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MARCH 1990

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volume 20, number 217

BUILD:
"Sproose Goose"
"Trenton Terror"
"Celtic" Bostonian
Nats Winner

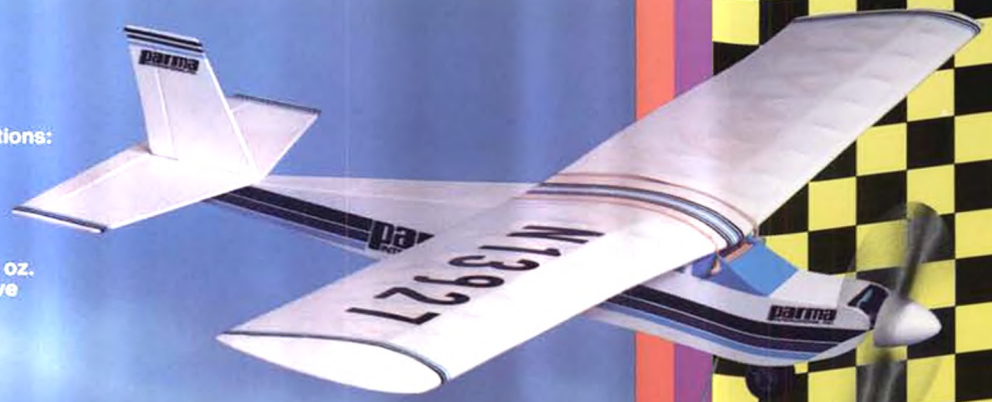
REVIEW:
Schluter "Magic" Heli
Futaba 9VHP Heli Radio
Enya 60XF-4H

Jet Trails at Swinderby

Heli World Champs, Part II

74820 08545 5 03

Aero Tiger Specifications:
#25000 Basic
#25100 Deluxe
Wingspan: 49½"
Wing area: 396 in.
Length: 31½"
Flying Weight: 38-44 oz.
Motor: .05 Direct Drive



Aero Sprint Specifications:
#25500 A.R.F.
Wingspan: 50"
Wing Area: 450 sq. in.
Length: 36¾"
Flying Weight: 40-46 oz.

Pair Of Aces

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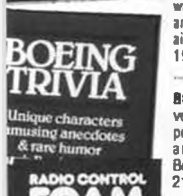

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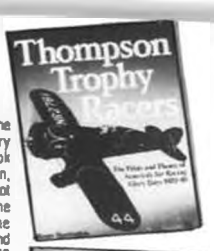

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MODEL BUILDER

MARCH 1990

volume 20, number 217

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FEATURES

CONSTRUCTION

COVER: Readers located in the frozen and snow-covered areas of our USA should especially enjoy this photo by Jim Miura, Honolulu, Hawaii. It shows Rosalina Serai with Bert Moriguchi's one-third scale Christen Eagle. The background is West Beach, on the island of Oahu, a couple of miles from Barber's Point Naval Air Station. Rosa is an air traffic controller with the FAA, stationed in Diamond Head Crater, with the Honolulu Air Route Traffic Control Center (where Jim is also a controller). The Eagle is covered with Coverite's Baron film and the colorful "feathers" come from Byron Originals. Power is a Supertigre 3000 with Tatone muffler, turning a Zinger 18x8 prop. Futaba PCM and Don Harris smoke pump round out equipment. Plane had seven flights at this time.

Inset photo is of World Champion Yukihiro Dobashi's Hirobo/Black Body helicopter. Full description in James Wang's Part II report in this issue.

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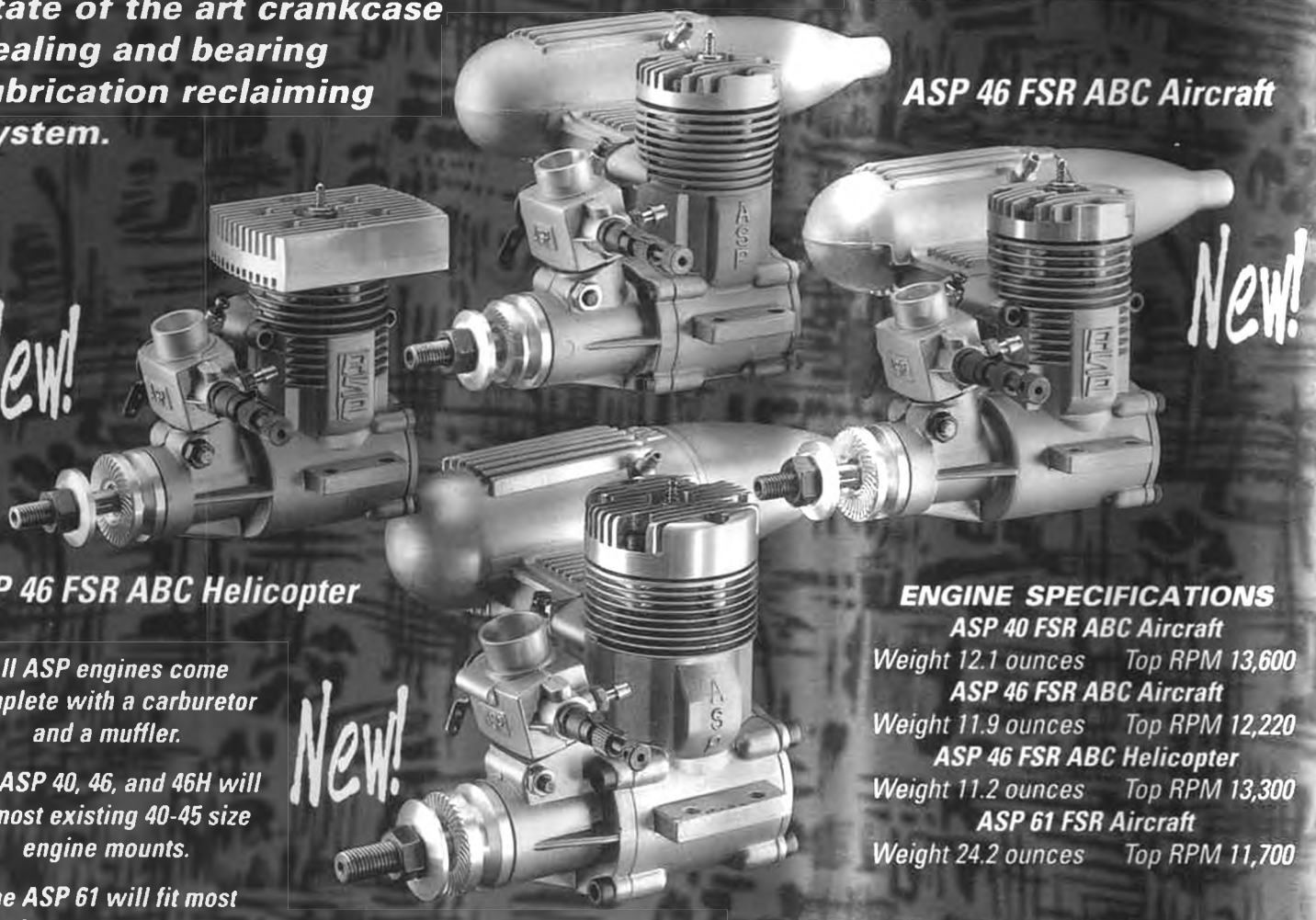

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from Bill Northrop's workbench

A real sexy caboose! This big "G" Scale car is a result of the combined efforts of R.E.A. and Polk's Model Craft Hobbies. Why is its picture in *Model Builder?* Read on!

• Darn you, Nat Polk! Why did you have to send us that "G" Scale REA Caboose for Christmas? What all-around modeler hasn't at least once taken a fling at model railroading . . . no, not the toy or "tin plate" stuff . . . we're talking *models*, the kind you build from kits. We consider ourself one of the above modeler types, and for several post-WWII years, when apartment living and frequent moves while in the search of that "right" occupation limited our model building activities, the construction of HO freight cars and steam-type locomotives came to the forefront. And that interest has never gone away, although somewhat dormant for several decades.

In the last couple of years (maybe it's actually more than that, to those who are currently active in the hobby), model railroading seems to have enjoyed a resurgence of general public interest through the new large gauge "G" Scale. The models in this gauge seem to be a combination of ready-made and do-it-yourself products, which should not appear unusual to anyone who has observed the trend in the other "transportation hobbies," as we like to call them; model aircraft, boats, and cars.

To add a broader interest range to our IMS hobby shows, we have, in the past couple of years, included live demonstration displays by model railraod clubs. The large gauge stuff has definitely aroused the most interest on the part of spectators, particularly the busy Del Oro Pacific layout featured at the Pasadena show the past two years (three years by the time you read this).

All of this kinda rekindled our spark of interest, aided by the multitude of model railroad displays at the Chicago RCHTA show . . . Then along comes this caboose! Cabooses (cabeese?) always have this special attraction. They are cute, they are ugly, they are classic, they are functional, and unfortunately, they are becoming history on real-life railroads. Modern communication methods have made their original purpose obsolete. But every model railroader loves 'em!

OK . . . Next comes our trip to the local Sav-On, a large chain-operated pharmacy-turned-department store, where we were picking up some Christmas stuff; light bulbs, wrapping paper, extension cords, etc. And guess what's on display in a center aisle . . . a Bachmann "G" Scale train set, with a Baldwin 4-6-0 steam locomotive, tender, long gondola car, and of course . . . a caboose! This is a short, red, bobber (four-wheeler) in Atchison, Topeka & Santa Fe markings . . . the caboose, that is.

A few days later, another trip to the Sav-On was necessary. And of course, we checked the railroad sets. Some had been sold, and the price had been reduced from the original "sale" figure. Hmmm . . . Naw, forget it! A train set at my age?

Our last trip to that store before Christmas was on Sunday, Christmas Eve day, to get a few last-minute items. Could I have picked them up somewhere else, closer to home? Sure, but I had to check on something . . . you guessed it, the price on the train sets had dropped to 65 percent of the original amount, and when I left the store, I was carrying a set by its built-in suitcase handle!

Lord knows where this whole thing is going to lead, but here's the kicker. We had some other grown-up "kids" at the house Christmas Eve, and before you knew it, the train was circling around its diminutive oval track that came with the set. We did take a look at the instructions once . . . before plugging the little transformer into the house current. Our General Manager was looking on from time to time, but made no comment. Why? On Christmas morning, I opened a large box which was labeled to me, from her, and suddenly there I was with TWO identical train sets . . . I suppose I did mention my interest in the big gauge stuff, and the set I had seen at the store. Come to find out, we missed each other at the store by less than an hour. She paid the best price too! Oh well . . . there are some grandsons who *might* be interested. . . .

NOW . . . IMS MILWAUKEE!

As this is being written, the first consumer-oriented model hobby show in 1990, IMS Pasadena, is just 11 days away. That will be followed by the Northwest Expo in Puyallup, Washington (Feb. 3 and 4), the WRAM Show (Feb. 24 and 25), the Toledo R/C Exposition (April 6, 7, and 8), IMS Atlanta (May 18, 19, and 20), the MARC Show, Timonium (near Baltimore), Maryland (June 2 and 3), and . . . and, the first annual IMS Milwaukee, that's right, Milwaukee, Wisconsin, October 5, 6, and 7.

During the last three years, conversations with Chicago area modelers (read that "model products consumers") indicated their concern about the loss of a consumer-oriented show within their metropolitan area. As IMS had responded to the urging of southeastern modelers and the industry by opening an annual model sport and hobby show in Atlanta, Georgia in 1988, Chicago area modelers appealed to IMS for help.

After a year-long preliminary investigation of show possibilities by IMS, and further conferences with area modelers and interested manufacturers/exhibitors, the final decision was made to go ahead with a North Central consumer model sport and hobby show. As always, IMS has kept in mind the need for a show at which low-budget manufacturers are given equal opportunity to exhibit along with major companies, aided by the option to sell at

the show, which in turn, promotes increased modeling activity and sales at area hobby shops.

The show site is the beautiful MECCA Center in Milwaukee, Wisconsin, and the dates for 1990 are October 5, 6, and 7. On the western shore of Lake Michigan, Milwaukee is just 90 miles directly north of Chicago O'Hare International Airport, via the 294/94 Tri-State Tollway.

IMS Milwaukee will follow the pattern of the other IMS shows, with a car track large enough for quarter-scale (Pasadena now has an outside 1/4-scale car demo area), a large pond for R/C boat demonstrations, static model display competition, swap shop, giant raffle, and as mentioned previously, optional selling by exhibitors.

As you read this, model manufacturers, distributors, and importers in the R/C sport and hobby industry will have received their invitations to exhibit in Milwaukee. Model aircraft, boat, and car clubs in surrounding states and Canadian provinces will also receive direct mail notices about the show, with the hope that club officers will pass the word to all their members through their club newsletter. Anyone in the model hobby industry, and interested modelers who would like further information about the show are invited to call our toll-free number, 800-243-9593 (in California, call 714-548-4700).

VINTAGE R/C COLUMN

"I Ain't Got It" didn't have it in the February issue, nor in this issue because of a combination of lack of space (February) and lack of time (this issue). But fear not (or should it be "fair warning"), it will reappear next month. It is partly written at this time, and we have restored a set of plans for Jack Port's 1953 Nationals R/C winner, as originally published in the March 1954 issue of *Air Trails*. If there's space available, the plan will be included, as it goes along with our discussion about rudder-only R/C. After all, Jack's airplane, the "High-Q," was rudder-only, not even throttle control, and it won out over all other models at the 1953 Nationals, regardless of radio equipment. In those days there was only one class of R/C aircraft . . . period. So-called "multi" control was still in its infancy, so that a well-designed rudder-only model, flown by a skilled pilot, was on equal footing with anything else going at the time.

Letters are starting to come in from vintage fliers of vintage R/C models. If you have any interesting photos, please send them along. Include an S.A.S.E. if you want them returned. Even if we publish any of them, we can still return your original prints. Incidentally, "Vintage" has not yet been clearly defined as to beginning and ending years. We'd like to receive your opinions on that. Should it be any model built and flown prior to a certain date, say 1960, or should it start when the Citizens Band was opened for radio control and end in 1960? And what about the cut-off date? Is 1960 too early, or too late?

THINGS TO DO

The Tri-City Soarers (TRICS) will hold the 1990 International Scale Soaring Fun Fly on May 25, 26, and 27. There will be much fun and festivities in addition to non-competitive fun flying. Michael Selig will be the guest speaker. For full information and required pre-registration forms, contact Wil Byers, 632 Meadows Dr. E., Richland, WA 99352, phone (509) 627-5224, or 525-7066.

FAREWELL

Carl Fries, co-founder of the National Free Flight Society, passed away on December 7, 1989, at the age of 74, just short of his 75th birthday on January 22, according to word from Vic Cunnyngham, Exeter, California.

"Carl and I were the last of the active model builders from the early 1930's Stix Baer and Fuller model airplane club in St. Louis, Missouri. We both joined in 1930 and have been friends ever since.

"Carl was co-founder of the National Free Flight Society in 1966-1967. He was a true free flight modeler. Carl set his first world record with a twin pusher in 1930 in St. Louis, MO. He did everything in his power to improve and develop the free flight model airplane hobby.

"When Carl and Dick Black started the N.F.F.S., I am sure they did not realize how important it would be for all free flight modelers.

"Carl started modeling in 1925 and was a member of A.M.L.A., Airplane Model League of America; N.A.A., National Aeronautical Association; and a charter member of A.M.A., Academy of Model Aeronautics. He has the #2 membership card for N.F.F.S., and was inducted into the N.F.F.S. Hall of Fame in 1979.

"In 1989, I nominated Carl for the A.M.A. Hall of Fame. I am hopeful that in 1990 he will be elected into that prestigious group. On the introduction for his nomination I wrote:

Having an old friend is always enjoyable. It is one of the bonuses of life, for it enables you both to recapture and relive earlier times that might otherwise remain buried in your past without recall. Memories are priceless.

"Besides Carl's work and his love for free flight model airplanes, he and his lovely wife, Delores, raised four fine children.

"May the Lord let him rest in peace and watch over us.

"Farewell to my friend of sixty years." •

ADVICE FOR THE PROPWORN
—By Jake

Dear Jake:

True story! One of our customers bought a bottle of CA glue explaining that the old bottle had been dropped, and that his wife had stepped on it, squirting glue all over their dog. The dog's name is Jake. It seems the name Jake gathers trouble no matter who wears it. Any truth?

Bill in Palmdale, California

Dear Bill:

Do these people have a son named Tommy Smith?

There's at least one difference between their Jake and me. Their Jake won't be doing any shedding for a while.

Jake

* * *

Dear Jake:

I recently bought a "computer radio" system for many dollars. This one features a computer-memory. On the first flight with this radio in my super gas-guzzler sport plane, the aileron reversing was backwards and the plane crashed on take-off. Despite being almost a total loss, the airplane was repaired.

Last Sunday I flew the plane again, and the same thing happened! How come my computer-memory radio didn't remember that the ailerons were backwards?

Peter in Centreville, Virginia

Dear Peter:

Like any computer, intelligent R/C systems are only as smart as their programmer. For this very reason, I held off from buying a computer radio. I figured why should I pay $900 for something with my intelligence level?

But then I had an inspiration and rushed out to get the best programmable radio that money could buy. I programmed it to assume that every third command I gave was wrong, and to apply the opposite control. This little stroke of genius has saved

Continued on page 107

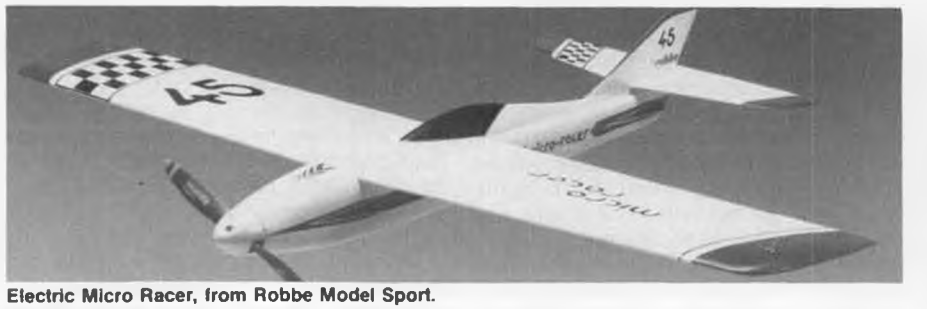
OVER THE COUNTER

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

In addition to some new items, Robbe Model Sport, 180 Township Line Rd., Belle Mead, NJ 08502, phone 201-359-2115, has some announcements to make.

First, Robbe has been selected by Rossi USA to distribute its entire line of high performance engines. Although well known for many years as producers of engines that are used by the top modelers in various phases of competition, many of the engines are equally well adapted to everyday use . . . that is, they are not finicky to install, tune, and operate by the average modeler who wants a little more in quality and power output. The main feature of Robbe's association with Rossi is the matter of parts back-up, something that can be a serious drawback with imported engines. Robbe stocks all parts for current Rossi engines, and will usually ship within 24 hours.

Robbe is also extending its product availability to include those customers in areas not covered by the network of hobby shops and "Authorized Robbe Service Centers" carrying Robbe's line of model airplane, car, and boat kits and accessories.



Electric Micro Racer, from Robbe Model Sport.

Easy-Weld Micro Flame Torch, from Du-Bro Products.

Multi-Weld solder paste, from Du-Bro Products.

A new, direct order telephone line has been established. A new price list shows all Robbe kits and many accessories with discounted sales prices for direct orders. For technical information and Robbe's monthly specials, call (201) 359-2115. For orders only, call conveniently between 8 a.m. and 7 p.m. (EST), Monday through Friday, toll free, (800) 527-6223. Telefaxed orders are welcomed anytime via (201) 359-1415, or write to Robbe Model Sport, Inc. at the address mentioned above.

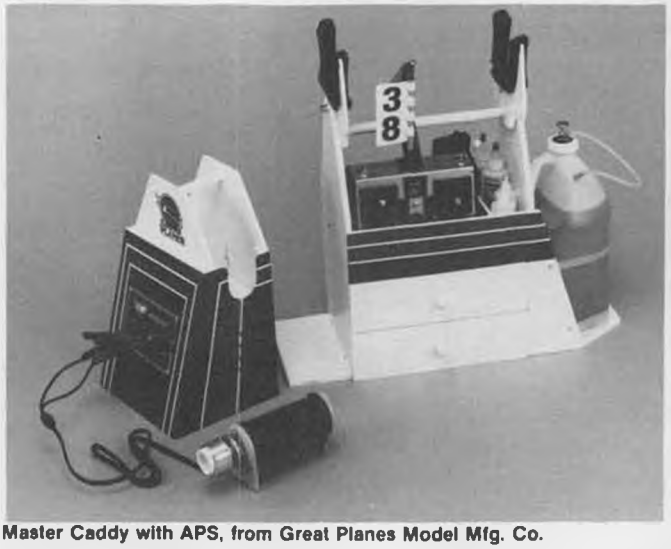
Three new airplane kits are now available from Robbe; two electric and one gas. The electrics include the "Speeder E" and the "Micro Racer." The Speeder is an all-wood constructed model for the experienced builder and flier. It is fully aerobatic on aileron, elevator, and motor switch. Kit includes all wood components, mostly die-cut or pre-cut; electric motor (540S); suppressor set; propeller and prop adaptor. Span is 43 inches, length is 34.8 inches. The Micro Racer is especially designed for electric pylon racing. It is quite fast, and requires an experienced pilot (I'm glad to see manufacturers telling it like it is), with a span of only 32.8 inches and length of 24 inches. The all wood kit in-

Robbe "Acrobat" for .25 gas engines.

Speeder E, aerobatic electric from Robbe.

The "1300 Blimp" from Peck Polymers.

Kyosho Advance 5- and 7-channel aircraft radios.



Master Caddy with APS, from Great Planes Model Mfg. Co.

Kyosho Stratus 2000 electric sailplane.

cludes die-cut and pre-cut parts, R/C hardware, a 540S motor, prop and prop adaptor, and spinner. The optional Keller 22/5 or 22/9 motors will put you in charge of the hottest electric you may ever fly, according to Robbe. A three-channel radio is required, along with 7-cell battery, and covering of your choice.

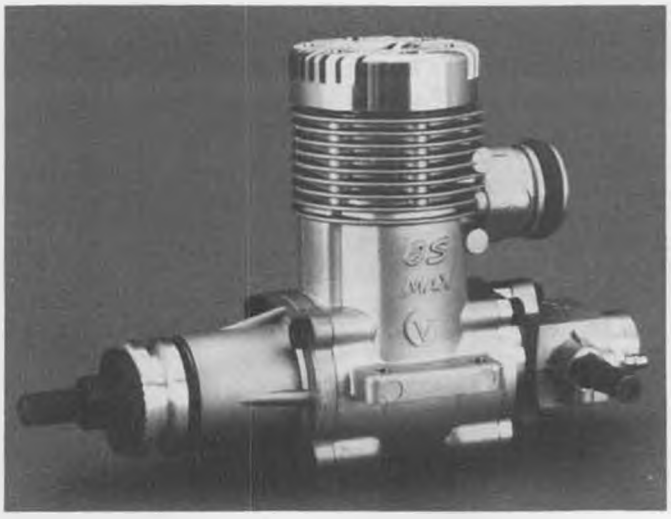
For the gas-powered fan, Robbe offers the compact "Acrobat," which spans 40 inches, weighs 48 ounces, and takes .25-size engines. It should fit in the trunks or hatchbacks of most any small car without having to be disassembled. The kit includes molded cowl, pilot figure, and canopy, die-cut and plywood parts, landing gear, wheels, and all R/C hardware.

* * *

Multi-weld is a silver-bearing solder in paste form that comes in a syringe applicator and requires no flux. After application, the heat of a match or lighter flame makes it flow smoothly into the material being connected. When cool, the solder residue washes off to leave a clean, corrosion-resistant joint. It is an excellent conductor of electricity. It can be applied to all metals except aluminum, magnesium, and pewter. Multi-weld is a new item from Du-Bro Products, 480 Bonner, P.O. Box 815, Waukonda, IL 60084. Any questions? Call Jim Broberg at (708) 526-2136.

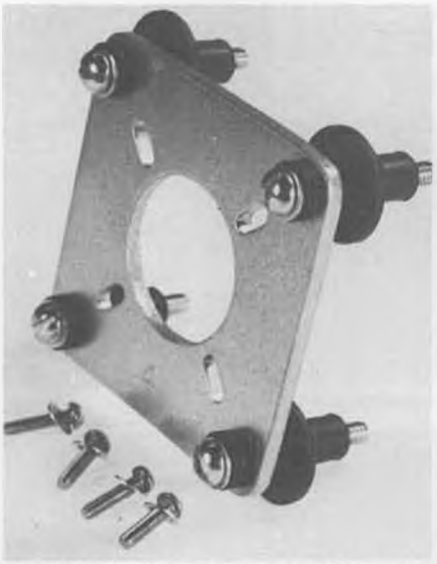
If you prefer conventional soldered joints, particularly where electricity may not be available, Du-Bro also offers the new Easy-Weld Micro Flame Torch, which comes complete with torch and soldering iron tips. It has a 2400° F Micro Flame Tip which can be used for heating, soldering, and braising with precision control. It will burn for 60 minutes from a single, refillable load of Butane (not included with torch).

Du-Bro states that it has a new plastic tube-in-tube push rod material which is extremely stable under varying heat con-

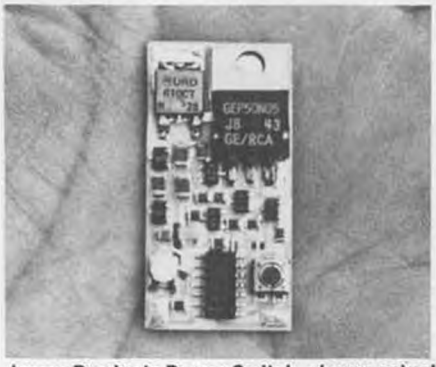


O.S. .65 VR-DF ABC ducted fan engine.

O.S. .61 RFN-H for helicopters.



"Snuf-Vibe" back plate engine mount from J'Tec.

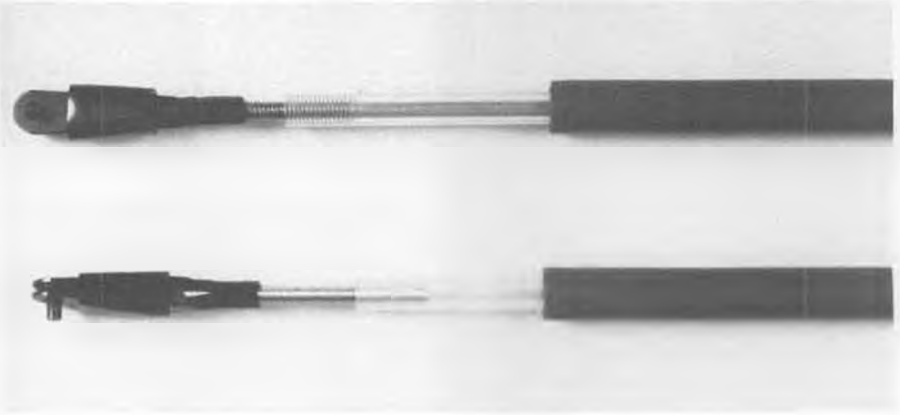


Jomar Products Power Switch, shown actual size.

ditions. Called "Laser Rods, they are said to have 75% less growth or shrinkage from temperature changes than any similar product currently available. The physical appearance is also different, in that the red outer tube has six inner splines throughout its full length, providing only six contact points of friction for the inner tube. And the inner tube is a translucent natural color so as to better match the color scheme of the model in which it is installed. The push

Sturdy Birdy from Hobbico.

Kyosho Reflex, electric powered pylon racer, ARF R/C.



Du-Bro "Lazer Rod" tube-in-tube pushrods.

Hobbico Hot Shot and Super Hot-Shot glow plug starters.

rods come in pairs, with end hardware, in 36 and 48-inch lengths.

* * *

Great Planes Model Manufacturing Company has come up with the "Master Caddy with APS." Decoded into everyday English, this means that it is a full-duty field box with a detachable, lightweight APS . . . Auxiliary Power Station . . . which you can take with you to the starting area or flight line for firing up your engine without having to bring along the whole field box. Now doesn't that make a lot of sense? The APS neatly holds the starter, 12-volt battery, power panel, glow plug clip-lead, and a few small tools in one compact unit. The base unit carries all the other garb . . . er, equipment, such as transmitter(s), glue and lubes, voltmeter, tach, and even a field charger. One of the two drawers will hold up to 12-inch props, and the other is parti-

Electronics Corner

By ELOY MAREZ

• Our opener for the month is a question that is heard often by the customer service persons at the different R/C companies. It is brought to us now by Otey Howe, of St. James, Minnesota, who writes:

"I have a Futaba 7FGE radio and several other Futaba FE and Conquest series. I really like the expo and think all radios should have it rather than dual rates.

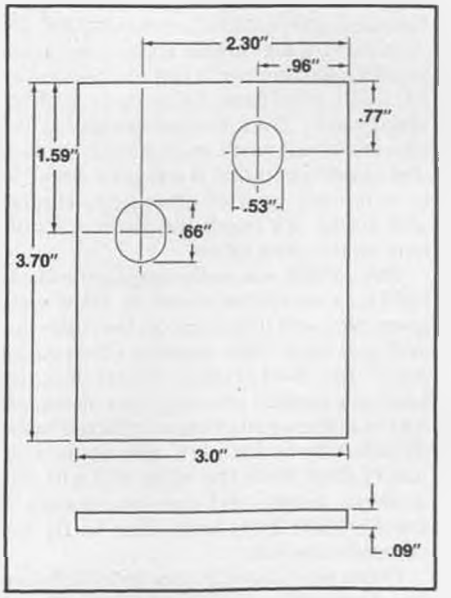
"This 7FGE is on Channel 38. My question is, can I change the receiver crystal in another receiver from, say Channel 50 to Channel 38 without having to have the receiver retuned? Are they close enough as long as they are on 72 MHz. These are not the new narrow band items."

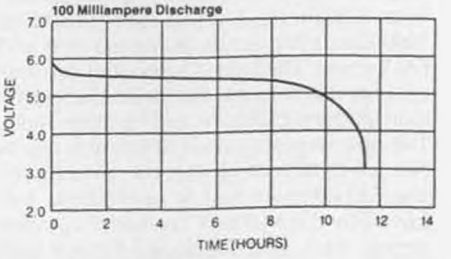
I have to comment first on the fact that Otey is certainly a minority . . . he likes exponential! I have found that the largest majority of fliers don't. I have also found out that most of them didn't bother to learn how to adjust it or used it enough to discover its advantages. I agree in that it is superior to dual rate, except possibly for those maneuvers which require an extraordinary amount of some control throw. If you have it in your transmitter, give it a second chance, I promise you that if your goal is to pilot an airplane other than to just aiming it, your flying will improve with exponential.

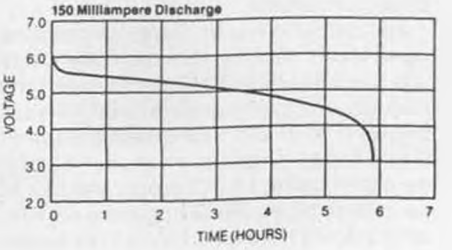
As for switching receiver channels . . . what I have to tell you on the subject applies to all of them, regardless of make or type. I have yet to see a system manual or product information sheet from any manufacturer that treats this subject in a firm manner, though the ads touting the system make a big deal about the ability to change frequencies. Whatever you read or are told by a company representative, disregard it and make your own test . . . it's simple.

You've heard about it before . . . and should be doing it . . . once before the start of every days' flying activities. It is called a range check. In all cases, we are starting off with a system known to be in good flying order, and on its original frequency. Establish an antenna-off or antenna-down distance, either in the airplane, or with the equipment connected up and placed on a non-metallic chair or stool. As you walk away from the model or receiver, note the point at which servo control becomes erratic. Then, after changing the crystal, or installing the different receiver, and without changing any equipment location or attitude, compare the operating range. If it is very close to the original distance, with no less than 10% reduction in range, it should be safe to fly. If more than 10% range is lost, it is an indication that the receiver needs tuning to the new frequency, or possibly a component change or two, and retuning.

Ungar UTC 200







PATTERN CHAMPS

By WALLY ZOBER

Hot and humid down south. . .
Our pattern competitors accepted the challenge in this "Fun Fly in Florida!"

• On September 16 and 17, 1989, the Radio Control Association of Central Florida hosted the Florida State Pattern Championship. This was a "AA," AMA sanctioned meet. We had two beautiful sunny, but very hot, days for this competition event. There were forty-one contestants, most from the state of Florida. However, we did have three contestants from Georgia and one from Trinidad.

RCACF's new runway is paved blacktop, 480 feet long and 40 feet wide. It is surrounded with sod and close-cut grass. The north end of the runway is being extended another 300 feet and is not finished as yet. RCACF's president, Mike Hays, had approximately 25 to 30 acres parallel to the east side of our north south runway mowed and close-cut so that if any pilot who had to make any type of emergency landing and could not reach the runway, could land in this area safely.

This contest was well-organized and was held to a very tight schedule. Pilots were given plenty of time to get to the ready box and also have their engines checked for noise. Joe Walker, the contest director, kept this contest moving right along. He had to as the weatherman predicted heavy thunderstorms for each afternoon. C.D. Joe Walker with the help of flight line workers, judges and the cooperation of the 41 contestants were able to fly five complete rounds.

There were five categories in this contest. They were as follows: Novice, Sportsman, Advanced, Masters (flew proposed 1990 class fixed series of maneuvers) and FAI Pattern. The largest turnout of contestants for this two-day event was in Sportsman Pattern category with sixteen fliers. The next largest turnout of entrants was in Novice Pattern with eleven contestants. The FAI category had six contestants, followed by the Master Class with five competing fliers, and Advanced Pattern with three contestants.

Ed Izzo, who was in charge of checking noise levels, told me that the noise range was from 92 DB to 100 DB. However, the majority of airplane engine noise level ran between 96-97 DB. The quietest readings were from engines that were soft-mounted, using 11 x 11 props, and 11 x 12 props with pipes. These engines were running below 11,000 rpm. This did not hinder the flying qualities of the aircraft. The airplanes flew all their pattern maneuvers and vertical maneuvers with authority.

In FAI Class, Ron Ellis did a great job flying his Checkmate to first place. His airplane was powered by an O.S. 61 long-stroke engine with a Pumper and Shadel piston and sleeves retracts, and a Futaba 1024 R/C system. His airplane weighed eight pounds and had a 65-inch wingspan.

Ron Ellis displays his Checkmate, winner of the FAI class, narrow victor over Tom Stryker during the "hot" two-day "heat."

Right behind Ron Ellis, by only 36 points, was Tom Stryker flying his original design airplane Stryke-1 powered by an O.S. 61 VR short-stroke engine with an A.P.C. prop and a Futaba Conquest P.C.M. radio and retracts. His plane weighed 7-3/4 pounds, had a wingspan of 64 inches, and flew great!

Gary Kirby finished third with his Aurora, powered by a Rossi 61. using a Hatori pipe, a 12 x 10 prop, MK retracts and Kraft 7-channel R/C system.

Fourth place went to Mike Ingalls flying a Dash-5, powered by a YS 61 engine with a Hatori pipe, and an Asano 12 x 11 prop, Futaba 1024 R/C system.

The Masters Event was won by Tony Stillman flying an Arcomaster powered by a YS 61 Hatori pipe and header, 11-1/2 x 9 prop, retracts, M.K. nose gear, Dave Brown retracts maingear, Futaba nine-channel PCM radio.

Masters champ Tony Stillman-Arcomaster handily bested his category. Masters group flew proposed 1990 class fixed series of maneuvers.

Second place was taken by Howard Morin with his Beetle powered by a YS 61, with a C.F.C. pipe, Max Daily 11-1/2 x 11 prop, Supra retracts, and a Futaba PCM 1024 radio.

Third place went to Sam Turner and his Generation II powered by an O.S. 61 long-stroke engine with pipe, Supra retracts, and a Futaba 1024 nine-channel R/C system.

Fourth place went to Brian Ozement flying his 1.2A Mark II. He used a YS 61 long stroke engine with a Hatori pipe, retracts and a JR PCM radio.

"How do you get to Carnegie Hall? . . .Practice, Practice, Practice!"

Proud winner Paul Towkack, Omega powered by a Rossi 61 tells us, just "like a day at the office."

The Advanced Class was won handily by Paul Towkach flying a very nice Omega powered by a Rossi 61, a Hatori pipe, a D.W. 11 x 12 laminated prop and a Futaba eight-channel PCM radio.

Second place went to Mark Mendonca who came all the way from Trinidad. He flew a very pretty and good flying EU-1A powered by a YS with a Hatori pipe and guided with a Futaba seven-channel R/C system. His airplane was a little on the heavy side at nine pounds - but flew great!

Third place went to Carl Hall flying his original design The Tar-Heel. It was powered with a Webra 60 long stroke engine, equipped with a Magna pipe. Carl used a Futaba eight-channel PCM radio. His airplane had a 66-inch wingspan, weighed in at 6-1/4 pounds, a very nice-flying airplane.

Sportsman Class had the most contestants, sixteen in all. Wade Matney took first place flying a Curare powered by an O.S. 61 long-stroke engine with pipe, and retracts, and a Futaba radio.

Second place went to Joe Walker Jr. He was only 68.04 points behind Wade Matney. Joe Walker Jr. is only sixteen years old. Keep an eye on him as I think you're going to see more and more of him in the winner's circle. Joe flew a very pretty Phoenix 8 with an O.S. Max 61 SF long-stroke engine, a Mac pipe and header and a J.R. Century 7 R/C system.

Third place went to George Diaz flying his Bridi Escape powered by a Rossi 61 with a Mac pipe, which had an insert to make it quieter. DB readings were between 90 and 95. George used Supra retracts and a Futaba radio.

Fourth place went to Ryan McLaughlin who flew his Curare, powered by O.S. 61 long-stroke engine with pipe, retracts and Futaba radio.

The Novice Class was the second largest event with eleven contestants. It also had a variety of airplanes competing. There were three Kaos's, one Goldberg Chipmunk, one Super Hot, a Great Plane's Stick, a Sig Astrohog, a scratchbuilt Killer, a Dirty Birdi, and one Deception.

First place was taken by Kevin Mekler flying a Kaos, powered by a O.S. 61 FSR engine, J.R. Centry 7 PCM radio and fixed gear.

Right behind Kevin Mekler with an approximate 5-1/2 point spread was Charles Norris who took second place flying a Carl Goldberg Chipmunk, Super Tigre 61, and a Futaba six-channel Gold Series radio.

Third place went to Douglas Johnson flying a Dirty Birdi, powered by O.S. 61 long-stroke engine, and an Airtronics Spectra PCM radio. His airplane had fixed gear. This was Doug's second contest.

Fourth place went to Doug Pfaff flying a Deception powered by a Rossi 61, a Miniature Aircraft pipe, Futaba PCM radio with an APC 11 x 11 prop.

Tony Arnaoutis was aced out of fourth place due to a radio problem (bad battery) in the flight pack. He changed the battery and was able to complete all of his rounds.

Joe Denicola wasn't so lucky. He lost his airplane on first flight; cause of crash unknown.

Kevin Mekler with his "Kaos." Kevin finished first in Novice Class.

Pattern flying certainly is alive and well in Florida. A lot of new faces were seen at this contest. There were a lot of young people competing. The average age (estimated) was about 35 years. There were three teenage contestants, five contestants under the age of twenty-five, about thirty between twenty-five and forty, and three contestants over forty.

Pattern flying is a very disciplined sport. To be a Top Gun pattern flyer, you need a good airplane, engine and R/C system; but most of all you have to work hard at it. There is an old saying, "How do you get to Carnegie Hall? Practice, practice, practice!"

Well, that's it folks, stay well and keep 'em flying! •

Celebration is in order, Sportsman winner Wade Matney overtakes 16-year-old Joe Walker Jr. in a close call. The division was definitely the most competitive.

Joe Jr. on left, prepping for the 1st round with his Phoenix 8, helper is Ryan McLaughlin, 4th placer in the 16 contestant division.

BIG BIRDS

By AL ALMAN

STIRRING THE POT

Although I don't try to stir the pot all the time, I do believe that some controversy is needed and healthy . . . and so from time to time purposefully include tidbits that are meant to sort of "get your attention."

Y'see, folks usually write only when: 1) they violently disagree with an author; or 2) they want to let him know how much they do agree with what he's said.

Well, back in the January "Big Birds" I included a bit on why I hadn't yet gotten into BIG electric power, figuring that it might generate some kind of response . . . which it did. However, I was quite surprised at the amount of almost instant feedback that started to arrive barely a week after that issue was out.

Even editor/publisher "Old" Bill Northrop stuck his two-cents worth in by telling you to send your letters directly to me . . . adding that he didn't agree with what I'd said, either. (This Venerable Tiger must be getting toothless 'cause in his younger days he used to enjoy getting involved in an argument or two.)

But what surprised me most was that many letters defending electric power came from guys who also enjoy using two and four strokers.

Here's what Bob Benjamin had to say; his letter was typical.

"Dear Al,

"I'll bet you're not surprised to be hearing from me after your comments on electric power showed up in your January column.

"Since the last time we had a good bull session I've found myself committed to an all-electric model shop. I'll be keeping several of my well-tested wet power models, but can't imagine investing building time, effort and money in any new projects that aren't electric. I know this must sound weird to anyone who hasn't had the chance to experience what serious electric stuff is capable of (it would have to me, too, not so long ago), but readers who have given electric power a chance will know exactly where I'm coming from.

"If you'll permit me to ramble a bit I'd like to address the points you raised. Your comments about having seen the all-too-well-known wimpy, ugly, electric airplanes are right on. There's still far too much of that stuff around, and the underpowered ARF models that appear to be engineered down to toy shop price (and performance) levels aren't doing the cause of electric power any good.

"And you're on track when you mention having seen some very impressive electric airplanes fly. There are a lot of them out there and, as more modelers become aware of what can be done with the excellent equipment that is on the market right now, there will be a lot more coming.

"You said that electrics appear to be a 'Tinkerer's' game. That term frosts me a little bit. It seems that when someone gets involved in a project that requires more work than just sticking a prefab kit together, he's described as a tinkerer by others who use the term as an excuse to avoid going to the trouble of learning something new.

"I certainly won't deny that back when you and I were learning to fly R/C there was a lot of real tinkering going on. Many, if not most, of the R/C systems available at that time would reach flight status only after LOTS of fussing and cajoling . . . and those early rigs became systems only when a dedicated modeler bought all the components separately and spent hours wiring his own connecters and balancing disparate components together.

"Because electric power is till evolving rapidly, and probably because not enough people have caught on to it yet to create a big enough market, the good stuff is still not available in complete system form the way we're used to buying our radios. This is an inconvenience but will change as more guys get involved. As far as real tinkering is concerned, not so. All the good quality equipment on the market works as advertised. I'll get back to this thought a bit later on.

"You mentioned being intimidated by the mass of a large battery pack serving as your 'fuel tank.' Motor batteries are heavy, no doubt about it, so I'll address that problem (although some really neat hi-tech cells that may supplant nickel-cadmiums are being developed and promise dramatic weight savings).

"The solution comes in several parts. Good electric builders arrange their planes so that nothing rests ahead of the motor battery except the motor itself, which is ideally protected from behind by a suitably stout 'fire-wall.' Also, we don't attempt to build crash-proof airplanes. Knowing that a severe crash may happen we endeavor to control and isolate the damage a battery might cause.

"Mounting technique helps. Most of us use motor batteries that are broken down into six or seven-cell modules, each of which is velcroed onto a mounting plate or tray of some sort. Additional restraint may be in the form of nylon cable ties. The point is that the single large battery unit or mass is eliminated while access to plenty of cooling air is assured.

"I'm going to jump ahead a bit and address one of your other concerns, that of the potential for failure of a motor battery cell. I want to make several points here, one of which leads into a major concern of mine.

"I have been flying electric intensively for about two years now and haven't had a

Bob Benjamin's Porterfield on floats. Pulled around by a geared Cobalt 25 swinging a reworked Zinger 13X6-10 . . . excellent flying machine. Bob built a new wing with a thicker airfoil (12%), Phillips entry and ailerons.

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ELECTRIC POWER

By MITCH POLING

• Last month I covered the electro meet sponsored by Robbe at Lauterbach. A couple of weeks later, I went to a fun fly at Gau Algesheim, sponsored by the club there. There was lots of good flying and some very interesting models, plus the usual refreshments including "new wine." This is a very refreshing drink made from freshly picked grapes, served at festivals and to the grape pickers in the field. This is wine country, and the saying is that the quality of the grape crop can be judged by the new wine. If so, my opinion is that 1989 will be a vintage year! When you buy a German wine, look for the words "mit pradikat" on the label. This means special quality, and it guarantees a good wine. The word Kabinett on the label means a dry wine, Auslese and Spatlese are sweeter. The German labels are very precise, you know what you are buying by what is printed on the label. You can, with a guidebook, even locate the exact vineyard from the label! German wines are excellent and quite inexpensive. Unfortunately, most folks have only tried Blue Nun or the equivalent. These are labeled "Qualitat-swein" which means a mixed or common table wine. Try a "mit Pradikat," you will notice the difference!

