Scotty said, "When you are ready to snap, let me know and I'll hold it up." I found out that this hernia factory weighs 12 pounds, dry. It holds 8 pounds of ballast, which must be jettisoned over the ocean before the ship can be safely landed. The landing wheel is retractable. The dry wing loading is 35 ounces per square foot. The ballasted wing loading is 58 ounces per square foot. The wing area is 800 square inches. It has a foam core, covered with thin plywood. The wing has a two piece aileron to prevent binding, due to wing flex. The inner section of aileron has more throw than the outer section — 20 degrees up, and 10 degrees down. Scotty has not timed the speed yet, but he said that the free fall velocity from 2000 feet is theoretically 211 mph. Hang gliders give the Hyper Locus a wide berth when it is in the air.

Anyway — I had a nice day, and managed not to fall off the cliff.

Byron Blakeslee, Editor of the Newsletter of the Rocky Mountain Soaring Association, Thermals, drew my attention to an article in the March 1981 issue of that publication.

Annual Pitch for Segelflug Bildkalender — Sandy Bassett of North Carolina, imports this German calendar which has beautiful pictures of full size soaring activity in Europe. For several years now, RMSA has used the pictures (matted and inscribed) as contest awards and they are very popular. The cost is reasonable (about \$12 for the calendar), so it works out cheaper than buying plaques. Magazine soaring columnists might do well to mention this idea as a service to clubs who would like to try something different for awards. Sandy's address is: 4420 Darventry Ct., Charlotte, N.C. 28211.

A serious problem is emerging to confront R/C fliers. Why it has been slow in coming, I don't know. The problem is one of shared R/C frequencies. Most of us have been vaguely aware that our frequencies are available on a shared basis with whomever the FCC assigns. Yellow and White (72.960) is virtually useless in the Central Valley area of California because of one or more powerful transmitters operated by a State agency. We are regarded as secondary residents on the frequencies.

Recently it came to light that a Doctor's Service Bureau had applied for a license to operate 25 watt repeaters to blanket San Diego County, in California, with a paging system. These were to use one or more R/C frequencies. A meeting was called of representatives of all the R/C Clubs in the County to discuss appropriate action. It was decided that each club would send a letter to the FCC, protesting the granting of this license. Roger Taylor of the Torrey Pines Gulls, suggested it would be more effective to operate through the AMA, and volunteered to call them. Roger made a call to Carl Maroney at headquarters. Carl was right in the middle of the problem himself, and asked for a report, to be included in documentation of the situation to the FCC.

Meanwhile, back at the ranch, a knowledgeable representative of the club group contacted the President of the Doctor's Service Bureau to apprise him of the situation. The President was non-plussed and had no knowledge of interference to another service. He was most sympathetic and cooperative. He determined that other frequencies were available and a shift could be made with no

cost or problems.

So, this part of the story has a happy ending. It is, however, just a prologue. This situation was discovered in time to take action. The first indication *could* have been planes falling out of the air. In view of our rather tenuous grasp on the R/C frequencies, we need better visibility into FCC license requests. Perhaps if the AMA could periodically check license requests with the FCC, either at the national level or local level, we might have an early warning system. Also, how about the AMA contacting manufacturers of the transmitting equipment: there can't be so many as to be impractical. If the transmitter could be sold with the alternative frequencies, the problem could at least be begged until logistics makes it impractical.

Anyway — we got plenty big trouble, methinks.

Some new kits are in the wind. Some of the ones I know about are:

A 2 Meter Bird of Time, by Mark's Models. This will be a mini version of the big one. It will, however, feature two wing sections. One is an 11% thickie (relatively), and an 8% thinnie. The builder will have the option of selecting either one. They should be available sometime in the middle or the end of summer, according to Mark Smith, major-domo of Mark's Models.

Camano-100, from Dodgson Designs. Bob Dodgson is offering a 100" version of his Camano design. The 100" wing has a foam core, fully sheeted with 1/16" balsa. The stab also has a foam core, and is sheeted with 1/32" balsa. The airfoil is an Eppler 193. The wing area is 850 sq. in., with a wing loading of 8.5 oz./sq. ft. Bob says, "The covered wing panels weigh 10 1/2 oz. each! The wing loading is about the same as the Camano! It handles great and flies great!"

Last, but not least is the "Gemini," by Pierce Arrow Co. After winning the "Laminar Rock" Award from the San Fernando Valley Flyers Club, in California, for a thin wing Gemini, designer Ed Slobod went thick! The Laminar Rock Award is awarded yearly to the most deserving sailplane designer. The criteria for winning is to fail to reach a design goal, and to still have a sense of humor remaining

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CUNNINGHAM ON R/C

Chuck Cunningham

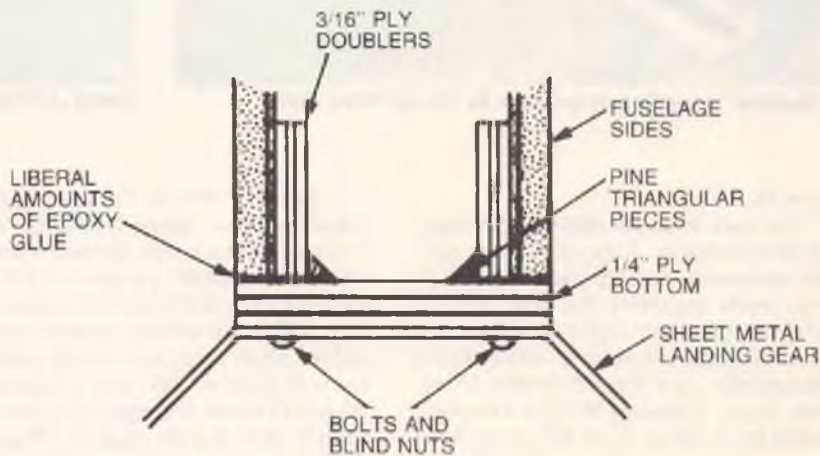


On the February cover of RCM appeared a beautiful picture of one of my designs, Miss Texas, along with a lovely Hawaiian girl, Sharlyene Kushiya. The cover shot was taken by my good friend, Jim Miura, and the Miss Texas shown in the picture was built and flown by Jim. Since this cover shot appeared I have been swamped with letters asking about using a sheet metal landing gear on Miss Texas, and placed ahead of the wing, rather than having the wheels under the leading edge of the wing. Since I know that Jim has been flying his Miss Texas for some time with the gear in this position, I decided to give it a try to see, first, how it would look and, second, how the ground handling and take-off run would be affected by gear placement being placed farther forward than is normal for a tail dragger. My Miss Fort Worth aircraft is a smaller Miss Texas and although it utilizes the same wing airfoil, it has a 5' wingspan rather than 7' as in Miss Texas, and the fuselage is scaled down accordingly.

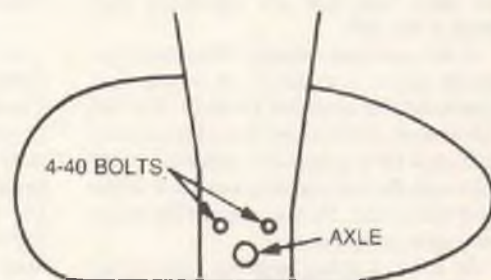
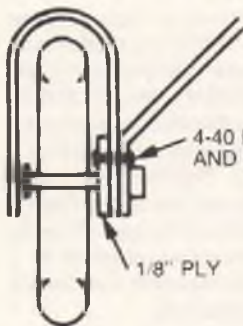
This aircraft has proven to be a very good flying ship and attractive to look at. I have modified it several times. It started out to be a tail dragger with the landing gear wires mounted in the wings. Next I added a nose gear and reversed the sweep on the main gear wires and made a trike gear job out of it. So, it was a natural to try out the further forward gear location on Miss Fort Worth. Just a bit of cosmetic surgery was needed. The sketches show how you can modify most fuselage constructions to accept a sheet metal gear. I used a stock Ugly Stick gear for my modification, but a Halco gear would be perfect in all cases. I had a pair of wheel pants left from a project some years back so I added these to the landing gear, making sure that there were no places where the wheel pants rubbed on the wheels.

Everything was finished off and out to Thunderbird Field we went to give it a try. Boy, was I pleased. Miss Fort Worth taxied out on the runway with very good taxi control. Her nose was pointed into the wind, the throttle shoved forward, and she tracked straight down the runway with a tail high take-off run. A bit of up elevator was fed in and she broke ground clean and smooth. Landings were the same, nice and clean, with no tendency to ground loop. Jim has sold me on this gear placement; next I'm going to give it a try on my Miss Texas. If you wish to customize these or any other designs, give it a try. Often you will come up with a flashier look than did the original designer.

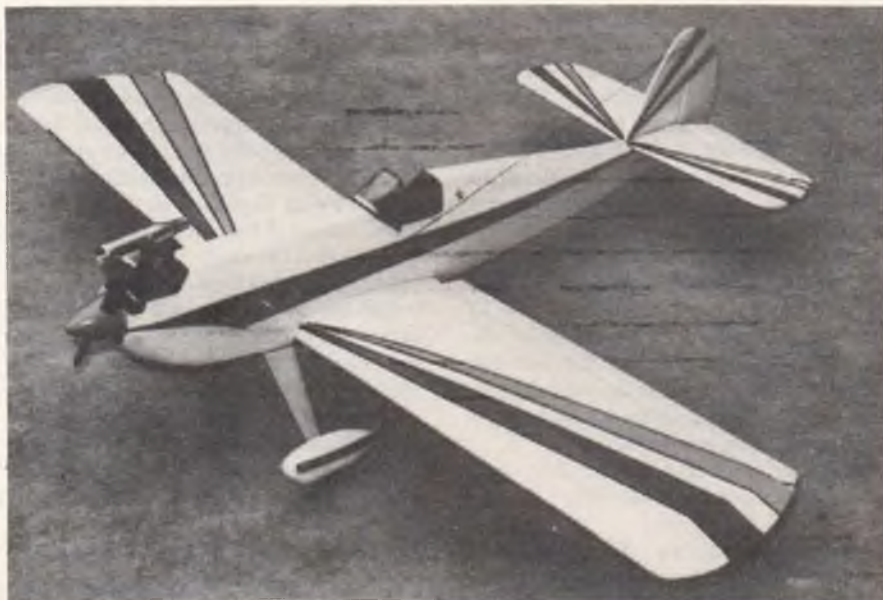
Since we were talking about customizing



WHEEL PANTS (PLASTIC, FIBER-GLASS OR Balsa)



SLOT WHEEL PANT OVER AXLE, BOLT WHEEL PANT TO SHEET METAL GEAR WITH 4-40 BOLTS AND BLIND NUTS. FILE BOLTS ON INSIDE SO AS NOT TO CUT OR JAM WHEEL.



Miss Fort Worth, modified for forward placed sheet metal landing gear and wheel pants.



Carl Goldberg is ready to launch Claude Brown's Curtiss P-1. Claude modified the Goldberg P-6E kit to the P-1 configuration.



Claude Brown's kit modification is an example of how simple changes can result in an excitingly different aircraft.

existing kits some few months back. I received a letter from Jack Knight of Decatur, Illinois, enclosing a picture of Robert Land's modified Sweet Stick. The standard kit was modified to become a tail dragger with wheel pants, a round cowl was added to the nose, wings were bolted on, and the ailerons were reversed with the wider portion at the center section and the narrower portion at the tip, and with strip linkage installed rather than pushrods and bellcranks. All mods rather simple, yet the finished project shows the creativity of the builder.

Anyone else who has modified a standard kit, send in black and white photos so that we can pass them along to all of the other modelers who are considering customizing a kit.

Also, a couple of months ago, I wrote about trying your hand at making a canard (tail first) design from a stock Falcon 56 kit. I admitted that I really couldn't be much help in this department since I had never tried it, but Larry Wright of Seattle, Washington, has done this, so move over and give Larry a listen for a bit:

Dear Chuck,

I always read your column in RCM and it is usually very good. But, in the Mar. '81 column you gave some very poor advice about converting a Falcon 56 to a canard. I have been flying canards for a long time and, if you set up a Falcon 56 to fly as a canard the way you said, you would have a

pile of wood in short order. The forward canard surface must be set 10-12 degrees positive, move the rudder back to the wing or under the rear of the body, and increase the area by one third. The C.G. should be approximately 1 1/2"-2" forward of the wing leading edge. Nothing flies more erratic than a tail heavy canard. It's best to start nose heavy and work from there. A properly set up canard is a very smooth easy to fly airplane, you should try one.

*Sincerely,
Larry Wright*

It seems that a number of thoughts are surfacing these days about building and flying canard types. Ken Willard has been doing quite a bit of talking about them. So, if you're interested in this type of design, give Larry's thoughts a re-read, and then go through some back issues and see what Ken has had to say. Don't write and ask me, because I haven't tried it although, when I get some time, I will give this type a try.

☆☆☆

Fun Fly types of contests are the backbone of club contests all over this vast R/C world. Almost every club has some type of contest at least once a year to keep its members interested. There are many, many types of Fun Flies that can be held, ranging from simple spot landing contests to more exotic things such as laying out a grid system on the runway with each square marked as an Ace, King, Queen, Jack, Ten, and Nine. Each flier has five landing attempts on each round to build up the best

poker hand that he can by touching down in each square. Of course, it's possible to have five aces, but the guy that does this really has something up his sleeve . . . like good landing ability.

Other simple things to judge are limbo flights, bomb drops with eggs, sacks of flour, old doughnuts, or anything that you can think up. You strap a paper cup to the top of the fuselage, place the "bomb" inside the paper cup, then you must lay this bomb on the target. It isn't all that easy to do. Sometimes you can release the bomb by rolling inverted just at the right time (this works with heavy bombs such as an egg). Another, and more normal method, is to lob the bomb at the target by coming over the target area rather slowly, pulling up sharply, then pushing down sharply, tossing the egg or bomb forward of the aircraft. I suggest that you yank in up again rather quickly, because you can smite the ground very rapidly with this maneuver if you're not careful.

A very easy Fun Fly type of contest to run is to make it a timed event. The clock starts, you have to put the prop on your aircraft, start the engine, take-off, climb for fifteen seconds (built-in time) then do three loops, three rolls, chop throttle (and never touch throttle again, if you do, it's zero points), touch down on a point grid, grab your aircraft, stop the engine, remove the prop and put the prop into a box by the judge's chair. Time stops. Sounds easy, ha . . . try

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Modified Sweet Stick by Bob Land. K & B .61 cowl, wheel pants, bolted wings. Slick.



The "Hooker." Chuck Cunningham's swept wing design for fun fly type competition. Will be an RCM construction article.

RADIO SPECTRUM

Jim Oddino



In the April issue, we responded to a letter from a reader who wanted our recommendations on radio control equipment. He mentioned that one of the systems he was considering was the new JR from Circus Hobbies. At the time I wrote the article I hadn't really seen much of the JR and I knew they were having some trouble getting all of the receivers to perform to the high standards that Circus Hobbies had set. Now all of the problems are solved and the JR systems are available. They sent an Unlimited Series for our evaluation and I must admit I am impressed. It is going to take more than one issue to talk about it, so let's get started.

Circus Hobbies JR Remote Control System

I don't care how much experience you have, if you've been in R/C as long as I have or have just come upon the scene, if you walked into a hobby shop that had all of the radio equipment on the market, and you had to select one system based on what you could see, hear, and feel, I suspect you would choose the JR. The product engineering, if that is the right term, is superb. It looks very expensive, but I suspect it is cheaper to build than many systems that don't look half as good. The transmitter case is a combination of extruded aluminum and plastic with a jillion switches and controls protruding and another bunch under two removable panels on the back. Just to continue with first impressions, I'd say the size of the transmitter is ideal. The position of the sticks could be a little closer to the edges of the box, but the distance from the top is perfect for getting at the various switches. The sticks are adjustable in length but I feel could be longer for finger fliers. Don Weitz uses the sticks from the Spectra Series which are longer. The transmitter has a replaceable RF module which I feel is a must in this day and age. We'll go into the other features in just a minute.

The airborne equipment also leaves a very good first impression. The receiver also contains a replaceable RF module so it is a little bigger than some receivers but still very reasonable at 1 3/4" x 2 3/4" x 7/8". The servos are smaller than most of the standard servos used with equivalent torque. When you turn the system on, you will be impressed by the sound of the servos and the smoothness and centering of both the sticks and the servos. I must admit that when I saw the insides of a JR transmitter at Toledo last year, I was not impressed, but the inside of the Unlimited Series is just as impressive as the outside. So, once again, from a first impression, that is, observing what a



modeler can observe over the counter in a hobby shop, I'd have to give the JR at least a nine on a scale of ten.

Well The first thing you are supposed to do is read the instructions. I suspect most people skip this step. In fact, I usually get out the screwdriver and start taking things apart to see what is inside. However, the best way to describe what the JR can do is to take you through the instruction manual which, once again, is first class. The following is a list of some of the transmitter features:

- Servo reversing on aileron, rudder, elevator and throttle.
- Triple rate ailerons, dual rate elevator and rudder.
- Rudder dual rate can be interlocked with the throttle to provide minimum deflection at high throttle and maximum deflection at low throttle.
- Servo travel adjustment allows independent adjustment either side of neutral on aileron, rudder and elevator functions.
- Three snap roll buttons are available — left, right and inverted.
- A throttle button allows pre-set throttle independent of the throttle stick position.
- An elevon mode allows full span ailerons to function as flaps as well as ailerons.
- Electronic trims can be mechanically neutralized.
- A direct servo controller allows servo control without turning on the transmitter.

That is just the beginning, but let's take a quick look at the receiver and servo features. I mentioned that the receiver employs a module system which, like the transmitter, provides a convenient means of changing frequencies. I haven't figured out the circuitry yet but it does not use the conventional integrated circuit approach being used in most FM receivers. The connectors are typical of Japanese systems with male pins soldered into the receiver board. These are gold plated and make contact at three points with the servo connectors.

Although the servos are small the torque is way up there at 45 oz.-in. The output shafts are supported in ball bearings. The potentiometer is driven directly from the output shaft to eliminate backlash. Before discussing performance I thought we'd spend a few more minutes describing what you can do with the transmitter. Let's talk about the flap mixing device. The flaps can be coupled to the elevator, control line fashion, by putting the flap mixing switch in the elevator position. The amount of mixing is set by the flap trimmer on the rear panel. When the elevator rate switch is used in conjunction with flap mixing, the amount of mixing is proportional regardless of which position the rate switch is in. Okay, you like having the flaps coupled for square loops, but you may not want them coupled all the time. You have more options, you can switch the coupling out by putting the flap mixing switch in the middle position and

operate the flaps proportionally with the Aux 1 flap control, or you can switch the flap mixing switch to the spoiler position. In this position the flaps can be commanded to any one of three pre-set positions by means of the three position spoiler switch. In this mode the Aux 1 control would be used as a trim.

When you shift from elevator to spoiler there is no shift in neutral so you can trim the flaps to neutral in the elevator coupling mode, switch to no coupling and have no shift, and then switch to the spoiler switch for control and still have no shift. Then you have two down flap positions available by means of the spoiler switch. Of course you can have spoilers coupled to the flaps at the same time. Clear? I doubt it. I had to read it six times and then actually try it out to understand, and this is only the beginning. But we'll hold off until next month.

Before we get on to another subject, let's touch on performance. The trim levers on the transmitter have detents which means you can only move them in little steps. My first reaction is that this could be a compromise in performance. Therefore, one of my first measurements was to see how big the steps were. I found that they were only 4 μ sec. With a servo transfer function of .12 deg/ μ sec you can see the servos will move in roughly half degree steps with the trim. The surprising thing was that the servos responded when I reversed the direction of the trim one click. This means the hysteresis is less than 4 μ sec which is better than twice as good as the Kraft KPS 20H we talked about last month. However, I suspect that the JR servo is a little softer (less force) around neutral than the Kraft in order to accomplish this. We'll be making more measurements and report on them in future issues.

New Frequencies

In the May issue of Model Aviation, old friend Ted White took a shot at the new frequency proposal which I'm sure will be cussed and discussed for some time. Ted feels we couldn't get a worse deal if we tried. He lists the following: "(1) 50 new frequencies all shared; (2) narrow band — 20KHz (we have trouble now with adjacent frequencies 80 KHz apart); (3) radios become illegal in ten years; (4) more expensive equipment, etc., etc."

Let's take them one at a time. I don't think Ted is complaining about the number of channels and I don't know where he comes up with this "shared" bit. It is my understanding that we will be on the odd frequencies 72.01, 72.03, etc., and that these will **not** be shared frequencies. This has got to be better than having interference on exactly the same frequency as is possible with the present set-up. This is not to say you won't have trouble if you are on 72.01 and an industrial user has 150 watts on 72.02 and is only a short distance away, but with 50 frequencies you ought to be able to find a clear channel some place. And, I'm not so sure you couldn't work 10 KHz away from a high power commercial station. Mike Gilbertson ran a test with a narrow

band FM system operating between two simulated base stations with signals 20 db stronger than the R/C signal, with little degradation in the recovered R/C signal. You wouldn't want to make a practice of operating with these conditions but it shows you the situation isn't completely disastrous. If you live in a large metropolitan area you probably have broadcast stations that are only 10 KHz apart and you can pick them up with receivers that cost ten bucks.

Ted's next comment indicated that narrow band should be considered bad. I think what he is complaining about is that the channels are spaced too close. Narrow band equipment is what it takes to use this spacing. The cold facts are that there is not much space available in the spectrum so, if you want a lot of channels, you must have close spacing and, therefore, narrow band equipment. I don't think there will be any more adjacent frequency problems than there are now at 80 KHz spacing.

We already talked about the radios becoming illegal in ten years. Personally I don't think this is a problem. Look how long it took for superregen equipment to disappear when the more expensive superhets came along. And that kind of takes care of the last comment, too. If you've followed electronics over the last twenty-five years you know that today's equipment is better and cheaper even if you don't add inflation's effect. I believe this trend will continue.

In summation, I'd like to say I don't agree with Ted and I think the frequency committee has done a fine job. I think some of the frequency tolerances they are talking about are too tight and could cause more trouble than all the industrial stations ever will, but that is another story.

Digital Pulse Meter Mod

In the March issue we published a mod to the digital pulse meter circuit that was originally published in the September 1979

issue. I didn't print the number of the seven segment LED display used assuming you would use the same one used in the original circuit. It was identified as a FND 70. Reader Norman Finney wrote in and said that FND 70 must be a bad number and asked what I used. What I did was to go to the local electronics store and find one that looked the same as those in the kit. Unfortunately they have common anode and common cathode types. I couldn't remember what I used so I took a quick look at the schematic and you guessed it, I guessed wrong.

Anyway Mr. Finney wrote back and corrected me. The right answer is to buy a common cathode display. Norm suggests an FND 357 which apparently is available. He is making a new circuit board and will use the Litronics DLO 4770.

Checking Transmitter Modulation

The following question came from Dan Kramer of Pullman, Washington. "How do you check transmitter modulation? I have a scope and have seen some modulation checking that somehow comes out trapezoid and have yet to figure out a circuit or a hook-up to accomplish this."

The first thing to do, Dan, is to get a copy of Fred Marks' book **Getting The Most From Radio Control Systems**. On page 71 Fred shows two circuits. I like the untuned version. See Figure 1. I can't let an issue go by without some kind of a circuit.

What you should see on the scope looks like Figure 2.

The bottom of the trace should be at zero volts if you have a DC scope, and the amplitude is a function of your signal strength and how close you are. The width of the pulses should be about 350 μ sec and they should be about 1.5 msec apart. It is not a bad idea to get to know what this waveform looks like and to monitor it once in awhile. You can spot many transmitter

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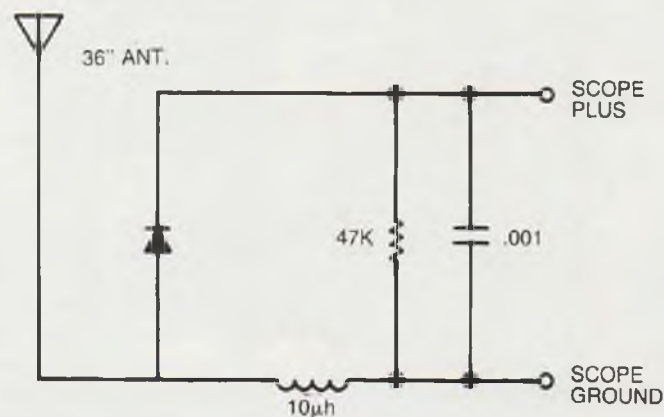


FIGURE 1

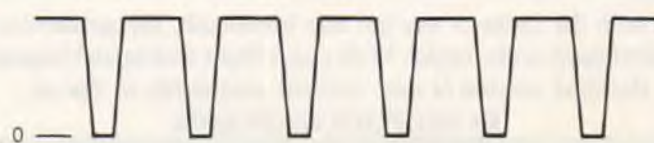


FIGURE 2

QUICKIE



PHOTO BY EBERHARD WINKLER

Impressed with the looks of the full size homebuilt, the author created this 1/2A powered sport scale model. With much flight testing and improvements, the final version is very realistic and stable in the air.

BY SIEGFRIED GLOECKNER

ABOUT THE AUTHOR

Siegfried Gloeckner, age 29, lives with his wife in Schwaebisch-Gmuend, West Germany. He has recently completed his education as a mechanical engineer.

Siegfried began building model airplanes 17 years ago and was soon designing his own models. He became interested in 1/2A activities in 1975 after reading R/C Modeler for the first time.

Siegfried became acquainted with an astonishing plane called the Cutle, that could fly on a Cox reed valve engine and carry a custom radio gear with two servos. This plane sparked his interest in 1/2A modeling which was nearly unknown in Germany. He went on to build other planes of this size.

In researching the building techniques of lighter models, Siegfried learned about, and became involved in, Peanut modeling. He has a special interest in unorthodox designs.

Siegfried has been building 1/2A or smaller aircraft since 1975 and, at the same time, he has been perfecting his English by reading and studying English language airplane magazines.

The full size Quickie is a very small lightweight plane. The wingspan is 16 ft. and weighs 240 lbs. (empty). It can carry a load equal to its own weight, resulting in a gross weight of 480 lbs. With an 18 hp., two cylinder four stroke engine, it cruises at 121 mph. The range is 570 miles on 5.8 gallons of fuel. It stalls at 53 mph and is acclaimed as a very safe and stable flyer.

The first picture of the Quickie that I saw was in a German aircraft magazine. I was amazed by its appearance and hoped to get more information. Sometime later I bought the March '78 issue of the Aeroplane monthly magazine, with a more detailed article on the plane as well as many photos. I regretted that there was no 3-view. One year later, I finally found another article on the Quickie, with a 3-view in a "flight" magazine that I purchased by accident at a railway station bookstore. Now I had what I needed to design a model from scratch.

The Quickie pleased me because of its unusual fuselage shape, its economy, and the ingenious idea to integrate the landing gear into the front wing, reducing weight and drag. At first I built a balsa profile glider in order to research stability. The glider proved the stability of the design. After wondering about what size model should be built, I decided to build it with a slightly smaller span than my 1/2A monoplanes (because it has two wings) and gave it 700mm (27.5 in.) wingspan. This might not seem very scientific, but it was a good solution. The next step was to draw a side and plan view of the intended model. I was upset because of the small wings. Working with low Reynolds numbers, it seemed impossible to me that the wings would give enough lift to fly the model at reasonable



QUICKIE

Designed By: Siegfried Gloeckner

TYPE AIRCRAFT

1/2A Sport Scale

WINGSPAN

Front 25 1/2 Inches

Rear 27 1/2 Inches

WING CHORD

Front 3 3/8" (Avg.)

Rear 3 3/8" (Avg.)

TOTAL WING AREA

176 Sq. In.

WING LOCATION

Canard

AIRFOIL

Flat Bottom

WING PLANFORM

Front — Tapered L.E. Swept

Rear — Tapered L.E.

ANHEDRAL, EACH TIP

Front Wing 1 Inch

DIHEDRAL, EACH TIP

Rear Wing 1 Inch

O.A. FUSELAGE LENGTH

30 1/2 Inches

RADIO COMPARTMENT AREA

(L)13" x (W)3" x (H)3"

VERTICAL FIN HEIGHT

5 1/2 Inches

VERTICAL FIN WIDTH (incl. rudder)

3 Inches (Avg.)

REC. ENGINE SIZE

.049 Cu. In.

FUEL TANK SIZE

Cox Tank Mount

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

2 (3 Optional)

CONTROL FUNCTIONS

Elev., Ail., (Throt.)

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa, Ply

Wing Balsa

Empennage Balsa

Wt. Ready To Fly 18 Oz.

Wing Loading 14.8 Oz/Sq. Ft.

speeds. The drawing was put aside and I looked for other planes that might be worthwhile to build.

But I could not forget the Quickie. I re-read the articles on the full size plane, checked the 3-view, and looked at my drawing again and again. I did not want to enlarge it, because that would increase weight and drag, and I did not want to use a larger engine. Two weeks after the first drawings were done, things went quickly. The wing chord was increased slightly so as not to disturb the airplane's appearance, and a light building structure was worked out. One problem was to find a canopy to match. The rear part of the canopy of the Graupner Cumulus sailplane was the solution. I'm sure there are many others than can be modified and used.

Three weeks later the plane was ready.

A serious problem was the C.G. location. It was not mentioned in the 3-view, so I used the C.G. of the hand launch glider. This was

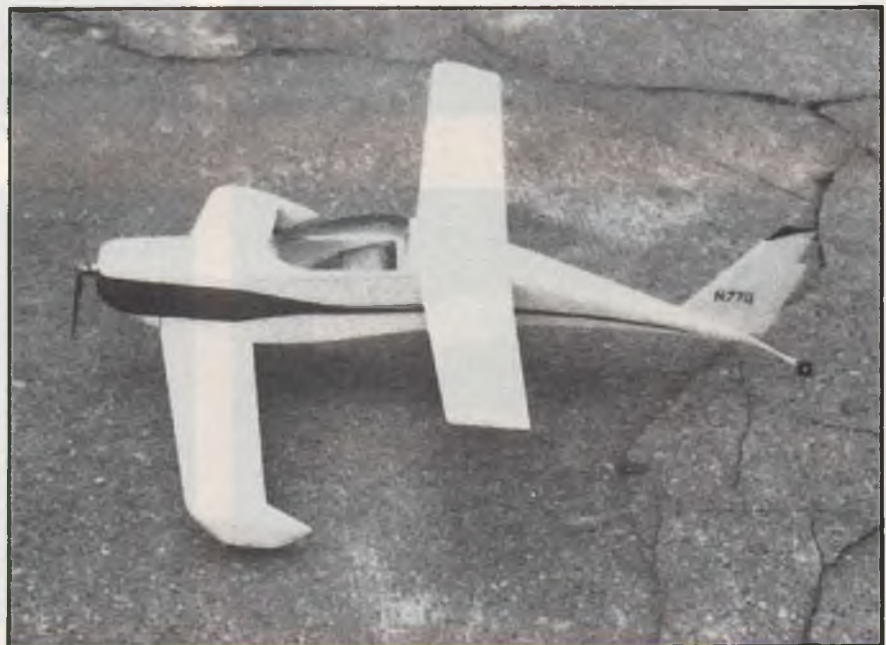
to give me some very exciting moments in the first flight.

