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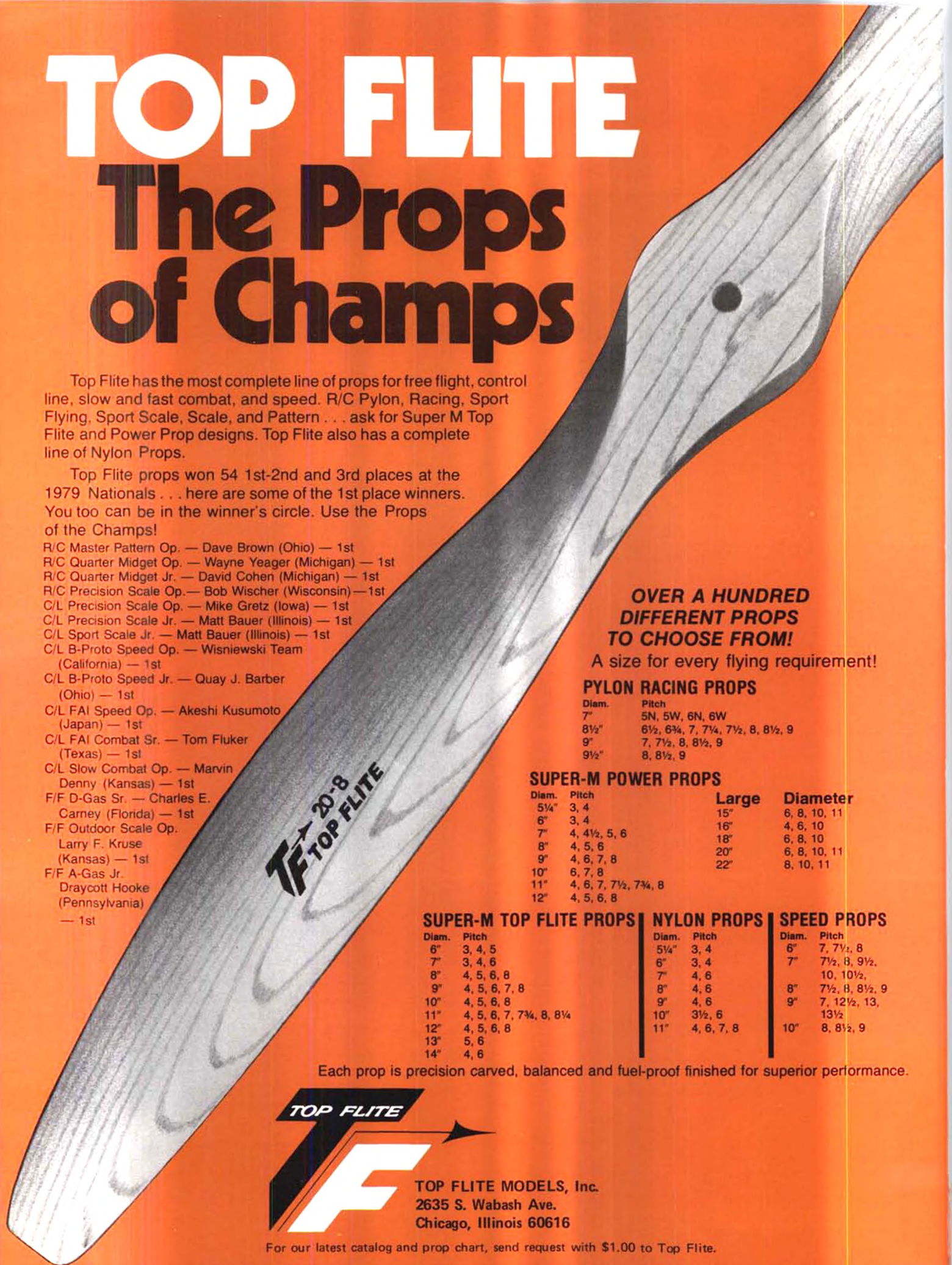

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9½"	8, 8½, 9

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Diam.	Pitch
5¼"	3, 4
6"	3, 4
7"	4, 4½, 5, 6
8"	4, 5, 6
9"	4, 6, 7, 8
10"	6, 7, 8
11"	4, 6, 7, 7½, 7¾, 8
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Large	Diameter
15"	6, 8, 10, 11
16"	4, 6, 10
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20"	6, 8, 10, 11
22"	8, 10, 11

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Diam.	Pitch
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7"	3, 4, 6
8"	4, 5, 6, 8
9"	4, 5, 6, 7, 8
10"	4, 5, 6, 8
11"	4, 5, 6, 7, 7¾, 8, 8¼
12"	4, 5, 6, 8
13"	5, 6
14"	4, 6

NYLON PROPS

Diam.	Pitch
5¼"	3, 4
6"	3, 4
7"	4, 6
8"	4, 6
9"	4, 6
10"	3½, 6
11"	4, 6, 7, 8

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Diam.	Pitch
6"	7, 7½, 8
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1982

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CONTENTS

FEATURES

CONSTRUCTION

Cover: Top photo is of Mick Charles' Supermarine S-5 Schneider Cup racer. Powered by a Webra Speed 61 and using a Futaba "J" series radio, the model is to 1/5th scale. This beautiful racer was a not-too-distant relative of the famous Spitfire fighter of WW-II fame. Photo by Ron Moulton, Managing Director of Model & Allied Publications, England.

Aircraft in the bottom photo by Al Holmes, is the historic "Snow White", designed and built by Joe Raspante. This is one of the last photos taken before Al began dismantling the model to make the fine set of drawings featured in this issue.

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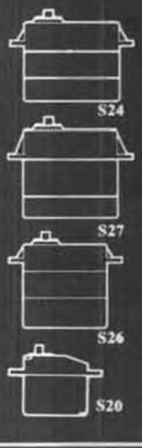

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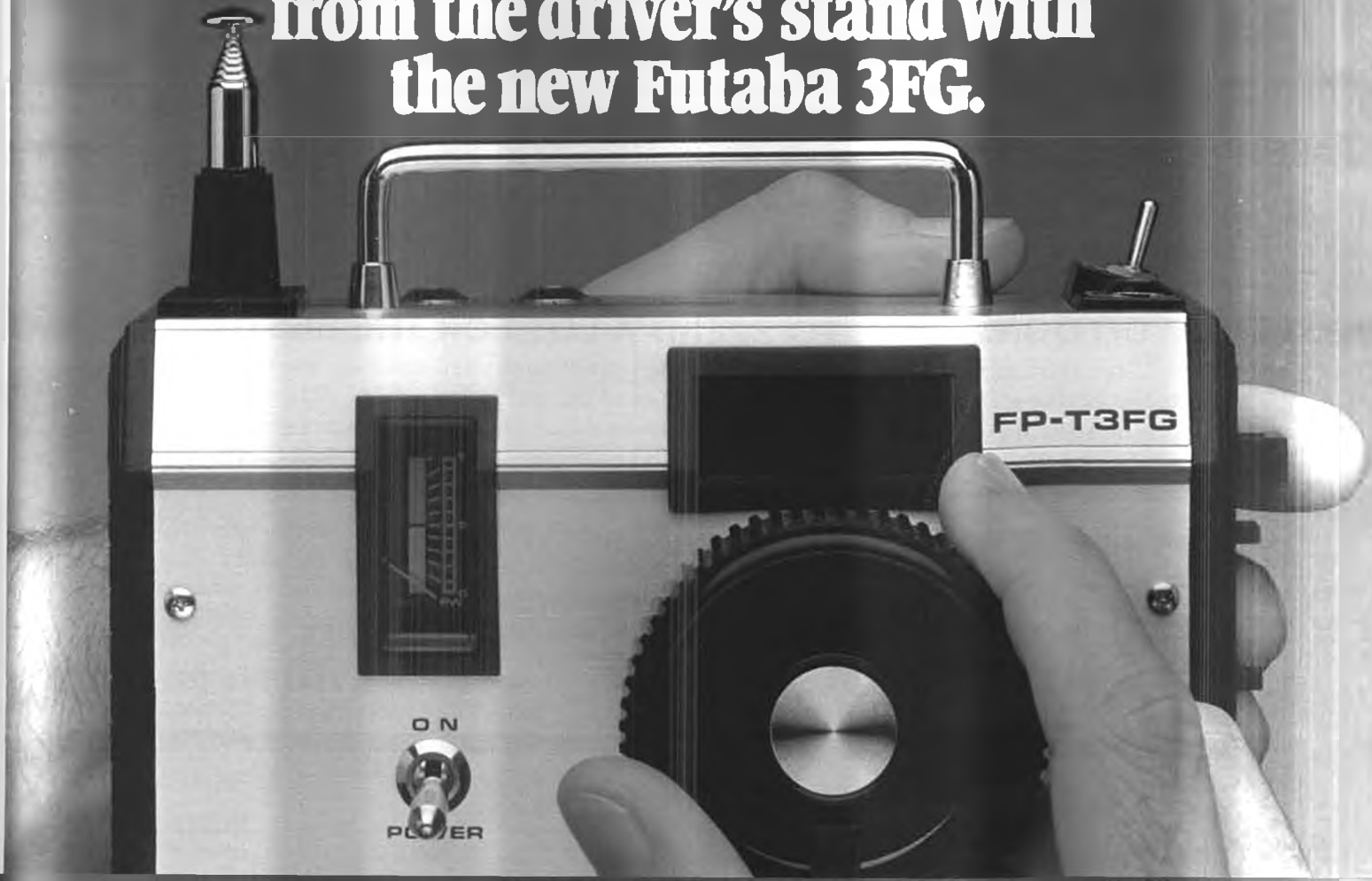

SUPERMANTIS

Pictured left to right: George and Curtis Croker / Helicopters by American R/C / Paint Scheme by Eugene Croker / Radios by Futaba.

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Ask Curtis and George Croker. They both flew stock Supermantis Helicopters (8 months old) in the first Schluter West Coast Helicopter Contest, this May, and as you can see did quite well. George finished 3rd in the expert class and young Curtis showed his father just how it should be done, capturing 1st place with his .40 powered Supermantis. Robert Gorham, flying a competitor's .60 powered model finished second.

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"Smooth Hare" was short lived (bad battery in pulse box) follow-on "Square Hare" by MB's Editor, dating February 1963. Won Intermediate Design trophy at Weak Signals Toledo Show. Cameron .19, Kraft single-channel, Galloping Ghost for proportional rudder and elevator. Note typical GG "birdcage" wire crank linkage on elevators.

THE TIME IS NOW

"Dear Mr. Northrop,

"You are no doubt aware of the incident that occurred at the Mint Julep scale meet this past month, where a 125-or-so-pound 'model' airplane ran out of control during its takeoff attempt and swerved into a runway light (and smashed it) instead of swerving in the other direction to possibly cut a swath through the flesh and bone of several human beings with its four(!) power-lawn-mower-size hardwood propellers.

"Seeing the sadness and difficulty that our U.S. President's former press-aid James Brady (and his family!) is experiencing today (according to recent newspaper accounts) since a reckless madman invaded his skull with a small metal object a few months ago; I have come to the conclusion, my friend, that I wish to see the AMA and all responsible people withdraw sanction from the growing interest to fly so-called powered airplane models (?) that are so overpowered and heavy that they present a very serious threat to the safety and well-being of both pit crews and innocent spectators. As this insanity grows, and more 'giant scale' models with chainsaw-size engines are built and flown, it will only be a matter of time before some poor soul finds a piece of hardwood propeller sticking five or six inches into his or her brain.

"And I, myself, want no part in this foolishness, Bill - I only hope that you might feel the same way about this growing mania, my friend, and that you consider using **Model Builder** *as a forum to air this thought."*

Writer of the above letter is Cyrus Stow, a dentist from Conyers, Georgia, a former aircraft mechanic on A3D Skywarriors, who was also an engineering/technical draftsman for the old Glenn L. Martin Company, and a builder of model aircraft for thirty years.

I agree with his basic concern, and have on several occasions written to AMA officials (to no avail) on the need for a clearly defined line of separation between an aircraft, which falls under FAA jurisdiction, and a model aircraft, which comes under AMA regulation and responsibility. **It is vital to the model aircraft hobby that this line of definition be established A.S.A.P.!** Our relationship with the FAA, which is responsible for control of the airspace over the continental United States and its possessions, is that AMA must regulate models to the satisfaction of the FAA. If not, the FAA will step in with its own version of model aircraft regulations . . . something we as modelers would find very difficult to live with. . . Government regulation of our modeling activities!

Ray Forbes, who instituted the very successful dealer-direct sales program at Kraft Systems, has been named Vice President of its Hobby Products Group.

Several times in past years, the FAA (usually as the result of highly publicized and exaggerated news media reports of an incident between a model and full-size aircraft) has taken a closer look at our activities, to determine if it should take over regulation of model aircraft. I can remember a Chicago Nationals where the word got around that an official FAA observer was among the spectators. Fortunately, he was singled out and thoroughly briefed by responsible AMA officers.

