

## PART TWO: The Birth of Radio Control

# MODEL BUILDER



WORLD'S MOST COMPLETE MODEL AIRCRAFT PUBLICATION

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COVER: Benny Howard's DGA designs are well-known to air race enthusiasts. DGA-3, "Pete," was literally drawn up around the dimensions of an 88hp Wright Gipsy engine and a pilot. Although Benny hadn't planned on racing Pete himself, the 1930 Air Races found him without another pilot to whom he would trust the plane. Pete went into competition with Benny Howard at the controls and came out with five firsts and two thirds, several of which had been won against planes of much greater power. The cover painting is an idealization of Pete's days of glory, crystallizing the moment of rolling level after rounding a back course pylon during one of the races of the 1930 season. The number two plane, the Wedell-Williams No 92, did indeed finish second to Pete in the 1930 1,000 cu. in. free-for-all while being flown in an early, low-power configuration. Behind the Wedell-Williams is a Lambert monocoupe. The original 22- x 28-inch painting by Bob Benjamin is available for purchase. Photo prints of this and all earlier *Model Builder* race plane covers are available as well from Robert A. Benjamin Aviation Art, 1222 26th Ave., N.E., Olympia, Washington 98506.

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# Take a look at an A.S.P. from our vantage point.

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## **Sig CAs - They are designed especially for modelers**





## from Bill Northrop's workbench

• We have a great bunch of readers. In our July column, we mentioned that someone was trying to find out what became of a Northrop military aircraft that was lost during WWII, and some years later fished out of the River Thjorsa in Iceland for the purpose of restoration, as it was a rare specimen.

As it turned out, a complete article on the completed project appeared in the March 1981 issue of *Air Classics* magazine. One reader sent a copy of the article to the inquirer and sent us a copy as well. The aircraft, sort of an A-17ish-looking design with twin floats, is now on display in Oslo, Norway, after being restored by personnel of the Northrop Corp.

Another reader sent us information on the plane, a Northrop N-3PB, by way of copies of newsletters from the Vintage Aircraft Boosters Club, a part of the Northrop Recreation Club, which is also affiliated with the Western Museum of Flight, 12016 Prairie Ave., Hawthorne, California 90250, phone (213)332-6228. Also included was a copy of *The Taildragger*, the newsletter for the WMF. This, in turn, is "currently the visible part of the Southern California Historical Aviation Foundation (SCHAFA), a nonprofit organization registered with the State of California." You can contact the WMF at the above address or phone to find out more about its operation and purposes. Visiting hours are 9:30 to 2:30 daily, except Sunday, and there is no charge. Membership in the Foundation is available.

### M.A.R.C. SHOW

The last of the hobby consumer/trade shows for the spring season of 1988, took place in Baltimore (actually Timonium), Maryland, on June 4 and 5. This was the Fourth Annual M.A.R.C. (Mid-Atlantic Radio Control) show. The following report on the show comes from exhibitor Ralph Warner, Radio Controlled Models (RAM).

"Modelers who had attended the first three shows were impressed by the obvious



"Carried away? With what?"

growth in the number of exhibitors and interested modelers who attended. This is an active area, and there is every expectation that this show will grow in size and importance. The Fair Grounds is close to interstate expressways, has a large free parking lot, and a modern display building.

R/C car racing and helicopter flying was demonstrated in a fenced display area on one side of the building. Boaters had a long pond on the other side of the building which allowed them to demonstrate the high-speed performance of electric-powered vessels. R/C planes were demonstrated Saturday evening after the show at

the sponsoring club's nearby flying field.

"Dan Yarchin, chairman, and his committee can be proud of the show, and they have plans to improve it even more for next year. It deserves your support."

"HEY, KID"

We've had lots of great letters on the "Hey, Kid" series by Bill Warner. The following, written by Earle W. Thompson, of Los Angeles, California, was just a little different, but still meant as a compliment:

"I launched a 'Super' Slick Streak into the air. It flew away over the trees, I know not where.

"I launched a 'Perfect' Peck ROG into the





air. It flew away over the trees, I know not where." "Now I launch overweight, warped-wing Bostonians into the air. They fly into the trees, but sometimes I get them back." "This is progress?"

#### MODEL AIRCRAFT BUILDER?

You might recall, or maybe didn't notice, that we modified the logo/title on the cover of the May 1988 issue per the above heading. It was rather tentative, and we figured to measure the reaction before making a permanent change. Actually, we figured that inserting the word "Aircraft" in smaller type in the middle of our regular logo would be sort of subliminal in effect, and maybe hardly be noticed. That almost turned out

to be the result.

Surprisingly, most of the mail addressed to *Model Aircraft Builder*, to the best of our knowledge, came from new contacts, who, seeing the title for the first time, just assumed that was it, period. However, several pieces of mail came from known regulars who apparently just took it as a matter of fact, and made no comment. The very few who did make comment were all in favor, one in particular saying, "I don't care what you call it, just keep on doing the same stuff!" One regular "correspondent," however, took strong exception to the modified logo. . . the Post Office. According to the postal authorities, the modification constituted a complete magazine title change,

and they demanded that we go through all the formalities and red tape to make it official. As a matter of fact, we had to do some fast talking just to get that issue mailed as a "temporary, one-time experiment," or something to that effect! So obviously, we dropped the change on subsequent issues until we've had time to give it further thought.

Strangely enough, we received more mail about the modified title from regular readers after we reverted back to the old title than we did previously. . . all in favor of the change. Anyway, it's not a closed issue. If anyone has any comments or suggestions, drop us a line. •

Dear Jake:

If you have watched any sports events lately, you couldn't have missed those guys holding up signs reading "John 3-16" or the like. I always thought it was a religious message until the other day. I was at a pattern contest and I saw a man holding a sign that said "Jake 7-10." I saw another one at a soaring contest. It read "Jake 9-17." Now, either you are a British agent taking a coded message on the price of tea, a religious prophet who says we all go to a pizza stand in Detroit when we die, or a figure skater and I've been seeing your judges' scores for artistic merit.

These all came from deciphering the signs. I can't make up my mind.

Tony in Barrie, Ontario

Dear Tony:

That was my dentist. I have a tendency to forget my appointments, so he was reminding me of my cleaning in July and my checkup in September.

Jake

\* \* \*

Dear Jake:

How come you never write about free flight?

No Wires or Strings Attached

Dear No Wires:

I don't write about free flight because I've concluded that there's no such thing. First, if you want insurance, you need an AMA license. They're not free. Second, if you want a flying field, you have to belong to a club. Their dues aren't free. Finally, when is the last time you got or built a model airplane for nothing? Have you priced silk lately? How about balsa wood? Did you know that Ecuador is fast on its way to becoming a wealthier nation than Saudi Arabia? It's not from banana sales.

When I was about 14, I took my last real shot at trying to achieve free flight. I made a hand-launch glider. No propeller, no gas engine, not even a rubber band. I built it out of twigs and sticks fallen from trees. I lined my pockets with plastic baggies, and snuck out contraband rubber cement and paste from school. I covered it with toilet tissue lifted from a public restroom on the Garden State Parkway. Total cost of materials was \$0.00, and since I was under 16, my labor was free.

I took it to a neighborhood park with free admittance and no parking fee. As I launched it and watched it soar majesti-



#### ADVICE FOR THE PROPWORN

—By Jake

cally into the air, I couldn't help but feel the euphoria of true, free flight. Not one penny invested, and yet there it was, racing with the wind! Right through the park superintendent's living room window, and right into his wife's collection of Danish blown glass miniatures.

So my last attempt at free flight cost me \$246.93 and made my paper route non-profit for the next 11 months. I don't write about free lunches either.

Jake

\* \* \*

Dear Jake:

A high-performance sailplane designer writing in the *American Institute of Aeronautics and Astronautics (AIAA) Journal* said that his new airfoil had a bifurcated vernier cusp, and as a result, the loci of imaginary roots in the Bode domain had transmogrified from an underdamped Dutch roll to a classical Epstein lateral divergence. What was he talking about?

No Comprendo in Lewiston, Maine  
Dear No Comprendo:

The capital of Botswana, make-believe radishes, a corpse, a croissant from Holland, and a college running back named Epstein, I think.

Jake

\* \* \*

Dear Jake:

Now that the *Tournament of Champions* is on again, have there been any changes to the rules?

Aerobatics Enthusiast in San Juan  
Dear Aerobatics Enthusiast:

Only minor ones. Aircraft must still be scale models of real aerobatic airplanes in order to be eligible. Maximum allowable scale deviation is still ten percent, and gross weight may still not exceed 22 pounds. Known, unknown, and freestyle Aresti maneuver schedules will still be flown within a fixed 120-degree viewing "box." The one change from 1984 involves the scoring bonus awarded to biplanes. Back then it was ten percent, and there was some discussion that it was too high. I disagree. Granted, biplanes finished first and second, but the next best biplane was eighth, and all the others finished substantially lower than that. Nevertheless, the biplane bonus has been lowered to six percent this year. We'll probably see a few more monoplanes as a result.

The only question that remains unresolved is: What happens if you break your monoplane's wing in two while doing a snap roll or a high g pull up? Does it then

Continued on page 107

# OVER THE COUNTER

All material published in "Over the Counter" is quoted or paraphrased from press releases, furnished by the manufacturers and/or their advertising agencies, unless otherwise specified. The review and/or description of any product by MB does not constitute an endorsement of that product, nor any assurance as to its safety or performance by MB.



• Kyosho has a new 40-size Cap 21 pattern ship that comes with pre-covered balsa wings and a fuselage of strong, light LSS molding. The Cap 21 has a wingspan of 59 inches and weighs 92 ounces. A 40-45 two-cycle or 60 four-cycle is required for power. All hardware is included with the kit. See your Great Planes/Kyosho dealer or write: Great Planes Model Distributors, Box 4021, Champaign, Illinois 61820.

\* \* \*

The new SpaceCase transmitter case is now molded in grey ABS to keep your radio equipment cooler in the field. The new case is factory assembled and comes with foam for custom-fitting your radio to the interior. There's a SpaceCase model designed to fit two-stick, pistol grip, or single-stick radios. And if you have more than one radio, they make expander modules that allow you to add to your present SpaceCase without modification so that you can carry more than one radio to the field. For more information, see your hobby shop or write: Matrix Enterprises, 7015 Carroll Rd., San Diego, California 92121.

\* \* \*

American Sailplane Designs, 2626 Coronado Ave., #89, San Diego, California 92154, has added a Klingberg Wing to their catalog of glider kits. The Klingberg Wing has been computer designed by a team of aeronautical engineers to fly in a variety of modes and conditions. With no fuselage or rudders, it can deliver consistent, maximum performance for you. The wing has a span of 83 inches and an area of 650 sq. in., with a ready-to-fly weight of 20 ounces. For a catalog featuring the Klingberg Wing and other sailplane kits, send \$3 to American Sailplane Designs. Tell them you read about it in *Model Builder*.

\* \* \*

From Zenith Aviation Books this month

*Continued on page 107*



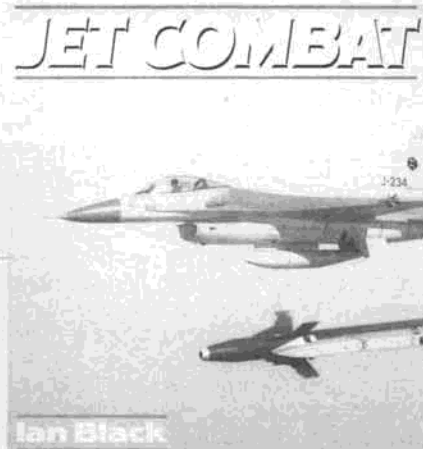
Kyosho's new CAP 21 ARF.



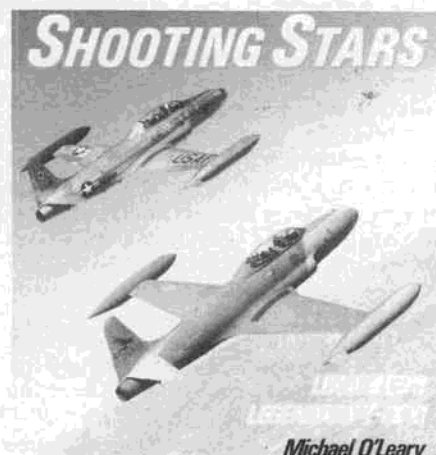
Matrix Enterprises' SpaceCase for transmitters.



Klingberg Wing from American Sailplane.



New books with aviation themes from Zenith Aviation Books.



# BIG BIRDS

By AL ALMAN



• Being able to change crystals so we can fly on a different frequency whenever we have to may be an advantage, but it sure has its pitfalls. Last week I bent a good flying machine and the crankshaft on my engine because I didn't carefully check the new crystal going into my transmitter. Here's what happened:

I picked up a new four-channel tranny for a paltry sum, but had to get a new crystal because it was originally set up for Channel #56, and I operate on Channel #40.

When ordering the crystal, all the necessary info (such as brand name and model number) was included, and I did verify that it was a Channel #40 crystal before installing it.

I should have "gotten the message" when my first range check using this TX yielded

barely 50 feet, but I found that I could get the needed 100 to 125 feet by moving the receiver a few inches away from the bolted-on aluminum landing gear, so I proceeded to fly it this way for well over a month with no apparent problems.

But last Sunday, after making a "bounce and go," my luck ran out. My beautiful BIG Bird was directly in front of a Channel #38 transmitter when she executed a kamikaze attack, right there in front of God and everyone.

I didn't say anything out loud but was blaming that Channel #38 tranny for splattering all over my frequency. Hey, it had to be his fault because I had a new, recently tuned rig; right?

Wrong! A thorough check by Cliff Weirick and his band of merry men at Airtronics

revealed that I'd been operating my four-channel AM transmitter with an FM crystal. According to Cliff's note on the repair sheet, "This combination of crystals doesn't work well except close up. Did you do a range check? Come on, pal, 'fess up! I gotcha!" Had I looked closer, I would have seen that the new crystal was tagged with an "FM" and not used it. But I didn't and paid the price. Use your eyeballs and don't take anything for granted; there could be more at stake than just your plane.

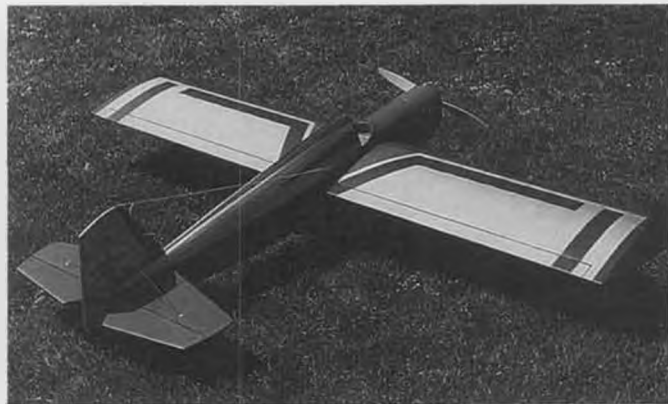
## SACHS 40

Here are the tach readings for A&M Aircraft Supply's (1801 South Crest, Carrollton, Texas 75006; 214/242-0984) new Sachs 40 that I forgot to include in last month's column.

These numbers are most impressive for a 2.6-cid engine, especially when you consider that, 1) all three test props have high load factors, 2) the engine had only 30 minutes of running time, 3) she was fed a 40:1 gas/oil mix for break-in (100:1 is recommended for normal running), 4) all running was done with a SuperTigre muffler installed, and 5) the test stand was a huge packing case with lotsa frontal area that caused mucho backwash: 20x6-10, 7300 rpm; 20x10, 6800 rpm; 18x8-14, 6900 rpm.

This 3-1/2-pound, short-stroked powerhouse is a hybrid and sure to please because it's so light, easy-starting, smooth-running, and gutsy. Al Willaert has taken the piston, cylinder, and shaft of a 2.6 Sachs and then added his own carb, case, mount,

*Continued on page 78*



Air Flair's new 81-inch Express was designed for 1.2 to 1.5 2-stroke and 4-stroke engines.



John Trought's scratchbuilt Fairy Fulmar.



A nice-looking Morrisey Bravo from the Sig kit by Bob Burich. This one came in at 17.5 pounds with a Zenoah G-38 for power.



Ed Andrews turned out this six-foot version of a Fokker DR-1. A G-38 hauls this 20-pound tripe around.



# Black Star

By MICHAEL SAPONARA. . . Having never seen a swept-wing, Vee-tailed model, the author decided to design one. The result is a fun flyer with foam wings and an .049 engine for radio control.

• I enjoy building and flying swept-wing models. Vee-tailed models are rather rare, but even more rare is a Vee-tailed swept-wing model. Well, as you guessed, I decided to design just such a model, the "Black Star." In all my years of modeling, I don't think I ever saw a swept-wing model with a Vee-tail.

Whenever I show a picture of the Black

Star to people, they invariably say that the model is one of the nicest they have seen. I hope you agree and decide to build the Black Star.

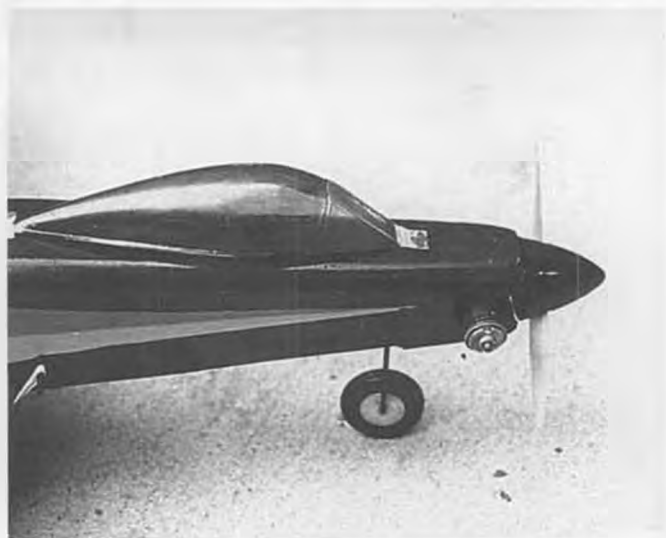
You may remember a model I presented in this magazine about a year ago called the Viking. That model used the Ace foam wing also, and I cautioned not to use a reed-valve .049 engine because not enough lift was

created to keep the plane in the air. That plane used about 2/3 of the Ace constant chord wing, and it was for this reason the plane would not fly with the reed engine. Black Star uses the full constant chord wing, which adds about 25 square inches, and thus allows the plane to fly with the less

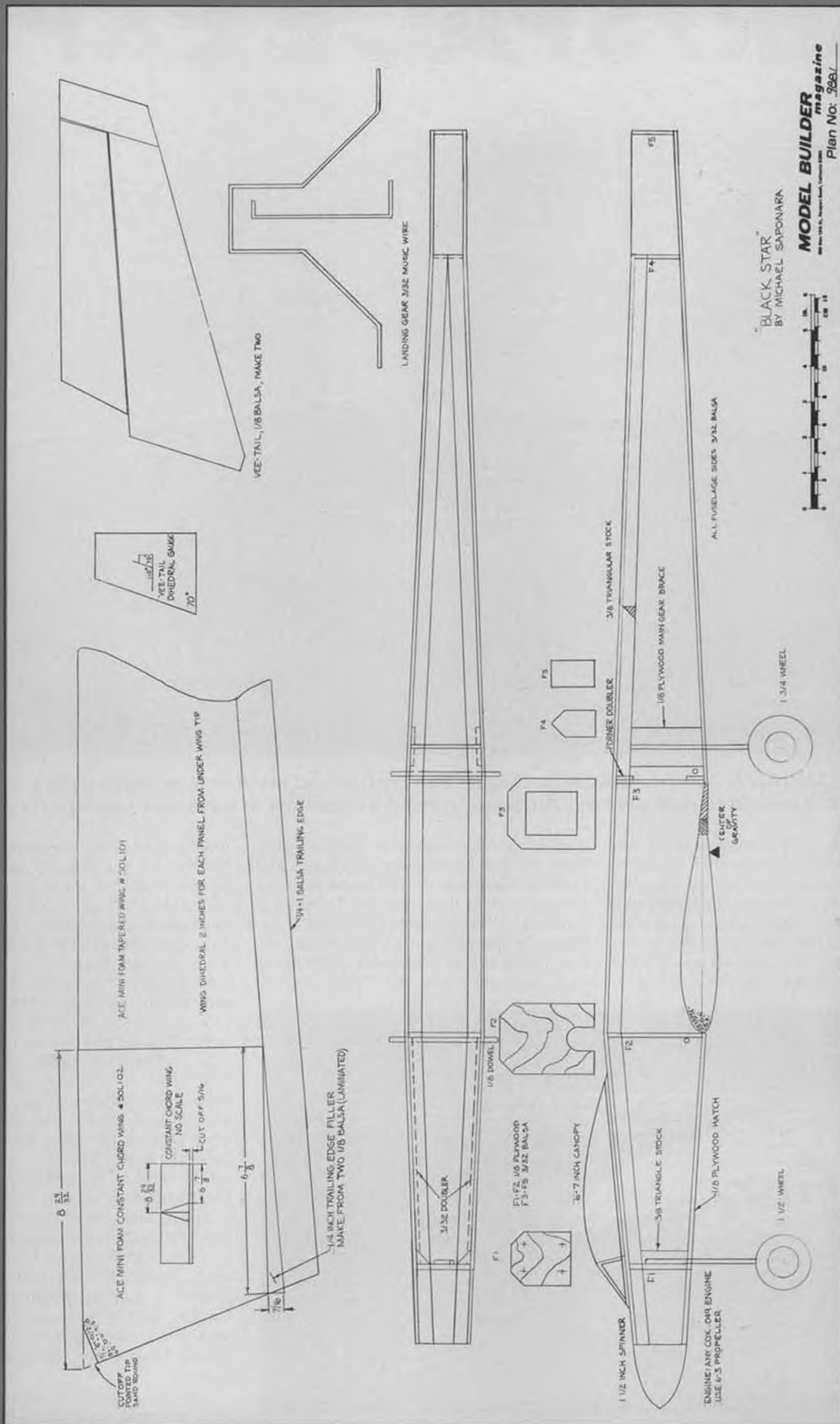
*Continued on page 82*



Author/builder with his sleek black beauty. The use of ready-made foam wings from Ace R/C makes construction easy.



Power for the Black Star is an .049 engine, with the author's preference leaning toward the Cox Black Widow or the Dragon Fly.



# AIR/SPACE EXPO



By **BILL HANNAN & JIM ALABACK**. . . Despite hot weather and interminable traffic delays, the first Air/Space Expo, designed to rival the Paris Air Show, offered a close look at some very special aircraft.

• Brown Field, on Otay Mesa between San Diego and the border of Mexico, is usually a fairly quiet airport. But not during May! The former WWII pilot-training facility was transformed that month into a world-class air show and display site, changing its image drastically. The organizers aimed high, openly challenging the long-established in-

ternational extravaganzas conducted at Paris, France; Farnborough, England; and Hanover, Germany; as well as the more recent ones held in Singapore, China, and Australia. Although there are plenty of enthusiastic spectators in all these locations, the proliferation of shows and escalation of costs have stretched the advertising al-

lowances of manufacturers to such an extent that few can afford to participate everywhere. Thus, a cautious wait-and-see attitude by such major U.S. firms as Boeing, Lockheed, McDonnell Douglas, and Northrop, who elected *not* to exhibit their wares at San Diego. Said one industry representative, "We think there are more sellers than customers." However, over 300 U.S. and foreign companies *did* participate in the Brown Field display, including General Dynamics, Hughes, and Teledyne Ryan. Their booths were housed in "high-tech tents," 525-foot long, 100-foot wide aluminum-framed translucent fabric-covered enclosures that appear adaptable to indoor model flying!

One of the many ceremonies held during the 10-day event was the U.S. Air Mail service 70th anniversary commemoration. Issued during the show were new 36-cent airmail post cards featuring the Douglas DC-3 and 45-cent airmail stamps honoring Samuel P. Langley. Keynote speaker Bill Chana, of the San Diego Aerospace Museum, pleased us by including a discussion of Langley's experiments with *model* aircraft!

Outdoor displays encompassed a vast variety of aircraft, such as RPVs (Remotely Piloted Vehicles), gyroplanes, ultralights,



Part of the nine-plane Canadian Snowbirds team at rest in the early morning fog before show.



In spite of its size, the An-124 accelerates rapidly. The four nose wheels have already left the ground in this view.



Up, up, and away! An-124 is in a climbing turn to the right immediately after takeoff.



Jim Alaback admires the display model of the An-124 presented to the San Diego Aerospace Museum by the Soviet delegation.



Heading back after a steep 180-degree turn, with flaps and wheels extended. A spectacular sight.



Craig Hosking's Double Take Pitts made upside-down touch-and-gos as well as landings. For takeoff from inverted position, pilot must be hoisted into cockpit with internal winch.



NASA's unique QSRA blown wing research aircraft demonstrates its remarkable high maneuverability and slow-flight capabilities.

lightplanes, and military equipment ranging in vintage from WWI through 1988.

Among the more unusual machines to be seen was the NASA QSRA (Quiet Short-haul Research Aircraft). Featuring a "propulsive lift wing" equipped with four jet engines, the craft can takeoff quickly, turn tightly, cruise slowly, and land in exceedingly short distances.

Flying demonstrations included Formula 1 pylon races, enlivened by a good variety of designs flown by colorful pilots, such as

aviatrix Cathy Grey and Astronaut Deke Slayton. The skies were also brightened by multicolored parachutes, which are now so controllable that they are flown almost like hang-gliders. Aerobatic planes were everywhere, ranging from a clipped-wing Cub to Bob Hoover's North American Sabreliner, one of four different machines he brought along.

Team aerobatics contributed greatly to the show and included two highly modified Waco UPF-7s, a trio of Siai-Marchetti SF

260s, the USAF Thunderbirds with their F-16s, and the Canadian Snowbirds nine-plane formation.

Additional participants included U.S. Navy Tomcats, National Guard Delta Darts, a B-1 bomber, and even a U.S. Postal Service jetliner. If a stealth fighter was there, we didn't see it.

Round-trip hops in a French Concorde SST at speeds up to Mach 2 were also availa-

*Continued on page 68*

# RAMBLIN' AROUND AUSTRALIA

By STU RICHMOND. . . Our ramblin' wreck marks a real highlight of his trip with an extended visit with Australia's premier modeler, Ivor F. Stu interviews Ivor and learns about his long history in modeling.

• The greatest model airplane organization in the world is the USA's Academy of Model Aeronautics. It is free and independent of the United States' government and is financially self-sufficient; it fosters model competition, manages scholarships, maintains records, enables rule making and updating, maintains a museum, and its staff of nearly 50 people is dedicated to serving the needs of American model builders in pursuit of fun within this wonderful hobby we enjoy. The AMA is of such world status and recognition that I honestly hope someday its membership and administrative talents will totally be offered to the world's model building/flying enthusiasts to replace the present affiliation of countries with the FAI organization in Paris. FAI seems to revel in glory and patronage of full-scale aviation. The amount our AMA spends annually on FAI activities, including "franchise fees" paid to our National Aeronautic Association for FAI affiliation, is absurd.

In Australia I was privileged to spend considerable time with Ivor F. (that's his whole name) who holds Australian aeromodeling license VH-1 which would be like having AMA #1 for us. As you read Ivor's comments, you'll see how he's making efforts to parallel the directions and accomplishments of our AMA for model builders in Australia. Australia follows FAI model rules for international competition; but, for their own home pleasures, they have, much as we do, their own set of model flying/competing rules, outside the FAI framework.

My ramble to Ivor's home was by appointment and included dinner with him and his charming wife Vera. I've heard of him for years in the model press, and a chance to spend a day with him, as arranged by host John Chadd, was one of my modeling highlights. Ivor is now a retired school counselor who is a college-trained psychologist. He has spent a long time in model airplane activities and is Australia's first life member of their MAAA organization, the Model Airplane Association of Australia.

My tape recorder got the following while visiting the club house built behind Ivor's home:

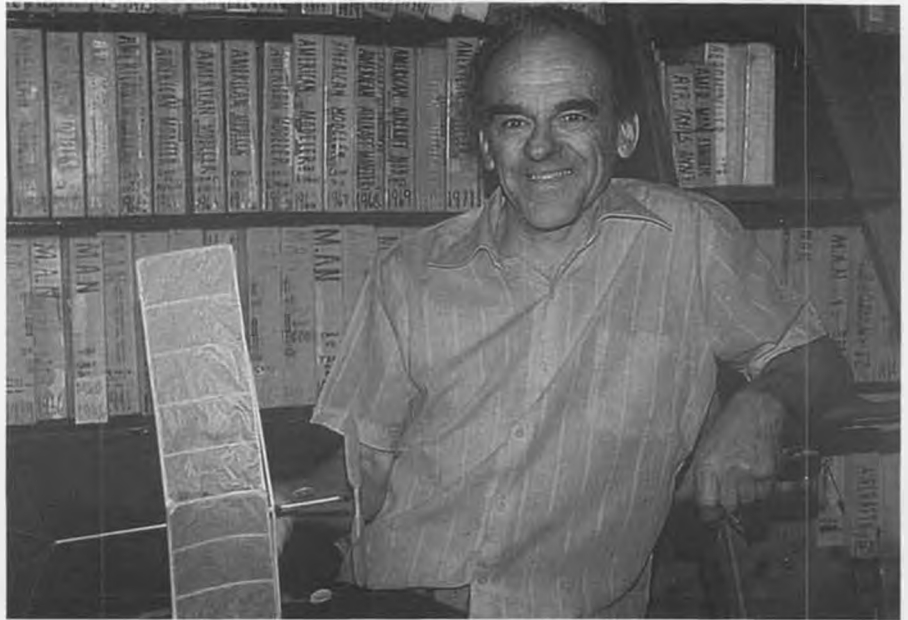
**Stu:** Ivor, please tell me about this building we're in.

**Ivor:** We had set our hearts on having our own premises in 1947 when we began the Doonside Model Aero Club when I got back from World War II.

**Stu:** And you've had kids coming through this clubhouse since then?

**Ivor:** Yup, for over 40 years, 38 at this very location. And this actual model clubhouse was built in 1960. It took us eleven years to raise the money to build it.

**Stu:** When did you start teaching model building?



Australia's premier model builder, Ivor F. stands before the world's largest collection of model airplane magazines which date back to 1898! The model he holds is a Hangar Rat, built from Model Builder magazine plans. Stu's visit with Ivor was a major highlight of his trip downunder.



Ivor's engine collection totals over seven hundred, including these made in Australia by Gordon Burford. Ivor has made 1,000 Doonside Mills .75cc diesels and 350 Sesqui engines of 1.5cc size to become the second most prolific producer in the southern hemisphere.

**Ivor:** About 1948 or 1949.

**Stu:** Ivor, how many kids do you think you've helped?

**Ivor:** Difficult to tell because I've also done it as a grade school craft activity. I suppose it totals a couple of thousand easily, one way or the other. This clubhouse is now open Wednesday nights 7:30 to 9:30. That's late enough on a school night. And this Doonside Model Aero Club building is

open Saturdays 1:30 to 5:30 too.

**Stu:** Do you sometimes get abused by being used as a babysitter?

**Ivor:** You're one of the smart cookies, Stu. You understand! They want to, and I say, "Look, I'm not a child minder. If you want that, take 'em to the Boy Scouts or the Air League. And, Dad, I want to teach you too, so I expect you to stay here with your child. My chosen task is to teach you and to teach





As many as 2,000 children have been introduced to model building and flying through Ivor F.'s efforts and his Doon Bat glider kits. Photo shows how balsa gets maximum utilization by Ivor.

your child!"

**Stu:** That's smart! Ivor, let's talk about the model airplane magazine collection in this building. I've never seen anything like it. Is it the world's biggest?

**Ivor:** Yes, it probably is the world's biggest and most complete when you consider it has *Model Engineer* from 1898 (every issue). Yes, that's going back a bit. That, of course, contains the records of the Model Aeroplane Association of Britain, and it has Edgar Westbury's designs in it. He published in that before there was an official publication for aeromodeling in Britain. In November 1935 *Aeromodeler* began publishing.

**Stu:** Do you have the first issue of *Model Builder*?

**Ivor:** Nope. I have every issue except that one, although I do have a photostatic copy of the first issue. I've advertised for that first issue. It's a very rare magazine and apparently the publisher, Bill Northrop, gave away the first issues to introduce the magazine. Where was I?

**Stu:** How about *R/C Modeler*? Do you have the first issue?

**Ivor:** Yes, I've even got a duplicate which I'll trade for a first issue of *Model Builder*.

**Stu:** How about *Grid Leaks*?

**Ivor:** Yes, they're all here.

**Stu:** And *Model Airplane News*?

**Ivor:** Yes, they're all here too, bar one that somebody flogged off with.

**Stu:** How about *Aeromodeler*?

**Ivor:** Yes, *Aeromodeler* is complete. I've got Number One of Volume One that I got from John O'Donnel. That John O'Donnel; he charged me about \$100, if I recall correctly!

**Stu:** This is a tremendous collection and a treasure of the aeromodeling world.

(At this point I slid out the *Model Airplane News* issues for 1939 and there found quickly a picture of me holding a 10-cent Comet rubber scale model. I was ten years



Sydney, Australia is one of the great cities of the world. Surrounding area has about 120 control line fliers, 160 free flighters, and about 2,500 R/Cers. Photo shows the Sydney Harbor bridge with the arched peaks of the opera house in silhouette. State has about 70 model clubs.

old then. Ivor was as delighted as I was to find it, from almost fifty years ago, and half-way around the world from Florida.)

**Stu:** Ivor, what are you going to do with this collection?

**Ivor:** Well, I suppose it belongs in a model museum, but I've put it together as a service. You see, there's an old photocopy machine here too. I'd really like for the Model Aeronautical Association of Australia to put a good photocopy machine in these premises. I'll do the work for nothing. Anybody who wants photocopy services from this library could make a donor payment direct to MAAA for a scholarship fund, and I'd do the work and provide the copies direct to the donor. I'd really like to get this idea off the ground. I don't know how I'll do it; it's gonna really be hard.

By in-depth interviews elsewhere in Australia I'd learned before this evening that MAAA feels it should only administer for modeling building clubs and individual affiliations in Australia, unlike our AMA.

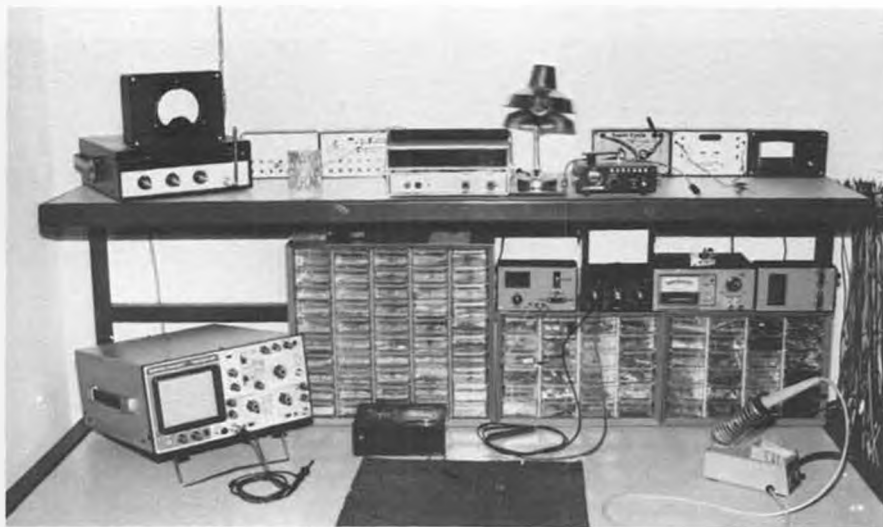
Please remember that MAAA has no staff like our AMA, but it is a virtual volunteer organization. Present MAAA leadership seems to want to overlook this tremendous model library and the scholarship activities that it can foster. Ivor F. feels a bit frustrated when he sees what our AMA does in America for modeling. I learned that Ivor has also made a significant dollar contribution in the name "MAAA Scholarship Fund," parallel to our AMA fund, but his donation had not been recognized due to apparent shortsightedness to this date. The USA's 120,000+ membership allows activities that Australia's 6,000 membership can't yet enjoy.

The Doonside Model Aero Club building is now a veritable museum. Hanging overhead is a Comet rubber-powered Clipper, Jr., a Chet Lanzo Record Holder, a Dynajet speed model, a twin pusher, a compressed air model, and many other treasures of

*Continued on page 74*



Here's one of the few dozen prototype Doon Fly U-Control models. Five hundred have been mass produced to revive U-Control flying for Australian children.



# Electronics Corner

By ELOY MAREZ

• Eloy's Law as it applies to loud car stereos did not fall on completely receptive eyes out there in the wonderful world of *MB* readers. No doubt you will know immediately the persons who did not appreciate the reference. Anyway, there is a late development on the subject.

According to our local newspaper, the city of Sacramento, California, has passed and is enforcing an ordinance against exactly this type of noise pollution. The article reads that an auto stereo that can be heard from a distance of 25 feet is good for a fine of \$100, and that 25 to 30 citations are

being issued weekly. I say good for the city of Sacramento, let us hope it starts a trend.

I am aware that we R/Cers are not completely clean when it comes to noise, and I applaud the efforts of AMA President Don Lowe and others who are trying to keep us from becoming more of a public nuisance. On the other side of that particular coin, I could accept model airplane noise complaints with more tolerance if I could understand why John Q. Public will tolerate loud auto stereos, loud autos themselves, noisy motorcycles, noisier lawn mowers, ear-wrecking chain saws, etc. with never a

comment, yet will run for the nearest telephone upon hearing a model plane, no matter how far away or the actual level of its engine noise.

'Nuff soapbox. For you who did not like my little touch of humor, true as it may be, I can't answer you, as I didn't hear you too well, your radio is making too much noise!

## RADIO INTERFERENCE

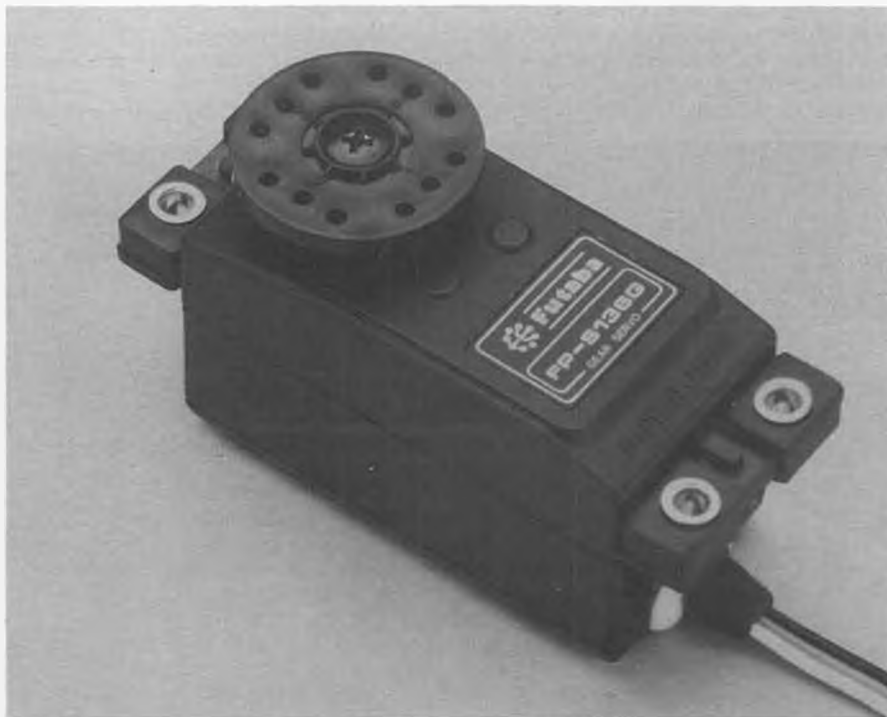
The subject guaranteed to strike terror into any R/Cer's heart is radio interference. Understanding it is almost as difficult as accepting it, and, in some cases, the source of interference is never really pinpointed and probably actually accounts for a lot of what is blamed as radio failures. Since we are not the only users of radio and electronics equipment, we are not the only ones plagued by what is known in the electronics industry as "RFI." As you will no doubt be able to deduce, that stands for Radio Frequency Interference, and unlike some of the abbreviations you run into now and again, is not something I invented, but the actual terminology of the professionals.

It seems that even the big boys are not immune to the evils of RFI. It is reported that the U.S. Army is having RFI problems with its UH-60 "Black Hawk" helicopter. As many as five of these machines, which carry a price tag of \$6 million may have been lost due to RF interference with its flight control equipment. Now that is a real case of "I ain't got it!"

In this instance, the reason is known. And that is always the first step towards finding the cure. All these problems have been happening in Europe, in the vicinity of where some extremely high-powered Radio Free Europe transmitters are located. These transmitters are aimed, which you can do to a radio signal, towards the Iron Curtain countries and generally operate on international shortwave frequencies between 5.95 and 26.10 MHz. They require a lot of power, as their signals are jammed at the other end and only brute force gets through under those conditions.

A contribution to the problem is the helicopter itself, the first one that is electrically controlled rather than in the more traditional fully mechanical way. In other aircraft, especially the early ones of this type, this method was referred to as "Fly By Wire." In such systems, instead of cables, rods, or hydraulics making the connections between the pilot's controls and the flight surfaces, the pilot's commands are transformed into electrical signals and sent by wire to remotely located servo mechanisms which then actuate the controls. Not unlike what we are doing, except without the radio link. And fellows, I don't know these control systems in great detail, but I know one thing: it's PCM!

Actually, there is a lot of "PCM" electronics available to us now, in many forms. PCM is our use and terminology, which by the way is correct and not another one of those word "inventions" I mentioned earlier. It refers to the conversion of an electrical signal into computer "bits" (and "pieces" if you get RFI!), and the same thing is being done in digital television, digital



New from Futaba for retract gear applications, the S136G 180-degree servo measures only 0.87 by 1.75 by 1.00 inches and weighs 1.48 ounces, with a power output of 76.4 ounce/inches.

Continued on page 88

# MODEL DESIGN & TECHNICAL STUFF

By FRANCIS REYNOLDS



• Good morning, class. Welcome back to the one-room school house. Today's lesson isn't in your textbook. We are going to cover new ground! It is both academic and very useful. Wrong guess. It won't be about load-ing dice.

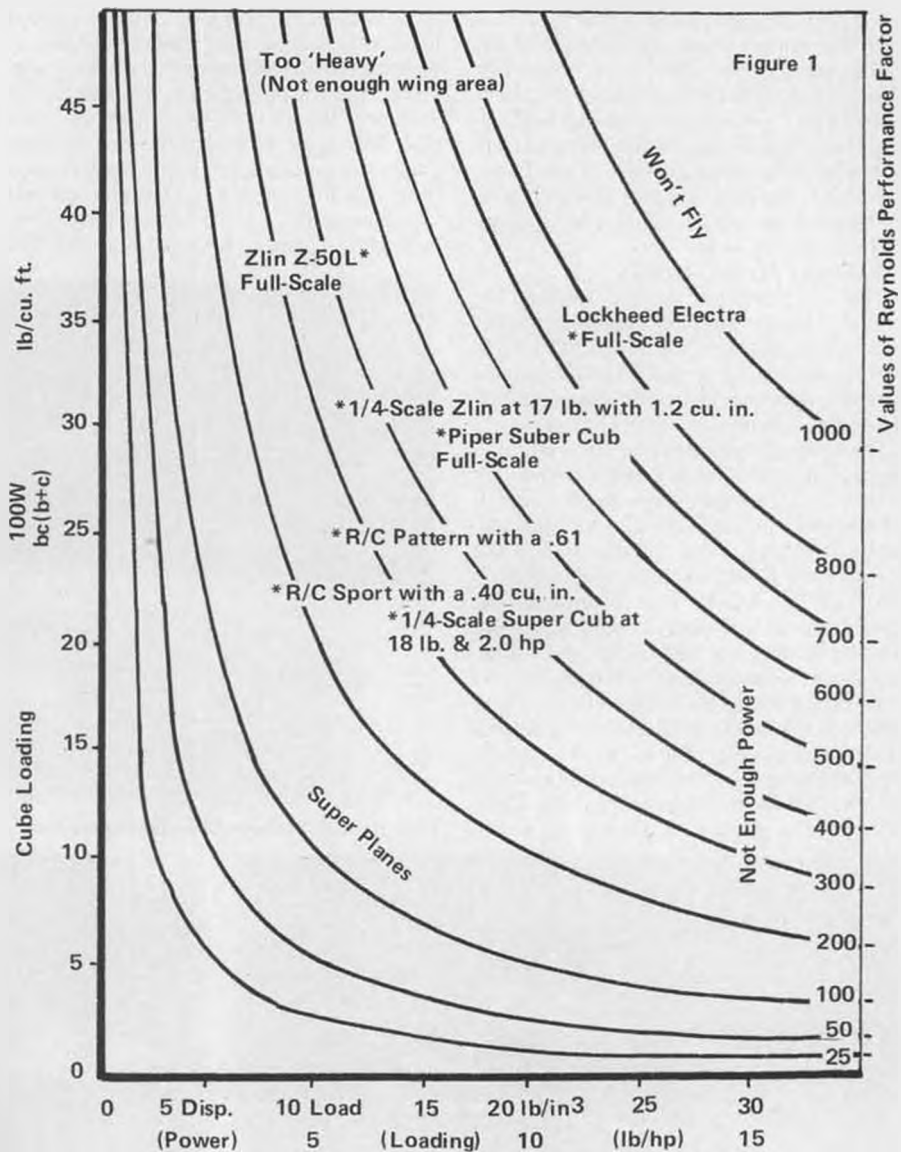
"Wing loading," the weight of the airplane divided by the wing area, is a useful parameter when comparing the performance of two equal-sized airplanes or in examining the effect of changes to be made on a particular airplane. *But*, here is where its use should end! Wing loading is a misleading thing to use when comparing airplanes of different size. The problem is that the wing loading is and should be higher for large planes than it is for small planes. This frustrated me as a Boeing engineer, and it has frustrated me as a model airplane designer and builder.

Weight is proportional to the volume of the plane and therefore acts like a cubic function of size. Area is length times width (span times chord), or a squared function of linear size. In wing loading then, we have a cubic term divided by a squared term. Therefore, wing loading is directly proportional to size. It is not due to Reynolds number of anything but plain (and plane) arithmetic; a branch called dimensional analysis.

If we insist on building a scale model airplane with the same wing loading as its full-scale prototype, it will have to fly at the same velocity as the prototype. No thanks! Darrol Stinton's book, *The Design of the Airplane*, shows that for true scaling, velocity should vary as the square root of the scale. That relationship tells me that if an airplane cruises at 100 mph, then an accurate 1/8-scale model of the same plane should cruise at 35 mph.