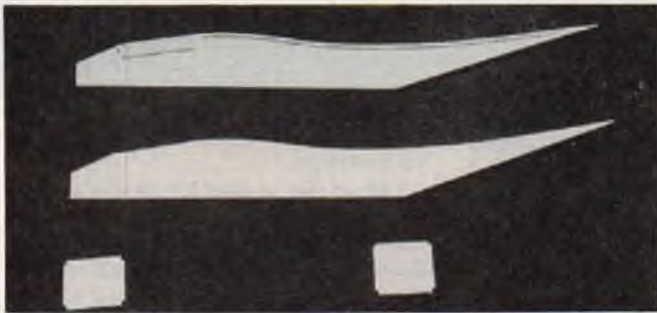
Out on the airfield, with the engine turning full rpm's, the model was hand launched into the wind. Then there was real chaos; the model climbed steep and fast into the air, rocking severely, and nearly impossible to control. Thinking it was radio failure, I throttled back, trying to control the descent. Still rocking, the plane hit the ground in a knife-edge position, proving how strong the airframe was. Only the front wing hold-down was broken and had to be repaired. Both wings were still sound and the radio was working fine. I guessed that the wing rocking was caused by the wrong C.G., but I was not sure.

Then, again by accident, I bought another "flight" magazine in which Rutan's latest designs were described. There were improvements on his VariEze mentioned, to stop wing rocking that some amateur builders complained of at aft C.G. position and high angle of attack. Before trying again and risking the loss of the model, I wrote a letter to the Rutan aircraft factory. Some photos of my model were included, along with a copy of the 3-views, asking for the correct C.G. position on the full size Quickie.

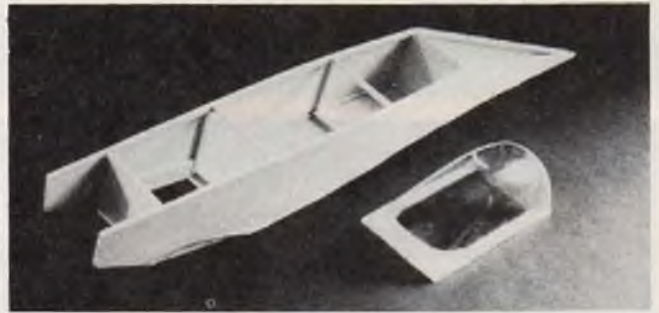
The Rutan people were very kind and sent me the information. I shifted the battery and receiver forward until the plane balanced properly. The next flights were without problems. After some aileron trimming the model flew very stable. Speed is gentle, and the plane looks very realistic in the air.

Now, let's see how to build it. Construction photos are of the prototype so some parts on the photos vary with those on the plans. The parts were changed as

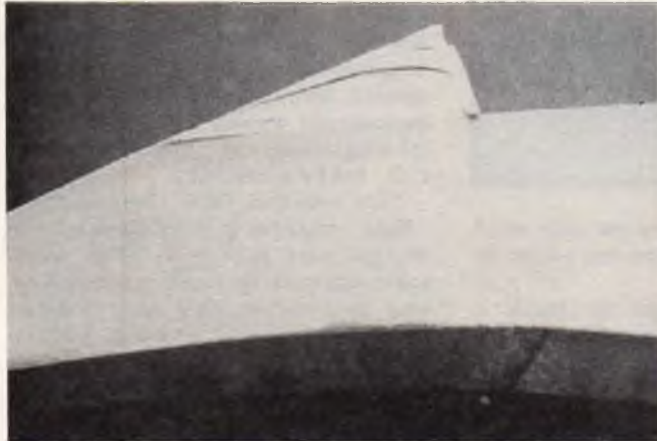




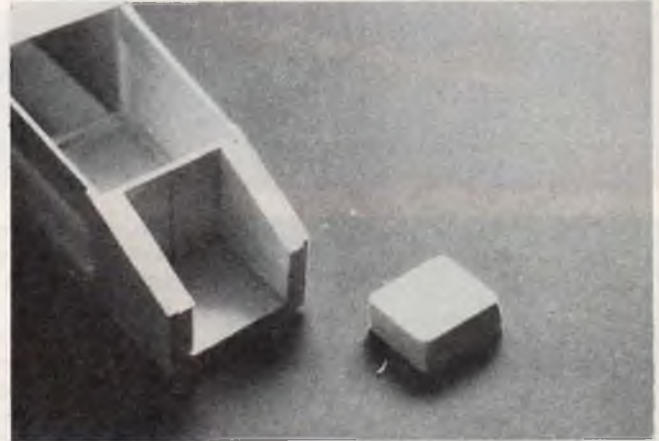
Fuselage sides with reinforcing strips assembled.



Partially built fuselage and assembled canopy.



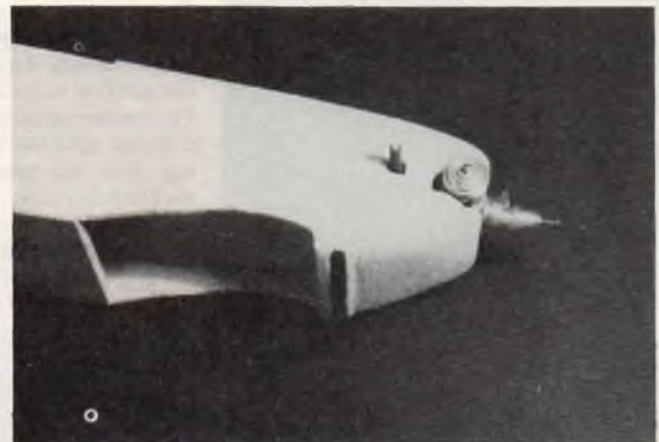
Reassembled and installed part F12.



Motor mount prior to installation.



Fuselage sanded to shape.



Nose and engine installation.



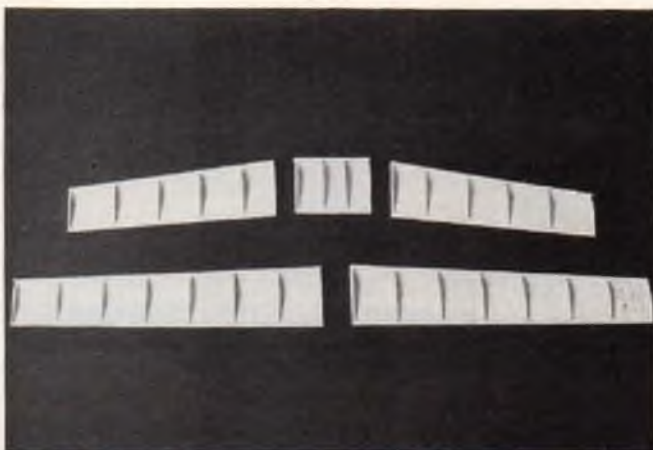
Wing bottom sheeting and ribs.



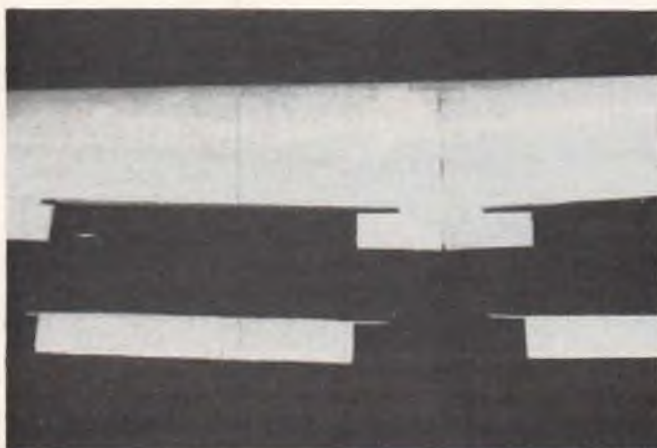
Rib length is marked for tapered ribs.



Bottom of ribs is trimmed to match rear spar depth.



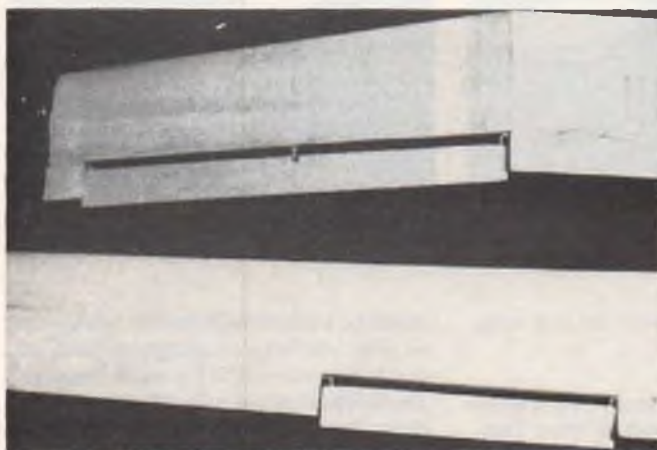
Wings ready for top sheeting.



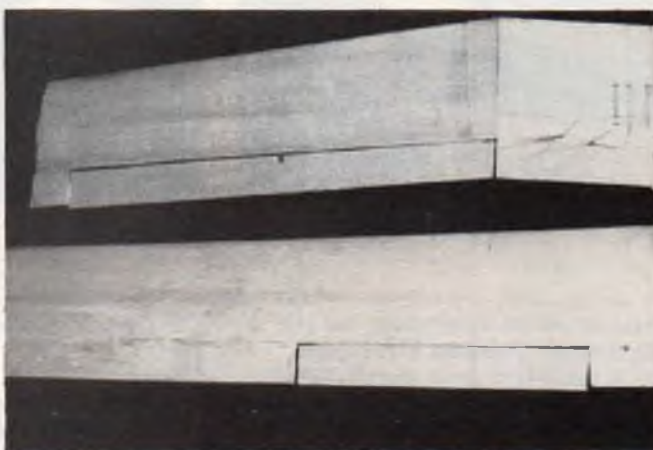
Hinging details ready for installation.



Another view of hinge and control installation.



Typical hinge and control installation.



Hidden hinges make neat installations.

improvements were worked out during the flight testing.

CONSTRUCTION

Select light, strong balsa, perhaps indoor quality, for sheets. Blocks should be the lightest wood available. Different glues were used. To speed up building, cyanoacrylate glue and 5-minute epoxy were used generally. Contact cement was used to sheet the wings.

Fuselage:

Cut out the two fuselage sides, and add the longerons. Make sure the two fuselage sides are of the same density wood. The

bottom longerons may have to be notched to bring them around the curves. Add the bracings of 3 x 3mm (1/8" square), and parts F3 and F13. Be sure to build a left and a right side. Sand the longerons at the aft end of the fuselage to match together as shown on the plan. Mark the motor mount location on firewall F1. Glue the fuselage sides together at the ends, and put F1 in place. Turning the fuselage upside down helps to align the fuselage sides on the workbench. Add F2, F4 and the spreaders of 5 x 3mm (3/16" x 1/8"). Hold together with rubberbands or clamps until glue sets.

Epoxy the wing hold-down F9 to F8, together with the 6mm (1/4") triangular balsa. The triangular balsa should be covered completely with epoxy for added strength. Install F8 to the fuselage sides. F4 and F14 are installed later. When you have completed the fuselage to this stage and are sure it is properly aligned, you can cover the bottom with 1.5mm (1/16") sheet balsa running cross-grain.

Now smear some epoxy around the assembled motor mount parts F10 and F11 and epoxy to F1.

Match the bottom nose block to the



Aileron control arrangement is straightforward.



See text for elevator servo hook-up.



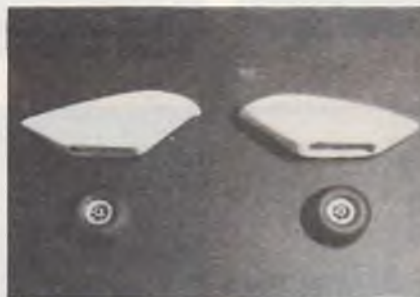
Throttle servo is mounted with foam mounting tape.



.049 side mounted engine viewed from front.



Carved out area is for cooling.



Wheel pants.



Wheel pants and wheels installed.

fuselage, cut out the air outlet, and glue to the fuselage. Glue parts F3A in place.

Cut parts F12 as shown on plan. Parts F12 are pre-cut, because they are difficult to cut equal at both sides, when installed to the fuselage. I cut out the whole wing section and reassembled the parts. F12 is reassembled to help in sanding the turtledeck properly. When the reassembled F12 is in place, add the balsa block for the turtledeck. Cut out canopy frame F5, add F6 and T.E. stock. Make the canopy fit to the frame and glue. Do not glue the assembled canopy to the fuselage yet. Sand the turtledeck and check the canopy to make sure the contour is flush with it. Glue the front top balsa block in place and sand to match the canopy. Do not glue the canopy in place at this time. Sand the fuselage front end and add the front nose block. Cut out the air inlet before you do this.

Sand everything and cut the turtledeck behind the canopy as indicated on the plan.

This part will be matched to the rear wing later.

Wings:

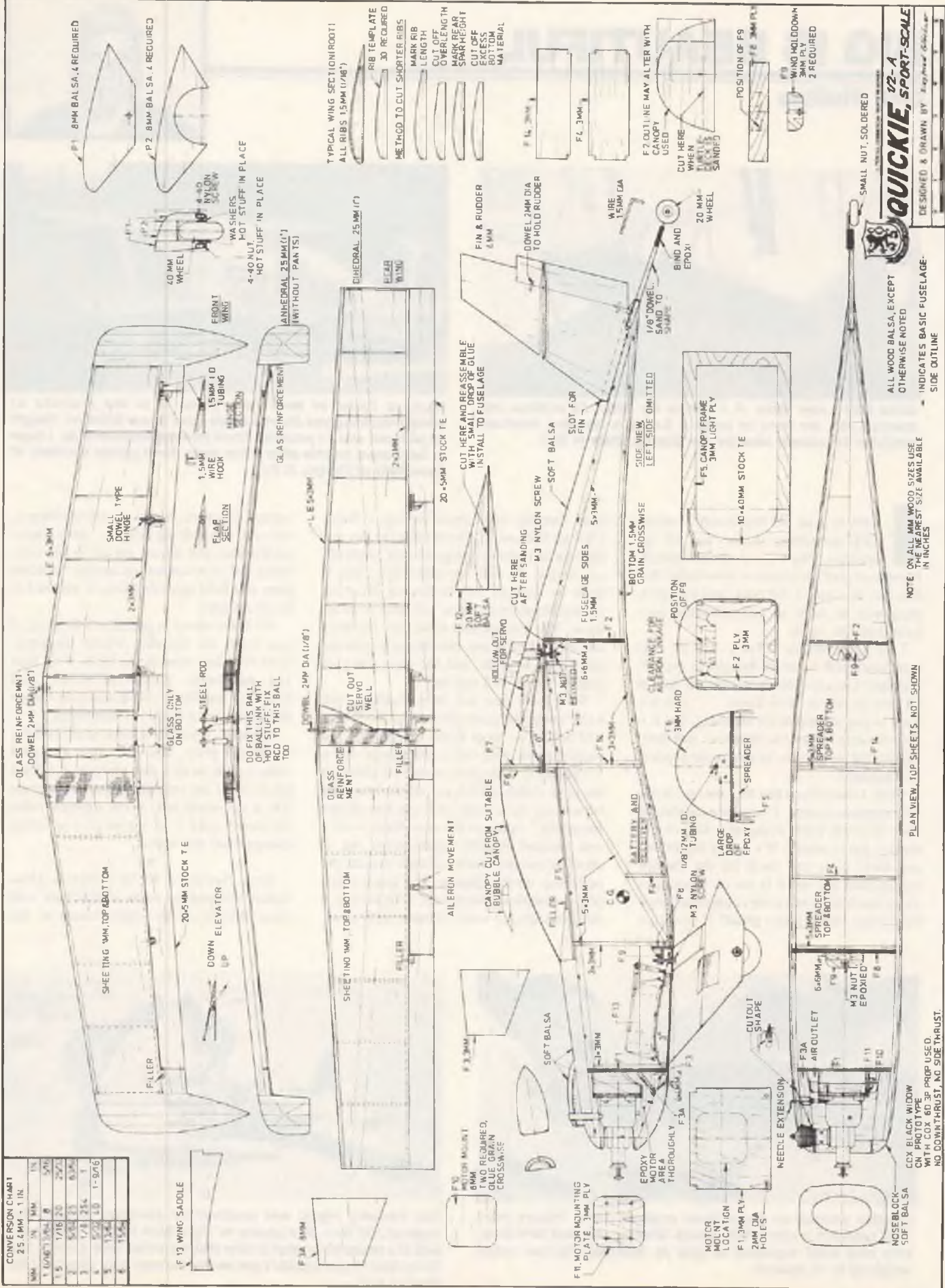
Construction of the front and rear wing is similar. Cut bottom sheeting from 1mm (1/16") balsa. In this case 1/16" sheet will have to be used and finished wing can be sanded. Use light wood for the rear wing and stronger wood for the front wing. Note that the bottom sheeting extends from under the L.E. to under the rear spar 2 x 3mm (3/32" x 1/8"). Glue the L.E. and rear spar in place. Cut out the ribs and glue them to the bottom sheeting. Make the shorter ribs as shown on the plan and construction photos. Glue the root ribs at the proper angle for dihedral. Use contact cement to glue top sheeting. Take the T.E. stock for the wings and center section, cut out the controls and glue the non-moving parts of the T.E. in place.

The hinges of tubing and wire hooks were designed so as not to be visible. The wire

should be a matching fit into the tubing with no slop. Use brass or aluminum tubing so that 1/16" wire will fit the inside diameter. The elevator linkage is similar to that of the flaps. Actuating wire ends do not move parallel because of anhedral and sweep back. The solution to the ball links shown on the plans and photos works very well. There is no negative aileron effect when aileron is used. Note there should be some play between balls of the ball links, as the balls are moving together when up elevator is applied. You need differential on the elevator. You need more up than down elevator. When up elevator is given, control surface deflects down; remember it is a canard. When giving down elevator, the control moves up, forcing the nose down. No differential was used on the ailerons.

Bend up the four torque rods using 1/16" wire and 1/16" I.D. tubing. Install ailerons and elevators as per plan. Robart hinge

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CONVERSION CHART
25.4MM = 1 IN.

MM	IN	MM	IN
1.0	1/16	1.5	1/16
2.0	1/8	3.0	3/16
3.0	1/8	4.0	1/4
4.0	1/4	5.0	1/4
5.0	1/4	6.0	1/4
6.0	1/4	7.0	1/4
7.0	1/4	8.0	1/4
8.0	1/4	9.0	1/4
9.0	1/4	10.0	1/4
10.0	1/4	11.0	1/4
11.0	1/4	12.0	1/2
12.0	1/2	13.0	1/2
13.0	1/2	14.0	1/2
14.0	1/2	15.0	1/2
15.0	1/2	16.0	1/2
16.0	1/2	17.0	1/2
17.0	1/2	18.0	1/2
18.0	1/2	19.0	1/2
19.0	1/2	20.0	1/2
20.0	1/2	21.0	1/2
21.0	1/2	22.0	1/2
22.0	1/2	23.0	1/2
23.0	1/2	24.0	1/2
24.0	1/2	25.0	1/2
25.0	1/2	26.0	1/2
26.0	1/2	27.0	1/2
27.0	1/2	28.0	1/2
28.0	1/2	29.0	1/2
29.0	1/2	30.0	1/2
30.0	1/2	31.0	1/2
31.0	1/2	32.0	1/2
32.0	1/2	33.0	1/2
33.0	1/2	34.0	1/2
34.0	1/2	35.0	1/2
35.0	1/2	36.0	1/2
36.0	1/2	37.0	1/2
37.0	1/2	38.0	1/2
38.0	1/2	39.0	1/2
39.0	1/2	40.0	1/2
40.0	1/2	41.0	1/2
41.0	1/2	42.0	1/2
42.0	1/2	43.0	1/2
43.0	1/2	44.0	1/2
44.0	1/2	45.0	1/2
45.0	1/2	46.0	1/2
46.0	1/2	47.0	1/2
47.0	1/2	48.0	1/2
48.0	1/2	49.0	1/2
49.0	1/2	50.0	1/2
50.0	1/2	51.0	1/2
51.0	1/2	52.0	1/2
52.0	1/2	53.0	1/2
53.0	1/2	54.0	1/2
54.0	1/2	55.0	1/2
55.0	1/2	56.0	1/2
56.0	1/2	57.0	1/2
57.0	1/2	58.0	1/2
58.0	1/2	59.0	1/2
59.0	1/2	60.0	1/2
60.0	1/2	61.0	1/2
61.0	1/2	62.0	1/2
62.0	1/2	63.0	1/2
63.0	1/2	64.0	1/2
64.0	1/2	65.0	1/2
65.0	1/2	66.0	1/2
66.0	1/2	67.0	1/2
67.0	1/2	68.0	1/2
68.0	1/2	69.0	1/2
69.0	1/2	70.0	1/2
70.0	1/2	71.0	1/2
71.0	1/2	72.0	1/2
72.0	1/2	73.0	1/2
73.0	1/2	74.0	1/2
74.0	1/2	75.0	1/2
75.0	1/2	76.0	1/2
76.0	1/2	77.0	1/2
77.0	1/2	78.0	1/2
78.0	1/2	79.0	1/2
79.0	1/2	80.0	1/2
80.0	1/2	81.0	1/2
81.0	1/2	82.0	1/2
82.0	1/2	83.0	1/2
83.0	1/2	84.0	1/2
84.0	1/2	85.0	1/2
85.0	1/2	86.0	1/2
86.0	1/2	87.0	1/2
87.0	1/2	88.0	1/2
88.0	1/2	89.0	1/2
89.0	1/2	90.0	1/2
90.0	1/2	91.0	1/2
91.0	1/2	92.0	1/2
92.0	1/2	93.0	1/2
93.0	1/2	94.0	1/2
94.0	1/2	95.0	1/2
95.0	1/2	96.0	1/2
96.0	1/2	97.0	1/2
97.0	1/2	98.0	1/2
98.0	1/2	99.0	1/2
99.0	1/2	100.0	1/2

QUICKIE, 1/2-A
DESIGNED & DRAWN BY [Signature]
PLAN NO. 840

ALL WOOD BALSA, EXCEPT OTHERWISE NOTED
INDICATES BASIC FUSELAGE SIDE OUTLINE

NOTE ON ALL MM WOOD SIZES USE THE NEAREST SIZE AVAILABLE IN INCHES

PLAN VIEW, TOP SHEETS NOT SHOWN
CX BLACK WIDOW CN PROTOTYPE WITH COX 60 3P PROP USED. NO DOWNTHRUST, NO SIDETHRUST.

BIG IS BEAUTIFUL

Dick Phillips



Balsa USA's new 'baby. A 1/3 Scale Fly Baby. All outlines, rib spacing, etc., are dead on scale. A 3-view is included, finished weight is 19 pounds ideal for the Quadra. More in text.



Richard Talbo of New York State is in the process of scratch-building this Quarter Scale Laird Super Solution. Weight as pictured was 11 pounds. Good looking workmanship, I hope to have more on this after it has been flown (photo courtesy of Dave Reid of Phelps, N.Y.)

I want to lead off this month's effort with something in the way of an apology. No . . . I didn't insult anyone, or goof on a name or something like that but, in a way, I did goof, and I suspect there may be some of you out there who have done the same.

I've seen Balsa USA's ads in the magazines and I sort of thought to myself that their kits can't be up to much if **that's** all they're worth. You know . . . I don't want to pay too much for anything, but it's often foolish to pay too little too, and their kits looked too good to be true as far as price is concerned.

Well, I can tell you that they are one of the best bargains around. I've seen a number of their Sopwith Pups flying at a few of the meets I get to attend. It's a very big model and looks to be too much for the Quadra engine until you see it in the air. It stooges along much as its full scale counterpart must have done, and it looks **great!** If you have

been hanging back from buying a Balsa USA kit because you were afraid to pay too little for something that good, don't hold off any longer. As with any other firm, they'll have to bow to the forces of inflation eventually and their price will have to go up some. The kits are just what they say they are, the wood is good, the cutting is accurate and the fit is great, and the price can't be beaten, so far as I can see.

They have also not been standing still while doing the good things they do. There will be a new, large Balsa USA kit on the market by the time this reaches print. It's a 1/3 Scale Fly Baby and is stand-off although the guys at Balsa USA say the outlines and rib spacing are to scale, so it can't be all that 'stand-off!' Span on the new Baby is 83" and finished weight should come out at about 19 pounds which will make it quite the performer on the Quadra. Full sized rolled plans, complete instructions with photos, a documentation 3-view, formed ABS cowl,

formed wire parts, hardware, except hinges, fall-out die-cutting, cable, cable ends, turnbuckles and decals are all in the box. Balsa and plywood are top quality, no foam parts and field assembly time is claimed to be 10 minutes.

All of the above is priced at \$99.95 or, if you want the Quadra engine included, \$183.95 direct from Balsa USA, P.O. Box 164, Marinette, Wisconsin 54143. Add \$1.00 for handling. (What can you handle these days for a buck? — not much!)

Anyway, if you have been scared off the kit by the price, don't be. It is excellent value for the money; how they do it, I don't know, but I am sure glad there is someone left in the world who gives superior value for money paid --- it's a bit of a welcome change from the norm!

★

Jerry Smith of RCM's Here's How feature dropped me a note awhile back with some details on an improvement to the



Loading payload on board three engined drone. Picture from 1967 research project. Note sturdy landing gear and dual tires, plus very solid mounting of gear to fuselage. Payload could weigh up to 16 pounds.



Dan Parsons (right) and unidentified assistant prepare five engined (OS Max .80's) drone for flight back in 1967. Model was part of a research project in New Mexico at that time. Look at that flying field, if you couldn't get on that runway, you shouldn't fly! More in text.

Kawasaki engine. This consists mainly of machining off the mounting flange from around the front of the engine. The alteration is chiefly cosmetic but does have a benefit in addition to making the engine look a good deal better. The slight decrease in weight improves the engine's power to weight ratio and improves the outside diameter of the engine resulting in easier cowling the engine in, depending on the model being built.

★

Wendell Hostetler is preparing to do it again. This time with an all-time favorite of almost everyone. The Curtiss Hawk P6-E is Wendell's current addition to his line of good plans. The Hawk is stand-off with such non-scale additions as four ailerons, wider stand in the landing gear, symmetrical airfoil, and a slightly longer tail moment, all of which will likely add to the model's performance while detracting from its appearance only marginally. The span is 84" and the model should come out at around 26 pounds. Wendell tells me that T & D Fibreglass will be making a cowl, auxiliary fuel tanks, wheel pants and landing gear. Plans were available at Toledo in April and there are three sheets, plus instruction booklet. Price is \$30.00.

Wendell also mentioned he has been doing some experimenting with a custom 3.7 c.i. Kioritz engine (which is a new one on me — what about that, John Gibbs?). The engine has been used in Wendell's 26 pound Skybolt and he tells me he has been doing sustained 70 degree climb-outs. The 3.7 engine weighs only 5 ounces more than the 2.44 c.i. Kioritz and has been getting 45 minutes of flight from 16 ounces of 50:1 mix fuel.

Wendell has been making his own props for awhile and found with this larger engine that he was getting some unnerving flutter in the prop tips on his 21/14 props which are carved from one piece of hard maple. Subsequently, several props were made from the same hard maple, but laminated from strips glued up with Titebond glue. The laminated props did not have the tip flutter which was evident from the solid maple props. Wendell's conclusion from this observation was that the 5 h.p. plus engine, and laminated props approach full scale construction even more closely than we had thought. I've said it before, and feel it bears repeating, we are no longer building models, we're building miniature aircraft and we should be aware of the fact and build accordingly.

Incidentally, on the same subject, I suggested awhile back that you should always build to fly, not to crash, which is true. But I neglected to credit the advice to the guy I stole it from; Dario Brisighella was the guy who originated the remark and I picked up on it, and used it without realizing where it came from. That too is good advice; if you build strong enough to survive almost any crash, you are building heavy enough to almost assure that you will crash. Build it strong, but build it to fly, as well. The two are not incompatible.



Wendell Hostetler's new P6E Hawk. Slight deviations from scale have not hurt the looks of this attractive model. Plan will be available by Toledo '81. More in text. Wendell's wife deserves a medal for agreeing to pose in that kind of weather!

★

I had a letter late last year from Dan Parsons in Albuquerque, New Mexico. Dan markets the lightweight glass cloth mentioned here a couple of months ago. His most recent letter contained some pictures and information on large sized modeling done back in the mid-sixties and I thought they might be of interest to those of us who think we are into something 'new.' Dan designed and built these drones as instrument test and research vehicles at Sandia Labs in Albuquerque and used materials and methods with which he was familiar as a modeler.

The Trimotor weighed 23 pounds, power was three O.S. .80's and the five engined job weighed 38 pounds without payload. Payload added 12 to 30 pounds, for an all-up weight of 35 to 68 pounds! Not bad for 1967! Dan also indicates that flying the five engined model was great fun as the bogey type main gear made touch and goes a breeze. He also mentioned that he had started all five .80's one day when the starter battery went dead.

A field altitude of 5300 feet added density altitude to the equation and Dan indicated they had no problem flying these large models from that altitude on the powered on board. I am assuming that this work was part of Dan's job at that time and I can't think of a nicer way to earn a living than to work at modeling. I'm assuming again, but would think that all the required materials would have been supplied along with the time to do the work. Judging from the pictures, the weather and the field used must have been pretty great as well. While the two models involved may not have been all that beautiful, they were certainly big enough. My thanks to Dan for sharing this bit of big history with us.

★

This correspondent is currently involved in moving to another city. I have lived in the same place for 20 years and the collection of

modeling material (that junk, my wife calls it) has to be weeded down to manageable proportions. You know the kind of things I mean, old wings that were "... too good to throw away," and odd bits and pieces of material that were too small to do anything with but too big to discard. Well, there have been a few loads of 'that junk' taken to the dump and I'll have the opportunity to start a new collection. Even the J-3 Cub that started all this Big Is Beautiful had to go. It was getting pretty shabby and I was not keen on flying it anymore for that reason. It sure taught me a lot, but if I ever build it again, it'll be even better than the first one. I kind of hated to see it go though, it sure started something big!

For the benefit of those of you who are more or less regular customers and who write me from time to time, my new address will be 9 Geneva Crescent, Saint Albert, Alberta, Canada T8N 1B6. Incidentally, with postal rates in both the USA and Canada taking a rise in the recent past, both RCM and their many columnists are asking that you enclose a self addressed, stamped envelope (SASE) if you wish a reply from us. In my case, the SASE is not much help as I cannot use the U.S. stamps to mail to you from Canada. If you are writing me from the U.S., just enclose a U.S. stamp as I can use them for my own SASE's to the U.S. In that way, you'll get an answer and I won't get a horrendous postage bill.