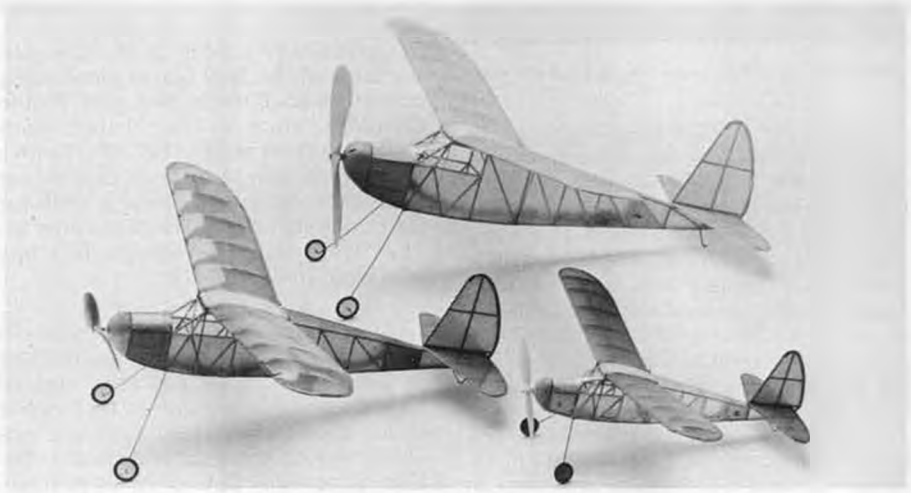
With the coming of model aircraft "heavies", and the seeming ego trip on the part of some modelers to out-do everyone else in size and weight of their "model aircraft", AMA must step in quickly and establish a limit of responsibility. This has nothing to do with rules and specifications for any competition class but simply, **what is a model aircraft, under AMA's responsibility, and what is not.**

Currently, our provisional rules for Giant scale specify a maximum weight of 40 pounds. If this weight limit could then be established as the maximum weight for a model aircraft under AMA regulations **and** responsibility, then any "model" weighing more is **not** a model, and becomes the owner's sole, legal responsibility. As such, it could not be flown at any AMA function unless the owner can provide proper insurance coverage for himself and the field owner.

Continued on page 89

OVER THE COUNTER

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



Three sizes of Pacific Ace, from Schlueter Free Flight Models.

• Francis Smith's Ship Yard (formerly Prospect Park Hobby Shop) has just introduced its new model kit of the Coast Guard Patrol Boat, 'Cape Gull.' The model builds out to 48 inches long with a beam of 10.5 inches and the kit is crafted from aircraft quality birch plywood for keel bottom, bulkheads, stack, middle, and main decks, and hull sheeting. Fittings are mostly brass, and tiller arms and drive shafts are provided. The mast, stack, and wheelhouse are designed to be removable for maintenance. For more information on this new offering from the 'Ways of Francis Smith,' send a SASE to: Francis Smith's Ship Yard, P.O. Box 118, Norwood, PA 19074.

★ ★ ★

Byron Originals has, in its program of customer service, issued a Byro-Jet Safety Bulletin containing some timely reminders for the proper operation of its ducted fan units and also quite appropriate for other fan units, in many cases. An excellent method of incorporating a needle valve extension is included, too. Send a SASE for a copy of this informative bulletin. For a copy of Byron Originals' latest complete catalog, send $5 (credited against your initial purchase) to: Byron Originals, P.O. Box 279, Ida Grove, IA 51445.

★ ★ ★

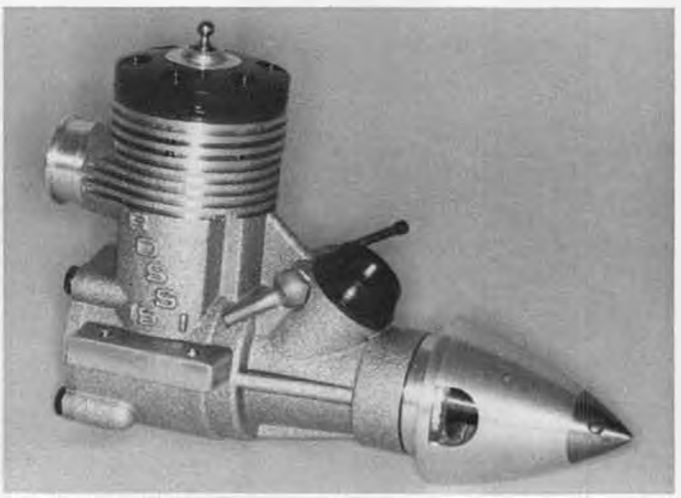
Cannon R/C Systems has announced two different tachometers for direct measurement of engine RPM. Either unit derives RPM data direct from the prop hub, spinner, or flywheel. No loading of even the smallest of engines is claimed, and accuracy is equal to other mechanical or electronic tachs costing much more. The basic tach has two speed ranges; 0-10,000 and 0-25,000 and lists for $22.50. The 'Protacho' professional model has a remote sensor, three speed ranges and a larger, easier to read meter face. Ranges are 0-3,200, 0-11,000 and 0-28,000 and lists for a reasonable $34.95. Send 75¢ for a complete catalog covering all the Cannon hobby items to: Cannon R/C Systems, 13400-26 Saticoy St., North Hollywood, CA 91605. Dealer and distributor inquiries are invited.

★ ★ ★

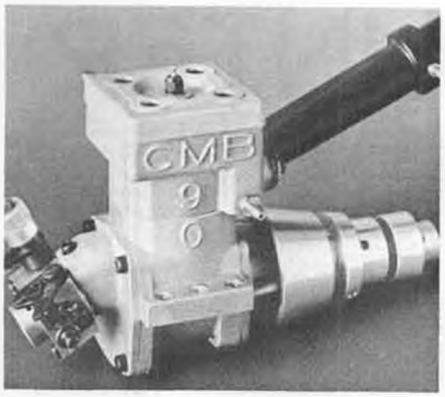
Condor Hobbies has in stock, as of this writing, the full line of Rossi engines; from the R 15 to R 90, including all the in between sizes, too, in both aero and marine versions. Pipes, couplers, plugs, and most spar parts are in stock and more coming. The people at Condor suggest that the modeler write (send a SASE) or call to check on availability and price of the item in question. Condor Hobbies, 17835 Sky Park Circle, Suite F, Irvine, CA 92714, or call (714) 957-1331.

★ ★ ★

Coast Guard Patrol Boat, by Francis Smith's Ship Yard.



One of full line of Rossi's, available from Condor Hobbies.



CMB 90 Grand Prix from TEJA Engineering.

Ted Dodd of TEJA Engineering sends word that he is the agent for the fabulous CMB 90 'Grand Prix' marine engine. This marine engine has been especially designed for high speed and long distance racing. Constructed of specially selected materials and utilizing high quality control standards, the CMB 90, rated at 5.5 hp at 24,000 RPM, has been designed to yield a long useful life. TEJA is also handling the CMB 60 R/C Aero engine, featuring a rear exhaust, rear intake 'slide' carburetor, and ABC set-up. Horsepower of 2.4 at 17,000 RPM is claimed, and here again, the best in materials and quality control are the prime concepts of these engines. For more information, send a SASE to: TEJA Engineering, Rt. 9, Box 399 N., Bakersfield, CA 93309.

★ ★ ★

From out of the past, come the Flying Aces, Henry Struck designed 'Trail Blazers.' From RET (Flying Aces) Plan Services, Rusty Toliver has had reprinted, on heavy white stock, some of the classic rubber powered models of that era. Such interesting models as the Wright Flyer Biplane with a 16-7/8 inch span, the Bleriot channel flyer, the Rumpler Taube with a 22-1/2 inch span, and the Douglas Globe-Girdler at 25-inch span are some of the Trail Blazer plans being offered at $2.25 each, post paid. Profile Quickies, such as the 20-inch span Bellanca YO-50 and the Bell XP-39 with a 12-1/2 inch span are being offered for $1.35 each, post paid. Send a SASE for the complete list, and more to come to: RET (Flying Aces) Plan Service, P.O. Box 7893, Midfield, AL 24238.

★ ★ ★

International RC Specialties throws its hat into the quarter-scale ring with a line of instrument panel kits consisting of high quality photographed instrument faces, appropriate sized O-rings, machine screws, plywood and sheet celluloid, all for only $8.95 plus 50¢ postage. Quality miniature safety kill switches are offered five for $5 plus 50¢ postage. Also available is .025 nylon coated wire with a swaged 3/32 ball end in eight, 5-1/2 foot lengths packaged for $5 plus 50¢ postage. Send a SASE to: International RC Specialties, 2310 Cimarron Road, Las Vegas, NV 89117, for more information.

★ ★ ★

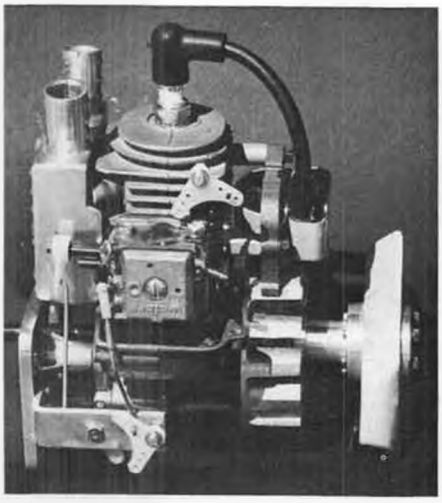
Futuraglass Design has added a 'Round Nose Hydro' to its aquatic line-up. This latest offering is 1/8 scale, of classic design, and with minor changes, it can become one of many scale hydros. It features a joined deck and hull, urethane foam filled sponsons, and the brilliant gelcoat finish is of the highest quality. Suggested list is $149.95, direct or dealer only. Futuraglass Design, One Cannon Drive, Nashua, NH 03060, or call (603) 888-3576.

★ ★ ★

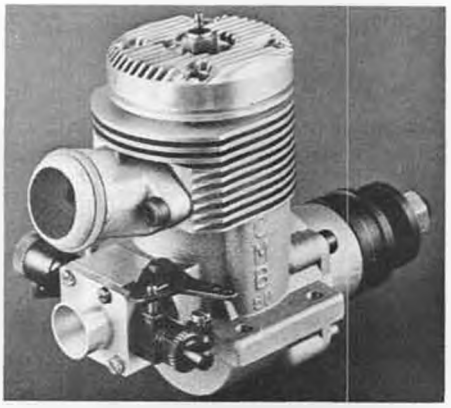
Schlueter Free Flight Models presents an epidemic of "PACIFIC ACE FEVER," that is to say, the 20 inch PA-20 and the 30 inch PA-30 have been joined by a bigger brother, a new 40 inch wing span version, the PA-40. With all the excellent flying traits of its smaller brothers, it's also convertable to .020 power via the convience of a bolt-on firewall. At present, only partial kits are available, which include computer graphics drawn plans (black line reproductions), and all necessary printed wood parts for the fuselage, wing, horizontal and vertical stabilizers. Prices are $3.25 (PA-20), $4.70 (PA-30), and $6.65 (PA-40), plus $2.00 for handling and postage. California residents include 6% tax. Contact: Schlueter Free Flight Models, 3508 Poinsettia Ave., Manhattan Beach, CA 90266.

★ ★ ★

Gary Richter, Mike Steffan, and Sharon Christmas, of Panavise Products.

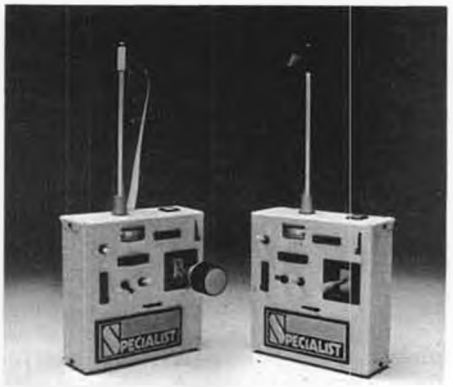


Magnum II by Homelite from Contempo.



CMB 60 R/C Aero Engine, TEJA Engineering.

Panavise Products, Inc. has just celebrated its twenty-fifth birthday. Otto Colbert, owner of a small die cast company, felt that he could design and develop a holding device that would turn, tilt, and rotate, thus making his job and that of his fellow workers much easier. After fourteen years, PANAVISE surfaced in the retail hobby business. Products were also developed that were a boon to electronic assembly line techniques. In 1978, PANAVISE was purchased by the current owner, Gary Richter, a hobby enthusiast himself, and six months later, moved the operation to



Specialist sailplane radio, by Millcott.

Tatone flexible exhaust pipes.

its present, larger location in Long Beach. Careful market study and research has provided the staff, including Gary Steffen, who had joined PANAVISE as National Sales Manager and Sharon Christmas, newly promoted to the sales and marketing department, with the insight to continue as a leader in the hobby and electronics field as well. As it has been said, everyone should have a little vise, PANAVISE, that is. PANAVISE Products Inc., 2850 E. 29th St., Long Beach, CA 90806.

★ ★ ★

For those who are into scale model ships, boats, historical craft, whether for the mantel, glass showcase, for sailing, or operating via steam or electric power, Taubman Plans Service will have plans for it. The listings, of which there are over 2,000 plans available, covers everything from paddle steamers, U.S. and foreign naval ships and submarines, hydrofoils, tugs and trawlers, to speed boats and landing craft! Also listed are many books on naval history to ship modeling. For the complete set of very extensive catalogs, send $5.50 to: Taubman Plans Service, 11 College Drive, Box 4G, Jersey City, NJ 07305. or call (201) 435-5205.

★ ★ ★

Contempo Hobby Products proudly presents the MAGNUM 11, a specially modified, premium quality 2.5 ci model airplane engine, manufactured by Homelite. Features include a ball and roller bearing supported crankshaft, needle bearing equipped (both ends) connecting rod, hemi-head combustion chamber, chrome plated cylinder, pyramid reed intake, Schneurle porting, AND, comes complete with specially made muffler, stand-off mount, and a precision machined aluminum 6-bolt hub. All this is backed by a written one-year limited warranty by Homelite, the nation's largest manufacturer of chain saws. Thirty-seven warranty service centers and over 5,000 Homelite saw dealers assure you of getting parts and service close to home. Total all-up weight (less prop) is 4 lb. 6 oz. for this 2.5 cubic engine, rated at 2.6 horsepower @ 8500 RPM. Available now is a throttle linkage kit, on-board mixture control kit, and a smoke system kit. See your local dealer for the MAGNUM 11, plus the Eagle and the CAP 20L large-scale kits. Contempo Hobby Products, 11611 Cantara St., North Hollywood, CA 91605. Dealer and distributor inquiries are invited.

Art Chester's 'Jeep', from Wendell Hostetler plans.