Fortunately, there is a solution to the problem; a comparison figure that works perfectly, regardless of size. All we have to do is use wing *cube* loading instead of wing *area* loading. At least one other modeling columnist has recognized the problem and the nature of the solution, but didn't carry it through to completely useful proposals.

I believe the earlier advocate proposed calling it "wing volume loading." I don't remember what dimension he proposed to use for "height." For simplicity, one might use average chord or the span as the multiplier to convert area to a cubic function. But it turns out that neither of these work



Wing Loading Chart. See text for explanation.

well, since the results are dependent on aspect ratio (inversely proportional in one case and directly in the other). A third dimension that is independent of aspect ratio is the average of span and chord of  $(b+c)/2$ . To simplify things, I drop the two.

Incidentally, modelers sometimes abbreviate span as "s" or "S," and area as "A." Full-scale designers universally use "b" for span and "S" for area (Surface). The "b" for

Continued on page 69

# CHOPPER CHATTER

BY DICK GROSSMAN



• The U.S. Navy's air exposition was held May 21 and 22 at the Glenview Naval Air Base outside of Chicago, Illinois. Besides the demonstrations of full-size craft, including the F-14 Tomcat, some vintage biplanes, T-34s, T-6s, and an aerobatic performance by a Pitts, there was a static display and flying model airplane demonstration by the Lake Shore and Skylarks R/C clubs. Datu Ramel of Chicago flew his Schluter Champion with a foamboard "profile" fuselage of a Huey Cobra (the hit of the F3C team trials in Dayton, Ohio, last year). I flew my X-Cell and Star Ranger. Nothing spectacular because both of us were very concerned about flying so close to all those spectators. The public's fascination with our helicopters didn't match that of the Navy personnel, who went bananas over our machines. Who were the most fanatic? The guys who fly the real ones, particularly the Huey pilots and the jet jocks!

## PERSONAL FLYING NOTES

That combination of the X-Cell, Airtronics, Spectra radio (with the new double ball bearing coreless Airtronics 735 servos) and the O.S. Long Stroke 61H side exhaust ringed engine has delivered some exciting flying this summer.

I'm running 9 degrees pitch at top end, 5 degrees at hover, and negative 4 at low stick with plus 12 degrees on pitch curve II which kicks in automatically for autorotations. This all fits comfortably within the mechanical limits of the collective pitch range of the X-Cell. The location of the swashplate at low pitch is well above the bearing block, so full cyclic swashplate movement is available at both high and low end. When set up for inverted flying, I had to forego the extra top end pitch for autorotation, and was just able to get -4 to +8-1/2 for both upright and inverted while keeping the swashplate far enough above the bearing block to get full swashplate tilt at full

negative.

The X-Cell might weigh 8.3 pounds on the moon, but here on earth it came out to over 10 pounds. As well as it's performing, I wouldn't want it any lighter. There are limits in the weight/power equation for a helicopter. Too light and it's not going to handle the wind well, and it won't land easily. Overpowered choppers don't have enough rotor blade area to absorb all the energy generated by the engine. Longer rotor blades aren't a solution because (1) they have problems with going supersonic at the tip and (2) a longer helicopter can't maneuver as well. You must remember that the most efficient rotor (or propeller) is a *single* blade. The more blades the less efficient the rotor disc. Simply increasing pitch won't do it because the aerodynamics of a helicopter—drag, and the retreating blade phenomena—put limits on the pitch that can be used effectively. Full-scale choppers deal with this

problem by utilizing multiblade rotor systems, but in a model these are expensive, hard to track and balance. So keep those helicopter engines within "sane" limits. No .61s in a .40-size machine, .90s in a .60-size, etc.

Bill Curtis of Tech Specialties is very high on the Airtronics gyro. He passes along this recommendation: Mount the gyro on *three* layers of 1/8-inch double stick foam tape. Set the gain to about 70 percent. The foam tape will insulate all the extraneous vibration from the engine, drive train, etc. and *only pick up the rotating tail movements*.

A note about double-stick foam tape: I use it for everything and *so should you*. It's the best way to attach a switch harness. On my X-Cell, the radio and gyro switches are taped to each other, and to the servo tray. I can easily reach through the top of the canopy and flip both switches. On my Heim Star ranger, I have them taped to the



Datu Ramel's Schluter Champion-Huey Cobra on deck as Sea King performs.



Coast Guard Sea King chopper in simulated rescue attempt.



F-14 Tomcat pilot LCDR Nick Kavouklis of Dallas, Texas, poses with author's Heim Star Ranger.



Flight Surgeon "Doc" Colle of Denver flies the big one.



One of the Navy's Bell UH-1 choppers open to the public.

side of the fuel tank. Avoid any more permanent installation, particularly on the canopy or bolted to the fuselage. Switches are very susceptible to vibration, and usually are the first things to get destroyed in any kind of crash if they're bolted to the helicopter. Also I use double stick tape to hold the receiver and battery pack, but not by itself. I tape the receiver to a piece of 1/2-inch foam, and tape the foam to the servo platform. I usually add a rubber band or two around everything for some extra peace of mind. By the way, the only double stick tape I use is Ace, either 1/8- or 1/16-inch. If the tape loses its tackiness, a little CA attaches it for good. It's funny the way Ace always seems to sell the best of whatever product they're offering, whether it's battery chargers, ESVs, tape, whatever.

And on the subject of batteries, it's probably time I mentioned SR battery packs and Larry Sribnik. SR Batteries (Box 287, Bellport, New York; 516/286-0079) sells high-grade matched cells which are thoroughly tested and are available in every conceivable configuration. I have been using them for five years, and truthfully I really don't think about them too much. I guess I take them for granted. They're the only batteries I use. When Larry first started selling batteries about five years ago everybody was talking about them. Now everybody uses them, but nobody talks about them. This doesn't help Larry's business. So, come on, everybody, let's talk about them, not just use them!

### 101 THINGS TO CHECK ON YOUR CHOPPER Engine

Engine, start shaft, clutch, fan, pulley—all must run true with no more than .002 inch runout at any point. Out-of-line or out-of-balance engine assemblies cause a high frequency vibration which often causes the fuel to foam in the tank, may destroy the radio and servos, and will eventually cause the side frames to crack apart.

Installation of the muffler pressure tap is critical. If it comes loose or falls out, the loss of pressure to the tank will cause the engine to go "lean" and possibly seize up and quit. The result can be a ruined engine and a crash. I recommend the "thin wall" pressure taps made by MAC and Miniature Aircraft. They are installed from *inside* the muffler and secured by a nut on the outside. If you can't insert small enough pliers or forceps inside the muffler or pipe, an effective technique is to "fish" a thin piece of wire into the pressure tap hole and out through the exhaust hole; then into the end of the tap, out through the bottom of the tap, ending with a bend, knot, or anything else to keep the "fish" on the line. The last step is to "reel in" the line, which is simply pulling the wire out through the pressure tap hole until the pressure tap itself is pulled right into its hole from the inside of the muffler. Slip the nut on the outside end of the wire, tighten it while keeping tension on the wire, and then either fish the wire back

through the tap so it can be pulled out the other end of the muffler or continue to pull in the same direction hard enough to pull apart the knot or bend in the wire so the wire will pull out or break.

Do not use a pressure tap that only threads into the wall of the muffler unless the wall is thick and there is a substantial amount of metal to tap a thread. You still must use a permanent type loktite or epoxy. **Radio-Receiver, Servos, Etc.**

With all the electronic spaghetti strung throughout a helicopter, the condition of the wires is very important. Neatness is fine, but not a priority. What is important is that wires are protected against dirt and fuel, insulation is in good condition, wires are not rubbing against wood or metal edges and *all wires are slack-nothing stretched, taut, or binding!* Never connect a wire anyplace that it doesn't reach *comfortably*. In the event of a crash or even a hard landing, you'll be glad you had that safety margin.

### Rotor Head

Blade balancing. About 99 percent of vibration problems are caused by an out-of-balance rotor disc. A shaking tail is the most common symptom of this problem, which usually has nothing to do with the tail at all. Notice I said main rotor *disc*, not blades, because it could be the flybar that is out of balance. I use the following method to balance the rotor disc: (1) Weigh each

*Continued on page 73*



UH-1 does some precision flight demos.



Crowd admires F-14 in background, models in foreground.



Photo 21.

• Continued from last month:  
**PHOTO 21**

Within two weeks after the 1938 Nats crash, damage was repaired and the plane made two demonstration flights for a large airshow crowd at the Kalamazoo airport, and later another R/C demonstration at Battle Creek.

**PHOTO 22**

A new (and final) fin and rudder were added later in the summer of 1938 to replace the rather ugly one damaged at the Nats. As Bill would be available for contests and demonstrations, 1939 was to be

a busy and better year for the R/C Guff, and the equipment had been upgraded again.

**PHOTO 23**

Bill is holding the plane with rebuilt receivers, and on the ground is a new transmitter which runs from a storage battery-generator voltage source and needs only 30 watts. That ends the problem of locating 110-volt outlets within reach of our 100-foot extension cord!

**PHOTO 24**

The drawing shows the placement of a new half-ounce escapement in the fin.

# R/C GUFF, *The Life Story*

By DR. WALTER A. GOOD  
 PART TWO



Photo 23.

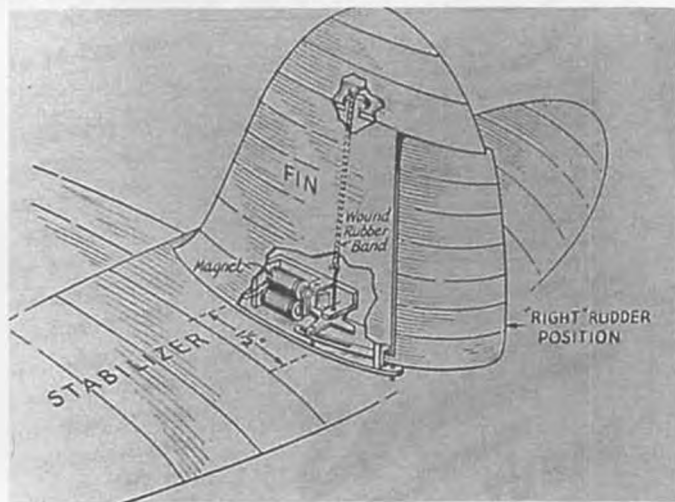


Photo 22(Above).

Photo 24(Below).

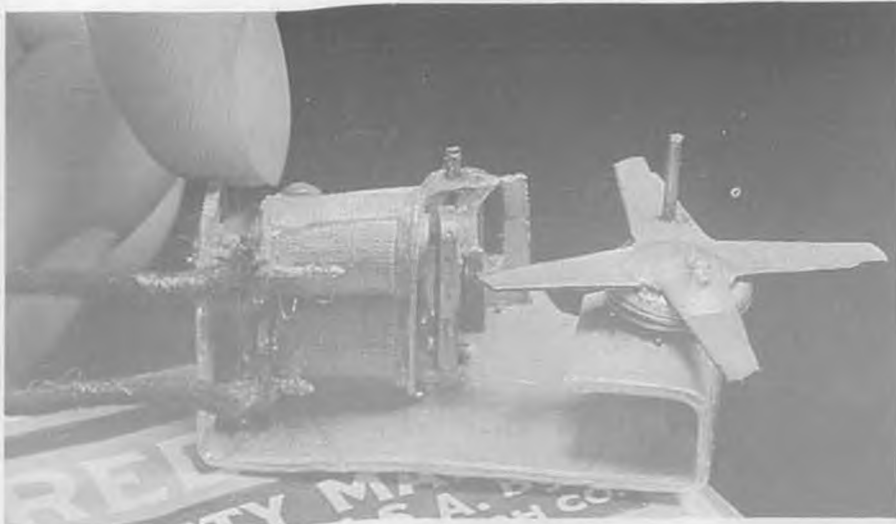


Photo 26.

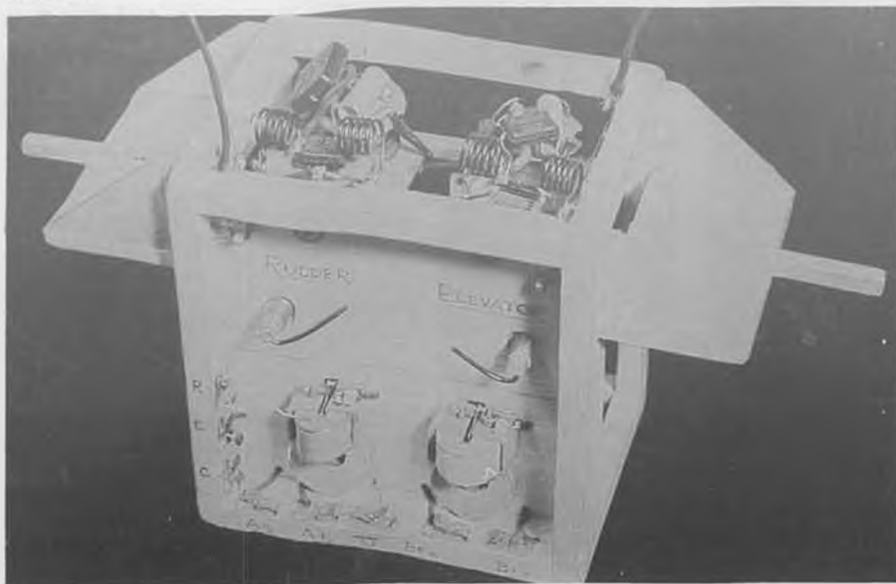


Photo 27.

**PHOTO 25**

This is a photo of the new escapement mounted in the fin. Another similar one is mounted in the stabilizer.

**PHOTO 26**

This is a photo of the new escapement. Note the size in relation to Walt's finger. The ball bearing thrust washer for rubber models is located under the four-armed escapement rotor.



Photo 25.



Photo 28.



Photo 30.

Bill is on the controls, and Ralph Littler and I are launchers.

**PHOTO 29**

Here's the launching, almost ready for release. This type of launching assistance was necessary to prevent ground looping caused by the forward placement of the wheels. The wheels were forward to protect the hand-carved propeller from being broken! A stronger engine may have insured a quick unassisted takeoff, but we didn't have one. The Brown Jr. was just right once the plane was in the air, which

**PHOTO 27**

This is the two-channel receiver used in 1939, with the two relays mounted on the facing panel. Often times we would tune the transmitter to the receiver to obtain more accurate tuning! Note the labeled battery lead clips.

**PHOTO 28**

Time for the test flight. Here we are ready for launch at the Kalamazoo airport.



Photo 29.



Photo 33.

is the equivalent to the .25 to .29 glow engine of today.

**PHOTO 30**

Here's Bill lining the plane up for the landing; almost 100 flights at this date.

**PHOTO 31**

Not all flights are perfect! The wing was cut off by a stubborn telephone pole. No record (confession?) of who the pilot was! Pure pilot depth perception error. We both stayed up all night repairing. We flew again the next day.

**PHOTO 32**

Seen here is the general layout of radio gear in the 1939 configuration. See *Air Trails* (11/40, 12/40, 1/41) for details.

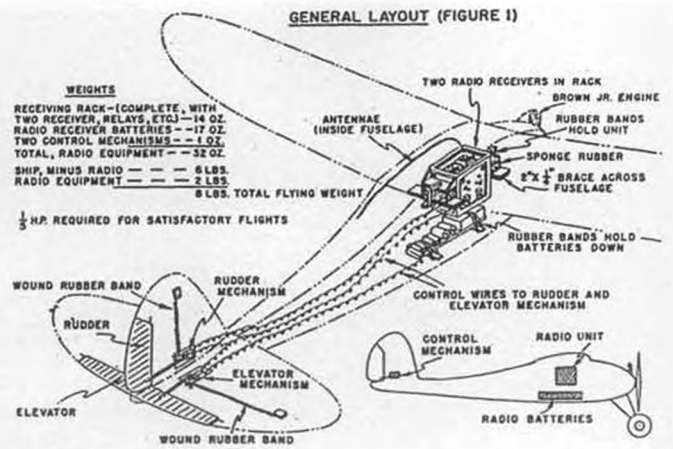


Photo 32.



Photo 31.

**PHOTO 33**

Gordon Light is holding the plane for Walt while FCC Inspector Emory Lee looks on at the 1939 Nats in Detroit. Lee was the man who asked Bill near the end of an official flight if he could try the stick. Bill asked him if he had a Ham license. Lee said, "No." Bill said, "Sorry."

**PHOTO 34**

After a very successful 14-minute flight with all maneuvers done twice, the R/C Guff earned a strong first place among the eleven entrants to win the 1939 R/C Nats, and this demonstrated that R/C really works. What a happy day that was! This was Bill's first R/C Nats, and he was the pi-



Photo 34.



Photo 35.





Photo 36.

lot on that flight, but he did let me hold the trophy! This was our first "win" of the beautiful Edward Roberts trophy.

**PHOTO 35**

Here's the Edward Roberts trophy for our winning the R/C Nats. It is now on display in the AMA museum.

**PHOTO 36**

Of the five demonstrations made that summer, one was at the Midwestern States

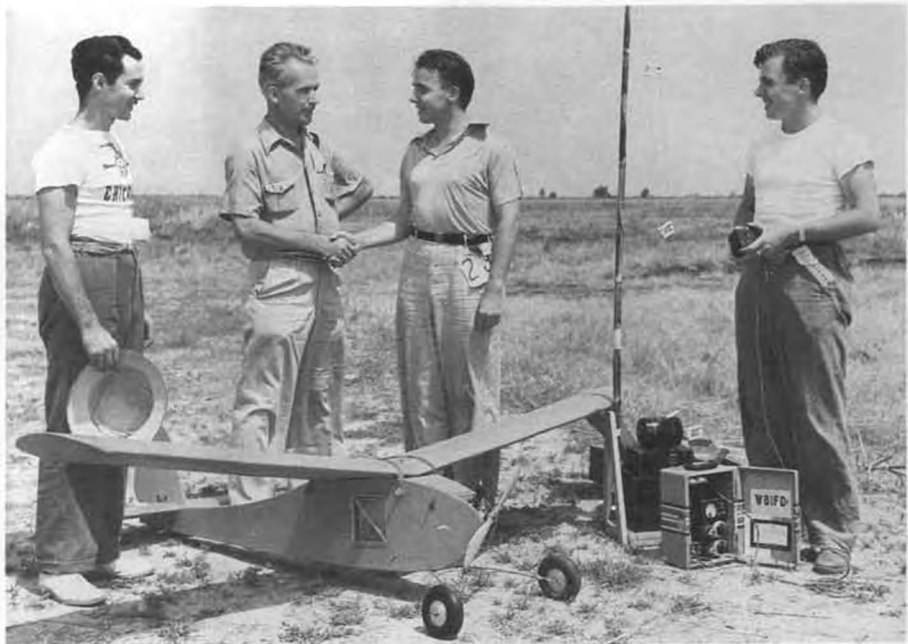


Photo 38.



Photo 37 (Left).

Photo 40 (Above).

meet in Chicago. Here I was the pilot and Bill was the coach. We always took strict "turns" as pilots, even when there was an FCC Inspector present. Being twins, we as-

sumed he wouldn't be able to tell us apart! Bill had the necessary Ham license at that time, and I didn't. (The photo here is by oldtimer Joe Lucas.)

**PHOTO 37**

Seen here is the Midwest field on Cicero in Chicago. Nice tall grass for catching errant models!

**PHOTO 38**

This is Frank Nekimken and Russ Weber, directors of the meet, congratulating Bill and me for the demo. (The photo here is by the late Joe Ott.)

**PHOTO 39**

Here are Bill (right) and Walt (left) after the Midwest demo. (Photo by Joe Ott.)

**PHOTO 40**

There I am starting the engine at the Canadian National Exposition in Toronto in August 1939, where we were invited to give an R/C demonstration for the modelers and the Exposition visitors. The crowd was so thick that the director asked Bill to stand on a box and call out his intended maneuvers before they were executed. Bill did so with convincing success. Later a gentleman came up to Bill and said, "Most of the spectators thought you were steering your plane by your voice, but I saw you use that little box in your hand!" This may have been the first R/C demo seen in Canada.

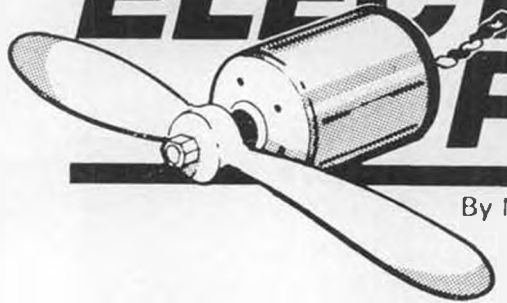
Note that at that time the plane was using a Dennymite engine with a long exhaust pipe.

TO BE CONTINUED NEXT MONTH! •



Photo 39.

# ELECTRIC POWER



By MITCH POLING

• I talked about the new Astro cobalt 020 and 035 motors last time, but had not had any time to do field tests. I still have not had time to field test the 020, but I have done a lot of car running and some airplane flying with the cobalt 035. It is a real powerhouse, with performance equivalent to cobalt 05s of two or three years ago. The efficiency gain that I spoke of in the last column is real, the larger brushes (the same size as the 40 brushes!) account for most of it. I flew it in the MRC Cessna 172 using a 6x3 Cox gray and a 6x4 Cox gray prop, and 800 and 1200 six-cell packs. The 6x3 prop gives good sport performance and so do the 800 six-cell packs. The maximum performance is with the 1200 packs and the 6x4 Cox gray prop. Flying weights with the 800 pack, three TSS10 Tower Radio micro servos (rudder, elevator, motor on-off with a toggle switch), a 250-mAh receiver pack, and the Ace Olympic V (Silver Seven) receiver is 33 ounces, 38 ounces with the 1200 Sanyo SC pack. The climb with the 1200 pack and the 6x4 prop is very fast, and there is so much power that you can pull back on the stick in level flight and watch it do consecutive loops until the battery runs down! Typical flight times are four to six minutes with on-off; an electronic throttle would give longer flights. When I used the 1200 pack, the plane would get so high that I had to shut down at least once per flight.

I drive offroad cars in competition, in six-cell stock. My RC10 has gone through quite an evolution, and now is a very competitive machine. I do pretty well in competition, usually in the top three places in Class B. My favorite motor is the 2WD super stock Twister motor, and most of the winners at our local track are using this motor. It is a very good one, and I reported on it in a previous column. Of course, by the time you read this column, there may be another motor on top of the heap, but this one is it right now.

Anyhow, I put the Astro cobalt 035 in the RC10 to see how it would do compared to the Twister. Quite a difference! The Twister is good, but the Astro cobalt 035 is better. The whole car "sharpens up," with crisper acceleration, higher top speed, smooth power response, better cornering, better handling on the straights, and it is much easier to "find the line." Why? The power band, or torque curve, for the 035 must be much wider (flatter and more constant). It is being driven well within its power handling capability, no peaks and dips in the re-



Tower Hobbies' Lambda Peak Detector charger.

sponse. The standard 05 motors are working very near their limits, and their power response is not nearly so smooth. The car "flows" around the track with the cobalt; it is a pleasure to feel the instant and positive response this motor gives. I keep coming up with the words "smooth," "positive," "solid," and "responsive." What a car motor! The kicker is that the current rules specifically disallow cobalt motors! What for? They are a pleasure to drive! This reminds

me of the situation when turbines appeared at Indy. They were too good, so they were banned. If you want to see what your offroad car can really do, try the Astro cobalt 035 for a real eye-opener.

Speaking of offroad, a few columns back I discussed the new generation of offroad stock motors, which are real powerhouses and a very good value for the dollar. Wouldn't you know, I forgot to mention something very important! One way these motors gained the extra power was by advancing the motor timing. This means the motors are "one way" motors. They must be run counterclockwise as you face the front of the motor; i.e., the conventional direction for right handed props. This is great for direct drive, but watch out on gear drive! Most gear drives will require the motor to run the other way, and these motors will be timed wrong. They will not deliver the power, and you will be disappointed. The answer is to use an Astro belt drive or the Al-Tech or DSC (One Wood Lane, Malvern, Pennsylvania 19355; 215/644-6772) gear drive, which do not require that the motor run "backwards." You could try to change the motor timing, but that is a real challenge because the motor back is held in place by tabs and cannot be rotated. You could undo the tabs, rotate the back for the best rpm/current in the reverse direction, then drill set screw holes to hold the back in, but I have not tried it. My apologies for forgetting to mention the timing, I did all my testing with direct drive, so it slipped by me.

I am often asked what charger I recommend, and I have reviewed several chargers recently. If you have up to the 40-size systems, I like the TRC Impulse 4. If you are flying the four- to six-cell systems, there is an excellent peak detector charger that is often overlooked. It is the Kyosho Lambda Quick Charger sold by Tower Hobbies and Great Planes Distributors. The charger has adjustable current and a six-ampere ammeter to show the current. The suggested charge rates are marked on the meter for 250-, 500-, 600-, and 1200-mAh packs. Voltmeter



A 1931 Curtiss-Wright Junior by George Lucas, from Model Builder plans. Powered by an Astro Flight Cobalt 25, this 76-inch beauty is a great flyer.

jacks are provided so that you can monitor the charge voltage with a DVM if you wish. There is a trickle charge output also for peaking up batteries. I find that the maximum current is about 4 amperes if I am charging a 1200-mAh pack. A six-cell 1200-mAh Sanyo pack will charge in 20 minutes, with a final current of about 3.5 amps.

I ran a series of chargers and motor runs compared to the TRC pulse charger (the Lambda is not a pulse charger). The Lambda compared very impressively. Once the pack settled down and was broken in, it delivered 57.5 amperes x minutes (60 amp minutes = 1 amp hour) from the Lambda charger, 59.5 amperes x minutes from the TRC charger. These numbers came from a fairly high discharge setup, a DSC Thrustmaster motor turning a Top Flight 8x4 nylon prop at an initial draw of 19 (20 amps for the TRC) amperes, which dropped to 9 (10 amps for the TRC) amps at the end of the run in 4-3/4 minutes. As you can see, the Lambda comes very close to the performance of a pulse charger. The charge cutoff is very reliable; only .01 to .03 volt drop is needed to cut off the current. I have been using the Lambda charger for over a year, and it has never overcharged a pack, in fact, the pack is cool at the end of the charge.

The Lambda can charge seven-cell packs, but at a slower rate. Initial current set at the maximum is 3.5 amps; this drops to 2 amps at the end of the charge. This means that a 1200 pack will take 30 minutes or more to charge. The 800 or 900 packs should take less time, but I have not tested them. The Lambda is \$79.95, part number KYOP 1045, and is available at Tower Hobbies, P.O. Box 778, Champaign, Illinois 61820; (800)637-4989. I recommend the Lambda for those flying the 05 systems; it offers very good performance for a price a little lower than most peak detection chargers.

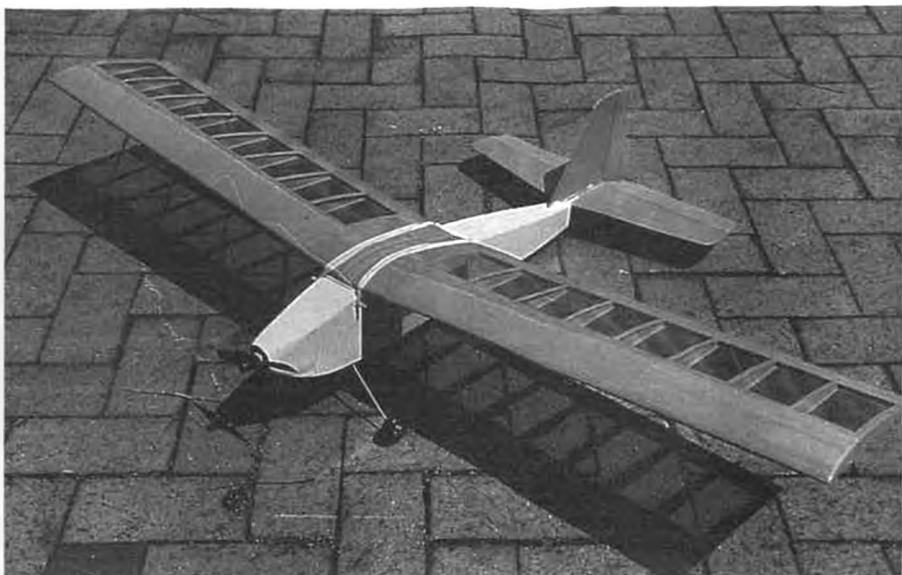
And now to the readers: Roy Farren, who lives in Australia, sent neat photos of his Aqua Sport. This is a float plane design of mine that was published in RCM. Roy modified his plane a little and used two spars with webbing, D-tube, and cap strips for the wing. (I used a single spar plus a wing tube and steel dihedral.) The sheeting is 1/32 inch! The wing came out at 6-1/2 ounces, very light. All-up weight with a Keller 25 and ten 800-mAh Sanyo AR cells was 4-1/4 pounds. The Keller turns a Taipan 7x6 at 12,000, lots of power. Roy built his plane in a hurry; he wanted to fly it at a float meet the next day! He succeeded in doing so, and the first flight, after all the hurry and excitement, was something of an anticlimax! The Aqua Sport made a straight-as-a-die takeoff run, lifted off smoothly, and climbed rapidly. It cruised effortlessly at half throttle and glided well with motor off. Touchdown was what float plane flying is all about; "a light kiss and a smooth settle," to quote Roy! Water handling was excellent despite no water rudder. Thanks for the info, Roy!

I have had several letters from very satisfied builders of the Aqua Sport, all of them have been very pleased at how easy it is to ROW and fly. It has been flown with as few as seven cells with an Astro cobalt 05

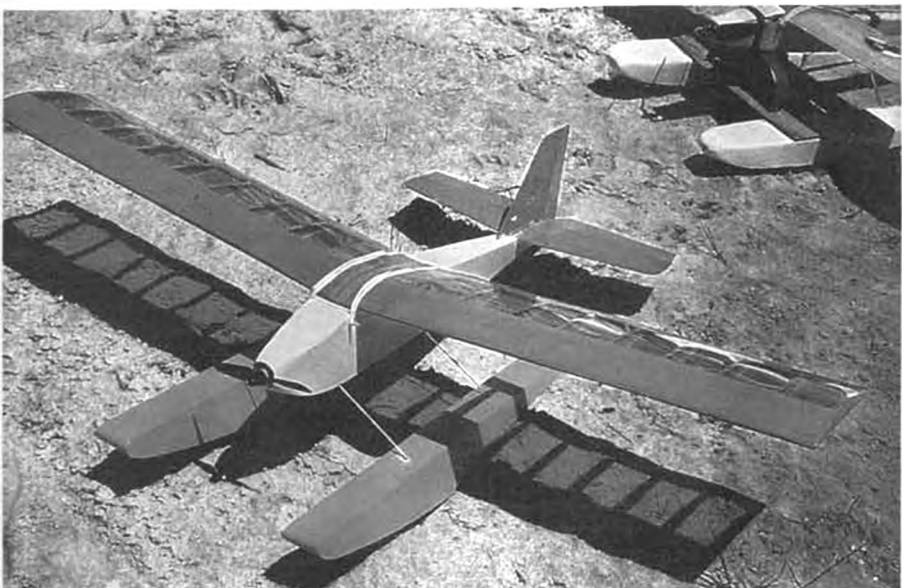
*Continued on page 64*



The scene is float flying way down under in Australia.



Australian Roy Farren, from Australia, sends these photos of his Aqua Sport. Here it rests on wheels. Wing sheeting is 1/32 inch, all-up weight is 4-1/4 pounds.



The Aqua Sport with its floats on. A Keller 25 with ten 800 mAh Sanyo AR cells turns a Taipan 7x6 prop at 12,000 rpm. This is an easy plan to ROW. See text for more.

# ALL ABOUT ARFS

By ART STEINBERG

• Quite often we tend to digress from a pure discussion of ARFs and find ourselves immersed in other topics of interest. These topics are not totally unrelated to our primary subject, as is demonstrated in our May column. At that time I undertook to examine the requirements for a "suitable" R/C trainer. While occasional reference was made to the "perfect" trainer, in all candor I must admit that I feel there is no such thing. There are too many variables in designing a trainer to select just one model as the best for the job. However, in attempting to outline some of what I considered to be important specifications, I included wingspan, wing area, type of landing gear, wing dihedral, wing location, fuel system, type of construction, choice of engine, and color scheme for visibility.

As is usually the case, not everyone can come to complete agreement on such a complex theme, and one person who found reason to disagree is someone who has devoted a great deal of time and effort to the study of this very subject. Jim Waterman of San Antonio, Texas, writes:

"During the 20 years that I have been in R/C flying, I found where I was needed the most, which is not in the various R/C contests because they can get along very fine without me, likewise running a club. The most glaring and crying need has been help for the R/C beginners. I easily taught myself to fly with an old Smog Hog without another soul in sight, but yet at least half of the beginners I observed (after joining a club) failed and gave up and were lost to our hobby. It was unnecessary and almost unpardonable because it wasn't due to their limitations. It was because they either chose the wrong trainer or were misled about which to choose. And, as the years went by, especially with the growing popularity of ARFs, the situation became worse instead of improving. I cannot reach all beginners before they make a heart-breaking mistake, but I know it to be an absolute aeronautical fact that a John Q. Beginner, age 25 to 30, average IQ of 99, can struggle for up to six years (the only record that I am personally familiar with) with a patient instructor (but the wrong "trainer") and still not solo until switching to a real trainer (and then soloing the same day).

"It is fairly well-known that a trainer must have a high wing with dihedral (the more the better). Knowledgeable fliers know that the larger a model is, the easier it will be. Where there seems to be, strangely enough, a lacking even among fliers who should know better, is that to fly slowly, as an easy-to-cope-with model must, it must be: (1) as light as possible (heavy planes must fly fast just to stay airborne), and (2) it

must have a high-lift airfoil. To recommend a trainer without these prerequisites to a beginner is to doom him to either failure or else a very long, drawn-out training period (even if he can find an instructor more patient than I am who has nothing better to do with his time). This is fair to neither the student or the instructor!

"The Headmaster ARF has a wing loading of 19 oz./sq. ft. (okay, let's be liberal and say some builders can get it down to 17 oz./sq. ft.). Thus, it cannot fly as slowly as a couple dozen other trainers on the market.

That's not even the bad news. The bad news is: *It does not have a high-lift airfoil!* What Ken Willard has designed is an advanced trainer! There is no, I repeat, no way that this type of plane will qualify as a good basic trainer. And, of course, it would be unthinkable as a primary trainer (you do know the difference; don't you?). I'm willing to put my money where my mouth is. I'll give it credit for being lighter than the plastic ARFs; and if you or anyone else suggests a plastic ARF as an entry-level model airplane, I will say that you have sold your soul to the devil.

"There is no keeping back the surge of ARFs coming more and more on the market (and heavily advertised in order to reach the naive beginners). If a person cannot make worthy enough use of his free time to build a balsa model or does not have a place to build, then I will grant that there is a place for ARFs, but this will never be true in regards to trainers! At least not plastic ones. Far better for the beginner to commission

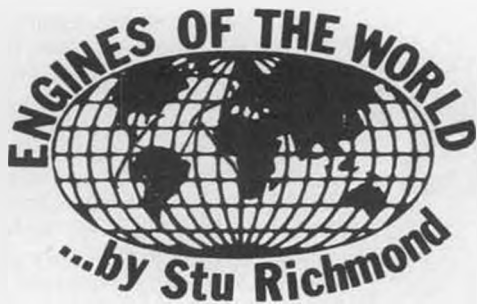
*Continued on page 92*



No, it's not an ARF, just the author's beat up old Buzzard Bombshell. The question: is this the perfect trainer?



The Eftbrebe, a ready-to-fly sailplane from Ed Cutler Plastics, shown here in its floating stabilizer configuration.



# JOHN G 05

**VITAL STATISTICS:** Only 1-1/2 inches long to the prop driver, 1 inch wide across the mounting lugs, 1-3/8 inches to the top of the cooling fins. Displacement is .03 cubic inch. Exhaust systems add 3 inches to R/C version, and 1-1/8 inches to normal. R/C weighs 31-1/2 grams, and normal weighs 25 grams. (28 grams equals one ounce.) Speed range from over 17,000 to under 4,000 rpm. Homemade in tiny volume.

**UNIQUE FEATURE:** This is one of the world's finest model airplane engines and uses a re-machined Cox #1032 glow plug for ignition.

- Back in the February 1985 column, I showed you a trio of tiny jewel-like diesel model airplane engines made by Jan Garcic in East Europe. There was a "Normal," a "Racer," and an "R/C" version, and the incoming mail concerning these .018 cubic-inch miniatures was so heavy that I called our publisher to ask how to handle it. These three engines came up with the initial "30-point rating" for excellence in design, manufacturing, and performance which this column seldom awards.

A few of you were lucky enough to end up owning a John engine. (John is the American translation for Jan.) Since that time Jan's fertile mind and golden hands have created several jewels of craftsmanship including a "V"-geared twin R/C diesel, a .40-size rear intake, rear exhaust FAL pylon rac-



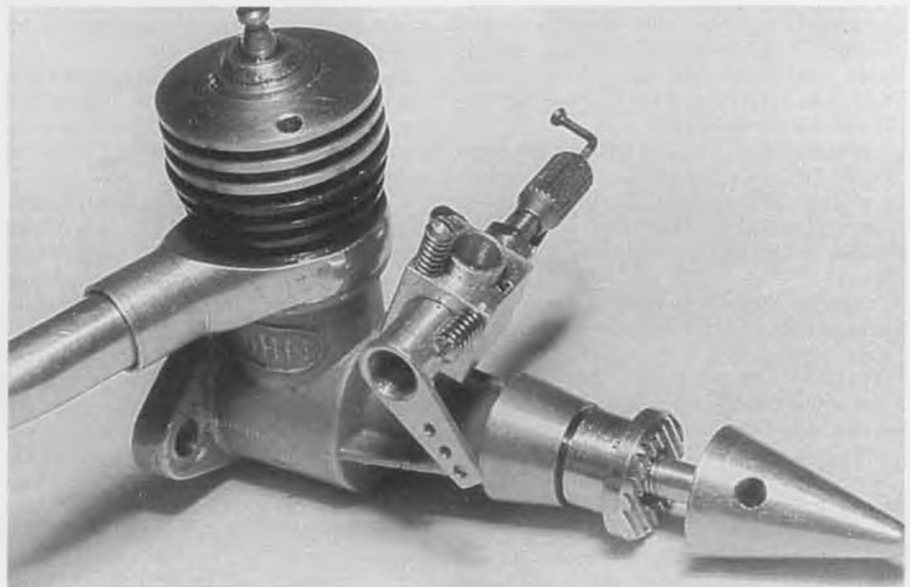
These John G 05 engines are one of the world's finest examples of metalsmithing. Engine is running at 3550 rpm idle in this shot.

ing engine with a gear reduction unit aimed at 200-mph speeds, a four-cylinder .080 cubic-inch with the axis of the four cylinders arranged *inline* around the axis of the crankshaft with its 12,500 rpm giving 50,000 firings a minute, and a .60-size 10cc more sophisticated R/C version of the same configuration which he calls the John Quattro Axial 10ccm. These unique experimental engines are worth, along with quotes

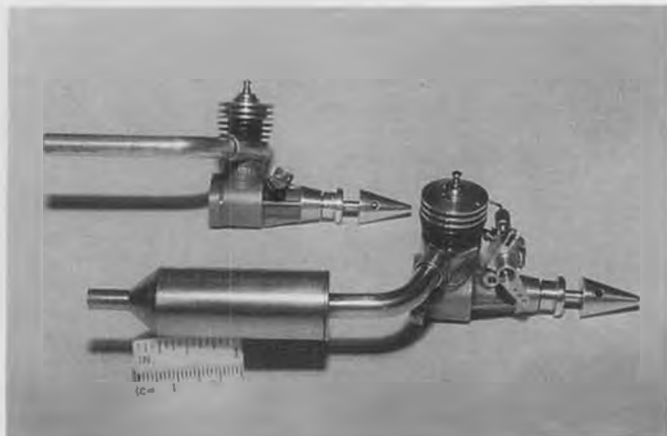
from Jan's letters, a separate column eventually.

I think all inventive/creative genius must run in cycles and comes back to established norms with regularity to get mental rest before taking off again on mind-boggling futuristic ventures. This month we've caught the results of Jan's cycle of rest with a

*Continued on page 66*



A common straight pin is the start of the carburetor construction. Glow plug is a re-machined Cox part no. 1032.



One-inch ruler gives size reference. John G 05 R/C in foreground and John G 05 normal in background.



Exhaust system is shaped like Magic Muffler which boosts power over a very broad speed range. Stu didn't use pressure nipple for test running.



# PLUG SPARKS

By JOHN POND

• This month our lead article will feature old timer models on floats. Hydro models have always been fun events as evidenced by one of the first at Oroville Dam Site in Northern California. Since the leader in this type event, Hal Cullens, moved to Louisiana, no further hydro meets were held.

It remained for SAM 51 to revive interest in this phase of old timer flying by staging a fun-fly type hydro event at their Bill Barton Memorial O/T Meet at Mavis-Henson field located near Woodland, California. This terrific field, which includes paved areas, shaded malls, a short order eatery complete with inside plumbing in the rear of the building, and an excellent fenced ground gravel parking area, is the "Best in the West." Response was most encouraging, with photo coverage of this get-together appearing in the May 1987 issue of *Model Builder*. A good variety of hydro models were seen; three-float types, long planing hull, and surprising (to a free flyer) the heavy use of twin floats.

This was no different in this year's meet as Photo No. 1 depicts Robin Pharis of Folsom, California, with a GHQ-powered Chet Lanzo RC-1. The floats are a local product by K-Ron of Sacramento cut entirely from foam.

The floats then are reinforced by 1/64 plywood veneer on the bottom to withstand water impact. The rest of the mounting is simplicity itself as vertical plywood are buried at least 1-1/2 inch deep in the float and epoxy glued in place.

This can be seen very clearly in Photo No. 2 showing the type of landing struts and cross pieces needed to make a stable float platform.

Most people are aware that some tilt must be put into the floats so that they will plane off the water. However, in the case of twin

floats, the centerline of the floats must be at a negative angle compared to the centerline (or thrust line) of the fuselage.

Long planing hulls employ this same line of design. In many cases such as McGovern's design of the Piranha, the Berkeley Custom Cavalier, and others, the engine pod over the wing is actually set at about two degrees upthrust. This gives the effect needed between the float line and the engine as noted for the twin float airplanes.

This is no great secret but most of the modelers (writer included) made the mistake of using the positively angled three floats used successfully in free flight models. What people fail to understand is that free flight models are so lightly loaded they literally jump off the water. In actuality, if the tail raises too quickly, the model will taxi a considerable length of distance before breaking water (if at all!).

In summary, with the engine set in a relative upthrust position to the float or hull line, the model literally flies itself out of the water with the engine pulling at an up angle.

Getting back to Photo No. 2, attention is drawn to the fact this RC-1 is a GHQ-powered hydro model. Talk about optimism! The writer simply had to act as mechanic and timer to see if this model would take off.

With a stiff wind and choppy water (two deterrents to successful R.O.W. operation), the model simply settled in the water and proceeded with the GHQ turning 4,000 rpm to chug along until an up elevator command was given. Talk about a surprise! Even with this underpowered setup, it still took off gracefully. Proof the pudding on float setups.

If the reader is not yet convinced, take a look at the real aircraft. Most light planes,

like a Piper Cub, have floats that seem to droop. This is from the negative angle that allows the plane to float in up-nose position.

Before closing out this discourse on twin floats and long planing hulls, always be sure to locate the float set at least half an inch ahead of the model's center of gravity. This does help to rock the model back on takeoff and make flying off water much simpler.

The lake, located next to the R/C flying strip, can be seen in Photo No. 3, showing SAM 21 Newsletter Editor Steve Roselle handing this Lanzo Record Breaker to helper Dave Lewis also of SAM 21.

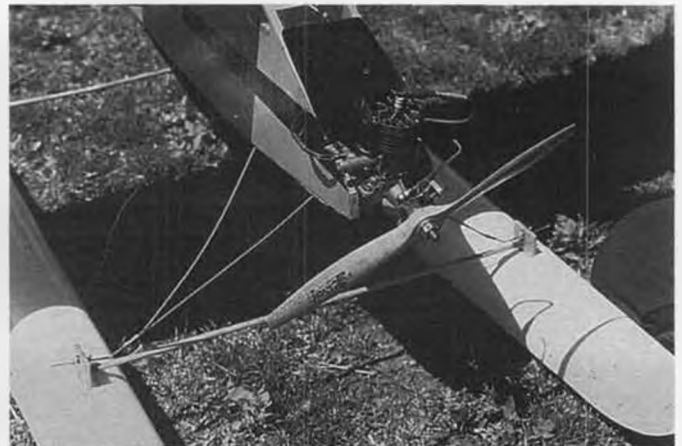
If this Record Breaker looks familiar to some of the readers, it is actually Don Bekins's old model that he sold off in favor of the Gas Bird and later, the Lanzo Bomber. Steve has had more than his return.

A successful three-float model is seen in Photo No. 4, a Powerhouse using Bunch "sled-type" floats as built by Gene Newcomb. The floats appear to be the same Bunch floats as were marketed by Joe Bridi, quite successfully used. The model is being weighed by longtime friend and S. F. Vulture member, Tom Smith, who moved from San Jose to the Sacramento valley foothills in his retirement. Tom was a first-class sheet-metal man who ran a very successful business in Santa Clara County.

Looking at three-float setups again in Photo No. 5 showing a Gas Bird on flights and Don Bekins assembling same, when making three-float types, "sled" or flat rectangular types, are the order of the day. Although the floats "appear" adequate on Bekins's model, close examination will show they will not displace enough water to keep the nose up. Bekins had his troubles that day and did not get the model off. In a heavy wind, high pylon models are tough enough to handle let alone on water. As Steve Roselle observed, "The floats looked like Dutch shoes and acted like them." One more shot (Photo No. 6) of hydro models and we will get on with it. Seen is Ken Myers with a Lackey Zenith on floats. Note that two sled-type floats are used here. Unfortunately, Ken decided to fly it first as a land-based model. At 500 feet or better, the model suffered a radio failure with the resulting spin completely demolishing the model. Too bad, as we would have liked to



1. Robin Pharis with his successful Lanzo RC-1 at Mavis Henson Field and Lake.



2. Proof of the pudding! A closeup shows a GHQ engine in the nose of the RC-1.



3. A good-flying Lanzo Record Breaker on floats by Steve Roselle, member of SAM 21.



4. Gene Newcomb's Enya 46-powered Powerhouse is being weighed by Tom Smith, SAM 51 official.



5. Don Bekins with his 8-foot Gas Bird converted to a seaplane. Float shape was not successful.



6. Ken Myers came up from Los Angeles to enter his Lackey Zenith on floats.

1. Eut Tileston	Westerner	O.S. .60	1001
2. Gene Newcomb	Powerhouse	Enya .46	831
3. Steve Roselle	Record Breaker	O.S. .60	487
4. Doug Barton	Long	Kall .45	291
5. Robin Pharis	RC-1	GHQ	217

see how the floats worked.

