

MODEL BUILDER

NOVEMBER 1984

\$2.50 U.S.

ICD 08545

volume 14, number 154

WORLD'S MOST COMPLETE MODEL PUBLICATION

FEATURES:

- SAM CHAMPS
- USA vs. CHINA
- PRODUCT REVIEWS
-  BECK CLASSIC



CONSTRUCTION:

-  BIPLANE
-  CLUB 2-METER
-  RMAN'S "MIKE" O/T
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COVER: Scratch one MIG! Two F-86-F's of the 51st Fighter Interceptor Wing close up and climb for home after jumping the enemy plane at low altitude over North Korea on a spring morning in 1953.

Shortly after *Model Builder* Editor/Publisher Bill Northrop and Cover Artist Bob Benjamin decided to do a *Sabre* cover, Bob chanced to meet Ben Hall at a local airshow and was offered a personal tour of his beautiful F-86-A, including a couple of minutes alone under that neat canopy. Bob wished that he could fly it! Afterwards, Ben put on an excellent show with the classic *Sabre*.

The artist's original 22' X 28' acrylic on canvas painting, plus several others, is available for sale. Bob's address is 1222 26th Ave. NE, Olympia, WA 98506; phone (206) 352-2602.

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MODEL BUILDER (ISSN 0194 7079) is published monthly by RCMB INC., 621 West 19th St., Box 10335, Costa Mesa, California 92627-0132. Phone (714) 645-8830.

Subscriptions: \$25.00 per year, \$47.00 for two years. Single copies \$2.50. Subscriptions outside the US (except APO & FPO) \$32.00 for one year only. All payments must be in US funds, drawn on a US bank.

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VETERAN FLIER AT 16 James Hann (Bridgewater, NJ) equipped his Kougar with tail dragger retracts, flaps and smoke system, has 55 flights in. This replaces his old Kougar, lost from radio failure, which had racked up 3600 flights, wearing out 3 engines in the process! Jim says he considers his Kougars the best airplanes he has flown in his 9-1/2 years of RC. The 9-1/2 years experience is particularly notable when you learn that he is now 16.



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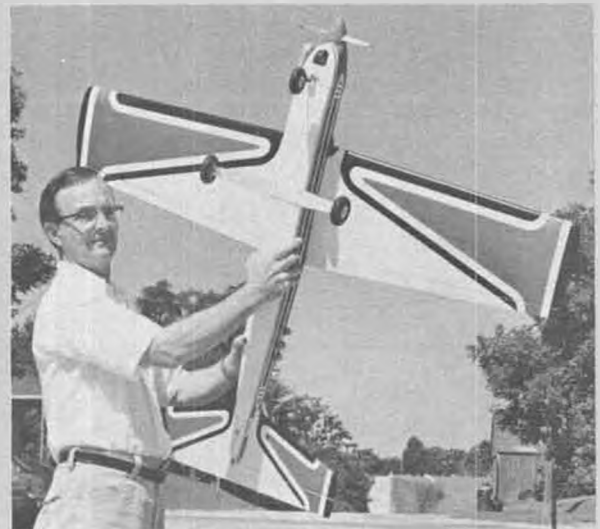
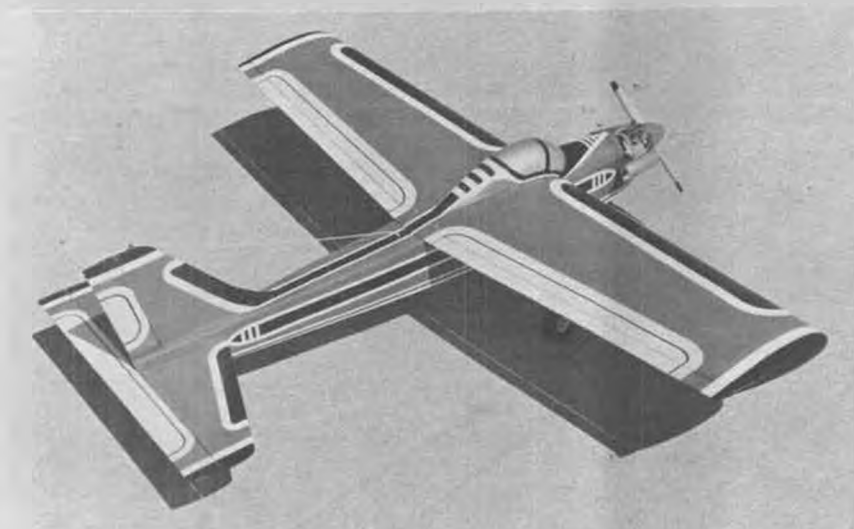
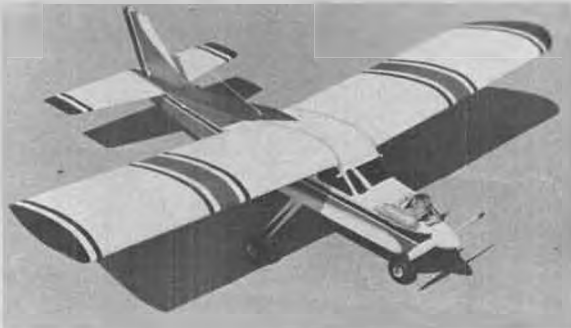
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STRIPES AND SUNBURSTS Above: Owen Martin (Gisborne, New Zealand) turned out this classy Komander with a dark blue, yellow and red color scheme, says, "Certainly a very docile model." Left: Wayne Bettin (Grove City, OH) visited the Sig Factory and brought along this smooth O.S. .40 powered Kadet MK II. Bottom left: Unusual markings in white, red and black make his Kavalier, also with an O.S. .40, a standout. Below: Wayne believes the bottom of a model (here the Kavalier) should have a different paint pattern to help in orientation and visibility in flight --- a good idea.



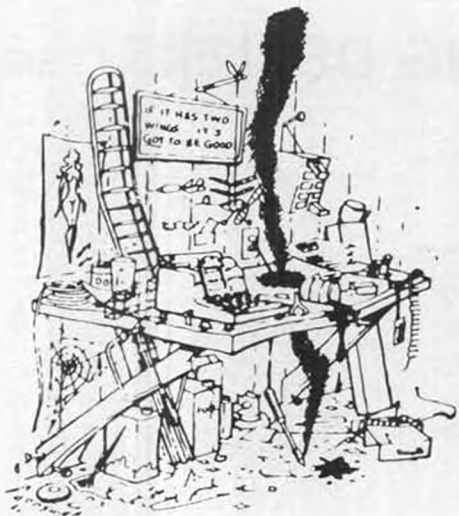


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WILLIAMSBURG
Hanger Hobbies
13259 Meeker Road
YOUNGSTOWN
Bedman Hobby Center
6820 Market Street
ZANESVILLE
Nent Hobby
110 S. 6th Street
OKLAHOMA
OKLAHOMA CITY
Campbell's Hobby House
10611 136th St. East
PH: 845-7675
TULSA
House of Hobbies
6914 E. Admiral Place
TULSA
Wings N Things
1350 Skully Drive
OREGON
CORVALLIS
Trump's (DJ's) Hobbies
1875 N.W. 9th St.
PH: 503-753-7540
PORTLAND
Strictly R/C
7868 S.W. Capitol Highway
PENNSYLVANIA
BATH
Valley Crafts & Hobbies
301 303 West Main Street
PH: 215-837-9066
BATH
Dick Wetzel's Hobbies
514 E. Main St.
PH: 215-837-6681
LANSDALE
Penn Valley Hobby Ctr.
817 W. Main St.
MILTON
Kreb's Newland
83 Broadway
NAZARETH
Tramland U.S.A.
105 Belvidere Street
PITTSBURGH
Bill & Wall's Hobby Shop
116 Smithfield Street
READING
Iron Horse Hobby House
60 South 6th St.
READING
Ott's Hobbies
536 N. 10th St.
WARMINSTER
J. C. R/C Hobbies
13 York Road
PH: 215-672-5200
SOUTH CAROLINA
MYRTLE BEACH
Ed's Hobby Shop
702 Main Street
TENNESSEE
KNOXVILLE
Tennessee Model Hobbies
8909 Oak Ridge Hwy.
PH: 615-482-2900
NASHVILLE
The Toy Mart
113 Grayllyn Drive
PH: 615-883-1648
TEXAS
ARLINGTON
The Hobby Hub
903 A Pioneer Parkway West
AUSTIN
J & J Hobbies
610 Renovator Dr.
EL PASO
Hal's Hobby Shop
No. 57 Sunrise Center
PH: 915-755-1914
FORT WORTH
Mott's Hobby Shop
7241 Grapevine Highway
PH: 817-281-0921
HOUSTON
Clear Lake Models
117 Camins S. Shopping Ctr.
PH: 713-488-6315
HOUSTON
Larry's Hobbies
2327 FM 1960E
PH: 713-443-7373
HURST
Roy's Hobby Shop
1309 Norwood
SAN ANTONIO
Clayton Hobbies
5707 E. Moubud
SAN ANTONIO
Dick's Hobby Shop
Terrell Plaza
113 Plaza Gordon
SAN ANTONIO
Kelley's Hobby Center
551 Walnut Road
UTAH
OREM
Miniature Aircraft Prod.
811 W. 400 N.
SALT LAKE CITY
Douglas Models
P.O. Box 9276
2065 E. 33rd South
- SALT LAKE CITY**
Pioneer Hobbies
170 East 800 S.
VIRGINIA
ALEXANDRIA
Modelmasters, Inc.
5710 F. General Washington Dr.
RICHMOND
The Hobby Center
1709 Willow Lawn Dr.
WASHINGTON
BELLEVUE
R/C Model Shop
14020 N.E. 21st St.
PH: 747-9914
BELLINGHAM
Hobby Hive
111 E. Magnolia
CASTLE ROCK
Aero Motive Products
607 Spirit Lake Highway
KENT
Nent Hobby
1313 W. Meeker
Sulia 110, Meeker Mall
PRYOR LIP
Fargrowe Model Supply
10611 136th St. East
PH: 845-7675
SEATTLE
Webster Supply Co.
17818 Aurora Ave. N.
SEQUIM
Fred's Hobbies and Gums
609 W. Washington Suite 7
TACOMA
Bill's Hobby Town
13923 Pacific Ave.
PH: 206-531-8111
WALLA WALLA
Harley's R/C
Route 1, Box 277A
PENNSYLVANIA
WEST VIRGINIA
CHARLESTON
Fountain Hobby Center
200 W. Washington St.
WISCONSIN
LA CROSSE
Hobby Hub
4336 Mormon Coulee Road
Shelby Mall
MARSFIELD
Wisconsin Hobby Center
Central Square 171 So. Central Ave.
MILWAUKEE
All in 1 Hobby
South Gate Mall
333 So. 27th Street
PH: 414-545-4555
MILWAUKEE
Casanova's Hobby
1423 S. Muskego Ave.
PH: 414-672-2700
WAUSAU
Ken's Hobby Land
640 South 3rd Ave.
CANADA
BAWLW, ALBERTA
B & P Transporth Ltd.
Box 6
PH: 737-3953
CALGARY, ALBERTA
Category Hobby Supply, Ltd.
Box 3173 5th St.
PH: 403-2721
CALGARY, ALBERTA
P. M. S. Hobby Craft
Category North Hill Centre
PRINCE GEORGE, BRITISH
COLUMBIA
M.S.M. Enterprises
6692 Essex Crescent
WINNEPEG, MANITOBA
Cedar Leaf Hobby, Ltd.
1354 Main St.
PH: 589-2037
ST. JOHN'S, N.F.D.
Capitol Hobby Centre, Ltd.
6 Freshwater Avenue
DUNDAS, ONTARIO
Skycraft Hobbies Inc.
139 York Road
SCARBOROUGH, ONTARIO
Toronto R/C Hobby
1869 Lawrence Ave. E.
PH: 416-755-1766
WILLOWDALE, ONTARIO
Kevin's Hobby Shop
5205 Yonge St.
PH: 222-4721
ARVIDA, QUEBEC
LeMotele Reduit' Env.
118 Mathias CP 341
PH: 418-548-2136
MONTREAL, QUEBEC
Can Air Hobbies
5850 Goun Blvd. Ouest
PH: 514-332-3565
SASKATOON, SASKATCHEWAN
Collins' Aero-Craft
238 First Ave. North
PH: 692-4775
YORKTON, SASKATCHEWAN
Radio Control Hobbies
39 Batts Ave.
AUSTRALIA
SYDNEY, N.S.W.
Pymont 2009
Burmae
137 Pymont Street
PH: 021-692-0694
ENGLAND
NORFOLK, NR17 1DG
Pegasus Models Ltd.
Easton A11leborough
NEW ZEALAND
INVERCARSILL
Model Shop
55 Arcade Dee St.
PH: 894-39

DEALERS: Write For Details On How Your Name Can Appear In This Column



**from
Bill
Northrop's
workbench**

• How's that expression, "It never rains but it pours"? Readers often ask how we're able to come up with enough material to fill an issue of the magazine month after month. They feel that we must live in a continuing nightmare, wondering what would happen if nothing in the way of editorial material was to show up in time for the next deadline.

Well, have no fear. Even in *normal* times, there's more than enough material on hand



"For the modeler who has everything." Bahb Johnson's (his first name is a story in itself) company, appropriately called Aircraft Carriers, manufactures model airplane carrier trailers which look like real aircraft in tow... a traffic stopper anytime. The round-cowled, wheel-painted Gee Bee is absolutely sensational. Red Baron example was seen at the Nats trade show. More info next month. Photo by Belinda Northrop.

to produce at least two or three issues, even if half of our regular contributors suddenly dried up. And that's highly unlikely, as our gang of writers are all very active modelers, very capable of passing the how-to word on to our readers.

But, now we're faced with a real dilemma. The World Championships in R/C Scale took place in early July, and Cliff Tacie has sent us a report. The 1984 Nationals has just concluded, and we're expecting about seven or eight individual reports on various events. I've just returned from the big IMAA Fun-

Fly that took place in Los Angeles just one weekend after the Nats, and on the same weekend, the fabulous Byron Originals Giant Scale Fun-Fly and Aviation Festival in Ida Grove, Iowa, was attended by still another reporter for *Model Builder*.

Anybody wanna start a new model magazine? We have enough material to keep you going for the next six months!

Anyway, the '84 Nats is over, and, as mentioned previously, we'll have individual reports on R/C Pattern, R/C Scale, R/C Soaring, Control Line, Free Flight, Electric, Indoor, and Old Timer, in coming issues.

This was one of the more "spread-out" Nats, with events being held at four different sites in and around Reno, Nevada. In seven days of travelling from one site to another, trying to see something of everything, we put over 400 miles on the car, and added about five years to its life every time we drove the stone covered washboard road to the Free Flight and R/C Soaring site. Corvettes are not known for soft suspensions!

There's always controversy at Nationals meets concerning workers, judges, rules juggling, equipment, etc., and most of it comes from newer contestants or those who cannot comprehend the overpowering logistics of putting on such an affair with almost 100 percent volunteer help. However, this year seemed to stand out as "badder" than usual. Having been on both sides of the fence in Nationals competition as far back as 1962, our overall opinion is that the spread-out sites and the lack of a large modeler population in the Reno vicinity from which to tap volunteers, were the primary causes for the strained organization.

Weather did not become a factor until Friday afternoon, when Reno succeeded in removing Chicago's title as the "Windy City"... strangely enough, the wind was two days late in catching Free Flight Scale, which almost always attracts the only windy day at a Nats. But of course, it did catch R/C Scale, which started Saturday, and natural-

TWELVE-TWENTY FOR EXECUTIVE VICE-PRESIDENT

The nickname "Twelve-Twenty" is well known to long-time modelers, particularly those from the northeastern part of the USA. As I understand the story, there was a major eastern R/C contest...back in the early days when the only known "proportional" controls were pulse rudder and "galloping ghost"... and all the contestants' names were listed on a blackboard from which they were called to the flight line by the P.A. announcer. Apparently, the announcer was not too familiar with the names of the active fliers in those days, as he said, "I don't know the name of the next contestant, but his number is twelve twenty." Well, as most of us know, if you don't put a line through the letter "Z," it can be mistaken for the numeral "2," and that's where Ed Izzo got his nickname.

That story is just our way of letting you know that Ed Izzo has been around the modeling hobby for many years, not just as an armchair enthusiast, but as a very active designer, builder, flier, and contestant. He's really known as "Ed and Lou," because his attractive wife, Louise, is really a part of him, always with him, and no one would have it any other way.

Until recent retirement Ed had reached a top executive position with the clock

division of Timex, and this came about because of his business and organizational skills and not, as rumored, because he prevented John Cameron Swayze from going over Niagara Falls in a giant Timex industrial clock!

Ed has a strong concern for the AMA budget process. Having been a member of the Executive Council for two and a half years as Vice-President of District 1 (Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, and Connecticut), he has been in a position to observe the budget process, and his business acumen tells him it needs updating and modernization.

To be in a position to institute a more disciplined and systematized budget process, and to oversee the financial operation of the AMA, Ed is seeking the position of Executive Vice-President. As he is retired, and has all the time and skills necessary to accomplish this task, I'm highly in favor of seeing him in this position. His knowledge of data information systems and his ability to apply business techniques to the AMA's operation, is sorely needed.

When your AMA ballot arrives, be sure to put your mark in the box labeled 1220...er...Izzo!

Continued on page 108



Advice for the Propworn

Dear Jake:

What is this new "turn around pattern" event I keep hearing about?

Puzzled in Pottstown

Dear Puzzled:

It's a new event for FAI and Masters fliers where after each maneuver they turn around and ask the judges what score they got.

— Jake

★ ★ ★

Dear Jake:

How do you trim out a high performance gas free flight?

Thermaler in Thornwood

Dear Thermaler:

If it's covered with silk or tissue, I usually trim with colored dope and striping tape. If it's mylar covered, use sticky Monokote for trim. Stars are nice, also sunbursts.

— Jake

★ ★ ★

Dear Jake:

Our club field has one lone pine tree standing in the Northwest corner and not another tree for miles. Well that darn tree must have a balsa magnet in it because everybody in the club has hit it at least once. I myself hold the record with eleven encounters of the leafy kind. What can I do about this problem? Is there something I can buy, like special glasses, to improve my depth perception? Please help.

Desperate in Des Plaines

Dear Desperate:

I don't know about your depth perception, but one thing you can buy that will help is a chain saw.

— Jake

★ ★ ★

Dear Jake:

Me and my brother Homer tore down the outhouse and built us a hang glider machine from the boards. We got us a bed sheet and Essie Mae's horse blanket and made one of them there Roogallo wings for it. It flies right nice when we jump off the barn roof, but it don't never go up. It just glides right down and lits in the side yard everytime. Now I seen pictures in one of them glossy maga-

zines of some high glidin' machines way up in the air. Sez they got there by riding on risin' air called thermuls. How can me and Homer find us one of them thermuls?

Pilit from Peacock Ridge

Dear Pilit:

You might try looking for rising air over that outhouse you tore down.

— Jake

★ ★ ★

Dear Jake:

A few months ago, I completed a F/F Peanut Scale SE-5. The plane looks great, and flies very well, so that's not my problem! What bugs me, is that every time I launch my model into the air, a bright red DR-1 dives down, with the sun at its back, and sends my plane to the ground in a spiraling death dive! What can a do!!

Rickey from Roseburg

Dear Rickey:

Don't fly when the sun's out.

— Jake

★ ★ ★

Dear Jake:

Not enough people appreciate the contribution that someone like you makes to our hobby. Many novices don't have local club members or experienced flyers to help them with their problems. If it weren't for the timely advice of columnists like yourself, many of them would crash more models, get frustrated, and quit the hobby. In fact, you advice guys are probably single-handedly responsible for our overcrowded flying fields and R/C frequencies. So why don't you just shut up and let us regulars have it all to ourselves, and keep the newcomers back in the school yards where they belong.

— Anonymous

Dear Readers:

While I certainly do not agree with the above letter, I feel obligated to include it because everyone is entitled to an opinion in our society of free speech. However, I must take exception to that portion which maligns me personally. I feel strongly that the record shows that my advice has never prevented anyone from getting frustrated. As a matter of fact, several people have told me that

nothing irritates them more.

— Jake

★ ★ ★

Dear Jake:

Were you at the IMAA fly in at Ida Grove? I saw a guy in a blue wind breaker with "Jake" sewn over the pocket. He was about 50, balding, and had an impressive beer gut. Every time I saw him he was opening mail and taking notes in a spiral pad. Was that you?

Suspicious in Saskatoon

Dear Suspicious:

Probably not. I was there, but I'm only 49, have at least one third of my hair, and have an impressive malt liquor gut.

— Jake

Dear Jake:

You know how every once in a while you hear about some guy who lost an airplane 20 or 25 years ago, and out of a clear blue sky somebody 500 miles away calls him up and he gets his airplane back in perfect shape? Well, the most amazing thing just happened to me. I lost a Comet Zipper on May 27, 1940 near Beaver Falls, Pennsylvania. Since then I've moved three times, and now I live in Colorado. Last night I got a phone call from my last next-door neighbor in Sacramento where I lived before moving here. He said a guy from Chester, New York, which is about 300 miles from Beaver Falls, had been trying for weeks to trace me because he had some information about an old airplane. The guy had left his number, so I called him up right away.

Now here's the amazing part. He somehow knew about my lost airplane, and he wanted to let me know that nobody around there had found it yet. Talk about your million-to-one odds. Who'd have ever thought that a complete stranger on the other side of the country could give me new information on a 44 year old lost airplane? It's a strange world isn't it?

— Amazed in Aspen

Dear Amazed:

I lost an airplane once, but I found it four years later. It was in the trunk of my car where I had left it.

— Jake

★ ★ ★

Dear Jake:

I really made a killing at the swap shop at Toledo this year. I had this totally worn out Dremel tool to unload. I had it cleaned up so it looked good, but it was junk. Anyhow, I found this incredibly naive guy who actually believed me when I told him it was good as new, and I traded with him for a mint Super Tigre X60 still in the box. Which brings me to my question: The X60 runs a little rough and makes a sort of clicking noise at idle. There also seems to be a tight spot in the rotation near bottom dead center. I'm sure it's minor, but what do you think the problem might be?

— Wheeler Dealer in Waterford

Dear Wheeler Dealer:

I think the following letter, which I

Continued on page 108

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 R/CMB does not constitute an endorsement of that product, nor any assurance as to its safety or performance by R/CMB.



• Satellite City was first to introduce the modern "super glues" to the modeling community, an event which radically changed the building and repairing techniques of thousands of modelers. Now Satellite City has introduced a very handy toolbox size cyanoacrylate accelerator (Hot Shot) to simplify and expedite on-field repairs. It is a one-once plastic, refillable bottle with the well-known "Hypermist" spray pump. It speeds the curing of Hot Stuff exactly the same way as its larger counterparts, but is a lot more transportable due to its smaller size. Refills are available in six-ounce bottles.

Look for the new toolbox size Hot Shot on your local hobby dealer's shelf. It's there now.

For more information, contact Satellite City, P.O. Box 836, Simi, CA 93062-0836, (805) 522-0062.



Zenith Aviation Books catalog.

technical subjects, flying skills, and most importantly, **modeling**. This new catalog, with over 300 new books listed, is available free on request or with any order. Write to Zenith today!

World Engines has announced many new products lately, the first of which will interest modelers who fly propeller driven aircraft: Expert propellers! These are top quality Italian props made from beechwood, a straight-grained, lightweight, and inflexible wood which makes for true-spinning, long lasting propellers. The company which manufactures these props has been doing so for many years in Europe; you won't be disappointed with their workmanship. These props compare favorably with the top competition propellers available in the USA.

Expert brand props come in the following sizes: 9-4, 9-6, 10-6, 10-7, 11-7, 11-7.5, 14-6,



Satellite City 1 oz. Hot Shot for toolbox.



World Engines imported Expert props.

14-8, 15-10, 16-8, 16-10, 17-10, 18-6, 18-8, 18-10, 20-8, and 20-10. More sizes will be added as the next few shipments come in.

World Engines recommends Expert propellers for use with all 0.5., SuperTigre, Tartan, and Zenoah model airplane engines.

Modeltech pre-built balsawood model airplane kits are now being imported from Hong Kong on an exclusive basis by World Engines. Each of these beautifully finished kits features a completely built-up balsawood fuselage, reinforced with light plywood, and foam core wings presheeted with balsa. All fuselage formers and wingtip blocks have been installed and the tail surfaces have been cut to shape. All parts are



Golden Gate Hobbies Niwa Tool Kit.



World Engines/Modeltech Piper Cherokee for .19-.25 glow engines.



World Engines/Modeltech ARF .25-size Thunderbird.



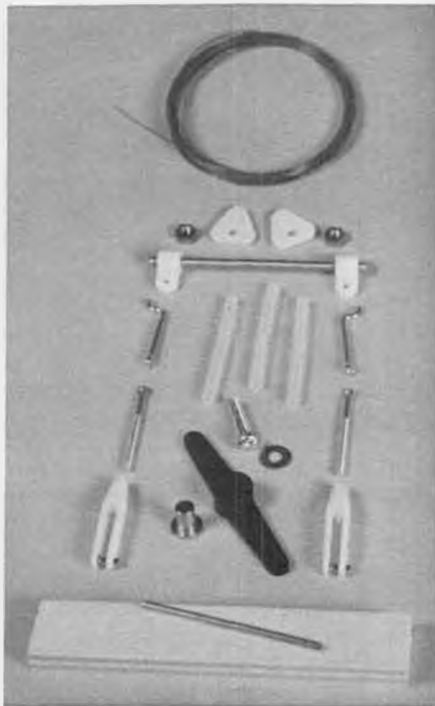
Futaba 2NL Attack 2-ch. R/C system.



Futaba 2PKA Magnum Junior 2-ch. system.



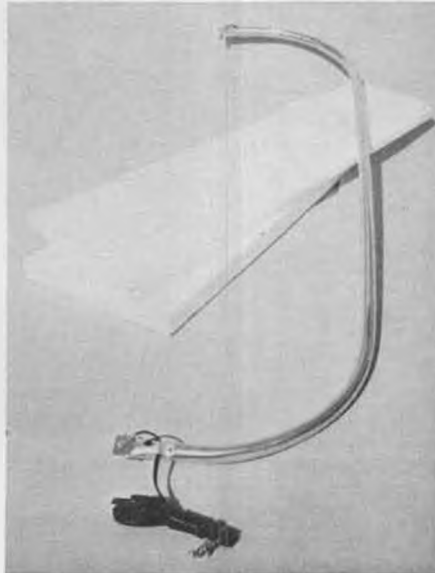
Model Research Labs. Syn-Lube oil.



Golden Gate Hobbies Pull-Pull controls.

finish-sanded and ready for paint or covering . . . even wingtips and leading edges.

Also included in each kit (where applicable) are: formed wire landing gear and hardware, tough nylon adjustable motor mount, clear canopy, aileron hardware, fiberglass tape and wing mounting bolts. Construction required includes hinging the control surfaces, painting or covering, and the installation of engine, radio gear, pushrods and landing gear. The average



Black Hawk polystyrene foam cutter.

builder should take no more than six to eight hours from the time he opens the box until he is ready to go to the flying field with a finished airplane. Due to the all balsa construction, when a crack-up does occur, the plane can be repaired quickly and easily using almost any kind of adhesive.

For the modeler who hates to build, but loves to get into the air as quickly as possible and still wants to retain the advantages of built-up balsa construction without having to do the building himself, the Modeltech line offers excellent quality and fine value.

Modeltech prebuilt model airplane kits are available exclusively from World



Robbe Spoiler Blades for sailplanes.

Engines, 8960 Rossash Road, Cincinnati, Ohio 45236, telephone: (513) 793-5900.

For details concerning any of the above mentioned models or propellers, contact World Engines.

★ ★ ★
Bob Dodgson of Dodgson Designs has introduced two new R/C sailplanes for thermal or slope. Visually styled after the popular *Saratoga Windsong* Unlimited Class soarer, these beautiful ships will no doubt be even more popular than their forerunners were: the *K-Minnow* and the original *Camano*.

The first of these two new designs is the all-new *Pixy*. This model is equipped with one of thermal soaring's most versatile airfoils: the Eppler 214. Now you can expect outstanding performance from a Two-meter Class ship, whether on the slope performing aerobatic routines, or in thermal competition or fun flying. The specifications read as follows:

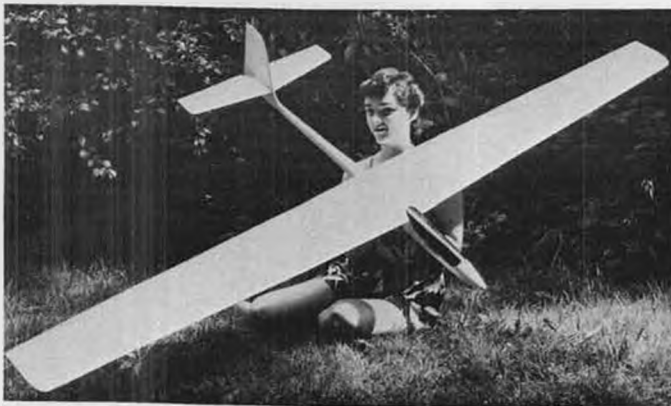
Fuselage length (less rudder)45 in
Fuselage width1.75 in (max.)



World Engines/Modeltech .19-.25-size *Lucky Bird*.



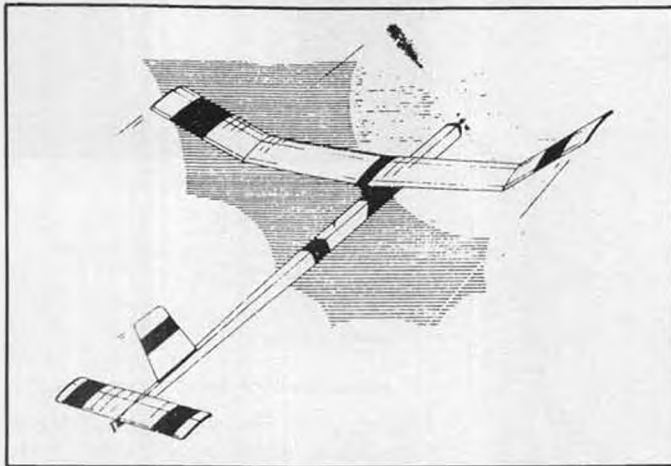
World Engines/Modeltech .35-.45-size *Lucky Stik*.



Dodgson Designs new *Camano 100* R/C sailplane.



Dodgson Designs new *Pixy* Two-meter Class R/C sailplane.



F.A.I. Model Supply new *Tilka F1B* Wakefield. Complete kit!



Robbe VW Cross off-road R/C car. Electric power!

Fuselage const. molded F/G
 & F/G reinforced wood
 Wingspan 78.5 in
 Wing area 687 sq in
 Aspect ratio 9 to 1
 Wing loading 9 oz/sq ft
 Airfoil Eppler 214
 Wing construction foam core, spruce
 spar system, 1/8" balsa sheeting
 Hardware complete: includes
 flap-elevator compensator
 Flying weight 43-45 oz
 R/C requirement 3-channel
 Functions elevator, rudder, ailerons, flaps

The *Pixy* is the only two-meter span, multichannel thermal competition glider kit available in the USA. There's more to tell about this amazing new glider, but space doesn't permit . . . so give Dodgson Designs a call or write Bob Dodgson a letter at the address below.

New glider number two is the redesigned, Standard Class *Camano*. The 1984 *Camano* features the remarkable Eppler 214 airfoil,

Continued on page 104

SCRAPBOOK of SCALE, 3-Views

& Nostalgia

Volume 2



CO₂
 RWD-6
 TRAVEL
 SOMMER
 WHIMSEY
 BEILANCA
 BOEING 247
 NIEUPOORTS!!
 FAIRCHILD 22
 FLETCHER FD-25
 & ANYTHING FROM AVI0 TO EJ10

by BILL HANNAN

Bill Hannan's *Scrapbook, Volume 2*



Aerosol X-Cel from Carl Goldberg Models.



Ikon N'wst new *Fleetwings 40* for .40 four-cycle engines.



Ikon N'wst new *Travel Air 2000* for .40 four-cycle engines.

BEEN RIPPED-OFF LATELY?

Guys, I sure hope you haven't, but it does happen . . . even in our hobby. One of the letters I received this past month provides a striking example. Gordon Coddling of Kingman, Arizona wrote:

"I recently received, and barely recovered from, a terrible shock. Having switched from gasoline engine models in 1948 to alky fuel, glow plug engines, courtesy of Ray Arden and the .099s and .199s, and I've been using glow fuel a long time (some diesels, too). The shock came last week when I asked a friend to pick up some K&B 1000 fuel for me on a shopping trip to Las Vegas, Nevada (nothing closer). The price for one quart was \$9.95 plus .57 tax, bringing a total bill of \$10.52 per quart. In the local market liquor section, I find that a good grade of vodka is only \$4.49 plus tax. Should I use

your fuel bills. First, nationally known brands, such as Cox, Fox, K&B, and Sig, are all excellent fuels. If you want to comparison shop, write to such companies and ask for their descriptive literature and suggested retail prices. Be sure to include a large, stamped, self-addressed envelope.

If that sounds like a lot of bother, then just leaf through the model magazines. You'll find several advertisements for mail order home-brew fuel at reasonable prices. I will suggest one of them because I have personally used the fuel and found it to be quite satisfactory. Sheldon's Hobby Shop in San Jose, California, offers a variety of mixtures of lubricants and nitro methane at very reasonable prices. For example, five-percent nitro fuel is \$7.75 per gallon. You must order a minimum of four gallons, but there are no shipping charges and you can have assorted

ever, there are only about fifteen as we commonly think of it. The major difference in the various types is the number of units of carbon per molecule. One-carbon-unit alcohol has a variety of names such as wood alcohol, alky, torpedo juice, etc. It's what we use in our engines . . . what we commonly call *methanol*. Technically, it's methyl alcohol. **IT'S POISONOUS.** Drink it and you'll go blind, or die, or both. It can also be absorbed through the skin. So avoid sloshing it around indiscriminately.

Two-carbon-unit alcohol is often known as grain alcohol, "sauce," hooch, booze, etc. You guessed it. It's what we mature, sensible adults tipple in order to relax, get giddy, etc., etc. It's not nearly as poisonous as methyl alcohol, but if you drink enough of it your liver will look like a sieve at your autopsy.

Three-carbon-unit alcohol is commonly known as rubbing alcohol. The other names are propanol and isopropyl alcohol. It's also very poisonous to drink. When you purchase it from a drug store, it contains about twenty-five percent water.

Here's a tip for improving endurance: Use up to twenty-five percent isopropyl in your fuel formula. It will really improve range. **NOTE:** Drugstore isopropyl won't do because of the water. You must use laboratory *anhydrous* (no water) grade. It should also be noted that there are two configurations of this alcohol, although that is of no consequence to us as modelers.


Next up the carbon ladder is butanol or butyl alcohol . . . two configurations. Fifth is pentanol or pentyl alcohol . . . many configurations. These and all others are of no concern to us as modelers.

OK guys, you are now experts on alcohol. Next time you're out at the flying site, and your buddy is having engine problems, you can drop a casual comment such as, "Sounds like you need a little pentanol in your fuel." Then, don't linger, move on. If the guy catches up, and asks for more information, just pass it off with, "Well, they tell me it's all in the *Handbook of Chemistry and Physics*." At the very least, he'll worry about it.

We're not through yet, because I haven't responded to Gordon's comment about going to straight alcohol . . . meaning methanol. Guys, it will work fine if you add about five percent nitro. The nitro simply makes it easier to adjust the needle valve. A great fuel for most flying consists of 75 percent methanol, 5 percent nitro methane, and 20 percent lubricant. I suggest Klotz KL-100 lubricant. KL-100 contains 25 percent castor oil. In cold weather, or whenever starting is difficult, one to two percent propylene oxide will do wonders.

Guys, in closing, please join me in a silent wish for an early car transmission failure for all unconscionable hobby dealers. Either that, or may the fleas of a thousand camels infest their armpits. ●

FUEL LINES



JOE KLAUSE
P. O. Box 2699
Laguna Hills, CA 92653

booze'???

"My memory tells me that Arden glow fuel did not have any nitro in it, and I'm told by a recent arrival from northern California that Pylon R/C racers there were limited to alky only. I'm also told that the reason for the exorbitant price on modern glow fuel is due to the high cost of nitro. . . . So why not go back to ordinary alcohol? If it worked so well in original glow plug days, and so well in recent Pylon R/C work, it should work again . . . and again . . . etcetera.

"I used a lot of Francisco Labs fuel down in old L.A., California, back in the late 1940s to 60s, as well as other brands. Like most So. Cal. modelers, I'm impatient with 'rip-off' type operations in my hobby. Prices like that make diesel, gasoline, and electric seem cheap by comparison. Is there anyone out there interested in testing cheap liquor for possible model fuel? Maybe some 'corn squeezer's' for domestic engines, Scotch whiskey for English engines, and vodka for the Russian imports? Or would sake be right for my Enya, OS, or Saito engines? How about it?"

As you can tell from his letter, fortunately, Gordon has a fine sense of humor because he was really "had." K&B's suggested retail price is \$7.95! Perhaps "Fuel Lines" can make some amendments for that obviously unconscionable hobby dealer. Here goes.

Gordon, although I normally try to avoid endorsing products, this time it's part and parcel of how to help lower

blends. They also accept telephone Visa/MC orders. For full particulars, see their monthly ad in *Model Aviation* magazine.

BOOZE

How about Gordon's suggested alternative . . . booze? Guys, it just won't work. Even 100-proof hooch won't. That's because "proof" measurement is only *half* of the pure alcoholic content. As a matter of idle interest, "proof" terminology developed many years ago as a crude measure of the strength of booze. Before the days of sophisticated laboratory analysis, distillers used to mix their product with gun powder. If they could flame it with a match, it was strong enough. If not, it was too weak. When it flamed brightly and steadily, it was said to have proved itself 100 percent. As it turned out on later analysis, the proving point was fifty percent alcohol. Today, our hundred proof "sauce" contains fifty percent alcohol. The other fifty percent? It's mostly water, and that won't work very well in our engines. Now if you tried some 200-proof stuff . . . well, maybe. I've never tried it, and I've never heard of it being offered for sale. If it was, it would be expensive. Sorry Gordon, better use the "sauce" for medicinal purposes.

ALCOHOL

As long as we're on the subject, here's a mini course in alcohol. There are many, many types of alcohol . . . somewhere around eighty in number. How-



The attraction for many at the Rhinebeck Classic meet is the mix of full-scale Golden Age planes with the models. Here we see a full-size Curtiss *Fledgling* on a low fly-by.

Rhinebeck Classic

By HENRY HAFFKE . . . Author, photographer, and Rhinebeck Classic competitor, Henry Haffke reports on one of R/C Scale's most exciting events.

Each year, toward the end of June, a great contest is held at the Old Rhinebeck Aerodrome, in Rhinebeck, New York. The contest is this writer's favorite of them all for several reasons. It isn't just a contest, it is something extra special. The contest brings back the nostalgia of the daring days of aviation during the Golden Era. Although this year's event was not restricted to the aircraft of those times, as in previous years, it was still a contest featuring the old aircraft of those memorable years.

Four events are flown at the meet. The normal Sport Scale event is flown, and also the Giant Scale event as per AMA rules. Then two other special "Rhinebeck" events are flown which recreate the dashing, daring exploits of the pilots of aviation's Golden Age. One of these events is called the Time Trials, where modelers fly their aircraft through an elec-

tronic speed trap to try to achieve the fastest two-way pass. Their speed is added to their static score for their final total. This gives the true scale models an equalizer with the models that are built expressly for the speed event with their hopped-up engines, tuned pipes and such. This is also an event which the many spectators enjoy, and it is flown each day just before the air show which takes place every weekend afternoon during the summer months. So thousands of spectators are in their seats along the runway and really get into the spirit of the event as they watch one modeler after another try to beat everyone else's speed.

The fourth event flown at the classic meet is the Barnstorming event, and if there was ever a real fun event, this is it. In the Barnstorming event, you must execute a series of maneuvers in the shortest possible time with

seconds added as penalties for any missed requirements. The requirements include taking off and executing a three-turn spin, dropping a mail bag (or other object) on a target, executing three loops, and landing on the target. Seconds are assessed for missing spins, loops, or missing the center of the target. It is a real fun event which is enjoyed by the participants and the spectators alike. You see some pretty wild flying, as some of the daring pilots try to better their previous scores.

Model flying is stopped at 2:00 PM each day as the real aircraft take over the narrow runway which was cleared out of the woods. This runway has to be seen to be believed, as there is a deep dip at one end of it and then a slight up-hill grade and a drop off at the other end of it, and it is not completely straight. The aircraft of Cole Palen's collec-



Armand Cote lifts his Aeronca LB for a better view. This beautiful classic took first place in Sport Scale. Armand's 1/4-scale Gee Bee Model E (foreground) took fourth place in Giant Scale.



LEFT: The author (left) and Hank Clark (*Model Aviation* cut-away drawing artist) check out the Giant Scale winning Gee Bee Model Z built by Henry Haffke.



RIGHT: Joe Wycela poses with his 6th place winning, Quadra powered Fleet biplane.



Radio problems grounded this Curtiss P6-E belonging to George Rose.

tion fly in and out of the field as if it were a normal, straight and level strip.

On Saturday, the air show consists mostly of the Golden Era aircraft in Cole's collection. These include such gems as a Davis, a Mono-coque, Great Lakes Trainer (with original Menasco engine), *Tiger Moth*, Fleet, Curtiss *Fledgling*, Standard D-25, and other assorted classic aircraft. They treat the audience to contests among the pilots as they cut with their wings paper ribbons that have been dropped from high flying aircraft. The contest is to see which pilot can make the most cuts before the ribbon gets too low. Then they take turns trying to bust helium balloons which are released from the ground as each aircraft zooms low over the runway right in front of the crowd. You really get a great view of each of these old aircraft doing their thing as they dive and zoom trying to break the balloons with their props. In addition to these novelty events, a number of aerobatic performances are also featured during the show.

On Sundays, an entirely different show is performed as Cole's entire cast of characters (and he has some characters) perform a choreographed production featuring the older WW-1 aircraft in Cole's collection. The show features, in addition to the old aircraft, an array of old WW-1 vehicles which chase each other all over the runway and run from attacking aircraft with action like you wouldn't believe as the good guys and the bad guys really go at it. Bombs explode all over the place, planes get shot down, the heroine gets captured, and later rescued, and all that good stuff. The aircraft that are flown in the show include a variety of rare WW-1



Cole Phalen's full-size Davis D-1W. (Westburg drawings avail. for D-1K model through MB.)

types of many nations. Two Fokker triplanes are featured (one of which has its original rotary engine for power), a Sopwith *Pup*, and very rare Sopwith *Dolphin*, a Morane Saulnier, Curtiss *Jenny*, *Albatross*, and several other WW-1 aircraft. The show is very entertaining and can be enjoyed by everyone in attendance, but to those of us who realize what we are seeing in the air, it is a super treat, as these 60 and 70 year old airplanes fill the sky.

This year's classic meet was reduced to a one-day affair, when the weather on Saturday was just not what you would desire for the flying of any aircraft, especially the models. Winds were in the 40 mph range and rain off and on all day caused the CD to call the contest off for the day before it even began. Judging started at 6:30 a.m. on Sunday, and it

turned out to be as nice a day as Saturday had been bad. Models started flying shortly after 7:00 a.m. and most pilots got their flights in OK.

I was flying in all of the events, so made sure I got there early and as soon as my two models were judged, I started putting in my flights. First I flew two Sport Scale flights with my .40 powered Gee Bee Model Y *Senior Sportster*, and then I flew my Gee Bee Model Z *Super Sportster* in the Giant Scale event. Next, I flew a couple of Barnstorming flights with the Model Y and then waited for the Time Trials.

There were an abundance of beautiful models at the meet which is normal, but the Giant Scale event drew more entrants than

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Piper J-3 by John Kovarik. This 1/3-scale *Cub* earned John a 7th in Giant Scale.



ABOVE: Jim Jenkins Sr. took 15th place with this Fleet biplane. He would have done better, but forgot to bring his scale documentation. RIGHT: Ray Hinds and his beautiful Curtiss R3-C took 9th in Giant Scale.





ROBBE SF-36

By DAVE PLATT . . . For the power flier who wants to break into R/C soaring . . . or the soaring pilot who wants to get into powered flight . . . Robbe has the answer: a scale motor glider!

• The Robbe SF-36 is a semiscale model of a Swiss motor glider, a delightful sort of airplane designed to be the best of two worlds: a thermal soarer with a motor for launching and cross-country purposes. The prototype is in the same mold as the well-known Fournier RF-4. The SF-36 is huskier, with a larger motor and a conventional gear rather than the Fournier's single wheel.

This R/C airplane flies like the real one. That means that you can't fly it like an *Ugly Stick*. You must coordinate rudder and aileron. You must make long, low approaches and fly it right down onto the deck. You must get used to the way it turns, and the different

speeds it will fly at. If you want a flying machine that is different, unique, and scale-like, and you're ready to learn a new and exciting style of flying, this is your aircraft.

The kit is a Cadillac. It's not a ready-to-fly model, in spite of the fact that the fuselage is blow-molded; there is a good week of evenings in it. However, once you get started, you will really enjoy the way everything fits together. It's beautifully thought out, from the tank mounting to the neat wing locks.

CONSTRUCTION

You won't have any trouble with the multilingual instructions. However, there are a few tips that will make things easier.

Former No. 87, which fits into the aft portion of the fuselage, is a round foam piece. I spent an hour looking for a wooden one.

Pin the aileron hinges! They work hard way out on the end of those long wings, and they take a lot of abuse in wing-low landings and ground loops.

All of the pushrods are metal (nevertheless, be sure to recheck your trims after the ship has been sitting in the sun!), and clevises and fittings are silver-soldered on. Ask your hobby dealer to recommend a good silver solder; I had

good success with Stay-Brite.

The rubber bands that come with the kit are too long. Either use standard rubber bands or double the ones that come with the kit. For the wing hold-down pins, which are held together by rubber bands inside the fuselage, wind them up to tighten the bands. It doesn't take much. In wing-low landings, you can bend the metal hooks on the hold-down pins out of shape. Check them.

Installing the tail skid is much easier with the long dispenser tube supplied with your bottle of Slo Zap. First, drill two holes in the rear of the fuselage for the attachment screws. Then, insert the plywood attachment plate through the hole in the rear of the fuse. Make sure the plate is positioned properly by looking up through the holes you drilled. When you have it right, reach in with the applicator and Slo Zap the ply plate in place. Next, drill two holes through the plate to keep the screws from pushing it up. Now install the tail skid.

Use a Dremel Moto-Tool with a round grinding head (the Robart grinders work great) to take off the projecting ends of the square wing mounting tubes. Don't use a file or sandpaper . . . there's too much chance of scarring the fuselage.

The cowling is easily trimmed to fit if



LEFT: The author raises the SF-36 up on a wing tip to give us a good look at the wing and horizontal stab planforms.

RIGHT: The new Enya .46 four-cycle engine gets a preflight run-up. Robbe plans an onboard starter for this engine. It should be available very soon.



PRODUCTS IN USE



Enya .40 installation: clip provides glow power; white gear has free-wheel clutch allowing disengagement of starter and running engine.



Once cowled in, the starter doesn't show. Black tube is crankcase vent.



Tune the Enya .40 to a good idle, you'll spend a lot of flight time there. First few flights were made minus the starter.

you approach it carefully. A good deal of plastic has to be cut from the rear of the cowl to fit the flange running around the front of the fuselage, so you have room to make some mistakes. There's less margin for error if you use the cowl trimmed from the front of the fuselage molding (for installations without the onboard starter).

Firstly, cut a hole in the side large enough for the engine to get through. Secondly, making sure that the front of the cowl doesn't touch either the starter gear or the spinner backplate, mark a line on the back of the cowl where it is to be cut. I used a strip of masking tape to get a reasonably straight line. Incidentally, you need to use a spinner that doesn't project backwards behind the prop drive washer. There just isn't room enough back there to keep it from rubbing against the front of the cowl.

If you don't use the onboard starter, you have scads of room inside the fuselage for the radio. However, make sure to add ballast weight where the instructions say to! The plane is designed to have those heavy starter batteries up front.

I put the receiver battery immediately behind Former 59. Both it and the starter battery were held in place with foam

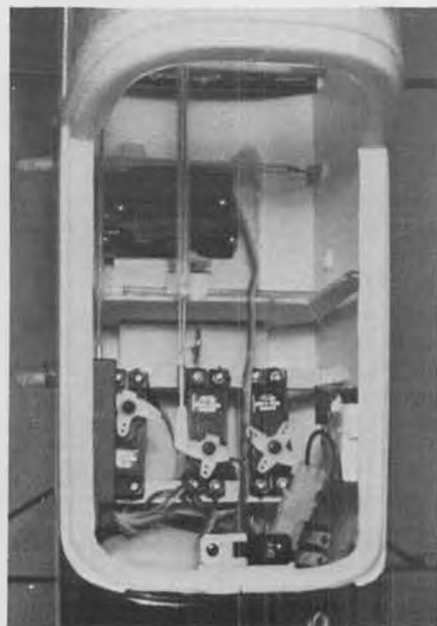
blocks. It's important not to let them rattle around. The four control servos install easily in the positions shown. I put the fifth servo for the starter against the side of the fuselage next to the throttle servo with double-sided tape. Use the smallest servo you can get.

I can recommend some products to make assembling this plane (as well as life in general) easier. The modern cyanoacrylate glues (such as Zap) and the accelerators are a big help. In fact, in many of the cases where epoxy is called for, Slo Zap works just as well. The Zap Foam Primer is great for the wings, tail surfaces, and that previously mentioned foam fuselage former. I covered the sheeted wings and the wooden tail surfaces with opaque white Micafilm. I had some trouble with Micafilm the first



The new Enya .46 fits beautifully! Clutch and gear parts will soon be available.

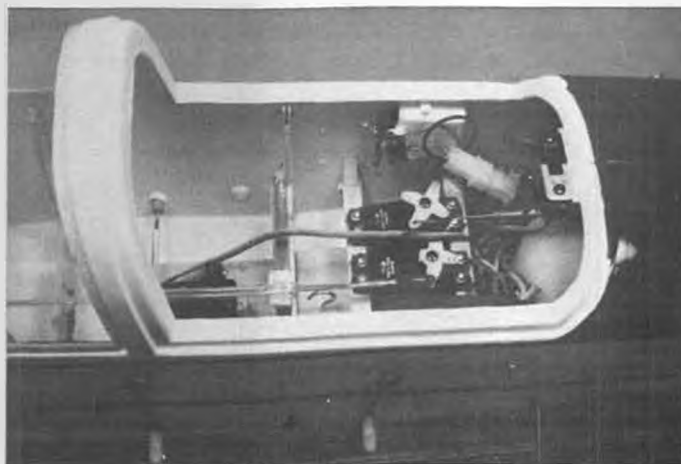
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ABOVE: Wing blade joiners fit into brass receiver tubes inside wing. Aileron linkage is inserted through hole in fuselage side. Rear rod holds wings in alignment while fasteners keep wings together. Rotate the fasteners 90° to remove wings.

LEFT: Radio installation. Plenty of room!

RIGHT: Small servo on far wall of fuse is on/off starter switch actuator.





WACO Biplane

By KEN WILLARD . . . Finally! Here's a fun little biplane designed for the G-Mark .030 that will fly and look realistic in the air or on the ground. Grab some sheet balsa and your micro radio gear!

• About twenty five years and thirty pounds ago, I designed a small, all-balsa and plywood Waco custom cabin biplane for the Cox Tee Dee .020 engine, an Otation super-regen receiver, and Babcock escapement. The design was published in the now defunct *American Modeler* magazine, and was popular with small airplane enthusiasts. After a couple of years of flying, the model was "retired" to hang in my garage.

A couple of years or so ago (the pounds had stabilized by then), I took the Waco down, cleaned it up, and installed a new radio and engine combination. The radio was Cannon's Super-Micro, and the engine was the G-Mark .030. It was the perfect combination; the throttle feature on the G-Mark made it possible to taxi out, take off, climb out,

throttle back and cruise . . . even do touch-and-goes! It was a reborn hit.

I took some photos of it with me when I went to the Toledo show in April 1983, and showed them to Bill Northrop, originator of the phrase, "Real airplanes have round engines and two wings."

"How about an updated construction article?"

"I'll do it."

Time passed, other designs came along. Then I went to Toledo in April 1984. Bill gave me that icy stare.

"I'm working on it," I lied.

"When'll I get it?" Bill demanded.

"Before the end of May."

"What year?"

He had me trapped.

"This year," I promised.

So here it is. When you see it, if it's late

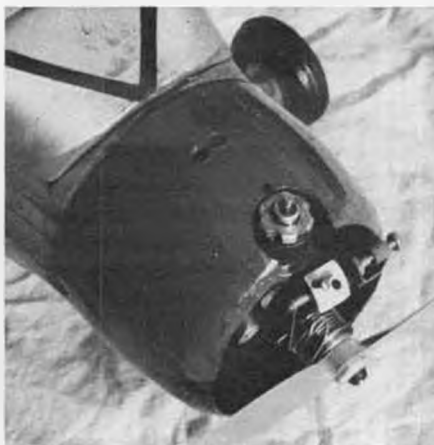
in the fall, don't blame me. I did what I promised . . . delivered it in May, 1984.

Yeah, I shoulda done it sooner, but there's a side benefit now. In addition to Cannon, you can also install the new, lightweight equipment from World, Airtronics, Circus, or Ace. The choice is yours. There's room for any one of them. The plans show a schematic installation for three servos, a small receiver, and a small battery pack. The servos are installed merely by sticking them to the sides of the fuselage with mounting tape, and the receiver and battery pack are loosely packed in foam rubber and stuffed up front behind the firewall.