Many of you have written to me and ordered my booklet "Building Big Is Beautiful." I have appreciated your implied confidence in me that you wanted this source book of building big information for your own collection and I gather it has been of significant help to many of you. I regret to say that the first printing has been exhausted and a revision for an expanded and more up-to-date volume is now underway. The new volume will contain more information, more illustrations and a complete plans list

to page 144



BOREALIS

The Borealis Bipe is the result of Leonard reading Chuck Cunningham's Basic Bipe article a few years ago. Wanting to design his own and living in Alaska where the winters are long, produced this wheel or ski equipped sport flier — great performer.
BY LEONARD L. OAKLEY



Biplanes have been favorites of mine ever since I was a boy in New Mexico. I can still vividly remember seeing brightly painted "double wingers" against the deep blue desert sky half filled with puffy, brilliant white, cumulus clouds. Most of the time they would just lumber noisily along obviously with some destination in mind, but occasionally a sky writer would advertise cola drinks across the sky. I also recall that biplanes usually attracted more attention from earthbound spectators than the more common Piper Cub types. Everyone would stop and stare when one flew over. I know I always did.

My father owned a couple of Standards during the barnstorming days in Kansas, long before I came on the scene. He had a couple of boxes full of photos of his "crates" which I loved to pour over for hours while wearing an old, cloth flying helmet and goggles that he had given me. I dreamed that some day I, too, would fly one of those beautiful birds. Well, I never did learn to fly for real but, through the magic of radio control, I can vicariously zoom along in my own jaunty biplane doing barrel rolls, Immelmans, loops, Split S's, and even fly inverted.

The Borealis Biplane is the result of reading a Chuck Cunningham article on basic biplane design a couple of years ago. There are lots of good biplane kits on the market and it would be easier to simply go down to the friendly hobby shop and buy one, but I get much more pleasure from designing and building from scratch. This model is not difficult to build, but I would not recommend it as a first "from scratch" project unless you have already built a number of R/C kits.

Living in Alaska, where the winters are long and snowy, forces me to use skis for a good portion of the year, or take up another hobby. This model handles equally well on snow or dry ground simply by removing four screws and changing from skis or wheels. The plans show both types of undercarriage.

Building is straightforward and should present no problems for the experienced builder. The construction sequence is up to you. However, I will present instructions in the order in which I usually build a model.

CONSTRUCTION

Fuselage:

(1) Cut the two fuselage sides from matched 1/8" medium sheet balsa.

(2) Cement the 1/4" sq. balsa vertical pieces and 3/16" balsa doublers to the balsa sides. Be sure to make one left and one right fuselage side. Models with two left sides fly (and look) funny!

(3) Add the 1/4" x 1/4" trailing edge stock to which the cabane struts will later be epoxied.

(4) Cut out all formers and cabane struts.

(5) Lay the right fuselage side flat on the building board and epoxy F2 and F3 in place. Check alignment with a drafting triangle or carpenter's square (exactly 90 degrees). When the glue is set, attach the left fuselage side to the formers using liberal amounts of epoxy and carefully checking alignment. It is vital that everything is straight and square at this point.

BOREALIS Designed By: Leonard L. Oakley

TYPE AIRCRAFT

Sport Biplane

WINGSPAN

Top 48 1/2 Inches
Bottom 42 Inches

WING CHORD

8 Inches

TOTAL WING AREA

685 Sq. In. (Approx.)

WING LOCATION

Biplane

AIRFOIL

Semi Symmetrical

WING PLANFORM

Constant Chord

DIHEDRAL EACH TIP

1 Inch

O.A. FUSELAGE LENGTH

40 Inches

RADIO COMPARTMENT AREA

(L) 14 3/4" x (W) 4" x (H) 3 1/2"

STABILIZER SPAN

18 1/2 Inches

STABILIZER CHORD (Incl. elev.)

7 Inches (Avg.)

STABILIZER AREA

117 Sq. In. (Approx.)

STAB. AIRFOIL SECTION

Flat

STABILIZER LOCATION

Mid-Fuselage

VERTICAL FIN HEIGHT

6 Inches

VERTICAL FIN WIDTH (Incl. rud.)

7 Inches (Avg.)

REC. ENGINE SIZE

.35-.45 Cu. In.

FUEL TANK SIZE

10 Oz.

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Ail, Throt.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa, 1/8"
Wing	Balsa, 1/8"
Empennage	Balsa
Wt. Ready To Fly	72-80 Oz.
Wing Loading	15-17 Oz./Sq. Ft.

(6) Drill all engine mounting holes, pushrod, and fuel line holes in F1.

(7) Add the 1/4" plywood landing gear plate and F1. Use plenty of epoxy here but wipe away any drips.

(8) Cement the rear ends of the two fuselage sides together. Check alignment

over top view of plans.

(9) Cement in place the 1/4" sq. balsa crosspieces in the rear fuselage area and add formers F3A, F4, and F5 to their top sides as shown.

(10) Cement the 3/16" sq. balsa stringers in place on top of formers F3A-F5.

(11) Add formers D1 and D2.

(12) Epoxy both cabane struts in place. Be sure that each strut is cut to the length shown and that the bottom edge of the struts are even with the lower edge of the trailing edge stock. Accurate cutting and placement here is vital if proper incidence angles are to be achieved.

(13) Add 3/32" x 3/8" balsa planking between D1 and F3. When all pieces are in place and the glue is dry, set the cockpit pattern in place and trace around the edges. With a very sharp model knife, cut out the cockpit.

(14) Add the 1/8" sq. balsa strip to the inside rear of the cockpit.

(15) Cement the 3/32" sheet balsa cockpit floor in place.

(16) Cement the 3/8" balsa wedge to F1.

(17) Pin formers H1, H2, and H3 in place on top of the fuselage sides and add the 3/32" x 3/8" balsa planking to complete the fuel and battery compartment hatch.

(18) Assemble and attach the hatch latch and canopy peg as shown. Be sure to Hot Stuff the 1/16" music wire lever in place **before** inserting the sanded 3/16" dowel into the brass tube.

(19) Build the cowl from medium soft balsa blocks as shown. Carve and sand to smooth contours.

(20) Add the 3/32" sheet balsa fuselage bottom planking, crossgrain.

(21) Add the 1/4" dowel wing rubber hold-downs.

(22) Build the steerable tail wheel assembly. Do not attach to the fuselage until you are attaching the rudder.

Empennage:

(1) Cut the horizontal stabilizer and elevator from 1/4" sheet balsa. Mark the centerline on top of the stabilizer to aid in proper alignment when attaching to fuselage.

(2) Cement the stab securely to the fuselage and add the triangular 1/4" sheet balsa filler to the top of the stab. This piece conforms to the top view shape of the rear of the fuselage.

(3) Pin the elevator halves in place over the plans. Epoxy the 1/4" dowel joiner in place. When dry, remove from plans and fill in any depressions in the joiner-elevator region with "blunder putty" (plastic balsa).

(4) Cut the two fin pieces from 1/4" balsa and cement together over the plans.

(5) Cut the rudder from light 1/4" sheet balsa. Add the two 1/32" plywood doublers.

(6) Cement the fin securely to the 1/4" balsa filler you previously glued to the top of



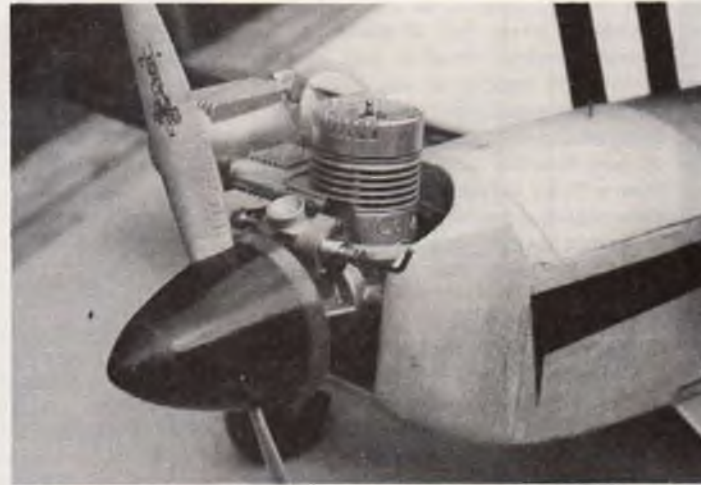
Fully assembled model from the front.



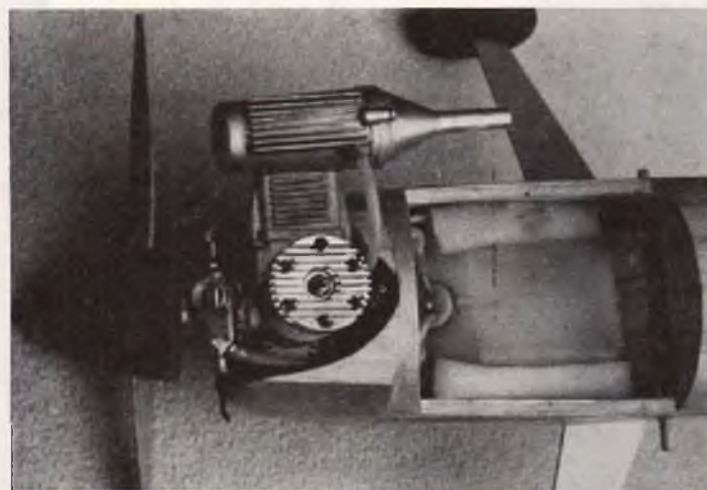
Fully assembled model from the rear.



Top wing removed to show cabane struts.



Up front is a Como .40 swinging a Zinger 10/6 prop. Nice combination.



Hatch removed showing "pylon" 10 oz. tank.



Underside of tank hatch. Hatch was planked with strips.

the stab.

(7) Add the balsa block fairings to each side of the fin and sand to shape. It is probably better to shape the fairing blocks about 90% before cementing in place.

(8) Radius the leading and trailing edges

of all surfaces, as shown on the plan sheet.

Wing:

(1) Using carbon paper, very carefully trace the wing rib patterns onto 1/16" plywood. These will serve as templates for cutting all ribs. The ribs may be cut

individually or, if you prefer, can be stack carved.

(2) Pin down the lower trailing edge sheeting of the upper wing directly over the plans.

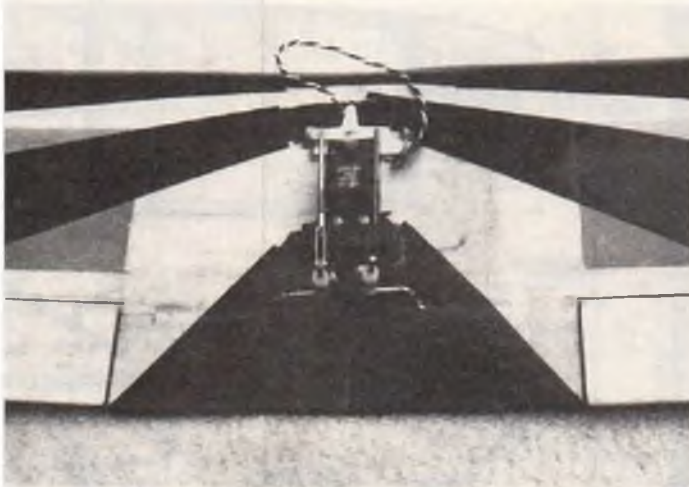
(3) Place 1/16" shims about half chord



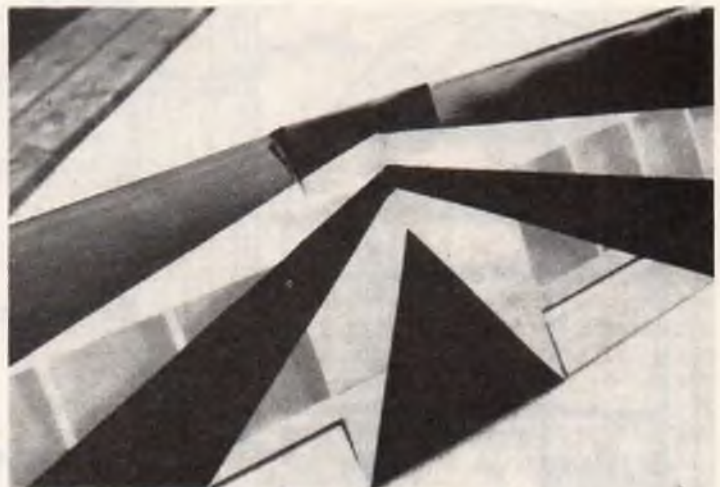
Bottom side showing landing gear installation. L/G bolted to 1/4" ply plate.



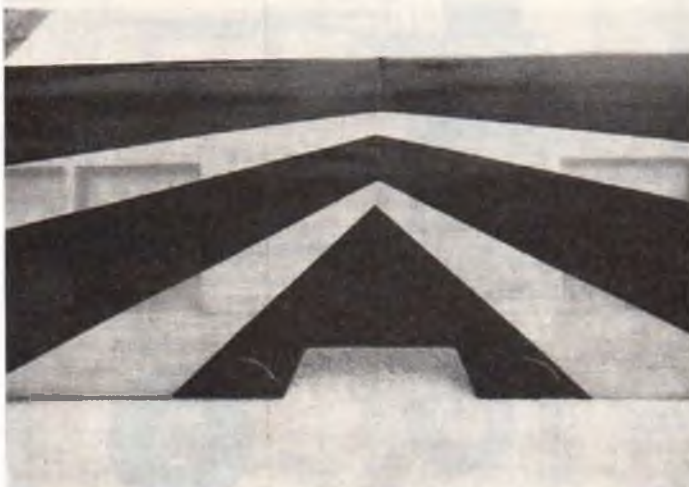
Bottom wing removed showing ample room for servo installation and access to linkage.



Aileron servo installed in bottom wing.



Note fairing block on leading edge to match fuselage bottom.



Center section of top wing. Note 1/32" ply reinforcements where ribs go.



Shows rudder horn and linkage. Elevator horn on right side.

under each rib

(4) Cement all ribs in place (except center line pair which are not cemented until the wing halves are joined) onto the trailing edge

(5) Add both top spars. Cement securely.

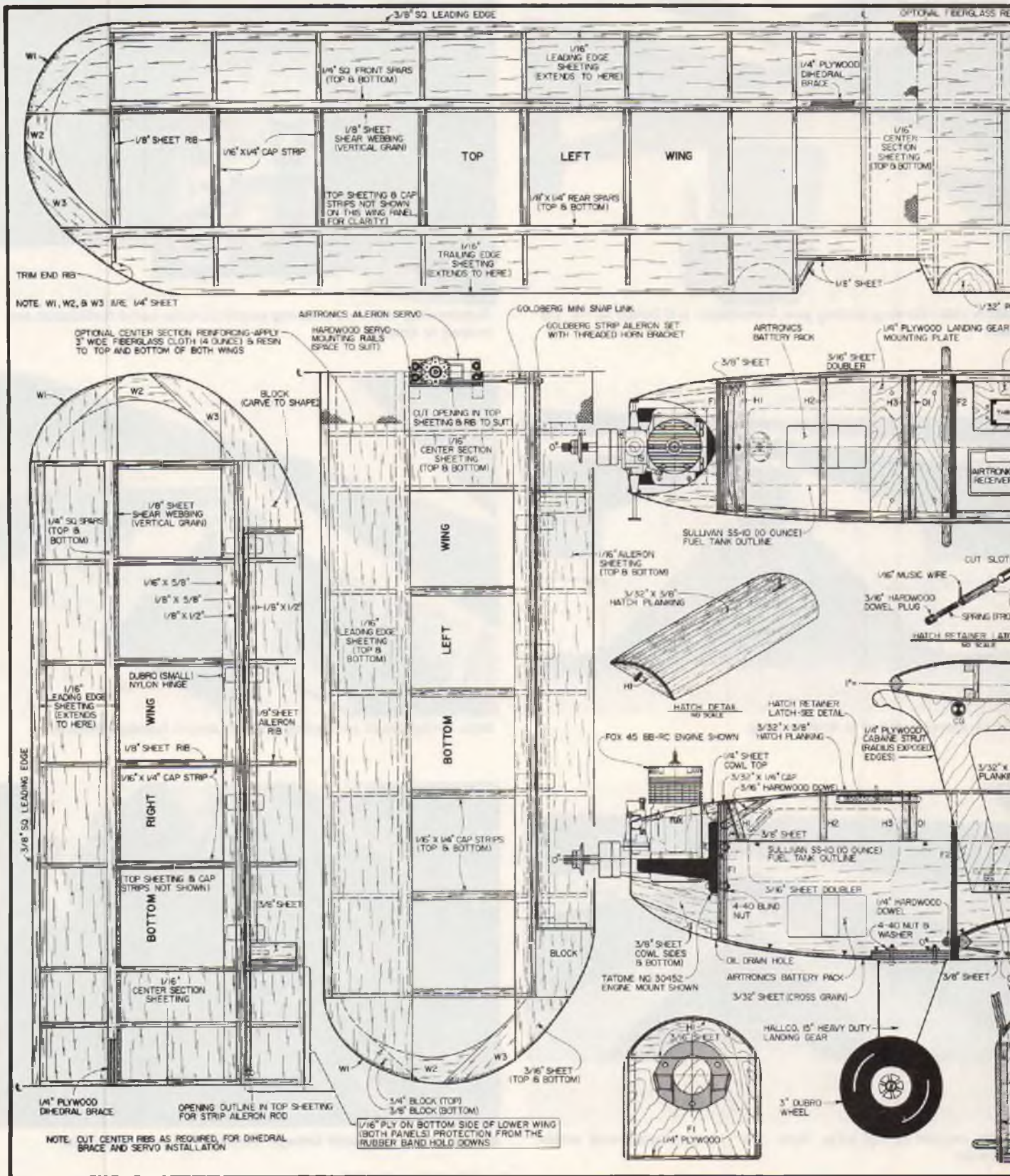
(6) Add top trailing edge sheeting.

(7) Cement 3/8" sq. leading edge in place

(8) Pin down W1, W2, and W3 tip pieces directly over the plans and cement together. Do not cement tips to wing panels yet.

(9) Remove the wing panels from plans and add lower spars and lower leading edge sheeting.

(10) Cement tips to main panels. Note that the front edge of each tip is cemented directly to the 3/8" sq. leading edge.



(11) Pin the wing panels back to the plans and add the 1/8" shear webs. A good fit here is important to the overall strength of the wing.

(12) Join the upper wing halves by epoxying the 1/4" plywood dihedral brace

between the main spars.

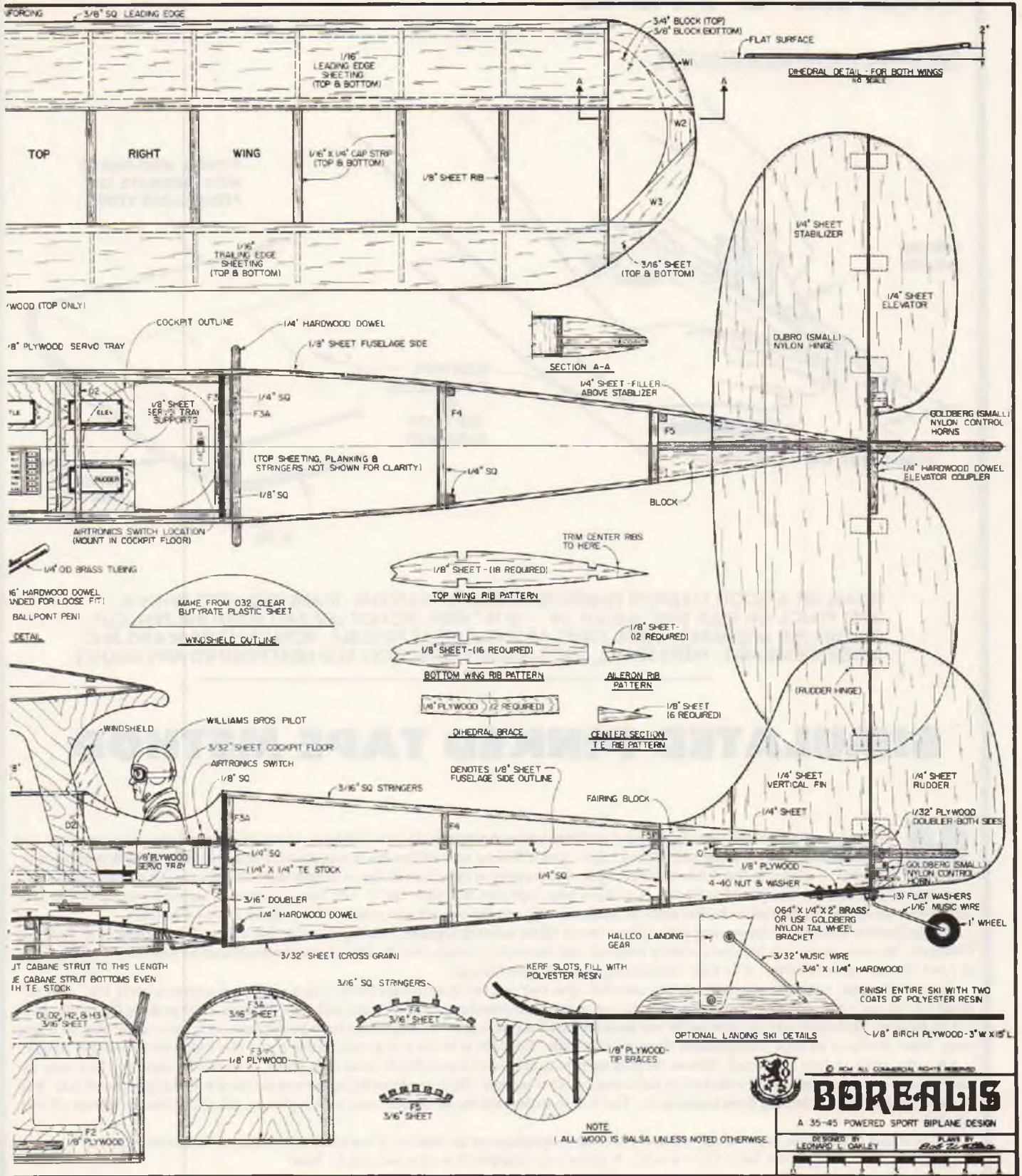
(13) With one wing half flat on the table, block up the other half 2" (measured at underside of tip rib behind main spar).

(14) Cut the two center ribs in two between main spar notches. Fit in place and

cement.

(15) Add leading edge sheeting and upper and lower center section sheeting.

(16) Cement 1/32" plywood half circles to the upper side of trailing edge. These help prevent the rubberbands from cutting into



PLAN NO. 842

the wing.

(17) The lower wing is built similarly to the upper wing except that the ailerons must also be built. If you successfully completed the upper wing, close attention to the plans will get you through the lower wing.

Covering and Finishing:

The original models were covered with silk and dope but at least one was covered with plastic film. I prefer silk and dope not only because it adds realism but it also greatly increases rigidity. However, any

modern covering method will be adequate so use your favorite kind. Be creative!

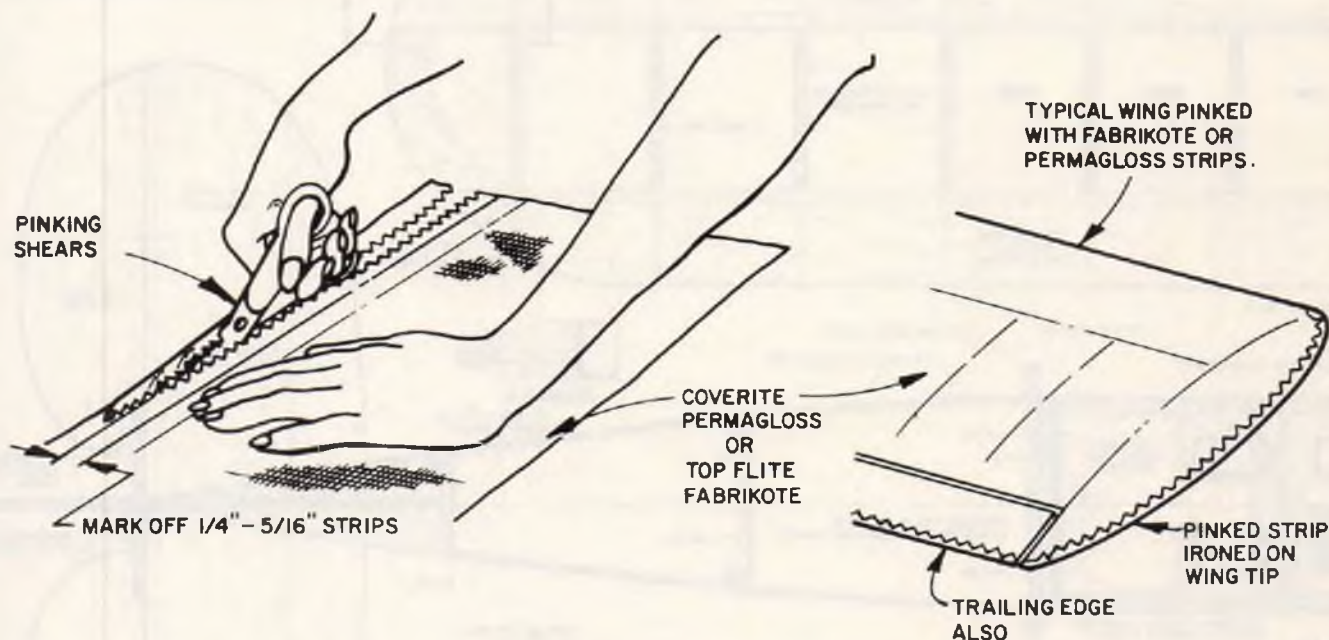
Flying:

The model has been flown with both .35 and .40 size engines. The .35 is adequate to page 136

HERE'S HOW

By Jerry Smith

FOR LARGE AIRPLANES AND BIGGER



ESTABLISH A GOOD STRAIGHT PINKED EDGE ALONG MATERIAL. MARK-OFF LINES WITH A SOFT PENCIL ON GLUE SIDE, ABOUT 1/4" - 5/16" WIDE. DO NOT USE BALL POINT INK PEN. CUT ON THE LINE AND MAKE PINKED STRIPS AS STRAIGHT AS POSSIBLE. IRON ON OVER SEAMS AND WHERE DESIREABLE. HIDES SEAMS, GIVES ADDED PROTECTION AND NEAT FINISHED APPEARANCE.

SIMULATED PINKED TAPE METHOD

Have you ever examined, closely, a full-size fabric covered airplane? If you will look, especially around the wing tips, stab and elevator, and rudder leading and trailing edges, you will have noticed that the seams are very neatly reinforced with pinking tape. This tape is unique in that it has serrated edges. The purpose of the serrated edge is to help make the tape lay flat and not pucker as it sometimes has to lay on compound surfaces. A straight-edge tape just wouldn't cut it. The tape is generally applied over seams to give additional strength and endurance. It also adds an aesthetic value to the overall appearance of the fabric covered aircraft.

For the last few years I have been using pinking tape on my fabric covered airplanes. My tape is made from Coverite Permagloss or Top Flite Fabrikote, the new convenient iron-on covering material with the built-in finish. No, the tape cannot be purchased so you must cut your own. It's not all that hard, however, it is time consuming. Like all good things!

To make the tape, simply lay out the covering material, glue side up, and strike parallel lines with a soft pencil approximately 1/4" to 5/16" apart. Do not use a ballpoint pen because some of the material is quite translucent and the lines will show through. With pinking shears carefully cut on the line. Each time you cut, line up the serrations to make the next cut. Pinking shears have short blades so it takes a few cuts on a long strip. Once you have an edge, things move along more rapidly. The idea is to cut a strip and maintain an even width over the entire length.

Once the entire surface is covered, iron on the pinking tape to help reinforce and hide those ugly seams. You will be surprised how easy the tape takes the rounded corners. Iron the tape in the center to tack it in place. Then iron from the center toward the serrated edge on each side. Roll the iron around the edge to keep from trapping air. You will soon develop the technique. Any excess glue squeezed out can be cleaned off with alcohol.

Could be that one of these days we may see some iron-on pinking tape on the shelves of our local hobby dealers. In the meantime, it's back to the pinking shears cutting our own. Give it a try. It gives your airplane that personal touch. Neat!

Oil Proof Your Model

One of the most destructive things that can happen to a model is allowing engine oil to soak into bare, untreated balsa or plywood. It will cause glue joints to loosen and results in a steady increase in weight. An oil soaked model cannot be properly repaired or repainted after a crackup, since glue and finish will not hold. Cover all wood parts of the model and put on enough coats of finish so that oil cannot soak in. Don't leave any exposed wood on the outside. Around the nose and engine compartment, apply extra effort at oil proofing. Coating the firewall and front joints with epoxy glue is best, but several extra coats of dope or paint will also do the job. Take special care during building to use plenty of epoxy glue to attach the firewall and coat the back of the firewall and the firewall braces with the glue. Fill any cracks with epoxy. □

RCM PRODUCT REVIEW

Top Flite F8F BEARCAT



SPECIFICATIONS

Name	F8F BEARCAT
Aircraft Type	WWII Stand-Off
Manufactured By	Top Flite 1901 Narragansett Ave. Chicago, Illinois 60639
Mfg. Suggested Retail Price	\$99.95
Available From	Both Mfg. and Retail
Wing Span	60 Inches
Wing Chord	11 3/4" (Avg.)
Total Wing Area	630 Square Inches
Fuselage Length	43 Inches
Stabilizer Span	27 Inches
Total Stab Area	142 Square Inches
Mfg. Rec. Engine Range	.60
Recommended Fuel Tank Size	12 Ounce
Recommended No. of Channels	4 +
Rec. Control Functions	Rud., Elev., Throt., Ail. (Flaps & Retract Gear opt.)

Basic Materials Used in Construction:

Fuselage	Balsa
Wing	Balsa
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (6 pages)
Construction Photos	Drawings

RCM PROTOTYPE

Radio Used	Ace 7 Channel
Engine Make & Displacement	O.S. .60 FSR
Tank Size Used	Kraft 12 Oz.
Weight, Ready to Fly	150 Ounces
Wing Loading	34.3 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Aero series F8F book included in kit, flying characteristics, easy construction and good directions, scale details on plan sheets.

WE DIDN'T LIKE THE:

Missing wood (see text).

The last of Grumman's famous "Cat" family, the F8F Bearcat, originated from such combat-proven fighters as the Wildcat, Hellcat, and Tigercat. Although never used by the U.S. Navy for combat, the Bearcat did see service with the French in Indo-China and with the Thai Royal Air Force.

"The legend lives on . . ." as Top Flite says, in the form of that company's newest Stand-Off Scale kit. Your new Bearcat comes packed in an 8 pound, 42 1/4" x 10 1/2" x 4 1/4", snazzy red box with a beautiful picture of the F8F-2 on the lid. Upon opening you'll find everything neatly packed inside (how do they do that?), including two 35" x 45" folded plan sheets, a 6 page instruction manual, and a good 52 page reference book by Aero Publishers.