Tough break for Ken, as he drives over 500 miles from Los Angeles to attend the many Northern California meets. As can be seen in the background, this field is an excellent site. Just too bad the mosquitoes are so numerous. Inasmuch as rice is the main commodity grown in the Woodland area, the stagnant water required by rice is a natural breeding place. This writer missed most of the contest as he was bitten on the eyelid. With the eye rapidly swelling, Pond decided to leave quickly for the 120-mile trip home before all vision disappeared.

This meet featured all standard SAM R/C Events plus Texaco Hydro, Electric L.E.R., and Ohlsson 60 Event. In the latter event, Howard Osegueda, seen in Photo No. 7, is the leader of SAM 00, a new SAM Chapter. Howard is posed with a Lackey Zenith that flew well enough to garner a third place. Not bad for the first time out!

We won't list all the results, but feel the Texaco Hydro is worth looking over for types and times.

In closing off, the 1988 Winner of the Bill Barton Memorial Trophy was Eut Tileston. Only the standard SAM Events were used to compute the winner.

#### ENGINE OF THE MONTH

This month we feature an extremely rare

engine, the Clipper XX770 as so kindly loaned to us by that magnanimous engine collector, Bob McClelland, Secretary-

Treasurer of the M.E.C.A. This columnist, having passed 71 years (young!) is hopeful he will be able to feature most of the old engines, rare or otherwise, that abounded in those pre-WWII and post-WWII years. A tremendous outpouring, especially after the war.

Not too much information is available on the Clipper engines, hence, we have had to



7. A standard version of the Lackey Zenith by Howard Osegueda, guiding light of the new SAM Chapter 00.



9. Happy owner, John Pond, and builder, Bob Munn pose with the Bowden Mallard with Spitfire markings.

glean what information we have from reports appearing in Tim Dannel's Model Engine Collector Journal.

This engine first came to this writer's attention in a very early issue showing the Clipper Generator model. This was actually an internal generator (not magneto) that was produced in very small quantity. According to the designer, Hugh Gunter, six engines were assembled for testing. His partner, who remains anonymous, was said to have assembled a few more. These engines were run and flown.

The Generator model did not reach full production status, as it appears the bearings employed were also used in the defense industry during WWII and the Korean War.

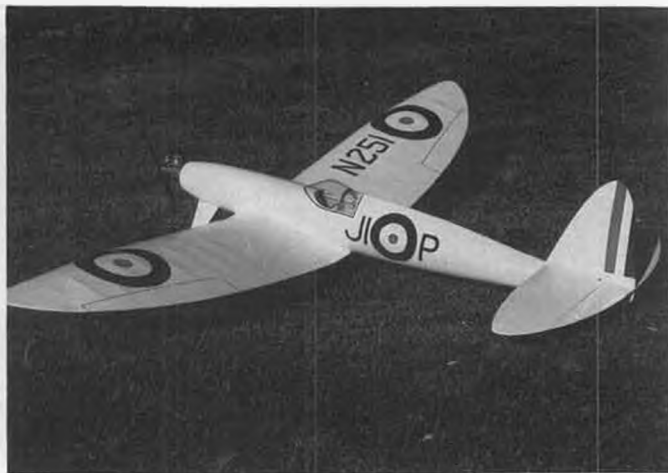
Apparently there seems to have been four models, the Generator, the generator-less model, and the dual combination of the ignition and glow head types as first advertised in the January 1952 issue of *Model Airplane News*. The advertisement shows a glow plug and ignition combination that was not exactly correct, as the glow version came with vertical finned heads.

The customer was given the option of using a head suited for spark plugs or glow plugs while the second, known as the "Firing Head" was a specialty design fitted with India mica to form a spark plug; practically indestructible according to the manufacturer. This plug was not made of porcelain, is non-fouling, and lasts indefinitely. A boon for those flying control line models.

Specifications of the engine reveal the engine is about the same size as the Baby Cyclone, the engine that had tremendous influence on many subsequent engines. Weight was eight ounces.

The engine was manufactured using a high-silicon aluminum die-cast crankcase, an all-steel cylinder with ground and lapped hard chrome piston. A one-piece hardened and ground hard chrome-plated crankshaft was supported by a special "lifelong" micro-finished main bearing. A forged aluminum connecting rod was incorporated. An aluminum gas tank was attached to the rear of the crankcase.

Sold for the competitive price of \$11.95, the Clipper Manufacturing Co., 5632 Lexington Avenue, Hollywood 38, California, urged the customer to order direct (ala Baby Cyclone).



The Mallard looks like the real thing. It's powered by a Rossi 60.

As usual, this was another California engine company (seems there were hundreds) that knuckled under to the pressure of sales by the large manufacturers; Ohlsson, Atwood, et al. With the flood of money over by 1948, competition for the dollar was too much for survival.

#### FIRST BRAGGING RIGHTS

Ever since this writer acquired Xerox copies of the Col. C. E. Bowden book, *Petrol Powered Model Aircraft*, published in the 1937-38 era, this writer has been drawing up plans to most of Bowden's models which have "a lock-on for ugly." This is standard joke about most Bowden designs; they were designed to fly, not to look pretty.

Imagine the surprise generated when I received a Xerox copy from Alex Imrie with some Bowden models not presently drawn. Among those was the Mallard, looking not unlike a Supermarine Spitfire. Drawing was no easy chore, as every rib had to be plotted individually as were the elliptical fuselage formers. With a planked fuselage and elliptical wings and tails, this was a formidable model to construct.

Bob Munn, good friend from San Diego

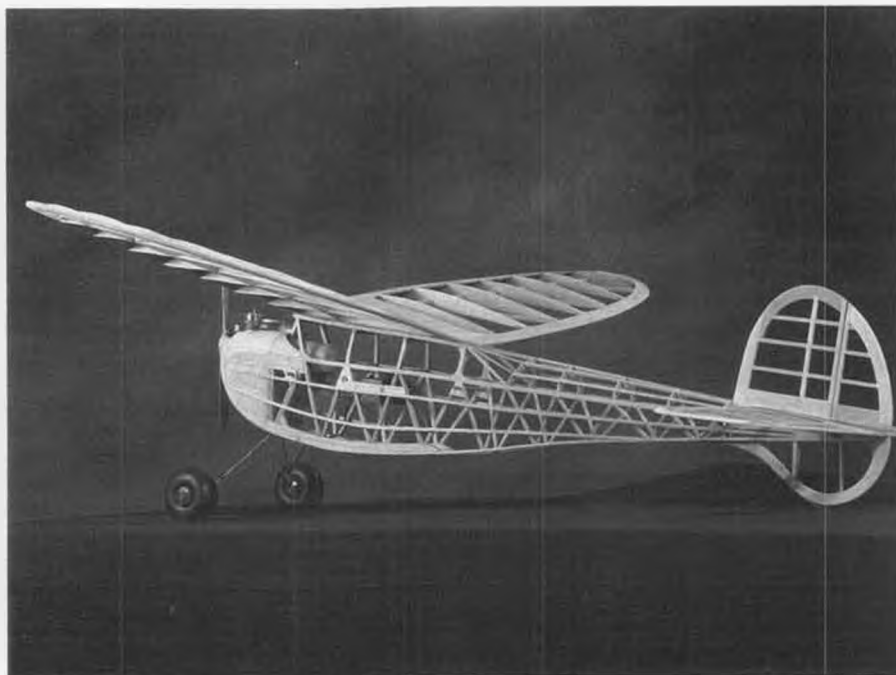
and also buddy in Australia, saw the plans and was agreeable to framing the model. In a remarkably short time, Bob had the model back to Pond for final trimming and radio installation.

Seen in Photo No. 8 is a shot taken on the lawn across the street. Also seen in Photo No. 9 are the jubilant conspirators in this project, Pond and Bob Munn.

Pond, with his penchant for decoration, decreed the model to be finished in white. From there on, it was a bit of research into the books on early Spitfires to arrive at the cocardes and identification design. Although ailerons are marked out, this is a three-function radio model; no aileron operation. Lettering on the side was taken from a Spitfire marked JEJ on the dust cover of the Harleyford book on Spitfire. Why not make it JIP (John I. Pond initials)?

Of course, the registration number N251 is simplicity itself with N standing for United States registration and 251 the owner's AMA number. What the heck? For a stand-way-back-off scale, it doesn't look too bad.

At present, the model is powered by a



10. Beautiful shot of a Bay Ridge Topper by Andy Anderson, SAM 27. Photo: Nevels.



Rossi .60 glow intended for the SAM Event, Antique Glow. Provisions have been made for a removable firewall so as to switch an O.S. .60 four-cycle engine in the nose for the Texaco Event. It's going to be fun!

#### SAM 30

For a change; this writer did not win the Twin Pusher event. The only regret he has is that he missed out on a case of beer. However, consolation prize was a six-pack. The boys in SAM 21 still had some refreshments in the warm afternoon.

Nick Nicholau wanted this writer to acknowledge a most generous donor to the SAM 30 Contests: Pete Huckins, the local Budweiser distributor. Pete, a model enthusiast himself, has been into old timer flying for the last five years. He dearly loves to watch those old twin pushers fly, especially in a mass-launch where every model goes every which way.

Worth noting at this contest was the special Electric Texaco Event which drew 12 entries. In a flyoff, Al Ward beat Tim Gundlack with a flight of 16:29 to 14:39. Don't anyone say that electric models (despite their weight) don't soar.

Gas Texaco was even more hotly contested with four 45-minute runs, forcing fly-offs at 32:43 (Kaminar), 28:28 (Bekins), 11:58 (Bruner), and Lane at 3:54. Tough event to win!

#### SAM 27

Received the SAM 27 newsletter featuring "Andy" Andrews version of the Bay Ridge "Topper" as the cover photo. This writer was so struck for the good art work, he immediately contacted Ned Nevels (SAM 27 photographer and graphic arts man) to receive a photo for this column.

Two photos arrived very shortly thereafter. This writer selected the one that was not used in the SAM 27 newsletter (not because the other had been featured), but this Photo No. 10 appeared to be the better for details.

As can be seen, this is a radio control adaptation of the old free flight plan. For those contemplating the construction of this Scotty Murray design, one would do well to study the photo. Those building the "Answer," which was the *Model Airplane News* construction article (based on the "Topper") can also gain an insight from the photo.

Also from SAM 27, Don Bekins sends in Photo No. 11 of his protege, Skye Greenawalt, celebrating his second-place win at the NCFCC Contest at Waegell Field.



12. A 1938 Magnusson Wakefield by Nils-Olof Magnusson, Sweden. Quick takeoff!



11. Hey! I did it! Skye Greenawalt displays the proper enthusiasm for placing at the NCFCC meet. Photo: Bekins.

With the columnist's Ford LTD Station Wagon as background, Skye is literally saying "I beat Pond out of second place!" Don is justifiably proud of this young flier, as this was his first contest. Now that we have him hooked, all we got to do is to keep him away from cars and girls. Fat chance!

#### SWEDEN

We are still using those good photos sent in by Stan Persson of Halmstead, Sweden. Seen in Photo No. 12 is Nils-Olof Gustavsson with a 1938 Magnusson Wakefield.

In a writeup on the 1938 Wakefield contest, *Aeromodeller* magazine reported this design was the big surprise of the meet held in France with its terrific climb.

As can be seen in the photo, the model

literally jumps off the board with torque making it bank to the left. Probably the most surprising thing about this flat wing layout with upturned tips is the stability of the design. Frank Zaic captured this (or similar) model in his 1938 Year Book. Interesting layout.

#### SAM 86

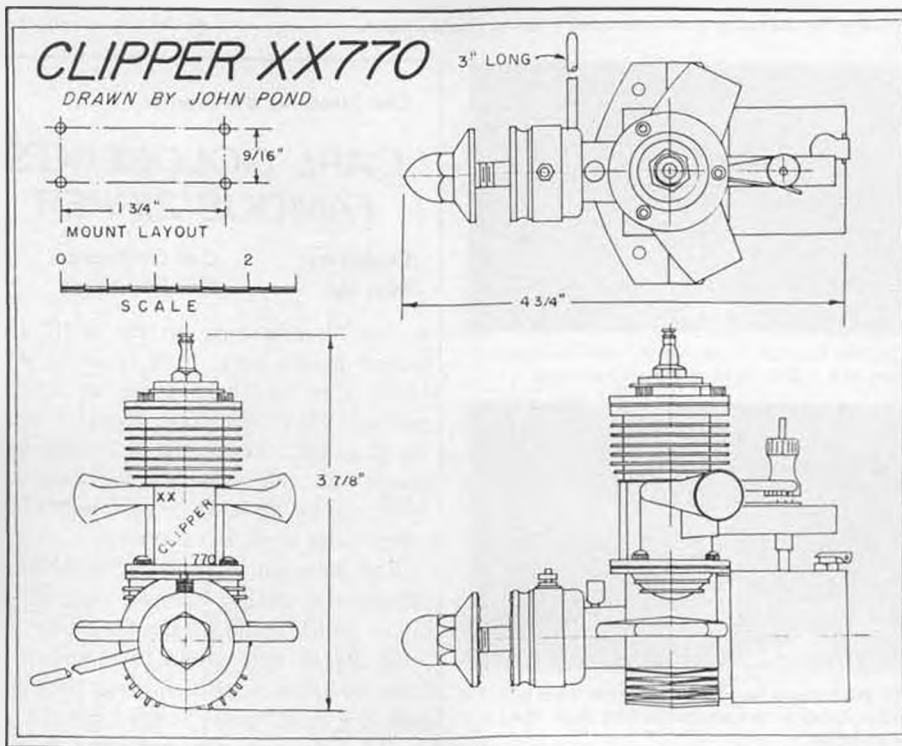
We always look for a spot to put in the SAM 86 Newsletter portion of "Foolish Questions" as have been induced by the local hobby dealers. Try these on for size:

Q: Did you get any frog legs in yet?

Q: Do you sell trampolines?

Q: I need one of these diamond head needles for my phonograph . . .

A: I don't think we carry those.



Q: What do you mean? I bought it here last time. . .

A: I think you may have us confused with Westside Electronics down the block.

Q: No way. I'm sure I bought it here!

Q: Do you sell Santa Claus suits?

Q: Do you have a motor for a 'GT Chevy gas control?

Q: Do you carry any insects?

Q: Do you have any candy-making supplies?

Q: What kind of propeller do you have that would fit the hat on my "benie and Cecil" doll?

Q: Do you have blank music notebooks?

Q: What R/C car can I buy for under \$5?

Q: Do you sell jumping beans?

Q: Do you have any of the Porsche plastic kits?

A: Yes, we have a few different ones.

Q: Which one would I like?

Q: Do you have any wine bottle corks?

Q: Do you have assembled plastic model kits?

Q: Do you sell electric football men?

Q: Do you carry "Airtronics" radios?

Q: What's the difference between a 6V and a 7.2V battery?



13. Old time control line is growing by leaps and bounds in Australia. Bruce Abel with Hot Rack, with Frog 500 power. Took First in SAM Australian Championships in 1987.

#### SAM AUSTRALIA

Our old friend, Bruce Abell of 17 Ferguson St., Cessnock, N.S.W. 2325, sends in another photo (No. 13), this time an old time control-liner named "Hot Rack." This design by Leon Shulman was designed specifically for the Drone Diesel engine also being marketed by Shulman. Leon won quite a few stunt contests with this particular model.

ally for the Drone Diesel engine also being marketed by Shulman. Leon won quite a few stunt contests with this particular model.

*Continued on page 99*



14. Old Warden Day and it is Henry J. Nicholls and son, Richard, discussing the Mercury with interested friends. Photo: Imrie.



15. A Kloud King built by Dick Tanis, New Jersey. Built in 1971, this model is in excellent flying shape.



16. Bill Preston, Washington, with his latest hot one, a Sky Devil-powered Sailplane.



17. Would you buy a used car from these guys? John Gates with transmitter and Rich Martin with beard.

#### Old Timer of the Month

### CARL GOLDBERG'S FAMOUS 'ZIPPER'

Design by: Carl Goldberg  
Plan by: Phil Bernhardt



• The "handwriting on the wall" appeared in the July 1939 issue of Air Trails. Carl Goldberg began an article entitled "The 1939 Gas Model," with these words, "When the thirty-second motor run rule was adopted early in 1938, the boom of large gas models for competitive work was sounded."

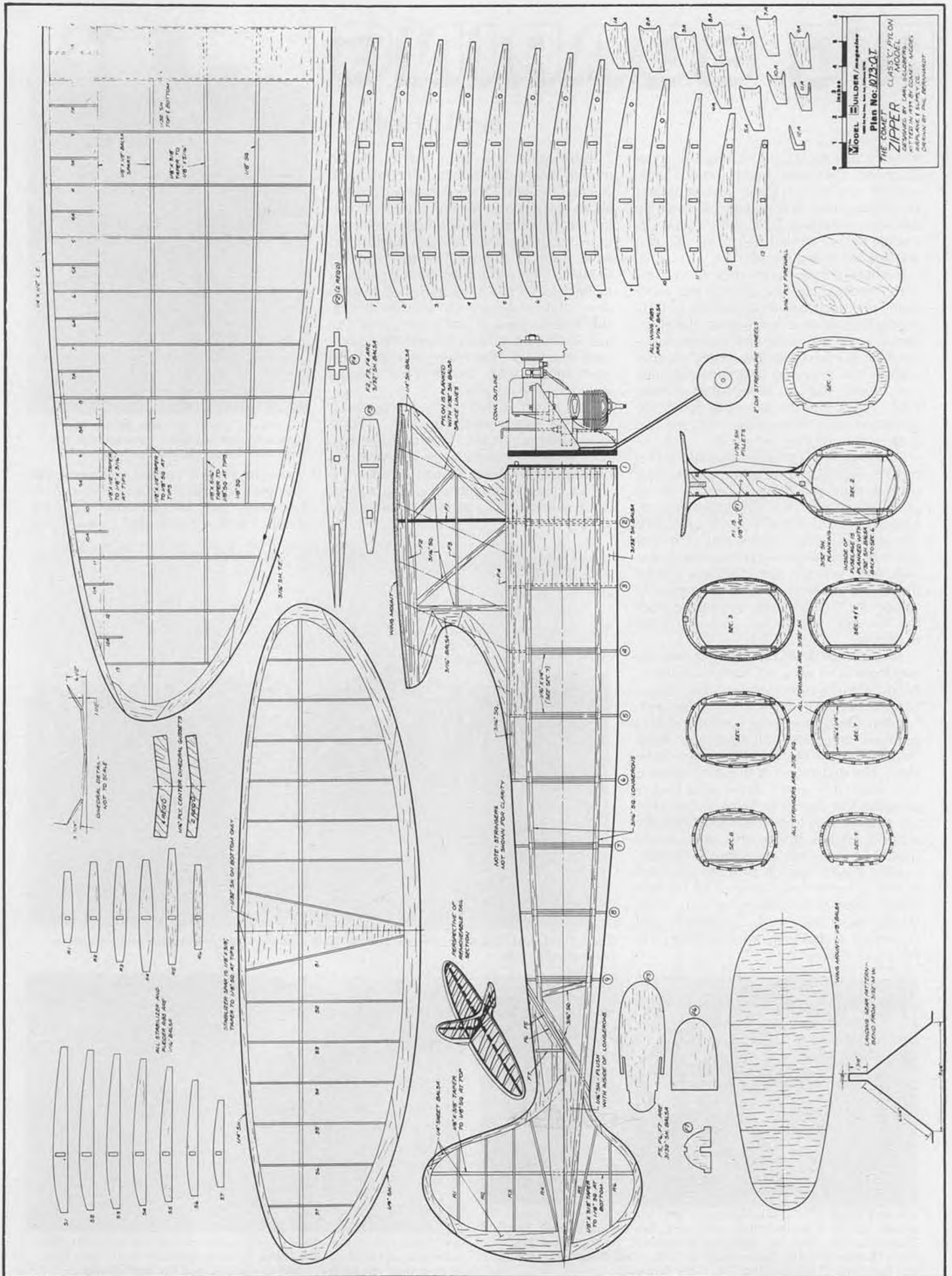
Carl went on to explain the theories behind the design he had created, a model which could handle the power of a big engine that would be required in order to get as much altitude as possible with the new "short" engine run. (Can

you imagine what would have happened if someone had proposed 7 seconds in those days?)

The design Carl described was, of course, his famous Zipper. Advertising for the Comet kit had already appeared, and for years to come, this pylon ship, with its high center of lateral area (a total departure from the then popular existing theory), was to completely dominate the contest scene.

Other important design changes have

*Continued on page 107*



Model Builders Magazine  
**THE COMET**  
**ZIPPER**  
 CLASSIC Pylon  
 DESIGNED BY CARL SCHUBERT  
 WITHIN 40% OF COST - MISC.  
 DRAWN BY PAUL DEBARRNET

# R/C SOARING

By BILL FORREY

• Every year the Inland Soaring Society of Riverside, California, hosts a major radio control hand-launch glider contest at their club flying field. It is traditionally held on the first weekend of June at the University Middle School athletic field. This year that worked out to be June 5th.

Twenty-eight pilots flew their AMA Class A (1.5 meter span) sailplanes in this year's event, making it the fifth annual ISS RCHLG held at this site in as many years. The attendance was down somewhat from previous contests, but next year this should improve with better advanced magazine publicity (i.e., some display advertising). *Model Builder* magazine has agreed to donate the space and the trophies (again) next year as a means of supporting the event.

Publisher Bill Northrop has told me that he sees RCHLG as a highly visible, relatively simple and inexpensive way to get people involved in R/C flying (and I agree). *Model Builder* has traditionally sponsored the trophies for this contest and, by means of this column, the post-contest exposure as well. Next year this contest is going to be the biggest and the best. Trust me, and build a glider for it! I'll be there, and maybe you'll be the one with your picture in the magazine!

As usual, the ISS RCHLG contest drew entries from as far away as Chandler, Arizona; Albuquerque, New Mexico; Las Vegas, Nevada; and (for the first time) Portland, Oregon. These guys came just to be able to pit their designing, building, and flying skills against the best hand-launchers in the West. The dedication of these modelers is truly admirable, and it shows what kind of attention this event can bring in the AMA community. Due to its size, model industry support, and publicity, this event really should be classified as a national championship. If participation by three countries makes an event "international" by FAI definition, then participation by four states should make this event a "national" one! I'm in favor of changing its name! Now on to this year's contest:

Statistically, more than half of the 28 models flown, 16 by actual count, were original designs. Of the remaining models about half again were modified kits or partial kits which are available commercially. Only about one-fourth of the models flown were stock kit gliders. This tells me that there is a lot of experimenting still going on in the field of Class A model design. In what other glider category can one see the results of one's ideas in such a short time? The average RCHLG glider can be built and covered in a week, test flown in an hour on one's lunch break, and enjoyed literally anywhere and anytime.

The winner of this year's championship (can I get away with that?) was Joe Wurts. Joe's name is certainly familiar to anyone who reads this column with any regularity because he wins just about every contest he enters. He flies nothing but his own original designs, and he has a good eye for what flies well.



Top view of Wurt's no-name model. Wing is foam core and fiberglass, covered with carbon fiber tow stringers as reinforcement.

Joe came to this contest one week after setting an FAI world record and two AMA national records for Unlimited Class R/C gliders. He flew his "Moby" cross-country



The Fifth Annual ISS RCHLG contest drew 28 competitors, fewer than last year, but more fierce competition.



Ten of the top 11. CD Ian Douglas (at left) placed 8th with a Paraphrase. Left to right, kneeling: Joe Wurts, 1st, Dennis Brandt, 2nd, Dick Odle, 3rd. Top row: John Lupperger, 4th, Garth Warner 6th, Allan Guthmiller, 5th, Gary Anderson, 7th, Craig Robinson, 10th, and Don Nigg, 11th. Missing, 7th, Gary Anderson.



Joe Wurts, flier extraordinaire, and winner of this year's contest. This is the end of his round one flight, a mid-air collision didn't stop him from getting the longest flight of the day, and the most applause.



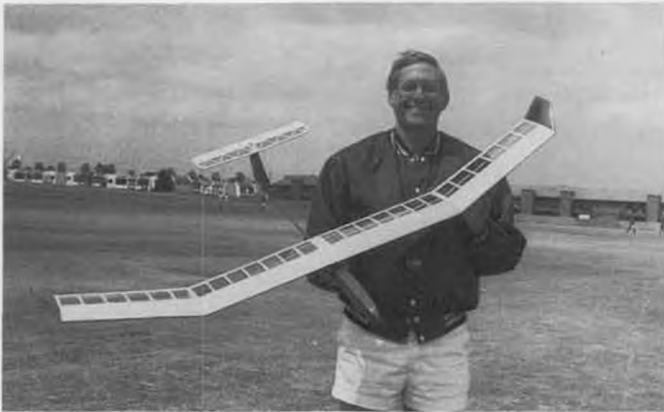
Fourth place John Lupperger demonstrates a back-saving follow-through which happens to yield great launch height.



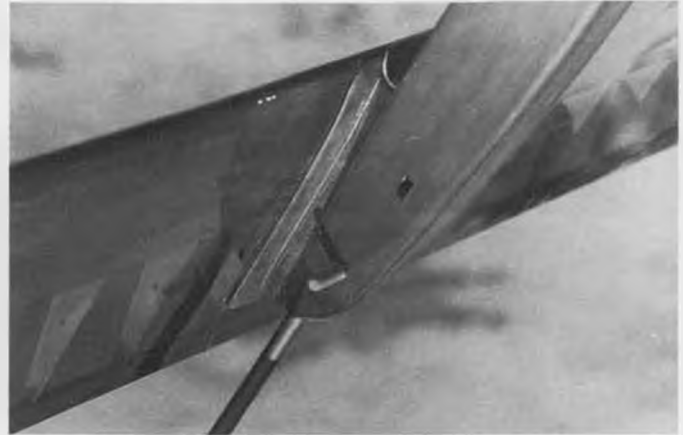
Dick Odle and his follow-through toss. Dick's release gives a higher initial launch attitude than John's, but at less velocity.



CD Ian Douglass hurries to time an unidentified contestant's Paraphrase.



A smiling Dick Odle has just maxed his flight group with the second longest flight of the day. An unusual model, the RO-19 is a really good floater with good ground covering ability.



What ties everything together is the wing pylon. Text has the details. Note the use of index and middle finger pegs for fast throw.



Last year's winner, Don Nigg came with a better ship this year and finished in 11th place. Competition was tough.



Don's plane thermalling in lift. Cloudy day produced adequate lift in most flight groups.

glider to a record-shattering declared distance of 141 miles. The flight started at Lancaster, California, headed east past Barstow, and ended in Chandliss, California. This plane was first flown by Joe in the 1986 TOSS Western Great Race (I believe) and is pictured in my November 1987 column (pages 38 and 39) as Joe's light-air, secondary racer at the 1987 WGR. Its fuselage is an epoxy-glass Vyger part from a Lewis Clark partial kit now out of production.

I guess Joe was still pretty "hot" on the sticks a week later because he flew three 1,000-point (normalized) rounds during the contest and then won a fly-off for first place. His plane has no name, but I can tell you a few things about it. It has a wingspan of 59 inches, a root chord of 7 inches, a poly-break chord of 6 inches, and a tip chord of 4.5 inches. The trailing edge of the wing is very slightly swept at each dihedral point while the leading edge sweeps back noticeably at each point. The airfoil section Joe

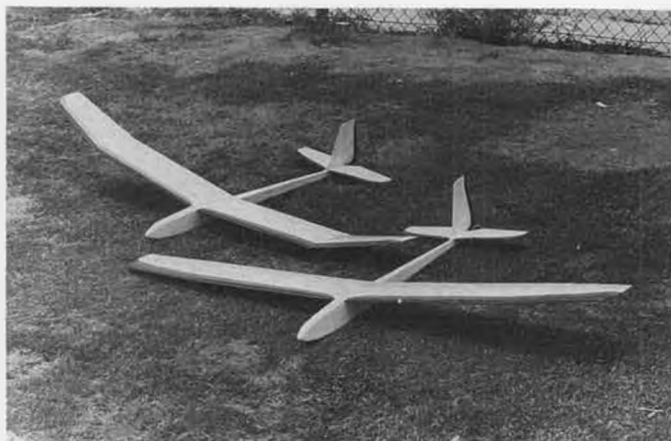
chose is the Eppler 387 which is a relatively thin, high camber section that many people feel is excellent for HLG (see September 1985, page 27).

The wings are hot-wired from two-pound density blue foam, laid up with carbon fiber tow, fiberglass, and epoxy, and then vacuum-bagged between two sheets of mylar film for a near perfect surface. The mottled appearance of the wing is either from a slurry of fine micro balloons and epoxy which is squeezeed very thinly onto the fiberglass skins to fill pin holes, or it's from aerosol spray automotive primer paint (I didn't ask; either way works). This is then sanded back down to the fiberglass so that only the pin holes are filled. The vertical and horizontal stabs were also made this way.

The fuselage is actually from an old LJMP Flinger whose wings and tails were worn out. The resultant plane weighs only 14.75 ounces which is about average for this type

of model, however the performance and the strength of this model are way above normal.

On this last point, it was exciting to watch Joe in his very first throw of the contest. The task of round one is to record your best flight in a ten-minute time slot given unlimited throws. Joe threw right at the start of the slot and hit lift right away. Other planes followed Joe into the same thermal, including a BODST flown by Gordon Poulsen. These two managed to midair at about 30 feet. Both lost control momentarily and recovered, but only Joe managed to pull out at about ten feet, reenter the thermal, and slowly work his way back up to "speck-out" altitude. The whole episode was so dramatic that as Joe caught the model to end the flight (see photo), there was a spontaneous eruption of applause. He's so good he's amazing. And on top of it all, he's not on a big ego trip about it (which I suppose is even more amazing).



A pair of Sunrise 60s, with the aileron version in the foreground.



Every year a totally ready to fly RCHLG is raffled off. This year, it was a BODST, plus a Futaba 4NL-33 Conquest radio.



Rod Knight and his no-name slope ship. It's a fast flyer with adequate thermalling ability.



George Spitzer from Pasadena suffered a pre-contest landing crash and didn't compete.

Of all the round one flight groups, Joe had the longest flight of the day with 9:52 showing on the stopwatch. Next longest recordings were Dick Odle with 8:25, Dennis Brandt with 6:46, John Bently with 5:15, Jerry Krainock with 2:26, John Lupberger with 1:39, and Garth Warner with 1:33.

The object of round two is to fly a five-minute precision duration within a ten-minute slot. You are allowed unlimited throws to make this time. Four fliers managed to make five minutes exactly, they were: Don Nigg, Garth Warner, Craig Robinson, and (you guessed it) Joe Wurts. Let's see, now, out of a possible max of 15 minutes in these two rounds, he's got 14:52. I wonder how many throws he needed in round two?

Round three is the real strategy round. Again, it is a ten-minute slot task, but the idea here is to get as much time in the air as possible with two minutes (120 seconds)

being the most you can record in a single flight, and only five out of six throws count. Time in the air is accumulative, so theoretically the most you could do would be ten minutes or 600 seconds.

Working from the lowest scoring (worst lift?) flight group winners on up to the highest we have: Allan Guthmiller with 179 seconds, Gary Ittner with 244 seconds, Dennis Brandt with 356 seconds, Dick Odle with 386 seconds, Don Nigg with 414 seconds, Craig Robinson with 468 seconds, and the numero uno pilot. One guess. That's right, Joe Wurts had 534 seconds out of 600. This means he averaged in incredible 107 seconds per throw on his five tosses. Think about it. In a random ten-minute time period, given six tosses, could you get five of them to average out to within 13 seconds of a two-minute max? He found lift on every throw. I watched in disbelief! He has to be able to see hot air rising. Has anyone else ever looked through his glasses? He works

for Lockheed, maybe he's got top secret lens filters!

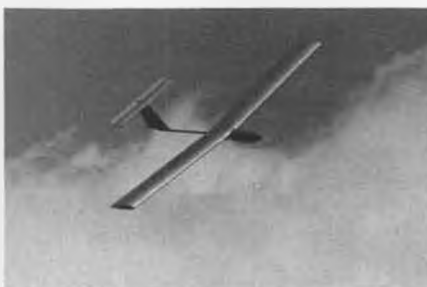
Dennis Brandt is another hotshot glider pilot. He flies a modified Flinger and is always competitive with it. The Flinger he flies has had its fuselage lengthened and its wings punched out to the Class A limit, but otherwise it's stock. In its stock form, the near-Eppler 205 winged Flinger has trouble at slow speeds and high angles of attack. This is a model that demands that you keep your speed up when thermalling. To cure this, Dennis laid two thicknesses of 1/16 wide automotive trim striping in a trip pattern on the outboard wing panels. Now the model holds tight turns with the best of 'em.

The original Flinger is available in plan form from *Model Builder Plans Service*. The plan number is 9842, the cost is \$9.50 plus \$1.90 shipping and handling (Californians add an appropriate gratuity for the

*Continued on page 94*



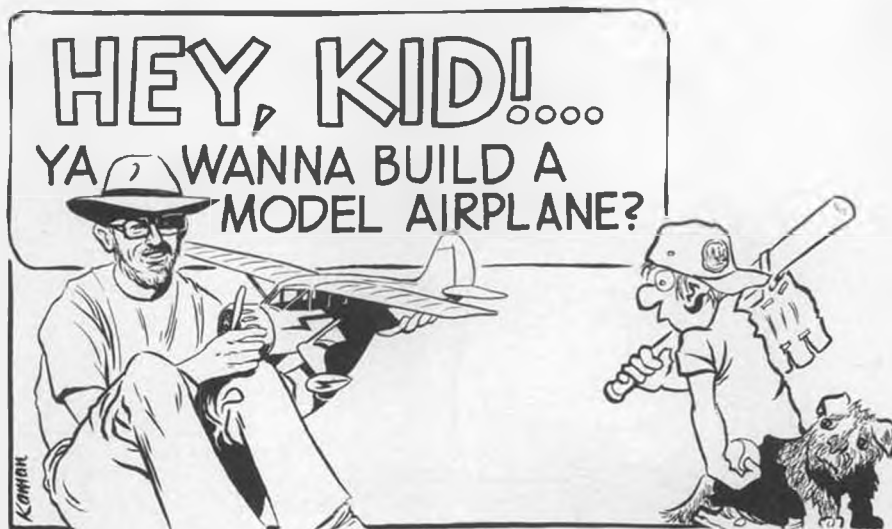
Pete Olsen's Fantasia, a fine ship that needed to lose two ounces and gain a better airfoil.



Jerry Krainock borrowed Dick Odle's RO-17 and did well considering its weight and lack of sufficient wing camber.



A hot RCHLG, 60-inch version of the Gentle Lady from Goldberg, flown by Frank Green and John Bently.



By BILL WARNER

Illustrations by JIM KAMAN

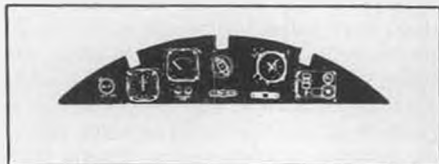
## PART 11

• Just as I gave you two choices of making your Moth with a long or short nose, I am now going to give you the choice of making it with the tail glued to the fuselage, the tail put on with rubber bands, or a pop-up "dethermalizer" tail. Like most other things in modeling, each has advantages and disadvantages. A tail assembly glued solidly to the fuselage is easy to put on and gets your model built in a hurry. However, when you go to fly and find out that it needs to be moved, there will be a lot of swearing and cutting and regluing to do. Putting the tail on with rubber bands is a little harder to do, but much easier to adjust. Making a tail which does a trick, namely popping up at a 45- or 50-degree angle to bring the model down out of a thermal, takes more effort to build, but may save your airplane to fly another day.

If you just want to glue the tail on as shown in the plane, just skip the part about the other two tail setups. I am going to give you the information on how to make the others now before we cover, as there is some structure to build in before the tissue goes on.

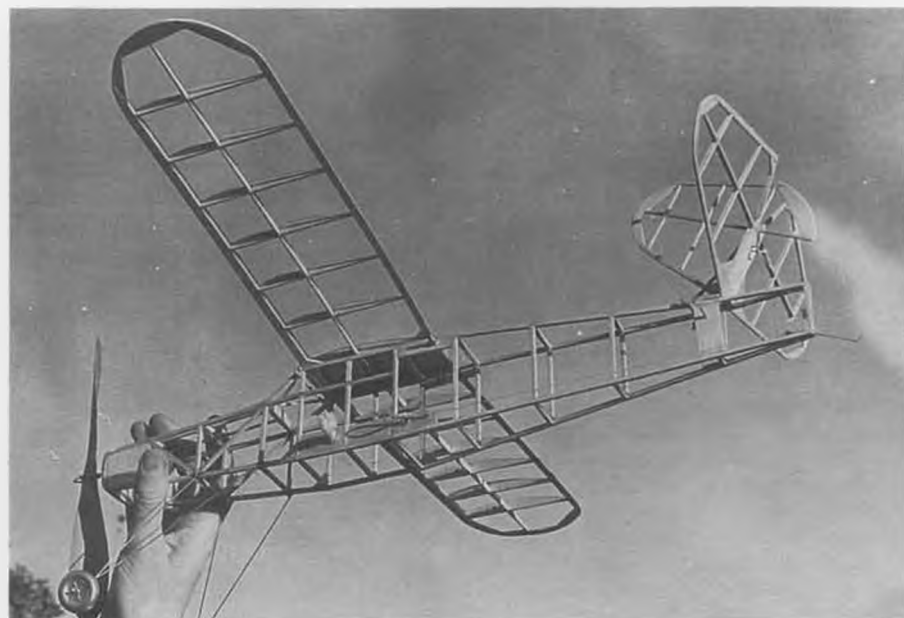
### THE KEYED STAB

Holding the tail (stab and rudder) on with a couple of rubber bands has three advantages: It can be taken off for storage, it makes repairs easier, and it is easy to shove in small thicknesses of balsa (called "shims" or "packing") under the stab T.E. to change its angle. Once you make it removable, however, you have to do something to it to make sure it goes back on straight each time you put it on. You could draw lines on it down each side, I suppose, to make sure the rudder is not turned to one side or the other (it doesn't take much to make a differ-

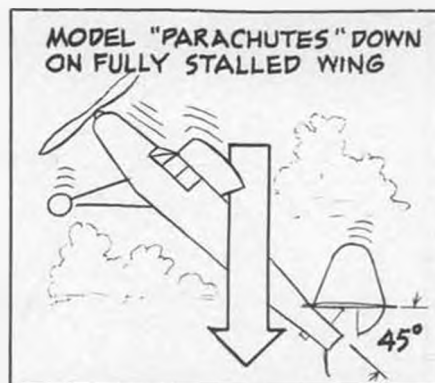


Here's a ready-made instrument panel for your model. Just cut it out and paste it to F-4.

ence in the flight!). I have tried that, but I sometimes forget to check it each time I fly. If you are like me, it will probably be better to "key" the stab in place so it always goes back right where it was before. Some modelers glue little bits of balsa stick to each side of the L.E. and T.E. where they meet the fuselage. This "outside" keying is not glued to the fuselage, but fits up snug against it. The reason it is glued to the L.E. and T.E. is that they are pretty solid, but the tissue in between is not. Never glue anything that takes any stress to just the tissue with no balsa behind it. These keys are added after covering. The rubber bands to hold the assembly on can be hooked around the tailskid and then over the stab to the rear motor peg, which will give the added bonus of keeping the peg from moving. The weight of your rubber bands should be just heavy enough to hold the tail without adding a lot of weight. Tying a knot and cutting off part of a long rubber band



The framed-up Moth with the tail kicked up to show how the DT works. This enables your model to descend to earth safely, rather than have it fly off, never to be seen again.

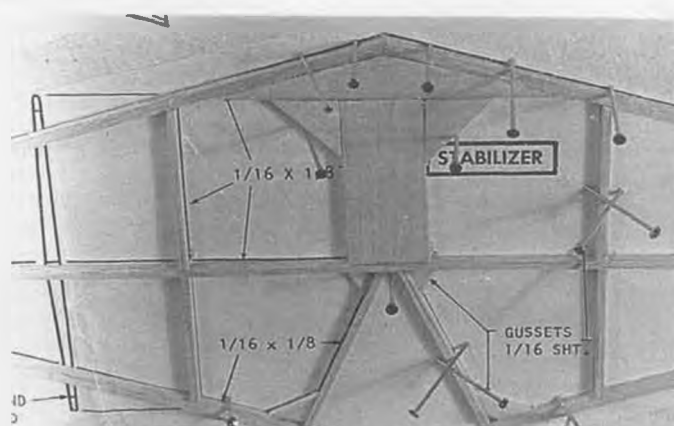
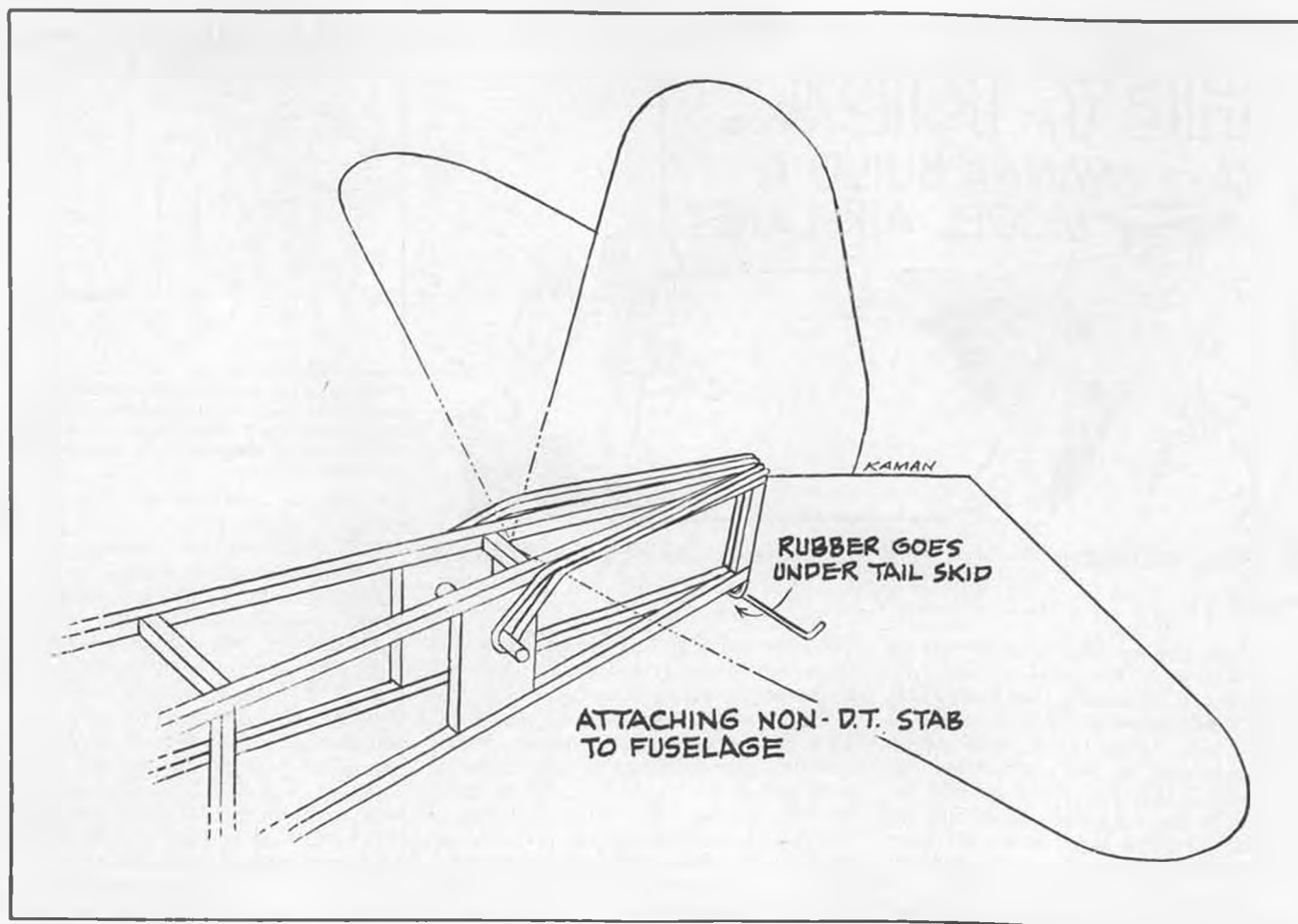


Popping up tail to induce deep stall brings your model back to earth before it flies away in a thermal. We'll show you how to add a fuse-operated dethermalizer to your model if you want to try it.

can give you one that's just right for you with just enough pull.

### THE POP-UP TAIL "D.T." (Dethermalizer)

A thermal, as you may recall, is a rising bubble of warm air which can take your model for quite a ride, sometimes up and out of sight. On a hot day, about every third flight you make will be influenced by thermals. Once you have your model well trimmed out, the chances of losing it on a wonderful, high, thermal flight are very, very good. Now this is okay for a Sleek Streak or Peck R.O.G. because you don't have much invested in them, but to lose your F.A.C. Moth will hurt. It will be quite a thrill watching it go up, smaller and smaller into the great cumulus cloud realm of Hung, the Great God of the Thermal, but on your way home from the field, you may just wish you had it back to perform for you another time. Enter the "D.T." The Flying Aces Moth is a natural for a D.T., as it turns out nose-heavy anyway. We're going to use a "pop-up" D.T., probably the most popular way of getting models back. The principle involved has to do with the fact that when the wing gets to a certain "alpha," or angle of attack, the air flow on top breaks away while the underside of the wing, exposed



Extra wood in center section of stab will let you make either a removable "keyed" installation, or will let you make a D.T.

more and more directly to the relative wind coming from the front, gives more and more drag. By popping the stabilizer at the rear of the model up to about 45 degrees, we throw the model into a "deep stall" from which it cannot recover. It just stops flying forward. There is no way to go but down. The undersides of the wing, the stab, and the fuselage now "feel" the wind as if it were blowing up from the ground, and act as if they were parachutes, slowing down the fall. When the stab is adjusted at just the right angle of "pop-up," the model will come straight down, making retrieval much easier. In contests where flights are only timed for a certain time, called a "max," the D.T. is timed to work right after the official flight time is ended. That way you have your

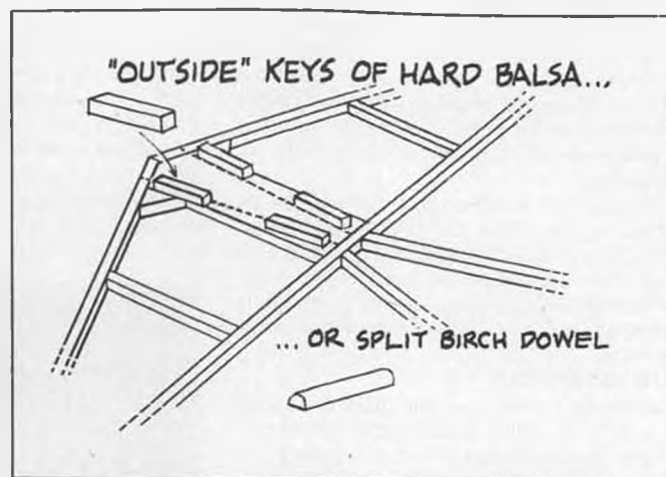
model back to fly again without a long chase. If the wind is blowing, you may want to "short fuse" just to stay on the field and out of the trees.