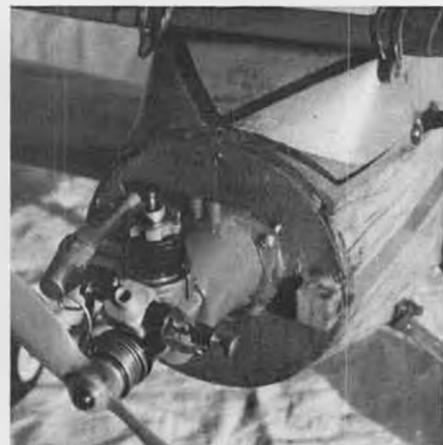
With the exception of the radio mounting, the basic construction is unchanged from that which was described twenty one years ago. This is the way it



Cowl in place, wing and windshield removed. Throttle servo in fuselage's right side, receiver minus plastic case on left side.



Slightly different cola bottle cowl. Cutouts allow access to fuel lines and glowhead. The windshield block is held in place under wing.



G-Mark engine mount is an offset backplate shim that has been slanted and tapered to give down and right thrust.



read:

WINGS. The top and bottom wings are made in three pieces — the right and left panels and the center sections. The panels are butt-joined and glued to the center sections, with the inboard ribs of the panels slanted at the proper angle to provide the right dihedral. Some sanding may also be required to make the angle accurate. Then a 1/2" strip of nylon, or Celastic if you prefer, is glued over the joint on the top and bottom to give it the

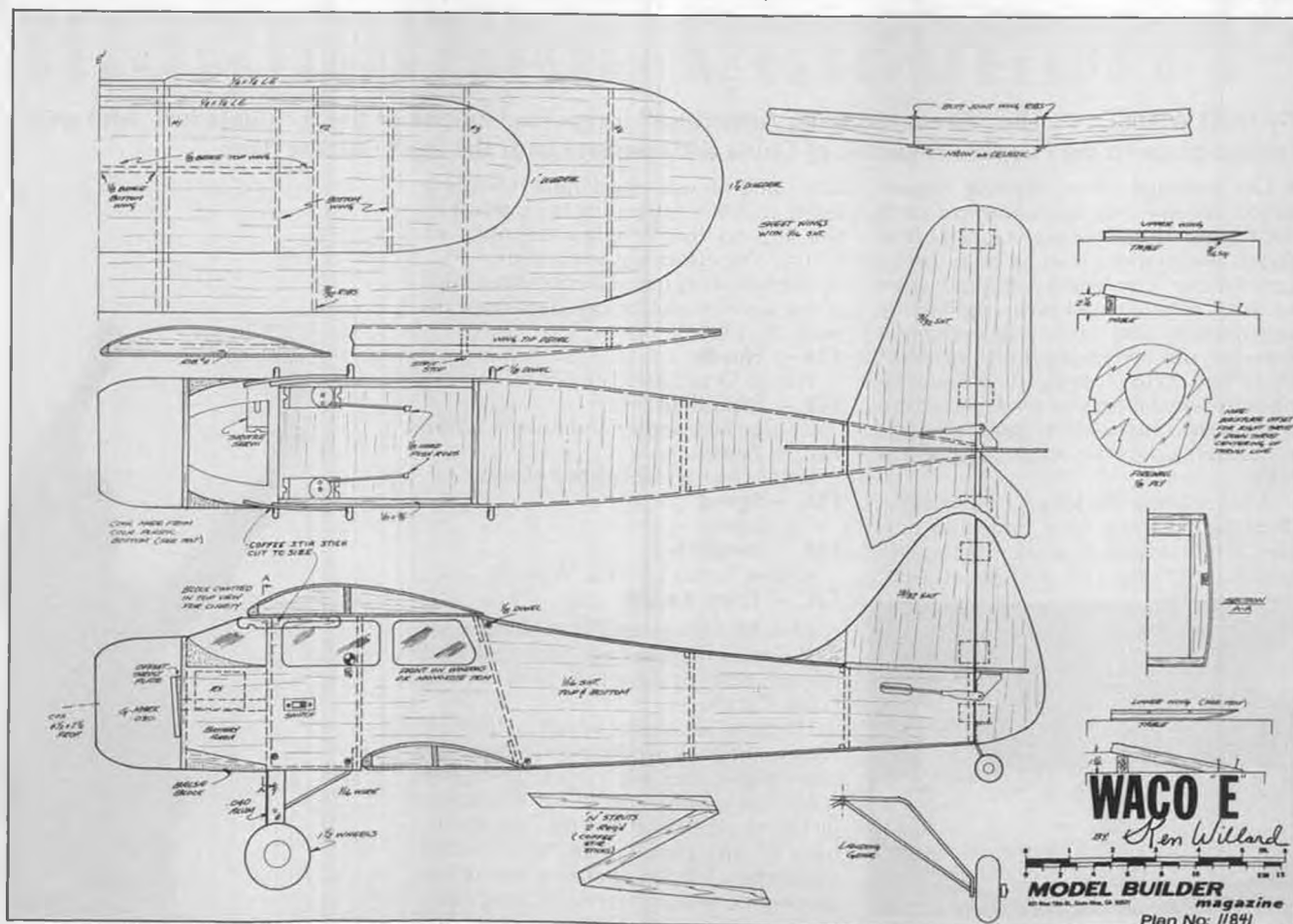
necessary amount of strength. To make the panels there are a couple of tricks. Let's take a top panel in sequence.

1. Lay the bottom sheet of 1/16", sanded to 1/20", on a flat surface.
2. Put a piece of 3/16" sq. stick *under* the bottom surface, longitudinally, at the tip rib location. Pin the bottom sheet to the table.
3. Trim the bottom of the leading edge to fit the curve from the tip rib to the next inboard rib. Glue in place.

4. Glue and pin ribs in place. Also glue the brace for the center section rib in place.

5. Glue forward edge of the top sheet to the leading edge. Leading edge can be shaped from a piece of 1/4" x 5/16" balsa, as shown in the side view, or if this is too tedious, use a piece of 1/4" square and run the top sheet forward an additional 1/8".

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Friendship is what it was really all about. (L to R) Schroedter, White, Johnson, Drake, and Hines with their Chinese friends

China vs. USA

Friendship Tournament

By BOB WHITE . . . The "Great Modeling Adventure" is reported by one of the fortunate few who were invited to go to the People's Republic of China and compete with the best Chinese fliers.

• Our national aeromodeling organization received an invitation in March 1984 from the Chinese Aeronautical Sports Association, inviting us to send a control line team and a free flight team to visit China in order to strengthen the cooperation and technical exchanges between our two countries. Upon AMA President John Grigg's recommendation, this invitation was given FAI distribution and interested persons were requested to contact AMA by phone or letter.

After reading the letter, I put it aside, thinking no more of it, until the next day. While driving to work, the thought struck me, "Why not try for the trip?"

This decision was acted upon. I wrote a letter to AMA expressing my interest in the trip to the People's Republic of China. The effort was successful.

The following teams were chosen, and plans were made for our departure on June 15, 1984:

- F1A — Nordic**
Wayne Drake and Lee Hines
- F1B — Wakefield**
George Schroedter and Robert White
- F1C — Power**
Bob Sifleet and Clarence Haught
- F2A — Speed**
Carl Dodge
- F2B — Aerobatics**
Robert Baron and R.J. Whitely
- F2C — Team Racing**

John McCollum and Tom Knoppi

The team manager was John Griff and the two officials were C.C. Johnson and Frank Garcher.

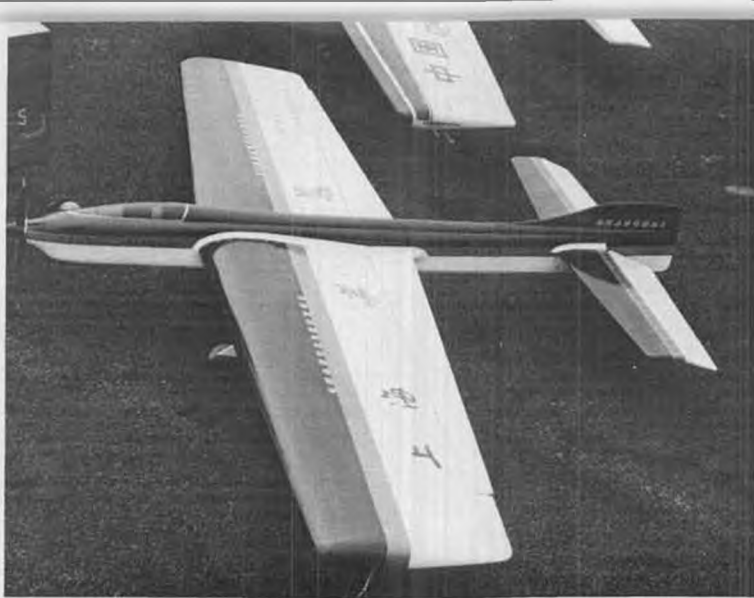
The great adventure began at noon on Friday, June 15, when our Chinese Air Lines plane took off from Los Angeles (LAX) for a brief stop in San Francisco (SFO), to take on the remaining members of our group. The fully-loaded plane then left for Shanghai where we proceeded through customs, very early in the morning. When we arrived at our destination, Beijing, we were met by two



Chinese FAI/F2C plane. Team race was won by Din Zen qian and Li Quan qian.



Chinese hand-held wind instrument and temperature probe. Cute anemometer.



The winning C/L Stunt plane had detachable wings and three-bladed hand-carved prop. Zhang Xiandong's score: 6021.



Dr. Wayne Drake retrieves his Nordic with the help of a Chinese sidehack driver. Wide open spaces were perfect for F/F!

very friendly Chinese officials who would accompany us on our complete trip through China. They became our very good friends and, I'm sure, were responsible for our interesting, informative, and well-organized travels.

Our luggage and model boxes were placed on a truck, while our team boarded a bus which took us to the Yanjing Hotel on 19 Fu Xing St., Beijing. The trip, so far, was great and everyone was in good spirits.

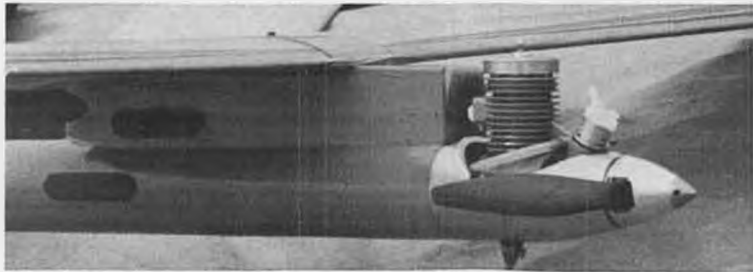
From our 19th floor window, we had a

fantastic view of the city on Sunday, June 17, our first day in this interesting country. After breakfast in the hotel, at 7 a.m., we left in an air-conditioned bus to visit the Great Wall, one of China's main attractions for visitors. It was a rather long ride through the countryside and over some mountain roads, which gave us a good idea what China is like outside the big cities. The Great Wall was quite impressive and very much as I imagined it to be. After we had our lunch at the Dingling Restaurant, we

resumed our sightseeing by visiting the Dingling Underground Palace which was very interesting.

We returned to our hotel at approximately 5 p.m. and at 6:30 we attended a banquet at the Beijing Duck Restaurant with the officials of the Sports Association. Needless to say, the dinner was excellent. The use of the traditional eating utensils was awkward at first, but we soon learned to use them skillfully.

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This typical Chinese FAI/F1C plane had a Nelson engine and a folding, carbon fiber prop.



Here's another Chinese F1C plane with a Chinese made engine. Note Seelig Timer for engine cut-off, autoruder, and DT.



C. C. Johnson points to something on the horizon in the midst of a large gathering of Chinese modelers. Event was Nordic Gliders.

BIG BIRDS

By AL ALMAN



PUGET SOUND ROC'S FLY-IN

Everything has got to keep getting bigger and better, according to the advertising media which constantly beats us around the ears with this litany. And so it's gotten to be the way we look at everything. We're allowed to presume we've had one helluva good time *only* if the present happening surpasses the one held last year.

Well, folks, it turns out that for a number of reasons, the Roc's Second Annual BIG Bird Bash was not *bigger* than the first fly-in . . . but it was *better* . . . not that you could have convinced *me* of that fact during the early hours of that July 21 and 22 weekend. Being so hung-up on the "bigger equals better" horse-puckey, I was on the verge of crying in



Steve Stephens did a fine job on his *Starduster* and to be sure it would really perform, he stuck a BIG Quadra up front. Impressive on the ground and in the air.

my beer 'cause registration was not up to expectations.

"Where did I go wrong," I asked, rolling my eyeballs up toward the heavens. "Why am I being punished?"

And suddenly I knew the answer! "It's because I've been renouncing gas engines, isn't it?" I yelled. "Oh how fickle to take it out on the whole club . . . and besides, I really didn't do any forsaking; I still have a Zenoah and one hopped-up Quadra left, don't I? That should prove something," I screamed, shaking my fists at the clear, blue sky.

I'd forgotten that I was standing in the lunchwagon line at the time, so not unexpectedly, I found myself completely isolated within a few seconds. Thanks to my outburst, the rather lengthy line and the mob of spectators in the vicinity of the wagon literally melted away. It wasn't Friday the thirteenth, nor was it time for a full moon . . . but most people figured that any "crazy" was to be avoided at all costs . . . especially if he had on a big, bright name tag proclaiming him to be a "Bash Boss" (whatever that was).

However, in spite of my ravings, and the chance that whatever I had might be catching, a couple of brave and compassionate bystanders helped me back to my chair near the impound area . . . and even tried to calm me down. However, I was disconsolate and would not



Walt Hale's smokin' *Citabria* is put through its paces at the 1984 Roc's BIG Bird Bash. The Quadra engine in this model was picked up for a paltry sum at the Northwest Expo.

respond to even the kindest of overtures; not even the promise of *free food* could break my mood (us bona fide Geminis really know how to be moody). After indulging myself in a near catatonic state for almost an hour, I finally began to believe what the rest of the Roc's were trying to tell me . . . that we did have a large, bustling crowd of spectators, a goodly number of pilots (32), and aircraft (47), a bright, cloudless sky . . . and raffle tickets that were going like the proverbial hotcakes.

It worked . . . I revived, and stayed perky for the rest of the weekend; it was hard not to. Both days were full of sunshine, albeit a bit on the gusty side, and the pilots and spectators were in a festive mood and having a great time . . . which all helped us celebrate the official opening of the "Roc's Roost."

Because our first annual bash turned out so well, we changed little for this year's fly-in, logically figuring that it doesn't pay to mess around with a successful format. Once again, each pilot had his own safety man . . . the only change here being that safety observers



Marshall Palmer's BIG Sopwith *Pup* lifts off the runway at the Roc's Fly-In. Marshall brought this Balsa USA beauty from Seattle for the festivities. It was quite the majestic flier, capturing every eye!



Often mistaken for a Great Lakes, this little-known Wiley Post "Model A" was built and flown by Fred Pierce of Kent, Wash. Fred avoids all rigging hassles with unique breakdown procedure.



ABOVE: Dick Parrish, Holcomb, NY, let everyone know what his home club was! His *Gipsy Moth* towed a banner saying "135th Aero Sqdrn of NY".

LEFT: Tom Herrett's 14.5 lb *Byron Pitts* was easily pulled aloft with an ST-2500.

RIGHT: This *Tiger Moth* and 78' *Skybolt* were flown by Ray Broomfield. A Q-50 powers 'Bolt'.



Snoopy always has a great flight in Ken Crawford's Zenoah 2.3 powered CAP 21. Weighing only 16 pounds, it can fly straight up!



Bruce Edwards, IMAA's District XI Director, flew this red, white, and blue *Big 'E'*. A Zenoah 2.3 really motivates this 15 lb bird.

had to be qualified pilots. It made sense that being a competent pilot himself, the safety man would be more comfortable out on the flight line and would have the savvy to be more than just another pair of eyes . . . thereby enhancing the observer's role.

In the interest of safety, we limited the amount of birds in the air to three. This worked out to everybody's satisfaction. No one suffered from a lack of flying time, and there was far less potential confusion both on the flight line, and in the impound and frequency control areas. For everyone's safety, we imposed an absolute "no taxiing" rule in the pit area, which was well received by all

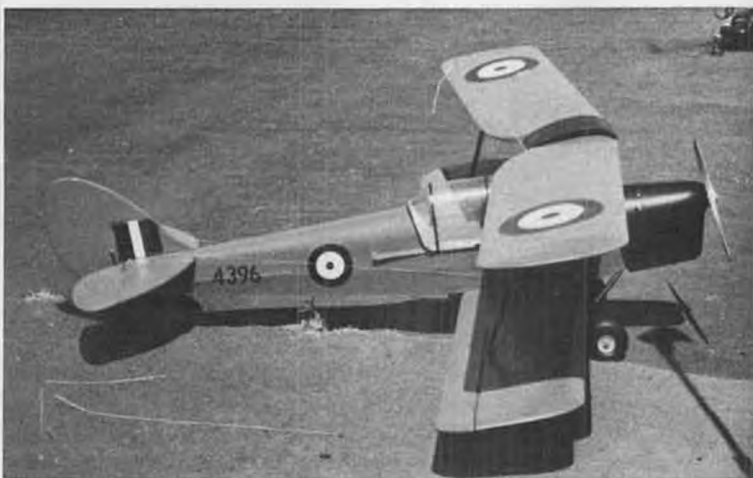
pilots.

All the frequencies, old and new, were used with no problems, although I understand that some frequencies are useless in the Seattle area which is sixty miles north of us. Smoking was prohibited in the pit area; pilots and spectators were frequently reminded not to smoke near the aircraft. Six fire extinguishers were evenly spaced along the pit area.

As expected, the crowd of onlookers was extremely well-behaved and respected the orange and black nylon rope barrier. Again this year, we used Explorer Scouts/Cadets assigned to the local police department to handle the parking and to keep the peace. There's

no doubt that most folks respect a police uniform and act accordingly, even if the guys and gals wearing the cop suits are only unarmed juniors. Also, these Explorers did double duty, giving us good cover in case emergency first-aid treatment was needed . . . both from a standpoint of being able to handle the medical techniques, and having instant communication with police and ambulance service.

But all went as planned, and we had no need for fire extinguishers, mob control, or ambulances . . . which meant that the Lions Club Lunchwagon must have been turning out edible goodies! Initially, I was going to opt for the same people who served four different kinds of great tasting sausage last year, but I was easily talked into using the local Lions Club "Roach Coach." Their hot dogs and chili turned out to be unusually good, and we certainly endeared ourselves to the town of Yelm because their Lions Club showed a nice profit for that weekend. We'd also arranged with the lunch wagon honcho to have our percentage of the take used for free breakfasts and lunches for the pilots. True, the meals were sort of token: breakfast consisting of coffee and doughnuts, and lunch being hot dogs and cokes . . . but at least it showed those who came to fly with us that we cared.



Another good-looking *Tiger Moth* was brought by Del Bowers who learned to fly in the full-size version of this airplane some years back. A Q-35 hauls this 25-pound machine very realistically.

Continued on page 84



CHOPPER CHATTER

By RAY HOSTETLER

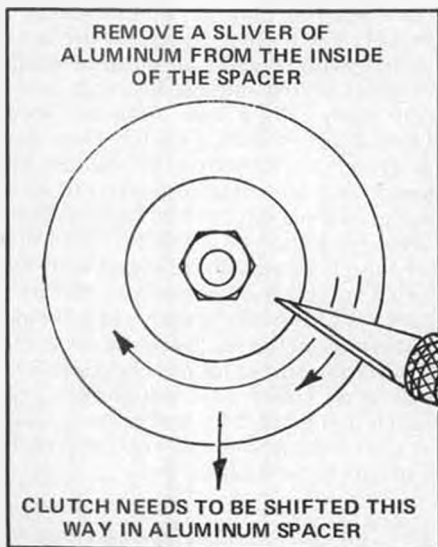
• This is being written just before the Nats, which I will be unable to attend due to flying full-size birds in LA with all



Cone start system fixes to eliminate vibration. Note how bottom of aluminum spacer is machined to fit fan recess. Centers automatically.



This gap (arrow) is what causes problems at the top of the spacer.



the Olympic activity. Unfortunately, an emergency rule has been proposed that would prohibit metal tip weights in rotor blades. Why? I guess safety has been the key reason, or possibly just following along in the FAI's footsteps. I know I've never heard of anyone being hurt by lead tip weights from broken rotor blades. Hopefully by the time you read this the contest board will have turned down this rule.

Rather than saying "no metal tip weights," how about some installation guidelines (i.e.: "Lead tip weights shall be epoxied in place, and the rotor blades covered with half to three-quarter ounce fiberglass cloth.")? I don't know if you've flown fiberglass blades or not, but they are stronger, and provide excellent reinforcement at the blade root as well as the tip.

The flybarless ships demand tip weight, and one of the heavier items next to lead is leaded glass rod. I'd rather have lead than glass in rotor blades. Let's not limit the development of flybarless systems or any other type of rotor system by eliminating the best type of tip weight ... lead.

ROTOR HEADS VS. CONE HEADS

Years ago, when dad and I started flying helicopters, we didn't know a whole lot about rotor balancing or engine alignment. Because the Kavan *JetRanger* had belt drive, engine alignment was not too critical as long as the belt tension was right. However, the *JetRanger's* rotor head was tricky to balance, especially as each one was different from the next. Because of this, we learned about rotor head balancing out of necessity, and most of that the hard way by trial and error.

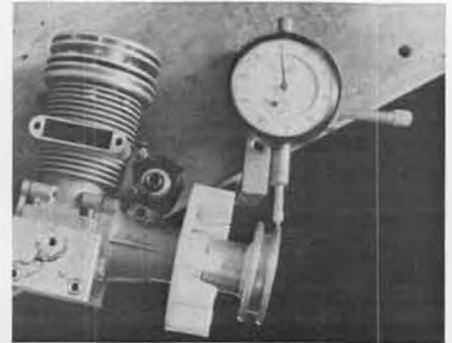
When the *Heli-Boy* came out, all of a sudden engine alignment became critical. Engine induced vibration plagued my first *Heli-Boy*. Not that it was all my fault, because the instructions essentially said screw it together and let it go.

People with machinist's backgrounds realized the precision needed was not there, and they had dial indicators to check it out and make it right.

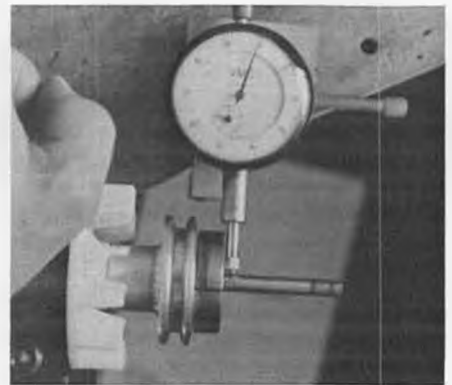
For the past few years, I've used the tip of a small screwdriver or a piece of piano wire to check the runout on clutch shafts. Now you can get pretty accurate if you use this method properly (spelled p-a-t-i-e-n-c-e), but in fact, nothing beats a dial indicator shaft.

Since then I've obtained a good

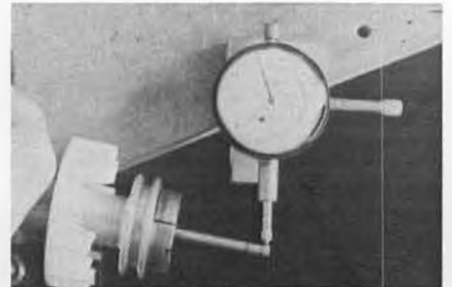
quality, used dial indicator, and I use it for all shaft alignments. It is THE way to go. If you own a cone-start type helicopter you really should get a dial indicator and do it right. Just as you need a *High Point* balancer for rotor heads, you need a dial indicator for engine clutch alignment. Here is my latest alignment system in detail. It is written with a *Cobra* or *Competitor* in mind, but is also directly applicable to the *Heli-Boy* or *Superior*.



Dial indicator being used to assure perfectly true running of spacer.



After adding clutch to shaft, check runout at base of clutch shaft to make sure it is perfectly centered in aluminum spacer.



The last point to check is the tip of the shaft. If there is a variation in dial readings...



... then adjustments can be made by slipping a brass tube over the shaft and applying hand pressure to bend in desired direction.

THE PROBLEM

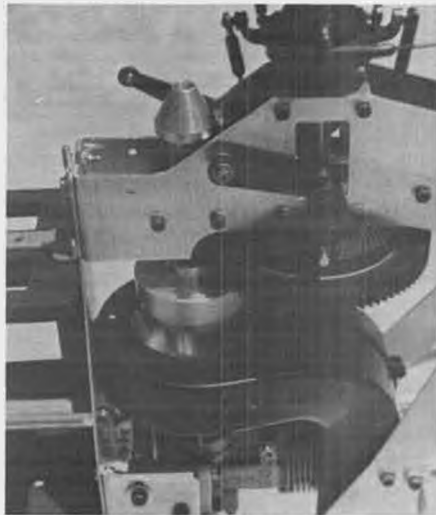
With the Gorham/Hirobo system, the fan slides on over the engine shaft and mates to a split cone, then an aluminum "spacer" mates to the fan. The engine nut holds both of these in line on the engine shaft. Now the bottom of the aluminum spacer is machined to fit the cooling fan, but the hole drilled through the "top" of the spacer is too large for the threaded portion of the engine shaft. Supposedly, new spacers will be coming out with two diameters in them, one for the thick portion of the crankshaft, and the other for the threaded end. As it stands now, when the engine nut is tightened up, it can pull the spacer off center slightly. This in turn sets the rest of the system off center and leads to vibration.

THE CURE

To keep the spacer perfectly centered over the shaft, get some epoxy of the "liquid metal" type, hard setting, not the typical, flexible model epoxy. Make sure it has a working time of an hour and



The author flies John Gorham's *Lama* at the Gorham Model Products flying site in Calabasas, California. He says he'd like to build one for himself as it is a good flier and a beautiful scale model.



The Gorham Model Products *Cobra* drive system is very nice. The single bearing above the clutch bell allows easy alignment & gear mesh.

completely hardens overnight. I use JB Weld. Coat the portion of engine shaft threads that the aluminum spacer covers, not all of the threaded area! Slide the spacer on over the shaft and mate it to the fan. Add more epoxy with a toothpick if necessary to fill the gap between the shaft and spacer. Now, Loctite the exposed threads, drop a washer over the threaded shaft, and torque down the nut hard. This will seat the spacer to the fan. After this is done, loosen the nut so it is only "1/4-tight". (This prevents damage to the engine bearings as you tap the spacer). Dial indicate the upper diameter of the aluminum spacer. It is important to mark the "high" point so you know where to tap. It also gives valuable feedback about how much the spacer moved with the last tap. Tap the spacer until it dial indicates .001 or less. *Let harden overnight.* In the morning, retorque the engine nut tight. Don't forget to do this!

ADDING THE CLUTCH

As you mate the clutch to the aluminum spacer, note if it is a tight fit, or if there is slight play. Loctite the two clutch screws, and screw the clutch to the spacer. Only lightly tighten the screws to allow you to shift the clutch. Once the clutch is in place, check the runout of the shaft just as it comes out of the clutch. If there is some error (more than .001) and the clutch fit the spacer with slight play, you can tap the clutch with a plastic hammer to shift its position in the direction desired. If the clutch has a tight fit to the spacer, mark the side that the clutch needs to be shifted to on the spacer, remove the clutch, and remove a sliver of aluminum from the inside of the aluminum spacer with a modeling knife (see Figure 1). Then, refit the clutch using finger pressure to hold the clutch toward the side that it needed to be

Continued on page 98



Wendell Hostetler's new Bell *JetRanger* sure looks nice with its light and dark red trim on white fuselage. Rossi .61 powered, Airtronics R/C.

By BILL FORREY
Photos by JIM BRANDON
and MICHAEL FORSTER

R/C SOARING

PROMISES DEPT.

At last! The opportunity to get caught up on several long delayed items has presented itself. I write this as the Nats are underway; when they conclude, I'm sure there will be much to write about, photos to run, etc., and the backlog will again build up. This month, however, it's time to clear the desk.

THE SEARCH FOR A COMPLETE RULE BOOK

Unfortunately, the 1984-1985 AMA rule book needs an errata. There are several areas (not necessarily limited to R/C Soaring) that are no longer accurate, and there are some things that really should have been included that were not. Rather than point an accusing finger at the AMA and stir up a lot of anger and hurt feelings, I'm simply going to write up a little "for your information" type report based on my conversations with, and written documentation supplied by David Peltz (AMA 968), an R/C Soaring pilot who is one of the nation's foremost authorities on AMA procedures, budgets, and policies outside of the "bureaucracy." Dave is a past holder of the US Altitude Record for R/C Sailplanes, a contest director, member of the District X R/C Soaring Contest Board, and the co-author of the newly approved, provisional FAI event; F3B R/C Soaring Cross Country Racing.

Dave outlined in a letter to the AMA president, dated April 26, 1984, those areas where the problems exist in R/C Soaring. I will likewise present the material in outline form in my own words, again, based on Dave's report.

ITEM 1:

NATIONAL R/C SAILPLANE RECORDS

The national records section of the rule book which falls under scrutiny is located on page 74. Under the paragraph labeled "Speed," we read that the speed course is to be an equilateral triangle with sides of 100 meters (approximately 328 feet), outside of which the sailplane must fly one complete pass, crossing a start/finish line at the mid point of one of the legs.

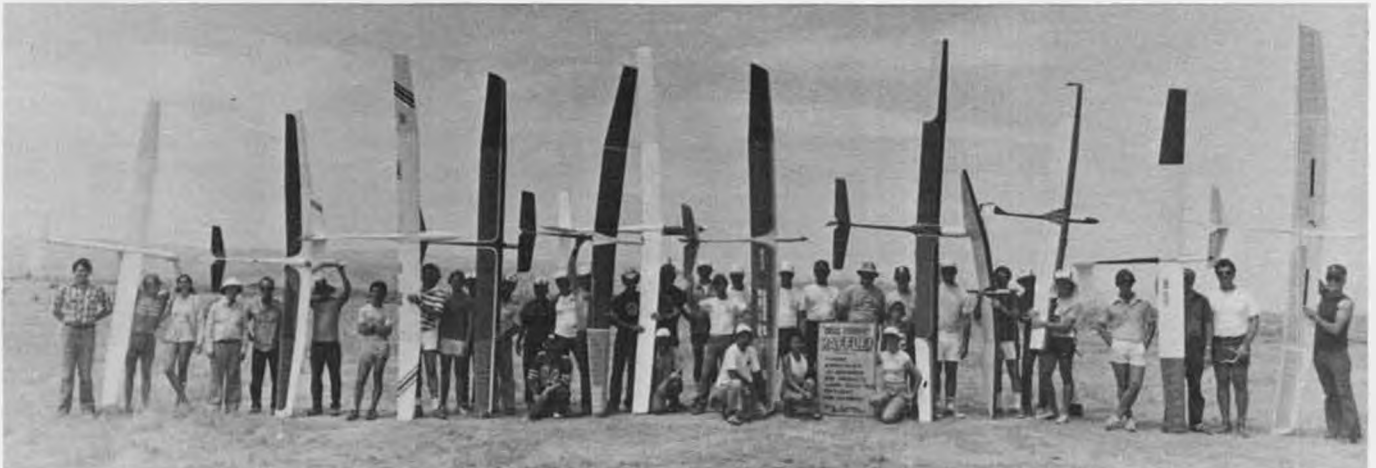


Western Great Race winners: (L to R) Joe Wurtz, Gary Ward, Jan Navone. This sailplane was unique in a couple of areas: flap system and airfoil used . . . see text for the details.

The San Fernando Valley Silent Flyers tried these rules a few years ago in an attempt to establish some national records. They found out just how hard it was to fly this course accurately and at the same time quickly. Keep in mind that the course must be flown without the aid of an engine or motor, the aircraft must enter the course at an altitude no more than 50 meters (try measuring that one when an 80 to 100+ mile-per-hour sailplane passes the starting gate), and the flight must be timed by two or three people (see rule book) whose watches must agree to within 1/100 of a second (try that one with a friend sometime!). All these elements combined in-

to an almost impossible set of prerequisites for an official flight. Then too, the flight ended up being a large circle in order to conserve kinetic energy. So why a triangular course in the first place?

Dave and a few fellow SFVFSers got together after the second or third attempt to run one of these near-impossible tasks and drew up a rules change proposal. It was formally submitted, and formally accepted by the Contest Board in the first half of 1983. The new rule was to adopt the internationally recognized, FAI/F3B, 150 meter, four-lap course as the official record course. This was to simplify the logistical and technical setup



Judging from this photo, 12 teams competed for honors at this year's Western Great Race. Quite a variety of planes were flown.



Two 15-foot *Comets* were raced this year. This new design from LJMP is truly incredible in performance. W. Meredith & L. Jolly hold.



The team of Percy Megginon, Don Northern and Bret Northern flew this unmodified *Sagitta XC*.

of the old course, and to make it more convenient for CDs and fliers to go for a follow-up record trials after an FAI contest (the course would already be set up). It made perfect sense.

Well, somewhere in the maze of the rules proposal system, this rule became lost and forgotten, and it failed to appear in the latest rule book. Dave's cutting accusation was, "Somewhere, this important rules change fell through the cracks, and no one at AMA headquarters will accept the blame or seems to really care." Without any evidence of malice aforethought, foul play, or conspiracy, it would appear that these words may have come on too strongly, and a more appropriate, "Dear AMA . . . What happened?" would have sufficed.

Since Dave's letter was sent to AMA HQ, there has been published in *Model Aviation* the corrected version of the rules for establishing a national speed record. May I

ask you, did you notice this correction? Did you clip it out of the magazine and stick it in your rule book? Probably not is my guess. Anyway, you should. Grab your July 1984 *Model Aviation*, turn to page 121, and clip out the article entitled "1984-85 AMA Rule Book Corrections." Then, get your AMA rule book, turn to page 74, cross out the paragraphs under the bold face word "Speed" and insert your clipping.

One correction down, and one to go.

**ITEM 2:
PROVISIONAL FAI EVENT: F3B R/C
SOARING CROSS COUNTRY RACING**

As the co-author of this important new event in international R/C soaring, the fact that it was not mentioned in the AMA rule book alongside the other FAI/F3B rules hits close to home with Mr. Peltz. Perhaps when the CIAM passed these new rules in late 1983 it was already too late for inclusion in the 1984-1985 rule book (this is a possibility).

Normally, all international (FAI) rules are included automatically.

For whatever reason, there was never any detailed report or summary of these new rules published anywhere (to my knowledge) by the AMA. Because of this, I'm not really sure how many people even know about it.

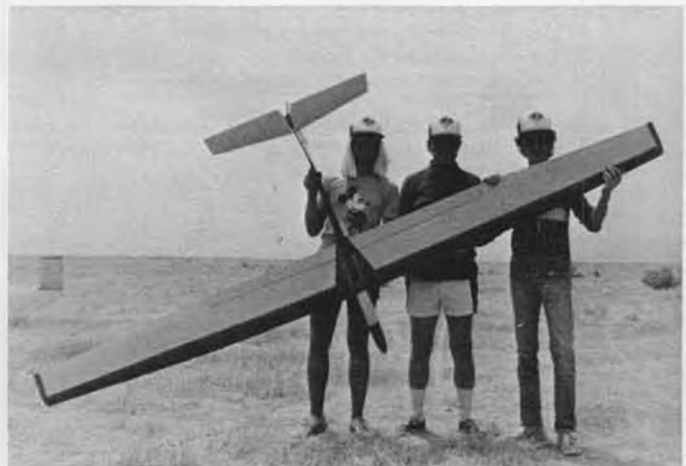
Well, if you don't mind (what choice do you have?), I'm going to run it here in this column. If it doesn't interest you, skip over it, if you enjoy thermal cross-country flying, then copy this section, clip it out, and save it for future use.

As an aside, this is the second USA proposal to be sent to the CIAM for a vote. The first was submitted by Lee Renaud back in 1982. This proposal met with resistance in Europe and was voted down rather handily. If you want to read it, it appears in our AMA rule book to this day, on page 73, under the heading "16. Racing for RC Gliders."

The second proposal met with a 14 (for



Joe Wurtz and Jan Navone disassemble their plane after it crashed on launch. Radio problems suspected. Earlier flight won contest.



John Paul Leeming, Harry Leeming, and David Leeming flew their original design *Luster*. Featured modified E-205, flaps, 132" span.

and 1 (against) vote, as submitted by the co-authors Dave Peltz and Jerry Krainock (there may have been others). The Europeans liked this one because it was more flexible in terms of course length and layout, an important factor in Europe where the wide-open spaces just don't exist as they do in our country. Also, as per full-size practice, the event is called by the contest manager at the pilot's meeting on the morning of the contest. This is to allow for changes in weather, road conditions, and the unforeseen "problems" that sometimes crop up at the last minute.

AGENDA OF C.I.A.M. 1st/2nd DECEMBER 1983 MEETING
X—NEW PROVISIONAL EVENT
U.S.A.

5.6. RC Soaring Cross Country Racing

5.6.1. Rules for Entry

- A) Open to any country affiliated with the FAI member National Aero Club.
- B) Each National Aero Club may enter up to 2 teams. A team consists of a pilot and up to 2 helpers, all of whom must be in possession of an FAI Sporting License from their National Aero Club, affixed with a current FAI stamp.
- C) Each team shall include one timer who will be assigned by the organizers as official timer for another team. The official timer shall also be responsible to certify distance traveled if less than the full course distance.
- D) Each team may enter any number of sailplanes. Each sailplane must be flown on the same assigned frequency.
- E) There is no restriction on the type or number of chase ground vehicles. Suitable space must be provided in one of the vehicles for the official timer.
- F) All sailplanes shall fall within FAI limitations with regard to size and weight. (Refer to 5.3.1.3. Characteristics of Radio Controlled Gliders.)
- G) There is no restriction on the number of controls or sensors.
- H) All ballast must be carried internally and cannot be jettisonable except for water ballast.
- I) All sailplanes shall bear the FAI Sporting License number and national flag of the primary flier.

5.6.2. Description of Task

- A) Object is to fly the course non-stop with one model. Fastest time wins. Any pilot of the team may fly the model.
- B) If all flights are less than the course length, then the longest distance flown wins. In the case of ties, the shortest time will determine the winner.

5.6.3. Description of Course

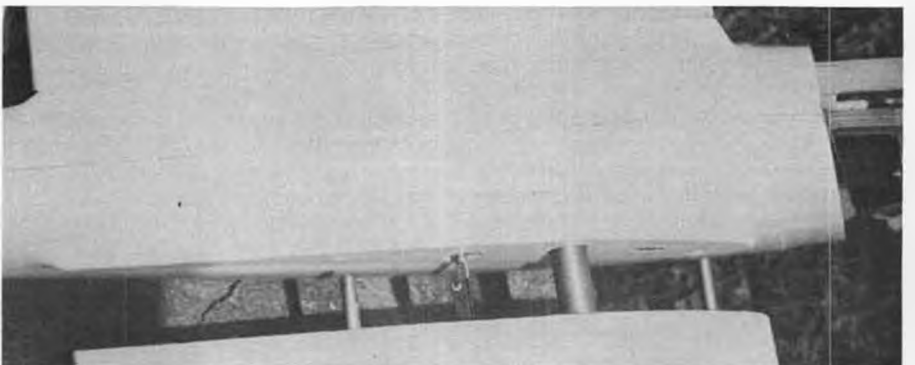
- A) Depending on local conditions, the course may be any of the following:
 - 1) Point A to Point B (distance to a goal);
 - 2) Point A to Point B to Point C (broken leg distance to a goal);
 - 3) Point A to Point B and Return to Point A (goal and return);
 - 4) Distance Around a Closed Course with 3 or more turn points (triangle, quadrilateral, etc.);
 - 5) Free Distance.
- B) On the days of competition, the organizer shall define the nature and length of the course to be consistent with the local wind and weather condi-



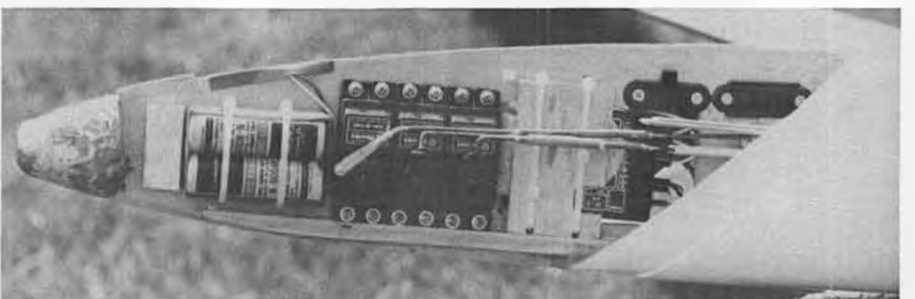
The Rowing *Merlin* imported by Wilshire Model Center. Michael Forster has provided us with a mini product evaluation on this fine piece of German soaring machine. See text for story.



The *Merlin* sports a Wortmann airfoil (probably the FX 60-126 from the looks of it) which gives it a wide speed range for thermal hunting and climbing. Note aileron servo connector.



Top view of the wing being inserted in place on the fuselage. Note spoiler clevis protruding from the wing and the pushrod from the fuselage. Looks like a hefty 3/8ths joiner pin!



Popular in Europe and Australia is the so-called nose sheath or nose cone canopy which allows the ultimate in servo accessibility. Note 800 mah Sanyos, wire ties holding in the receiver.

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Model Builder Visits... Leisure Electronics

This is the first of a series of "Model Builder Visits" to appear periodically. We hope you will enjoy the informal question and answer format, as well as the fascinating history of this company. Welcome to LEISURE ELECTRONICS!

MB: I remember that years ago, you and your twin brother, Bob, were into R/C soaring, and you were producing a line of free flight and R/C glider kits under the Astro Flight name. When did you first become interested in using electric power to fly model aircraft?

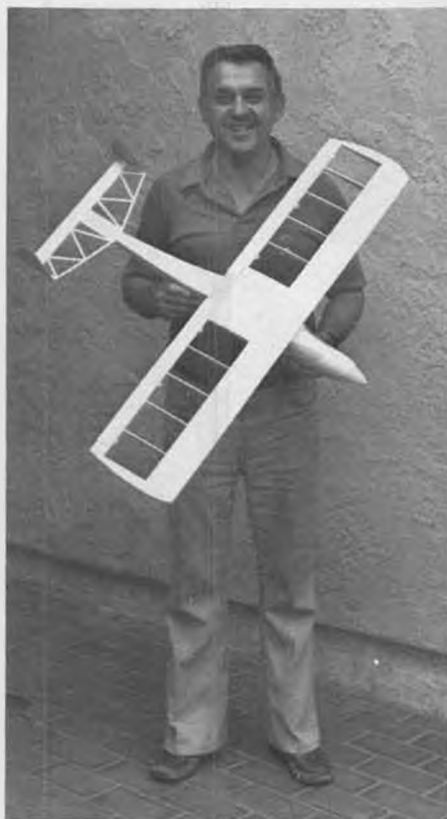
ROLAND: My involvement in electric flight came about in a most unlikely manner. In the fall of 1970, while attending an R/C sailplane contest at Taft, California, Mark Smith indicated that he planned to make a blimp with his *Mark's Models* company logo on the side and fly it inside the Anaheim Convention Center at the next model trade show. He said he would use electric motors to hold down the noise.

MB: Aside from the noise, I bet the Convention Center people wouldn't have wanted gas (or methanol) engines running inside the building.

ROLAND: Probably not. Mark didn't have a blimp at the show, so maybe he was only kidding. Actually, Mark's idea sounded good to me, so I figured to do the same. However, I had no sooner finished making the bag than our cat took a dislike to it and tore it to shreds.

MB: I guess thanks to your cat, our International Modeler Show in Pasadena became the first trade show to feature an electric powered R/C blimp some years later!

ROLAND: Also thanks to that cat, I switched my thoughts to creating an electric powered model airplane. A quick calculation showed that electric power could weigh in about half way between rubber and gas power.



Roland Boucher holds a framed-up *Wasp*, designed by Jim Zarembski, and the next electric kit from Leisure Electronics.

Rubber and gas planes had been around for years, so electric should work. A number of semi-successful planes were constructed that fall, so then I began a detailed theoretical analysis of the problem. By the Christmas season, I felt confident that electricians would work and tried to "sell" my concept to Jack Ryan, then chief engineer of Mattel, Inc. Mattel could not accept this offer, as they already had Phil Moscow, a member of the San Fernando Valley Flyers,



Leisure flight packs: 7-cell/800 mah, 8 oz; 7-cell/1.2 ah, 13 oz; 6-cell/1.2 ah, 11 oz.



R/C car packs for Cox and MRC, but may also be used in other brands.

working on an electric plane of their own. **MB:** When did you first publicly demonstrate electric powered model flight? **ROLAND:** I gave an outside demonstration of radio controlled, electric powered flight on April 17, 1971, at the Anaheim (MACS) trade show. The demonstration was a success and aroused lots of interest, but the model press all but ignored it. Two weeks later, I was sent to England on a seven-week

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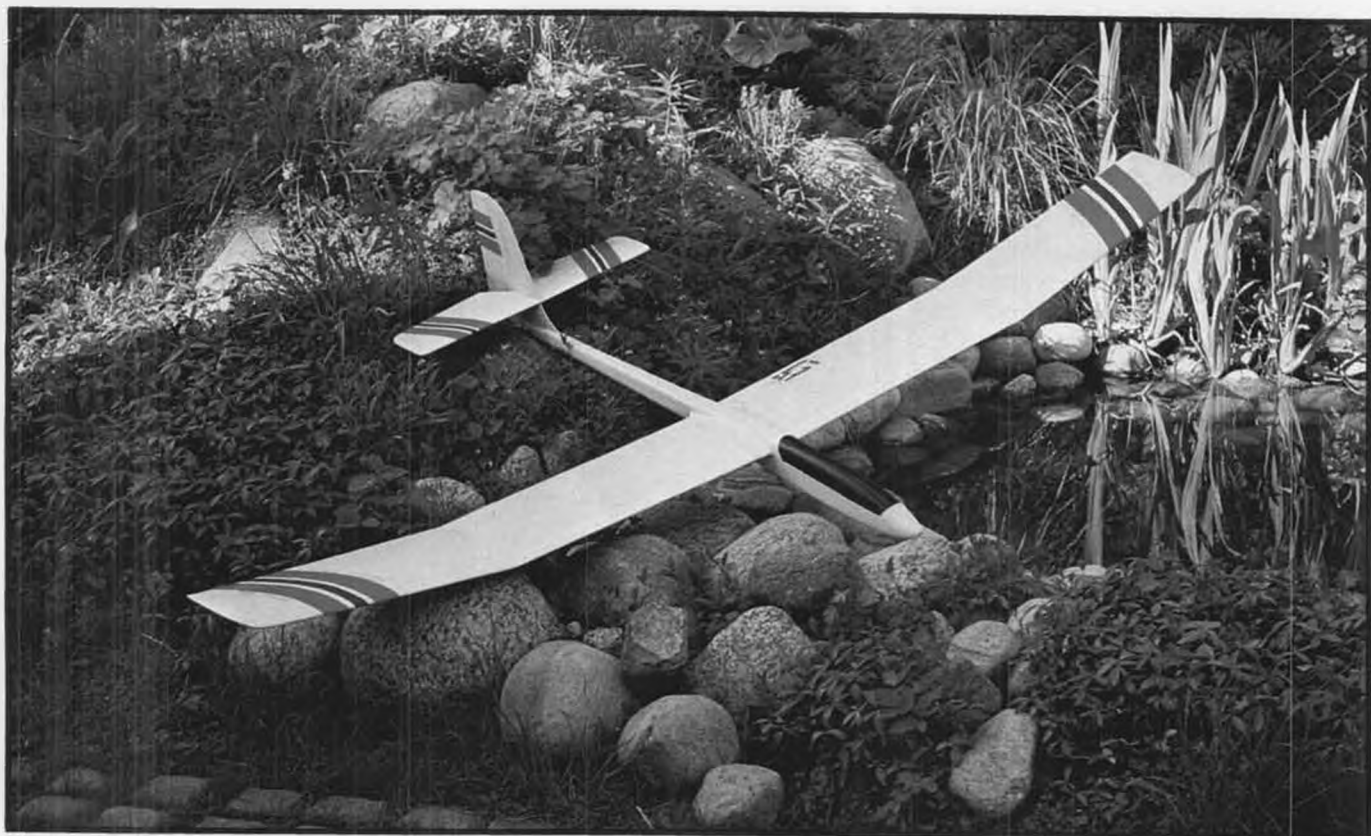
Final assembly of an AC or DC No. 107 battery charger.



Camera almost stops prop as tach is used to test various prop and motor combinations.



Dynamometer reveals current drain and rpm (3.89 amps and 15,190 rpm showing).



From Norway, the Cirrus RC-Flyklubb **KLUBBENS 2-METER**

By KÅRE SCHANCHE . . . Norwegian and English Two-Meter Class rules restrict controls to rudder/elevator only. Within those rules comes this highly refined, competitive thermal glider developed by the Cirrus club.

INTRODUCTION

The model has been designed at several club meetings of the CIRRUS RC club in Oslo, Norway during the autumn of 1982 and winter of 1983. We have used this opportunity to give our members a simple schooling in model airplane design, aerodynamics, and practical construction work.

The design manager has been Thorbjorn Jespersen, also known as one of the *KITT-193* designers. (See *MB* February 1984.) The drawings were made at late nights and early

mornings by the author.

The appearance has been a compromise between an easy-to-build model and a good-looking model. Our philosophy has been that the Two-Meter Class ought to be a schooling class only, and an introduction to the F3B tasks.

The soaring background in Norway is too small for two competitive programs. In our opinion, a two-meter model ought to be easy-to-build, easy-to-fly and at the lowest possible cost. That is why we have chosen only

two functions: stabilizer/rudder or V-tail. We have used parts which can be bought in even the smallest modelshop. The standard design has wings made of balsa and fuselage laminated with plywood. Some of our members make foam wings and some cover the fuselage with epoxy/glasfibre to achieve a more resistant surface.

When you are going to build a model from scratch, you have to make all the parts. A lot of model builders become apprehensive at this point, particularly the airfoil ribs terrify



Cirrus RC Flyklubb members gather for a 2-meter contest on May 27, 1984. At least three "Klubbens 2-Meters" were present.



There's lots of space in there for the biggest servos. Clean design is very obvious.

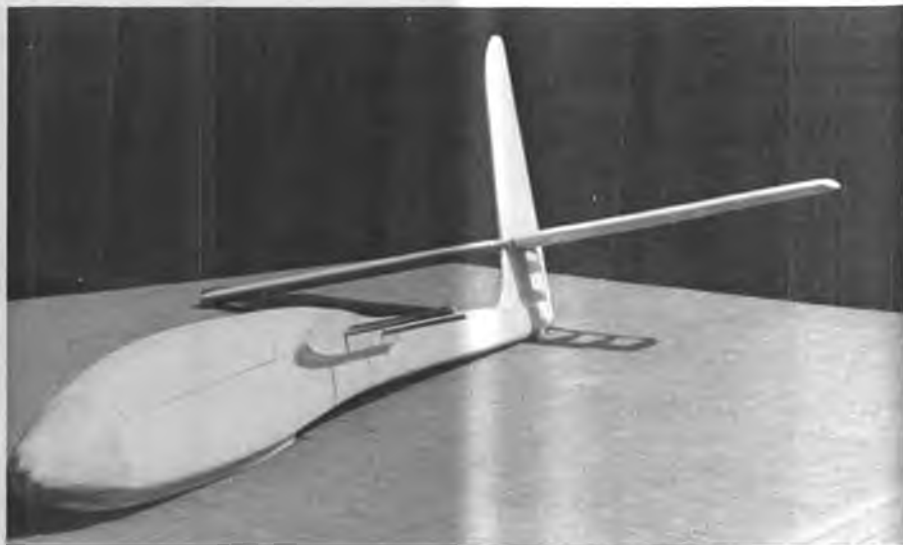
them. It's easier to buy a kit and just put it together. Believe it or not, most of the parts can be made by simple methods!

As you see from the drawings, we have not solved all the problems in building this model. We have left some details to each builder's own choice.

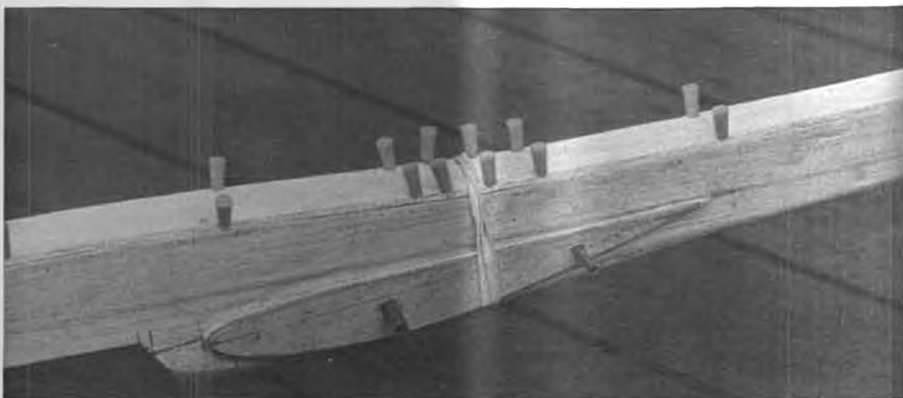
Now, let us start with the construction!