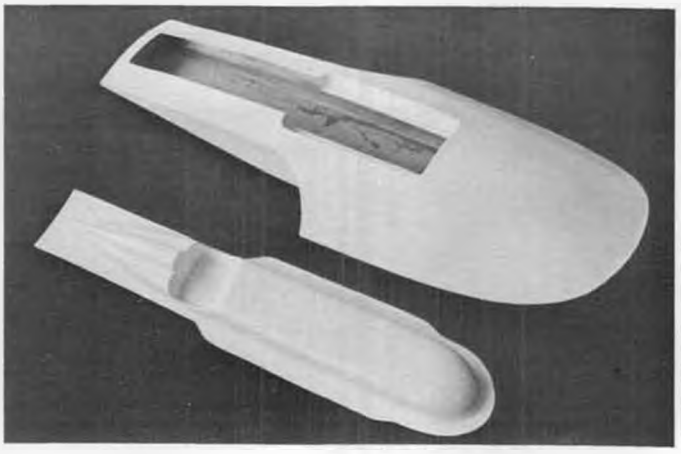
★ ★ ★

Tatone Products has just made available FLEX-OFF, a flexible metal tubing designed for muffler tail pipes. Features are; easily bent, will hold its shape after being formed and the hot exhaust or hot fuel does not effect it. Made from lightweight galvanized steel and supplied with a worm drive clamp, it is packaged in 12-inch lengths and available in the following sizes: 1/2-inch I.D., $5.75, 5/8-inch I.D., $6.00, 3/4-inch I.D., $6.25, and 7/8-inch I.D., $6.50. Available at most hobby shops or order direct, adding $1.50 for postage and handling. California residents, 6% sales tax. Tatone Products Corporation, 1209 Geneva

Continued on page 88

Shinwa tachometer from Cannon Electronics.

Instrument panel kits by International R/C Specialties.



Classic 'Round Nose' hydros from Futuraglass Design.

Protacho tachometer, from Cannon Electronics.

The latest from Col. Art Johnson, Delray Beach, Florida, is this P-43 Lancer, forerunner of the P-47 'Jug'. It weighs 20 pounds, is Quadra powered, and is a great flier. It will be a future construction article.

R/C WORLD

by JOHN ELLIOT

• Thought for the month. "If evolution really works, how come modelers only have two hands?" This gem from the *Propwash* of Waco, Texas. Or, how about this item. "Don't worry if you start losing your memory, just forget about it." Lifted from the S.A.C. Newsletter of Chicago, Illinois.

★ ★ ★

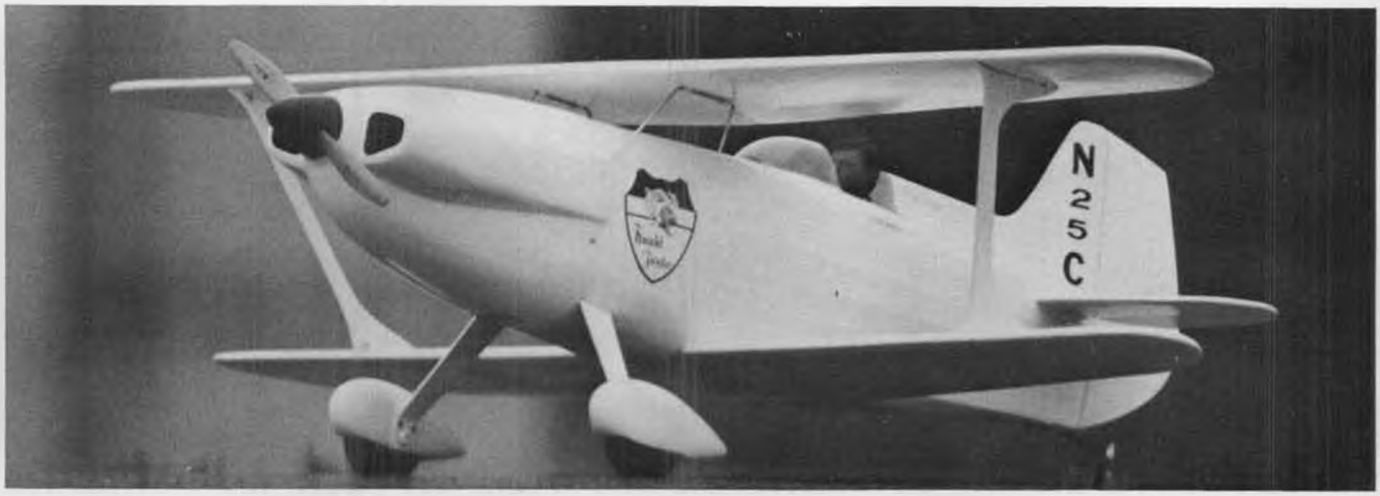
The 17th and 18th of April saw the SGVRCL (San Gabriel Valley R/C League) hosting its R/C scale event with Sportsman, Expert, Giant, and Team categories being contested. Turnout was light for this first scale event of the So-Cal season, partially because some planes were being 'saved' for the MACS show the following weekend and other R/C pilots were gun-shy of the wall under final approach north of the runway. This did not deter the team entry of Parcell/Kelly from flying its B-25 'Executive Suite' to a first place. Others braved the wall with no difficulties at all. Unfortunately, several beautiful trophys went unclaimed. Considerable effort and planning went into this contest, 'tis too bad that the scale contest types support of this contest was so light.

Forrest Edwards, Sr., builder of jewel-like radial four-strokers proved that he 'flys what he builds!' Forrest's big Fleet featured one-flip starting and horsepower to spare, enabling his 22 pound Fleet to climb out at about a thirty degree angle with ease! Some beautiful throttle work added to the illusion and netted a well-earned second place trophy. Dick Skoglund flew his Upton Baby Ace into first in the giant scale category. Roland Baltes' well detailed Beech Bonanza in German civil markings netted him first in Sport Expert. In Sportsman, Dick Skoglund (again!) was first with his Ercoupe/Aircoupe, Rod Larson and his Aeronca Champ were second, and first timer, Forrest Edwards, Jr., was third with a Skybolt. A good contest, a shame

Rod Larson's Nosen Aeronca Champ cruises by at SGVRCL contest.

Roland Baltes taxiis his Beach into position for takeoff at SGVRCL meet. Had scale long range tanks in cabin.

Dick Skoglund's version of the Bob Upton Baby Ace. Was first in Giant Scale at SGVRCL contest.



Quarter-scale, but still only 48 inch span, is Brian "Crash" Curry's pert little Vernon Payne "Knight Twister". A future MB construction project . . . even if Brian crashes it!

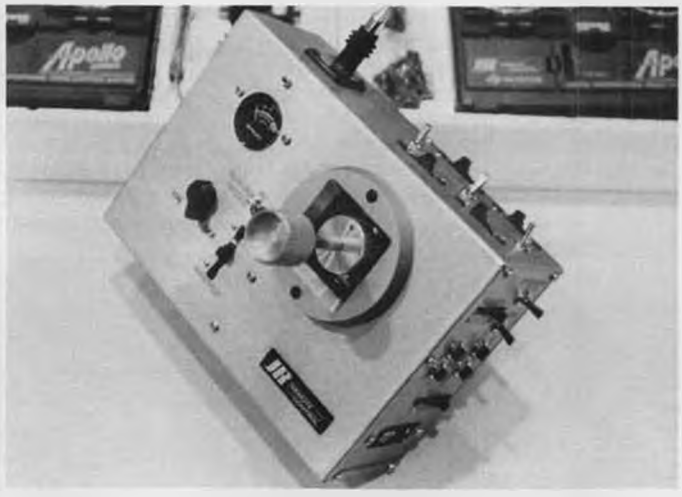
attendance was down.

★ ★ ★

The following weekend featured the MACS show in Long Beach. The show appeared a bit light this year, a few major exhibitors not being present, quite a few manufacturers are suffering from "trade-show-itis" by now with the Chicago show in October being considered by many to be the first show of the winter season, the MACS show makes the sixth show in seven months, excluding the industry-only HIA show.

Due to new construction on the site adjoining the Long Beach Convention Center, flying demos were limited to helicopter, electric sailplanes, one ARF 'foamy,' and some rocket launches. However, the 'chopper' boys were really out to out-do each other, including several passes under the airplane/helicopter-eating bridge! All were successful this year, though. Not too much new in terms of really exciting goodies, most had been seen at Toledo, the Wrams, or the IMS show. Local west coast kit manufacturers had some new items and kits and Magic Boats had quite a line of hydro's and such on display, as did Prather. Circus Hobbies was showing a new 'full house' Single Stick transmitter. Understand it will be somewhat expensive due to a limited market, but bully for them for producing it! At any rate, it's encouraging to see an overseas manufacturer taking a serious look at this particular market. Basically, Ace/Pro Line, Kraft, and World Engines are about the only equipment manufacturers,

Whaddya know! Vern MacNabb, the Citizenship radio man, 79 years young and still at it. Top Flite 'Jug', Kraft radio. Art Johnson pic.



Enough to make any single stick switch twiddler's fingers itch (say it fast three times) JR's limited production latest. Can it play 'Nola'?

John Simone Jr's Super Mantis takes a bow to the spectators after a classy demonstration at the Long Beach MAC Show.

Shane Cramer's 1/6-scale P-47 won first in Military Scale at MAC Show, has since flown successfully.

Forrest Edwards, San Pedro, scratch-built this fine running radial 4-cycle. Mucho power for his Concept 1/4-scale Fleet.

Forrest Jr. holds on for Forrest Sr. before 2nd place flight at SGVRCL meet. Combo has had many flights. That's class!

domestic or otherwise, that will cater to 'salad bowl' (single stick) drivers. 'Tis a shame as some years ago, a well designed, human engineered single stick system was over twenty percent of one manufacturer's business. Guess those numbers just aren't sufficient in today's world ... To paraphrase Henry Ford, "You can have any system configuration you want so long as it's Mode II." However, some systems can be ordered as Mode I, although in some cases the customer has to do it himself!

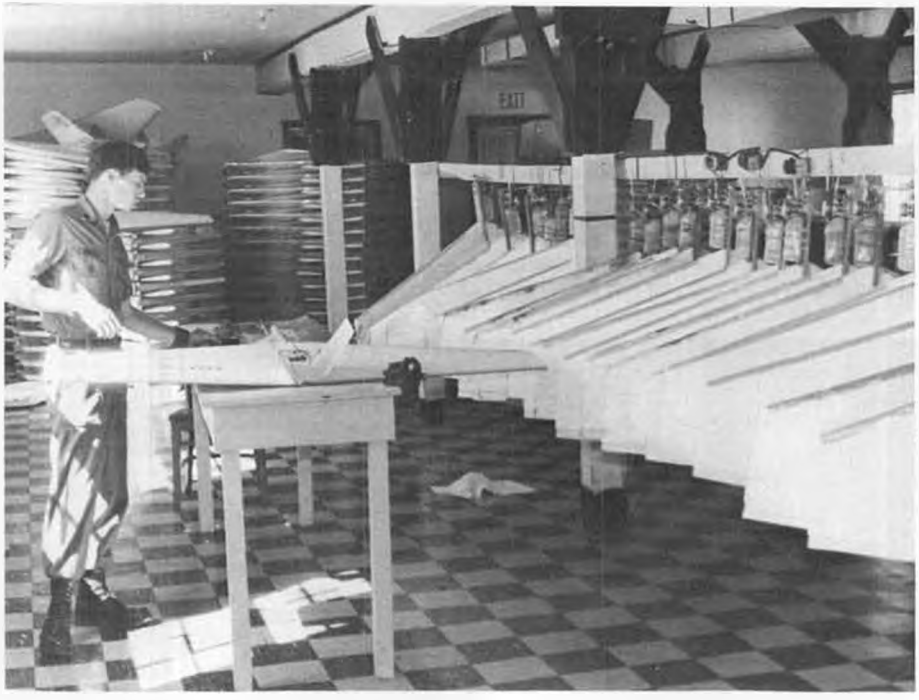
★ ★ ★

Col. Art Johnson, of F-82, P-38L, and P-40 fame has been busy drawing and building again! Seems like Art has outdone himself one more time. His latest effort is the Republic P-43, one of the forefathers of the well-known P-47 'Jug.' Built to a scale of 1 to 5.3, this yielded a 81-1/2 inch wing span and came in weighing 20 pounds, ready to fly, no tail lightener required. Art powered it with a Quadra (fully cowled) and says it's faster than his P-40 with an 18-8 Dynathrust or 18-10 Zinger doing the chores. To answer your next question, *yes*, it is to be a future construction article in Model Builder... Art goes on to mention that he is putting pencil to paper for a 1/8-scale Martin (*not* Douglas) B-26 (the late Joe D'Amico would have liked that) and at 1/8 scale, it would be a perfect hangar mate for Kent 'Cowboy' Walters' new 1/8-scale B-17! We have heard of a 13-foot span P-38 under construction in northern California, but no further details as yet...

Another picture sent in by Art is of retired R/C equipment manufacturer (does everyone retire to Florida?), 79 years *young* Vern MacNabb, the Citizenship man, and resident 'elder' of the Gold Coast Radio Controllers. Vern built the Top Flite P-47 in the photo and has flown it, but has since donated the model to the club's airshow team and is easing into gliders. See, older modelers just keep on flying! Good to hear of it, Art...