All die-cut parts are numbered and easy to identify. Other parts are obvious by their shape or material.

Construction:

This kit will surprise you as to how fast it can be built. If you put your mind to it, you can build the entire fuselage in one weekend --- we did! If you have built any of Top Flite's Superform airplanes before, you'll find this kit a snap.

Before you get out the glue, though, there are a few things to look

for. Included in our kit was a set of right and left paper templates to use in laying out the wing opening in the two bottom fuselage shells. Whether you have these or not depends on whether or not the shells are printed. Ours were semi die-cut so the templates weren't needed. Also included was a product improvement bulletin to be attached to the plan sheet. This details a change in stab construction. Guess who found this little item after the stab was already built?

The kit contains molded, die-cut, and machined wood and plastic parts. All were well done, and all parts were of good quality.

Construction will go smoothly by following the instruction manual and the plan sheets. Even so, there are several areas where you should use some caution. The following should be noted:

(1) Be careful when building the fin and stab. These areas overlap on the plan sheet and are a little confusing. Use caution (and a pencil) when marking the stab rib locations --- one reference mark (|) is missing for S-4.

(2) The plans show the shaped leading edges for the rudder and elevators as 1/2" x 1/4", while the wood in our kit was 1/2" x 1/2". Make allowances for this in the elevator/rudder

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SCALE VIEWS

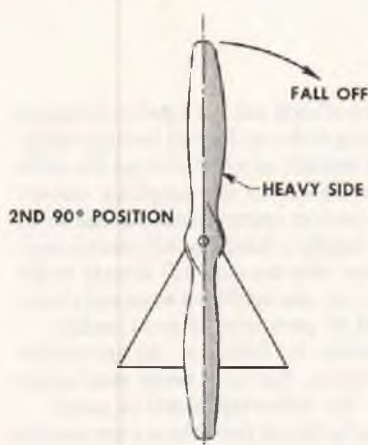
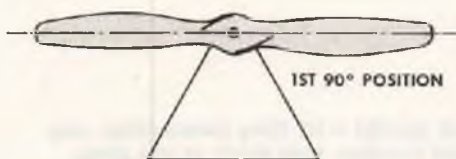
Claude McCullough



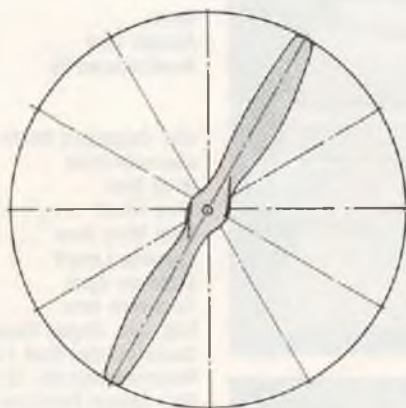
Balancing Act

Wendell Hostetler (of Giant plan fame) writes that Don Lowe mentioned in his January RCM column, on the effect of vibration on models, that he balances props at two 90 degree positions. Wendell says this approach really does the job and feels that a complete explanation of the process would be of interest. In view of the amount of mail I get from scale novices asking questions about every phase of basic information, I'm sure it would.

Don Chapman (master mechanic and helicopter expert), who works with Don Lowe, taught Wendell as follows: The goal of the familiar balancing procedure is to get the prop to hang suspended on the balancing frame in a horizontal position, parallel to the ground or workbench. But to really get it right, the prop must also be balanced at the second 90 degree position, vertically as well as horizontally. Place the prop vertical on the stand. If it "falls off" to either side of vertical, remove material from the "heavy" side as indicated by the shadowed area in the prop drawing. When perfect balance is achieved, the prop can be placed at any point around a 360 degree rotation and it will stay in that position.



Wendell says, "This has been of value to us and we hope it will be to others." When it comes to those big shakers used in Giant Scale, this refined method of balancing is definitely called for.



PROPERLY BALANCED PROP REMAINS IN ANY POSITION

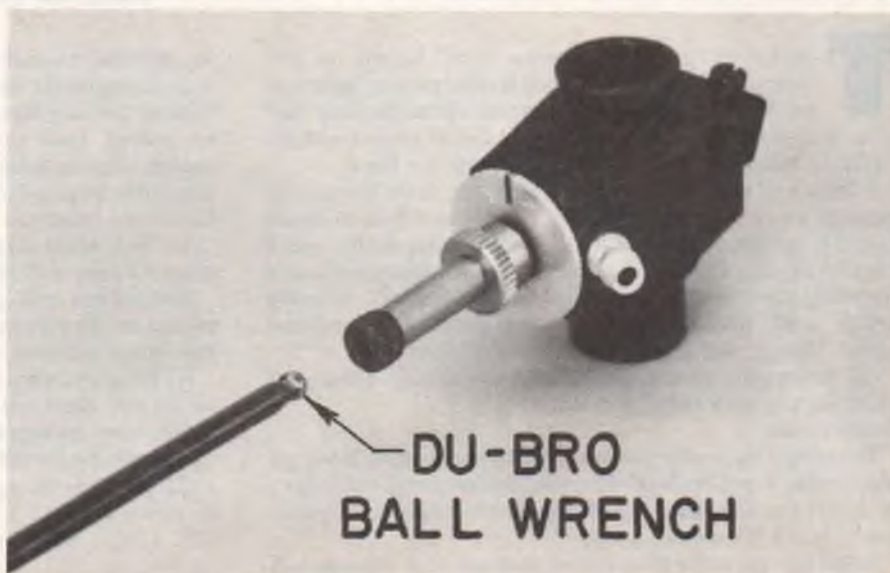
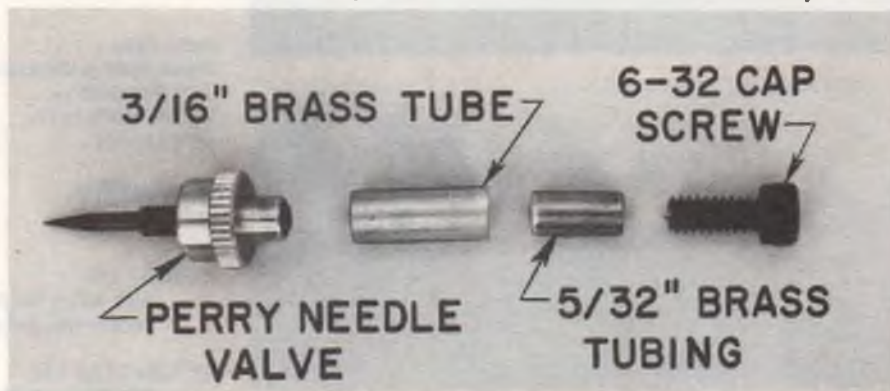
Hide and Go Tweak

A needle valve or extension sticking out of cowling spoils the looks of a scale model but some method of tuning the engine, when required, is absolutely necessary. No matter how many times you get away with pre-adjusting the needle valve with the cowl off, sooner or later, at the worst possible

time, a needle valve change is going to be required on the runway with the engine running and the cowl on. The photos show a modification to the Perry carburetor needle valve so that it can be adjusted with a Du-Bro ball driver inserted through a small access hole in the cowl.

The piece of 3/16" O.D. brass tubing of the required length fits snugly over the end of the needle valve. A sleeve of 5/32" O.D. brass tubing telescoped inside of the first piece brings down the diameter so that a 6-32 cap screw is centered in the end of the outside tubing. (You may have to sand down the screw threads a hair to make them go in the tubing.)

Solder the whole assembly together. Start by sanding all the parts to a bright, clean finish. Coat them with non-corrosive soldering flux and assemble. I prefer a big, hot iron for this type of job. The solder can be "boiled" through the interior quickly without a lot of long heating as would be necessary with a small iron. Tin the end of the iron generously. Have some soldering flux on the outside of the assembly to start



distributing the heat instantly. Put solder on the tip of the iron as it is pressed against the top seam and let the solder flow into the interior. Zap it at the needle valve seam to make sure the solder travels completely through the interior.

It is best not to make the needle valve extension too long. Vibration of a long extension can cause the needle valve setting to change. If you have a big cowl, with the needle valve a long way from the outside, keep the extension short and build a guide tube into the cowl that will steer the ball driver into the cap screw. One advantage of a ball driver is that it can approach the needle valve at an angle and still do the job.

This idea can be adapted to other needle valves besides the Perry by varying the method of attaching the tubing to the needle valve body. It is also handy on exposed needle valves as a way of keeping valuable fingers away from the chopper on the front of the airplane.

Smoke Tips

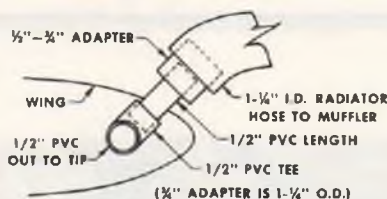
Vince Ligouri (Newbury Park, California), has a novel smoke installation which puts out a trail from both wing tips. This caper will lay the crowd in the aisles at an air show. I'll not try to pass off the model so equipped as a semi-scale F-5 for it is in fact a stock Sig Kougars. (I like to think of the F-5 as a semi-scale Kougars!) But the system can be easily adapted to scale models and, anyway, smoke generation is always a popular column topic.



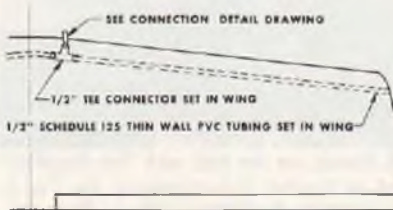
A standard smoke system, such as a Du-Bro or Higley, feeds into the wing piping. The pipes are common Schedule 125 Thin Wall PVC plastic plumbing. When the installation calls for an angle, angle fittings are available, but weight can be kept down by heating the pipe and bending it as required. The drawings detail the hook-up to the muffler. The connections will easily slip off the wing tee or off the muffler when the wing is removed for transport. Be sure to balance the completed wing.

The Kougars wing has a foam core, which would melt if it got hot enough, but, evidently, there has been no problem. I imagine that the foam actually contacting the piping does melt in practice, but as soon as there is an air separation between the pipe and the foam, the heat transfer would drop right down. Seems like it would be easy to have a little cooling scoop that would move air down along the outside of the pipe and exhaust at the wing tip also. I'd recommend a good solid block mounting for the tee at the center. The wooden block wing tip

supports the pipe at the outer end. A long plumber's drill bit can be used for the pipe hole or cut it with a hot wire.



Vince Ligouri's WING TIP SMOKE SYSTEM



Vince, a member of the Conejo Modelers R/C Club in Thousand Oaks, California says he has been using kerosene and Prestone for smoke fluid. (Remember the story, early in this smoke series, from the guy who had the radiator on his car break and smoke billow from the anti-freeze hitting the manifold?) Like many others, he asks if anyone knows how to color smoke. That's the \$64.00 question and we hope someone comes up with something that will accomplish this effect.

Scale Data Sources

Aerophile. Published by Aerophile, Inc., 4014 Belle Grove, San Antonio, Texas



78230. Bimonthly, 6 issues — \$15.00. 62 pages.

Continuing our series on specialist aviation magazines that aren't available on newsstands --- and, therefore, not familiar to the average scale builder --- this month's selection looks like an aviation industry publication but is actually directed mainly at model builders, aviation historians and students. Printed on quality coated paper, it has lots of good black and white photo coverage, 3-views and detail line drawings. Except for the cover, no color as yet. In Volume 2, Number 4, the main feature is on the McDonnell-Douglas RF-4. Wing tip coupling experiments are described in an interesting historical article. If you don't follow that, it is hooking two aircraft together at the wing tips. The air museum department covers the Lackland (Florida) AFB display, where you can see and photograph such rare birds as the Bell RP-63G and the Cessna XT-37, as well as a big batch of standards --- B-24, B-17, UC 45J, T-28, P-51H, F-82E, P-47N, etc.

Since photography is an important part of modeling and history, a "Photophile" column endeavors to improve reader's photo efforts. I was interested in the current issue article on color film longevity. When I mentioned the transient nature of color prints and transparencies in a previous column, several readers asked professional color photographers about the matter. They claimed to have no knowledge of it and one insisted there was no such problem. I'm afraid they have prejudicial blinders on because of self-interest and don't want to face up to an unpleasant fact. Eastman and other film companies work on this flaw steadily, trying to find a solution. Modern Photography and other photographic magazines have had coverage. I've been taking color transparencies and negatives since 1946 and the fading and shifting of the older ones are obvious to the eye. Color prints in particular fade badly and continuously with age. I repeat my previous assertion: If you want longevity, take black and white photos at the same time you are doing color shots.

Metal Covering Feedback

T.A. Jacoby's request in the Scale Views column of RCM for January, asking for information on covering a model with aluminum, brought in a bunch of suggestions. Several thought that aluminum foil was the way to go. But John Murphy (Boxboro, Massachusetts) doesn't agree, saying:

First off, forget about aluminum foil. It's far too thin and it is impossible to remove any crease or other type of blemish. Sheet aluminum in a thickness of .015 to .008 will be ideal to work with. It is easy to cut and shape with fingers and pliers. You can even scribe panel lines and rivets on the top surface before bonding to the balsa structure.

To bond the aluminum to the structure, use Hot Stuff, Jet, Zap, etc. The drops of

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PIT STOP

Gene Husting



The 1st Annual Florida Winter Electric Championships was held in Orlando, Florida, and was run by the Florida Electric Auto Racers club, with sponsorship by General Electric — Battery Division.



Bill Jianas, on the left, was Top Qualifier and is being interviewed by Tony Stephenson, the Editor of Radio Race Car Magazine in England.



Jianas' RC12E car was built by Mike Lavacot, featuring Reedy Modified horsepower, graphite chassis, Novak servos and receiver.

1981 FLORIDA WINTER ELECTRIC CHAMPIONSHIP

The Annual Florida Winter Internationals for the 1/8 Scale gas cars has grown over the years to become one of the best races of the year. It has not only attracted racers from all over the U.S.A., but also from Europe and South



Rick Davis (Top) is thinking — I've got Jianas tied for Top Qualifier, now all I've got to do is beat his backup time. Meanwhile Mike Reedy is thinking — I wish I had Rick's problem.

America. And because a lot of these racers also race the 1/12 Scale electric cars, the Florida Electric Auto Racers club decided to run a 1/12 Scale Winter Electric Championship race the week before the gas car Winterinternationals. I think it was a fantastic idea because a lot of the expense of racing is in traveling and this way we got to race two races for the price of one, so to speak. And you get to race with a lot of new

people, which adds to the excitement of racing.

And, you'll never know how exciting 1/12 Scale electric racing can be until you've raced with a group of ROAR 1/12 National Champions like Mike Lavacot, Kent Clausen, Bill Jianas, Rick Davis, Re-Pete Fusco, Curtis Husting and Arturo Carbonell. Yes, I said Arturo, and yes I said

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Yes, it's true! That's Arturo Carbonell thrashing on a new prototype Delta 1/12 Scale electric car.



"A" Main event drivers (from the left) Curtis Husting, Mike Lavacot, Bill Jianas, Kent Clausen, Arturo Carbonell, Ralph Burch, Jr., Rick Davis and Re-Pete Fusco.

1981 FLORIDA WINTER ELECTRIC CHAMPIONSHIP RESULTS

PLACE	NAME	QUAL. LAPS	"A" MAIN TIME	CAR	MOTOR
1	Mike Lavacot	30	8:16	Associated	Reedy
2	Arturo Carbonell	29	8:02	Delta	Reedy
3	Ralph Burch, Jr.	30	8:17	Jomac	Reedy
4	Kent Clausen	30	8:14	Associated	Reedy
5	Curtis Husting	30	8:14	Associated	Reedy
6	Re-Pete Fusco	29	8:04	Associated	Reedy
7	Rick Davis	30	8:13	Associated	Reedy
8	Bill Jianas	30	8:13	Associated	Reedy
"B" MAIN					
1	Gene Husting	29	8:06	Associated	Reedy
2	Ray Hepner	29	8:14	Associated	Reedy
3	Al Chuck	29	8:09	Associated	Reedy
4	Mike Hamilton	28	8:05	Jomac	Pro-Slot
5	Olle Soderholm	29	8:05	Bo-Link	Bo-Link
6	Chuck Phelps	29	8:09	Associated	Reedy
7	Mike Kimrey	29	8:09	Associated	Reedy
8	Pete Fusco	28	8:04	Associated	Reedy

WHY NOT FLY OLD TIMERS? OR WHY NOT FLY, OLD TIMER?



Henry Struck is shown with a beautiful R/C version of the New Ruler built by Walt Moucha, Sr.



An example of the classic 1936 Quaker built by George W. Dickinson.

By Steve Halvorson

Much as I hate to publicly admit it, I am getting on in years, which is a kind of way of saying that maybe I am getting old! Now don't get the idea that I am a feeble, senile old man for, far from that --- it's just that I have the middle age pouch, bifocals are mandatory, smoke my pipe too much, and maybe --- just maybe --- my reaction time might be just a tad bit slower than some hot shot pylon racer.

It took a lot of time, effort, and money to raise six kids to the point that they were self-sufficient, and the majority were out of the nest and on their own --- so I got a late start into R/C flying. It's not that I was not interested, I remember in 1968 going to the old Asheville, North Carolina, airport and watching R/C contests and wanting to get my own outfit. About once a year for the next ten years, I would wander into a local hobby shop --- gaze at all the goodies, ask a few questions and then buy a couple of R/C magazines and go home and dream!

Finally, in the summer of 1977, I took the plunge --- bought a Sig Kadet Kit, O.S. Max .25, and a used Kraft 5 channel radio --- incidentally, I am still using the radio weekly and the engine is still in service! By the time I was ready for my first flight, I was within several weeks of being a half a century old --- which is a very crude way of saying that I was 50 years old.

Hobby industry, kindly take note! If, in all my trips into the hobby shops, I would have received any friendly encouragement about getting into R/C, or if I could have found readily available written information directed towards the person who knows nothing --- but nothing --- about R/C, I would now have ten years experience rather than four. I honestly believe the hobby

could double the number of participants (and sales) in one year if the industry would do some education and promotion, and the increase would come from the adult segment, who have available excess funds, rather than from the kid with a Christmas toy and an inadequate allowance from Dad.

So much for the lecture, back to me and my R/C! The local R/C situation in Virginia left a lot to be desired. The hobby shop owner was at odds with the local R/C club because he claimed (justifiably) that the members did all their major purchases from the discount mail order houses, bought fuel by bulk and, as a result, he would not even tell anyone where the local field was. Let alone try to help anyone! The club members claimed the hobby shop not only would not give a discount, but quite often increased kit and engine prices above the advertised retail price. So here am I, literally a babe in the woods trying to learn something about R/C and end up in the cross fire of an intensive feud.

Now the local club itself was not all that unique for there seem to be a lot of clubs with the same philosophy. They did not go out of their way to encourage novices. To fly at all, first you had to belong to AMA, and be a club member which may not be all that bad. They claimed they were limited to 50 members max; however, they only had 32 paid memberships and if there were six fliers at the field on a nice Sunday, they considered it to be overly crowded. In reality, a small clique of fliers wanted their own private field and, by their attitude, discouraged novices, students, new members and, to some extent, existing members. While I was building my Kadet I joined AMA and, with a lot of perseverance, managed to become a

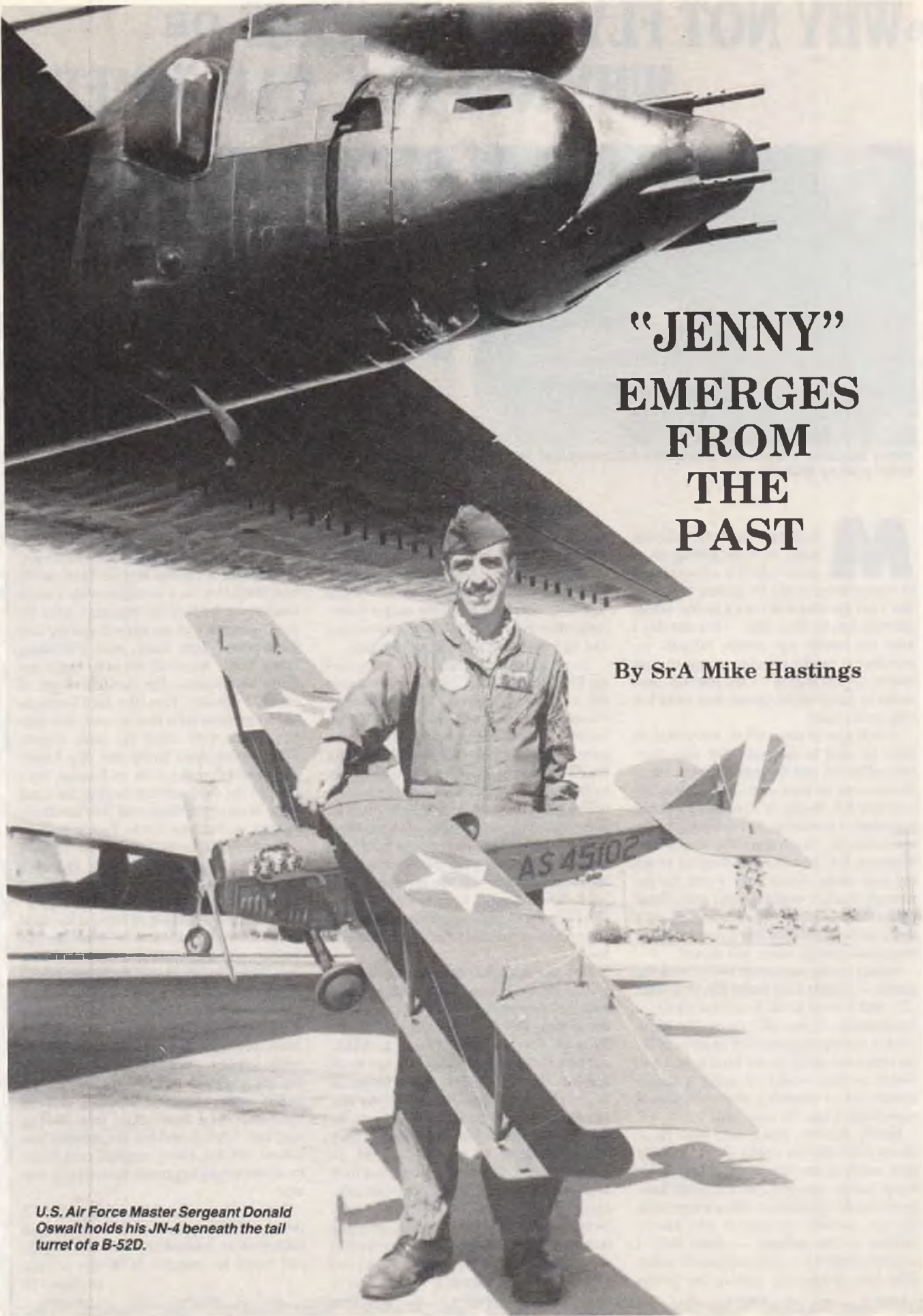
member of the local R/C club.

Hey, now, I am going to learn to fly R/C --- I thought! Everyone told me Tom was the best instructor, so I arranged with Tom to meet me at the field on Saturday. After the pre-flight check of the aircraft and the trim flight which Tom made, with everything being TOK, we were ready to begin my flight instructions. On the first flight of about 15 minutes, Tom flew for 13 minutes and let me have it for two minutes. The next two flights were about the same format. Tom sure enjoyed flying that Sig Kadet! Tom couldn't make it out on Sunday, but I went to the field anyway hoping for some help. Most of the fliers said they could not instruct or, because I was Tom's student, did not want to interrupt his training program. Along about dark, the club president did agree to help me for one flight which I thought was kind of nice.

After three weekends of being at the field from dawn to dusk, both on Saturday and Sunday, with Tom failing to show and being darn lucky to get in one flight per day, I began to wonder --- was it me? Did I forget to take a shower or brush my teeth? Was I being obnoxious or what? Was the hobby worth getting into or should I quit before really starting, even though I had a small fortune invested? I even went back to the hobby shop to see if I could hire an instructor, but I received no help. A long time later I discovered that the problem was not me, but was a very common experience to anyone trying to get into the hobby in that area.

Strictly by accident I happened to meet a local resident and, in a very stupid conversation, learned he was a R/C fanatic and loved to instruct. With our diverse

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A black and white photograph showing a man in a military uniform, identified as Donald Oswald, standing on a tarmac. He is holding a small, wooden biplane model, the JN-4 'Jenny', in front of the tail section of a large B-52D bomber. The bomber's tail turret is visible above him. The man is smiling and looking towards the camera. The background shows a clear sky and some distant structures on the airfield.

"JENNY" EMERGES FROM THE PAST

By SrA Mike Hastings

U.S. Air Force Master Sergeant Donald Oswald holds his JN-4 beneath the tail turret of a B-52D.

As part of his normal responsibility as an aerial tail gunner, Sergeant Oswald puts in his time as an alert crew member. To pass some of his spare time, he worked on completing the "Jenny." Here we see him in his flight suit, soldering small pieces of the wing.

As the solder cools, the tiny joint on the ancient JN-4 biplane is sealed between the metal extension and the brass eye. It is the last of over 14,000 parts constructed. As it is put into place and a cable run through the eye and attached to the control stick, a boyish smile comes to the face of the precisionist whose 1500 hours of work enabled an idea to be transformed into reality for thousands to admire in the future.

U.S. Air Force Master Sergeant Donald Oswald, a B-52D bomber aerial tail gunner assigned to the 2nd Bomb Squadron at March Air Force Base, California, has an unusual pastime. He creates exact replicas of historical aircraft.

Constructing replicas goes beyond building models with a similar outward appearance. Every single part that would appear in the original must be included, inside and out, from the ground up. What makes the task even more extraordinary, is that Sergeant Oswald doesn't just assemble a

As many as 12 separate parts had to be built in order for this configuration to be complete. All of the cables, including the ones seen here, meet at the control stick inside the cockpit, which controls all of the movements.

kit, he builds every part from scratch.

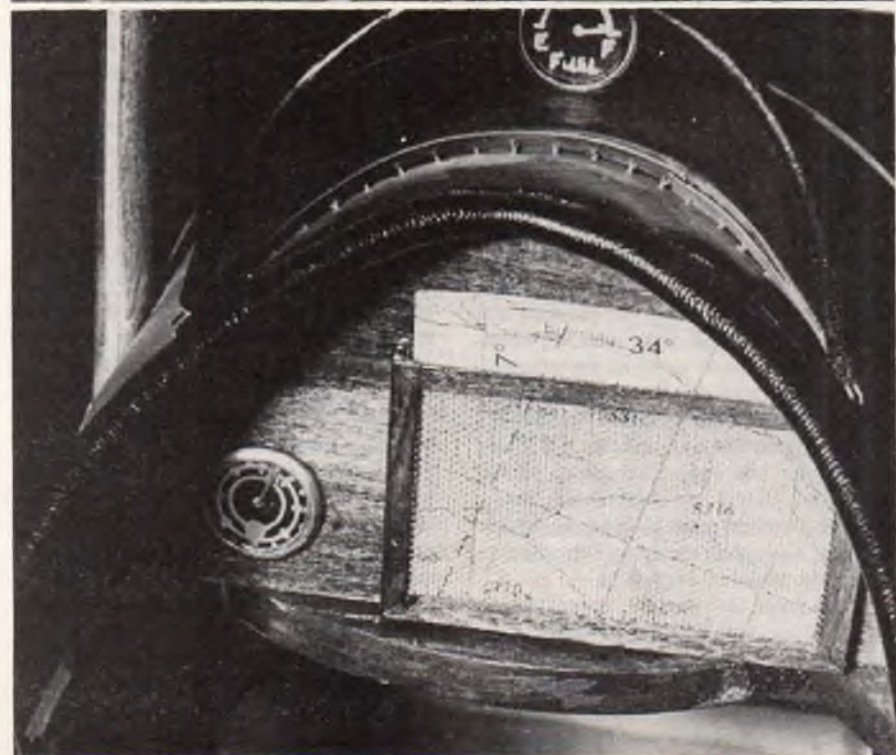
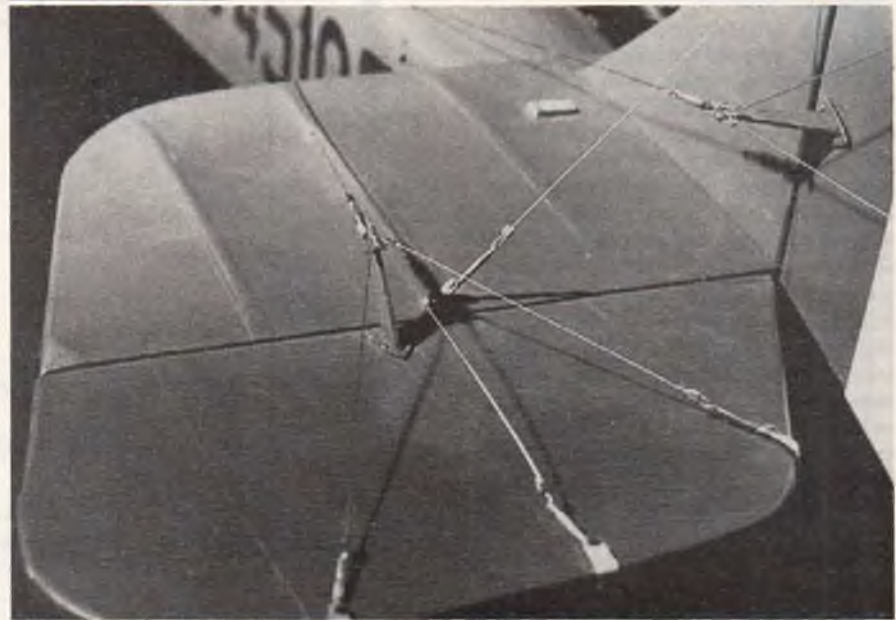
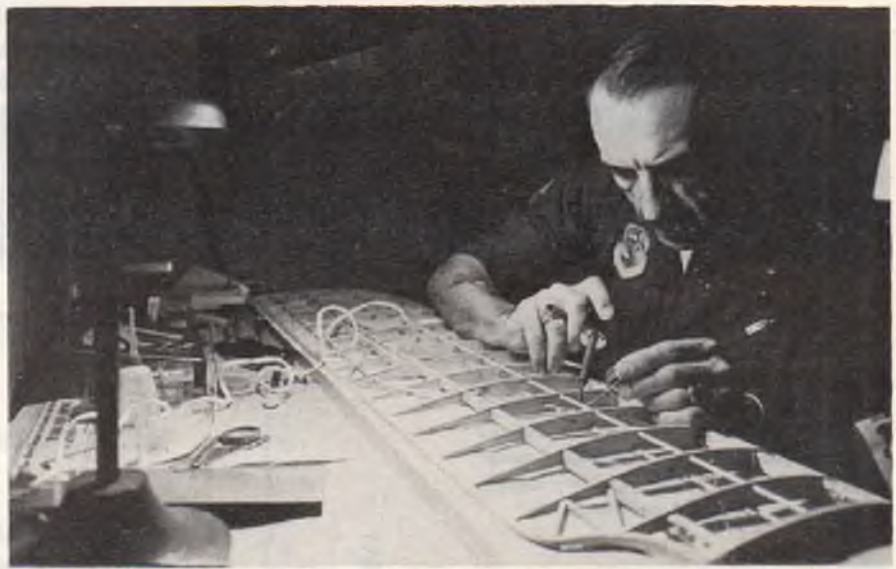
One of the main reasons, besides enjoyment, Sergeant Oswald undertakes such projects is the preservation of heritage. "I'm glad when I see people interested in our heritage. Too often we forget our past," he noted. "People don't understand how a plane like the JN-4 flew. The more I work on the replica, the more I appreciate the designers and pilots who flew it," he said.