WINGS

Firstly, you have to make the ribs. We considered airfoils like E193, E201, and E205 for this model. We chose the E201, an airfoil not so very much used, even though its capabil-



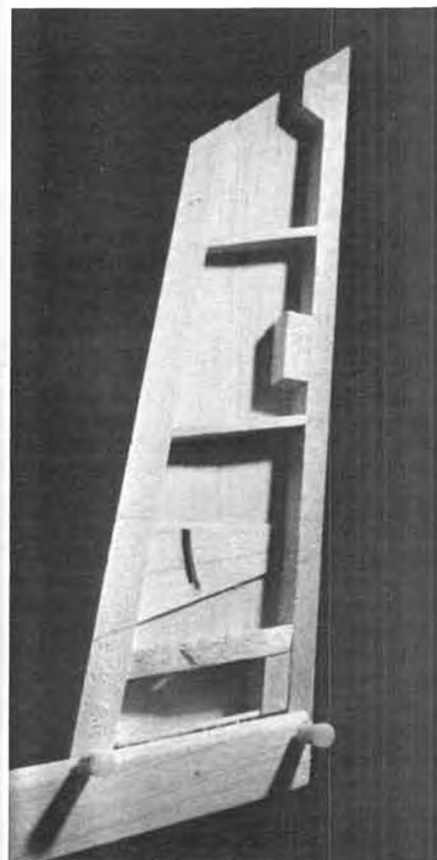
Completed fuselage and empennage. Hardwood skid would be advisable for rough fields.



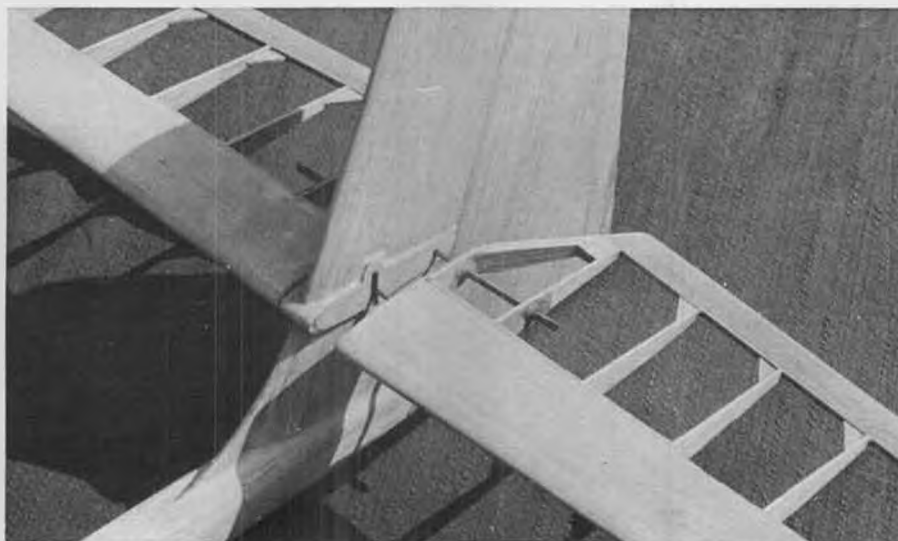
Bottom fuse sheeting is pinned in place. Note the grain direction: longitudinal, not cross-grain!

ity is not far from the E193. Besides, it will give us a thicker and therefore a stronger wing. When you make the templates for rib fabrication, you will get the most correct airfoil from an airfoil book. The airfoil shown in the drawing is not guaranteed 100% correct, but it is good enough to use for making the templates. Use ply or aluminum for templates. Work exactly, and be sure that you will get all sheetings and spars inside the airfoil contour. You have to make templates of the root rib, the rib in the polyhedral break, and the wing tip rib.

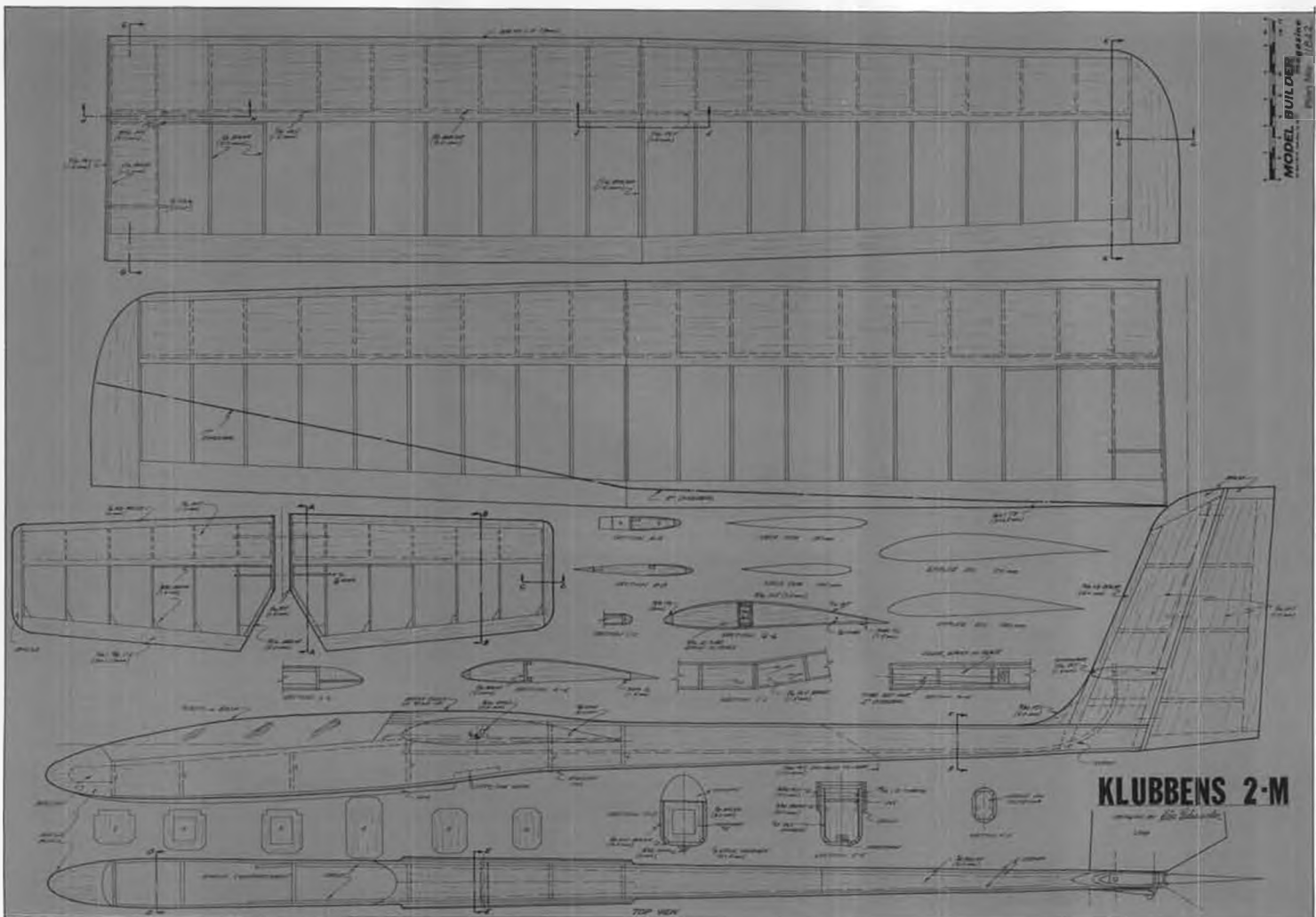
You then put the necessary numbers of rib



Fin sides are reinforced inside and outside with thin plywood where stab mounts. Firm! Small blocks are for hinge support.



Shaped fin and stabs. Note the ply and balsa stab rairing: yields strong pivot area, streamlining.



blanks between the templates and keep the stack together with some long needles or screws. First you make all the ribs (two wings at a time) from the root to the polyhedral break, then you make the ribs for the outer panels. For the forming, you will need a knife and one or two sheets of sanding paper.

We have not numbered the ribs, so you have to ensure that they will be placed correctly.

If you like to take care of (or protect) the drawings, you have to cover the plan with clear plastic wrap.

You start by cutting the spruce spars and the lower sheeting to length. The spruce spars taper from 3x10 mm at the root to 3x5 mm at the wing tip. For all wing sheetings, we use 1.5 mm (not too weak) balsa. Cut the trailing edge 3x15 mm to length. Put the lower sheet-

ing on the drawing and glue the lower spruce spar to the sheeting. Below the rear end of the ribs and front of the trailing edge you have to place a 1.0 mm shim. Then you can glue the ribs (not the root rib and the ribs in the polyhedral break) to the spruce spar and lift the sheeting up to the ribs with shims and glue it to the ribs. Then glue the trailing edge to the ribs. Now it's time for the upper spruce spar. Glue it to the ribs. Then you put shear webs between the ribs. As you can see from the drawing, we have 2.0 mm plywood on both sides between ribs no. 1 through 3 (no. 1 = root rib), then 1.5 mm plywood between ribs no. 3 through 5 and 3.0 mm balsa for the rest with exception of the polyhedral break where we use 1.5 mm plywood at both



Wing joiner pins may be stored under canopy block. Snug fit for large R/C gear. Note LSF!



Ballast compartment hatch. Neat idea!

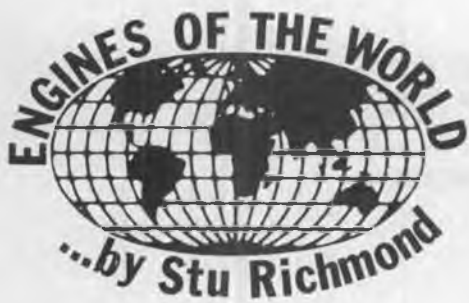
Continued on page 98



The author and codesigner, Kare Schanche, poses with the Cirrus Klubbens 2-Meter in the backyard of his home in Oslo, Norway.



Wings are constructed rather conventionally. Airfoil is slightly curved on the bottom, so shims are needed at LE and TE for flat surface.



OTM 1.5cc Diesel

RIGHT: This .09-size Russian sport engine is nicely annodized in black to set off its appearance. It is the middle size of three OTM brand engines. This one, called the "Waterbird," is quite simply made compared to other .09 sport engines. Americans are surprised to see in Russian engines features that they have come to expect in their own, such as double ball bearings, etc.

Quite steadily since 1972, a series of three small sport engines has been available under the trade name of OTM. The largest is of 2.5 cc displacement ... a .15 ... called a SOKOL, which translates to FALCON in English. The middle one is the .09 STRYZ which translates to WATERBIRD in English. The smallest is the OTM Kolibri which is an .049, but is physically quite large and heavy compared to Cox engines of similar displacement.

Photo No. 1 shows our OTM STRYZ, with a nickel for size comparison, and the cardboard box in the background which has printing in three colors. Most Russian engines come from the factory in unusually nice moulded plastic display boxes ... this is a simple stapled together carton. The OTM series of engines ALL have the fins annodized, like so many European engines. This

engine has the prop drive washer, spinner nut, intake extension, and backplate cover also annodized. First appearance of the engine seems quite nice ... but ...

Photo No. 2 shows the simple type of

VITAL STATISTICS

2-1/2 Inches long, 1-13/16 inches wide, 2-1/8 inches high, weighs 84 grams ... or a shade under three ounces. Displacement is 1.48 cc's ... or roughly is a .09 cubic inch displacement. The STRYZ is a conventional diesel engine.

UNIQUE FEATURES

This engine was received new-in-box with out ANY printed instructions and without a tool of ANY sort, which is not characteristic of Russian engines.

manufacturing flaw that the average American modeler would readily notice. When the mounting holes were drilled in the mounting lugs ... the holes were not carefully spaced ... they are off-center to the front of the engine. It wouldn't take too much force at the WRONG TIME to break out the casting in front of the forward mounting bolts. American and Japanese engines, along with other fine imports, have spoiled the American modeler. It appears that ALL the Russian engines are made in quite small volume ... and have a generous amount of HAND LABOR involved in their manufacture! A nice feature ... a bulbular "knob" on the spray bar also shows in this photo. It makes a good ANTI-SLIP device to keep the fuel line in place ... maybe other manufacturers

Continued on page 98



Notice the slightly off center mounting holes. This shows an apparent lack of manufacturing tooling and jiggling. The author only gives this month's engine a "2" in manufacturing excellence.



Another tell-tale sign of hand tooling ... was this done with a three-cornered file? This surface needs a lot more "grip" on the prop. The spinner nut requires the prop to be reamed out to 1/2-inch!

ELECTRIC POWER



By MITCH POLING

• The second annual Boeing Hawks meet was on June 30, a welcome change from last year when it was held in September. That year the weather was so bad that the rain was horizontal! This year was "electric heaven" with beautiful blue skies, light wind, and sun galore. I even got sunburned, a real surprise for

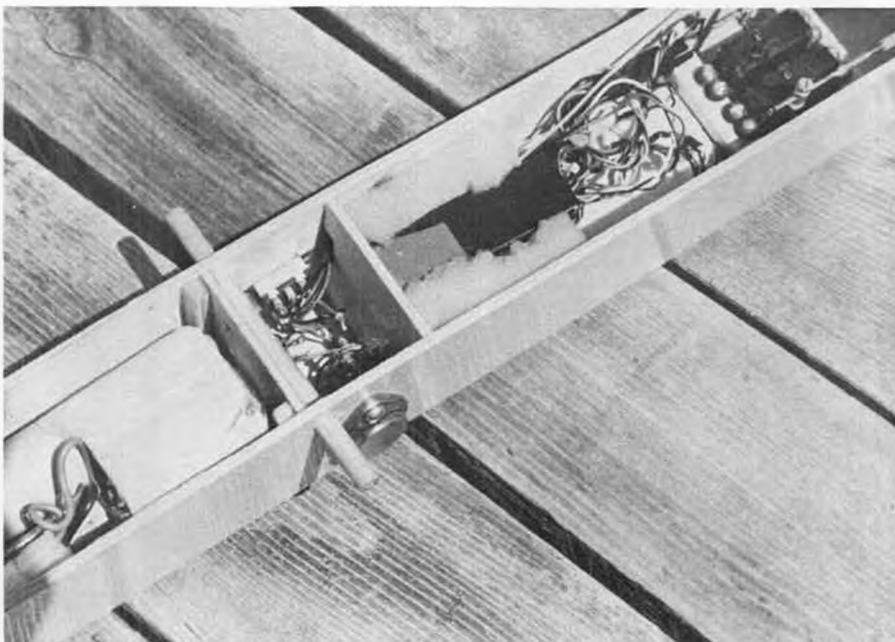
this mossy Northwest native! This annual electric fly is growing, as there were a dozen entries this year compared to half that last year. Everybody flew themselves out, from nine till two, and everybody agreed that there will definitely be another meet next year!

Just to give you an idea of how good the thermals were, sheets of paper took off from the registration desk, and thermaled out of sight! I made an easy thirteen minute flight with my *Aqua Sport* on wheels (powered by the Astro cobalt 25), riding thermals half the time.

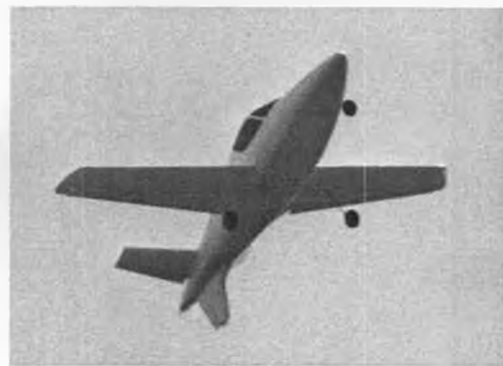
I'll list the awards first, then look at some of the planes. The Best of Show was the *Laminaire* by Jerry Holcomb, followed by Jay Olson's *Hot River*. The *Hot River* is an ARF that looks like it is doing 100 mph just sitting there! (It is available from Wilshire Model Center.) The *Laminaire* looks like it is doing 200 mph just sitting there, but more on it later! Most aerobatic was Dave Katagiri's *Electrobat*, with Jerry Holcomb's Kraft *Chipmunk* following. Speed was taken by Dave Katagiri's *Uno*, powered by an Astro cobalt 05, which posted 68 mph average on a two-way run. The Smallest Plane award went to Bernard Cawley's *Schoolboy* for R/C, and Leonard Bedford's *Brooklyn Dodger* for F/F. The Largest Plane award went to the



Al Weber smiles from ear to ear after flying an unofficial "longest flight." *Oly 650* model.



Inside story on Al Weber's stretched *Olympic 650* (an Airtronics kit), showing R/C installation and homemade electronic throttle (note transistor sticking out of the side of the fuselage).



Best of Show winner at the Boeing Hawks meet was Jerry Holcomb's *Laminaire*.



Electric Pattern flying was aptly demonstrated by Dave Katagiri and his *Electrobat*.

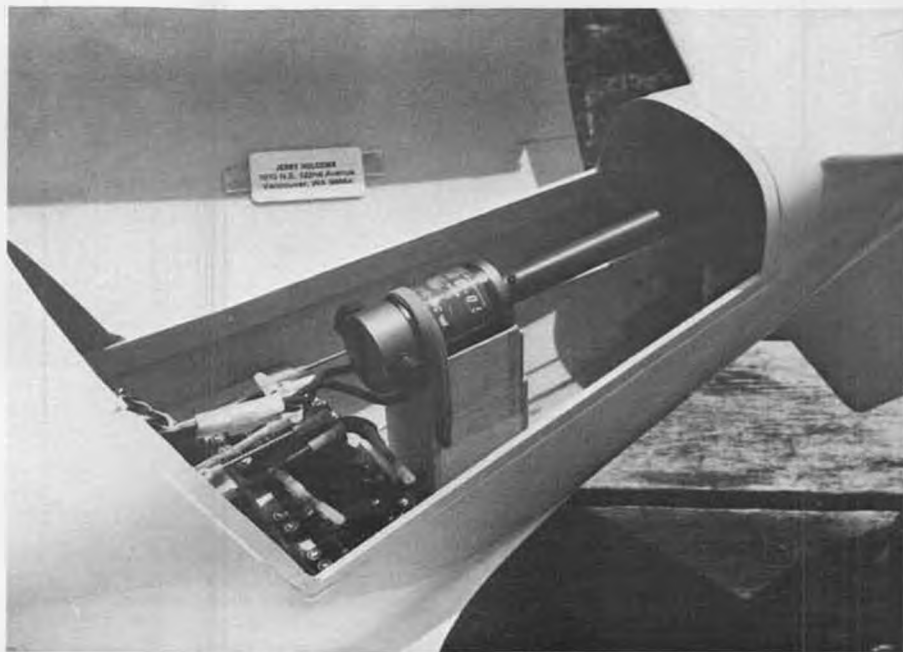
Hot River. The Best Crash award went to nobody at all, there were no crashes . . . not even a bad landing! The day was perfect, which makes up for how bad it was the year before! Leonard Bedford with his Leisure *Playboy* got the Longest Flight award, followed by Harold Hayley with his *Electricus*. Gayne Jones and myself tied for the leftover awards! Everybody got a prize, even if your plane didn't fit a category! My special thanks to the manufacturers who donated prize certificates, Astro, Leisure, Satellite City, and Zinger props.



Free Flight O/T, electric style! Leonard Bedford's *Brooklyn Dodger* takes off!



Jerry Holcomb and his Astro 05 cobalt powered *Laminaire*. Might be full-size plane one day.



Equipment installation for the *Laminaire*. Challenger 05 motor is mounted on a balsa pylon and held in place with rubber band. Fuselage is molded F/G. Prop used is a 6-6 pusher, handmade!



Jerry also showed up with a Kraft *Chipmunk* with Astro 05 and 600 mah pack. Flew great.

The outstanding plane of the fun fly was definitely Jerry Holcomb's *Laminaire*. Jerry built the model as a "proof of concept" for a full-scale plane that is in the planning stages. Jerry is hardly a typical, "average modeler" (is there such a thing?), he designs, builds, and flies full-scale planes. One of them, the *Ultra Imp*, is for the proposed ARV (aircraft recreation vehicle) class. It is designed for 100 knots on 30 hp. Anyhow, when Jerry brought the plane to

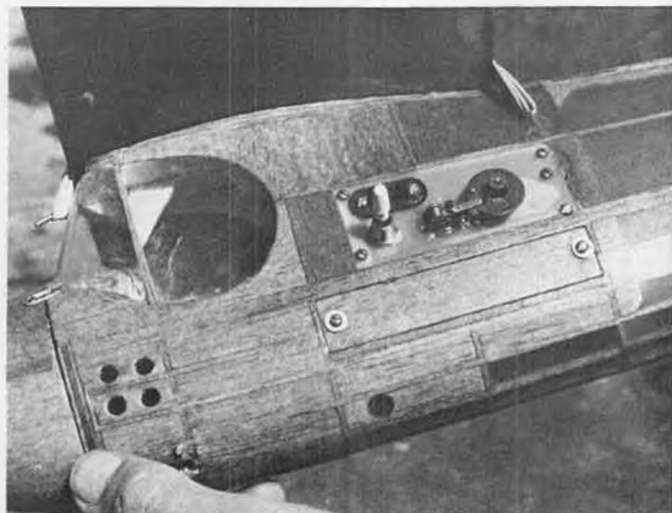
the meet, I thought "it will never fly!" It was beautiful, with an absolutely immaculate fiberglass fuselage and wings, but the body was huge compared to the wings, and there was a tiny toothpick prop on the back, hardly enough to push it, or so I thought! The body seemed huge, of course, because it is truly scale and the full-size one has to hold a human pilot, not just R/C gear. There was a lot of room in there! The *Laminaire* weighed 4-1/2 pounds, with an Astro 05 cobalt motor turning a 6x6 hand-carved pusher prop via a long drive shaft. The photo shows the details; note that the motor is held in with a rubber band! This, I think, would allow for any slight misalignment, though there was none that I could detect. The power pack was made up from eight, 1.2 ah Sanyo cells, and the wing area was 303 square inches (a 34.2 oz/sq ft loading!) You can see why I had my doubts! Well, Jerry put it on the runway, turned

it on, and took off in a little over 100 feet. He proceeded to fly all over the place! It looked very impressive in the air, I would guess it was doing over 60 mph. Jerry brought it in for a perfect landing after about four minutes. He flew this unusual model several times during the day.

Jerry knew exactly how to fly it, and how to design it. It has to be flown fast, that is why it has such a high-pitch prop. The magic combination for a fast plane like this according to Jerry is high pitch, and high rpm. I can believe it! Jerry did not do anything more than wingovers; he said that if it slows down at all, the stall can be violent. Jerry made it all look easy, but he is an exceptionally good R/C pilot.

Jerry also flew his Kraft *Chipmunk*, an almost-ready-to-fly (ARF) foam plane that was marketed (along with the

Continued on page 86



Leonard Bedford's *Brooklyn Dodger* up close. The motor timer was detailed last month. Note safety on/off switch, cooling holes, hatch.



Astro motors. The author reports on static performance of the cobalt 15 (left) and Super Ferrite 15 (right). Cobalt 40 shown for size comp.



The completed *Miss America* from Beehive Models is both a good looker and a good flier. Author's plane covered in Monokote.

Beehive R/C Model Co. Miss America

By JIM "SAM Speaks" ADAMS . . . Here's an Old Timer model that may be purchased in two versions: 1) kit form, and 2) prebuilt, but uncovered. This review covers the former, but photos of the latter version, straight from the box, are presented to show the reader how little work remains for the builder.

• Did you ever build a kit model that flew right off the board? It's a great feeling! From that moment on you love that model . . . and the Beehive R/C Model Co. *Miss America* kit is one that you are going to fall in love with. However, I'm getting ahead of myself. When you open the huge box that contains the multitude of neatly cut out parts, you are going to experience a pleasant surprise. The parts are all bandsawed to shape and do not require any sanding prior to use, and this is just the first surprise, they just keep on coming.

The first thing that catches your eye after you paw through the neat little plastic bags that contain the detail parts for the fin, rudder, stab, and wing, is the two completed fuselage sides. Further searching through the box uncovers a completed top and bottom for the fuselage. I could hardly resist the temptation to start building the fuselage without reading the instructions. However, resisting the impulse, I opened the instruction booklet and started thumbing through the construction pictures. To my surprise there was also a booklet of written instructions, and it is very complete. Newcomers should seriously consider this kit. I found that you could take your choice and work from both sets of instructions, or the one of your choice. They are quite adequate, and you should have very little trouble following them.

The experienced modeler, who has been building for years and years, is going to miss the fuselage drawings that are usually included, but are not included in this kit. Don't fret, however, there are plan prints for constructing the wing and tail. In fact, the wing and

tail building sequences are almost identical to previous Old Timers that you have built in the past.

The building sequence of the fuselage requires that the aft section (about one foot) of the sides have to be joined to the main side structure before commencing the job of assembling the fuselage. This is all very clearly spelled out in the instructions and sketches. A word of caution is in order here. As you join the side frames to the section containing the stabilizer support, use a three-foot straightedge and verify that the stab platform is parallel to the top of the cabin; that is, you should verify that the center line of the symmetrical stab airfoil will be parallel (or flat) to the cabin top that is going to support the wing center section. I found that this surface apparently moved when the body sides were cut into two parts. This could require shimming the stab to obtain hands-off level flight if you wait until the model is finished and in the test flying stage. In passing, if you're one of those guys who doesn't have a good metal straightedge for checking such things as I

have just described, take a trip down to your local hardware store and look at the inexpensive line of aluminum yard sticks!! If you don't own one, you don't know what you have been missing.

The fuselage builds very quickly with the totally prefabricated sides, tops, bottoms, and bulkheads. One of the pleasant surprises here is that the stock parts fit, and did not require a lot of trimming and sanding to make them fit. Using Hot Stuff to join the sides and the other major body components, the fuselage was assembled in about one hour. This did not include the birch veneer that is added over the forward part of the fuselage. The two 1/32 plywood doublers that cover the forward part of the fuselage are fully cut out including the windows, but they require some sanding before installing on the body. This job was easily done by clamping the two parts together and performing a sanding and sizing job on the two matching parts. The doublers were then joined to the body using Titebond and allowed to dry before proceeding to the bending and joining of the

The kit version of the Beehive R/C Models *Miss America* is very complete, and the fuselage sides and top and bottom surfaces are already framed up for you. Parts fit was excellent. An O.S. .60 four-cycle engine was the chosen power source.



PRODUCTS IN USE

doublers to the forward section over the six-ounce tank bulkheads.

The engine is mounted on a removeable plate that is, in turn, bolted to the top of the engine mounting runners. Beehive furnishes a 1/4-inch, drilled aluminum plate for use as this mount. This plate only needs to be cut out to fit your particular engine. We chose to replace this with a 1/4 plywood plate (just a personal preference). The kit supplies the necessary plywood and veneer parts to make a removable cowling. We chose to Hot Stuff all of this in place as there is so much room in the engine compartment that the O.S. .60 four-stroke that we chose for power could easily be installed and removed without any difficulties with the cowling permanently installed.

The six-ounce clunk furnished in the kit is mounted directly behind the engine, just under the windshield cowl.

The landing gear comes prebent and assembled (brazed), ready to bolt onto the plywood covered bottom of the fuselage. The gear is restrained with nylon keepers (furnished in the kit). The only change that I made here was that I replaced the wood screws with 4-40 machine screws and blind nuts. I guess by now the reader has discovered that I like lots of insurance when I put a model together. This comes from forty-plus years of experience in putting them back together after a rough landing, or having to pass up a flight at a contest because your model wasn't ready to go when your number was called.

At this point, it should be mentioned that there is an abundance of hardware items furnished in the kit. In fact, I did not use all of them. We all have personal preferences that we have developed over the years in building models, and that is one of the reasons I enjoy building from kits. Sometimes I find that the kit maker has ideas that I like better than my own.

When your fuselage is complete, you will find that you have a durable, good looking body that speaks of first class R/C construction. This is not a flimsy flyweight, but a ship that will last and give you hours of enjoyment.

I chose to power mine with an O.S. .60



Wing and fuselage structure is clearly seen through the transparent red Monokote. Metallic green trim and silver striping tape really set this model apart from the "crowd" beautifully.

four-stroke. Under the Society of Antique Modelers (SAM) rules, this engine is rated as a .40 cubic inch displacement size, and the 1000 square inch wing area of the *Miss America* makes it a legal entry at SAM contests. This engine has plenty of power, the ship is responsive under this power, and it will glide with the best of them... even at six pounds all-up weight, where ours came in.

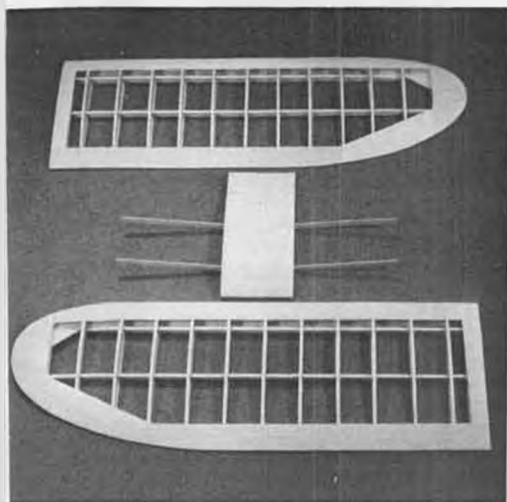
The kit maker includes a cute little tail wheel assembly that installs on the lower end of the rudder post. All of the controls are inside of the fuselage (which seemed like a good idea), but we found that the mechanical advantage on the little tail wheel bracket was too great and tended to make the steering very touchy... not to mention the overly quick and large travel on the rudder.

My own preference is for a rudder that moves exactly as much as I command. For this reason, we revised the control arm to one with 3/4-inch length, which meant extending the arm outside of the fuselage and revising the pushrod detail somewhat. I limited the rudder travel to the width of the stationary portion of the stabilizer, which prevents interference between the elevators and rudder surfaces in a tight, climbing turn.

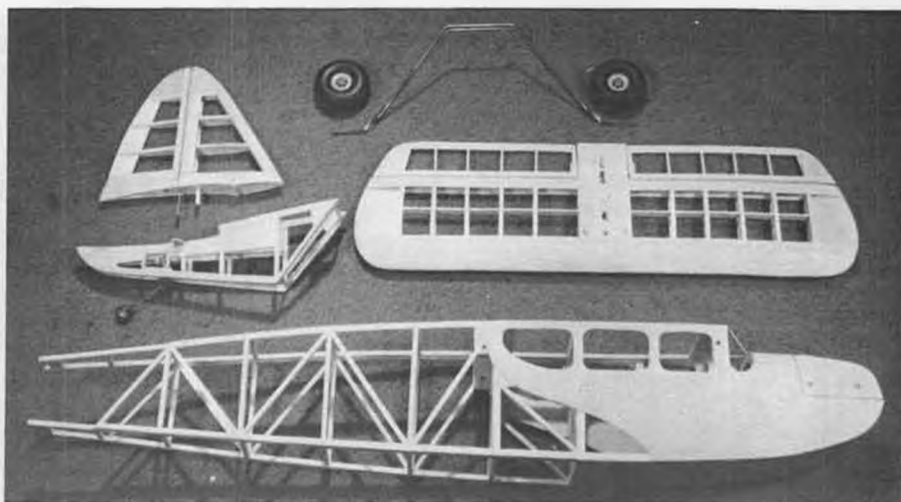
The wing structure is typical of 1936 construction: *rugged!* This best describes the use of two-inch wide sheeting around the perimeter of the entire wing, and cap strips on all the ribs. The *Miss America* from Beehive has been strengthened by adding a front spar to the wing that the original ship didn't have. The flight tests have shown that our model can really take it. On one of our test flights, the model was sucked up to a 1500-foot altitude, and we had to resort to full down trim to bring the ship down to 400 feet, a more acceptable altitude. The speed build-up was a little frightening, but the ship pulled out without a flutter.

The wing airfoil is the Clark Y, which is an excellent choice for this size model, and is the airfoil on the original ship. Experience with R/C models has taught me that you can't have the spars too strong on a wing of this size, especially if you are prone to try some acrobatics now and then, or if you can't resist yanking them around in a tight turn. For this reason, we made another slight change. The spars in the *Miss America* are 1/4 x 3/4 balsa. These are adequate in a free flight model, but

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The preassembled version comes from the manufacturer just like this. Join and glue!



Preassembled version of the *Miss America* as it comes from the box. Fuselage is too long for UPS shipping regulations, so tail section is built separately. It joins in literally seconds!

FFC

Charging System

By ELOY MAREZ . . . *Model Builder's "Electronics Corner"* editor reviews the handiest little gadget for fast field charging (FFC) both transmitters and receivers from 12v DC.

• The Ace R/C FFC Charge System is one more quality product in Ace's rather extensive line of Ni-Cd battery chargers. All of these chargers are similar in that they will correctly revitalize your batteries when used as instructed, but each charger is unique and intended for a specific purpose. The FFC is a closer kin to the Ace Overnighter than it is to the others, as both are twelve volt DC powered. However, the similarity ends there. While the Overnighter does its job in a 14 to 15-hour period, as the name implies, the FFC works at the "fast" charging rate. It charges receiver batteries at a 500 mah rate to 85% of full charge, and for transmitters, it charges to 50% of full charge, after which it automatically switches to a lower 35-milliamp rate. The power source can be any twelve volt battery of five amps capacity or larger, the FFC is designed to charge 4.8-volt (4-cell) receiver and 9.6-volt (8-cell) transmitter Ni-Cd batteries only.

The 50% transmitter battery charge is limited by the fact that the charging voltage must be a certain amount over that of the battery being charged. The twelve volts normally available to us is simply not enough to raise a 9.6-volt Ni-Cd battery to much over 50% of its capacity at the high current applied. Normally



The Ace FFC, Silver Seven TX, and regular 4-cell battery pack shown side-by-side for size comparison. The FFC fast charges TX and RX cells automatically and safely!

though, 50% capacity is ample for field charging after having started the day's flying with a full, 100% charge. Conversely, the higher voltage available from an automotive twelve volt system when the engine is running would cause an *overcharge* of the transmitter battery, therefore, a voltage sensing circuit has been incorporated into the FFC to reduce its rate to 35 mils under those conditions.

The FFC, like all its other Ace cousins, is available either assembled, tested and calibrated, or in kit form. Either version comes without connectors at both input and output. Some suggestions for both

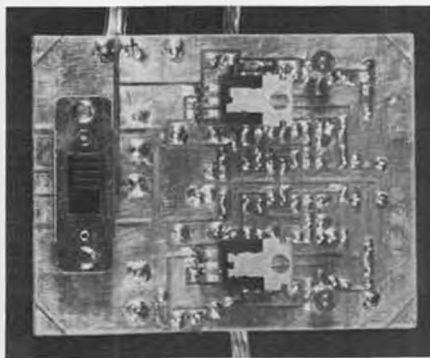
are included in the instructions. First things first, the input can be terminated with clips or a cigarette lighter plug, available from Radio Shack, for temporary use, or the FFC can be permanently wired to a twelve volt battery in a field box. Those of you with a power panel might consider the use of banana plugs for temporary connections through it to the battery, in which case you would plug into the starter sockets in the panel.

Polarity for both input and output must be maintained at all times! It is a good idea to check it before attaching the connectors, after doing so, and once again before turning on the power.

The outputs can be terminated directly with the proper plugs to match your R/C system, and it is probably best if you only have one brand of R/C system or identical connectors on the different systems. However, the versatility of the FFC is increased by the addition of polarized jacks on the output cables with polarized jumpers made (and used) to complete the connections to the equipment. The Ace instructions show the proper method of installing Dean's connectors; I prefer (and use) RCA audio jacks and plugs, also available from Radio Shack for this purpose. Either will work well . . .



The FFC's PC board showing components. All major circuitry is on this board!



Flip side of PC board. Note two power transistors, two LEDs, on/off switch.

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PLUG SPARKS AT THE SAM CHAMPS

By JOHN POND



• As Confucius say, "A picture is worth a thousand words," so this issue we are going to feature photos like they are going outa style.

Actually, this is the way the description of the SAM Championships at the Bong Recreational Area should be. Everybody likes to see his name in print and most of all the pictures. Then again, this columnist has had a lot of requests asking to run something similar to a column written sometime back, outlining the best models for competition and/or fun.

To begin with, the contest held at Bong Field, located 16 miles west of Kenosha, Wisconsin, on Highway 152, had a very good place for free flight. It was one of the best in the Midwest when one considers the lack of good flying areas in the district.

This columnist was not impressed with the high winds which caused many a fine model to get lost, even a few R/C models! As a matter of fact, the wind blew so hard on the Wednesday that all R/C events were "scrubbed," much to the amusement of the free fliers!

The latter were extremely lucky in that the wind blew smack down the center of the runway (or what is left of it). What the free fliers failed to realize is the discipline of the R/C rules requiring a model to land in the same area as the takeoff. If you miss the field, it is not an attempt but an official flight of nought, nix, nil and zero seconds! Not too many of the boys wanted to chance getting their models broken up by the high winds plus a zero flight for all their trouble.

Before going much further, the columnist is indebted to Harold Johnson (our unofficial SAM photographer), 1415 Trollhagen Drive, Minneapolis, MN 55421, and to Dean Everetts, Corell St., Sioux Falls, SD 57104, for their coverage of free flight and R/C activities



1. Eastern Airlines President Frank Borman (former astronaut and current SAM member) chats with CM Karl Spielmaker. (Johnson).



2. Buck Zehr, R/C CD, found time to smile in spite of the windy weather. Tom McCoy works over the entry sheets. (D. Everetts.)



3. Tom McCoy rang the bell again with his 2nd win in the compressed air event flying this Burd design, the *Kingbird*. (Johnson.)



4. Bert Pond, still pushing the compressed air event, displays his latest design . . . quite stable looking! (Johnson photo.)

respectively. Their photos, plus the bunch that this writer took, should extend for several months. So, if you don't see your picture, be of stout heart, men. We'll gettum in yet!

The whole tenor of the SAM Champs can be expressed by Photo No. 1 showing Frank Borman (Eastern Airlines president and a SAM member) with contest manager Karl Spielmaker. Of

course the candid camera caught Karl making a face but all in good fun!

Never enough credit can go to the hard-working contest directors, Bob Pattison for the free flight, and Buck Zehr for R/C with Tom McCoy as backup. As can be seen in Photo No. 2, Buck was his usual genial self all through those trying days while Tom (in the background) was an invaluable assistant.

Photo No. 3 is an excellent shot of Tom McCoy with his compressed air powered *Kingbird*, winner two times in a row! No mean feat in that wind! This design was revived by Danny Sheelds and Jim Crim in kit form and was (at \$29.95) a real bargain. Sorry, that's all folks! None left now.

Whilst on the subject of compressed air power, we should acknowledge Bert Pond, the premier leader in compressed air. He has been building motors along these lines since the early '30s! If you have one of the old model aviation magazines of the era, e.g. *Popular Aviation*, *M.A.N.*, etc., you can easily spot the ads by Peru Model Supplies offering compressed air engines for sale. Hate to date myself, but your columnist



5. Joe Konefes converted his ORIGINAL *Buzzard Bombshell* to 3-ch R/C operation. Flies great, just like the F/F version. (Photo by Everetts.)



6. Chet Lanzo gets a helping hand from across the pond in the form of one Ken Hinton, SAM 35, England. (Everetts photo.)



7. Jim Noonan won the Jimmy Allen event with the popular *Bluebird* design. (Johnson photo.)



8. Not to be out done, Jim Alaback lost by only four seconds flying another Jimmy Allen *Bluebird*. (Johnson photo.)



9. Bruce Norman, R/C Sweepstakes Winner, is still flying the same *Dallaire* that he first entered 5 years ago at Salt Lake Champs.

bought one from Bert back in 1934!

Bert, being a mechanical engineer, is a real gadgeteer on compressed air engines, producing many sizes of motors. His latest, a walking beam type, can be flown indoors! The biggest problem is making the engine itself, and especially the tank, light enough to carry a good payload.

In that respect, Bert Pond went the other way. Instead of large, six-foot jobs with their resulting drag, he has (to lower the wing loading) come up with a super light motor in a compact original design. This can be seen in Photo No. 4 where Bert doesn't look a day over 60. Maybe Doc Mathews was right when he made up the adage that, "God does not

subtract the days of your lift spent on models!"

Well, another great free flighter has succumbed to the lure of radio control. Photo No. 5 is almost self-explanatory when one observes the original orange and black *Buzzard Bombshell*. Joe Konefes has converted his original *Bombshell* to three-channel operation. As he pointed out, it has made for many, many pleasurable afternoons when the old legs are not up to snuff.

Photo No. 6 depicts Chet Lanzo, assisted by Ken Hinton, tinkering with a motor. We don't know how Ken does it, but he and the missus have been coming over from Ye Merrie Old England every year for the SAM Champs. For some

reason, most likely business, Ken didn't bring his usual entourage of models, preferring to visit and exchange ideas on Old Timers. I bet he got a few goodies from Chet!

Some of the non-basic events, not applicable in the calculating of the Sweepstakes winner, enjoyed a very good turnout. A neat surprise was in store for those who entered and flew in the Jimmy Allen event. For those who can't (or prefer not to) remember, the Shelley Oil Co., back in 1936-1938, put out a series of Jimmy Allen designs to be used in the Jimmy Allen Races sponsored by Shelley Oil.

The most popular design turned out to be the *Bluebird* as can be seen in Photo No. 7. Jim Noonan won this event but only by four seconds over Jim Alaback as seen in Photo No. 8. If you don't know what a Jimmy Allen *Bluebird* looks like by now, we will run some more Jimmy Allen photos in subsequent



10. Contest Director Buck Zehr gives the old eagle eye to the Lanzo *RC-1* built and flown by Jack Ross of the SAM 39 organization.



11. Jack Ross flew this 1/2A Texaco version of the Lanzo *RC-1* to second place.



12. Chuck Schooley of Toronto, Ontario, and his son, Dave, entered identical Carl Goldberg Gas Bird R/C Assist models (scaled up).



13. Free Flight Sweepstakes Winner Cliff Betz lofts his O&R .23 powered So Long. Good performing design that improves with age. (Dean Everetts photo.)



14. Earl Hipp, North Platte, NE, with his Ace Whitman Falcon, a rarely-seen version of the cabin Albatross. (Johnson photo.)



15. Richard Thompson poses with his Tad Dietrich Convertible. It's a popular choice for the 36-inch Commercial Cabin event.

months.

With this column being written in a random fashion, endeavoring to tell and show who used what to win at the SAM Champs, it is time for a break and a gaze over this month's engine drawing.

ENGINE OF THE MONTH

The writer must again acknowledge the generosity of Charlie Critch for the use of this month's motor, the "Yellow Jacket" as developed and manufactured by Bruce Underwood.

Most of the information has been extracted from the "MECA Bulletin," wherein a history of the Yellow Jacket was presented in outline form.

Bruce started to manufacture this

motor when racing car competitors complained about the Dooling .61 engine. In their attempts to "hop up" the Dooling, they would remove too much metal without reinforcements, hence the cases would crack or ruin the engine proper.

The first Yellow Jacket casting patterns were made from original .61 Dooling parts with proper reinforcing added to the mockups. Bruce then machined the reinforced castings, anodized them yellow, and reassembled all other Dooling parts to the new case. Bruce enjoyed immediate success, which allowed him to gradually perfect the crankcase and, with it, the newly designed parts which

yielded the all-Yellow-Jacket engine.

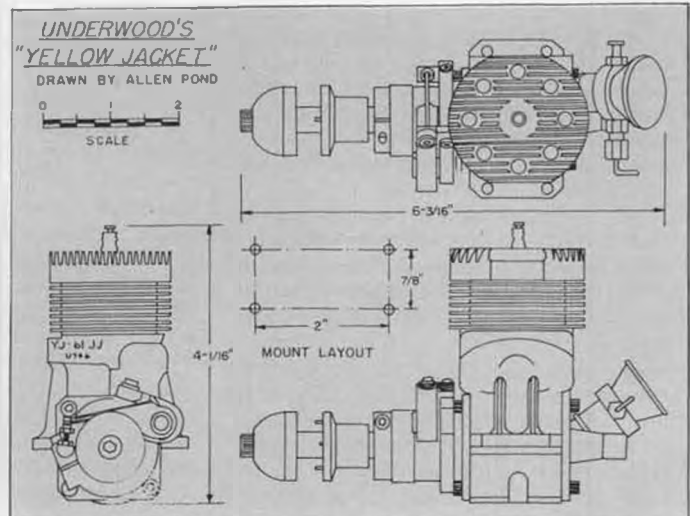
According to the outline presented, Underwood made his first Yellow Jacket from bar stock in 1946, and ran it on methanol and castor oil. Following this, he also completed a four-cycle engine to prove that a four-banger need not be any heavier than a two-cycle engine.

After developing a CO₂ turbine motor which wasn't overly successful, he also developed an expansion engine of .40 cid, also designed to run on CO₂. It ran better on compressed air!

April 13, 1955, marked the appearance of the YJ-61 which with the YJ-61A was never completed. The YJ-61B was the first cast cylinder block to replace the



16. Hans Ochsner flew a rare Australian Record Stick model enlarged from Frank Zaic's 1938 Model Aeronautics Yearbook.





17. Bob Bissett stunned the boys with this recreation of an early Zipper/Mercury prototype. First time seen in built form. (Johnson)



18. Here's a seldom-seen Louie Garami design called a Skylark. Larry Nigh built it, flew it and almost lost it in the lake at Bong.



19. Another rare one! An Alvie Dague Tulsa Skyrocket as recreated by Larry Lehrman of Des Plaines, Illinois. (Johnson)



20. Joe Barrette had a really good flier in his Jimmy Allen Skyraider, but for some reason failed to place. Red and blue tissue covered.



21 The popular Earl Stahl Hurricane as flown by Larry Schaeffer of Cheyenne, Wyoming. (Johnson photo.)

Dooling .61. The success of this led to the "C" model with fins designed to fit racing cars designed for the Dooling engines. The process of anodizing the cases before machining was started in the 1959-60 period. The first blocks of the YJ-61E would, when machined after anodizing, leave a bright metal area which contrasted nicely with the yellow anodizing.

The model featured this month is the YJ-61 JJ, sporting two-inch diameter fins with speed flats machined to same at 1.8 inches. As noted previously, this was a natural for Control Line Speed models, but it was actually done to enable the Yellow Jacket to be mounted in car bodies designed to fit 1.8-inch diameter fins.

The JJ model also featured an auxiliary bypass. The crankcase blocks were made larger around the bypass for strength and to provide metal for machining the auxiliary bypass. These 1969 models featured the model number on the side of the exhaust stack (front).

Interestingly enough, the early motors featured two-inch cooling fins, but later models were actually 1.975 inches in diameter. This was an accommodation to allow fitting the fixture on the bypass milling machine.

The Yellow Jacket engine series continued to model YJ-61P in 1972. The 61Q and 61R models have not been released. Most of the engines are now in the hands of collectors as they are attractively finished and easily command top speed engine prices.

SAM CHAMPS CONTINUED

Getting back to the SAM Champs at Bong, this was probably the longest and busiest time for the SAM member who was also a member of MECA. One could

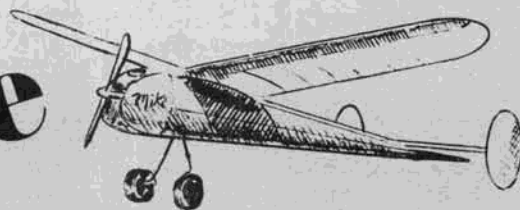
not complain about having nothing to do from June 24th to June 28th.

Festivities started on Sunday at the

Continued on page 62

O/T of the Month

Mike



| | |
|------------|---------------|
| Design by: | Gil Shurman |
| Drawn by: | Al Novotnik |
| Text by: | Bill Northrop |

• Although it's relatively unknown, this month's O.T. should prove to be a popular choice for free flight competition. Modification for a D.T. only requires the addition of a stab platform, along with the usual snuffer tube and rubber hooks. The model is Gil Shurman's "Mike," as featured in the June 1940 issue of *Flying Aces*. Gil's better-known design, the "Rambler," was also a single-wheeled model with twin rudders, but it did not have a retracting gear. The *Rambler* is MB plan No. 1276.

With only about 450 sq. in. wing area, and weighing around two pounds, the relatively moderate Brown Jr. power must

have hauled *Mike* into the air at a pretty rapid clip. Note also that the wing and tail sections are unusually thin, which also must contribute to a rapid climb. It would seem that the frail wing structure probably depends a great deal on the skin strength of the recommended double-tissue covering. If you plan to use soft-tension plastic covering film, you better plan on some reinforcing. One-thirty-second by one-quarter cap strips certainly wouldn't hurt either. In fact, one photo in the article appears to show cap strips, although they are not called for on the plans.

Yes, the balance point is totally ignored in the article and plans. We'd suggest making the first test glides with the balance about four inches aft of the wing leading edge.

Who will send us the first photo of their 1984 *Mike*? ●



Electronics Corner

By ELOY MAREZ

EVERYTHING YOU'LL EVER NEED TO KNOW ABOUT PCM

According to my mail, our readers have liked my "simplified" explanations of some of the new electronic features we are seeing in this ever-changing world of R/C. I guess that even if our expertise lies somewhere outside electronics, most of us want to know at least a little bit about what all those high-tech-sounding words mean, and what they will really do for us when we taxi out.

Those of you who are steady readers of the column, and those who have asked personally, have no doubt noticed the conspicuous absence of any mention of pulse code modulation, or PCM as it rapidly became known. There are a couple of good reasons for this. One is that the manufacturers have not released any information as to their exact approach to the PCM system, and another is that, by its very nature (a mixture of different technologies), PCM is not simple, and it is difficult to explain it so. Anyway, let's give it a go... at least we won't crash if things don't come out just right.

Let me tell you at the start that PCM is not exactly new, the Europeans were flying it probably three and maybe more years before it became available to us in this country. And to bring you up to date, Futaba has had its PCM system out for some time, and from all

reports it is working well in the field. Many of us have seen the JR PCM system at this year's trade shows; it has been flown in this country and is supposedly soon to be available. Miniature Aircraft Supply, of Orlando, Florida was showing the German Multiplex PCM at the shows this year, and MRC had no less than Hanno Prettner telling us about the Simprop system.

There are bound to be some circuitry differences in these systems, and in any others that will come along later. One difference I know of is that Futaba has introduced a new servo for its system, while the JR will work with any of its current model servos. Why this is, I can't tell you, neither do I know of any advantages or disadvantages, other than the obvious advantage with the JR that you can use your old servos. At this point, I have not had the opportunity to closely examine or fly any of these systems... something I hope to remedy sometime in the near future.

Anyway, onwards to pulse code modulation...uh, *slightly* simplified!

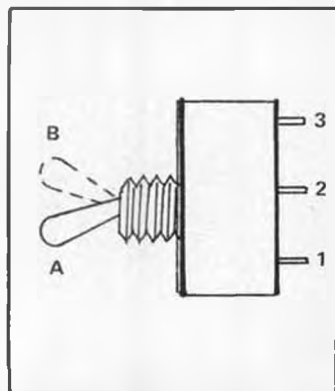
To review, remember that our old friend, the well-developed and reliable AM system works by generating a series of control pulses. As you move the stick, you vary the length of this pulse, which in time arrives at the servo to be compared to a standard, neutral length pulse. Any difference is read, and is what is



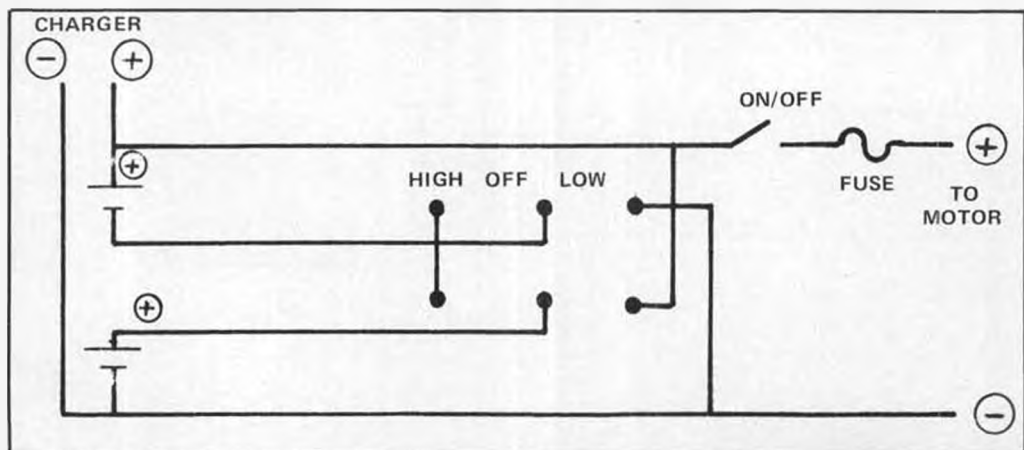
Would you buy a used radio from this man? The well-known Hanno Prettner is seen discussing the German Simprop PCM at Toledo this year. The author explains PCM in basic terms this month.

transformed into servo movement, and position, proportional to the stick movement. The precision of this system depends a lot on both mechanical and electronic details, but in its support, we have to remember that when used properly in a clean, solid, friction-free installation, this method is capable of smoothly controlling a 180 mph Formula One racer down at altitudes that most of us see only when we are landing.

PCM does not work on pulse length. Instead, the control pots vary a voltage, as they do in the older methods, but in this case, this voltage is immediately transformed into digital information, by an IC device called an analog-to-digital (A/D) converter. From here on, until the modulation is fed to the RF amplifier, which is the same as those for AM or FM, things are working as they do in computer. The control information, in its smallest unit called a "bit" (short for binary digit) is



Switches car. fool you; there are two possible switching connections relative to the lever position. See text; incorrect wiring leads to backwards operation.



Electric motor control circuit. Provides high-off-low functions from a servo operated DPDT center off switch. Batteries can be any number of cells to suit motor

added into larger units called "bytes." There are standards for all of this, and this is one of the things we don't know about in R/C PCM systems. For example, a byte can contain eight, or it can contain 16 bits. Completely skipping over the computerese, eight bits can provide 256 pieces of information (control in this case) while 16 bits would translate into 65,536 such pieces.

To keep the arithmetic simple, let's go with the smaller of these two values. Our interest all ends up in the stick-to-servo relationship; if we move the stick to generate 256 individual signals, or commands, this then means that our servo will follow in 256 steps. Right?

So far so good, let's see what that gives us in terms of resolution, which is the measure of a servo's action to its control input. Taking our average servo with a ninety-degree rotation, and breaking that down into 256 "steps," we have a movement per step of .3516 degrees. In case you hate figures, this means that as you move the stick from one extreme end to the other, the servo will move in tiny, less than .3-degree steps. You won't be able to see this stepping action with your eye, and more importantly, your airplane won't know it either. Actually, this is better precision than we now enjoy... this is, of course, assuming that the gimbal is mechanically as good, that the servo gear train is mechanically as good, and that you don't install your radios using 1/16 pushrods in 1/8 holes.