Well, this is a column on electrics, so back to the subject! Karl-Dieter Wiegand was at Gau Algesheim with a ducted fan Heinkel 162 Salamander powered by a Keller 80/11 (cobalt) on thirty-six 900 mAH cells. Karl built the plane from a Bauer kit, the ducted fan is also from Bauer, the BM 40/81. I do not see this particular unit listed in the Bauer advertisements. The Salamander is normally flown with a .60 engine and a BM-50-S fan unit, which I think is equivalent. The BM-50-S uses a 10-15 cubic centimeter engine (.60 to .90 cubic inches) with a rotor speed of 15,000-22,000 rpm. The unit can be used with five to fifteen blades, I think Karl used twelve. The Keller motor turns the fan at 14-15,000 rpm, with a thrust of 2 kp (4.4 lbs.). Current draw is 20 amperes, so the power input is about 720 watts, nearly one horsepower. Flying weight is 4.3 kg (9.5 lbs.). Karl made only one major change from the kit, he increased the span from 1380 mm (54") to 1520 mm (60") to increase the wing area to 50 sq. dm. (775 sq. in.). This gives a wing loading of 28 oz./sq. ft., quite reasonable for this size and power range. The first flight was July 29, 1989 and the takeoff was flawless after a 400 foot ground roll. With a flight duration of three minutes, the model was landed with lots of power left. The following flights were four minutes, with power left for landings. Karl said the plane flies well, but you do have to be an experienced pilot to handle it safely. I didn't find out if it has done any loops or rolls; I'm sure it can, and Karl is still developing it. It is a very handsome plane, and has plenty of room in it for larger cells . . . a 1700 pack should be good for eight minute flights. Karl says the sound of the ducted fan is great, it sounds like a real turbine. I did not get to see it fly that day, but Karl lives locally, so I hope to later.

The Bauer Modelle line is quite impressive. They specialize in ducted fans, and have a Messerschmitt ME 262 for .60 size fans ($550), the Heinkel HE 162 for .60 engines ($322), the Skyhawk A-4 for .90 en-

Karl-Dieter Wiegand at Gau Algesheim fun-fly displays his ducted fan Heinkel 162.

Karl built the plane from a Bauer kit, the ducted fan is also from Bauer. Fuselage shows plenty of room for larger cells.

Close-up of twelve bladed fan unit. Keller motor twists 14-15,000 rpm with a thrust of 2 kp (4.4 lbs.).

This vintage Stampe is being pampered by Marcel Heinrich. Flyer does scale loops and rolls, which Marcel made look very easy.

gines ($440), and the Hornet, a sport model, for .60 engines ($220). They have three fan units, the BM-30-7 for .40 engines ($170), the BM-50-S for .60-90 engines ($187), and the BM-70-S for .80-.90 engines ($194). Their catalog is $6, write to Bauer Modelle, 8501 Allersberg, Neumarkterstrasse 28, W. Germany.

Marcel Heinrich had a beautiful quarter-scale Gypsy Moth, powered by a Geist 150/15 (cobalt). It flies on 20 to 30 cells on direct drive, turning a 17x8 Multiplex prop. Flying weight is 12 to 14 pounds depending on the number of cells used. The upper span is 82 inches, the lower span is 80. It takes off in less than 40 feet, and flies very much like full scale, slowly and gracefully. It does scale loops and rolls. Marcel made it look very easy. In fact, quarter-scale electrics are very practical; figure on 20 to 30 cells and a motor (Astro 60, Geist 150, Keller 80, etc.) that will handle it.

Three other planes were popular at the fun fly; the Uhu, the Chip, and the Race Rat, all kitted by Graupner. These planes show excellent performance on Mabuchi motors and six to seven cells. I was very impressed. They are all available from Hobby Lobby, 5614 Franklin Pike Circle, Brentwood, Tennessee 37027. I've mentioned before that their catalog is a real "must have," and is $2. The Uhu is a 66 inch span motor glider with 450 sq. in., and a ready made ABS plastic molded fuselage. The Hobby Lobby price is $89. I strongly recommend the unit that is designed for the Uhu; the Speed 600, $29.90 from Hobby Lobby. This unit is a real bargain, and comes with a direct drive folding prop that is very efficient . . . it beats anything I have seen. The motor is a Mabuchi 550 with a metal back plate. This is far superior to motors with plastic back plates, which can distort or melt from the heat of flying. Metal back plates are the only way to go. The Uhu climbs quickly, thermals very well, can fly fast too, and it is aerobatic. The Uhus I have seen get very good flight times . . . at least six minutes, usually closer to ten. It is a very fine all around plane at a reasonable price.

The Chip has the same fuselage as the Uhu, but less span, either 59 or 63 inches, for 395 or 418 sq. in. area. It is usually flown with ailerons, though I have seen a Chip with rudder and increased dihedral which flew just as well as the ones with ailerons . . . $118 from Hobby Lobby. The most popular motor unit for the Chip is the Speed 600/8.4 volt system, which includes that excellent direct drive folding prop, for $31.70 from Hobby Lobby. This will give you excellent aerobatic performance. The climb on the Chip is very impressive. The fliers love to do high speed passes "on the deck," then zoom to 500 or 600 feet and do hot dogging. It is a good plane to show off with! Graupner has really done its homework with these two planes.

The Race Rat is a racer with a ready-made ABS plastic fuselage, and it is fast! It is also fully aerobatic and looks and acts like a pattern plane . . . $99.50 from Hobby Lobby. A popular unit for it is the Graupner Speed 600/7.2 volt Race motor run with seven cells and the Graupner 6x6 scimitar direct drive folding prop. There are lots of hop-up possibilities listed in the Hobby Lobby catalog. Werner Detweiler designed this plane originally as the Race Cat, which is available in plan form. I saw the Race Rat and Race Cat fly together. The Graupner Race Rat appears to have a larger fuselage cross section and does not seem quite as fast as the original Detweiler plane, which is fast, fast, fast!!! The Race Cat plans are available from VTH Postfach 1128, 7570 Baden-Baden 1, W. Germany, plan number MT 902 price $6. The Race Cat design flies as fast on an ordinary ferrite Speed 600 motor as most pylon racers do with a cobalt motor. Very impressive!

Well, on to other topics. First, I would like to head off a few letters about a statement Art Steinberg made in his November *MB* column on ARFs. He did a very good review of the Parma Aero Sprint ARF sport electric plane, and it sounds like a good plane. He even compared a gas and electric version, in which the electric came out very well indeed. However, he had one statement, "Besides, for good battery health, the experts advise me to limit electric motor runs to 30 second bursts." Folks, I was NOT the "expert" who gave that "advice," so PLEASE don't send me letters asking me to explain it!! I have never heard of such a procedure, I routinely run my packs down to nothing in the air, often in continuous mode, and have never had any damage since I started flying electrics (1972). NiCd batteries are tough beasts, and they are not affected by being discharged even to reversal, and they can be run continuously. I have run packs into reversal many times, and have had no damage. They are affected by two things: overcharging and overheating. As for the advice of "experts," check to see if they are flying electrics or if they are running electric cars. If they are, take their advice seriously. Those who are offering advice from

Front to back; the Uhu, the Chip with diheral and rudder, then the Chip with ailerons . . . very impressive indeed. Kitted by Graupner.

ENGINES OF THE WORLD
...by Stu Richmond

SOVIET KOMETA "MD5"

The Soviet KOMETA MD5 is a .29 glow engine. *MB* reader Jim Donick was lucky to get a marine version before his U.S. employer transferred him back home from Moscow recently.

Stu gives this Russian runner the lowest possible rating points . . . it rates among the world's worst model engines. It is still in production in USSR.

• VITAL STATISTICS: 3" long to the prop driver, 1-3/4" across the mounting lugs, 3-1/16" to the top of the cooling fins. Weighs 7-3/4 ounces and uses glow ignition. Displacement is .29 cu. inch.

UNIQUE FEATURES: The KOMETA (means "Comet" in English) MD5 is made in the Soviet Union and is one of the world's worst model engines.

Winners get copied! In the mid-1950s Super Tigre of Italy made their G.21 with a bore of 19 millimeters and a stroke of 17 millimeters . . . an over-square, high performance, glow engine that was a record-setter in its day. The Soviet Union chose to copy this winning design as best they could. With help from one of my East European pen-pals, the following data is available: The MD5 KOMETA was built in the second half of the sixties as a "universal" model engine. Version "A" was for airplanes . . . version "M," with a flywheel, was for marine and car use. The engine is two stroke, air-cooled, one cylinder, with a glow plug. Suction is bycrankshaft . . . cross scavenging. Volume is 4.82 cubic centimeters, with a bore of 19 mm, stroke of 17 mm, and it weighs 225 grams (28 grams = 1 ounce). The MD5 is still in production . . . a very old design with inferior performance . . . about 25 HP at 12,000 rpms.

It is best that I just say "thanks" to my pen pal . . . and NOT mention him by name in this article.

The "MD" roughly translates to micro engine. I have four of these Soviet micro engines in the "5" size. All are slightly different . . . three are new, one is used.

Notice how the KOMETA's prop driver would scoop dirt into the front bearing. Fuel poured out the front bearing (see the drop that's formed?) as it ran. Vibration was so violent with a 9-4 prop that a Richter Scale in Central Florida would have gotten a reading!

Stu sez each KOMETA MD5 should come with a fine file for finishing. The piston hit the bottom of the cylinder head as this engine was turned over. Note the dual piston rings with "Z" ends. Perestroika may put a halt to this engine's production.

Not cast in stone . . . but cast in metal on the right is "UEHA 11 pyb" which translates to "Price is 11 rubles" . . . or $1.76 by today's standards. Engine is a copy of what was a very successful Super Tigre Italian contest winner from the 1950s.

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We're helping advance the sport of R/C modeling through excellence in our equipment. Airtronics continues to develop new products and technology to keep us ahead of the competition.

We not only invest a great deal of time and money in product development, we also work to inform and educate modelers about the complexities of 1991 specifications and claims. We believe that knowledgeable, informed modelers will intelligently choose the best equipment available.

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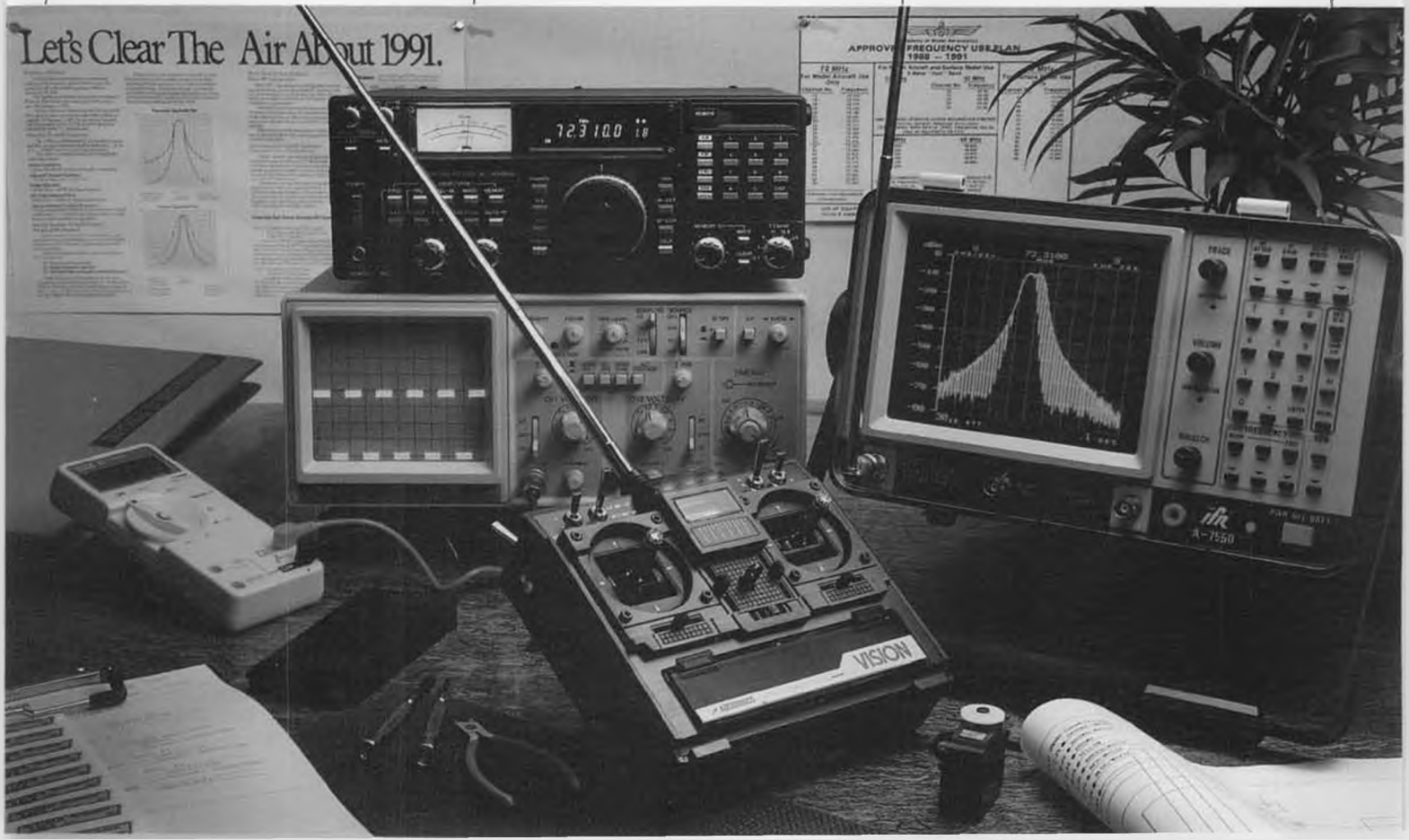


JET TRAILS AT SWINDERBY

By RON SWEENEY

• In past years, Swinderby has signalled the start of the official fan flying season, being held early in the year. This situation gave pilots the opportunity to air their winter projects and iron out troublesome areas of their models.

The meeting this year was programmed for late summer to allow the other events to be spread across the season. The weather was perfect, warm, balmy and with the slightest hint of a breeze providing really scale takeoffs and landings. British fliers are used to battling with the elements and it is normally quite an experience to cope with ideal flying situations. Held at Royal Air Force station Swinderby in Lincolnshire and organized by Graham

A "clutch" of F-20's with over 500 total flights between them. Quite a recon for reliability!

Alex Cornish Trestail's MIC 29, single seat model. Kress RK720 fan, Mac pipe, OS 25. Dolly undercarriage with steerable nose wheel.

Jim Harrison's super Thorpe F-104. Thorjet fan, OPS 65. Very fast, but doesn't seem to benefit from engines over 45 size.

Paul Thorpe's F-18 Hornet. Now eight years old Picco 80, Thorjet 9-blade Micromold fan. Balsa, ply, and foam construction, 12 pounds.

Immacaulate Thorpe F-20 with drop tank. Model unfortunately crashed.

Trestrail's pilot, Paul Leighton, with third prototype two-seater MIG-29. Weighs 7-3/4 pounds ready to fly.

Preston and his crew, the event attracted about 50 pilots and a good size crowd of onlookers who witnessed both triumph and tragedy with no less than seven models being totally written off in various accidents. Carnage was a word I heard muttered over my shoulder from a spectator as I disconsolately filled a plastic bag with fragments of my Fanjets Hawk lost through pilot error and disorientation. I really must get some new glasses!

Aircraft on hand showed a definite resurgence of former popular models and a return to the tried and tested designs. The Thorpe Brothers must have been pleased with no less than twelve of their designs present, all but one demonstrating why they are so successful. There were five Tigersharks, three F1 Mirages, two Starfighters, two F-86 Sabres, and their own F-18 Hornet. Considering that the newest of these plans, the F-20, is now five years old, it really does demonstrate the soundness of their designs, which were among the fastest models on display. These are all plan-built models employing traditional wooden structures, allowing the builder to vent his own artistic flair.

Another popular model flown by four different pilots was the BAE Hawk, designed in the very early '80s by Paul Gray for grass field operation. Whereas the majority of the Thorpe designs are sky scorchers, the Hawk, whilst not a slouch, fulfills an entirely different role and can perform aerobatics in a very precise manner. Its large, admittedly non-scale inlets and jet pipe provide a respectable turn of speed but allows the fan to power the model through very tight turns with little loss of speed in the maneuvers. I am currently putting the final touches to my own version specifically for grass field operation. It originally flew very respectably on a Super Tigre 40 and is obviously very lively on the current range of 45 engines. The model's success is based on very light structure with a 6-1/2 to 7 pound finished weight, not too difficult to accomplish. The model normally employs a dolly undercarriage to achieve this lightness.

Being an end-of-season event, several well known modellers were missing but several newcomers made up the numbers with some promising models.

The new OS90 fan engine made its debut turning a Dynamo fan installed in a J.H.H.

Jet Hanger Hobbies Phantom, OS 91 power, Dynax fan. Poor engine runs spoiled performance.

Jim Harrison's Star Cobra II. OPS 45 powered Thorjet fan. Weighs 8-1/4 pounds.

SPROOSE GOOSE

By BILL NORTHROP

First published in January 1973, this original design was the successful result of an attempt to build a lightweight R/C model almost entirely of spruce. It'll take a while to build, but it's worth the effort.

• Back in the first few years that *Model Builder* was published, there were quite a few R/C aircraft designs presented which, at the time, were quite popular with the small readership of the magazine. Obviously, because of the limited total distribution, a large part of the growing numbers of R/C modelers were never exposed to these designs, except by possibly seeing them occasionally advertised (not pictured and very little description) on a page listing previously published plans that were available.

This month, because none of several projected new construction articles were ready in time to meet the deadline, we are presenting a model published in our 15th issue, January, 1973. When the opportunity, and space, permits, we will resurrect other early model designs that proved, by feed—back and plans sales, to be popular. These models, because of limited magazine distribution, did not receive the exposure they will now, when circulation is more than ten times the quantity of 15 to 19 years ago.

The "Sproose Goose" was designed and built in the winter of 1966-1967. The idea behind the design was to come up with a "could-be" scale biplane that would also be very aerobatic. This was a time in the R/C model era when biplanes were considered worthy as a scale project, but strictly a novelty when it came to aerobatics. Having already produced the quarter-scale Gipsy Moth and "Big John" designs, along with several other two-winged creations, we had acquired the reputation of being a Biplane Nut First Class, so the S.G was no surprise to most of our modeling acquaintances.

Coincident with laying out the lines of the S.G., we wanted to test the use of spruce as the main construction material in an R/C model, and designed the structure accordingly. Believe it or not, we were not, at the time, aware of the nickname that had been given to the now famous Howard Hughes flying boat, unless it was a subliminal reaction, and the misspelling of

Lead photo was on January '73 cover, taken shortly after competition. "Ginger" belonged to Arny Lipschutz, who built several balsa versions of S.G. Lower photo was taken same day, by Richard Spier, at Delaware R/C flying field, Spring of 1967.

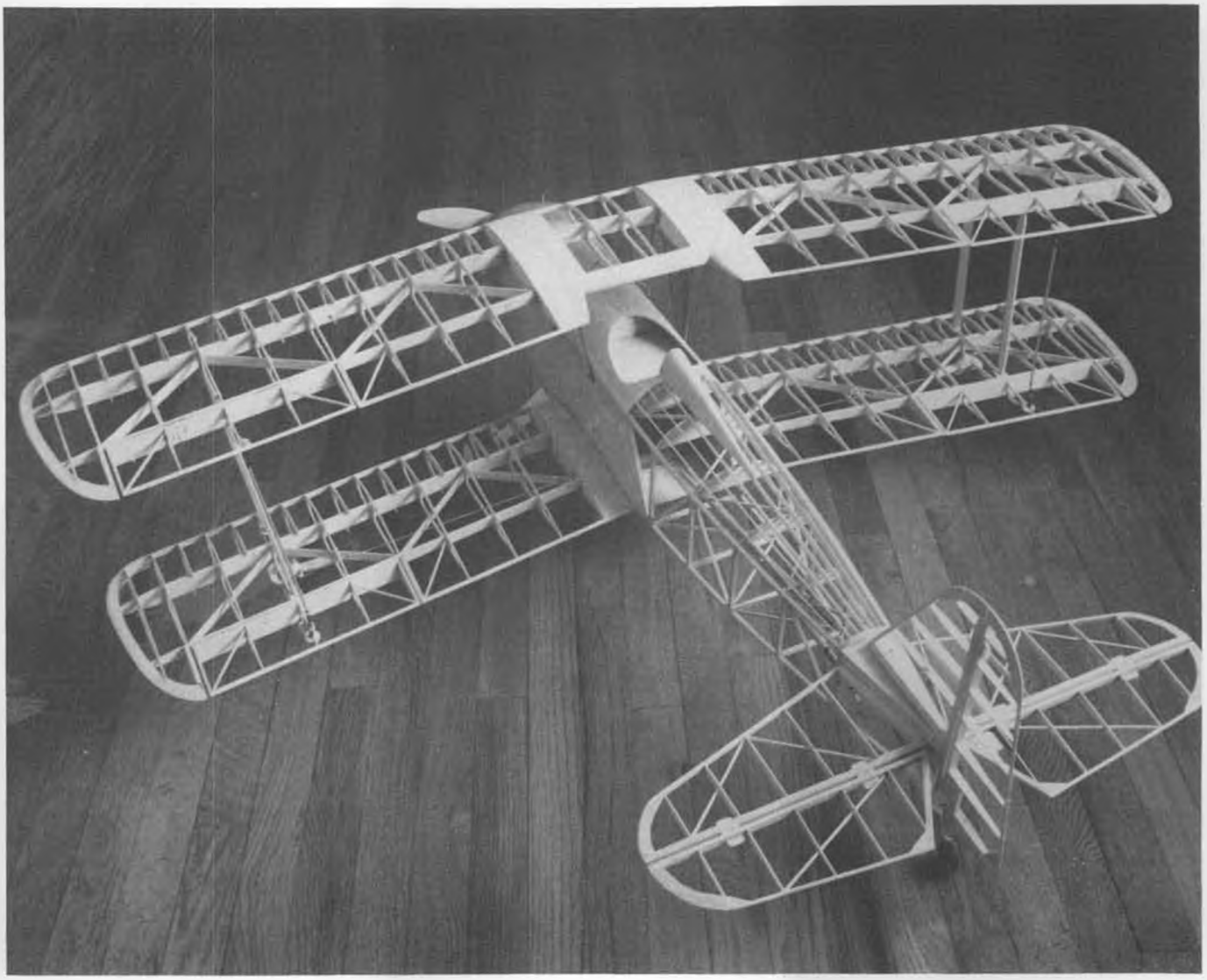
Coat hanger wire cabane struts are rugged, yet easy to bend into shape. Short aluminum tube brings antenna clear of windshield. Flew for two seasons with PCS "metal can servo" radio.

"spruce" just seemed to go better with "goose!" The experiment, in our opinion, was a complete success. Essentially, the only balsa in the plane is the sheeting around the wing dihedral joints, the fuselage sides and decking back to the cockpit, and the headrest. Other than a few balsa scraps here and there, the model is built entirely of sproo . . . er, spruce.

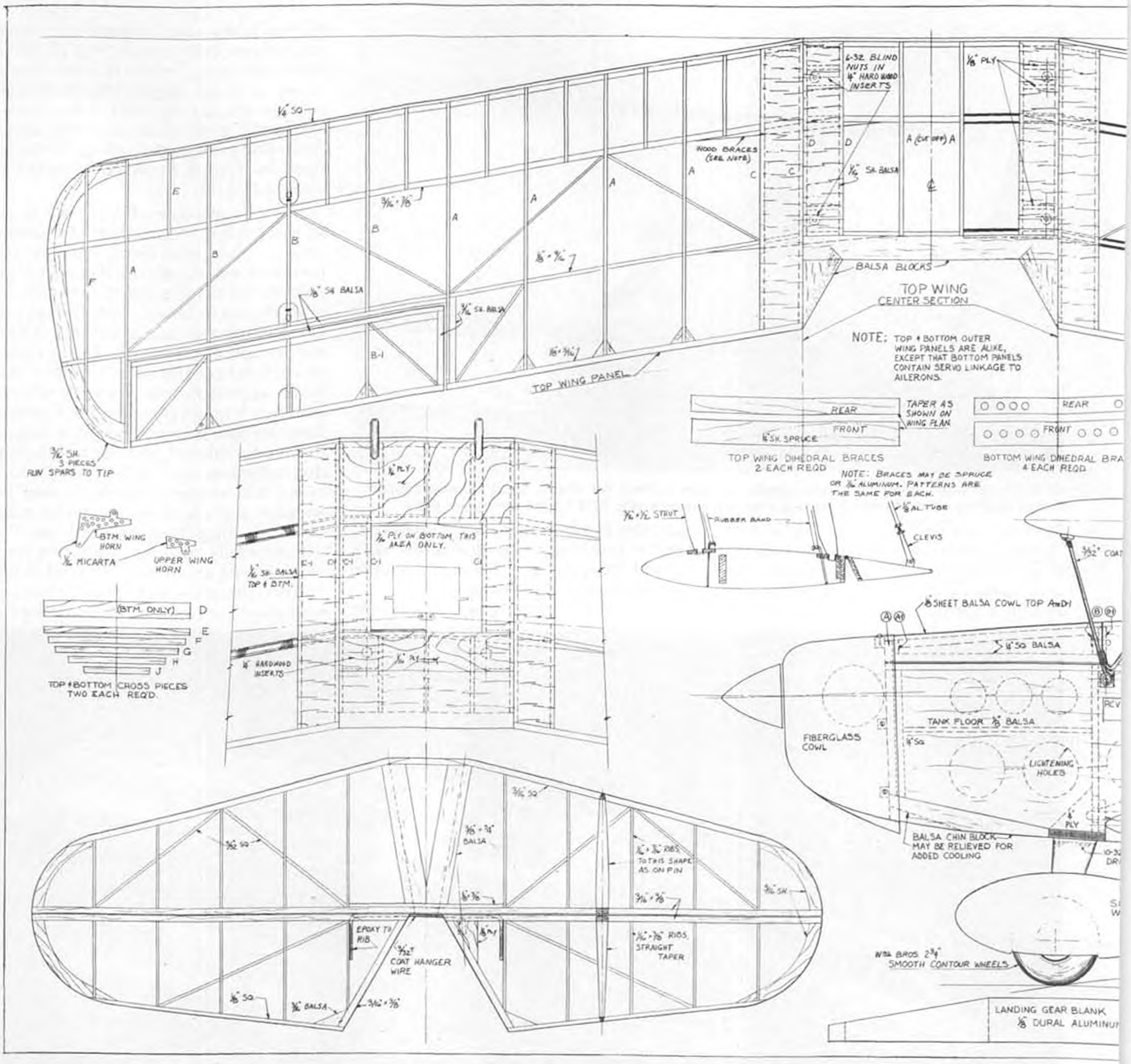
The finished model, ready to fly except for fuel in the tank, weighed six pounds, ten ounces. With a wing area of 880 sq. inches, the wing loading is in the 18 to 22 oz/sq. ft. range, depending on the percentage of total wing area you may assume is effective in this biplane configuration. According to the cubic loading chart developed by Francis Reynolds, it would be around 7 oz/ft³.

As for its aerobatic ability, the S.G. was an outstanding success from our point of view . . . that point being the view of a non-competitive aerobatic flier who simply enjoyed performing realistic aerobatics in no particular order and with enough precision to impress local onlookers. It was a comfortable airplane to fly, having no bad characteristics, and able to make slow steady approaches for two or three-point landings. It took very little right rudder to keep the nose straight when punching the throttle for takeoff, and our favorite hot-dog maneuver was to roll inverted as soon as we had enough altitude to clear the wingtips and continue the climbout and turn from the pattern upside down.

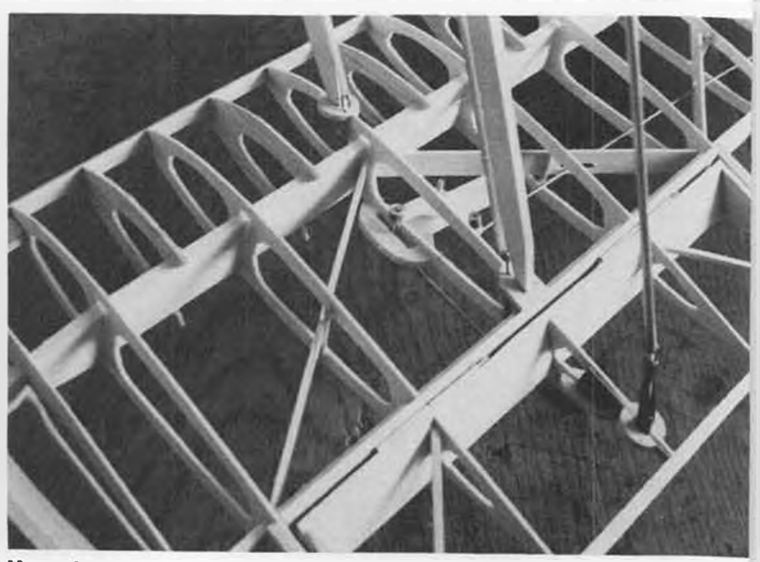
Incidentally, the use of the past tense when talking about the S.G. is not exactly correct. The plane was flown for two seasons when we were still living on the east



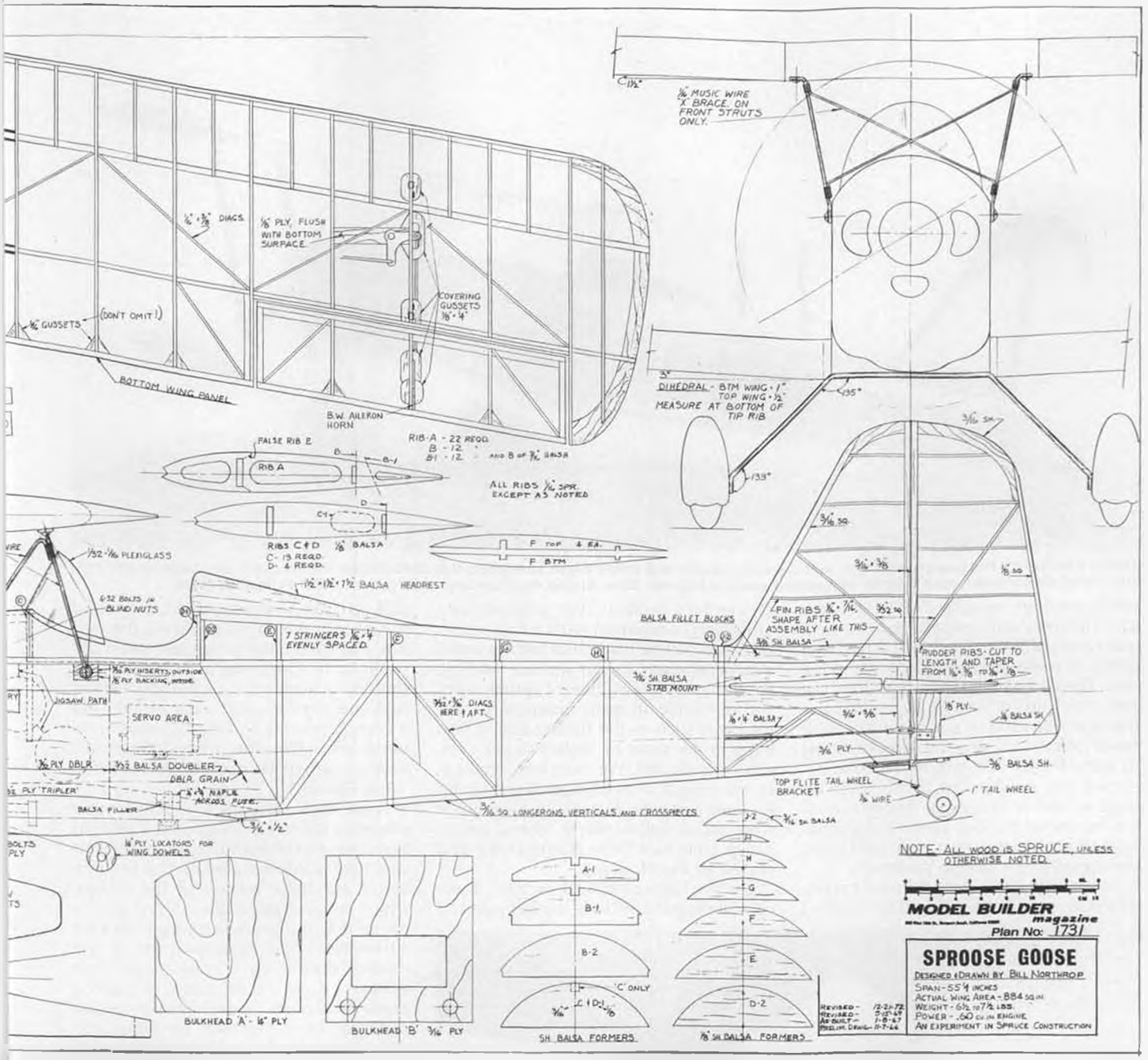
Here's the inside story on the 56 inch span S.G. Except for balsa fillet blocks, headrest, front fuselage sides, wing and cowl sheeting, it's all spruce! Ribs are sliced from shaped block.

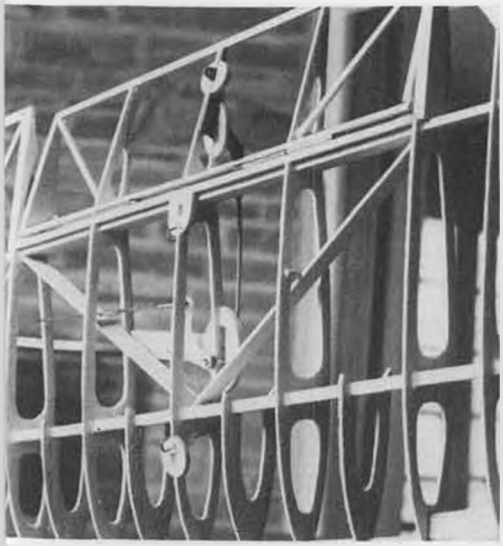


Struts are not necessary structually, but maintain spacing between wings, keeping allerons in alignment. Micarta horns.

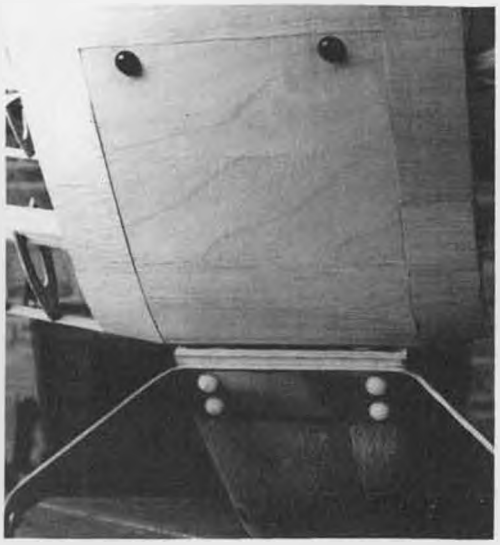


More wing construction detail. Hinges are brass tubing with weld rod pins (eliminates rusting!) Aluminum tube alleron push rod.





Stuts fit into sockets and are held in place by rubber band stretched between hooks.



Landing gear and bottom wing are held on by nylon bolts. Aileron servo not yet mounted.

Tailwheel linked to rudder by piece of strip aileron horn swivel.

Always a sucker for that transparent finish, we covered the Goose with yellow Silron, used many thin coats of clear nitrate, added blue butyrate trim and black butyrate numerals, then finished with several coats of butyrate clear. Rudder area has been enlarged for better knife-edge flight.

coast, and then was retired when we came to California and somehow became a magazine publisher. Ever since, it has been sitting in some loft or another, gathering dust. The silk (actually Silron) has dried out and cracked in many places, but the framework is still in good condition. It never suffered any structurl damage during its many flights. The only mishap that occurred was on the first flight, when an unglued aileron hinge-pin slipped out, allowing one of the four ailerons to disconnect and trail in the slipstream, held on by the upper/lower aileron pushrod!

As for the spruce material used in construction, some of the wood sizes called for can be a problem. We used our own table saw, equipped with a fine-tooth plywood cutting blade that left the wood clean and ready to use without sanding. Sig has an extensive line of spruce sizes, and of course, in many instances, except for items such as the trailing edges, firm balsa in the same or slightly larger sizes, can be sustituted. We even went so far as to cut several sizes of sheet stock for tip outlines and ribs. Actually, the wing ribs were sliced, baloney-style, from a spruce block that had been bandsawed and routed to the rib shape.

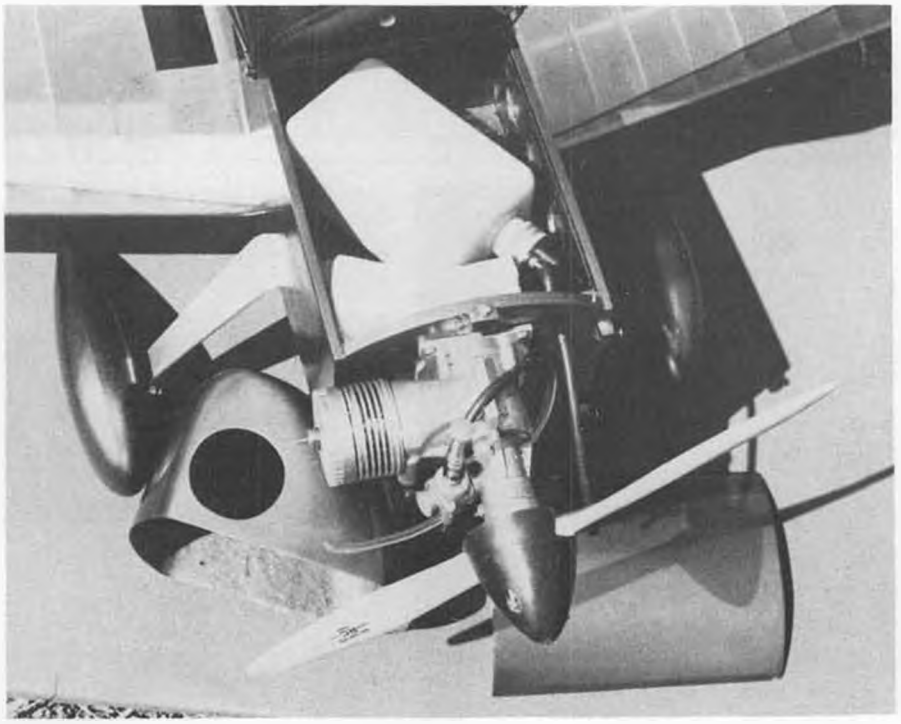
On the east coast, back in 1967, it was possible to go to the local lumber yard and pick up clean, straight-grained, unknotted spruce from which you could saw the various wood sizes. We're not sure this is still possible. In California, at least, the only sources of quality spruce are suppliers of boat and aviation structural materials, and it costs a fortune. You may be able to do better with white pine, in which case you'll have to change the name of the model to "Pine Pigeon!"

There is an alternative . . . When other modelers saw the S.G. fly, some wanted to build one, but preferred to use more conventional building materials. This brought about our balsa version of the design, which was renamed the "T'Winger," a name that the plane acquired because whenever a spectator pointed at the model, they'd say, "Look at the two winger!" If we are successful in locating our original plans for the balsa version, we will make them available. For either version, Dwight Hartman, Hartman Fiberglass R/C, Box 86, Dept. MB, 233 Melrose St., Argenta, Illinois 62501, still has the mold for the cowling. He'll make you one for $9.70, plus $1.50 for shipping, in the USA.

This was not intended to be a full-blown construction article, because it should be obvious that the S.G. is not a project for anyone who hasn't had a great deal of scratch-building experience. But we will point out a few things that may need some explanation.

Don't be alarmed at the coat hanger wire being used for the cabane struts. It's the unpainted type, and is slightly over 3/32-inch diameter. Welding rod may also be used. Sure it's softer than music wire, but once the unit is completed (those eyes in the ends are very easy to form) and bolted in place, it's as rugged as music wire, but much easier to make.

Top and bottom wing panels are exactly alike (well . . . two lefts and two rights!),



How's this for accessibility? Tank cover is locked down by fiberglasss cowl (available from Dwight Hartman, see text), which in turn, is bolted to nose in three places. Cowl muffles sound nicely.

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PLUG SPARKS

By JOHN POND

1. At the age of 20, Chet Lanzo with his first radio control model, in 1934. It was too fast (air loads too heavy on surface) for his actuators.

• Several months ago, we ran an "obit" on Chester Lanzo. Time did not permit us to present a biography; lack of good photos being the main deterrent. However, full credit should be given to Robert "Bucky" Walter, 5807 Cambridge Circle, Sandusky, Ohio 44870, for his efforts to obtain photos from Mrs. Peggy Lanzo and for Bucky's write-up on Chester from which we are extrapolating.

Chester Lanzo was born in 1914 in Cleveland, Ohio, with a modeling career that started in 1922. Like all of us in those early days, not much was known on how to adjust flying models. It was as late as 1933 that Vernon Boehle introduced right thrust to keep the models from stalling and torque-ing in. Regardless, Chet was a modeler who wouldn't quit, winning a place on the 1936 Wakefield team.

Although Lanzo was well known for his rubber powered designs, as early as 1933 Chet started to design and build his own radio systems. The first radio control model built in 1934 was a seven-foot cabin model. Lanzo christened this model, Radio Control No. 1, which in later years was called the RC-1. This model proved to be too fast for the equipment of those days. Chet is seen in Photo No. 1 at the age of twenty with his RC-1.

Following this, Lanzo built a huge 12-foot model called the Racer. This was a departure from R/C-1 as the model was anything but a racer! This model filled the bill, as it flew very slowly. At the 1936 Nationals, the model crashed on a test flight as one of the plug-in tips pulled off. Not having enough time to repair (as he also flew in rubber events), the model missed fame as it would have been the only R/C model entered!

However, next year, Lady Luck smiled on Lanzo with his Lanzo R/C Stick model. Photos of the model in *Air Trails*, December, 1936 show the model with the bare cabane struts and a covered version. The latter proved an annoyance as the R/C set required constant tuning.

At the Nationals, Lanzo was again plagued with wing tip trouble as one of the "helpers" stepped on the tip structure. Repairing same, he then went for a test flight. Officials told him any attempt or flight would be official as there was such a long wait.

Chet only put in a minimum amount of fuel as Baby Cyclone engines were noted for their economy. According to reports received prior to this, the model proved to be woefully underpowered and would not take off. Lanzo went to "needle" the motor a bit when it suddenly came to life and the model began a take-off. Chet was seen racing back to the ground plane control area just in time to gain control of the model. The flight was rather short (between little fuel and problems on the ground) but it was official despite claims by other contestants that it did not truly show the R/C qualities.

Lanzo was an outstanding rubber power model designer. In the early thirties, a 30—inch wingspan cabin rubber model was returned to Lanzo by a young boy. Being interested in models, the young lad asked Chet if he would help and coach him. Talk about a coaching job, the boy was Dick Korda, 1939 Wakefield winner!

Photo No. 2 is a splendid example of the large Class D Stick built by Chet Lanzo that has proven to be so popular and successful. Only problem is that this model requires a huge rubber motor and winding same can be a problem for the inexperienced rubber

2. Chet with his Class D rubber stick model. His most successful design, and still winning contests for its many builders.

3. The controversial Puss Moth designed by Chet Lanzo. It wiped out the competition, even outflying many Wakefields of the era.

6. Above. Gorgeous all red Berkeley Super Buccaneer with white lettering, built by Vern Anthony, Toronto, Canada. 5. Right. Walt Geary with graceful, well made Soaring Eagle. A good R/C subject. (Ross photo).

4. Chet Lanzo with his original Ohlsson 60 powered Bomber. Today's most popular gas model for O.T. competition.

flier. Well worth the trouble, however, as the model is an excellent performer as proven by its win in the Outdoor Stick Event at the 1940 Nats.

Lanzo built all sorts of free flight models, among those his Puss Moth which has been the speculation of flying scale modelers for years. As can be seen in Photo No. 3, the model looks and flies like a Wakefield model. This model flew so good that eventually it was barred from the U.S. Free Flight Scale Champs by the N.A. Flightmasters Club, on the basis of scale conformance. (Had to find some reason!)

After graduating from high school, Chet became a draftsman for a local printing press manufacturer. In early 1940, Lanzo became the chief tool designer at Cleveland Pneumatic Tool Co. It was during this time that Chet took night courses at various colleges ending up as a certified engineer.

In 1942, Chet found his niche at the NACA-NASA Lewis Research Center, working in many fields of engineering. Among his many areas of expertise were electrical, instrumentation, heat transfer, nuclear and laser studies. Lanzo authored numerous reports for the Center.

This columnist can think of no better way to wrap up this short biography of Chester Lanzo than to present Photo No. 4 showing Chet back in the late thirties with his original Lanzo Bomber powered by an Ohlsson 60. There have been some comments about the antiquity of the model, but inspection of the parked cars should provide some clues for the most doubtful.

The Bomber has proved to be the most popular design to-date with the old-timer competitors. The model handles power well and has a superlative glide. In short, tough to beat.

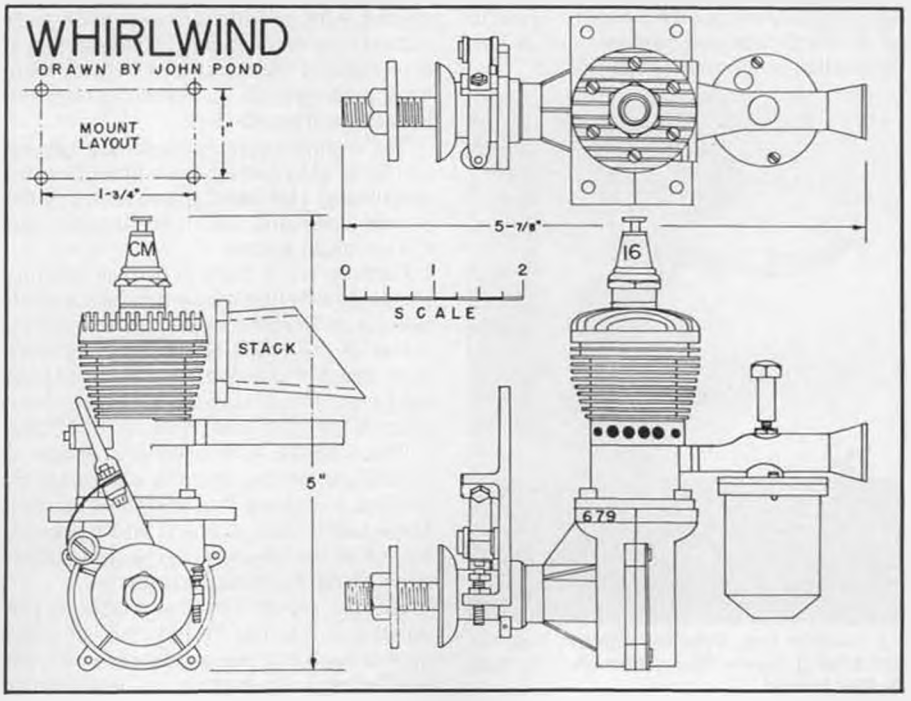
Bucky Walter (who is a great needler) says he loved to tease Chet about the fact he was the Rodney Dangerfield of modeling. Never got enough credit!