★ ★ ★

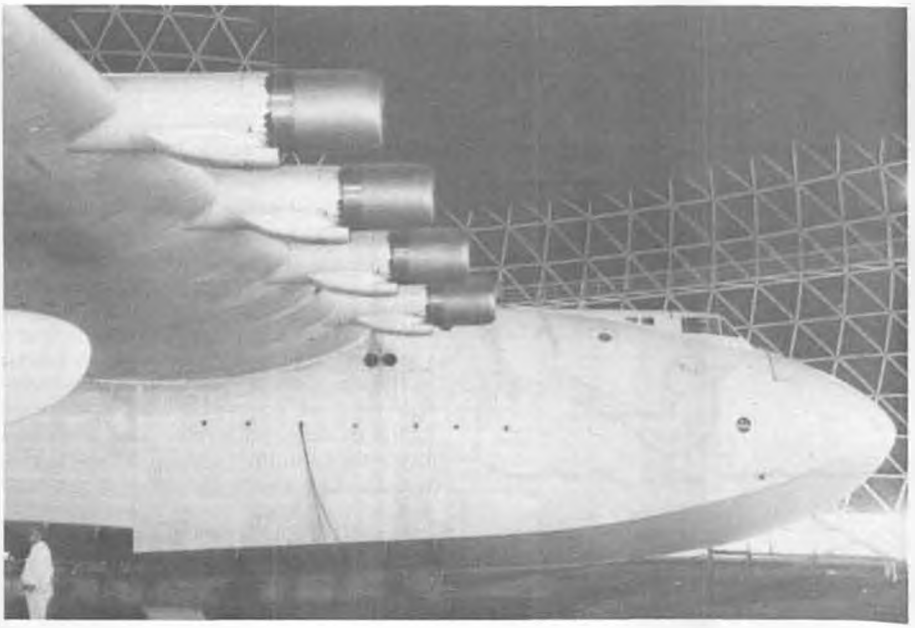
The cute 1/4-scale biplane reposing in front of the famed Santa Ana Blimp hangers is the handiwork of Brian "Crash" Curry. Brian developed his Knight Twister from material supplied by the Twister man himself, Vernon W. Payne. Some of you over-the-hill and not quite (?) over-the-hill gang will recall the beautiful 30-inch span control line Twister drawn by one Walt Schroder, that appeared in a late 1944 Air Trails! Well, it seems Brian was working on his model one evening in the garage and a neighbor dropped in. The neighbor knew of Brian's hobby, so conversation about airplanes, model, and full scale ensued, and would you believe this gentleman is the grandson of Vernon W. Payne, Vernon W. Payne, III? 'Tis a small world indeed... AND, his son is Vernon W. Payne, IV! Brian's arm has been



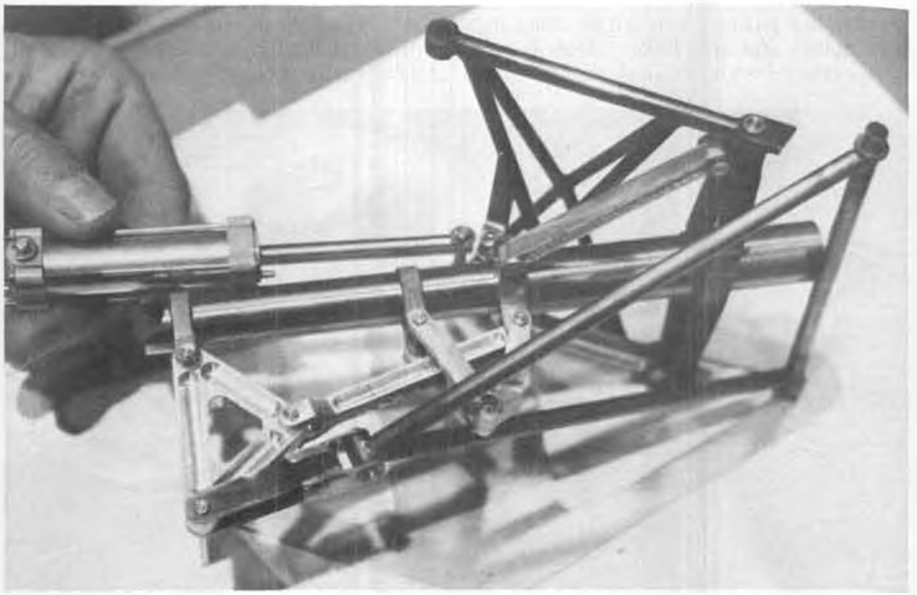
Army Specialist IV performs maintenance in "hangar" (looks like meat locker) on his squadron of RS radio controlled RC-MATS. See text for more. U.S. Army photo.

John Elliot and Darrell Meyer stop for a picture while taking a stroll on wing of world's largest airplane, Hughes "Hercules".

Bob "Robart" Walker mans the broom to uncover famous 'N' number, just to prove he was there.



Don Dombrowski and Bart Fury are dwarfed (and that's hard to do!) by Hercules. More info in text. Photos taken and reproduced herein by permission of Wrather Corporation.



The next Meyers brothers project after the successful 'Spruce Goose', is the Northrop XB-35 flying wing. This is partially completed scale retract main gear, minus axle.

suitably twisted (pun intended) and hopefully in the future, we will have a construction article on this 48-inch span, 1/4-scale jewel. Brian's 1/3-scale Sopwith Pup won 1st place in Giant Sport Scale at the Macs show, a tribute to his modeling ability.

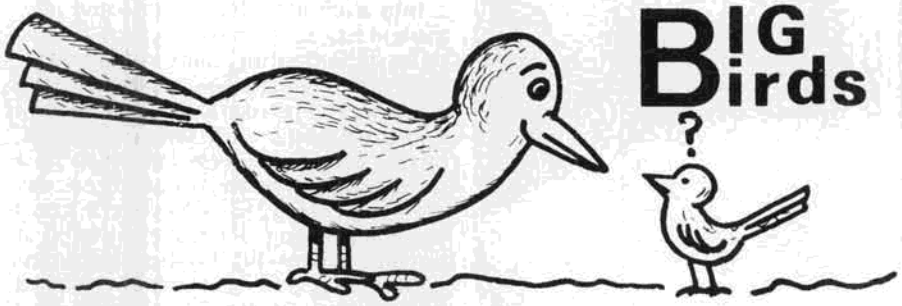
★ ★ ★

Into each life, along with some rain, the sun has been known to, from time to time, shine brightly! Back in the middle sixties, this writer was residing in the northwest Florida area, and having acquired some skill flying our R/C model aeroplanes, was invited to fly a demonstration at an Armed Forces day air show. This, plus having a good modeling friend, John Woods, who at the time was a F-101 'Voodoo' instructor pilot, netted an indoctronation ride in a dual control, RF-101. To say the least, it was a high point in my life with respect to aviation. Having outgrown the Air Force height maximum limits as a fourteen-year-old, I still managed to squeeze, or shrink myself into a flight suit and rear seat of the 'One-O-Wonder.' It was quite a ride, not to be forgotten, ever! All of this simply leads up to another super moment.

A conversation at the recent MAC's show led to 28, April 1982 as being HK-1 or "Spruce Goose" day. The "Robart Kids," Bob Walker and Bart Fury, his father and sister, House of Balsa's Don Dombrowkski, Darrell Meyer (one-half of the famous Meyer brothers, and the man with the clout!) and yours truly were given a fabulous tour of Mr. Hughes eighth wonder of the world by Mr. Stan Sudenberg, a long time employee of Hughes Aircraft. Some of the histroy that Stan related was fantastic in itself. The museum, scheduled for opening in March, 1983, now houses, with room to spare (!) the big Hercules, all in one piece. To have cut up into pieces this engineering achievement and scattered them to the various aviation museums would have been a historical crime, indeed. Hats off to the Southern California Aero Club and especially to Wrather Entertainment International for picking up the ball and preserving a very

Continued on page 88

J. W. Jones and his much flown Concept Fleet are in the news again. Took "Best of Show" at recent Annual Arkansas Jumbo Fun-Fly.



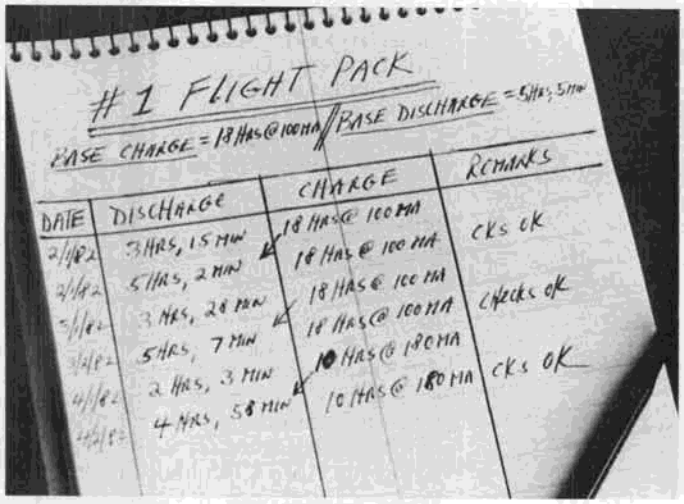
• Admittedly I'm not one for putting great looking finishes on an airplane, because I get too impatient to go fly the beast; but I do compensate, and because I'm a practicing Dirty Old Man, I've had the sexiest smelling birds instead.

Like everyone else, I've also been on a quest to find the best airplane cleaner, finally settling for a combination of water, alcohol, and dishwashing detergent . . . and then adding my own personal touch by sneaking some of my wife's Chanel No. 5, Cachet, White Shoulders, or some other equally alluring scent into the basic mix. As you might imagine, the effect has always been dramatic; every time I started to clean my plane, the guys near me (modelers and spectators alike) would snap their heads around to see what kind of "vision" was wearing such an inviting aroma.

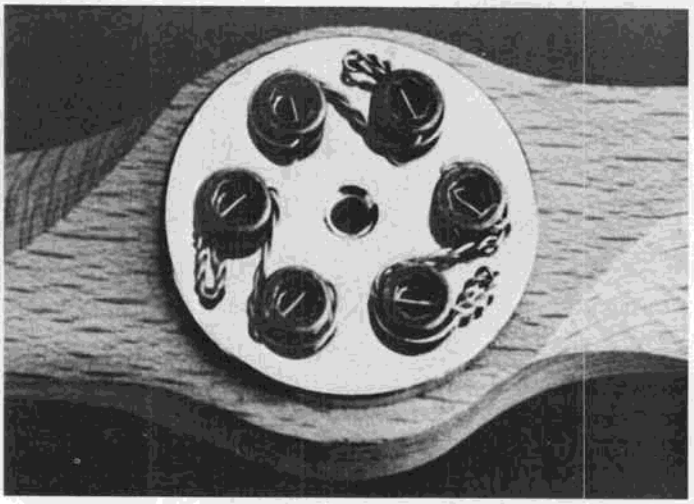
Recently though, I've given up sex (but only at the flying field, you understand) and gone back to basics; I'm now using baking soda, the great all-purpose cleaner. Most people know how well it eliminates odors, but many have overlooked it as a terrific cleaner for most kinds of dirt and grime. And you can't beat it for minimal cost; just four tablespoons per quart of water in a spray bottle will keep your birdie squeaky clean so that you can show it off, even at a moments notice. And four parts soda to one part water will yield a paste that'll get out tough stains and ground-in dirt, pronto (it'll also make the insides of your tea or coffee cup shine like new).

A TIGER BY THE TAIL

Got a whole bunch of calls and letters from guys who are justly concerned about the number of BIG Birds still being lost because they're tail heavy. I couldn't



Keep a log on battery packs and cycle them through on first of every month. No rating listed as Al uses only 1200 mah packs.



"The Gospel" according to Pratt & Whitney. Thou shalt safety wire thy bolts so each pulls against the other. It pays.

agree more; the carnage is unbelievable . . . and unnecessary. In fact, I just finished reading about two different BIG Birds and how they both came awfully close to crashing on their maiden flights because they were severely tail-heavy. And yet both authors glossed over the hairy escapes and the immediate and dire need for mucho lead up front as though not doing your homework and bringing an unbalanced bird out for her first flight was the accepted norm.

If you've ever had this kind of "tiger by the tail," you can count your blessings, because you really haven't missed a thing (in fact, you must be doing something right, so don't change your procedure). If, on the other hand you have been in this kind of panic situation, you know how that paralyzing feeling of helplessness starts deep in your stomach and works its numbing way up to your throat while you're desperately thumbing in full down trim and trying to fly with full foward stick . . . which is truly an unnatural and very awkward feeling.

How do you avoid getting into this kind of situation? Simple! That BIG Bird of yours should **not** leave the workshop until she's absolutely ready to fly; she should be balanced laterally, as well as fore and aft . . . and all incidence and thrust angles should be checked, also. Quite frankly, you're a damn fool if you don't take the time to make these checks on every aircraft, because there's no other way to insure that your new bird meets the basic requirements and is ready for her first flight.

(Any modeler with a free flight background knows you simply DON'T fly a model until it is checked for balance and trim. wcn)

We take too much for granted and some of us carry it to extremes; there seems to be a common misbelief that you not only don't have to worry about incidence and thrust angles if you're building from a kit, but that you're in even better shape if you scratch build, because the parts will be cut much more accurately. And if you think that's ridiculous, how about this; many of these same modelers extend this crazy reasoning to include balancing, and are quick to explain that if you use the same (or very similar . . . which is okay, too) engine and radio used on the prototype, your balance point will come out as indicated on the plans. I still can't believe that I've heard these pearls of wisdom from guys who should know better.

PHOTO BY JIM MIURA

Darrell Wong with his Hobby Shack Giant Stick. He added shear webbing to wing, more vertical stab support, substituted weak stab with unit from Cunningham "Eindecker".

And then they top it all off by trying to do a balancing act out at the field. With the help of another lame-brain, they stick greasy thumbs under some very arbitrary points at the wingtips, lift the craft off the ground, and declare her to be "pretty well in trim." Gad, who's trying to fool who? Even if it were dead calm, that procedure is near worthless . . . but with any amount of wind present (and there usually is), you're setting up that young and tender bird for a very early grave.

Of course these same folks become proficient at only one thing; dorking airplanes. And what little flying they do get is nothing to write home about because their birds are really dogs in disguise . . . and other than Snoopy, when was the last time you saw a dog that could fly????