#### THE ANATOMY OF A D.T.

There are several types of D.T.s, ranging from weight-shifting schemes to parachutes and air-brake "spoilers." They are set off by timing devices from as complicated as clockwork timers to stuff as simple as Silly Putty (a wire pulled through it at a certain rate releases a line). I am going to show you two fuse-operated designs.

#### D.T. NO. 1 (THE REAR-MOUNTED TYPE)

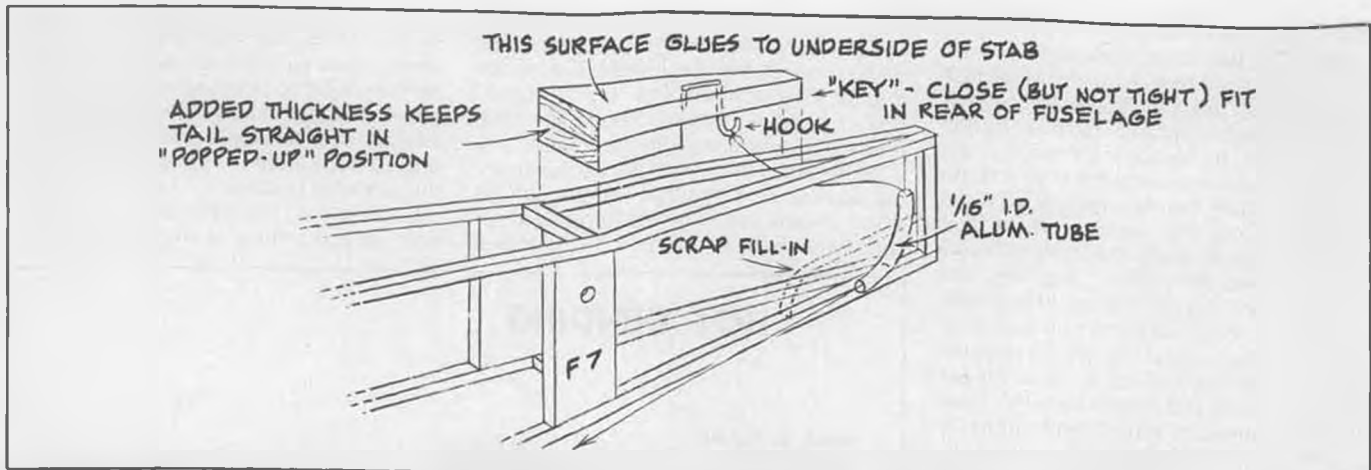
This is the simplest design. The center section of the stab is strengthened with some balsa sheet and two small hooks bent from pins or thin music wire glued on the



top. Two rubber bands pull between these hooks and a length of "Q-Tip" dowel glued just forward of the stab L.E. The L.E. of the stab butts up against a stop made from scrap on top of the fuselage. Cut a wide "Vee" to mate with the shape of the center of the stab's L.E.

Make a "plug" or inside key that just fits inside the top rear of the fuselage where the tail goes. Not too tight, not too loose, as you don't want it allowing the rudder to change position; but you do want it to come out when the stab pops up. Make it double thick in the front so that when the stab is popped up there will still be some key in the fuselage to keep it from moving from side to side. Add a hook, well bent over and glued in, to the key as shown. Make another





The most sensible location for a D.T. is near the center of gravity, though it involves running the limiting line forward.



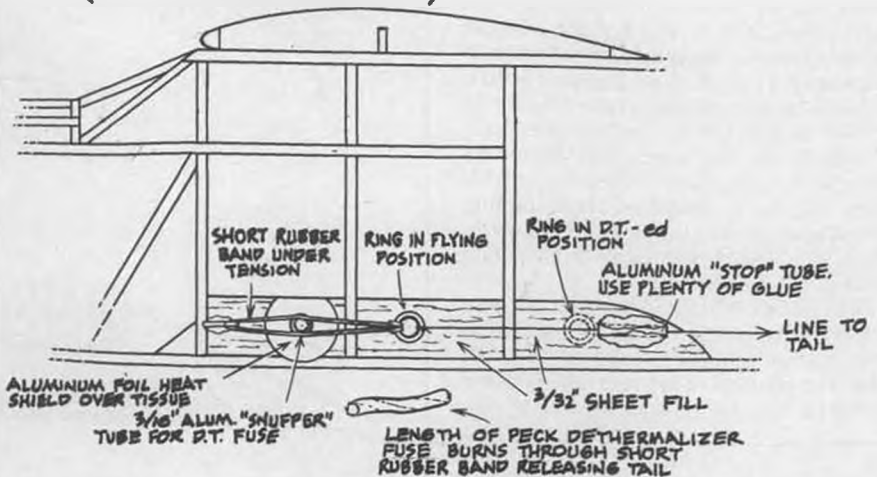
Parts for a front-mounted D.T.: fishline with stop ring, fuse, flared snuffer tube, bent guide tube, stop tube, .015" music wire hooks.

hook for the lower rear part of the rudder and glue well.

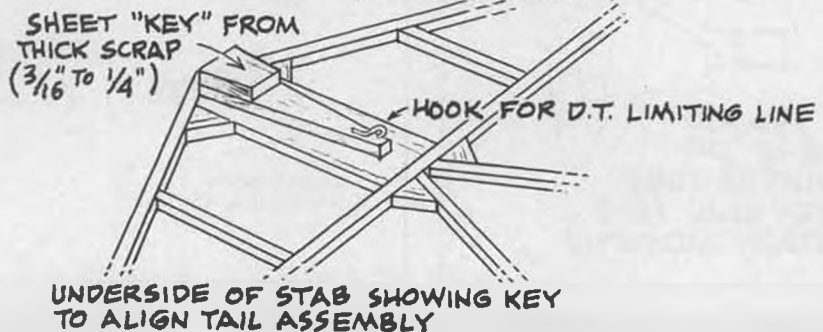
Flare a short length of 3/16-inch aluminum tube. The flare helps get the fuse in, but it is not essential. You can "roll your own" from soft drink can aluminum if you don't have the right size tube. You make a flare by rotating a nail or similar in one end of the tube to push the edge out a bit larger. Glue the tube up between the two lower longerons of the fuselage and glue some scrap on each side to make the installation stronger. This tube is very important, as it puts out the fuse when it has done its job. It won't help if you land in dry grass before the fuse has burned down, though, so use good sense when you fly in dry areas!

Just in front of the tube, a piece of scrap across and another little hook will about finish the job. Then all that is left is to make a "limiting string" out of a bit of fishline or

### D.T. WITH FRONT-MOUNTED SNUFFER (LEFT SIDE OF FUSELAGE)



### "INSIDE" KEYING (PLUG METHOD)



strong polyester thread to stop the rear of the stab when it gets up to 45 degrees. The thread goes from the tailskid to the hook on the key, inside the fuselage, tucked neatly in for the next use each time it's time to fly. When the top rubber bands that pull the stab up are connected, the stab should pop up every time, stopped by the limiting thread. If it doesn't, try more pull on your rubber bands (shorten by knotting) or take a little off the sides of your key, now strongly glued to the underside of the stab. Insert a short length of Peck D.T. fuse (or clothesline with soft cotton stuffing such as Mike brand) into the tube. Surrounding the tube area with aluminum foil will help protect

the model. Now stretch a thin rubber band from the hook at the rear of the rudder forward, around the fuse, making sure that it touches it, and on to the hook near F-7. When the fuse is lit (careful not to light the model!), note how long it takes to burn a quarter of an inch. This will help when you fly. Beware being fooled, though, as when the plane is moving the fuse burns faster. Check it at some distance from a fan to simulate flight conditions.

#### THE FORWARD-MOUNTED D.T.

This is about the same as the regular D.T. just mentioned, except that it carries the fuse near the CG of the model. The fuse does have some weight, which it loses as it

burns. This can change the trim of your model if you have a long fuse and if you use the rear-mounted type. Also, it gets the fuse in a little safer place in relation to dry grass if you land early (kept away by the wing and landing gear). It's basically the same as the rear-mounted one as far as the keying of the stab, top rubber bands, and L.E. stop are concerned. You will need to add a bent piece of tubing to guide the limiting thread around toward the snuffer tube's new forward location, though. You could probably use plastic tubing for this if you have any, though getting glue to stick usually requires a good roughing up with a file of 80-grit sandpaper. Heat will help in bending. I use 1/16-inch aluminum tubing bent around a 1/2-inch diameter marking pen, but a half-inch bolt held in a vise would be easier if you have only two hands. Aluminum tube has the nasty habit of folding or snapping when you try to bend it. The larger the bend, the easier it is. Also, holding pressure down where it is bending with your thumb helps keep it from folding. I usually bend it a little, hold in the flame on the stove for 10 to 15 seconds to soften it, bend a little more, re-soften it, etc. The trouble with aluminum is that it "work-hardens" in bending, which gives you your problems. The limiting thread goes around the bend inside easily when it is "hardened" with a little glue rubbed into the thread.

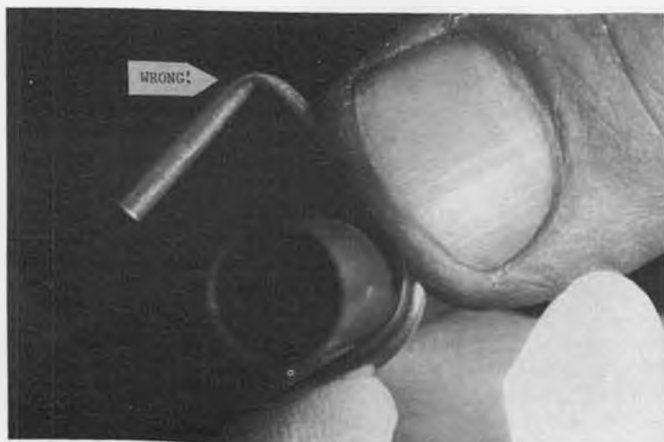
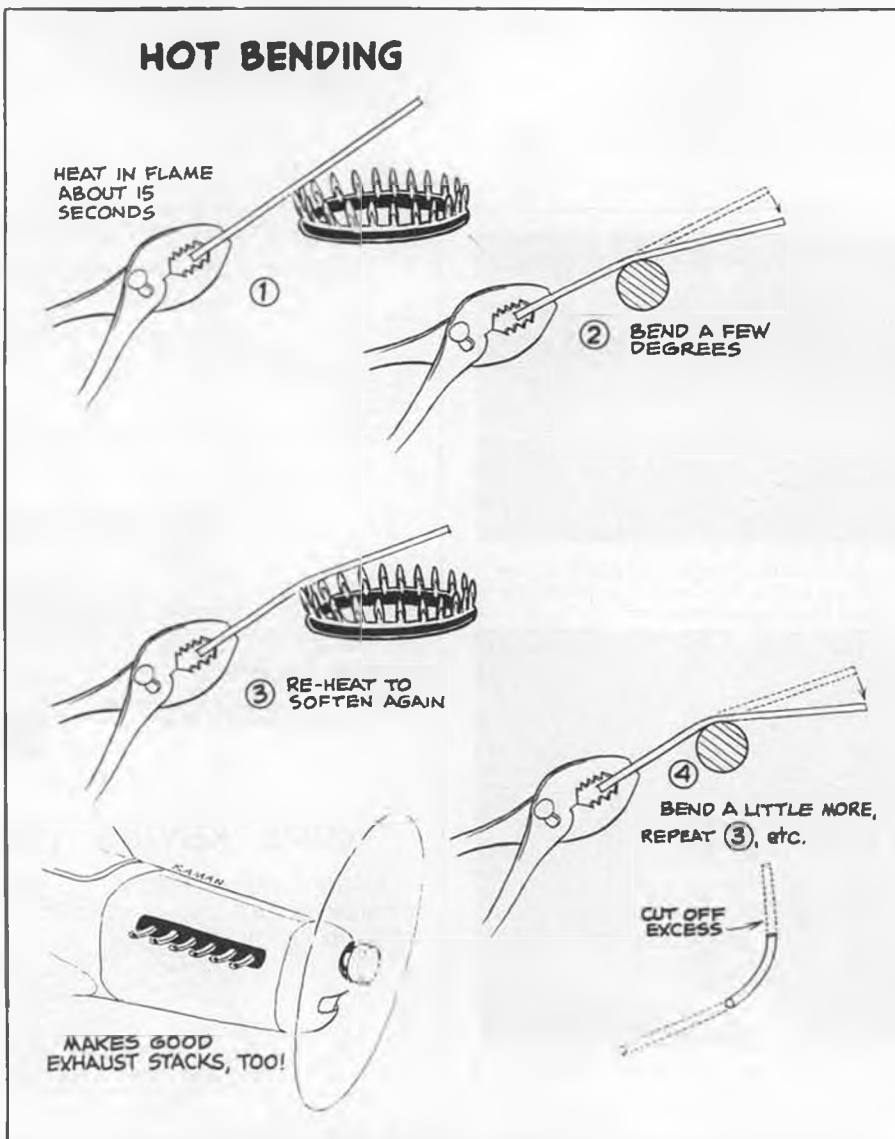
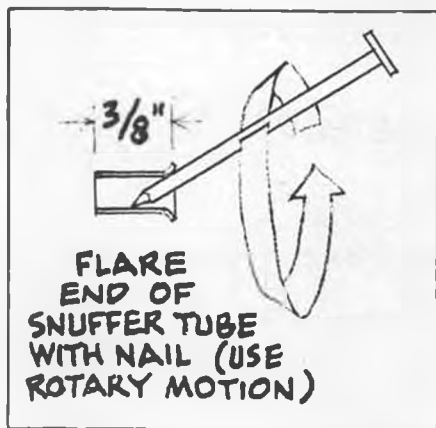
The end of the limiting thread has a little ring or crosspiece tied to it after installation through the "stopping" tube of 1/16-inch tube. The position of the stop tube is determined by how far the stab is going to pop

up. Study the diagram to see the positions of the stop, snuffer, and front hook mounted on scrap sheet over the lower longeron under the wing position. The "burn-through" rubber band is hooked around the ring, over the fuse, and onto the front hook.

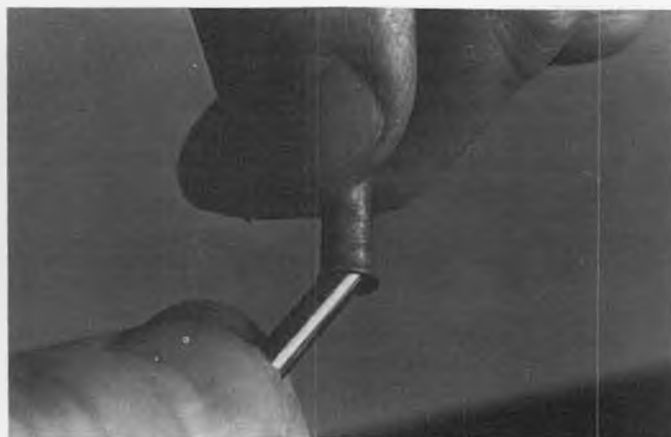
Well, gang, I think we'll put off the finishing up until next month. I can get only so many photos and sketches in each time, and we're about at our limit this month. I

know, you'd rather get your thousand words' worth that way! Still, I know that some of you will have it covered and flown before we get to covering and flying, so let me wish you good luck. Just remember to take all the warps out before ya' fly, and expect to put a lump of clay on the tail to get the model in balance.

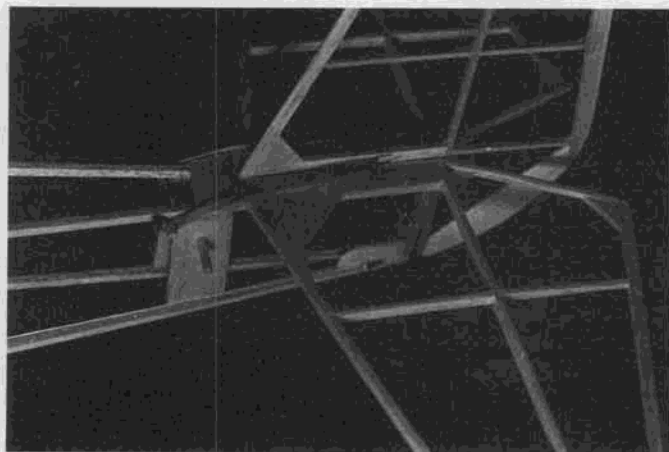
If you haven't started your FAC Moth yet, now's as good a time as any. We're going to



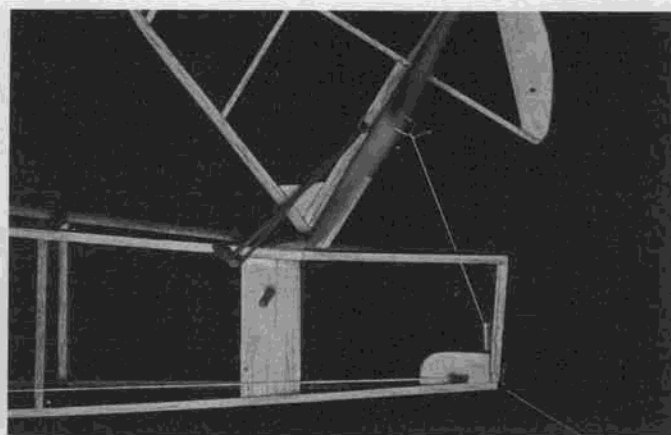
Aluminum will kink when bent cold on small-radius bend. Either keep thumb pressure or use "hot" bending technique.



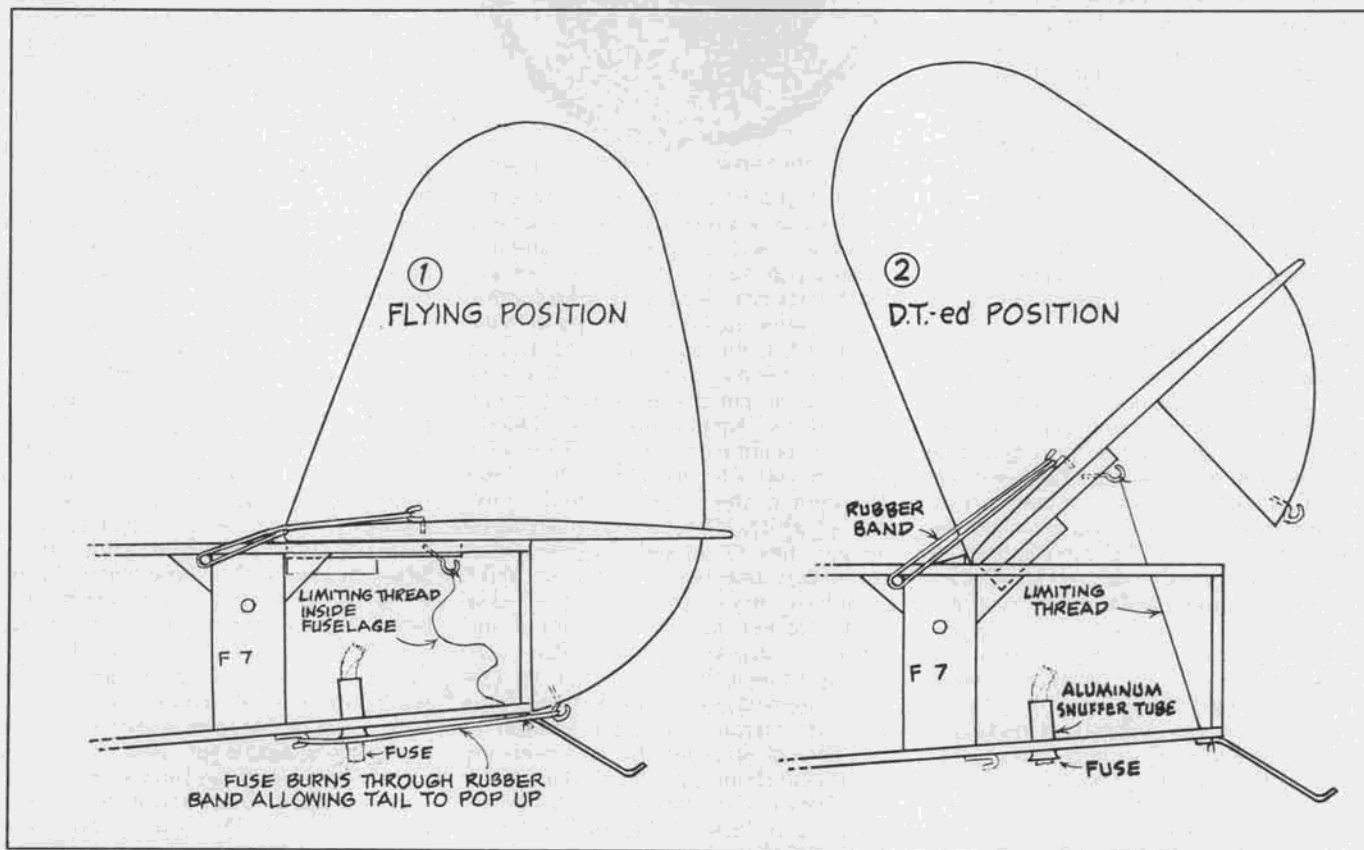
Flaring the D.T. snuffer tube with a thick nail or end of a drill as shown will make fuse insertion easier.



Tail pulled down into place while model is in normal flight.

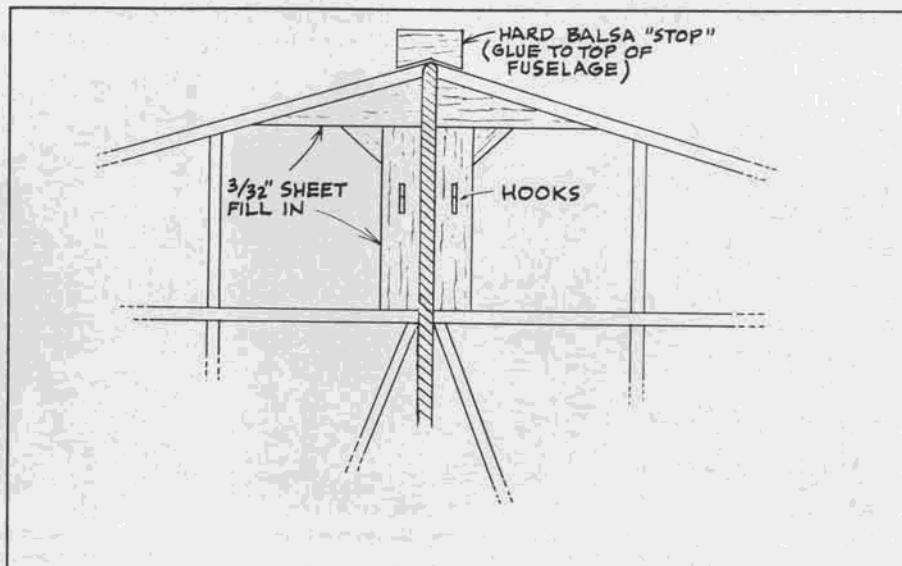


Rear of tail is released when fuse burns through the retaining rubber band, putting model in deep stall to dethermalise it.



have a special contest for all you guys and gals out there soon where you can send in a picture and tell us in 50 words or less how it flew. There will be some nifty prizes, and the best photos will be published in this great magazine.

You might want to order some covering tissue from Peck's, as there is just enough in the kit to cover with if you don't mess up. I understand the original was green with yellow wings, and a sheet of Peck's domestic black is great for adding trim. It doesn't fade out like some Japanese black I've used. We'll show ya' how to decorate with tissue, too, and also the fine art of windshield attachment will be covered. Peck-Polymers/Beginners, Box 2498, La Mesa, California 92041, has a list of kits and materials we're using in the series for a SASE, and their full catalog is \$2. The balsa prop blank can be had from Oldtimer Model Supply, P. O. Box 7334, Van Nuys, California 91409. •



# Control Line

By JOHN THOMPSON

• Writers of columns like this one tend to assume that their readers have some modeling experience, and often we just launch into the middle of topics without laying the groundwork.

Occasionally, however, it's probably wise to acknowledge that, as we go along, we pick up new readers (new modelers, people thinking of getting into the hobby, or perhaps modelers in other types of flying) who may not have the background in many of the topics we mention only in passing.

It may be a bit confusing to read a discussion on FAI combat or Formula 40 Speed or the latest interpretation of the entry point of the horizontal square eight if you don't know what FAI is, or what Formula 40 stands for, or that there was more than one kind of figure-eight.

This column, then, is intended to go backwards in time a bit for the benefit of those beginning, thinking about beginning, or simply curious about control-line model aviation.

## STRINGS ATTACHED

First of all, let's begin with a brief discussion of the definition of control-line model aviation. Yes, I know it sounds elementary, but remember that in this diversified society of ours there are people who have never seen CL model aviation. I am reminded of this every time I am at a Nats or a major local contest at which R/C fliers happen to drop by. Even these active modelers often profess amazement at the discovery of the excitement of CL competition (and a few become converts to what they learn are "cheap thrills" in comparison to what they've come to know).

Control-line is the only type of model aviation that gives the pilot direct control of his craft. He is close enough to see its maneuvers, can feel the plane's responses immediately through the lines, and is a "pilot" in the truest sense possible without actually going up in the air. It also is the fastest of the modeling events in its competitive form



Logo for the Seattle, Washington Skyraiders.

(due to its proximity to the ground) and the one that can be done in the most confined space. Because it uses only wires and mechanical parts for control, it is less expensive than the types which use radio control.

Control-line model aviation began in the late 1930s. Correspondence and reading I've done over the years indicates that it actually was invented approximately simultaneously by several people. The earliest I am aware of is the late Oba St. Claire of Eugene, Oregon, who upon his death in 1986 still owned the never-crashed "Miss Shirley" which is believed by many to be the very first CL model airplane. Other names that have been mentioned, and I cannot give the exact dates of their early flights, are Ron Moulton of England and Robert Smurthwaite of Grants Pass, Oregon. Also among the pioneers, and the one whose promotion of CL flying through his business enterprises is acknowledged to have been most responsible for worldwide spread of the hobby, was Jim Walker of Portland, Oregon. From Jim Walker's trademark comes the nickname "U-control" often applied by old-time modelers.

There are several kinds of control-line systems in existence, the most popular of

which is based on the system used by St. Claire and Walker, the T-shaped bellcrank (as an aside, it was interesting to me to learn that St. Claire's original airplane actually used four lines, with the third and fourth lines operating an aileron system designed to keep the plane tight on the lines; a system St. Claire abandoned after early flights showed that it was unnecessary).

The basic principle of the T-bellcrank is that the pilot's use of his arm movements to adjust the tension on the two lines operates the arm of the bellcrank that moves the pushrod that in turn moves the elevator (and, on some airplanes, wing flaps and/or rudder).

Other control systems, also still used and popular, are the one-line torque system and the three-line system. The one-line system activates a torque unit in the airplane by twisting the line, and the three-line system uses a special bellcrank to operate a throttle or other function on the aircraft. Each kind of control system uses a different kind of handle. The two-line system uses a handle with two-line connection points (sometimes adjustable in separation so that control sensitivity can be adjusted). The three-line system adds a third line between the elevator-control lines; the third line is operated by a trigger and/or lever. The one-line system uses a handle attached to a threaded rod and a knob that moves back and forth, spinning the rod as it moves.

The two-line system is used for many sport flying planes, for combat, racing, and precision aerobatics. The one-line system is common in speed competition. The three-line system is used for Navy Carrier and scale modeling and many sport planes. Additional lines have been added by some scale competitors for additional functions. Scale modelers also have begun using electricity-conducting lines to operate on-board electrical systems for scale functions.

*A digression:* Just above, I used the term "sport" modeling. If you're new to the hobby, you may be confused by the common usage of that term among modelers. Try to follow this: If you are a casual flier, just doing it for fun on Sunday afternoons, you are a "sport" flier. If you attend contests and participate in the sport of model aviation, you are a "competition" modeler. I don't know how this apparent contradiction in terms evolved. Furthermore, I have never



Combat is a team sport. Norm McFadden and John Salvin work on plane for Gary Byerley. Photo: Charlie Johnson.



Racing planes need regular maintenance in order to perform well. Paul Gibeault works on rat racer in Richmond, B.C. Photo: Hazel.

known why some fliers say, "I don't fly competition; I just fly for fun." Well, I fly sport and competition and find them both to be fun. But this topic could cause us to digress for pages.

Notwithstanding the dacron lines that come with some ready-to-fly plastic toys and are available for small planes in the hobby shops, 99 percent of CL models are flown on steel wires. The most common type is the seven-strand stainless steel cable available in sizes from .008 of an inch up to .021 of an inch. Also common in racing and speed is single-strand music wire in a similar size range. The braided cable is more versatile and withstands abuse better; the single-strand wire is stronger for its size and cleaner (less draggy) in the air.

One of the major manufacturers in recent years attempted to market a new kind of lines, which were eagerly awaited but turned out, in their first form at least, to be unsuccessful. These were the Kevlar lines, made of a super-strength synthetic material. They were indeed strong enough, but they produced such excessive drag that they seriously degraded the performance and trim of aircraft. They also had no legal use in competition, a situation that might have changed had the lines been practical.

#### TAKING OFF

How does a person get started in CL modeling?

Obviously, it all starts with the first airplane, engine, lines, handle, battery, etc.

In "the old days," meaning any time from the 1950s through the 1970s, one could simply walk into a local hobby shop and ask the person behind the counter. A little while later, you'd walk out with all you needed to get started.

Unfortunately, it's a little more complicated than that nowadays, but still possible.

The hobby shops of today are oriented to the high-profit radio-control market and most are operated by people who are business people and not hobbyists. So, if you don't know exactly what you're looking for, you're likely to come away with something you didn't really want. If you do know what to look for, you may or may not find it in your hobby shop, but I always advise new modelers to try their local shops first. After a while, you and your fellow modelers may build up an interest in the shop owner in carrying what you need.

In the meantime, how do you get what you need to get started?

The first thing you have to track down is another CL flier. It may seem like there are none around you, but there are. CL modelers are spread out in little pockets and by themselves in corners of every community. Many fly in schoolyards, depending on where the crowds and noise will allow. In communities with clubs and CL fields, they probably fly in some remote location away from, again, the crowds and sensitive neighbors.

First, ask in your hobby shop. Do they know of any CL fliers? If it's a good shop and the owner is paying attention to his customers, he knows whether there are CL modelers around or not. If he's honest and reputable, he'll tell you how to get in touch with them. Beware if he says, "Nope, none



Racing action keeps pilots busy. Four-up Northwest sport race, in Portland, Oregon. From left: John Hall, Rich Salter, Jim Cameron, Glenn Salter. Photo: Hazel.

of those around here. How about a nice R/C plane?" Second, look for the club nearest you. Again, try the hobby shop. They will most certainly know if any clubs are in the area, and may have information on their meeting times and flying sites.

If the hobby shop can't help, write to the AMA. There's a term you will hear much of as a modeler, the AMA. The Academy of Model Aeronautics is the national miniature aviation organization, a division of the National Aeronautic Association. AMA is the organization that sanctions model aviation competition, insures fliers, publishes a magazine and various newsletters, acts as a clearinghouse for all kinds of modeling information, operates a computer network, runs a model aviation museum and the National Model Airplane Championships, makes and rents modeling films, charters local clubs, helps with obtaining and keeping flying sites, negotiates with the federal government over R/C frequencies, repre-

sents U.S. fliers in the international Federation Aeronautique Internationale (FAI), and generally serves as the modelers' all-purpose service organization. Dues to AMA are the best investment you can make as a modeler and should be one of your first expenditures; the insurance alone makes it worth while.

Write to AMA at 1810 Samuel Morse Drive, Reston, Virginia 22090. Dues are \$40 for open (age 19 and up) full membership, \$36 for open limited membership (newsletter only, no magazine), \$20 for an additional family member, \$21 for senior citizens (65 and up), \$16 for juniors (ages up to 14) full membership, \$7 for juniors no-publication membership, \$18.50 for seniors (ages 15 to 18) full membership and \$9.50 for seniors no-publication membership. You can join at any AMA-sanctioned contest.

*Continued on page 101*



Concentration is important in combat. Mel Lyne, left, and Frank Boden go at it in Richmond, B.C. Photo: Hazel.



Jet speed planes take on unusual forms. This is George Fogarty, from Texas. Photo: Hempel.

# THE PAINTED DESERT



**STORY AND PHOTOS BY DAVE "VTO" LINSTRUM. . .**The annual USFF Championships in Taft came off well as usual, with a stalwart gang of free flieters launching at the crack of dawn.

• For over two decades, free flight fanatics from all over the nation (and some from Canada, Mexico, and foreign shores) have been attracted to the California desert like iron filings to a magnet. This mystical migration is now free flight folklore. The U.S. Free Flight Champs is the pinnacle of competition, outshining even the formerly prestigious AMA Nationals in quality and keen contestant skill.

Why do these seasoned competitors fly in the desert? To be free, of course; free from buildings, pine forests (and other trees), hills and deep gullies, highways, etc., free from all the model traps. If your free flight ship drifts with the wind in the embrace of a sustaining thermal, you want to be able to chase it without barriers, natural or man-made. Another desert benefit is that thermal activity is predictably high, though you have to take the downdrafts with the lift. Thermal detection at the USFFC is a science and a fine art.

This particular desert is in the lower reaches of the San Joaquin Valley, about two hours by car from Los Angeles and five hours south of Silicon Valley. Gardner Field, the flying site, is a level area a mile outside the small oil town of Taft, just east of the "Kitty Litter" factory. The foothills are full of oil derricks, and the valley floor beyond the field is verdant with new crops. When the California Aqueduct arrived, farmers were able to irrigate and turn the desert into a breadbasket for Los Angeles and points south. So far, this has not interfered with flying. For many entrants in the

USFFC, this is the best flying site they will see all year. No wonder it is a mecca for F/F!

Since we can't show you color photos of this many-hued scene, we will try to paint



John Oldenkamp, San Diego fashion model, thinks this Starline T-shirt says it all about rubber power.

some word pictures of the desert action. Perhaps flying into San Francisco on a big silver bird (America's "On-Time Machine" DC-10) was an omen, for our first impression of Taft was in deep black and silver. We drove down with Oakland Cloud Duster Jim Harris by the light of a silvery moon, arriving at the field at 3:00 a.m. We awoke to bright white sunlight as sol ascended over the parched brown hilltops. All around us was a curious gypsy village of campers, RVs, station wagons, and vans. Strung out in front were bright nylon sunshades, protecting models and fliers from that searing sun. It became a yellow ball in the sky, which curiously enough was "Carolina Blue." Soon fluffy white cumulus cloudbanks formed, proving that thermal activity was abundant. At day's end, the orange and purple sunset was blurred by wind-torn cirrus and ominous grey storm clouds. After nightfall, modelers brought out those strange yellow-green chemical litesticks. They attached these to everything from "D" Gas monsters to little P30 rubber jobs and proceeded to night fly.

At dawn, the sane flying returned. Covered in many hues of tissue, silk, and mylar films, the models stood out against the pure blue sky. We noticed that several fliers were using broad black and white strips on undersurfaces. Many hand-launch glider fliers used black on the underside to give better visibility for timing. This works well against sky or hillside. For a max, contrast is important in the clear desert air (no smog here, Los Angeles fliers agree). Finally, we have



Carl Hatrak, with SCIF, was a Trenton flier when this Miss Fortune was designed by Nick DeAngelis.



Phoenix's Randy Archer cleaned up in FAI Power with seven max flights. All aluminum-clad surfaces, graphite boom, Nelson .15.

the warm brass and brown wood tones of the trophies, delivered truckload-style by Contest Director Carlo Godel.

Statistically, the USFFC falls between gargantuan and behemoth with an incredible 244 contestants sampling a smorgasbord of 52 F/F events. There were opportunities for all in 25 AMA events; 12 Old Timer, 4 Indoor, and 11 Special Events (privately sponsored). CD Godel and his understudy Bill Booth Jr. were kept busy, but the contest was really run by member clubs of the Free Flight Model Association of Southern California. Without these clubs, there would be no timing tables or timers. This meet was run by fliers for fliers, a very satisfying management philosophy.

Other statistics also come to mind, in the form of stupendous scores in the thermal-packed desert atmosphere. Bob Sundberg of Los Angeles claimed top time in 1/2A Gas with a mind-boggling 50-minute total! Not to be outdone, Ray Faulkner (also of Los Angeles) led the pack in D Gas with 59:45; that's 11 maxes and a 5:45!

The team champions, calling themselves "The Combat Kids," were no slouches: Terry Kerger hit 44:38 in B Gas; Randy Archer, of Phoenix, aced a cool 30:00 in FAI Power; and Martyn Cowley, a refugee from the UK, totalled 21 minutes in Nordic A/2 (F1A) towline glider. Matt Gewain put Martyn in second place, mind you, by six seconds.

The Old Timers had their statistical highs as well: Dick Lyons, of Los Angeles, soared



Fresno's Dallas Porter with humongous D Gas Satellite 1300 with O.S. .60 glow engine. Not a kit, it took a carload of balsa, Hot Stuff, and MonoKote.

to 34:36 in 1/2A Texaco while Larry Clark, of San Diego, thermalled for 25:42 in OT Texaco. Even tiny craft flew long, as shown by Pee Wee 30 winner Carol Bartick, of Po-

way, who got a 2207 score with her "Moon-shot" designed by husband Don. All these fliers worship the Thermal God "Hung." While astronomical scores like those may



SCIF old timer Bob Erickson flies classy Miss World's Fair 50, a 1939 design from Fresno Models kit for OT Cabin Rubber event.



San Diego Orbiteer Bob Langdon with pretty Jimmy Allen Blue Bird flown in special event for Allen designs.



Bob Beecroft from San Diego says the devil made him do it; still flies 26-year-old Class D Satan.



Detroit's Paul Crowley gives thumbs down on air sensed by his recording thermal sniffer. It's essential in Wakefield.



San Jose's Jim Harris looks for lift to launch his R/N kit Slats. Note Foreign Legion hat.



SCAT flier Juan Livotto of LA ready to jog out with circle-tow glider number 25. Wind was rough on towing.



C.T. Jordan, Tustin, California old timer, loves his mammoth Lanzo Bomber with Super Cyke .60 ignition with 13.6 Rev-Up prop.



Martyn Cowley of LA via UK D.T.'s the wing on his OHLG Gold Rush, a regular winner in glider competition.



Sacramento FAI power maven Roger Simpson tunes ABC Rossi in aluminum-clad RS-80. Sleek ship placed 2nd in flyoff with Archer.

be indicative of good field tactics and thermal sensing, there is no way to predict how models will be named. Sure, there were "Stardusters," "Satellites," and their common brethren in the air, but have you ever seen a "Low Box"? That's the name John Oldenkamp, intrepid desert photographer and San Diego Orbiteer, hung on his new all-balsa P-30 Rubber. His clubmate Bob

Beecroft, back in action after a long hiatus, named his D Gas "Satan" when he built it 26 years ago! Another San Diegan, Alfie Faulkner, had a huge (not tiny) "Pixie" from the 1938 Zaic Yearbook. In a modern vein, Mike Mulligan, of Los Angeles, flew his "Sheer Terror" (Loren Williams design) in Mulvihill. The name derives from the pre-launch feeling you get with a fully wound

gumband in the fragile model. Vic Cunnyngham Jr., of Covina, had his venerable "Sir-rocco" in D Gas, while Doug Galbreath, of Davis, flew "Summerwind" in FAI. Ed Carroll, of Riverside, was behind him with a "Saje" FAI, while Roger Simpson chickened out, namewise, with his "RS-80" FAI. Boring! Randy Archer was more creative with his "Silver Bird" winner.





Blacksheep Squadron's Ray Juncal of LA with Peck kit Pietsenpol and Mace kit Caudron.



Rich Rohrke of SCAT club in LA has it made in the shade with all-white flying duds and his Mozart Wakefield.



Alfie Faulkner of San Diego sees a thermal meant for his O.T. Gas '38 Pixie. A Schumacher design from Zaic Yearbook with DC 350 diesel .21 from England.



Chuck Rushing of San Francisco displays his elegant Wakefield CR.2 that uses a Starline front end.



Mulvihill man Joe Foster of Oakland Cloud Dusters smiles because timer Hank Cole has a max on the watch!



Don McHugh, San Diego lets loose of his hot No Name P-30 rubber, an event that was created by his club.

In the AMA Gas classes, "Texan" designer Ed Miller, of El Paso, came up with the swift-climbing C Gas "Cultured Pearl." Andy Faykun of SCAT/LA built a 1941 Danish Wakefield, "Victory." Those Danes are still about, as his clubmate Norm Furitani had a "Tilka" Wake built from Dolby kit. Finally,



Kathy Ganzer of Mojave, California with neat little peanut Piper Cub from Peck kit.

Martyn Cowley was seen flinging his "Goldrush" HLG into the heavens. It went OOS! The most creative, tongue-in-cheek model name, however, came from Steve Geraghty of the Oakland Cloud Dusters. I admired his HLG, built-up wing and all, and asked the name for a photo.



San Diego Orbiter and P-30 originator John Oldenkamp lofts his yellow Lo Box all-sheet quickie P-30.

Steve smiled and replied "Dave, I named it after you." Now this really got me curious. What had I done to have a model named after me? Did he mean "VTO" or was the HLG another "Dave" or even worse, "Whatshis-

*Continued on page 98*

# INSIDERS

## INDOOR FLYING REPORT

By DAVE "VTO" LINSTRUM

### HINT OF THE MONTH

Our HOTM for September is for indoor scale fliers who don't want to go all out with an airbrushed, color finish. There are several good colors of tissue available from Peck-Polymers, Indoor Model Supply, and Micro-X Supply. However, for certain models you need an unusual tissue color. We faced this problem when building a Mooney Peanut Avro "Spider" from MB centerfold plans.

The answer was Spectra Art Tissue, available at art supply stores. We found the perfect WWI British brown hue among the many available. The tissue is without grain and is a wee bit on the heavy side but is still lighter than doped tissue. Next time you are in an art supply store, ask to see their Spectra selection.

### INSIDERS WORKSHOPS

Bill Warner of the Flightmasters (Los Angeles) sent in this month's workshop photo,

showing the compact but efficient building area used by Joe Bickinella in Alhambra, California. Joe's homemade desk/drafting/building board has a hinged top with magazine shelves and storage under. At the back are scale pilot figures, model and drawing tools, and a clamp-on drafting lamp. Good lighting is essential to precise building. Send us a photo of your workshop, with a brief description, for a future column.

### OBSCURE AIRCRAFT

Another contribution from Los Angeles, that hotbed of scale flying, is the plans list of all Obscure Aircraft drawn by Roger W. Teagarden of the Flying "T" Model Company. We know the name sounds like a ranch or brand of beef, but it is really just a clever expression of the attitude that went into selecting and drawing these plans. For only \$5, you get a fully detailed 18 x 24 blue-line print of a fabulous flyer. Available



DC Maxecuter Don Srull launches his Alco Sport Coconut Scale to win event.

at present time are: 1911 Hironnelle (France), 1913 Deperdussin HS (France), 1911 Avro Type K (UK), 1917 SIA 7b-1 (Italy), 1912 Chiribiri #5 (Italy), 1917 SVA 1-10 (Italy), 1907 Bleriot VII (France), 1911 Nieuport Racer (France), 1916 DH-6 (UK), 1913 HP Yellow Peril (UK), 1912 Nieuport Schneider (France), and 1911 Latham Monobloc (France). **TOTALLY OBSCURE!**

All plans come vis first-class in USA, post-paid. Roger also has neat scale fittings. Order today! Roger Teagarden, 1234 N. Edgemont, #204, Los Angeles, California 90029.

### WHAT IF THE RULES WERE DIFFERENT?

(This NFFS item by Hewitt Phillips is continued from the August issue.)

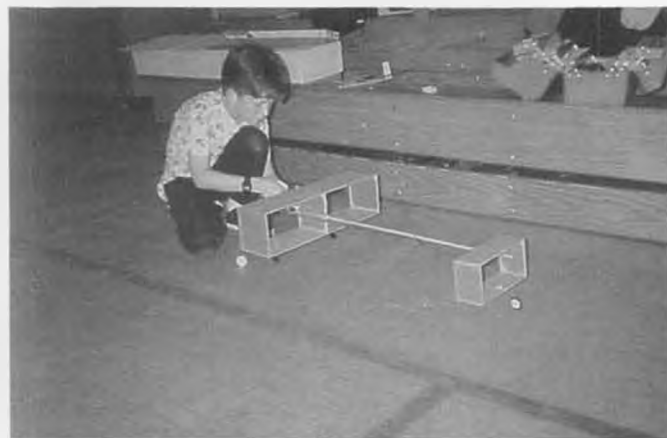
A second comparison is made of the various types of models winning in the open class in the "Mini-Dome" at the 1987 U.S.



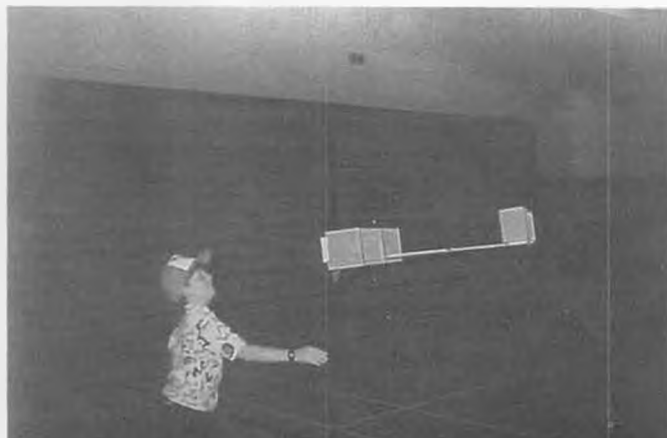
Author Linstrum found his thrill with his new models. From left: Phantom Flash (stretched), Bristol Scout, P63 FAC NoCal.