WESTERN NEW YORK O/T CHAMPS

Received a report from Jack Brown, SAM 48, who says these two days (August 12 and 13) were probably the best two days of the Summer. Couldn't beat the 80 degree temperature coupled with two mph winds, plus the field was in great shape.

About this same time, Morton Ross of Morristown, New Jersey, sent in a flock of photos taken at most of the eastern contests. We couldn't resist the excellent shot of a Soaring Eagle as built by Walt Geary seen in Photo No. 5. This is the type model you want for O/T R/C as it is not the most successful F/F model. When they are not stable, the models respond better to radio commands!

Another beautiful shot is Photo No. 6 of a Buccaneer by Vern Anthony of Toronto, Canada. Wonder who does his script lettering? Beautiful job, but failed to place. Here is where a point system for craftsman-



9. Clarence Bull surveys the crash damage of his large "Gool" F/F gas job. (Stalick)

ship would help offset the lack of duration.

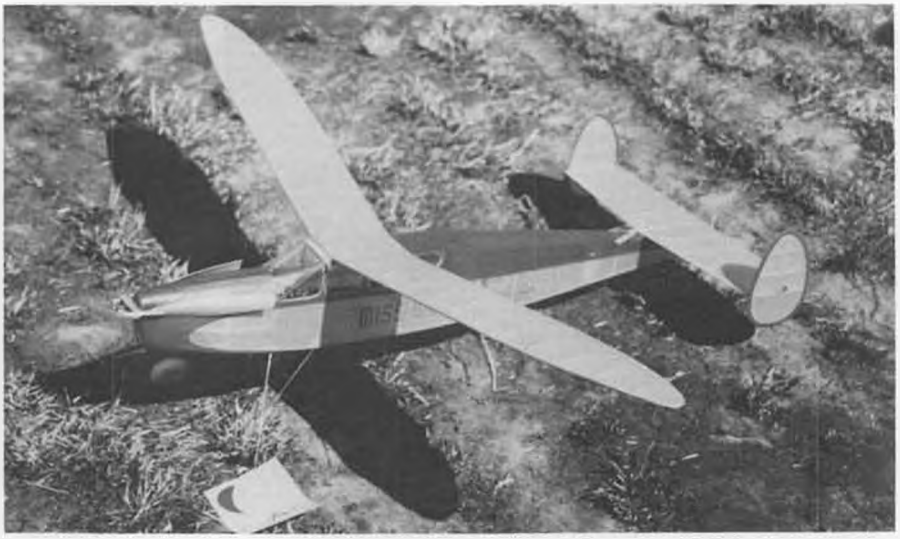
We won't print the results, but will note there were 34 contestants, making 127 entries. Eleven SAM Chapters were represented all the way from Indiana to Ontario. Great meet for renewing old friendships.

ENGINE OF THE MONTH

Acknowledgements for this month's engine are profuse. First to Ted Kafer, who loaned us the engine, thinking it was a Fielgeibel, but this was quickly corrected by Karl Carlson, who thought the unknown might be an Australian engine, especially after the Fielgeibel drawings from Burford were not matching at all.

The rest was rather quickly resolved by getting Bruce Abell to send a Xerox copy of the Model Dockyard catalog, especially after Mike Clanford had called it the "Docklander" in his pictorial engine book. However, it remained for Monty Tyrrell to give the origin and background of this Australian engine, the "Whirlwind."

10. Swedish lass, Sofia Vinvardsson, with her good flying Casano Stick. The boys better look to their laurels!



7. Beautiful Miss Worlds Fair, built by Brion Pommay. Entered in Beauty and O.T. Rubber competition events. Folding prop looks a bit modern. (Stalick photo).

8. Winner of Pylon Ignition at Northwest Champs, an Orwick-powered Super Viking by Greg Davis. (Stalick photo)

To start with, the Whirlwind design was based on the Tlush Super Ace, which enjoyed good sales in Australia in the late thirties. Of course, World War II quickly put an end to any imports.

Trying to trace the early history of the "Whirlwind" is difficult as the staff connected with production were extremely reluctant to name names. This engine was a prohibited manufactured item as were most engines in all the countries involved in warfare from 1942-46.

The engine was produced in a ready-to-run form or in castings with blueprints for machining. The late Captain James of the Model Dockyard, Ltd. in Melbourne, was the principal source.

Castings were done in a small foundry located in Bentleigh, a suburb of Melbourne, as were the machining blueprints. Some of the ready-to-run engines were done there or in nearby small shops. These sold over the counter for about seven pounds (in those days, about U.S. $20.00).

This was the only engine available to Australians directly after the war except for the 8 cc Vanguard Pup and the Cub 3 cc. These were local products also marketed by the Model Dockyard, the only difference being the manufacturers.

The last report Tyrrell was able to run down was that the "Whirlwind" showed up in a Tasmania powerboat club with the late Dennis Smith making up a few engines in the early postwar period. These, of course, were made from castings and machine blueprints.

As previously mentioned, this engine was extensively advertised in the Model Dockyard catalog directly following World War II. Their expanded line of engines included ten British ignition and diesel engines, the Vanguard Pup (Baby Cyclone copy), the Whirlwind, and the reduced version known as the "Cub."

The Whirlwind was advertised at 7 pounds, 10 shillings, complete with coil, plug, carburetor, tank, and condenser. Flywheels were 10 shillings extra. Blueprints could be purchased for 30 shillings. The post war model also featured detachable cylinder head and forged steel crankshaft.

The "Whirlwind"weighed in at 12 ounces. This 10 cc (.60 cu. in.) engine featured a bore and stroke of 7/8 in. No performance figures are available, but sales indicated the engine ran as well as a Brown Junior or Tlush Super Ace.

Ignition systems were at a premium after September 1939 and it was not until the close of the war that 10mm Packard Spark Plugs were available. These plugs were actually used in motor bikes and automobiles. The plugs gave the engine a most ungainly look. This was brought about by mounting a 2-inch high plug in an engine 3-1/2 inches high! It wasn't until 1946 that the American Champion and British Lodge

11. Ray Newman at Canadian SAM Champs fueling his Class A Rocketeer.

12. Father Dignan about to launch his OS 15 powered So Long . . . where else . . . heavenward!

spark plugs became available.

However, the ignition coil was another story, as the Dockyard made an excellent coil which took six volts with no damage. This coil was generally considered superior to the overseas products except for weight and linear dimensions.

Forty years is a long time for recall but Tyrrell feels the production of Whirlwinds was taken over by Lee Marget, a model racing car fanatic and master machinist (like Henry Orwick) and Gil Nichols of Ezycut Tool Co. These were made for quite some time until the American and British engines became plentiful.

NORTHWEST OLD-TIMER CHAMPIONSHIPS

A considerable amount of time has elapsed since we have heard from Bob Stalick *(MB* Free Flight Editor) on the modeling activities in Oregon, Washington, and other parts of the great northwest.

This year's Championship, held September 16 and 17 at Parker Field, did not enjoy the usual plethora of modelers. Bob feels the AMA Nats took away quite a bit of the entrants plus the upcoming Jean, Nevada SAM Champs had a few modelers saving their models for this prestigious contest.

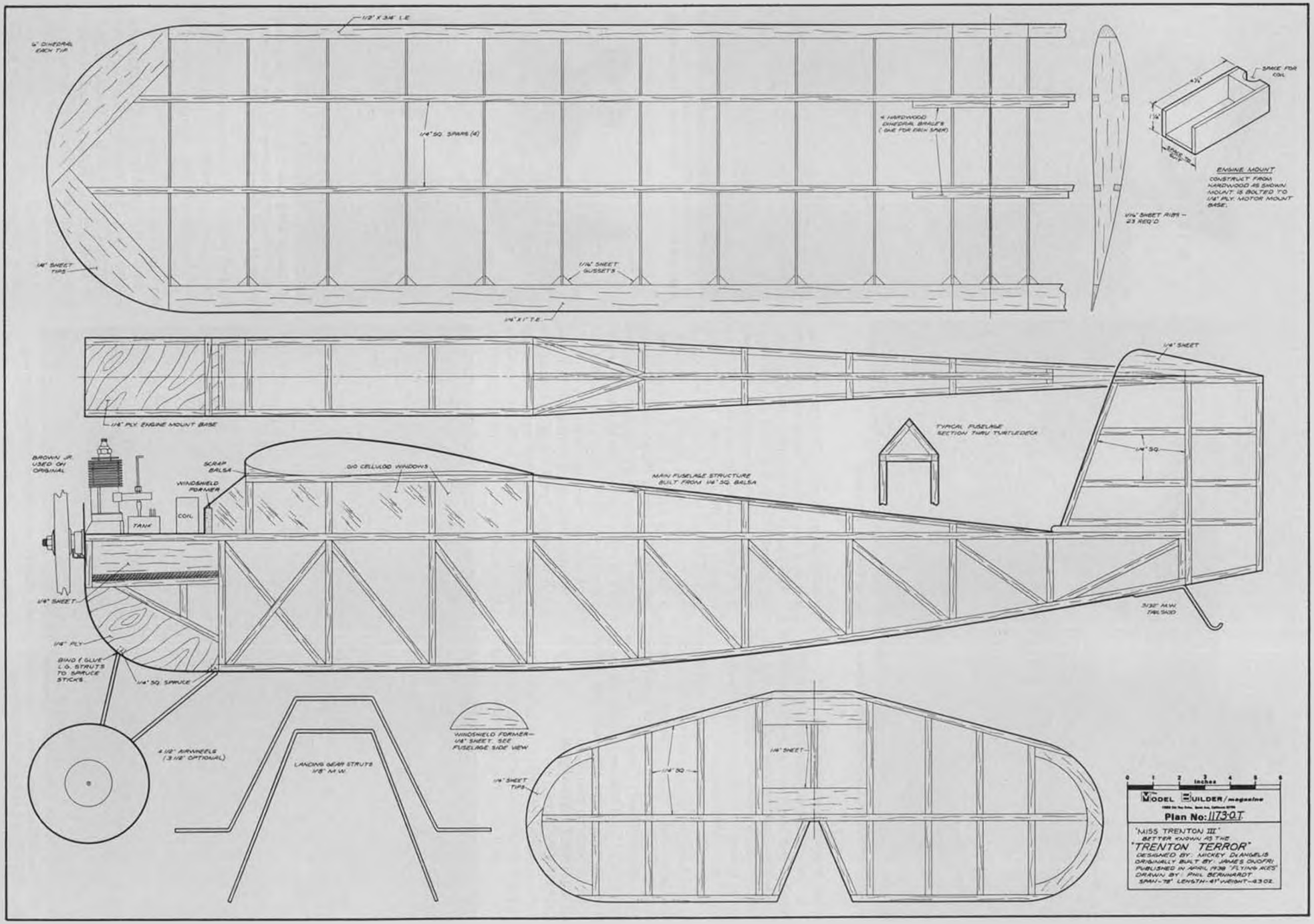
As usual, Bob sent a flock of good photos, the first being Photo No. 7 showing Brion Pommay, of Portland, with a well built Scientific Miss Worlds Fair that was entered not only in the rubber event but the Concours (Beauty) Event!

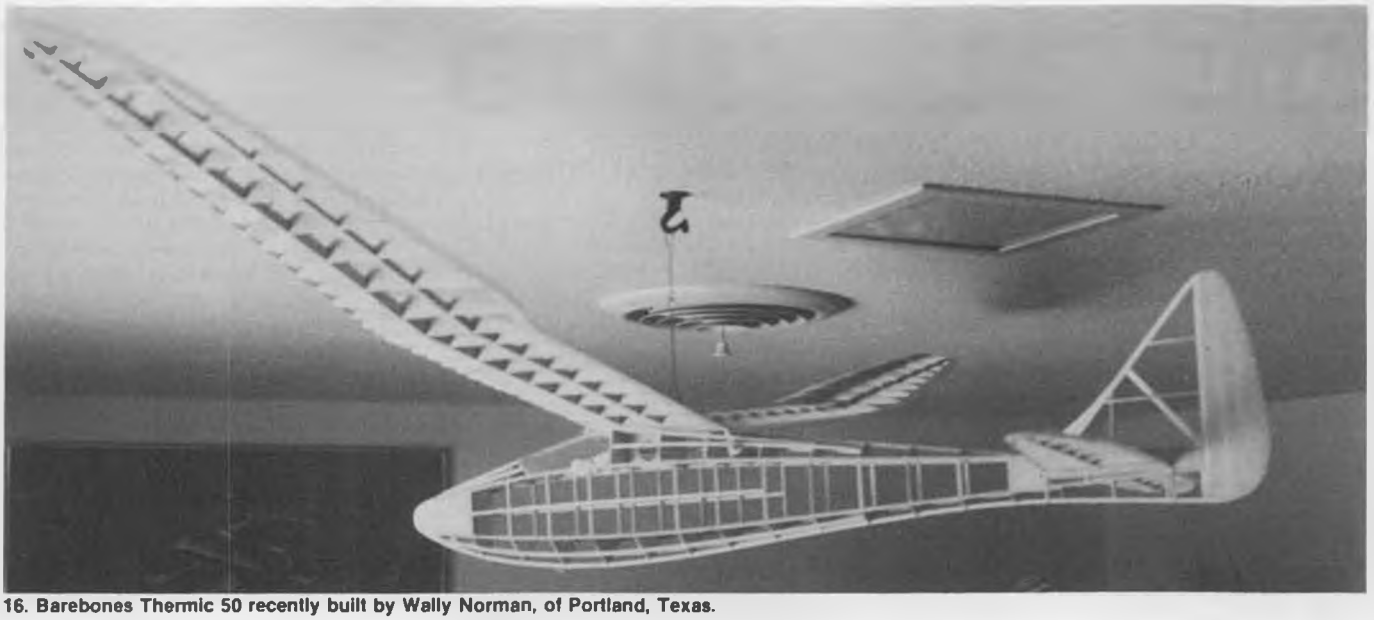
Weather was gorgeous with only 3-4 mph winds to keep the temperatures in the high seventies. This made for some fine times in the Pylon Ignition event. Greg Davis, Vancouver, B.C., seen in Photo No. 8, won this event with a well built Super Viking using an Orwick 64 for power. Isn't that disgusting to the average modeler? It not only looks good but flies so well. How do you beat these guys?

13. Dave Day's First Place winner in the Aldrich Nobler stunt event at English Nats. Wouldn't you know, he finished it at 3 a.m. that morning!

14. George Aldrich (left) exchanges notes with Dick Downes while holding Ian Ward's replica Nobler #1. Just before the storm hit!

About the only way this columnist knows is when Lady Luck interferes as witness the crash by Clarence Bull's "Gool," a Ted Etecknap design. This model had won the Beauty Event at the Benton County R/C Club Exposition, hence Clarence was a little too cautious in limiting the motor run. Alas! Not enough altitude! Fuselage broke


1/2" X 3/4" L.E.
6° DIHEDRAL EACH TIP
1/4" SQ. SPARS (4)
4 HARDWOOD DIHEDRAL BRACE'S (ONE FOR EACH SPAR)
1/4" SHEET TIPS
1/16" SHEET GUSSETS
1/4" X 1" T.E.
1/16" SHEET A/B/R - 23 REQ'D
SPACE FOR COIL
ENGINE MOUNT
CONSTRUCT FROM HARDWOOD AS SHOWN. MOUNT IS BOLTED TO 1/8" PLY. MOTOR MOUNT BASE.
1/8" PLY. ENGINE MOUNT BASE
1/4" SHEET
TYPICAL FUSELAGE SECTION THRU TURTLEDECK
1/4" SQ.
BROWN JR. USED ON ORIGINAL
SCRAP BALSA
WINDSHIELD FORMER
TANK
COIL
GIO CELLULOID WINDOWS
MAIN FUSELAGE STRUCTURE BUILT FROM 1/4" SQ. BALSA
1/16" SHEET
1/4" PLY
BIND & GLUE L.G. STRUTS TO SPRUCE STICKS
1/4" SQ. SPRUCE
3/32" M.W. TAILSKID
4 1/2" AIRWHEELS (3 1/2" OPTIONAL)
LANDING GEAR STRUTS 1/8" M.W.
WINDSHIELD FORMER - 1/8" SHEET. SEE FUSELAGE SIDE VIEW
1/4" SHEET TIPS
1/4" SQ.
1/4" SHEET
0 1 2 3 4 5 6 inches
MODEL BUILDER / magazine
Plan No: 1173-OT
'MISS TRENTON III'
BETTER KNOWN AS THE
"TRENTON TERROR"
DESIGNED BY: MICKEY DeANGELIS
ORIGINALLY BUILT BY: JAMES DIJOFA
PUBLISHED IN APRIL 1938 "FLYING ACES"
DRAWN BY: PHIL BERNHARDT
SPAN-78" LENGTH-41" WEIGHT-43 OZ.



16. Barebones Thermic 50 recently built by Wally Norman, of Portland, Texas.

in front of the tail mount. That is going to take some time to restore!

Photo No. 9 should be captioned, "Hang down your head" (Tom Dooley) Clarence Bull. The unfortunate Gool is seen in damaged shape. Just a shame, the model is gorgeous!

An unusual way of deciding the Concours D'Elegance event is employed at this meet. The model must be entered in the competition events to qualify. Anyone who is present can vote for the most beautiful model. No judges here! Strictly what appeals to the masses!

FOREIGN SAM ACTIVITIES

Sweden

According to the latest letter from Jim Adams, SAM President, the SAM Sweden group under the direction of Sven-Olov Linden, has applied for a SAM Chapter with over 150 members!

This is simply great, as this enhances the idea that SAM is truly international. In that same line, fragmentary reports received from Gordon Burford, who visited Italy last September, indicate that a European SAM Champs is being planned. We'll have more on that later!

Sten Persson, who is Editor of the "Olde Tymer," the official Swedish O/T organ, sends in Photo No. 10 showing two beautiful models, the first being Sofia Wivardsson with a 1940 Casano Stick model.

Lest anyone think otherwise, young Sofia, now 15, has been building models for the last several years and has achieved some modest placings in the Annual Old-Timer Championships. Last year, her Casano model was unflown and untested, placing low. This year, she secured a fifth in the

Continued on page 73

15. Vern McIntosh with early Ideal kit Blériot model, seen at Michigan "Mini-Sam."

The "TRENTON TERROR"

Old Timer Model of the Month

Grab a large handful of 1/4 square balsa sticks and you have most of the materials required to build this model that was featured in the April, 1938 issue of "Flying Aces." Designed by Mickey DeAngelis, the fuselage longerons and cross pieces, the tail surface framework, and all wing spars were of this standard stock.

Though never a big contest winner, the design has long been popular because of its low building cost and simple, clean but squarish lines. The sample in the photo was built by Phil Bernhardt's mother, Marge, and it was only her second model! Easy to trim and fly, it makes an excellent beginner's OT ship. It's also a perfect subject for Old Timer R/C, using rudder, elevator, and throttle.

R/C SOARING

By BILL FORREY

This is what the Torrey Pines site looks like. Blacks Beach (nude beach) far below. Note hang glider sharing the air.

FIRST ANNUAL TORREY PINES GULLS SCALE FUN FLY

Given a decent place to fly and sufficient cause to gather, there is a surprising number of model sailplane fliers willing to attend a scale meet. However, it is not the traditional contest format that is drawing the crowds, but the unstructured fun-fly. *(Applies to every facet of the hobby. wcn)*

In the last few years, there have been at least three big-gun flies that come to mind. First, there was the Tri-Cities, Washington fun-fly, hosted by Wil Byers and his TriCS club, which is going into its third year. Then there was the flat-land SOAR Scale Uprising in Illinois. Now, there is a second west coast, slope scale fun-fly venue, in Torrey Pines, just north of San Diego.

Not surprisingly, it is the slope soaring variety of fun-fly that is the most popular. With the 1988 statistics not at hand, it seems to me that there were just over 100 model entries in the first Tri-Cities event. According to Wil, there were 140 models in 1989.

The Event Director, Joe McBride, tells us that the three-day Torrey Pines meet drew about 300 spectators, plus 59 pilots on Friday, and 80 pilots on Saturday. I didn't get Sunday's figures, but it must have been close to 60 pilots. Most people did not attend all three days. All in all, there were at least 100 pilots flying at sometime or another with an average of two-to-three models apiece! Some guys had as many as five!

Torrey Pines may not be quite as nice a place to fly as the Tri-Cities site, but it is very good. Full-size sailplane meets are still held there each spring, and the hang-glider pilots use the site all the time. It has many acres of relatively flat landing area behind the slope. The slope itself is a very high, vertical cliff facing the Pacific Ocean. Lift is usually good to excellent.

Another nice thing about Torrey Pines is that you can park within a four-minute walk from the cliff. There is a hobby shop, and cafe called the Cliff Hanger, (619) 452-3202, right along side the hang-glider landing zone, and within a short drive are camping sites. There is even a "Wind Talker" phone number to call for a recorded message of the local soaring weather (619) 457-9093.

Altogether, Torrey Pines is just a very desirable place to fly . . . this is known

Ray Smith and his scaled-up Jim Walker Model 74 from F/F chuckie model. Flew great, and a real show stopper.

Charley Morey and his F-86 Sabre from Jet Hangar kit.

Mark Gobble (transmitter in hand) watches as his P-51D is thrown over the cliff.

Chris Lake and his 1/2-scale bald eagle. Rudder elevator control seemed adequate for scale-like flight.

Joe McBride, event director, and two WW-II era TG-2's built from Model Builder plans.

worldwide, not just in California. Add to this, the proximity of the two largest metro areas in the U.S. (L.A. and San Diego), and you have the formula for a very good turnout.

The weather for the three-day event was less than ideal, however, there were periods of "flyable" wind each day. The first day, there was a small breeze; the second day, in the morning, it rained a little, then blew okay. The third day, it rained more and blew even less. Unusual weather for Torrey, and who knows if that didn't keep some of the scale fliers away?

Because scale models at fun-flies tend to be "labors of love" rather than contest machines, there isn't a whole lot of benefit from intricate descriptions of each model. If you want to get into building a scale sailplane, you either have to scratch-build from a three-view or a plan, or buy a kit. Kits are generally available in the USA from the following sources.

SCALE MODEL IMPORTERS:

Hobby Lobby (615-373-1444) for the German makes: Multiplex, Krick, and Graupner.

Hobby Shack (800-854-8471) for the English made Sailplanes International 1/5 scale ASW-20.

Robbe Model Sport (201-359-2115) for German made Robbe models.

AMS Imports (702-786-7733) for Austrian made Bauer Modelle and Modelltechnik models.

DOMESTIC MODEL MANUFACTURERS:

American Sailplane Designs (619-429-8281) for 1/3-scale ASW-20, 4-foot Phoebus, and assorted brands.

Bill Liscomb and his 1/5 scale DG-202 with thinned Eppler 374 airfoil. 1/4 scale also available.

Scale Glider Components (619-931-1438) for 1/4-scale DG-202.

Triton Models (907-283-7716) for 1/6-scale Reiher.

DOMESTIC POWER SCALE SLOPERS:

Cliff Hanger Models (213-320-4530).

Slope Scale Models (714-924-8409).

Combat Models (714-887-2820).

Celerity Aero-technical Designs, aka. War Wings, aka. Combat Wings (619-944-5681)

Please refer to these numbers when asking for information about scale models seen in this report, or when seeking specific scale models.

STANDOUT MODELS AT TORREY PINES

Charley Morey, of *Slope Soaring News*, had a superbly finished, 1/9-scale F-86, built by Harry Finch from a Larry Wolfe (Jet Hangar) kit. The F-86 was painted in Duracryl aluminum auto paint with an overcoat of Satin-Clear K&B. The detail inside the canopy was outstanding.

At five pounds, the F-86 checks out at a rather lightweight 16-ounce wing loading and flies in light to moderate winds unballasted. I arrived too late, and missed Larry Jolly flying his swing-wing MiG

Bill Liscomb and his scale retracts in 1/5 and 1/4 scale. Many models at the meet used his retracts. NOTE: One retracted, the other extended.

Fake, shrimpo bald eagle meets overgrown chuckie in mock combat. What an unusual sight! Two R/C weirdos!

Jared Stalls waits for a clearing in the action before pitching out his Multiplex ASW-22 into the wind.

Bob Reynolds "Top Gun" fuselage F-14 with oversize flying surfaces. Model features only elevon for control.

Combat Models MIG Flogger and A-10 Thunderbolt power scale slopers. Fast fliers and very agile.

Cliff Hanger Models pit area. New F/A-18 Hornets in foreground, three KAI-100's and a F-5E Tiger II in background.

Flogger with the F-86, I was told it was really quite something to see!

Mark Gobble came down from Fresno, California, to fly his power scale sloper (PSS). It was a P-51 Mustang, scratch-built from *RCM* plans that appeared a little over a year ago. Mark lightened the tail surfaces by substituting built-up structure for the sheet, which helped drop some excess nose weight. This model was only the second one Mark had ever built, and it flew great!

Ray Smith, from Encinitas, California, had the most unusual scale subject I've ever seen. The "rules" say scale sailplanes, but

Left: Brian Laird of Slope Scale Models and his wares. They all are really beautiful aircraft with show finishes.

Above: Steve Turnbull's OV-10 Bronco cruises over the edge of the slope. Hard to believe it was once totally rebuilt from a bad crash.

Combat Models A-4 Skyhawks in Navy Blue Angels colors. Didn't fly them, but they looked awfully nice!

Dan Troxell and his Krick kit Grunau Baby which he bought in England already built! Love those classics.

they don't say scaled-down sailplanes, do they? How about Ray's scaled-up 6:1 Jim Walker American Junior Model 74 Jet Fighter? At six times normal size, this model spans 72 inches, weighs four pounds, and has a 10 oz./sq.ft. wing loading. It features rudder, elevator, flaps, and ailerons for control, a 12.5% thick symmetrical airfoil, and a 25% high point. It is fully aerobatic, and totally captivating. It was the "show-stopper" for me.

Second most unusual, was the 1:2 scale bald eagle, built and flown by Chris Lake, of San Diego. It is an all styrofoam model covered in a heat shrink film covering. It features a foam rubber beak for crash-cushion, and a clear plastic vertical stab for yaw stability. Overall performance for this two-channel bird was . . . well, scale like! To see it fly next to Ray's Jim Walker Model 74 was truly weird.

Joe McBride, event director for the fun-fly, had a pair of TG-2s. One TG-2 was all framed-up and ready for covering, set up with a spring loaded aero-tow release. The second TG-2 was actually flown at the meet. Joe's friend, Carl Gwartney, likewise had a TG-2 ready to fly at the meet.

Bill Liscomb of Scale Glider Components, displayed a 1/5 and a 1/4-scale DG-202 sailplane which he makes and sells. He also showed a pair of 1/4-scale (standard and heavy duty) and 1/5-scale sailplane retracts which he machines and sells.

The 1/4-scale (3.75 meter, 148 inch) DG-202 has some unusual features: computer thinned Eppler 374 airfoil (8.25% average thickness, 9% root, 7.5% tip); one-piece molded, white gel coated fiberglass fuselage; carbon fiber spar system; assembled wings with fiberglass doubled obechi wood veneer; pre-installed wing joiner tubes and leading edges, and pre-cut pushrod passages; foam core obechi sheeted stabs; decals; and five-foot nylon and music wire pushrods (also sold separately). This sailplane is very fast (100+ mph) and efficient, with a low sink rate and ability to thermal.

Dennis LaBerge and his Discus from a Roebbers kit. Purchased in Germany and imported privately.

Jared Stalls, of Huntington Beach, California, had a beautiful Multiplex ASW-22 with flaps, spoilers, ailerons, rudder, elevator, and retracts! It must have won the unofficial "most-functions" award. Jared uses a regular Airtronics Module 7SP radio to keep things under control.

Steve Peacock, of Cliff Hanger Models, Torrance, California, showed his latest kit prototypes of an F/A-18 Hornet PSS. It

Continued on page 95

Sal Peluso and his 3.75 meter Pilatus B4 aerobatic scale ship. Nice to see a finish other than white!

Charley Morey and his P51D. Charley is the editor/publisher of Slope Soaring News.

ALL ABOUT ARFS

By ART STEINBERG

• As my regular readers know, I do a lot of R/C instructing. Why? Well, mainly because I do a lot of R/C flying, and as I am not into competition, most of it is just done for relaxation. I evaluate a great many ARFs, and many of them are trainer types, so what better way to test a trainer than to use it to actually teach someone to fly? That's one reason why my column is so full of references to the proper way to learn the art of R/C piloting. You see, I tend to equate Almost-Ready-to-Fly airplanes with beginners. That is not to say that experienced R/C fliers don't get involved with ARFs, because they certainly do. As a matter of fact, there are many ARFs around which are suitable only for experts to fly. One example which immediately comes to mind is the EZ Christian Eagle. This model is advertised along with the admonition that it is intended for experienced modelers only, and I am in absolute agreement with that. In the proper hands this is a model which can turn in a superb performance, but low-time pilots probably couldn't even get it off the ground.

A Kadet Senior majestically leaves the ground. The author feels this is the best kit-built trainer on the market today, but wishes it were available as an ARF.

Anyway, I do have a lot of fixed ideas about the proper way to learn to fly, and as I have stated before, I definitely think there are a number of ARFs on the market which can be used as highly satisfactory trainers. There are at least a dozen ARFs around which can stack up against many of the traditional trainers built up from kits. In my opinion, you can buy an ARF just as good as the Sig Kadet or the Goldberg Eagle 63, both of which are among the most highly accepted trainer airplanes. So, while thousands and thousands have learned on such aileron-equipped models, I really think there is a better way to learn, and that is by using one of the old-timer types as a primary trainer. After soloing a student on one of these, I move him up to an aileron trainer, and he usually gets the hang of it in just a couple of flights. Unfortunately, the difficult part is finding an old-timer to learn on without building one from the ground up. If one has the skill to build himself such a model he is well ahead of the game. Once in a while a beginner comes along who used to build old-timers many years ago, and this individual really has it made if he wants to learn R/C flying, because he has the skill to build for himself about the finest trainer available. About the closest thing you can buy in a kit as a primary trainer today is the Sig Kadet Senior, which is really an old-timer dressed up with a few modern lines. It's big, highly stable, flies slowly, and requires only three channels. If only it were available as an ARF!

Well, all this instructing keeps me refining my teaching procedures, and lately I have had to rethink a few of my methods. Let's take a look at the case histories of three recent students of mine, and we'll see if we can gain an insight into this entire subject of R/C flight training.

Let's begin with Marty, 13 years old, a nice boy, kind of interested in R/C, but he's never built a model in his life other than one or two plastic display kits. This boy typifies the kid who fools around with electric race cars, but now thinks it would be more fun to fly airplanes. I really didn't know if he was mature enough, but I went along with it when his father got the boy into R/C. He bought Marty a beautifully built old-timer with engine and radio already installed, and asked me to train him. The father knew nothing about model building or flying, nor were there any other relatives, friends, or neighbors to give the lad a hand. Well, Marty and I went out to the local flying field, whereupon I took his lovely old-timer up a couple of hundred feet, trimmed it out for slow flight, and handed him the transmitter. Being young and possessed of good reflexes, after about five minutes or so he was executing a fairly decent right-hand racetrack pattern around the field. And that's another reason I love to use old-timers as the primary trainer in a course of instruction, as you just don't have to continually grab the transmitter from the student. Nor is a buddy box system with trainer cord necessary, as the student has plenty of time to correct any error. If necessary, all he has to do is release all controls and the model will fly itself. Now, all the time Marty is doing his racetrack pattern he is told to keep away from the throttle. If he gets too high I just reach over and throttle back a couple of clicks, and I manage to keep him at about 200 feet by occasionally adjusting the throttle for him. Marty seemed to be enjoying himself, so I let him fly for a solid twenty minutes in this manner. Then I took the transmitter, landed the bird, and refueled. We had a short critique, mostly with me praising his performance. I also included a little talk on how the throttle was used to control altitude, contrary to the beginner's belief that the elevator control is used to make the plane go up and down. I demonstrated to him what is meant by increasing and decreasing throttle and how to feel the clicks as he moved the throttle stick.

I took the old-timer up again, and put Marty back into his right-hand racetrack pattern. This time I showed him how to apply a slight amount of up elevator to keep the nose up in the turns, and five minutes later he had that down pat. Now, when I wanted a throttle adjustment I would tell him he was too low or too high, and would allow him to move the throttle lever the number of clicks he was told. A bit later in the flight I had him commence a left-hand racetrack pattern, and by the time the twenty minutes were up, he was doing just fine. Forty minutes of air time so far on his first day, and not once did I ever have to wrest the controls out of his hands. I was really happy with my instructing system at that point. I had Marty throttle all the way back and glide around the field in

Lyman "Pinky" Litman of Dana Point, CA, shows one of his favorite low-wing ARFs. He favors the more realistic appearing models.

a circle until he was about fifty feet high, then I took over the controls and landed, explaining exactly how I was doing each step. On the next flight I had him doing figure-eights for ten minutes, then I allowed him to spend the rest of the flight flying wherever he wished, maintaining any altitude which I considered reasonable. Once again, he did the approach and I did the actual landing. That ended our first flying session, with the student having a solid hour of flying time under his belt and absolutely no mishaps of any kind. How different from the usual learning experience! Traditionally, it takes the average beginner weeks to accumulate an hour's flying time, plus a couple of crashes. Why? Wrong plane, wrong procedure, wrong instructor, wrong everything!

Back to Marty. During our next flying session he learned takeoffs, loops (yes, old-timers do loop nicely), and he performed his first solo. After less than two hours of slow-paced, laid-back flying, this novice had done what every beginner dreams of, he had attained the ability to take off, fly, and land all by himself. By now I was feeling like the world's best R/C flight instructor! Within the next few weeks Marty's dad had bought him a new ARF, an intermediate sport trainer called the Skyward 40. It was purchased completely assembled by an experienced modeler, and was ready to fly with engine and radio neatly installed. The last time I saw Marty he was getting quite proficient with his new airplane, and still enjoying his newfound sport to the fullest. Oh yes, I feel I must mention that Marty knows absolutely nothing about repairing his two airplanes. He cannot even perform the minimum amount of maintenance, such as patching small holes in plastic shrink-type covering. He can change props, fill fuel tanks, recharge his Ni-Cds, but he hasn't got the first inkling about how to adjust a needle valve or how to choose a new glow plug. Because of my insistence he does belong to the AMA, so I know he receives a model magazine every month, but I doubt he is interested enough to read it. He has no modeling friends, belongs to no clubs, and flies wherever he can find a piece of open ground. I'm not sure I did this young man a service by teaching him to fly, because his future in R/C is highly questionable.

My second student is named Kevin, a twenty-one year old marine. Kevin contacted me by telephone after reading a few of my columns. He wanted some advice on which ARF to buy, as he was extremely anxious to learn to fly R/C. As it turned out, he lived pretty close to my neighborhood, so I invited him to a Saturday flying session on my current old-timer, the "Kloud King." Kevin turned out to be a different breed of cat. He used to build and fly U-Control models, devoured every word in every model magazine he could get his hands on, had a good working knowledge of engines and the differences between two and four-stroke types. He was so highly motivated that you could see the light shine in his eyes when he watched me prepare the model for his first flight. Teaching Kevin was a real breeze. On our very first day of flying he got in an hour and a half of flying time, and by the time we packed up for the day he had soloed. He was starting the engine by himself, engaged me in a discussion of propeller choice, proper fuel selection, engine care, etc. I can't even remember the topics we covered that day, but by the time we finished I knew that Kevin was a real natural, and would turn out to be an outstanding R/Cer. Actually, it was important that we cover as much as possible, because he was due to go to an overseas assignment in a couple of weeks. Anyway, by the time he left he took with him an intermediate ARF I helped him select, and with any luck, he expected to enjoy his new tour of duty to the fullest.

An EZ.25 powered ARF pylon racer owned by Paul Suter of Mission Viejo, CA. Definitely for expert flyers only.

Student number three is Ralph, one of the nicest people you could ever meet. I don't know his exact age, but he is certainly well into his seventies, and we met while he was browsing in one of the local hobby shops. It turned out he was looking for a new hobby, as he was easing up on a number of activities that had been keeping him busy. R/C flying intrigued him though he had never actually seen a radio-controlled model fly, so I invited him to join me at my next flying session. Once again my Kloud King floated gently at the usual 200-foot training altitude, and I handed the transmitter to Ralph. He was extremely enthusiastic, and by the time he had been flying ten minutes he was a bundle of nerves. I knew this because he responded to my direction for a right turn by making a left turn. So, I landed the airplane and we talked and drank coffee for half an hour. And that's the way it went, flying ten min-

One of the author's primary trainers, a three-channel Buccaneer he's had around for years. It's been used to train dozens of beginners.

MODEL DESIGN & TECHNICAL STUFF

By FRANCIS REYNOLDS

PORTABLE SLOPE SOARING

That's right, the *slope* is portable! Some time ago I heard Paul McCready speak at the University of Washington. I hope you remember Dr. McCready, the scientist behind the Kremer prize-winning Gossamer Albatross and Gossamer Condor man—powered airplanes. Paul covered many areas that evening, but one thing he talked about was especially fascinating to the modelers in the audience. (Paul was a modeler himself, and was again when his group built the Pterodactyl ornithopter).

Paul described how his sons developed a method of controlled model slope soaring where *they* provided both the slope and the wind without ever leaving their level yard. Furthermore, the glider was completely controlled without radio, and they could keep it up as long as they wanted to. The "slope" consisted of a sheet of cardboard which the "pilot" held at an angle over his head in front of himself. The wind up the slope was generated when the boy walked forward. The glider was small and very light, so it would glide at walking speed. They could even turn the glider at will by tilting the cardboard "hill" to the side and walking in a circle.

It would seem that the young McCreadys have inherited some of the creativity and ability of their famous father. Paul McCready is one of my heroes. Bert Rutan is another. (Bert designed the "Voyager," which flew around the world nonstop without refueling, and did it without government money).

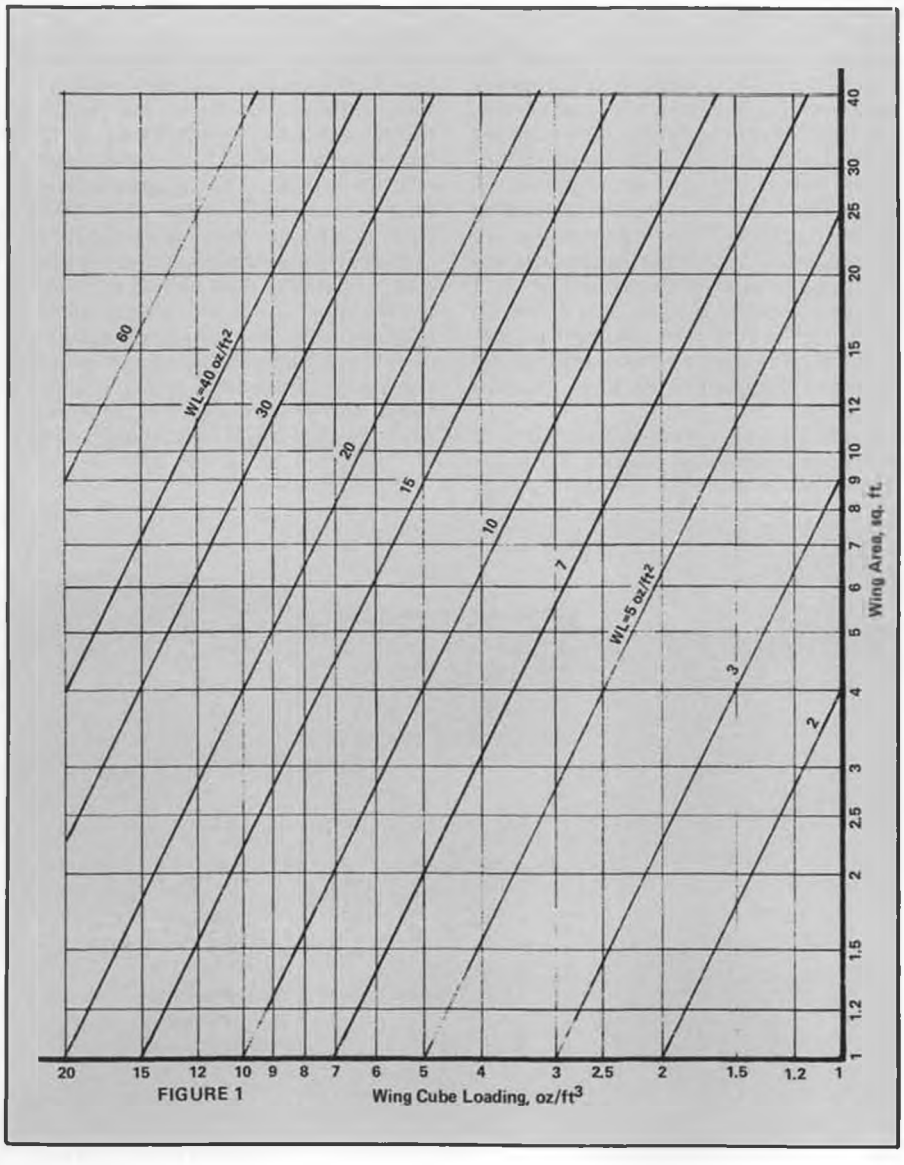


FIGURE 1

MORE ON NI-CD "MEMORY"

Last month I quoted the *General Electric Nickel Cadmium Battery Application Handbook* which informs us that Ni-Cd "memory" is a myth. It is actually a misnomer for a minor problem called "voltage depression". It is caused by overcharging, not by frequent partial discharges. The cure is to discharge the battery completely, then don't overcharge it. "Cycling" batteries wears them out and does no good. I am bringing Ni-Cd memory up again so soon because, by coincidence, right after I mailed that February chapter of MD&TS to *Model Builder*, I again read about Ni-Cd memory in Jim Oddino's "Radio Spectrum" column in *RCM* for December.

Jim got his authoritative information from Gates Energy Products Co. instead of G.E. I'm happy to report that both companies say that Ni-Cd memory is a myth, both agree what it really is, and agree on how to eliminate it! Jim included a curve in his December column of the voltage depression phenomenon. Look it up if you missed it.

But you know, no matter how often G.E. and Reynolds, and Gates and Oddino try to spread the word that there is no Ni-Cd memory, some people will still insist it is real. Well-established misinformation is powerful stuff.

WET RADIO GEAR

Anyone who has ever flown R/C sea-

The 3rd F3C R/C HELICOPTER WORLD CHAMPS

By JAMES WANG

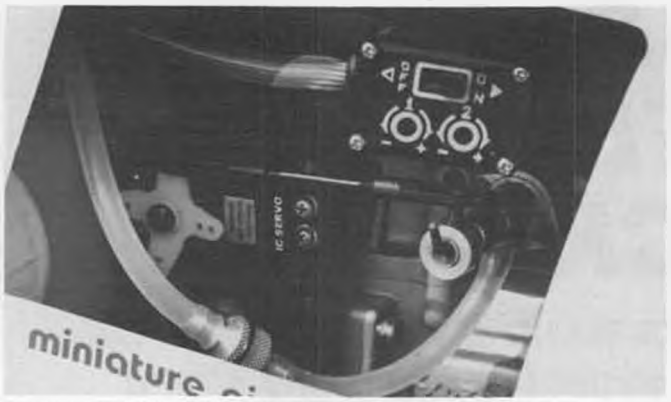
As speculated, the Japanese contention had a very strong possibility of a team win, repeating two previous World wins.

Fourth place winner Ishikawa's Kalt Bell 222 fuselage with TSK mechanics and TSK hingeless main rotor head. The only Bell 222 at the contest. The landing gears were retracted during aerobatics. Beautifully scale looking helicopter.

• This month we will present Part 2 of the Third F3C Helicopter World Championships report. One problem that I am facing is that there is so much about helicopters that we can talk about, but there isn't room enough to print all of it! *(Is that a hint? wcn)* Of course, I have to find time to write it, too. Usually, each month we have a very technical discussion on model helicopter theory, such as vehicle stability, rotor head design, blade design, principle of stabilizer bar, etc. In the next few months we will discuss airfoils, controllability, tail rotor design, delta-4 feedback, lead-lag induced ground and air resonance, composite blades, and much more. In each issue we also have an update on the hottest news in the R/C chopper community, and a separate product review of a new helicopter kit, radio or engine (Excalibur, Rebel, and Cyclone II are coming). To make sure that the helinuts will see all the interesting pictures of the hi-tech helicopters from the F3C World Championships, I have made this month's report only about the Japanese helicopter technology. This report also includes some detailed pictures of the American helicopters that we talked about in the December, 1989 issue. The European helicopter technology and a two-page comprehensive listing of the equipment used by the 41 competitors will be shown in the future.