This modulation system is definitely more precise, and it can be applied to either of our transmission methods: AM or FM. Now, what happens in the Futaba radios, I don't know, but obviously in the JR, all those bytes and bits are being converted back to a variable length, positive pulse. If done properly, there should be no loss of precision with this extra step, the weak link is still going to be a mechanical one.

Now, all of this miraculous stuff takes a micro-processor. However, don't let that scare you off either, it is just another integrated circuit, though a highly complex one. And to extract that information from the radio signal at the other end, there is also a micro-processor in the receiver, and this is where one of the big advantages of the system comes into play. Micro-processors can be programmed, that is, they can be taught to remember, and to do what we tell them to.

Again, I don't know exactly what is happening in the current PCM systems, but something similar is doubtlessly going on. The receivers can be taught to ignore everything but the information signals from the transmitter. Thus, noise, or a lack of control information, will not cause the servos to go hard over, or even to move, as they do in non-PCM equipment. Instead, they will maintain their current position, until the next valid bit of information comes along. If nothing is forthcoming for a pre-determined amount of time, it can be taught to control the servos to a given position: a failsafe! To me the value of a failsafe feature has yet to be proven, but that is another subject!

In a situation of pulsed interference, such as another non-PCM signal of lesser or equal strength, the PCM controlled model will probably not react in level flight but would be slow to respond otherwise due to the intermittent flow of valid command informa-



The Robbe Rokraft (Model No. 8298) is one of Robbe Modelsport's many variable speed controls. This device proportionally controls electric motor speed according to throttle position.



The Robbe Mini Switch (Model No. 8296) is a simple, electronically controlled, R/C actuated, on/off switch for up to 30 volts and one amp.

tion to the servos. In other words, they would then move in coarser steps, as current information is intermittently accepted by the receiver and routed to each servo. It's all better than "hard over" and a signal to "land!"

This tells us that the system should be immune to ignition interference, which is all pulses: short enough and often enough to be completely ignored by the receiver.

Well, it wasn't really all that bad, now that I look back at it... hope you agree! However, there is one more very important thing to mention before we leave the subject. More history, you might say, but not about pulse width this time.

Back when frequency modulation R/C first appeared on the R/C horizon, one of our model magazines reported it as being interference free. I forget the exact wording, but the implication was that the "old" AM radios would not bother it, even on the same frequency. Well, of course this is not so, and it was quickly corrected in the same publication, but not before the damage was done. For months, FM was thought by many to be immune to at least some of the devils that plague us.

Well, the same thing has happened with PCM! Unfortunately, one of our other magazines has referred to PCM as "essentially immune to all outside interference." Friends (I know, that sounds like an old-time radio preacher!), such is not the case. If it was, only the military would have it, and we would never have heard about it. A receiver, any receiver, can be simply "drowned" by a signal of enough power.

Radio energy is not unlike light energy. You can't see it, of course, but a receiver does. Now, assume a completely dark, extremely large room, and one small yellow light on the far wall. You'll be able to see it quite plainly, you are the receiver in this case. Now, close to it, and at the same intensity, we place a small red light. You can see them both, and are able to differentiate one from the other. Say then, that we steadily increase the power to the red light. Obviously, at some point, it will reach a degree of intensity that will saturate the yellow light, which will no longer be visible to your eye. The same applies to radio receivers and radio signals. The

Continued on page 90

R/C POWER BOATS

By JERRY DUNLAP



FROM THE PRODUCTS IN USE DEPARTMENT

The guys at Model Racing Products, Gary Keys and Bob Welch, continue to expand their product line in the area of ARF (Almost Ready to Float) model boats. Between keeping up with the latest developments in the field of R/C cars and offering more model boat products, the MRP gang is definitely busy.

The latest model boat from MRP is a scale-like offshore deep vee they are calling the "Pantera." The *Pantera* has a plastic hull measuring 25-1/2 inches in length with a beam of 7-1/2 inches. The *Pantera* is one of the most realistic appearing deep vee models this writer has seen. For the model boater who enjoys painting scale paint schemes, the *Pantera* would make an excellent generic model deep vee to use for any of the popular full-size offshore deep vees.

The boat was intended to be powered by a .05 electric motor and can be obtained with a MRP .05 electric motor already installed along with battery pack and speed control unit for \$165. All that is required is to install a radio system and apply some of the mylar trim stickers also included in this package. The shiny white plastic hull makes a great base for trim sheets and decals. It is also possible to paint the plastic. It is possible to purchase a basic kit *Pantera* for \$65 that includes hull and running gear but no motor, battery or speed control.

As an electric boat, the *Pantera* recently set an electric class record for boats using under 12 volts. Gary Keys used an eight-cell Ni-Cd system to power the boat through the 1/16-mile straightaway at slightly over 19 mph. Gary's times would have been better but he had radio problems and the boat slowed at the end of the runs. Gary believes the boat is capable of speeds nearing 25 mph with the eight-cell pack.

Besides the electric power mode, it is possible to use .09-.15 glow engines in the *Pantera*. One of these small engines with a throttle makes a really fun boat for sport running. The guys at MRP have tried bolting the K&B 3.5 outboard on a *Pantera*, but found it was too small to take the power that engine provides. However, the *Pantera* with a Cox .09 has proven to be "real yuks" according to Gary Keys.

I brought out my *Pantera* to a recent powerboat race and spent part of the day supervising other contestants' kids while the little guys ran the boat. This *Pantera* is using a seven-cell pack for power. With a full charge in the battery pack, the boat would operate at full speed for five to six minutes. Top speed with this boat is around 15 mph. For the



Emily Klees runs circles around the icebergs with her Octura Models/Kyoshu *Santa Monica* electric outboard. Park rangers at Portage Glacier don't mind the pollution free model.

youngsters running the boat, this was plenty fast. It actually worked out pretty well to run the electric boat at that contest. When there were breaks in the racing to pick up stalled boats, the *Pantera* could be run. It proved to be a popular way to fill time during delays.

The advantages of an electric boat have been related previously in this column. A boat like the *Pantera* provides a very quick method of becoming acquainted with R/C boating. The installation of the radio system is fairly simple when compared to powerboats using glow engines. When it comes to ease of starting, press the throttle control on the transmitter. Cleanup is a snap, no mess in or on the hull. Electric boats have some definite advantages.

There are, of course, some things that need to be remembered about electric boats. The speed and duration of the run is not on the same level as a glow engine. When the batteries run down, there is a charging time delay.

Attempting to run the *Pantera* on a windy day proved rather frustrating. The problem wasn't from the waves. The *Pantera* handles rough water very well; rather, the problem was one of turning the boat with the wind blowing against the side of the boat. When the wind began blowing over 15 mph, it became almost impossible to turn the *Pantera* into the wind. The problem (it appears) is caused by the sides of the boat creating more resistance than the prop

and rudders can overcome. This difficulty in steering under windy conditions would be more prevalent with the electric powered version than it would be with the glow powered boat



Joey Caines tries his hand at driving the MRP *Pantera*. Offering advice and waiting for a turn are Adam Grim, and Shawn Dudley. Electric boats are great for training kids or adults.



Rod Gerghy, Northwest R/C boat designer, is up to new "tricks" with his flashy, rear stabilizer equipped 3.5 tunnel.



The MRP electric *Pantera* offshore deep vee has scale-like appearance and may be powered by .09 to .15 glow engines.

More information about the *Pantera* as well as other Model Racing Products boats can be obtained from MRP. They have just finished a model boating flyer which they'll be glad to mail to you. The address is 18676 142nd N.E., Woodenville, WA 98072.

ELECTRIC BOATING IN ALASKA

The timing of this letter from Bruce Klees of Anchorage, Alaska, is rather appropriate following a review of an electric boat.

"I read your column on boating every month and thought you might like an unusual picture.

"This is a Kyosho *Santa Monica* styro-foam boat powered by an RS 380 motor and six-cell, 1200 mah pack. The scene is the catch basin at Portage Glacier in Anchorage, Alaska. The owner and photographer is my wife, Emily Klees. She likes the electric because it's quiet, clean, and doesn't pollute. Park rangers frown on gas boats in the Basin and private boats are not authorized. The *Santa Monica* usually gets 15 to 20 minutes of run time on a charge, and hits 10 to 15 knots underway.

"We have a short boating season up here . . . the water gets hard pretty fast.

"I enjoy your magazine."

I hope we can use the photo Bruce sent along. It isn't all that often you see a model boat operating among ice floes.

A READER PROVIDES A HELPFUL HINT

Lew Van Duzer of Horseheads, New York, sent along the following hint for working on the K&B 3.5 Outboard.

"Try using a Cox 1/2A wrench for removing the threaded prop stub shaft assembly from the K&B 3.5 Outboard. It works great and the small cut-out fits the needle valve locking nut. I keep this wrench in my boat box and use it after each race to remove the flex shaft for lubricating.

"Keep up the good work . . . I enjoy reading your column in *Model Builder*."

Thanks, Lew, for a fine suggestion on how to easily lubricate the flex shaft on the outboards.

NOW SOMETHING FOR THE LITTLE KIDS

Model boating, especially the R/C aspect, is definitely an adult activity. However, many of those participating have children who often accompany

dad and sometimes mom to the racing events. It's pretty difficult to involve youngsters in the competition aspects of model boating. But it is encouraging to see attempts made by different groups to have activities for the children. The "Kids Are Model Boaters, Too" events held at recent N.A.M.B.A. Nationals have received rave reviews by both parents and children.

The local model boat club to which I belong, the Puget Sound Model Boat Club, has begun scheduling youth events at some of their local meets. The trophies for the participants, often each young racer receives a trophy, are donated by members. No entry fee is charged. At a July race, there were seven entries in the Beginner Class and four in the Advanced Class. They ranged in age from seven to seventeen. Almost all of the youngsters' fathers were model boaters.

As the 3.5 Outboard Tunnel Class is very popular in this area, all the youngsters run that type of boat. In order to make the racing as simple as possible, a three or four-minute enduro format is used with a one-minute prestart available. Depending on time, two or three sections are run to determine who has the most laps. The number of boats on the water at one time is limited to three or four.

Most of the fathers get the engine started and then allow another adult to serve as driver's helper. This practice of not helping your own son/daughter

during the race seems to help avoid hurt feelings between children and parents when things don't go the way they were intended. An uptight parent can spoil a kid's fun.

It appears that the children are having a good time, many of them have won trophies and ribbons, and it provides an opportunity to share the hobby. If your group is doing something to promote youth model boating, congratulations. If you can see the possibilities for fun that can be achieved from such an activity, then get something going in your club or area. I'm confident you will find your efforts well received and rewarding.

8th ANNUAL NORTHWEST OUTBOARD CHAMPIONSHIPS

I try not to give undue importance or space to events in which I participate locally. There's no doubt that many exciting things are happening in model boating in areas besides the northwest corner of the States. I wish more readers would send in photos and information about model boating events in their own localities. However, because I was not swamped with photos or results prior to submitting this article, you'll just have to endure another Northwest racing report or go read what Dirty Dan is "tweaking" this month.

The 1984 Northwest Outboard Championship was conducted on July 14 at Olympia, Washington. Held in conjunction with the Olympia Lakefair festivities,

Continued on page 96



The author raced his *Sprint 7.5* design (MB plan 6841) at the 1984 Northwest Outboard Championships, managed to avoid all problems, and won the event.



Control Line

By MIKE HAZEL

PHOTOS BY THE AUTHOR

TANKS A LOT DEPARTMENT, CHAPTER TWO.

Last month we covered a general discussion of metal tanks. If you have any questions about some stone left unturned, pass it on to me. This month we will take a look at elastic tanks . . . better known as bladders.

Taking a look at the lead photo, there are three different types of bladder tanks, in raw form. From left to right, there is a pen bladder, accompanied by exterior balloon, in the center is a baby pacifier, and on the right, a length of surgical tubing.

The origin of the pen bladder tank was in the early fifties' speed flying activity. Engine fuel draw was found to be weaker with the opened up venturis that were the common practice while in pursuit of additional horsepower. As the venturi size approaches the optimum maximum bore to run on suction draw, things become more critical. The typical problem experienced was fuel starvation due to surging upon launch.

The pen bladder was the answer, as it

delivered fuel at a steady rate regardless of outside forces, such as acceleration, centrifugal force, and engine rpm. It also enabled competitors to increase venturi bore sizes, creating more power.

Tatone Products Corp. markets a pen bladder. Construction is as follows (per package instructions): "Insert the 3/8-inch long brass tubing into end of fuel line. This prevents binding from crushing the fuel line. Place six to eight drops of glycerine into balloon. Slide pen bladder into balloon until both openings are even with each other. Insert end of fuel line containing the brass tube into the pen bladder approximately 3/8 of an inch. Bind pen bladder to fuel line, then bind balloon to pen bladder. Squeeze all air out of balloon before tying. Use soft copper wire or strong thread for binding. Fill pen bladder with as much fuel as required. Squeeze or bleed air out of fuel line before connecting to engine." (End of instructions.)

The advantage of a bladder type tank is (basically) that it provides steady fuel flow, regardless of the aircraft's



Author's "how to" series continued. Pressurized systems (L to R): pen bladder with protective balloon, pacifier, and rubber tubing.

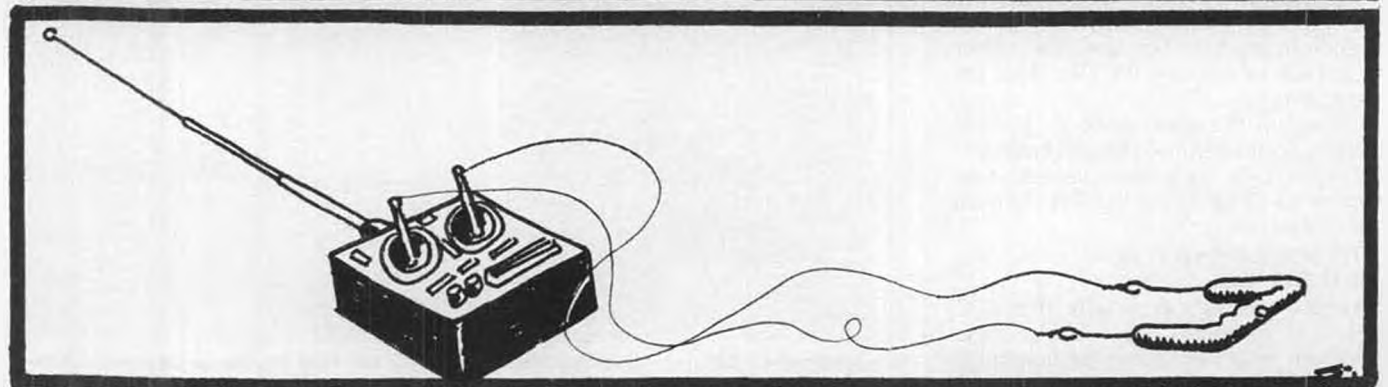
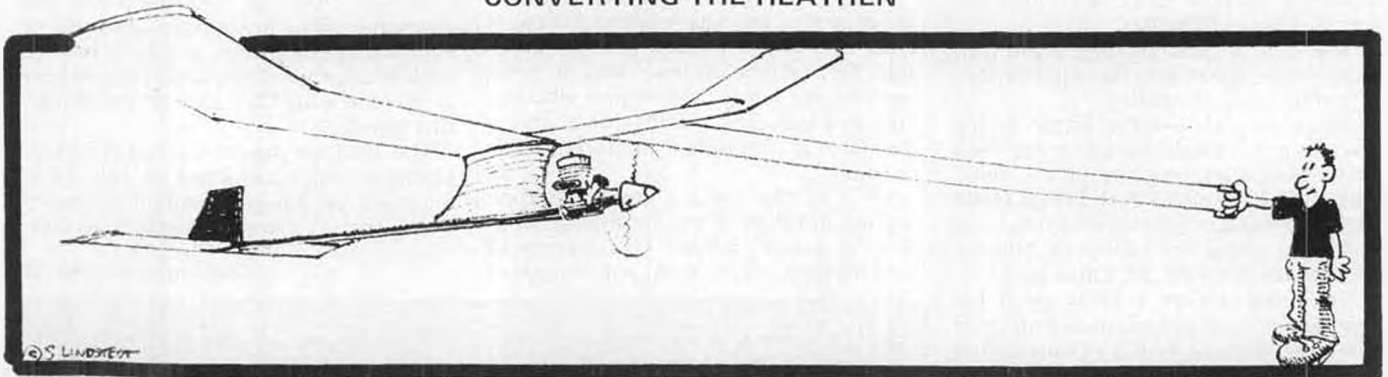
attitude, speed, or tank placement. A bladder tank is also very lightweight. Another feature is that most bladder tanks will give the engine a brief rich mixture before running out. This gives you a warning of engine shutdown, and also provides a desirable cooldown.

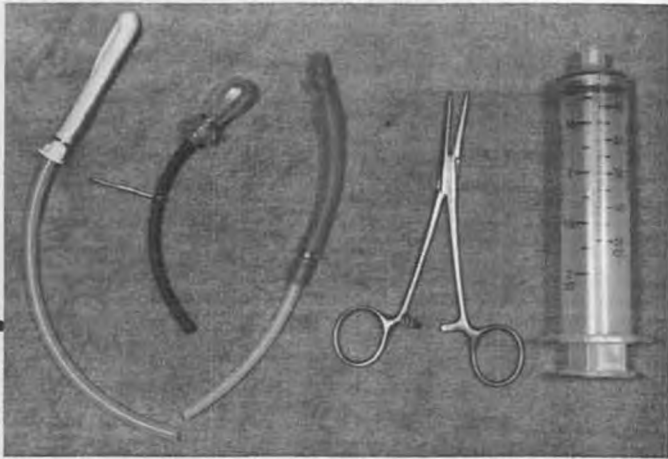
One feature which has mixed merits, is that any leaks or failures are rather obvious.

The pacifier bladder is not as popular today as in the past, but still finds favor with several modelers. Check with FAI Model Supply (frequent MB advertiser), for supply of proper pacifiers at a decent price.

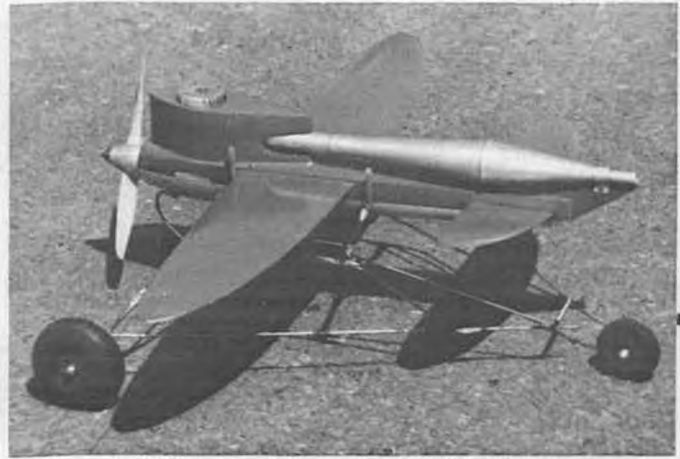
For assembly, simply bind the pacifier

CONVERTING THE HEATHEN





Assembled bladder tanks (L to R) pen bladder, pacifier, silicone rubber tubing. Tools needed to fill tanks at right: hemostat and syringe.



Greg Beers of Vancouver, Washington, built this OPS .29 Speed model. Design is called the *Piper-Bee*.

over a piece of fuel line that has a short piece of brass tubing inserted. Depending upon the neck size of the pacifier, it may be helpful to insert a short length of large size surgical rubber tubing to function as a space filler between the fuel tube and pacifier.

The surgical tube tank has popular applications in both Combat and Speed type models. The first word of caution here is to be careful of the product you may buy: some products work great, and others are junk. The junk varieties are usually found in your local hardware store in the fishing section. This is not to say that you will not find good stock, but be advised not to invest in any great quantity until you try it.

The best bet is to find a local Combat flier, and either buy some from him, or be advised of a source.

The buing that I use is R/C glider histart material. Again, this stock may vary. When you find the tubing, store it properly. This means in a cool, dark place. Sunlight will destroy surgical tubing.

Back to construction. First of all, you must determine the desired length. For longevity, keep in mind that it is best not to fill to maximum capacity. The open end can be sealed with an insert plug, and bound with wire, or simply tied in a tight knot. The other end is bound with wire over the fuel tube and brass insert as before, and *voila*.



Autogyros are always a novelty. This one belongs to Don Cobb of Portland, Oregon, and features dual rotors, and a Fox .35 for motive power.

Now, before we will any of these tanks, let's look at some necessary precautions. All bladder type tanks are prone to bursting if not handled or contained properly.

The pen bladder type is generally used in Speed planes, carried in the metal speed pan. Assuming there are no sharp or rough areas, the balloon provides good protection from abrasion and heat.

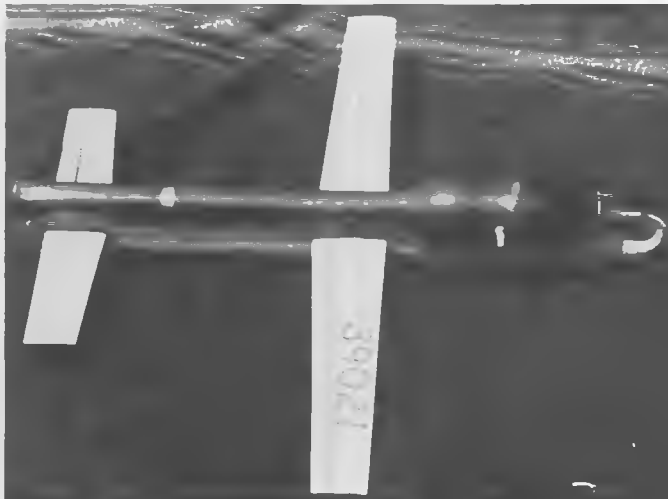
The pacifier tank, when fully filled, may be just over two inches in diameter.

It should be contained within a fuel-proof chamber. This can be an epoxy coated balsa pod, a modified plastic ball, or a pudding tin.

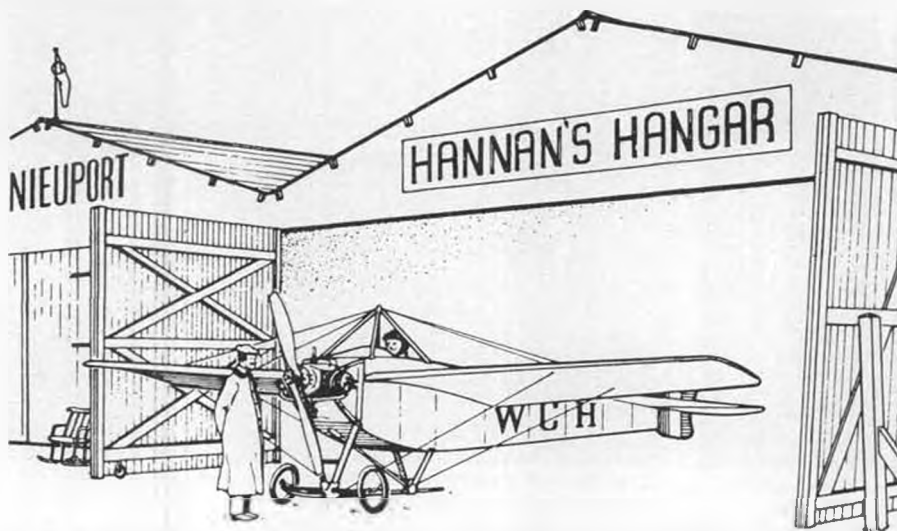
The surgical tube tank will look like a latex sausage when filled. Methods of containment are: fuel-proofed model rocket body tubes, plastic tubing, or fabricated fiberglass cylinders. All of these must be slightly larger in diameter than the bladder when filled. If this tank is not contained, some protection can be provided by slipping a length of expanding gauze over the bladder.

Referring to the photograph of the assembled tanks, you will see some tools of the trade for filling bladders. A graduated syringe is a must, as most applications require a precise injection. This is particularly important if the bladder is filled to capacity within a contained area. If the bladder is overfilled to where it is squeezed inside an area, two things can happen: 1) you will experience a false needle valve setting as the fuel pressure will reduce when the bladder is not constricted, resulting in a lean condition; and 2) the bladder may burst!

The forceps in the photo work very well for pinching the fuel line after the



Author's new Dyna-Jet powered *Super Burp*. Note the extended intake. This little wonder has clocked 183 miles per hour . . . on its first flight!



"The more simple anything is, the less liable it is to be disordered, and the easier repaired when disordered."

• Our lead-in line this month, by Thomas Paine (1737-1809), comes to us from retired North American Aviation test engineer "Duke" Silver, by way of Ken Hamilton, also a retired North American Aviation engineer.

FAREWELL HENRI

Henri Fabre, the first man to rise off water in an aircraft (March 28, 1910), has died at the remarkably advanced age of 102, according to the *London Daily Telegraph* shared with us by Tommy Wilson. Fabre who taught himself to fly, had donated his pioneering *Hydravion* to the Musee de l'Air, where it still exists today. Henri also had a life-long interest in model aircraft and gave them credit for inspiring designers of early full-size machines. Flightmaster Bill Stroman,

who had built and flown a model of the *Hydravion* during 1976, received a personal letter of congratulations from Fabre, who implied that the model probably flew better than the original.

MB readers may recall that an R/C model of Henri's craft was featured in the March 1984 issue.

Fabre was married to Germaine de Montgolfier, daughter of the famous balloon manufacturers, and was a close friend of the Seguin brothers, manufacturers of the Gnome rotary engine employed in the *Hydravion*. Our condolences to the relatives and many friends of this heroic gentleman of the air.

HOW TRUE!

Al Osterman, of Springfield, Oregon, says, "Oh that the time spent making a living, in relation to the time wanted for airplane building, could be reversed! A very common lament, I fear."

MORE PHILOSOPHY

Tom Winter, editor of "The Winding Stooze," not only incorporates full-size model plans, handy hints, and contest reports in his newsletter, but he offers food for thought as well. For example: "I never accomplish more than when I am doing nothing," which Tom credits to Scipio Africanus. And: "... think of time as a succession of boats passing your dock. Whether these boats go on their way empty or with something in them is



Lubomir Koutny, Czechoslovakia, sends this photo of a pretty Czech girl holding a rubber powered P-38L by M. Stranik. The plane has exceeded 60 seconds. Both models beautiful!

your choice. Take time. Master time or serve it."

If you might enjoy receiving "The Winding Stooze." Subscriptions are available for \$7 (nine issues) from: Tom Winter, 1010 Eastridge Dr., Lincoln, NE 68510.

MORE RECOGNITION FOR MODEL BUILDING

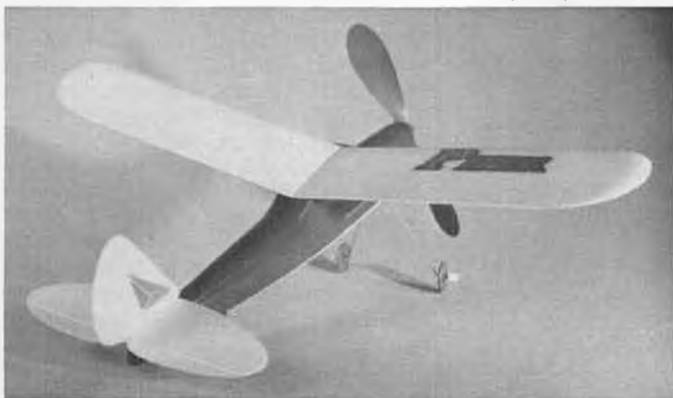
Thanks to Lyn Christensen and Carl Hatrack, we recently received a copy of *Air Force* magazine of August, 1983, and were pleasantly surprised to see a model aircraft on the front cover! (A civilian aircraft at that.) The marvelous color photo depicts the uncovered structure of a 1933 Wedell-Williams racer resting atop a modeler's workbench which is strewn with tools, model engines, paint jars, a set of plans and a box of wheels. Our congratulations to Hurst Bowers for his beautiful workmanship and to Thomas Radcliffe who staged the marvelous photograph.

SORRY!

Former U.S. NAVY pilot Eric Ericson



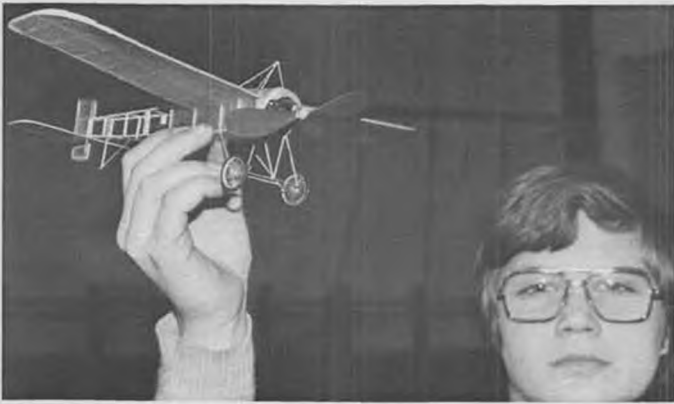
Exceptionally nice *Zippy Sport* by Jacques Delcroix (France) is rubber powered.



MRC is now importing from Japan this all foam and plastic Cessna with 14-1/2-inch span and 12-1/2-inch length overall. See text.



A. P. "Speed" Wilson's variation of Sherman Gillespie's *Navy Fighter*, a fine flying rubber powered model.



Junior flier Vlastimil Simek's pioneer Moraine monoplane is a good flier according to Lubomir Koutny, Czechoslovakia.



The *Super Hawk* is a high performance foam and balsa kit model designed by John Voorhees. It is one of several beginners' models we will be describing in a future article.



Here is a view of a small portion of the Gustave Whitehead Museum in Leutershausen, showing some of the models, drawings, and other artifacts. Photo by Joseph Shultz.

wrote in to chide us about a caption under a photo of him flying a Peanut Scale model which declared him to be a former *AIR FORCE* pilot! Ah well. . .

ULTRA-LOW ASPECT RATIO WINGS

Shortly after the Winter Olympics we mentioned that ski jumpers must be employing the lowest aspect ratio wings ever tried. George Ardwin, of Sabina, Ohio, sent us an article on the subject from the January/February *Science* magazine. According to author Sue Hoover Epstein, a great deal of scientific effort has been expended trying to improve the aerodynamic efficiency of ski jumpers.

As a typical 90-meter jump involves a duration of only about five seconds, it would take more than 700 jumps to equal about an hour in the air . . . obvi-

ously an impractical way to amass flight data. Thus, some skiers have been conducting experiments in wind tunnels, seeking better lift generating and drag reducing postures. Anyone for triplanes? **NOSTALGIA**

Dave Stott of the Flying Aces Club responded to our mention of the old-time radio and cereal premiums relating to aviation: "We were lucky to have had those days. I only hope today's kids can look back on Sesame Street (at best) with the same quickening of pulse as we can our radio heros.

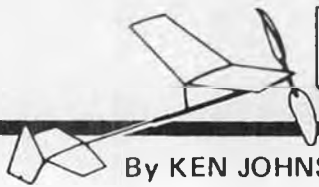
"On the other hand, it seems we were inspired by the doings of others. Thus armed, we quietly fed our imaginations to see what we could achieve. If out-

Continued on page 96

Dick Howard's O-46A observation plane was scaled down to Jumbo Rubber size. It flies every bit as good as it looks. Dick is from Arizona.



John Blagg's two-inch-to-the-foot scale Isaacs *Fury Mk II* is captured in flight over the Old Warden Aerodrome, England. Model is powered by 16 strands of 1/4" flat rubber. Model is still underpowered.



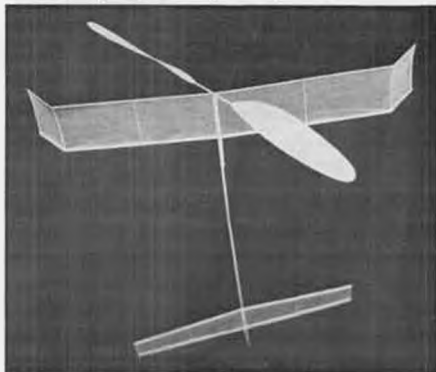
INDOOR

By KEN JOHNSON

MAKE IT TURN

Recently, at one of our Indoor sessions, I noted that Barnaby Wainfan was having some difficulty getting one of his models to turn tightly enough to stay off the walls. Sometimes it seems that no matter what you try, the darn thing still will not turn. Firstly, you try tweaking the vertical fin. Secondly, you put a small amount of clay on the inboard wingtip. When that doesn't do it, you try stab tilt. Well, I saw Mr. Wainfan get his craft to tighten that turn by cementing a one-inch strip of 1/32 square balsa to the leading edge of the inboard wing. The strip was placed vertically and touched the tip at center. This small amount of increased drag on one side was enough to get the desired turn on the airplane.

I believe it was mentioned previously in this column that Barnaby is an aeronautical engineer with Northrop Aircraft and a wizard with flying wings and unusual flying concepts. He seems to be able to get the darndest-looking *what'sits* to fly, when they look like they wouldn't. I'm about convinced that anything he brings out is gonna fly. Are there any flyers in your group like this?



Stan Chilton, Wichita, Kansas, built this meticulous Easy B. Nice camera angle too!



Walt Everson (MIAMA) carefully winds his 8-inch span *Found* on a winding stooge. This Pistachio plane finished 3rd in Cat. 1 at the recent Inter-Gnats. Avg. 40 sec. for 2 flights.

FLAPPER RESURGENCE

About a year ago, David Erbach of Canada decided to hold a postal contest for flapping wing craft. He announced that it would run for one year and set down the rules for this event. As some of you know, this editor is "nuts" about this type of flying machine . . . always have been, always will be. What a challenge! To make a plane fly by flapping its wings alone. No propeller.

Well, I did not enter this contest because of the way the rules were written. They stated that only half the fixed to flapping area was allowed. This was not in harmony with the current AMA rules and not to my liking.

The times turned in were nothing less than fantastic. Previously, a good flight for a flapper was three minutes, plus. Then, Walter Erbach (Dave's dad) did about four minutes, 20 seconds at West Baden and everyone was amazed. The winning flight in the postal contest was over six minutes. WOW! A model contest was held in Japan during that time



MIAMA's Dick Obarski balloons his FAI/F1D model inside the International Minerals & Chemicals warehouse, Mulberry, Florida. Site will soon be filled with fertilizer.

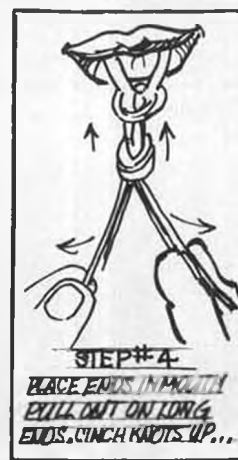
and this was where the winning flights occurred. The first three winners had flights over five minutes. The tops was over six minutes.

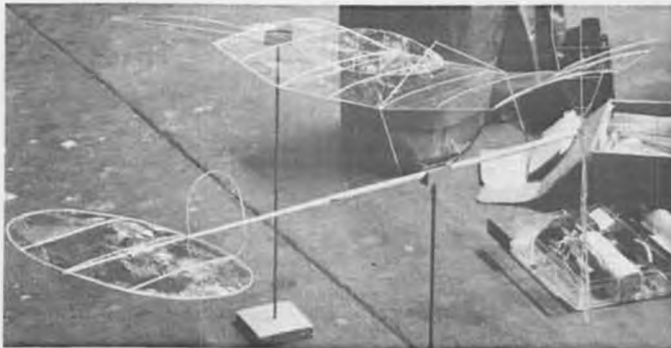
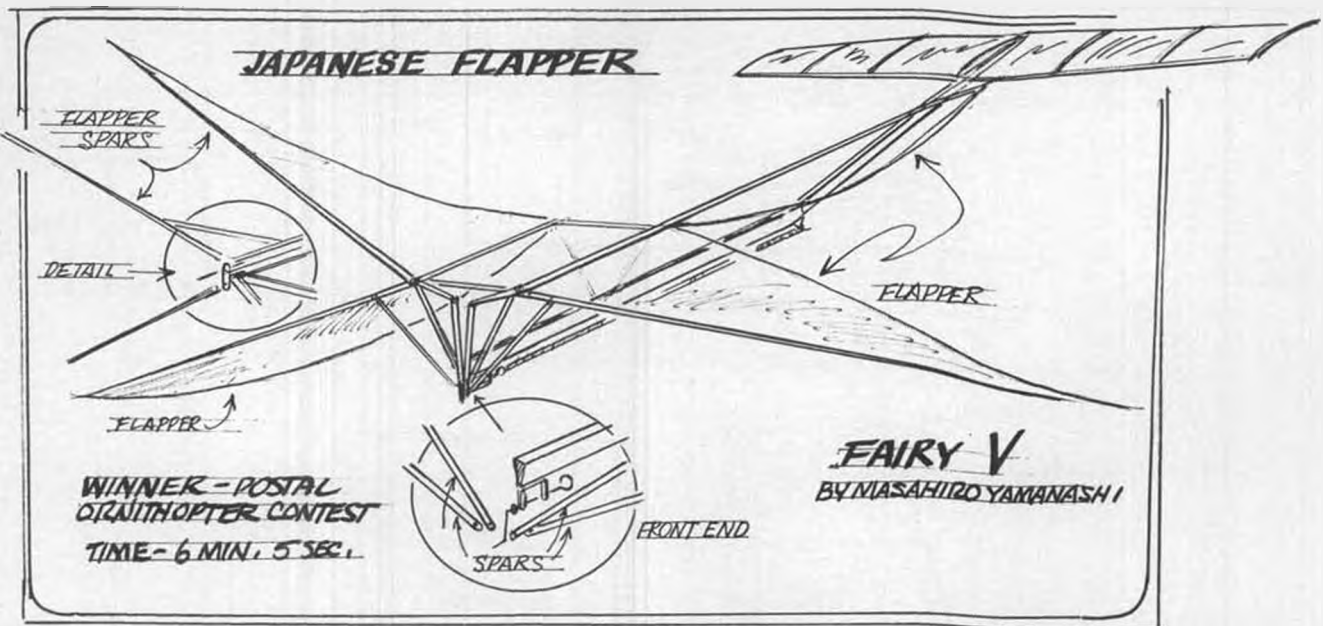
About two years ago, I received a flapper plan from Patrick Deshaye of Seattle, Washington. Pat had designed a model called the *Bibitte*. A biplane flapper that set two national records. During this time, Pat had organized an ornithopter group and began printing a newsletter.

This editor had this same idea some years ago, and he had even drawn up a logo. After examining my priorities, it was decided to shelve the club idea till later.

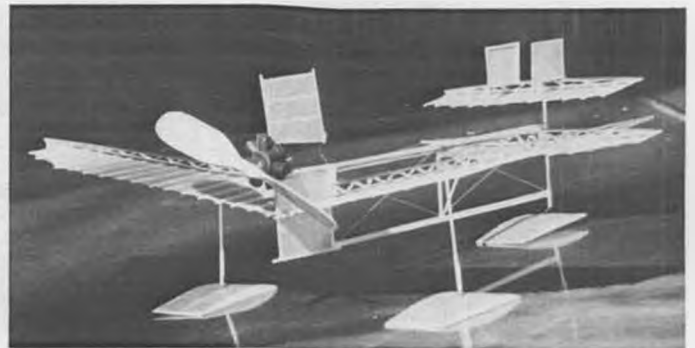
Patrick Deshaye went ahead and started the group, so I jumped on the bandwagon to support him. Apparently, this *Bibitte* design has started a new direction in flapper design. The high times are coming from variations of this

THE ERV RODEMSKY RUBBER KNOT. TRY IT... IT WILL NOT LOOSEN!





Seen recently at a record trials in Santa Ana was this beautiful Mic ship. Pigeons inhabit the blimp hangers here and newcomers are warned against setting up around "white spots" on floor.



Peanut Scale Fabre Hydravion by Doc Martin. This one was tough to trim! Required 8° down thrust and 7° left thrust. Flight times of 30 seconds are the norm. Great effort Doc! (Bob Andrews photo)

aircraft. The Japanese models seem to be from this *Bibitte* concept.

Mr. Al Rohrbaugh of Fort Wayne, Indiana, tells me he studied Patrick's airplane and came up with his version of it. After much bellcrank experimentation and lightening of the airframe, Al took two of the new models to a record trials at Akron, Ohio. With the help of Bill Hulbert (contest director), Mr. Rohrbaugh and his model set a new record of

over eight minutes. FANTASTIC!

I decided it was about time to set aside my tip-flapper designs and take a closer look at these biplanes. The Johnson biplanes have connected flappers on each side. The Deshayes biplanes featured four independent flapping wings. The Japanese plan printed in "Flapper Facts" was the basis for the new Johnson craft. My variation of this design is complete, and it has been test flown in the living

room. It looks very promising. I can't wait to get to the blimp hanger at Santa Ana to try it. A newer version will follow when this column is completed.

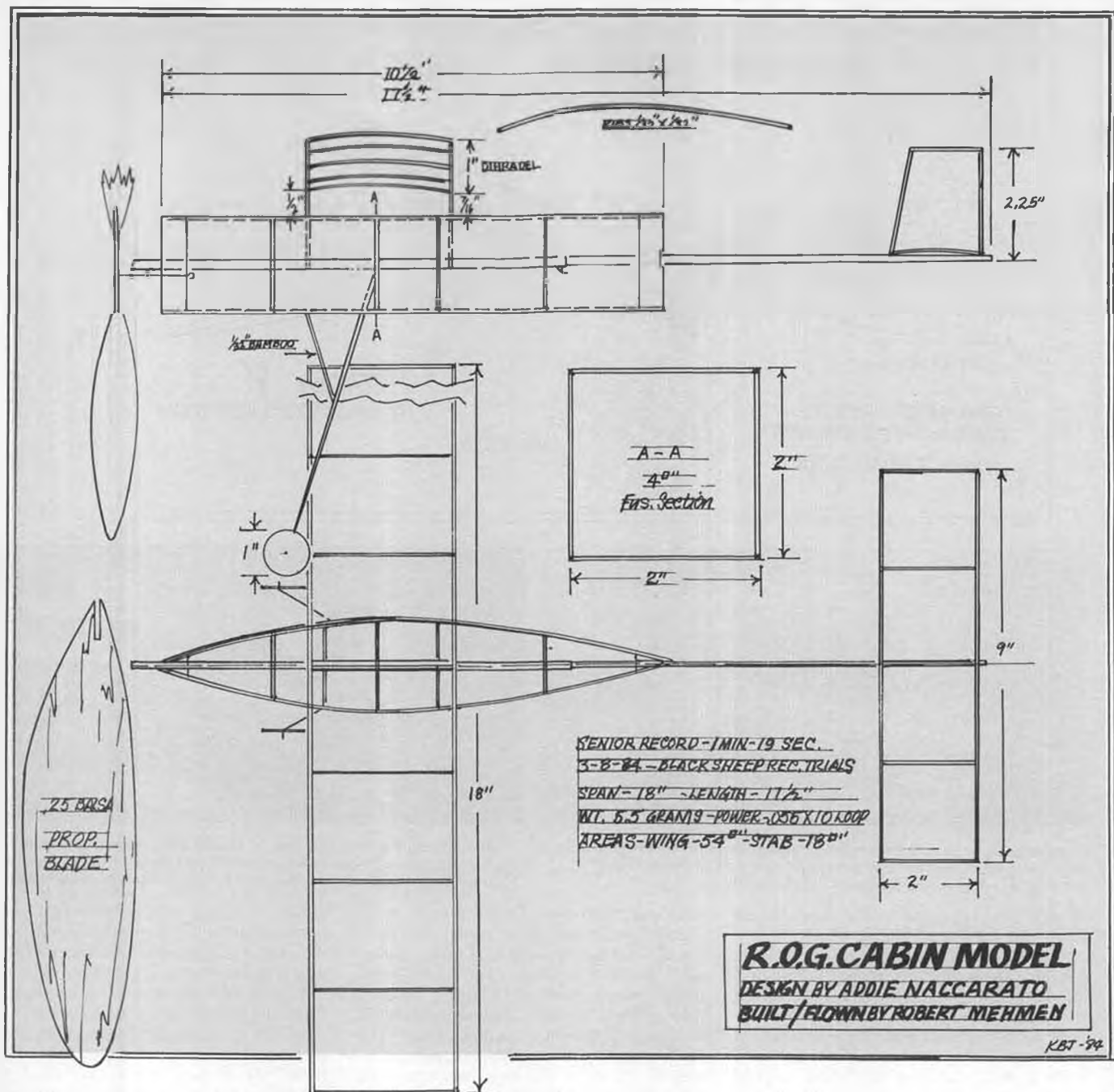
Where will these new models lead? Perhaps they will move toward the "golden 15 minutes" that I wrote about in a previous column. Half of this flight time has already been exceeded. Regardless, the interest in flapping wing aircraft is growing. The members in the



Daniel Walton maneuvers his R/C blimp above the people gathered for some indoor flying. A little like flying a *Queen Mary*, but very useful in bumping loose stuck models . . . or just breaking them!



Larry Cailliau patches the stab on his duration model. Note that his box doubles as a repair table. Many indoor field boxes are made of foam core board from art supply stores. (Johnson photo)



club are actively designing and flying new models in the USA, Canada, England, Australia, and Japan. I will keep the interested readers updated on the progress.

THE NATS SCENE AND THE LACK OF SAME

The biggest model airplane contest in the United States is the "Nationals." This event takes place every summer at a different location around the country. This year, 1984, brought the "NATS" to the West. Reno, Nevada, was host city for this spectacular happening. Those of us who live in the western United States only get to compete when the meet is located in our area or nearby. Sure, some modelers will drive or fly to wherever it is held each year. Most of us, however, cannot just pickup and travel a great distance.

Wouldn't you know that the year the "Nats" came west was the same year that the Olympics came to Los Angeles? This

reporter, for one, was **greatly** affected by this coincidence. Many of the working people in LA were forbidden to take any vacation time from June 15 to August 15, 1984. The '84 Olympics brought money to many businesses in our city. Buses, taxis, restaurants, police groups, and newspapers were only a few of those affected. We at the *Los Angeles Times* had to suffer along with the rest. Three events my family had planned were wiped out, including flying models at the Nationals.

Last week, I requested a one day vacation to drive to Reno to fly the indoor portion. Son Chris has never been to a super contest like this. I felt it would be a real experience for him to participate, but alas, it was not to be.

BUILDING TOO LIGHTLY

There is a tendency to build lighter and lighter to get model weights down and their times up. This can be carried too far. If the wood sizes are too weak to

make the model airworthy, you are in deep trouble. Be sure to make the wing leading and trailing edges big enough to maintain rigidity during the power burst. This is especially pertinent in Easy B, Pennyplane, and any other unbraced duration aircraft. The leading edge of the wing can tuck under causing the model to dive. The wings may simply collapse under the power burst.

Don't forget about the motor stick. A stick that is too small will bow under full winds and snap, destroying the model.

If the paper covering is snug, a fragile model frame will twist out of shape. This is common in stabilizers. A twisted stab will result in a very ill-flying model.

BIPLANE BUILDING TIPS

Chris Johnson has become somewhat of a rubber power biplane expert. About five years ago, Chris showed an interest in World War I biplanes and decided to

Continued on page 101

Boston Bullet

By FRANK ALLEN . . . This Bostonian class model was designed by a youngster who wants to show the world that Juniors can build and fly with the best. If you are looking for a project for yourself or a young flier, try this simple, lightweight bird!

AUTHOR AND DESIGNER

My name is Frank H. Allen IV, I am 12 years old, and I have been building models for about six years. I enjoy building rubber power models because it is a rewarding and constructive hobby. I am a member of the Scale Staffel and fly in Junior Class. I designed and built this model and wrote this article because I wanted to show adult model builders that Juniors could design models also.

MODEL

If you are looking for a lightweight, easy to construct, well-flying model, then you might want to make this your next model. This is a clean, straightforward model that is easy to trim. On a calm day it does an average of 40-45 seconds. Indoors it does an average of 50-70 seconds with a wood prop. If you want it to last a long time, you better keep it out of the hot sun. Now on to construction.

CONSTRUCTION

The model is constructed from 1/16 square sticks. When constructing the fuselage, make sure that it is straight and not bent over and crooked. The wing's leading edge should be made out of 1/8 square stick and the trailing edge should be made out of two 1/16 square sticks laminated together. This will help prevent warping when it is being covered. The tail and rudder should be constructed out of hard 1/16 square stick. For the nose block, use 1/8 sheet laminated together, and for the nose button I used a plastic Peck-Polymers nose button.

FINISHING

My model was covered with blue Japanese tissue. I applied the tissue with white glue thinned 50% with water. After the tissue was applied to the model, I shrunk the tissue by spraying it



Frank Allen winds up the rubber motor in his *Boston Bullet*. Note simple winding stooge.

with a mist of alcohol. After shrinking, I applied two coats of dope thinned 50% with thinner, then the model was assembled, and ready for flight testing.

FLYING

The first thing you want to do before flying is to make sure there are no warps in the model. Next, balance the model by adding clay to the nose or tail so that the model balances on the points shown on the plans.

Now you are ready to give your model a test glide. I think the most important part of trimming a model is to trim it in calm weather. Add or remove clay as needed to get a glide that is straight

ahead.

When satisfied with the glide, install a short loop of 3/32 rubber, about 10 inches long. Put in about 100 turns and then launch the model straight ahead. To get a left turn, I use a small piece of 1/32 sheet wood as a drag plate on the left wing set at 90° to the bottom of the wing at the trailing edge.

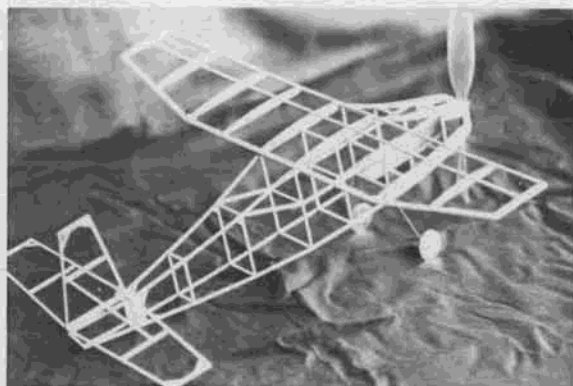
FLYING

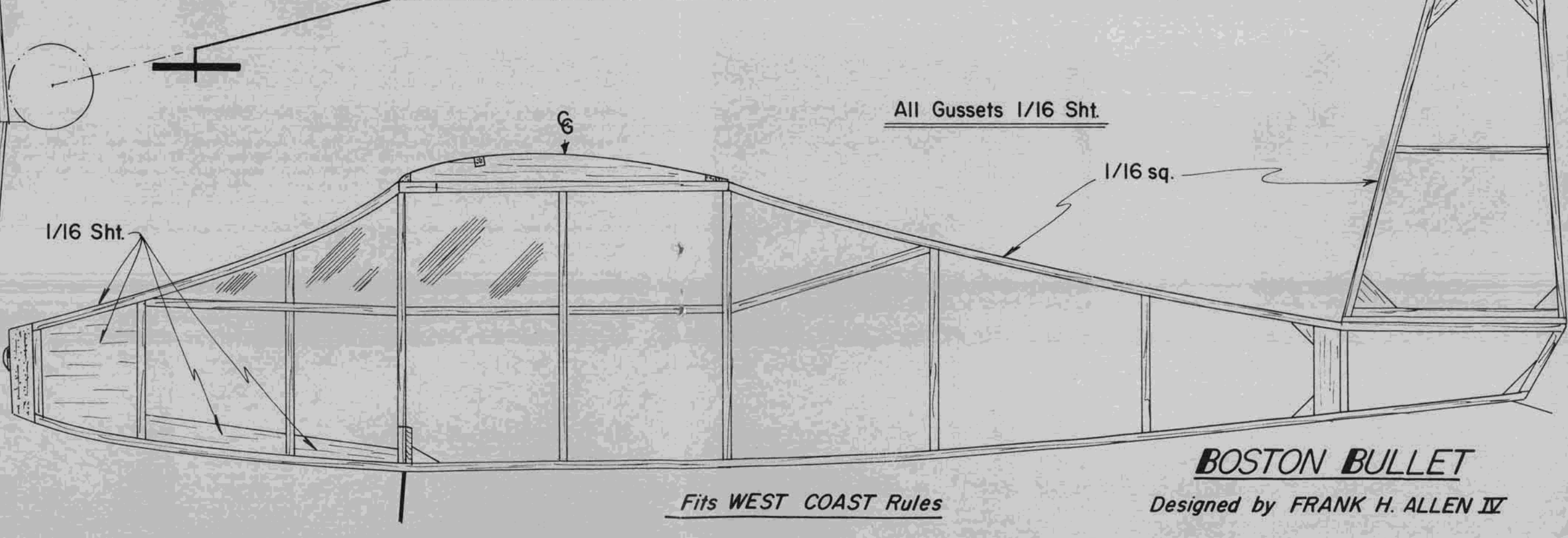
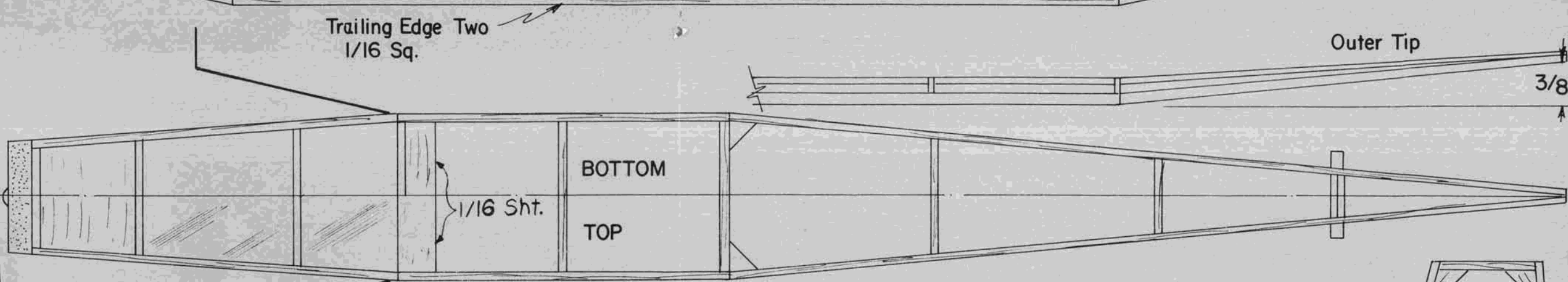
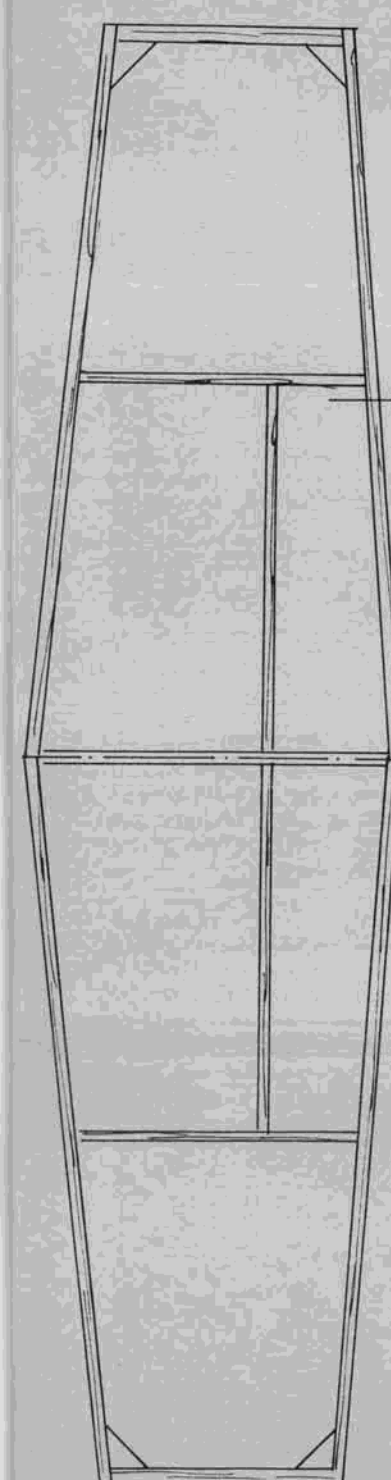
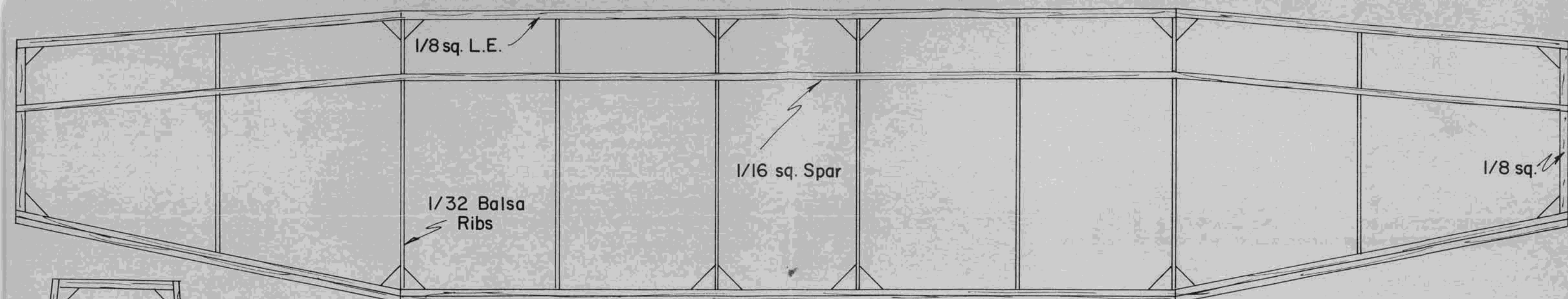
Now back to flying. If the model has any kind of stall under power, add a piece of scrap wood to the top of the nose plug for down thrust. If the model dives under power, place the wood at the bottom of the nose block. ●



LEFT: All ready for trimming flights, the *Boston Bullet* poses for a picture. Author claims easy trimming, but be sure to test glide in calm weather!