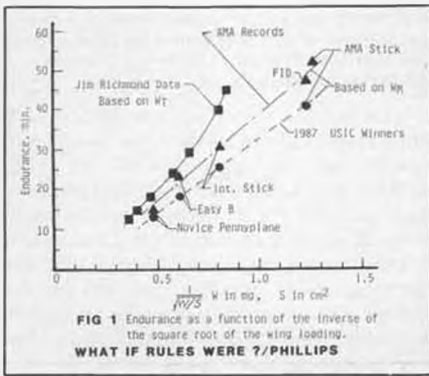
Joe Bickinella's home workshop in Alhambra, California, is source of precision guesswork.



John Wilson of New Brunswick prepares his Boxy Canard in a high school gym. It's cold outside!



Here John launches his Boxy Canard.



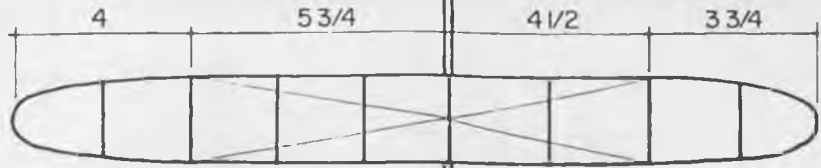
Indoor Championships (See Figure 1). These results appear a little more consistent, possibly because the models were flown in the same 116-foot ceiling under comparable conditions. Again, however, the endurance increases somewhat more rapidly than  $1/W/S$ .

A similar analysis using data for excellent flights made by models in various classes was given by Jim Richmond in his model-of-the-year article in the 1980 NFFS Symposium. Richmond's data were plotted as a function of the total weight divided by wing area,  $WT/S$ , using wing-along area and cor-

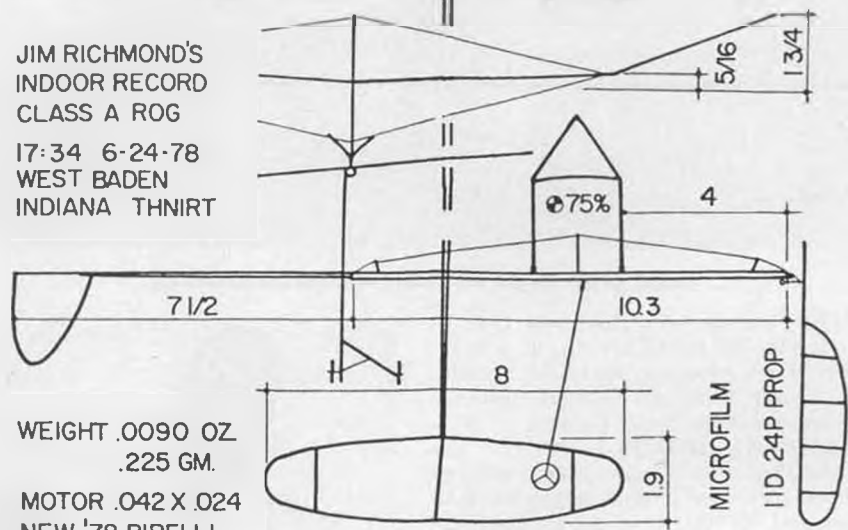


New Brunswick flier Dave Boyer with neat DeHavilland Leopard Moth.

# the atrium insect



JIM RICHMOND'S  
INDOOR RECORD  
CLASS A ROG  
17:34 6-24-78  
WEST BADEN  
INDIANA THNIRT



WEIGHT .0090 OZ  
.225 GM.  
MOTOR .042 X .024  
NEW '78 PIRELLI

rected to the same ceiling height. These data have been replotted as a function of  $1/WT/S$  in Figure 1. Again, the results show that the endurance is increasing even more rapidly than predicted by the formula as the wing loading is reduced.

### Results of the Overriding Effect of Wing Loading.

The least restricted category, the AMA Stick, has in past history been the focus of indoor model design improvement. The challenge of building models of this type has always been to seek methods of reducing the wing loading. In discussing his

With all that's happened at the Tennessee Indoor Champs, Taft Free Flight Champs, and other free flight activities nationwide, who said free flight is DEAD?

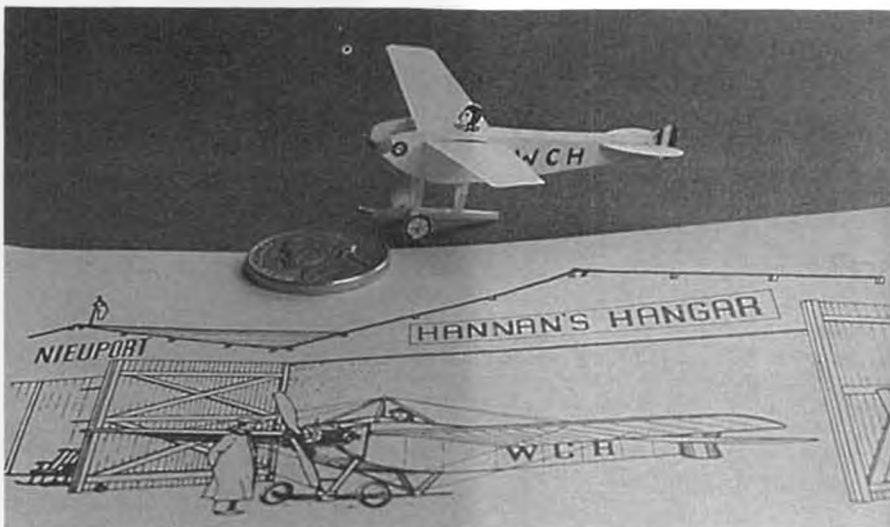
Sal Fruciano reminds us your best support of free flight activities, now and in the future, is a STRONG NATIONAL FREE FLIGHT SOCIETY.

Fifteen dollars to Sal Fruciano, at 6146 East Cactus Wren Road, Scottsdale, Arizona 85253, puts you on board as a member. This includes subscription to *Free Flight Digest* publication. DO IT NOW!

*Continued on page 80*



Portland's Jim Longstreth designed and built this sleek allred Bostonian Number 88.



"Good airplanes are the result of good compromises."

• Our lead-in line, doubtless true of models as well as full-size aircraft, is by retired North American Rockwell engineer and former American Aviation Historical Society president, Dusty Carter.

#### ERRATA AND UPDATES

Our May 1988 Hangar column featured Robert Lockwood's tribute to Merrill Hamburg and the AMLA, which attracted several letters. Bill Kee, of Twin Falls, Idaho, pointed out that AMLA was incorrectly represented, and should be Airplane Model League of America.

Dick Stuart of Walla Walla, Washington, agreed, and added that as a boy he had ordered a Baby R.O.G. kit from AMLA, as advertised in *The American Boy* magazine. For 65 cents he received a small bundle of sticks, a propeller block, some tissue, rubber, fiber wheels, wire, prop shaft bearings, banana oil, and Ambroid glue. Unfortunately, as he put it:

"My first attempt to follow directions and the small plan was a complete failure, like, I guess, thousands of others.



Walt Mooney's P-30 Squared is so-named because it is a semi-scale model of a Consolidated P-30 modified to conform to the P-30 competition rules.



Don Srull with his remarkable free flight Dornier DO-X, featuring 12 electric-motor driven propellers. A good flyer. Photo: Tom Schmitt.

Matsuru Watanabi, of Japan, made this charming paper model Nieuport monoplane from the Hannan's Hangar column logo. Model folds flat for mailing.

"I carried this failure with me for 55 years, until Frank Zaic published his *Model Airplanes and the American Boy* in 1982. THEN I rose to the challenge and built the original Baby R.O.G. exactly according to plans. It was *not* easy to build. The landing gear alone required difficult bends, and the bamboo, wow! Bending bamboo for the rudder and wing tips was quite an experience. I had several small conflagrations before I succeeded.

"The original Baby R.O.G. is difficult to fly well because of the small tail moment arm; the horizontal stabilizer almost touches the wing when the plane is balanced for flying." Dick now uses the model for flying demonstrations at shopping mall shows and in model building classes.

E. J. Sigmond, of Everett, Washington, also feels that a tribute to Merrill Hamburg is long overdue and says:

"My modeling fire (and 43-year career as a model retailer) was lighted while, as a young 'tyke,' watching my slightly older brother building a Baby R.O.G. from *American Boy* magazine."

#### AND FINALLY

Stefan Gasparin, builder of those tiny CO<sub>2</sub> engines and Wee R/C units in Czechoslovakia is an *electrical* engineer, not a mechanical engineer as we had supposed.

#### ALSO IN CZECHOSLOVAKIA

New Peanut and Pistachio scale model rules have been produced and tested, according to Lubomir Koutny and Tonda Alfery. Quite elaborate, the rules were intended to better equalize the competition chances of widely differing scale subjects by offering bonus points to those perceived as difficult to fabricate and/or fly. For instance, helicopters, autogyros, and flying wings would receive bonus points, as would flying boats, float-planes, and designs with functioning contra-rotating propellers.

Minus points are also included to deal with grossly out-of-scale models. Additional flight points were awarded for R.O.G. starts as opposed to hand launches.

Initial tests established that the intent of the new rules was achieved; however, the work load of Dr. Will Nakashima, well-known for his whimsical model-building cartoons, wrote to say that with the advent of his 30th high school reunion, he realized that modeling was still just as important to him now as it had been during school days.

He also expressed some personal philosophy about the types of models we build:

"... We really do tend to build models of a certain size. Mine seem to be Coupe d'Hiver, A1 glider, and 1/2 A Gas. I've built bigger and smaller, but I keep coming back to the above dimensions. I think you ought to make models bigger. Perhaps a 16-inch span limit. Fly them at schoolyards about an hour after sunrise when the air is calm and 'level.' This appeals to all of my likes which are outside at that time of the day and to have models which are less demand-

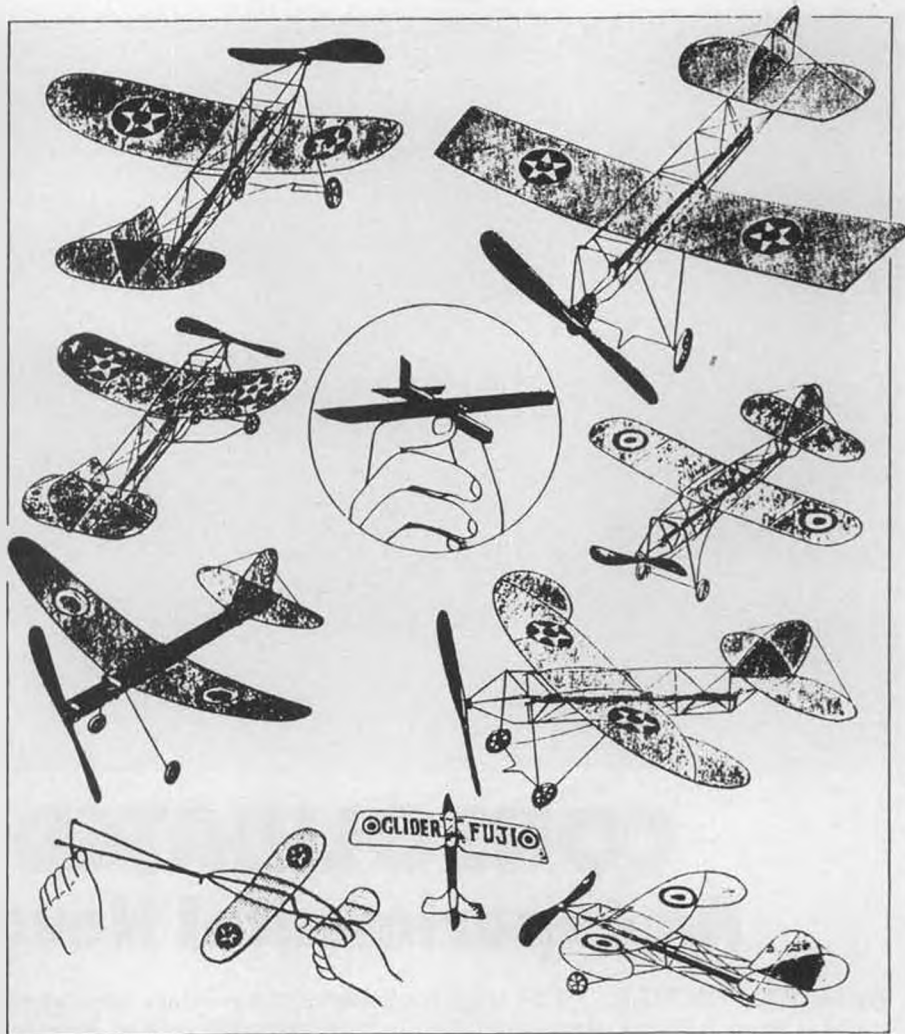


Christophe Hanriot, France, with his Pistachio Scale ULM Barouder, during a contest at Flammalle, Belgium. Photo: Van Hauwaert.



Ivan Simonik with his pioneer Guillebaud tandem Pistachio, designed by Lubomir Koutny of Czechoslovakia.

ing and more relaxing to build. Call it 'Schoolyard Sixteen' event. It falls into the gap between Peanuts and Jumbo scale. You can teach people the pleasures of the early



A selection of Japanese pre-war ready-to-fly models includes gliders and rubber-powered silk-and-wire models. More information in column this month.

morning, which I've only appreciated in the past few years."

#### JAKE'S GIROS

Jake Larson, of Pinellas Park, Florida, sent in a poem about model autogyros, from which we have extracted the following:

"There once was a Mooney named Walt,  
"whose autogyroing came to a halt.  
"When the rotor threw a blade,  
"from where it should have stayed.  
"His timer, most proper,  
"said, 'Walt, you've come a cropper—  
" 'cause the blade in the air stayed,

"the rest was a flopper.'" He added: "Walt should name his gyro 'Gillette' (as in 'how are you fixed for blades?')"

#### SPEAKING OF GYROS

George Perryman sent the photo of his latest, named the "Little Biddy Speckled Whirly Bird," which now holds three AMA records. The most unusual aspect of George's model is the square-shaped rotor, which is mounted *under* the fuselage. The rotor incorporates ten degrees of twist and

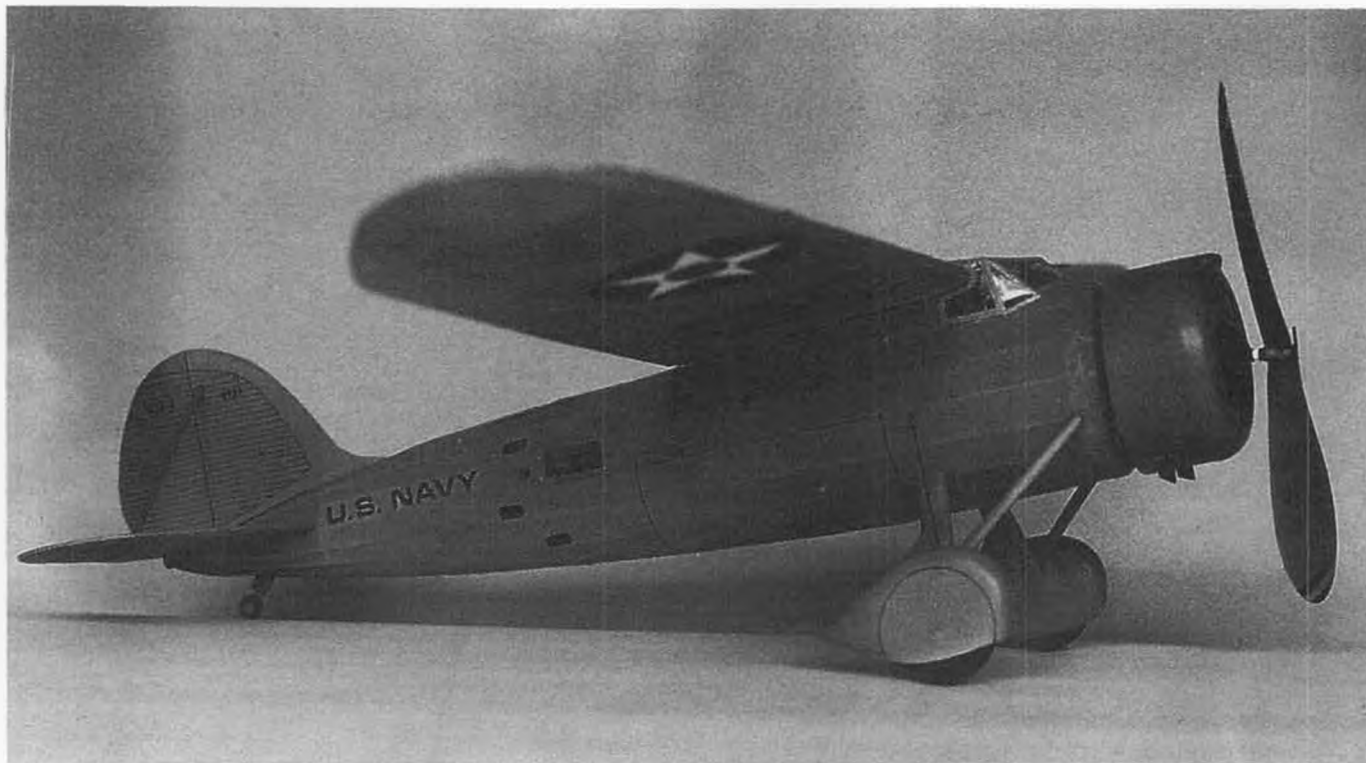
*Continued on page 85*



Al Backstrom's Coconut scale Lippisch Storch is rubber powered, spans 36 inches and has exceeded 30 seconds indoors.



George Perryman launches his AMA autogyro. Device beneath the model is square rotor assembly. Details in column.



## CONSOLIDATED XBY-1 An Experimental Navy Bomber

By MARK FINEMAN. . . This Vega lookalike is the military version of the Consolidated Fleetster. You can build it from full-size plans, available through our plan service, or turn the page and build a peanut version.

• In answer to everybody's first question: no, this is *not* a navalized version of the Lockheed Vega! The resemblance between the Lockheed and Consolidated products is striking to be sure. And the Consolidated Fleetster (the progenitor of the XBY-1) was a contemporary of the much more successful Lockheed ship. The Fleetster, like the Vega, was intended to be a single-engine commercial aircraft, but, for reasons about which one can only speculate, the Fleetster never equalled its Burbank contemporary.

The Fleetster was actually produced in two versions, a high-wing cabin job (the

Vega look-alike) and a parasol wing version with the pilot situated aft of the wing. The Fleetsters, incidentally, used an all-metal monocoque fuselage, unlike the all-wood Vegas. Only about two dozen Fleetsters of all types were ever built.

The depression economy provided little market for the Fleetster, a fact that was not helped by Reuben Fleet's own indifference to the big transport, even though it was named in his honor! In an effort to breathe new life into the project, Consolidated engineers reconfigured the Fleetster into a military aircraft, resulting in the XBY-1, a

handsome, monoplane Navy bomber in an era when the Navy was hopelessly smitten with biplanes. Besides being an all-metal monoplane, the XBY-1 had an internal bomb bay, a flush-fitting dorsal gunner's hatch, and beautifully painted fixed landing gear. The XBY-1 was intended for carrier work, being equipped as it was with a tail wheel and retractable arresting hook. With a fixed span of 45 feet, the big ship might have been quite a job to handle within the confines of a hangar deck, but the XBY-1 was scratched by the Navy before she ever saw the deck of an aircraft carrier. This in-



Cockpit detail on the XBY-1. Acetate and paper cockpit frame are built over a simple basswood framework.



Bottom details: ribbed flotation gear is glued to a 1/20 balsa plate in the wing of the craft.



The top gunner's hatch. The hatch slide rails are drawn in ink.

novative bomber was believed to have lived out her remaining years as a hulk in a mechanics' training school.

As a subject for a scale model, the XBY-1 is all but perfect. It has good moments and areas coupled with the usual stability of a high-wing cabin job. There are just enough details to make the project interesting, but not enough to cause frustration. The entire model, except for a slightly enlarged stabilizer, was built to 1/20 scale in honor of my Czech model building friends, who design all of their scale models to that criterion.

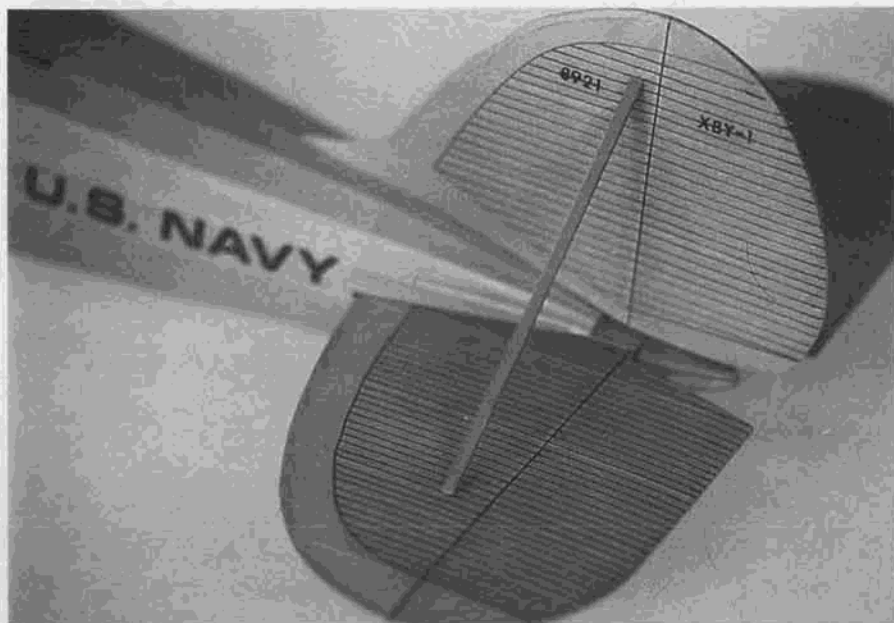
#### CONSTRUCTION

**Construction tips.** Most of the major sheet structures (wing ribs, fuselage formers, etc.) are cut from 1/16 sheet. It is recommended that you take the extra time to cut the fuselage formers from 1/16 sheet made up from cross-laminated sheets of 1/32 balsa. This will add a great deal of strength to the finished model with a negligible weight penalty. Tail outlines are also laminated from strips of 1/32 sheet softened in hot water and household ammonia, cemented around a cardboard form with diluted white glue. In much the same manner, the upper and lower fuselage keels are laminated from soaked 1/16 square stringers.

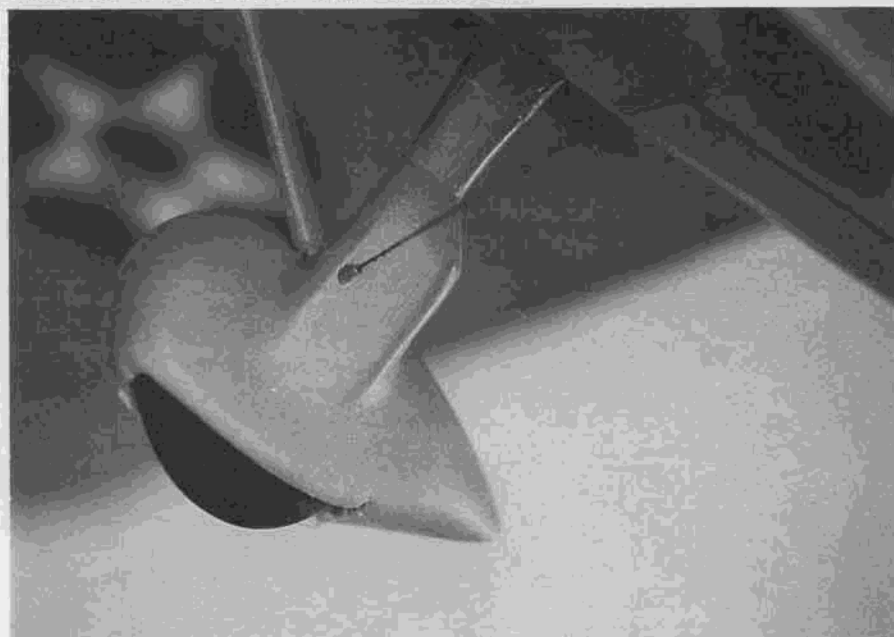
**Wing.** Construction is quite conventional. Note that the wing tip is raised to meet the main spar, which is a practice that adds some aerodynamic stability, much like tip washout, and simplifies covering. I added a thin strip of carbon fiber tape to the lower surface of the main spar for added strength, but this step is entirely optional. Upon completion, the flat center section of the wing should mate perfectly with formers F3, F5, and F6. The 1/20 flotation gear bases, glued between wing ribs three and four, allow you to add this detail without cementing balsa strips directly onto the wing tissue.

**Fuselage and engine cowling.** Once the upper and lower fuselage keels have been laid down, the fuselage formers are added at the locations shown on the plan. Follow the usual practice of laying down fuselage former halves, adding stringers, and then completing the second side of the fuselage. A length of top keel should be left between formers F2 and F3 for ease of construction. It will be removed after all of the 1/16 stringers have been added.

The cowling is shown in the side view on the plan. Use a drafting compass to make up the balsa rings that act as cowling



Strut is added only after the model has been flight adjusted.

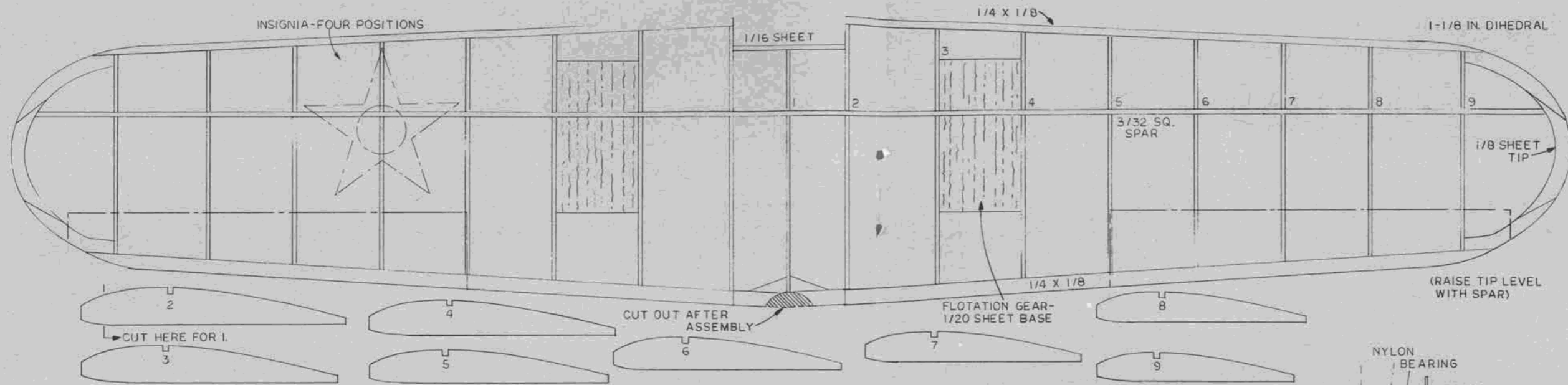


The gear wires are embedded in the struts and pants. Use filler to obtain curved fillets.

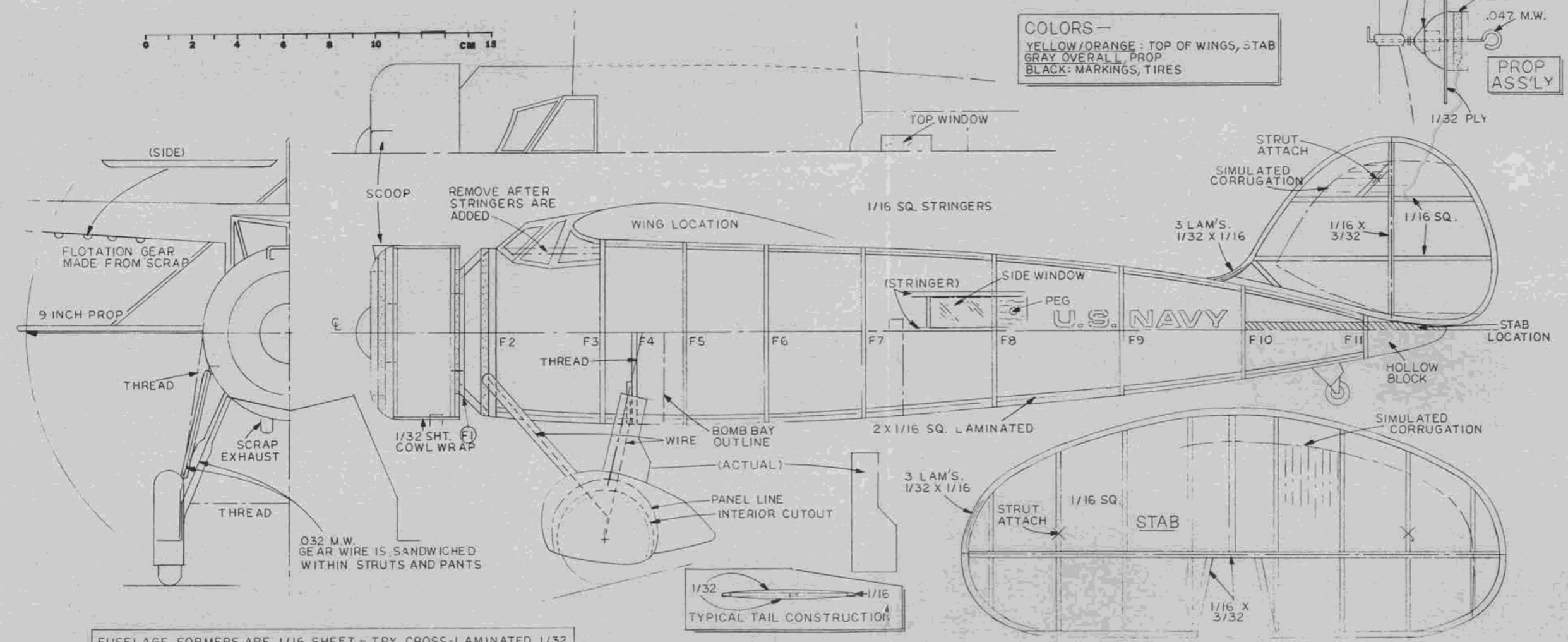
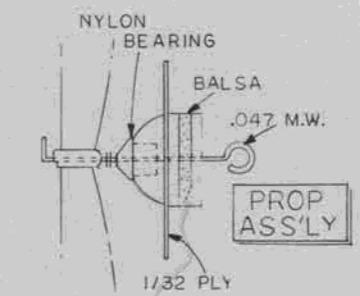


The radial engine is a paper cut-out. Note the elastic thread used to simulate wire.

*Continued on page 75*



**COLORS —**  
 YELLOW/ORANGE: TOP OF WINGS, STAB  
 GRAY OVERALL, PROP  
 BLACK: MARKINGS, TIRES



FUSELAGE FORMERS ARE 1/16 SHEET - TRY CROSS-LAMINATED 1/32 FOR EXTRA STRENGTH.

**CONSOLIDATED XBY-1**  
 MARK FINEMAN | MAY 1988  
 SCALE = 1/20

**MODEL BUILDER magazine**  
 888 West 10th St., Newport Beach, California 92663  
 Plan No: 9882

NOTE: YOU CAN BUILD THE XBY-1 AS A PEANUT, OR ORDER THE FULL-SIZE PLAN (27-inch SPAN) BY TURNING TO PAGE 106.





# Free Flight

By BOB STALICK

University. In order to do so, he must first show proficiency in English. Bob has offered to give him a place to stay while he attends English as a Second Language classes at a local community college this fall. The cost of these programs is beyond what Zhijian is able to afford, so it seems fitting that free fliers from this country, who have something to learn from this competitor, pitch in and give an assist.

Zhijian has offered to share his knowledge of engines and FIC systems to fliers here in the USA, and this might provide some means for him to earn a few dollars while pursuing his studies, which he hopes will lead to a degree in sports administration. I am printing this information so that

• Well, they've done it again! Who are they, you ask? They are the CIAM, the rules-making body governing FAI competition. In the July column, I speculated that R/C in Free Flight would not be passed by the CIAM. I also speculated that the Builder of the Model Rule would be maintained. I was wrong on both counts.

Here are the specifics: Effective January 1, 1989, FIC models may use R/C for engine shutoff and demarizer functions. Also effective on the same date is the rule that no longer requires a competitor to build his own model, adding that any model may be flown by only one competitor during any given competition. Both of these changes join in with numerous others that should have minimal impact to the FAI F/F scene. Both of these changes passed with overwhelming majorities during the CIAM meeting held during April 1988. Full details of these actions should be in print by the time you read this. George Xenakis, the CIAM F/F Representative from the USA, will supply the official report.

Also on the International front comes a request from Bob Gutai, well-known Pennsylvanian free flighter. Bob became acquainted with one of the Chinese FIC fliers, Cheng Zhijian. Zhijian intends to move to the USA and pursue studies at an American



Ken Grubbs, a dentist from Atlanta, is a life-long flying buddy of George Perryman. Here Ken shows off the trophy he won over George at the Dawn Mulvihill Flight Rebel Rally. Model is Ken's own Moteesa. Photo: Linstrum.

the free flighters who read this column might consider either making a donation to Zhijian or forwarding some ideas that I would be pleased to promote whereby he could add not only to our understanding of modeling in China, but also add to greater world understanding. If this is an idea that piques your interest, contact Bob Stalick, 5066 N.W. Picadilly Circle, Albany, Oregon 97321. If you would like to make an outright donation to help, send it to Bob Gutai, 1302 N. 23rd St., Allentown, Pennsylvania 18104. I understand that in order to complete his first year in the U.S., he will need somewhere on the order of \$4,000.

As this project gets better organized, I will publicize it via the pages of *Model Builder* Free Flight. If you are curious about the kind of modeler Zhijian is, then take a good look at September's Three-View of the Month—it is his latest.

## SEPTEMBER THREE-VIEW: Cheng Zhijian's FIC

Zhijian has been a member of the "Aeromodel Team of the Peoples' Republic of China" for at least two World Championships—1985 and 1987. The three-view featured this month is his latest creation, having been constructed since the 1987 World Champs. Notable differences in the design include the placement of the fin forward of the stabilizer. As is the case with all of the Chinese models, it is powered by a Nelson .15. The wing airfoil is presented in full size in the drawing. The ship itself is in 1/10 scale. Of interest is the following description to how Zhijian uses the five-function Seelig timer to actuate his controls:

"This is my new model control since last year. It uses a Seelig timer with five functions to improve by two functions. Its merit is that it can forestall model glide undulations, increase model stability and glide time. It will glide in static air for seven minutes. After I have used it, I can prove it functions very well, and now I recommend it to you." What then follows is a brief description, which I interpret as follows:

"Timer dispatch: right turn within .3 seconds afterop of the balsa sheet.

If nothing else, let the sketch give you the inspiration to do some doodling on your own. If you haven't been turned off by the addition of R/C to FIC, then you should consider a design like Zhijian's.



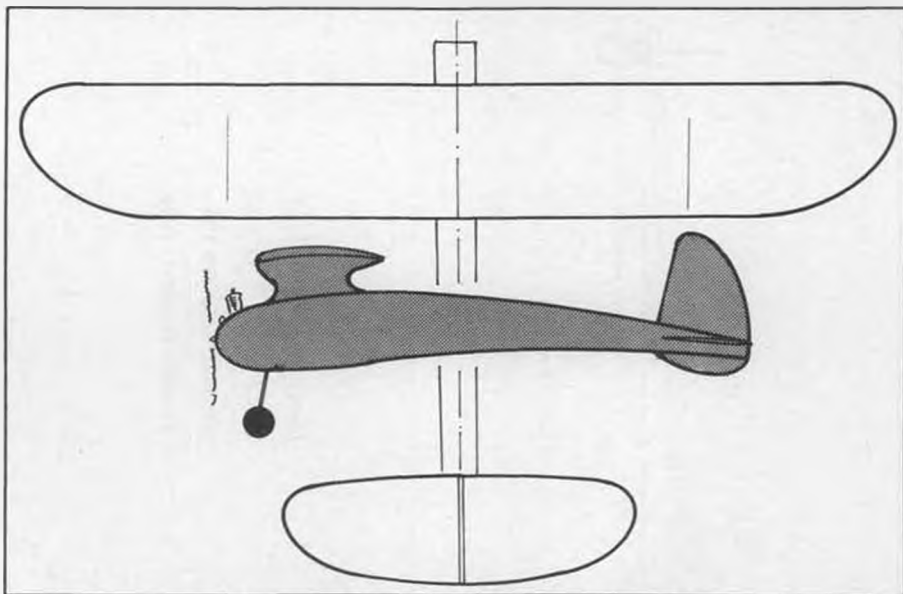
Terry Thorkildsen with his Astro Star. This is the larger version, with 600 square inches.



The Astro Star just released and on its way to another max. Power is by K&B 3.25 in A Gas and K&B 3.5 for B Gas.



Author with Nostalgia Ignition Powerhouse 41. Designed by Dick Korda, engine is O&R .23.



SEPTEMBER MYSTERY MODEL

**SEPTEMBER MYSTERY MODEL**

This is one of those puzzlers. As you look at the ship from its side view, you will notice that the fuselage is shaped like an airfoil. According to the article that accompanied the design, the airfoiled fuselage was there to take advantage oop of the balsa sheet.

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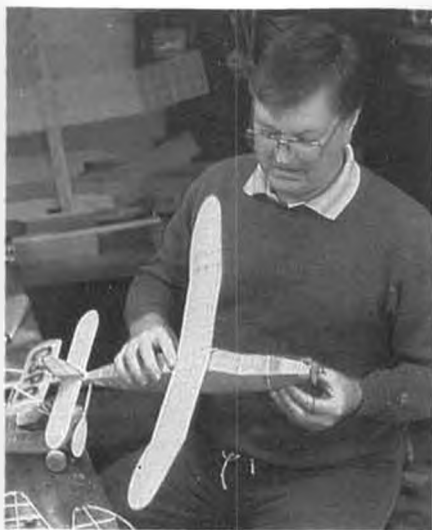
**SEPTEMBER MYSTERY MODEL**

This is one of those puzzlers. As you look at the ship from its side view, you will notice that the fuselage is shaped like an airfoil. According to the article that accompanied the design, the airfoiled fuselage was there to take advantage of the rules then in

effect which required .8 pounds for each square foot of wing area. The reasoning behind the airfoiled fuselage is that it will serve to give added lifting surface without added weight penalty. In recent correspondence with the designer, he noted that this gimmick was more fiction than fact, but it made a nice addition to the article when he wrote it. The ship is a genuine Nostalgia Ignition Legal design, and the original shows a Delong .30 in the nose. So, you think you know what it is, do you? Well, write it down and send to Bill Northrop c/o *Model Builder* magazine. First in line with the correct answer wins a free, one-year subscription to *Model Builder*.

**SEPTEMBER DARNED GOOD AIRFOIL—Sune Stark**

Back in 1951, the World FAI Championships Wakefield Cup was won by the Swede



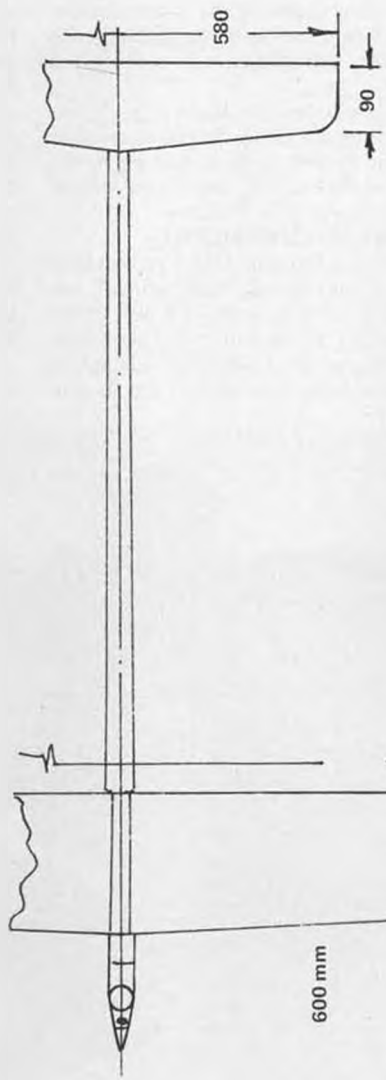
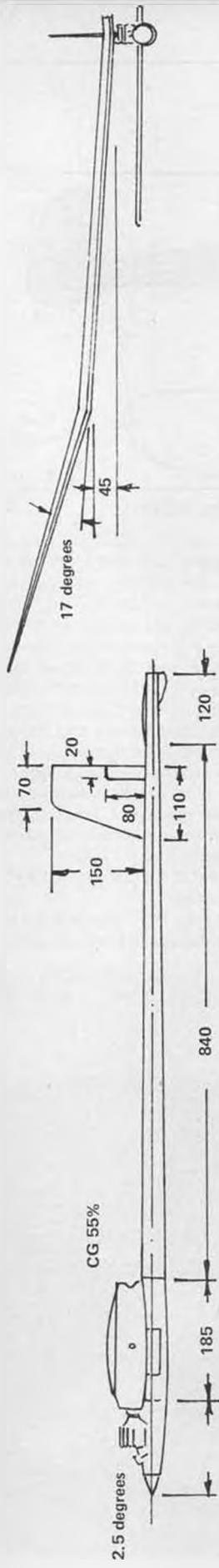
Ken Grubbs in his workshop inspecting another of his rubber-powered models.



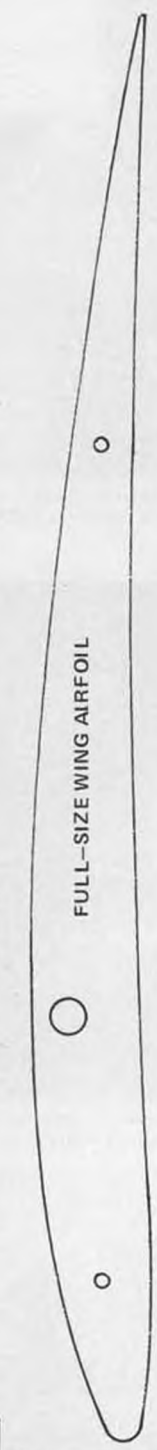
John Lenderman with his NFFS Top 10 winner, Le Nomade. Three-view of this model was in *Model Builder* earlier this year.



Mark Sexton with his version of Phil Hainer Sr.'s Chik'N Coupe, an ultra-simple Coupe d' Hiver design. Three-view and kit to follow soon.



WING AREA 493 in.2  
 STAB AREA 96.1 in2  
 ENGINE NELSON 15G  
 FLYING WEIGHT 750g



DESIGNER: Cheng Zhi Jian  
 SCALE M 1:10 F1C  
 TEAM AEROMODEL TEAM OF THE PEOPLES' REPUBLIC OF CHINA

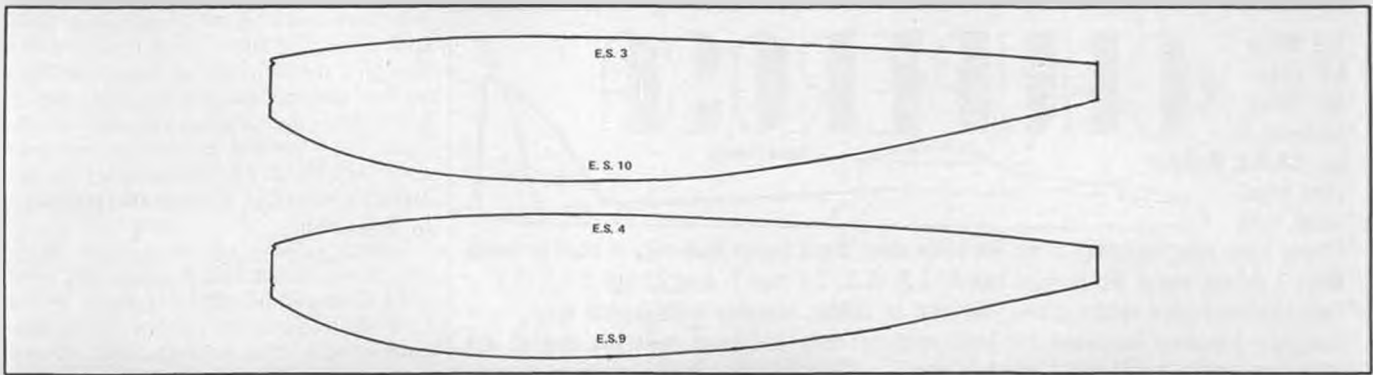


Fig. 1: Equiangular spiral curves plotted on plywood sheet. This sketch shows example of how to utilize 1/32" plywood sheets for two patterns. The top pattern shows 3% and 10% curve. Bottom pattern shows 4% and 9% curve. Note small notch at leading edge, about 2% below the end of the camber line. Notch is important and should be on each pattern.

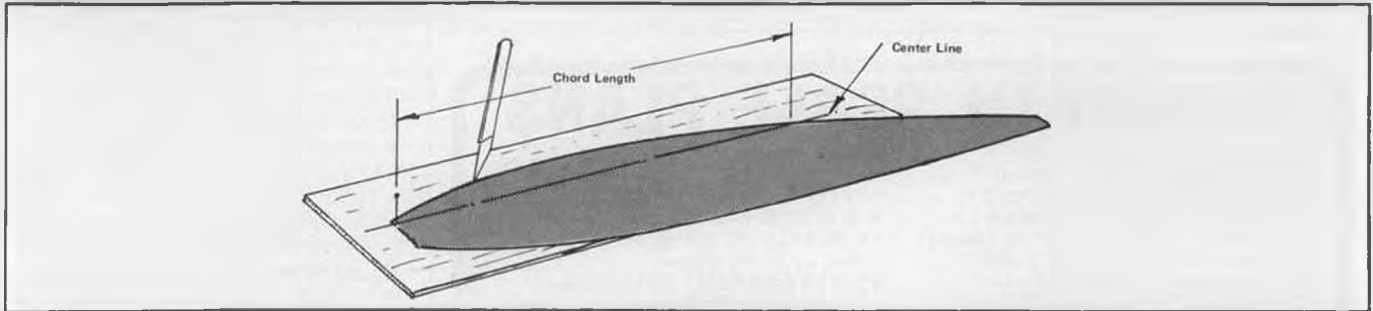


Fig. 2: Using the E.S. pattern. Sketch shows how to use plywood pattern to transfer the curve to sheet of balsa. Note position of the pin at the leading edge notch to place pattern in proper location. Rear pin is used to set appropriate chord length for your model.