We began by summarizing the American helicopter technology discussion. Shown in the pictures is Tim Schoonard's Long Ranger X-Cell. The important detail shown is the in-flight adjustable needle valve set-up on his modified Super Tigre carburetor on the OS 61 engine. F3C rules dictate that once the pilot has begun the first maneuver, he can no longer touch any part of the model, hence it may be beneficial to have an adjustable needle valve that can be controlled from the transmitter. This allows the pilot to richen or lean out the needle by about 1/4 of a turn. Len Mount, of Eng-

The three winning Japanese team helicopters. (L to R): 1st place Dobashi's Hirobo mechanics, Black Body Fuselage; 2nd place Sensui's Kalt; 5th place Ishikawa's Kalt Bell 222 body with TSK mechanics. They used MG 1000F 30% nitro fuel, $40 a gallon.

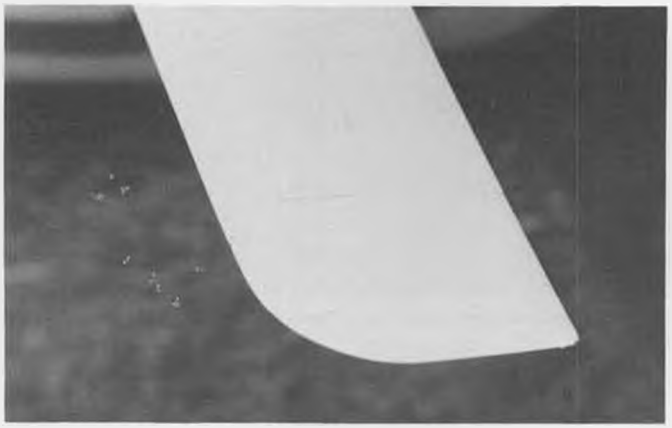


Ingenious inflight needle valve adjust setup on Tim's OS 61.

A very tight fit Magna Pipe exhaust system on the X-Cell Long Ranger.

The roll servo commands go to a push-pull setup first, then back to the swashplate bellcranks. Note the ball joints are all located under the servo arm to minimize torsion exerted on the servo output shaft.

This closeup shows the homemade push-pull mod on Curtiss' elevator setup. Bellcrank made from old sideframe material and it is supported by two 3mm ball bearings. This reduces unsteady aerodynamic loads feeding back from the blade pitching moment to the poor servo output shaft.



Swept tip on Tim Scloonard's Long Ranger. Swept tip reduces profile drag and consequently reduces engine torque needed.

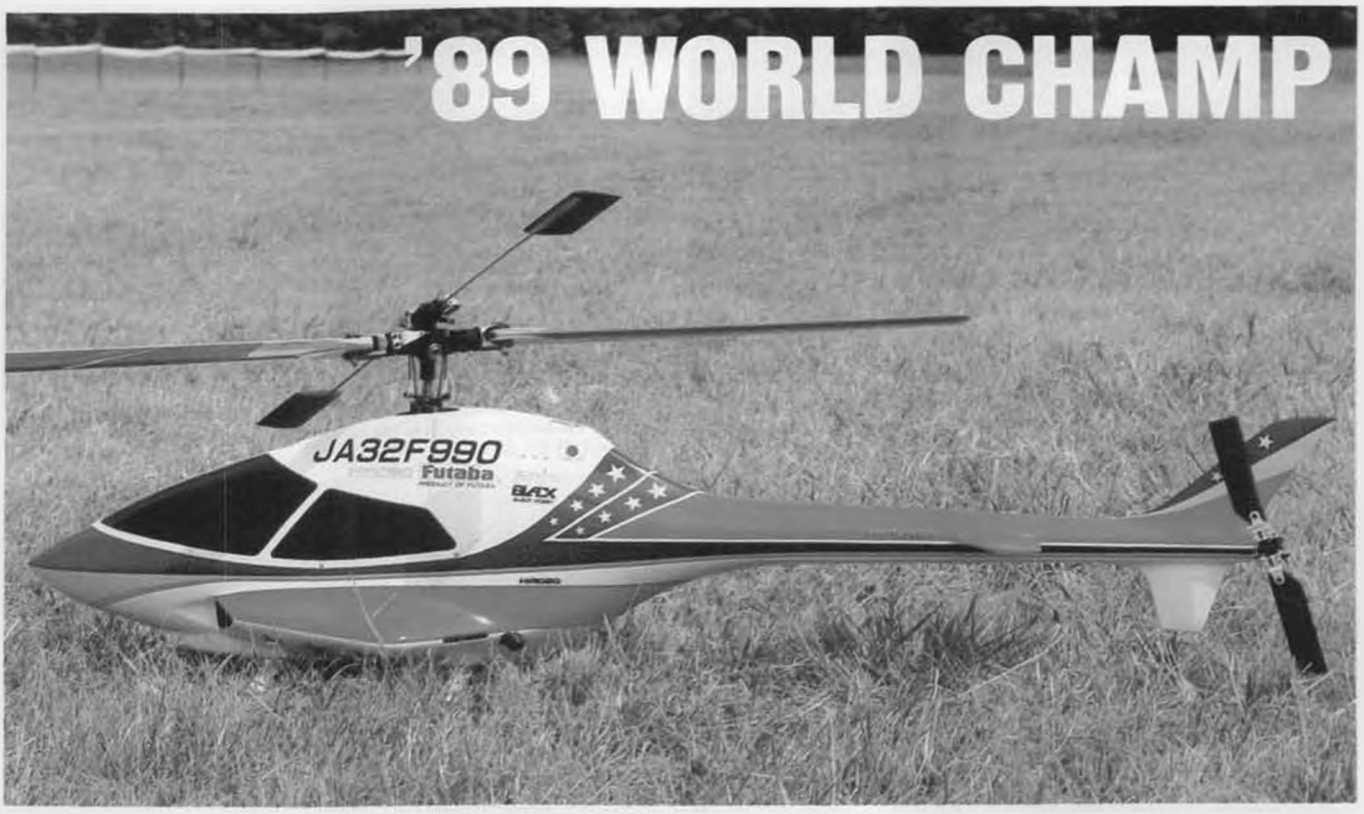
Inside Dobashi's helicopter. No driven tail rotor. Torrington bearing engine starting system. No push-pull control linkages. The large servo wheel is for collective pitch. It is very plain and simple! It proves that it's skill that wins.

land, also had an adjustable needle valve on his GMP Legend. However, there were not many others who had adjustable needle valves.

There is a trend in the U.S. to use a Super Tigre carburetor to replace the original OS or Enya carburetor. For the sport fliers, do not be alarmed that you have to chuck the OS or Enya carb and buy a Super Tigre carb. I love the Super Tigre carb; it is easy to adjust, and it gives great idle. However, I leave my Tigre carb on my Tigre engine. I don't believe in spending $200 buying an OS or Enya engine and then having to pay another $50 for a carburetor. OS and Enya sell tens of thousands of engines each year . . . their carb must be alright! You have to remember, these world class fliers will do anything to get that extra 1% edge over their competitors. I am presently using the Enya 60XF-4H in my Magic, the stock carburetor seems to do just fine for me.

Another picture shows the swept tip on Tim's main rotor blades. Tim used wood rotor blades instead of fiberglass blades. He carved the tip himself. As explained in the November and December, 1989 issues, a swept tip reduces induced drag very slightly (by about 1%), and reduces the rotor noise very slightly, too. Judges like a quiet helicopter. A swept tip does reduce the profile drag, consequently it also reduces the required engine torque significantly. To give you an example, I did a calculation for a blade for which the leading edge at the blade tip is sawed off similar to the Sitar blade. If the sawed off triangle piece is increased to one inch by one inch, then the saving in profile drag could reduce the required engine torque by 11%. This is like having an extra 11% in horsepower. But due to some lift lost at the blade tip, slightly more collective pitch is needed to lift the same helicopter. But the overall saving in engine torque could still be as high as 2 to 3%. OK, folks, go take a hacksaw and cut off the blade tip. Don't forget to thin down the blade tip to maintain the original airfoil at the tip. By the way, if the payoff is so good, then why don't all the full-size helicopter manufacturers saw off their existing blades? It is because this would shift the c.g. back, and also shift the center of pressure back, which increases the blade pitching moment. Model helicopters have relatively stiff and strong control systems, so it's OK to do so, but not on real helicopters.

There is a misconception that fiberglass blades are better than wood blades. Fiber-



1989 F3C World Champion Dobashi's model helicopter. Hirobo mechanics, Hirobo SSR rotor head, and Korukawa aftermarket brand fuselage. Soft teetering head and heavy, thick Hiller paddles give smooth flight characteristics.

glass blades do not offer any aerodynamic advantage over wood blades. Presently, the glass blades on the market are nice to own because they are pre-finished and pre-balanced by the manufacturers. Furthermore, glass blades usually have a shiny white gelcoat finish, thus, they look better. But performance-wise, wood is just as good.

Full-size helicopters used wood rotor blades in the '50s, then they switched to aluminum covered blades in the '60s. During the '70s composite material main rotor blades were first used on full-sized helicopters. Nowadays, most full-size helicopters employ composite blades. They are called composite because always more than one type of fiberglass cloth, pre-impregnated cloth, row weaving, and tow rope are used in each blade. For full-size helicopters, composite rotor blades offer an order of magnitude of better performance over the wood and metal blades because the beauty of the composite materials is fully exploited. On the other hand, model helicopter composite blades are just copies in size and shape of the wood blades. Full-size helicopter composite blades usually have twist, taper, and different airfoil sections from the root to the tip. The layers of cloth are layered up in special orientation to induce structural coupling to minimize hub shear, hub moment, and vibration. The different layers of fiberglass weavings are also layed up to give desired flapwise, lagwise, and torsional stiffness. Note, a stiffer blade is not necessarily better. We often hear of Kevlar model blades. Kevlar is used only for improved strength. Kevlar does not mean your model will fly better. For full-size helicopter composite blades, weights are added internally at blade modal bending points to reduce vibration and improve vehicle stability. In the future, model fiberglass blade manufacturers should try to utilize these features in order to make the fiberglass blades really more worthwhile than a simple straight chord wood blade.

In the last World Champs report we commented that all helicopter rotor blades generate significant amounts of steady and unsteady aerodynamic loads which are fed back to the servos through the control rods. Aerodynamics always induce a pitching moment on the rotor blades about the blade feathering axis. The blade consequently wants to twist leading edge down, and sometimes up. To stand up to these oscillatory loads, and to have a balanced control setup, push-pull linkage system is used. The two very detailed pictures in this issue show the push-pull control setup on Curtiss Youngblood's longitudinal and lateral cyclic servos. The pictures and captions are self-explanatory.

Now, lets move on to the Japanese helicopter technology. The specifications for the World Champion Yukihiro Dobashi's

Double ball bearing tail rotor blade grip. At 5:3 to 1 ratio (tail rotor:main rotor) this fast tail rotor speed should give excellent yaw response. Response might be even better if the tail rotor is on the other side. Very slick fin fairing.

Dobashi's wooden main rotor blade with lead weights. Entire blade was covered with fiberglass cloth and polyester resin. The dark color leading edge is actually made up of about 30 laminations of hard wood.

Second place winner, 18-year-old Kazuyuki Sensui. Kalt helicopter, OS 61 engine, and JR PCM 10 radio. The only belt drive tail rotor model at the contest.

1989 F3C World Champion Yukihiro Dobashi hustles his helicopter and caller to the hover ready box. He posted the highest single round score at the meet, 238.5 points.

Part of the Japanese display team's TSK Super Kaiser model. It uses the same hingeless TSK H-30 main rotor head as on Ishikawa's machine. A high quality, but expensive, pod-and-boom model.

Closeup of the TSK H-30 hingeless rotor design. 44,000 yen, or US$340 just for the rotor head. The spring steel flexbeam gives slopless, no dead-band, linear cyclic control response.

Hirobo/Black Body model are as follows: Hirobo SSR (Super Sharp Response) main rotor head with 61% Bell-Hiller mixing ratio. The prepainted Korukawa (Black Body) aftermarket fiberglass fuselage costs 126,000 yen, about $1000. It has a YS 61 side-exhaust ring engine, and K&S muffler. The majority of the fliers in Japan prefer ring engines, only less than 20% use ABC engines. The gear ratio is 9.7:1:5.3 (engine: main rotor: tail rotor). A torrington bearing was used on the engine starting shaft (see the photo). No push-pull control linkages were used. There was no driven tail rotor system, thus during the 180 autorotation maneuver there was basically no tail rotor control. Europeans and Americans prefer the driven tail rotor system. Gross weight was 4.95 kg, or 10.9 lbs. Hover rpm was around 1300. All three Japanese team members used 30% nitromethane MG 1000F fuel (7000 yen, $40 per gallon). MG must be a big sponsor for the Japanese team because during every photo session, the Japanese team crew insisted on putting that can of MG fuel in front of the models. Just look at the photo and you will see that can of MG fuel! The radio equipment on Dobashi's machine included Futaba 9-channel 1024 radio, 9201 servos, and 153BB gyro. Dobashi works for Futaba as a technician. He is only 20 years old, and was the 1988 Japanese National Champion, second place winner in 1987 Japanese Nationals, and first place in the Japanese World Champs team trial.

The second place winner was also a

Very slick looking fuselage. Muffler on the left side of the fuselage. Note the air cooling intake scoop at the front of the stubby wing. Small wing like this may improve longitudinal stability without unloading the main rotor thrust.

The Hirobo SSR (Super Sharp Response) single teetering rotor head. Pitch control bellcrank is on the left side. An extra I-arm is added to prevent pitch change when collective pitch is varied.

CHOPPER CHATTER

By JAMES WANG

PRODUCT REVIEW: Schluter MAGIC Futaba 9ch 1024 Enya 60XF-4H

• The Magic moment has finally arrived. At least a dozen readers called and asked when they would see the Magic review. Here it is! This month we will point out the design features of the Magic and the Futaba 9VHP radio. We will also address the special tricks we learned to maximize the potential of the Magic. Next month, we will present you with the computer program setup on our Futaba radio for the Magic. We will also discuss the Magic's flying qualities and the performance of the Enya 60XF-4H Aluminum Chrome engine.

Schluter products are known throughout the world for their quality. Just like the Mercedes and BMW, the German made Schluter kits deserve their reputation. As you can tell, I am very impressed by the Magic. It can be considered as the quintessence of all helicopters. The model not only flies well, but the logistics that went into putting the kit together shows organization. First of all, not a single part was missing. There are 19 individually wrapped plastic bags. The bags are labelled from 1 to 19. At each construction stage, you only open one bag. Unlike the other manufacturers, where all the nuts and bolts are placed in one hardware bag, in the Schluter kits, only the necessary nuts and bolts for that particular assembly step are placed in that bag. This gets an A+ already. To top that, how many other manufacturers do you know that give you a bag of few extra nuts and bolts for future use?

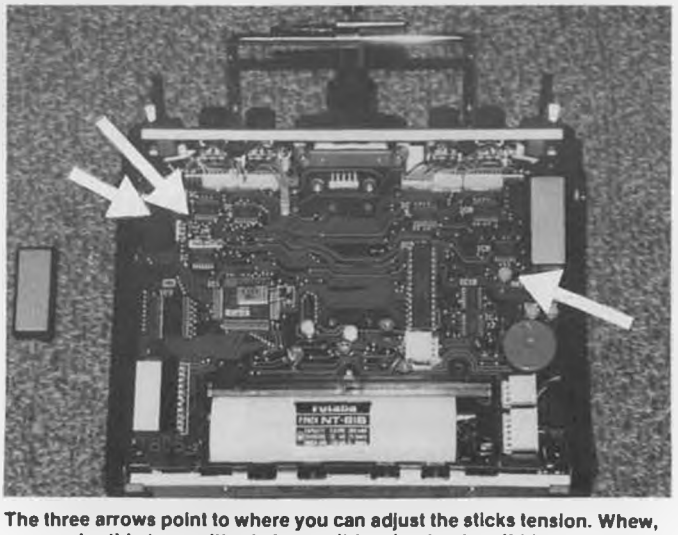
The machined metal components are superb. They all mate together without force. The molded plastic parts are of very high quality. The Magic may cost a few bucks more than other 60 size helicopters, but the workmanship is reflected in the price you pay (retail price is $795). After I finished building the Magic, the strongest impression left upon me was that these German chaps did their homework well. It is a thoroughly engineered job. The only nitpicking comment that I have is that it took me a long time to build it! It's like putting an intricate BMW engine together. The Magic design is more sophisticated than most other pod-and-boom helicopters. Unlike some kits, to put together the Magic, you need to assemble everything yourself, including the main rotor head, tail rotor gear box, servo tray, etc. But all the parts fit perfectly, as if someone had once assembled the model together already to ensure parts fit, then disassembled it for you to put them back together!

It took me seven days straight, and eight hours a day to put together my Magic.

This is one of the smoothest hovering and flying model that we have tested. At 58.7" diameter main rotor, it is one of the largest 60-size pod-and-boom helicopter. It will even fly off (shallow) water!

The Enya 60XF-4H Aluminum Chrome engine is used in our Magic. It's a non-ringed engine, and there is plenty of power. Very smooth idling.

The Futaba 9VHP helicopter radio has almost all the features that you can dream of and more. The instruction is clearly written. The LCD screen prompts you for easy programming. Programming is done with the 10 keys under the screen.



The three arrows point to where you can adjust the sticks tension. Whew, no wonder this transmitter is heavy, it has loads of stuff hidden inside.

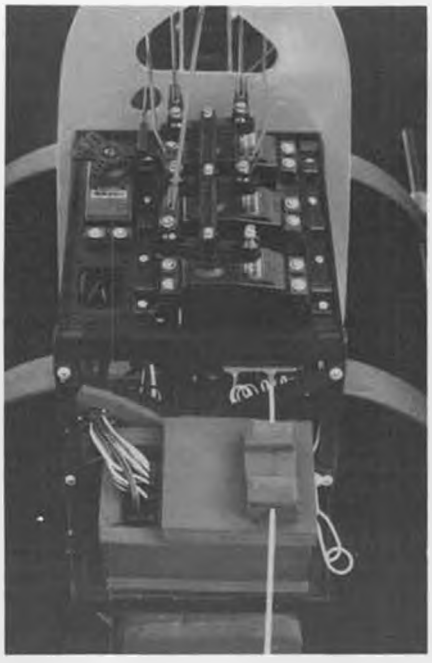
Even though I was anxious to fly it, I worked very meticulously to ensure perfection. Due to the excellent instructions, packaging, and parts fit, the assembling was most enjoyable. The instruction manual is written clearly. It may not be important to you or me, but the instruction includes French and German. There are four sheets of large fold-out plans to aid the construction. On the 7th day when the completed Magic was sitting on my workbench, just sitting back and admiring the result was a pleasure. I get that satisfaction from knowing that I have put it together perfectly. There are people reporting that they have built their Magic in less than 20 hours.

Schluter already has a nice stable of R/C helicopters, but here is Schluter's rational for the new Magic. "The driving force behind the development of the Magic was a combination of the desire for higher performance, improved efficiency in power system, and a reduction in vibration from the transmission. At the same time it was considered essential to retain as many as possible of the tried and tested Schluter components."

Now, before we move on to describing the specific features of the Magic design, let us first go over the Futaba 1024 PCM radio and the Enya 60X engine. For a world class helicopter like the Magic, it certainly deserves an equally sophisticated radio system. The other reason the Futaba 9VHP was used was that we wanted to use the CCPM (cyclic and collective pitch mixing) feature. Of all the programmable helicopter radios presently on the market, only Futaba 9VHP and JR PCM 10 have CCPM. The CCPM system controls helicopter collective pitch by moving three or four servos synchronously to raise or lower the swashplate. (Only Futaba can do 4-servo CCPM, JR does 3-servo CCPM.) To get roll cyclic or pitch cyclic controls, two servos will move in opposite directions to create a push-push couple to tilt the swashplate. The advantage of CCPM is that it eliminates mechanical bellcranks and levers that are necessary to separate the collective and cyclic commands.

The swashplate is supported at 4 points with 4 bellcranks. Delron bushing mixer is very free. Spring loaded starting shaft and cone pops up after the electric starter is lifted. This reduces vibration.

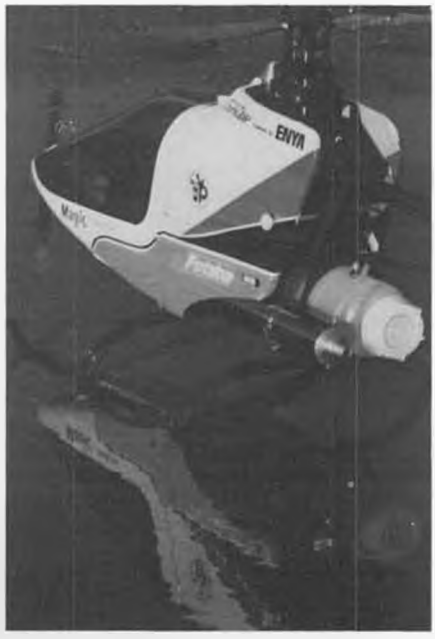
The Magic kit comes with a 3-servo rocking mechanism to control collective and cyclics (see the picture of David Ramsey's Magic). I have flown the Schluter Scouts and Juniors equipped with such a system and there is absolutely no problem with it. Dave says, if the plastic rocking mechanism is well lubricated, it should last at least 60 flight hours until slop begins to appear. The principle of this system is that all three servos will rock forward or back uniformly to raise or lower the swashplate. A roll cyclic command only causes the roll servo arm to rotate. Pitch command only rotates the pitch servo arm. The third servo is used to rock the three servos together to raise or lower the swashplate to induce collective pitch change. Schluter calls this "System 88" because it was first introduced on the Junior and Scout in 1988. The beauty of the System 88 is that the swashplate is supported by four bellcranks. Roll cyclic and pitch cyclic are each activated by pulling the swashplate with one bellcrank and pushing with the other bellcrank. This type of push-pull system is better than just pulling or pushing alone on one side of the swashplate. Mark Powelson also uses the original rocking mechanism, but he modified it so only two servos, pitch and roll cyclics servos, will rock fore and aft. The collective pitch control servo that rocks these two servos is stationary.



David Ramsey's Magic has the unmodified Schluter 3-servo rocking mechanism. Servo on the back is for roll cyclic. Middle one for pitch cyclic, and the front one for collective. All three servos rock fore/aft when collective command is given.

With the CCPM, my Magic accomplishes the collective and cyclic control mixing electronically. The Futaba 9VHP allows four different CCPM configurations. The four possibilities are shown in Figure I. Since the Magic has four bellcranks, I had the choice of using either three or four servos CCPM. I chose the four-servo arrangement. The four-servo setup is shown in the picture. Does electronic CCPM fly better than the Schluter mechanical mixing? Probably no difference. I had many long chats with Dave Ramsey, and we both seem to be equally satisfied. But the CCPM method looks cleaner, and there is no bearing to lubricate or wear out.

The immediate comment that you get by showing the Futaba 9VHP to others is, "That's incredible!" The 1.25 x 4.5 inch liquid crystal display is the center of the attention. A Bell 222 model is displayed on the LCD screen. The main and tail rotor blades are whirling, too. Very cute. Below the screen is a key board with 10 push keys.



The canopy is specially designed for the Schluter muffler. The large fuel tank provides over 20 minutes of flight time. Wide skids prevent tipover.

Six Futaba 9201 servos are used in my Magic. One on the left for tail rotor. Four on the right for electronic CCPM control of collective, pitch and roll cyclics. Throttle servo, receiver and gyro are below.

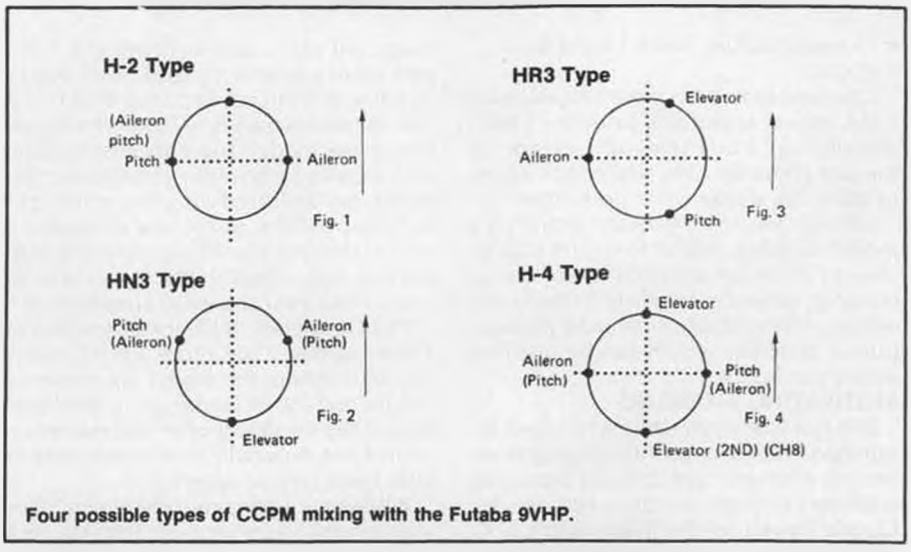
The Magic kit comes in two boxes: the mechanics and the canopy. Four sheets of clearly illustrated drawings and the well written instruction make assembling an enjoyable task.

The parts are separated into 19 bags. During each assembly stage, you only open one bag. All the machined and molded parts are of the traditional Schluter high quality.

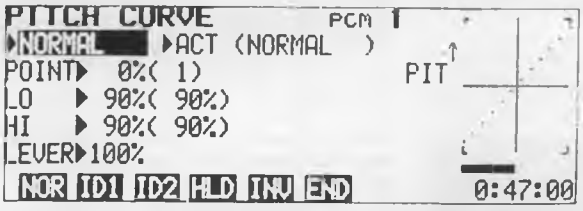
These keys allow you to change the display and input the program settings. There are more features than one knows what to do with. There are only two features that we did not find on it, which we will tell you about later. To give you an idea of the radio's capabilities, let's itemize all the features below. Next time we will tell you how we programmed our 9VHP for the Magic, so you may use it as a guide line.

1. Plug-in frequency module for easy frequency change.
2. FM transmission method to minimize interference from extraneous electrical noise.
3. PCM or PPM coding method. Thus you can use this transmitter to control your other FM/PPM receivers.
4. It comes with a dual conversion narrow band receiver that meets 1991 AMA

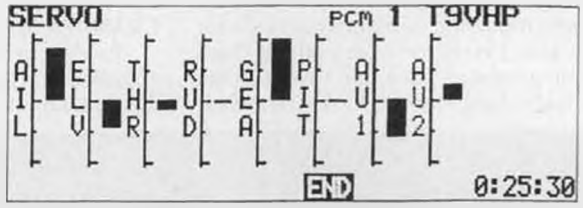
Continued on page 77



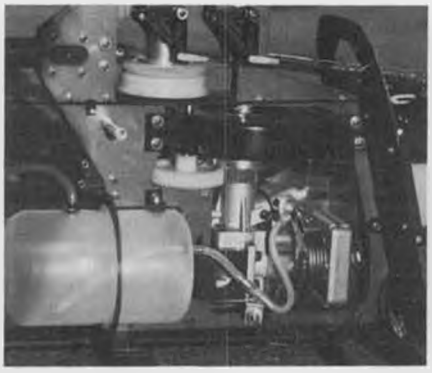
Four possible types of CCPM mixing with the Futaba 9VHP.



This illustrates what are displayed by the LCD screen to help you program the collective pitch curve. This is one of the many amazing displays!



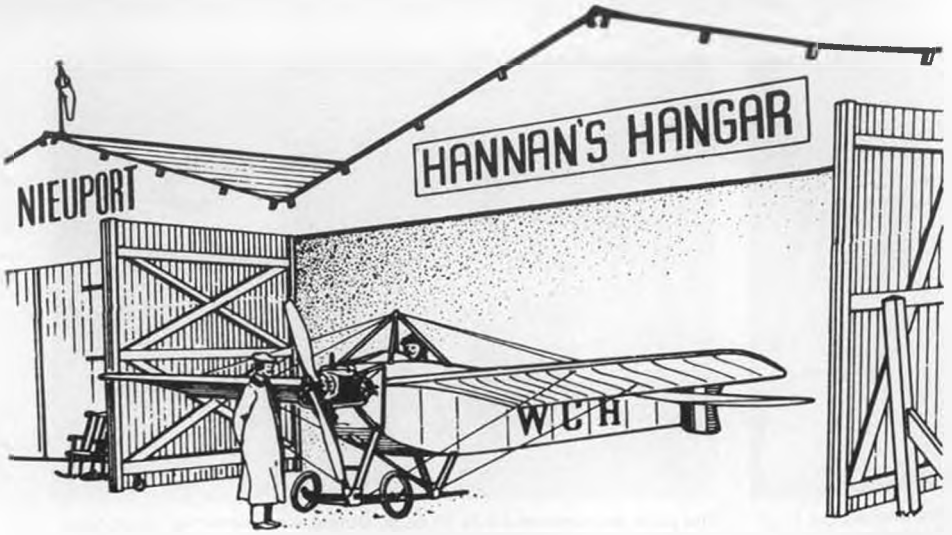
The servo test function has 8 vertical bargraphs to show you the loction of the servos on the LCD screen.



The 2-stage gear reduction design. The 1st stage is driven by the clutch bell housing. The 2nd stage is driven by a pinion gear running inside the Delron gear housing. Note the location of the remote glow plug connector and clear plastic cooling skirt.

The main structure and tail boom are anodized metallic red. The frames have channels running on the inside that make the structure very rigid. If the kit is built according to the instruction, gear mesh will come out perfectly.

New gear box and ballraced sliding pitch control mechanism is extremely smooth. Tail blade grip has radial and thrust bearing. The metal fin with the integral skid wire is very robust.



"Model Building Builds Model Boys . . . and Girls."

• "Model Building Builds Model Boys . . . *and* Girls."

Our lead-in line this month appeared in bold letters atop Dick Johnson's high school shop, many years ago, except for the part about the girls, which Dick added to bring the slogan more up-to-date.

Johnson's current museum project is a model-building exhibit to inspire youngsters to strive for appreciation of craftsmanship, patience, creativity, frugality *and* wild experimentation. A tall order perhaps, but all qualities which can be instilled within our hobby.

MOTIVATING MODELERS

It is not just youngsters who need inspiration. Most of us go through stagnation periods when we have difficulty becoming enthused enough to start a new model. Claude Powell, of the Washington, D.C. Maxecuters Club, offers his solution: "When I get saturated with long term projects, modeling or otherwise, I look for an escape. I want to do something that's modeling-related but I don't want to get heavily involved. I tend to look at modeling mags, old plans, and anything else I can pick up or just sit at my workbench with a building itch but not knowing what to do. The solution is usually a Comet or Megow ten-center model. These are easy to build and require only minor changes for flyability. No laminated wing-tips or trying to build super-light; just follow directions.

"For those of you whose modeling production has sagged in the last couple of years, this is your chance to jump back in."

Phil Oestricher, of General Dynamics in Texas, agrees: "The more I think about model building, the more I am drawn to the 10¢ and 25¢ kit models of my boyhood days. They no doubt offer the maximum enjoyment, especially for someone with as little spare time as myself."

Bill Feeny, of Wisconsin chimes in: "Save your models! They are more than just stick and tissue. They are alive with memories of the loving hands of the boys we were!"

GRANDPA WALT

"Professor" Walt Mooney is now a grandfather. His daughter, Chrislea Bee, is the proud mother of a new daughter, Kelly. Quick Walt, build a solid model for her to teeth on!

BOYS' LIFE

Our congratulations to 16-year-old Don De Loach, of Texas, who was featured with some of his models on the cover of the Boy Scouts of America magazine *Boys' Life* for October, 1989. Eagle Scout De Loach, who successfully competes in indoor and outdoor free flight, has a room full of trophies to show for his efforts, and we hope the magazine article may encourage other Boy Scouts to take up model building!

AUTOMATION ANYONE?

Model designer Vern Clements observes: "The great thing about computers is that there are just as many mistakes as ever, but now they are nobody's fault!"

And, model historian John Brown notes the increase in ineptly-produced publications since the advent of low-cost computers: "Desktop publishers using ran-

Dramatic photo by Lubomir Koutny of Czechoslovakia, catches Junior Vit Jan's Besson model after ROW take-offs.

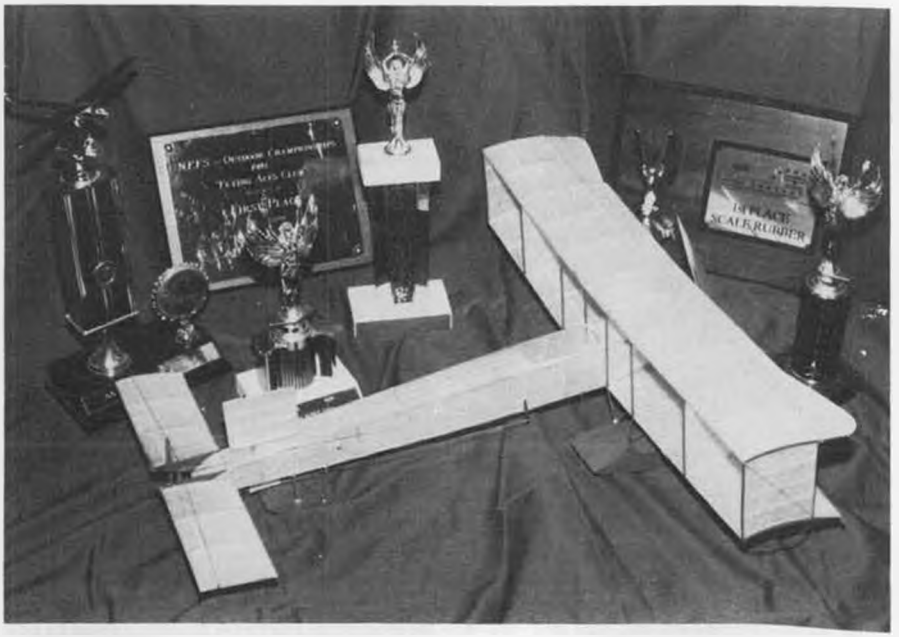
som-note technology."

As for the so-called "user friendly" devices, A. Lee Spencer remarked ". . . I had to change the ribbon in this thing, always a traumatic experience, at least for me. 'It is so simple even a child could do it.' Unfortunately, no child was around and I had to do it all by myself."

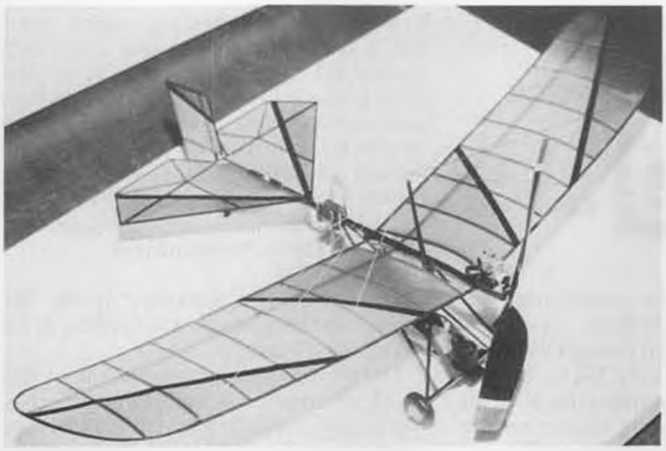
PERSON-POWERED 'COPTER HOPS

Thanks to Ed Whitten and Mark Fineman, we have reports of the first-known pedal-powered helicopter to leave the ground (actually a gymnasium floor). Piloted by cyclist Greg McNeil, the California Polytechnic University team project rose only four inches for a couple of seconds, however it did prove the possibility.

The American Helicopter Society's prize of $20,000 for a person-powered 'copter capable of a 60-second flight at ten feet of altitude remains an elusive goal. But then for many years so did the Kremer prizes and the English Channel!

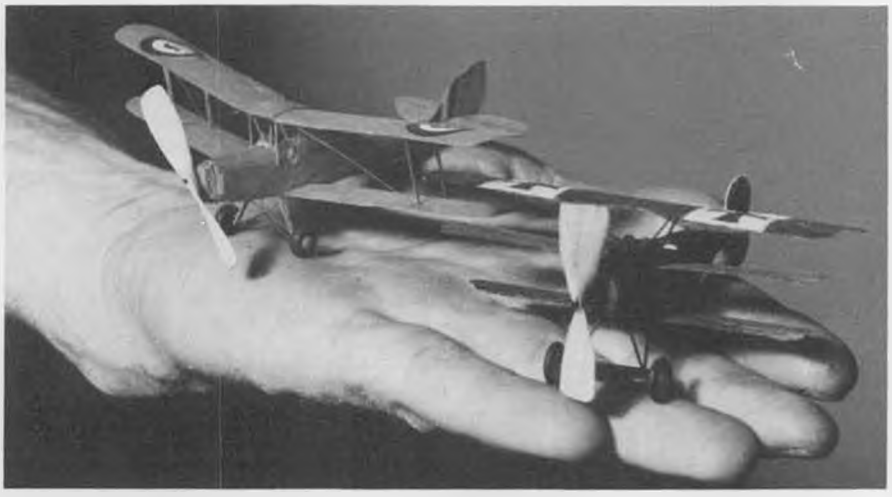


One of Eagle Scout Don De Loach's many successful models is this Voisin canard. See text for details.



Heinz Neumann's Peanut "Motte" Ultralight from Germany has a duration of 70 seconds. Tonda Alfery photo.

Allan Buttrick's busy building bench! Heinkel in foreground is from a Don Scrull Designed Flyline kit.



Smaller than Pistachios! Tiger Moth and Tripe can ROH (Rise Off Hand) of builder Graham Ferguson. Mike Combe photo.

BACK TO THE STICKS

As promised, here is the conclusion of the story which left off in our December, 1989 Hangar column. By way of review, Ed Bush, of New York, returned to model building after an extended absence, and was surprised how the hobby had changed. Eventually he located some "olde fashioned" stick and tissue kits, which fulfilled his quest for something with a high "putter factor" for relaxation and satisfaction.

Savoring the experience with a painter friend, he remarked: "You won't believe the neat thing I found today!" Whereupon I launched into a description of how much fun it is to build model airplanes with rubber band motors from balsa wood and paper.

"Her eyes glazed, she said, 'Oh, that's nice. Are you going to get a plastic penholder for your shirt pocket?' The look on her face said she'd always thought I was a nerd, and now she had proof.

"I told another friend. He makes sculptures out of paper, so I thought he'd understand my enthusiasm about model building. It turned out he tried to build one once, but it was too difficult. 'All those little pieces of wood kept breaking, and I couldn't get them glued together the right way. It was awful,' he said.

"A third person overheard us. 'I had a radio-controlled glider once. It had an electric motor. But the first time I tried to fly it, I launched it into a heavy wind, it crashed, and the wings broke off. Nobody told me you should fly gliders when it isn't windy. They aren't like kites.'

"Clearly, I wasn't going to find anybody to appreciate this new hobby (of mine).

"Sunday was spent sanding and painting, interrupted by a foray for more glue. I wish they sold it in bigger tubes. But then, how many people need a pint or a quart of glue?

"At work yesterday, I found it hard to concentrate on crunching my numbers. All I could think about was how I would cover the fuselage. At lunch I went to a newsstand and found an R/C model magazine. Most of the book carried pictures from fly-ins showing people with what I thought were very large replicas of airplanes. It seemed everybody was either building models for movies or hoped they would. Most of the planes were about to become kits, many of them ARFs (I was picking up the jargon), I was assured. Apart from trying to sell planes, a major goal consisted of trying to build the biggest, fastest, and most elaborate replica. What would be next, cruise missiles for the hobbyist?

"The magazine left me with the net impression that model airplane building wasn't really a hobby. It was more of a business in which beginners didn't count for much. The experts seemed to comprise a guild that passed on the craft through a secret tradition, and would just as soon have newcomers buy a plane from them. And y'all come back to buy another one after you crash.

"I'm not uninterested in R/C planes. I'm not against trying to make a living at something one loves to do. I can understand the appeal of size and speed. Most likely I'll buy an R/C trainer before I try to build one.

"Nevertheless, it appears that only a fraction of the time in this hobby is spent flying. The rest of the time seems to be spent recharging, refueling, repairing, and for some, mostly building. Without build-

How's this for vintage "character"? "Cruiser Pup" by John Meaney of England, is 12-year-old reliable flyer.

Free Flight

By BOB STALICK

• As anyone who has read this column for any length of time can attest, I have this love affair for the Dixielander gas model design by George Fuller. My original Dixie was built in 1971, and I have flown it regularly since then, although it has suffered innumerable punctures and patches. It also sports its second stabilizer and engine. Once upon a time, not too long ago, at the beginning of the Nostalgia movement, I even got carried away in my belief that the Dixie would qualify as a Nostalgia design. Well, that was not to be the case, but nonetheless, the ship is worthy of respect in the AMA gas classes. I have only a biased opinion about why the ship flies so well, but I am ready to share with anyone who seems interested.

Since you have read this far, I assume that you are interested, so here goes: The Dixielander is a classic design for much the same reason that the Starduster is a classic design. It is simple to build and fly, and it flies extremely well regardless of the powerplant. It has a profile type fuselage that is simple to construct, it has rectangular wing and stabilizer planforms that are a cinch to build. The high pylon keeps the wing out of the prop wash, the rear fin controls the power of whatever engine you put on it, and the undercambered airfoil . . . although quite thick . . . provides a reasonable glide even though the wing area of the original is only 350 sq. inches. The only secret for controlling the power is the large amount of wing washin on the right wing main panel and the washout at both tips. This adjustment plus a C.G. at 100% and lightweight construction give this ship the competitive edge.

I fly my original Dixie with an old O.S. Max III plainbearing engine using a 7-1/2 x 4 fiberglass prop on 35% nitro fuel, and it climbs with the best of the A ships in the area. The B class version that I fly has an O.S. Max .25 plainbearing engine, but it has a 370 sq. inch wing and a one-inch longer tail moment than the A version. Both grab a great deal of altitude and have only average glide characteristics . . . due in part to their weight.

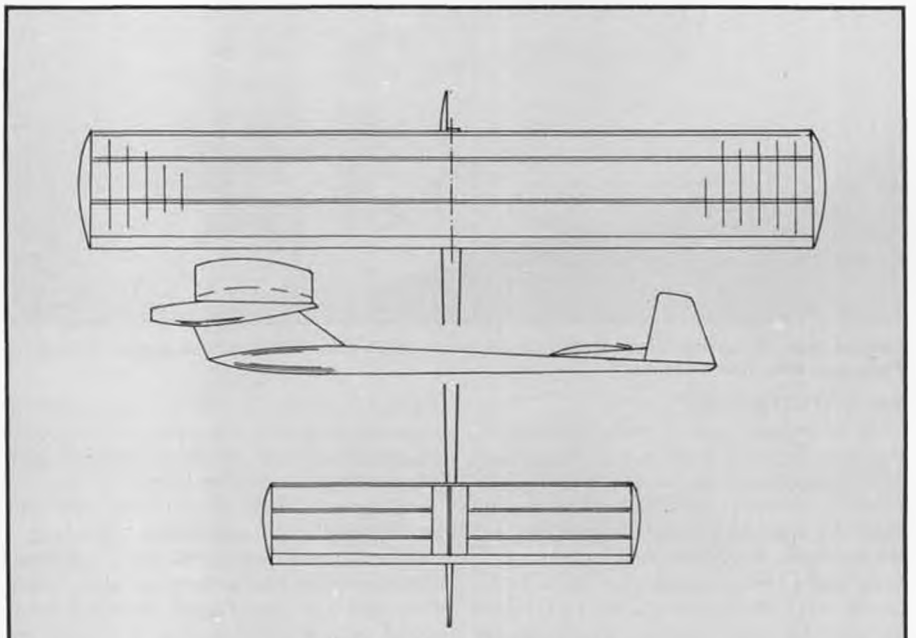
Well, all of this is just to introduce this month's three-view . . . the Dixie '88 by Peter Lloyd of Australia. So, let's get to it.

DIXIE '88 Open Power Model
by Peter Lloyd

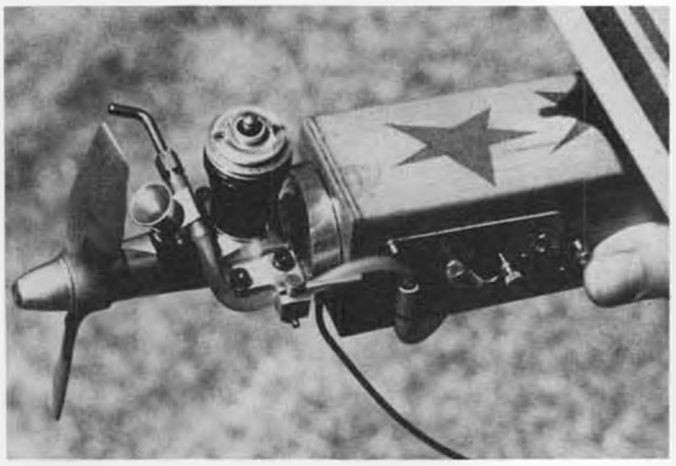
This article first appeared in the "Bat Sheet," the longstanding newsletter of the Kent Strat-O-Bats.

The genesis of this model began in 1955 or '56 when one George Fuller preached the gospel according to Dixielander and promptly converted the masses to a whole new religion . . . "The small Open Power model."