It is the most recent aircraft that Sergeant Oswald has completed. He was asked by his commander if it might be possible for him to construct the replica for the newly opened base museum. Oswald agreed.

The JN-4, or "Jenny" as it was called, was the first aircraft assigned at March. At that time, in 1918, March was known as Alessandro Aviation Field and was one of the main training bases in the Army Air Corps. The dismantled Jennys arrived at the field in 96 separate crates and were stacked inside a hangar. When the first base commander arrived, it was his responsibility to assemble, rig, and ready for flight, the contents of these 96 crates, and turn them into a flying squadron. His new job turned out to be a little bit more than he had anticipated, but he did it.

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Everything one would find in the original airplane can be found in Sergeant Oswald's replica. This includes a miniature map located in the cockpit. According to Sergeant Oswald, one could fly from Riverside to San Diego using that map.



SCALE SPEED ANOTHER APPROACH

By Gordon Whitehead

Is there such a thing as scale speed? Do the Quarter Scale beauties really fly more slowly than their smaller brethren? Does your brand-X pattern ship really land at walking pace? Will your engine/prop be adequate for that radial cowled "never been done before" scale job? We have a new look at some old problems.

Radio controlled scale model airspeed is a perennial topical of conversation, both at the club field and at competitions. Most folk realize that a high wing loading generates a high stalling speed; they also know that an undercambered wing stalls at a lower airspeed than does a symmetrically airfoiled wing of the same size and planform, with flat bottomed airfoil behavior lying somewhere in-between. However, it seems that the majority of us don't have any real feel for the magnitudes of the airspeeds involved. For example, we often read that monster models are safer than ordinary ones on the grounds that they "fly more slowly," and this writer is rather skeptical of such statements. With the advent of the large chain-saw powered ships, this lack of appreciation for model flying speeds could be a bad thing, and I am, therefore, writing this article in the hope that it will be a useful armchair look at the performance aspects of model airplanes.

Years ago, when aircraft were only just becoming practical machines, one of the figures of merit used in evaluating an airplane was its speed range. In these days of supersonic flight, such a figure applied in the full size sphere is not of any great significance. In regard to models though, the concept of "speed range" may still be of use. For if we can get a figure for stalling speed, we might be able to apply a spot of intelligent guesswork to predict an appropriate top speed; from here, we might even go so far as to estimate the required propeller size, and perhaps even the engine size --- all from our armchair! However, when I suggest that what follows will assist in propeller and engine selection, please remember that I am considering only normally powered models, not those which have had an engine transplant operation to double the speed of everything.

At this point, let us define "speed range" as used here. Speed range is the ratio of maximum model speed to stalling speed. If you examine the performance figures of most full size propeller driven airplanes, you will find that their top speeds lie around

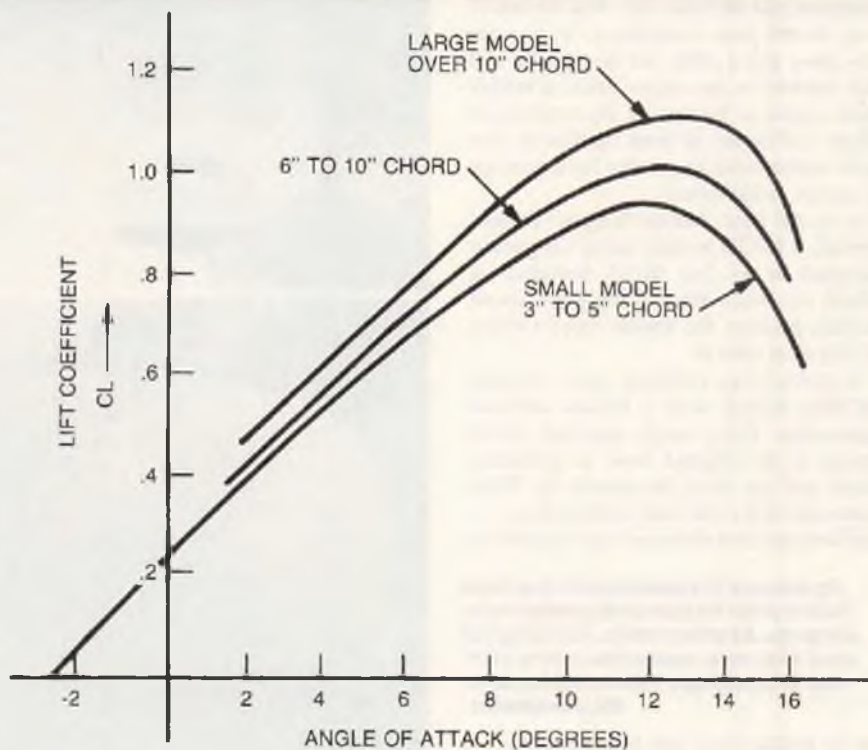


FIGURE 1

RELATION BETWEEN CL AND ANGLE OF ATTACK FOR CLARK Y WING SECTION WITH DIFFERENT CHORD LENGTHS

3 to 4 times their stalling speeds, i.e., their speed ranges are in the region of 3:1 to 4:1. Some of the early birdcages only had a maximum speed of about twice stalling speed, which limitation made them difficult to handle. If the engine cut suddenly, parasitic drag immediately slowed the ship to stalling speed with a resultant interesting time for the pilot. Any early pilot knew that if the engine died in flight, he had to push in some down elevator pretty quickly to enable gravity to take over from where the engine left off. Furthermore, with an available speed range of 2:1 or less, any attempt at a brisk climb would slow the ship down and make it wallow --- not a desirable attribute just after take-off. Still in the same vein, extra induced drag produced in turns could make changing direction an unpleasant experience, since the resultant slowing down might bring the ship to the verge of a stall where one might find a snap roll lurking under one wing tip. The foregoing suggests that we should hope for a speed range of at least 3:1 for our models, so that they can have a reserve of power or speed at hand to help to keep things running smoothly.

Let us look at performance envelopes for

some full size airplanes. The Curtiss JN4D had maximum and stalling speeds of 75 mph and 45 mph, respectively, for a speed range of 1.7:1; figures for the Nieuport 28 were 122 mph, 54 mph and 2.25:1; Ryan STA, 150 mph, 48 mph, 3:1; P51, 395 mph, 90 mph, 4.4:1. The above list is not exhaustive, but the aircraft are all fairly typical of their classes and not a lot would be gained by extending the list. Generalizing about the performance envelopes of all airplanes, we see that: pre-WW I and early WW I aircraft had speed ranges of less than 2:1; the later WW I scouts and mid-twenties biplanes operated on an average in the range between 2:1 and 3:1; trainers and military biplanes of the 1930's had speed ranges of around 3:1 to 3½:1; and high performance piston engine fighters had speed ranges of around 4:1. Most modern lightplanes were approximately the same as the 1930 trainers.

For our models to reasonably duplicate the performance of their full size brethren, then we need to try to operate them over similarly wide speed ranges. In practice, I would suggest the following as minimum criteria: pre-1919 airplanes, 2.5:1; 1920-30

airplanes, 2.5 to 3:1; 1930's trainers, etc.. 3:1; WW II fighters 3 1/2:1. These suggestions attempt to take into account the amount of power we are likely to have available in relation to model size.

As an example, suppose we were going to make a 1/6th Scale PT17 for which we guesstimated a stalling speed of 20 mph. The probable level top speed would be around 3 x stalling speed, or 60 mph. Knowing this figure, we could eventually determine propeller pitch at about 5" or 6" and, depending upon propeller diameter required, estimate engine suitability. A 1/6th Scale Sopwith Snipe would be about the same size as the PT17, but would probably be built more light, get away with a smaller speed range of about 2 1/2:1, and so use a finer pitch, larger diameter propeller.

Finding the Stalling Speed

In the PT17 example, we guessed that the stalling speed might be 20 mph. However, to ascertain the stalling speed of our model, we don't need to guess; we can work it out to within a couple of mph or so. For the prediction, we need to measure the model's wing loading, and determine a characteristic of its airfoil known as CL max. We then substitute these figures in a formula given shortly.

Most of you will have seen the airfoil graphs featured from time to time in RCM which plot airfoil "lift coefficient" (CL) against angle of attack for various airfoil sections. A graph for Clark Y is shown in Figure 1.

Actually there are three curves drawn on these axes. Comparison of these curves shows how the CL of a small chord wing is consistently less than that of a large chord wing. Since CL is a measure of the "lifting power" of a wing, then the comparison between CL values for small and large chord lengths indicates the relative efficiency of small and large models.

For Clark Y, the lifting power of the wing is greatest at around 12° angle of attack, and the value of CL at this angle is called CL max. As the angle of attack increases beyond 12°, CL diminishes, along with lifting power. This means that the wing has passed the point of the stall, and will develop less and less lift despite the angle of attack getting bigger and bigger.

Put another way, CL max is coincident with the stall point of a wing, and a 10" chord Clark Y wing will stall with a value for CL max of 1.1. Table 1 details the CL max values for various other popular airfoils you might come across in your modeling career.

We now find the wing area loading of our model in ounces per square foot as follows:

$$\text{Wing loading (oz./sq. ft.)} = \frac{\text{Wt. of model (oz.)}}{\text{wing area (sq. ft.)}}$$

Then we find the approximate stalling speed of the model, using the following formula:

$$\text{Stalling speed (mph)} = \sqrt[5]{\frac{W \text{ (oz./sq. ft.)}}{CL \text{ max}}}$$

TABLE 1
Approx CL max values for various airfoils at model sizes

Airfoil	Type (note 1)	CL max
NACA 6409	U	1.4
NACA 6412	U	1.3
Clark Y	FB	1.1
Go 697	FB	1.2
NACA 2412	SS	1
NACA 2415	SS	0.9
NACA 23012	SS	0.9
NACA 23012	SS flapped	1.5 (see note 2)
NACA 0012	S	0.8
NACA 0018	S	0.8

Notes: 1. U = Undercambered, FB = Flat Bottomed, SS = Semi-Symmetrical, S = Symmetrical.
2. Full span plain TE flap deflected 30°. Flap chord = 1/5 of main wing chord.

So let's choose an example. Imagine you are designing a 1/8th Scale (48 in. span) Curtiss BFC2 Hawk. Such a model would have a target weight of about 6 lbs., and assuming that the 570 sq. in. (approx. 4 sq. ft.) wing used a Clark Y-Type section, then wing loading would be about 24 oz./sq. ft., and the CL max would be about 1. Using the stall speed formula,

$$\text{Stalling speed} = \sqrt[5]{\frac{24}{1}} = 24.5 \text{ mph}$$

and you can forget the .5 mph, since I would not claim better than ± 10% accuracy.

There are too many variables involved,

such as accuracy of rib profile, quality of surface finish, and varying efficiency of different sized wings, for me to put hand on heart and promise you anything other than a ballpark figure. However, this approximation comes in very useful. Since we are dealing with a biplane, we would be satisfied with a top speed of between 2.5 to 3 times stalling speed, and we could expect the flat-out level speed of our Hawk to be about 70 mph.

Checking Out the Stall Formula at the Field

Not content in merely accepting the stalling speed formula (which is a

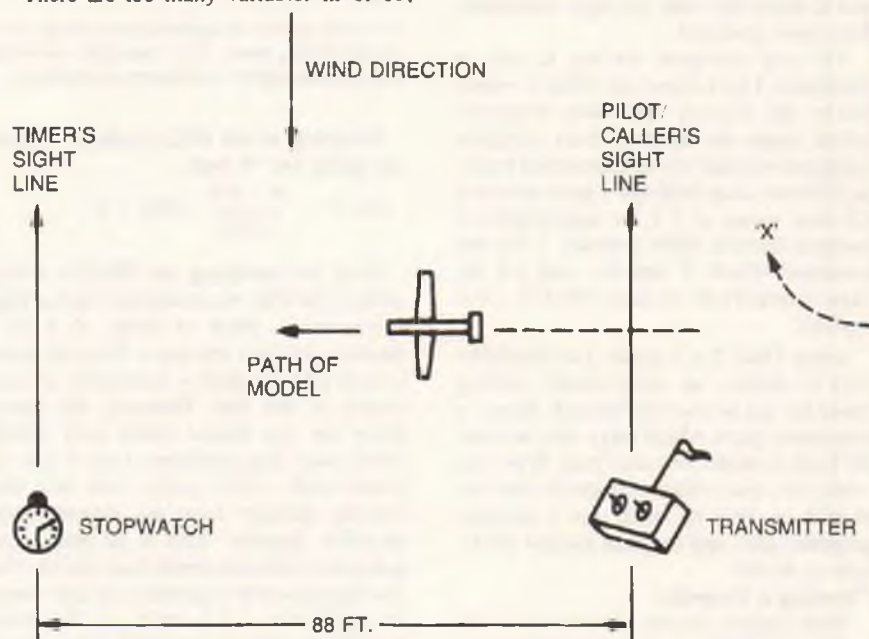


FIGURE 2

PLAN VIEW OF MINIMUM FLYING SPEED EXPERIMENT. WING WAS MINIMAL AND ARRANGED TO BE ACROSS FLIGHT PATH. MODEL FLOWN ON VERGE OF STALL AT CONSTANT HEIGHT. IF MEASURED TIME IS t SEC, THEN SPEED IS: 60/t mph. 'X' MARKS SPOT WHERE KEN'S MODEL STALLED IN, TERMINATING THE 10TH ATTEMPT WITH THAT MODEL, ALSO ENDING FURTHER EXPERIMENTS WITH HIS SHIP THAT DAY (VERDICT WAS PILOT ERROR).

rearranged version of the aerodynamicist's "lift formula") my flying buddy Ken Body and I set off for our flying patch equipped with a stopwatch, measuring tape, pocket electronic calculator, my sport scale 15 oz./sq. ft. Clark Y winged Tiger Moth and Ken's 20 oz./sq. ft. semi-symmetrical winged trainer. We marked out a length of 88 ft.; Ken stood at one end with the stopwatch, and I at the other with the Tx. See Figure 2.

After practicing flying each model as slowly as possible at about 25 ft. altitude — right on the verge of the stall with the airplane at high angle of attack and engine at fast idle to maintain height — we timed the model as it traversed the marked distance. I would call when the model passed me (using a 3-2-1-now countdown to help reduce Ken's reaction time) and Ken would clock-off as the model passed him. Dividing the measured time in seconds into 60 then gives the speed in mph.

We measured each model's slowest speed several times, taking the average, and got 3¼ sec., i.e., 60/3¼ = 18½ mph for the Tiger Moth; we got 2¾ sec., i.e., 22 mph for the trainer. The theoretical stalling speed for the Tiger Moth (CL max = 1) is 19.4 mph, and that for the trainer (CL max = 0.9 for NACA 2415) comes to 23.6 mph. As you can see, agreement of practice and theory is pretty close. The models would normally approach to land at speeds perhaps 3 or 4 mph greater than those we measured. Of further interest is that we chased my Tiger Moth down the main runway of the air base where I'm stationed, clocking an average of 50 mph; this speed is pretty close to 2.7 times the stalling speed and is about the same as might reasonably have been predicted.

To save everyone having to own a calculator, I have drawn up Table 2, which shows the slowest attainable airspeeds which might be expected from airplanes equipped with any one of three airfoil types, at different wing loadings. I have assumed CL max values of 1.3 for undercambered sections (NACA 6409 typical), 1 for flat bottomed (Clark Y typical), and 0.9 for semi-symmetrical sections (NACA 2412 typical).

Using Table 2 as a guide, you should be able to deduce an approximate stalling speed for any of your models and, hence, a maximum speed which takes into account the kind of model you are flying. If we can work out a maximum level speed, then we should be able to work out a suitable propeller size, and the next section shows how to do this.

Choosing a Propeller

Most engines deliver peak power in the region of 15,000 rpm, so we need to pick an airscrew which will match 15,000 rpm to 70 mph, and another formula will be of use here. Assuming an 80% efficient propeller,

$$\text{Propeller pitch (in.)} = \frac{\text{max airspeed (mph)} \times 1300}{\text{rpm}}$$

TABLE 2
Relating minimum flying speed to wing loading for different airfoil types.

Wing Loading oz./sq. ft.	Approximate minimum flying speed (m.p.h.)		
	Undercambered: Assume that CL max. = 1.3	Flat bottomed: Assume that CL max. = 1	Semi-symmetrical and symmetrical Assume that CL max. = 0.9
12	15.2	17.3	18.3
14	16.4	18.7	19.7
15	17.0	19.4	20.4
16	17.5	20	21.1
18	18.6	21.2	22.4
20	19.6	22.4	23.6
22	20.5	23.5	24.7
24	21.5	24.5	25.8
25	21.9	25.0	26.4
26	22.4	25.5	26.9
28	23.2	26.5	27.9
30	24.0	27.4	28.9
32	24.8	28.3	29.8
34	25.6	29.2	30.7
35	25.9	29.6	31.2
36	26.3	30	31.6
38	27.0	30.8	32.5
40	27.7	31.6	33.3
45	29.4	33.5	35.4
50	31.0	35.4	37.3

CL values quoted are approximate averages for the airfoil types. For landing speeds, add about 20% to quoted stalling speed. For a desirable minimum top speed, multiply stalling speed by factor of 3 and choose prop engine combination accordingly.

Returning to our BFC2 example, where top speed was 70 mph,

$$\text{pitch} = \frac{70 \times 1300}{15,000} \text{ inches} = 6''$$

Were we modeling the BFC2's Army relative, the P6c, we would now look at that in-line cowl, think in terms of a 10'' diameter airscrew and put a .40 in the nose as such a power plant is commonly used in models of this size. However, the Navy Hawk has that darned radial cowl which could cause drag problems. I use a rule of thumb with radial cowls such that the cowl diameter must not exceed .6 of propeller diameter. This is an attempt to guarantee sufficient swept area outside the cowl perimeter to produce enough thrust for aerobatics. If I can't get the cowl diameter to within a reasonable tolerance of .6 x propeller diameter at the design stage, say 3/4'', then I either redraw to a different model scale, or choose another subject. In the case of the BFC2, its 1/8th Scale would produce a 7'' diameter cowl, hinting at an 11½'' diameter airscrew. Unfortunately an 11½/6 would strain even the most willing

.40 and certainly not allow 15,000 rpm for top speed at peak power. The BFC2 cowl is only a narrow-chord ring, however, and will be of quite low drag; so one might get away with a 10/6. An 11/5 would be fine on most .40's and allow the required revs to occur in the air, but the top speed would suffer a little.

As you can see, even this prediction business can leave you a little uncertain, but a model sized and powered as per this example would probably give some future builder a lot of fun, provided it didn't exceed 6 lbs. in weight. One alternative is to use a larger engine, of course, say a .45, or a sport .60.

Is There Such a Thing As Scale Speed?

The full size Curtiss BFC2 has a stalling speed of about 68 mph, and its top speed is in the region of 200 mph. At 1/8th Scale, one would like the model to stall at 8½ mph and to have a top speed of 25 mph. In fact, our previous calculations have suggested practical model stalling and top speeds of about 24 mph and 70 mph. It can be seen,

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RANDY'S POU DU CIEL

A Flying Flea That Really Flies

By Dick Tichenor



Randy Wisley's Pou Du Ciel on a fly-by with Cindy Mewson at the transmitter.



This flight photo is almost identical to one of the full size G-ADMH published many years ago.

One of the most intriguing aircraft designs ever flown is the Pou Du Ciel (French Flying Flea) that was designed by Henri Mignet in the Mid-1930's. Mignet lacked the coordination required to pilot the conventional airplane following WW I and, after surviving numerous crashes, he decided to design a craft that he could fly. His Pou Du Ciel was the culmination of a series of unsuccessful designs and it was one that he could fly.

All was not well with the Pou. Literally hundreds were being built in Europe and, during 1935-1936, there were about a dozen fatal crashes. Popularity for the Pou suddenly came to a screeching halt. The Pou then became the first full-size aircraft to be tested in a wind tunnel. Test results showed that the vital slot-effect created by the wing arrangement deteriorated rapidly with relatively small changes which decreased the angle of incidence. In a shallow nose-down attitude with the angle of incidence decreasing, the nose would tuck under into an unrecoverable dive.

There has been numerous attempts in the United States to build R/C versions of the Pou. These have realized very little, if any, success. One was built by the RCM staff — it didn't work either.

Randy Wisley stopped by our office recently and somehow the conversation drifted around to the Pou Du Ciel. When modelers get

bored with the conventional they are likely to become weird. After a lengthy critique of the Pou's aerodynamic arrangement, Randy departed to give it a go.

The first step was to build a series of small, all balsa gliders to determine C.G. location, incidence angles, etc. The glider exercise was followed by a 44" span, 560 sq. in. area, 33 oz., .09 Enya powered version. This little job flew beautifully starting with the very first flight. In the air the Pou is an ugly looking little critter but, oh boy, does it have personality.

With the success of the small Pou, Randy proceeded to build the Quarter Scale version. This one has a 66" span, 1260 sq. in. area, weighs 88 oz., and is powered by a Seito 30 4-cycle engine. It too flies like a dream. There was a problem at the beginning, the trailing edge reflex in the rear wing was a bit too much which made the stability pretty touchy. A change made to that airfoil corrected the problem and now the larger version is as gentle as a lamb. Randy insisted that this writer fly it and also checked out our little friend Cindy on it.

There is a no-no with the 1/4 size Pou. Don't give it negative incidence with the engine wide open, it will tuck under and go into a

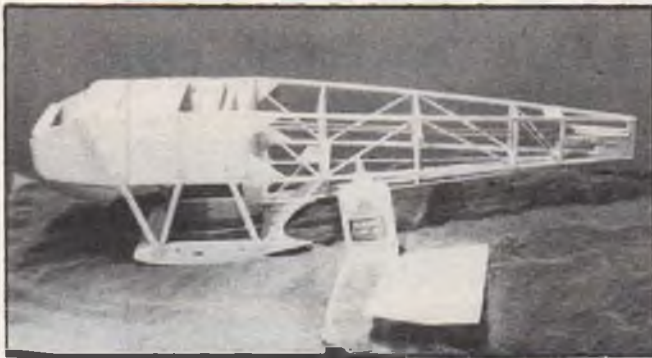
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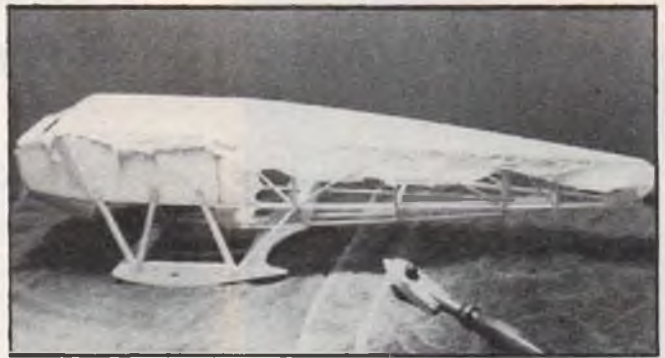
Randy holds his Quarter Scale Pou, smaller development model is on the ground.



Cindy was checked out on the Pou's flight characteristics prior to the photo session.



Completed framework ready for coat of water thinned white glue.



Pre-cut Koverall tacked down with sealing iron.

HEAT ADHERED KOVERALL FABRIC

By D.B. Mathews

Sig's Koverall polyester fabric can be applied to the framework of a model using heat, much in the manner of the popular heat shrink covering materials. We have discovered that the heat from a sealing iron will "pull" dry Elmers white glue into the weave of Koverall, sealing it tightly onto the framework by running the iron over the surface. One need only allow a few moments for cooling before the material is taut.

The wood framework is given two coats of white glue that has been thinned with water to a brushing consistency. When the adhesive is completely dry, the pre-cut section of Koverall is tacked down over the framework using the sealing iron set on the Coverite (hot) setting. The iron is then run along the entire perimeter sealing it firmly.

Overlapping joints should be given a second coat of the thinned glue. This step provides a good bond between the two layers of fabric, pulling some of the glue up

into the second layer, while also adhering to the exterior.

It is advisable to apply all the covering before heat shrinking. The pull is so strong that the structure might warp and twist if the structure were subjected to shrinkage from one side only.

Koverall, like all polyester fabrics, has a tendency to unravel along a cut edge. Much of this problem can be prevented by always using a sharp blade. Should any raveling or "strings" be present, we have found that using a cellulose cement such as Sig-ment or Ambroid, rubbed along and into the edge, greatly simplifies sanding out the fuzz. This cement also works well for sticking the fabric down onto fiberglass areas.

Although the polyester materials are compatible with all commonly used model aircraft paints, we find 2 or 3 coats of nitrate dope to be preferable for filling the weave. Nitrate is available in the K & B "matched finish" line, at many airport repair shops, and by mail from aircraft suppliers such as

Wag Aero, Box 181, Lyons, Wisconsin 53148, and Airtex Products, Fallington Industrial Park, Fallington, Pennsylvania 19504. Wag Aero and Airtex are both aircraft suppliers who stock Randolph dope in nitrate clear and also in non-taut clear. The primary advantage of using clear nitrate dope is it's much lower shrink feature and it's quick set. Butyrate, on the other hand, continues to cure for many days, can potentially over-tighten to the point of splitting the fabric, and is not compatible under epoxy or polyurethane finishes.

We find that Koverall when sealed with nitrate and finished with our choice of paint, produces a covering of immense strength with excellent puncture and tearing resistance. It is also highly abrasion resistant, durable, easy to clean and, most important is relatively inexpensive. The use of white glue and heat also greatly simplifies its application to the model. We recommend this technique to you. □

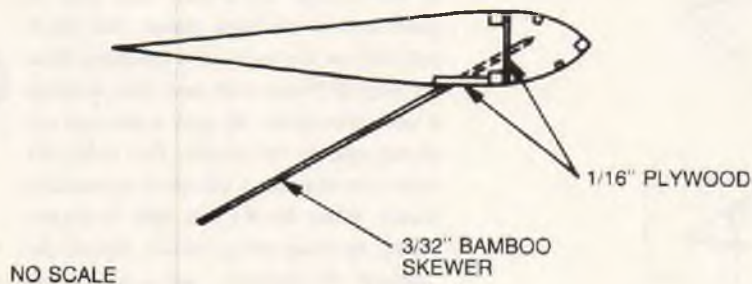


Cover all areas before shrinking to avoid any warps and twists in framework.

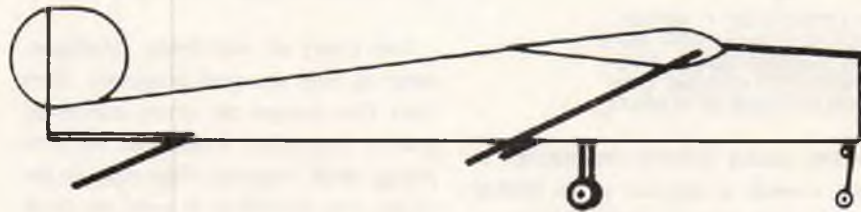


Completed covering after painting and trimming. Makes a very nice looking job.

FOR WHAT IT'S WORTH



NO SCALE



This helpful hint was sent in by Billie Lively of Pittsburg, California. Since Billie is still in the "beginners" stage, some fliers may be interested in the type of skids he uses (and needs).

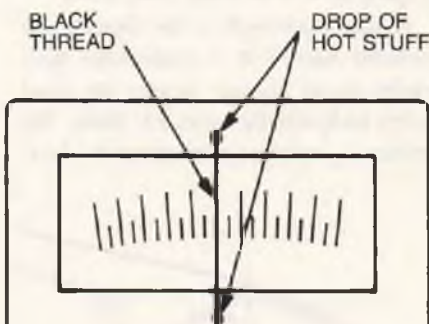
They are bamboo skewers 10" long by about 3/32" in diameter. Purchased in a local import house (pkg. of 100 for \$.59), they are extremely flexible and work much better than they look.

As skids, they are held in place by friction through two pieces of 1/16" plywood glued in appropriate locations before covering, thus allowing removal and installation any time. When removed, all that shows is the 3/32" mounting hole, which may be filled permanently any time.

These skewers may also be used in many other places as dowels as they are very strong in relation to their size.

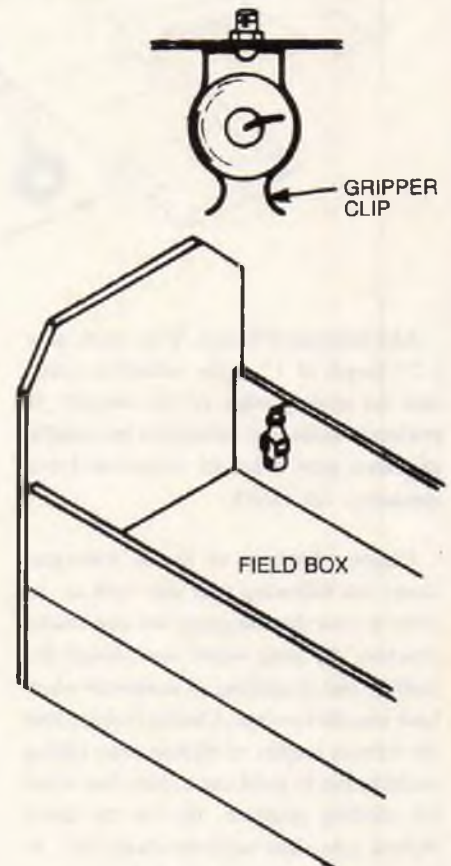
This helpful hint came from Al Niessner of Boalsburg, Pennsylvania. Trimming a plastic canopy to fit an irregular shape can be a difficult experience when using an X-Acto knife and scissors. Al has found that a plastic canopy can be trimmed quickly and easily to shape by using a hand held hole punch. These punches, normally used for punching paper, are found in most 5 and 10 cent stores. The punch is first used to cut away the excess material by punching a series of holes along the border. Fine trimming can be done with the hole punch by nibbling the plastic along the edge to be trimmed. This method avoids the problems of the trim running when trying to cut it with an X-Acto knife or splitting when cutting it with scissors.

Rusty Dose of Fremont, Nebraska, has made his Robart Incidence Meter easier to read with a simple modification. He attached a piece of black thread along the front of the meter to coincide with the 0° reading on the scale. The thread was secured at the top and bottom with Hot Stuff.