Obviously the common sense approach is to treat the cause and not the effect; in other words, don't wait until the bird is all finished before you get involved with balancing and trimming. By planning ahead, you can guarantee yourself peace of mind that comes from knowing where that balance point is going to be . . . instead of waiting too long and then ending up grumping and swearing in despair as you try to find a place up front to stow those pounds of lead. Of course, this is assuming your tail-heavy BIG Bird survives that wild and wooley first flight. . .

Okay gang, I know what a lot of you are probably thinking right now, which is the same thing I've had thrown at me countless times before: "Hey, this is supposed to be a hobby, and supposed to be fun . . . so keep your math and your formulas to yourself. Just let me enjoy flying my airplanes. . ."

Face it guys, in our hobby, ignorance is *not* bliss because the potential for

Continued from page 83

Two sides of BIG Bird's author, Al Alman . . . one, the burly brute with his 28 pound Puma, powered by a Super Hustler, and one, the insecure little fellow with his two-year old son's stuffed doggie and his trusty transmitter.

FUEL LINES

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

QUESTIONS AND ANSWERS

About two weeks ago at the Toledo Trade Show, April 1-3, more than a few modelers offered some nice comments about this column. Some of them had questions and suggestions for future topics. In addition to thanks and responses, I usually added, "Heck, just write anytime." Sometimes, their reaction seemed to be to the effect that they felt magazines probably wouldn't answer. Guys, let me assure all of you, if you write, I'll gladly respond. *(When you write to Joe, it would be kinda nice if you include a self-addressed stamped envelope if you want an answer. Overseas readers can include a couple of international mail response coupons. wcn)* To all those with whom I spoke at Toledo, thank you for your gracious words. I'll try to continue to provide an informative and not-too-dry column.

HOW ABOUT A NEW ENGINE?

If large model aircraft are your thing, you'll probably need quite a bit of power. In that case you might be interested in a new engine being offered by the Rossi brothers of Brescia, Italy. Take a look at the photograph. Interested? Well, that's two .80 engines bolted to a special mount, and hooked together with a twin "V" belt drive. A rather neat package. I only had the opportunity to cursorily examine the engine, but I can tell you something in general. Briefly, two .80's are actually in hefty .61 cases. Sound impossible? Not really, if you'll recall that the Rossi .60, .61 and .65's all use the same sleeve and piston. Only the stroke is changed from one to another, and that merely means adjusting crankpin location. In this instance, the bore probably was also modified. The reduction ratio is 1 to .56, or vice-versa depending upon your viewpoint. Let's put it this way, for every 1000 engine RPM the prop shaft will rotate 560 RPM . . . hopefully. Reportedly, the prop idle RPM is very, very low. Wish I had had a chance to run it. When and where can you get it? Well, in the early Fall, Condor Hobbies expects to receive the first shipment. The price will probably be close to $600. For more information, write to Condor at 17835 Sky Park Circle, Suite F, Irvine, CA 92714, or call them at (714) 556-1888. You might also be interested to know that the prop drive unit will be available separately. It is suitable for .60 to .90 size engines. The guesstimate on the price of the prop drive unit at this writing is $200.

ECONO FLIGHT OPS

If the above prices leave you with a shudder, you might consider 1/2A flying. Certainly the engines are considerably less expensive . . . even those that have been customized. Wait a minute, it's not fair or objective to compare quarter-scale engines with 1/2A. Or is it? Let's put it this way, big is more expensive . . . even with gasoline four-cycle engines. But, you can't deny there's merit to their realism. Smaller engines, in say the .25 cubic inch displacement or below, are comparatively inexpensive, and even if you use a lot of nitro, the cost per flying minute will be significantly less. The question then becomes, "Is realism only possible with huge model aircraft?" I don't think so. If nothing else, indoor and outdoor "Gumbanders" have proven that. I really admire those guys. I may be inviting a lot of criticism, but I don't believe it's stretching a point to consider them as modeling purists. What has all this proven? I'm really not certain, but my point is that you should pursue your particular interests . . . short of perhaps a divorce.

What about other econo measures? Perhaps your event allows you to "play" with fuel ingredients. Want more laps or air time? You won't get it with nitro, but there are other liquids that will do better, and they're not banned by AMA rules.

A few years ago I became involved in flying events with specified tank capacity. I soon became aware of fuels such as the British 25% formula. Specifically, 25% nitro, 25% methanol, 25% anhydrous iso-propyl alcohol and 25% lubricant. Iso-propyl alcohol is commonly known as rubbing alcohol, but be forewarned: don't buy the common drug store variety. It's about 15% water, and won't burn very well at all. If you want to try such a range fuel, you must use anhydrous (water free) iso-propyl. It's available from chemical supply houses. Ask for reagent grade iso-propyl. To save you some experimentation with various blends, here's one that I found to be pretty good: 10% nitro, 45% methanol, 25% iso-propyl, and 20% lubricant.

Another additive or ingredient is Xylene. That's a common paint thinner that you can purchase from full service paint stores. Nevertheless, I'd recommend using a pure grade from a chemical supplier. Here's a good formula for starters: 30% nitro, 30% xylene, 20% methanol and 20% lubricant.

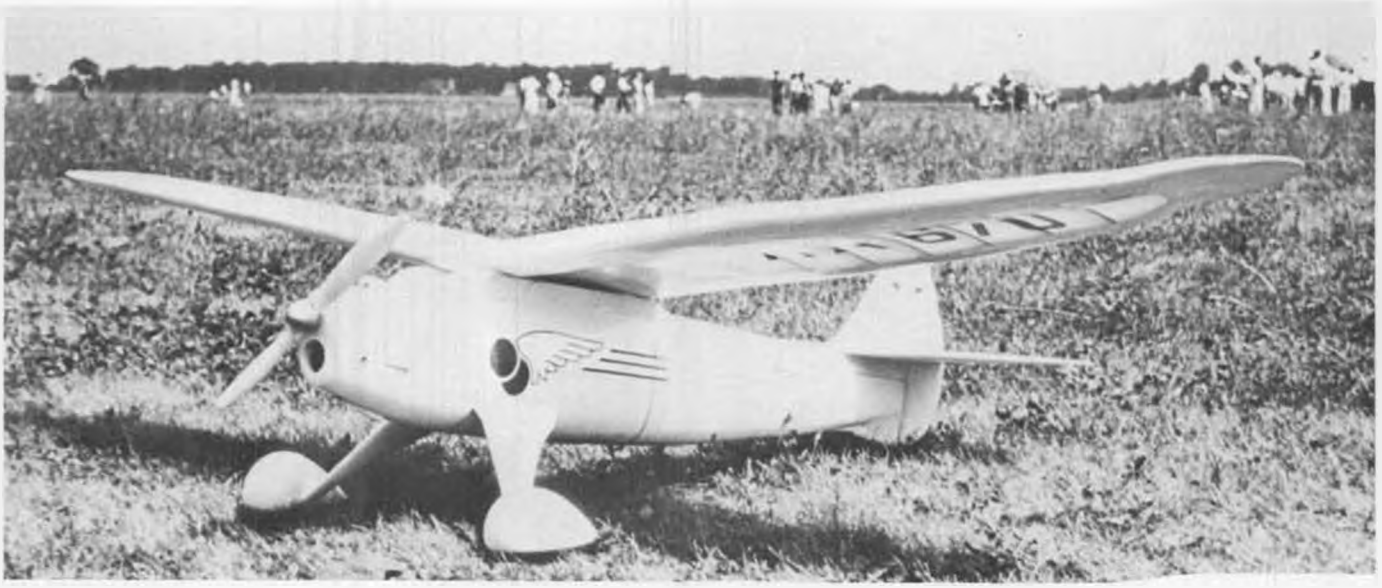
At this point, I have one precaution and another bit of information. The precaution first: if you use the above ingredients, be forewarned. Like gasoline, they are highly flammable! Many a flooded engine has ended up in an incinerated model. Many arm hairs have been singed, and burns are not uncommon. Be careful! The other bit of information is that trying such a home brew doesn't guarantee success. These fuels are particularly sensitive to compression ratios and glow plugs. You'll have to experiment with head spacing, chamber volume, and glow plug heat ranges to realize the best results. Usually you'll have to use higher compression ratios than normal, together with hot type glow plugs. As always, those who work at it usually are the top few finishers.

Still on the subject of fuel, here's some information in response to inquiries about Klotz lubricants. Klotz KL-100 is a two-cycle racing oil. It is my understanding that this lubricant contains 25% castor oil. Klotz KL-200 and KL-300 do not contain castor oil. Some readers may recall that I've mentioned previously that I use KL-100. Yes, it's a fine lubricant. Others may be as good or better, but I have no complaints about KL-100. You'll have to look closely to know which Klotz oil you see on the shelf. Look at the back of the can, at the bottom, and you'll see in lettering about 3/64 of an inch in height, the identification KL-100, 200 or 300.

For the future, I have three other new,

Continued on page 80

Two Rossi 80's bolted together and linked to a 1 to .56 reduction belt drive. Check with Condor Hobbies for future availability.



THE REAL SNOW WHITE!

By AL HOLMES . . . Instead of *OLD TIMER of the Month*, this is "OLD TIMER of the Century"! Joe Raspante's classic Beauty Winner has been the center of some controversy as to her parentage. This article, and the accompanying plans, should straighten it all out.

Joe Raspante at the console of his ham TV station.

INTRODUCTION BY THE EDITOR

This article has been in the works for quite a while. In fact, Al Holmes has worked on the plans over a period of five years. Until recently, there didn't seem to be any controversy involved . . . Snow White was simply a very beautiful gas model, designed and built by Joe Raspante in 1937-1938, which went on to win many beauty contests, where flying ability was also an important factor. Its beauty has remained timeless, and down through the years, it has been considered by many modelers as something very special, something revered, something with a mystique and aloofness, mostly because it could not be duplicated . . . no plans, no kit.

Beginning with the April '82 issue of **MB**, Bill Effinger's *W.E. Technical Services* advertised the Snow White "20", stating that it was a 3/4-size version of Joe Raspante's model, as designed by Bill Effinger. **Model Builder** also published a photo of the original Snow White in the March '82 *R/C World* column, in which the caption, supplied by Bill Effinger, "clarified" the fact that Snow White was his design.

Meanwhile, discussion with Al Holmes, who was in the process of finishing up the labor of love published herein, indicated that he believed S/W was Joe's design! We asked Al to get with Joe and try to clear up the confusion before we published the Snow White plans.

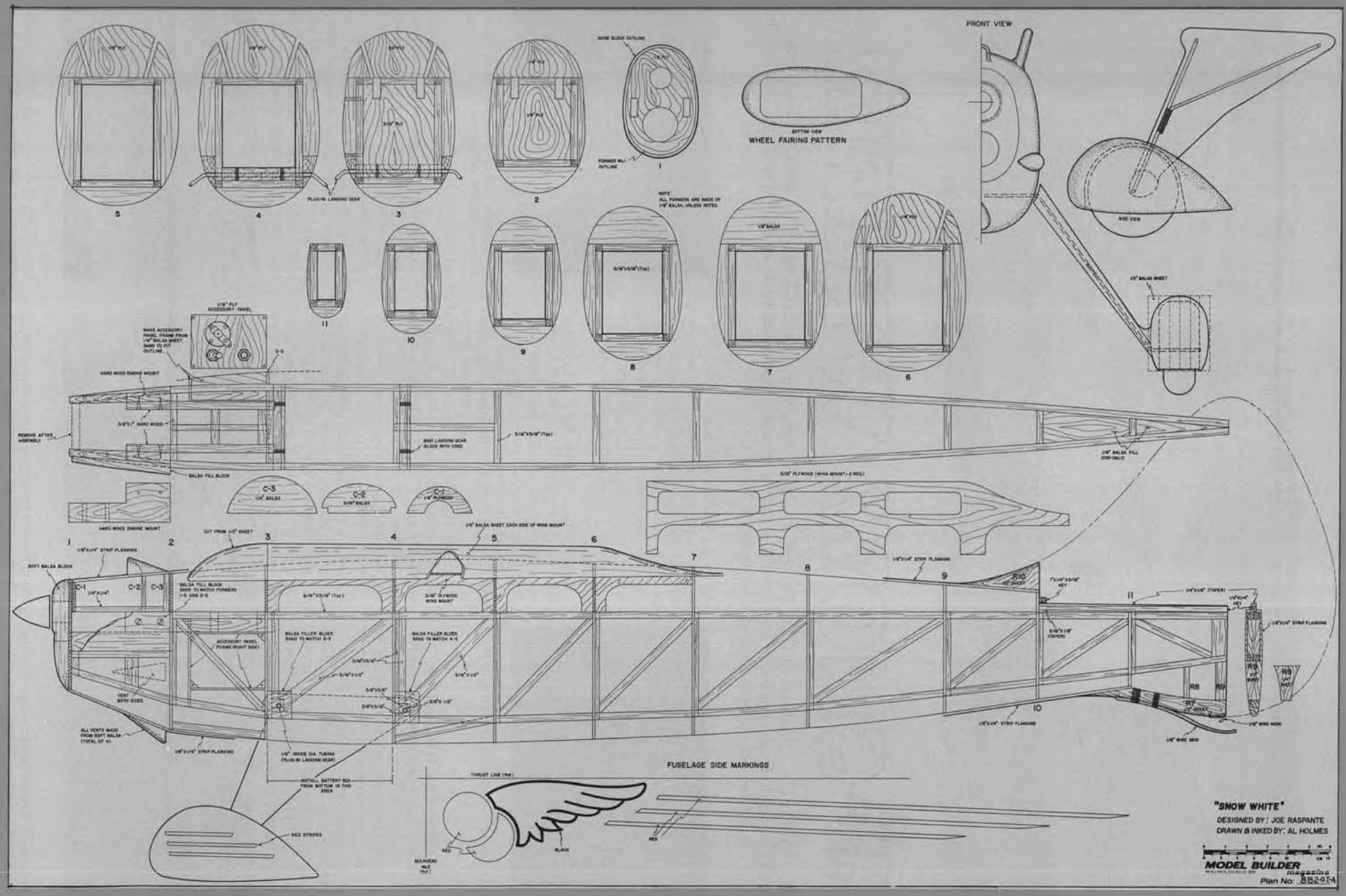
Joe looking at a set of Snow White plans for the first time in 45 years.