RIGHT: Here's a shot that will graphically show you just how simple the framework of the *Boston Bullet* is. Lightweight for long flights.





Fits WEST COAST Rules

BOSTON BULLET
Designed by FRANK H. ALLEN IV



Free Flight Scale

By FERNANDO RAMOS



Expert modeler, Pres Brunning, with his *Albatross* which won him the Earl Stahl Perpetual Trophy.

• In the little town of Utica, Michigan, way back in 1922, the Packard Motor Company built a 2-1/2 mile, banked concrete test track. This was built to test those magnificent cars that Packard used to build. When Packard went under, the Ford Motor Company bought the track. Now apparently, Ford no longer has a need for this facility. All that prevails are memories embedded in the concrete track reminding us of the cars of years gone by, running at high speed when quality was a byword for such cars!

For some of us however, this was the site for the 4th Flying Aces Nationals, or simply FAC IV!! Every other year since 1978, the eastern half of the United States experiences an event that defies description. The following is an effort to capture this, the best of all F/F Scale.

This year's odyssey began on a Thursday afternoon when Bill Warner arrived at my home with models and luggage in hand.

From here we motored south to San Diego to Bill Noonan's home. The plan was to fly from Lindbergh Field early Friday and head for Detroit. Bill Warner and I really had an enjoyable time as the guest of Bill Noonan. (From here on, they will be referred to as BN and BW.)

We started the afternoon watching the tape of Howard Hughes' "Hell's Angels." Then, we took a trek out to BN's workshop. Everywhere you look, you can see this man's enormous talent. It would take a book to cover all of this man's ingenuity! Let me give you one little example.

Behind the door of BN's workshop is a flattened out model of an Aviatik mounted on a large picture frame. For the unwary, if they swung the door open too much, they would get the impression that they were the ones responsible for the condition of the model! What really happened is that this particular rubber scale model didn't meet

the flying quality BN had hoped for, so he laid a big sheet of plywood over the model, then drove his car over it! Needless to say, it does make an interesting "picture!"

Thursday night, BN fixed us a steak dinner with all of the trimmings. Is there no end to this man's talent?

Friday's flight to Detroit was uneventful, which is definitely the best way to have things go. We rented a car and headed for Warren, the site of the motel which would be headquarters for the FAC. Upon our arrival, we unloaded the car and proceeded to put together all of our models in preparation for Saturday's flying.

FAC IV was sponsored by the Detroit Cloudbusters led by the likes of Ralph Kuenz, Jack Moses, and Pres Brunning. They



LEFT: Mike Midkiff poses with his slick-looking and flying B-25 *Mitchell*.



RIGHT: Bill Noonan tries to patch up his Fokker *Trimotor* after his own CO₂ powered *Kitten* biplane attacked it on the ground. The full, hilarious story is found in the text.



If you were looking at all that rubber being stretched out in front of you, you'd be holding that Cessna racer at arm's length too! John Stott and wife.



Another Mike Midkiff masterpiece, a Sopwith 1-1/2 *Strutter* sitting on its winding stogie.



Henry Komp and his Megow Jumbo Scale Ryan ST.



One of the author's favorite models is this Arrow Active biplane powered by an .06 Taifun German diesel. Model weighs 17 oz, has pendulum control, painted with silver Floquil.



Mark Fineman and the Mr. Smoothie racer.



Dennis Norman had no trouble getting "helping hands" when it came time to wind up the Lancaster bomber.

had arranged a hospitality suite. This gave us an opportunity to greet our old friends, and to meet new ones. Our time clocks were moved up three hours, so the three of us from California found it difficult to think about bed much before one in the morning. However, we decided that we'd better get some sleep as we would be getting up at 3:00 a.m. California time!

Saturday morning found us looking at one great flying site. Here were hundreds of acres inside of the track covered with tall grass! For Californians, this is about as rare as one of our condors! By the time we arrived, there were several modelers fine tuning their models. Just imagine, we witnessed eight different events being flown on this first day! There were so many spectacular models that it was difficult to keep track of

everything.

Even though I had taken two models, I decided to enter only my diesel powered Arrow Active biplane. There was just too much happening that I didn't want to miss. Talking and taking pictures would be the order of the day. The FAC Nats is more than just flying scale models, it's an educational experience to be sure! It was getting fairly late in the day before I tried to qualify my Active. I was having too much fun visiting with the greatest gathering of scale modelers anywhere in the world!

While I was making the rounds, BN was flying his CO₂ powered Martin Kitten biplane. The model was flying superbly under power. When the Brown Motor ran out of gas, the

Continued on page 88



One of five "crew members" visible inside the four-motor Lancaster bomber.



Mass launch! Contestants in the Golden Age event are seen here giving the old heave-ho to their F/F scale models. There is nothing more spectacular in F/F than mass launches.



Yes, the "Lanc" does indeed fly! Here we see it on its way to a 32-second flight.



Free Flight

By BOB STALICK



RIGHT: Sal Frusciano took this striking photo of Travis Hunter and his *Satellite* at the 1984 SW Regionals (Buckeye, AZ).

BELOW: Larry Norvall checks out the weather conditions (and the competition) at the Buckeye Meet, 1984.

• I like free flight. I like the thinking time that it takes to wrestle over the solving of the little problems that arise during the building process. I like the planning that is involved in making the gadgets that work functions like the VIT and flood-off mechanism, the Montreal prop-stops, and the circle tow units. I like selecting the right piece of balsa for the job at hand, and choosing the right covering materials, color schemes, and finishes that set my models apart from the rest. I like test flying . . . and the little lump in my throat each time I launch for that first flight. I like the thrill of making a max and the hike after the ship dethermalizes. I like the camaraderie during and after the meets. I like the sharing of ideas and new thoughts that move the brain into high gear. I like the taking and sharing of pictures of, about, and for free flihters. I like writing about modelers who are free flihters. I like the international flavor of the free flight movement.

I like it all: the Old Timers, the AMA events, and the FAI events. I like indoor. I envy those who build well. . . especially those who have scale models that really look like the original should have looked. I wish I could build like that. And it is a real bonus when those good-lookers fly like they should.

It may be that free flight is changing. It may be that it no longer has the appeal that it once had . . . that our numbers may be dwindling. I would like that to change, *if it is true*. I would like it to change not so much because of me. It should change because those who have never tried it, or worse yet, know nothing about it are missing out on a valuable part of life.

I am a winner because I like free flight. I am a winner not because I have won the big contest events, the Nationals, or the World Champs. I am a winner because since I was five years old, I have built and flown free flight models. Free flight is part of my life, and it is an important part.

So, when people ask, "Why are you



still playing around with model airplanes?" The answer for me is simple and easy.

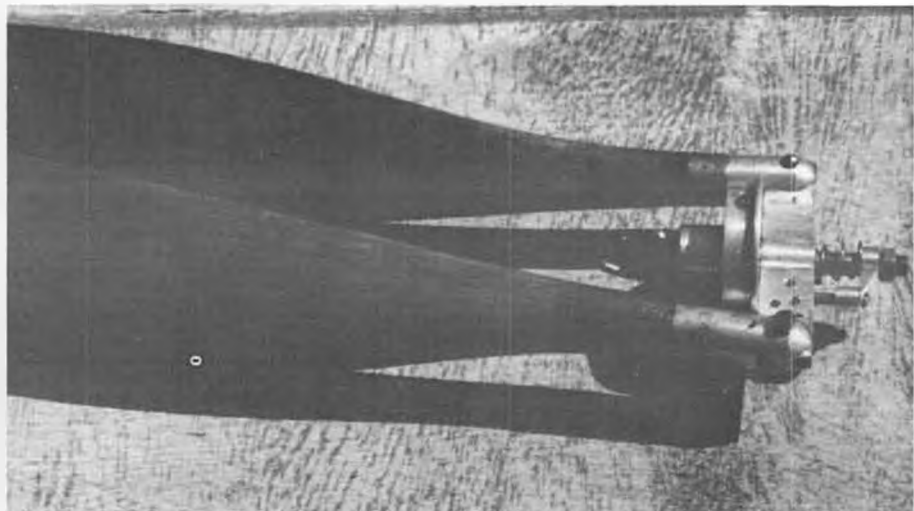
I like free flight.

MYSTERY MODEL FOR NOVEMBER

I don't know how many of these rubber powered contest models were built, but the number must be in the

thousands. At one time, this ship was kitted as one of a trio of designs by the same designer. They corresponded to the Class C rules in effect back then. They are still hot competitors in Old Timer Stick Rubber events.

I built one as my first-ever rubber powered competition model. As I knew



Wayne Drake returned from the Friendship Tournament in China with this exquisite prop hub assembly from a Wakefield model. Made from a bar of aluminum, it has a Montreal stop device (wonder what the Chinese call it?). Hand carved hardwood prop blades are lightweight.

little about how much rubber to put into it, I followed the articles I read about the Wakefield boys. My ship had 14 strands of 1/4 inch Pirelli rubber. The prop was from the kit prop blank . . . about 12 inches in diameter as I recall. The climb was absolutely spectacular, and the prop run was on the order of 10 seconds. The glide was something else. I didn't have much left of the ship, though, when one day the 14-strander broke at about 90% winds and wiped out everything in front of the motor anchor. I really enjoyed that ship. Later models were powered with a more reasonable eight strands of 3/16 rubber. It climbed slower, but flew better.

So, if you think you can identify this model, send your best guess to Bill Northrop, c/o **Model Builder**, P.O. Box 10335, Costa Mesa, CA 92627. Bill will reward the winner with a one-year subscription to "this-here" magazine. By the way, Bill uses a handicapping system that allows those of us who live on either coast the chance to compete for this prize on an equal footing. While you are at it, you might include your favorite story about this month's mystery model.

MYSTERY MODEL WINNER

Russ Backer of Orange, California, was first to send in his answer for September's Mystery Model. He will receive a free one-year subscription for correctly identifying George Perryman's 1/2A V.T.O. *Raunchy*.

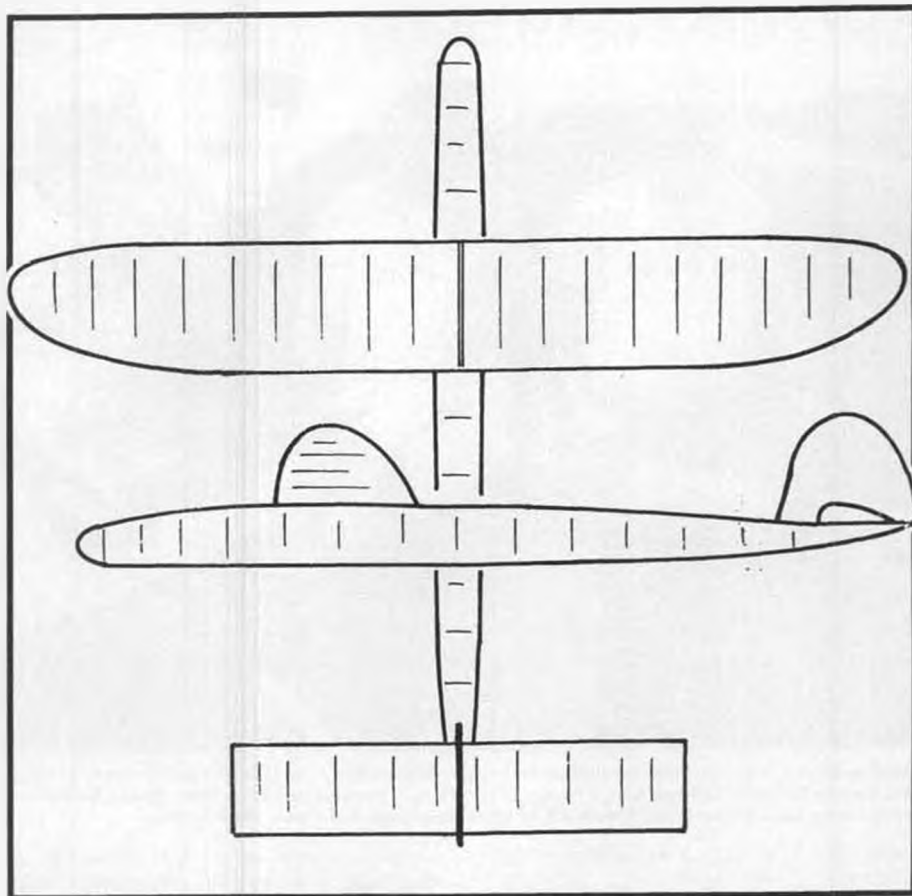
Russ included the following short note: "Hi Bill, I thought I would see if I could get lucky on the September '84 Mystery Model . . . Only Perryman could come up with one like this . . . it's about 1954-56, 1/2A *Raunchy* for V.T.O., Keep up the good work." Yes, Russ, you did get lucky!

NOVEMBER THREE-VIEW: THE SUPER SWALLOW, COUPE DE HIVER

This three-view comes courtesy of *Vol Libre*, the excellent free flight magazine/newsletter from France. The model, however, is by Britisher Ian Dowsett. What I like about this design, besides the fact that it's a winner, is that it looks good and should be easy to build with its rolled tube fuselage. Note that Ian has included a pod on the fuselage bottom in order to get the correct cross section as specified in the Coupe rules. I wonder what the purpose of those little wing tip extensions is?

DARNED GOOD AIRFOIL: SOKPSI

Don't ask me how you pronounce it,



NOVEMBER MYSTERY MODEL

but this section is one used by the Dutch Nordic flier, Pieter de Boer. Steve Helmick presented this section (and another one) in a recent issue of the "Bat Sheet" with the explanation that it is apparently a derivative of the Sokolov airfoil. Pieter has been a long-time world class competitor. The section should be worthy of consideration for the next A-2 you are contemplating.

"VTO" GROUNDED

For many years, I have read about free flight from my fellow correspondents who have written the "VTO" column in *Model Airplane News*. First, it was Dick Black, one of the co-founders (along with Carl Fries and yours truly) of the National Free Flight Society. After Dick's untimely death, it was Dave Linstrum, a long-time free flight pen pal and long distance buddy, who wrote the column. Recently, Dave dropped me a note with the unexpected news that he was moving

to another magazine. It seems that *MAN* has decided to become 100% R/C. I wish Dave the best of luck with his new free flight column. Look for him in the November issue of *Flying Models*.

THIRTY-FIVE YEARS OF SOUTHWESTERN REGIONALS

Buckeye, Arizona, is a place I have read about for . . . well . . . it must be about thirty-five years now. It's the site of the Southwestern Regional Model Airplane Contest. January 26 and 27, 1985 is the next Buckeye meet. The major event categories include Free Flight, Control Line, and R/C Old Timer. I count a total of 41 different events and classes of competition. To whet your appetite for this biggie, I've included a couple of nice photos from previous years. If you are interested enough to inquire, drop a line to: Southwestern Regionals, 2717 E. McDowell Rd., Phoenix, AZ 85008. Tell 'em **Model Builder**

DARN GOOD AIRFOIL – SOKPSI A-2



| x% | 0 | 1.25 | 2.5 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 95 | 100 |
|---------|------|------|------|------|------|------|------|------|------|------|------|-----|------|------|------|------|------|------|
| y^b % | 0.32 | 1.52 | 2.34 | 3.57 | 4.63 | 5.42 | 6.72 | 7.82 | 8.53 | 8.98 | 9.37 | 8.7 | 7.6 | 6.15 | 4.44 | 2.48 | 1.42 | 0.34 |
| y_0 % | 0.32 | 0.02 | 0.96 | 0.05 | 0.72 | 0.37 | 0.35 | 0.97 | 1.63 | 2.22 | 2.95 | 3.5 | 3.52 | 3.04 | 2.11 | 0.93 | 0.93 | 0.34 |



Wayne Drake (far right) was quoted in the local newspaper that he flew the purest form of the purest model airplane flight: Nordic Glider. Bob Waterman (far left) dubbed him, "Purest of the Pure." Power fliers Waterman, Ralph Cooney, and Wake flier Gene Jensen received appropriate nicknames too. Scene is the Western FAI Challenge meet at Tenino, Washington.

sent you. (Thanks to Al Lidberg for the info.)

THE SEARCH FOR POWER — YOUR COX .049 CAN GO FASTER

(Adapted from an article in the "CIA Informer".)

The options afforded the average competition modeler who wishes to milk extra rpm from a stock 1/2A Cox engine can probably be broken down into five or six areas of concentration: fuels, glow heads, props, fit of parts, maximum porting revisions, and in some cases, formal break-in procedure. A brief explanation of how you can do some improvements to your little power plant follows.

FUELS

The Cox T.D. .049 really loves nitro, and with some adjustments, it will satis-

factorily accept up to 70%. However, as the nitro is increased, the engine may become increasingly temperamental. If you begin with a new, stock engine, or with an engine that you have been running on Cox Racing Fuel (red can), you will probably need to add additional glow head washers to increase the cylinder compression volume. Just how many washers you will need depends on your atmospheric conditions and the individual engine. Trial and error will prevail at this point. If much atmospheric deviation occurs during the course of the contest day, washers may need to be deleted or added accordingly. Forty percent nitro seems to be the limit of nitro without fiddling with the compression. (Suggestion: use 40% nitro fuel all the time.)

GLOW HEADS

The glow head and the fuels used need to be matched. The usual glow head used in the T.D. is the high compression No. 1702 version by Cox. Sometimes, with the high nitro fuels, adding compression washers is necessary to gain additional rpm. One glow head that does seem to work well is the Glo Bee. According to Warren Kurth, this head will burn 70% fuel very well. The Glo Bee will, however, need a bit more than the standard 1.5-volt starting battery. The Glo Bee Fire Plug gives this added juice and makes starting easier. I have had good luck with this glow head and a two-volt, lead acid battery and a long (eight-foot) lead wire.

PROPS

The ultimate 1/2A prop has yet to be invented, but the standard Cox 6x3 is pretty close . . . particularly if it is cut down to a 5.5x3. In addition, this Cox

prop needs to be balanced carefully, even if the tips aren't cut down to make a 5.5-inch diameter prop. I have yet to find a properly balanced, stock Cox 6x3 prop. A number of **Model Builder** advertisers supply prop balancers . . . buy yourself a good one and use it.

FIT OF PARTS

The matching of mating parts in any mechanism is certainly dependent on its ultimate performance. Fits, such as: glow head to cylinder, cylinder to crankcase, and backplate to crankcase, are quite easily accomplished. Lay a piece of 600 wet or dry sandpaper on a flat, smooth, hard surface such as a piece of glass. Apply a couple of drops of 3-IN-1 oil to the sandpaper, and hold the edges of the paper down to the glass with one hand and press the part with the surface to be lapped face down on the paper. Lightly rub the piece in a circular motion until a uniform, flat surface is obtained. Clean thoroughly before reassembly.

MAXIMUM PORTING REVISIONS

Unless you are a bona fide engine expert, I'd suggest you leave this part of the job up to an expert such as Joe Klaus. If not, you may find yourself in possession of an instant handful of junk.

BREAK-IN

I suggest that you follow the recommendations that came with your engine to get to the proper break-in procedure. However, I do have one additional suggestion: start the break-in gradually with a low nitro (10% or so) fuel and run the engine on the rich side. As the fit loosens, and the engine runs out a full tank easily, increase the nitro content and decrease the size of the prop. Eventually, you should be up to 50% or so

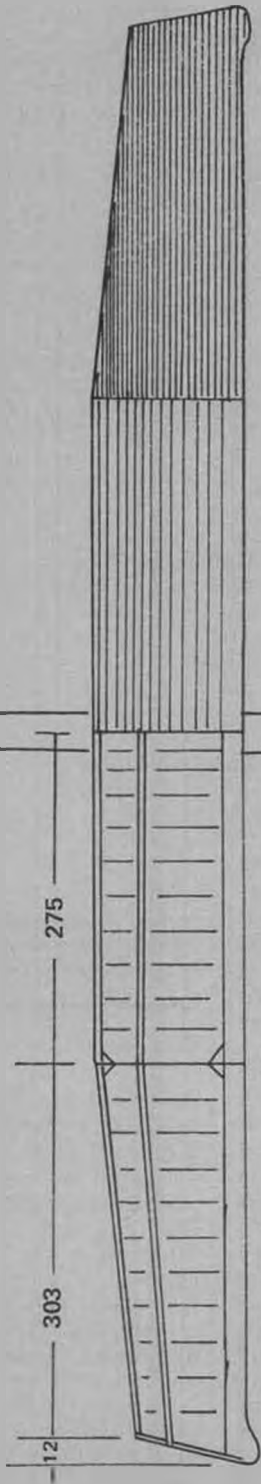
Continued on page 102



Your editor, Bob Stalick, launches his "Not So Pure" power model *Deja Vu II* at the Western FAI Challenge. It is powered by a Rossi R-15, and was featured as a 3-view in the September 1980 *MB* "Free Flight."

COUPE

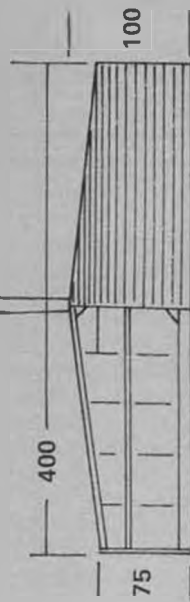
D'ARTYER



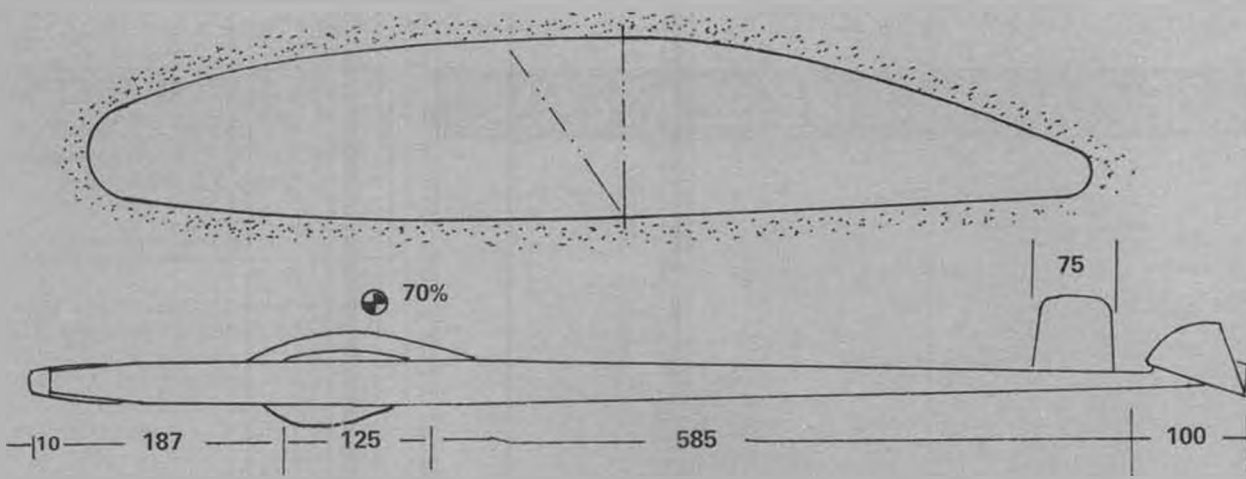
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is another name that appears among the winners at the meet each year. Doc Margraff maintained his winning record in the Barnstorming event which he has dominated each year except the first, and George Woods usually comes in just behind him as he did again this year.

Another Rhinebeck Classic meet is history, and the fun of it all is gone for another year. The modelers will all be back next year for the ninth edition, which most of them will tell you is the most fun-filled meet anywhere in existence. The Mid Hudson Club and its

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Final results after the day's flying were as follows:

SPORT SCALE

| PLACE/NAME | MODEL | STATIC | FLIGHT | TOTAL |
|-----------------|-------------|--------|--------|-------|
| 1. Armand Cote | Aeronca LB | 91 | 78 | 169 |
| 2. Henry Haffke | Gee Bee - Y | 81.5 | 80 | 161.5 |
| 3. Art Corman | J-3 Cub | 69.5 | 71 | 140.5 |
| 4. Tom Polopink | Taylor Cub | 56 | 80 | 136 |
| 5. Ed Kelleher | Gee Bee - D | 59 | 70.5 | 129.5 |

GIANT SCALE

| | | | | |
|-----------------|-------------|------|------|-------|
| 1. Henry Haffke | Gee Bee - Z | 92.5 | 81.5 | 174 |
| 2. Frank Tiano | Laser | 81 | 89 | 170.5 |
| 3. Tom Polopink | Morane | 86 | 84.5 | 170.5 |
| 4. Armand Cote | Gee Bee - E | 85 | 84.5 | 169.5 |
| 5. Bill Stefees | Tony | 84 | 83 | 167 |

BARNSTORMING

| PLACE/NAME | MODEL | TIME (SECONDS) |
|---------------------|-------------|----------------|
| 1. Doc Margraff | Fleet | 100 |
| 2. George Woods | J-3 Cub | 127 |
| 3. Henry Haffke | Gee Bee - Y | 163 |
| 4. Frank Sanfilippo | Barnstormer | 180 |
| 5. Jim Jenkins | Fleet | 214 |

TIME TRIALS

| | | |
|-----------------|-------------|---------------------|
| 1. Frank Tiano | P-51 | Times not available |
| 2. Bill Stefees | Tony | |
| 3. Henry Haffke | Gee Bee - Y | |
| 4. Ed Kelleher | Gee Bee - D | |
| 5. George Rose | Firecracker | |

A special award called the Granville Bros. Challenge Trophy is presented to the most outstanding model of a Granville aircraft flown at the meet each year. This year, the winner was Henry Haffke and his Gee Bee Model-Z *Super Sportster*.

After the contest, beautiful trophies were awarded to the winners, as well as excellent merchandise prizes. Engines are awarded to all first place winners, kits are awarded to the second place winners, and power panels are awarded to third place winners. Top winners at the meet included Henry Haffke who became the first pilot to finish in the top three in every event in the eight year history of the Rhinebeck Classic meet. Henry has been a consistent winner at each of the previous meets with his Gee Bee models. Armand Cote took first in Sport Scale and fourth in Giant Scale and is another of the modelers who always finishes among the winners at Rhinebeck. Frank Tiano took first in the Speed event and second in Giant Scale and

contest organizers really know how to put on a great meet, even when the weather doesn't cooperate fully. They are a great bunch. •

Plug Sparks . . . Continued from page 40

Holiday Hotel in Kenosha with the MECA Grando Collectogether starting at 9 a.m. This went on all day as will be described in succeeding paragraphs.

What made the meet seem long was the Texaco R/C flying on Monday, normally a day when the modelers checked in for the start of the flying on Tuesday. Regardless, this feature turned out quite successfully as most good flights with a Texaco ship topped fifteen minutes or longer.

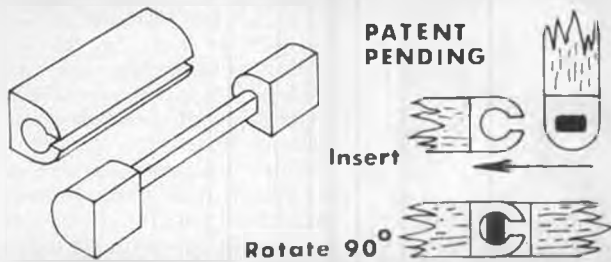
Winning the Texaco event gave Bruce Norman of Fort Worth, Texas, a big jump towards winning the overall R/C Sweepstakes Trophy. Photo No. 9 shows Bruce

Rhinebeck . . . Continued from page 13

any other. Some really exceptional Giant Scale models were to be seen. There were two other Gee Bees in the event besides my Model Z as Armand Cote and Jim Jenkins both brought their beautiful, identical models of Skip Tibert's Model E *Sportster*. Ray Hinds, who always shows up with a spectacular Giant model, had a Curtiss *Racer* which flew great. Frank Tiano had a beautiful model of Leo Loudenslager's *Laser* with its new Budweiser paint job. Tom Polopink flew his fantastic model of the Morane Saulnier. There were a couple of fantastic Fleet biplanes, one flown by Joe Wycela, and another by Jim Jenkins Sr., and a great 1/3 scale Piper J-3 flown by John Kovarik. George Rose flew his 1/4-scale *Firecracker*, and also had his well known P-6E on hand for the Sport Scale event.

The static scores were quite low for the quality of the models, but the placement of the models in relation to each other was very fair. The highest static scores of the meet were the scores attained by George Rose with a 96 for his P-6E, Henry Haffke with a 92.5 for his Gee Bee Model Z, and Armand Cote with a 91 for his Aeronca LB. There were six models with scores in the 80s: Tom Polopink's Morane with an 86; Armand Cote's Gee Bee Model E with an 85; Bill Stefees's Tony with an 84; Henry Haffke's Gee Bee Model Y with an 81.5; and Frank Tiano's *Laser* and George Rose's *Firecracker*, each with an 81.

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with Joe Percy checking the fuel allotment. This *Dallaire Sportster* has been steadily winning over the last five years, a credit to Bruce's flying ability and care of the model.

Getting back to the start of things, the writer had the following impression of the engine collectors' shindig.

MECA "GRANDO"

Ever since the Model Engine collectors Association (MECA) started holding their Grand Collectogether on the first day preceding the SAM Bean Feed, this has proven to be one of the most satisfying and pleasurable swap meets this writer has ever attended.

Inasmuch as many MECA members are also SAM members, this naturally leads to a compatible situation. This year, Bob Cowles, el "Grando" organizer, realized that the average SAM member would not pay the \$4 door fee to simply walk around and visit with the engine collectors. By dropping the fee to non-displays to \$2, a crowd developed which lasted well beyond dinner time. Even this scribe spent quite a bit of money for things that he simply could not live without.

During discussions with some collectors, the following information which may be of some interest to Mr. Average SAM Member was gleaned.

WAHL ENGINES

A powwow with Herb Wahl of Forkville, Pennsylvania, revealed the following program for 1984 and 1985.

Herb is just about wrapping up the manufacture of the present 900 Ohlsson Gold Seal engines. These gold plated goodies are a must in any engine collectors set of Ohlsson engines. . . and Herb stated that there are still a few available because of cancellations, non-payment, and so forth.

After completing the Ohlsson, Herb will fill the orders for the Brown Jr. engine he was originally manufacturing. He has also decided to build more Brown Jrs. and Hurlemans to suit the demand.

Future projects include the Bunch Gwin Aero and the Lykens Brown. As we write, the latter engine is still in the talking stages with Bill Brown. The Gwin is still a bit uncertain as Herb hasn't settled on the particular model appeal-

ing to the engine collecting fraternity.

MACRO VALVE

Whilst wandering around MECA, your scribe encountered Bill Crenshaw who was displaying the Macro Valve under the title of Shelby Tool & Engineering Co., 43 N. McLane St., Shelbyville, IN 46176.

It's priced at approximately \$10 and is equipped with neoprene seals which will shut off gas, alcohol, and diesel fuels with no damage to the valve components.

A unique feature is the short throw required. The valve can be turned off with only a 20-degree arc. This allows dual operation off one servo.

FORSTER 99

Ralph Mroch and Les Payne report that Forster 99 engines are being produced in sufficient quantities to catch up with the original orders. Les also stated the work of converting Torpedo Glo-Torps back to ignition is working out nicely with the ignition parts presently in stock. If you have a Glo-Torp, you will be pleasantly surprised, as it will cost only in the region of \$50 to put it back into ignition shape.

BEAN FEED

As reported previously, after Monday's R/C flying, the Annual Bean Feed was held in the evening at the University of Wisconsin Union Hall building. This was a very nice setup, but as the boys were a little slow in coming, the food was slightly overcooked. Some of the hamburgers finished up a little tough. You can't please 'em all!

FREE FLIGHT O/T EVENTS

Tuesday morning saw an increase in activity as the free flighters made their presence felt with twenty-two events to be run within three days! Holy sufferin' catfish! Just to fly in half these events would be a superhuman effort. This was particularly true in view of the windy conditions which made retrieving a real chore.

The free flighters had a real laugh at the expense of the R/C boys who refused to fly on Wednesday, probably the high-point of the windy days. What the free flighters failed to appreciate was the fact that radio jobs which took off from the small, mowed clearing had to land in the same area. Otherwise a zero-zero official

flight!

R/C OLD TIMER EVENTS

With a 20 mph gliding speed in a 25-30 mph wind speed, the distinct probability of a "zero flight" was a rather foregone conclusion. As it turned out, the scrubbed events were run the next day. This was at the expense of more than one competitor as some of the frequencies had as much as nine or ten pins (pilots) on them.

To save time, many models were pre-processed as seen in Photo No. 10. There's Willard "Buck" Zehr, Contest Director, recording the weight of the Lanzo RC-1 of Jack Ross. This 1936 design, by our old friend Chester, was approved by the SAM Board of Directors as an Antique Class model, eligible for Texaco. Jack Ross, SAM 39 member, claims this very simple model flies simply great!

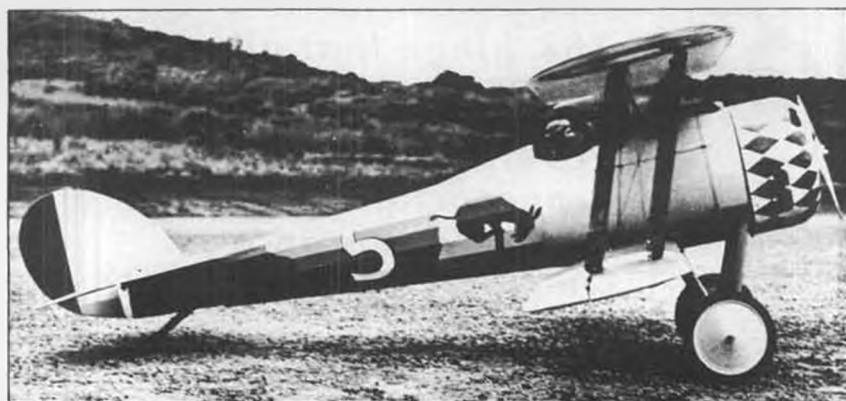
The design was also popular in scaled sizes as we see in Photo No. 11. Jack was quite successful, winning second place, in the 1/2A Texaco event a tough event in which to place. SAM 39 members were particularly noticeable with their various Lanzo designs of the *Record Breaker*, *Bomber*, *R/C Stick*, and *R/C-1*, all full-size and scaled. All entries did quite well.

Observed on the edge of the mown grass was Chuck Schooley's *Gas Bird*, so it was recorded for posterity in Photo No. 12. Chuck and his son David had identical *Gas Bird* models. Results show that Dave beat his dad in the Texaco event. Chuck, who hails from Toronto, Ontario, Canada, is a member of the SCAMPS (SAM 13) in Southern California. The only other SCAMP member at the Champs was Sal Taibi. The SCAMPS can be proud of both!

BACK TO THE F/F O/Ts

Meanwhile, back at the ranch, sorry, free flight side of things, Photo No. 13 shows Clif Betz from New Orleans, Louisiana, who turned out to be the overall Free Flight Sweepstakes Champ.

Because of the high winds, only two-minute flights were allowed. This made for some pretty terrific competition as five competitors tied for first place in Rubber Stick, four tied in 30-Second Antique, three tied in Class A Pylon, two tied in .020 Replica, same as Class C



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Pylon. There were fly-offs all over the place!

(Same story in R/C-ville, there was a five-man fly-off in Class C Glow, four in Antique Glow, and two in Class B Ignition. No question about the competition. Winning was no fluke. The winners came well prepared and flew at the right time.)

Getting away from the hot-shots, we would like to run a series of photos of the also-rans. If it wasn't for the also-rans, the winners wouldn't look so good!

Photo No. 14 shows Earl Hipp of North Platte, Nebraska, posing with an Ace Whitman *Falcon*. We have previously published pictures of the cabin version, the *Albatross*, but apparently the boys have been overlookin' this good bet. It's a good, stable flier for that wud!

Ever since Frank Zaic put out a new 1934-39 *Model Aeronautic Year Book*, the *Convertible*, a rubber cabin design by Tad Dietrich, has turned out to be a popular selection. It's ideal for the 36-inch Cabin Commercial event, as can be seen from the long length of rubber available. Makes a fine flier! Richard

Thompson in Photo No. 15 will attest to this.

Another good-flying rubber stick job that the boys are overlooking is the Australian *Record Stick* as published in Zaic's 1938 *Model Aeronautic Year Book*. This is shown in Photo No. 16 with Hans Ochsner holding his way-up flyer from down under. Hans is standing on the uncompleted Bong AFB runway and the general background gives one some idea of the flying area. Good for the Midwest boys, but the California boys and other western types wouldn't consider the field as a good picnic ground!

Bob Bissett caught Bob Larsh and the rest of the SAM board of directors off base when he produced this early prototype *Zipper/Mercury* model as shown in Bob Larsh's article in *MAN* which traced the derivation of the *Zipper* and such associated Goldberg designs.

Larsh quickly reacted to this design being entered, and he immediately called a director's meeting for a vote to approve the design as an Old Timer (not Antique). This was quickly done, and the plane can be seen in Photo No. 17.

This design has all the earmarks of a good-flying ship and will eventually be available when we can get Bob Bissett to part with his sketches. Bob makes no secret of the fact that he took the three-views as developed by Bob Larsh and blew 'em up photographically. Couldn't complain about accuracy.

As pointed out, the free fliers were lucky in that the wind blew straight down the old runway most of the time. If the model went long enough, it could drop into the lake at the far end. Photo No. 18 shows this quite graphically with Larry Nigh holding an Ohlsson 23 powered *Garami Skylark*. This little-seen design, is a fine flyer, but most modelers do not enjoy the prospect of a gull wing breaking off in a steep spiral. In reality, the wing is a lot stronger than credit is

given. Larry's model survived the winds quite well!

Getting on with the picture parade, we present another rarely-seen rubber cabin model, the Alvie Dague *Tulsa Rocket* as faithfully reproduced by Larry Lehrman of Des Plaines, Illinois. The model seen in Photo No. 19 flies great according to Larry. Sorry, no plans are available yet. You will have to use Frank Zaic's 1938 *Model Aeronautic Year Book* to scale it yourself.

Probably the most surprising event to this columnist was the Jimmy Allen event and the pains the contestants went to in carefully reproducing their Jimmy Allen models, even to the large wheels! Such is the case in Photo No. 20 showing Joe Barrette with a Jimmy Allen *Sky-raider*. Although Joe failed to place, his enthusiasm for the event remains undiminished. Joe says we should have more fun events like Jimmy Allen, Earl Stahl only, Henry Struck designs, etc. This really brings out the fun.

Well, we have been yakking about the contest, the models, and the characters who participated, but the reader eventually asks "Well, what went on otherwise?" For those desiring to know what is going on in SAM businesswise, a short synopsis is offered.

ANNUAL SAM MEETING

As usual, SAM being primarily a mail-exchange organization, the annual business meeting always brings out a good number of SAM members.

Highlights of the meeting were the announcements of the new officers for 1984-86. They are: President Sal Taibi, Eastern V.P. Woody Woodman, Midwest V.P. Bob Larsh, Rocky Mountain V.P. James Thomas, Western V.P. Jack Jella, Secretary/Treasurer Richard Williams.

The newly adopted policy of running the R/C events over a four-day period with the first day devoted to Texaco was extended to include 1986 by unanimous approval. The following SAM Champs dates have been approved: 1985 West Coast SAM Champs, Madera, California, June 17-20, Contest Manager Jack Jella; 1986 East Coast SAM Champs, Westover AFB, Chicopee, Massachusetts, over the July 4th holidays. Contest Manager George Armstead.

The foregoing is rather unusual inasmuch as it's the first time the SAM Champs dates have been awarded for more than one year in advance. You have plenty of time to plan that vacation now!

That's about enough of the contest chatter, so what better way to wrap up this column than with Photo No. 21 showing Earl Stahl's *Hurricane* as created by Larrie Schaeffer. Larrie came to Bong with the avowed intention of winning the Overall Free Flight Championship, but things didn't work out that way. So, Larrie will be shooting for the West Coast Championships.

Well, you have been patiently waiting for it . . . so here are the results of the mighty 18th SAM Championships at Bong Field.

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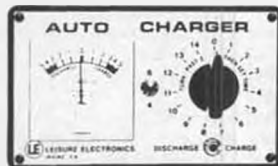


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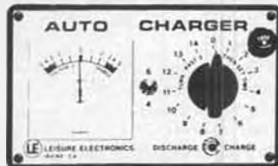
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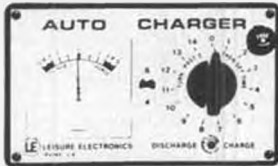
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- 1/2A TEXACO
- Bruce Norman (Ehling) 1800
 - Jack Ross (Lanzo) 1693
 - Wayne Belcher (Interceptor) 1527
 - Jim Reynolds (Playboy) 1434
 - Roger Laprille (Fly Baby) 1429

TEXACO

- Bruce Norman (Dallaire, OS 60 4C) 3093
- Jim Kynco (Anderson, OS 60 4) 2585
- Bob Walters (Lanzo Bomber, Orwick) 2005
- Dave Schooley (Gas Bird, OS 60 4C) 1998
- Harley Hoffman (Lanzo Bomber, OS 60 4C) 1806

CLASS A IGNITION

- Joe Percy (Kerswap, McCoy 19) 855
- Bruce Norman (Brigadier, O & R 19) 824
- Bob Walters (Lanzo Bomber, Hornet 19) 610
- John Lange (Interceptor, OS 20) 465
- Don Schneider (Thermal Thumber, Arden 19) 245

CLASS B GLOW

- Joe Beshar (Fox, K & B 29) 1198
- Jim Reynolds (Playboy, ST 29) 1173
- Wayne Belcher (Kerswap, K & B 29) 1130
- Jim Kynco (Kerswap, K & B 29) 1068
- Richard Huang (Playboy, K & B 29) 1048

CLASS C IGNITION

- Buddy Tanner (Playboy, O & R 60) 1239
- Joe Percy (Theoradical, O & R 60) 1233
- Richard Thompson (Bomber, O & R 60) 1220
- Bruce Norman (Kerswap, Torp 32) 1160
- Jim Kynco (Anderson, McCoy 60) 1151

CLASS A GLOW

- Jim Reynolds (Playboy, K & B 19) 1260
- Arthur Peterse (Sailplane, Veco 19) 1216
- Richard Huang (Playboy, K & B 19) 1190
- Jim Kynco (Kerswap, K & B 19) 1150
- Joe Percy (Kerswap, K & B 19) 754

CLASS ANTIQUE IGNITION

- Jim Reynolds (Cumulus, Anderson) 1462
- Chet Lanzo (Bomber, Cyke) 1346
- Bob Walters (Lanzo Stick, Orwick) 1271
- Fred Quederfeld (Bomber, Anderson) 1106
- Richard Thompson (Scram, O & R 60) 1035

CLASS ANTIQUE GLOW

- Jim Kynco (Anderson, Rossi 60) 3646
- Bruce Norman (Dallaire, Rossi 60) 3536
- Richard Huang (Cumulus, OS 60) 1800
- Joe Percy (Cumulus, OS 60) 1800
- Wayne Belcher 1747

CLASS C GLOW

- Jim Reynolds (Playboy, ST 35) 1961
- Bruce Norman (Playboy Cabin, KB 35) 1793
- Richard Huang (Playboy, KB 35) 1753
- Roger Laprille (Bombshell, ST 35) 1753
- Arthur Peterse (Playboy, KB 35) 1260

CLASS B IGNITION

- Chet Lanzo (Lanzo/Forster 29) 1549
- Robert Waller (Lanzo/Forster 29) 1542
- Bruce Norman (Kerswap/Torp 29) 1249
- Joe Percy (Kerswap/Torp 29) 998
- Richard Huang (Kerswap/Torp 29) 730

FREE FLIGHT

CLASS C PYLON

- Mitch Post (Zipper/Torp 32) 455
- Elmer Jordan (Sailplane/OR60) 360
- Dan Daugherty (Sailplane/Spitfire) 351
- Woody Bartelt (Zipper/OR33) 333
- Jim Robinson (Sailplane/OR60) 319

CLASS A CABIN

- Jim O'Reilly (Cabin Ruler/OS15) 314
- Wayne Cain (Dodger/Arden 19) 308
- Jim Walston (Cabin Ruler/Arden 19) 305
- Sal Taibi (Diamond Demon/Hornet 19) 283
- Bob Edelstein (So Long/Arden 19) 245

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- Robert Bissett (Zipper/OR29) 323
- William Bell (Trenton Terror/Brown) 233
- Woody Bartelt (Powerhouse/Spitfire) 204
- John Bortrak (Folly II/OR60) 26

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- Jim O'Reilly (Eugene II) 351
- Bill Franklin (Korda) 336
- Ed Konefes (Korda) 335
- Bill Baker (Korda) 315
- Robt. Bissett (Johnson) 291

NOSTALGIA, CLASS ABC

- Bob Edelstein (Spacer/Fox 35) 334
- Larry Ellis (Happy Days/OS15) 321

- Ron Beranck (Hogan/Fox 35) 272
- Dan Daugherty (Spacer/McCoy 19) 189
- Bob Watson (Zeek/OS15) 120

SLAG EVENT

- Bob Edelstein (Ranger/Roger 35) 303
- Ted Dock (Viking/Thor 29) 285
- Tim Banaszak (Cyclone/Thor 29) 130
- Bill Baker (Coronet/Thor 29) 96
- John Bortrak (Alert/Thor 29) 11

JIMMY ALLEN EVENT

- Jim Noonan (Bluebird) 86
- Jim Alaback (Bluebird) 82
- Larry Schaeffer (Bluebird) 67
- Karl Spielmaker (Sky Raider) 52
- Mike Moskow (Bluebird) 50

020 REPLICA

- Willard Smitz (So Long) 480
- Larrie Schaeffer (Strato Streak) 360
- Bob Edelstein (So Long) 352
- Ted Dock (Red Ripper) 349
- Larry Willis (Kerswap) 345

CLASS A PYLON

- Cliff Betz (Snuffy, Arden) 316
- Jim Walston (Stormer, Arden) 300
- Elmer Jordan (Interceptor, OR 19) 300
- Bob Edelstein (Interceptor, Arden) 298
- Dan Daugherty (Ranger, Hornet 19) 278

CLASS B CABIN

- Cliff Betz (Dodger, McCoy 29) 360
- Wayne Cain (Dodger, OR 23) 315
- Jim Robinson (Dodger, OR 29) 314
- Ed Konefes (Cloud Snooper, OR 23) 306
- Bob Edelstein (So Long, Forster 29) 279

SCALE, GAS POWER

- John Bortrak (DeH 4, Cox 09) 187
- Larrie Schaeffer (Piper Cub, Cox) 141
- Ted Dock (Taylor Cub, Wasp) 119
- William Bell (Taylor Cub, Cox 02) 101

HAND LAUNCHED GLIDER

- Bill Baker (Zoomer) 210
- Bob Larsh (Thermic 20) 186
- John Bortrak (Zoomer) 159
- Otto Curth (Hervat) 134
- Larrie Schaeffer (Halert 38) 127

COMPRESSED AIR EVENT

- Tom McCoy (Kingbird) 87
- Karl Spielmaker (WW-2 Drone) 76
- Ed Konefes (Original) 11
- Tim Banaszak (WW-2 Drone) 5

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- Larry Willis (YoHo, Cox 049) 323
- Jim O'Reilly (Scimitar, Hornet) 313
- Bill Baker (Spacer, Hornet) 237
- Guy Eaves (Fu Bar, Cox 049) 52

COMMERCIAL RUBBER EVENT

- Jim O'Reilly (Altimeter) 360
- Richard Thompson (Convertible) 354
- Ed Konefes (Convertible) 309
- Bill Franklin (Sparky) 306
- Rob Moulton (One-and-a-Half) 303

CLASS C CABIN

- Sal Taibi (Playboy, OR 60) 360
- Les Payne (Playboy, Cyke) 340
- George Armstead (Bombshell, OR 60) 317
- Bob Edelstein (Dodger, Forster 305) 306
- Ted Bieber (Clipper, Madewell) 245

CLASS B PYLON

- Woody Bartlett (Hayseed, OR 29) 466
- Cliff Betz (Kerswap, McCoy 29) 332
- Ted Dock (Zipper, Torp 29) 331
- Jim Robinson (Alert, OR 23) 329
- Mitch Post (Zipper, Torp 29) 325

30-SECOND ANTIQUE EVENT

- Mitch Post (Anderson, Spitfire 65) 480
- Robert Bissett (Rambler, OK 60) 473
- John Bortrak (Gas Bird, OR 29) 451
- Ed Ranguis (Anderson, Orwick 64) 445
- Bob Edelstein (Gulf, Super Cyclone) 320

RUBBER STICK EVENT

- Ed Konefes (Lanzo) 1012
- Bob Watson (Lanzo) 897
- Joe Macay (Cassando) 691
- Jim Rummery (Stickler) 629
- Bill Baker (Lanzo) 551

SCALE RUBBER

- Larry Schaeffer (Interstate) 175
- John Bortrak (Skyfarer) 119
- Jack Tisnai (Fairchild) 96
- Eric Anderson (Caudron) 66
- Jim O'Reilly (Interstate) 65

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OHLSOHN 19/23 CABIN EVENT

| | |
|------------------------------|-----|
| 1. John Bortrak (So Long) | 296 |
| 2. Jim Walston (Cabin Ruler) | 207 |
| 3. Elmer Jordan (Coronet) | 244 |
| 4. George Armstead (So Long) | 233 |
| 5. Bob Edelstein (So Long) | 224 |

*All models used O & R 23's

TWIN PUSHER MASS FLY-OFF

| | |
|-----------------------------------|-----|
| 1. Bob Moulton (Zaic Streamliner) | LMD |
| 2. Bill Bell (Burnham) | |
| 3. Bill Baker (Burnham) | |
| 4. Willard Smitz (1937 Original) | |

SUPER OBIT NOTICE

On a proposal by SCIF member, Carl Hatrak, a list of the SAM members who died in the interval between SAM Championships was to be read out at the awards dinner and they were to be duly and properly toasted.