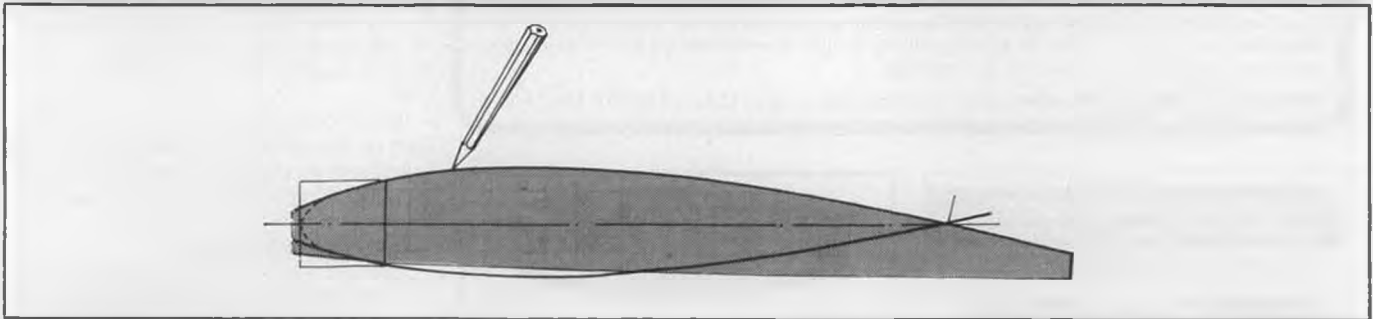


Fig. 3: Symmetrical airfoils using E.S. Pattern. If you wish to design symmetrical airfoil, use same plywood pattern (say 9%) for both top and bottom camber. In this case, datum line is in center of airfoil section as shown in sketch. Sketch also shows rectangular leading edge that is faired into airfoil when drawn to final shape.

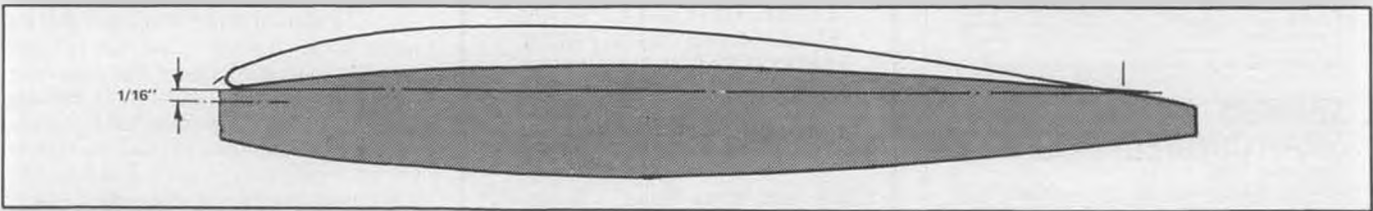


Fig. 4: Undercambered sections using E.S. Pattern. To produce undercambered section, mark the datum line and place pins at desired leading and trailing edge points. Take upper surface template (say 6%) place notch around pin and bring template to touch trailing edge pin. Next, bias leading edge pin by moving it down about 1/16" then repeat above procedure using thinner template (2%). Fair in leading edge with suitable curve.

### AIRFOIL OF THE MONTH

#### SUNE STARK

STA.	0	1.25	2.5	5.0	10	20	30	40	50	60	70	80	90	100
UPR.	0	2.00	3.14	4.81	6.86	8.55	8.85	8.44	7.54	6.31	4.87	3.31	1.70	.2
LWR.	0	-.48	-.54	-.51	-.26	+.55	1.13	1.32	1.22	.95	.59	.19	-.1	-.2

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Basic design-Russell A. Shaw

Redesign, plans-Leroy K. Satterlee

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 F8F HELLCAT - 98" Wingspan  
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BOEING F4B2 - 90" Wingspan  
 DOUGLAS O25C - 80" Wingspan  
 F/W FW56 'Stosser' - 103.5" Wingspan  
 WACO/YKS-6 - 99" Wingspan  
 RYAN S-C - 112" Wingspan  
 T-28B - 102" Wingspan  
 STEVENS AKRON - 100" Wingspan  
 WATERMAN ARROWBILT - 92" Span  
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Sune Stark using this airfoil on his wing. Stark's ship featured a geared motor, and a three-view can be found in the 1951-52 Zaic Yearbook. The model was very typical for its time, and return gears were not an unusual feature. Afterwards, the model press featured a number of articles pro and con about the proper airfoils to use on Wakefields. John Barker was one of those commentators and wrote in *Aeromodeller* in October 1954:

"... I have tried Sun Stark's wing section on a folding propeller Wakefield model. Occasionally this would turn in a good flight, but nine times out of ten it would develop a stall when the power ran out and continue stalling the whole way down. This could not be cured by any trim which still

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### Tom Dixon

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gave any performance. A new multispar wing of NACA 6409 was then produced as a replacement. The model immediately settled down to stable flight with no trouble at all.

"Some time later I again tried the Stark wing section with the same results—violent glide stalls with probably 15-foot dips right into the ground. In desperation I took a piece of string out of the model box and pinned it in front of the wing with six pins to form a turbulator. The model was flown, and although the glide was nothing like as good as the NACA 6409, there was no stall. Several flights were made afterwards changing nothing but the piece of string. The re-

sults were amazing: no string, violent stalls; with string, flat glide." So, for your edification this month, here is the Sune Stark airfoil—with turbulator. Obviously, the airfoil without the turbulator worked well for Stark, but it needed the turbulator to work for Barker. Worth the experiment? Why not?  
**NFFS NOSTALGIA IGNITION LISTING**  
 by Bob Larsh

Several months ago, I reported on the new event that is being run at this year's SAM Champs: Nostalgia Ignition. By the time you read this, the event will have been completed and the results known. According to Bob Larsh, one of the gurus of the Nostalgia movement, the number of inquiries received about the event shows that quite a number of fliers are interested in reliving those ancient days of yesteryear. Bob and co-guru Ralph Prey have put together a listing of Nostalgia Ignition eligible models for your information. Although the list probably has a few omissions, it is the most complete list available in one place, and it can be yours by sending an SASE to Bob Larsh, 45 S. Whitcomb Ave., Indianapolis, Indiana 46241. The list contains 140 designs, many of which are available from John Pond's plan service or from Bob Larsh himself.

By the way, I speculated in the April issue of *Model Builder* Free Flight that Korda's Champion, Goldberg's Cumulus, and Denny Davis's San De Hogan would qualify. Let me clear up this misstatement. They do not qualify. Sorry to mislead, just in case!

Bob also noted that the oft-promised update on the NFFS Nostalgia rules, with listing of new models and engines, will not be ready until early 1989. So, stop asking for it until then!

#### WORD FROM THE WISE

"I would write a shorter letter if I had the time," by G.B. Shaw as reported in the *Okie Flyer*.

#### UPDATE ON EQUIANGULAR AIRFOILS

One of the real difficulties in being a columnist is trying to determine just how much you should take for granted that the readers know. The other difficulty is knowing when to repeat features that have been covered in the past. Recently, I had my senses jogged by a letter from Jeff Hansen of Hollywood, California. Jeff had read the article on equiangular airfoils and had difficulty translating those curves into anything resembling an airfoil that he could use. His suggestion: explain it in more detail. Good idea! So, here goes: First, open your May issue of *Model Builder* to page 63 and look at those curves. The bottom curve is one-percent "thick," and the top curve is ten-percent thick. The curves in between are in increments of one percent, just like the coordinates that are listed.

To use any of them, it will be necessary to copy the curve directly onto a sheet of thin plywood (1/32 inch is what I use). If the chord of the wing that you most often use is longer than six inches, then I would suggest you go to your friendly copier shop and enlarge the curves to a more useful number, such as ten inches. Remember any of the curves can be shortened.

Once you have the right chord length,

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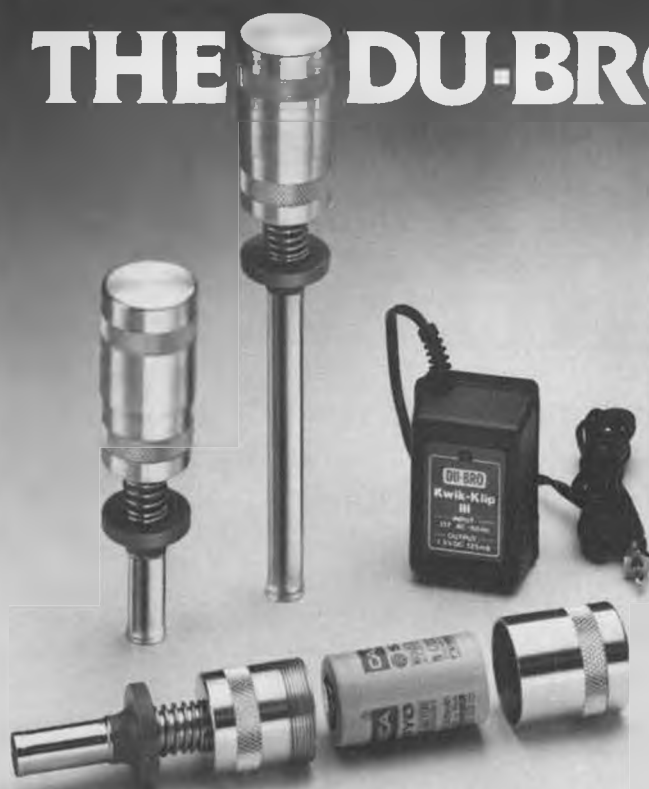
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trace the curve onto the piece of plywood and carefully cut out along the line with a sharp knife. Dress the plywood cut carefully with fine sandpaper. You can cut several thicknesses of curve and keep them for future use. Sketch #1 shows two curves on one piece of plywood. In this way, you can maximize your use of the plywood. Note that a small notch is filed into the leading edge of the plywood. This notch is used to line up the airfoil with the datum line of the finished airfoil.

Sketch #2 shows how to line up the rib pattern with the datum line. Note that the entire plywood template does not need to be used, as the equiangular section maintains the same curve throughout the entire airfoil.

Sketch #3 shows how a symmetrical airfoil may be sketched using the same plywood template for the top and the bottom of the section.

Sketch #4 shows how an undercambered airfoil might look using a thicker curve (say nine percent) for the top camber, and a thinner curve (say two or three percent) for the undercamber.

In all cases, the use of these airfoil curves requires that the nose entry be pencilled in after the major curves are completed.

There you are. After the actual airfoil is drawn, you will need to determine how best to place the spars, sheeting, leading and trailing edges, and the like. For these important considerations, I advise you to take a look at the three-views that have been featured in this column during the past year

or two. By studying these examples, you will get some idea as to how the successful fliers have been doing it, and you should be able to determine what you want to do.

Jeff, I hope the above information is helpful to you, and I hope that others who may have been too bashful to write will be informed enough so that they, too, can begin to design their own airfoils.

#### **A WORD FROM THE WISE, NUMBER TWO**

"Simplicate and add lightness," Henry Struck as reported in the *Okie Flyer*.

#### **MODEL COVERING MATERIALS COMPARED by Bob Schafer**

This article comes from the *Classic Flyer*, the newsletter of SAM 8, Olympia, Washington.

#### **WEIGHT COMPARISON OF MODEL COVERING MATERIALS**

	Grams/Sq. In.	Grams/Sq. Ft.	Wt. # of Silkspan	Oz./10 Sq. Ft.	Brushed Finish
Lt. Japanese Tissue	.0955	2.7504	53	.970	3 cts 50/50 nitr.
Lt. Wt. Silk	.1240	3.5712	68	1.260	5 cts 60/40 nitr.
Orange Skysail	.1767	5.0890	98	1.795	4 cts 50/50 buty.
Black Silkspan	.1811	5.2157	100	1.840	5 cts 60/40 nitr.
White Japanese Tissue	.2389	6.8803	132	2.427	3 cts 50/50 buty. + 1 ct. tuelp/roofer
Nylon Chilton	.2395	6.8976	132	2.433	6 cts 50/50 buty
Red Monocote	.2432	7.0042	134	2.471	As is
Orange Coverite	.3608	10.3910	199	3.665	As is

"Considering its combination of weight and strength qualities, I believe that lightweight silk is the ideal covering material for free flight gas models. I also believe that it is much lighter than most other commonly used materials.

"I recently gave a five square inch sample of black silkspan from my 'Westerner' and white silk from a 'Rambler' to a friend from

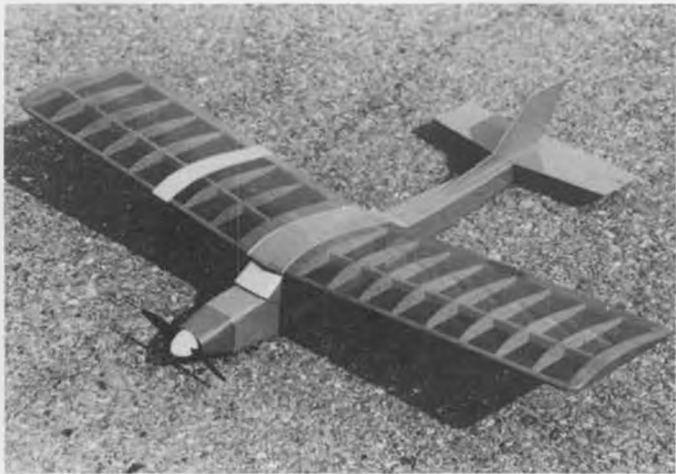
Chevron Research who agreed to weigh the samples on their laboratory scales. He advised me that the 'Metler Balance Scales' used are so accurate and sensitive that they can easily weigh the mark a pencil makes on a piece of paper.

"To make the test more comprehensive, fellow SAM 8 fliers Tom Cope (now deceased) and Ray Chalker added samples of other covering materials. To minimize chances for error, the pieces were stacked and cut to 2 x 2.5 inches. Except for the MonoKote and Coverite, the materials were removed from models and were in their finished flying condition.

"The weight shown in 'Oz./10 sq. ft.' refers to the total area (top and bottom) of a 720-sq. in. wing.

"The results supported my belief that silk is considerably lighter (by 32 percent) than silkspan. Each material has its own applications and merits, so I make no claim for superiority. To each his own! For example, Ray Chalker told me that he was able to remove the nylon material he uses, in one piece, repair the internal structure of a damaged wing, and lay the nylon back in place.

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Bob Boucher's Astro Challenger won the 84 Reno Nats its first time out and has been winning electric sailplane contests all over the country ever since. Powered by an Astro Cobalt 05 Geared Motor turning a 12 inch folding propeller, the Challenger climbs almost out of sight in 45 seconds, and can repeat this climb three or four times on a single battery charge. The distinctive wing planform with elliptical tips maximizes aerodynamic efficiency and minimizes tip stalls. It's gentle and forgiving nature make it perfect for beginners too. Kit features all machine cut and sanded balsa parts. Wing Span 72 inches, Wing Area 612 sq.inches, Airfoil Eppler 193 Flying weight 39 ounces. Kit#1020..... \$ 49.95



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So, there you have it. A scientific test conducted several years ago, but still good after all these years.

#### SOME HUMOR FROM TERRY THORKILDSEN

A few months ago, I did a recitation of some of the humorous incidents that I had seen around the contest circuit during the last couple of years. Terry Thorkildsen, of the San Valeers, dropped me a letter the other day in which he told of some of his most memorable incidents. I thought I would share one with you.

"I had purchased an old Fox 36X for \$10 and had it in a modified C class Texan. I had hopped the engine up and was running 40-percent nitro so it was turning up pretty good for a baffle-type engine. I was at one contest and on my fourth or fifth max and was standing behind the engine tuning it when I heard a distinct 'pop.' The front half of the crank with the prop still attached flew out from the engine.

"Gene Terra, one of my best friends, casually stated, 'Well, you just can't get your money's worth out of \$10 any more.'" Terry sent along a couple of photos of his Astro Star design, one of the NFFS Top Ten for 1988. Find one or two elsewhere in this column.

#### THAT'S IT

That's it for another month. Hope it's been a good one for you. For me, I'm just getting into the swing of the contest season as I write this. I will catch a thermal for both you and me this month. Cheerio!

#### Electric. . . . . Continued from page 25

geared. The original wing design is very strong; it uses a 1/4- x 1/2-inch spruce spar with a 1/4-inch diameter aluminum tube bound to it, then a 3/16-inch diameter steel music wire dihedral brace inside the tube which goes out a third of the span. It will not break! I went to this type of construction after a disastrous crash caused by a wing folding on an electric O5 glider that used twin spars, plus webbing, plus D-tube sheeting. The glider had gone up so far I could hardly see it, so I spun it down, but broke the wing in the process. It broke at the outer edge of the center sheeting. That was in 1976. Since then I have used the "steel in the wing" method and have never broken a wing. I do not use center sheeting; it is the place where stress collects and where the spar will fail. For those of you who have had a wing break in flight, you will probably remember that this is just where the wing broke. On the other hand, the conventional methods of wing construction usually do hold up well. Wing failures are not all that common, and usually happen only under extreme conditions such as a sharp pull out from a dive or spinning from high altitude.

A couple of columns back I described George Lucas's method of holding batteries in place with Velcro, and mentioned at the time that I would try it. Well, guess what? All my battery packs and planes are now

converted to "the Velcro system." This is the best idea to come along since clear tape hinges! It is wonderful, wonderful, and great! I use the 3/4-inch sticky-back Velcro and run two strips down the back of the pack. I run two parallel strips in the plane, on the floor, from just in front of the wing to back to the radio area. In larger planes with two or three six-packs, I do the same on each fuselage side. Now the battery packs stay in place, I can easily shift them forward and back, it takes no room at all, and adds very little weight. The batteries do not move even after rough landings, but they are easy to remove and put in place. Velcro is the answer to an electric flier's prayer! I have converted my RC10 offroad car to this too; the body is held on by Velcro, and so are the batteries. In all the rough and tumble of offroad driving, the body and batteries have not come loose. I buy the Velcro at a local fabric store; it is \$1.50 per yard of each type, so figure \$3.00 total for a yard of 3/4-inch hook plus loop material. I use the hook material in the plane and the loop material on the batteries, but I think it really doesn't matter which way you go.

There is another material similar in operation to Velcro, sold at Radio Shack. It is much stiffer and uses knobby "locks" which interlock (no hooks/loops). It is used for installing car radios, tape players, CD players, CB radios, etc. under the dash. This knobby lock material is incredibly strong, and I use it to hold down the electronic speed control in my RC10. It is like using



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nuts and bolts, it holds so firmly. It is probably too strong for battery packs, but would be useful for holding servos, receivers, etc. I use it in 1/2- x 3/4-inch patches; larger pieces are almost impossible to pry apart! It would be ideal for holding down hatches, too. There you have it! If everything seems to want to fall apart, you have the means for victory and to get it all together!

Two contest reminders, the KRC meet is September 17 and 18 at the Buc-Le Aerospotsman field in Quakerstown, Pennsylvania. Contact Bruce Fenstermacher, 636 Schoolhouse road, Telford, Pennsylvania 18969, if you need more info. The second annual Dallas All Electric Fun-Fly will be October 1, from 9:00 a.m. to 5:00 p.m. at Eastfield College, off I-30 in Mesquite, Texas. Contact Frank Korman, 5834 Goodwin, Dallas, Texas 75206; (214)821-0393 after 5:00 p.m. Enjoy the summer and fly high with electrics!

Engines. . . . . Continued from page 27

pair of half cubic centimeter .03 cubic-inch glow engines which appear conventional but simply have to be admired for their extremely high level of jewel-like appearance due to choice of metals and their finishes.

Serious collectors will immediately recognize the John touch in the photos, as the crankcase castings for the miniatures have remained the same since the first few

smaller capacity diesels were made many years ago. The casting can probably accommodate no larger physical size than .03 cubic inch without a new die being made. The conversion to glow ignition has eliminated much of the diesel starting mystery and greatly enhanced the idle. Although you can't tell it from the pictures, the glow plug begins life as a Cox #1032 part number which I send from the USA. In the summer of 1985 I managed to visit Jan Garcic twice, and he showed and explained the smart and unique way he pressure casts his tiny crankcases.

On the left end of his workbench, a bracket holds a propane plumber's torch like my grandfather used to sweat-solder joints. A small crucible is held in place where the heat of the flame focuses its intensity. Metal pieces are put in the crucible and the torch is lit. The crankcase die is firmly mounted to the bench. A small funnel is precision-fitted to the top inlet of the die in preparation for pouring. Nearby, a semi-rounded cap that precision fits the top of the funnel sits in waiting. A retaining clip holds a piece of asbestos firmly to the inside of the semi-rounded cap.

The pressure casting process is as follows: The torch melts the crucible's contents, the funnel is inserted into the die, the semi-rounded cap's asbestos is filled with water, the molten metal is poured into the funnel to a precise level, and the semi-rounded cap is quickly locked onto the funnel's top. At this point the moisture in the asbestos drips down on the molten metal and forms steam. The entire casting apparatus of die/funnel/cap is pressure-tight. The steam has no place to go. The steam exerts intense pressure on the molten metal. The results are one slick pressure die casting for another of Jan's jewels! He's really clever.

This month's John glow engines have an unusually fine piston/cylinder fit; the engines hold compression extremely well at top dead center indicating a bit of taper exists internally that could not be used in his earlier diesel versions. The diesels require free movement of the contra piston, and such freedom comes when the cylinder walls are 100-percent parallel, not tapering smaller toward TDC. The R/C diesel version he used to make had a very free floating contra piston so the speed could be controlled by an ultra-tiny servo of a Cannon R/C system that flew in a Smith Miniplane (20 ounces total weight) built by Jan's good friend, Bohumir Kracja. The contra piston control was elaborate and delicate compared to the classic R/C carburetor of this month's engine.

I chose to run the John G 05 R/C with muffled pipe, which he ran at 16,500 on FAI fuel. My 10-percent nitro fuel with only 10-percent oil recorded a steady 17,600 with a reliable idle of 3,550 on a grey Cox 4-1/2 x 2 prop. Easy-starting, no rpm fluctuations, good acceleration from idle, almost unbelievable. I hand-started, but Jan uses an Astro mini-starter. The piston/cylinder taper fit made hot restarts a verbally correct "snap," and one or two flips seems to work every time. The R/C carburetor starts with a straight pin to which a ratchet drum is silver-soldered. A jeweler's screwdriver is

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CH236	Circus Handcrank Fuel Pump	15.99	11.99
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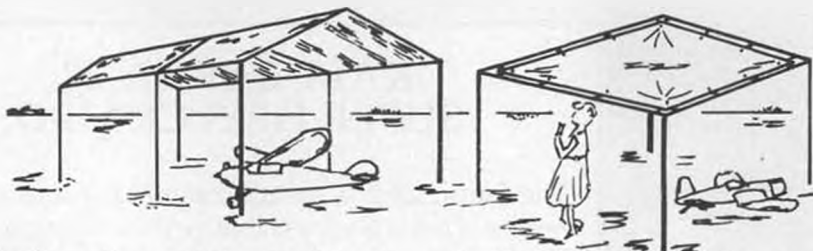
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needed to adjust the throttle stop bolt and the air bleed bolt. The exhaust system is tuned because when I pulled it off with the

engine running, I lost a couple of hundred rpm and got a shrill bunch of noise in their place. Two tiny plastic seals fit the exhaust

system to its manifold. I didn't run the John G 05 normal, but I'm fairly sure its manifold/muffler is tuned also much like a Formula 1 racing 40's extractor pipe length is critical to maximum performance.

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Air/Space. . . . Continued from page 13

ble to those willing and able to spend \$985 per seat. For this ticket, patrons were flown about halfway to Hawaii and back, being served snacks of caviar, smoked salmon, French champagne, and pastries enroute. Although your *Model Builder* reporters were not invited along, other media members reported that about three-fourths of the paying passengers were senior citizens, obviously very young in heart.

For the first time in a U.S. air show, the Soviets participated, arriving in style aboard a 240-foot wing span Antonov An-124 "Ruslin," known in the West as a "Condor." Although capable of lifting 171 tons of cargo, its load on this trip from Moscow to Brown Field consisted of a light Mi-34 helicopter and a Sukhoi Su-26M aerobatic monoplane plus crew members and support personnel.

Having examined all three national, and one of the Su-26M appeared in the May 1986 *Air International*, and June's *Model Builder*.

Although we were prepared for the outstanding performances of the copter and the Sukhoi, we were totally unprepared for the awe-inspiring flight demonstration of the Antonov transport. Supported by 24 wheels, it looks as ungainly as a beached whale at rest. However, after running up its four massive turbofan powerplants, it accelerated swiftly, rotated easily, and climbed away at a starnational, and one of the Su-26M appeared in the May 1986 *Air International*, and June's *Model Builder*.

Although we were prepared for the outstanding performances of the copter and the Sukhoi, we were totally unprepared for the awe-inspiring flight demonstration of the Antonov transport. Supported by 24 wheels, it looks as ungainly as a beached whale at rest. However, after running up its four massive turbofan powerplants, it accelerated swiftly, rotated easily, and climbed away at a startling angle. Takeoff was followed immediately by a hard right turn at low altitude, when it commenced a series of small-radius, steep-bank angle turns that amazed us all. As Walt Mooney put it: "The noisy, boisterous crowd went completely silent." Although Walt estimated the flying speed at over 200 miles per hour, the sheer size of the behemoth performing gracefully and effortlessly so close to the runway made it appear to be suspended by invisible wires. The fact that its swept wings incorporate ailerons, lead-

ing edge flaps, Fowler flaps, and 16 spoilers is entirely beside the point. One simply doesn't expect an enormous cargo plane to be pirouetted around like that! But then, as a Soviet Cosmonaut once remarked on television, "The laws of aerodynamics are no different on other continents." Sidelight: When the crew of the An-124 presented a fine display model of their aircraft to the San Diego Aerospace Museum, Master Museum Model Maker Ray Crowell had arranged for a display of Mig models to be on hand. Apparently in appreciation, Ray was privileged to go for a ride in the Antonov. How's that for *glasnost*? Model builders are a fortunate group.

An estimated 200,000 people attended Air/Space America '88, and as with most first-time endeavors, there were some problems. For example, the narrow roads leading to Brown Field were inadequate to handle the massive influx of traffic. According to *The San Diego Union* newspaper, the Concorde "...traveled halfway to Hawaii and back (1,500 miles) in less time than it took some spectators to drive from Chula Vista to Otay Mesa." (That's about 9 miles!) Once at Brown Field, parking was unpleasant and costly (\$5 per car), general admission tickets were \$12, pit passes were \$10, and bleacher seats were \$2. No food or beverages were allowed to be brought inside the gates, water fountains were conspicuous by their absence, and refreshments were expensive. To San Diegans accustomed to free air shows at the Miramar Navy Air Base and Oceanside Airport, these prices were quite a shock.

In spite of everything, most people interviewed felt the show had been worth the cost and frustration. (Walt Mooney attended on three different days!) Organizers have promised to minimize the difficulties before the next time. Four other cities, New Orleans, Louisiana; Las Vegas, Nevada; Houston, Texas; and Palmdale, California; have expressed interest in hosting the affair, however, Air/Space America president Bill Walsh is firm in his choice of Brown Field: "There will be a 1990 show, no question, and it will be here." •

**Tech Stuff. . . . Continued from page 17**  
span is about as logical as the way Wm. C. Northrop Jr. writes his name (the "C" stands for Walter). (Say what?) Strange or not, because they are so widely used, I am sticking with  $b$ =span and  $S$ =area.

When we divide weight in pounds by area (span times chord), and by the average of the two, all in feet, we get numbers less than one. Since I find whole numbers easier to remember, I'm multiplying the result by 100.

Tail "volume" coefficient, which is also a cubic function, is not a true volume. Neither is wing "volume loading." Therefore, to minimize confusion, I propose that we call our new comparison number simply "cube loading." Also, let the abbreviation for cube loading be "CuL." We shouldn't use just CL, since that already stands for "control line," "center of lift," "coefficient of lift," and maybe more. We now have:  $CuL=100W/S(b+c)$  or

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101	3/32	30	264	1/8 x 1/4	1.30	251	.010 Brass	1.25
102	1/8	30	266	5/32 x 5/16	1.50	252	.015 Brass	1.75
103	5/32	35	268	3/16 x 3/8	1.75	253	.032 Brass	3.00
104	3/16	40				254	.008 Tin	.75
105	7/32	45				255	.016 Alum	.80
106	1/4	50				256	.032 Alum	1.00
107	9/32	55				257	.064 Alum	1.50
						258	Asst Brass	1.50
						259	.025 Copper	2.75
ROUND BRASS TUBE (12")			BRASS STRIPS (12")			BRASS ANGLE (12")		
125	1/16	35	230	.016 x 1/4	.25	171	1/8 x 1/8	55
126	3/32	35	231	.016 x 1/2	.35	172	5/32 x 5/32	85
127	1/8	35	232	.016 x 1	.50	173	3/16 x 3/16	55
128	5/32	40	233	.016 x 3/4	.40	174	7/32 x 7/32	80
129	3/16	45	234	.016 x 2	.90	175	1/4 x 1/4	85
130	7/32	50	235	.025 x 1/4	.30			
131	1/4	60	236	.025 x 1/2	.40			
132	9/32	65	237	.025 x 1	.70			
133	5/16	70	238	.025 x 3/4	.55			
134	11/32	80	239	.025 x 2	1.30			
135	3/8	90	240	.032 x 1/4	.35			
136	13/32	1.00	241	.032 x 1/2	.50			
137	7/16	1.10	242	.032 x 1	.85			
138	15/32	1.20	243	.032 x 3/4	.65			
139	1/2	1.30	244	.032 x 2	1.60			
140	17/32	1.40	245	.064 x 1/4	.60			
141	9/16	1.50	246	.064 x 1/2	1.00			
142	19/32	1.60	247	.064 x 3/4	1.25			
143	5/8	1.70	248	.064 x 1	1.70			
144	21/32	1.80	249	.064 x 2	3.00			
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118	3/32	30	150	3/32 Square	70	182	5/32	80
119	5/32	40	151	1/8 Square	80	183	3/16	65
120	1/8	35	152	5/32 Square	90	184	7/32	70
			153	3/16 Square	1.10	185	1/4	75
			154	7/32 Square	1.20			
			155	1/4 Square	1.40			
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						163	3/32	25
						164	1/8	40
						165	5/32	60
						166	3/16	80
						167	1/4	40
						168	.081	40
						169	.072	25

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$CuL=100W/bc(b+c)$ .

For small models, the cube loading will be greater than the wing loading, and for large models the wing loading will exceed the cube loading, as it should. Table 1 shows a few examples.

TABLE 1

Airplane	Span ft.	Chord ft.	Weight lbs.	Wing Loading oz./sq. ft.	Cube Loading lb./cu. ft.
R/C Sport	5.0	1.0	5.0	16.0	16.7
R/C Sport	10.0	2.0	40.0	32.0	16.7
R/C Pattern	6.0	1.0	8.1	21.7	19.3
Zlin 50, full-size	28.0	4.8	1586.	188.6	36.0
Zlin 50, 1/4-scale	7.0	1.2	24.8	47.2	36.0
Lockheed Electra	55.0	8.3	9750.	340.6	33.6
Gossamer Albatross	96.0	5.7	175	3.5	0.3

We can observe several things from this table: Cube loading does not change with

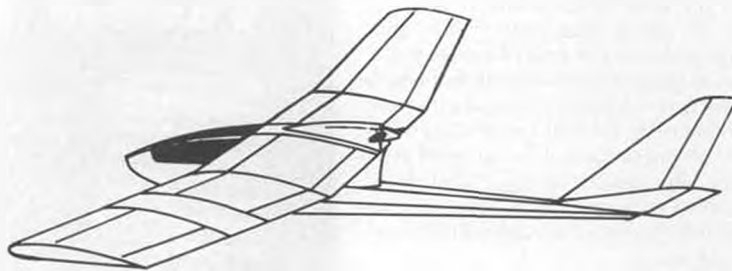
size (if the weight changes in a scale manner as the cube of the size); thus, big planes can be accurately compared with small planes. As with wing loading, a lower cube loading means a lighter airplane for its size. The cube loading of unusual airplanes can

be surprising. Look at what the Gossamer Albatross has (including "powerplant"

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weight).

But 24-8/10 pounds sounds like a lot for a 7-foot-span R/C model. It is. Let's see why, and ways in which cube loading (CuL) is useful to model builders and designers.

We don't build our scale models to exact scale weight. Experience has shown that if we do, they are too hot for us. It is usually a matter of human limitations. If a hand-launch model is too hot, we can't throw hard enough or run fast enough to launch it. In R/C or CL, excessive speed may be more than the pilot's reflexes can keep up with, and very fast R/C models fly out of visual range too fast. They might also require larger fields than we have access to, and their greater speed would make them more dangerous (hard to duck and capable of doing more damage). Therefore we usually strive to build our models as light as practical, so they will fly slower and require less power. To fly scale models moderately slower than their true-scale speeds, we must make them moderately lighter than their true-scale weights.

And how much lighter is "moderately lighter"? By means of cube-loading numbers, we can accurately see how much our model weights vary from scale and how one model compares with another model of the same or different size. I'm just beginning to use CuL myself, so I can't give you a lot of tried-and-true data yet, but it looks like full-scale cube loadings are usually in the range of 25 to 50. Most R/C models are in a CuL range of 10 to 25, with some of the scale models near the upper end. What will

the cube loadings of rubber-powered models run?

Let's say you want to make a quarter-scale Zlin, Z-50L model. First, calculate the true-scale weight of a quarter-scale Zlin. (True-scale model weight equals full-scale weight times the scale factor *cubed*.) You come up with 24.8 pounds, which you know is more than you want. From experience, you build light and end up with a total weight of 17 pounds. In Table 1 we see that any size completely scale Zlin 50L would have a cube loading of 36. (Without the table, we simply calculate the cube loading for the Zlin, or any other airplane, large or small, from the data we have on it.) Now let's see what cube loading the 17-pound model has. Note that the cube loading is directly proportional to weight, so it is simple arithmetic again. The cube loading of this model is  $36 \times 17/24.8 = 24.7$ .

Another modeler decides to build a 1/6-scale Zlin. It ends up weighing just six pounds. Which of you built the lighter airplane for its size? Let's find out. When you divide the 6.0 pounds of his plane by its wing area and span plus chord, his cube loading turns out to be 29.2. Surprise! Because weight should vary as scale cubed, his Zlin, which is barely a third the weight of yours, is actually significantly heavier for its size and will have to fly much faster for its size than your Zlin. His is quite heavy. Comparing wing loadings would have misled you. His wing loading is 25.64 oz./sq. ft., while your's is 32.38. The greater wing loading of the larger plane doesn't count,

because it should be greater. That larger cube loading of his is what really tells the story.

We have used cube loading to show that you have a better-performing Zlin than he has. He should have used cube loading, before he started building, and seen that he must keep his 1/6-scale Zlin down around 5 pounds (a cube loading of 24.4) in order to have an adequately docile airplane. Cube loading is very handy. If we use it, we can avoid making poor-flying models!

Another interesting observation is that the units of cube loading are the same as the units of density, pounds per cubic foot. That makes good sense, since both cube loading and density are measures of weight per unit size. *Forget wing loading.* You will find CuL much less confusing and much more useful.

I can see some of you looking at the clock. I know you want to get out and fly, but class isn't over. We have some more, but related, new ground to cover.

### PERFORMANCE FACTOR

In the December 1987 issue of RCM, in his column, "Big is Beautiful," Ken Runestrand addressed the use of a "performance factor" to compare and evaluate airplanes and to help design them right in the first place. Stinton also reports on a similar performance factor. The factor Ken reported was inverted from the one commonly used, but both factors involved both wing loading and power loading. In other words, how heavy and how powerful is the plane for its size? A potentially useful tool, but it has the same limitation that wing loading has, since it incorporates wing loading! It, like wing loading, is not independent of size.

Ah ha, you are ahead of me! We can use cube loading in place of wing loading in our performance factor and have just what we need! Fortunately, power is already basically a cube function so the power-loading part of the performance factor is okay.

Full-scale designers use horsepower in their performance calculations. Some of our model engines have a power rating at a specific rpm, but we usually don't know what power we are going to be flying at. An easier measure of relative power for us is displacement. What we really want to know is how large an engine are we going to need, and by large we mean, "how many cubic inches"?

Therefore, I propose that our new and im-

proved performance factor be cube loading times displacement loading. The units will be pounds squared divided by cubic feet and cubic inches. For example if a 6-pound model with a CuL of 15, has a "60" in it, it has a displacement loading of  $6/0.6 = 10$  lbs./cu. in. Multiply that by 15 and we have a performance factor of 150. That is a very good airplane. I don't have enough data yet to know what performance factor a barely-flyable "dog" would have. Please write and give me some examples. Can a model with a performance factor of 1,000 fly? And what are the best (lowest) ones you can find in models or full-scale?

We now have a performance factor that differs from the old ones that used wing loading, so we must give it a unique name. Okay, if you insist, call it, "Reynolds Performance Factor." I guess I can live with fame. (It runs in the family, you know. Osborne Reynolds has had his Reynolds Number for about 100 years.) (*Whatever happened to C-for-Walter Reynolds? wcn*) The abbreviation for Reynolds Performance Factor is RPF.

Different types of model engines put out different amounts of power per cubic inch of displacement, therefore we need to standardize the relationships. In the March 1988 issue of *Model Builder*, Stu Richmond, in his "Ramblin'" column, reported on some relative power assumptions that are being used. They are doubtless more accurate than my guesses would be, and they already have a little acceptance, so I will use them. Stu's numbers didn't include Davis Diesel conversions. That factor is from my own experience. My friend and colleague, "Wiggie" Wigdor, contributes the factor for the Quadra-type two-stroke gasoline engines. So, until someone improves upon it, we have Table 2.

**TABLE 2**

**Displacement Loading Formulas**

- Schnuerle-ported glow engines: DL - 1.00W/disp.
- Loop-scavenged glow engines: DL - 1.25W/disp.
- Quadra-type gasoline engines: DL - 1.50W/disp.
- Four-stroke glow engines: DL - 1.50W/disp.
- Davis Diesel conversions: DL - 1.00W/disp.
- Antique Diesel engines: DL - 1.75W/disp.
- Antique spark-ignition engines: DL - 2.00W/disp.

Since RPF is independent of size, we will use it to compare scale models to their full-scale prototypes, so we also need a standard relationship between horsepower and model engine displacement. There are many factors that prevent us from getting an accurate and invariable reading on this, but the ratio of one to two looks like a good average. That is, a power loading of five pounds per horsepower is roughly equivalent to a displacement loading of ten pounds per cubic inch. In other words, on average, our Schnuerle glow engines develop about two horsepower per cubic inch (give or take a horsepower or two). Therefore, Reynolds Performance Factor equals cube loading times displacement loading or cube loading times twice the power

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loading.

Let's look at ways to use our performance factor. Assume two airplanes of the same design and with the same RPF, but of different size. (Because of Reynolds number, two airplanes of different size will perform somewhat differently, but the effect of R.N. is usually small.) One of these assumed airplanes is "heavy" (has a high cube loading), but is "powerful" (has a low displacement loading or power loading). The other is "light" (low CuL), and has a high power loading, yet it has the same Reynolds Performance Factor as the first plane. These two airplanes will fly at different speeds, but their performance will be comparable otherwise. It looks to me like they will fly at

the same lift coefficient and have the same speed-range ratio. Will someone check me please?

Each value of RPF is not a point representing a single type of airplane, but a curve representing a range of airplane types. Now comes that neat part! When we plot a family of these RPF curves, as shown in Figure 1, we have a mighty handy tool. We can now pick the proper size wing for a given engine and weight of plane, or pick a proper size engine for a given wing size and airplane weight, or pick the weight we should build to for a given engine and a given wing size! Know any two values and select the third.

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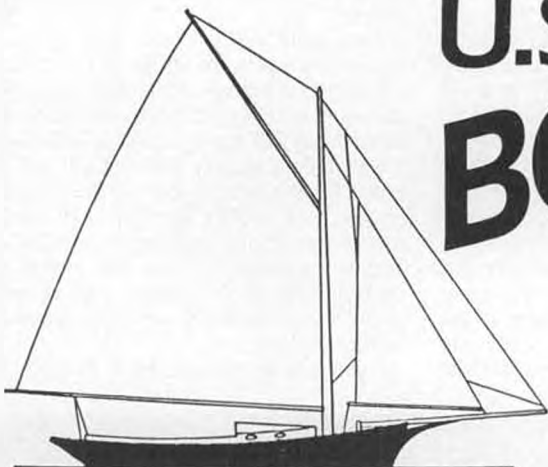
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you will recognize these curves as a family of rectangular hyperbolas. The name may sound imposing, but they are really very plain and user-friendly. The formula for a rectangular hyperbola is simply  $xy=k$  or, in our case, cube loading times power loading equals Reynolds Performance Factor. Each curve represents a different value of RPF.

The curves are theoretically accurate and enabled us to estimate the RPFs of points (plotted for various planes) lying between them. The whole picture is a convenient visual method of comparing the performance of any number of different airplanes, independently of their sizes. We could make up tables of cube loading, power loading and RPF for various airplanes, but I think the curves are much easier to use and give better insight.

I've included the plot points for a few full-scale airplanes and models, but I don't have much actual data available to work from. Anyway, individually you are going to be interested in comparing many different types of airplanes and models, so plot up your own. Just copy Figure 1 and start adding more airplanes to it, or use a clean piece of paper and plot and draw your own rectangular-hyperbola curves first. Remember, it is just  $xy=k$ . Use as many or as few different  $k$  (constant) values for as many guide curves as you want.

Notice that the models have lower RPFs than the full-scale planes. Not only do we build our models with lower cube loadings than full-scale, but also with lower power or displacement loadings. We want

performance!

I, for one, am very curious to see where certain full-scale craft and where different types of models will fall on the sheet. Please send me data for your areas of interest and I will try to publish it. I can predict that rubber-powered models, for instance, will fall on the left side of the plot, but just where? Of course, you will have an additional problem in plotting up rubber-powered models. What is the equivalent displacement or horsepower of a given rubber motor? Any suggestions, other than dynamometer tests?

This has been fun, for me at least. I hope I have neither lost too many of you nor bored too many of you. Next month we will start on a series of chapters on model weights, materials, and structural design. Until then, design with cube loading and RPF.

Francis Reynolds, 3060 W. Lk. Sammamish N., Redmond, Washington 98052; (206)885-2647. •

**Choppers. . . . Continued from page 19**

blade. (2) Cut a piece of stick-on covering to use for balancing. That piece with the backing removed should weigh as much as the amount by which the heavier blade exceeds the lighter blade. (3) Put the blades on a balancer like the High Point, Schiuter, or Tech Specialties balancer; or remove the rotor head, attach the blades so they extend straight out, and suspend the entire rotor from the flybar. (4) Place that piece of mate-

rial that you cut out on several places along the length of the blade (let it hang suspended by only a tiny part of the adhesive). Find the place where the material will make the lighter blade balance the heavier one. It may be at the end, the center, close to the root, or any place in between.

When done, you will have two blades equal in weight and with the same lengthwise center of gravity. Now hover your chopper and look for any vibration, then set it down. Observe the blades to see if centrifugal force has pulled them out to form a straight line, or if they form a slight angle. If they form an angle and you were getting some tail shake, your chordwise blade center of gravity is probably off. This can be corrected by moving a tiny weight (wheel collar, flybar weight) along the length of the flybar in the direction of the larger angle. Do this until the vibration stops.

This method will correct your vibration problem most of the time. You may want to do some major surgery on the blades some time in the future to get a perfect lengthwise and chordwise center of gravity, but that's a subject for another time.

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Congratulations to Dan Chapman, of Dayton, Ohio, winner of the autorotation contest. Defending champion Dwight Shilling, of Carol Stream, Illinois, had one auto 1-3/4 inches from the "pin" but lost on the total of the three autos.

World and National champion Curtis Youngblood gave an exhibition with his "Dork," a GMP Stork with a pro-head instead of the stock DDF head. The unusual radio setup that Curtis uses for inverted flying was a surprise to me. His JR Century VII Single Stick radio is set up to go from plus nine degrees at full stick to minus nine degrees at low stick. In the Idle-Up mode the throttle actually increases as pitch goes from zero to minus nine. The effect of all this is that he can fly inverted without using an inverted switch. This is basically the way that Mike Maas, one of the pioneers of inverted flight, did it before radios had an inverted flight function. Curtis is so talented that he can reverse the controls in his mind, and in going from upright to inverted and back, the transition is perfectly smooth.

Worst idea since President Carter gave away the Panama Canal: The new AMA frequency flag system.

**Ramblin' . . . . Continued from page 15**

museum worth. Glass showcases are stocked chock full in a hobby shop atmosphere in addition to building tables that fill the club room. The interview continues:

**Stu:** Ivor, if a kid shows up with \$5 on a Saturday afternoon and wants to get into model building, what happens?

**Ivor:** Well, we try to talk him out of spending a big sum. We try to sell him the idea of the 75-cent glider project. For the 75 cents he gets the cutout bits and he gets the chance to sit down and be taught to build. I usually use two kits. I'll do one while the youngster does the other. It works great! I'll show him where and how to sand and glue; it works fine. The lesson takes about one-and-a-half hours; as you and I know it could be done in five to six minutes without the one-on-one teaching by using CA glue.

**Stu:** That's giving of yourself. We all need to do it if we're going to replace ourselves. Ivor, we met last week at a little town of 4500 people at Waikerie at the 40th Australian Nationals. That was your—

**Ivor:** That was my 27th consecutive Nats. They're all waiting for me to die or knock me off. I'm the big attender, and Leo O'Reilly is right behind me. I'll keep doing it as long as I have the strength. But, Stu, my BIG goal is to get MAAA into its own three-story premises which today would cost about half a million dollars. We could lease the lower two floors and occupy the top for our museum and offices. Logically it would be in our nation's capital city of Canberra where the city was carved out of a paddock (field) halfway between Sydney and Melbourne. As modeling grows with Australia's growth, we could occupy more of the building maybe.

**Stu:** Ivor, you have one of the world's finest model engine collections. How did it

C. See that gyro is operating in correct direction. With gyro and transmitter on, twist helicopter left or right. Tail rotor servo arm should move rapidly in opposite direction for just an instant, and then move back to its original position a little more slowly. Sometimes people miss seeing that first movement and only see the second, then they set the gyro in the wrong direction.

If done incorrectly, A, B, and C can result in a crash immediately on liftoff.

D. Check all clevises, ball links, pushrods, etc. to see that nothing has broken or come unattached. Also check all pivot balls, nuts and bolts, and screws for looseness.