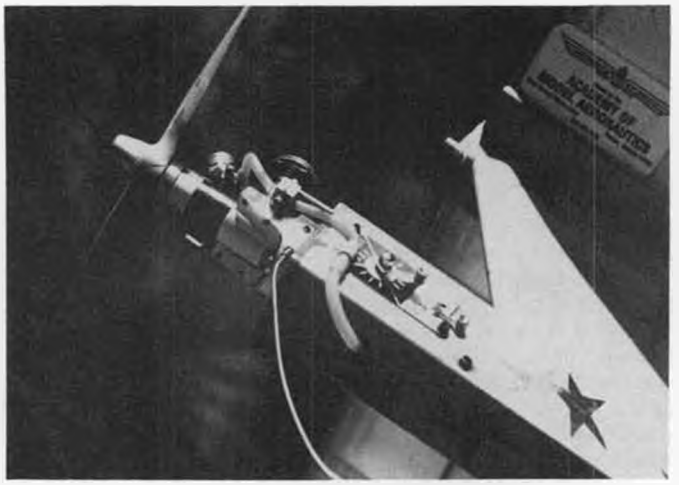
For the beginner, the Dixielander has much to commend it; simple to build, easy to trim, and capable of handling a diverse range of engines . . . so why fiddle with the design? The answer to that is simple . . . I wanted something different. Likewise, I'm



MARCH MYSTERY MODEL



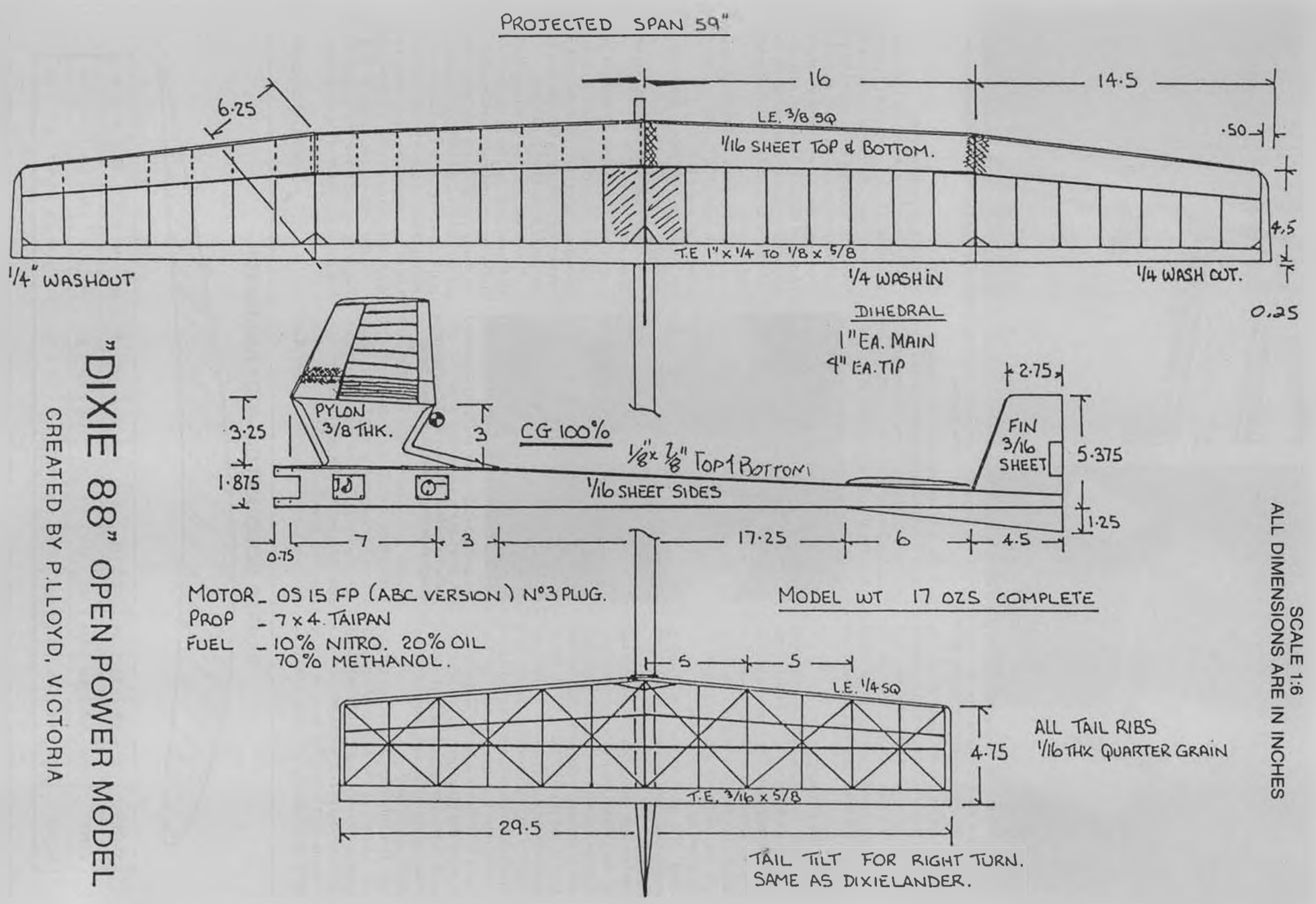
Beecroft's T.D. .049 mounted in the Top Banana. Note the counter sunk allen screw on the spinner, and the K.K. #512 needle valve assembly—"a vast improvement over the standard Kim-Kraft type needle," according to Bob.



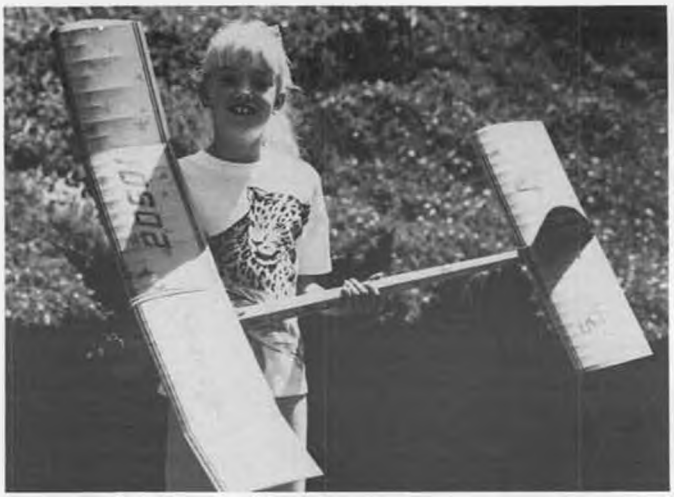
Underside of Beecroft's Top Banana. Fuel shut-off block was constructed by Bill Lynch allows fuel to be shut off during starting. Pacifier mounted in fuselage cavity that is K&B Super Poxy linded for fuel proofing.

"DIXIE 88" OPEN POWER MODEL

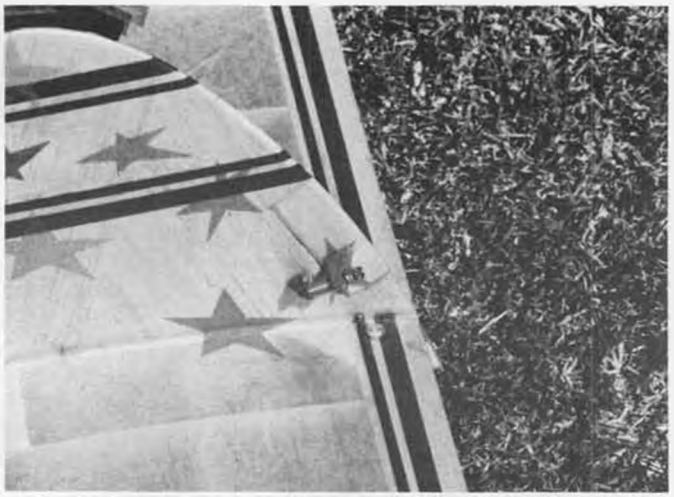
CREATED BY P.LLOYD, VICTORIA



SCALE 1:6
ALL DIMENSIONS ARE IN INCHES



Bob Beecroft's daughter, Ashley, poses pretty with Dad's Top Banana. Ashley is seven years old and has a great big smile.



Beecroft's Top Banana Nostalgia model fin. Note the screw adjustment for the trim tab.

not stupid either, so my approach to this model was to take what was already proven and rearrange it. Yes, it looks different, but take it as fact that the wing, tail and fin areas, wing-to-tail moment, dihedral angles, thrust lines, and CG position are identical.

Here are the changes:

Fuselage: Top and bottom longerons and spacers are from 7/8 X 1/8 thick sheet with 1/16 sheet sides. The engine and D.T. timers are arranged as shown to assist in balancing the finished model. The pylon height was reduced and constructed of three layers of 1/8 sheet balsa.

Wing: The wing section was changed from the basic NACA 6409 to NACA 4409 (thinner) but lost something in the translation to finish up with what is presented here. The D-Box construction method was chosen for strength, and the small amount of undercamber is reduced to a flat-bottom section at the tip. The Wing T.E. is swept forward 1/4 inch and tapers in width from 1" to 5/8". One-eighth square spruce spars are used top and bottom and taper to zero from the dihedral break to the tip. The D-Box is 1/16 sheeting and 1/32 spar webs complete the structure. Each dihedral break is reinforced with 1/16 ply keepers. The two center rib bays are sheeted on the bottom surface only.

Tail: The tail airfoil is the basic Dixielander section at the 6 inch chord and proportionally reduced in thickness to suit the 4.75-inch tip chord. Both spars are from 1/8 square and while the bottom one is straight, the top one is actually curved to suit the L.E. sweep and not straight as drawn. Construction may be beyond some modelers to achieve, therefore, the simpler Dixielander style can be used instead. (Note: for anyone who wishes to build the

Jon and Mike Valdrow at the WMC Fall Annual F.F. meet. Jon is a successful Junior F.F. contestant in the N.W. Model is the T-Bird Nostalgia design as built by Mike. Pix by Mark Sexton.

regular rectangular Dixie stabilizer, the dimensions are: 27-inch span by 6-inch chord. Rib spacing is two inches. No diagonals are used. The tips are 1/2-inch each side using the Starduster style of construction. The stabilizer rib shown on the three-view is accurate for either stabilizer plan-form.)

For the GO department:

The choice of motor to use can be vexing as there are so few decent 15s on the market (I have eliminated things like Rossi, Nelsons, CS, and Taipans as too costly and/or too heavy). You may wish to use a Cox Tee Dee .15 modified to take a glo plug, and old O.S. Max 15 or Magnum .15 (both baffle piston motors), but my choice is the new O.S. .15 FP series for the following reasons:

a. It is affordable at $85.00 Australian.

b. It is light at 127 grams . . . one gram more than the T.D. .15.

c. It is an ABC motor and Schnuerle ported.

d. It has reasonable power output (.45 bhp).

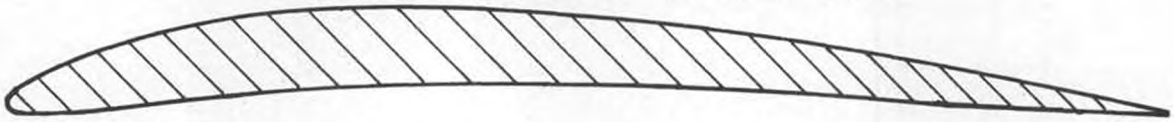
e. I was not paid to say these things.

Whatever motor you use, I would strongly suggest running it on pressure to prevent it from cutting out when using the *Energetic Launching Technique.*

The model has not demonstrated any serious vices so far. Yes, it has been DT'ed under power and even launched left, so if you want to walk on the wild side for awhile, this model will point you in the right direction. P.S. If you are contemplating building a Dixielander, note where I have put the engine (yes, it's up front, wise guy!), approximately 1/3 of the engine is to the rear of the wing L.E. and not finishing on the L.E. as the original Dixielander plans show. This cuts down the

Continued on page 103

DARNED GOOD AIRFOIL—GOTTINGEN 155



STATION	0	1.25	2.5	5.0	7.5	10	15	20	25	30	40	50	60	70	80	90	100
UPPER	0.83	2.54	3.32	4.64	5.69	6.63	7.96	8.67	9.34	9.23	8.67	7.60	6.02	4.20	2.19	1.19	0.40
LOWER	0.83	0.00	0.06	0.22	0.55	0.77	1.38	1.88	2.32	2.49	2.43	2.21	1.66	1.11	0.28	0.11	0.00

B.F.M. BOSTONIAN

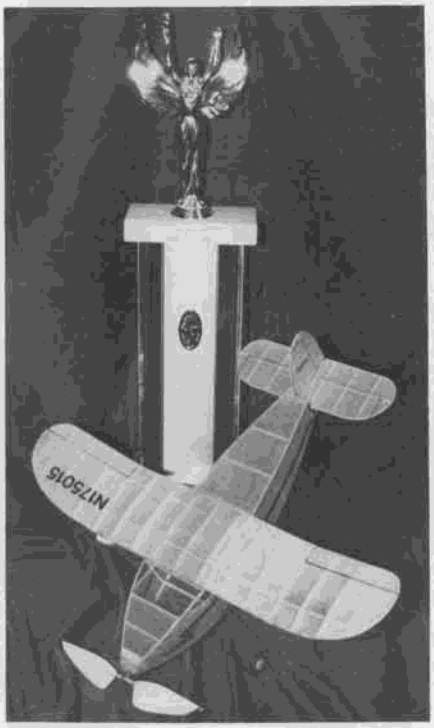
★ ★ ★ CELTIC ★ ★ ★

DON DE LOACH releases his recent Nat's winner—so pick your weight/classification and let's get building!

• When I designed this Bostonian back in May of 1987, I had no idea that it would ever boast such a renowned and illustrious career . . . including it's recent Nats win in indoor 14 gram Bostonian. My one prototype has gone through several modifications/improvements, and has become my mascot of modeling infamy. Read on.

If you'll remember, back in '87, most Bostonian builders stood behind the theory that "skinny" was better than "broad." That is, that less induced drag occurred with a narrow fuselage, as opposed to a wide one. For those of you who are wondering why a Bostonian fuselage is either "tall and skinny" or "broad and flat," let's look to the rules. The rule regarding fuselage volume is our focus. This particular rule states that the fuselage has to be big enough, at one point, to enclose a "theoretical box" measuring at least 1-1/2 x 2-1/2 x 3 inches or greater. This means that designers may choose to enclose the theoretical box in any way they wish. Like I said, until recently, most designers chose the "tall and skinny" configuration, resulting in what they claim is the best choice aerodynamically.

The B.F.M. . . . almost anyone could build and fly it with excellent results.

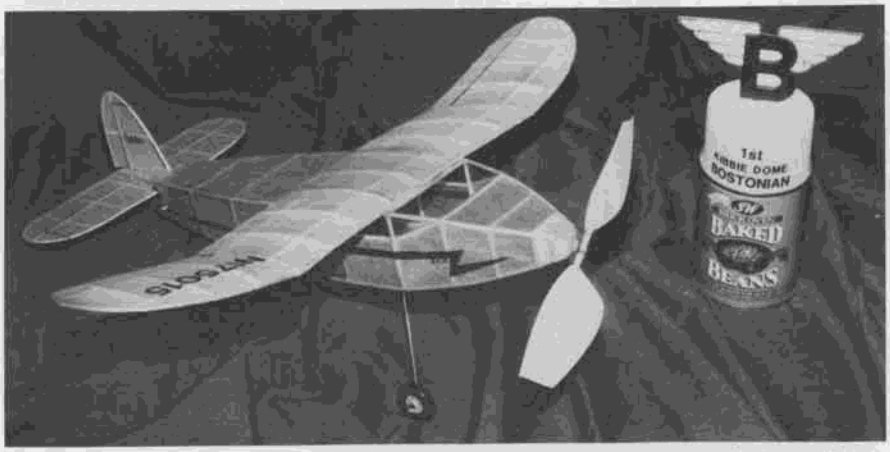


Recent Nats winner—indoor 14 gram Bostonian and trophy. The B.F.M. was originally designed for "West Coast" rules.

Well, after seeing my model fly, I think you'd agree that induced drag on a "Broad Bostonian" isn't so bad after all. The "B.F.M." flies like a dream; with excellent stability and outstanding duration capability. I believe the design could be further improved. I have planned a B.F.M. II with a slightly longer nose, an uncambered airfoil, and a fuselage profile that is flat-bottomed instead of symmetrical! Go for it!

The B.F.M. was originally intended and designed for the "West Coast" (14 gram) rules. The plan is drawn accordingly, but I'm sure a lightened version built to seven grams would fly great, too. I feel the model is capable of winning contests in either class, so pick your weight classification, and let's get building.

Unless you are new to the concept of free-flight model building, or you want to learn some of my own techniques, you might as well skip this section and build the B.F.M. the way you like. One of the best



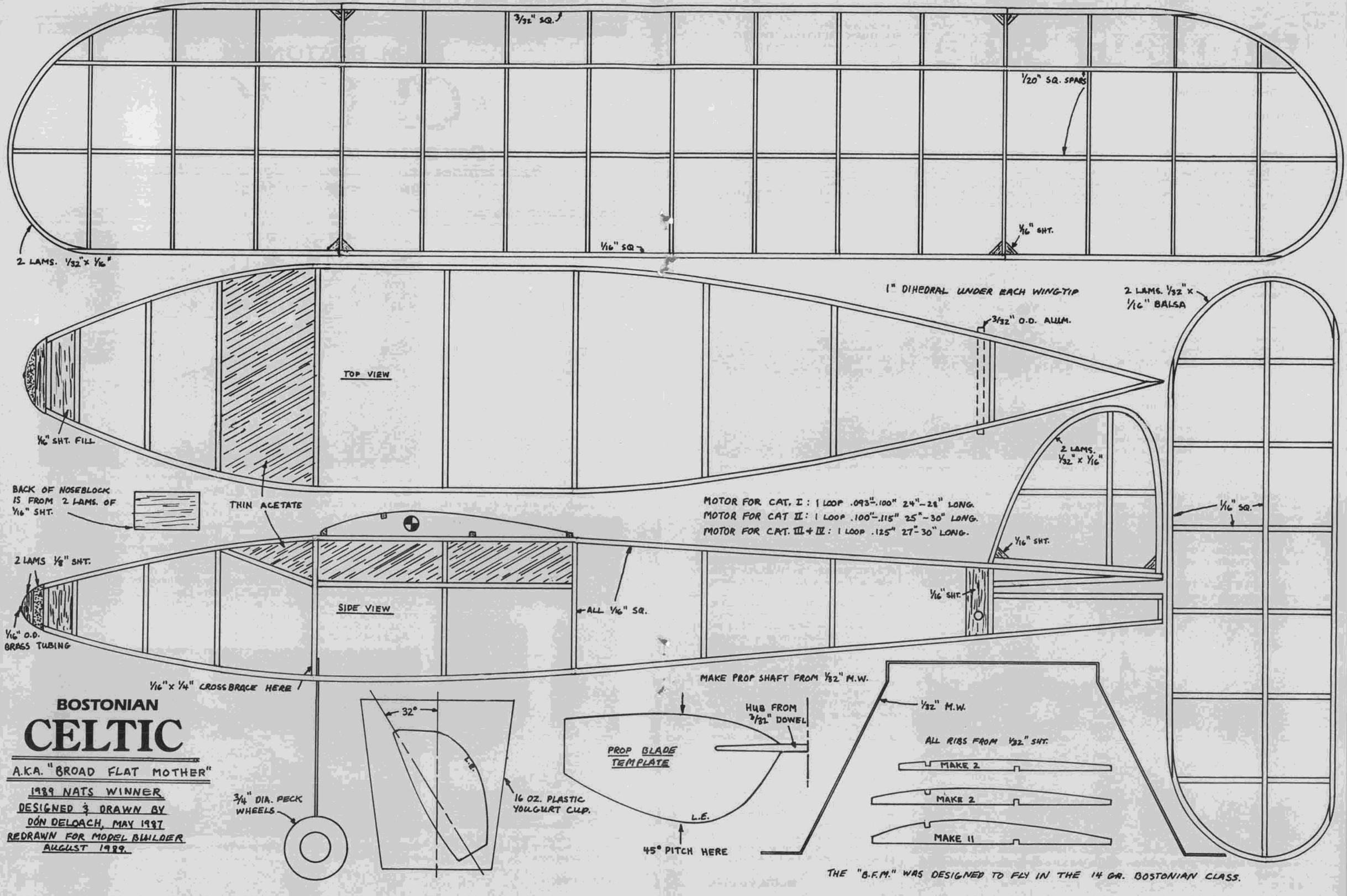
Don tells us "broad is best," with excellent stability and outstanding duration, the design could be even further improved.

BOSTONIAN
CELTIC

A.K.A. "BROAD FLAT MOTHER"

1989 NATS WINNER

DESIGNED & DRAWN BY
DON DELOACH, MAY 1987
REDRAWN FOR MODEL BUILDER
AUGUST 1989.



THE "B.F.M." WAS DESIGNED TO FLY IN THE 14 GR. BOSTONIAN CLASS.

Control Line

BY JOHN THOMPSON

TRIPLE TREAT

A new control-line contest series is under way in Southern California which is designed to provide three kinds of fun from a single, simple airplane.

The Southern California Foxberg Championship Series was scheduled to begin at a trial contest in January. It's a year-long six-meet series designed around a single, carefully restricted airplane type . . . the Goldberg Shoestring, Cosmic Wind or Buster profiles.

It's somewhat similar to the 12-year-old Northwest Sport Race Drizzle Circuit and the Texas Quickie Rat round robin racing series, but the SCFCS takes a somewhat broader approach: In addition to a racing event, each contest will feature a stunt event and a balloon bust event, all using the same airplane.

Kenn Smith, the new editor of *Direct Connection*, the newsletter of Southern California's Knights of the Round Circle, says:

"A lot of interest has been generated concerning this series of events and it looks like a lot of people are getting ready for the trial contest. . . .

"We've not attached the SCFCS to any specific club, preferring to sponsor the series on our own. We feel that a greater participation will be realized by not doing so. I'm a member of the Knights of the Round Circle and the Black Sheep Exhibition Squadron and have put on talks at each meeting. We plan to hold each contest at two or three different sites. We have three or four sites to choose from."

The series has published a very attractive rule book, complete with master copies of score sheets for the racing, stunt and balloon bust events.

The racing score sheet has places for the contestant's name, airplane type and number, two heat times, a feature race time, and a finish position.

The stunt score sheet has places for each maneuver, scored "attempt," "fair," "average," and "good." Maneuvers, which are split into two flights, include takeoffs, level upright flight, two inside loops, level inverted flight, two outside loops, a wingover, horizontal eights, vertical eights and landings.

The balloon bust score sheet has places for three attempt scores, including speed and, targets hit.

There's also a running score sheet for each contestant in each round of the series.

In case other clubs are interested in looking at such a concept for their regions, here are the rules:

SOUTHERN CALIFORNIA FOXBERG CHAMPIONSHIP SERIES 1990 RULES

General:

1. All current AMA regulations apply to this contest series except as amended below.

2. The purpose of this contest series is to promote fun, simple and friendly competition using established rules for each event and basic aircraft and equipment. It is the intent of this contest series to promote family participation through special activities on contest days such as picnics, novelty contests, potluck, and other events.

Note: It is *not* the intent of this contest series to become a complaining corner, a ventilation for your outside frustrations or a sounding board for anyone inclined to complain about every little rule infraction whether it affects the outcome of the event or not.

Unless it is obvious that a particular competitor has a declared advantage over other competitors, no infractions of the rules will be initiated by the contest officials.

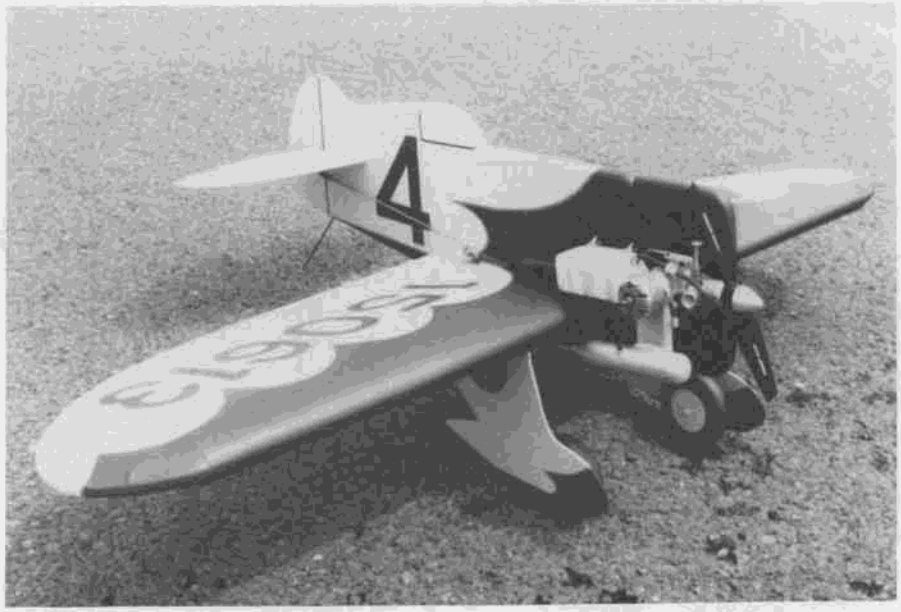
Rule infractions are to be brought to the attention of the contest officials by contest participants. After discussion of the infraction with the accused competitor, the contest director will make a determination which will stand with no additional discussion.

Concept:

1. The Southern California Foxberg Championship Series is an annual series of six contest dates spaced approximately two months apart. At each contest, three events will be available for competition; racing, stunt, and dive bombing. The racing rules are derived from the Dallas Model Aircraft Association Goldberg Racing Rules. The stunt rules are derived from the Old Time Stunt event rules generally in use across the United States. The dive bombing rules are taken directly from the current AMA regulations book.

2. At the completion of each contest, awards will be given to the first place junior of each event and to the first, second, and

Navy carrier fliers trade their "secrets." Wayne Spears (left) and Rick Wallace examine a nice-looking carrier plane at 89 NW Regionals.



A sport scale entry at the 89 NW Regionals. The Gee Bee has a slightly animated appearance.

third place senior/open combined in each event. Additional awards will be presented to the specialty, novelty, and theme event winners when held.

3. At the end of the series, a banquet will be held at which the series grand champion junior and senior/open trophies will be awarded. In addition, several other specialty awards will be presented at the banquet.

The airplane:

1. The same airplane must be used in each of the three events at a particular contest. A substitution will be allowed only in the event that the original airplane is wrecked.

2. The airplane must be a Carl Goldberg Shoestring, Cosmic Wind or Buster profile stunter or a direct copy. Substitution of kit wood is permitted but the part must be a duplication of the original.

3. Engine mounts and plywood doublers may be lengthened for strength but may not be increased or decreased in thickness.

4. Elevator horn doubler may be enlarged and/or placed on both sides for strength.

5. All remaining items must be per the kit, including rudder offset (3/8") and line sweep. Engine offset is optional.

6. No additional wing sheeting will be allowed. Wing airfoil and fuselage thickness must remain unchanged.

7. Landing gear must be of the two-wheel, side-by-side type with a minimum of five inches between the wheels. Wheels must be at least two inches in diameter. Tail wheels are allowed.

8. The finish must be colorful and representative of a real race plane with the canopy either a contrasting color or outlined in a contrasting color. Racing numbers shall be placed on each side of the fuselage and upper side of left wing. Decals furnished with the kit are recommended but are not mandatory.

9. The engine must be a stock Fox .35 stunt engine, #13500, with *absolutely no alterations.* The piston and cylinder may be deburred to prevent excessive wear. Needle valve assembly shall be stock Fox .35 stunt with no modifications. Skids to protect the needle valve are permitted. Needle valve stems may be shortened to prevent damage. All engines are subject to disassembly to verify legality.

10. The fuel tank shall be a stock, manufactured, 1-1/4 oz. stunt tank with a single fuel feed tube and a top and bottom vent tube. No uniflow, no pressure systems, no quick-fill systems, no fuel shutoffs or other special fuel supply systems are allowed.

11. Fuel with 10% nitromethane and 25% castor oil will be provided for the racing event only. The contestant will provide fuel of his or her choice for other events.

12. Any commercial glow plug is permitted. No hot gloves, electric or mechanical starting devices are allowed.

13. Only unmodified 10x6 Master Airscrew propellers will be allowed. Deburring and flashing removal will be permitted. The trade name and size markings must be easily read.

14. Control lines shall be .018-inch diameter and 60 feet long, plus or minus 6 inches as measured from center line of airplane to center of handle.

15. Entire model and control system must withstand a 25-pound pull test.

16. Prior to the start of each contest, a pilots' meeting will be held to regulate contest conditions, announce special site rules, answer questions or discuss other important issues pertaining to the contest at hand.

A proud Bob Furr of Omaha and a "stretched" combat Streak powered by a very quiet HP21 4-cycle engine. Can't be heard at 100 ft. away!

17. Immediately after the pilots' meeting, all participating aircraft will be put on display for inspection by the competitors to determine conformance to the rules.

Any violation of the rules that can be determined during this inspection time must be brought to the attention of the contest officials prior to the start of the contest. No protests concerning aircraft legality as described above will be recognized after the first flight of the contest has begun.

18. All engines of prize-winning aircraft are subject to tear down and inspection. New gasket kits *will not* be furnished by the SCFCS. If there is a disqualification, the teardowns will progress to the next place winners.

The racing event:

1. The circle layout shall be 60 feet for the inner circle and 76 feet for the outer circle.

2. The pit crew may consist of no more than two people at any one time.

3. Qualifying heats:

a. Each heat race shall consist of three fliers until only two or four fliers are left. If there are four fliers remaining for the last two races, then the last two races will consist of two fliers each.

b. Each flier will fly two heat races back-to-back and the fastest time of the two heats will be used to determine their finishing position.

c. Each heat race will consist of 70 laps back-to-back with two minutes between heats. Two mandatory pit stops are required in each 70-lap race. If an entrant completes 70 laps without making the required number of pit stops, the time shall continue until the required number of pit stops have been completed, and the plane has then flown one additional lap.

d. The six fastest qualifiers shall advance to the final heats.

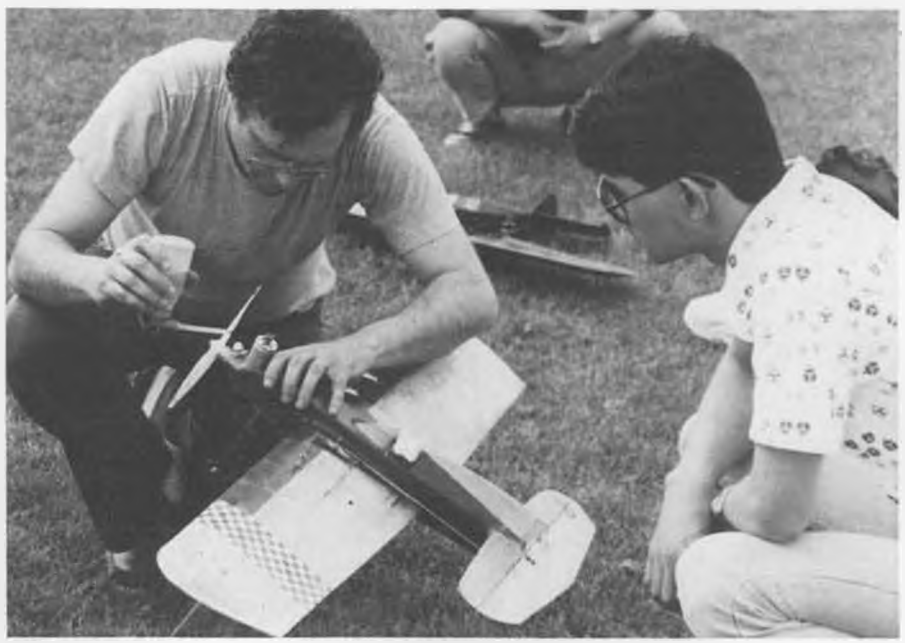
4. Final heats:

a. Two final heat races of three fliers each will be flown to determine the finishing positions of the six finalists.

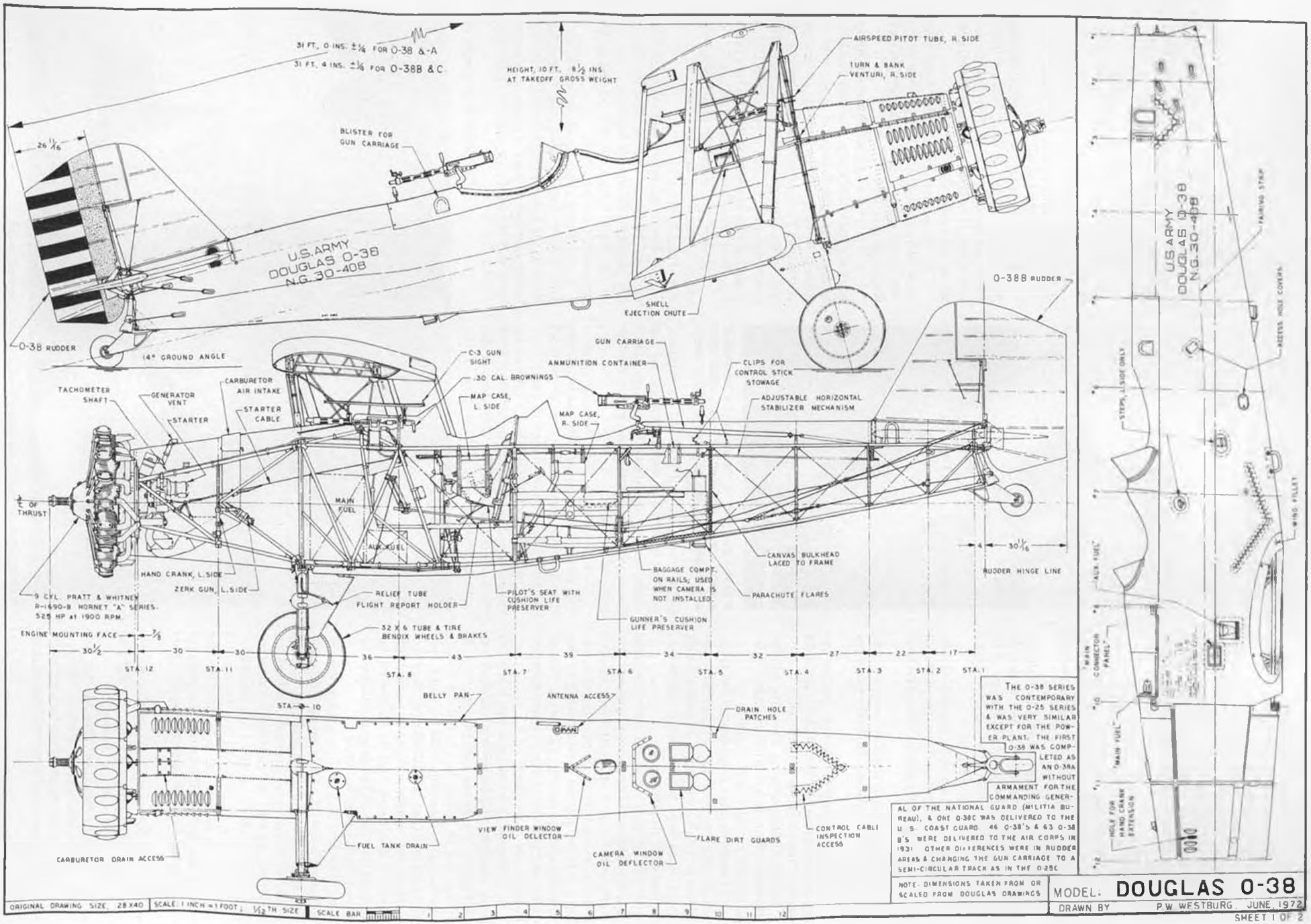
b. Each final heat will consist of 140 laps with four pit stops.

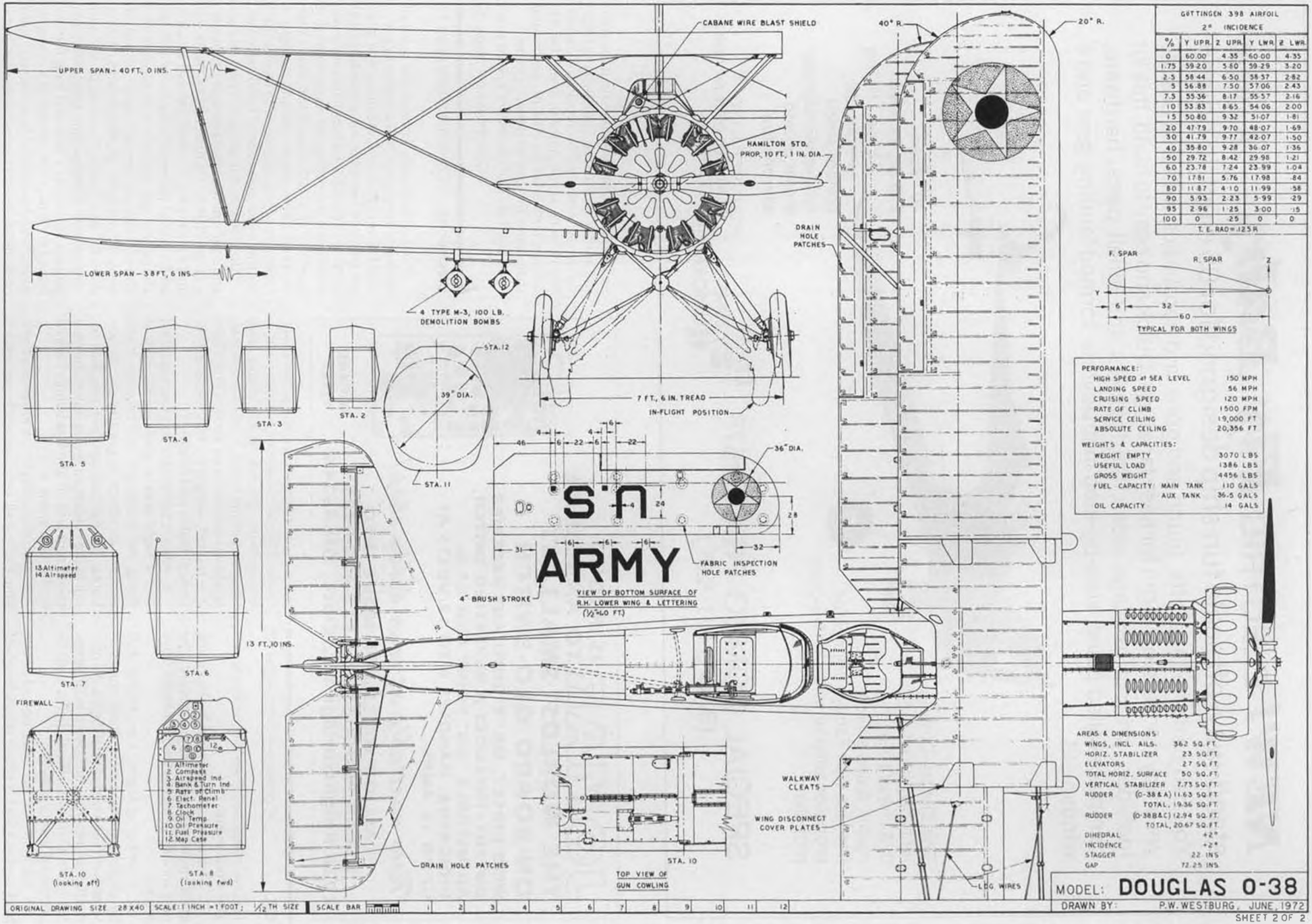
5. All flying shall be done between 6 and 20 feet. Aircraft being overtaken shall drop to the lower elevation until the overtaking aircraft is past. Failure to comply with the above flying criteria shall draw

Continued on page 60



Nathan Sturman and Y. Funasu fire up a diesel-powered plane.


31 FT. 0 INS. ±1/4 FOR O-38 & -A
31 FT. 4 INS. ±1/4 FOR O-38B & C
HEIGHT, 10 FT. 8 1/2 INS. AT TAKEOFF GROSS WEIGHT
AIRSPEED PITOT TUBE, R. SIDE
TURN & BANK VENTURI, R. SIDE
BLISTER FOR GUN CARRIAGE
26 1/16
U.S. ARMY DOUGLAS O-38 N.G. 30-408
SHELL EJECTION CHUTE
O-38B RUDDER
O-38 RUDDER
14° GROUND ANGLE
GUN CARRIAGE
C-3 GUN SIGHT
AMMUNITION CONTAINER
.30 CAL. BROWNINGS
CLIPS FOR CONTROL STICK STOWAGE
TACHOMETER SHAFT
GENERATOR VENT
STARTER
CARBURETOR AIR INTAKE
STARTER CABLE
MAP CASE, L. SIDE
MAP CASE, R. SIDE
ADJUSTABLE HORIZONTAL STABILIZER MECHANISM
E OF THRUST
MAIN FUEL
AUX. FUEL
CANVAS BULKHEAD LACED TO FRAME
30 1/16
RUDDER HINGE LINE
HAND CRANK, L. SIDE
ZERK GUN, L. SIDE
9 CYL. PRATT & WHITNEY R-1690-B HORNET "A" SERIES. 525 HP at 1900 RPM.
RELIEF TUBE FLIGHT REPORT HOLDER
PILOT'S SEAT WITH CUSHION LIFE PRESERVER
BAGGAGE COMPT. ON RAILS; USED WHEN CAMERA IS NOT INSTALLED.
PARACHUTE FLARES
GUNNER'S CUSHION LIFE PRESERVER
ENGINE MOUNTING FACE
7/8
32 X 6 TUBE & TIRE BENDIX WHEELS & BRAKES
30 1/2 | 30 | 30 | 36 | 43 | 39 | 34 | 32 | 27 | 22 | 17
STA. 12 | STA. 11 | STA. 10 | STA. 9 | STA. 8 | STA. 7 | STA. 6 | STA. 5 | STA. 4 | STA. 3 | STA. 2 | STA. 1
BELLY PAN
ANTENNA ACCESS
DRAIN HOLE PATCHES
DRAIN
CARBURETOR DRAIN ACCESS
FUEL TANK DRAIN
VIEW FINDER WINDOW OIL DEFLECTOR
CAMERA WINDOW OIL DEFLECTOR
FLARE DIRT GUARDS
CONTROL CABLE INSPECTION ACCESS
THE O-38 SERIES WAS CONTEMPORARY WITH THE O-25 SERIES & WAS VERY SIMILAR EXCEPT FOR THE POWER PLANT. THE FIRST O-38 WAS COMPLETED AS AN O-38A WITHOUT ARMAMENT FOR THE COMMANDING GENERAL OF THE NATIONAL GUARD (MILITIA BUREAU), & ONE O-38C WAS DELIVERED TO THE U. S. COAST GUARD. 46 O-38's & 63 O-38B's WERE DELIVERED TO THE AIR CORPS IN 1931. OTHER DIFFERENCES WERE IN RUDDER AREAS & CHANGING THE GUN CARRIAGE TO A SEMI-CIRCULAR TRACK AS IN THE O-25C
NOTE: DIMENSIONS TAKEN FROM OR SCALED FROM DOUGLAS DRAWINGS
MODEL: DOUGLAS O-38
DRAWN BY P.W. WESTBURG. JUNE, 1972
SHEET 1 OF 2
ORIGINAL DRAWING SIZE, 28 X 40 | SCALE: 1 INCH = 1 FOOT; 1/12TH SIZE | SCALE BAR 1 2 3 4 5 6 7 8 9 10 11 12
U.S. ARMY DOUGLAS O-38 N.G. 30-408
FAIRING STRIP
ACCESS HOLE COVERS
STEPS, L. SIDE ONLY
WING FILLET
AUX. FUEL
MAIN CONNECTOR PANEL
MAIN FUEL
HOLE FOR HAND CRANK EXTENSION



GÖTTINGEN 398 AIRFOIL
2° INCIDENCE

%	Y UPR.	Z UPR.	Y LWR.	Z LWR.
0	60.00	4.35	60.00	4.35
1.75	59.20	5.80	59.29	3.20
2.5	58.44	6.50	58.57	2.82
5	56.88	7.50	57.06	2.43
7.5	55.36	8.17	55.57	2.16
10	53.83	8.65	54.06	2.00
15	50.80	9.32	51.07	1.81
20	47.79	9.70	48.07	1.69
30	41.79	9.77	42.07	1.50
40	35.80	9.28	36.07	1.36
50	29.72	8.42	29.98	1.21
60	23.78	7.24	23.99	1.04
70	17.81	5.76	17.98	.84
80	11.87	4.10	11.99	.58
90	5.93	2.23	5.99	.29
95	2.96	1.25	3.00	.15
100	0	.25	0	0

T. E. RAD = .125 R

PERFORMANCE:

HIGH SPEED at SEA LEVEL	150 MPH
LANDING SPEED	56 MPH
CRUISING SPEED	120 MPH
RATE OF CLIMB	1500 FPM
SERVICE CEILING	19,000 FT
ABSOLUTE CEILING	20,356 FT

WEIGHTS & CAPACITIES:

WEIGHT EMPTY		3070 LBS
USEFUL LOAD		1386 LBS
GROSS WEIGHT		4456 LBS
FUEL CAPACITY	MAIN TANK	110 GALS
	AUX TANK	36.5 GALS
OIL CAPACITY		14 GALS

AREAS & DIMENSIONS:

WINGS, INCL. AILS.		362 SQ. FT.
HORIZ. STABILIZER		23 SQ. FT.
ELEVATORS		27 SQ. FT.
TOTAL HORIZ. SURFACE		50 SQ. FT.
VERTICAL STABILIZER		7.73 SQ. FT.
RUDDER	(O-38 & A)	11.63 SQ. FT.
	TOTAL,	19.36 SQ. FT.
RUDDER	(O-38B & C)	12.94 SQ. FT.
	TOTAL,	20.67 SQ. FT.
DIHEDRAL		+2°
INCIDENCE		+2°
STAGGER		22 INS.
GAP		72.25 INS.