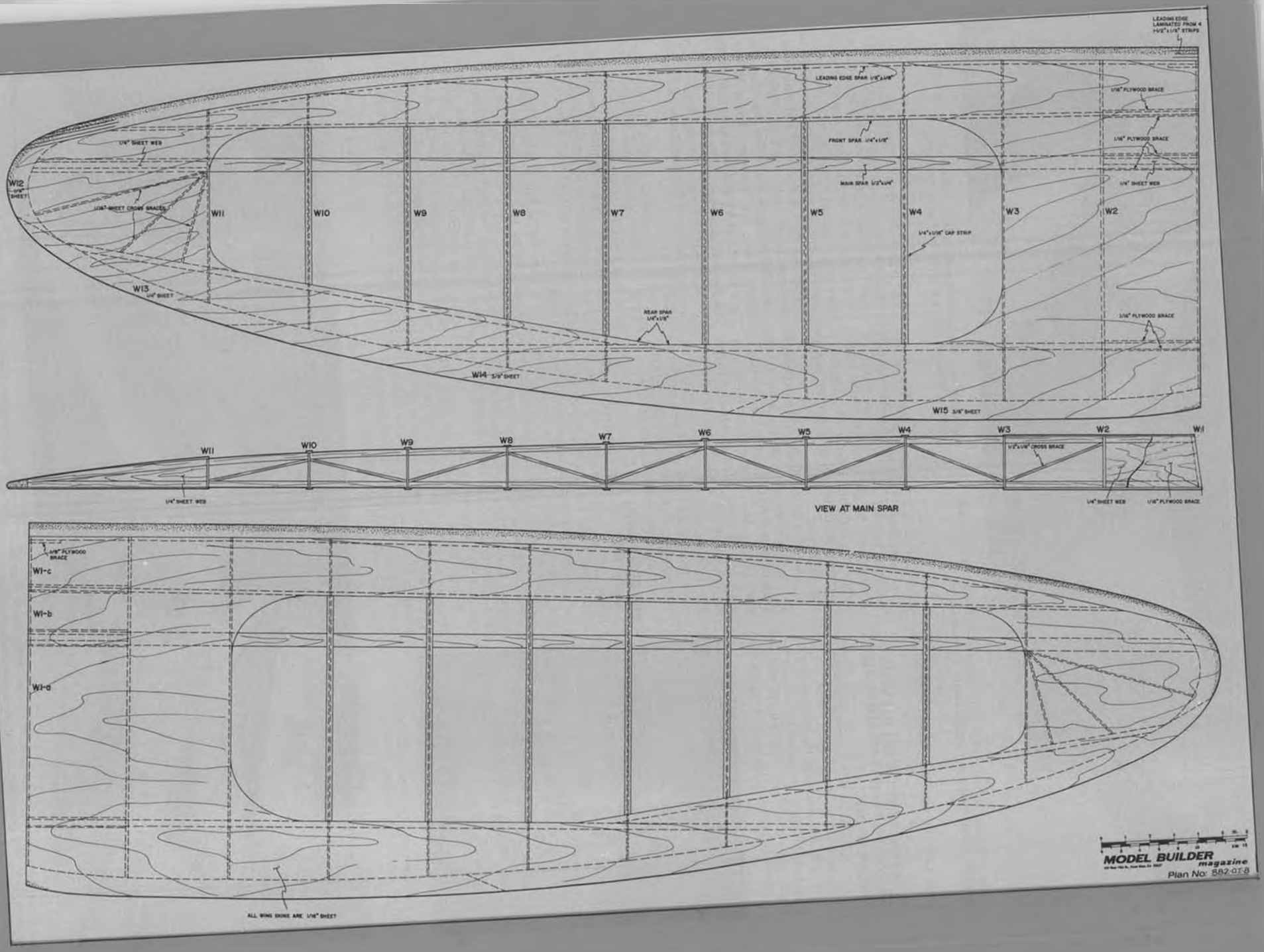
However, along comes the June '82 issue of *Model Aviation*, with a story on Snow White which adds more confusion to the situation, particularly the three-view which is supposed to be a 3/4-size version of the original model. This lit a fire under Al and **MB**'s editor, to get the **real** Snow White published as soon as possible. With that introduction, we

Al Holmes using a razor saw to remove a wing rib. Each one done the same way.

Using thinner to remove spar pieces from rib. Cap strips removed with model knife.

Sanding rib smooth before tracing. There were no short cuts to this job!


FRONT VIEW
WHEEL FAIRING PATTERN
FUSELAGE SIDE MARKINGS
"SNOW WHITE"
DESIGNED BY: JOE RASPANTE
DRAWN & INKED BY: AL HOLMES
MODEL BUILDER magazine
Plan No: 882-01-A



FULL SIZE PLANS AVAILABLE — SEE PAGE 100

After removing half of stab, rudder could be laid down flat to trace outline. Everything was traced directly from model parts.

Using thinner to remove planking from top of wing. Note truss bracing between ribs, a typical method of the time.

now turn the podium over to Al Holmes.

• • •

"MIRROR, MIRROR ON THE WALL . . . WHO'S THE FAIREST OF THEM ALL?" "SNOW WHITE"!

Yes, SNOW WHITE is alive and well on Long Island!

To my knowledge (and I've been building models for more than 40 years), there has never been a model to attract so much attention with so little exposure.

Joe Raspante with his hand made four-cylinder marine engine. Yes, it runs.

Consider this, only *one* Snow White has ever been built, that was 45 years ago. Its contest record was nothing short of astonishing. In *every* contest the Snow White has entered, it won! This includes the prestigious Berryloid competition at the 1939 Nats.

Today, the Snow White is in the center of a controversy. That is; who *truly* designed her? At this point I won't try to sway you in any direction, or bless you with the pearls of my conclusions. Rather, I will list what I have found out about Snow White over the past five years (that's how long I've been working on the plans). Keep in mind how difficult it is to uncover a 45 year old truth.

THE BEGINNING

Early 1937, in Joe Raspante's radio repair shop, on Atlantic Avenue in Brooklyn, New York, Joe sat racking his very inventive brain for some inspiration for a new airplane; one with a new look about it, classic, graceful, and large. In walks a friend and member of the same model club (Majestic Gas Model Club), Bill Effinger (Bill was the moving force behind Berkeley Models).

As Joe recalls, it went something like this: Joe said, "I've been sitting here trying to come up with something new to enter in next year's Beauty Contests. I want something big, like Ben Shershaw's 'Cavalier'. What do you think?" Bill took out a pencil and on a slip of scrap paper sketched the outline of a likely model. Joe took the sketch home after closing the shop that night. Over the course of the next two or three weeks, Joe engineered, refined and gave birth to Snow White on the backs of old, flattened out, brown paper bags. Joe said, **"Indeed, I give Bill Effinger credit for the idea, the inspiration, that gave me Snow White, but in NO WAY did he ever contribute to the actual design of the Snow White!"**

Now that I have everyone's hackles up and divided into two camps, let's define "DESIGN".

DESIGN: used as a basis for anticipating practical problems and solving them at the engineering stage.

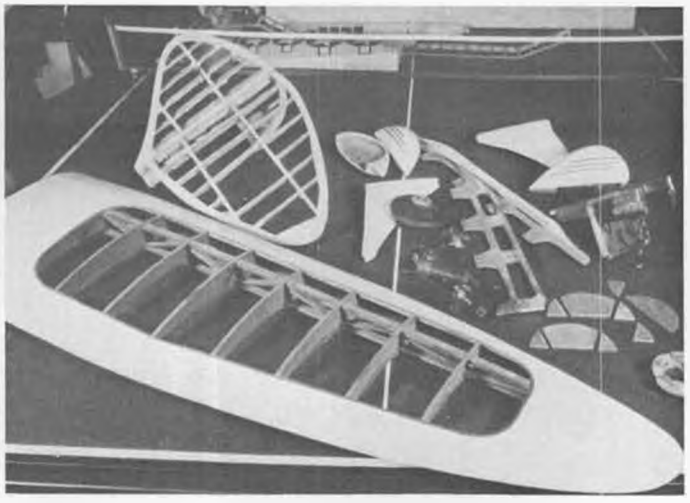
DESIGNER: one who plans, produces, or creates utilitarian or aesthetic objects. (Ref. Webster's Third International Dictionary)

I would say, if this is what "DESIGN" means, then Joe is indeed the "DESIGNER".

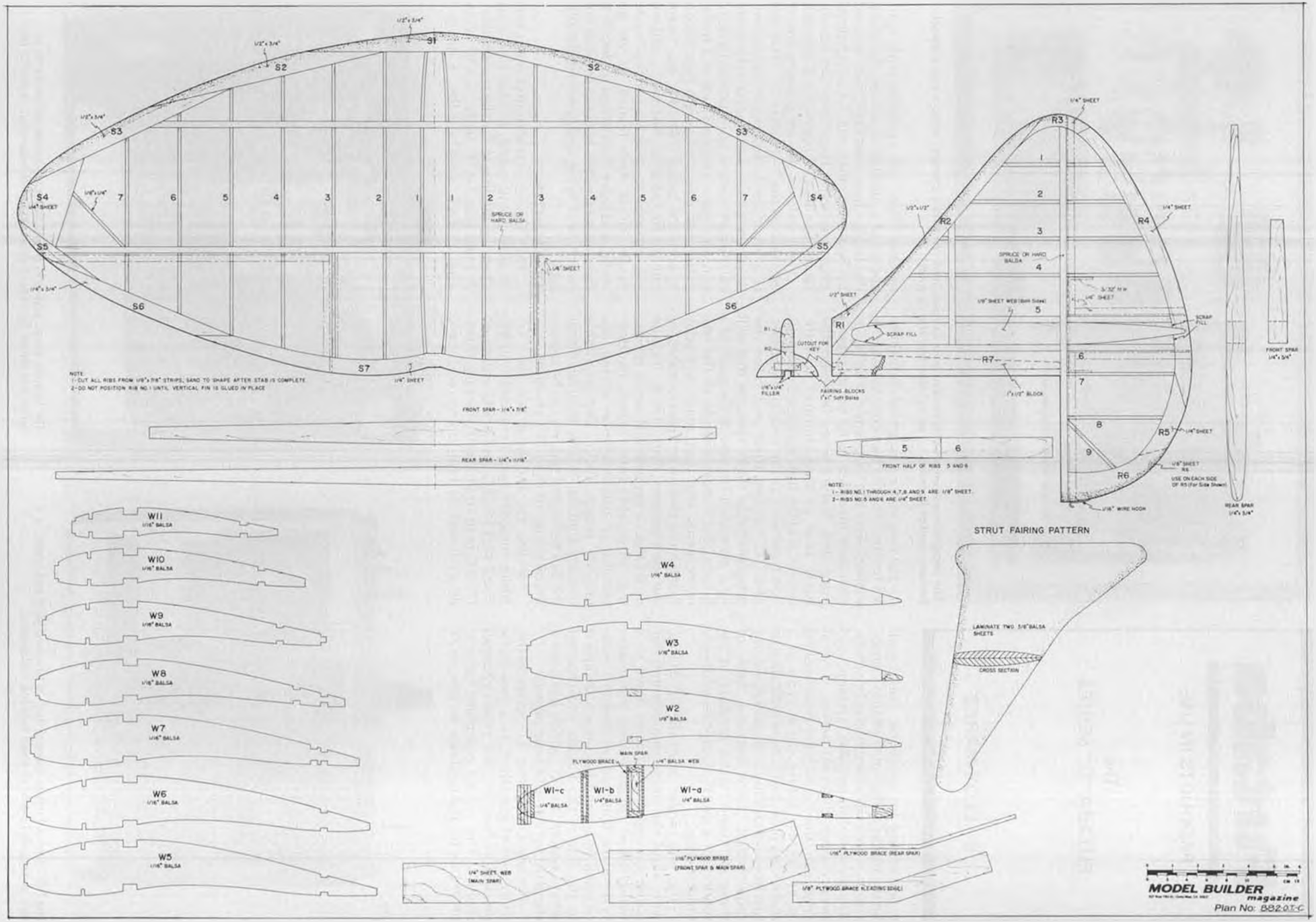
Now if you haven't guessed already, I firmly believe, that without a doubt, Joseph M. Raspante is the one and only designer of the famous SNOW WHITE! This is not intended to shoot anyone down, least of all a man who has made the kind of contribution to model

Continued on page 98

Nearly completed Show White in front of Joe's radio repair shop in Brooklyn, N.Y. The original of this photo is dated March 1938.



All that remains of Show White after Al resurrected its construction on the drawings shown with this article. Now you can build her!