E. Be sure the engine needle valve is backed out the right number of turns.

F. Final check of transmitter setting. All dual rates, idle up, invert switch either in proper position or disengaged, all trim buttons and levers in proper position. Don't rely on the setting you had last time you used the radio. These can easily get moved in your flight box, carrying case, or even just while setting the transmitter on the ground right before starting the engine. It's a good idea to work all the controls before starting the engine to make sure everything is connected and working. A single switch out of position, such as Idle-Up being engaged, can cause a disaster before the flight even begins.

start?

**Ivor:** Well, I couldn't afford an engine before the war, nor right after the war neither. But Australia's big model manufacturer and wholesaler had just had their propeller carver die. They were looking for a replacement in 1948, and I was "it." They were importing the Mills diesels then. So I hand-carved 314 six-inch diameter props and got paid for it with my first motor, a Mills diesel. I taught my wife Vera to carve too. We kept records, Stu. We hand-carved 25,000 propellers (it took seven years), and we got paid a penny an inch. My take-home pay in those days was about seven pounds per week, which was respectable right after the war!

**Stu:** Ivor, what would you like to do with the rest of your life?

**Ivor:** I believe modelers should be shown the need of fostering juniors and be prepared to really do something about it. What I want to do is see a \$1 million scholarship fund established for an Australian scholarship in every state and territory of this great country. The fund is only \$225 for each present MAAA member. I've written the first scholarship check to MAAA. I could devote my remaining years to the scholarship fund.

**Stu:** How'd you get VH-1 as your license number?

**Ivor:** Well, there was an existing small organization of modelers here. But nobody was interested in getting the Australian modelers into the great international brotherhood of modeling, and I was! I thought we should belong with others in FAI. This country is a bit like America; we used to say FAI stood for Federation of Antiquated Ideas, but it's not so. If FAI is not good for modeling, then it is the fault of America and Australia for not making it good. Australia's FAI competition has been quite good in the past ten years, partly a tribute to Gordon Burford's efforts. In the beginning I pushed for FAI affiliation or membership. Finally, I sent a membership application in 1948 with an English pound note (a lot of money) to France. That's how I got VH-1. There were MAAA numbers at that time. I was #328, but they were subsequently dropped in favor of FAI numbers indicated by the "VH" prefix for Australia.

That ends the interview with one of the world's most colorful model builders. The glider Ivor teaches the kids to build is the "Doonbat," and the photo shows how he mass-cuts the parts. Since he lives in the Doonside district of Sydney, you can get the name connotation. Ivor bought from the USA a huge carton of Cox engines at a relatively low price per engine; like from "returns" at the Cox factory. The Australian government taxed him unmercifully upon import which elevates the cost per engine miserably. Then he designed a simple U-Control model called the "Doon-Fly" with a Perfect-type fuel tank, dual plywood firewall with the landing gear sandwiched between. Then he had 500 of the models kitted. U-Control flying near Sydney, Australia, is leaping forward with new activity.

Ramblin' around Sydney, Australia, a major world city, proved to be tremendous fun. Next month we visit a world-class R/C

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scale modeler, learn hard financial facts from a hobby importer and distributor, visit a couple of the more active hobby shops, and leave Sydney to ramble around New Zealand's model builders. Stay tuned. •

**XBY-1. . . . . Continued from page 53**

formers, consulting the plan for inside and outside diameters. The cowlings should be built directly over the plan, using half-shell construction, with lengths of 1/16 square stringers to hold the formers in place during

construction (located at the top, bottom, and side positions). When both sides are completed, the cowlings framework resembles a drum; wrap with 1/32 sheet and add the three 1/8-inch thick rings at the front of the assembly, cross-laminating as you go along. Finally, sand the front rings to a smooth, rounded contour.

**Landing gear.** This is the only unusual aspect of construction. Although the landing gear must be firmly attached to the fuselage, it must also be springy enough to absorb rough landings. The main landing

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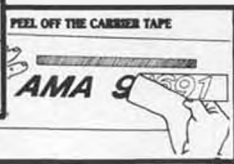
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gear wire is bent as shown on the plan and glued in place on fuselage former F4. Add a doubler on top of the wire to complete the sandwich arrangement.

On my model, I ran an additional wire from F2 to the main gear wire and soldered the two together for additional strength. This brace strut wire was anchored to F2 through a short length of 1/16 aluminum tubing glued into F2. The balsa landing gear structures, wheel pants, and brace strut were then built up around the wires. Each brace strut, for example, was made up of two 1/16 x 1/8 lengths of balsa that were glued around the brace strut wire and then sanded to shape. The wheel pants were

built as separate units but grooved to accept the main gear wire. Lots of sanding sealer and lightweight spackling were needed to fill and smooth the landing gear contours to the streamlined shape shown in the accompanying photos. The finished model has several thread "wires" attached to the landing gear that were simulated with very fine sewing elastic.

**Finish and details.** The entire model was covered with white Japanese tissue, alcohol shrunk, and given two coats of very thin, clear, nitrate dope. As a general rule, try to do as much detailing as you can on the separate assemblies. The scrap details, like the ribbed flotation gear, intake scoop, and

exhaust stubs are added right before painting. The entire model is medium gray, except for the tops of the wing and horizontal tail surfaces, which are yellow-orange. The color was Aerogloss dope applied with an artist's mouth atomizer.

A separate instrument panel, if you want one, can be added at this point. All of the "windows" are thin acetate. The main cockpit structure was built up from short lengths of 1/16 square basswood, covered with acetate, and then gray paper window frames. All of the black lettering ("U.S. NAVY" and tail codes) are pressure-sensitive letters applied to clear decal sheet that are then transferred to the finished model. Control surface lines were done with a black, Pilot brand, permanent fine-line marker. The four "star 'n' ball" insignias are best created from color-doped tissue or decals, if you're lucky enough to have them. Three access steps on the right rear fuselage can be simulated with rectangles of black tissue.

Finally, a word or two about the simulated corrugations: All of these were drawn with light gray ink in a capillary technical pen. In order to get neatly spaced lines, each of the tail surfaces was laid out on my drafting table, the 1/8-inch rulings lightly drawn in soft pencil, and then inked-in, using a T-square to insure good alignment.

### AT THE FLYING FIELD

Several nine-inch propellers were tried, but they all seemed about equal to the task. A commercial plastic prop was eventually selected. Power comes from two loops of

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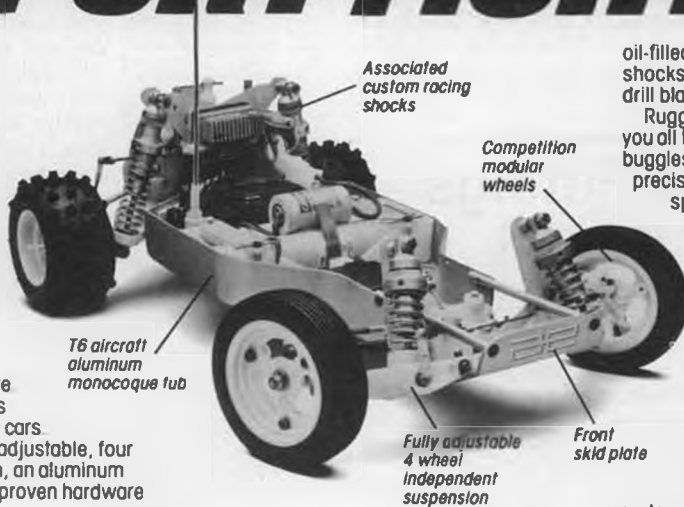
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3/16 FAI, 26 inches in length and braided to take up some of the slack. The finished model was slightly nose-heavy, requiring a tiny glob of clay on the tail cone. A 1/8-inch down-and-right shim was needed for thrust adjustment.

It is suggested that you leave an enlarged slot for the stabilizer, should small up or down adjustments be needed during trimming. Once the model is trimmed, the open areas around the tail can be finished with gray tissue and the tail struts added.

How does it fly? The model now puts in regular flights of 45 seconds, with occasional joy rides in excess of a minute. It is capable of impressive altitude, and it surely looks like a craft that might have been flown by Don Winslow of the Navy!

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#### Big Birds. . . . Continued from page 9

and six-bolt hub and came up with a dandy little engine that should fit most anywhere.

Also, the engine comes set up with a mechanical spark advance that will interface with any ignition system using Deans plugs, like the C.H. Electronics unit that's proven to be so reliable these past years.

I'd scrounged this very early (#2) prototype from Al before he'd had a chance to wring out any of those first few engines, so we were both surprised when initial running showed that this Sachs 40 doesn't like standard spark advance settings, which is usually somewhere between 28 and 32 degrees.

Y'see, because of her porting, this baby just loaf and doesn't even breathe hard when advanced to a mere 32 degrees. She has to be coaxed with another 10 to 11 degrees, and then she comes alive. The advance on my engine figured out to be 43 degrees, which is within a degree of what Al's setting his production models.

A quarter of a turn CCW on the low-needle valve brought the idle down to a steady, reliable 1500 rpm. No matter how long she was left ticking over, jamming the throttle all the way open brought an immediate and smooth burst of power.

I was going to tell you that I like this engine, but, in truth, I've fallen in love with it. Outside of wishing that the needle valves were easier to get to while the prop was swinging and having a slight case leak that seems to have abated (after all, it was a prototype), I really can't find anything to nit pick about. There have to be a whole slew of BIG Birds out there that need a lightweight hummer like this up front.

And you have three choices when it comes to sound reduction. Go with the easy conversion of a SuperTigre 2500/3000 can (it does a surprisingly good job), or a custom-made muffler from either B&B Specialties, Inc. (14234 Cleveland Road, Granger, Indiana 46530) or A & M Aircraft Supply.

One last item: Although the engine came with a standard size spark plug, I couldn't run it because all my C.H. Electronics ignition units are set up for the small 1/4x28 NGK plugs. Enter good buddy Lloyd Marohl who made a slick adapter from an old spark plug in less than an hour and

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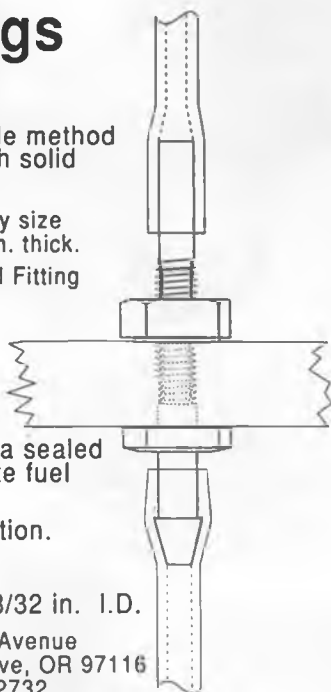
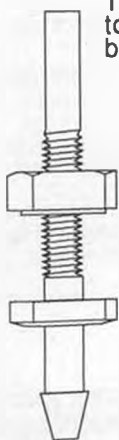
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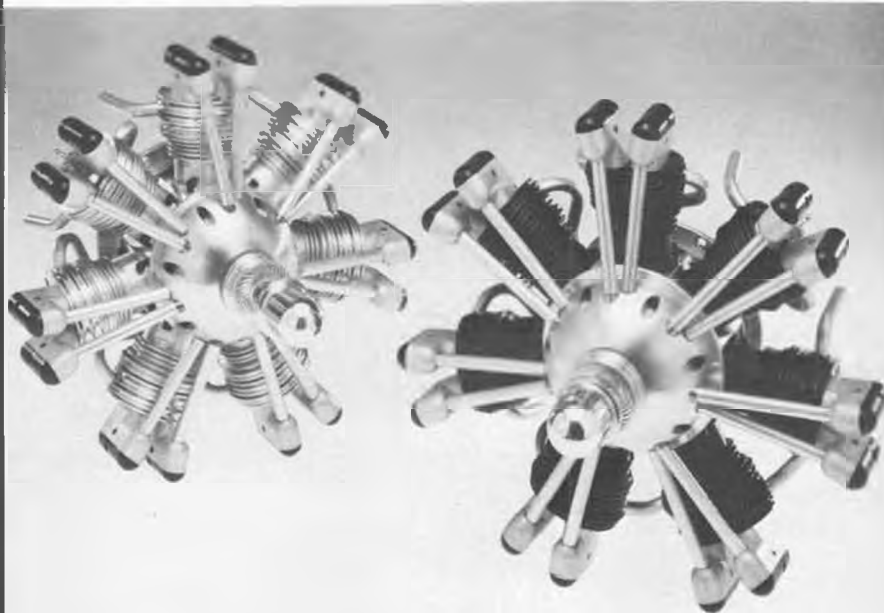
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I needed Willaert.

"What's the matter, Al? Are guys flying too good now and not breaking enough engines to keep you and your people busy?" "No," twanged Al, "as a matter of fact, they're flying more and dorking more planes than ever before. The problem is that the repair business is too good." "Huh?" "It's like this, pardnuh. I realized that engine re-

pair isn't where I want to be. I'd rather be developing new engines, but the broken ones keep coming in so fast that I have very little time for R&D." "Well, when is the changeover?" I asked. "And who will be doing the repairs from now on?" "Al, I can't tell you who they are right now, but I can tell you that we've already started training these people. We've had a great relationship with Saito and we're trying to make sure that the quality of repairs doesn't suffer because of this changeover." "Sounds good, but who should guys be sending their broken engines to in the meantime?" "It's all been worked out," he commented. "For the time being, engines will still come to us, and we'll make sure that they get taken care of. When the new repair people are ready to take over, we'll let everybody know." Naturally I asked about the R&D he'd mentioned. His response was:

"Well, a couple of twins, one five cubes and the other ten cubes, may be coming down the pike. The smaller one will use the new Sachs 40 parts. And we're probably gonna come out with a lightweight, low-cost single that'll be somewhere in the 30cc range." So, for now, send your broken, abused, galled, and seized Saito directly to A&M Aircraft Supply for fixin', and Mr. Willaert will see that it gets into the right hands.

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## Safety first!

**Insiders. . . . . Continued from page 49**

record-breaking flight of 52 minutes, 14 seconds, Jim Richmond writes, in his NFFS article mentioned previously, "I can hardly wait to build an even lighter plane." Unfortunately, these unrestricted models have developed to a point that they require skill in construction and handling possessed by only a few individuals.

In addition, the endurance of these models is such that a contest would be impractical if there were more participants; and the time required for their construc-

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tion, combined with their ease of destruction, has discouraged many modelers from participating in this event.

The overriding effect of wing loading has two main effects as far as rule-making is concerned. First, by requiring a higher wing loading, the rule can limit the endurance as much as desired. Second, if rules do not limit the wing loading directly, builders will seek any means within the rules to reduce the wing loading. One example of this tendency is seen in the design of models for the F1D category. Originally, the span was limited to 65cm to reduce the size of boxes required to transport these models, and the minimum weight of 1 gram was established because European builders felt that they did not have access to the best quality balsa wood and were therefore at a disadvantage in trying to make the lightest possible models. Over a period of years, the design trend of these models has been to use wider chord and larger tails to get as much lifting surface as possible in the 65cm span. The aspect ratio has been reduced to such an extent that these models must now be very lightly constructed to make the model as light as one gram. If the builder cannot reach this weight, the one-gram rule becomes inoperative.

Another example of efforts to reduce the wing loading is found in the Pennyplane category. In this class, the rules specify the weight, but the wing area is not restricted except by specifying the overall length and projected span.

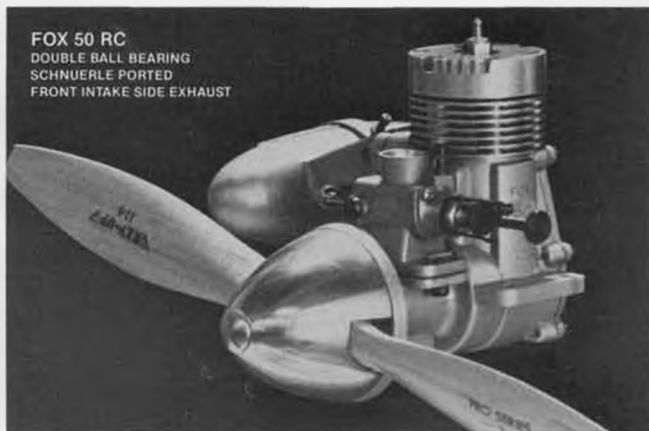
Builders found that they could build

biplanes (triplanes if the large stab is counted), without exceeding the specified weight. Since the Pennyplane was originally conceived as a beginner's category, a new class, the Novice Pennyplane, had to be introduced to provide a model of simpler construction.

The three categories, AMA Intermediate Stick, Easy B, and Novice Pennyplane, all contain restrictions that tend to increase the wing loading. Though these provisions were probably made primarily to simplify construction, they have the desirable result of reducing the endurance. The methods of limiting the wing loading are different, however, and have different effects on some of the desirable characteristics.

In the case of Novice Pennyplane, the weight is specified and the wing area is essentially fixed by specifying both the span and chord of the wing and tail. The specification of weight is considered to be somewhat undesirable because of the difficulty of checking this value at a contest. Also, with the propeller diameter, motor stick length, and overall length also specified, the model design is essentially fixed and does not offer a very great design challenge.

In the case of Easy B, the weight is increased by specifying paper covering and by requiring solid motor stick and boom and by prohibiting bracing (except when made of wood). The specification of covering material is considered undesirable because there is no assurance that the material used (condenser paper) will remain available or be consistent in properties.



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Also, by requiring a relatively heavy covering material, the builder is encouraged (somewhat inconsistently) to make the framework just as light as possible, resulting in a fragile model that is subject to aeroelastic effects, and that requires careful handling. The other specifications of wing dimensions and tail area result in essentially a one-design class with little design challenge.

In the case of the AMA Intermediate Stick, the covering material is specified as either paper or commercially available plastic film. This type of rule has the same disadvantages as it does for the Easy B. There is no assurance that a commercially available film as light as microfilm will be available in the future. Also, in this class, the

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wing area is specified. This method of controlling the size of the model may be somewhat undesirable because the wing area is a difficult quantity to check at a contest, especially with planforms that are not described by simple mathematical formulas.

As mentioned previously, the specification of model size by fixing the span, as in the case of F1D, results in long, ungainly models, whereas fixing the area causes problems in checking the models. An intriguing method to limit the size would be to specify the maximum wing chord. This quantity would be very easy to check at a contest. The designer would have the challenge of selecting the best span or

aspect ratio. Selecting too small an aspect ratio would result in a model with too small a wing area, whereas selecting too large an aspect ratio would increase the wing weight excessively.

The tendency, however, would be to a large aspect ratio than currently used on F1D models, resulting in more graceful models. A good way to require larger values of wing loading would be to eliminate external bracing and to rule out attached bracing such as boron filament. The need to use unbraced cantilever wings of fairly high aspect ratio would require spars strong enough to withstand the loads in flight, and, as a result, the model would be much

less fragile than a braced model. By eliminating bracing, one of the most difficult and time-consuming steps in building a model is avoided, and the model is much easier to repair at a contest. In the opinion of the author, microfilm is an easier covering material to handle than either paper or thin plastic film. In fact, some builders put such film on hoops and handle it like microfilm. Perhaps microfilm was avoided in the Easy B and Intermediate Stick models with the hope of making these models easier for beginners. According to the recollection of the author, however, when microfilm was introduced in the thirties, when there were more genuine beginners than today, these youngsters found little difficulty in doing a good job with microfilm, and, with its use, they immediately produced models that were graceful, beautiful, and capable of much longer endurance. (To be continued next month.) •

**Black Star. . . . Continued from page 10**

expensive reed engines. I would recommend using either the Black Widow engine or the best .049 engine for the money, to me, the Dragon Fly.

Don't be turned off by the Vee-tail, although you will need a mixer to produce turns or pitch control. The model is very easy to fly and can be flown by a rank beginner.

Let's get to building.  
**THE FUSELAGE**

Start by cutting out the two fuselage sides. Next, using white glue, glue the 3/8 triangle stock to the fuselage sides. Be sure to make one right and one left side. Now cut out the fuselage formers. Glue F-2 and F-3 perpendicular to the fuselage using five-minute epoxy. Now glue the other fuselage side to F-2 and F-3. Now install F-1, F-4 and F-5 using five-minute epoxy. It is time now to install the main landing gear and the plywood braces. Finally, add the top and bottom sheeting.

Now carve the top edge of the fuselage round and sand with medium-grit sandpaper. Add the triangle firewall reinforcement and the 3/32 balsa doublers. Next, cut out the hatch from 1/8-inch plywood. Finally add the 1/8-inch dowels. This completes the fuselage.

**THE WING**

Start by cutting 5/16 inch off the trailing edge of the two tapered panels and the one constant chord section, bringing the trailing edge thickness to 1/4 inch. Because the wing molds don't match perfectly, it is necessary to sand the wing's root and tip sections smooth using medium-grit sandpaper. Now cut out four trailing edge fillers from 1/8-inch balsa; see plan. Glue two together making them 1/4-inch thick.

Next, take the constant chord wing panel and draw the wing sweep angle on the bottom of the wing; refer to the plans. Using a coping saw, cut out the sweep angle. You should now have a right and left wing section. The plans show the right wing section full size; the left side is a mirror image of the right side. Glue the trailing edge filler to the right and left side of the constant chord sections.

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It is now time to glue the constant chord wing sections to the tapered wing panels. Using the balsa trailing edge as a straight edge, line up the trailing edge of the tapered section with the trailing edge of the constant chord section. They should mate. Satisfied that they do mate, lay down a piece of waxed paper so the wing panels won't stick to the building board and mix some five-minute epoxy and spread it over the root section of the tapered wing. Now join the tapered section to the constant chord section using the balsa trailing edge to align the trailing edges of both panels. Failure to do this will result in misalignment. Repeat this operation for the other two wing panels.

It is now time to glue the balsa trailing edge to each of the two wing panels. Spread white glue on the trailing edge of the foam wings and line up the balsa trailing edge with the contour of the wing. Use pins to hold the balsa trailing edge in place. Repeat this for the other wing panel.

Next, it is time to cut the sweep angle of the balsa trailing edge at the root of both wing panels using a razor saw. Also square off the wing tips by cutting off the balsa trailing edge that extends beyond the wing tip. The dihedral of the wing is two inches for each wing panel. The two inches is from the building board to the bottom surface of the wingtip. Follow the instruction sheet included with each foam wing. Using five-minute epoxy, glue the two wing panels together. Now cut off the pointed tip at the center of the wing. Refer to the plans. Sand the pointed tip area that was cut off round so it blends in with the contour of the leading edge of the wing. This completes the construction of the wing.

#### THE VEE-TAIL

Cut out the two stabilizer sections from 1/8-inch balsa. Hinge the stab sections using nylon reinforcing tape. Next, lay down a piece of wax paper and place one stab section on it. Mix up some five-minute epoxy and spread it on the other stab. Now, using the dihedral gauge let the second stab rest on it and form the 110-degree angle with the stab resting on the board. Refer to plans for this operation.

#### FINISH

You may finish the model any way you like, but remember, keep it light. I finished my model by giving all balsa surfaces two coats of clear dope. I sanded between coats with #300 wet or dry sandpaper. Next, I used Pactra's Formula-U black polyurethane paint. Only one coat is necessary. Finally, I trimmed the model with red, orange, and yellow paint.

#### RADIO INSTALLATION

Du-Bro and other manufacturers make mixing units suitable for this model, follow directions supplied with these units. For some of you this might be the first vee-tail plane you have encountered, so I will briefly describe how the vee-tail works.

With the plane in front of you and you at the rear of the plane, to make a left turn the left stabilizer must have the elevator down while the right stabilizer must have its elevator up. If this doesn't make much sense, visualize the left stabilizer in the vertical position. It now becomes clear that down

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elevator is left rudder. The right stabilizer, if made vertical, is in the up position; its elevator, which is also left rudder. For a right turn, the elevator positions are reversed. A vee-tail model is not the most efficient way to turn a model because when we are asking the model to turn we are also feeding in up and down elevator at the same time. To see this, put the left and right stabilizers in the horizontal position. For a left turn, the left stabilizer's elevator is in the down position while the right stabilizer's elevator is in the up position. Since a vee-tail is neither horizontal or vertical, but in between, it does both. That is, turn and up-down at the same time. When both elevators go up what they are doing, in reality, is feeding in left-right turn plus up.

*(Suggestion: Don't try to figure it out; just believe it and go flying! wcn)*

#### FLYING

Always fly on calm days, if you don't chances are you will lose the model. Make sure that the surfaces are going in the right direction. This is especially true if your radio has servo reverse. The model must be hand-launched. Run into the breeze and throw the model straight and level.

**Hannan. . . . . Continued from page 51**

is inclined five degrees relative to the fuselage center line. It conforms to the AMA rules in having 164 square inches of rotor area relative to the 160 square inches of the fixed gull-wing.

According to George, he had miserable luck with the usual top-mounted rotor, however, putting it under the fuselage was "like turning on a light." The model, constructed during 1977 as a P-30, has its rotor mounted at the center of gravity, and it imparts a stabilizing effect. When the model tries to stall, it just mushes for a few feet, then goes on flying. Although the rotor is a poor aerodynamic device, the model flies more smoothly with the rotor on than off.

Having retired recently, George has had time to reflect on his hobby, and opines:

"Models and kissing girls are a lot alike in that you don't have to be good at it to have a lot of fun."

#### THOSE SILK-AND-WIRE MODELS AGAIN

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the prewar Japanese silk-and-wire models, which were marketed at low cost in "five-and-dime" stores. For a long time, we had assumed that there were only a few different types manufactured; however, it now appears that they were made in many designs in prodigious quantities by various companies. Thanks to Frank Nekimkin and John Brown, we are able to present illustrations extracted from old Japanese catalogs. The selections are fairly typical; however, other more complex variations were also manufactured, including some with fully enclosed fuselages and even some ornithopters. We intend to make some translations of the catalogs' written information and likely may have more to say about them



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in a future column.

### FAREWELL MILTON CANIFF

Famed comic strip creator Milton Caniff has passed away at age 81, according to clippings from Dick Howard, of Lake Havasu, Arizona. Early in his career Caniff had authored "Dickie Dare" and "The Gay Thirties." It was his later productions "Terry and the Pirates," "Male Call," and "Steve Canyon" that gained him worldwide recognition. His audience of loyal fans included many aviation enthusiasts, appreciative not only of his sensuously portrayed girls, such as "Burma," "Lace," and the "Dragon Lady," but his authentically drawn aircraft.

### SOME THINGS NEVER CHANGE

Author/designer Joe Wagner favored us with this extract from a Francis A. Collins model article featured in the October 1919 *Woman's Home Companion*:

"There is a great variety of model aeroplanes on the market in case you may wish to buy one ready-made. The cheaper models are not efficient; many of them will scarcely fly at all. If you intend to buy one, try to find one which has been made by some boy who has a reputation for his flights, or from a thoroughly reputable model supply house. . . . You will, however, feel a much greater satisfaction in flying a model aeroplane which you have made

yourself!"

### DO THEY?

Don De Loach, of Texas, recently visited Torrey Pines near San Diego, where hang gliders share air space with R/C sailplanes. Don struck up a conversation with one of the fellows and mentioned that his main interest was in free flight models, to which the incredulous glider-guider remarked:

"They still do free flight?"

### YES, THEY DO!

*Flying Models* magazine editor Robin Hunt reports that their free flight model plans continue to sell in greater quantities than all of their radio control and control line model plans combined!

### COMIC BOOK THREE-VIEW

Modeler Jim Longstreth, of Portland, Oregon, has recently created plans and instructions for building a balsa "solid model" of comic book hero *Airboy's* "Birdie," a bat-like, jet-powered ornithopter fantasy aircraft. Appearing in the May 1988 issue of *Airboy*, the drawings are presented in simulated blueprint form.

Longstreth and *Model Builder* cover artist Bob Benjamin recently joined forces with Frank Macy, of American Junior Aircraft Company, to give a four-hour model aircraft presentation to school children in Camas, Washington. Busy people!

### HOW'S THAT AGAIN?

According to a local television report, visiting Soviet aviators were offered a tube of sun-screen lotion during the San Diego air show. When one asked, "What is this for?" The unthinking reply was, "To keep you from turning red."

### FLEMALLE '88

The 12th annual indoor model contest of Flemalle, Belgium, will be conducted during August 26 through 28. Events will include Microfilm, EZB, Micro 35 Paper, Saint Formule, and, of course, Peanut and Pistachio scale. A special category will be for any Peanut or Pistachio model of an Alfred Renard design. Note that Walt Mooney's plans for a Renard R-17 appeared in the September/October 1974 *Model Builder*.

Proxy entries are always welcome, and more details are available by sending three International Reply Coupons (available from most post offices) to: F. L. Van Hauwaert, Grand Place, 1-B 52, B-4110, Flemalle, Belgium.

### ARCHIVE ACCUMULATIONS

Many, if not most, model builders have sizable collections of magazines, books, and plans accumulated over many years. Although rewarding to own, such materials can create problems eventually. What if the reference material outgrows the space available for it? What if the "archivist" passes away? Disturbing questions to face. But if we don't, our survivors must.

Leo Opdycke, publisher of *WW 1 Aero* and *Skyways*, is looking for solutions to these problems to be shared with his readers. If you have constructive ideas, contact Leo at 15 Crescent Road, Poughkeepsie, New York 12601.

Meanwhile, here are a few thoughts to consider: Surviving relatives of deceased collectors may simply dispose of such material in the easiest possible way, by throw-

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ing it out. Others may, instead, try to convert it into ready cash, often undervaluing (or overvaluing) it for lack of knowledge. At the very least, perhaps you should tell your spouse the worth of your collection?

Also consider that some aviation museums will accept donations of such items, possibly with tax advantages, or may even be prepared to purchase especially choice volumes. In such cases you *should* still have access to your items. Discuss this possibility with the curator *in advance*, however, as some museums are just as short of space as you are.

A final idea: Try reducing the scope of your collection. Be realistic about what you may use and what you won't. Don't hoard

reference material; share it with friends via photocopies, or possibly outright gifts. Think of the satisfaction to be gained in giving it to someone who will appreciate it and employ it constructively. After all, someone will eventually dispose of it anyhow, why not you, while you can enjoy the gratitude?

### SIGN-OFF

Modeler/author Larry Kruse was kind enough to send us some silk thread from Kansas when we were unable to locate any locally. Silk thread is ideal for pioneer model rigging, since it is free of unsightly "fuzz," may be tautened by water-shrinking, and is exceedingly strong.

When the package arrived, we were amused to read the accompanying note:

"I'm not going to be so tacky as to suggest that the enclosed ought to 'sew it up' for your future projects, or even that your request 'had me in stitches.' Of course, on the other hand, you ought now be able to maintain the 'thread of whimsy' that is so much a part of your writing, almost indefinitely." •

Electronics... Continued from page 16

audio, and lots of "high tech" entertainment electronics.

In the Black Hawk, without a receiver being part of the control system, just how is a radio signal going to foul up the works? I can't tell you exactly, except that a strong enough RF signal will often be rectified within a non-receiving circuit. The results are an unwanted uncontrolled DC voltage within the circuit that changes everything; modifying the operation in some cases and killing it in others. The cure is simple if you can find where within a piece of equipment this phenomena is taking place, but finding where can often be impossible. The only cure then is complete shielding, even including the wires, and extensive use of bypass capacitors and RF chokes.

I know that few, if any, of you are going to be flying around one of these Radio Free Europe antenna farms, and you are asking: What's the point? Well, only to try to help you understand that radio interference can come from completely unexpected sources, and, in our case, from usually never to be identified sources. The important thing to believe and to remember is that interference does *not* have to come from another radio control transmitter right at your field. It can come from hundreds and even thousands of miles away. Remember too that "our" frequencies are not exclusively ours. If you do enough flying, the chances are that RFI is going to get you, which is not a nice thought, but is a risk we all take.

### ELECTRONIC SPEED CONTROLS

This topic always seems to be a popular subject here in the pages of EC. In recent months, there was one bit of related information which I was not able to bring you about ESCs: a source of MOSFETs in small quantities. I did mention this before, and some of you were kind enough to write in with the names and addresses of quantity suppliers, for which I thank you. And all this time, the source has been right under my nose, so to speak, and in my hands often.

Ace R/C to the rescue! I've mentioned be-



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fore that it stocks and sells a great variety of electronic components in any number, but always assumed that they were only the parts that are used in its proprietary equipment, and I didn't know of any of it that used MOSFETs. I still don't, for that matter, but in making up an order recently, as I was going down the list, there big as life were BUZ-11s

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and BUZ-71s. The former is stock number SS070, at \$8.50, and the latter is SS071A, at \$2.25. As I have said here before, if you are serious about doing-it-yourself, you've got to have an Ace R/C catalog, available for a mere \$2.00. You see, even I still find new and important things in it.

Another repeat, for you latecomers: The International Rectifier IRFZ40, another popular ESC MOSFET, is available in small quantities from Digi-Key Corporation, P. O. Box 677, Thief River Falls, Minnesota 56701-0677. The latest available price is \$6.00. This MOSFET is efficient and holds up well in drive service, but does not do as well in brake service, for which I recommend the BUZ-11.

Remember that these MOSFETs in ESC

applications are subject to ESD. Here we go again with more of those abbreviations; huh? ESD, Electro Static Damage, is a valid acronym in the electronics industry, and in this case is a gremlin that can completely ruin some types of components. MOSFETs come in special antistatic packaging, require careful handling, and must be soldered with static- and spike-free soldering irons. As you can see, they are costly, take the necessary precautions when working with them.

Fortunately, once they are mounted onto a circuit board, they become safe, and, except for soldering, the item can be treated as any other circuit. That is with one exception: electronic speed controls will sometimes be mysteriously triggered into operation, even with the companion receiver being off, as long as the drive battery is connected. I can't explain the reason why this is so, and neither could Bob Novak, who has probably designed more successful ESCs than anyone else around. The problem has not been reported to me in R/C cars, only in airplanes in which the receiver is powered from a separate battery and not from the voltage regulator within the speed control. Maybe this is a coincidence, or an actual factor. What makes it difficult to pin down the cause is that the exact conditions are impossible to duplicate so as to conduct the necessary tests.

The number of such reports are few, but are similar in that they involve an airplane put away with the drive battery still connected. All of a sudden, the motor is running and, as you might expect, damage of various sorts occurred. There are other similarities; these things always seem to happen indoors, and that may be a clue. MOSFETs have different drive requirements than do bipolar transistors, which require a low voltage high current on the base in order to start conducting. A MOSFET, however, requires only the application of a voltage, with very little actual current flow. It may be that in some cases there is enough of an electrical field created by the home alternating current, static electricity, or both to in some manner build up enough potential on the printed circuit board to trigger the MOSFETs.

As I have said in the case of black wire corrosion, it would be satisfying to know the causes of some of these weird happenings. But since they sometimes elude us, the most important thing then is to be aware of them and take the necessary precautions. In the case of wild electric airplanes, the cure is obvious: disconnect the battery except when you are ready to fly, and, by all means, disconnect it after a day's flying.

It may be that this runaway motor phenomena is larger than I know. I have been test-flying a new electric airplane, the "Professor" manufactured by Hirobo in Japan and to be distributed here in the US by Futaba. Great little machine, and I will tell you all about it once my testing is complete. Anyway, I notice that in more than one place in the manual, you are instructed to unplug the nickel-cadmium drive battery.

TALKING ABOUT BLACK WIRE

# MRC-Tamiya's Blackfoot

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## A deranged Ranger

This 1/10 scale Ford Ranger is all business and no compromise. Perched on its mammoth wheels and turf chompin' tires that are nearly a full 5" high, the Blackfoot towers above the ground like a Goliath. It stands high enough to scale sharp inclines and stomp the stumps and bumps that strand lesser pickups. Single piece hubs allow quick assembly, low weight and maximum ruggedness.

## Tall isn't all

The Blackfoot's hefty ground clearance means it'll climb most any obstacle. And Tamiya's high output, high torque RS-540S engine pumps plenty of ground thumping power. While the Blackfoot's heavy duty, coil-dampened suspension — double wishbone in front, trailing arm in the rear — lets it effortlessly cut and dart with a nimbleness that belies its size.

## Other creature features

Tamiya has engineered the Blackfoot with attention to quality and durability. Like a sealed gear box to protect the drive train gears from debris and moisture, differential gears for tight cornering stability and positive control on any type of terrain. And its one-source power from its BEC (Battery Eliminator Circuitry) gives you maximum space in the chassis with lower weight. For overall best performance we suggest you buy genuine, matched MRC-Tamiya ni-cads (not included).

## The beauty at rest

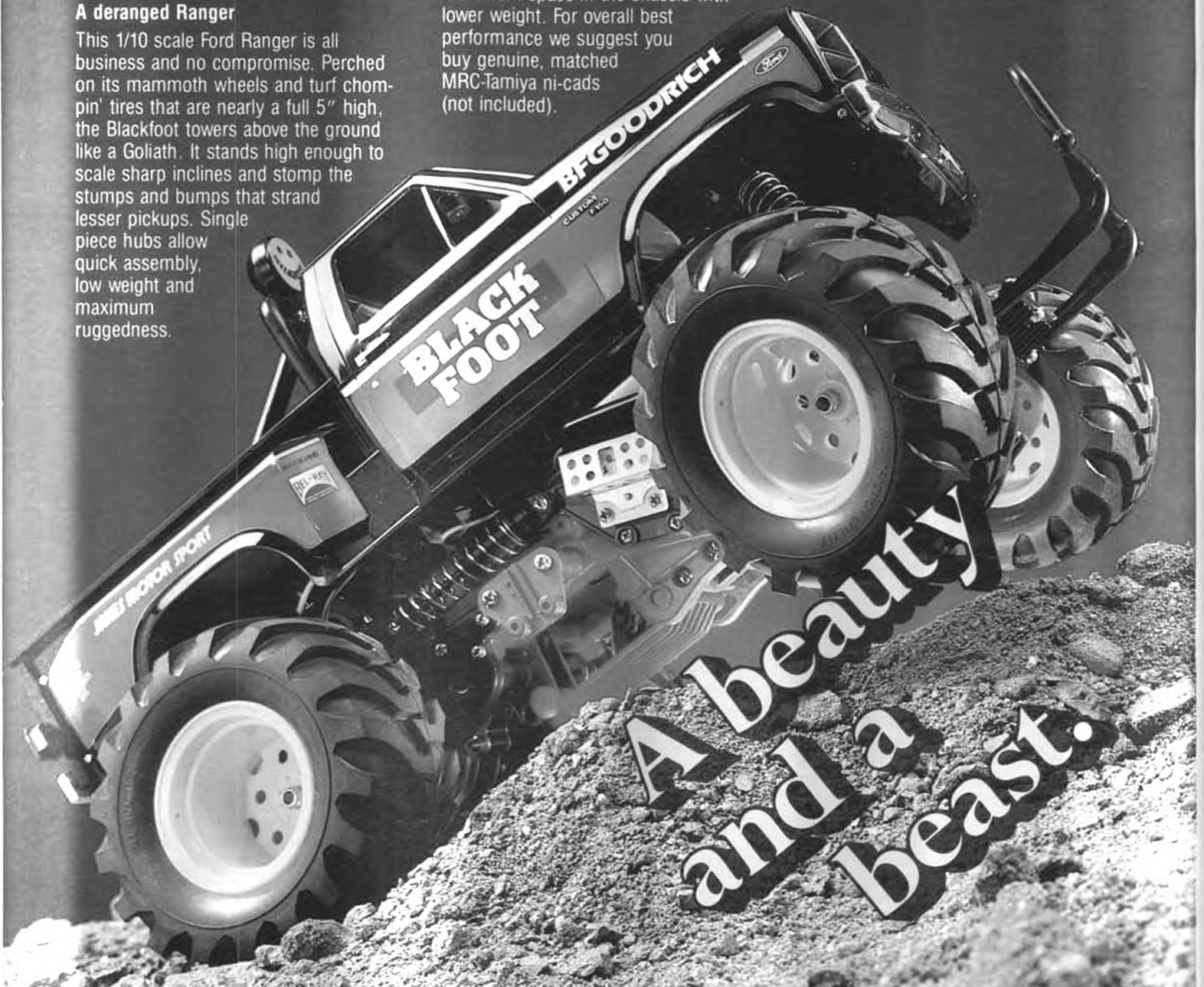
Check out the lifelike scale and detail on the authentic undercarriage. Examine the carefully crafted chrome grille, the headlights, the doorlocks. From top to bottom, few R/C reproductions rival it.

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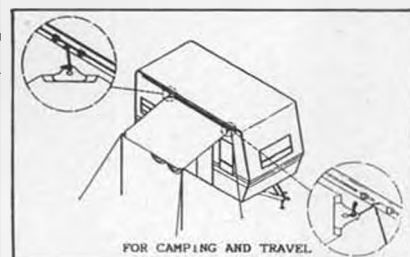
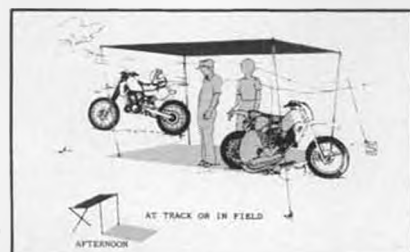
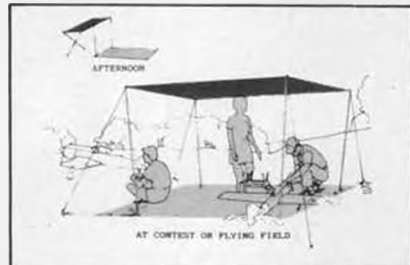


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### CORROSION

I've closed the book on the subject of black wire corrosion a couple of times, but it keeps coming back to life. The subject has actually spread outside the columns of EC, with some rather strong theories without any factual backing being offered as undisputed facts. Well, I've just recently received some material from Sanyo Electric Company, who I feel safe to say knows more about nickel-cadmium batteries than all the rest of us.

Sanyo, in speaking of the Storage Characteristics of its "Cadnica" cells, states:

"Generally speaking, a loss of voltage and capacity due to self-discharging during storage is unavoidable. With open-type nickel-cadmium batteries or manganese

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dry cells, this self-discharge is less noticeable than with Cadnica batteries, which have a large facing electrode area and a limited amount of electrolytes, all of which are completely sealed.

"The following two factors greatly affect the self-discharge of nickel-cadmium batteries while in storage:

"1. Instability of inactive materials. Nickel oxide is thermodynamically unstable at its charged state and self-decomposes gradually to generate oxygen gas, which, in turn, oxidizes the negative electrode. Thus, the self-discharge proceeds." The second factor stated dealt with impurities and is not pertinent to the discussion.

Anyway, according to that, the Black Wire Death starts with the negative electrode of the cell, the outer shell, seeming to focus at the wire connection and creeping up the wire. Many of the reports that came in told how unplated wire was more susceptible to this corrosion, which begins to make sense as it would be more affected than plated wire or the outside of the cell which is also plated. The solder connection, being mostly lead, also falls into this category. Works for me.

If indeed this is the cause, the cure is not to let your batteries get too far discharged while idle. We've always recommended periodic charging during winter, for example; now it seems important for one more reason.

Last of all, should it turn out that this is not the main or only reason, it is important to remember that the wire connected to the negative terminal of Ni-Cd batteries does at times corrode enough to stop the equipment from operating, and periodic checks for it is a good idea.

Well, as always, Ni-Cds and charging has to be mentioned every month. At least I didn't hit you with anymore of those nasty formulas. Now go fly!

ARFs. . . . . Continued from page 26

one of us who enjoys building. I just finished a conventional balsa trainer in six days! I expect to continue to average one a month in my never-ending search for trainers that I can honestly recommend. That effort has become practically an all-absorbing pursuit thanks to the regrettably large number of people in this hobby who seemingly would not know an easy-to-fly trainer if they sat on one (or else really don't care about whether or not a beginner solos easily or whether or not he becomes discouraged and drops out).

"Art, I'm sorry to have to be so vehement, but this has been such an uphill crusade of mine. I knew that Bob Benjamin, Mitch Poling, and quite a few others were well-aware of what I'm trying to do and encouraged it.

"Yes, removable fuel-tank hatches are a convenience, but the tradeoff (fuel leakage) means they are a secondary requirement. Yes, trike usually handles better than tail-dragger (unless the tail-dragger's landing gear is set up right), but, again, this is a secondary rather than a prerequisite. I have given you the prerequisites. Now it is up to you whether or not you are willing to help make the naive aware of them. There is a God, and there is a hereafter, and I firmly believe that we were put on earth to help one another." I think we can all agree that Jim has embarked on a veritable crusade in the cause of choosing the proper trainer. Jim has been running an advertisement offering to send his *Ease-of-Flying Ratings of R/C Trainers* for \$1.50 postpaid. As is often the case when we become encouraged in the pursuit of a single goal, we sometimes tend to lose sight of the big picture. We answered Jim as follows:

Dear Jim:

Many thanks for your thought-provoking letter in regard to my recent article in *Model Builder*. I must admit, however, that you

have me at a disadvantage, having been able to read my thoughts on the subject of trainers without having granted me the privilege of reading your article. I will nevertheless attempt to answer some of the points you touched on.

Last week I trained a young man to fly R/C in one morning, after a total of one hour and twelve minutes air time. He was a junior military officer with absolutely no modeling experience of any kind, and not particularly motivated to learn R/C. The airplane we used was a full-sized Buzzard Bombshell with an old Enya .29, swinging a 10/5 prop. During the training period I never once had to take the transmitter from him, and he could land and take off at will by the end of the session. Great! This must be the ideal trainer; don't you think? Plenty of squares, big undercambered wing, super-light wing loading, and so slow it can fly backwards in a light breeze!

Jim, I think you will readily agree that many old timers such as the previously mentioned Buzzard, the Super Buccaneer, the Playboy Cabin, Miss American, and the Quaker, to name a few, would be about as good as a trainer can get. And if a new student comes my way who is a veteran builder, wants to learn R/C, and is willing to wait weeks or even months to get into the air, I'll send him home to clear his workbench and get started.

Now, I hope you will give me credit after having been flying R/C for close to 20 years and having trained maybe a hundred students, some of whom are out there winning competitions today. I am no dummy, Jim. If a student prefers to build an airplane, I can come up with at least two trainers that just have to be on your preferred list, the M.E.N. Trainer and the Sig Kadet Senior. I could probably think about it and come up with a lot more, but for now, those two ought to do. And if those two models aren't top-rated in your evaluation list, then I would accuse you of not knowing your subject. I admit that these are the kinds of airplanes I want to teach somebody to fly with. But I happen to live in the real world, and if you could try to see the other guy's side, you would realize that building and flying are separate activities. If you want to learn on a store-bought plane, the Headmaster will get the job done admirably. So will the Hobby Shack 40T, which is even bigger, is very gentle to fly, and sells for only \$99! So, I am willing to compromise to get someone into the air and solo him as quickly as possible. I am proud to say that I have over a 95-percent success rate with my students, and I feel that the quality of instruction is at least as important as the equipment used in training.