This columnist would also like to do so, and say (a la WW-I style), "Here's to the next man who dies." You will be surprised at the list, fellows.

| | |
|---------------------|--------|
| Tom Rice | SAM 49 |
| Ed Kelley | SAM 49 |
| Bill Hooke | SAM 27 |
| Rogers Barton | SAM 29 |
| John De Ford | SAM 1 |
| Jim Persons | SAM 21 |
| Howard Boys | SAM 35 |
| Independents | |
| Nathan R. Smith | |
| Tom Sutor | |
| James W. Roberts | |
| Phil Dembinski | |
| Lee Renaud | |
| Rudy Bender | |
| Sun Lau | |

To compound things somewhat, we have just heard from Jim Walston from

Georgia that Gerry Ritz (also known as Ritzenthaler) was killed in July flying one of this own production ultralights.

It appears the wing developed a flutter at 60 mph at about 50 feet altitude, naturally over a concrete runway. The wing separated, and Ritz lost his life at 68 years of age. All this happened near the Tullahoma, Tennessee, airport. One less Chicago Aeronut.

THE WRAP-UP

This columnist can think of no better way to conclude the report on the 1984 SAM Champs than to print the following letter:

Gentlemen:

Thank you for a really fine contest. I didn't fly, but that did not stop me from having a lot of fun.

I am the spokesman for the local group of R/C fliers (the bunch obtaining this field, flying after work, and flying on weekends) hence, I was most interested in the comments about the field.

I haven't heard a thing that would make me think I wasted time and money to get the field put in the park. This sort of appreciation makes any effort worth the while.

After the contest I went around to see what rubbish had been left and what there was to clean up. Nothing! Again, gentlemen, thank you for your kind consideration and please come again.

John, in conclusion, I could write for an hour and fail to express my gratification. I brought out two, young, active members of the Air Explorers Post on

Monday. What greatly pleased me was to see the two 16 year old boys sit and watch for a half hour. That is really an attention span for that age.

Now, so you can just put a face on me, I am the guy with the two, old Joe Ott kits in the rear of the Volkswagen: Richard A. Buege, 256 Robert St., Burlington, WI 53105

Ace FFC Continued from page 36

watch the polarity! The jumpers, or any prepared connectors spliced to the output cables should be no longer than two inches according to the Ace instructions.

Assembly of the kit version of the FFC is neither difficult, nor lengthy. The instructions are simple, yet precise; the printed circuit board is large with widely spaced lands. If one can solder acceptably and follow the prescribed sequence in the directions, the FFC will almost certainly work as designed and require only calibration upon being completed.

There is one slight departure from most other kits which is worthy of mention. The FFC uses a lot of high tolerance resistors, all plainly identified in the parts legend. However, instead of the normal three color code we are most familiar with, these show four, and in some case, five color bands. If that isn't enough, some colors, such as red and brown, can look confusingly similar under artificial light. If one is not used to

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working with electronic component color codes, it would be best to place all these resistors in the order listed in the parts legend, before any are soldered in, and check them off both on the list and on the printed circuit board layout pattern one by one as you install them.

The completed kit version of the FFC will require calibration, the proper setting of two small variable resistors. The calibration procedure is not complicated, requiring only the reading with a meter across two easily located test points, and the adjustment of the pots to a given voltage. The procedure does require either a digital volt meter, or a good analog meter capable of accurate measurements of exactly .25 volts. In-

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accuracy here can lead to either over or under charging, so take your time.

As a matter of fact, inaccuracy in calibration is so unacceptable that a test procedure is included, to assure proper operation and to compensate for the variations inherent in voltmeters and test setups. Even so, nothing other than the equipment already mentioned is necessary, plus a little patience and a steady hand with which to set the position of the pots. And, oh yes, you should have a good, freshly charged, 12-volt battery to power the FFC with while calibration is taking place, as it determines the entire operation of the system.

THE CIRCUIT

In electronics, small size no longer indicates simplicity . . . a fact we can thank the integrated circuit for. Our best example of this is the common servo, a highly sophisticated mix of electronic and mechanical principles and practices, which works at extremely short time pulses and high tolerances . . . and yet, look at the size and precision available!

The FFC, though mechanically simpler than a servo, is also highly sophisticated electronically, working on very small voltage changes which it must sense and act upon. Current flow is through a TIP-32 high power transistor, whose base is driven by an IC to permit exactly 500 ma emitter current flow, which also flows through the battery. Sensing is done by another section of the four part

integrated circuit. This turns off the first section and thus the transistor when the battery voltage reaches a preset value.

Operation is simple and foolproof: the FFC can be used as either a fast charger at 500 ma or a slow charger at 35 milliamps, determined by the plug-in/turn-off sequence, as detailed in the instructions. In the fast charging mode, automatic reduction to the lower rate takes places at the proper time, monitoring is not required.

It should be remembered that all Ni-Ni-Cd cells are not recommended for fast charging. Be sure to review the owner's manual for your particular equipment or check with your battery supplier before you subject your cells to the fast charge rate. The FFC can be an extremely useful device to top your batteries off for unexpected or extended flying sessions, but is not recommended for routine charging; your system's overnight charger is best for that purpose.

The Ace FFC is available from Ace R/C, Inc., P.O. Box 511D, Higginsville, MO 64037, (816) 584-7121. For further information call or write to Ace. Send \$2 for catalog of Ace products.

Next month, we will cover, no, not another charger, but a most useful device to insure that all of the chargers we have reviewed in the past few months, and your batteries themselves, are doing their job and will not leave you without those precious electrons when you most need them. We are going to discuss the Ace R/C Voltmaster, a four-range expanded scale voltmeter which you can use to accurately test your batteries for proper voltage, under the recommended loads. You're expected!

Friendship . . . Continued from page 19

Each member of the American team was presented with a beautiful cloisonne vase and stand.

We returned to our hotel for some much needed rest, before our second day in Beijing, which was Monday, June 18. After a seven o'clock breakfast, we visited the Emperor's Summer Palace.

Adjustable, 1:8 scale
varilok ball differential



Wally Bailey



Phil Booth



Rick Davis



Rick Davis



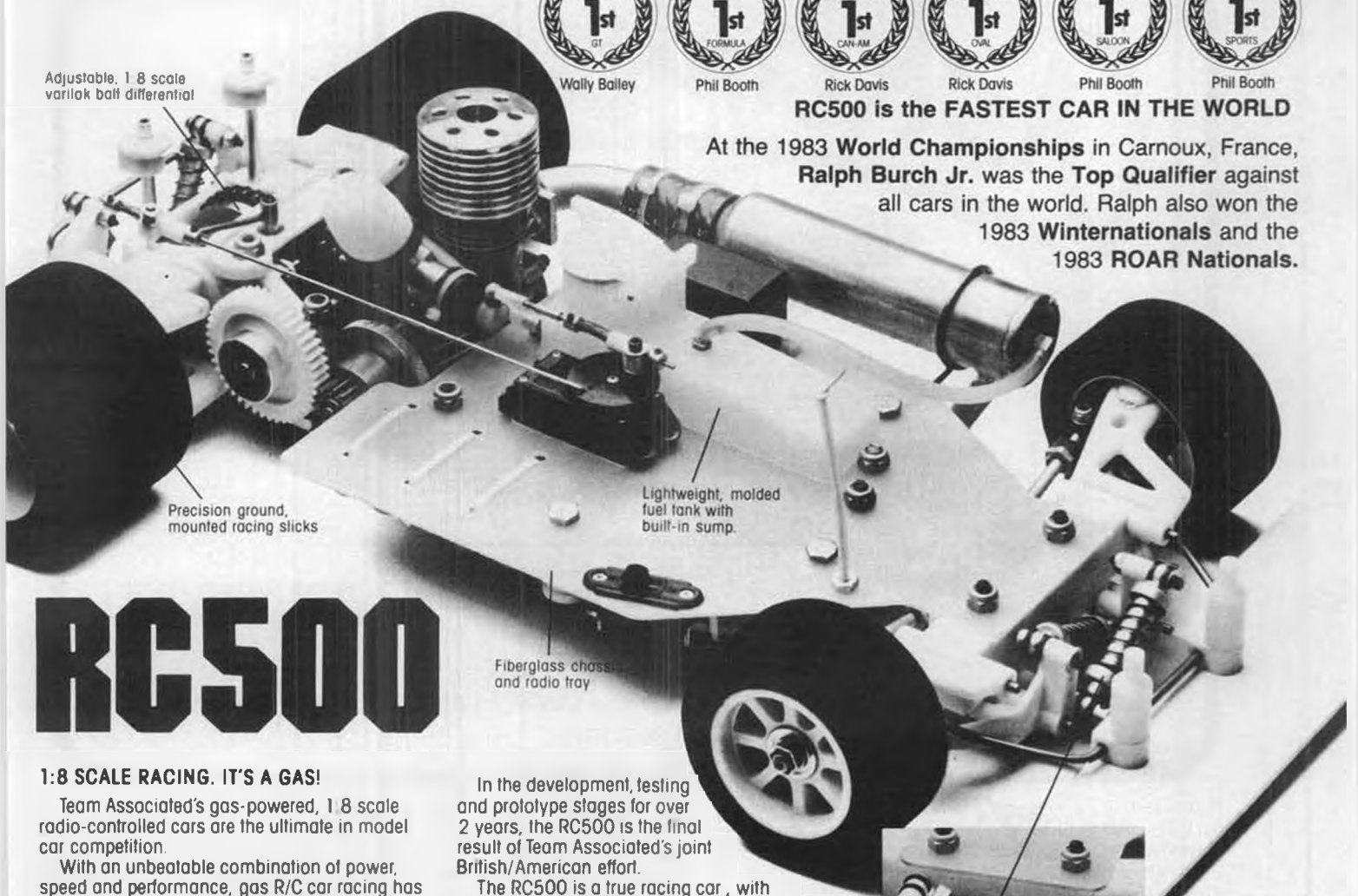
Phil Booth



Phil Booth

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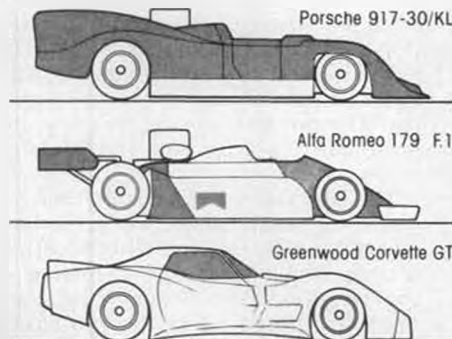
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THE RC500. ANOTHER WINNER.

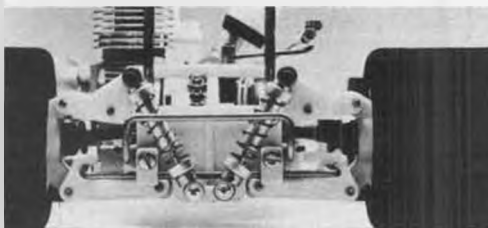
For all the pride and satisfaction there is in building and driving the sophisticated RC500, there is still nothing quite like the thrill of victory.

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This was truly a magnificent place with its lake and buildings of impressively carved architecture. Our visit included a boat ride which added to our appreciation of the area.

Lunch followed at our hotel, after which I took some pictures from our 19th floor window. It was a great view which showed a very clean city, with little traffic from cars, and the use of many bicycles. I was very impressed with the friendly and happy Chinese people, and their patient and courteous manner with our group.

In the afternoon we toured the Palace Museum, originally the Imperial Palace, and popularly known as the "Forbidden City" in the old days. This was the permanent residence of the emperors of the Ming and Qing (formerly called Ching) dynasties. Built in 1406-1420, the magnificent palace has a history of 560 years from 1420 to 1911 when Pu Yi, the last of the Qing emperors, was overthrown. A total of 24 (14 Ming and 10 Qing) emperors lived here and exercised feudal autocratic power over the country for 491 years.

The palace retains, to this day, its original layout and covers an area of about 720,000 square meters, including 9,000 compartments with a total floor space of 150,000 square meters. It has more than 900,000 pieces of art treasures of all periods of Chinese history: jewelry, traditional paintings, bronzes, ceramics, and arts and crafts of the Ming and Qing dynasties.

The next thing on the day's agenda

was shopping at the Beijing Friendship Department Store. Here, a few purchases were made by various members of our teams. Our interpreter and companion was Jian Xiong Chou, a young man who spoke fluent English and was very friendly and helpful throughout our travels.

At 11:30 p.m. we boarded a train with sleeping compartments and traveled for nine hours to the city of Zibo, which was the site of the free flight competition. Zibo is situated in the middle part of Shandong Province and covers an area of 2,914 square kilometers. It has a population of 2,230,000 and is famous for its rich resources, flourishing industry, and cultural relics. It is also renowned for its manufacture of pottery and porcelain, colorful silk and glass art wares.

The Zibo Guest House, which was our home for several days, was a modern, impressive hotel, with high-ceiling rooms, which gave one a feeling of spaciousness. We checked in about noon on Tuesday, June 19, and after a quick lunch, we left for the field, to do some flying. The weather was good, and the field was reminiscent of Wiener Neustadt, Austria, with its close cropped grass and very distant trees in all directions. I might note here that this field is definitely a world-class competition field in every respect. Hopefully, someday, the Free Flight World Championships can be held there. All the team members proceeded to check out their planes . . . in fact, this proved to be our

only real chance for final adjustments and practice before the contest. The only one who experienced some difficulty was Lee Hines. His glider wing broke on the zoom, and this being a complex repair job, it would have been difficult for Hines to do it. One of the Chinese glider flyers, whom Hines had met in 1979 at Taft, offered to repair the wing and did so, in time for him to fly it the next day.

After this brief period of test flying, we were taken back to the hotel. That evening we attended a formal banquet with high ranking city officials. Bill Hartill had provided our team with a copy of his marvelous book, *Free Flight Review*, to be presented to the Chinese flyers. I was able to do this at the dinner, and they received it with much appreciation, as they had not previously read the book.

We went back to the field on Wednesday, June 20, for the opening ceremonies. We never dreamed that the opening ceremonies would be on the scale that it was. As we drove to the field, we noticed an increase in buses and people walking along the road, and the closer we came to the field, the more crowded and congested it became until the road was completely blocked with *thousands* of children, their parents and teachers, also older people. They were going to the opening ceremonies!

Men and women sky divers provided a colorful scene. The first group consisted of three girls, one of whom presented John Grigg with a bouquet of

flowers, which he carried all the way back to the US. The parachute jumping was followed by a demonstration of Control Line Stunt flying, which included our own Bob Baron. After this there was also a demonstration of R/C Pattern flying.

When the opening ceremonies were over, and most of the people had gone back to town, we took care of the processing requirements for free flight. We were given little tissue insignias to attach to the wing, tail, and body of our planes. Our motors were to be weighed the next day inside a bus, as we had not been notified to take them to the opening ceremonies.

In the afternoon we had time to do more testing, but the weather proved rather windy, and there were many people walking around which made it rather dangerous. However, some of the flyers chose to do so anyway. We had hopes of being permitted to do a little testing the next day, which was Nordic day, but this was not allowed.

Thursday, June 21, was Nordic day. The weather was overcast and there seemed to be very little wind. We arrived at the field in plenty of time for some test flights, and the planes looked in trim. There was a fine mist falling, so it was rather humid. In the first round, Hines flew first and maxed. Drake followed, also with a max. This continued through Round 4, which finished the flying until after lunch.

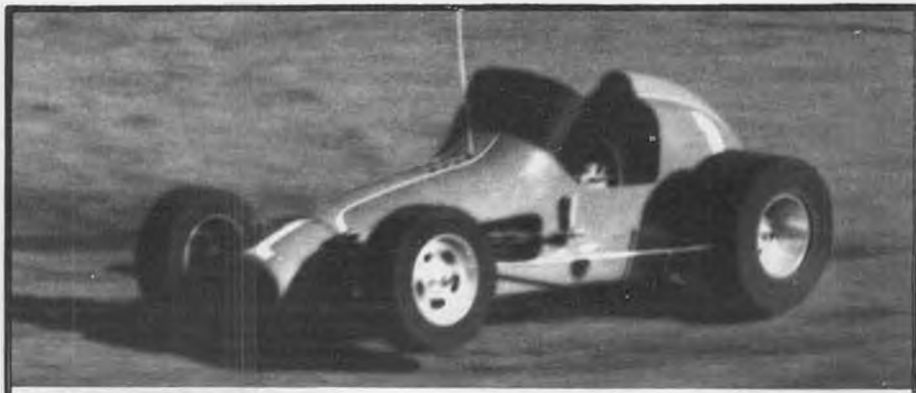
The Chinese flyers also had four maxes.

With the exception of our two Nordic flyers and C.C. Johnson, who remained on the field to prepare for Round 5, the rest of us went to the local town for lunch.

After the break, a fine rain began to fall. In Round 5, Hines maxed, but Drake missed it, as did one of the Chinese flyers. Round 6 produced three maxes, two for us, and one for the Chinese team. In Round 7, Drake dropped nine seconds, and Hines maxed out. Each of the Chinese flyers maxed in the last round. Liang was the only one to max out all flights.

The fine rain continued, and the planes were thoroughly soaked. In the fly-off about an hour later, Hines had 109 seconds on the four-minute attempt. Liang had 224 seconds, thus winning F1A in our five-man contest. Hines was second, and Guo of China, was third. I might add here that our contest was held in conjunction with the Chinese Nationals, which had approximately 70 entries in F1A. The caliber of flying was excellent, as they went on beyond the four-minute fly-off max. We did not get those results, but our part of the competition in F1A was over.

On Friday, June 22 (Wakefield day), Schroedter and I left for the field, ready to give our best effort. We were able to make one test flight, both of which looked proper. Schroedter chose to go first in the round, and his first flight was a max. Later, when I flew my plane, it stalled and I missed the max. Both teams



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had perfect scores in the second and third rounds. Schroedter maxed the fourth, but I missed again. The fifth, sixth and seventh rounds were all maxes for the US. Wang, Zhang, and Li of China had perfect scores.

Having maxed out, Schroedter was in the fly-off with the three Chinese flyers. He and Wang made the four minutes, while Zhang had 214 seconds, and Li had 187 seconds. On the five-minute attempt, Schroedter scored 249 seconds and Wang made 257 seconds, which won the event for him with a total of 1757 seconds. Schroedter finished in 2nd place with 1749 seconds, which was very commendable. Tao Zhang, of China, placed 3rd with 1474 seconds. In the Nationals portion of F1B, approximately 25 flyers maxed out. In their fly-off, two flyers made their six-minute attempt.

The F1C event was held the next day, Friday, June 22. The weather was the same as on Wakefield day, calm and cloudy. In the first round everyone had maxes. In the second round, Clarence Haught had 179 seconds! The remaining flyers maxed. The third round brought maxes to both teams. Sifleet missed the fourth max, while each of the other four made 180 seconds. We had five maxes again in the fifth round. Haught missed the max in the sixth round, and each of the others made it. On the last scheduled round of the day, each of the flyers achieved a max.

Only the Chinese flyers were in the

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fly-off, and they all made their four minutes. Two missed the five-minute attempt, with Chen making 275 seconds, for second place. Li scored 261 seconds, and finished third. Dong succeeded in making the five-minutes, but on the six-minute attempt, in competition with those flyers in their Nationals, he made 263 seconds. However, he was first in competition with the American team. In the Nationals, 26 maxed out from a field of approximately 60 entries. We learned that four achieved the six-minute max, but because of darkness, the fly-off had to be resolved the next morning.

The Power flyers used either a Chinese engine or the US made Nelson engine. Almost without exception, the flight

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patterns were the bunt configuration. The planes seemed to have an excellent glide with an average-sized circle. If I have an impression of this whole experience, it is that the Chinese flyers are every bit as good as anyone in the world, and in some cases, better.

The day after the competition, we went sightseeing in Zibo. We were taken to a very interesting and typical commune where the people work and live together. We particularly enjoyed the visit to a school where a group of small children sang for us and gave each of us a pink paper flower. That evening, we boarded the train for a 12-hour night trip to Shanghai. We noticed that live steam locomotives are still used in China, and obviously, some of these are quite new.

The Shanghai Mansion, where we stayed, was quite comfortable, and the meals (as usual) were excellent. Monday, June 25, was a day to take it easy. This was the time for us to do some shopping, and then after dinner, to get to bed early and catch up on sleep.

On Tuesday, the 26th, our control line team went to the field early to test their planes. Opening ceremonies, which

were at 8:30 a.m. consisted of a lineup of both teams, an introduction of the officials, and the delivery of several short speeches. The competition then followed in a well-organized and professional way.

As the day progressed, our flyers performed with skill equal to that of the Chinese teams. Bob Baron and Bob Whitely did a fine job in the Aerobatic event. Whitely sustained damage to the bellcrank on his plane, which was due to a defective pull-test fixture. It was partially repaired and gave him some difficulty on certain maneuvers. Bob Baron was judged second place, and Zhang won first place.

On his second official flight in F2A Speed, Carl Dodge made excellent time, scoring 269.7, which bettered the current US National record, and won second place for him in the competition.

Our F2C Team Race competitors, Tom Knoppi and John McCollum, proceeded through the preliminary races without problems and did quite well. On the final race, after the second pit stop, as it was launched, the plane hit Knoppi's knee, chipping the prop, and requiring a restart. This probably cost our team first

place in the Team Race event, as they were leading by a good margin. However, they did place second, and the Chinese team of Din and Li won first place.

On Wednesday, June 27, we went to the Aeromodelling Center in Shanghai, which was adjacent to the control line flying area. It is a three story complex with large rooms for building aeroplanes, and it has a large, temperature controlled machine shop facility. There is also a dormitory area for the young people attending the center.

That afternoon, we attended a symposium on control line and free flight flying. Most of the Chinese free-flyers were still at the National meet in Zibo. In the evening, we were scheduled to attend a performance by a very famous acrobatic group in Shanghai. This turned out to be more than that. It was a full-fledged circus, with jugglers, clowns, and performing lions.

The next day, the 28th, we spent sightseeing by taking a pleasure cruise out of the harbor and along the Hangpu River, which is 112 kilometers long to its outlet into the East China Sea. On a three-and-a-half-hour round trip cruise covering 60 km, the elaborate pleasure boat takes one all the way to the mighty Yangtze River, the third largest river in the world. Aboard the boat we could enjoy all the sights of the river: Chinese and foreign ships as well as the traditional junks. There was music to entertain us, as well as magic shows.

That evening we attended the farewell banquet given by the Chinese Aeronautical Sports Association. Each member of our teams was presented with another beautiful gift. Later in the evening, we said our good-byes and expressed our gratitude for their gracious hospitality throughout this fantastic trip.

The following day was spent in visiting the charming city of Soochow. It has many beautiful gardens, and an interesting history. It was a typical day of sightseeing, and though it was a bit tiring, it was well worth the effort.

Saturday, June 30, was departure day for the teams with the exception of Hines who left for home on the 29th. George Schroeder and I departed on July 1st for Tokyo, Japan, and for what proved to be a very fine visit with our FAI friends.

I left China with a completely different impression than what I thought would be the case. The Chinese Aeromodelling people are up-to-date and modern in every way. Technically, there isn't much in new development that they are not aware of, and their F1C planes are equal to, or better than the state-of-the-art in the rest of the world. Glider flying is all circle towing, with very good launch control, and a very high standard of performance. F1B is also equal to the state-of-the-art in the rest of the world. The majority of the planes utilize timer-actuated autostab and autorudder. Some make use of timer-actuated auto-wings (Jim Patterson pioneered this

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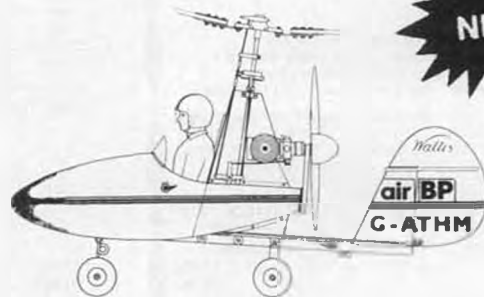
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device).
 It will be interesting to see how these flyers compare with the rest of the world at the next World Championships. We hope to be there to renew some friendships.

F2A RESULTS

June 26, 1984 Shanghai China

| Place | Team | Competitor | Round | | | Result |
|-------|---------|---------------|-------|-------|-------|--------|
| | | | 1st | 2nd | 3rd | |
| 1 | China | Zhu Yeng nian | 262.1 | 275.4 | 0 | 275.4 |
| 2 | America | Carl Dodge | 269.7 | 262 | 245.6 | 269.7 |
| 3 | China | Din Yi po | 244.0 | 0 | 0 | 244.0 |

Chief Judge: F2A Judge: Result Judge:

F2B RESULTS

June 26, 1984 Shanghai China

| Place | Team | Competitor | Qual-1 | Qual-2 | Final-1 | Final-2 | Result |
|-------|---------|----------------|--------|--------|---------|---------|--------|
| 1 | China | Zhang Xiandong | 3011 | 2989 | 2962 | 3010 | 6021 |
| 2 | America | Robert Baron | 2922 | 2973 | 3001 | 2977 | 5974 |
| 3 | China | Zhu Yao nan | 2950 | 2934 | 2942 | 2928 | 5892 |
| 4 | China | Niu An lin | 2923 | 2872 | 2819 | 2907 | 5830 |
| 5 | America | R.J. Whitely | 2749 | 2858 | 2805 | 2818 | 5676 |

Chief Judge: F2B Judge: Result Judge:

F2C RESULTS

June 26, 1984 Shanghai China

| Place | Team | Competitor | 1st round | 2nd round | Final | Result |
|-------|----------------|--------------------------------|-----------|-----------|---------|---------|
| 1 | China | Din Zen qian Li Quan qiang | 3'41"95 | 4'0"39 | 7'36"54 | 7'36"54 |
| 2 | (A) America | John McCollum Tom Knoppi | 3'42"60 | 3'36"03 | 7'40"18 | 7'40"18 |
| 3 | China | Liu Dong ying Zhao Yao tang | 4'0"00 | 3'51"42 | 8'56"85 | 8'56"85 |
| 4 | China | Ao Wei liang Li Da Zhong | 4'06"50 | 3'51"58 | | 3'51"58 |
| 5 | (B) America | John McCollum Tom Knoppi | 4'16"11 | 4'18"41 | | 4'16"11 |
| 6 | China | Huang Yong Chen Zhi xiang | 5'54"51 | 5'22"00 | | 5'22"00 |

Chief Judge: F2C Judge: Result Judge:

6. When dry, remove pins holding ribs in place and glue top surface to ribs and to the bottom surface at the trailing edge. Leave tip unglued. Hold top down to ribs with rubber bands stretched from plans at leading edge to pins at corresponding points at trailing edge.

7. When dry, remove from table, block up center rib 2-1/4". press tip down so top surface touches bottom surface all around tip curve. Glue and pin in place until dry.

8. Sand smooth, fit center rib to center section rib at the proper angle for dihedral, and assemble wing.

The bottom wing is made the same way, except that the tip slopes up from the outboard rib. To glue the tip of the bottom surface to the top sheet, block up the center rib 1-1/4".

TAIL SURFACES. Cut out the stab, fin, elevators and rudder from 3/32" sheet, sand, and after they are doped the hinges can be installed. Reason for waiting until this point to install hinges is to keep them from becoming stiff from soaking up the dope. The whole tail assembly is glued to the top of the fuselage at the stab. Note that the elevators with the 1/8" joining dowel must be installed before the rudder is attached to the fin.

FUSELAGE. This is a pretty standard box construction, with the two sides built up and then joined with conventional cross braces. Only a couple of points need explanation. Note the section A-A where the side brace has a slight curve to give the proper contour to the sheet side as it rounds into the forward firewall curve. You'll have to wet the sides and mold them to fit the firewall, glue and let dry. Then you can cut the shaped piece of 1/8" sheet on which the windshield block rests and glue it in place. Also the block at the bottom, which is carved to fit the firewall and fair into the bottom where the landing gear brace is glued.

The 1/16" x 1/4" spruce sticks glued to the top of the sides, with notches for the rubber bands that hold the top wing in place, can be cut from Popsicle sticks.

With these two sticks jutting forward, the windshield is carved from a block of soft balsa which fits between the sticks, under the leading edge of the wing, and forward to the firewall, where a piece of tapered balsa is fitted, as shown, so the block can be removed without having to take off the top wing.

Note the offset for the engine mounting blocks. This takes care of the down-thrust and right thrust and results in the center of the propeller aligning with the center of the cowl.

As for the cowl, there are several alternatives. If you are fortunate enough to find one of the 3" aluminum cowls that used to be available, it'll be nice, although it will get dented in hard landings.

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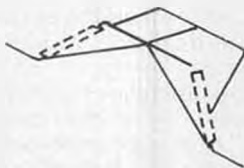
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and cut out the bottom. Tailor it to the right shape and fit it to the firewall like a bottle cap, hold in place with a couple of small screws. This cowl will survive all sorts of banging about. Make cutouts for the needle valve and the fuel tank intakes. Also, unless you want to rig up some wiring scheme to attach your booster battery, a hole will be required to get at the glow plug. I'm assuming, of course, that you'll be flying with the cowl on. You can fly the model without it, but it doesn't look nearly as well.

WING STRUTS. These are cut from 1/32" plywood. After you've finished the wings and fuselage, put them together, fit the struts in place, then glue small strut braces to the wing surfaces, located so that the struts are under slight pressure and have to be snapped in. Then you can fly the model with the struts mounted, and, in case of a hard landing, they'll snap out without damage.

LANDING GEAR. Here again there are several ways to make a semiscale gear. The whole structure can be made up from 1/16" wire:

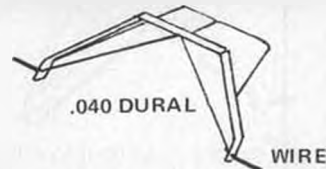
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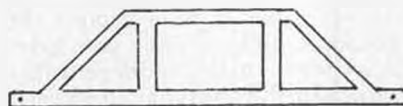
Then add balsa fairing to the main strut.

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2.



Or cut the whole pattern from dural,



and run the axle wire up to front top center.



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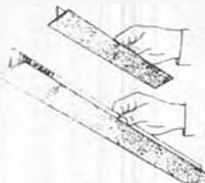


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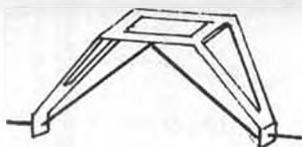
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sure the model isn't tail-heavy — and this may mean you'll have to add ballast at the firewall, because the nose is rather short. It's better to start off nose-heavy, if anything, to avoid the common stall and crash of the tail-heavy job. If it's nose-heavy, it will fly faster and may be hard to keep up with on the controls, but that's better than trying to keep turning it out of a stall.

Since the rudder and elevators are fairly large, they are very effective. Keep the travel down to ten degrees or less until you're familiar with the response rate. Also, a 1/16" droop in the elevator can make the difference between a stalling flight or a steady one.

Because of the large fin and rudder areas, the Waco, when trimmed, will hold a turn in either direction until opposite rudder is applied. Also, if the alignment is off, the turn in that direction will gradually build up into a spiral dive. Opposite rudder will pull it out, but you should re-trim your rudder before the next flight.

Hand launching is easy, due to the stagger of the lower wing. You hold the model by the rear landing gear struts and launch straight ahead and level.

Take-offs are fine, if you have a runway. Just be sure your wheels are straight and there is no binding.

UPDATE NOTES ON THE WACO

Most of you are totally unfamiliar with super-regen receivers and escapements, as mentioned in the original article. Too bad; you'd have a lot more appreciation for the modern day lightweight equipment. With an escapement, when you operated the controls, they went right to full throw; you couldn't "ease in a bit of up elevator." It was all or nothing. But you learned how to "blip" the controls — short blips for gentle action, longer blips for more violent maneuvers. It was, as they say, a "sporty course."

Also, twenty five years ago, we used nitrate dope, and then added a "fuel-proofer" to protect the finish. Butyrate with fuel resistant additives came later, as did the iron-on finishes such as Monokote.

Then too, fiberglass techniques were uncommon. Note the mention of "Celastic" to strengthen the wing joints. I don't even know whether it is still available, but, nylon tape is, so you could still

use that, or a strip of fiberglass tape.

One last observation. With the G-Mark .030, the performance is very realistic. You have to "fly it on the wings." It will not take off and climb straight up. If that's what you want, install an .049. But I don't recommend it. The full-scale Waco "E" was a fine performer. Don't spoil your model by making it a hotrock. The model's realistic appearance and performance is what makes it such a crowd pleaser . . . even when dwarfed by some of today's giant scale jobs.

Kids love it. At least this kid does! •

Robbe SF-36 . . . Continued from page 15

time I tried it. Then I read the instructions. If you set your iron around 240 degrees, it goes on as if you were buttering toast.

I used Pactra Formula U spray paint on the fuselage, after sanding lightly to roughen the plastic for better adhesion. The black forward section was brushed on. The stripes, including the tail stripes, were done with Goldberg striping tape. The Robbe decals go on great and have proven to be very tough. The wings and tail weren't painted because I ironed on the Micafilm with the shiny side up. They look great.

ONBOARD STARTER

One of the unique features of this machine is the optional onboard starter kit. It allows you to do scale operations: take off, kill the engine, thermal around a while, and fire back up when you lose lift. Between the fuel economy of the recommended Enya .40 four-stroke engine and the restart feature, you could stay up for hours, but try to use a frequency that no one else uses or you'll lose friends!

Installing the starter is much easier if you do it before gluing the firewall in place. Assembly of the electric motor and gearing system is straightforward. The starter shaft rides in a brass tube, which is cut to length and has a bearing fitted in the end after cutting. Keep this tube as long as possible to support the shaft. If the shaft flexes, it can break teeth from the nylon gear that fits over the motor shaft. It's a good idea to wrap a nylon zip tie band over the front of the crankcase and around the starter shaft to keep it meshed. The band doesn't have to be very tight, just snug.

There isn't enough room in the fuselage for the switch bracket that goes on the starter servo, unless you stick it way back by the aileron servo. I removed the microswitch from the bracket and glued it to the servo case at an angle, so that when the arm moves from one extreme to the other it hits the switch. A blob of epoxy on the end of the servo arm makes this easier. The retract switch controls it.

The nylon gear that fits over the motor shaft should be soaked for 24 hours or so in warm water. You soak it for the same reason you boil a nylon prop: it makes it less brittle. Don't boil the gear; you

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might expand the metal insert and deform it. Grease the insert thoroughly before soaking to prevent oxidation.

Another trick I've had recommended to me is soaking the gear (and nylon props) in antifreeze rather than water. Antifreeze does a better job than water, and won't rust the insert.

The engine must be run in and adjusted before trying the onboard starter. If you bought a new engine, run it for at least 45 minutes before trying the starter. You can fly the plane without the starter by removing the nylon gear from the motor shaft and substituting a spacer to clear the cowl.

The engine is side mounted, on a level with the fuel tank, and there isn't much tubing between the tank and the carb. This means that you'll idle rich, which is what four-strokes like. It also means that cranking is going to draw fuel into the engine quickly. If you over prime a four-stroke, you'll get backfiring; if you really over prime, you'll get hydraulic lock. Both of these are real problems for the starter. So, when you start the first time, flip the prop a few times with the throttle open to be sure the engine is relatively dry. For warm starts on the ground, pull

the prop through manually for safety's sake. In the air, let the engine cool down for 15 seconds or so before trying a restart. You should have no trouble, and the Enyas improve with age.

ENGINE NOTES: ENYA .40 AND .46 FOUR-CYCLES

The Robbe onboard starter system is designed to take the Enya .40 four-stroke. This engine has been discontinued, but there are still plenty of them around. It has plenty of power to pull the plane, even at the eight pounds, two ounces that I ended up with. Prop the engine as recommended in the instructions, and try for the largest diameter and lowest pitch you are comfortable with. A big, low-pitch prop will provide some braking effect at idle and greatly improve your landings.

As mentioned before, tune the engine carefully before trying the onboard starter. You may find that you need to open the airbleed screw on the carburetor a half turn or so to lean out the idle. Make all these adjustments with the engine mounted in the plane.

The Enya .40 four-stroke comes with an extra head gasket to reduce compression. I recommend installing it. Regap the valves after you do. I also recommend four-stroke fuel. I've had good results with Red Max 10% as an all-round four-stroke fuel. JMD's Pow-Fuel increases the high end and smooths out the idle. In a pinch, 15% two-stroke fuel will work fine.

Enya has replaced the .40 with their new .46 four-cycle, and I've tried it out in the SF-36. The .46 fits the same engine mount as the .40 if you sand the insides of the mounting arms slightly. Profile and layout are similar, except that you will have to cut a hole in the top of the cowl to clear the needle valve. That puts the adjustment in the handiest spot. The onboard starter kit that is designed for the .40 won't fit the .46 because the engine's shaft is larger; however, I'm

told that Robbe is producing a new nylon gear and prop nut to fit the .46. Once those parts are available, everything else will fit.

The Enya .46 itself is magnificent. It is similar in layout to the very successful .60, .90, and 1.20 Enyas. It has the same rocker box cover, the same cooling fin shape, and a similar muffler. You may want to leave the muffler off if you fly at a field where others are flying. I have had the experience of being dead-stick and not knowing it for two or three minutes.

The .46 takes a lot of different props happily: from 10-6 to 13-5. I broke it in on an 11-6 and 10% Sig fuel. After two tanks of this, I installed it in the plane and went to Red Max 10% four-stroke fuel and an 11-5. It's a first-flip starter.

Starting is easy because of a unique choking arrangement. There's a handle that extends out of the carb on the throttle side. When you pull this handle, it pulls the carb barrel off-center, covering up the big hole in the barrel and uncovering a machined groove. Pulling the prop through twice draws a precisely-metered, rich mixture into the cylinder, rather than the raw fuel that you get with a choke that totally seals the carb. Push the barrel back to its usual position, apply power to the plug, flip the prop with your chicken stick, and you're underway. It works like a charm. Why aren't all engines like this?

Don't choke any four-cycle if you use an electric starter. And don't start any engine larger than an .020 with your finger. I know, you've been doing it for years. But you know that sooner or later you'll get bitten. So isn't it kind of dumb to stick your finger into that whirling bologna slicer? Buy a chicken stick, or a piece of rubber hose.

To sum up the Enya .46, I would say that you will be hearing a lot from this engine. It is clearly designed to drop right into any .40-powered kit made. The easy handling will convert a lot of people to four-strokes. There's enough power to pull an eight-pound-plus plane with ease. It's a gem.

FLYING NOTES

As I said earlier, this is a different sort of bird. Unless you already have plenty of stick time on big, heavy, R/C sailplanes with ailerons, you'll be learning a whole new style of flying.

The ailerons seem sluggish compared to regular, sport R/C power planes because the wing has to push around a lot more air when the ship banks. You will get used to the slow roll rate more quickly if you anticipate where you want the plane to be and make your control inputs sooner. This is especially important in slow flight (like approaches) when the ailerons get really sluggish. Make long, straight approaches and use rudder to correct.

If you don't have rudder-aileron coupling in your transmitter, get a hold of a Jomar CAR unit. Start with about a 1/4-inch of rudder at full aileron. Or you can coordinate with the sticks, but it's hard to be very precise this way.

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- Overall lead length is approximately 6" to 8"
- Modeler must furnish own longer extensions as required

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Coordinated turns with rudder will allow you to make beautiful tight climbing turns. At about half throttle, it'll climb like a spiral staircase. And yes, the SF-36 thermals like a champ. If you don't have the onboard starter, knock the engine back to idle and see how it soars. You'll love it.

On your first flight, expect a long, low climbout. You may want to use rudder to get the wheels off. The tail comes up quickly, and the long body helps keep it from nosing over. Fly it up to a comfortable altitude and set your throttle to about one-quarter. Trim the elevator for this power setting, and make turns for a while until you're used to it. Experiment with your elevator trim. Elevator and throttle interact in the same way with this ship as they do with the full-scale motorglider.

Once you're more comfortable, practice approaches. You'll quickly see that flaring after a glide isn't a good idea unless you fly from a sod farm with 1000 feet of runway. Once you pull the elevator back, you're good for four or five hundred feet before the ship will settle. So make your approaches long and low, and learn to handle it at slow speeds. The SF-36 will slip, but it takes a bunch of rudder to do it and you may not be able to straighten it out fast enough. A better approach is to fly it right down onto the deck and let the grass slow it down. Stay off the elevator. The long tail helps keep it from nosing over once you're on terra firma.

Spoilers would be wonderful. I understand from Robbe that they will be offering a blade-type spoiler kit for their big foam wing sailplanes that would go into the SF-36 quite well. You simply dig a trench for it in the top of each wing. Actuation is push-pull so no bellcrank platform is needed. I've got my order in. If your transmitter is set up for it, you might also like to try flaperons. You'd have to have a servo for each aileron, but there's plenty of room for 'em. The ailerons aren't awfully useful at low speeds anyway, so developing them as flaps after you've established a straight approach would probably work fine. What the ship really needs is to throw out an anchor!

CONCLUSION

The SF-36 is a unique, delightful flying experience. There's nothing else quite like it. If you're ready for something different, this is it. Construction is simple, engineering is high-tech, and it looks great.

Robbe kits and supplies are distributed only through hobby shops. Your local dealer will have a catalog. Check with him; if he doesn't have it, he can get it quickly.

Soaring Continued from page 26

- tions which exist and/or are forecast for that day.
- C) The exact nature and length of the course will be announced by the organizer at a pilots meeting held on the day of the event. A different task may be used on each day of a multi-day competition.
- D) Minimum course length for a World Championship event shall be 20.0 Km. A World Championship event shall include at least three days of official flying.
- E) It is the responsibility of the organizer to provide sighting gates and observers at the turn points, if any.
- 5.64. Launching
- A) All launching shall be by electric winches which shall be set up and remain in a launching area designed by the organizer.
- B) Winches may be supplied by the organizer or may be supplied by the teams.
- C) Winches will be 12-volt launching systems with a maximum line length of 600 meters with the turnaround located 300 meters from the winch.
- D) The towline must be equipped with a pennant having a minimum area of 5 square decimeters (77.5 square inches). A parachute (5 sq dm minimum area) may be substituted for the pennant provided it is not attached to the model where it remains inactive until the release of the cable.
- E) More than one team may share the use of the same winch.
- F) Each team will provide and is responsible for its own line retrieval.
- G) To prevent lines from fouling on the ground, immediately after release from the sailplane, every towline must be wound down to the turnaround. Failure to do so will allow the organizer to add

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- Except for the Free Distance event, the fastest finisher is the winner of the task. If there are no finishers, the winner is the team which flew the longest distance.
- In Free Distance, the winner is the team which makes the longest distance flight.

B) When a team lands off course, an imaginary perpendicular line from the course to the landing spot shall determine the distance flown. A marker shall be placed by the official timer at the projected point on the course.

C) Score Computations:

- If there is a finisher:
 - Finishing team's score:
Score = 1,000 X (Ti/Tw)
 - Non-finishing team's score:
Score = Di/Dw X (slowest finisher's score)
 Where:
Ti = Team's time to finish the course.
Tw = Fastest time to finish course.
Di = Team's distance flown.
Dw = Distance of the task
- If there are no finishers, each team receives a score as below:
Longest distance flight = 1,000 points.
Score = 1,000 X (Di/Dw)
Where:
Di = Team's distance flown.
Dw = Longest distance flown.
- The overall winner shall be determined by adding together all the daily scores.

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on the new FAI event simply because, to my knowledge, it has never before been published in a US magazine. It is important that you photo copy these rules and place them in your AMA rule book for future reference. If you or your club are planning a cross-country race, these are the best rules ever devised, use them!

WESTERN GREAT RACE MINI REPORT

Tying in with the above cross-country FAI rules beautifully is this mini report on the Western Great Race held near Taft, California, July 13-15. This annual event was one of two major cross country races this summer (the other one being the Michigan International Soaring Society's Soar Cross '84.) The host for this contest was (and will be next year) the Thousand Oaks Soaring Society.

I was unable to attend either the TOSS club's Western Great Race or MISS club's Soar Cross, but for the former, I was able to obtain some photographs and a little technical information. I will share these with you in the form of photos with caption information and a few things of interest below.

The winner of this year's Western Great Race was Joe Wurtz. (I believe Joe was the winner of last year's race also, but it would take me too long to research that for confirmation.) Joe flew an original design of four-meters span (13.1 feet). It was unique in that it had slotted Fowler flaps on the inboard panels. It was a T-tail, polyhedral wing design using the Eppler 374.

As far as I know, this plane was given no name, but from reports I've heard, it could have been named the *Escalator* or the *Elevator* because of its fantastic rate of climb while thermaling. Its best L/D was probably no better than many of the other ships present, but what advantage it didn't have here it certainly made up for in the thermal stops. Larry Jolly at one point was in a neck-and-neck race with Joe and company. He reported that his *Comet* sailplane (soon to be released in kit form) was superior to Joe's in between the thermals by a noticeable amount, but Joe always thermaled up through him at each stop. The two teams leap-frogged down the course with Joe winning the last leg by virtue of his sailplane's early exit from the last area of lift. Larry will be adding a flap option to the *Comet* kit!

Speaking of the *Comet*, let's see what it is all about. The *LJMP Comet* has a wingspan of 178 inches (14.8 feet), a root chord of 11 inches, and a tip chord of 7 1/2 inches. It features the popular Eppler 205 airfoil and built-up construction. Its polyhedral wings are two-piece. There are two I-beam spars in each center section wing panel and one in each tip panel. Spar caps start out as 3/16 x 1/2 inch spruce. Shear webbing is multi-layered 1/16 ply at the root which gradually transitions to balsa webbing for stress-riser avoidance. Aspect ratio is 17.4 to 1, and Larry's *Comet* has a 10 oz/sq ft wing loading empty. Larry claims a redline of at least 100 mph for his ship as he has safely flown this speed without adverse affect. When ballasted to 11 pounds (FAI limit), the *Comet* has a wing loading of 14 oz/sq ft. Glide path control is provided for by spoilers.

Personally, I have observed this ship in flight only once. However, I was able to launch it, fly it, and land it, with Larry's per-

REASON FOR NEW RULES

At the end of the submitted rules proposal there was an interesting reason given for the adding of same. I quote: "A new task which correlates to full-scale practice, and offers new challenge in aircraft design and structure, as well as pilot and ground crew skill. Does not conflict with any existing rules or events. The rules have been well tested by annual contests in the USA since 1975, with entries from Canada, Switzerland, and South Africa who have competed."

I have included this rather lengthy section

a 5-minute time penalty to the flight time.

5.6.5. Flight Rules

- All launching sequences shall be at each team's discretion.
- Relaunches on the course are not permitted.
- Flight time for each attempt will begin only when the sailplane crosses the start line in the direction of the course. Prior to crossing the start line, the pilot is responsible to inform the officials that he is making a start. Flight time will stop when any of the following occurs:
 - The sailplane crosses the finish line;
 - The pilot declares the sailplane is lost;
 - The sailplane touches the ground.
- A team may change planes with no restrictions other than the initial assigned frequency must be used.
- Any number of attempts will be allowed within the contest time period. The best flight each day will be used in the final scoring.
- Once on the course, the chase vehicle(s) must travel the designated route except for possible off-course retrievals.
- The sailplane need not fly directly over the prescribed route. At designated turn points, if any, all turns must be flown outside of the course perimeter.
- In the event of on-course landings (less than full course length), the point of landing shall determine the distance flown.
- If the sailplane is destroyed in flight, or goes out of sight for a period not less than 5 minutes, the official timer will log its point of furthest progress up to that point.

5.6.6. Scoring

- The winner of each task shall receive



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mission. I have never seen anything like the Comet: it is the absolute QUIETEST sailplane at high speed that I have ever not heard! This thing has only the faintest of wind noise on a low pass at an estimated 50 mps. You almost do a double-take and try to clean the wax out of your ears with your pinky finger in disbelief. It's eerie! (Ha, ha.) What this means is that the Comet is a very aerodynamically "clean" ship.

Larry demonstrated the Comet's aerobic ability (yes, as in stunts) by doing a slow, graceful roll. I've never seen anything like this 15-foot R/C sailplane!

Unfortunately, I'm running out of space for this "Mini Report," so I'll have to let you look at the pretty pictures taken by Jim Brandon, and read the appropriate captions.

ROWING MERLIN REPORT

As promised last month, here is a mini review of one of Germany's finest ARF gliders, the Roving Merlin. This glider is imported from the Federal Republic of Germany by Hans Weiss of Wilshire Model Center, 2836 Santa Monica Blvd., Santa Monica, CA 90404, (213) 828-9362. (See the advertisement, July 1984 *Model Builder*, page 94.) What follows is one man's experience with the craft as purchased from Wilshire.

Dear Bill,

The Merlin (as you probably already know) is very highly finished as it comes from Rowing, with hollow, molded fiberglass wings and stabs, and a very nice molded fiberglass

fuselage. The design includes the newly popular method of a nose cone over a keel assembly holding the radio gear. The controls used include ailerons, elevator, rudder, and spoilers.

The new Futuba PCM is used for control. The ailerons are coupled to the rudder function; the elevator and rudder are mixed for the V-tail setup of the Merlin; the ailerons are setup with differential in the transmitter and are setup also as flapperons. This gives me a great deal of flexibility in setting up the plane after building is over. I have been able to optimize the aileron differential for maximum thermaling performance or for high speed turning, for example. The spoilers are mixed also, so that when they are activated the elevator will deflect, pulling the nose up slightly.

The servos in the picture are laid out with the front servo being for the spoilers, the next two are then for the stabs. There is room next to the keel behind the radio for my Thermal Sniffler. The batteries used are 800 mah Sanyo cells. The aileron servos are mounted in the wings at the base of the ailerons (Futuba S-133). There was plenty of room for these! I built a box to house these with screws used to hold the servos in place. When work on a servo is necessary, the servo just pops out!

The plane flies very well. I am not the best competition flyer around, but if there is lift, this plane will go up. We just completed a contest where the Merlin was the only plane

able to get significantly above launch height. Ten-minute maxes were recorded by the Sagittas and Sailaires, but the Merlin was able to get to the cloud base. It is very docile and easy to fly and is the easiest plane to launch (with ailerons) I have flown. Landings are very easy too, with the spoilers giving superb glide path control.

It would be very competitive with the Eisemann Camaro given a set of flaps for reflexing during a speed run or slightly for distance. (I have a fully flapped Camaro which flies very well indeed). Overall, I am very pleased with my Merlin, and very importantly, I am very comfortable with it.

I appreciate your column very much . . . it is very informative and is the only place I can go to find out about much of the sport! Keep it up.

Sincerely,
Michael Forster

WRAPUP

Well, another month has gone by and not everything I wanted to write about was included in this column. Next month . . .

Sorry if you missed the Airfoil of the Month this time, there simply wasn't sufficient room. Next month we'll have one for you, however, and a small report from a couple of model builders who have successfully used the Selig airfoils on original design ships.

Also next month we will have a small report on the Nats (I didn't go), and perhaps a full-blown report prepared by Larry Jolly, wait and see! There's lots coming up for sure! •

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MB Visits Continued from page 27

assignment as a consultant to the Bristol Aeroplane Company. I demonstrated the electric plane in England and got a nice write-up in the July 1971 issue of *Aeromodeller*. The U.S. model magazines still totally ignored my efforts.

MB: *Whew! That let's us out . . . we didn't start Model Builder until September of 1971. What was that first electric model?*

ROLAND: It was a semi-scale Fournier RF-4 with a 100-inch span. The motor turned an 8x4 prop at 10,000 rpm, giving about the same power as a .10-size glow engine. The plane would climb to about 1000 feet on

a four-minute motor run, and could be looped if you first put it in a slight dive.

MB: *Isn't it about time for a commercial?*

ROLAND: Funny you should ask. After returning home from England, Astro Flight showed some interest in this project, and I agreed to market my electric flight developments through A/F. Working at home, I developed the Astro 10 and the Astro 25, and a 15-minute battery charger. Without quick charging, electric models would never be practical.

MB: *Agreed. One flight per charge at the standard rate would mean one flight per day per pack. It's either bring six to eight charged battery packs to the field, or use a quick charger. (Hmmm . . . Which is less expensive?)*

ROLAND: Guess it's all according to your sources. Anyway, by now the competition in electric flight was heating up. Mattel introduced its *Super Star* for the 1971/1972 Christmas season, and Fred Militky, the late German electric pioneer, who was working with the Graupner model company in Kirchheim, West Germany, demonstrated his first outdoor R/C electric model during the R/C Aerobatic World Championships in Doylestown, PA, October, 1971.

MB: *Hey! That's where we introduced Model Builder Magazine to the world. It was also where Dieter Schluter demonstrated the first, practical R/C model helicopter.*

ROLAND: And speaking of firsts, this was when I started work on a world record electric powered plane. Unfortunately, the FAI had no electric powered record categories at the time. However, on February 12, 1972, flying around a 1000 meter closed course, it reached speeds of 60 mph and covered a distance of 60 km in just under a half-hour.

MB: *Wasn't it around this time that you began experimenting with solar powered RPVs for the government?*

ROLAND: Yes, I was still employed by Hughes Aircraft Co., and had developed an air transportable TV satellite broadcasting station for them. On the morning of the day I made that unofficial record flight, the satellite station left for China to cover the historic visit to China by President Nixon.

Soon after this, my attention turned to solar power. I contacted a patent attorney and began the long process of attempting

to obtain patents on electric flight, 15-minute battery charging, and the solar airplane. The solar airplane would require solar panels much lighter than any previously made, it would need a lightweight motor using samarium ferrite magnets, and its total structural weight would have to be about one ounce per square foot.

In the summer of '72, I wrote two proposals to the Advanced Research Project Agency of the Department of the Defense. One was for a battlefield drone based on the record plane. It would fly a surveillance payload for one hour under electric power. The second proposal was for a solar powered high altitude surveillance aircraft which would stay aloft for extended periods of weeks and months. Both proposals were accepted.