ORIGINAL DRAWING SIZE 28 X 40 | SCALE: 1 INCH = 1 FOOT; ½TH SIZE | SCALE BAR 1 2 3 4 5 6 7 8 9 10 11 12

MODEL: **DOUGLAS O-38**

DRAWN BY: P.W. WESTBURG, JUNE, 1972

SHEET 2 OF 2

C/L ..... *Continued from page 57*

two warnings and then disqualification.

The stunt event:

1. The same aircraft used in the racing event must be used in the stunt event. The only modification allowed is needle valve setting.

2. Number of flights: Contestants shall be permitted (time permitting) three attempts to make two official flights. All official flights are to be considered as attempts. No more than two official flights shall be permitted each contestant.

3. Each official flight shall consist of two back-to-back flights of two separate sets of maneuvers as shown on the score sheet. (Note: Flight 1 consists of Airborne within one minute, takeoff, level upright [two laps], two inside loops, level inverted [two laps], two outside loops and landing. Flight 2 is takeoff, wingover, horizontal eights, vertical eights and landing.)

4. After a contestant has been notified that a flight area is available for official flying, the contestant shall be given three minutes in which to get the aircraft airborne. Failure to accomplish this shall result in the contestant giving way to the next contestant and an attempt being charged to the flier giving way.

5. Duration of flights: A 10-minute flight time limit shall be given each contestant including the three-minute limit for starting as specified above. Judging is to begin following release of the aircraft for takeoff. Maneuvers accomplished after the 10-minute limit shall receive no points and shall cause the loss of pattern points.

6. Scoring: The contestant's point score

Continued on page 92

Electronics . . . *Continued from page 11*

It is not generally known, but a lot of receivers are graded by the maker as low—band and high-band, meaning that they are adjusted for optimum operation at that portion of the 72 MHz band. In some cases it is merely the tuning; all receivers of that type being tuned to a certain mid-range channel. With some designs though, a capacitor or two may need to be changed for optimum operation at band extremes.

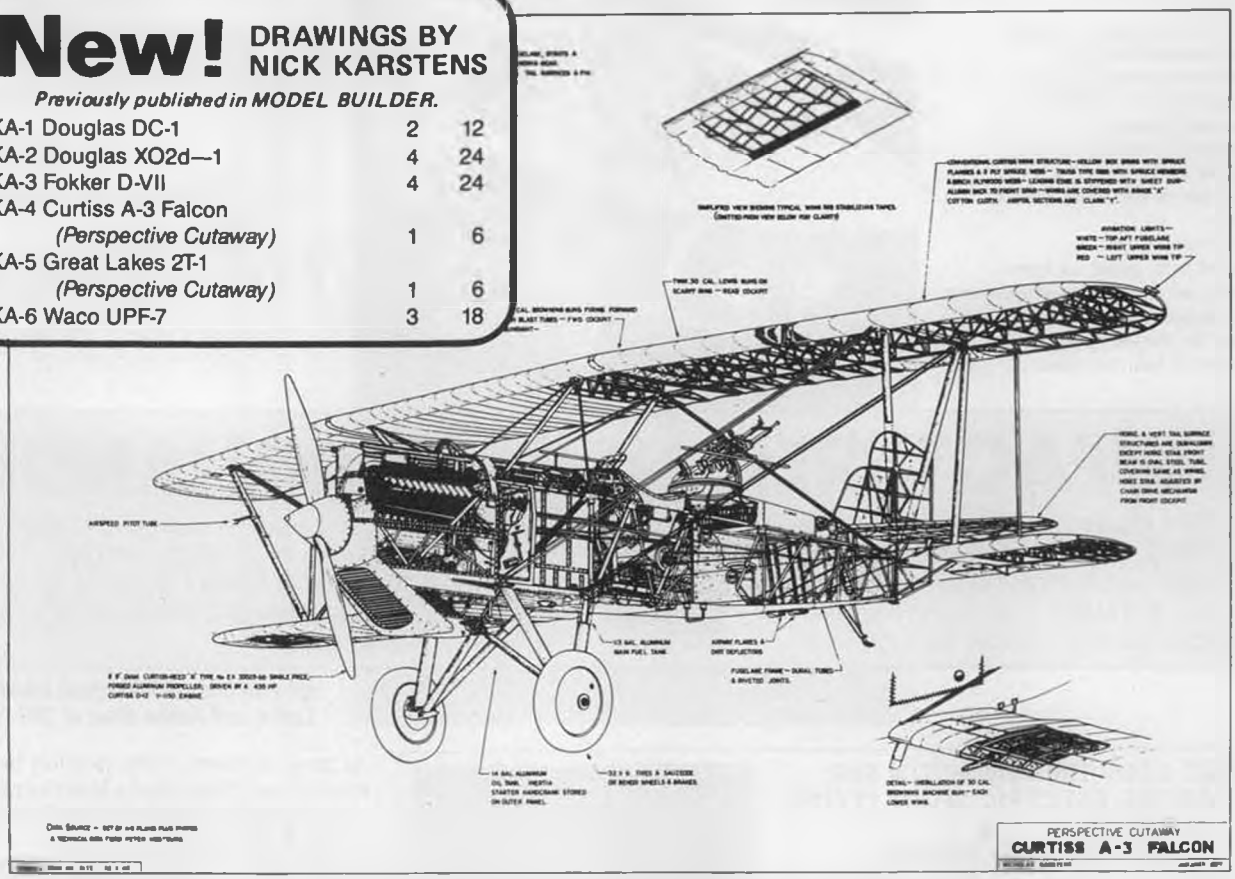
After making the proper crystal change and confirming acceptable operation with a range check, it is time to bite the bullet and fly. Keeping in mind that old aviation advice about the worthlessness of altitude above you, get as much as possible *under* you as fast as you can, and don't get too far away. With plenty of altitude and circling directly overhead, make your second range check. Collapse the transmitter antenna a section at a time and look for any loss of control as the attitude of the model varies. You should be able to maintain solid control under those conditions with but a

Peter Westburg's
SCALE VIEWS

New! DRAWINGS BY NICK KARSTENS

Previously published in MODEL BUILDER.

KA-1 Douglas DC-1	2	12
KA-2 Douglas XO2d—1	4	24
KA-3 Fokker D-VII	4	24
KA-4 Curtiss A-3 Falcon *(Perspective Cutaway)*	1	6
KA-5 Great Lakes 2T-1 *(Perspective Cutaway)*	1	6
KA-6 Waco UPF-7	3	18



SUPER-ACCURATE AIRCRAFT DRAWINGS. USE FOR SCALE DOCUMENTATION AND/OR FOR DEVELOPING MODEL CONSTRUCTION PLANS. ALL DRAWINGS ARE 28 x 40 INCHES BORDER- TO-BORDER, AND ARE SCALED AS LISTED BELOW.

1/24 scale: ½" = 1 ft.	No. of Shts.	$
WE-18 Douglas O-35/B-71	1	6
WE-23 Douglas XO-36/XB-7	1	6
1/12th scale: 1" = 1 ft.		
WE-2 Boeing F4B-4/-3	4	24
WE-3 Boeing P-12E	3	18
WE-4 Curtiss A-8 Shrike	3	18
WE-7 Curtiss Gulfhawk 1A	2	12
WE-8 Curtiss N2C-2 Fledgling	4	24
WE-9 Curtiss O-1B/A-3 Falcon	3	18
WE-10 Curtiss P-1B Hawk	3	18
WE-12 Curtiss XP/YP-23	3	18
WE-13 Curtiss SBC-4 Helldiver	4	24
WE-14 Czech Avia B-534	2	12
WE-15 Davis D-1K	2	12
WE-16 Douglas O-25C	3	18
WE-17 Douglas O-31A/O-31B	3	18
WE-19 Douglas O-38/O-38B	2	12
WE-20 Douglas O-43A	3	18
WE-21 Douglas O-31C/Y10-43	3	18
WE-22 Douglas O-46A	3	18
WE-25 Fokker D-17	3	18
WE-26 General Western Meteor	1	6
WE-28 Grumman F2F-1	3	18
WE-29 Grumman F3F-2	3	18
WE-34 Stearman 4E Mailplane	2	12
WE-36 Travel Air 2000	2	12
WE-37 Waco ATO Taperwing	2	12
1/10 scale: 1.2" = 1 ft.	Shts.	$
WE-1 Berliner/Joyce P-16	4	24
WE-5 Curtiss BFC-2 Goshawk	4	24
WE-6 Curtiss F9C-2 Sparrowhawk	4	24
WE-11 Curtiss P-6E Hawk	4	24
WE-24 Fiat CR-32	3	18
WE-27 Great Lakes Trainer	4	24
WE-30 Hawker Fury Mk I	4	24
WE-31 Hawker High Speed Fury	3	18
WE-32 Hawker Persian Fury	3	18
WE-33 Monocoupe 90A	2	12
WE-35 Swedish Sparmann P-1	2	12

ORDERING INSTRUCTIONS (Minimum order: $10.00)

U.S. orders, including APO and FPO, add 20% of total order for shipping and handling. Overseas orders (includes Canada and Mexico) add 50% of total order. Remit payment by International Money Order or U.S. funds, drawn on a U.S. bank. Please, no cash or C.O.D.s. Master Card or VISA include card number, expiration date, and signature. Add 5% to credit card orders. Send payment to RCMB INC., 898 West 16th St., Newport Beach, CA 92663. Phone (714) 645-8830.

CALIFORNIA RESIDENTS ADD 6% SALES TAX

single section of antenna extended. This is also a good test to make with a new system or periodically to assure yourself that the performance at either end is not deteriorating.

You will find that quite often, you can fly consistently even though your equipment does not quite come up to standards during either one of the two range checks described. And you can probably fly that way for a while, but the system will let you down someday on a long low approach or when some not too clean transmitter fires up on an adjacent channel. The making of range and control checks are good habits to have. If you are an instructor, how about stressing them to your students?

WE WON ONE; ALMOST! I don't remember reading anything about it in the model press, but it has been common knowledge amongst the R/C equipment companies that a concern named Robinson Engineering Company, a manufacturer of industrial cranes, had filed a petition to the Federal Communications Commission requesting permission to use our 75 MHz (Non-flying model) frequencies for remote operation of their equipment, which they were already doing and selling to end users. This action took place last January (1989) and we've all been waiting with more or less bated breath for the outcome.

As soon as word of this petition became known, our AMA filed a letter of opposition through its attorneys, and everyone settled back to wait.

And wait . . . as the FCC is not exactly famous for its speed in making rulings in such cases. In all fairness, however, we must remember that there are more important uses of radio services, than the running of R/C cars which affect and contribute to all of us. The major concern here was the setting of a precedent, the almost certain knowledge that if the Robinson Company was granted the use of R/C 75 MHz frequencies, it wouldn't be long before other commercial users began asking for permission to use it . . . and of course to use our 72 MHz airplane channels as well.

The good news is that in late November, the FCC finally came through . . . with a cease and desist order to the Robinson Company. The bad news is that the same FCC order allows continued operation of the Robinson equipment already in use, until June 1993, under the condition that "such operation causes no harmful interference to the remote control of model surface craft or model aircraft." The AMA is investigating further in an effort to determine how the operation on R/C 75 MHz channels started in the first place, with an eye of course, to the prevention of similar occurrences in the future, and why it should now be allowed to continue at all.

Let's hope their efforts are successful; such actions by the FCC are important to

all of us and have a definite effect on our entire future. I know that it is difficult for us hobbyists to see such things objectively, being more than a little emotionally involved and often not knowing all the facts, but I find it hard to accept not making these crane operators change the frequency on their equipment to one they are legally authorized to use. After all, the cost of a frequency change should certainly be less than the cost of the damage possible to an out-of-control R/C car or boat at full speed, not to mention what such interference can do to an airplane!

We all owe a "Good On You" to our AMA for this action, and should remember such things when we feel the urge to criticize. Yes, it has done things I don't agree with, and probably will again. But then, I have found that if I really try, I can find fault with *anything!* Can't you?

In the meantime, if you have any thoughts or opinions on the subject, it is recommended that you channel them to AMA, as individual correspondence to the FCC does not seem to carry a lot of weight. Our contact man at AMA for this, and similar matters, is Bob Underwood, at (703) 435-0750.

PROPER SOLDERING is very important to the reliability and survival of your R/C model, and the subject has been mentioned here more than once, as has the proper choice of your soldering equipment, which too many modelers seem to purchase on the theory that if a little bit of heat is good, a lot of heat has to be better. This theory probably stands if you are soldering roofs or radiators, but not if you are working on R/C models where one soldering operation might involve No. 28 stranded wire and the next one a 1/16th piano wire throttle linkage. Both of these connections are important and must be done right the first time . . . often there is no second chance!

Obviously what is required is a soldering iron with a throttle . . . one on which the tip temperature can be set correctly for the task at hand. A visit to the nearest electronics store will expose one to a bewildering and confusing array of such instruments, from many manufacturers both foreign and domestic, and for a wide range of prices. I personally use an industrially rated iron which has all the latest "bells and whistles" for such devices, and which I enjoy thoroughly, but which cost over $250. The more casual user should not have to make such a high investment nor have to spend time shopping and comparing . . . and now no longer has to. The American made Ungar Electronic Solder Systems, as well as other products of the same name, are now available through normal model distribution channels, which puts them as handy as your favorite hobby shop.

Pictured here is the Ungar UTC 200, adjustable from 400 to 800 degrees Fahrenheit, which will readily accept different tips for different soldering requirements, and furthermore has a fully grounded tip, a strict requirement for soldering of all static conscious CMOS devices, including those MOSFETs found in all electronic speed controls. What's more, it won't cost an arm and a leg; the suggested retail price is $109.95, but we all know about discounted pricing; I would imagine the real price will be less than $100. I can promise you that if you are seriously into working on electronic equipment and are still using a fixed temperature iron, you are doing the equivalent of flying on reeds. Do yourself a favor and try one of these adjustable temperature beauties.

Your dealer can obtain this and other Ungar products from Horizon Hobby Distributors, 3102 Clark Rd, Champaign, Illinois 61821; (217) 352-1913.

BATTERY DEVELOPMENT continues, and no wonder, it seems that it is difficult to pick up a consumer product that does not require a battery of some sort in order to operate. An interesting development, with possible R/C applications, comes from an old name in battery technology, Gould Electronics, which recently introduced its "Powerdex" series of batteries. These are described as ultra-thin, ultra-light, high energy lithium batteries. Ultra-thin it is, with one version being as thin as 0.04 inches; ultra-light it is also, with weights around one ounce.

Take a look at the enclosed drawing, a sketch of the Powerdex V/P 6/1400 battery, a six-volter which has obvious applications as power for R/C equipment. Because of its physical shape, it'll fit into places we don't generally think of as suitable for battery installations. There is a big negative,

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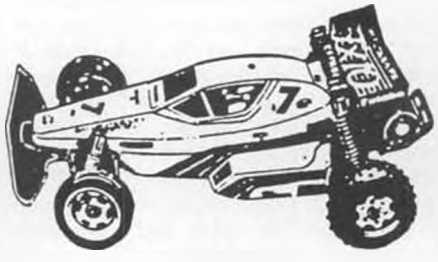

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however . . . the Powerdex is not rechargeable . . . but for certain specialized applications it might just make the difference between getting off the ground successfully or not doing so at all.

Obviously, the Powerdex batteries have more than a slight similarity to the more familiar Polariod battery available from that company for many years as power sources for its cameras. I don't know if this is the same battery under a different label, but we need not concern ourselves with who in the battery world is doing what to whom, only with what they are making that can be useful for our use.

The V/P 6/1400 is rated at six volts, with a rated capacity of 1.4 amperes, at up to .15 amps continuous drain. Most airborne R/C equipment will operate at six volts without any adverse effects, though if necessary, a single power diode in series with the battery will drop the voltage down to a more nominal Ni-Cd pack level of 5.25 volts. No data was furnished on the voltage regulation at specified drains, but if the battery will stand 150 milliamps continuous, it should hold up acceptably well under the greatly intermittent loads imposed on it by an R/C system, even though at times the drain might be higher. Naturally, fully stalled servos are to be avoided, as they will pull three or four times that amount . . . but then, fully stalled servos are not ever recommended, regardless of the battery.

Note too, the discharge curves at 100 and at 150 mils, and note the operating times in hours before the voltage decays down to an R/C critical 4.4 volts. Remember that this is not any sort of an indication of operating time, since average current drain differs greatly from one airplane to another, but the charts can give you some idea of what is to be expected in the way of battery life in a specific application.

The Powerdex series is obviously not the answer to all of our R/C equipment power needs, but they do have some interesting possibilities. I remember some time back hearing from a reader who was getting double duty from similarly flat Polaroid batteries . . . they were serving as horizontal tail surfaces in addition to providing the necessary electrons. Tinkering is what got this hobby where it is today, let's not stop now!

Eloy Marez, 2626 W. Northwood, Santa Ana, California 92704. •

Jet Trails ..... *Continued from page 21*

Phantom which didn't appear to be set up very well and the model's performance suffered as a result. Alex Cornish Trestrail now has his second MIG 29 up and flying and a fine performer it is. He also brought along his third prototype this time, a two-seater version. Although fresh out of his own moulds, it really looks the part with development work focused on an all-flying tailplane system to give pitch as well as roll control. These models use the OS 25 fan engines and modified Kress fans adapted to suit the increased horsepower of these engines over the earlier K&B 21s. Alex uses carburetor extensions on his motors, which places them outside the duct work and not only improves the airflow characteristics of the unit but equally makes fuel flow adjustments that much easier. The potential to produce a heavily loaded model dictates that it use a drop-off dolly undercarriage to reduce the airborne weight. The Mig is fully aerobatic in the skilled young hands of Paul Leighton, Alex's pilot, who can virtually stop the model in the air with the potentially damaging belly landings, the only real drawback to this type of system.

The meeting had its agonies and ecstasies and quite a few moments of humor. Try as he might, Phil Boyden and his friend just couldn't get their F-100 Sabres into the air. Normally the model is a really good flier and has a real "presence" in the air. Having failed to achieve any success, Phil resorted to hand launching his House of Balsa F-86 and on the fourth attempt received a resounding cheer from the crowd as the model skimmed the grass and proceeded to reward the crowd for their tolerance with a fine display of close-in flying. The nine-year old model, powered by a K&B 21 and Axiflow 20, was whisper quiet and smooth as silk, reminding the high tech merchants that this type of design is still lots of fun to fly. Phil thoroughly enjoyed himself.

Graham Preston, who organized the event, brought along his OS46 powered Thorpe F-20 and flew faultlessly through-

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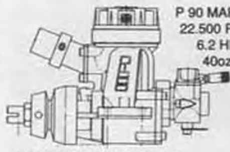

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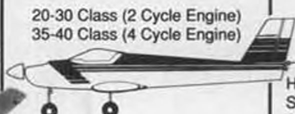

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We had the best summer for many years. We had the best selection of models, and the finest piloting skills ever witnessed at any gathering. Equally, there were tragedies with some fine models, now just a memory, kept alive by a brief glimpse of those occasions recorded shakily on amateur video, with lingering doubts as to the cause of the particular mishap. A victim of both triumph and tragedy, I share with others the emotions. My approach to dealing with these mixed feelings is to learn from the mistakes and temper the enthusiasm of success and direct this objectively into improving the quality of the finest branch of our hobby. Here's to 1990. •

Sproose ... *Continued from page 26*

out the day. The model is flown all year 'round and is now entering its fourth season and flying as well as on its maiden flight. Graham promises to have his third Swing Wing Tornado ready for next season, again OS 46 powered, about nine pounds in weight with retracts . . . don't ask me how he does it but I've seen the second prototype fly at this weight so I can vouch for the figures.

I confess to suffering from a very complex eye problem which currently restricts my fan flying to the less exotic subjects and even these pose problems of orientation and judgement at a distance. A model I have always fancied is the Thorpe F-104 (I have the formers ready cut). Two samples that did fly not only inspired me but equally convinced me that the size and speed of this model would not only tax my skills but test my visual judgement, and find them both lacking. However, for anybody with average experience, this model will quench any thirst.

How the Thorpes can produce a design that can fly at a blistering pace and yet linger almost suspended at stall speed without the slightest hint of instability never ceases to amaze me. Try one, you won't regret it. You will definitely require a hard runway.

Another model which always impresses me is Jim Harrison's Star Cobra II, a scaled-up 45-size version of the original RCM plan. Jim performs some impossible maneuvers with this model which complements his piloting skills and serves to demonstrate the versatility of this design. Jim manages to transit from a 45-degree angle-of-attack, ultra low speed flight, to straight and level swooping and diving with incredible ease. This is not an exaggeration, these activities are recorded on video to substantiate this commentary.

Pym Smith brought along his John Carpenter kit of the Folland Gnat and proved why he is one of Britain's best fan fliers. This is a big model for its K&B 7.5/Turbax power unit which flies superbly in Pym's hands.

In retrospect, life has a habit of focusing the memory on the highlights of one's activities, and now that 1989 is over, I have the fondest memories of the flying season. only the center sections differ. Dihedral joiners may be cut from 1/4-inch spruce and tapered to match the sweepback of the wings. Alternately, joiners can be cut from 1/16th aluminum sheet, bent to match the sweep, then wrapped with soft copper wire or button thread to the spars and epoxied in place.

The outboard struts are not required for structural integrity, but they keep the wing panels properly spaced so that the top and bottom ailerons line up with the wings. Besides, they improve the looks. The struts simply pop into square holes by forcing the wings apart, and the rubber bands keep them in place and are hardly noticed.

The most important thing about fuselage alignment is to start out with a perfectly flat 1/4-inch ply firewall bulkhead. Note the oversize holes for the bottom wing forward mounting dowels, in Bulkhead 'B'. Also note the ¼-inch locating rings that fit on those dowels. When fitting the bottom wing, slip the rings on the dowels, set the wing in the fuselage cut-out, hold firmly in place, with the leading edge snuggly up against the rings and bulkhead 'B', with the dowels centered as well as possible in the

large holes in 'B', and mark the location of the rear nylon bolts in the maple mounting block. After these mounting holes have been drilled and tapped, again place the wing in the saddle, and *lightly* tighten the rear nylon bolts. Clamp or hold the wing firmly in place and tack-glue the rings to bulkhead 'B'. When you're sure the rings are locked in place (I didn't have CA glue back then, so tacked the rings with one-minute epoxy), gently remove the wing and then add epoxy glue fillets around those rings so they'll never move. You'll now have a firm, snug, and accurate fit of the bottom wing to the fuselage!

Incidentally, the original S.G. was powered by an O.S. 58. We have no idea why this size was built. Maybe that was why John Maloney of World Engines was so willing to give us the engine for this project! It certainly did the job, and you couldn't tell it from a .60, except for the number cast on the side of the cylinder.

Hmmmm. . . . Wonder if we should blow those plans up to about six, seven, or eight-foot span? •

O'Counter . *Continued from page 10*

tioned to neatly hold small tools, glow plugs, escapement winder (WHAT?), etc., and the end opposite to the APS location holds a gallon of fuel in a metal can or plastic jug. For more info on this Caddy and a free catalog of the entire Great Planes line of kits and accessories, write to Great Planes Model Mfg., P.O. Box 788, Urbana, IL 61801, and be sure to tell 'em *Model Builder* sent ya.

* * *

We shouldn't confuse matters by doing this next, but you might as well get it straight now. Great Planes Model *Distributors* Company, P.O. Box 4021, Champaign, IL 61824, phone (217) 398-6300, has a whole bunch of new stuff for 1990, from O.S. Engines, Kyosho, and Hobbico.

First, from O.S. comes a new helicopter engine, the .61 RFN-H. This engine weighs 20.5 ounces and claims an RPM range from 2,000 to 16,000, producing 1.7 Bhp at the top end. The engine is available in ringed and ABC versions, with suggested retail prices of $289.95 and $299.95 respectively.

For Jet Trailers, O.S. has introduced a new mid-sized ducted fan engine, the 65 VR-DF ABC. This is an ultra-high RPM engine featuring ABC piston/sleeve construction for high compression and output. It weighs only 20.3 ounces, but is said to have an RPM range of 2,500 to 25,000, producing 3.0 Bhp at 22,000 RPM's.

With a span of only 31.5 inches and a weight of 37 ounces, the Kyosho "Reflex" is a hot little electric powered ARF. With a blow-molded plastic fuselage and built-up, precision-made flying surfaces, assembly time is minimal. The direct drive LeMans 540 motor and specially designed folding propeller provide lots of power and improved glide performance. A three-channel radio with electronic speed control and a six or seven-cell battery pack is required.

Today's most popular type of aircraft, for both the advanced beginner and the experienced modeler/flier is the electric powered sailplane. Kyosho has filled the bill here with the Stratus 2000. This "kit" comes with LSS one-piece molded fuselage, and pre-built and covered balsa ribbed wing and tail surfaces, for strength and fast building. The covering material is Excelcote. A direct drive, high performance 540-size motor is included, along with a scimitar-style folding prop for improved gliding times. A three-channel radio with a six or seven-cell battery pack is required. The Stratus will be the subject of a "Products In Use" review in the near future.

Kyosho has stepped into the multi-channel aircraft radio arena, with the announcement of the Advance Five-Channel PCM and the Advance Seven-Channel FM radio control systems. The suggested retail prices are $299.95 and $319.95, respectively. Both systems are designed to meet and exceed technical guidelines and specifications for 1991 and beyond. The radios are claimed to provide fliers with increased security against frequency interference within the 20 kHz channel separation, and the greatest overall reliability. Both systems include four KS100 servos with 38 oz.-in. of torque, servo reversing on all channels, and dual conversion receivers with excellent narrow band characteristics. A variable hold failsafe function is included in the PCM-5, while both include aileron and

elevator dual rates.

The "Sturdy Birdy" is Hobbico's version of the crash-surviving school of thought for an R/C basic trainer, though it also claims to have an improved wing design that offers the ease of flying of less rugged trainers. It features a PVC fuselage, super-tough foam wing and aluminum main channel, and extra tall landing gear to absorb shock and reduce prop breakage. A two-stroke .25-size engine and three to four-channel radio are required. Span is 53 inches, and weight is around four pounds.

Two new rechargeable glow plug starters are being offered by Hobbico. One uses a 1400 mAh NiCd battery, the other a long-lasting 4000mAh battery. Both feature a positive locking glow plug clip and include a reliable 110 AC overnight wall charger. They retail at $25.95 and $39.95 respectively.

* * *

John Tatone's company, J'Tec, 164 School St., Daly City, CA 94014, phone (415) 756-3400, is now offering a back plate (or "radial") type engine mount in six different sizes, to accommodate engines ranging from .09 to 1.82 displacement. They are called "Snuf-Vibe" because they are all equipped with the "Snuf-Vibe" vibration dampening system, consisting of back plate and firewall mounting bolts that are completely encased in neoprene rubber, the only way to completely isolate the engine vibration from the aircraft structure. The mounts are available at most hobby shops, or you can call J.T. and order directly. If you do, be sure to tell him we sent ya, ya hear?

If your local politician buddy has run out of hot air, you can always rent a tank bottle of helium and fly the newest R/C blimp from Peck-Polymers. This is a 13-footer, that very nearly resembles the familiar Goodyear blimps you often see on TV, covering major sporting events. Bob Peck has done o lot of development work on blimps since he first came up with a double weather balloon creation for the first IMS indoor R/C blimp competition 10 years ago. In recent years he has maintained a more scale-like appearance in his models, and has continually improved the control system's reliability. The "1300 Blimp," as the newest one is called, has complete control. It can fly straight up and down, forward and backward, make tight turns, has slow to high speed electronic control, and has safety guards over the propellers. It uses any four-channel radio. For a returnable $15.00 deposit, Peck-Polymers, Box 710399-MB, Santee, CA 92072, phone (619) 448-1818, FAX (619) 448-1833, will send you a VHS tape of the blimp in action. Return the tape and you'll get your money back.

The basic blimp kit, with eight pages of plans and instructions, includes a formed gondola and propeller guards, die-cut balsa and ply, machined control parts, and finished blimp bag. A power kit is also available, with motors, NiCd batteries, AC/DC charger, helium filler, and electronic speed control. The basic kit is $349.00 and the power kit is $300.00. For the non-builder, ready-to-fly blimps are available. (WHAT? You want it shipped blown up?)

* * *

Pictured ACTUAL SIZE, the Power Switch is the world's smallest electronic switch for on-board glow applications. It features the latest in MIL-SPEC surface mount technology, to fit a lot of features in a space not much bigger than a postage stamp! (You could hide it with some special issue stamps). Improved for 1990 to work with the "1024" and other types of PCM radios, as well as standard AM and FM, the Power Switch features an adjustable "ON" point, a reversing switch, and an L.E.D. indicator light making it very easy to set up right. No more dead batteries because you forgot to turn it off, either! When your radio switch is off, so is the Power Switch! The power switch is good for both single AND twin cylinder glow installations and detailed instructions are provided for a simple installation. The Power Switch can also be used to turn other loads on and off, replacing a servo, microswitch, and all the adjustment problems. Great for on-board video camera control, bomb drop solenoids, or even small electric motors. The Power Switch can handle up to 12 volts and 10 amps continuous current. It's provided with super flex wire and Sermos connectors on high power leads . . . you add your receiver connector. Made in America by JOMAR, and available at most of the better

hobby shops. If not available, contact Joe Utasi directly at Jomar Products, 2028 Knightsbridge Dr., Cincinnati, OH 45244. •

Plug Sparks. . *Continued from page 33*

30/40 stick class of 24 contestants. Another U.S. model won her a third in the B2 class (20/30 rubber). She is quickly becoming a threat to us old foxes!

CANADIAN SAM CHAMPS

SAM 22, with John Bortnak, has been holding the "Canadian SAM Champs" for the last five years at the southeast end of Calgary.

As Simon Blake, reporter, says, this may be a trifle optimistic as SAM 22 has only a half-dozen members. Regardless, despite small entries, this is the only area suitable (within driving distance) for the high flying ignition models.

Photo No. 11 shows the background of the huge hay field with Ray Newman of Salt Spring Island, B.C., cranking on the O.S. 15 in a Class A Rocketeer. He never did get a good motor run but made up for that by taking Class B with an O&R powered Winged Yankee.

Not too many of the "cloth" fly model airplanes, but Father Degnan of North Dakota is generally seen at most of the big SAM meets. Photo No. 12 shows Father Degnan about to launch an O.S. 15 powered So Long. He looks pretty fresh after a 700 mile drive.

The Edmonton Model Aeroneers are hurting for membership. Hopefully, this plug will attract a few in that area. Give Simon a call at (403) 992-0622.

ENGLAND

Old Warden Echos

Received a most interesting letter from George Aldrich, 12822 Tarrytown, San Antonio, Texas 78233, wherein he describes and sends photos of the action at Old Warden Aerodrome in England.

George was invited for an old timer controline event featuring his famous "Nobler" design at the recent British Nationals. A surprisingly large number of Noblers showed up, but the weather refused to cooperate; offering only 45 mph winds, rain, cold, etc. Only three or four heroes made official flights. Dave Days finished his Nobler at 3:00 a.m. and then promptly proceeded to win the event!

Photo No. 13 shows excellent craftsmanship on Dave's red silkspan covered Nobler. Matter of fact, Aldrich notes that Days was the only one to get through the entire pattern. The only placer was Ron Prentice, second. Ian Ward from Scotland was to be commended on all the ground work while Dick Downes judged.

As can be seen in Photo No. 14, George is exchanging notes with Judge Downes. We had a picture of Ian Ward's model after the wind wrecked it, but are a little short on space. Aldrich says he never saw a model so badly manhandled by the wind!

George enjoyed himself hugely at the Nats and the good weather at Old Warden. George met quite a few of his modeling idols; Bob Copland, Albert Judge, Hank Staireman, and Ron Moulton. His only re-

gret is that he missed Peter Chinn, as George was eager to exchange notes on engines, both being experts in that area.

USA SAM 4

Upon receiving the latest SAM 4 newsletter so ably edited by Karl Spielmaker, I ran across a photo of Vern McIntosh, who competed at the SAM "Mini-Champs" in the flying scale event.

Seen in Photo No. 15 is Vern with an old Ideal kit model version of the aircraft Bleriot successfully flew across the English Channel.

Truly a shame we don't have an age factor (as do the Australians) for old models. The 1927 date would make this model very competitive with about a 50-point bonus!

ELECTRIC RULE REVIEW

With the electric events becoming so popular in the SAM competitions, a rules review was conducted by Jack Alten at the recent Jean, Nevada SAM Championships.

This review was in line with the set of rules issued 19 March 1988 where a one year trial period was set for those rules. Again, many SAM Chapters (00, 02, 21, 26, 27, 41, 49) participated with the end result there were very few rule changes. The following list of rules reflect only the changes from 1988:

Section I: No changes except to note that wing loading is 8 oz/sq.ft.

Section II: This section has been completely overhauled with much of the technical specifications being scrapped. This section covers battery, motor, power control, and propeller requirement.

A. Batteries

1. A 7-cell Ni-Cd rechargable pack with a (manufacturer's marked) maximum rated capacity of 800 mAH shall be allowed.

2. Packs with unmarked rating must be tested for capacity for the 05 electric Texaco event.

B. Motors

1. Any direct current, permanent magnet electric motor that operates on 7 cells up to and including any production 05 may be used.

2. Motors may drive the propeller directly, or indirectly via a gear or belt speed reduction drive.

3. Ferrite magnet motors, or non-Ferrite motors (i.e., Cobalt) may be used.

C. Power Control

1. Power flow from batteries to motor may be controlled by any method.

2. Power shut off must be demonstrated to timer.

D. Propellers

1. Folding props may be used as long as they are restrained from folding in flight. The intent is to provide protection for the motor/gearbox in the event of a noseover, while neutralizing any aerodynamic advantage.

2. Prop hubs which are partially cut through (in order to protect the gearbox in the event of a noseover) are NOT allowed. This procedure creates an operational safety hazard and is NOT permitted!

Section III: No changes.

Section IV: No changes.

Section V:No changes.

As can be seen, the representatives attending this rules review meeting were in general accord to do away with "nit-picking" rules about motors, prop sizes, and battery sizes.

According to the latest information, the "new" Electric rules will be presented to the membership for official adoption and inclusion in the rule book.

CORRECTION PLEASE

Just received another enthusiastic letter from Graham Podd, of Irvine, California, who writes to say the photograph of his wife holding his model is not a "Judge" Wakefield. The model is actually a "Linnet" another good flying British design.

Graham is trying to put together a collection of Wakefield plans, the designs which conform to the L2/100 cross-section rule. Any help out there?

Maybe this should be titled, "Have you used white glue?" Like many modelers, this writer has had his share of troubles with Micafilm, a covering plastic material that is quite sensitive to heat changes.

Walt Rozelle wrote an article for the now defunct Okie Free Flight News that should be of interest to all modelers regardless of whether they cover with tissue, silkspan, silk, or any of the plastics. Here's what Walt has to say (slightly edited of course).

"Anyone who still applies tissue by going through the age-old ritual of brushing on several coats of clear dope and then soaking through the paper with thinner just hasn't been listening for a few years *(or*

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reading Walt Mooney's Peanut construction articles in MB! *wcn).* Most people know that using thinned white glue instead of clear dope is faster and simpler. The uses of white glue in covering go even further, I recently discovered. It's been widely reported that a disadvantage of Micafilm is the small range between application temperature to adhere the film to Balsarite and the film's shrinking temperature. A common problem is that the film will creep from the periphery when you shrink the open areas. A common solution is to apply an adhesive such as 3M 77 spray cement on the LE/TE and to apply Balsarite on the open-area framework. I read where old FF'er, Woody Blanchard, used white glue to attach Micafilm on an R/C electric model. I decided to try it. Flying blind, I brushed on two thinned (50-50) coats of Franklin Home & Craft Glue around the stab outline. Then I set my 'Moneycote' iron at about '11:00,' drew a deep breath, and started to iron on the Micafilm. I'm standing here with my right hand raised to tell you it worked like a charm. I learned real quickly to use only the nose of the iron and to work with the iron outside the framework; doing otherwise shrinks the film before it is attached to the edges. Next, I discovered that white glue will also work well on the overlap joints, like at the wing polyhedral-joint rib. I just brushed on a couple of thin coats and slapped the Micafilm down on top. I also found that I didn't have to wait for the glue to dry if I skootched the iron temperature up just a hair. A word of warning: I also discovered that when I used CA to glue down a stubborn edge of Micafilm, the glue causes the coloring to bleed when I rubbed the surface to make the glue adhere. So, use a teeny amount of glue in such a situation. Eager to share my discovery, I called Jim Walston, retiring editor of 'SEKS Talk,' the SAM 47 newsletter. When not building outstanding Old Timer FF power models, Jim is a distributor of hardware products, including Franklin products. Jim patiently listened and stifled a few yawns as I excitedly related my newfound discovery. Then he asked if I had tried the white glue trick on silk. He proceeded to tell me how he brushes white glue onto undercambered rib surfaces and then attaches the silk with a covering iron. If you have not tried it, the above glue (in a bright blue bottle) has some advantages over regular Titebond for normal gluing applications. It is thick and will not run when applied to a vertical surface. And it dries clear without shrinking (makes a neat looking, strength-adding fillet at for example, a fuselage-fin joint). This glue also requires some patience when stirring before it thoroughly blends with water when thinning it for covering uses."

AUSTRALIA

Bruce Abell enthusiastically writes to announce the Second Aeromodelling Veterans Gathering will be held on May 19 and 20, 1990 in New South Wales. Format will remain the same; i.e., no organized competition, meeting of old friends, making new ones, and general bull session about the "Good Old Days" in a relaxed atmosphere.

For those interested in making the long trip write to: Aeromodelling Veterans Gathering, P.O. Box 6, Musswellbrook, N.S.W. 2333, Australia.

READERS WRITE

Received several interesting photos from Wally Norman, 111 Shore Drive, Portland, Texas 78327, where we picked out what we thought was the most interesting.

Inasmuch as Wally built a Thermic 50 back in 1943, Photo No. 16 shows his latest efforts in producing another some 40 years later. Some of the features of this model are:

(1) Installed all wing and stabilizer riblets

as per plan.

(2) Machined all spars, etc. from white pine (on a radial arm saw!)

(3) Used balsa that has been carried around for the last 30-40 years.

Wally has also created a 32-inch rubber model having most of the "classic" shapes utilizing some unusual materials; i.e., micarta for wheel reinforcements, landing gear fairings from K-Mart basket and tip laminations of grape wood. In short, Wally has been having a ball re-creating those old models!

THE WRAP-UP

Cahill Clodhopper

George Aldrich also reports that he was able to run down Jim Cahill in his quest for information on Jim's Clodhopper design. When contacted, Jim was recovering from a broken vertebrae, but his mind was still like a steel trap. George was able to obtain the following details on the design.

Due to wood selection and intricate construction, Jim Cahill's model was the only one he ever saw fly well. Designed with a 40% stabilizer for the 1937 Moffett International Trophy, the model was lost in winning the 1937 Nationals at Detroit.

His brother, Bob, recovered the model and returned it to Jim, the model being partially eaten up by grasshoppers (locusts?) during the time it was lost. Although the model had a lot of patches from repairs, Jim decided to use it for the Wakefield finals in France.

Meanwhile, the rules had been changed in 1938 allowing no more than a 33% stabilizer. To meet regulations, Jim cut the leading and trailing edges, and spar to shorten the stabilizer span to meet the required area.

George says his calculations show a 19.75-inch span with a 4.25-inch chord and tips as shown in the Air Trails plans. The plans give a stabilizer of .07 sq. inches under maximum allowed.

Aldrich hopes to build the A.T. 1937 Clodhopper model by simply shortening the stabilizer. Jim Cahill also volunteered the information that the fuselage and the fin were covered Fokker Red while the wing and stabilizer were Loening Yellow. What a great memory! •

Choppers . . *Continued from page 47*

requirements.

5. 1024 PCM steps resolution for precise implementation of the servo motion.

6. Easy-to-read and understand LCD screen for convenient software programing.

7. Servo endpoint adjustment on all nine channels.

8. Servo reversing on all nine channels.

9. Dual rate, exponential, and Futaba's VTR (variable trace rate).

10. Provision for auto dual rate feature that allows the aileron, elevator, and rudder dual rate to be switched on automatically according to the throttle stick position. For example, you can program the radio to operate the aileron, elevator, and rudder in low rate when the throttle stick is below one-half, and high rate at above one-half.

11. The top rear right toggle switch can be programmed to be either an invert switch, rudder dual rate, hi-idle 1, rudder offset, or gyro sensitivity switch.

12. Front left switch can be programmed as either an auxiliary switch, or rudder dual rate switch.

13. A very neat feature is that you can program the switches to pull forward to activate the dual rates, or push away to activate them. In other words, you can really customize it to suit your habit.

14. Electronic mixing among any two channels. There are four of these mixing circuits. For example, for helicopters with stiff flapping rotor, it is desirable to mix in left cyclic with back cyclic, and forward cyclic with left cyclic. (We will explain why in later issues.)

15. A total of five different programmable pitch curves, normal, throttle hold, invert, hi-idle 1, and hi-idle 2. The reason for two hi-idles is that hi-idle 2 is usually set with a higher low end throttle setting, so you can do inverted flights on hi-idle 2 without hitting the invert switch.

16. Each pitch curve shape is defined by 11 points. You adjust the pitch curves by defining the location of these 11 points. Figure 2 illustrates the LCD screen display that prompts you for programming the 11 pitch curve points.

17. Each of these five pitch curves can have its own programmable throttle curve, too. A nice feature is that at low collective stick, the throttle can be programmed to come back up. This is excellent because

the throttle should be lowest at 0-pitch, and higher throttle when the pitch becomes negative.

18. Eight mechanical trim pots to further fine tune these pitch curves and throttle settings. These are called sub-trimmers. They allow you to do quick fine tuning at the field according to wind and weather conditions, but without changing the computer program settings.

19. Four possible CCPM configurations.

20. Can store program settings for six different model configurations. Hence, you can use one transmitter to fly six different models (of course, not simultaneously), or you can have six different programmed settings to suit six different flying conditions for one model. The user can even assign each set of program settings with a name, like Magic, Legend, X-Cell, Excalibur, Concept, or Airwolf.

21. The memorized data is protected by a five-year lithium battery.

22. Trim positions for each model can be memorized. This allows the trim levers and sub-trimmers to be returned to the center.

23. Program data for one model can be copied onto another model program.

24. A buzzer beeps once when the pitch trim lever, hi-idle trim pots, revolution mixing knob, or hovering throttle knob is in the center.

25. A unique rudder-to-throttle mixing feature. This allows you to program the radio to automatically increase the throttle slightly when right rudder is fed in, and to decrease the throttle automatically when left rudder is fed in. The reason for this feature is that right rudder increases tail rotor pitch which robs engine power so the engine needs to be opened up slightly to maintain a level pirouette. On the other hand, left rudder unloads the engine, so the throttle should be reduced.

26. Provision for automatic throttle hold. This feature automatically turns on the throttle hold when the throttle stick falls below a user preset position (of course, after you flick on the throttle hold switch first).

27. Automatic servo test. When activated, it automatically moves each servo one at a time to show if all the channels are working properly.

28. The servo test display is another unique feature. As shown in Figure 3, as you move the control sticks, the LCD display shows the positions of the servos on eight barographs. I get almost as much fun playing with this radio indoors as flying with it outdoors.

29. A reset option allows you to erase your program settings and return the settings to the original factory preset settings.

30. A built-in digital tachometer, and the photodiode sensor is built into the transmitter. Tachometer can measure rotor rpm for 1 to 5-bladed propellers or rotors.

31. Digital alarm/timer has up, down, and rhythmic timing modes.

32. An integrating timer that monitors the total transmitter on time. It's like the odometer on your car, it tells you how many hours and minutes you have used the transmitter since you bought it. You can re-zero it anytime. This is great for monitoring the health of the transmitter Ni-Cd battery because I usually re-zero it after each battery charge. This way I know how long each charge will last.

33. Ball bearing open gimbal control sticks.

34. Adjustable stick tension by opening the transmitter back.

35. Adjustable stick length.

36. The control stick can be angled and tilted by the user.

37. Quick change Ni-Cd transmitter pack.

38. A power off function that turns the transmitter power off automatically if the controls are not operated for 30 minutes. Maybe, instead of 30 minutes, 5 minutes might be a better choice. Most electronic calculators have auto-shutoff set for five minutes. If you have not operated the sticks for 5 minutes, more than likely you have forgotten to switch it off. *(Also better is transmitter sitting in compound at a contest. wcn)*

39. Has a DSC (direct servo control) system that allows you to operate the servos without turning on the transmitter. This is great for busy club fields and contests. The

voltage of the transmitter and receiver battery can also be read simultaneously while using the DSC.

40. You get a beeping alarm when the transmitter voltage is low.

41. Individually programmable fail safe or hold-last-command for all nine channels.

42. Gold plated servo connector pins in the receiver for better contact.

43. The system comes with a 1000 ma Ni-Cd battery for the receiver and servos.

44. It includes five FP-S9201 servos. Each rated at 69.5 oz-in torque, and 0.22 second for 60° travel. Indirect drive potentiometer minimizes shocks and vibrations transmitted from the servo arm back to the servo. Futaba custom servo IC provides high starting torque, narrow dead band, and excellent traceability. For top-of-the-line servos, like Futaba 9201, JR 4031 and Airtronic 94735, when you are not moving the control sticks, you can often hear a humming noise from the servos. This is because the electronic circuitry has such a good feedback, it holds the position where you demanded exactly. The slightest amount of load will cause it to hum. This is normal. This is also a measure of how smooth your control linkages are. A perfectly smooth, frictionless control setup will not cause any hum.