I realize that you have done your homework and your wing loading calculations and have devised parameters for trainers to conform with your ideas. Nevertheless, I submit that even certified flight instructors disagree on what makes the best trainer for a pilot of full-scale aircraft, so all you have managed to do so far in the field is promulgate what is essentially *your own opinion*, and you have evaluated so-called "trainers" in accordance with your own personal observations and standards.

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information on his "Eftrebe," a prefabricated sailplane which is completely custom hand-built. Ed has been a sailplane enthusiast for many years, and he is now offering this model in two wingspans, a 126-inch version which meets F3B competition requirements and a 126-inch version which is intended for general sport flying. The wing is designed with the state-of-the-art Quabeck airfoil section, which seems to be leading in international competition of late. Wing chord is ten inches, and all-up flying weight is right at 80 ounces. In addition, three tail surface configurations are offered, a floating stabilizer, a "T" tail, and a "V" tail. Flaps and/or spoilers are optional, just state your requirements. The buyer may order the Eftrebe in just about any stage of completion, but Ed offers a ready-to-fly model with obeci-skinned foam wings and tail surfaces, and a fiberglass pod-and-boom fuselage. For do-it-yourselfers, the model can be had in standard kit form with unskinned foam wing and tail cores plus the standard fiberglass fuselage. Of course, wing skins and all hardware are supplied with all unfinished versions. As we are dealing with a truly custom builder, just about anything is available. For further information, contact Ed Cutler Plastics, 1934 Comanche St., Oceanside, California 92056; (619) 726-4971.

### ARFS WE WOULD LIKE TO SEE

It would be quite a challenge to attempt to count the number of ARFs available to us today, but types of models are getting to be conspicuous by their absence. For example, it is time we had a World War I style biplane. When it comes to ARFs, almost any kind of biplane is as scarce as hen's teeth, but warbird types are totally nonexistent. Another category of ARF I would like to see made available is a multi-engine scale type. Just imagine if the makers of the EZ line of warbirds came out with a twin-engined DC-3! Another variety of plane many of us would enjoy having is a ready-built ducted fan, and we are still waiting for that one. The purpose of this dissertation is to get you readers thinking about what kind of ARFs you would like to see on the market. If you have any pet cravings for a particular ARF, how about letting me know, and we'll spread the word to the manufacturers. Write me in care of MB, or directly at 2267 Alta Vista Drive, Vista, California 92084. Thanks for visiting the cockpit this month, do come back, you're always welcome. •

Soaring. . . . Continued from page 36

Duke).

Dennis was the only other flier besides Joe to have a perfect 3,000-point score at the end of three rounds. This forced these two into a fly-off. The task was selected: five-minute slot, three tosses count, no flight over two minutes. Joe launched at the start of the five-minute slot, but Dennis did not. Instead, he chose to let Joe point out the lift and then piggyback off of him. That was his mistake. Joe maxed twice (you were expecting less?), and so did Dennis. However, by virtue of launching earlier, Joe was able to keep his glass-winged ship up a total of 291

However, I do wish to compliment you on your efforts to get some sanity into the choice of a first airplane. Actually, you and I think very much alike on this subject. There are too many unqualified people out there making poor choices of airplanes for novices, and I do suspect that some of it may be profit-motivated, but I prefer to chalk it up to ignorance and inexperience. Thanks again for your letter, I found it most stimulating.

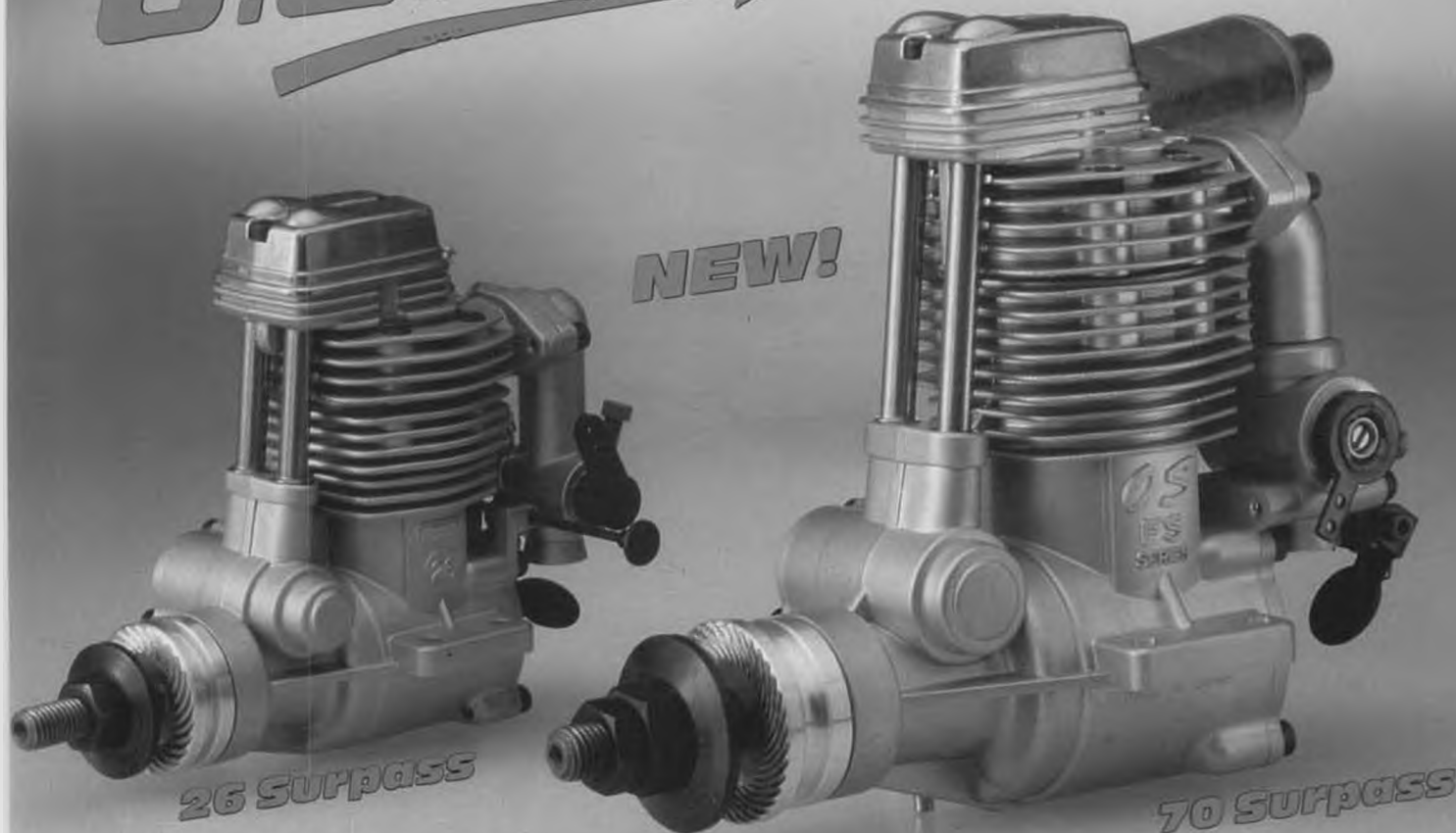
### CUSTOM ARFS

When we think of today's ARFs, we think of a highly sophisticated product which is mass-produced in modern manufacturing facilities. However, that is not always the

case, as some ARFs are produced in small quantities and may be entirely hand-built. Some custom builders concentrate on only one or two models, while others will accept commissions to construct any model the buyer desires. As this is a small, but active, segment of the ARF industry, we will from time to time present the products of private custom builders. We are now in the process of preparing a future column devoted to such model builders, and those who offer this service are invited to contact me so that we may include you and your models in our forthcoming report.

Apropos of this topic, Ed Cutler sends us

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seconds to Dennis's 275. Dennis attributed his hesitation to brain fade after a long, hot contest. Can't really say I blame him!

Dick Odle was third behind these two guys at 2993, only lagging by 7 points! His model was the RO-19 (Richard Odle design #19). This model was perhaps the most highly specialized of the bunch and showed the appropriate potential. RO-19 was the CD's choice for best floater. At one point early in the contest I overheard Dick commenting to his spotter, Jerry Krainock, that he was impressed by its ability to slow down and thermal, yet really speed up when urged by down trim.

RO-19 has some intelligent design features that may give it an advantage aerodynamically and structurally. First of all, the wing is elevated from the fuselage by means of a one-inch pylon. This in theory provides for a less interrupted flow of air under the wing. The core of the pylon is light balsa. Over this balsa is 1/64 ply, and over the ply is fiberglass. Being only one inch high, it is not very likely to flex or break during the most energetic tosses. This pylon is firmly glued inside the pod-shaped fuselage and "ties everything together." It forms a part of the thrust block that keeps the throwing dowel from ripping out, it holds the fiberglass tail boom securely in place, and it provides a location for a threaded anchor block for the wing's hold-down screw.

The nine-inch fuselage pod forward of the wing's leading edge holds the radio equipment in tandem. The narrowness of

the pod helps keep the form drag down, and the combination of pod and boom helps keep the parasitic (skin friction) drag to a minimum.

The horizontal stab is 15 percent of the wing's area, and the vertical stab is 7 percent. The T-tail stab is proven to be the most effective configuration because it reduces the number of drag-producing intersection points from the usual four of a mid-fin stab down to just two, and also by acting as an end plate for the top of the rudder and fin which eliminates half of the induced drag during rudder actuation. Also, T-tails place the horizontal stab out of the turbulent downwash of the wing. What the heck, all of that probably doesn't mean too much; T-tails just look better.

When asked if Mike Charles's Ultra HL was the inspiration for RO-19, Dick answered that he did think it was "cute." A comparison of the two (see September 1987 MB) shows many similarities.

I would assume that to make the wing easier to build and cut down on heavy joiner materials, the wing of RO-19 is flat across the center section with poly tips and tiptlets. The result is a light wing that has good roll power and stall resistance. The airfoil is a homebrew of Dick's based on the upper surface of the Quabeck 2.0/12 and a self-inflicted lower surface. The result is a 10-percent thick section with 2.7 percent mean camber. At one point during the contest, Dick wasn't sure it was quite enough mean camber, but watching it fly, it sure

looked adequate. The wing area of RO-19 is 412 with a 7-inch average chord and finishing with (my guess) a 3-inch tip chord. All up, the RO-19 weighed 14 ounces for a wing loading of 4.9 ounces.

These three guys, Joe Wurts, Dennis Brandt, and Dick Odle took home the *Model Builder* trophies for 1988. However good these guys were on this particular day, there were many more who "could'a been a champ" as well. Anyone in the top ten or eleven were capable; the competition was that keen! In fact, the entire bunch was noticeably more skilled this year than in past years.

Rounding out the top ten we find that John Lupperger finished fourth flying one of his BODST partial kits which he sells for \$19.95 (J.M. Lupperger Plans, 1304 Palm Ave., Huntington Beach, California 92648). John was 69 points shy of a perfect 3,000-point day.

Allan Guthmiller (Las Vegas) flying his original design "Nuthin Special" original based on previous year's successes finished fifth. Allan is always the guy who shows up with the smallest and lightest planes.

Garth Warner flying his third generation Chicken Sh\*t finished sixth. This year's plane had a new wing.

Gary Anderson flew his Scott Whitney Models Paraphrase to seventh. Gary's company, American Sailplane Designs (2626 Coronado Ave, #89, San Diego, California 92154), mail orders these full kits for \$29.95 with complete hardware. I must say I was

impressed by how much better Gary flew this year since he switched to the Paraphrase.

Due to a scoring error of approximately 400 points, the rightful eighth place finisher was not recognized as such at the field, and as a result was sent home minus a trophy. That flier was the CD himself, Ian Douglas! Ian also flew a Whitney Models Paraphrase.

John Bentley (Chandler, Arizona) placed ninth with that fantastic scaled-down Gentle Lady that we showed you last year. I guess Goldberg Models either missed the hint I dropped last year about doing a kit of this model, or (I hope) they are working on one! Unfortunately John had to make tracks for home before the top-ten photo could be snapped, but I did get a rather nice shot of the "Micro Lady" passing by overhead.

Craig Robinson (Portland, Oregon) brought his whole family down from the cool Pacific Northwest to compete in this event. They were rewarded for their patience with dad by going to Disneyland the following day. Craig may have broken the four-year running record for longest distance travelled that has been held by Frank Green since the beginning. For his efforts he won tenth place and took home the ninth place trophy!

Craig is kitting his winning design called the Sunrise 60. Contact him at 12225 SW 127th Ave., Tigard, Oregon 97223, for prices. Briefly, the Sunrise 60 is a reduced-span Sunrise 66 which has been cleaning house in the Northwest in RCHLG contests for the past two years or more. It features a long tail moment which makes it easy to fly and the popular E387 HLG airfoil.

Last year's number one winner slipped to eleventh place this year. Don Nigg, flying a highly modified Flinger (as in it only resembles a Flinger). The nose was lengthened one inch, and the tail was lengthened two. The wing chord was increased one inch also, and then the airfoil was changed to the Goettgen 795. The results sure looked good to me! Don and his timer/helper Dennis Brandt commented that it flew much easier than a stock Flinger, and, from what I observed, it climbed a lot faster with no comparative drop in performance in any other area.

Besides the trophy winners and top ten (or eleven) pilots and planes, there were other interesting designs.

One such design was Pete Olsen's "Fantasia." This was very beautiful in flight, and because of this I snapped a couple of photos of it passing under some cloud formations. This model had the usual 59.75 (1.5 meter) wingspan, a very average 375 square inches of area, a rather uncommon (for RCHLG) E193 airfoil, and a somewhat heavy 16-ounce total weight for a loading of 6.15 ounces per square foot. The way it was all put together was fairly unique. It has a T-tail stab, pod and fiberglass tailboom, and a balsa-covered foam core wing. The main wing panels had no sweep in their trailing edges but mild sweep back in their leading edges. The tip panels were very swept in both LE and TE. The plane had a constant taper root to tip. Pete says next time he's going to go sparless and just run 1/32 sheet

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balsa over the foam. This Fantasia's wings were just a little on the heavy side, even with the foam removed between the false "rib caps." Rod Knight competed with an unnamed original that looked promising. It was one of the few (only?) models that used Jack Chambers airfoils. The models main panels were JC-15, and the tip panels transitioned from this to the JC-M section (the latter having more thickness and less camber). The JC-15 is 8.5-percent thick and can penetrate 30 mph slope winds with ease (Rod flies this plane mostly over the slopes of Orange County). He flies with a rather rearward CG, 45 percent! The overall effect of

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the design features is a model which rolls well, keeps its energy on turns, and even flies inverted in spite of being rather "undercambered." Well, that's going to have to do it for this month's report. Next year try to make it to the sixth annual ISS HLG Contest. It is sure to be a winner!

### PLEASE CHECK THAT MAILING LIST

Model Builder's R/C Soaring columnist (that's me) has moved! The problem is that I'm on many mailing lists with my old address. The new one is 3610 Amberwood Ct., Lake Elsinore, California 92330. If you could ask your newsletter editor to change that mailing list, I'd appreciate it. I use

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newsletters in ways that aren't obvious to my readers out there, and believe me, they are vital!

If you have any questions, call me after 6:30 p.m. in the Pacific time zone at (714)245-1702. Thank you. Until next time, thermals!

### Painted Desert. Continued from page 47

trum"? So I kept asking and got the same answer. Finally Steve laughed and said, "This glider is called, 'After You!'" What a suitable name for an event where piggybacking is the norm and a flier declines to "go first" because he would rather fly in a thermal picked by someone else. "After You" indeed!

Earlier, we mentioned the odd night flying, but how about getting up before dawn to fly? An event was started in 1978 by Bob Meuser for a single, "sudden death" dawn Mulvihill flight. Now Jim Quinn has taken

the theme with his "360 Club" for dawn Wakefield. Bob Piserchio won this with a nice 5:40 flight. Bob has done a full six minutes (the "360" in Club) in overcast at Taft. His slick model, which uses his own front-end assembly, has the contrasty black and white bands on the undersurfaces.

Another famous "Bob" was notably absent from the flying World Champion and Wakefield Cup holder Bob White of Monrovia. He did show up on Sunday to introduce his new bride, Jean, to the fliers. They had just returned from a trip to Argentina, where he flew with the local gum-banders. Now that he is an international celebrity, no telling where he will show up with his high-climbing twin-finned birds. All American free fliers are very proud that one of their countrymen, after so many years of trying, now has that venerable Wakefield pot on his mantle. Hooray for the USA, non-gadget models, and Robert P. White, aeromodeller extraordinaire.

Not all the models climbed skyward as dependably as a Bob White Wakefield. Several fliers learned, to their chagrin, that little trim changes can end up in big crashes. Bob Beecroft and Vic Cunningham Jr. met unexpectedly in mid-field on Saturday morning when their models met the earth with a thud! Bob's 1/2A "Prolepsis" made less of a thud than Vic's huge "Sirroco 1100," but a number of splattered parts were about the same. We recorded for posterity these two gentlemen sharing a sorrowful glance amid the debris. My advice to put each model in a trash bag with a gallon of "Hot Stuff" was ignored with contempt.

The flight line, and adjacent campsite, is laid out in a huge "L" with the scale fliers and modern fliers on one leg and the Old Timers on the other. For most of the day, this allowed good segregation. The vista from downwind at the OT site was superb, as you could observe power patterns on the FAI ships and see how high those young arms could fling a HLG. San Diegan Bob Boyer, the Robert Redford of F/F, shot his model right into lift to win "One Flight" HLG. We watched it drift all the way across the field, slowly gaining height before it DT'd into the sagebrush. Bob must have learned something from his dad, OT flier Larry Boyer. Too old for HLG, Larry contented himself with wowing us all with a magnificent flight on his Bunch Tiger-powered Comet "Clipper." Unfortunately, it had a rough DT and severed the wing upon contact with terra too firma.

Another OT enthusiast from San Diego, Don Munn, had a cute little Pee Wee 30 .020-powered Shulman "Wedgie" that caught our eye. It also caused eye strain; it flew OOS on a 25-second engine run! Apparently this is the second "Wedgie" he has sacrificed. Thermals do have an appetite for models with no DT, Don.

We have mentioned a number of colorful personalities among the desert rats that flew F/F over three days of the Memorial Day Weekend, but we would like to profile a few outstanding models for you as well.

Soft spoken but highly competent Randy Archer from Phoenix is a rising star in the ultra-high-tech field of FAI Power with his "Silver Bird." A World Cup winner, it flies like clockwork, as smooth as the imported German Seelig timer. This shuts down a high-revving USA Nelson .15 in a smooth fiberglass cowl. Randy uses his own design folder, with graphite/epoxy blades on a 17/4 steel hub. Flying surfaces are all skinned with .009 aluminum from Kenny Happer-set. This method, with the aluminum skin bonded to balsa and with a carbon fibre spar, results in a very rigid wing. This is essential to combat tip flutter, as the model climbs out at well over 50 mph. Randy uses a "bunt" at the top; the model drops its nose sharply upon engine shutdown, then it levels out for a wide circle soaring glide. Also a factor in trim consistency is the carbon fibre tail boom, a very rigid rolled, tapered tube. Randy's models are world class high-tech, and we expect he will do well at the Seguin Team Selection Finals. We hope he gets the chance to represent the USA at the next World Champs.

Over in the low-tech corner, we find

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Charlie Yost has escaped from San Diego to sponsor a Jimmy Allen Old Timer event. The Jimmy Allen designs from the thirties are a real trip for the OT crowd. High wing or low wing, they are real flyers. All are stick and tissue, with long wire landing gear and huge wheels. They have those classic proportions that say "This is a high climber." Phil Moore of SDO had a slick 1935 Jimmy Allen "Sky Raider," a bitty thing at 26-inch span but still potent. Bob Langdon chose the much larger Jimmy Allen "Bluebird" with 38-inch span from 1934. This Jimmy Allen event, with half a dozen designs to choose from, may well catch on with the OT crowd. Mik Mikkleson, of Hollywood, even flew one by proxy for a Detroit area Allen fan.

Also on OT ROW we discovered Carl Hatrak trying to hide his big brown and white 1936 "Miss Fortune." This was the little-known predecessor of the famous "Trenton Terror" designed by Mickey DeAngelis. Hatrak was a member of the Trenton club at the time. His ship has a Morrill Hornet .19 on the nose and an IGMMA logo on the silk-covered wings. Now he flies with the SCIFS club in Los Angeles.

We really don't like mentioning the high winds (gusts to 50 mph) that came in Saturday night blowing down sunshades and creating a camper's nightmare! Bill Warner had his tent blown down before dawn, so he stole away to Los Angeles. Those scale fliers who remained elected to wait until Monday to fly. Good thing they did, as it was a repeat of Saturday, balmy in the 80-

degree range and wind to five mph.

Outstanding scale flier was Mik Mikkleson, who built a giant Focke-Wulf 47 "Stosser" for Jumbo Scale. His ship got top scale points in judging, and then he proceeded to sacrifice it to Hung on an OOS flight to Maricopa, a nearby hamlet. Fortunately, it was found and returned after the meet. Mik took home the Otto Behrens trophy for top score in Jumbo (over 36-inch span rubber).

With two days of gorgeous, not-very-hot weather, the "foreign legion" of desert fliers had much to be thankful for. All agreed to return in a year to the arid region to sample the food of Taft and the fortunes of the flying field. You don't have to go to Palm Springs and play golf with Bob Hope to enjoy the deserts of California. •

#### Plug Sparks. . . Continued from page 32

Abell's model is powered by a FROG (English acronym for Flying Rise Off Ground) 500 engine. This 5cc engine, glow operated, was enough power for Abell to tie for first place at the SAM Canowindra Champs in 1987. Abell is hoping for greater things when the engine is fully broke in. New pistons take time to seat!

#### ENGLAND

We have been carefully hoarding the photos sent in by Alex Imrie who writes an excellent old timer column called "Vintage Corner" for the British model magazine, *Aeromodeller*.

This time, we feature a photo of Henry J.

Nichols as seen in Photo No. 14 wearing what we would call a "California Shirt" (actually an airplane shirt somewhat similar to the jacket Pond wears). Henry is offering some advice to his son Richard who is the builder and flier of the English Mercury design with "ZAP" on the rudder.

This scene is typical of the Old Warden Vintage Meet held near the Shuttleworth Collection Museum. Henry Nichols has been coming to these meets ever since they started. Although he is now retired from his hobby business and not active in flying, Henry thoroughly enjoys meeting and talking with fellow modelers.

No modeler worth his salt has ever missed the Nichols Hobby Shop on Holloway Street in England. You never knew who you were liable to run into there!

#### READERS WRITE

Ever so often we get a letter from Dick Tanis berating Joe Beshar for some of his ideas about making radio control out of free flight models and vice versa, making R/C models into F/F mode.

This writer has carefully abstained from any comments on the "new AMA F/F R/C Assist" rules, as the free fliers have been raising enough hob with the idea. Very frankly, this writer regards the radio control discipline as too tough for the free flihter to endure.

Case in point is the popular method of piggybacking models in a thermal. This writer can just see the reaction now as one model is spotted in a thermal. The modeler rushes to get his model ready, fires up his

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engine, and then: whoa! Do you have the frequency pin? No, sorry, old boy, but the model in the thermal already has that frequency tied up. That will get the staunchest free flight modeler!

From a casual sport flying standpoint, particularly in restricted areas, this is the way to go; but remember any competition is severely limited to a number of frequency pins available and a number of radio sets on these frequencies.

As can be seen in Photo No. 15, Dick Tanis of Hawthorne, New Jersey, is posing with his radio-controlled old timer, a Kloud King, a design produced by Mickey De-Angelis, quite the designer of gassies in the 1934-40 era.

On a bet, Dick built this model and flew it in seven days! This blue and yellow model, built in 1971, is still flying utilizing .19- to .40-size engines, depending on the event entered. As Dick points out, the old timer R/C events are extremely popular at the SAM Champs but again that old bugaboo of having to wait on your particular frequency.

### MORE READERS WRITE

Received a most interesting letter from Bill Preston, 11945 Miller Road, Bainbridge Isle, Washington 98110, who sends in Photo No. 16 showing Bill with his Sky Devil-powered Comet Sailplane. This picture was taken at Harts Lake Prairie near Tacoma, Washington, where SAM 8 contests are held.

One of the big problems using a Sky Devil engine appears to be the vibration induced in servos by this powerful engine.

Bill reports that the Sailplane came out pretty heavy, in the 100-ounce range. In a weight reduction movement, he replaced all Futaba S130 servos with the micro S133 Futaba servos. According to Bill, this was the source of all his glitches and wild antics in the air.

Bill feels that micro servos are not able to function in an environment of vibration that the red hot Sky Devil creates. After much argument about RFI causing servos to fail and the spark plug coming loose at critical moments, Bill is now using shielded spark plug leads (from CH Electronics) that keep the high-tension lead from separating from the spark plug.

In addition, he has had all the S130 servos repaired and fitted with new amplifiers. Bill feels that separation of the high-tension lead created enough noise to ruin the servos.

Bill Carpenter, an associate, doesn't believe Preston's theory about high vibration and sudden inrush of RFI caused servo failure. Bill reports that he has run into many cases of RFI that have not damaged the servos.

However, Preston is still concerned this situation could repeat itself. It is this writer's opinion that the use of a 10K Ohm resistor at the spark plug connector is a must. That high spike of electrical noise must be, and can be, reduced. No problems have been reported using this system of commercially made high-tension, shielded leads made by 77 Products, 17119 So. Harvard, Gardena, California 90247. Pay attention fellows!



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## TOMY TOY CONVERSIONS

Ever so often an article is written on how to convert the Tomy-Toy animals into aircraft shutoff timers. Jim Alaback, newsletter editor of SAM 41 *Aero News* newsletter, featured a writeup on how to convert a Tomy Toy.

Sometime last year, this writer offered completed Tomy-type timers as built by John Fletcher of Australia. Needless to say, these were gone very quickly. Having just received another dozen, it is again first come, first serve.

The only drawback this time is that the price has jumped to \$15 each. Regardless, these timers are still a bargain when considering the time and effort put into them. If you are interested, write to John Pond, 4269 Sayoko Circle, San Jose, California 95136, enclosing your money. We'll gettun out as long as your last.

Might also mention if the demand is big enough, Jon Fletcher will make more as he is interested in a swap deal. This is an easy way to avoid heavy custom duties. If interested, let us hear from you.

### THE WRAP-UP

Fred Lehmborg, who produces the Feather Merchant line of old timer kits, sent in a photo of John Gates, who has gained considerable notoriety in flying Lehmborg's "Goon" design.

Photo No. 17 shows Gates and his bearded friend, Rick Martin, in the background. The caption for the photo was suggested by Fred, so the fun is between that trio!

Lehmborg's piece de resistance was a small order placed back in 1934 (the best date this writer can come up with) and written from Assembly Hotel, Sumner, Washington:

"Woburn Model Airplane Shop, 19 Belmont St., Dept. UM-3, Woburn, Massachusetts.

"Kindly send me the following order. I enclosed 52 cents and (blank) for postage.

"Sincerely yours, Jack Towne.

"2 ounces colorless cement, .16; 1/16 x 2 sheet balsa (2), .05; 1/8 flat rubber (20 feet), .20; 1/8 x 1/4 balsa sticks (2), .03; No. 10 music wire, .01; 3/4 and 1 in. dia. balsa wheels, .07; total, .52." Now how about that! I'll bet that hobby shop got rich on that order! It is a wonder this particular shop in Massachusetts didn't have a minimum amount to order.

Just to look at the prices quoted in those days is enough to make the strongest man cry. I particularly like the glue price! Remember fellows, this was over 50 years ago!

### Control Line. . Continued from page 43

As I started to say above, AMA can refer you to the nearest club because it has records on all clubs, updated annually. It also has a computerized list of all members and their interests, so it could put you in touch with members in your local area.

If all else fails, you can find a wide array of modelers to meet, talk to, and learn from at any contest. You can find out about nearby contests by checking the competition calendar published by AMA. Once you get in

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touch with a club, you can keep up with their activities through meetings and newsletters, which may provide more up-to-date information.

There also is at least one independent regional newsletter devoted entirely to control-line. Serving primarily the Pacific Northwest, it's called *Flying Lines* and can be contacted at this address: *Flying Lines*, P. O. Box 177, Kila, Montana 59920. Subscriptions are \$12 for 10 issues.

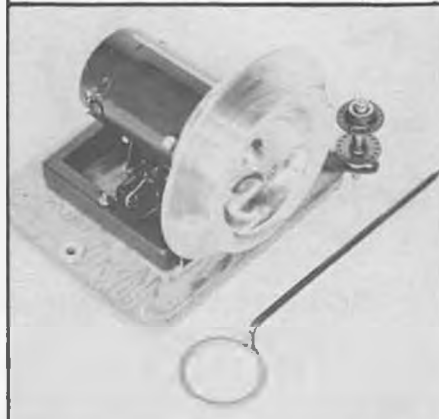
Once you have tracked down that experienced modeler, use him (or her; there are some female fliers) as your teacher, coach, mentor, and guide. All CL modelers are interested in building up the fraternity and

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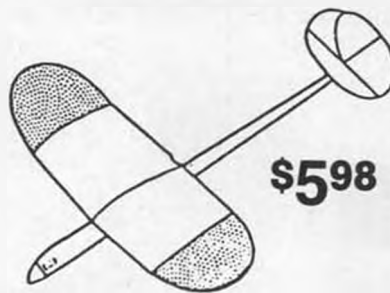
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will be glad to talk to you at great length, invite you into their workshops, help you fly, etc.

Don't be discouraged if you have a little trouble getting a lively conversation going the first time you approach a modeler at a contest. Remember that at a contest, the fliers are competing. It's fun, but it's a serious competition as well, and they have a lot on their minds.

Watch, listen, and learn, and when the opportunity comes, the modeler will be glad to meet you.

It's not that you can't get started without experienced help, but it will save you much time, effort, and frustration. Modern building techniques and the vagaries of flying CL planes can't be communicated through kit plans or the instructions on tubes of glue. That hands-on help really pays off, and it's nice to have somebody to share your hobby with as well.

Again, talking of "the old days," the likelihood was that your first plane would be built from a kit made by a major manufacturer. It would be simple profile, powered by a stunt-type .35 or .15 or one of many small kits designed for an .049 engine.

One of the unfortunate trends has been that some of the big kit manufacturers have abandoned CL in favor of R/C. There are some good kits available, but you may have to look for them. However, every problem has a solution. If you can't find kits in your hobby shops, try researching the newsletters of the special interest organizations (listed here in the June edition), and you'll

come up with many choices of good kits made by garage manufacturers for CL enthusiasts.

If you can't find a suitable kit for your first try, look through the plans available through all the major magazines and try building a plane from scratch.

Follow kit or plane instructions carefully, and use the expertise of your "coach" to fill in gaps or update you on modern techniques, and you will soon be flying.

**KEEP IT SIMPLE**

A radical idea for your first airplane: make it ugly.

Don't make what's probably the most common mistake of people jumping into the hobby by themselves, a mistake that almost always leads to failure and quitting the hobby before you really get started.

Don't try to be too fancy. Don't look for the kit with the biggest plane, the most realistic, the brightest colors, the biggest engine. Get a simple, sturdy, inexpensive plane. If you can find an old Top Flite "Flite Streak" Trainer, or build one of the simple trainers published frequently in the magazines, that would be best.

I recommend that adults, if they have expert help, go with a .35-size plane. The big ones are easier to fly. Kids and adults without help should try 1/2A (.049) size planes because they can withstand much more abuse, though they're trickier to fly. Use a profile-type design (the fuselage is simply a flat sheet of wood, not a built-up body).

Don't spend a lot of time finishing and decorating your plane to be a masterpiece of art and beauty. You're going to crash this plane.

Build it simple and strong and don't worry about how it looks. Don't even paint it. Just make it fuelproof.

The worst impediment to learning to fly is to go to the field with your first plane and be afraid to fly it.

Make the first plane one you aren't afraid to fly, crash, repair, fly, crash, repair, etc. If you have time and materials, build two or three of them. Always be building a new one while you're flying the one you just finished.

As soon as you learn to fly level, start working on wingovers, loops, figure eights, and inverted flight. By all means, begin learning upside-down flying as soon as you have mastered upright. The longer you procrastinate, the harder it will be to learn inverted flight. Inverted flight is enjoyable for sport flying and an absolute essential for combat or aerobatics.

**THE CL "SPORT"**

For many model aviators, the joy of flying on a sunny Sunday afternoon, doing laps, loops, and lazy-eights with their colorful Ringmaster or sport-stunter is enough.

Others, though, once they become proficient at this "sport" flying, get the idea of playing games with their planes. Maybe they want to see who can fly inverted the longest, or who can do the most touch-and-goes, and one thing leads to another. Before you know it, they're flying fast combat at the Nats.

But let's back up. What are the competition events and what happens in them? Following is a quick overview of the main com-



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petition types, which we'll expand on in future columns.

The best way to learn about the main competition events, in detail, of course, is to obtain the official rulebook from the AMA. With your AMA membership you are entitled to a rulebook, though this year you must request it. All AMA members will receive a membership manual with a lot of general information about the organization, but the rulebook is sent only to members who request it on a form provided by AMA when your membership is acknowledged.

**Fun-fly Events:** A whole variety of interesting and amusing activities exist not in the AMA rulebook but in the informal Sunday fun-fly activities of clubs. These are usually designed to be easy for the average modeler and usually don't require any special equipment. Sometimes several events are combined. Here are just a few:

**High-low.** Each contestant flies his plane as fast as it will go for a measured quarter mile (7 laps on 60-foot lines) and lands. He may then change prop, glow plug, and/or fuel and then fly as slow as he can for another quarter mile. The difference in mph between slow and fast is the score.

**Blind man's bluff.** Can you fly blindfolded? Add a balloon bust task. It can be pretty wild.

**Time target.** How's your sense of time? Try to set your plane up for a six-minute flight. Using no clocks, watches, or signals from your crew, make a flight that's as close as possible to two minutes (takeoff to touch-down). Starting with 120 points (one for

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petition is for beauty, flyability, etc. Or no competition at all, just get them all out and fly.

**Crate race.** Club provides some materials, such as wood from old apple crates, bellcranks, wire, nails, etc., and the contest is as follows: Everybody takes the available materials and builds a plane. First one flying wins.

The number of fun-fly events is as limitless as your imagination.

**Racing:** I mention racing first of the tradition competition events because it is the one that probably is the starting place for the most CL modelers. In its simplest form, all one has to be able to do is start an engine and fly around level. It's not much different in its most challenging form, except that everything goes around a lot faster.

The basics of CL racing are as follows: Races involve multiple-plane flights over a measured distance. Pit crews start engines and launch the planes upon the "Go" signal. Laps are counted at the point on the circle where the plane started, and time is kept by stopwatches.

For example, preliminary heats for most racing events (above 1/2A) are 5 miles (70 laps on 60-foot lines), and feature races are 10 miles (140 laps).

The fastest AMA classes (rat, slow rat, Goodyear) usually involve two planes at a time, the slower, regional sport races usually have three or four up.

Either best times or best scoring in round-robin heats are advanced to the feature races. Often a pair of preliminary heats are combined for a total time.

Races range in size and difficulty from the sometimes hilarious 1/2A Mouse Race, using tiny .049-sized airplanes, to the fast and terrifying AMA Rat Race, using 40-sized planes going 160 mph. Probably the most popular form is sport racing, which is done under slightly different rules in different parts of the country. These usually are

.35- to .40-sized airplanes of a simple configuration, ranging from 75 to 100 mph, and sport racing is the point of entry into competition for many fliers.

**Precision aerobatics:** This is another one of the common competition entry points. The big, beautiful and graceful airplanes are attractive to many newcomers to the model aviation hobby. Precision aerobatics (nicknamed "stunt") doesn't require the high-horsepower, high-technology, or lightning reflexes of some of the competitive events. It does, however, require much study, careful craftsmanship, and a lot of practice.

The competition involves flying a prescribed pattern of maneuvers, with the quality of the flight scored maneuver by maneuver by a panel of judges.

Stunt fliers have a very strong national organization and a very supportive fraternity, with everyone willing to help newcomers. The event also has the immensely successful PAMPA (Precision Aerobatics Model Pilots Association) skill classes, so that fliers compete against others in their own ability

level. Nobody ever has to feel outclassed, as you move gradually through the beginner, intermediate, and advanced levels to become an expert.

Another advantage of stunt is that, once you get a good-flying airplane, it will last for some time, as opposed to the more equipment-intensive combat events. The rules are very stable, and there's lots of room for creativity in design and decoration. The same planes are legal in all classes.

For starters, beginners should become proficient at flying upright and inverted and begin learning the maneuvers shown in the AMA rulebook. They probably should start with a simple profile, move to a flapped profile stunter (many good designs exist) and graduate to full-fuselage ships as their proficiency increases.

An associated event is Old-Time Stunt, a nostalgia event that recreates the stunt event of the late 1940s and early 1950s.

**Navy Carrier:** This is another event that attracts many newcomers because the planes look like real planes, the event simulates wartime Navy carrier operations, and



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the flying task is fairly accessible for newcomers because it does not require maneuvers.

Perhaps the most difficult part of the event is learning to set up and operate the throttle and three-line system, with which any experienced carrier flier can assist. After that, as in many activities, it's just a matter of practice.

The task involves takeoff from a simulated carrier deck, a high-speed segment, a low-speed segment, and an arrested landing on the deck. Scoring in each task (high speed, low speed, and landing) is added to a bonus for fidelity to a real carrier aircraft.

**Combat:** This is the event that attracts the spectators, and often it pulls in some new fliers. It can be started fairly inexpensively, and the airplanes are not difficult to build nor the engines difficult to operate. It's a

popular event in many contests.

The flying is exhilarating, and as you move into the more difficult classes, it gets faster and more exciting as you go.

Combat is essentially, to the lay person, "dogfighting." Each of two planes tows a crepe-paper streamer, and each pilot tries to maneuver his plane to cut or remove the streamer from the opponent's plane. Points are scored for cuts, "kills" (removing the whole streamer), and for time in the air during the match period.

Newcomers should be prepared to spend plenty of time in the workshop building planes, because this is the one event in which the airframes are considered more or less "disposable." The better you get, the fewer planes you will wreck, but it takes a while to get to that stage.

Beginners are best advised to start with the sturdy, often reusable and inexpensive

1/2A planes and move up through the classes to AMA slow combat to the premier event, AMA fast combat. A good alternative starting place, growing in popularity, is the "FoxDoo" event, which requires a Fox .35 stunt engine, a VooDoo 1960s vintage combat plane, and uses AMA fast rules. This is an event of a speed that is within the grasp of the novice flier but which still uses planes that perform well.

**Speed:** On the surface, this is the simplest event. The task is to fly a plane a measured distance as fast as possible.

However, the task requires a good bit of expertise in the building of airplanes and the preparing of engines. It's not generally seen as a beginner's event, though speed experts have been working on some new events designed to attract the novice.

Classes of competition range from the small, relatively simple 1/2A proto event

through Class D, using .65-size engines at over 200 mph. There also is an event for pulse jet engines. One of the new events is a "sport speed" using .21 engines and simplified equipment rules.

**Scale:** This is an event for those who like to display their craftsmanship. The object is to build planes as much like full-size counterparts as possible, and to fly them as well.

The range of possible airplanes is limited only by the number of different real airplane designs.

Fliers must be able to do some research and show documentation on the actual plane their model is designed to replicate.

As in most competition events, however, the rules include several kinds of scale modeling, ranging from profile scale through sport scale (models are judged at a distance) and precision scale.

#### LET'S GO FLYING

Getting started in CL modeling is just like anything else worth doing. It takes a little work and study, but the rewards will be great satisfaction.

Once you've selected the type of model activity that interests you, find that expert helper, if you can, and get started. Take your time to build a strong, straight, safe airplane, and find expert help if you can.

Then get out on the field and practice, practice, practice.

As always, I invite comments, club newsletters, questions, photos, and any other input from readers.

John Thompson, 1505 Ash Ave., Cottage Grove, Oregon 97424.

#### Counter. . . . . Continued from page 8

comes a spectacular color book of photographs entitled *Jet Combat*, by Ian Black. The author went up with a score of jet fighter pilots to record maneuvers, refueling, and practice sorties, and came back with stunning photos of free world fighters in the air. Many of these wingtip's-length photos put you as close as you're likely to get to the supersonic fighters that prowling the frontiers. You'll find RAF Lightnings, F-4 Phantoms, British Aerospace Hawk T.1's, F-16s, and more, all sharply photographed in full color in this 128-page book.

Also from Zenith is another in the Osprey series of color books on aviation, this one the venerable T-33 fighter/trainer, called *Shooting Stars*. Written by Michael O'Leary, it contains 128 pages of full-color photographs of Lockheed's legendary T-Birds. The T-33, basically a P-80 Shooting Star converted to a two-seat, dual control trainer, has served for 40 years in USAF and Air National Guard units. Now, in 1988, the T-33 is being retired. To commemorate this plane's years of service, the California and Oregon ANG's combined to create a T-Bird flight, and this is covered in the book, along with the T-33s variants seen in many locations, including that famous graveyard for America's older aircraft, Davis-Moan Air Base in Arizona, where we see many T-33s prior to their dismantling for scrap. The final chapter has a recent innovation: the basic T-33 airframe has been made over by aviation pioneer Russell O'Quinn into the Skyfox, a sleek, good-looking aircraft that

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#### Old Timer. . . Continued from page 32

come along in later years but Carl Goldberg and his Zipper represented the single most significant turning point in the history of gas powered free flight. From that time onward, the competition endurance gas model became a functional design in itself that no longer bore any but the most elementary resemblance to its man-carrying counterpart. It could also be said that the evolution was at least inevitable, if not regrettable! The modeler who might focus his dissatisfaction on Carl for this should remember . . . the rule came first, Carl was only finding a way to make the most of it . . .

#### Dear Jake. . . Continued from page 7

become considered a biplane, and if so, do you get the six-percent bonus for the snap roll and for any other maneuvers you may complete before the airplane hits the ground? The rules committee is hard at

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work on this touchy issue.

Jake  
P.S. In 1984, in the early aircraft development stage, Dean Koger broke a wing on his Skybolt biplane. If this had happened during the actual competition, should his bonus have been raised to fifteen percent for three wings?

\* \* \*

Dear Jake:

The mechanic down at the Arco says that plain old Hypoid 90 weight rear end oil makes a perfectly acceptable feedback pot wiper grease. What do you think?

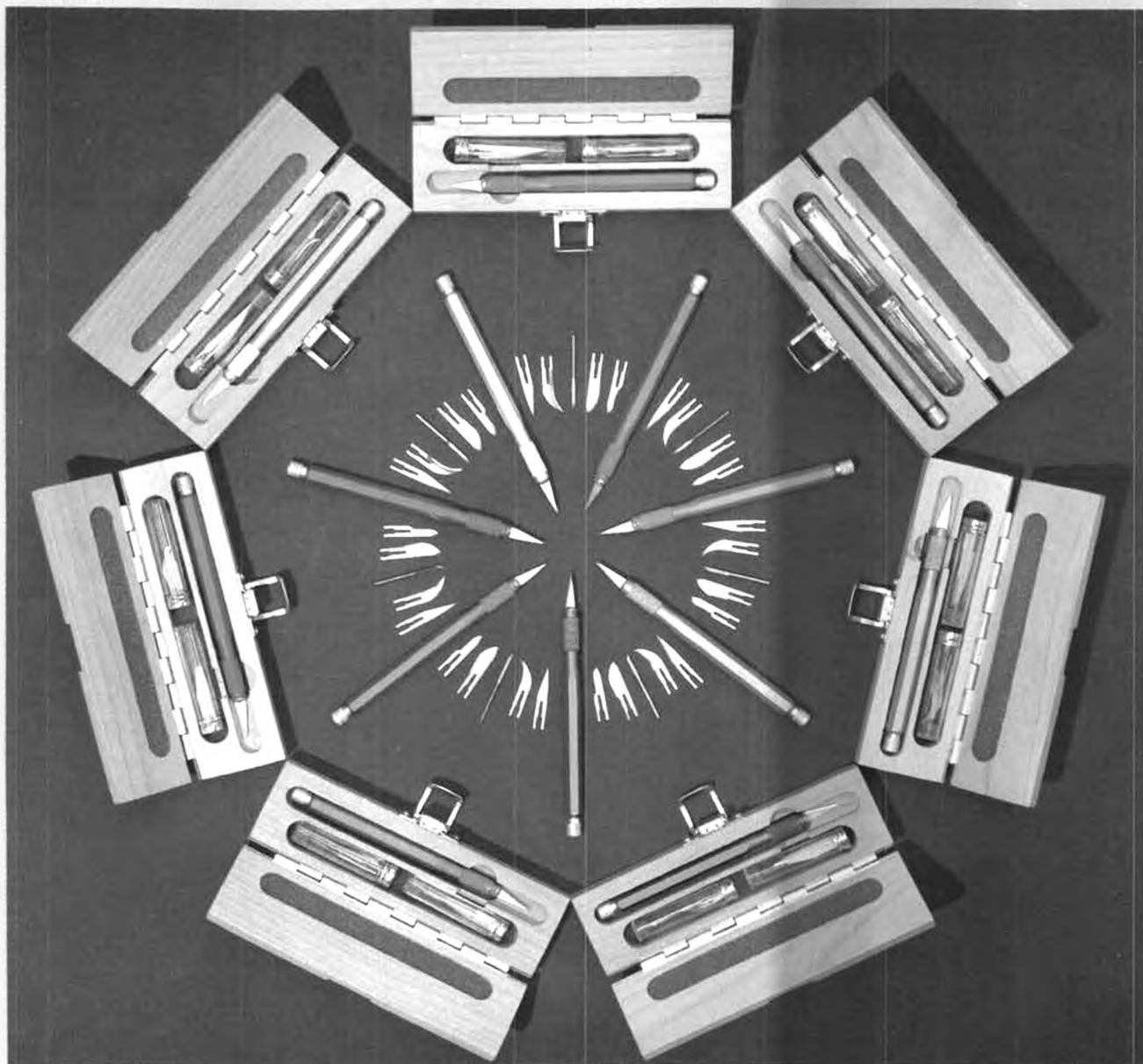
Cost Cutter in Corvallis

Dear Cost Cutter:

I think your mechanic must buy his servos from International Harvester.

Jake

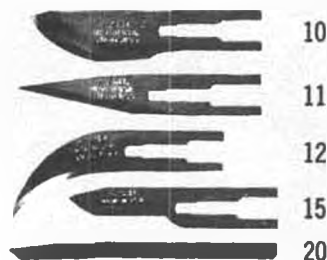
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