I resigned my position as an engineering manager at Hughes and joined my brother Bob to incorporate Astro Flight, where the projects would be run. Up to that time, Astro had been a part-time business run by Bob, in which I assisted by cutting bass and balsa for the kits.

Astro Inc. was formed in January 1973. I served as its first president, and continued to be responsible for electric product development. That year I developed the Astro 05, the Astro 15, and the Astro 40 ferrite magnet motors. I also designed three electric kits; the RF-4 motorglider, the *Bushmaster* sport plane for 25 power, and the *Electra 225* pattern plane.

MB: *This was the twin?*

ROLAND: Yes. It was a little sluggish using 25's, but with 40 motors installed, it became a tiger! It would climb to 1000 feet in 30 seconds, and was timed through official NMPRA speed traps at 90 mph. Not bad performance for early 1973. These motors turned 8x8 Top Flite props at 11,000 rpm. They had been developed for the battlefield drone, which successfully flew over one hour and was featured on KNBC-4, Los Angeles.

MB: *And the solar plane?*

ROLAND: The solar plane finally got started in early 1974 and was funded through Lockheed. I resigned my presidency of Astro and spent full time on this project.

The solar plane had a span of 32 feet and an all-up weight of 25 pounds, for a wing loading of 4 ounces per square foot. Struc-

ture was spruce and balsa, weighing just over one ounce per square foot of area. Spars were 7/8-inch spruce, tapered in thickness from 3/8 at the root, to 1/8 at the tip. Ribs were 3/32 balsa, trailing edge and D-spar leading edge pieces were 1/32 balsa. Covering was 1/2-mil mylar obtained from FAI Model Supply. Fuselage longerons were 3/16 sq. spruce, with 3/16 sq. balsa uprights and cross pieces.

It first flew on battery power, using 24 cells and a pair of Astro 40 ferrite motors, turning a 36-inch prop through a 5:1 gear reducer.

The solar panels were installed on the top of the wing from the spar aft, and the ferrite motors were replaced by new cobalt 40's which I had previously qualified for operation at 70,000 feet in a Lockheed altitude chamber. The aircraft had 28 successful flights on solar power alone before being destroyed in turbulence at about 8000 feet. **MB:** When did you establish Leisure Electronics?

ROLAND: I left Astro Flight in July 1975 for personal reasons and returned to Hughes Aircraft. In August 1975, my wife Nancy and I formed Leisure Electronics, where we developed the 1/12-scale electric car. Our new car could beat the gas cars, and in 18 months, 1/12-scale gas cars were dropped by ROAR in favor of electrics.

MB: When did you get back into electric aircraft?

ROLAND: My separation agreement with Astro prevented me from getting into the electric aircraft market until 1979, but we actually waited until 1980 before getting involved.

In fact, you were responsible for my getting into electric powered aircraft, in case you don't remember. When Kraft came out with its electric *Cardinal*, you showed it to me, commented on its lack of power and duration, and said that if cars could run for eight minutes, why couldn't planes fly longer. A few weeks later, we were getting 13-minute flights instead of 2-1/2, and Leisure was in the aircraft business. It's all your fault!

In the spring of 1981, we introduced our 05 Black Label motor. It produced nearly twice the power of the Astro 05 and ran for more than twice as long. In November 1981, we introduced the LT-50 motor and started selling a geared version in the spring of 1982. In the spring of 1983, we began importing the Keller line of cobalt motors.

MB: The Leisure Playboy electric has been a very popular kit. We have a review on it coming up next month, I believe. Got some more airplanes coming?

ROLAND: Yes. We showed Jim Zaremski's *Wasp* at Toledo this year, and the kit's just coming out. We're also planning to do his Taylorcraft. Both planes appeared in RCM. We're also looking for a real, genuine trainer . . . a ship that flies by itself . . . one that any beginner, no matter how new he or she is to piloting, can fly.

MB: What else is coming up in the future from Leisure?

ROLAND: We're developing a new folder hub for the Graupner prop blades, which we stock, by the way. This is for use with our 3.8 gearbox and is primarily aimed at the R/C powered glider enthusiasts.

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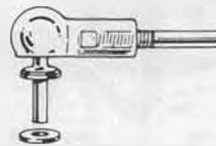


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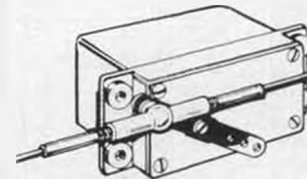


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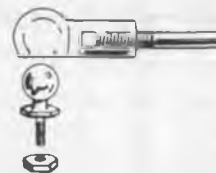


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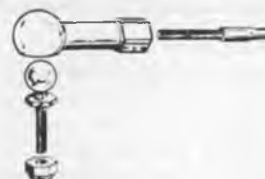


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MB: And the cobalts?

ROLAND: We're playing a waiting game. We stock some Kellers, but we have to hold off on large quantities until the AMA rules settle down. Keller has four basic motor frames and eight different windings for each. That could mean a total of 32 different items for a dealer to stock, and at the stroke of a pen, about 30 of them could become obsolete! That would be like manufacturing thousands of .63 cu. in. glow engines on speculation just before the FAI and AMA adopted .61 as the maximum for Pattern many years ago.

MB: It seems to me that electric powered model aircraft have been right on the edge of busting loose for several years now. Yet,

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it's still in its infancy as far as general use is concerned.

ROLAND: That's right where it is, and I think that getting rules established for motor sizes and battery power will really turn on the switch, so to speak. We can then produce in greater quantities, more dealers will stock the motors, batteries, charging systems, and accessories needed.. and we're ready to supply them!

My proposal for motor sizes by the displacement method has been published in the AMA magazine. If that proposal goes through, and I don't see why not, everyone in the business of producing electric power for model aircraft will fill the market with the materials required, and we'll be on our way.

BIG Birds . . . Continued from page 21

The top-of-the-line, seven-channel Championship radio donated by Airtronics really did wonders for our treasury. We grossed something over a thousand bucks on this raffle, which not only covered all our expenses (flyer/handout printing and mailing, a thousand feet of nylon rope for the barrier, portable toilet rentals, and a check to the Explorer Scouts fund), but also made us a bit more solvent than we'd been. This year's raffle brought in more money mainly because we were selling the tickets at a buck apiece, or six for five dollars . . . or twelve for ten dollars.

People love to feel that they're getting something for nothing, and usually respond favorably to this kind of raffle offer.

The overall quality of BIG Birds Bash is getting better. Only a few didn't pass our airworthiness inspection, and all it took were some keepers on clevises to give them a 100 percent passing grade. More and more, BIG Bird lovers are building scale, or close to it. Well over 90 percent of the guys flying the forty and sixty-sized stuff don't even mess with scale . . . but with BIG Birds, it's a whole different story.

These biggies of ours lend themselves so well to some kind of scale touch that it's the non-scale airplanes that are in the minority here. Even I've found myself leaning heavily toward those scale details . . . like the 88-inch, four-stroke powered Tri-Pacer I'm building. I find it hard to believe that I've actually gone out of my way to visit three different air parks and take pictures of Pacers: insides as well as outsides. I'm probably not going to go wild and super-detail this bird, but I do have the hankerin' to make her look "good."

Spectator interest and curiosity about quarter-size machines has certainly not waned, as indicated by the many hundreds of people who visited with us on Saturday and Sunday, and by the new members we recruited. Somewhere I read (or heard) that the average age of BIG Bird flyers is in the mid-forties . . . and the proof, as they say, seems to be in the puddin' . . . or in this case, in our club; we look like we're either senior citizens, or close enough to be in training. Which brings to mind the concern about where the youngsters are . . . especially in regards to our segment of R/C. According to the ubiquitous prophets of doom, once our present bunch dies out or becomes too feeble to be active, BIG Birds will be dead.

T'ain't so! There seems to be a "natural order of things," and as long as we do our best to cultivate young people and introduce them to the basics of modeling, our ranks will continue to be filled. Sure, unless he has a dad who's into R/C, the average kid is gonna find the cost prohibitive, as compared to getting involved in rubber, free flights, or ukie . . . and who can argue that the realm of BIG Birds isn't more expensive than flying the smaller glow-powered craft. But the majority of modelers "move up," so to speak, and gravitate toward R/C . . . where that special "natural" attraction that BIG Birds have is felt, and acted upon, by older modelers.

Why older modelers? Well, one reason's that we usually have more financial freedom in our later years as compared to when we're brand new to marriage and our jobs. Another reason is that it seems to take a good twenty years to get a real nostalgic feeling about a particular plane we flew, or flew in, as a youth. Also, our expertise gets bigger the longer we are modelers, and it takes a number of years before guys feel that they're "ready" to start on that special

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scale project.

We're not all going on to that Big Hangar in the Sky at the same time, so there are always going to be BIG Bird lovers holding fly-ins and talking it up . . . and this kind of devoted exposure will insure the continuing growth of our hobby. As I mentioned before, it's vital that we do take an active part in getting young people introduced to the basics of modeling . . . and as long as we help them, and don't ignore them, there's no reason to fear that we'll become an endangered species.

A good cross-section of aircraft were on display those two days, from pre-WW-I types to the modern *Hyperbipe*. However, for the second year in a row, we saw no WW-II warbirds at all; not even one *Mustang* in the bunch . . . and this is usually a popular plane to model. Can't really explain it, and neither can any of the guys I've talked to about it . . . except for the cost factor. In order to have a decently scaled warbird you need retracts, and their cost really drives the total expenditure way up . . . and for many people in this area, at least, it's beyond the point of no return.

We also saw a wide range of engines being used. The BIG four-strokers have become very popular, and with bigger ones (2.3 to 3.0 cubic inches) about to be released, their use should become even more commonplace within the next year. Also the new breed of BIG two-cycle glow engines, like the ST-2000/2500, Moki, Bully, and Tartan, are fast becoming favorites; they seem to be quieter than most Quadra types, lighter, smoother running, and less intimidating because, after all, they're basically nothing more than a BIG glow with porting and timing designed for BIG props in the 7000-8000 rpm range. Most guys feel much more comfortable with these engines, even though they swing the same size prop as a Quadra or Zenoah.

The gas engine is no longer king when

it comes to powering a BIG Bird . . . and for good reasons. The BIG glow and four-stroke engines are lighter, which means that the same eight or nine-foot airplanes will be many pounds lighter and easier and safer to fly. These same engines are also much smoother running, which means much more airframe longevity. Sounds good to me!

It used to be that the Pitts, or *Mustang*, or Cap 21, or even the *Cub* were the most modeled bird at a fly-in. Not any more . . . D.H. *Gipsy* and *Tiger Moths* seem to have come on strong; there were only five at our fly-in, although it seemed that everywhere I looked I saw a *Moth*. Some were scratch built, and some were built from kits, but all flew extremely well. One of the *Gypsies* was hauled all the way from Holcomb, New York, by Dick Parshall, who came to fly with us while visiting relatives in the area. Built from MB plans (No. 6771), letting everyone know about his club, the 135th Squadron of New York. Unfortunately, his bird had a run-in with the top of a fence and got severely wounded in the wings. . . . According to Parshall, it will fly again.

Although the crowd was impressed with Walt Hale's smokin' *Citabria*, and the aerobatic ability of Ken Crawford's Cap. Bruce Edwards *Big 'E'* and Bruce Gale's *Hyperbipe*, they seemed to really appreciate the grace and beauty of the *Gipsy* and *Tiger Moths*, and the way Marshall Palmer's nine-foot Sopwith *Pup* blotted out the sun. Many spectators pointed out their favorite airplanes . . . with the old-time bipes getting the most votes.

One bipe that was overlooked by everyone, and mistakenly identified as a Great Lakes, was Fred Pierce's Wiley Post "Model A." This mystery ship was built back in 1935 and, to say the least, is not too well known. Fred's model breaks down into 3 parts . . . using only eight bolts . . . and requires no rigging at the field. Interesting, no? If you want to find

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out more about this bird and how Pierce breaks her down, keep your subscription to **MB** current 'cause our beloved "WCN" is planning on featuring Fred's article in an upcoming issue.

It didn't take too much brainstorming to figure out why registration was down some compared to last year's bash. The six to eight Canadians we expected never materialized, which I'm positive was due to the current devaluation of the Canadian dollar. It's great for us to visit there, but a real losing proposition for our Canadian friends to come down here. A second factor was the big airshow at Paine Field which is not too far north of Seattle. Although this same airshow didn't seem to hurt us last year, the forecast for continuing sunny weather really drew the crowds up there this time . . . including at least eight guys who otherwise would have flown with us.

Though I started out fretting like an old lady about the "lack" of pilots, I really did mellow and was into the swing of things by Sunday morning, hitting my peak at the 2:00 p.m. raffle ticket drawing time . . . which also happened to be the official end of the fly-in. We've found that terminating in the early after-



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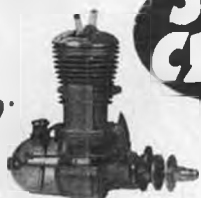
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noon gives the guys who've driven a long way a good start back home . . . before they get too tired. Of course those who want to are always welcome to stay and fly some more. Anyhoooo, a cute little missy helped us out by pulling the winning raffle ticket out of the hopper; and as might be expected, Ed Marker, who won the seven-channel Airtronics, not only had never seen R/C aircraft before, but bought a couple of raffle tickets only because his wife insisted they were for the pilots and he wanted to prove she was wrong . . . which he certainly did. There are no R/C'ers any closer to Salkum, where Ed lives, so we're trying to sweet-talk him into joining us good guys.

All the pilots, and a surprisingly large number of spectators made our weekend complete by dropping by and saying "thanks" for an enjoyable two days (a lot of people evidently came back on Sunday). And up until the following Friday, I was still receiving calls from guys and gals who wanted us to know that they'd had a good time at our BIG Bird Bash. Talk about feeling content and satisfied that all the time and effort was well spent . . . WOW! Most people are nice . . . and those who like BIG Birds seem to be the nicest of all!

HOROSCOPE

SCORPIO (October 23 through November 21): You are shrewd in business and cannot be trusted at club auctions. You win fun-flies because you practice one-upmanship with a total lack of ethics. Most Scorpio people are very uncoordinated and stuff birds faster than they can be built.

TIP OF THE MONTH

During moments of severe trauma, like when "dumb-thumbing" your favorite BIG Bird into the ground,

remember this ancient Japanese proverb by Detective Nick Yamana (Jack Soo): "Many things look bleak at the moment of occurrence . . . but at least we ain't got locusts!"

★ ★ ★

Al Alman, 605 168th Street, East, #95, Spanaway, WA 98387. Don't forget to take pix of your winter projects and sent them in. I can always use photos and everyone likes to see what the other guy is doing.

BE CAREFUL . . . IN YOUR SHOP AND OUT AT THE FIELD! ●

Electric Continued from page 33

Cardinal) a few years back by Kraft. Both of these planes are now sold by Tower Hobbies. The *Cardinal*, by the way, is an excellent electric plane. I recommend it to anyone who has had R/C experience. Two changes make it even better: put in more dihedral (3-1/2 inches at one tip, the other panel flat on the table), and use a larger capacity battery pack. I recommend either a sub-C, six-cell pack, or the new 800 or 900 mah packs. These are sold by Astro, Leisure, SR Batteries, and Wilshire. The SR cells are 900 mah, the others are 800 mah. This will cure the "short flight" problem. You will have to get a charger for these, the Astro Dual Charger does a good job. The *Chipmunk* and the *Cardinal* were a little ahead of their time when first introduced, now I think the market is ready for them. Anyhow, Jerry really showed off the *Chipmunk*, with rudder rolls, loops, and inverted flight. It was quite impressive.

Jerry was using a regular Astro 05 with the stock, six-cell, 600 mah pack that comes with the *Chipmunk*. He also flies

it with the Astro cobalt 05, he says that really turns it on! Jerry also felt that the biggest favor you can do for the *Chipmunk* is to remove the landing gear. The reduced drag allows it to get up to speed so it can be fully aerobatic. The *Chipmunk* likes to fly fast. Again, I think an 800 mah pack would be just the thing for more duration and a little more rpm. However, Jerry caught a thermal on one of his flights, and the little *Chipmunk* went right up for a ten-minute flight!

Dave Katagiri showed us how electric Pattern can be done with his *Electrobat*. This plane is a beauty, both in the air and on the ground, and I am hounding Dave for some plans, so I can build one for myself. How about it, Dave? Dave can do the complete Turnaround Pattern easily, the plane flies smoothly and as well as any gas plane. The *Electrobat* is powered by a Keller 25/12 from Leisure Electronics, using twelve, 1.2 ah cells. It runs a 9x6 prop, and weighs 3-1/2 lbs (light for a power unit this size). The wing is 370 square inches, for a loading of 22 ounces per square foot.

Dave also flew his original design 05 pylon racer, the *Uno*, with an Astro 05 cobalt motor turning a 6x4 propeller. Seven sub-C cells are used as "fuel", and the all-up weight of the model is 33 ounces. He won the Speed award with a two-way timed run of 68 mph.

Al Weber showed us how to fly REALLY long flights, with his stretched *Olympic 650* and his own electronic throttle. Al didn't fly in the contest, just for fun, or he would have undoubtedly won the Duration award. Al told all about how to make the throttle in the June 84 issue of the SEAM newsletter. (This issue alone, by the way, is well worth membership in SEAM. It has TWO articles on how to build electronic throttles, another article by Al on how to convert Zinger props to folding props!

Al's throttle is inexpensive and easy to make. He uses the servo amplifier from a RAM servo sold by Indy R/C for about \$11. All you have to do is remove the servo motor, and use one of the leads. Put a 500 ohm resistor in one of the motor leads, and connect that to the base of an MJ11032 Darlington transistor (made by Motorola). The emitter lead of the transistor is connected to the negative lead of the motor battery pack and to the negative lead of the servo amplifier. The case (collector) of the transistor goes to the negative terminal of the motor. That's it! You have an electronic speed control for under \$25!

With this setup, from zero to full throttle is 40% of the transmitter stick throw. If the action of the throttle is opposite to what you like on the transmitter, just use the other servo motor lead instead. This will reverse the effect of the transmitter throw.

If you wish more throw on the transmitter, you can shunt the resistor (100 K, Brn, Blk, Yel) on the bottom of the servo board with a 10 K resistor (this value may have to be adjusted to suit different transmitters), and shunt the capacitor (.18 mfd) on the top of the board next to

the yellow servo signal lead with a 2.2 tantalum capacitor.

The MJ 11032 Darlington is quite hard to find, as I discovered. I used a 2N6284 Darlington. Use a transistor that can handle 20 amperes of current. The 2N6284 isn't nearly as efficient as the MJ 11032, and there is a considerable rpm loss. I get around this by shunting the electronic throttle at full speed with a servo and toggle. Al's solution to cooling is very simple, he mounts the transistor on the outside of the fuselage! Thanks, Al, for permission to share this with the readers.

Who had the most fun? Everybody. However, I will nominate Leonard Bedford who took great delight in chasing his *Brooklyn Dodger* free flight all over the field. The *Dodger* did its best to take off for parts unknown, and only the DT kept it near home (a very wise feature). A couple of flights had us really holding our breath as the thermals did their best to make the *Dodger* disappear despite the DT! The *Dodger* is built from a kit (I am not sure who makes it), and weighs nine ounces all up with 150 square inches of wing area. The *Dodger* is powered by an Astro 020 turning a 5-1/4x3 prop on five 100 mah cells.

The motor timer is quite clever; Leonard shared it with us last month in this column. All it is a disk with a notch cut in it mounting on a rotating timer shaft. The notch allows the microswitch to pop up and turn off the motor at the end of the run. The photo this month, and the sketch last month show the details. Leonard keeps talking about using the SR 175 mah cells, but that just may be overkill!

Leonard also flew his *Leisure Playboy* to get the Duration award. He routinely gets over twenty minute flights with it, and recently he got an hour and a half. That makes my neck ache just to think about it! The *Playboy* uses an Astro 05 cobalt motor with an Astro 2.5:1 belt drive turning an 11x7-1/2 Super M Top Flite prop on seven Sanyo Sub-C cells. All-up weight is 45 ounces. The plane is beautiful to watch in flight, with a floating glide and a brisk rate of climb.

Who used the electric clinic the most? I will nominate Gayne Jones for that, with Harold Hatley next. Harold had some trim problems and a CG problem with his *Electricus* which was solved by moving the batteries forward. After that, the plane flew very well, in fact, Harold got second in Duration with it. The plane was powered by a Leisure LT 50 on six Sanyo sub-C cells, turning a Top Flite 7x4 prop. All-up weight was 48 ounces. The climb and glide were excellent.

Gayne did what a lot of us do, he finished building his *Pacific Ace* at the field! Then he found his receiver battery was dead; however, a field charge solved that problem. The CG was too far back, and there was some trimming to do, but once that was done, the plane flew fine. It is a scaled-up rubber power job (in the spirit on Don Srull's electric *Sparky*), and it is a very attractive plane. The span is about 50 inches, with a

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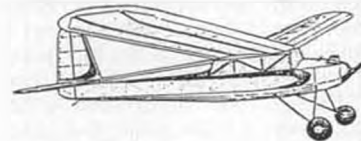
Leisure LT50 Gear Motor turning an 11x7 prop on six sub-C cells. Gayne had a big smile on his face once the plane flew; it is his first electric, and his first R/C.

Two items came up at the clinic. One was the CG. I have been seeing a lot of tail heavy planes lately in the hands of beginners. A tail heavy plane is very hard to fly, and will snap roll easily, usually close to the ground where the damage is the worst. Most planes should balance a little nose heavy at the main spar, about 30% back from the leading edge. Be sure to check this if you are helping a beginner!

The other item is a subtle one! Two fliers at the meet have had very heavy brush wear on their cobalt 05s. It turned out that both had flown their motors on direct drive, then switched to gear drive. You have to run the motors in reverse on gear drives! At any rate, it ate up the brushes. In one case, the brushes broke! If you switch from direct drive to gear drive, you might get a new set of brushes and install them, keeping the old brushes for future direct drive use. Apparently, the break-in is different for the two directions. Belt drive, of course, will not have that problem because rotational direction is not changed.

NEW MOTORS

Onward to other topics! This past week I have been testing the new Astro 15 cobalt motor and the new Super Ferrite 15. New? Yes, these motors have been around for awhile, but they have been available only in ten-turn wind



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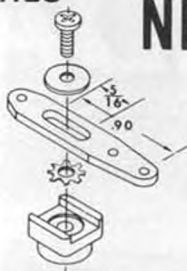
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armatures for the cobalt 15, and thirteen-turn winds for the Super Ferrite. These winds are "hot," and are suitable for very high power for short periods of time, such as for Pylon racing or FAI/F3E, where maximum use of energy in a short time is quite important. They are also useful for gear or belt drive, where the reduction ratio can be set to suit the armature. However, on direct drive they are limited to smaller diameter, lower pitch props, and that is a definite problem in sport planes, which prefer slower turning, higher pitch props. In other words, in sport planes you like to have lots of torque and less rpm.

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15s which now have 13 turns and 15 turns respectively. I am impressed! Firstly, I will give you the technical data, secondly my flying tests. The cobalt 15 turns a Top Flite 8x4 nylon prop at the following rpm after each minute: 12,400 rpm initial; 11,550; 11,200; 10,850; and 10,200 for a total run time of four minutes. Initial current was 20 amperes. The battery pack was 12 Sanyo sub-C cells, charged to its voltage peak by way of dual charging (Astro Dual Charger). The Super Ferrite motor turned the same prop on the same battery at 12,400 rpm initial; then 11,500; 11,200; 10,930; and 9300; for a run time of four minutes. (By the way, the run time is a good way to tell the hot wind 15 from the new 15: the hot wind 15 will run less than three minutes.) Initial current was 20 amperes. These numbers look about the same as for the cobalt, but read on!

I do want to say that if you want to compare readings, that tachometers (I used an AccuTach I), batteries, props, and air conditions may conspire to make your readings vary as much as 500 rpm from these. I have not run these motors on the 800 mah packs; I think the run times would be 2/3 of what I got. i.e., about 2.5 minutes. I also noted that the cobalt motor did get hot at the end of the run, the Super Ferrite was only warm. Part of this, I'm sure, is the size difference, the cobalt motor is much smaller and has less area to dissipate heat. The Challenger (cobalt) motor only weighs seven ounces, the Super Ferrite weighs nine and a half ounces.

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The cobalt 15 is a marvel of compactness, it is the same size as the cobalt 05, which is smaller than the regular 05! Anyhow, on to the flying.

I put the motors in my *Aqua Sport*, which I consider ideal for motor testing. A seaplane demands a lot from motors! First tested was the cobalt 15. What a surprise! It yanked the 4-1/2 pound plane off the water in less than 30 feet, and up into a very brisk climb. Performance was "electrifying," that is, snappy, crisp, lots of power right there, all the good things you dream about! The climb was so rapid that I had to turn off the motor three times to keep it from getting so high that it would be hard to follow! That first flight was 7-1/2 minutes, and the following flights were over eight minutes! I give this motor an "A" (yes, I am a teacher!). It was hot after each flight, and there are no cooling holes in the *Aqua Sport*, which could allow it to overheat if you are not careful. I recommend cooling holes or scoops for the motor.

The Super Ferrite 15 flew the plane very well too: takeoff was about 40 feet, and the climb was quite good, though not as fast as with the cobalt 15. Still, I did have to turn it off three times to keep it within sight! Flying times for the ferrite 15 were also eight minutes. The ferrite 15 got hot after each flight, but not as much as the cobalt motor. Cooling holes might be a good idea here too.

I like the SF 15 motor; it is beautifully made. I consider it a good buy at \$60, and well-suited for enjoyable sport flying. I think the cobalt has the edge over it when it comes to absolute performance, but the margin is not a major one. If, however, you wish to have that extra margin, the cobalt 15 is \$90 and worth it.

It is interesting that static tests did not hint at the difference in the air, the cobalt must "unload" more in the air. If you have been considering a .15-size plane, now is the time, these motors will give you some very enjoyable flying.

Well, for now, fun fly with electrics! ●

F/F Scale . . . Continued from page 57

small biplane began to spiral earthbound. As I have mentioned before, there are hun-

dreds of acres of flying space, and dozens of models, make that *hundreds of models* dotting the scene. The *Kitten* zeroed in on BN's Fokker *Trimotor*, and made a direct hit on this beautiful model. Naturally, the Fokker had not qualified yet! BN had his work cut out for him as he had to repair the fuselage from the wing back to the stab . . . Ah, Murphy!

Meanwhile, there were several different mass-launch events beginning to take place. These still remain very popular with the FAC'ers and the spectators. It is an unbelievable sight to see eight models of say, the WW-I or WW-II era taking off *en masse*. Everyone is given two minutes to get their models wound. If the motor breaks, you're out, even though there might be enough time to make a quick change. Winding for this event is a real science, because generally a model will have to fly in three different heats, possibly four depending on the number of entries. Therefore, you can't over do it on the first or even second heat. The same motor has to be used for all heats. It is a real trick to get the most out of a rubber motor.

Don Scrull doesn't need any introduction, and I spent a lot of time watching this champion in his element. Seemingly, he enters every event, and wins them! He is a tough competitor with few equal to the task of beating him. His models are designed for maximum flying efficiency and bonus scale points . . . one tough dude!

I spent a delightful time talking to Joe Fitzgibbon (Golden Age Reproductions) about his latest efforts, and the trials and tribulations of kit manufacturing. It truly is not all a bed of roses. The latest kits are real beauties: one is the *Albatross CV* of WW-I fame; and the other two are favorite WW-II airplanes, the P-47 and P-39. The P-47 can be made as either the "razorback" or bubble canopy version. The P-39 can also be made into two different versions: one the conventional tri-gear, or the Navy version as a taildragger, called the *Airbonita*. If you aren't familiar with these great kits and planes that Joe offers, drop him a buck for his listings. He's located in Braintree, Mass. Joe provided all the contestants with a print of a Jumbo Rubber model of a Northrop *Gama* designed by Pres Brunning. Joe is quite a guy!

While making my rounds, I had an informative talk with another tough competitor, Mike Midkiff. "Iron Mike" as he's called by his flying buddies, brought a carload of models from Texas. Mike is a first class designer, builder, and flyer of scale F/F models. He is a real asset to our modeling world. Mike has a genuine interest in helping Juniors, and was concerned by the lack of them at this contest. In talking, we estimated that the average age of all FAC'ers at Utica was 47 or 48!

I finally got around to flying my *Arrow* late in the afternoon. The pendulum-equipped biplane put in a very nice flight. Because the FAC power event is almost an endurance event, I don't feel very comfortable in over fueling the tank which could lead to a lost model. Therefore, I didn't fly it a second time as I was more than satisfied with the way it flew initially.



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With Saturday's flying over, the three of us loaded up all of our gear into the rented wagon. We forgot to put BN's enormous box lid in the car first. Rather than remove all of the stuff, we decided to put it on the luggage rack. At this point, you might be wondering why we would haul this item to the flying field. Well, this is BN's winding stooge. Plus, it has many photos of former FAC Nats.

While driving to the motel, we were commenting about all the fun we had during that first day of flying. All of a sudden, we heard this awful sound followed by a loud expletive. You probably guessed what happened. The lid literally flew off the rack onto following traffic. We heard this crunching sound as a pickup truck ran directly over it! BN pulled the car over while BW and I stopped traffic to retrieve the remains.

Fortunately, the lid did not hit any cars. We found out later that an FAC'er had been the one to run over the lid, and that Don Srull was behind him seeing pictures going by. Unbelievably, one of those pictures was of Don! BN was a bit upset, but he had enough of the lid intact to still do the job for the return trip home . . . that is, with the aid of a roll of duct tape!

Saturday evening all of the contestants and many of their family members attended a very nice banquet. After the meal was over, trophies for that day's events were given out. This year a very appropriate perpetual trophy was awarded for the first time. This being the Earl Stahl Perpetual Trophy. This special award is for the best model that typifies the spirit of the FAC philosophy. There were many models entered for what will be a coveted trophy. Earl Stahl, Ralph Kuenz, and Linn Reichel had the task of making "that" choice.

The trophy itself is a work of art. It is not the usual trophy or plaque, it is a glass covered box with the background of one of Mr. Stahl's popular scale rubber models. Then, on top of the drawing were some of Mr. Stahl's original drafting tools he used when drawing all of those well-known designs. The winner of the first Earl Stahl Perpetual Trophy was modeler, *par excellence*, Pres Brunning. His model was a Golden Age Reproductions *Albatross CV*. I might add that the model flew as well as it looked.

Sunday morning found the FAC contin-

gency back at the test track for the final day of flying. I had another grand opportunity to do more talking and picture taking. The highlight of Sunday's flying was Dennis Norman's masterpiece. He had a superb model of the *Avro Lancaster* with a 50-inch wingspan. All of the engines were rubber powered! To boot, he hand carved five of the seven crew members that could be seen inside the cockpit and turrets. In all, it was an exquisite model.

The *Lancaster* drama really unfolded as the arduous task of winding all four motors proceeded. After a few trimming flights, the "*Lanc*" put on a beautiful 32-second flight. The crowd showed their appreciation with a resounding applause. Dennis was given a special award for his fine effort.

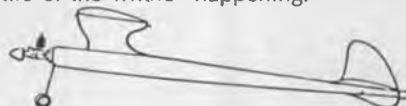
When this day's flying was over, and everything was tallied, Don Srull was Grand Champion for the fourth time in as many FAC Nats. There's no doubt about it, Don is a tough competitor, and an inspiration to all of us.

The weather for the two days of flying was pretty good. There was a threat of rain on Sunday, but fortunately, it really never materialized.

Sunday evening Robert Clemens, Allen Schanzle, Dennis Norman and his wife, BN, BW, and I went to a seafood restaurant. Don Srull and Tom Schmitt would have joined us, but we got our wires crossed. That evening was one of the most enjoyable moments of the whole trip. We literally closed up the restaurant!

The toughest part of these FAC Nats are the good-byes. We wait two long years for these Nats to come around, and before we know it, they are over! The next one is scheduled for 1986! Rumor has it that it will be on the East Coast. Wherever they will be, I'll make every effort to be there. You too should plan to attend this outstanding event!

In closing, I want to personally give a special thanks to the Detroit Cloudbusters under the leadership of Ralph Kuenz, who took on the challenge of taking care of the myriad of details it takes to run a successful contest . . . a job well done!!! Also, I hope you enjoy these pictures which only tell a little of the whole "happening!"



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Electronics . . . Continued from page 43

PCM receiver should have excellent rejection capabilities: better than we've had up to now, but a far stronger signal on its frequency will saturate it, will interfere with it, and there you'll be with the transmitter held high and doing the "I ain't got it" dance.

Hopefully, you aren't going to be flying into any of those "far stronger signals," but it would be false security to believe that your PCM system is 100% immune from outside interference. Should you run into minor interference that you can fly through, the thing to do is to get your airplane as close to your transmitter as possible, and as far away from the flight line or pit areas as possible, in the hope that it is another R/C'er that is bothering you, and your cries are going to alert him to the problem and he will turn off.

Equally important to remember is that your PCM transmitter, or anything else that comes down the pike in the foreseeable future, will also interfere with other AM or FM transmitters on the same frequency. Not a fault in the design, it is just the nature of the beast. So stay away from red lights!

WHAT ABOUT 2001?

You did notice that both R/C systems mentioned above are currently on the cutting edge of R/C technology and are *Japanese*, didn't you? Well, look for things to stay that way. According to a body named the "Japan Economic Research Center," Japanese supremacy in products and productivity will continue well into the early part of the 21st

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century. They claim that while the US may stay ahead in basic research, Japan will lead in commercializing products. This center claims that this competitive edge is due to our country's inability to organize ventures between government and industry, in contrast with Japan which has already succeeded in its efforts to develop new generation computers and robots.

I do remember having heard that the new OS plant is all computers and robots, and that your new OS engine has not been touched by human hands. Well, maybe in Cincinnati!

However, all is not bad news, the center does concede that Japan is seriously behind in the aerospace industry... at least we are ahead in one area!

SOME THOUGHTS ON NI-CDS FOR ELECTRIC POWER

Dick Henderson, our man in Phoenix, was heard from again. This time he writes:

"Well, here I am again with probably stupid questions, but you seem to have all the answers I need, so I will try again.

"I am charging all different size packs of 1200 mah sub-C cells. I bought an Astro six-cell charger which seems to charge eight sub-C cells with no problem. It is fine for seven and eight-cell packs used on the Astro 05's and 07's. After that, the charge requirements are greater for the Astro 15 and 40. I got the enclosed wiring diagram from Stan Wilson of Miami, Oklahoma, who designed an electric called the *Pleaser* (MB plan no. 5831) for the 05XL. The diagram was included in the plans and was primarily a three-position switch. He explained to me that the switch system could be used to charge larger packs by setting it to low (parallel). I have charged 18 sub-C cells from a 12-volt source through the six-cell charger this way. I charged them (two nine-cell packs) for 20 minutes at about two amps. I tested the whole 18 cells at once from a Radio Shack voltage tester... shows red (throw away or charger) and shows green when fully charged. The needle was well past center green when set at 22 volts (rated pack voltage is 21.6).

"I don't know if I'm doing good or bad, but the cells seem to be charged and nothing gets hot... *BUT* I'm not sure if the packs are up to full charge or not... the Radio Shack voltage tester seems like a rule-of-thumb method. So, what can I use to accurately test for a full charge voltage, and where can I get it (without a loan on the farm)... and how is it used. I have just ordered an Astro Dual

Charger, so I still need a method of checking the full charge of cells or packs accurately.

"The book you mentioned of all the electronic and electric things you've done for MB in the last ten years: is it an index or does it contain all the articles?"

Dick, I have heard that the only stupid questions are the ones that *don't* get asked. And I don't have all the answers, but thanks anyway! As to the first part of your letter, how to confirm if a charging system is indeed doing its job, I've talked about this sort of thing before, but not exactly in this context, so we'll do so again. First off, there is no better way to do this than one of the so-called battery cyclers on the market. I say so-called because the name is not truly descriptive, in that they do cycle the batteries, but they also perform the most useful function of measuring the actual capacity of a battery in milliamps. They do this by discharging the fully charged battery at a known rate, and measuring the time required for the voltage to drop down to 1.1 volt per cell, the point at which a Ni-Cd is discharged.

My favorite is the Ace R/C Digipace, because I use a lot of Ni-Cds for a lot of different things, and this one tests packs of four, five, eight, and ten cells. There are others; a similar instrument from L.R. Taylor is also made in various models for different batteries. Both of these instruments contain their own timing devices. Both of them also contain internal chargers to which automatic changeover occurs at the end of the discharge cycle.

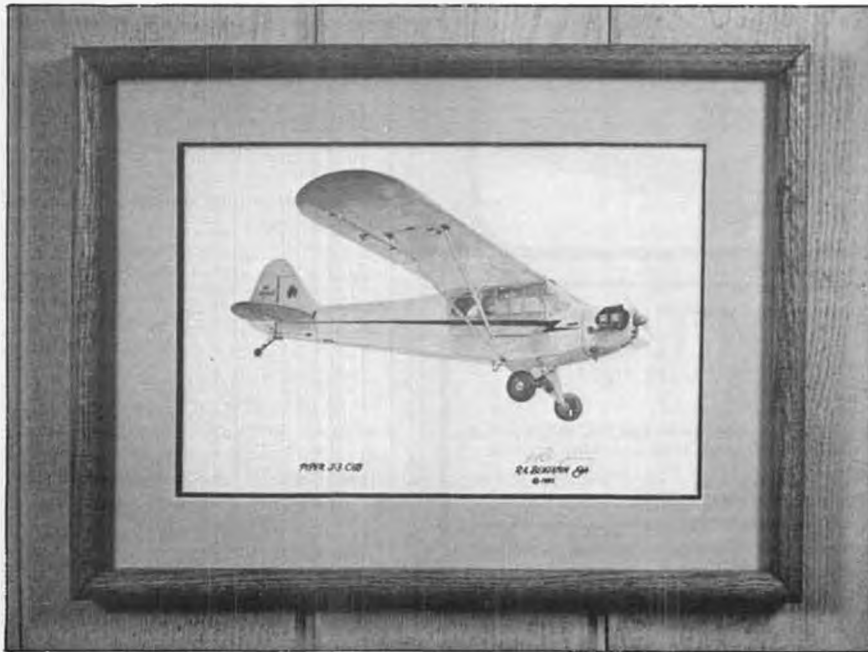
For less sophisticated requirements, you'll want to look at the Simple Cyler from RAM. It does the same thing, without any frosting. Instead of a timing device, this one beeps at you so you can look at your timepiece, and you have to recharge in the usual manner. The Simple Cyler works with packs of four and eight cells. All of the above come with detailed instructions.

The first thing you will have to do, Dick, is to connect your cells in the numbers that the cyler of your choice can handle. Solder connections are always best, clips can cause erroneous readings. Then, because you are testing both batteries and a charging system, starting with discharged batteries, charge them at the low, overnight rate, (C/10, 120 milliamps for your 1200 mil cells) for at least 16 hours. Run them through the cyler and determine their capacity. This will tell you what they are capable of delivering if properly charged, and show up any defective or low capacity cells.

Now, back they go into your fast charging system, starting again with discharged cells. After charging, put them through the discharge cycle once again. Unless the second capacity test is very close to the first one, you are either not charging them properly or they simply won't accept fast charging; not all cells will.

The above is general information, so you can test all of your batteries and charging methods. I can tell you right-off though, that the two nine-cell packs you talk about are not charging properly. You see, in terms of electrical power, everything converts to watt-hours. Your 18-cell, 1.2 amp cells have a rating of 21.6 watt-hours. In all cases of battery charging, due to various losses, you

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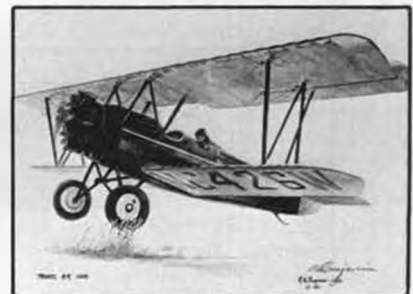
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always have to put in more than the rated capacity; in your case, with 12 volts at two amps for 1/3 of an hour, you've only put in eight watt-hours. In addition, as the battery voltage rises with the degree of charge, the battery resistance increases and the current decreases. Twelve volts is not enough to maintain a two-amp rate for long. Even eight-cell, 500 milliamp transmitter packs will only charge to about 80% from a 12-volt battery.

For those higher voltage batteries, you need a higher charging voltage, or a charger that increases the input voltage, such as the Robbe Automax 21 we talked about back in July.

Now, for your friend's charging circuit! More bad news! As shown, when the charger is connected, the motor is going to run,

unless it is unplugged or the fuse is removed. Also, the system "on" switch must be in the "on" position, contrary to the instructions, for charging to take place. As you will notice, it is in the negative line, and with the switch open, everything stops there as the only other path is the one to the motor, none to the battery negative. Because of these problems, we are not showing the circuit. Instead, I borrowed the basic idea, which is good, and I've included a simpler version. You can charge the batteries in parallel, as in the original circuit, or with a high enough voltage, in series, as determined by the position of the switch.

Now, for a quickie on switches in general, refer to the sketch of a common toggle switch such as we've all seen and used. This one is a single-pole, double-throw, but the facts to be mentioned apply the same to double-poles, single-throws, center off, large or small switches. And that is that, some switches will complete the circuit between the terminals in the direction opposite that of the lever, and others, because of an internal knee actuating type of mechanism, will make contact between the terminals on the same side as the lever.

Looking again at our switch, with the lever in position A, some switches will make contact from terminal 1 to 2; others between terminals 3 to 2. In both kinds, of course, the action changes when the lever is reversed. You can determine which type you have by a simple continuity check with your ohmmeter. I mention this because in the diagram received from Dick, a DPDT switch is shown marked "Hi-Off-Lo" and I had to trace a lot of wires before I could determine the actual

switching action. It will make a difference when you mount the switch.

The last question is the easiest! About the indexes, which I now have for **MB** and **RCM**, they do not include any articles. They are only a listing, by title, and cross-referenced by subject matter, of not only my articles, but all of those that are electronic by nature. Speaking for **MB**, most all back issues are available for the period of the index, but if you happen to pick one that isn't, we'll see that you get a reprint of whatever interests you. Thanks Dick, keep in touch.

ROBBE ELECTRONIC PRODUCTS

Psst... could I interest you in an "Elektronischer Fahrtregler für Automobile 1:12 mit 5-6 Zellen und Kleine Schiffsmodelle?" Or how about an "Elektronischer Schaltbaustein mit Transistorendstufe?"

Well, I really didn't think so, but then, how about an electronic speed regulator for 1/12th cars and boats with five to six cells, or an electronic mini-switch with transistor output?

These are but two of the many items available from Robbe, a company whose line of electronic products is extensive and varied. We previously mentioned the Automax 21 charger, well, the complete line runs from that to electric motors, to starters, to sound generators, and a whole family of switches and regulators... plus all of the accessories, large and small, needed to match them to your models and R/C systems.

Pictured here is the No. 8296 Miniswitch, a small device which plugs directly into the receiver's servo output and can provide On-Off switching function for up to 30 volts at one amp. If the device to be operated draws a small amount of current, the Miniswitch can be modified, with the addition of one jumper, to provide this current from the R/C system battery, thus saving the weight and expense of an additional battery.

Also seen is a photo of the No. 8298 Electronic Speed Control. It too plugs directly into the receiver and controls the speed of an electric motor proportionally to the movement of the transmitter's throttle stick. Such speed controls are made by Robbe in various models, capable of handling from two to thirty amps. Some of them are also equipped with electric feedback brakes, for those applications on which this function is desirable. Speed controller No. 8287 (not shown) differs slightly from the others in that it is designed to be mechanically controlled by a servo, and is capable of handling up to 20 amps normally. Its capacity can be doubled to 40 amps by the addition of No. 8288 booster.

The complete Robbe line of products includes not only electronics, but something for everybody, from boats (power and sail), to cars (glow off-road and electric on-road) to an interesting number of scale and sport R/C planes. There is even a fire-engine and a fireboat! A full-color catalog is available for \$3 from Robbe, Suite 345/55, The Office Center, Princeton Meadows, Plainsboro, NJ 08536. If you are out here in the west, a little faster service on the catalog, and Robbe products, can be obtained from Dave Dicker, at The Hobby Shop, 440 E. 17th St., Costa Mesa, CA 92627 (714) 646-6565.

Next month? All I know for sure is that it's coming, with deadline time being after the

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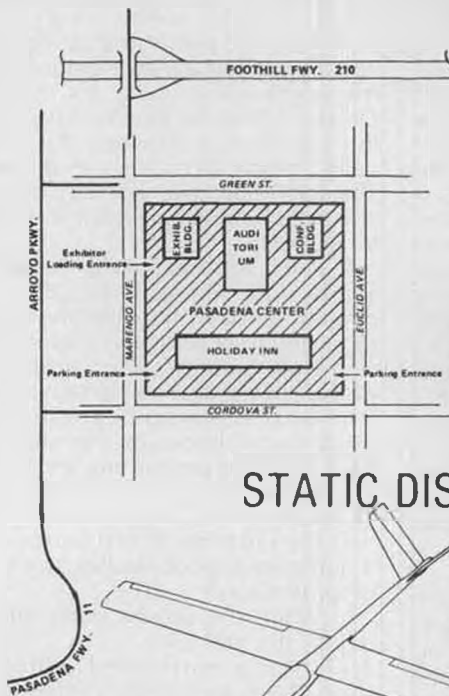
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Nats. If I see anything electronic interesting there, I'll share with you!

Miss America . . Continued from page 35

if you plan on pulling a few "Gs" on your wing, I recommend capping the top and bottom of both spars with 1/8 x 1/4 spruce strips. This is the kind of "insurance" that I trust. Incidentally, the *Miss America*, thus modified, is very capable of loops, rolls, and inverted flight, and the sharp turns that you need to make to turn back into a passing thermal. I guess your author just can't get that old seat-of-the-pants flying urge out of his system, I love it!

I chuckled when I got to the point of establishing the balance point (often called "CG") on this model. Anyone who has read *Model Builder* magazine for any length of time knows that Editor Bill Northrop's pet peeve with Old Timer plans is that old-timers invariably left the location of the balance point off of their plans, and this kit is no exception. Nowhere in the instructions could I find this mysterious point mentioned, so being the resourceful type, I went back to my *Zaic 1937 Model Aeronautic Year Book*, and on page 52 there is a three-view by Frank Zaic. Sure enough, there was the "CG" indicated as being 33% of chord from the wing's leading edge. I know there are those modern R/C flyers who insist that the placement of the CG is not really important, and that you can overcome tail heaviness or other ills by the use of the trims; however, you will be surprised

by the hands-off takeoffs you can get with this ship set up the way Zaic's three-view shows. Incidentally, 1½ degrees of right thrust were added to the engine mount to offset the torque of the big .60 swinging a 14-inch diameter propeller.

The stabilizer, rudder, and fin are built by combining good free flight and R/C practices. The units are solid, rigid, and not prone to distortion or flutter. The hinges provided in the kit are the Robart type. Be careful when installing these that you don't get Hot Stuff in the hinge joints when you're cementing them into the spars of the tail units. When inserting them, drill the mating holes in the spars and put your adhesive in the hole and then insert the hinge points into the holes, making sure that the CA glue doesn't creep up into the hinge joint. Don't put cement on the hinge point and then press the point into the hole, this just wipes the cement right into your hinge.

I covered all the parts of my model with Monokote prior to assembling them, this assures that no exposed, raw edges of balsa wood will be left showing for fuel to attack. The use of Hot Stuff or Super Poxo around the edges of the cowling insures against fuel sneaking under the edges of the Monokote. This will keep the model good looking much longer.

In closing, I would like to say that this model will give you hours of flying enjoyment. The ship has very good handling qualities and no bad vices. Our ship weighs 6 lbs, 4 oz which gives you a fairly light wing loading and provides for a really nice handling ship that is fun to fly. The O.S. .60 four-stroke engine seems to be made for this ship. The quiet running of this engine seems to be made for the character of this plane. The ship drew many admiring glances when it was flown on its first flights at Taft's Condor Field.

The *Miss America* is available from Beehive R/C Model Co., Box 744, Layton, UT 84041, and it comes in two versions: 1) a fully framed, but uncovered model at \$209.95; and 2) the kit version reviewed here at \$109.95. Both versions are money well spent.

Control Line . . Continued from page 47

tank is filled. With the fuel flow restricted, you may connect the fuel line to the

needle valve assembly. If you are using your fingers as a pinch-off, make sure that the needle valve is closed. Note that the pacifier tank in the photo has a pinch-off right on the fuel line. In case you can't tell, it is simply a line connector, which works quite well.

Here are a couple of safety tips to keep in mind: eye protection should be considered as the fuel can go everywhere if the bladder happens to burst. Remember, the fuel line must be reasonably tight on the fittings, or the pressure of the full bladder will cause it to slip off.

To put your bladder tank in use, please remember the following facts:

1. The needle valve will not need to be opened very far, as compared to suction draw, or even pressure feed.

2. The fuel is flowing with the needle valve open until the bladder is empty.

Here is a suggested starting procedure using a Combat type plane where a length of fuel line is free between the bladder compartment and engine.

1. Close the needle valve.

2. Fill the tank, and pinch off the fuel line.

3. Hook up the fuel line to the fuel fitting nipple on needle valve.

4. Hold the plane so that the intake venturi points toward the ground. Open the needle valve about 3/4 to 1 turn. Quickly adjust the needle valve so that the fuel flow is between the rate of quick, steady drops, to a small stream. The fuel need here will vary between engines and intake size, but this will do for starters.

5. Pinch off the fuel line when the approximate setting is found. At this point, you may wish to hold the fuel line up against the fuselage or engine mount with your thumb for a pinch-off, eliminating a device that may get in your way.

6. Give a generous prime in the exhaust and hook up the glow plug leads. Grab the prop firmly, and turn the crank over once. You should feel a "bump."

7. Flip the prop. With this procedure, it sometimes works better to flip the prop backwards.

8. When the engine starts running, release the fuel line.

9. If the guesstimated setting was close, the engine will continue to run. Now, make the final needle valve adjustments. If the setting was too lean, the engine will starve. Pinch the line off, open the needle just a bit, and try again. If the engine floods out, pinch off the line, turn the needle down, and try again.

After some practice, you will develop a feel for knowing when to release the fuel line, and when to make the needle valve adjustments.

PAMPA

One of the very largest control line organizations is PAMPA, which is an acronym for the Precision Aerobatic Model Pilots Association. If you fly PA (Stunt), and are not a member, you are really missing out on a lot of information. The information comes via the official publication, "Pro-Stunt News." As the editor, Windy Urtnowski does a great

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HOT TIPS FOR BEGINNERS

Now that I have done an advertisement for PAMPA, I will take the liberty of lifting out a piece from one of the last issues. This is good stuff for the beginning Stunt flier:

"Firstly, stick with a basic, Fox .35 engine and a wooden 10-6 prop. A four-ounce Stunt tank such as those marked by Carolina-Taffinder will work fine at this stage of development. Taffinder's fuel (5% nitro) would be my first choice for an apprentice. This combination will provide an excellent power source and will be relatively easy to manage. Use a fuel filter when filling your tank, and a filter between the tank and motor. Fox idle bar, R/C-type plugs work well in Fox engines. This setup should prove reliable, easy to manage, and give years of service for very few bucks. It will probably see you through your first few years of development and allow you to learn the pattern.

"The next step is a decent airframe: *Ringmaster*, *Tutor*, *Banshee* . . . all will be quick to build and serviceable for an apprentice. Monokote the wings and tail and paint the fuselage with dope or epoxy. Try to build the wing straight, but build in a trim tab on the outer panel just

in case. A one by four inch piece of tin can epoxied to the trailing edge is adequate.

"Now that you have a good power setup and a decent airframe, check to see that the ship balances before flying. I recommend 1 to 1-1/2 ounces of tip weight to begin with. Too much won't hurt you, but too little will. Prather makes a stick-on lead weight, or children's modeling clay will allow quick adjustments without the bother of a tip weight box. When you pick up the ship, front and back, the outboard wing should drop immediately. Use the CG shown on the plans and avoid being more than a half-inch off this location. Pick up the ship with one finger under each wing tip and run a straight line to the fuselage to see how close you are. If the ship is too nose heavy, it will not turn corners. If it is too tail heavy, it will not fly level. Check and recheck this before getting airborne.

"Get yourself .015-inch diameter, 60-foot lines and set the motor just under full power for the first few flights. If it's too slow, and you don't have much tension, just fly level. If you can loop, do a few directly downwind to see how the ship turns. You should need only three-quarters of your full amount of control to loop without the plane slowing down excessively, shaking, or stalling. Save 'full' control for emergencies only. This is a habit you must develop right at the start. Pulling full control to loop or perform any other maneuver will slow

down the ship too much.

"If you can fly inverted, try flipping the plane over from the top of a loop, and downwind. If it doesn't fly with the wing parallel to the ground, inverted or upright, bend the trim tab on the outer wing in the opposite direction you want the wing to go. A friend outside the circle can help you with this adjustment.

"If the plane speeds up inverted, lower your tank with 1/16 inch balsa shims. If the ship goes rich inverted, raise your tank with 1/16 inch balsa shim until it runs at the same speed upright or inverted."

That ends the tips and hints section regarding Stunt flying.

GOOD HUMOR MAN

The cartoons featured this month were drawn by Steve Lindstedt of Portland, Oregon. Steve has agreed to join my CL "staff." Be looking for his humorous insights into this cra-zee hobby in future issues.

SOUTHWESTERN REGIONALS

I just received a press release from Al Lidberg, contest manager for the Southwestern Regionals. This is a big contest which features 17 events for Control Line.

"The 1985 Southwestern Regionals Model Airplane Contest will be held at the Buckeye Airport, about 30 miles west of Phoenix, Arizona, on January 26 and 27. This contest, now in its 35th year, features Free Flight, Control Line, and R/C Old Timer events. January weather here is typically very pleasant and the

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contest enjoys a good reputation. We've had about 120 contestants from Arizona and surrounding states for each of the last few years. There will be a total of 41 events in the three areas. It's a nice place to fly, and we'd like to see more contestants." Write to: Southwestern Regionals, 2717 E. McDowell Rd., Phoenix, AZ 85008.