That's a lot of features, and I have probably missed a few. Is it worth the retail price of $1199.95? If you can fly a model helicopter already, then you will definitely appreciate such a sophisticated and powerful radio. It takes a few hours to read through the book-like instruction manual. The easiest way to learn how to program it is to mount it in a helicopter, and program in the settings while watching the servos move. It is fun! I noticed that with such a capable radio, I get lazy while installing the control linkages, because I can now use the end-point adjust, pitch curves adjust, throttle adjust and other adjusts to perfect the same control setup that I use to achieve with a careful mechanical setup. This radio is for the imaginative modelers. It lets you play around new control setups and ideas without resorting to mechanically overhauling the model.

The two features that I wish could be there are; automatic rudder offset with the throttle hold, and a reverse tail rotor mix. (1) The 9VHP does have a rudder offset with hi-idles, but not with throttle hold. During the autorotation maneuver, most helicopters yaw slightly to the right because the tail rotor is not disengaged completely. A rudder offset would be desirable to help null out this yawing, but not essential. However, for many competition helicopters, equipped with driven tail rotors, a rudder offset with throttle hold is necessary to automatically offset the tail rotor pitch close to zero. (2) It would also be desirable if it had reverse tail rotor mixing because when the collective pitch goes below 0, you would like the tail rotor blade pitch to INCREASE again. Most helicopter radios, including the 9VHP would continuously decrease the tail rotor pitch, even when the main rotor blade pitch goes below 0, which just worsens the situation at the upside down portion of a roll or loop. This is the reason why many top notch competition pilots simply switch off the tail rotor mixing completely to avoid this problem. Other than these two minor points, it is almost a perfect radio system. I tip my hat to those engineers who thought of all these fancy features. I am impressed!

Now we shall continue on to the Schluter Magic helicopter features. All the metal parts, including the frames, tail boom, and vertical fin, are anodized in metallic red instead of the conventional black. After fishing through umpteen hobby shops, I finally found that Pactra R/C Car Racing Finish Pearl Coral color paint matches the Schluter metallic red perfectly! The Pearl Coral comes in a small spray can or a jar. You need at least one whole can to paint the canopy. Unfortunately, I discovered this paint after I painted my canopy. This paint is not fuel proof, so it needs a coat of clear Formula U enamel to protect it afterward. Since the pictures were taken, I have painted the horizontal stabilizer in Pearl Coral to match the tail boom, and it looks great.

Schluter canopies are always a challenge for creative paint schemes. Shown in this month's pictures is my scheme with the color strips. Next month's pictures will show Ray Stonge of Hybrid Hobbies, who painted for me a white, pink, yellow and green misty-blend version. The long-nosed canopy combined with the long tail boom (about two inches longer than the Champion and Scout) make the Magic, probably,

the largest 60 size pod-and-boom helicopter on the market. Its large size and weight make it a very stable helicopter in calm or windy weather. However, the drawback is it does not fit in my car trunk! The main rotor diameter is 58.7 inches, and the fuselage length is 57.7 inches. For now, let me just say it flies great. It has that typical Schluter style of control smoothness. All aerobatics are done in a slow and graceful manner that require you to fly through them, rather than bang over the stick to roll it over, or pull back to yank it over. Next time we will delve deeply into flying.

The rotor head design is the same as the proven Scout and Junior. The head is injection molded. Each blade grip has two radial bearings and one thrust bearing. The floating axle design provides a very stiff flap response ideally suited for aerobatics. The Bell-Hiller mixing system is similar to the Heim helicopter. The swashplate slides up and down to vary the collective pitch, and tilts to vary the cyclic pitch. Even though the swashplate mounting points are rotated 45°, it does not affect the control law at all! It is simply done for conveniently attaching to the bellcranks. I recall someone once said that the 45° rotated swashplate improves the flying characteristic because advancing the swashplate introduces coupling between pitching and rolling. That is absolutely not true! There is no coupling effect at all because the swashplate AND the mixing unit are both rotated. Some full-size helicopters, like the BO-105, also have a rotated swashplate.

The beauty of the four-point supported swashplate is that it provides super solid support to the swashplate. Four-point support requires two bellcranks to tilt the swashplate, which gives a more balanced and solid control input. When you tighten the three small screws on the swashplate top surface, make sure they are not tightened too much, otherwise the swashplate would not be able to tilt. It takes about 10 flights to seat the swashplate center ball, then the cyclic controls become very smooth. My personal experience with the Schluter plastic swashplate is that after many hours of use, slop begins to develop. Maybe in the future we can have a metal swashplate?

Probably the best feature of all on the Magic is the spring-loaded starting system. As shown in the picture, the engine starting shaft is no longer connected to the clutch, rather, it only engages the clutch when the electric starter is pressed down onto the starting cone. Upon removing the electric starter, the starting cone and shaft will spring up automatically. The distinct advantage is that we do not need to use a dial indicator to align the starting shaft to the clutch anymore. This system eliminates the possibility for engine alignment induced vibrations. However, if the clutch, cooling fan, and flywheel are not concentric with the engine shaft, there can still be engine induced vibration. It is pretty tough to dial-indicate the fan and flywheel on this unit, so Dave and I just installed them without aligning. They came out alright because the aluminum flywheel is machined very accurately.

The kit provided two sets of different diameter flywheel collars to suit most brands of engines. Well, Dave uses a Webra engine, he says the collars fit his engine perfectly. I used an Enya, and the collars do not quite fit, so I had to play some tricks to shim the inside of the collars. You probably have no idea what I am talking about! The best bet is to talk to your local fliers who have built a Magic, and ask what engine they use, and how does it fit. So far I have tried an OS 61 and an Enya 60. Neither of them fit the collars perfectly. We think it's a German conspiracy to force you to buy the German Webra engines! Call Vince at Robbe and convince him to tell Schluter to

come up with two sets of collars that will fit OS and Enya. So far, my Enya 60X runs very smoothly. The needle valve is opened 1-1/2 to 1-3/4 turns. The idle adjustment is still factory original. Due to the large rotor diameter and wide chord blades, at 10-collective pitch, the engine starts to sag a little (that's why the instruction manual suggested a 90). The torque at mid-throttle is excellent. A regular Fox R/C long plug and 10% nitro synthetic fuel are used. At full throttle, the large rotor and the mucho-powerful engine make the model climb out of sight.

The kit comes with an autorotation unit. But I also installed an optional driven tail rotor system (#52833), so I can still have tail rotor control when the main rotor is freewheeling during the autorotation. (Next month we will explain why driven tail rotor is only useful for FAI 180 auto, but not recommended for sport fliers.) The driven tail rotor option is a very simple mod, thus, I assume everything was taken into consideration right from square one during the design stage. The gear reduction system between the engine and the main rotor is very unique. As shown in the picture, it's a two-stage gear reduction system. I believe the total reduction ratio is 10:1. Due to the two-stage gear reduction system, in order to maintain the traditional clockwise rotation of the Schluter main rotor, the second stage has a pinion gear running INSIDE a bellhousing gear. If you look at the photograph, you will understand. The pinion gear and the bellhousing gear need to be greased every 10 flights, otherwise the Delron gear can get chewed up. The holes on the metal frame and the bearing holders are all superbly machined. Without any fiddling, simply assembling the frames and gears together already gives perfect gear mesh. This is another A+.

The other interesting note is that the main gear to drive the tail rotor is a separate molded piece. Thus, instead of having one main plastic gear, like on GMP and X-Cell models, the Magic has three plastic gears. Is this better? I don't know. But it works.

One suggestion is that you might want to boil all the plastic gears in hot water for about a half hour to relieve the molding stress. This will help extend the life of these gears. People who fly R/C planes with the nylon propellers usually boil the plastic prop to prevent blades from breaking off. David Ramsey suggested that you can add some cloth dye while boiling them to change the gear color. Dave's gears are dyed black.

Another nice design trend in all the Schluter helicopters is that the main rotor shaft is usually kept fairly short, specifically, the distance between the rotor hub and the bearing block at the top of the metal frames. This minimizes the possibility of bending the rotor shaft in a crash and helps lower the roll inertia of the helicopter, which improves the roll.

One lovely feature of the Magic is that the engine is the easiest to remove of all the 60-size helicopters, because there is no clutch shaft connected to the engine. To remove the engine, simply unbolt the four engine lug mounting bolts, then the engine will slide out from the side. This is an A+ design. The black cooling shroud is molded very accurately, but it requires a clear plastic skirt which needs to be trimmed and fitted at the bottom of the shroud. It took me two hours to cut, trim and fit the clear plastic shroud (the picture shows the clear shroud). It would have been nicer if the molded black two-piece shroud includes the skirt as on most of the helicopters.

The picture also shows that the forward facing engine renders the conventional pocket ni-starter and conventional glow plug connector useless. The kit comes with a glow plug extension system, but I chose to use the McDaniel extension system. If you study the picture, you will observe that only the red wire is needed. The McDaniel unit is bolted to the engine crankcase, so there is no need for the black grounding wire. I later discovered that instead of using the McDaniel connector at the glow plug side, I just cut it off and use the small alligator clip that came with the Magic kit. The reason is that in cold weather, ABC engines can be difficult to crank over by the starter. Therefore, with an alligator clip you can simply unclip it, then loosen the glow plug, reconnect the alligator clip, start the engine, and then tighten the glow plug while the engine is idling.

To loosen the glow plug, you need an 8mm socket head wrench with a screwdriver type long handle. The conventional four-way glow plug wrench will not reach into the front facing engine. The merit of having a front facing engine is that it helps keep the helicopter center of gravity forward. Furthermore, this allows the fuel tank

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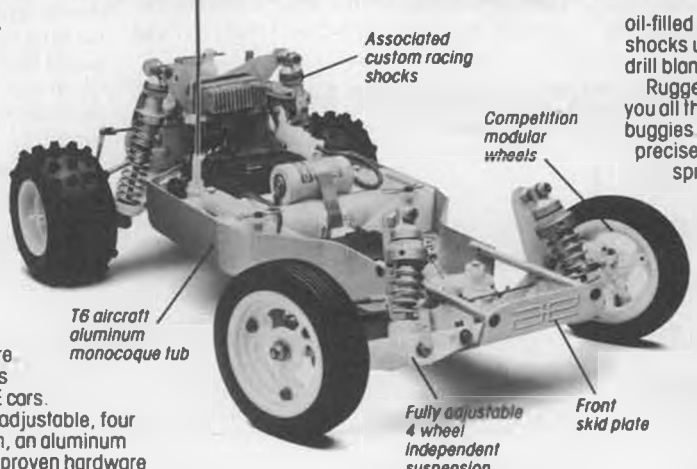

oil-filled racing shocks. These custom shocks use machined alloy cylinders and drill blank shafts for silky smooth action.

Rugged, yet light, the suspension gives you all the adjustability of full size, full race buggies. The A-arm/Ball joint design allows precise camber, caster, ride height and spring rate tuning. Even anti-roll bars and a VariLok dif are included.

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to be placed right behind the main shaft for great visibility. The drawback is that the glow plug is difficult to reach, and you have to remove the canopy to do so.

The other Schluter kits, like the Champion, Junior, and Scout all have a wood servo tray. The Magic has a time-saving molded plastic servo tray. It is very light weight. The edges on the plastic tray are quite sharp, so take some sand paper to round off the edges, otherwise they might cut the radio wires. Dave says the servo tray is probably molded slightly off-center. I think it's either that the servo tray is slightly off centered or the canopy is molded slightly off center, because both of our canopies bump into the servo tray on the right side of the canopy. Since I tinted my canopy window from the inside, the scrubbing leaves scratch marks on the right side of my tinted window.

Dave made another suggestion. That is, the standard Schluter muffler, which is designed for the Magic, sits very close to the left side of the canopy. The heat eventually melted the left side of my canopy. In my new canopy, I decided to cut away part of the left side so the muffler is exposed. This helps cool the muffler and the engine, and the canopy doesn't melt. Dave avoided melting by filing away about 1/8 inch off the muffler mounting stack. This moves the muffler closer to the engine. He also extended the cabin wood backplate behind the servo tray on the left side by a 1/4 inch. This moves the canopy outward on the left side by a 1/4 inch. The end result is he has slightly more than 1/4-inch clearance between the hot muffler and the plastic canopy, and he reports no meltdown.

The tail rotor gear box is similar to the proven Scout's, except now the vertical fin is bolted to a separate plastic piece. The Magic gear box has a flange that allows it to be easily bolted onto a scale fuselage tail boom. While the Champion and Scout have only a radial bearing inside the tail blade holder, the Magic has a radial bearing and a thrust bearing. Pitch control is implemented by a sliding ballraced sliding sleeve sliding on the tail rotor shaft (similar to X-Cell and Concept). Due to the good design and precise molding, the pitch change mechanism is extremely smooth. Only with a frictionless mechanism like this would you be able to fully appreciate the beauty of a high quality gyro, for instance like the Futaba 153BB gyro that we are using.

The landing struts and skids are the same as on the Scout. It is very robust. There is an optional white strut set (#52839). For scale lovers, there is a fiberglass Jet Ranger fuselage kit (#2724) that is specifically designed for the Magic. Alternatively, there is also a complete Magic/Ranger kit. The only other minor point is that the pushrods are very soft. They bend easily. Be especially careful not to bend the pushrods on the threaded area, that is where it's most likely to break.

So far we all love our Magics. I have also spoken to Mark Powelson, Jimmy Channy, and other Magic owners, and they all enjoy flying theirs, too. Next month we will discuss how to loosen up the nylon bushing bellcranks, the radio setup, engine adjustments, and the flight performance using various rotor blades (stock unweighted wood blades, Robbe's swept tip fiberglass blades, and Hybrid Hobby MFG's high performance weighted wood blades). Stay tuned! •

Big Birds .. *Continued from page 14*

motor battery cell go bad. Remember, electric motor battery packs operate in an almost ideal environment. We are (or should be) using only cells designed for very high charge/discharge rates, so overloading shouldn't be a real concern. Our pack is effectively cycled every time we fly and it 'lives' in a virtually vibration-free installation. Nonetheless, cells or entire packs, will eventually give out.

"Regarding the problem of locating bad cells, how much time have you spent over the years fooling with carburetor adjustments so you could fly without having to dead-stick? Have you ever considered 'wet power' to be impractical because of that necessity?

"To replace the usually long-lived Big Bird motor battery pack can easily cost one hundred bucks or more. However, all the evidence I've seen indicates that such a battery pack will provide useful service for at least two or three years. How much will you spend on fuel and glow plugs for a BIG

4-stroker in that time?

"And this leads to what I'd really like to emphasize. A lot of what we have seen written about any size electric-powered model seems to concentrate on the disadvantages that must be overcome. Let's shift our focus just a bit and look at all the disadvantages of glow/gas power.

"It is noisy; it is messy and always requires that you do some form of cleanup; fuel and oil proofing of some sort is essential, and very few models entirely escape the problem of oil infiltration; a crash often means that unprotected parts of the airframe will be bathed in fuel. Engines VIBRATE, and much more of the structure of our airplanes than we might realize is there to dampen out those harmful vibrations. And engines require constant tuning. Ever go flying without having to tweak the needle valve? I could go on, but you get the idea.

"Wouldn't it be more constructive to think in terms of the characteristics of each form of power and not their disadvantages? The point is that we have been fooling with little gas engines for so long that we accept their shortcomings without much thought, but focus, instead, on the shortcomings of a new alternative.

"You're quite right that there is much to learn for the modeler who chooses to get into electric. Big deal! The inquisitive and adventurous among us learned how to care for and feed four-stroke engines when they appeared on the scene, and I think that most will agree that those engines have made a real contribution to model aviation. The same goes for electric. It is neither frightening nor mysterious . . . just different.

"Electric power is not for everyone, any more than four-strokers or pylon racing or competitive scale flying are . . . but it is a tremendously rewarding aspect of model aviation for those who will take the trouble to become involved.

"I will readily admit that the nature of electric power is such that those modelers who pay attention to detail are those who will have the most success, but isn't this really the case with most everything we do?

"And I don't think that the cost of a good electric system is that much of an issue. Most of us buy a fair amount of new equipment more or less regularly. One has the option of choosing whether to spend the money available on more of what has been used in the past, or to invest it in something new. What's the problem? If you want to try electric, buy a good system instead of some other goodie. There's no risk. If you've been paying attention to the magazines for the past several years, you already know that electrics work . . . and work well. Go for it!

"Electric power for Big Birds is a viable option now, and will become even more attractive as an increasing number of modelers become involved with it, allowing manufacturers to expand their offerings at lower prices. I suspect that the appearance of larger flight motors than are now on the market will coincide with the demand for same by enough modelers to make production economically feasible.

"My Porterfield Collegiate is a good example of what can be done with the larger electric systems. At six feet in span, it flies very well on a Cobalt 25, which is far from the largest motor available. My article on operating the electric Porterfield on floats should be in the February, '90 issue of *MB*.

"At the moment I have two 3-inch-to-the-foot scale projects in the works for electrics. I intend to take them both into serious competition and wouldn't be investing the effort if I felt that electric power would limit their chances.

"Should you choose to include all this, Al, please don't edit it. I feel strongly that what I have presented here has needed to be said for some time and that it warrants the requisite use of space."

I'd seen Bob's Porterfield fly (with wheels) about a year ago and was impressed with her performance, from taxi and takeoff to landing.

Yesterday, Bob sent me a 15-minute video of this same bird on floats . . . and she's even more impressive. No lumbering or stooging around here. If it wasn't for the turbine-like sound of the geared Cobalt 25 you'd think she had a large, gutsy 2- or 4-stroker up front.

All the pros and cons about electrics remind me of what happened many years ago when the first Polaroid cameras were introduced. Seemed like most of the so-called experts were falling all over themselves trying to be the first to proclaim that

this would be the end of 35mm photography that Polaroid would be king.

But of course that didn't happen, although Polaroid found its own niche and often did become a useful tool for people working with 35mm.

THOUGHT OF THE MONTH

There are two reasons why some people don't mind their own business:

1) They don't have a mind.
2) They don't have any business.

Please keep those cards, letters, newsletters and photos coming. They are appreciated . . . and I do use 'em. Al Alman, 1910 154th Street Court South, Spanaway, Washington 98387, 206-535-1549. •

Celtic . . . . . *Continued from page 53*

things about this model is that it is fairly conventional in all respects. I think almost anyone could build and fly it with excellent results. The following construction sequence will make it easier for those of you with little experience.

Begin by building the two fuselage sides on top of each other, and separated by Saran Wrap. While they are drying, cut out all the fuselage crosspieces, top and bottom. As the fuselage is curved on the top and bottom, we are unable to install the crosspieces with the fuselage sides pinned over the top view on the plan. Glue them on "in the air," doing your best to keep them and the fuselage straight. While your fuselage is drying, bend the landing gear wire and make the noseblock. Thread wrap and glue the landing gear wire to the fuselage, making sure it is level and aligned. Drill the 1/8-inch hole in the noseblock (preferably with a drill press). Your fuselage should now be set aside, sanded smooth and ready for covering.

The best way to create those gorgeous curves on thewing, fin, and tail is to laminate them with 2-1/16 x 1/32-inch balsa strips. This is a common technique used by most free-flighters today. First, make your templates out of scrap 1/8 or 3/32 sheet balsa. Next, soak your strips in a pan of boiling water until they sink. Now, carefully laminate each piece, brushing a thin coat of thinned Titebond or Elmer's glue on each strip. The laminations should be held in tension by small pieces of masking tape along the curve. Let the finished products dry overnight to assure their strength. When you remove them, be sure they have dried thoroughly and are straight. Now, they are ready to be fitted and pinned over the plan.

Using your nice new laminations and lightweight 1/16 squares, build the stab and fin over the plan. Do your best to keep them as light and warp-free as possible. A heavy and warped empennage is the one thing that will keep this model from winning. Take your time and get it right. While the stab and fin are drying, cut out the wing ribs from medium-light 1/32 sheet balsa. Remove the finished stab and fin from the plan and sand them smooth. Set them aside now, and proceed with the wing construction.

Carefully select two fairly hard, straight-grained pieces for the wing leading and trailing edges. Pin them over the plan, along with the wingtip laminations. Now install each rib, custom fitting each one to a slight friction-fit. After all the ribs have dried, carefully cut off each outer wing panel and miter-sand the edges for the dihedral. Now block up each tip as you glue in the dihedral. Install the 1/16 gussets and allow the wing to dry. When dry, carefully remove it from the plan and glue on the top and bottom spars, aligning each carefully. When the spars have dried, take your time to do an excellent sanding job on the wing. The leading edge should be very sharp. Leave the trailing edge square . . . about 3/64 inch high.

Now it's time to cover the model. Of course, the best covering for this type of machine is Japanese tissue. For those of you who have never worked with it before, here are a few suggestions: always cover the structure with the shiny side of the tissue out. Always cover with the grain of the tissue lengthwise to the spars or longerons of the structure. Finally, I recommend using Nitrate dope. It is a bit lighter and shrinks less.

Now begin covering all the surfaces, taking special care to do a smooth, wrinkle-free job. Once again, take your time and get it right. Not only does a wrinkle-free model look better, but it is also less likely to warp later on. When you are done adhering the tissue, apply a thin spray coat of rubbing alcohol to the wing and fuselage

ONLY. Alcohol shrinking the empennage would result in a warped mess. Don't do it! Simply leave the stab and fin in their limp, untautened state. When the alcohol has dried on the wing and fuselage, apply to each a thinned (50/50) coat of dope, plasticized with a few drops of castor oil or tri-cresyl phosphate to minimize shrinkage. You may, at your own risk, also apply a thin coat to the tail and fin, but be aware that warpage might still occur. At this point, if any surfaces have warped, straighten them with steam from your trusty tea kettle. Now the model is ready for assembly.

Begin by aligning the fin and gluing it lightly to the fuselage with Ambroid or R/C 56, so you may soften the glue with acetone and realign it later, if necessary. Follow the same procedure with the wing, doing your best to keep it straight. On my prototype the wing was glued on normally, but you may want to offset it 3/8 of an inch or so to the left. This is a trick Jim Clem advises using on Bostonians. This technique, Jim claims, compensates for the high torque on takeoff, if you fly your model to the left like Jim and I do. I think Jim's method is a lot better; his models never torque-in on takeoff! Next slip the stab into its slot but don't glue it. The slot is designed to allow the tail to be adjusted for proper decalage. Simply shim the stab in as you adjust it. When the model is finally trimmed perfectly, glue the shims and the stab itself in place.

The prop is the last, and possibly most important part of the model you have yet to build. First, you must obtain a 16-ounce plastic yogurt (or sour cream, or cottage cheese) container, as mentioned on the plan. When you have eaten (or dumped) the contents, wash it and cut out two blades at the angle shown on the plan. Now cut the slot for the hub out of each blade, and prepare to glue the blades to the hub using the 45-degree station listed on the plan.

The easiest way to get fairly accurate pitch is to simply tack-glue each blade on, and check the 45-degree station while constantly fine-tuning the pitch. This is not the best way to do it, just the easiest. I recommend building some sort of simple jig out of scrap balsa, or using a commercial indoor jig, such as the one made by Jim Jones. As a final note, this particular prop is yet another innovation of Jim Clem. I believe this is the best all-around Bostonian prop ever used by anyone. I'm sure you'll see how great it is when you see how long your model flies with it!

Now, all that's left before you are ready to fly are a few small details. Attach the wheels at this time, along with a small tail skid, if you want. Bend a "reverse-S hook" into your 1/32 wire prop shaft, and assemble the prop/noseblock assembly (don't forget the brass washers). Also, don't forget the windows and windshield. Cut them from thin acetate sheet and attach with Ambroid or R/C 56. Finally, you may now add any decorations to the model (i.e., pinstriping, panel lines, etc.). Now it's time to fly.

Install a 24-inch loop of 3/32-inch rubber for test flights. With the rubber evenly distributed throughout the fuselage, apply clay until the model balances at the location shown on the plan. You may want the balance point a little further forward, as the one on the plan is a bit aft for most people. A balance point that is further forward will make the model more stable, but it will also make it necessary to add more nose weight. Who knows, a further forward balance point might be better after all. Just use what works best for you.

As this is an indoor model, there is no need to test glide it. Simply make adjustments based on short powered flights, gradually increasing the number of turns each time. The final trim of my model was as follows: 2 degrees downthrust, 3 degrees left thrust, 3 degrees decalage, 2 degrees right rudder, and a tweek of left wing wash-in. I fly mine to the left, but I think it would fly equally well or better to the right. Once again, whatever works for you.

In closing, I would like once again to thank Jim Clem for his great prop design, and Larry Kruse for doing an outstanding

job of proxy-flying the B.F.M. at the Nats. (I know what you're thinking . . . with Jim Clem and Larry Kruse helping out, ANYONE could win the Nats! Hmmm . . .) Good luck and good flying! •

EOTW . . . . . *Continued from page 18*

Between them, the four engines have three different needle valve assemblies! One has lettering cast in the rear of the crankcase that looks like "UEHA 11 pyb" which translates to "price is 11 rubles" it's not unusual to see Russian metal products with the price cast in place, as they have had no inflation in their price-controlled economy.

The Soviet economy is now recognized as no longer workable . . . hence we hear of "perestroika," which translates to "economic restructuring." The Soviet ruble supposedly has been worth about $1.50 for years . . . but the Soviet State bank has just announced a dramatic devaluation of the ruble, from the old official rate of $1.59 per ruble to 16 cents (yes, sixteen cents!). This means that if you travel to Russia and are lucky enough to find a KOMETA MD5 in a store, you will pay 11 times 16 cents . . . or about $1.76 for the engine. THAT'S ABOUT WHAT IT'S WORTH . . . plus the cost of your trip!

All four of my engines have a red eloxed (anodized) intake venturi, three have prop drivers that are cast and aim dirt straight into the unshielded front ball bearing . . . one has a bright prop driver that is so well machined that it virtually seals out incoming dirt. Two have black glow plugs for two-volt lead-acid wet cell starting batteries, and two have bright shiny 1-1/2-volt glow plugs as we use. Oddly enough, the glow plug threads are SAE 1/4-32 NEF threads this American size is standard for glow engines throughout the world! All four engines are assembled with metric machine screws that are yellow plated and a few are the yet unpatented high-torque types with the screw head off-center from the bolt itself . . . the Soviets are famous for these. As you tighten the screws the screwhead wobbles around . . . honest! These engines are among the very few today that use two piston rings with the ends "Z" cut . . . unconventional for model use.

When the square intake and exhaust holes were punched or broached through the cylinder walls, the tooling wasn't trued and all the windows are cocked about 12 degrees. One new engine even came with the cylinder installed *backward!* The highest ports are always for exhaust. If you get a cylinder in backward the idle or low speed running will generally be better than average, but the engine stops as you lean it out or advance the R/C throttle. All crankcases are not from the same mold. Although a tap area is cast for shaft-timed pressure, none are drilled, tapped, or closed with a screw.

All Soviet factories are government owned, and production volume/rates are preset by bureaucrats. The same factory makes the 2.5 cc (.15) METEOR on the same preset plan. From 1959 through 1964 they made 5,000 glow and another 5,000 diesel METEOR engines . . . they're just as awful.

The glow plug of the KOMETA is offset so it sits directly over the piston's baffle . . . like the early 1946 K&B Torpedo. I've been into lots of model engines, but the MD5 is the first I've seen with a totally "ambidextrous" connecting rod . . . no matter which way you install either end, it fits, as the crankpin and wrist pin have identical diameters. One of the past Russian engines (MK-12b in November, '86 *MB*) had a scientific hook on the end of its needle valve to catch dirt . . . not so on this series, but the KOMETA needle valves are skillfully (?) handcrafted to a point by holding and turning them against a running grinding wheel. One of my new KOMETAs has an internal bind in its dual ball bearings and another is missing the paper gasket behind its front case housing; two of them have counterweighting cut into the crankshaft's discs and two do not. The top of the piston in the new engine which was disassembled for photos, hits the bottom of the cylinder head as the piston goes through top dead center. If only they supplied a small file with each engine produced!

Peter "Dusty" Miller, my British engine-writing pen-pal says of this engine " . . . they make 'em with hammers and cold chisels" . . . and I say he sez it like it is!

But now for the best . . . I broke in and test ran serial number B3149 as it was the

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best fitted of the KOMETAs. After a very careful running in with my own private break-in fuel, I was able to consistently get two-flip and three-flip starts when either hot or cold. A 10-6 Master Air Screw read a none-too-smooth 9,400 to 9,600 rpms . . . a 9-6 read 10,800 to 11,000 and things were really shaking a lot, although I'd not yet reached 12,000 rpms for which this engine is rated. With a 9-4, I recorded a wandering 13,400 to 13,650 and the four-cement-block test stand I use was shaking like it was gonna record 7.1 on the Richter Scale . . . I yanked the fuel line and the KOMETA hasn't run since.

RATINGS: As the engine is a direct copy of the G.21 it gets only "1" on the 1-10 scale I use for design excellence. I also only give it a "1" for manufacturing excellence. As it does run, I feel obliged to at least give it a "1" for performance . . . three points out of a possible 30 point total. Each of my four KOMETA MD5s is worth eleven rubles times 16 cents per ruble, or $1.76 each, plus ONE FOURTH OF THE COST OF A ROUND TRIP TO RUSSIA!

COMING ATTRACTIONS: In early 1990 the new Fox EAGLE IV will be available, followed closely by the reintroduction of the world-wanted Cox TD .010 jewel. Ivan's terrible KOMETA MD5 is a loser . . . but just wait until you see here in *MB* what Ivan's "Soviet Sixty" . . . the *RADUGA 10 R/C* looks like. Better subscribe to *MB* now so you don't miss a single issue! *(Atta boy, Stu! wcn)* •

Control Line . . . . *Continued from page 60*

for competition purposes shall be the average of the scores given by no fewer than two judges. Flight points shall include those accumulated during the better of the two official flights permitted.

7. Flight pattern: Maneuvers shall be accomplished in the order listed on the official score sheet. The contestant shall notify the judges prior to the flight as to any maneuvers he or she wishes to omit. If the listed maneuvers remaining are attempted or accomplished in the proper sequence, the contestant shall receive 25 pattern points. All of these 25 points are to be given to the contestant, even if after the accomplishment of one or more maneuvers in the proper sequence an unpreventable reason, such as a crash or failure of the engine to run or to run smoothly, prevents completion of the pattern. No pattern points are to be given when the flier neglects to attempt a maneuver, omits one, accomplishes one in other than the proper sequence, or attempts maneuvers after 10 minutes.

8. Precision flight points: These are to be given, as shown on the score sheet, when maneuvers are accomplished on the first attempt and in the proper sequence. No more than one attempt shall be made by the flier for each maneuver, which shall be preceded by at least one full lap of normal level flight.

9. Maneuvers:

a. Starting: Takeoff within one minute from the starting time. The time allowed to obtain 5 points for getting the plane airborne within one minute starts when the contestant or mechanic begins cranking the engine. The contestant has a total of three minutes to get the plane into the air from the time the handle is placed in the center of the flight circle. Failure to be-

come airborne within the three-minute flight limit will constitute an attempt.

b. Takeoff: "Attempt" is when the plane does or does not get off the ground but is not able to continue the flight. "Fair" is one when the plane is out of control or wobbles and bounces into the air. "Average" is when the plane is instantly airborne and climbs too steeply or when the plane leaves the ground, then touches the wheels again with a bounce. "Good" is when the plane is under full control at all times, with the climb at a gradual angle representing the climb of a real airplane.

c. Level upright flight: Two laps at a 6-to 10-foot altitude. "Attempt" is when the control of the plane is such that it is constantly in and out of the 6- to 10-foot altitude. "Fair" is when the flight is very unstable and varies over 4 feet in altitude. "Average" is when the flight is wavy, not too stable, and varies over 2 feet in altitude. "Good" is when the flight is very stable and varies less than two feet in altitude.

d. Two consecutive inside loops: Both loops should be done within ¼ lap with control lines at an angle of 60 degrees or less to the ground at all times during the maneuver. Loops should be judged for roundness and smoothness. If they are not round or if the plane wobbles or mushes, they are not executed smoothly. They should both be done at the same spot without the plane moving forward or backward from the position of the first loop. Both loops should be the same size for maximum points.

e. Level inverted flight: Must start with plane in upright position. Flight direction must be opposite to that of takeoff. Plane should be flown at a 6-foot altitude. Immediately upon becoming inverted, the plane should attain a 6-foot altitude and the judging of the laps should begin. Inverted flight laps should be judged the same as for level flight for two laps. After two complete laps are flown at approximately 6-foot altitude, recovery can be made if the contestant desires to enter outside loops from an upright position.

f. Two consecutive outside loops: Loops may be entered from inverted or upright flight, so long as complete loops are made. Outside loops should be judged the same as inside loops.

g. Wingover: Vertical climb and dive with plane passing directly over flier's head, cutting the ground circle in half. "Attempt"—Airplane makes a turn to vertical and falls out or turns out before completing to other side of circle. "Fair"—A 60-degree climb and dive or the plane mushes and wobbles badly on entry or pullout. "Average"—A 90-degree climb and dive, but mushes slightly on entry or pullout. "Good"—A 90-degree climb and dive with sharp entry and pullout without mushing. Start and finish at approximately 6-foot altitude.

h. Horizontal figure eight: Should be done within 1/2 lap, with control lines at an angle of 60 degrees or less to the ground at all times during maneuver. Both ends of the horizontal eights should be of the same size. At the point of intersection, plane should be in a 45-degree position. Any figure eight that has mushing, wobbling, unequal-size ends or plane not in 45-degree position at intersection will be given minimum points.

i. Vertical figure eight: Control lines should not exceed an angle of 90 degrees to the ground. Vertical eights are judged the same as horizontal eights with the exception that the plane should be in a horizontal position at the point of intersection. Vertical eights may have inside loop part on either the top or bottom. Either part may be done first.

j. Landing: A plane will be considered as having made an attempt if, at any time during the landing, it goes up on its nose, even though it may not flip over on its back. Should the tail drop to the ground,

the landing is still considered as being a nose-over. "Fair"—A landing in which the plane bounces more than one time, drags a wingtip, or ground loops. "Average"—A landing where the plane lands fairly smoothly but bounces once without leaving the ground more than a few inches. "Good"—A landing with no bounce or roughness and the plane rolls to a smooth stop.

10. Special points to remember: Contestants may fly as many laps as desired for warm up and testing (but remember, you only have 1-1/4 oz. of fuel aboard). When ready to start flight pattern, a raised arm signal must be given the judges. It is up to the contestant to give this signal long enough to ensure the judges seeing it. Holding the signal during the entire level flight maneuver is suggested. There must be at least one level lap between maneuvers.

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b. Maneuverability (diving over the barrier and breaking the balloons).

c. Pilot skill.

2. The airplane does not fire any weapons, but through contact with the target balloons the breaking of balloons is accomplished.

3. Field layout will consist of one 60-foot radius circle on the downwind side of which the target area shall be placed. The circle is set for counterclockwise direction of flight.

4. Flight: The plane must rise off ground (unless it is decided prior to the start of the event that ground conditions are not conducive to R.O.G.) and fly seven laps at maximum altitude of 15 feet for speed timing. The plane shall be timed from the instant of release to the instant the plane passes the release point the seventh time; then the pilot must approach the targets in upright position flying level, dive over the barrier and knock targets. Maximum altitude before dive is approximately 20 feet. Pilots are allowed five passes to knock out targets. The pilot must signal when the airplane is over the target area prior to each scoring pass by raising an arm overhead. All balloons broken in any pass will count; however, they must be broken by the plane itself. Balloons knocked over (except by wind) will not be replaced during flight. Pilots must not:

a. Whip or lead plane during speed run.

b. Stunt or engage in aerobatic flying except the diving and climbing necessary to engage the targets.

c. Crash.

d. Use more than one plane.

5. Official flight: Three attempts (time permitting) will be permitted toward two official flights. An official flight is charged if the airplane has completed seven laps and the pilot signals for a scoring pass. Note: Once the pilot has signaled for a scoring pass, he will be charged with it the next time the plane passes over the target area, whether or not he dives and attacks the targets.

An attempt will be charged if the pilot fails to start the engine within three minutes from the signal from the judge.

6. Scoring: The target balloon nearest the barrier pole is worth 10 points, the next is worth 8 points, then 6, 4, and 2. The final score equals the speed in mph times the sum of balloons broken. Example: 40 mph x 12 (6, 4, and 2 balloons) = 480 points. A

crash or failure to break any balloons would result in a zero score.

A FEW PARTING WORDS:

Let's have a good time! Let's not get too serious! Let's be fair. If you cheat, you're only cheating yourself, you don't have anything to brag about and you don't deserve to win or even play the game.

If someone has misinterpreted the rules or one does not have a clear advantage over the other, then don't protest—just have a little talk with him, or her, or ask the CD to do it.

With your help we can make this championship series the control-line flying fun it used to be.

We'll be interested to receive reports of the first few Southern California Foxberg Championship Series contests and see if it is working out the way the organizers hope. It sounds like they're putting a lot of work into it.

Questions, comments, photos, club news, etc., are always welcome. Write John Thompson, 1520 Anthony Ave., Cottage Grove, Oregon 97424. •

R/C Soar . . *Continued from page 37*

spans 44 inches with a 288 square inch wing area and an 8% thick higher lifting airfoil section. I was able to observe another F/A-18 flying and was suitably impressed. Hornets are one of my favorites. Other PSS in the Cliff Hanger line are: F-20 Tigershark, F-5E Tiger II, P-40 Warhawk, KAI-100 (very Zero-like), P-51D Mustang, and F4U-1A.

Steve Turnbull of Laguna Beach, California, flew his fabulous OV-10 Bronco scratch built from a three-view blown up by a photo copier. It features a 12% flat bottom wing for flying in lighter winds. It spans 53 inches and weighs 1.8 pounds. Covering is tissue over balsa with a Formula U Olive Drab paint job. Steve says after one bad radio-failure crash he threw this model away. His wife saved it and talked him into a rebuild!

Steve is the manufacturer of the non-scale Pharaoh flying wing slope glider. Stay tuned to future columns for details on this one, or call Steve at (714-499-2540).

Bob Reynolds is an F-14 Tomcat nut like me. He has successfully test flown a nine-pound 8th (and 10th) scale Tomcat modified from a Larry Wolfe (Jet Hangar) fuselage. This is the model fuselage used in the filming of Top Gun. It was originally not intended for a flying model, just a movie miniature. Bob took the 1/10th scale fuselage and mated it to a set of 1/8th scale flying surfaces. There are no ailerons (not scale, you know), instead the all-flying elevons control roll and pitch. Soon Bob will add rudder control.

Bob's F-14 is very stable, too stable he claims, and is nearly impossible to turn quickly. Its Eppler 214 to Eppler 222 airfoil and nine-pound weight cause it to fly slowly, stall gently, and flair into landings like a parachute. To date it has had seven flights.

Bob's smaller, 19 oz, flat bottom airfoil F-14 "Kitty Kat" has had 21 flights. It flew

swing-wing for the first time during the meet. The flight was rocky and went something like this: when the wings were first swept back, Bob says it dropped like a rock. As it gained speed, it remained controllable. Then as altitude dropped further in the weak lift, the wings were swept forward. The F-14 ballooned upwards, almost struck the cliff, and eventually landed on the beach hundreds of feet below.

Brian Laird of Slope Scale Models was present on Sunday with a bevy of PSS ships. These included: P-63 Kingcobra, Focke-Wulf 190, Spitfire Mk 14, P-51B, Zero, Hellcat, Me-109, and Mini Me-109. All are about 46 inches in span (except the Mini ME-109) and weigh 28 to 32 oz. Fast aerobatics are their specialty.

Byron Bruce of Combat Models was also there with four of his PSS model kits. These included his original foam F-16 Falcon, and his newer balsa and foam core A-4 Skyhawk, MiG 27 Flogger, and A-10 Thunderbolt (Warthog). The latter have easy-to-repair balsa fuselages, easy-to-finish foam cores, most hardware, ball links and shear bolts. Three Blue Angel Skyhawks in Monokote Insignia Blue and Yellow were on display to excite the masses. These models are fast, aerobatic, and fun to fly.

That's going to have to do it for this portion of the column. If you want to go to the next scale fun-fly, it will be May 25 through 27, 1990, at the TriCS site in Washington state. Contact Wil Byers at 632 Meadows Drive East, Richland, Washington, 99352. More next month.

SOARTECH EIGHT: SELIG/DONOVAN/FRASER AIRFOIL TESTING RESULTS ISSUE READY

For a very modest (nonprofit) $15.00 including postage, you can get a copy of Soartech #8. Send $20.00 and you can get the 100-page #9 when it is printed. For your $15.00 you get a 400-page technical journal which is the culmination of over two years of research at Princeton University by Michael Selig, John Donovan, and David Fraser.

I have a copy of the #8, and it is well worth your investment. If you are a designer or scratch builder, you shouldn't be without it. Newer, higher performance airfoils have been designed and tested. You should have this information. Send your money to: Herk Stokely, 1504 North Horseshoe Circle, Virginia Beach, Virginia 23451.

THERMALS!

Bill Forrey, 3610 Amberwood Ct., Lake Elsinore, California 92330. (714) 245-1702. Please call between 7:00 and 9:00 p.m. PST. •

Hannan . . . . *Continued from page 49*

ing, you're missing half the hobby. Even though I don't have my first plane in the air yet, I doubt that merely flying a model will ever appeal to me. Building is too interesting.

"I gleaned a few useful bits of information (from the magazine). I learned from the adverts that no, I had not discovered the wonders of cyano glue. You can buy it thick and thin and lots of other ways as well, made especially for model builders. I also found ads for hobby stores, mostly in California (because of the aerospace industry?), that sell all kinds of airplane kits. So, the hobby lived. There existed stores where you could buy balsa in bulk and probably didn't have to dust off the dope.

"Otherwise the magazine devoted little space to building, and what there was lacked detail. It had a few nuts and bolts articles. But when I tried to read one about electric motors, the graphs it referred to had been omitted. I thought there must be people out there who are into wood, paper, rubber and elegant simplicity.

"I kept looking for more magazines. On the way home I picked up two more. One was thick, full of ads, one of which was for a store in Brooklyn. Good news.

"Then I opened the third one, *Model Builder*, July, 1989. I flipped through the pages and was heartened to see gliders, and lots of planes with electric motors. Even though I guess the latter are high-tech, they don't seem as imposing as nine-cylinder gas engines driving aircraft nine feet long that excrete little men on parachutes as they speed past the flight line. The plans accompanying some of the articles were readable and looked as though you could actually use them. I read about alternatives to airplane dope, which made my respiratory system breathe easier. This was getting better. This hobby had a lot of variety after all.

"And then, on page 44, I saw your column with the head RELIABLE RUBBER POWER. Hold on. Then I read, 'Is this a

sign of yearning for days of yore nostalgia?' I thought of the Corsair fuselage on my drafting table. Then I found out that not only is there a class of models for little planes with rubber band motors, there are curious exotics like rubber-band ducted-fan jets and CO_2 motors. International competitions are held all over the world. And even a journal, yours.

"A few pages later I saw entire columns devoted to indoor flight, free-flight scale and Walt Mooney's article on the Pussycat. I expect in a few months I should be able to build one of them in a few hours. And then, maybe, I'll take a flier at designing one of my own. Well, first I'll read up a little on aerodynamics.

"I suppose that after a while the novelty will wear off. I won't be rushing home from work to finish the stabilizer. I'll be able to crunch numbers at work without being distracted. But I think it will be a while before I lose interest.

"Now I'm learning to take a few sticks, some paper, and a little glue to come up with a hand-held marvel. It calls upon you to be creative yet precise, all the while remaining within the laws of physics.

"This letter ran a bit longer than planned. I'm excited about this. But I have to stop now. I just found there's a place called Jan's Hobby Shop up on 76th and York, and I might just get there before they close. They tell me they have balsa in bulk."

MARTIN TBF CONTEST

Yes, we know, it is a *GRUMMAN* TBF, however this event was instigated by Doctor John Martin, head creative wag of Florida's MIAMA model club. The idea is to make a model of President George Bush's WW II Grumman Avenger from plans and documentation available from MIAMA, c/o Dr. John "Doc" Martin, 2180 Tigertail, Miami, Florida 33133, for $2.95 to cover reproduction and postage. Please also include a pre-addressed 9 x 12 envelope to expedite shipping. (Offer good until April 1, 1990, U.S.A. only).

The event will be conducted during the 1990 U.S. Indoor Championships, June 10, 1989, in Johnson City, Tennessee. For those unable to attend, witnessed indoor duration times will be accepted, to be sent c/o Linstrum, to arrive no later than June 6. According to Doc Martin, the best time will win "a Presidential Citation. . . ."

NEW PRODUCTS DEPARTMENT

A veritable flood of new items have arrived during the past months, and we apologize for the brevity of our descriptions. More information may be obtained directly from the manufacturers.

DIELS ENGINEERING KITS

Dave Diels has released two more quality kits, both 1/24th scale, of traditional stick and tissue rubber-powered type. The first, a Grumman F4F Wildcat is based on the out-of-print *Model Builder* book *Flying Scale Models of WW2*. The second, a Japanese "Shinden" Canard fighter is a fascinating and unusual subject. Both kits feature printed balsa sheets, stripwood, lightweight tissue, molded plastic canopies, exceptionally complete plans, instructions and high-quality decals. These are strictly limited-production offerings available only factory-direct. The Shinden is priced at $18 postpaid, while the Grumman goes for $21.50 postpaid from: Diels Engineering, P.O. Box 101, Woodville, Ohio 43469.

COCONUT SCALE MONOCOUPE PLAN

Al Lidberg's drawing-board is always active, and his most recent offering is a magnificent construction plan for the 1930-31 Monocoupe which may be constructed in either standard or clipped-wing style, which in model form, means the difference between 40 inch and 29 inch wing span. The plans are unusually complete and feature numerous clever details as well as trim schemes. Priced at $6 postpaid, they may be ordered from: A.A. Lidberg, 614 E. Fordham Dr., Tempe, Arizona 85283.