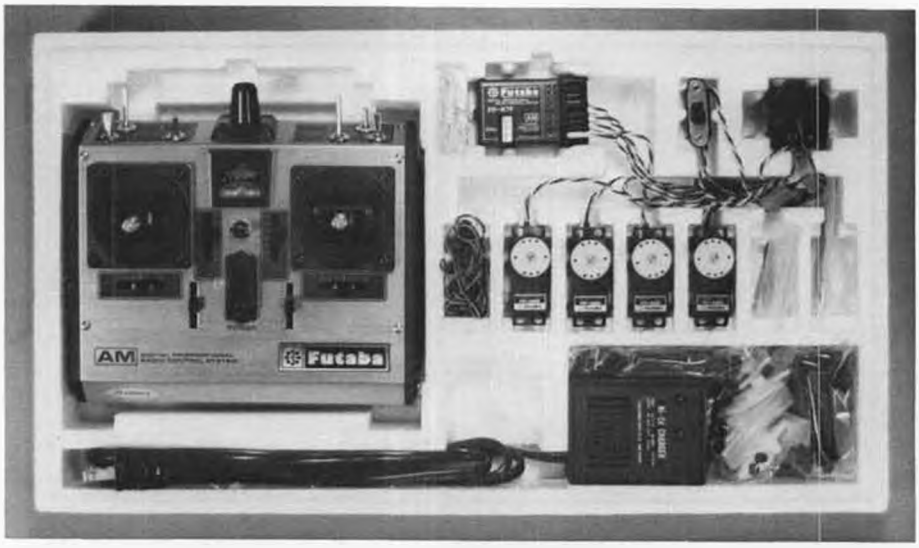
FULL SIZE PLANS AVAILABLE – SEE PAGE 100

Futaba

PRODUCT$ IN U$E

The FUTABA "G" SERIES

By ELOY MAREZ



The complete system, as you receive it in its foam bed, including charger, servo trays, manual, battery, switch harness . . . everything but the co-pilot!

• Something for everyone, could well be the motto of the Futaba Radio Corporation, whose latest descriptive brochure lists sixteen different R/C systems, and twenty-three different servos. Several years ago, this could have been looked at as merely being some type of a marketing ploy, but is now indicative of just how demanding and specialized our requirements have become. Each of these different Futaba products is intended for a specific purpose, with very little overlap.

The line ranges from the "J" Series, with all of the latest requirements for pattern competition flying, down to a two-channel, plastic-cased transmitter system for the budget minded two-channel flyers and beginners. Included in the line is the Futaba two-channel wheel system, the 2F, which has been a standard for car and boat drivers.

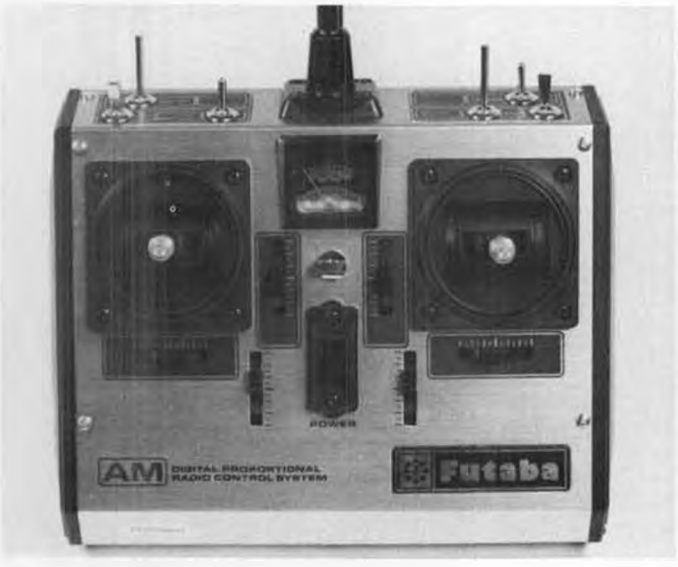
The latest entry, the "G" Series, in the flyer's configuration, is a two-stick version in five, six, and seven-channel models. The official complete name is FP-7FG/K for the dual rate version, or /E for the one with exponential. Substitute a 5 for the 7 for the five-channel system, similarly 6 for the six-channel. The "G" is obviously intended to fill the gap, both price and feature-wise, between the basic four or five-channel no-frills system, and the fully equipped competition types with all the bells and whistles. The "G" Series does not have the programmable flight features that will fly a maneuver for you at the push of a button, but it does include all the late refinements that can make everyday flying more precise and pleasureable for the non-pattern flyer. These include dual rates or exponential, servo reversing, adjustable servo travel, rudder-elevator or rudder-aileron mixing, adjustable length sticks, and adjustable tension gimbals. If later desired, either the 5 or 6-channel systems can be factory modified up to the full 7 channels.

For the car and boat fan, the "G" Series includes two 3-channel systems. The 2-stick FP-3EG, and wheel-equipped FP-3FG feature dual rate steering, throttle and mixture fine tuning, and servo reverse. They are available with your choice of a number of servos, including the heavy-duty, watertight S-27 favored by boaters. Unlike the 5 to 7 channel aircraft systems, these two can be obtained for dry cell operation if desired.

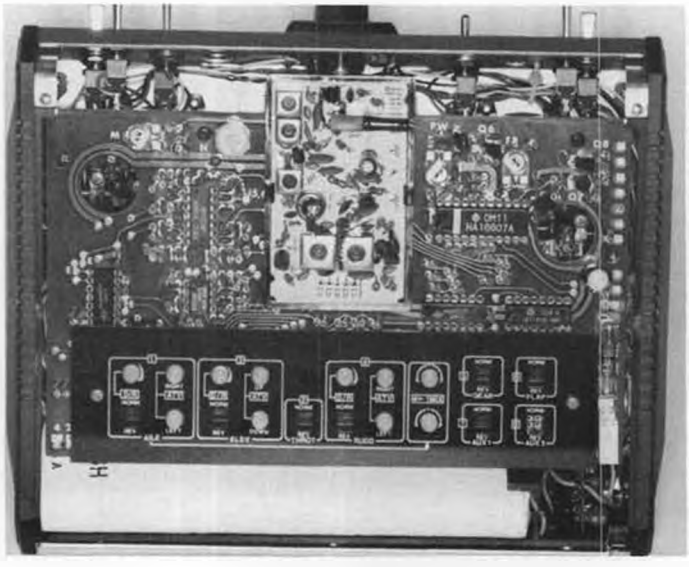
Here and now, we are going to dissect and discuss the 7-channel "G"; this one is a /K model, dual rate equipped. Apparently there is still some reluctance on the part of some non-pattern flyers to consider even a second look at a transmitter with one or two extra switches on it, with the belief that they are meant only to fly Curares! Not so . . . and we will attempt to give you a few more details about each feature as we go along, and leave it up to you to decide if the sum total might not help smooth out your type of flying, and even installations a bit.

TRANSMITTER

The "G" Series transmitter is encased in plastic and metal, in that non-boxy shape so familiar to Futaba transmitters. It measures 7-3/4" wide, 6-1/8" wide, and 2" thick; weighs 2 lbs., 5 oz. It is



The "G" Series Futaba transmitter, in brushed gold and black, is a very purposeful piece of good looking equipment.



The beauty is not just skin deep! Switching and rate controls located just above battery. Everything well organized. It has to be!

finished in brushed bronze and black, looks quite attractive! The open gimbals are smooth working and accurate, and feature rapid, no-tool, stick length adjustments and internal, screwdriver-set, spring tension. All trims and proportional auxiliary channels are ratcheted. Trims are normally located adjacent to the control sticks; cross trims are not available. A dual scale meter is used to indicate relative power output, and battery voltage simultaneously. The latter is an indirect reading, since the actual power out is a product of battery voltage, the needle crossed from the green down into the red portion of the scale at just under nine volts, or as the battery approached it's 1.1 volt per cell critical point.

The antenna is detachable; there is a pocket in the base of the transmitter into which it can be inserted for transporting and safekeeping.

Now for all those switches! All models of the airplane "G" Series (all references will be to those only, not the 3-channels), have a two-way mixer, for which a three-way switch is located on top. It selects mixers off, or an aileron-to-rudder mixing which should be especially interesting to those flying larger models on which this type of mixing is almost a necessity for realistic flying. In this position, the aileron control affects the rudder, to a degree and direction adjustable through the removable back panel, but the rudder can be used independently, without switching back, for ground steering or those in-flight manuevers requiring rudder only. Also known as C.A.R.

In the other position of the mixer switch, you will get rudder and elevator mixing at a ratio of one-to-one. This is the type of mixing normally used for V-tails and elevons, using two servos, one for each direction of roll. In this configuration, rudder can be used independently without switching; the elevator control affects both channels.

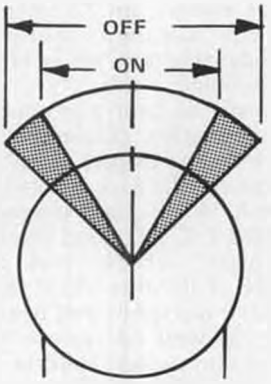
These electronic mixers are simply great . . . no more need for those slop and friction-producing sliding servos and complicated mechanical linkages.

Servo reversing at the throw of a switch is standard on *all* of the channels, not only on the main flight channels as often seen, as a standard feature. So is what Futaba refers to as "ATV"; Adjustable Travel Volume, which permits independent servo travel adjustment on either side. There is also an "ATL"; Adjustable Throttle Limiter, on the throttle channel, a trim function which works only on the low end, so that you can adjust the idle or cut-off without upsetting the top end setting.

Other than mode, frequency, and number of channels, the only other decision you will have to make when ordering your "G" Series is to pick between dual rate and exponential, which come on elevator and ailerons on the five and six-channel systems, plus rudder on the seven. Either one or all can be switched in and out at the flyer's option.

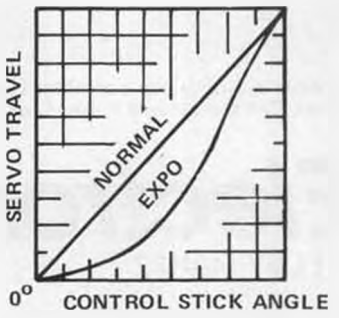
All of the auxiliary function switches are located on the top, within easy reach, also having different levers so you can get to recognize them by feel, no need to look down.

For those who have not yet experienced either one of these refinements, a short explanation follows. Dual rate is a method of reducing the total servo travel at the throw of a switch, the reduced amount being adjustable to your needs. The advantage is that since it then takes more stick movement to obtain a certain airplane effect, smoother manuevers can be made with fewer jerky motions and overcontrol. A disadvantage can come when the switch is forgotten in the low rate position and a manuever requiring full control movement is attempted.

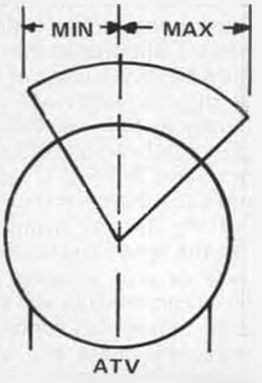


DUAL RATE

Exponential control is somewhat similar to dual rate, in that it also results in a reduction of servo to stick movement around stick center. However, as the stick is moved further off center, the ratio increases until at the end of stick travel, normal full servo travel is obtained. We've included a couple of little sketches which should help to clarify the action of both of these features. I personally think that these are the greatest improvements in transmitter functions to come along in years, even more so than servo reversing.



EXPONENTIAL COMPARISON CHART



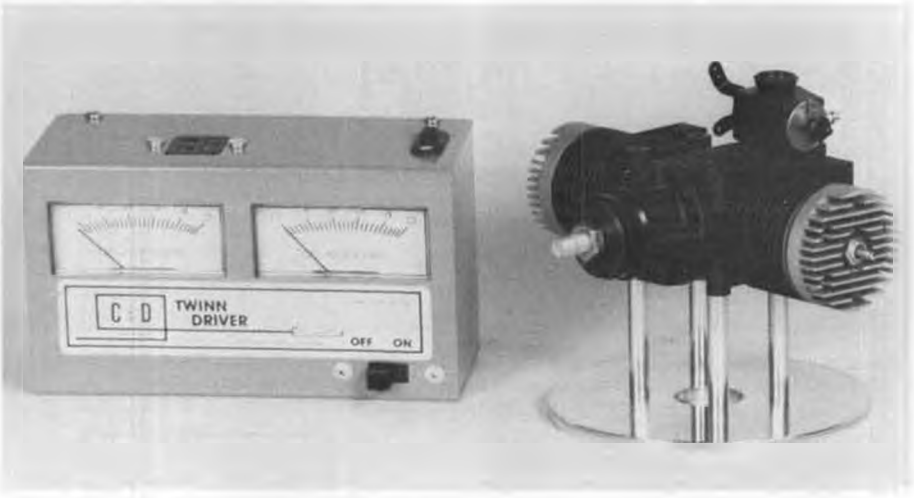
ATV

BI-DIRECTIONAL ADJUSTMENT

The "ATV", Adjustable Travel Volume feature is simply another way of saying that the total servo versus stick travel is adjustable; independently on each side,

Continued on page 64

The airborne components, with a common 9-volt transistor battery for size comparison. Their compact size is suitable for all but the smallest planes.



The C&D Twinn Driver, a completely self-contained glow plug power source for two cylinder engines. Can also be used singly. Classic Ross twin shown.

Electronics Corner

By ELOY MAREZ

THERE IS GOOD NEWS, AND THERE IS BAD NEWS . . .

The good news, frequency-wise, is that things are proceeding according to the expected schedule in regard to our new R/C frequencies. The Federal Communications Commission has released its so-called NPRM (Notice of Proposed Rule Making) covering AMA's petition, now officially known as RM-3248. The next step is that those for and against file their "for's" and "against's", after which the Commission makes its ruling for the benefit of the largest number of we citizens. By the time you are reading this, all the actions and answers will have taken place, and the ball will be back in Washington's court. No serious opposition is expected, nor is any delay seen, only the normal amount of time necessary for such actions. If all goes according to expectations, this good news will only get better. . .

The bad news also has to do with frequencies, and the comfort of being able to operate our R/C vehicles with the greatest possible security. It is one thing to have to contend with illegal CB'ers on 27 MHz, and non-R/C though properly licensed stations on 72 MHz, but the misuse of our own frequencies by knowledgeable R/C'ers is beyond my understanding.