Douglas Wright of Los Altos, California, has come up with an idea to keep his open bottle of cyanoacrylate adhesive from falling over inside his tool box on the way to the flying field. He installs a gripper clip

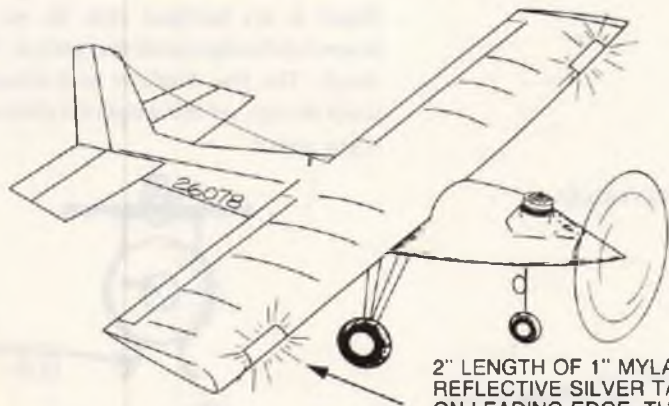
(found in any hardware store for use as broom handle clips) inside the field box. See sketch. The glue bottle is held securely inside the clip, yet comes right out when and if you need it.



Dr. Joe Beckner of Loveland, Colorado, sent in this suggestion on pins used in R/C modeling. Spray that new box of pins (in the box) with silicone spray lubricant. This will make withdrawal from glued areas easier. After the pins have been sprayed with silicone, stick them in a block of foam (about 3" x 6" x 1"). Taking them from such a block is a lot easier than fishing them from a box and getting your finger stuck! A piece of 3/4" plywood 3" x 6" glued to the bottom of the foam block will give it some weight, for easier one-hand removal of pins.

A method of cushioning battery packs and receivers was submitted by Terry Terrenoire of Endicott, New York. Wrap a strip of Sig Foam around the unit (bat. or rx) loosely, trim to length, remove, coat the two mating ends with contact cement, and join to make a tube. Insert battery and rx, each in its own tube, and position the units in the fuselage. Use additional pieces of foam to lightly secure the installation.

FOR WHAT IT'S WORTH



2" LENGTH OF 1" MYLAR REFLECTIVE SILVER TAPE ON LEADING EDGE. THIS PRODUCES STROBE LIKE REFLECTIONS IN SUNLITE.

John Suhajda of Racine, Wisconsin, uses a 2" length of 1" mylar reflective silver tape on leading edge of his aircraft. It produces strobe-like reflections in sunlight and also gets a lot of attention from spectators. See sketch.

Charles Kirtland of Rome, Georgia, shares the following neat idea with us. In order to ease that annoying last step before attaching the wing which was always the stuffing and re-stuffing of connector wires back into the fuselage. Charles realized that the leftover lengths of NyRod outer tubing could be put to good use to help him solve his stuffing problem. He cut the outer NyRod into short sections about 3/8" to 1/2" lengths and split them lengthwise. These pieces were then Hot-Stuffed into the fuselage at appropriate places to improve

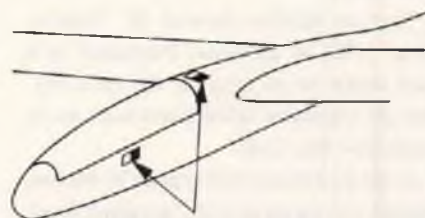
the wire routing between components. A small V-notch at one end of the NyRod section assists in wire insertion. The use of these stuffing-helpers has taken away much of the concern about the wiring getting tangled in servo arms and keeps the antenna routed away from other wires.

Duie Matenkosky of Murrysville, Pennsylvania, has the following system for keeping up with the razor blade status.

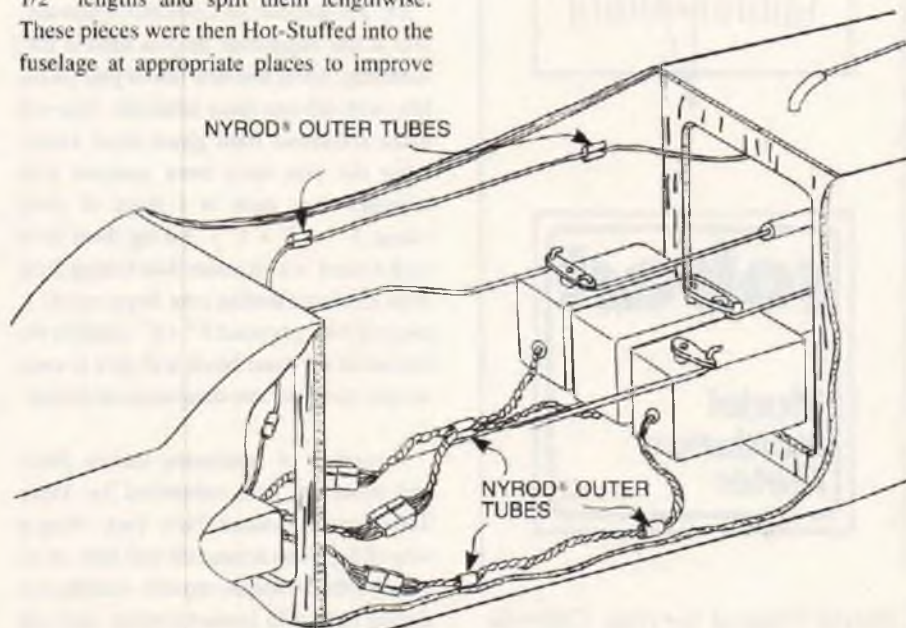
If your workbench is like Duie's, you probably have 3 or 4 single edge razor blades laying around, besides the usual hobby knife with the usual #11 blade. The problem is, which razor blade has the 'best'

or newest edge (for critical cuts, such as clean cuts across balsa grain), and which one did you just use to trim the epoxy from the firewall? Now, each time Duie unwraps a new razor blade, he puts a piece of red plastic tape on the handle. This is his #1 blade (for clean cuts), all others are hacking blades. When the #1 gets dull, he rotates blades, throwing out an old one, making the "retired" #1 a hacker --- and --- mark a new #1 with the red tape. Works great!

Don Drury of Ann Arbor, Michigan, came up with this goof eliminator. Ever since Don charged the wrong transmitter prior to a sailplane contest, he has been putting small frequency flags right on the model. Use MonoKote to make the small flags and locate one on the side of the fuselage or on top behind the canopy. When charging the transmitter flight pack, it reminds us to check flag on transmitter and receiver.



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NYROD® OUTER TUBE (RED OR BLUE) APPROX. 3/8" LONG, SPLIT ALONG ITS LENGTH WITH SLIGHT V-NOTCH AT ONE END TO AID WIRE INSERTION



Help for the scale enthusiast is in this idea submitted from Wayne Boots, Waterloo, Iowa. Wayne has discovered a very effective way of installing scale-like wing walkways on aircraft with a minimum of hassle. The procedure is as follows: First, mask off the area of the walkway, next spray on a wet coat of flat black, i.e., K & B, Formula U, etc. Follow immediately by sifting micro-balloons on the wet surface through a stretched nylon stocking. When the desired texture is achieved, spray a light cover coat and the results will be the most scale appearing walkway you have ever observed.

Send your hints & kinks to R/C Modeler, P.O. Box 487, Sierra Madre, Ca. 91024 & win a free book from RCM's Anthology Library Series if your idea is used.

from page 71

... steep dive very quickly. It recovers nicely if you throttle back to idle and crank in positive incidence. This is not unlike the real one.

We feel that Randy's Pou has been developed to a very practical stage and it certainly is an attention grabber. Randy is now working on the construction article for it that we will present later this year. Incidentally, Randy chose a production variant of the HM.14 proposed by Stephen Appleby in England back in 1936. □

SCALE SPEED

from page 70/68

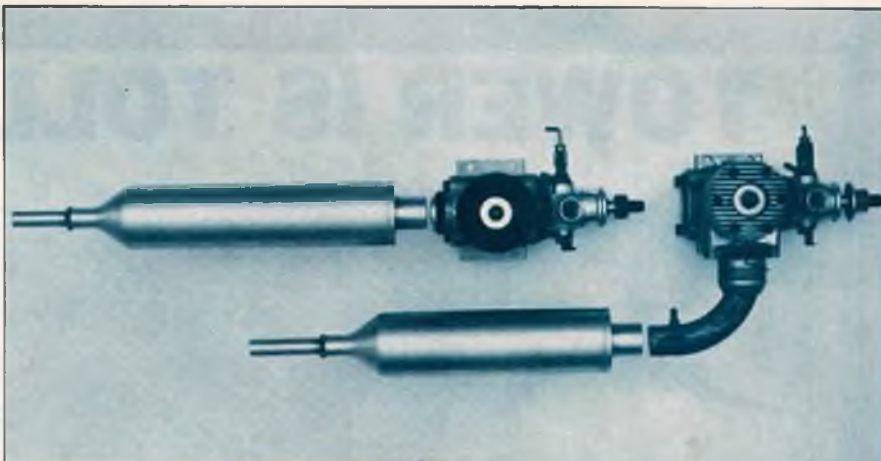
therefore, that a 1/8th Scale Curtiss Hawk will **not** fly at scale airspeed. In fact, if you wish to fly most scale subjects at proper scale speeds, then you will either have to think in terms of amazingly low model wing loadings, or enormous models. In the former case, the lower wing loading will lower the stalling speed. In the second case, a monster model with normal wing loading maintained will stall at about the same airspeed as the small normally-sized version; but the lower scale factor will make its airspeed appear more scale-like. For instance, a 1/3rd Scale BFC2 with a 24 oz. loading would still stall at about 23 mph (perhaps 20 mph because of its more efficient big wing) and its max speed would still be about 60 mph; these speed values are almost to exact scale. The model would span 10' 6", have 29 sq. ft. of wing area, weigh about 43 lbs. for 24 oz./sq. ft. loading and need something like a 100 cc two-stroke spark ignition engine producing 7,000 rpm on a propeller of 11" pitch and about 28" diameter! A 1/8th Scale BFC2, with scale stalling speed would have a 3 oz./sq. ft. loading, for a total weight of 12 oz. including engine and avionics.

Conclusions

It appears from the foregoing simple theory (and is easily demonstrable of course), that Super Scale models do not fly significantly slower than smaller models of the same wing loading. Sure, their bigger wing chords might raise the CL of the wing section because of the larger Reynolds Numbers involved, producing perhaps a 10% drop in stalling and cruising speeds, but I don't think that 10% is significant. The more sedate appearance of most big models must be caused by optical illusion.

Models do not land at walking pace. The average sport pattern ship of 20 to 25 oz. loading with a stalling speed of around 23 to 26 mph, will land at over 25 mph, so don't believe all you read in the ads!

High wing loadings can be bad for scale models, especially if the model is overweight. The high loading will dictate



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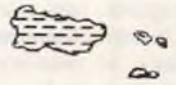


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the need for a high top speed to give a usable speed range. However, if the model weighs too much, the original engine might have insufficient power to climb the model at a respectable rate. The pilot will then raise the nose too high in an effort to improve climb rate, excessive drag will then ensue because the model's attitude, the model will slow down to its high stalling speed and . . . well the choice is straight stall into the deck, or a snap roll, also into the ground. Some folk talk quite glibly of 40 oz./sq. ft. loadings, possibly without knowing that the slowest airspeed of their model will be in excess of 33 mph. These people will not experience any heartache provided their model's powerplant can produce sufficient in the

way of top speed and acceleration. It is not the actual size of the stalling speed which causes problems to arise, but the failure to realize that a 33 mph stalling speed is not compatible with, say, a 60 mph top speed, bearing in mind that a figure of 2 times stalling speed is used in full size aerobatics as the entry speed for snap rolls!

Hopefully, this little excursion into the realm of applied aerodynamics will usefully supplement the experience which is the main ingredient we put into any new model design. I find it comforting to be able to predict mathematically some of the characteristics I might wish to embody in a model. It kind of helps to reinforce my overconfidence in my inexperience!

"JENNY"

from page 67/66

Over sixty years later, Sergeant Oswald was introduced to the idea of constructing a single "Jenny" replica. He accepted the project which, by his own admission, turned out to be more than he anticipated, but he completed it.

"I looked at the project as an interesting challenge," he commented, "but I had no idea that other peoples interest would grow like it did. One day I was working and this fellow walked in, someone I had never seen before. He said that he heard about what I was doing from someone else, and that he



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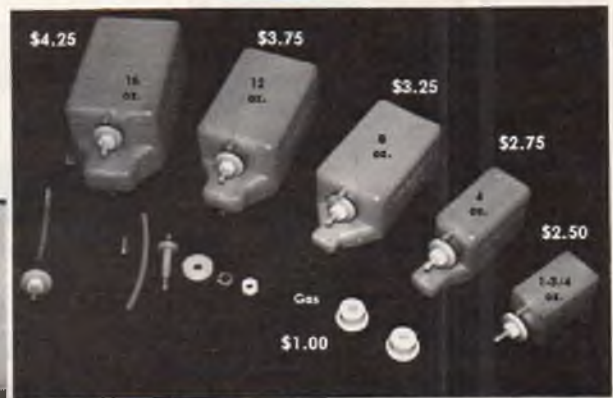
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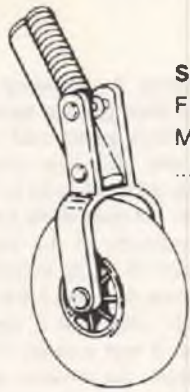
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had been building planes for some time and wanted to see how I was doing." Oswald explained.

Sergeant Oswald worked on the project for more than eight months, bringing the plane with him when he pulled alert duty at the base. He spent as many as 18 hours a day working on it. During his off duty time, he worked in a small room in the attic of what used to be the original base theater. "It's ironic," he said. "I was stationed here at March 15 years ago and I used to always go to the movies to pass the time. Now here I am back in that old theater again, and I've spent 1500 hours working on this project."

Being in this secluded location hasn't prevented interested visitors from stopping

by. They range from friends from his squadron or the wing commander, to just people who have heard about what he was doing and had to satisfy their curiosity. But, whatever the case, almost everyone returned with a friend. They would go through the same motions that Sergeant Oswald had gone through with them, explaining what each of the cables did, pointing out the miniature map located inside the cockpit, and explaining how even the wing rivets were the same proportion and number as in the original. But the piece de resistance was picking up the "Jenny" by the center of the wing with one finger to show how perfect the Center of Gravity was.

"Everyone gets lucky once in awhile." Sergeant Oswald protests when asked to explain how the Center of Gravity came out so well. Actually, however, it is a testament to how perfect the job was. In order for this balance to be attained, every part made must be of the exact size and weight.

As for the Jenny, "I love the lady," he says. "I think everyone should leave something of themselves behind for others; Jenny is one of the things I'll leave."

The word artist is defined as "one able to project or create an image or subject that is remembered, admired and treasured by the people of present and future generations." MSgt Donald Oswald is truly an artist at work. □



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OLD TIMERS

from page 65

backgrounds and interests. It is amazing we ever met — we were both picking up our daughters at a football game and we engaged in some idle chit-chat while waiting. John volunteered to teach me to fly R/C, but only if it was not done at the local R/C field. Two weekends at the local landfill (garbage dump) of flying until the batteries went dead each day, and I was at the point that I could solo with a small degree of confidence. It was a rough four days — the place stunk, the weather was cold and windy with a lot of drizzle, and the runway was a gravel road consisting primarily of pot holes. On two of the days we flew until the aircraft went down due to weak receiver batteries. But I did learn the basics of R/C flying. The Sig airframe was still airworthy even if it did look as though it truly belonged in the garbage dump. John was an excellent instructor, very demanding and had a tolerance level about equal to a grouchy marine drill instructor at a boot camp. But could he ever fly! And he could teach! Still, to this day, when I taxi out to the runway I'll physically touch all four trim levers to insure they are in the proper position, usually check all control surfaces for movement, and then run the engine up before take-off. For I know if I fail to do it, John will let out a bellow that I will hear even though I am a thousand miles away!

Just prior to our first flight, John said I would not relax and start to learn how to fly until my very pretty Kadet had been subject to some minor damage and tried to drop a screwdriver through the wing covering! As it turned out I had clunk trouble and John gave me a choice --- field repair or no fly! I opted for field repair and instantaneously his hammock size hand in one fast swoop ripped off the windshield and all the balsa over the tank! After the repairs, a piece of cardboard held on by rubberbands sufficed as being adequate repairs for flying.

After this basic training, I went back to the local R/C field for a lot of hours of self-practice and wear and tear on the Kadet. I ended up parking it in the top of a 60' tree where it remained for three days; flew through a power line and sheared the wing in half; broke the tail off several times, plus enough hard landings that eventually the Kadet had so much epoxy added to it that the O.S. .25 could no longer get it airborne. About the same time that the Kadet would no longer fly due to insufficient runway length, I was transferred to Atlanta.

I built a Tri Squire (three channel) and, still using the O.S. .25, flew and flew until I wore the airframe out. The Tri Squire is a very small, but fast (for me) aircraft and half the time it was either so far away I could barely see it, or going so fast that my thought process was still in the take-off mode when the aircraft was in the landing

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mode! So I said to myself, "Self, you need something large, slow, and you need to learn four channel flying." Well, I built a Bud Nosen Citabria, put in an O.S. .60FSR and, not wanting to impose on anyone, went and successfully test flew it. Talk about knees knocking — mine did — so that one flight was enough for that day. By the next day, I had found my courage again, so out we went. The first flight was pretty good, but by the second flight a slight cross wind had developed and, just after lift off at about 35' of altitude, in a split second I undid four months of hard labor. Talk about cross controlling, I had left aileron, right rudder, back on the throttle, and down elevator. Instead of veering away from the tree, I drove straight into it and that Citabria literally exploded!

Only the engine and radio were salvageable, so I got a Lanier Comet (Big Wing) which turned out to be faster than a passionate jack rabbit, and only lasted a couple of flights. Within the next six months, I went through about six aircraft, some were crashed and some were sold, but one thing was common to all of them --- they were .60 powered, large wing and fast --- but were not what I was looking for.

Early one overcast Sunday morning, I wandered up to the Roswell Air Force R/C flying field in North Atlanta. In the middle of the cow pasture --- yes, cow pasture --- stands some guy (cowboy boots with the pants stuck inside one boot and outside of the other, wearing the most decrepit raunchy cowboy hat in existence, shirt tail flapping in the drizzle) slow flying some large aircraft in and out of the overcast. As I watched, he set the transmitter on the ground and lit his cigar. After what seemed to be an eternity, he picked up the transmitter, looked around, but couldn't see the airplane in the overcast, so spiraled it down and made a very gentle three-point stall landing in front of his cowboy boots. It looked so easy.

He wandered over, stuck out his hand and said, "Hi, I'm Stu Richmond." After some conversation about Stu's plane (a Quaker Flash) and getting an earful about the greatness of Old Timers, Stu took the plane off and handed me the transmitter for some of the most relaxing R/C flying you can imagine.

Since that day, almost four years ago, I have found my style of R/C --- Old Timers --- and have had Quakers, Dallaire, Buzzards, Clipper, Mercury, Cumulus, Powerhouse, Pacemaker, Contest Gas Model and I'm presently building a Buccaneer. For awhile, I sort of alternated between Old Timers and conventional sport aircraft but, about a year and a half ago, I made a clean break and sold --- or about gave away --- all aircraft not truly an Old Timer. I even unloaded that O.S. .60 and bought a couple of four cycles. On several occasions, I have transgressed back into the other way of life, but quickly came to realize the error of my ways.

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the sky — which is basically very true. Invariably though, when I start up the four cycle engine in my Quaker or in the Dallaire and do a slow, tail up, take-off or do a slow and low pass and can literally walk alongside the plane for the length of the runway, the spectators seem to lose interest in the Quicky 500's and direct their attention to the slow, large aircraft. Their comments are generally, "Gee, that sure looks realistic," or "that sure takes a lot of skill and looks like fun." Of course, I wouldn't say anything to a spectator to let him know just how easy flying Old Timers is; after all, you want to take all the glory you can!

In summary, the advantages of Old Timers are many. They fly slow, are very graceful and realistic and, generally speaking, are three channel. They can be seen at a much greater distance and are, to say the least, very unique. To be honest, there are a few disadvantages:

(1) They are hard to transport in the average car.

(2) The selection of kits available is severely restricted.

(3) It takes a lot of money to buy covering material.

But if you want to fly something for pure enjoyment, complete relaxation, or if your eyesight and reaction is slowing down, try an Old Timer — you may like it!

PIT STOP

from page 62

they were all ROAR 1/12 electric National Champions. And, let's not forget some future possible champions, like 13 year old Ralph Burch, Jr., Mike Hamilton and Olle Soderholm. If you ever get a chance to race against this group you'll know what exciting racing is. And for the 90 racers present, the thrill will last a year until we get to do it again.

The Florida Electric Auto Racers club is also called the FEAR club. I guess this must have sounded like an appropriate name after watching some of the beginners drive. But I think I voluntarily joined the FEAR club when I saw what they were using to lay out the track. All of the track was laid out with 2" plastic pipe nailed to the asphalt. It would be totally impossible to cut any corners no matter how hard we all seemingly tried. After running on this track we all learned to fear the pipes, so maybe the FEAR club is appropriately named.

This race was run by the FEAR club on the parking lot of the Colonial Plaza Mall in Orlando, Florida, and was sponsored by General Electric's Battery Division. It's nice to see new sponsors come in to help the sport of electric car racing. The layout of the track was excellent. A true driver's course. The traction was good and after practicing on Friday we learned to respect the boards — or pipes — so we weren't hurting the cars as much. Most of us, that is. This track did have one peculiarity though, which we had

never seen before. The asphalt was made with coral, which made it like sandpaper. Our front tires would only last two 8 minute races before they were worn out! Normally a set of front tires should last hours before they're worn out.

There was only one class car run, which is the most popular class, the 6 cell Modified Can Am class. All qualifying heats and A, B, C Mains were 8 minutes long, per ROAR rules. The weather over Friday, Saturday and Sunday was excellent, as was the racing. It looked like the man to beat in qualifying was Bill Jianas — who else? Bill was racing a car that Mike Lavacot had built for him. The track surface was a little rough: just enough to make a noticeable difference in the various car's handling. While Bill's car was excellent, Lavacot's seemingly identical car was far from right. So Lavacot was continually trying things to improve the performance. But it never did match up to Bill's. Bill Jianas led the first rounds of qualifying, turning 30 laps in 8 minutes and 13 seconds. Quite a few drivers came close to this time, but none could better it. Rick Davis came closest with an identical 30 laps in 8:13, but Bill's backup time was better. Kent Clausen was 1 second behind with 30 laps in 8:14. And Curtis Husting was also 1 second behind with 30 laps and 8:14. You just can't get much closer, exciting racing than that.

On one of Curtis' qualifying runs it looked like he was going to shatter Bill's record. They were both in the same qualifying heat and Curtis got a super start, took the lead and was pulling away steadily. At 6 minutes he was coming up to lap Bill, then his batteries started to go. At 7 minutes he was off the track with dead batteries. Bill went on to win and Curtis still finished 2nd, only running 7 minutes. Curtis had tried to do what we have all tried to do. Gear the car higher to make it go faster and hope it lasts 8 minutes. It doesn't work all the time, but the only way to find out is to try.

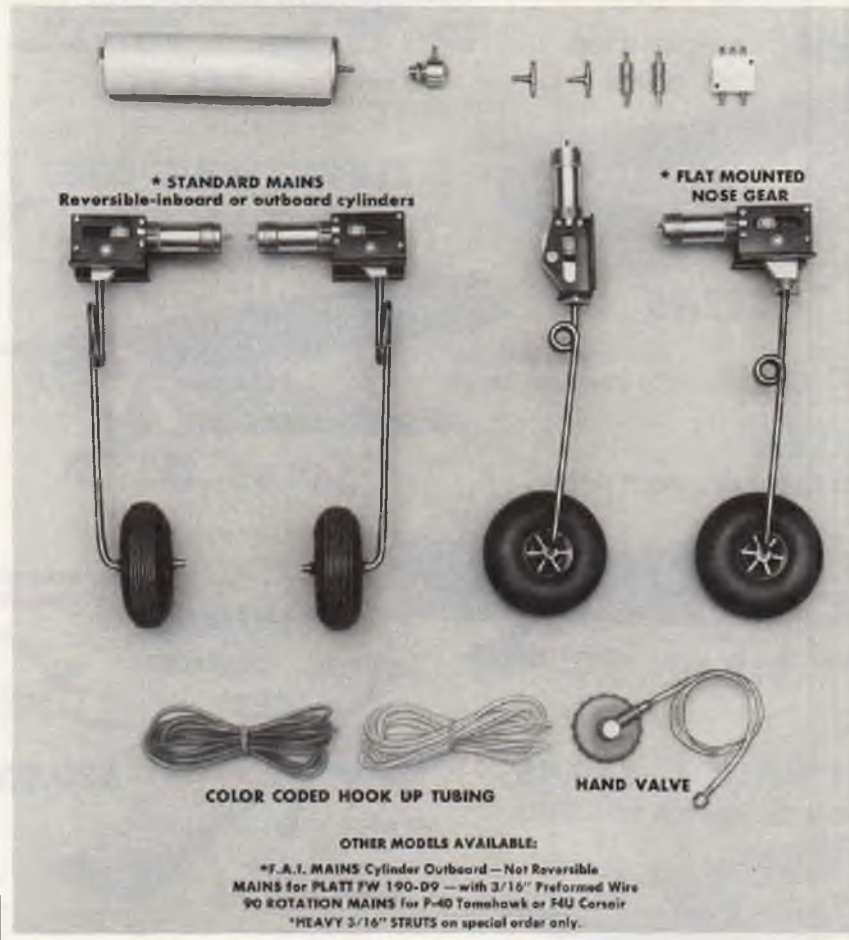
Arturo Carbonell was getting a fast lesson in 1/12 electric racing with his new Delta prototype 1/12 racer, but Art is a fast learner, and it looked as though he'd been racing electrics as long as he'd been racing the gas cars. I guess if you've got it — you've got it! And Art certainly has whatever it takes to be a champion.

When qualifying was completed, Jianas held on to 1st place with 30 laps in 8:13. Rick Davis was 2nd with an identical 30 laps — 8:13, Kent Clausen 3rd only one second behind with 30 laps 8:14 and Curtis Husting with an identical 30 laps in 8:14 in 4th. I found myself missing the "A" Main by 2 seconds, but as fast as those guys were going, the "B" Main looked like more of a realistic goal today for me.

Sunday was a beautiful, sunny day made for racing. The "B" Main had 8 drivers with very close qualifying times. The start of these races is always critical, because the cars are so evenly matched, it's very difficult to pass someone that can go as fast as you. The green flag was raised, everyone

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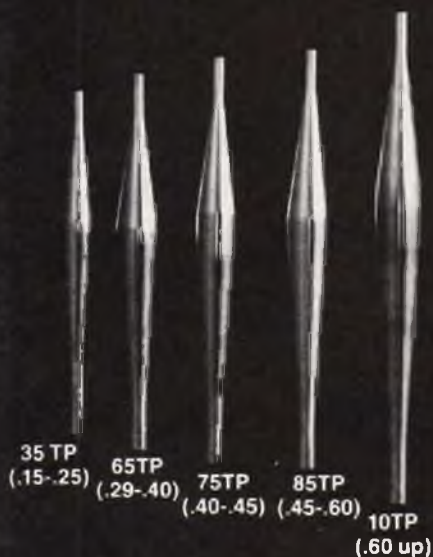
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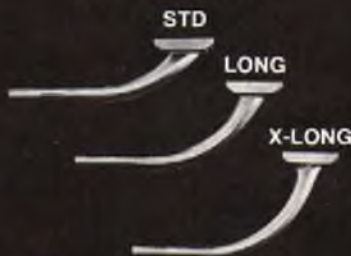
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PIT STOP

from page 119/62

took off and I was in 3rd place. But the 1st and 2nd place cars tangled in the first corner and I was able to slip by and take the lead. I was hoping I could make the next 3 or 4 corners before that herd of hornets behind

me ran over me. With these pipes nailed on the ground, you didn't want to make any mistakes because you could go from 1st to 8th place in just a few seconds. But my car was working perfectly and I respected the pipes. I had about a 50 foot lead and every once in awhile that lead would drop to 20 feet, then they would hit the pipes and the lead would open up a bit more. Mike

Kimrey was standing next to me on the driver's stand and he said, "Gene, is that you leading?" and I said "Yes," and he said, "I'm going to catch you!" I said, "I figured that might be your plan." And he would get closer, then you could hear the familiar sound of a car hitting those pipes, and I could hear Mike say, "Oh, darn!" and I would have a little more breathing room.



Mike Lavacot makes winning a habit. First Place in the Florida Winter Electric Championships will be added to his long list of accomplishments.



Lavacot's winning RC12E is identical to the one he built for Jlanas.



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to page 124

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PIT STOP

from page 122/62

They announced 6 minutes and Mike asked if my batteries were going down and I told him, yes, they're dropping fast and the car feels much slower now. That must have been what he wanted to hear because it made him try harder and then at 7 minutes he yelled, "Oh, no! Gene, I just hit the pipe again and 4 cars passed me!" It's kind of tough when you aren't allowed to even make one mistake! I held on for the win about 50 feet in front of Ray Hepner, who was closing fast in 2nd place. Third went to Al Chuck, who was right behind Ray. This

was Ray Hepner's first 1/12 race. He's been racing 1/8 cars for years, and when Mike Reedy offered Ray his backup car to race, Ray jumped at the chance. Now, Ray lives in Orlando, meaning he's finished 2nd to Arturo Carbonell more years than he'd like to remember. But Ray and Art were in the same qualifying heat and Ray will never forget the day he beat Art. Art was about 50 feet in front of Ray and it took Ray about 10 laps to catch Art, but catch him he did and drove around him. When Ray passed Art the whole crowd let out a cheer, because the impossible had actually happened! It had to have been Ray's finest hour. It was one of those dreams come true.