That's all for now, see you next month. Mike Hazel, 1073 Windemere Drive NW, Salem, OR 97304.

R/C Boats . . . Continued from page 45

the event was hosted by the Evergreen Model Boat Club and directed by Tom Dudley. This year's event attracted a field of 15 boats in the 3.5 Tunnel class and an equal number in the 7.5 Tunnel class.

Over the years, a variety of racing formats have been used. At one time, the Championship was a two day event with points accumulated in different events counting towards an overall championship. This year the format took on yet another appearance. The winners of the 1984 Championships would be determined through the process of entering four qualifying heats, participating and placing in three main heats, and then racing in a winner-take-all championship heat.

Those who made it into the championship heat had been involved in a full day of boat racing by the time they reached that final heat. Race strategy became

important as contestants figured out how many points they needed to qualify for one of the three mains. It was possible to not do well during the qualifying heats and still make it into the final if you could do well in one of the main heats. The breakdown for qualifying for the championship heat was as follows: first and second in the C Main qualified, first through third in the B Main were in, and first through fourth in the A Main were eligible. With the exception of one trophy for the winner in the final championship heat, all other trophies were awarded for positions in the three main heats. There was no reason to hold back in the championship heat because only the winner was going to receive an award.

The day's racing program was blessed with acceptable water conditions and very warm weather. During the course of the racing, there were some excellent heats of racing and a number of crashes and flips. The worst crash of the day occurred during the running of the 7.5 championship heat when the first three boats entering turn one for the first time collided and were eliminated. The impact of the collision actually tore an engine right off of one of the boats. Luckily, SCUBA divers were able to find the engine a couple of days later.

The results of the mains and championship heats are as follows:

3.5 TUNNEL CLASS

1. Rick Grimm Gerghty Tunnel
No other finishers

B Main

1. Dennis Caines Gerghty Tunnel
2. Paul Dunlap Dumas Hotshot IV

2. Paul Dunlap Dumas Hotshot IV

No other finishers

A Main

1. Bob Welch MRP Tunnel
2. Mike Wight Gerghty Tunnel
3. Tony Bellezzi MRP Tunnel
4. Jim Welch MRP Tunnel

Championship Final Heat

1. Jim Welch
2. Dennis Caines
3. Rick Grim
4. Paul Dunlap

7.5 TUNNEL CLASS

C Main

1. Jim Burba Hughey Tunnel
2. Bob Welch MRP Tunnel
3. John Havens Sprint 7.5

B Main

1. Dennis Caines Sprint 7.5
2. Tony Bellezzi MRP Tunnel
3. John Vinton Hughey Tunnel

A Main

1. Gary Keys MRP Tunnel
2. Rick Grimm Original Tunnel
3. Jerry Dunlap Sprint 7.5
4. Tom Dudley Klampon Kai

Championship Final Heat

1. Jerry Dunlap
2. Rick Grim
3. Gary Keys

Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498.

Hannan Continued from page 49

done, we felt no animosity. We simply had yet another hero to feed our imaginations!

"I'm still grinding out plenty of models. Still fly 'em every weekend, plus holidays. I really think I enjoy flying best of all. We have had many new guys at our local field this year. Some of 'em are pretty old 'new guys,' but just as avid as the best."

WHY?

Frank Zaic opines: "The joy of free flight comes only when your model is on its own, fighting in a three-dimensional world with your intelligence. It is a partnership that is wonderful beyond words."

SAVE YOUR POSTAGE

We have received enthusiastic reception to Fritz Mueller's electronic calculator conversion which counts rubber model winder turns, and Editor Bill Northrop has given the OK for an article. Fritz is hard at work on it, and offers assurance that it is a low-cost, relatively simple project. Our thanks for your responses.

HOW'S THAT AGAIN?

Q: What does one call a boomerang that will not return?

A: A stick.

YOU GET WHAT YOU PAY FOR

Larry Williams offers his opinion of some cheap electronic stopwatches: "If you don't watch it, they stop!"

PROXY NO-NO

With the spreading interest in mailing models to other countries for proxy flying, more guidelines are being discovered. The most recent lesson was an expensive one, according to Jere Robinson, who sent a Peanut model to Europe. Considering the time he had devoted to the model and shipping box construction, Jere insured the package for \$300.

After all, he reasoned, insurance is inexpensive.

What happened, however, was that the foreign customs people took extreme interest in this valuable little artifact, and levied a customs fee of \$75! A word to the wise...

THOSE COVER GIRLS

Every now and then a letter reaches the "Hangar" in regard to MB cover girls. First off, it should be clearly understood that cover subject selection is not one of our duties (pity!). So any pro or con comments should be directed elsewhere.

However, we did receive a bit of inside information on how choices may be made. If you will refer to the August MB, you will see three models are featured on the front. And two of them are aircraft. In this particular instance, the owner of one of the models felt somewhat slighted, and wondered why his model was not the predominating subject. "Because your photo had less visual impact than the other one," was the thrust of the editorial reply. "Oh I see," said Colonel Thacker, "You are trying to tell me that curvaceous female fuselages sell more magazines than toy airplanes." Well truthfully, those are not exactly the terms he used, but he challenged us to present this story without using those words...

INDOOR BOOK RETURNS

Ron Williams' comprehensive book *Building & Flying Indoor Model Airplanes* is once again in print. The new publisher is Gibbs Smith, which we think is an intriguing name reminiscent of the late C.H. Gibbs-Smith, English aviation historian and champion of the Wright brothers. Inquiries about Ron's book may be directed to Gibbs Smith Inc., P.O. Box 667, Layton, UT 84041.

NEW PRODUCTS AND COMING ATTRACTIONS

CUSTOM GOLF: Some people are efficient enough to be involved in more than one hobby or business. John W. Bell, who makes aerodynamic custom golf woods, also designs model planes. The examples sent to us include a Spitfire Mk XIV and a Mustang "H" for rubber power. Sized 5/8-inch-to-the-foot scale, the models are clearly presented in blueline form, and are priced at \$4.50 each, postpaid, from: John W. Bell, 650 Pinecrest Drive, Largo, FL 33540.

SUPER HAWK: One of our photos depicts John Voorhee's new rubber-powered, 20-inch-long endurance model. John says he built 98 foam-winged types ranging in size up to P-30 class while developing this kit design. A sample was sent to us and we hope to offer commentary regarding its performance next month.

MRC FLYING FOAM PLANES: Also to be tested for next month's column are some brand-new semi-scale foam construction models being marketed by MRC. We have already assembled one of their simpler offerings, the Cessna, and found it to be a very impressive performer indeed. Preliminary testing was conducted in conjunction with the



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"Mooney Factory Team" (Walt, and his two sons, Douglas and Curtiss), and all were pleasantly surprised by the altitude the little Cessna reached, even when only hand-wound. (See accompanying photo.)

The second model we received, a Spitfire, is more advanced than the Cessna, requiring additional time and care in construction, but resulting in more realistic appearance for the effort invested. We hope to have tested it thoroughly in time for next month's column. Others in the series include a Japanese Zero, a P-51D Mustang, a Cessna Skywagon, and a Citabria.

We find it encouraging that there is rebirth of interest in basic model among builders and manufacturers, and eagerly look forward to running comparison experiments.

YES SIR, YES SIR, 5 BAGS FULL: Walt Mooney, surely the most prolific producer of Peanuts who is not a farmer, has announced another "Bag of Peanuts," bringing his total to five. The most recent additions consist of construction drawings for: the Honey Bee (a model of Walt's full-size aircraft which is now in the EAA Museum collection); the Keleher Lark midwinger; Morane-Saulnier MS50C parasol; Farman 100 high-altitude research machine; Super Sytka, a midwinger from Finland; the BD-8 low-wing aerobatic plane; Polish R-XII highwinger; Aeronca Defender; and five more. Even a bonus plan for a Bostonian, called the Boston Found. For only five dollars, this has to be a best-buy. See Walt's advert in this issue. Oh yes, the previous bags-o-nuts are still available too.

"VTO" R.I.P.

Sad to report that the *Model Airplane News* free flight column "VTO" has been terminated, according to its long-time editor, Dave Linstrum. However,



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Dave will continue his work under a new masthead in *Flying Models* magazine.

WHITEHEAD MUSEUM GROWS

Reader Joseph Shultz, of Pottstown, Pennsylvania, has recently returned from Europe, where he had a chance to visit the Gustave Whitehead Museum in Gustave's home town, Leutershausen. The many publications, models, photographs, drawings, and artifacts have accumulated to such an extent that the museum will be moving into larger quarters this fall. Our thanks to Joe for providing this update, and more on this subject is expected in the near future.

THE STARTING POINT

Well-known English aircraft painter, author, and model builder Ken McDonough recalling his younger days in the hobby: "My word, that Fokker D VII (prewar kit) was tricky to make... exactly from the plan. But a good exercise in tissue covering. Could not avoid elliptical dihedral. Nevertheless, the kit was a marvelous value at the time. I think I paid two shillings for it (school pocket money, and walking to and from school

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to save bus fares!). The equivalent of about 45 cents American at the rate of exchange in those days. All my modeling has stemmed from that beginning."

THE BOTTOM LINE

A visit by two airline pilots during the time this column was being composed served to underline the basic fascination of all things aviation . . . regardless of simplicity or complexity.

Here were two professional jet transport pilots who found the time to spend a few minutes carefully examining tiny "toy flying machines." Both are former model builders, and both are thinking about returning to the hobby. Sometimes one thinks there are no former model builders . . . it is just that some take longer than others to return to the fold.

Aviation offers so many facets, each with its own avid supporters expressing equal amounts of enthusiasm, whether it be for free flight, control line, radio control, static display, or full-size types. Perhaps Dick Allen of Canada summed it up best when he signed a letter to the "Hangar" with: "Hurray for air-planes!"

Choppers Continued from page 23

moved to. Tighten the screws, and re-check the runout. Usually, a sliver or two of aluminum is all that needs to be removed to align the clutch perfectly with no runout at the bottom of the

shaft.

Once the bottom of the shaft is running perfectly true. Hot Stuff the clutch to the aluminum spacer. Now dial indicate the tip of the clutch shaft. Note the runout. Whacking the tip of the shaft can throw out the bottom adjustment, so to bring the tip into alignment, slide a brass tube (12 inches long) over the shaft and bend the shaft in the direction desired with hand pressure. The brass tube gives good leverage on the shaft; without it the shaft is difficult to tweak accurately. After the top runs true (within .001) double check the bottom again to make sure it hasn't shifted. This will leave you with a perfectly aligned clutch shaft, top to bottom, and an absolute minimum of engine induced vibration.

A FEW OF MY FAVORITE THINGS

For the new or prospective helo pilots who might be following along, I thought I'd offer you a few items that I've used over a period of time and have been very pleased with.

Engines are critical in any helicopter. They must run consistently smooth and cool. For the .40-sized birds, I recommend the Webra Speed .40 with the TN barrel carburetor. The OS .50 FSR-H has worked well for the .50-powered helicopters. I have heard good things about the Enya .49X, but have no hands-on experience with it.

Excellent engines in .60-size are the Webra Speed with the TN barrel carburetor, HP .61 Gold Cup with the HB carburetor, Rossi .61, and the HB .61.

No matter which engine you run, it should be broken in on the bench with at least a half-hour of running on a smaller-than-average prop. The smaller prop will keep the RPM high and the engine cool. I run at full open for two minutes and idle for one minute, full open for two minutes and idle for one minute, etc.

Ball links are more subtle items that are still very important to the overall smoothness of control in your bird. Links that are too tight will make your servo fight to recenter itself, while links that are too loose will give sloppy control.

The best link I've found to date is the Rocket City product used by Gorham Helicopters in the *Cobra* and *Competi-*

tor series. These have excellent strength, lots of threaded area to screw into, and they fit perfectly on the black balls provided by Gorham. If you have a bird with less-than-perfect ball links, you might want to consider upgrading to the GMP ball links. It would be money well spent in a vital part of your control system.

That's it for this month, see you next time.

Ray Hostetler, c/o MB Magazine, 621 W. 19th St., Costa Mesa, CA 92627. •

Engines Continued from page 31

should notice this idea!

Photo No. 3 shows clearly the prop drive washer's FRONT surface . . . it is a SMOOTH DISC, in which radially positioned grooves have been filed . . . evidently BY HAND . . . as they are NOT evenly spaced. The filed grooves almost look like an AFTERTHOUGHT. As the surface is essentially smooth, the prop will surely be apt to slip. You can also see in this photo, along with Photo No. 1, that the props for this engine will have to be reamed out so that the spinner nut will fit into the prop. The shaft is 1/8-inch in diameter, but the spinner nut section that goes into the prop is over 1/4 inch in diameter . . . a big hole for a small prop! Other evidence of rather careless workmanship is in the compression adjusting screw . . . the crossbar is held into the screw by a "crunched" indentation . . . and the screw itself is incredibly LOOSE where it threads into the top of this engine . . . not real good by the standards we expect.

This little engine is "nearly square" in bore/stroke . . . 12.5mm/12mm . . . designed to achieve peak power at 15,000 RPM's according to an East European engine guide. As this specimen is new, it will not be run. Repair parts are virtually non-obtainable in the USA . . . so this is a collector's engine. The smaller version has been run, and it was VERY DIFFICULT to start.

Much of the OTM STRYZ's weight comes from the cylinder or sleeve, which is over 1/8-inch thick . . . massive for an .09 engine, and the three bypass ports machined into the inner surface of the sleeve appear to be of less volume than a Cox non-competition .049! The wrist pin simply floats back and forth through the piston . . . no Teflon pads or such to keep the wrist pin from running a groove into the front and back of the cylinder bore.

This particular STRYZ was made about 1975 and came from a pen-pal in Czechoslovakia. It is worth between \$35 and \$50, rates a "5" on the appearance scale, and only a "2" on the manufacturing excellence scale. It probably very well fills the needs of it's users in the Soviet Union as far as performance. •

Klubbens 2-M . . . Continued from page 30

sides. Do not glue the rear webs between ribs no. 1 through 3 yet! The wing joiner which

is a 5 mm inside diameter brass tube, will be installed and glued when the wings are ready to be mounted to the fuselage. The rear wing joiner, 3 mm ID brass tube, will also be glued later. Now it's time for making the polyhedral joint. Cut and adjust the spruce spars to the proper angle (11-2=9 degrees). Then raise the outer panel to the angle shown on the plans and glue the polyhedral braces on both sides of the spruce spars. Use epoxy! The braces are made of 1.5 mm plywood.

Glue the ribs in the polyhedral break and also the balsa wing root (two degrees). I prefer to glue the 2.0 mm plywood root rib to the wing later (see fuselage construction). Then you cut and adjust the upper sheeting and glue it first to the inner and then to the outer part of the wing. Be sure that you don't get any distortion. As weight when gluing the sheets use some volumes of M.B. or other model airplane magazines. Cut the 8x8 mm balsa leading edge to length, and glue it to the wing. We have laminated the wingtip with 1.0 mm plywood.

When you assemble the wings to the fuselage, you can adjust the wingspan by cutting the wing tips to achieve exactly two meters. If you think the work with the first wing has gone well, it's just to start with the other. But, be sure that you make the opposite one! Many model builders have been shocked when they discover that they have made two left or right wings. If you prefer to build both wings at the same time, you are guaranteed not to get a problem like this. For gluing the wing joiners and root rib (plywood): See fuselage construction.

STABILIZERS

We have chosen the symmetrical airfoil NACA 009. You can form the ribs just like you did for the wings. To get the stabilizers as light as possible, we have used the upper spruce spars only and they taper from 2x7 mm at the root to 2x4 mm at the tip. The ribs are made from 1.5 mm, the trailing edge 3x15 mm, the leading edge 6x6 mm and the sheeting 1.0 mm, all balsa. Rib no. 2 from the root has to be laminated with 0.6 mm plywood. As joiner tubes, we use two 2.0 mm ID brass tubes.

You start by cutting the spruce spars and the upper sheetings (just like the lower) to length. The stabilizers should be built upside down and both at the same time. Put the upper sheeting on the plan and glue the spruce spars to the sheeting. Before you glue the ribs to the spruce spars, you have to shim them up at the rear end 5 mm (not shown in the drawing). Glue the ribs to the sheeting and then the trailing edge to the ribs. Be sure that the airfoils are symmetrical! Then raise the sheeting up to the ribs.

Then you form and glue the bracing of 4.0 mm balsa between the root rib and the trailing edge. You now adjust holes for the brass tubes and glue them to the ribs with epoxy in both stabilizers at the same time. Be sure that they are glued straight and on the same level. Press the inner end of the tubes together, otherwise the joiners will perhaps take a trip through a couple of ribs sometime. Then, you glue the lower sheeting to the ribs. Finally, you glue the leading edge, the wing tip, and the 1.5 mm balsa webs in place.

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fuselage such as side, top, and bottom sheetings and 5x5 mm triangle stock. Use the drawing to get the right shape. We use 3.0 mm balsa laminated with 1.0 mm plywood from the nose block to the middle of the tail boom. For laminating, you will achieve the best result in the shortest time using glue of contact cement type. We place the laminating plywood inside the fuselage due to the fact that balsa is easier to form later on. In all inside corners we glue in place 5x5 mm triangle stocks.

As you already have observed, the top sheeting is straight before gluing the contour balsa between the wing shoulders. Pin the top sheeting to the board and glue the sides to the top. Then you glue the triangle stock in place. Like the building of the stabilizers, the fuselage must be built upside down. Be sure that the sides are glued at right angles to the top sheeting. I use two aluminum angles for this purpose. Be exact! A distorted fuselage is almost as bad as distorted wings. The bottom sheeting is not glued in place until all the installations in the tail and rear part of the fuselage are carried out.

For the tail fin, we use balsa only except for the stabilizer shoulders. Be critical when choosing the materials. Use only the lightest and be stingy when using glue. One gram too much in the tail has to be compensated with several grams of lead in the nose. The leading edge 10x10 mm balsa and the rear spar 10x15 mm balsa have to be joined properly to the fuselage. But first make the whole vertical fin separately. The width of the rear spar tapers from approximately 12 mm at the bottom to approximately 8 mm at the top. The airfoil is identical to that of the stabilizer, NACA 009. We make ribs from 2 mm balsa, and for sheeting we use 1 mm balsa.

When one side is sheeted, you can install the Nyrods, with the Ball Link and the 2 mm brass tube. Remember to glue in place holds for the hinges. You will need them because the rear spar is to be carved out to make place for the movable rudder. The Nyrods must be attached at two or three points inside the tail boom.

We have mounted one extra Nyrod tube for the antenna inside the fuselage. It looks much better this way, and the antenna itself

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is better protected against damage. Then, you make sure that everything works properly before you sheet the opposite side and glue the vertical fin in the right position. The 2 mm plywood fairing in front of the fin you adapt and glue in place.

The next step is critical to proper fuselage alignment. Make the 2 mm plywood shoulders and root ribs for the wings. Drill 5 mm and 3 mm holes through all four ribs at the same time. If you want to make the shoulders wider, you make additional fairing ribs from balsa and of somewhat larger size than the root rib. Then, you trace the root rib onto the fuselage sides and make the necessary holes for wing joiner tubes. You then put the balsa fairing ribs between the plywood and the fuselage and glue it in place. Be sure that the prescribed 2 degrees angle of attack (angle between fuselage center line and airfoil center line) becomes the same at both sides. Make a jig to assure this. Use epoxy for all gluing in connection with the wing joiners. When the shoulders and brass tubes are fastened, you glue in place the 2 mm plywood brace behind the 5 mm brass tube. Make it an extra strong joint! Don't be stingy with the epoxy.

Then you glue in place the fuselage formers no. 4 through 6 and the "ceiling" in the ballast compartment. All fuselage formers are made of 3 mm balsa laminated with 1 mm plywood on both sides. Between the shoulders you place a balsa block to achieve a nice, aerodynamic fuselage.

Now it's time to glue in place the bottom sheeting including the hardwood stock as hold for the tow hook. Before gluing in the formers no. 1 through 3, you must check the

size of your RC equipment to insure that the fuselage will have sufficient space. If needed, make the formers a little wider and/or replace them. Thereafter, you adapt the noseblock, canopy, landing skid and tow hook. The noseblock is hollowed out for nose weight if necessary.

Inside the canopy, I have made slots for the 3 mm and 5 mm wing joiner pins for safe-keeping when not in use. The landing skid is made of 2 mm plywood with 5x5 mm triangle stocks on both sides. To achieve a fairing between wings and fuselage, I use epoxy with "micro-balloons" and sand it after hardening.

Now it's time to carry out the remaining wing work. Put the fuselage on a table. Assemble the wings to the fuselage and glue the 5 mm brass tubes in correct position. Be sure that you achieve the described two degrees dihedral. After hardening, you glue in place the 3 mm brass tube. Now, it's very important that you build in the correct angle of attack in both wings. The best way to discover any misalignment is to look at the wings from the rear. Raise and lower the fuselage slowly by the tail and sight along it. The undersides of both wing halves should appear or disappear simultaneously. If not, the wings are out of alignment (relocate the 3 mm brass tube). When the brass tubes are fixed in the right position, you cut some hard balsa blocks to fill out the space around the brass tube between the spruce spars. Fill the remaining space with epoxy and press the balsa block in place. Then you add the 2 mm plywood webs. Be sure that the epoxy doesn't enter the inside of the brass tubes. Finally, you glue in place the root ribs and then the wings and fuselage should be ready for sanding.

RUDDER

The rudder is made in the same manner as the vertical fin. The front spar tapers from about 12 mm at the bottom to about 8 mm at the top, and it has to be rounded off to fit the slit in the vertical fin. The ribs are made of 1.5 mm balsa while the sheeting is made of 1.0 mm balsa. Remember the holds for the hinges and control horn. Hinges and control horns are glued in place after finishing and covering.

FITTING, SHAPING, AND COVERING WINGS/STABILIZERS/RUDDER

Firstly, you have to make a template to achieve the correct form of the leading edge. After rough working with knife or planer, you first sand with a coarse sanding paper, later

on you use a finer one. Line up the model with the wings mounted to the fuselage. Then assure that the wingspan is correct. If not, cut the necessary part from the wing tips. Thereafter, you can start the final sanding. After sanding, I usually dope once to reinforce the balsa fibres. Then I have to sand once more with a very fine sanding paper.

Covering is the next step. You can use any of the known coverings, paper, nylon, Solarfilm, Monokote, etc. This time I chose Solarfilm just because I had some at home. It's an advantage to use light colour on top and dark colour under the wing. When you turn the model, this colour scheme makes it easier to see if the plane turns away from you or towards you.

FUSELAGE

Now you have come to the final shaping of the fuselage. We all want a nice and well-shaped model, so we have to round the fuselage a little bit. See the drawing! Now you will realize the advantage of laminating the fuselage with plywood inside! The leading edge of the vertical fin must also be rounded. Due to the balsa outside the fuselage, we have to make a hard surface to protect against damage. I have chosen epoxy/glassfibre: two or three layers from the nose to the rear of the wings and only one layer for the rest. After sanding with very fine sanding paper, I finally finish with one coat of car enamel.

RADIO EQUIPMENT INSTALLATION

The fuselage formers 2 and 3 are, of course, glued in place to fit your radio equipment. Install from the front, the battery pack, the receiver, the switch, and the two servos. Push the receiver antenna down the Nyrod tube in the fuselage. Assemble the completed model and check the control surface movements for proper direction. The stabilizers should have a total throw of about 17 mm measured at the leading edge, and the rudder should deflect about 23 mm each way.

BALANCING THE MODEL

This requires great care, because the performance and flying characteristics of the model are governed mainly by the proper positioning of the center of gravity. If you have used lightweight materials and possess normal radio equipment, you should not have to put much lead in the nose block.

As shown in the drawing, we have three different places for the center of gravity. For the two-meter competitions, we use only two of them. For duration, we place it 68 mm behind the leading edge of the wings, and for the speed task, 81 mm behind the leading edge.

Now, when you first balance the model, balance it for the speed task. Then add a little piece of lead to the nose to achieve the correct center of gravity for the duration task. When changing from one task to another, you have to trim the stabilizer a little on the transmitter to achieve the correct angle of attack. For duration: two degrees. In speed task, we reduce the angle a little to achieve less drag.

For windy days and for the speed task, we have installed a ballast compartment with a capacity of 800 grams of lead. When filling the compartment, assure that you don't move the center of gravity. The weight of the model should be within 1000-1100 grams (35 to 39 ounces,) depending on the builder giving a

wing loading of 25-28 g/dm² (8.2 to 9.2 oz/ft²) with the ballast compartments filled with lead we will achieve a total wing loading of 45-48 g/dm² (14.7 to 15.7 oz/ft²)

FINAL CHECKS

Be sure that all flying surfaces are without warps. Warps can be removed by reheating the film covering. It's OK with a small amount of washout in the wings as long as both tips are equal.

Check the control functions and make certain once more that the moving surfaces move in the proper direction. (It's my experience that you never can check it too often.) Be sure that batteries are fresh, and if you use Ni-Cds, be sure that they are fully charged. At this point, I am sure you can't wait any longer. After a couple of hand launchings to see if the model climbs or dives too much, or turns left or right, you take it up on the line for the first time. Try to find the way of flying which gives best results for the two-meter tasks.

Fly the model in a proper manner! Don't take unnecessary chances! It often ends with a very second-hand kit.

Congratulations with your new two-meter! Have fun, K&re Schanche.

Indoor Continued from page 52

build one. I told him that it might not fly well, but he was determined. His first effort was rather crude, but guess what, it flew. He fell in love with biplanes after that and built many, many more.

Most are scaled right from the three-views in model magazines, and they fly well. Efforts to encourage him to build duration models, gliders, and flappers have proved fruitless. Modelers now seek his advice on ways to make their bipes fly better. Chris offers these tips on building and flying biplanes:

1. Locate the balance point at about 70% of the cord on the upper wing.
2. Keep the tail EXTREMELY LIGHT.
3. Set the incidence angle on the wings to about one degree.
4. Use a rather large, fast spinning propeller. Most of Chris's "bipes" feature plastic props.

Chris has built over 50 biplanes so far. (Not to mention four triplanes.) The *Phalz* is his favorite, having built a Peanut and a 30-inch Jumbo for Outdoor Scale.

Doc Martin's Pistachio postal contest awarded Chris first prize for his eight-inch Boeing F3B-1 (built from three-views). As our local Indoor contests offer only one set of trophies, Chris has had to compete against everyone, and he has known the frustration of coming home a loser against the polished adult-built models. He has learned all his trimming techniques on his own and has refused any help or advice from his dad.

WHAT'S SO EASY ABOUT EASY B?

Many Indoor builders are led into believing that Easy B models are a snap to build and fly. Not necessarily so. The restrictions placed on design make Easy B a real challenge. I know several modelers who build *only* this class of model (Ted Buxton of Los Angeles, for

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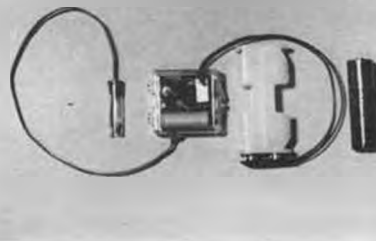
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one). These experts are always on the lookout for ways to get an edge over other competitors.

Earl Hoffman used a built-up prop covered with thin sheet wood while Dick Obarski of Florida braced his wings with wood strips. Some time ago I voiced the opinion of some West Coast Indoor builders that Easy B models should be covered with any material except Microfilm. Because condenser paper shrinks greatly, it is apt to warp the model in a humid room. Several weights of condenser paper are available and give an unfair advantage to those in possession of the lighter material.

After this viewpoint was published, I received a letter from AMA Contest Board Coordinator (and active Indoor flyer) Don Lindley. Don notes that my suggestion that readers send their preferences on Easy B to AMA headquarters in Reston, Virginia was in error. He suggests instead that readers write to their district contest board member (listed in *Model Aviation* magazine) or better still, write a formal rules proposal and send it to AMA headquarters for distribution to the proper contest board.

Personally, Mr. Lindley shares the frustration with Easy B. "I think this event has developed levels of competitive ability based on access to materials rather than skill and craftsmanship," he says. He further states, "In your consideration of the event, look seriously at Cezar Bank's proposal for the '80-'81 rules cycle. . . . While arguments about prop diameter, etc., may crop up, I think his proposal was the best I've seen. . . . One gram is a very reasonable weight for an Easy B. . . . I would like to see a maximum fuselage length of 20 to 22 inches to restrict the long moment arm (110% CG) models now being developed, but I think restricting covering materials only complicates the event for most flyers."

LISTEN FOR THE TICKING

Often after launch, a duration model will lope along and refuse to climb more than 15 feet. This can be because a knot near the prop hook is bumping the underside of the motor stick. A faint *ticking sound* can be heard as the knot makes contact with the wood. After the model has left your hand there is little you can do other than balloon the air-

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19:38

19:17

18:54

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1. B. Boehm
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3. W. Simmers

SENIOR GLIDER

1. Bryan Fulmer

JR. GLIDER

1. P. Loucka

AMA SCALE

1. K. Groves
2. J. McGillivray
3. J. Martin (flying a Cessna AW)

BOSTONIAN CABIN

1. J. McGillivray
2. J. Kubina
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The promised discussion of Indoor scales will have to wait till later. No more room.

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See you next time!

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craft down or wait for it to descend on its own.

The remedy is to check for "trouble" knots before launching the model. Use the first finger and thumb on the free hand to nudge the knots aft of the metal hook.

It is also wise to check for rubber that is climbing the hook at the rear of the prop shaft. Make sure that the metal hook is as closed as possible. This closed hook will stop the rubber from jumping the hook. Some flyers use and swear by S hooks. I have tried them a few times, but I can't say that I would recommend them over other styles of hooks.

SEED BEADS

Some duration models like Microfilm are so light that the only bearing needed for the prop shaft is one small Teflon washer. Other types need a spacer as well as a bearing.

For about 10 years, I have been using a very small glass or plastic bead just in front of the Teflon washer. This works particularly well on ornithopters where a right angle bend is required in the shaft. The bead is wide enough so that it will not move around the bend and cause a problem. A drop of cement is deposited on the shaft, and the bead is slid over and cemented in place. There is very little weight to the bead, so it works quite well. (Pennyplane models are another application as well as Manhattan and Boston Cabin planes.) If you

wish to try these little beauties, look for them in the local beading store or sewing variety store carrying decorative beadwork. Just recently, I discovered that they are called "seed beads." They are sold in a variety of colors and sizes.

INDOOR CHAMPS RESULTS

The Third United States Indoor Championships were held June 18, 19, and 20, 1984 in the Detroit (Michigan) State Fair Coliseum. The ceiling in this room measured 66 feet. The \$500 per day rental on the building was not covered by the 57 entrants. The \$18 basic entry fee was based on a minimum of 85 entrants flying three events each. Total event entries totaled 177. The largest attraction was Easy B with 23 flyers participating. There were 13 entries in F1D. An ex-Flying Tiger pilot, Robert Dial, was guest speaker at the banquet held Tuesday evening. The previous Indoor Champs meets were held at West Baden. The winners were:

PAPER STICK

1. Ron Ganser
2. Larry Loucka
3. Richard Doig

F1D

1. Larry Cailliau
2. Bill Hulbert
3. Paul Tryon

PEANUT SCALE

1. Jack McGillivray
2. K. Groves
3. R. Biewonstein

INDOOR STICK

1. Jim Richmond

Free Flight . . . Continued from page 60

nitro using the aforementioned 5.5x3 prop. RPM should be in the 22,000 range when all of the above suggestions have been implemented.

Now, there are two other things you can do . . . drill out the venturi as stated on the spec sheet that came with the engine (remove the screen and keep it off), and use pen bladder or pacifier tank pressure. Now, it should be running a strong 22,000 rpm. If not, get another engine and try it all over again until you get it right.

RENO, HERE I COME

This article is being completed just a couple of days before I pack up and

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drive to Reno to cover the Nats. The next few issues will undoubtedly feature some photos and sketches seen at the Nats. I plan to share them with you. I look forward to it, I hope you do too! Thermals!!

Counter Continued from page 10

an advanced, multichannel control system, foam core wing construction, and a new *Windsong*-like fiberglass composite fuselage. Specifications for the new *Camano* are:
Fuselage length (less rudder) 45 in

Fuselage width 1.75 in (max)
Fuselage const. molded F/G & F/G reinforced wood

Wingspan 98.5 in
Wing area 850 sq in
Aspect ratio 12 to 1
Wing loading 9 oz/sq ft
Airfoil Eppler 214
Wing const. foam core, spruce spars, 1/8" balsa sheeting

Hardware complete: includes flap-elevator compensator

Flying weight 52-56 oz
R/C requirements 3-channel

Functions elevator, rudder, flaps, ailerons

The new *Camano* is a sporty handling, smooth tracking, Standard Class glider that when flown by a "pro" can out-fly anything in the sky . . . except perhaps a well-flown *Windsong*. The *Camano* is truly the *Windsong* of the Standard Class. With the fantastic Eppler 214 airfoil, it can work very light thermal lift, it can fly slope with the slope racers, it can take FAI/F3B zoom launchers in stride, and do aerobatics with ease. This remarkable sailplane can even wing-swap with the new two-meter *Pixy*!

For further information on these two gliders, you'd better get a letter off to Bob Dodgson at Dodgson Designs, 2904 SW Camano Dr., Camano Island, WA 98292, or give him a call at (206) 387-7412.

★ ★ ★

We just received our copy of F.A.I. Model Supply's latest catalog (No. 14) of free flight kits, materials, tools, parts, books, and timing devices. Of special note, however, are the new products being offered by this reputable firm.

New from Wakefield competition (F1B) is the *Tilka*, a state-of-the-art design from the Swedish World Champion B. Eimar. The complete kit comes with a ready-to-use wire hub with Montreal stop, bearing, bobbin, and blade retainers. Die-cut ribs, marked prop blanks, and English instructions round out this remarkable one or two-piece wing design. The F.A.I. Model Supply price for the *Tilka* is \$38.95.

Other new items include an "improved" Sidewinder by John Morrill for winding rubber motors. This device can wind any size motor and safely handle up to 120 inch-ounces of torque with no trouble. The Sidewinder retails for \$57.25.

Also new in Catalog No. 14 are the "New Design Prop Kits by R/N." These are two-blade molded balsa folders. Features include: formed shaft, spring, thrust washer, and easily assembled plywood hub. Pre-drilled aluminum tubing attaches blades to hub. Prices are \$4.95 for the 14-inch props, and \$7.95 for the 18-inch props.

Contact F.A.I. for further info on any of these new products. Send 50¢ for F.A.I.'s new catalog, it's a treasure trove of F/F goodies! F.A.I. Model Supply, P.O. Box 3957, Torrance, CA 90510, (213) 830-8939.

★ ★ ★

So . . . you've been looking for a sport R/C biplane to go with that 40 four-cycle engine that's been glaring at you from inside your model engine drawer, huh? Well, we know where you can obtain two excellent designs which qualify. The answer is Ikon N'wst's

dynamic duo: the "Travel Air 2000" and the *Fleetwings 40*."

Ikon's *Travel Air 2000* has a wingspan of 52 inches and a flying weight of 4 1/4 pounds. The attractive biplane is designed specifically for the 40 to 45 four-cycle engine. The performance is fun and the landings are slow, the undercambered wings help get good speed and climb from the 40 four-cycle. The price is \$60.00, and it is available now.

The Ikon *Fleetwings 40* is really a nice flier and is fairly aerobatic. It too was designed for 40 to 45 cid four-strokers and has a 52-inch span. Flying weight for the *Fleetwings 40* comes out at 4 1/2 pounds. The plane is very simple to build and gets into the air fast. The struts are built into the fuselage so there is no alignment problem, just put the wings on. The *Fleetwings 40* is a good plane for your first biplane. The price is \$60.00, and it too is available right away.

Send \$2 for more information on these airplanes as well as the entire Ikon N'wst line of fine kits.

Ikon N'wst, P.O. Box 566, Auburn, WA 98071, (206) 941-8248.

★ ★ ★

Carl Goldberg Models, Inc. has announced its latest new product, which according to the press release on our desk is the "answer" to the "problems" that modelers run into with pump-spray cyanoacrylate accelerators. What is it, you ask? It's the new environmentally safe aerosol X-cel CA accelerator.

Aerosol X-cel is more convenient to use than pump bottles, and it comes in a handy, three-ounce can. Give it a try; we think you'll find it the best way yet to speed up those "super glues."

X-cel is available at your local hobby dealer's shop now. For further information, write to Carl Goldberg Models, Inc., 4734 West Chicago Avenue, Chicago, IL 60651.

★ ★ ★

Futaba has a couple of new, two-channel R/C rigs that you should know about. They are the 2PKA Magnum Junior and the 2NL Attack.

The former is an R/C car or boat driver's dream come true. It has been built around a comfortable pistol grip handle and a trigger style throttle control. Steering is made painless by way of switchable, adjustable dual rate, and setup is likewise made painless through the use of servo reversing switches and end point adjustment for the throttle. This system comes in three different versions determined by the servos included: two S28, two S29 (heavy duty, watertight), or two S32H (high speed). Furthermore, there is a choice of receivers: the regulator R2GS receiver which operates best with the S28 or S29 servos, and the R4H micro receiver with S32H servos. Switch harness and dry cell battery case are included. Operation on either 27, 72, or 75 MHz frequencies is up to the modeler.

Secondly, the new 2NL Attack radio, a two-channel, multi-use system, has been released and is available now. This rig features the traditional control sticks favored by many R/C modelers both in the air and on the ground. The "Custom" gimbals have "adjustable stick axis and neutral adjust, and

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full trim control." The receiver is the R2GS model paired with two S28 servos, switch harness, and dry cell battery case. The Attack radio is available in 27, 72, and 75 MHz frequencies.

If you want you to know more about either of these systems, or any other Futaba product, write to Futaba, 555 West Victoria Street, Compton, CA 90220, and ask for your 1984 Futaba Systems Catalog when you do.

★ ★ ★

Golden Gate Hobbies, P.O. Box 4412, Burlingame, CA 94010, (415) 467-3170, has announced the availability of several new

products lately. This month, we will feature three of these products.

Firstly, we have some hardware that will make life very easy for R/C modelers who like to use pull-pull cable actuation systems for rudder or elevator. Although this hardware is listed under two different manufacturers' names, it is still very much a single system. Those names are: Orient Pull-Pull Horns and Tetra Pull-Pull Hardware. As you can see by the accompanying photo, the two combine to make a perfect and complete hardware setup.

The Orient Pull-Pull Horn is of very simple but effective design. A threaded rod is

inserted through the control surface. Two small plastic triangular plates are slipped over this rod (one on each side) to make contact with the control surface. Two nuts are provided to secure the plastic plates and the threaded rod to the control surface. Two nylon fittings are provided which are threaded onto the rod (one on each side) for clevis attachment. These control horns are fully adjustable and are suitable for use on rudders and elevators on up to .60-size models where pull-pull controls are utilized. The list price for the Orient Pull-Pull Control Horn is \$0.83 each.

The Tetra Pull-Pull Hardware is suitable

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for use in all pull-pull control applications such as elevators, rudders, steerable nose gears, and tail wheels. All hardware required such as plastic coated wire, nylon clevises, copper crimp tubing, entry-exit tubing, large bellcrank, and metal fittings are supplied. The pull-pull application eliminates all control slack and provides constant positive feel of control surfaces. Installation time of pull-pull control is significantly lower than that of conventional push rods. Additionally, a significant savings in weight is possible. This hardware has been thoroughly tested on .60-size Pattern aircraft elevators. The pull-pull hardware should be used in conjunction with the Orient Pull-Pull Control Horn. The list price for the Tetra Pull-Pull Hardware is \$3.84.

Thirdly, Golden Gate Hobbies now has available a really handy tool kit which provides the hobbyist with the most commonly used metric tools, called quite simply, the Niwa Tool Kit. It will lend itself to many an

engine tear-down or radio installation or repair.

Included in the kit are: open end wrenches in 4mm, 4.5mm, 5mm, 5.5mm, and 6mm sizes; nut drivers in 3mm, 3.5mm, 4mm, 4.5mm, and 5mm sizes; allen drivers in 1.5mm, 2mm, and 2.5mm sizes; flat bladed screwdrivers in 1.5mm, 2.5mm, and 3.5mm sizes; Philips head drivers in no. 0 and no. 1 sizes; and finally, an awl. The list price for the Niwa Tool Kit is \$9.94.

Contact Golden Gate Hobbies for further information and/or shipping instructions.

* * *

Model Research Laboratories, 24692 Nympha, Mission Viejo, CA 92691, has announced its latest new product for state-of-the-art modelers: Syn-Lube 4A. As you may already suspect, this is a synthetic oil. It is the first and only oil developed specifically for model engines. The most unusual thing about this oil is that it was developed to run in high performance engines at a 40:1 mix ratio. Of course, this translates to a correspondingly large increase in performance.

Included with the detailed and lengthy press release from MRL was an eleven-point summary of the advantages of using Syn-Lube 4A. To summarize these points is to lose some of the important little details, so we recommend that you write this company and get a copy of this press release as well as the other high-tech manuals it offers for the paltry sum of two bucks. In them you will find application notes and data on the relative strengths of the many new composite materials (including boron, carbon fiber, Kevlar, etc.) that are available through MRL. It is well worth the time and money.

In just a few words, the advantages of using Syn-Lube 4A are: less oil needed in the mix; improved upper and lower rpm performance; smoother running; agrees with four-cycle engines (mix in a ratio of 5% Syn-Lube, 12% nitro, 73% alcohol); cleaner burning (no visible smoke); mixes well with all fuel ingredients; contains enough castor to prevent rusting; spark plugs stay clean in ignition engines; all testing done in real models under real conditions and with real, recorded results (distinct speed increase with Cox .049 racing engines); cooler running helicopter engines without castor oil smoke trails (currently being used in Hollywood movies); lower exhaust gas temperatures; and finally, in the 40 years of modeling experience that the director of MRL has, including the use of many synthetic oils that have proven to be less than adequate, Syn-Lube 4A has been found to protect against engine wear better than all, including castor, *plus*, it costs less!

Now that you're interested, you'd better get a note off to MRL and order a quart of Syn-Lube 4A. Include \$20 for the oil and \$2.50 for the UPS man and you're set!

* * *

A product of interest to all R/C soaring types is the Robbe® blade spoiler system. Here is a parallelogram type system that allows the spoiler blade to pivot up out of a flush wing surface very positively and accurately. Control is achieved by direct attachment to a servo via a single pushrod per spoiler.

Specifications for this glide path control device are: length, 9.85 in; width (including blade well), .591 in; blade width, .244 in; and installation depth, .630 in.

Of interest to R/C off-road car enthusiasts is Robbe's VW Cross. The VW Cross is the newest off road electric car from Robbe. Four-wheel independent suspension and an enclosed compartment for gearbox and radio allow the VW Cross to be used under the most adverse conditions. A special servo saver is built into the steering linkage to protect against possible damage to the servo gears when operating under rough conditions.

The high performance RS 540 electric motor is coupled to the rear wheels through special Cardan drives, thus allowing full suspension travel and excellent traction.

Other features include: durable, one piece chassis; adjustable ball link steering; high traction rubber tires; lightweight plastic rims; camber changing rear suspension; integrated roll bar; shock absorbing, flexible Lexan body; and oil filled shocks which are available separately.

If any or all of these fine products interest you, then see your local hobby dealer and ask for them and/or write to Robbe Model Sport directly: 55 The Office Center, Suite 345, Plainsboro, NJ 085346.

* * *

Bill Hannan has done it again! He's written another volume entitled *Scrapbook of Scale, 3-Views & Nostalgia*. This second volume contains more scale and semi-scale modeling information, "just for the fun of it!"

Featured are articles, model construction plans, photographs, general arrangement drawings, documentation . . . even "a modicum of modeling metaphysics." There is something for almost any scale modeling taste. If you liked Volume 1, you'll like Volume 2 as well.

Get your copy of this valuable scale reference (and Volume 1, too!) for \$8.95 each. California residents add 6% sales tax. Send \$1 for postage and handling to: W.C. Hannan, Graphics, P.O. Box A, Escondido, CA 92025.

* * *

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* * *

When contacting manufacturers and hobby suppliers mentioned in "Over the Counter," please tell them you saw it in *Model Builder*.

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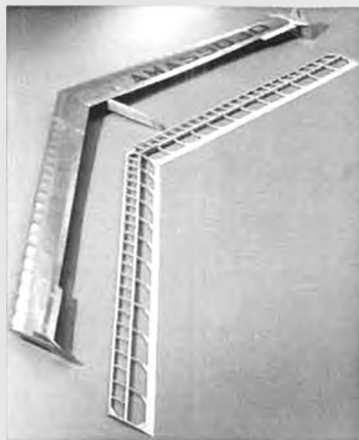
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Dear Jake Continued from page 7

received on the same day as yours, might shed some light on your problem.

—Jake

★ ★ ★

Dear Jake:

Remember me, Tommy Smith? I wrote to you before when I got a paper bag stuck on my face with super glue. Well, my mom got it off with nail polish remover, but now I've got another problem. I was getting ready to paint my Sr.

Falcon this morning when I knocked a whole quart of desert brown Hobbyoxy off the workbench. It spilled all over my mom's French poodle. I tried to clean her off with thinner, but Fifi didn't want any part of that and hid under the stairs. The stuff dried and now we've got an armor-plated dog. I haven't told my mother yet. What should I do?

—Tommy Smith

Dear Tommy:

Sounds like you've invented the French armadillo.

—Jake

★ ★ ★

Dear Jake:

I can't keep a prop on my OPS .60. It kept throwing props until I put a lock nut on it. Now it throws the blade right off the propeller. What should I do?

—Propless in Peoria

Dear Propless:

Lower your compression ratio by adding a head gasket, cut back to 5% nitro, and don't fly at my field.

—Jake

★ ★ ★

Dear Jake:

I just got a new puppy. I'm using your column to paper train him. He seems to have an instinctive knowledge of just what to do on your words of wisdom.

—Chewed Furniture in Chattanooga

Dear Chewed Furniture:

Always glad to hear from a reader who appreciates the full potential of my column. I realize you didn't ask for my advice, but here's a free helpful hint: Until your dog is housebroken, don't walk around in the dark barefoot.

—Jake

★ ★ ★

Dear Jake:

I doubt seriously that you will heed my suggestion, but I think I can speak for all your readers when I say we are tired of your flip and supercilious answers to people who have made a sincere request for help. Please either change your ways or withdraw from the journalistic arena. Thank you.

—Critic in Claremont

Dear Critic:

I'll admit that my answers are occasionally silly, but I don't think that

they're the super silliest. Besides, why should I listen to you? You can't even spell.

—Jake

★ ★ ★

Dear Jake:

We have your wife. If you ever want to see her alive again, send \$500,000 to account No. 30-542J-41173 at the Banque du Nord, Lucerne, Switzerland. We will contact you again after we receive the money and tell you where and when she will be released.

—Adirondack Liberation Assembly
Dear Adirondack Liberation Assembly:

The only major aircraft manufacturer in Switzerland is Pilatus. Requests for technical information or drawings on any of their aircraft should be sent to the Swiss Embassy, 120 Avenue of the Americas, New York, NY 10017, Attention: Deputy Minister of Information Exchange.

—Jake

★ ★ ★

Dear Jake:

I just got a new Como .40 engine. It runs great, but the mid-range is a little ragged. Any suggestions?

—Open to Suggestions in Ocala

Dear Open:

Put a Perry carburetor on it, then it'll really sing. (Think about it.)

—Jake

Workbench Continued from page 6

ly, it blew across the runway! We'll tell you more about that in our future coverage of the event.

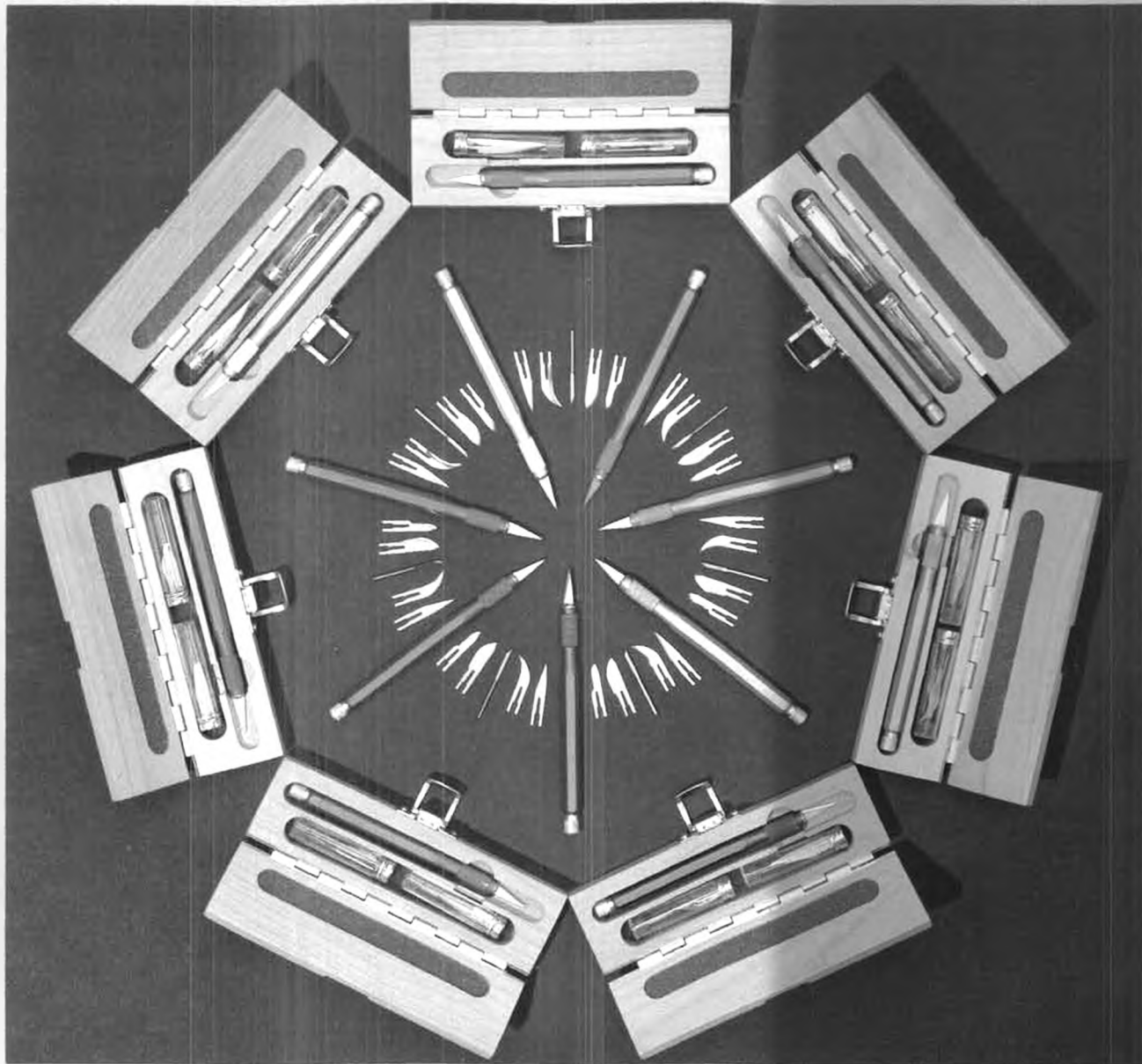
R/C Pattern, Pylon, and Scale, plus most of the Control Line events, were held at Reno-Stead Airport, site of the famed Reno Air Races, about five miles north of Reno. Helicopter, Control Line Combat, and O.T. R/C Assist were held at Rancho San Rafael Park, at the north end of town. Indoor was held at the Centennial Coliseum, near the south end of town (about five miles apart) which was also the headquarters site, and the R/C Soaring and Free Flight field was another 10 miles south and east of the coliseum. It was definitely a road show!

The R/C Helicopter event, in addition to being handicapped by a judging shortage which resulted in contestant judging(!), was also subjected to the distracting sound of Control Line Combat ships going at full pitch less than 200 yards away. Combat is an exciting event, demanding the sharpest reflexes in the hobby, and everyone but the hapless helicopter contestant and the judges would stop whatever they were doing to watch the battle. The cheers that went up at the end of a match were half from enthusiasm and half from relief!

On Friday, while watching O.T. R/C Assist, we saw a runaway Combat ship climb up to the cloudbase in dizzying circles, then come down in a beautiful glide, stabilized by about 10 feet of streamer.

That's kinda the overall picture of the Nats...very skimpy...but we'll leave it to our special reporters to tell you more in the next couple of issues.

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Go ahead and put the 40 Baltic through the paces. Give it the throttle, and watch how the bow rises perfectly out of the water. Then turn to the left and right, and check out the positive and immediate response. It's easy. While you don't have to be experienced to control it, it's fast enough to challenge your skills.

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Designed for a 2-channel radio, the boat is powered by a clean-running, Mabuchi RS-380 electric motor, operating through a 3 to 1 gear reduction box which whips a hefty 50mm x 50mm nylon propeller. Performance is exceptional. Switch from hard left to hard right, from forward to quick reverse, rapid switching of control is no problem. And when you give it rudder input, there are no sloppy, sliding turns... it locks into a positive, sharp, responsive radius.

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The basic construction of the 40 Baltic is simple. The boat's one-piece hull and one-piece superstructure are made of tough ABS plastic. They mate perfectly in a monocoque construction that means fast,

simple assembly and one that will last.

And when it comes to detail, this boat is striking. Its decals are ultra-accurate in their sizing and realism. The chrome plastic fittings like wipers, horns, and railings complement the clean, white hull and wood-like deck. And the custom deck fittings provide the final touch of realism.

Chances are, you'll want to sit back and admire this boat even before you put it in the water. But don't wait too long, it's there that the real thrill of R/C boating is. MRC's 40 Baltic... it's fast and it's fun. Ask your hobby dealer.

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