PUBLICATIONS GALORE

ARGUS BOOKS, of England, must be running their presses overtime, because they are turning out new books faster than we can review them! We suspect Ron Moulton was determined to keep them busy after his recent retirement. . . .

AIRCRAFT ARCHIVES: This popular series features detailed drawings from past issues of *Aeromodeller* and *Scale Models International*, plus a wide assortment of photographs compiled in convenient form for model builders. *Aircraft of World War One*, Volume 3, contains data on aircraft of Great Britain, France, Germany, Austria-Hungary, and a lonely 'Jenny' from the U.S.A., highly recommended. *Famous Racing and Aerobatic Planes* features civilian competition machines of Great Britain, France, USA, Belgium, Czechoslovakia, and the Soviet Union, all in highly-detailed form representing a fantastic amount of research by AAP 'Pat' Lloyd and Harry Robinson. An absolute "must" for racing plane enthusiasts.

RADIO CONTROL HANDBOOKS: This ongoing series from Argus Books, provides practical instruction in almost every aspect of R/C modeling, compiled by specialists. Recent titles are quite self-explanatory: *Radio Control Foam Modeling*, by David Thomas; *Moulding & Glass Fibre Techniques*, by Peter Holland; *R/C Giant Scale Aeroplanes*, by David Bodington; *Ducted Fans for Model Jets*, by David James; *Covering Model Aircraft*, by Ian Peacock; and *Vintage Model Aeroplanes*, by Peter Russell. All are well-illustrated with typical *Aeromodeller* style crisp line drawings and photographs (a few of which we would like to have seen larger). Although specifically aimed at builders of R/C models, we found plenty of ideas equally adaptable to other model categories. Things have never been better for aeromodelers who may also be book collectors! Argus publications are available from Zenith Books (see advert in this mag) or directly from the publishers, Argus Books, Argus House, Boundary Way, Hemel Hempstead HP2 7ST, England. Please mention *Model Builder* when you write!

SIGN-OFF

From a Landsberg paper company advert: "Be careful of your thoughts . . . they may break into words at any time. . . ." •

Electric Pwr... *Continued from page 17*

what they have read or from the viewpoint of radio power supplies simply do not have the experience in high power applications to be able to help you.

Speaking of expert assistance, I strongly recommend the Bob Kopski columns in *Model Aviation* starting with the December, 1989 issue, in which he covers the advantages of a high pulse rate in speed controls. Bob goes out and TESTS in the field, and I am very impressed by what he has found. Basically, what he has done is prove that a 50-cycle pulse rate causes heating and power loss in motors at intermediate power settings, a 2000 cps rate does not. The consequence is that a low pulse rate throttle at partial throttle results in less flying time, and can damage the motor magnets from the heat. I had already known from reading that low pulse rates were bad for motors, but Bob has the first "hard data" that I have seen. Nice work, Bob! I agree with him, FIND OUT what pulse rate the throttle you are buying is using. If it is a 50 cps pulse rate, use it as an on-off switch, and avoid intermediate settings except for short times. I use JoMar throttles (2028 Knightsbridge Drive, Cincinnati, Ohio 45244) which have the 2000 cps rate, so I never have any problems. As I test other speed controls, I will now be more alert! Remember, my new address is 7100 CSW/MC, Box 734 PSC 2, APO New York 09220-5300. If you live overseas, you can write to me directly at Normannenweg 20, 6200 Weisbaden-Biebrich, W. Germany. The telephone number is 06121-844551 in Germany, or O11-49-6121-844551 if calling from the U.S. ($1.50 a minute!). For now, enjoy the "new generation" of electrics, and have a great 1990! •

Tech Stuff . *Continued from page 40*

planes knows that in spite of all precautions he will sometimes have wet R/C gear on his hands. I've had my share, so let's talk

about it. The first thing to do immediately after a model gets dunked, with the possibility of water getting into the model, is to disconnect the receiver battery. If the battery connector got wet, or if the switch or any servo connectors are wet, there will be one or more partial short circuits which will eventually run the receiver battery down. But that isn't the problem; batteries can be recharged.

The problem is the electrolytic corrosion that is going on inside a wet connector or switch as long as there is power on it. In a surprisingly short time this corrosion can eat clear through the fine contact pins on the battery and servo plugs. Not long ago I had a baffling radio failure. In tracing the trouble I noticed that the battery connector was missing a pin. I found it in the female connector of the switch assembly. It had corroded off from repeated wettings.

I repeat, disconnect the battery immediately. Tomorrow morning isn't soon enough. There will be a lot of damage by then. You may think that this doesn't apply to you because you only fly from fresh water. Oh yes it does. It is true that fresh water is a pretty good insulator, but there is always enough contamination on the surface of connectors and other electrical parts to provide a little conductivity if it gets wet. That small start rapidly grows into quite a leakage current because the metallic ions which are removed from the parts by electrolysis go into solution and provide a good (actually it is bad) low-resistance leakage path. Also provided, whether you want them or not, are green and white corrosion products, and damaged circuits.

With regard to salt water, I never fly from it and don't want to. I sympathize with and respect those who have to. Salt water presents a much worse set of problems.

OK, we have the battery disconnected and we have blown the water off the battery connector pins. The next most urgent thing to consider is the battery itself. It is still connected to its own wiring and if there is water inside the battery case or shrink tubing, there will be electrolytic corrosion going on. It will corrode off some of the intercell connecting wires if the water stays there.

However, most flight batteries are fairly well-sealed. Even if there is some water on the surface of the battery case, unless it was actually immersed in water for a time, there is a good chance that no water got in. Blow it off and give it some gentle heat for an hour or two to evaporate any possible moisture inside.

The receiver case is usually not well—sealed, and most receiver connector areas are completely unsealed. I try to protect the receiver from water by putting it in a small plastic bag which is then tied around the bundle of servo wires. The antenna comes out through a small hole in the bottom of the bag. This may sometimes keep water out of the receiver, if very little water got in the hull or fuselage, but it usually gets in anyway and I wonder why I bother with it.

So the receiver is wet. You have already disconnected the battery, so there is no electrolytic corrosion going on, but don't just let the receiver soak in its newfound juices. For one thing, some of the electronic parts may absorb water and change electrical value or fail. Also, the water got in easily, but it will be very slow in getting back out. Some of it will probably be there the next time you try to fly. "Try" is all you will do, because the electronics in a receiver contain a lot of high impedance circuits that definitely will not work when wet.

Disconnect the servos, take the case off the receiver, shake and blow out the water, and set the parts out to dry. A little sunshine or warm air will help. Maybe you can get it dry and fly again the same day, but overnight is safer.

Once dry and reassembled it will almost always work as well as ever. Of course if it got salt water in it you must wash the salt out *very thoroughly* before drying it.

The switch will usually dry itself OK in time. The only concern there is that if there is any water left in the switch when you reinstall the battery, electrolytic corrosion will start in the switch even though it is turned off.

We are down to servos. In the 1960s and early 1970s I remember getting water in the servos frequently, and had to remove the servos and their cases, and dry them like the receiver. Now, however, the servo case joints fit much better. I haven't removed a servo from a wet seaplane for years, and I obviously didn't need to, since

I have had no servo failures. I usually use "watertight" servos (Futaba), but I also use others in seaplanes and have no trouble. I "waterproof" the non-watertight ones myself, by running a bead of silicone sealer along the seams and around the electric cable where it enters the case.

So usually all you need to do is drain the water out of the plane after removing the battery and receiver, blow the water off the servos and switch, and let things dry. Some warm air from a hairdryer or a covering-shrinking heat gun will speed things up, but *watch* it. These blowers will melt foam and deform plastic push rods, fuel tanks, and maybe some servo cases!

All this is a bother and takes time, but it is one of the conditions we accept when we fly seaplanes. The alternative is to seal the airplane so well that no water ever gets in. Unless one is an exceptional craftsman, this seems to be a difficult thing to do. I'm going to try harder, but I'm not convinced that I could always keep all the water out. Certainly good sealing won't help if the plane splits open in a water crash.

WING CUBE LOADING

One of my goals in life is to try to give cube loading enough exposure that a few modelers and a few full scale designers and pilots will remember it and begin to use it so its use will grow.

If you are interested, read my September, 1989 column. That way you won't still be ignorant of the subject when most people will be using wing cube loading instead of wing loading.

I'm still learning about cube loading myself, both from the work a few other modelers have done on the subject, and from my own efforts. The latest from here is Figure 1. This chart, which I am finding very handy, relates wing area, wing loading and wing cube loading. It very nicely illustrates the major advantage of cube loading. Wing Cube Loading (WCL) is independent of plane size, while wing loading is directly dependent on the size of the model or airplane, and is therefore very confusing when one is trying to compare models of different size, or comparing a scale model to its prototype.

For instance, let's say you have a model with a wing loading of 20 oz/sq. ft. That is a wing loading number which many modelers would accept as about right. Is it about right? That depends on how large the model is. If it has about four square feet of wing area (about 58 inch span and 10 inch chord), the wing loading of 20 is fairly average. If it is one of the BIG BIRDS that Al Alman writes about, and has a span of 116 and a chord of 20 inches (16 sq. ft. of area), a wing loading of 20 is very low. A model that size will normally have a wing loading around 40 or more.

And if the model is very small? Say 29-inch span and 5-inch chord (one square foot). Now a wing loading of 20 would be much too high. It should have a WL down around 10 oz/sq. ft. Actually, I chose these three hypothetical models so I could easily pick their positions from Figure 1. At the respective wing loadings of 10, 20, and 40 they would all have the same relative weight and they would all fly the same for their size.

How do we relate these three functionally-similar models to each other? By Wing Cube Loading. It is the same (10 oz/cu ft.) for all three models. You saw in the September issue that the formula for WCL is weight in ounces divided by the wing area in square feet and by the square root of wing area, which is the same as dividing by area to the 1.5 power. We offer an easier way. If you have the wing area and wing loading of a model, you can use Figure 1 to get its Wing Cube Loading.

A Wing Cube Loading of ten is a good light loading for any size model (or any full-scale airplane). A WCL of five is very light, and one of twelve is near the upper limit for anything but racers, which may go as high as fifteen. Learn to think in terms of Wing Cube Loading. It is much more useful and less misleading than wing (area) loading.

A correspondent has argued that he doesn't build scale models and therefore doesn't need the complexity of cube loading. He does build models of different sizes, however, and he actually did get into trouble on one design because he ignored some of these scaling facts.

In Figure 1, I used log scales for both the ordinate and the abscissa, since the constant-wing-loading lines are theoretically straight this way, making it easier to plot them accurately and easier to read them.

Speaking of the September "chapter" of MD&TS on wing cube loading, I presented a chart there proposing some circles to indicate areas where different types of models might be found. I said in connection with that chart that I was only guessing how big these circles should be and just where they should be located. Time has

shown that my guesses were no better than I guessed they would be. Several of you have told me about special good models that fall well outside the circle of their category. The circled areas are only generalities, not gospel.

FLIGHT LOGS

For over twenty years I have kept flight logs on all of my R/C flying. I'm now in the middle of volume five. Why bother? Because it helps me to become a better designer, builder and flier in a number of ways. It is a record of many interesting and often important things I would otherwise forget. It is an organized place to keep data on batteries, engines, control surface settings, performance, weather, and *pilot errors* I don't want to repeat.

Mine are more than strictly log books. I could call them my modeling diaries or notebooks. I include all of my observations related to design, construction, adjustment, and piloting problems. I discuss in the log the things that work well and the things that don't. Materials, processes, model products, and accessories get covered when the occasion arises. I am (was) a pilot and kept a log book, but my modeling log books are much more extensive and much more useful.

I use bound notebooks with 8-1/2 x 11 pages, and write legibly in ink. The pages are all numbered and there is much cross-referencing within a volume and between volumes. Every flight gets recorded, and will take at least two or three lines. A flight that ends in a crash or was otherwise unusual may get a full page or more of the log book. In all cases the name of the model, the date, the weather, the time of day, the number of flights, the location, the length of the flight, type of flight, how well I flew it, and all other pertinent data, such as planned changes in cg position, is recorded. It is not a chore. I enjoy keeping the log, and it has proven to be *very* useful. I refer to back pages and to back volumes of my log books surprisingly frequently.

PARTING WORDS

"Though the study of aerodynamics may appear to be intricate - it is not, for it involves only the simplest forms of physics and mechanics and necessitates a sound understanding of only the lowest degree of mathematics." Avrum Zier, *Flying Aces Magazine*, August, 1935.

Francis Reynolds (AMA # 9241), 3060 W. Lake Sammamish Parkway N., Redmond, Washington 98052. SASE please. (206) 885-2647. •

ARFS..... *Continued from page 39*

utes, then resting and talking. Ralph was in no hurry to solo, and I certainly didn't want to rush him, so we just kept up the easy pace. Now, Ralph didn't have any model building experience, but he was a craftsman in other fields. He was intensely interested in model building methods, and I remember one of our discussions lasted over an hour and dealt just with the various glues we use today. After his first two flying lessons Ralph got himself a senior citizen membership in the AMA, started reading all the model mags he could find, and began assembling an ARF intermediate trainer. As he is a most meticulous worker, he does everything slowly. For example, I think it took him four evenings just to glue the two wing halves together. But all that is fine with me, because he is having a great time working on his ARF while he builds up flying time on my old-timer. How is he doing? Well, with three or four hours of air time to his credit he still often turns left when I call for right. Sometimes when he needs more throttle he pulls the stick back instead of pushing it forward, but I don't get too serious about it, because he is having the time of his life. He doesn't like flying more than ten minutes at a time, as he does get weary and starts making even more mistakes. But our trainer is very forgiving, and he is never in any real danger. Maybe he won't ever be able to fly on his own, but he loves the hobby/sport dearly, and he looks forward to the companionship he finds at the flying field.

The three cases we have just examined allow us to draw a number of conclusion.. First, no two students are alike when it comes to flying R/C. Each has a different pace he must follow, and each has a different goal he wishes to achieve. One beginner may only regard it as a passing fancy, like a toy to be picked up, played with, and discarded after a time. Another becomes so deeply involved that his entire life eventually revolves around R/C flying. And

somewhere between these two students lies the one who for one reason or another never gets really proficient at R/C. He loves doing it, goes to the flying field every chance he gets, relishes every moment in his workshop, but can't really get it together when it comes to flying. Perhaps he will end up as a master builder, leaving the flying to others. I'm sure many of you know such a modeler. Almost every club has those who would rather build than fly. We certainly have room for them in the hobby. We welcome them, especially those of us who would rather fly than build. So we mustn't turn down anyone who asks us for assistance, for by offering our help and guidance we may be instrumental in gaining an outstanding future pattern flier, or possibly a builder of exquisite scale models, or maybe just another sport flier to keep us company at the local flying field. Sure, we'll lose some novices here and there, but consider all the fun we'll have in looking for that diamond in the rough!

Art Steinberg, 2267 Alta Vista Drive, Vista, California 92084. Telephone (619) 726-6636, FAX number (619) 726-6907. •

Champs ... *Continued from page 44*

young Japanese, 18-year old Kazuyuki Sensui. He works for Isumi Model Company. He was F3C Japanese champ in 1987. Sensui flew a Kalt helicopter. The fiberglass fuselage resembles a Bell Jet Ranger, but with many modifications, notably the web between the landing skids and the fuselage. This theoretically improves the lateral stability in forward flight. But imagine what happens in a hard landing. Kalt Black-10of single teetering rotor heads were used. On one of his models the rotor head has one rubber damper. On the other model the rotor head has two dampers. I assume the two are set to give different flap stiffness for different weather conditions. But both are single teetering, not individual flapping design. Both Dobashi and Sensui rotor heads were set up with very soft teetering stiffness (about half that of the American and European rotor designs). Instead of following the American and European styles of using fly-bar weights for stability and thin paddles for controllability, Japanese used heavy, thick Hiller control paddles for stability and large paddle area for controllability. The consequence of this choice is a very smooth, slower response, and a more gentle helicopter which is less likely to cause pilots to get into pilot induced oscillations (P.I.O.). Sensui had the only belt-drive tail rotor helicopter at the meet. OS 61 engine, JR PCM 10 radio and JR120 gyro were used. All three Japanese contestants used wood rotor blades with lead weight. The blade tips were all swept back parabolically (see the photo).

Shizuo Ishikawa, the third Japanese team member, placed fourth at the world championships. Naturally, the Japanese team captured the overall team trophy. Ishikawa was the only Japanese team member who also participated in the last World Championships held in Bern, Switzerland. He was fifth last time. Same as last time, Ishikawa flew a Kalt Bell 222 fuselage with retractable landing gear. In fact, he had the only Bell 222 at the contest. At the previous World Champs, there were a few Heim Bell 222's, but since the introduction of the Heim Lockheed 286 two years ago, the Heim 286 became more popular. Ishikawa's Bell 222 had TSK mechanics and TSK hingeless rotor head. The closeup picture reveals the TSK H-30 hingeless main rotor design. The retail price in Japan is 44,000 yen, about $340. It has 88% Bell-Hiller mixing ratio. TSK recently replaced the H-30 with a new H- Multi Custom "Pearl III" Pro hingeless rotor design (45,000 yen). Basically, it is similar to the H-30, but it is black anodized. (If you are interested in purchasing TSK products in the U.S., give Nick Nicholas, at Vortex Precision Products, a call, (714) 220-2112. He is located in Anaheim, California, and he imports the TSK line.)

The advantage of a hingeless main rotor head is that there is absolutely no teetering slop. Most teetering rotor designs such as Hirobo, GMP, and Kalt Baron use a teetering pin that can move very slightly inside the bearing. This is unavoidable. The floating axle design such as on Schluter and X-Cell also have a very minute amount of teetering slop. Again, this is unavoidable because in order for the axle to tilt, there must be some degree of freedom. As shown in the picture, for hingless rotors, the blades flap up and down by elastically bending the spring steel flexbeam. If designed properly, the flexbeam functions like a very linear spring system with no deadband at the center. In other words, the pilot can input very precise cyclic command and the rotor will tilt very precisely,

too. The handling qualities of a hingeless rotor is determined by the spring stiffness of the flexbeam. The old Baron 30 and Cyclone I rotor heads had very thin flexbeam, thus, the control was very docile. TSK H-30 and H-300 have thicker flexbeam which is more suited for F3C aerobatics. For more discussions, please refer to the rotor design theory article in June, 1989 *Model Builder*.

At 37, Ishikawa was the oldest member of the Japanese team. As he also works for Futaba, naturally, he used Futaba's top of the line 9-channel PCM 1024 radio and a 153BB gyro. I am presently using one of these radios in my Schluter Magic. Indeed, these modern computer radios are impressive! The discussion of the 1024 features are included in the Magic/Futaba 1024 review in this and the next issue.The other common denominator among the Japanese is that they do not use a neck strap, nor a transmitter tray. The transmitter tray is an European invention, and the neck strap is an American invention. When we buy a Japanese radio, we get a free neck strap only because the Japanese are good businessmen, they know what American buyers want. If we could figure out what the Japanese want, then our trade deficit to Japan wouldn't be so high!

The other interesting observation is that nearly all the Japanese R/C aircraft and helicopter modelers fly on Mode One, which means elevator and rudder on the left stick, and throttle and aileron on the right stick.

The Japanese team operated in a very organized manner. Each member brought at least three helicopters. Each pilot had a caller/mechanic. Then there was a team manager. Then there were three or four other gophers who just ran errands. Underneath the Japanese team workbench there was an abundant supply of sodas, fruits, cookies, noodles, and munchies, etc. The three Japanese members flew machines from three different manufacturers, but the manufacturers all united together and covered the bill for them to travel to Hawaii for a month of vacation and practice right before the meet. Their whole attitude is they were out to win. It was no fluke, they won the previous two F3C World Championships, too. What did they do after they won? They probably said, "We are going to Disney World!" After you read this article and look at the photos, we should all realize that there is nothing fancy in their machines. It's all practice, practice, and practice. The next World Championships will be in Milan, Italy, in 1991. Go practice! •

F/Flight .... *Continued from page 52*

amount of lead required at the back to balance the model.

FEBRUARY MYSTERY MODEL

Back in the late 1950s, the FAI engine of choice was the Oliver Tigre .15 diesel; however, Leroy Cox did some design work and came out with one of the prettiest .15-sized engines ever produced. He called it the Olympic .15, and it was intended for FAI competition. This engine was a rear intake reed valve design with dual ball bearings, and the other familiar Cox traits. This month's Mystery Model was designed to use Leroy's new engine.

The model used high thrust, rear fin, rectangular planforms, flatbottomed airfoils, and double tissue covering. The designer of the model was very prolific during his heyday, and even though this Mystery Model came at the end of his active free flight career, he continued to be influential with the model airplane scene for another 25 years.

So, here's the deal. If you know the name of this month's model, write it on a postcard or letter and drop it in the mail posthaste. First in line with the correct answer gets a free, one-year subscription to *Model Builder* magazine. Send your entry directly to *Model Builder*, c/o Bill Northrop, editor.

FEBRUARY DARNED GOOD AIRFOIL—GOTTINGEN 155

For this month's DGA, I have reached back to the Comprehensive Reference Guide to Airfoil Sections for Light Aircraft. The section presented is one of the many airfoils developed and tested by the Gottingen Laboratories in Germany. The year of this test was 1917.

What is appealing about this airfoil is the low entry angle coupled with a reasonable top camber and a moderate undercamber. It appears to be very similar to the Goldberg G-610B section, although it should be

faster on the climb. It would he a reasonable substitute for the MCA 4409 used on this month's three-view model.

I would recommend it for lightweight gas models, and would not be afraid to try it on a number of lightweight rubber models, such as larger Mulvihill designs. Construction should feature a sheeted leading edge on top or false ribs. Standard T.E. stock could be used because the T.E. is reasonably thick.

BOB MEUSER HANGS IT UP—AGAIN!

Way back in October, 1971, The National Free Flight Society Digest listed, for the first time, the name of Robert Meuser as Editor. Following this special 1971 Nationals issue, Bob continued as either the Associate Editor to George Xenakis' editorship, or finally, with the January, 1973 issue, he became the 'main man' until 1977. Other than mid-1977, when Keith Varnau took over the driver's seat for a couple of issues, until July, 1980 when John Oldenkamp finished a three-year term to the present, Bob has been the driving force behind "Free Flight." At the same time he was editing, and writing much of the copy for Free Flight, Bob was also doing the monthly column for *Model Aviation*. Rightfully, he was honored by The Distinguished Service Award from the National Free Flight Society for his service to both the Society and the free flight arm of model aviation.

It is time now, to give our collective thankyou to Bob Meuser, who is calling it quits after "only" about 20 active years writing and editing materials about free flight. Much of what I know and what you know has come through Bob. I am not sure what kinds of accolades and honors will come to him for his contributions, but they will not be enough. I will miss his ascerbic wit and pointed insight. It was great fun while it lasted, and it lasted a long and fruitful time. Goodbye and good luck, good friend.

The mantle of editor of Free Flight has been passed to Chris Weinreich, 905 W. 5th Ave., Olympia, Washington 98502. Chris has most recently seen service as the editor of the Bat Sheet, newsletter of the Kent, Washington Strat-O-Bats. All you newsletter editors and other free flight fanatics should put Chris on your mailing list.

INDEX TO ADVERTISERS

MORE NFFS—WANT TO JOIN?
NEW MEMBERSHIP
CHAIRMAN ANNOUNCED

After two years in which the National Free Flight Society saw a resurgence in membership, Sal Fruciano is stepping down as the membership chairman. The new man at the helm is Nat Comfort, who resides at 12324 Percival St., Chester, Virginia 23831. If you are not a member, you ought to be. With the AMA turning over more and more of the free flight activity to the NFFS, your membership will help keep an organized voice for free flight here in the USA. The cost is only $15.00 per year or $26.00 for two years. Send your check to Nat Comfort today and be a full-fledged free flight supporter.

NEED A SCREW?
CONTACT PLENNY BATES

In fact, Plenny Bates has many filister head screws that he would like to get into the hands of free flighters everywhere. He has 2-56 x 1/2" nylon screws that he is willing to sell at 25 for $1.00 plus an SASE with 45 cents postage. If you have been wondering where to get these little goodies, contact Plenny Bates at 2505 White Eagle Trail, S.E., Cedar Rapids, Iowa 52403.

CORRECTION—CORRECTION

In the January issue of *Model Builder* Free Flight, I noted that the plans set for the Stardust Nostalgia design would set you back $5.00 plus postage. Since that article went to the printers, I got a copy of the plans from Don Wensel. I did not count on a 2-page set of wonderfully drafted plans with all ribs drawn to size and the whole works. This is a quality plan set, and at the correct price of $8.00 per set plus $1.00 for postage in the USA, it is a real steal. If you want a set of these plans, contact Don Wensel at 1233 Sunford Ave., SE, North Canton, Ohio 44720. Make sure you send $9.00 with the letter.

SOUTHWEST REGIONALS ANNOUNCED—
FEBRUARY 10 AND 11, 1990

This is the 40th Annual Southwest Regional, and it will be held at the new site in Eloy, Arizona. This meet was once known as and held at Buckeye, but now the Southwest Regionals Association has an excellent location just Southeast of Phoenix on the road to Tucson. For those of you who like good wintertime competition along with some sunshine, this is a good place to be this February. Al Lidberg is the Free Flight C.D., but the meet also features R/C Old Timer events, R/C Soaring events, and a MECA Collecto to fill out the weekend.

For more information about the full slate of 18 free flight events and all the rest, contact Al at 614 E. Fordham, Tempe, Arizona 85383 or call (602) 730-9180.

Plan prices subject to change without notice.

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All Full-Size plans purchased from *MODEL BUILDER* Magazine include a reprint of the construction article, if building instructions were part of the article.

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No. 1173-OT TRENTON TERROR $8.50
Gas job from 1938 Flying Aces. Span 6.'. Simple lines. Redrawn by Phil Bernhardt.

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EAA type R/C sport biplane, mostly spruce, for 60 engines. By Bill Northrop.

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Bird-like slope/thermal R/C glider, 48" span. Plan shows three wing types. E. Heyworth.

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Bob Benjamin's 34" floats, designed for the Astro Porterfield or similar size elec. models.

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Canadian Roy Nelder's beautiful rubber ship. A real classic. Plan by Phil Bernhardt.

No. 1901 THE EDGE OF KNIFE $12.00
Tyrone Parker's super-aerobatic R/C ship, for .19-.25 power. A hot one! 40" span.

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Walt Good's classic rudder-only R/C model from '54 *Air Trails*. Span 61", .19-.29 power.

No. 12892 YAK 9 $17.00
C/L replica of famous Russian fighter, built almost completely of cardboard. C. Felton.

No. 1289-O.T. CADET MINOR $4.50
A slick little rubber-powered model kitted by Bunch before WWII. By Florent Baecke.

No. 11891 SEASPORT II $17.00
Large, non-scale but realistic looking flying boat for .60 power. 86" span. By Steve Gray.

No. 274-O.T. PACER "C" $9.50
Sal Taibi's famous 1941 Nats winner, 60" span. Easily converted for R/C O.T. events.

No. 10891 SWAN $18.50
Unusual tandem-wheel canard, .45 power. Has flaps on wing and canard. A.G. Lennon.

No. 1089-O.T. PINCH HITTER $10.00
Clean 56" Class B shoulder-wing originally designed to use no balsa. Plecan/Shurman.

No. 9891 EEE-Z-FLI $7.50
Basic .20 powered trainer. High/low wing, trike/taildragger. Al Wheeler

No. 989-O.T. INTERCEPTOR $6.50
Goldberg's hot Class A pylon model adapted to 1/2A R/C Texaco. Jim Reynolds.

No. 8891 SIMPLEX $12.50
Paul Plecan's 1941 F/F design, adapted to R/C. Easy to build and fly. Stu Richmond.

No. 7891 TIGERCAT Mk. II $15.00
Very pretty scale-like low-wing sport model. 60" span, .65 4/c. By Bob Benjamin.

No. 7892 STINSON MODEL "U" $12.00
Profile scale C/L version of the colorful 1930s airliner for three 1/2A's. By Mike Keville.

No. 1173-O.T. TRENTON TERROR $8.50
Gas job from 1938 Flying Aces. Span 72". Simple lines. Designed by Mickey DeAngelis.

No. 6891 SEA FLI XI $12.50
Composite foam/fiberglass R/C seaplane for .60 to .90 power. By Francis Reynolds.

No. 1174-O.T. LANZO STICK $7.50
Rubber stick winner, '40 Nats. 4-1/2'. Still good in Unlimited. By Phil Bernhardt

No. 5891 HUMONGOUS SAGE HEN $21.50
The ultimate R/C trainer. Big 84" span, .40-.45 power. Bruce Edwards and Al Alman.

No. 589-O.T. G.E. CABINETTE $7.50
Cute 36" cabin ship from 1942 M.A.N. originally powered by Atom .09. Frank Ehling.

No. 34891 PRETTY BIRD $12.00
Simple, lightly built 58" sport R/C ship for .40-.48 four-strokes. Alex McLeod.

No. 3489-O.T. SUPER STOFER $6.50
Half-A version of Harold Stofer's 1939 pylon model. 34" span. By Jose Tellez.

No. 2891 NORD 3202 $10.00
Scale model of French primary trainer, for .19 to .25 power. By Ted Schreyer.

No. 2892 1/3 GIPSY MOTH $25.00
Plans blown up from original 1/4-scale design by Bill Northrop. Ten-foot span.

No. 289-O.T. ALERT $10.00
Very competitive 53" B/C pylon design by Michael LaTorre, from Dec. '42 A.T.

No. 1891 DAYDREAM BIPLANE $23.00
A big, easy-flying sport scale designed for a .65 4-stroke. 60" span. Benjamin.

No. 1891-O.T. LI'L MISERY $7.50
An interesting fuselage pod-model from '42 with 50" span. By Cohen & Worth.

No. 12881 R/C GUFF $25.00
Pioneer R/C aircraft, won '38, '39, '40, '47 Nats, now in Smithsonian. Walt Good.

No. 11881 THE WHISP $10.00
Simple R/C hand launch glider for slope or park flying. 49-inch span. By J. Tank.

No. 11881-O.T. CLASS C GLIDER $7.50
A Joe Weathers classic-glider design from Flying Aces, 1939. Wingspan is 30 inches.

No. 10881 HAWKER HURRICANE $17.00
A control line sport scale for .30 to .40 engines, made of cardboard! C. Felton.

No. 1088-O.T. PORTERFIELD $7.50
Rubber scale monoplane from 1940 Flying Aces. 28-inch span. C. McCullough.

No. 9881 BLACK STAR $10.00
A swept-wing, Vee-tailed R/C model for an .049. Uses foam wings. By Saponara.

No. 9882 CONSOLIDATED XBY-1 $7.50
A rubber-powered bomber in 1/20 scale with a 27-inch span. By Mark Fineman.

No. 1073-O.T. GOLDBERG ZIPPER $10.00
Most famous of all OT gas models, ended cabin era. Redrawn by Phil Bernhardt.

No. 8881 MEYERS OTW-160 $10.00
A sport-scale replica of a classic biplane for .45 power. 50-3/4" span. Rohrback.

No. 8881-O.T. F.A. COMMERCIAL $5.00
From the October, 1936 issue of Flying Aces, a fun rubber job by Herbert Spatz.

No. 7881 LITTLE JOHN $10.00
Reduced-size version of Bill Northrop's "Big John," for 4-strokers. A. McLeod.

No. 788-O.T. FOO-2-U-2 $5.00
A small electric version of Dick Obarski's 1938 Old Timer favorite. By Don Srull.

No. 6881 SUKHOI SU-26 $10.00
A control line profile model for .35 engines. 48-1/2-inch wingspan. R. Schneider.

No. 973-O.T. SPOOK 48 $8.50
Well-known gull wing design qualifies for Antique Old Timers. By Snyder & Muir.

NOSTALGIA RULES GETTING SET FOR A NATIONAL LOOK

One of the difficulties with events that develop regionally is that the rules are not always the same from region to region. It seems that most of the country uses the NFFS Nostalgia rules with few variations, but in SoCal, there are the San Valeers Rules, and here in the NW, we fly by the Willamette Modelers Club rules. Although the major rules areas are the same, some prominent differences occur. Specifically, the NFFS has a strict set of rules regarding which engines can be used. The San Valeers allow T.D. engines. The WMC allows any engine that was manufactured prior to 1957 and any loop scavenged non-ball bearing engine produced since then except for T.D. engines.

The NFFS and San Valeers allow any model design to be scaled up or down and the WMC does not allow scaling.

All three groups acknowledge the difficulty with the current fly off system which does not use either a progressively decreasing engine run or increasing max. Some means to reduce the number of marathon fly offs in this event seems to be in the offing.

In an effort to move toward a more national set of Nostalgia rules, the WMC has appointed a trio of members, headed by Chuck Gode and including Jack Moreland and Al Grell. This group will work with Bob Larsh and Ralph Prey to see if some compromises and changes can be made so this event can he flown under the same rules regardless of location in the country. A good move, from my point of view.

No. 5881 FEATHER **$10.00**
A very easy-building hand-launched R/C glider with a four-foot span. Frank Green.

No. 673-O.T. ALBATROSS **$10.00**
Class C gas ship designed by George Reich. Redrawn by Phil Bernhardt.

No. 4881 BOXY-Z **$7.50**
A 1/2A canard design for R/C with Ace foam wings, easy building. By G. Weber.

NEW TOWLINE WINCH FOR YOUR GLIDING PLEASURE

Recently, I received a phone call from Schaul Chorev, who is studying at the University of Oregon. Schaul has been a World Championship contestant in F1A (Nordic), and an official with the Israeli National Team. Schaul and one of his teammates have developed some improvements to the nylon "Towmaster" reel that has been in use in the USA for the past 15 years or so. Here are the major improvements over the Towmaster:

1. The reel has two speeds for reeling in the line.
2. The reel has an enlarged useful diameter allowing heavier line to be stored.
3. The entire unit is lightweight and disassembles easily for cleaning.
4. A second wheel is incorporated into the design to support the drive wheel.
5. The entire unit is made from polypropylene and nylon.

Best of all, the full price for the complete unit is $15.00 postpaid. Order yours from Schaul Chorev, 222 Blackburn St., Eugene, Oregon 97405. Phone: (503) 485-5101.

THAT'S IT FOR NOW DEPT.

Another month's column draws to a close. As I write this, it is raining out here in the great Northwest, and we are into the indoor flying and outdoor building season. It's a great hobby; enjoy it. •

Jake..... *Continued from page 7*

me four airplanes, two boats, and an off-road racer to date.

Jake

* * *

Dear Jake:

I read in the September, '89 issue about Tucson Tony and his pattern ship trip. We were flattered to have our beautiful city referred to as an exotic port-of-call. We don't see too many pattern airplanes here in the Red River valley. Sorry, Tony, we didn't see yours as it passed through. There was one small catch in your story. The airline may have misinformed you on your plane's itinerary, but Grand Forks is in North Dakota, not South Dakota. R/C flying is alive and well here in the Northland.

Mike in Grand Forks, North Dakota

Dear Mike:

North Dakota, South Dakota! What's the difference? You sound like my geography teacher. She was always mad because I never knew what the capital of Omaha was.

Jake

* * *

Dear Jake:

I have recently moved to Yuma, Arizona. I have not yet been able to fly any of my old-time models. However, the air feels light here. Several times, while playing golf, I have felt light headed while facing the wind or while running away from a broken window. Being relatively hairless and having a side profile somewhat like a modified Clark-Y, I wondered if this anomalous feeling could be extreme lift. There doesn't seem to be any other old-time modelers here. Do you think I dare try flying one of my nine bombers?

Yuma Doc

P.S. I sold all of my aerions to Don Bekins before leaving California.

Dear Doc:

I spent a year in Yuma one August. I even played some golf. The fairways were nice and hard, so you got a good roll, but the browns were tricky for putting!

Those strange feelings you've been experiencing could be lift, but then again they may just be the Mexican food. Take a bi-carb. If you still feel it, then go ahead and fly.

I bought your aerions from Don, by the way. I put them in the tires of my Buick. Unfortunately, they didn't lighten the load enough to improve the handling. I did lose the spare, though, when I opened the trunk and wasn't quick enough to catch it as it floated out.

Jake

* * *

Dear Jake:

I am sorry for not replying sooner, but I found the magazine late. That's right, "found" it. Evidently the mailman was reading your column, and after he finished it, he chucked the magazine in the closest dumpster. A few days later I was taking a walk in the neighborhood and saw a tattered cover of RCMB in a dumpster. After a closer look, it was my magazine!

Of course, I read your column first, and this is where I want to make my comments.

Regarding the September, 1989 issue and the debate on the merits of Mr. James Wang's helicopter writings. I would like to add my vote to the manure side of the ledger. I would like to know how Mr. Wang can get his clutch shaft within .003 inches (page 38, bottom left photo) when he can't even center the clutch shaft between the side frames within an ⅛th of an inch (same page, bottom right photo)? Such craftsmanship! Sometimes I really wonder. . . .

Hover Lover in Los Angeles

Dear Hover Lover:

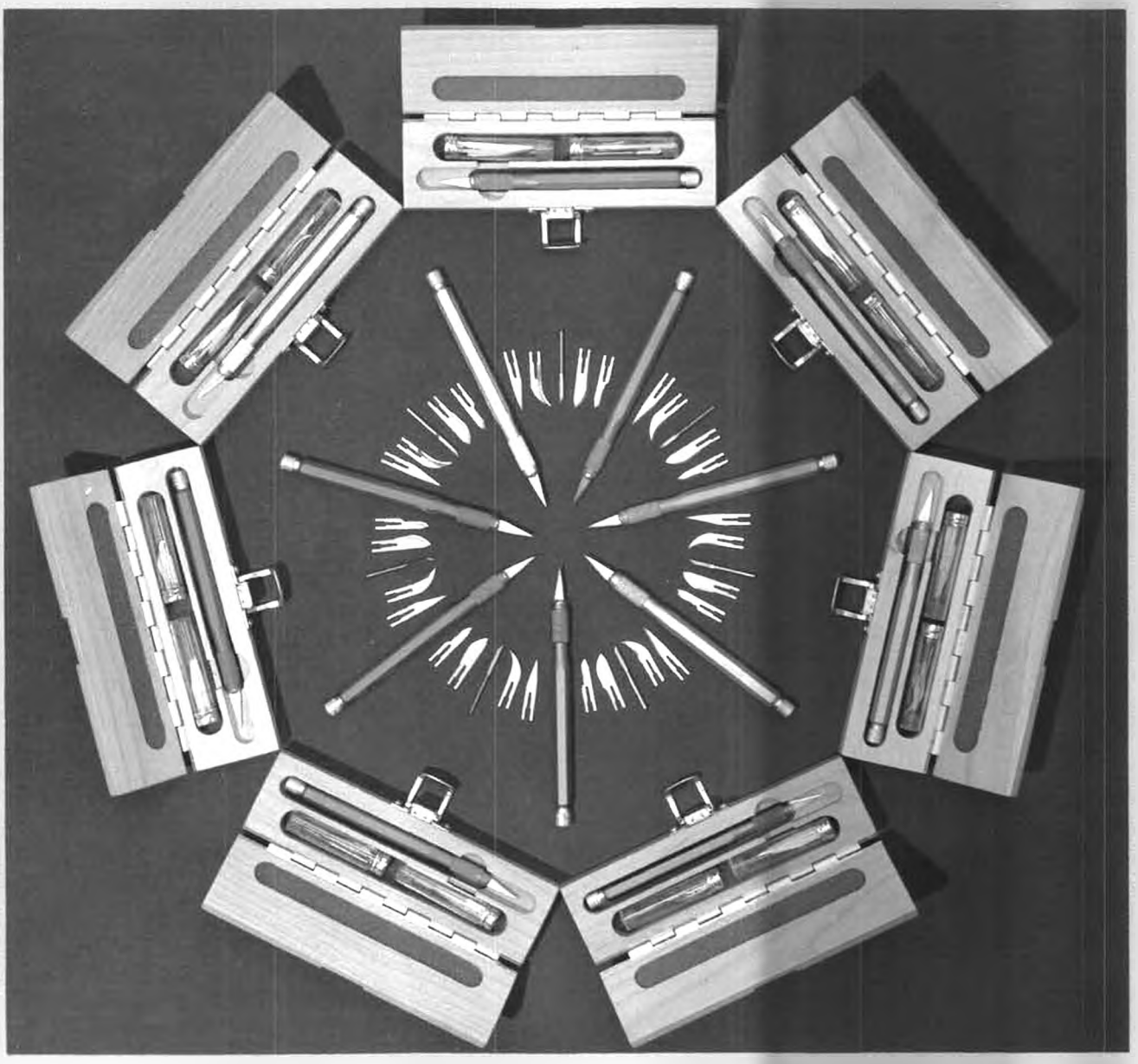
In the interest of keeping an open forum, I have published your letter. However, as I know absolutely nothing about helicopters, I will neither impugn nor refute your opinions.

Keep in mind that my experience is limited to fixed wing aircraft, but personally, an 1/8th of an inch out of alignment doesn't sound like such a big deal to me. Most of my spinners don't fit the fuselage within 1/4-inch, but it doesn't make the airplanes fly any worse. Come to think of it, it probably doesn't make them fly any better either.

Jake•

* * *

IN THE BEST CIRCLES, IT'S **über skiver**



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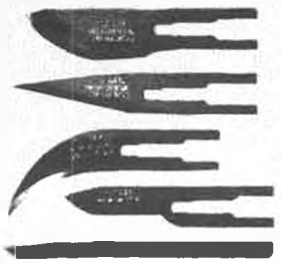

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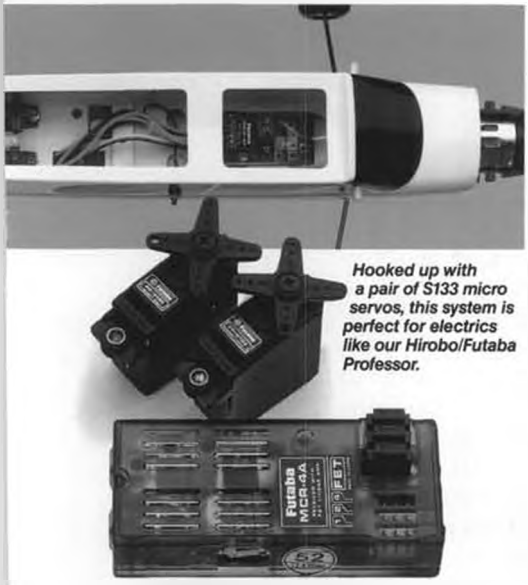
THE ATTACK 4NBL

Our newest 4 channel system has something for everyone. In fact, the Attack 4NBL is such a versatile performer we've customized it for all kinds of radio control fun.

ATTACK ELECTRIC

The 4NBL/MCR system is destined to become a favorite with electric flyers. This Attack system comes complete with our new MCR-4A integrated receiver/speed control. This remarkable device incorporated a four channel receiver and a MOSFET speed control into one very compact, very light and very efficient package. It also incorporates BEC to eliminate the need for, and extra weight of, a receiver battery.



Hooked up with a pair of S133 micro servos, this system is perfect for electrics like our Hirobo/Futaba Professor.

The MCR-4A four channel receiver/MOSFET speed control weighs just 1.5 oz. and can easily handle 280 to 540 size electric motors. 1.24" x 2.92" x 0.63"

SILENT ATTACK

There's a 4NBL system for sailplane flyers, too. With the Attack glider package you get a pair of S133 servos, R114H four channel receiver and a 250mAh NiCd pack. Again, when size and weight of the airborne package is critical, Attack is the answer.

Transmitter/T4NBL				
RECEIVER	SERVOS	BATTERY	FREQUENCY	TYPE
MCR-4A	S133(2)	BEC	72MHz	Electrics
R114H	S133(2)	NR-4K	72MHz	Sailplanes
R114H	S148(3)	Dry Case	72MHz	Aircraft
R114H	S148(3)	Dry Case	75MHz	Truck/Boat

ARF ATTACK

Looking for the perfect system for ARF and conventional sport aircraft? Once again, it's Attack to the rescue with a high value package including R114H receiver and three S148 servos.

4X4 ATTACK

There's even a surface Attack 4NBL system on 75MHz. Supplied with three S148 servos and R114H receiver, this ground and sea outfit has what it takes for gearbox-equipped 4x4's and RC boats.

The ergonomically designed T4NBL transmitter features comfort contoured case and adjustable length control sticks.

No matter which 4NBL system you choose, you'll also get our new four channel Attack transmitter.

Loaded with extras like adjustable stick gimbals, servo reverse switches and a rechargeable NiCd pack, the T4NBL transmitter also features a comfort contoured case and neck-strap for fatigue free operation.

The R114H and MCR-4A receivers both meet the new 1991, 20KHz specifications.

Futaba. 20KHz 1991

Futaba Corporation of America
555 West Victoria Street, Compton, CA 90220

At Last, A True Racing Truck.

For a change, someone didn't just modify a racing buggy and call it a racing truck. Tamiya's new Nissan King Cab was engineered from the ground up, with racing technology. And it's evident in every aspect of its performance.

In the turns. In the straight-aways. You're in control. That's why Tamiya, makers of the best-selling monster trucks in America, built the Nissan King Cab, so you'll stay in the lead.

Everything about this Nissan King Cab is exciting. From its mammoth spiked racing tires, to its ball bearing type differential, it out-handles the others.

For example, an angled front-end allows for better handling when you're landing after a jump. While a fiberglass reinforced subframe adds stiffness. This King Cab accepts a broad range of gear ratios to compensate for various track conditions. You'll also find six special, sealed ball bearings in the transmission for increased performance and spur gears of 70 teeth and 77 teeth. What's more, optional, hop-up parts include assorted pinion gears so this beauty can easily adapt to different track conditions.

It's all here. A real racing machine. A dynamite looking truck. See it at your hobby dealer.

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