The "A" Main event cars and drivers

came to the starting line and while pictures were being taken, the announcer presented the drivers to the large crowd. With this ceremony completed the cars were lined up, the drivers got ready, the green flag raised and the race was underway. Ralph Burch, Jr., took the early lead with Mike Lavacot 2 feet behind and Curtis Husting another 2 feet back. Down the straightaway Curtis tried to take the lead. He got past Lavacot and alongside Ralphie, the two cars tangled and Curtis spun out. The next lap down the straightaway Lavacot went too deep, got caught in the marbles and spun out. This gave Ralphie a little room, but in another 2 laps Lavacot was right up alongside Ralphie, tried to pass, the cars collided and

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RASCAL

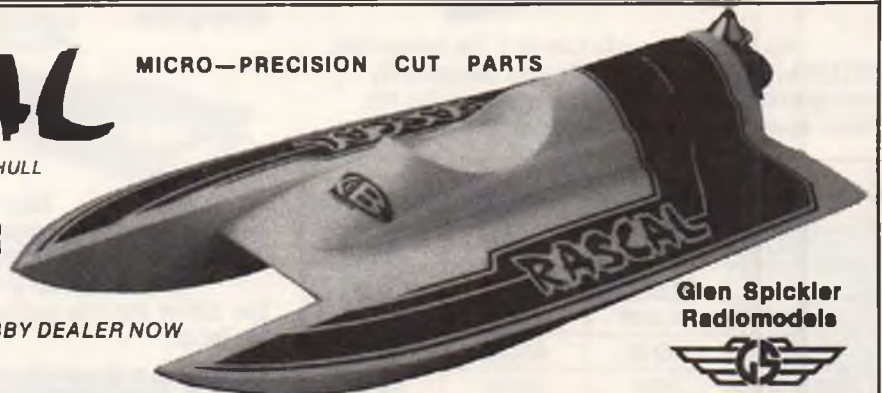
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Lavacot spun out, letting Art take over 2nd. Meanwhile, Curtis had recovered from his spin, and was closing on Art with Jianas 2 feet behind Curtis. Just then, as Curtis and Jianas were going around a corner, a car spun out in front of them, and a turn marshal ran out on the track without looking and stepped right on Jianas' car putting him out of the race!

As Curtis was catching Art, so Art was catching Ralphie. In a few laps the three cars were almost side by side. Ralphie hit a pipe and got stuck. Art took the lead with Curtis in 2nd. Meanwhile Lavacot had made up the round he lost on his spin and passed Curtis.

One of the pre-race favorites, Rick Davis had changed the resistor in his car, but

didn't have it trimmed right and had no brakes and was in trouble. But the fastest car on the track was Kent Clausen. Kent got bumped around at the start, and started last. He was soon passing cars, and after 5 minutes he was right behind Curtis, finally passing Curtis and closing on Art and Lavacot, who were about 100 feet ahead.

Art had lead the last 10 laps and I swear I have never seen a Reedy Modified motor run so fast as the one in Art's car, or so it seemed anyway. At the 7 minute mark, Lavacot finally caught Art and tried to pass Art on the tight corner at the end of the straight, but he hit the pipe, the car bumped back and Lavacot lost 15 feet. But by the time they got to the end of the straight,

Lavacot caught Art, tried to pass and hit the same pipe again! Now he had another 15 feet to make up, but they were now on the last lap!

Lavacot made up the 15 feet again, and this time he made a clean pass at the end of the straight and finished the race 5 feet in front of Art! Exciting? You couldn't ask for more!

There was some confusion in the 3rd, 4th and 5th place finishers, which was resolved by the Race Director. As this was the first big race the FEAR club ran, I thought they did a super job overall. There always seems to be some difficulties in lap counting wherever races are held. It's normal.

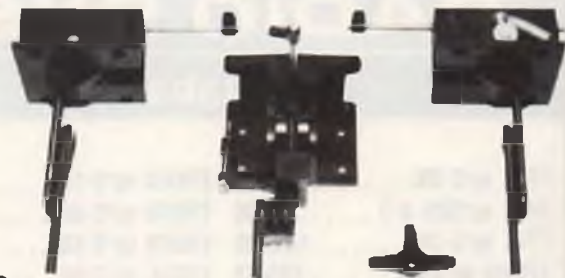
to page 128

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PIT STOP

from page 125/62

Naturally, we're always trying to find better ways to do everything. Someone came up with what sounds like a good solution for the system as used by the FEAR club. They call out the car number of every car, as it crosses the finish line, on every lap, and a second person writes the laps down as they're called out. Now, if this was recorded on a tape, the tape could be double checked against the scorer's sheet in case of conflict. This should be an excellent backup system. We're continually learning making things better for all of us.

Thanks FEAR club for a great first time big race. They'll get easier and bigger as you go along.

SCALE VIEWS

from page 61/60

glue can be placed on the back of the aluminum where capillary action will not reach, then the aluminum can be pressed in place and the glue run along the edge. If any glue gets on the top side of the aluminum it can be rubbed and polished off after the covering is complete.

Due to the weight, aluminum is best applied over a built-up structure. If heavier gauge, such as .015, is used, it can be put over open structure but you will need about 1/2" of bonding surface overlap on the balsa. Do not overlap the aluminum unless necessitated by the cap on a rounded wing tip, etc.

The best advice is to work slowly and use

small sections of aluminum on compound curves, etc. You will get a better bond and it's easier to work with smaller sections. I've seen this technique done on a Top Flite P-47 built by Bob Fish of Fisher R/C in Framingham, Massachusetts, and the results are amazing.

Robert Lane (Lake Jackson, Texas) has an index of model magazines which he used to locate the following list of published articles on the subject of metal covering:

Model Airplane News, Jan, 1956, p. 16. Highly detailed article by a young Granger Williams on building an all-metal, riveted Goodyear control liner with plans.

R/C Modeler, Feb. 1973, p. 40. How to braze, solder and glue aluminum by Roy Williams.

American Modeler, April 1973, p. 40. Roger and Glenn Bolick tell how to contact cement printing aluminum to combat C/L wings. Good detail and photos.

to page 130

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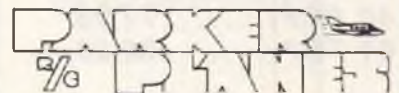
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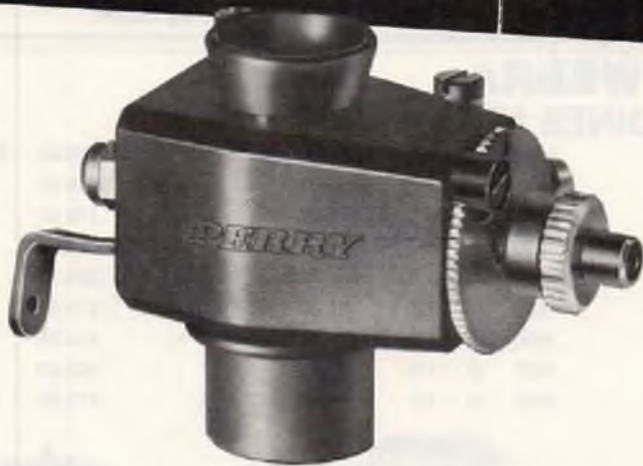
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SCALE VIEWS

from page 128/60

R/C Modeler, Aug. 1973, p. 56. Dick Tichenor's photos of Lou Casale's magnificent all-metal, riveted RC's. .60 size. Not much building detail.

Model Aviation, Oct. 1975, p. 19. Mike Stott's control line scale column gives Bill Harney's glue and rivet techniques with offset printing aluminum. Fairly detailed.

Model Builder, Dec. 1975, p. 8-12. Art Hall's article on covering with rivet-detailed, paper-backed aluminum foil. Good detail.

Model Builder, Feb. 1977, p. 20. For the purist: How to cover with gold leaf (!) by Phil McCary in Jon Pond's column. No photos or diagrams.

Model Aviation, Dec. 1979, p. 28. For after you've read the above articles and chickened out: Bob and Dolly Wischer's Scale column has details on how to paint on a finish with aluminum or bronze powders in dope. No photos.

Note: The page numbers are just the first page of what in many cases were several page articles.

Bob commented, "It's pretty hard to beat our aluminized nylar plastic iron-on films for that covering job." Yes, you are right Bob, on Sport Scale and for practicality, but on Precision Scale projects, nothing does quite as well as the real thing.

I've seen first hand the beautiful effects that Bill Harney gets with offset printing plate material, having gone to the 1970 World Championships in England with the U.S. Scale Team when Bill was on the CL section. Perhaps a combination of his methods with the suggestion from Murphy about the use of cyanoacrylate glue would be a good approach. Keep in mind that covering with metal is realistic but heavy. Plan for a high wing loading and use adequate power.

Hangar Flying

Jet Hanger Hobbies (12554 Centralia Rd., Lakewood, California 90715) has some accessories for their Cougar F-9F ducted fan jet kit that are adaptable to other scale subjects. The 21" long drop tank is vacuum formed from white plastic. Another vacuum formed sheet provides drop tank and Sidewinder missile pylons. A plan showing these mounted on the pylons is included. One idea gleaned from this plan is the use of Estes model rocket tubes and parts



to page 132

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SCALE VIEWS

from page 130/60

to make the Sidewinder. These light cardboard tubes come in various sizes and are a good start on constructing a scale rocket or missile. Check the model rocket department at your hobby store. The drop tank accessory kit is \$14.95.



The decal set for the Cougar is the water slide type and includes stars and bars insignia, letter and number markings, plus a squadron badge. I like the many stenciled instruction placards for access panels and equipment. They really add a realistic touch to a paint scheme. A Cougar 3-view plan is also provided, showing the location of each of the stencils. The decals are fuel resistant but the application instructions state that the prototype model was finally painted overall with K & B clear epoxy, thus completely fuel proofing the decals. Pactra fuel proofer and clear dope were also suggested as a clear overcoat for the decals. If this is tried, it must be done very carefully, with only light dusting coats put on, with ample drying time between coats. Test some scrap decal trim on another surface before trying it on the model. The solvent in any spray, and particularly in dope, gets to decals very quickly if overdone. And there are solvents that simply aren't compatible with waterslide decals. The decal set goes for \$9.95. □

F8F BEARCAT

from page 59

... sheets, or trim the leading edge stock to the plan size.

(3) The aileron leading edge stock is tapered toward the tip, but the wing trailing edge is constant thickness from root to tip. Be very careful when sanding the wing to match the ailerons that you don't sand through the wing skin.

(4) The punched holes in the tail wheel and elevator horns are too large for a good fit on the wire provided. It would be a good idea to use ball links on them to provide tighter control.

(5) F-9D is shown in two places on the plans — the dotted one is F-9B.

(6) The instructions call for, and the kit

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contains, two 1/8" x 7/8" x 30" wood strips for firewall to tail block side planks. Unfortunately, the fuselage is over 34" long at this point.

(7) The supplied die-cut dihedral gauge in our kit resulted in almost 7" of dihedral rather than the 4" called for in the manual.

Other than these, no construction difficulties were encountered. These items won't cause delays as long as you're aware of them in the beginning.

We used Devcon "5-Minute" and "Slow Cure" epoxies, Gluit aliphatic, Hot Stuff, and lots of Super Jet adhesives to stick things together.

We found several small items missing from our kit. After checking with Top Flite, they have completely changed their procedure for packing kits. These kits, being very complex with many parts and material involved, are now packed in a different way to eliminate any shortage of material. Each packer initials the kit they pack.

Covering:

Our Bearcat is completely covered with K & B 3/4 oz. glass cloth and two coats of K & B resin. Two coats of "mostly sanded off" auto primer and two light coats of R & S Perfect Sea Blue are topped with two light coats of Red Devil brand satin polyurethane. This provides a pleasing finish that adds about 13 oz.

Engine:

More than enough power comes from an O.S. .60 FSR and a Top Flite 12/6 Power Prop. A simple exhaust stack through the cowl side is made from a section of Du-Bro aluminum extension. The engine has 3° down thrust using Sterling nylon thrust wedges. A Kraft 12 oz. tank is installed as per plans.

We suggest you provide some additional cooling by some sort of baffle around the engine head. It will help to open up the top cowl flaps as well.

Radio:

Ace 7 channel radio equipment is used to control the four main functions plus flaps and Rhom-Air main retracts. There is ample room for uncrowded radio installation.

Flying:

Our Bearcat is balanced about 3/8" forward of the front mark shown on the plans. This required some additional nose weight. After the second flight, half of the weight was removed to locate the C.G. between the two plan marks. This made the airplane a little more touchy than we like so the weight was reinstalled. At this balance, the airplane is a very stable and smooth flier.

Control travels are not called out on the plans. Ours are as follows: ailerons 1/2" up and 3/8" down; rudder about 5/16" both ways (restricted by horn location); elevator 3/4" up and it hits the rudder horn on down --- **you will need a lot of up to flare on landings**; flaps deflect about 60°.

No trims were displaced from neutral except for elevator, which has about 1/2 of the down trim put in for level flight --- this is needed even with the engine down thrust.

to page 136

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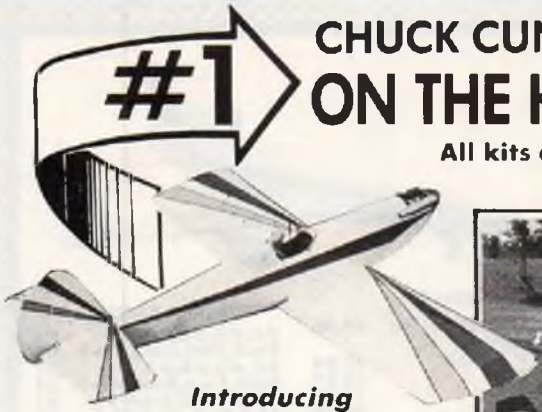
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F8F BEARCAT

from page 133/59

This reviewer is not very familiar with flaps, so he doesn't use them at all on take-offs, and only use about 1/2 flaps on landings. This way landings can be made quite slow.

The only real problem encountered was trying to taxi on our rough grass — this plane is so stubby it tends to bounce a lot.

Conclusion:

Top Flite's F8F-2 Bearcat is advertised as

a Stand-Off Scale model. If your goal is competition you'll probably find some things you'll want to modify to suit yourself. Ours was built to be an every day airplane, and slight deviations from scale do not matter to us. But, in comparing the model with the photos in the Aero book, it seems that the tail fairing of the F8F-2 is a little different from that of the model as kit-built. Also, the kit cowling is identical to the Corsair cowling and does not fair into the fuselage lines as on the real F8F-2.

When all is said and done, this kit will give you an excellent model of a great airplane. Build it according to the instructions and you will have a distinctive appearing and great flying machine. □

BOREALIS

from page 53/48

but naturally it is more aerobatic with a .40. Be sure it balances within 1/4" of where shown on the plans. Hold a little right rudder on the take-off run and allow the model to build up sufficient speed. A slight amount of up elevator will lift the model into the air. You are now on your own. Have a ball!

I would be interested in how your model turns out. Or, if you have building or flying troubles, please write to Leonard L. Oakley, Box 216, Chugiak, Alaska 99567. □

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BIG IS BEAUTIFUL

from page 47/46

for the larger model. I hope to have it ready for release later this year. If you don't have a copy, watch for my ads later this year.

That's all for this month, coming up in the future will be a review of some recent plans and a report on Toledo and the Trade Show there. See you next month. □

QUICKIE

from page 44/40

points can be used on all surfaces if desired. Either hinge as plan shows or use your favorite hinge.

Assemble the rear and front wing with epoxy and glass tape. Block up the center section of the front wing to get correct anhedral.

If you fly from a very rough field, I suggest that you glass the entire center section of the front wing out to the first rib past the center section. The 1/8" hardwood dowels can now be installed using epoxy.

Pants:

Cut out the necessary parts and glue the two blocks for the right and left pants together. Drill holes for the wheel axle, and glue the washers on the inner sides of the pants in place to act as bearings. Cut off enough wood around the holes on the outer sides to hide the 4-40 nut and screw head. Sand the pants to match the front wing, and epoxy in place. Do not forget the glass reinforcement.

Assembly:

Match the rear wing to the cut off part from the turtledeck. Install 1/8" I.D. tubing to F6 at proper location. Glue the canopy to the fuselage. If the aileron servo is installed as shown on the plan, cut out the hole for the servo in the rear wing. It still has enough strength to take its share of loads. Glue the cut out part of the turtledeck to the rear wing now. Epoxy F9 with triangular stock to F2. Triangular balsa should be covered completely with epoxy. Epoxy 4-40 nuts to parts F9. Drill holes in the wings for the wing hold-down screws. Drill a hole into the fuselage end to take the rear wheel strut, made from 4mm (1/8") hardwood dowel. Install wire for the tailwheel as shown on plan. Make cut-out for engine head and cooling on right fuselage side.

Fin and Rudder:

Cut from 4mm (1/8") light balsa and sand edges. The rudder does not move, but is built separate for better appearance. Drill the holes for 1.5mm (1/16") dowels.

Covering:

First, epoxy the motor area thoroughly and paint it black. The scoop on top of the cowling may be shaped now, to be installed when the fuselage is covered.

I covered the entire plane with white MonoKote. For the wheel pants and the

to page 146

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QUICKIE

from page 144/40

scoop, several small strips were used, to form around the curves. Do not forget to cover the control surfaces. Blue plastic film was used for coloring and lettering. Glue the scoop to the cowling. The canopy and cowl outlines were marked with black striping tape.

Final Assembly:

Put some epoxy into the holes on the control surfaces and the non-movable rudder also. Glue the controls in place

making sure that they do not stick to the tubing.

The wheels can be added now.

Engine Installation:

The Cox Black Widow has to be changed before installation. Loosen the four screws in the backplate. Take engine, tank, and backplate apart. Reassemble the motor with the engine and backplate turned to the right.

For the needle valve extension, take a wire of about 1.5mm (1/16") and drill a hole of the same size into the top end of the needle valve about 3/32" deep. File the plating from the top end of the needle valve then insert the wire into the hole and solder together.

If you want to use engine control, use an Acc throttle sleeve, it works well.

The engine is installed through the air inlet. You have to twist a little bit to get it in place. To place the screws, slip a piece of fuel tubing over the blade of a small screwdriver. Push the screw into the tubing with the slot fitting into the blade. This method was in a For What It's Worth idea in RCM. You also can fix the screws with Hot Stuff to the screwdriver. When the engine is in place, install the modified needle.

Radio Installation:

I mounted the elevator servo with servo tape to the front wing. The tape, being soft,

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QUICKIE

from page 146/40

adapts to the airfoil. Two wire hooks are glued to the center section to enable the elevator servo to be secured with a rubberband. With this installation, there has been no problems. (See RCM September 1977, page 85.) The aileron servo is installed in the accustomed way. Metal snap links were soldered to the actuating wire. The photos will show how the ailerons are connected to the servo.

If you want to use a throttle, mount the throttle servo to the right fuselage side with a plastic servo mount or servo tape. The model is balanced by moving the battery and receiver in the fuselage. When the model balances properly, remove the wings and install F4 and F14. There is good access to the inner fuselage when both wings are removed. The radio shifting is easily observed through the large canopy. For flying, a thick piece of elastic foam is stuffed under the canopy to hold the battery and receiver in place. I slipped the antenna through a piece of pushrod tubing from F2 to the fuselage end.

Flying:

Be sure the model balances properly, and the controls move the correct way with the movements shown on the plan. Remember it is a canard and the elevator deflects opposite to normal aircraft. The ailerons in the rear wing move the normal way.

To fuel the tank, drill a hole through the top of the cowling and slip a piece of fuel tubing on the filler tube of the tank. This is shown on the plan and is very practical. Any overflow runs out the air outlet at the bottom of the cowl. I had no switch on my plane. The battery was connected to the receiver before flight. I did not use a switch because I did not know where to install it without disturbing the plane's appearance. I used a 250 mah battery pack with my plane to reduce weight. Using this smaller battery instead of 500 mah saves about 2 oz. which is a lot on 1/2A planes. To compensate for less flying time with the smaller batteries, I take two battery packs to the field. My plane weighs 18 oz. and I advise you to stay under 20 oz.

With the engine running full rpm's, hand launch the model into the wind. Give some up trim before launch. Do not wait for something strange to happen when the plane is airborne. When accurately built, the model begins to climb in a left hand circle. Speed is rather gentle, there is no dashing around. The model has a remarkable rate of climb, which proves that no hotter engine is needed. A Cox Black Widow with 6/3 prop and 10% nitro fuel is a lot of power for this ship. Grey props are a little better than the black ones. I usually throttle back after getting some height, circling around and enjoying the sight of the plane in the air.

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QUICKIE

from page 150/40

When the engine cuts, transition to glide is smooth. Let the model have some speed during glide. Without prop wash, the ailerons are less effective at low speeds.

At a very high angle of attack and high G-loads, wing rocking still occurs. That might be caused through the constant chord of the ailerons. If you give too much up elevator, the elevators cause some wash-in that might result in tip stalls. But the plane will not spin, being a canard, the wings will rock. To stop this rocking, ease up on the elevator stick a little bit.

Although this model is very docile, I would not recommend it as a beginner's first plane. However, you need not be a racing pilot to be able to fly it.

If this model of the Quickie looks exciting to you, build one and enjoy it in the air.

Happy flying and good landings.

RADIO SPECTRUM

from page 39/38

problems very quickly without any physical connections to the transmitter.

Well seeing that I gave the art department something to do, I guess I can quit. Hope to tell you about Toledo in the next issue.

CUNNINGHAM ON R/C

from page 37/36

chasing that airplane down the runway to wherever it decided to stop, then stopping the engine, removing the prop and then sprinting back to the judge's table, a couple of hundred feet away to toss in the prop (generally the prop bounces out of the box and you have to scramble around to put it back in) before the time stops. If you think that you're in shape, and who is, this will really tell. If you and your aircraft survive, it's a great afternoon of fun.

Back at the tag end of the '60's and early '70's we tossed a yearly Fun Fly contest known as the National Fun Fly Championships. This format became rather popular for a time. This was a simple type of contest to judge since everything was counted, no "judging." The aircraft took off, and climbed-out for sixty seconds (this was later modified to forty-five seconds). At the top of this climb-out, the aircraft was put into a spin, and the number of spin revolutions were counted. The pilot pulled out wherever he wanted to. A flat spinning method was developed, by cross controlling after the spin entry, that made the aircraft spin very flat, almost revolving around a central axis. Many aircraft do not pull out of this flat spin, by the way, and will keep on

to page 156

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CUNNINGHAM ON R/C

from page 154/36

spinning right down to the ground. It's best to practice this at high altitude to give you lots of time to figure out how to break the spell. Generally, you neutralize controls, increase the throttle, and then go to down elevator to dive out. But remember to have room between the airplane and the ground. After the spin portion, the pilot positions his aircraft, calls "now," and then has thirty seconds to do as many inside loops as he can do. They must all be true loops, no wing-overs. After looping, he again places the aircraft where he wants it and then has thirty seconds to do as many axial rolls as he can do. At the end of this time he sets up and makes a landing on a grid with numbers on the grid for each five foot increment. Wherever the main gear touches down represents the points that this landing receives.

Fun Fly contests can come in many forms, and these are but a few that can be done. A lot depends upon the expertise of the fliers in your group. You can tailor the type of Fun Fly to the ability of the entrants. Nothing makes a flier get more proficient quicker than does some form of competition.

A type of aircraft has been developed in this area for Fun Fly competition, that has proven to be an all-around good flier in most any condition. This type of aircraft has a swept shoulder wing, with no dihedral. The rearward sweep of the wing takes care of the stability of dihedral. It is amazing just how a swept wing aircraft will spin, roll, and land, much better than a standard straight wing. Landings are generally nose high coming in, looking for all of the world like a duck settling down on a lake. Flying speed can be maintained and, yet, this plane can drop in just where you want it to. More about this at a later date. If you want to spur activity in your club, try a Fun Fly. If you come up with some new form of Fun Fly, write and tell me so that I can pass your ideas along to everyone else.

Last month we did a bit of talking about building from scratch (generally I really do like to build from balsa, but since the prices keep going up, I guess that scratch will have to do) and mentioned that I would touch a bit on covering.

Frankly, since the advent of plastic films, the building, covering, and flying of a new R/C ship has become a piece of cake. I never did like to paint models and most of mine looked like they were painted by a caveman. With the advent of plastic films, anyone can become a covering expert — even me.

The easiest way to do it is to cut out the pieces of film that you're going to use for each part of the aircraft. Lay the sheet (after you remove the backing) on to the piece to be covered, then tack it around the edges

with a hot iron, or sealing iron. Work from the middle outward, just lightly sticking down the covering material to the edges of the framework. Trim the pieces with a #11 X-Acto blade and then stick down tightly. Make sure that the edges of the next piece overlap the first piece at least 1/4" for good sealing. Stick everything down tightly with the sealing iron, then go over the part with the heat gun and shrink the covering. Be careful not to get the heat gun too hot, or hold it too close to the covering, or it will melt the plastic. If you just stick to the edges, then shrink up the open spaces, you will get a very even looking covering job.

Use the following procedures for slab sides: As you're shrinking the film with the heat gun, lightly rub the covering with a folded handkerchief to press the hot film to the balsa side.

You can trim out the covering job with trim film, and trim tape, then go over all of the joints and the trim lines with a narrow brush and a clear urethane paint, such as Pactra or Formula U. I have a quart can of Flecto Varathane clear varnish that I've used for years to seal the seams, and it works great. I'm looking forward to covering with FabriKote when it makes its way to the hobby shop shelves this spring.

I can't let this issue pass without reminding you for the last time this year to try to attend the Southwest Jumbo R/C Fly-In which will be held at Thunderbird Field on the shores of Lake Benbrook, just west of Fort Worth, Texas, July 18 and 19. This is a fly-in for all large types of models, the only restriction being a minimum wing span of 84" for monoplanes and 66" for biplanes. For added information, write to me at 2440 Colonial Parkway, Fort Worth, Texas 76109. Plan to make this a summer weekend that you will enjoy. See you there.

SOARING

from page 35/34

afterwards. The design objective was to retain most of the good features of the Paragon, but still penetrate, empty: in other words, have a much wider speed range than the Paragon. The award-winning ship featured an 8 1/2% airfoil but defied all attempts to get it to go fast. It flew much like a Paragon. To quote Ed, "It floated like a butterfly, but didn't sting like a bee."

The final version has a 15% semi-symmetrical section; with a 2.5% mean camber line. A 6.3 oz./sq. ft. wing loading helps it to float, but now Ed is really satisfied with the speed range. The wing span is 100", weight is 41 oz., and the name — Gemini MTS (Multi Task Sailplane). Availability? 24 pre-production kits were sold to selected fliers for evaluation. When the results are apparent, then production will start. My guess, end of summer.

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level, possibly adding a bit of up elevator to keep it level and releasing the rudder as it nears level flight. Some modelers will delay adding the rudder until near vertical to prevent pulling off heading. You can vary your technique with your particular ship to see what looks best. The very best maneuvers, however, are performed in a manner similar to that described.

A common mistake is improperly blending the rudder and elevator allowing the ship to pull off heading. It's most noticeable when rolling right to left (rolling right). The ship will move in toward you on the first quarter roll and also move in on the last quarter roll. If you have this problem, rolling from left to right will help hide the defect, since the ship will move away from you and is less noticeable. If you haven't already solidly established your rolling habits, it's probably best to roll left since most models seem to roll more axially in that direction — probably due to torque effects. Whichever direction you roll, it's probably best to always roll in one direction and develop your habits and skills accordingly.

The 8-point roll is a variation of the 4-point. The techniques are identical, and we simply pause at 45° intervals instead of 90°. The mixed rudder and elevator applications will pause in mid-travel at the 45° points.

I know that the above sounds complicated; it is, when we try to verbalize all of the subtle things that are going on. It will take lots of practice, preferably with expert coaching to help you avoid mistakes. It's probably best while learning the 4 and 8-point rolls to slow it down allowing more time to learn the control motions. Once familiar, you should speed it up to the desired competition timing. After performing a few hundred, you will find a pace that looks and feels right.

Let's close out this session by looking at the slow roll. This maneuver is about the prettiest in the schedule. Timing should be about 5-6 seconds for competition. The control blending is basically identical to the 4 and 8-point rolls; we simply do not pause at 90° or 45° intervals. The average roll rate will be slower than the other rolls since there is no pause and we perform only one roll in the required time interval.

Okay, let's run through the maneuver. As with all maneuvers, start from absolutely straight and level flight — **do not** pull the nose up to start the maneuver. Apply a small amount of aileron and, as the roll begins,

slowly add opposite rudder. As in the point rolls, you will probably need some up elevator to prevent pulling off heading. Continue to roll, increasing opposite or "top" rudder which will be maximum at the wing's vertical position. Continue the roll, reducing the rudder to zero when you reach inverted. Continue to roll and slowly add rudder in the direction of the roll, increasing to maximum in the 3/4 roll position. Decrease the rudder to zero as you continue the roll to level flight. The elevator position history during the roll begins with the application of a bit of up as the roll begins, reducing to zero in the wing's vertical position, then proceeding to application of down as it continues to inverted reaching maximum down in this position. It is now slowly reduced to zero in the 3/4 position and moved to up as it continues to roll to upright flight.

Well, does all of this discourage you? If it was all easy, then everybody would be an expert, and that wouldn't be fun — would it? As in all sports, only the serious competitors, willing to work hard at his craft, will reach the top.

As a member of the newly appointed AMA Safety Committee, I have a renewed sensitivity to safety items these days. We hope to develop for modelers, improvements in safe products and operations. From time to time I will stick an item in this column which may save some modeler a lot of grief. I'm particularly sensitive to safety as related to props since this very important device has a bad habit of slashing fingers and hands. It can also maim and kill — so beware! The following is an excerpt from "Quincy Hobby Center" (Maine) newsletter:

Safety: A recent trip to the emergency room brought home a point. That is, even when you are playing the game by the rules, you can still get hurt (10 stitches in the left hand). A blade separated, on a non-wood prop, at the hub. The blade hit Tom Hessler in the left arm even though he was in front of the prop. The rest of the prop stayed on the running ST 46 which tore itself out of the airplane. Your's truly was reaching for the needle valve from behind the plane. The engine and one prop blade walked up the side of my hand. Ouch. Thanks go to Don Glenn for driving me to the hospital and Tom, Roy Weast and Mike Bratton for help at the field. Just before we started the engine I had told two young boys "to go back to the fence because propeller blades could fly off." I think some props have ears.

Nuff said!

COSMIC COYOTE

from page 27/24

direction and at the control surface's maximum width.

The remainder of the flight was uneventful and the aircraft displayed very



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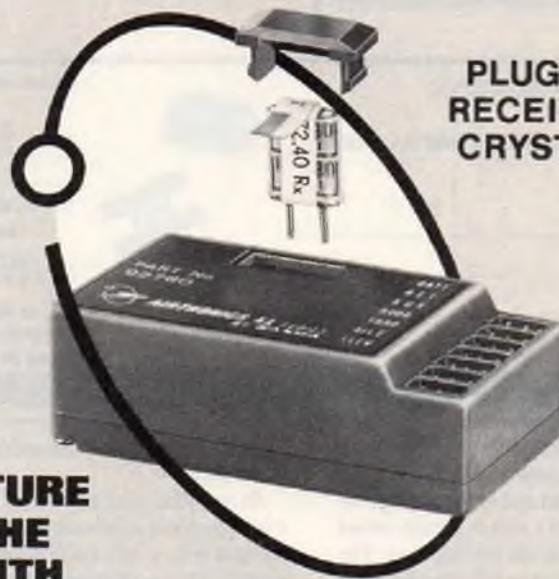
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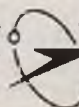


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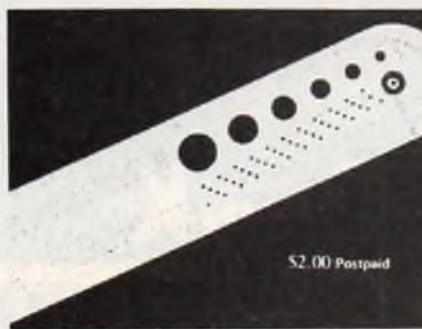
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satisfying flight characteristics, in spite of the windy, bumpy conditions. As the wind was a direct crosswind and rather strong, we elected to land directly into it, which meant landing across the normal landing area. The only obstacle to landing in this direction was a low barbed wire fence and high scruffy grass. The landing approach was entered and perhaps it was due to the slightly rich mixture setting combined with using a cold type plug, but after turning onto the final approach, the engine (which was throttled back to about 1/4 throttle) became very silent and the prop stationary. Being a "veteran" R/C pilot . . . it was "instantly concluded" that a "go around" would be somewhat difficult as the aircraft was only

about 25' high downwind and still well short of the field.

As any R/C pilot knows (or soon learns), it is impossible to stretch an aircraft's glide and that it is a very poor practice to let the aircraft become situated well downwind at a low altitude. Add to this, the problem of an engine flame-out and you have all the credentials necessary to win the "R/C twit of the month award."

By the time it was apparent that making it over the fence and onto the landing area was going to be --- interesting! With altitude lessening and the fence looming ever higher, the urge to feed in up elevator was overpowering. The Cosmic Coyote aided by much inhaling, body english, and an ever

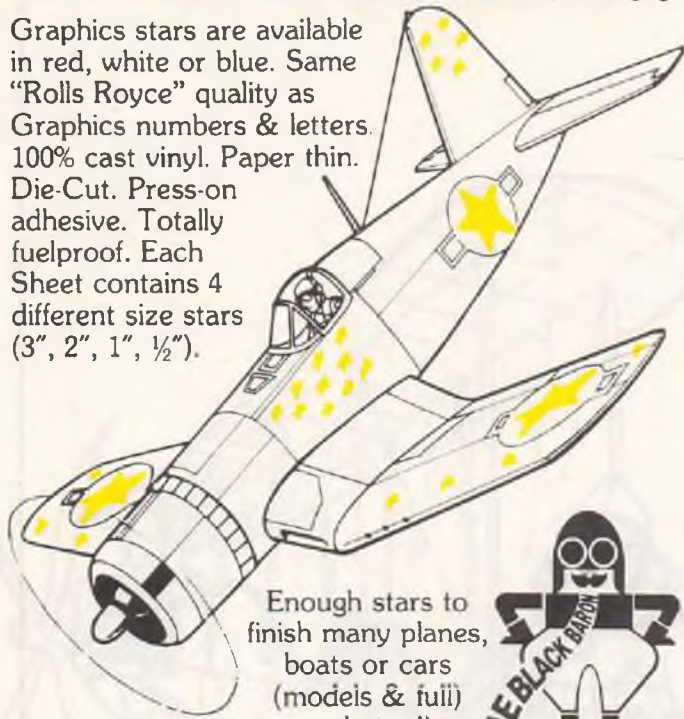
tightening sphincter muscle: cleared the fence with inches to spare and a beautiful full flare landing was made. The only problem being that the aircraft was still 2 1/2 to 3 feet off the ground! The Cosmic Coyote simply "plopped" to the frozen turf --- no snap roll or wing tip drop --- it just dropped vertically. The resultant "spot landing" was still hard enough to crack the landing gear and bottom nose block loose from the fuselage.

At this point, one does not exactly swagger over to retrieve one's aircraft. The walk could best be described as a head down, slink, accompanied by considerable muttering, relative to one's own ancestry.

to page 176

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COSMIC COYOTE

from page 174/24

This humbling account of R/C piloting ineptitude does, however, have one fortunate aspect in that, with such poor weather conditions prevailing at the time, there were only two other fellow RC'ers at the field to witness the landing debacle.

The damage was easily repaired and, on subsequent flights, the Cosmic Coyote has proven to be a real fun aircraft. It performs all the usual pattern maneuvers in a commendable fashion. In-flight speed is comparable to any .40 size sport pattern aircraft. The Cosmic Coyote has become my favorite sport flying aircraft and if you should decide to build one, hopefully it will become a favorite with you also.

The Cosmic Coyote, with its racer look, may even induce you to ultimately try your hand at the premier event in competition R/C modeling — **Formula One!** I sure hope so — see you at the races. □

TWINNY

from page 23

to remove the MonoKote from the portions where the cement will contact these items.

Engine:

We installed an O.S. .20 and muffler on the furnished motor mount. The mount required major reworking to fit the O.S. .20. The 3 oz. supplied fuel tank was used and located as per plans.

Radio:

A Litco airborne system was utilized with a Cirrus transmitter giving the commands for the four channels used. The radio compartment is large enough to accept most current radio systems with ease.

Flying:

The control surfaces were set up with the recommend throws and the C.G. was as per plans. This combination produced very sensitive aileron and elevator. The aileron was reduced to 1/4" up and down and the elevator 3/8" up and down. This makes Twinny very responsive to all controls, but stalls are straight ahead, no dropping of a wing.

Twinny flies very easy and stable. Take-offs are no problem because it is very steerable.

Conclusion:

The Twinny is advertised as a sport model which can be used as an aerobatic trainer. The Twinny definitely performs the task for which it was designed. Flight performance with a .20 or .25 is outstanding. Little or no trim changes are required with throttle changes. Inverted flight requires only a little bit of down, and aileron response is good right up to the stall. Any modeler with a couple of R/C models behind him should have no problem building or flying the Twinny. □

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SCAT CAT 500

from page 22

... sheet to the plans and then adding the various bulkheads, firewall, triangle stock, and pre-cut 3/16" balsa sheet fuselage sides to it. The stabilizer is glued in place with the fuselage assembly still pinned over the plan sheet.

The wing attachment phase of assembly is also performed with the basic fuselage still pinned down. We did not install the fuselage bottom sheeting (as the instructions suggest) until the control pushrods were fitted and installed. (We added a controllable rudder to our test aircraft, as the Formula 500 racing rules in this reviewer's area require it.)

The canopy effect 1/4" balsa sheet turtledeck piece was added, as shown on the plans. This piece is optional and not included in the kit. It is strictly for appearance purposes.

A K & B (#8011) .40 R/C engine, equipped with a Mac's .40 size racing muffler, was installed on a Fox aluminum engine mount. A four ounce Sullivan Slant style (ss-4) fuel tank was used. (Should the Seat Cat be built for sport flying purposes, a 6 ounce tank can be easily accommodated.)

Radio:

A Westport International Variant radio was installed, along with a 100 mah battery pack, in order to keep overall weight to a minimum.

Finishing:

After fine sanding and vacuuming, the wings of our Seat Cat were covered with Top Flite Econokote heat shrinkable film covering. The fuselage and tail surfaces were finished with K & B Super Poxo primer and gloss enamel.

Our ready-to-fly (less fuel) test aircraft weighed in at 55 ounces, which was one ounce under the legal racing limit. As we mentioned, a 100 mah battery pack was installed along with standard size servos. We replaced the 100 mah battery pack with a 300 mah pack, which brought the finish weight up to 56 1/2 ounces. The C.G. was located as noted on the plans and was easily achieved by radio component placement. The control surface travel limits were set up as suggested in the instructions.

Flying:

We stated that the Seat Cat 500 is an excellent kit. Its flight performance is in the same category! Take-offs are easy and quick, with full throttle. All that is required is to hold full up elevator and a bit of right rudder. The Seat Cat is airborne and on its way in less than 10" off of a grass field. After minor trim corrections and a slight reduction in the elevator travel, our test aircraft proved to be fast and groovy on the straightaways with the ability to turn tight and smoothly at the pylons.

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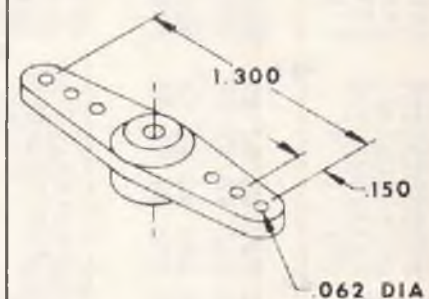


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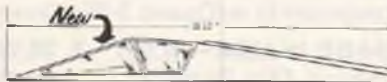


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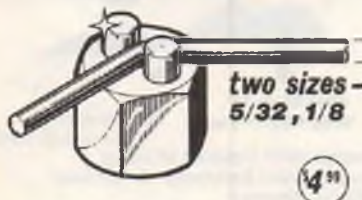
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design certainly apply to the Scat Cat. for it is a racing joy to fly. Landings are easily performed. We prefer to kill the engine on the final approach (with throttle trim) and land "dead stick" with a racer, in order to minimize potential prop damage and dirt ingestion into the engine. In this manner, the Scat Cat can be flared to a slow and easy three point landing or flown in for a faster wheel type landing.

If the Scat Cat is built for sport flying purposes, the builder will undoubtedly opt for additional control surface travels in order to make the aircraft more responsive. However, the manufacturer's suggested control surface travel limits are an excellent starting point and should be adhered to for initial test flying and trimming purposes.

Conclusion:

In summary, the Scat Cat 500 is an excellent kit, that offers both in the box and in the air quality. Modelers will be hard pressed to find fault with this aircraft. In this day and age of frequently exaggerated manufacturing claims, the Scat Cat 500 is truly everything that Flite Line Models claim. Formula 500 racing enthusiasts will find this kit hard to resist. A definite "best buy" and a design which will regularly be seen in the winner's circle. □

ENGINE CLINIC

from page 18/16

building faults, he is now available on request to analyze and correct the faults of Oracle Gr. 1, Gr.2 and Gr. 3. He is completely self-assured, but remembers that he was once humble.

Clarence Lee writes to him for advice.
Oracle Gr. 5. This status is impossible to achieve.

Tom . . . Oracle Gr. 2.

□

POWER BOATING

from page 8

Steve saying that he finally thought that he had worked the bugs out of his Streaker and offered to send Bev one for evaluation. When we received the hull we were surprised to see that Steve had completely redesigned the bottom. There are no outside chine strakes at all and, in fact, there is only one strake on the bottom positioned halfway between the chine and the keel. This unusual bottom design sure has turned the Streaker into a truly super competitive boat for the 7.5 cc class.

Our particular boat is shown in the first photo. Photo 2 shows the general internal arrangement of the boat. We used two Pylon SS-16 fuel tanks mounted on their sides on to page 186

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POWER BOATING

from page 183/8

an 1/8" thick plywood tray that was glassed to the engine rails in front of the motor mount. We only fill the left side tank when heat racing but use both tanks when competing in Deep Vee enduro races. Boat flotation is provided by styrofoam blocks in the nose section and by two plastic flotation bottles mounted outside each engine rail near the transom. These are plastic catsup bottles that have their nozzles cut off. A plastic disc is cut to be inserted under the screw-on lid. The top assembly is then sealed with Silicon Seal and the bottles are mounted using brass straps. Our radio box is constructed of phenolic and uses Scotch brand clear plastic tape to keep water from entering the lid. A piece of balsa is glued on the box top to protect it from the heat given off by the pipe. Two Du-Bro 2-56 ball links are mounted on top of the radio box lid for use as charging connections. By soldering the positive and negative charge wires to these ball links, the receiver batteries can be charged without unsealing the radio box. The radio box is mounted by four 6-32 bolts that screw into blind nuts that are imbedded into an 1/8" plywood tray that is glassed onto the engine rails. Never fasten anything to the bottom of a fiberglass hull because distortion of the riding surface will result.

Photo 3 shows the hardware set-up at the stern. We used a 40 Prather Deep Vee hardware kit as the basis for this set-up. The flex drive strut assembly was mounted so that the prop centerline is parallel to the keel and at a depth of 9/16". The cavitation plates were moved outward so that the inside of each plate is 1" from the hull centerline. Turnbuckles were fabricated using Delta 1/8 Scale race car front end clevises. A Steve Muck 20 size wedge rudder was mounted so that its leading edge was behind the propeller and 1 1/2" to the right of center. This rudder is machined from bar stock and is, therefore, super strong. It has a flush water inlet so that your motor will always run cool.

Photo 4 shows the other side of the hull. A tapered anti-spin fin is mounted on the right end of the ride plate. The fin is 1 1/2" deep and 1" wide at the top and 3/4" at the bottom. The flush water inlet can be seen in this view of the rudder blade. I found that an Octura 1650 propeller worked well for circle racing. With the pipe set at 9" out, the new O.S. 46 was happily turning 21,000 rpm on 60% fuel resulting in approximately 50 mph chute speed. You might also try Octura 1455 or 1750 propellers. The boat now handles and corners extremely well and it should be the hull to beat this year. We are very impressed with the boat and want to compliment Steve for working hard to give boaters only the best equipment he can produce. By the time you read this the new 81 Streaker, and a similarly redesigned 81



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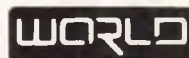
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We will now turn to answering a few letters that were received this month:

Dear Howard,

I'm almost ashamed to ask this stupid question, but we do not have anyone near here who could help us and the nearest hobby shop is 150 miles away—either in St. Louis or Kansas City, Missouri.

We just started in model power boating last fall. We have four boats, all outboard, and four K & B 3.5 outboard engines, a Sullivan 12V starter and a Hobby Shack 12V, 4.5 amp gell cell battery. Our problem is we only get one or two starts from the battery then it won't even turn the engines over. When we can get close enough to the water, we use the car battery and have no problem at all. This leads me to believe our gell cell battery just doesn't have enough amps to do the job although we have charged it for up to 15 hours until it shows 13½ volts on a voltmeter. Are we trying to use too small a battery and, if so, what do you suggest we get?

Your articles in R/C Modeler are at present far over our heads but we enjoy reading them and perhaps this summer some of the information will be helpful to us. We usually run our boats, when we can get them started, on an eight acre lake in the City Park and, since 99% of the people around here have never seen an R/C boat, we usually draw quite a crowd --- so if we can get our act together maybe others will get interested.

Your answer will certainly be appreciated.

Thank you,
Jim Bishop
California, Missouri

I hope that you and my other readers won't consider your questions stupid enough to be ashamed of. There are probably many others out there with problems similar to yours. I encourage all my readers to write so that the column will serve everyone's interest in model boating.

From your description of the problem I am certain that your gell cell battery is either not accepting a charge and is defective, or that you are not charging the battery properly. A 12 volt, 4.5 amp-hour battery should be sufficient to start your K & B outboard all weekend. This battery should be charged at 1/10 the capacity of the battery (450 m amp or approximately 1/2 amp) for 14 to 16 hours by a 12 volt charger. Gell cells are sealed batteries so it is very important that you do not overcharge the battery. If you overcharge, the battery vents and a loss of capacity will result.

I have had the best luck by using lead-acid motorcycle batteries for my electric starter. They are much more tolerant to overcharging and seem to outlast any gell cells that I have tried. If you are limiting your boating activities to 3.5 cc engines, or smaller, I would suggest a 12 volt

to page 189

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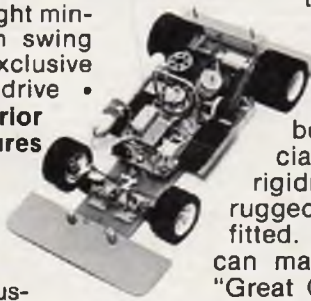
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POWER BOATING

from page 187/8

motorcycle battery of about 5 or 7 amp-hours capacity. If you loosen the glow plug while starting, this single battery will start even tight ABC racing engines. However, if you intend to use 7.5 cc or larger ABC engines you really should buy

two batteries so that you can use the Sullivan 24 volt starter. My starting box has two 12 amp-hour batteries wired in series to supply the starter with 24 volts. With this set-up I can reliably crank even flooded 10 cc engines as long as I loosen the plug. This is absolutely necessary if you are racing. The high capacity of my batteries is necessary since we often race on two days of a weekend and cannot charge during the weekend. I use a Goldberg HandyTote

starting box modified so that a battery is mounted at each end of the box. The thing weighs a ton but if you recruit a hefty pit man, he can carry it! You can use your Sullivan 12 volt starter on 24 volts but be prepared or it will jump out of your hands! Continual usage at 24 volts will tend to melt down the strip switch but you can easily repair this yourself using strip brass available at any hobby shop. The starter rpm to page 192

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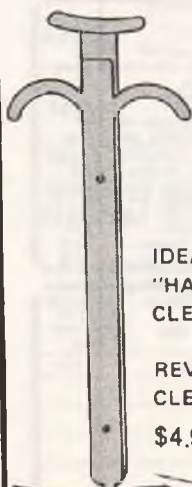
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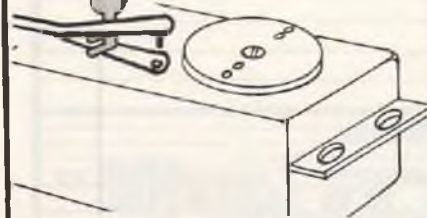


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POWER BOATING

from page 189/8

doubles when you use 24 volts on a 12 volt starter so I prefer the 24 volt starter.

Dear Mr. Power,

Your articles in RCM are just what the doctor ordered, as I am just in the process of completing my first radio controlled racing hydro. It's a Dumas U-76 equipped with an OPS 40.

I have a couple of questions for you. First you have mentioned the convenience of owning an audio tach for tuning the engines and pipe, but I cannot find one in any of the modeling magazines. Can you tell me where to find one?

Also, my only other boating experience is with a Dumas DV-40CF with an H.B. 40 PDP. What I am getting at is my hydroplane should be much faster than anything I have yet driven. According to your formulas I have hopes it will do around 50 mph after proper set-up. Since most of my boating is just fooling around at a local lake and not racing I am thinking about installing a fully controllable R/C carb on the OPS instead of the OPS racing carb. Would this work or is the engine too radical to run at lower rpm's even with an adjustable idle jet? I could then put on the racing carb for all-out runs or if and when I go racing.

Thank you,
Ted Burgmaier
Missoula, Montana

Unfortunately, Ted, audio tachometers are not very popular items at this time. With the increased emphasis on tuned pipes in other aspects of R/C modeling it is my hope that these devices will be mass produced and be more readily available through normal retail outlets. An audio tachometer is made by Wings Engineering (Stamford, Connecticut) which they call their "Sonotach." This device is a speedometer/tachometer combination which uses the Doppler principle for speed estimation. Tests that I have made on this device indicate that the speed measurement capability is too crude for my purposes but the tachometer portion of the device is very good. Your local hobby dealer should be able to get you this device. The last retail price I have for the Sonotach is \$69.95. I have a limited number of audio tachs available for \$49.95 if you can't get one from your local dealer.

The carburetor supplied with the OPS .40 is intended for use with pressure fuel feed. It is of very simple (or should I say outdated) design. As a result, low speed and mid-range acceleration suffer. This can be improved upon by reducing the choke area with a couple of reducer sleeves made from K & S brass tubing. The best replacement carburetor would be a big bore O.S. Max carb which has both a high and low speed

to page 194

CORRECTION

In the June 1981 issue, Engine Clinic column, p. 172, Clarence talked about mixing your own diesel fuel and that the fuel should contain 2% Amyl nitrate for better operation. Further on it is stated that "Amyl nitrate works even better but is almost impossible to obtain in less than drum quantities." A typographical error was made, and it should have read, "Amyl nitrite works even better but is almost impossible to obtain in less than drum quantities."

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Mr. Power,

I now have a Dumas Hot Shot powered by a K & B .21 outboard engine. The rig is a super performer except for its cavitation problem. Around right corners and in rough water (any size waves) it will go into a cavitation condition. The K & B outboard does not idle down slow enough to pull it out, you just have to pull the throttle back and wait it out until it grabs again.

According to your article in R/C Modeler, March 81, if I use a super cavitating section propeller it will help solve my problem. Will that help my problem or do I have other troubles with this rig? We have even tried Octura props (but same problem). Can you give me more info? Are there super cavitating section props available and, if so, where? Other problems? Your info would be very much appreciated!

*Dale Van Beck
Melrose, Minnesota*

Cavitation problems can be really bothersome and correction is usually a matter of increasing propeller depth or increasing blade area by choosing a different prop. To my knowledge, none of the model prop manufacturers have designed props with truly super cavitating sections. A super cavitating section does not really prevent cavitation but is designed to produce thrust while operating in a cavitating condition. Most fellows in this area use a J.G. E-20 propeller on their Hot Shots. The boat runs best with this prop when the top of the propeller shaft streamline housing is at the same depth as the sponson bottoms. If you are using mild fuel you may have to use a J.G. C-20 propeller. This is a smaller diameter propeller so you will have to lower the motor until the cavitation plate of the outdrive is approximately the same depth as the sponson bottoms. As you can see, an adjustable motor mount is necessary so that you can vary prop depth to keep away from cavitation. Prather, K & B, and Hughey boats all make an adjustable motor mount for the outboard. If your problem persists it is possible that you are turning the motor at too high an angle. If the angle is too high, the lower unit can block the water flow into the prop and induce cavitation. I am assuming that you have checked the balance of the prop and have sharpened its leading edges. You should also convert your old outboard's exhaust throttle and draw tube to the new outboard carb available from K & B. K & B sells an outboard conversion kit (Part #8683) for \$16.75 that

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Well, that does it for another month. Send all your questions, comments, and letters to the address at the end of the column. Remember to include a self-addressed, stamped envelope if you need a quick answer to your questions. Howard Power, Hobbies Unlimited, 766 Broadway, Seaside, California 93955, (408) 394-1200. □

SUNDAY FLIER

from page 6

mysterious canard. I'm contributing what little knowledge I have on the subject. Per your "Sunday Flier" in the March issue, the reason they call a "canard" what they do was explained to me by a knowledgeable co-worker named John Gard who is very well versed in French culture. He claims that whenever the French saw a canard type aircraft flying, they were sure it was going to crash into them so they would instinctively point at the aircraft, howl "Canard" or "Duck," meaning "hit the deck." Therein, the origin of the term.

Enclosed is a photo of my canard, built entirely out of sheet balsa, inclusive of all control surfaces and wings and powered by a Super Tigre .46 swinging a 10/6 pusher prop. Wt. is 6½ lbs. and covered in MonoKote. Look familiar to you? It should be. I built it from plans I purchased out of the September 1966 Radio Control Modeler, for \$2.00! It's Whitey Pritchard's "Praying Mantis." I built it for 4 channels using rudder, throttle, and a mixer for the modified foreplan. I added 1½" to the trailing edge and made the entire back removable (see picture). It's an extremely stable aircraft and it flies great! I recommend it to anyone, just be sure you add the working foreplan, keep the C.G. at 7" aft of the rear wing leading edge. To clear the runway before taxiing, yell "Canard," then proceed your take-off run.

*Sincerely,
Rich Kotziba
Phoenix, Arizona*

Sorry we couldn't print the photos of the Mantis, but I've seen Whitey's bird, and Rich is right, it really performs.

However, the idea that canard meant "Duck!" as in "Hit the deck!" started to come apart when I got a phone call from Hank Cohan, right here in the Bay Area. Hank quoted from the authoritative Jane's "All The World's Aircraft" 1917 issue covering the 1902-1916 period. On page 88 of the Aeronautical Dictionary section it says, "Canard: Literally a duck; French slang for a rumor, but aviatically, an aeroplane with elevator in front and without a tail, thus having a duck-like appearance when in the air."

to page 198

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Ready-built models: Byron Pitts with Quadra, 6 ch. radio and ball bearing servos, P51D with flaps, Super Kaos with retracts, 9' J-3 Cub, Aurora 1600 glider with 2 ch. radio, RCM Expert, M.E.N. trainer with engine, Model Merchants Revenger, F8F Bearcat, Racing Yacht, Soar Birdi with 2 ch. radio, 9' Bud Nosen Cessna, Tug Boat with steam engine installed, Pretty Quick 500, plus many, many more from \$49.

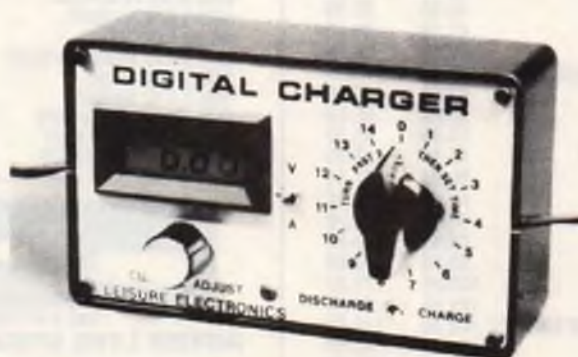
Kits: SST 40, Mirage sailplane, Love Machine, Bridi Basic Trainer, Pilot Staggerwing Beach, Piper Commanche, Midwest Magician, Super Eye Soar, Aeromaster Biplane, CG Voodoo, QB10L, Big Birdie, Midwest Sniffer, Heinkel Biplane, Wanderer, Das Slupen Thing, Craft Air SD-100, and numerous others from \$4. Helicopters, too—most popular makes—from \$40.

Engines: OS Max, HB, Super Tigre, K&B, Enya, Cox, McCoy, O&R, Fox, etc. 35's from \$15, 40's from \$25, 60's from \$35. Numerous old time ignition engines and parts.

Misc: Starters, Battery testers, ducted fans, flight boxes, sail controls, tuned pipes, covering materials, retract systems, plans, fuel, servos, props, etc. etc.

All of the above items (and many more!) were advertised in the last issue of HOBBY SWAP NEWS, the model enthusiasts "Used Equipment Guide." Your first ad FREE when submitted with subscription order—\$10/yr (10 issues) 3rd class mail. Add \$3 for 1st class. Canada & Mexico must use 1st class rates. Other countries write first. Mastercard & Visa accepted, include all numbers and expiration date. Allow 4 to 6 weeks for receipt of 1st issue. Submit free ad (65 words max) and subscription orders to: Hobby Swap News, P.O. Box 834, Dept. S, Santa Maria, CA 93456

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SUNDAY FLIER

from page 195/6

Well, I guess if Jane's says it's so, then it's so.

But wait! Here's an even earlier version --- well, at least Ed Katchmar says it's earlier, since it would have been around 1904 or '05 or thereabouts. Here's Ed:

Dear Mr. Willard:

The explanation of the word "canard" is so simple that it is no wonder that it got lost in history. Explanation goes like this.

When my great grandfather and the Wright boys were first experimenting with flying machines (separately, not together) my GGDad looked at Wright's machine and exclaimed, "Why that plane is ass backward."

This expression of course could not be published in those days so it was altered by the media to read "can forward." Down through the ages it became contracted to "Can'ard." Thus "Canard."

Any time you need more help, feel free to call.

Ed Katchmar

Thanksalot, Ed. Don't call me, I'll let you know. (Great story, though.)

Joe Luhine of Costa Mesa --- or is it

Mosta Keester, California, says y're all wrong. He sent me a card. It said:

Ken.

The first design was made by a Transpolitician engineer named Dranac, and since the darn thing flew backwards --- oh well.

Joe

So take your pick of the history of the word canard. And thanks to all of the rest of you for your similar ideas.

The second question in the March RCM asked why my little powered canard turned right on take-off instead of left, which most taildraggers tend to do. John Brownlee of Decatur, Alabama, writes his theory (along with his version of the origin of the word).

Dear Ken,

According to "Contact! The Story of the Early Birds," by Henry S. Villard, the French used "canard" to describe Alberto Santos - Dumont's XIV-bis airplane simply because it looked like a duck. He called it "Bird of Prey." You should be able to find a photograph of this airplane somewhere since it was rather famous.

How about the following explanation for your "skidded" canard's right turn on take-off?

(1) Slipstream rotation causes right roll forces in excess of engine torque.

(2) Friction of the nose skid with the runway is greater than any left yaw from the propeller if the axis is inclined upward from the path of travel. With both fuselage skids down, no yaw can be realized from the vertical fin. As the plane starts to skid forward, the left wing skid will leave the runway and the right will press hard, creating a drag center far to the right of the thrust line which causes the ground loops to the right.

(3) If you get the nose up quickly, greater left yaw will be realized from the propeller and it will not be restrained by the nose skid. As forward speed increases in the presence of left yaw, the rolling force due to the vertical fin will become progressively less and the right wing skid will not press as firmly. This keeps the skid drag center closer to the thrust line and, although some right turn tendency might still be present, it is not sufficient to cause ground loops.

Sincerely,

John Brownlee

This letter from the old aeronautical expert Brad Powers of San Diego, California, gives a succinct summary of all the letters.

Dear Ken:

I think that the prop . . . just forward of the relatively small forward surface, creates a "top-sided" pressure distribution over

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Balsa and plywood construction—Fully sheeted wing—Die cut parts—Fiberglass cowl—Scale spring steel tailwheel—Moulded windscreens—Full size plans—Heavy duty aluminum landing gear—Hardware package with control horns, strut attach brackets, screws—Building instructions—(Additional hardware required)

SPECIFICATIONS

Length	59.35 in
Wingspan	88.90 in
Wing Area	1038 sq in
Weight	12 1/2 lb
Engine	60-90 glow, 120 4 cycle, 20 cc gasoline
Radio	5 channel
Scale	1/5



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SUNDAY FLIER

from page 198/6

the surface, triggering a rolling moment considerably greater than the torque of the propeller, thus overbalancing it in the opposite direction.

This would be due to the ascending blade . . . in the case of conventional rotation . . . enhancing the flow over the left panel while degrading that over the right panel, and vice-versa when propeller rotation is reversed.

I think a pusher arrangement will clear this up.

I enjoy your column very much.

Sincerely,
Brad Powers

I had a better idea, Brad. Get rid of the engine entirely and go back to a slope soaring version. So I did --- built one with a



6' span, and my friend Mick Carlin built one with a 7 1/2' span. Here they are, alongside my big 1970 station wagon. Makes the wagon look small.

That's about all the room I've got this month, but I'd like to close this column about canards with a couple of photos of the most dramatic model design that was sent in. Ivan Poloni of Bergamo, Italy, submitted these photos of a Defense Research Projects Agency jet powered model. (Editor's note: RCM has no additional information on either the aircraft or the pulse jet engine.) The first photo was taken by Antonio Mucchetti, who also did the plans. The second photo shows the model with the team who developed it. On the left is Giulio Dedionigi, who was in charge of the radio system; center is Antonio Mucchetti, who made the plans, and on the right is Armando Lamarca, the pilot. They are members of the Aeromodeller Club of Busto Arsizio. The photo was taken by another club member, Sr. Volta.



What a beauty!
And that's it for this month. More later on. Keep writing.

FROM THE SHOP

from page 4

... Lexington M.A.C. Frank Rogoyski, 1800 Claymill Road, Lexington, Kentucky 40502.

Missouri:

St. Peters R.C. Club, August 15th and 16th. Jim Smith, #4 Glenwood Lane, St. Peters, Missouri 63376; or Wayne Knaust, Wayne's Hobby Shop, 1508 Watson, St. Charles, Missouri.

Thank you Horace for the information and best wishes for a fun program. Let's all keep the fun in R/C.

See you next month.