I am reading from a program printed by a publication entitled *R/C Racing News*, included as part of its March 30, 1982 edition. This program includes a list of events, drivers, **and frequencies** for the "1982 R/C Off Road World Championships" which took place in Anaheim, California, April 16 through 18, 1982. It was sponsored by said publication, as well co-sponsored by 26 industry companies. Held in conjunction with a full-scale off road trade and consumer show, I'm sure this event brought a lot of exposure of the R/C hobby to the general public. Too bad it could not have been done completely under the law!

The appalling and unforgivable thing to me is that **twenty percent**, by count, of the competitors were, according to the published schedule, operating, and permitted by the race management to do so, on illegal frequencies . . . those assigned for "model aircraft use only".

Twenty percent . . . now that is too much to be explained by "I didn't know". We all know that this has been going on, and little can be done about controlling such misuse at non-sanctioned events, but according to the program, there exists a body called **ORRCA** (Off-Road R/C Association), and of course, **ROAR**, the officials of which must be aware of the rules. In addition, many of the names mentioned in key positions and in competition are well known pioneers in the R/C car hobby . . . they know the proper frequencies. In the list of competitors, right by their illegal frequencies, are names long associated with R/C cars, and with the industry.

I find this shocking . . . There are two areas of heavy R/C airplane activity in the vicinity, one about three and a half miles away from where this event took place. Whether or not these R/C'ers believe it, our signals can carry that far. When the risks involve 10-pound, 100 MPH airplanes, deliberate operation on aircraft frequencies is completely irresponsible. And I find it so, not only on the part of the competitors, but more so on the part of the race officials and R/C organizations concerned, who by condoning that are also lending their approval.

There is **no** excuse, however, in all fairness, we will be happy to give equal, or more space to the other viewpoint, if one exists. We sincerely hope that the industry organizations who co-sponsored this event will reconsider or impose some restrictions the next time they are invited to do so for a similar non-aircraft event. After all, some of them are suppliers of aircraft radios and accessories as well, and owe us airplane drivers a certain amount of consideration.

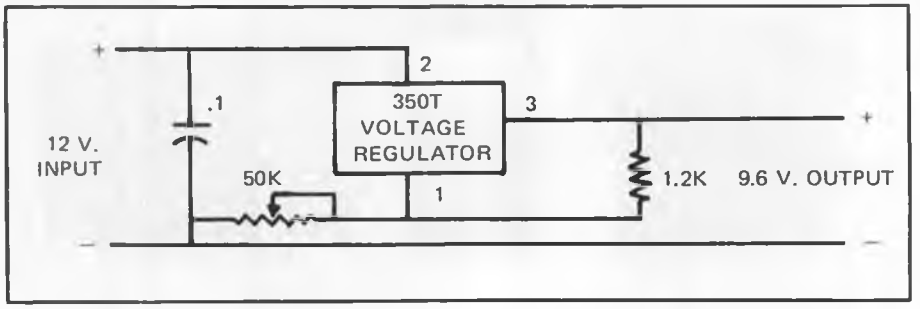
THE SPEED CONTROL, O.M.T.

We heard from Mr. W. Schweizer, of Pomona, New York, who tells us about his experiences with the Speed Control from our February issue. It seems he ran into a batch of defective triacs, which ultimately cost him a pot also. He is finally off and running, but has a further query:

"The question I would like answered Mr. Marez, is as follows: When the pot is on "0", switch on and a Dremel plugged in, I get no RPM. But I have to turn the pot half way up before the unit will begin to run. I cannot get the Dremel drill below 700 RPM. Is this normal and the way the speed control is supposed to work, or did I do something wrong? No matter what I plug into the unit, drill, drop light, fan, blender, etc., I have to turn the pot up to about 6 before any of the units work and they all seem to start off at half power. The speed control does not lower RPM to zero or say 100 RPM. Can you please advise me on this. I installed all the parts from your parts list."

Well, Mr. W., there is a simple solution. Use a smaller value pot; one of about half the resistance will probably work for what you are attempting to do.

My choice of the value originally used



Voltage regulator circuit to provide 9.6-volt transmitter power from 12-volt battery. Adjust pot for proper output.

was governed by two facts, though I knew it may be a little high for some applications. For one thing, there is no way of knowing just what it may be used for. For example, I learned recently that the circuit has been used to replace the Variacs, a type of variable voltage transformer, in plastic injection machinery in a plant up around Chicago. The pot used is a compromise that will work in most applications. The second reason for its choice is that I was trying to build around components that are readily available, which means Radio Shack. Unfortunately, they do not catalog one that will give the results you are after, you'll have to locate one from a more widely stocked electronic supplier.

On the matter of real slow speeds, there is a minimum that is governed more by the device in use than by the control, as there has to be enough power applied to it to overcome friction and armature inertia plus just enough more to maintain a very low speed. This type of control is too critical for a simple circuit such as the one we've used, which however, does result in good control over the practical ranges required.

AND RF NOISE, O.M.T.

I have some further information for Mr. Charles Castaing, New Iberia, Louisiana, and Mr. J. Onderka, Judibana, Venezuela (June '82 issue), who wrote asking about the ill effects of RF noise in the receiver, due to long leads, metal, etc.

During the Toledo show this month, I learned of a new product from Ace R/C that might help remove some of these gremlins. It is called a "Noise Trap", and is described as "a solid state device (which) blocks all noise that is picked up in the servo leads and does not load the receiver circuit". It is a relatively simple circuit, consisting of one IC, a small printed circuit board, and the necessary wiring. You will need some plugs, male and female, to match your R/C system. It gets its power from the receiver battery, without need of any special packs or connections.

I have not tried it, but I do know the theory, and have used similar IC's for other applications where it is necessary to clean up a servo pulse . . . the system works. It is certainly worth a try, and to test the validity of such a device, you should test the antenna-less or antenna-down range, with the engine running, with and without it. If your extraneous RF noise is being generated within your model or picked up by long servo leads, and the range increases with the "Noise Trap" installed . . . it is helping, leave it in. This goodie from Ace R/C is No. 26K17; priced at $3.95.

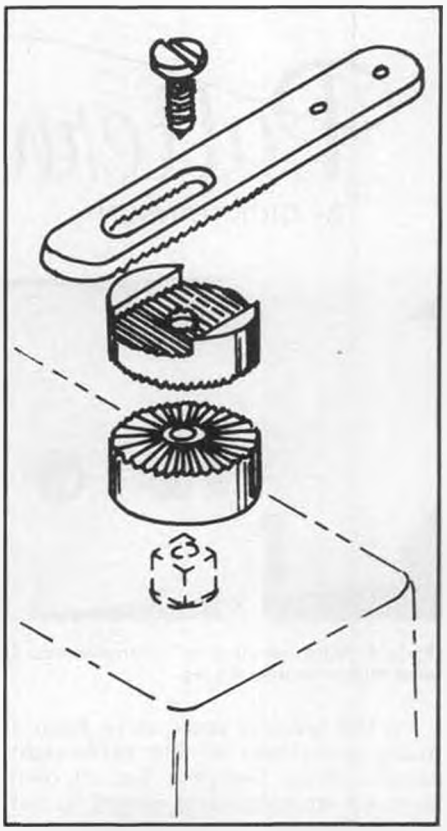
If you don't like to roll your own, you will find similar items available, ready built, from EMS, Electronic Model Systems, also introduced this year.

NI-CDS, AND FAST CHARGERS

Mr. Philip Bruce Mahony, of Lime Rock, Connecticut, has been heard from. He has recently been 'willed' an electric Kraft Cardinal, and an Astro .020 Twin, and is asking for information on the charging of Ni-Cd batteries.

Phil, there has been more information, and misinformation published on this one single subject than probably any other since Medco sold Bob Dunham his first set of button cells. We will try not to add to the latter.

The nearest thing to a bible on the subject that I know of is a book entitled "Nickel-Cadmium Battery Application Engineering Handbook". It is published by, and available from General Electric Company, Battery Business Dept., P.O. Box 861, Gainesville, FL 32602. I don't know the current price, so you will have to write direct, or call them at (904) 462-3911. This 5-1/2 x 8-1/2, and 5/8 inch thick book covers Ni-Cds in more detail than anything else I have seen to date, including their makeup, application, and yes, the various methods by which they may be charged.



Robart Super Trim Arm provides exact throttle arm movement, saves batteries. See text for more information

Though not quite as comprehensive, but then it was free when I last got one, is a leaflet entitled "Rechargeable Nickel-Cadmium Batteries" available from Gould, Inc., who incidentally is the only true maker of "NICAD" batteries, they have the name registered. Some charging info is also included . . . you might write for one, to Gould Inc., 931 N. Vandalia, St. Paul, MN 55114.

What Phil is trying to do is to get the

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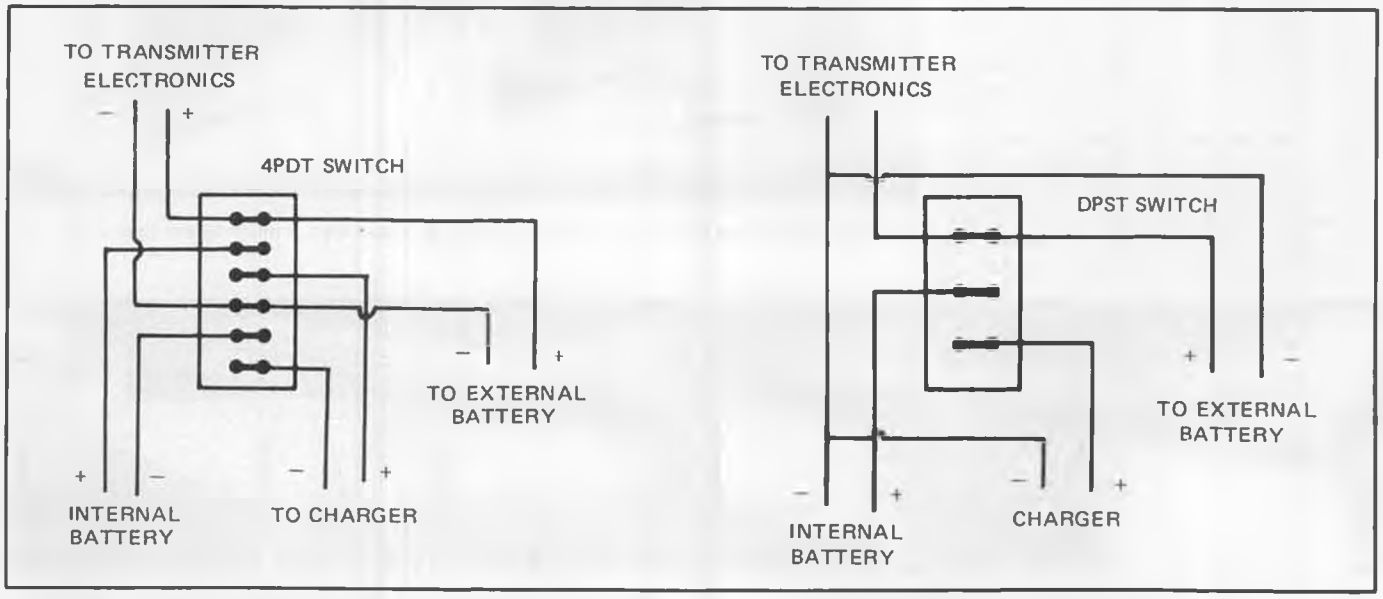

Two common transmitter switching circuits, and connection points for external battery supply.

Pattern Flying

By DICK HANSON

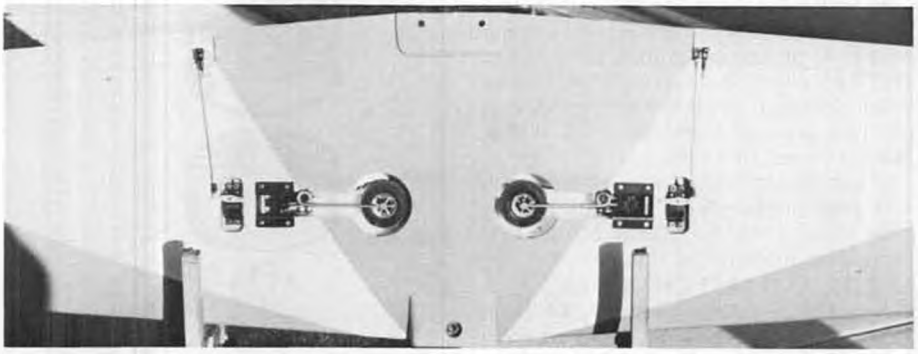

Photo A. Note "direct drive" aileron servos. Eliminates weight of linkages, wing weakening servo hole in center of wing.

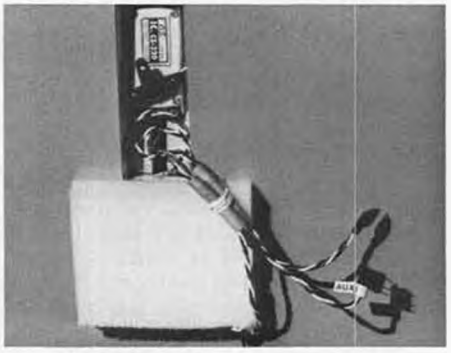

Photo B. Foam block covers receiver in foam pocket shown in Photo E.

• For the last few years we've been a strong proponent of the lightweight pattern plane. Everyone has his own ideas on what an ideal weight is, but consider the evolution of the present designs.

Originally we had the large Astro Hog type designs which were lightweight and had small engines. These faded from popularity as the smaller, heavier loaded designs with more horsepower developed. This type has been popular for the last ten years.

One of the most significant factors contributing to design change has been engine development. Our present engines deliver twice the pulling power of the early .45-.60 designs which ruled the skies in the '60s. We all found that smoothness could be gained by high speed, which produced the popular maneuvers like the long rolls, large loops, etc.

But, like it or not, space for the 3/4-mile long maneuver is becoming scarce, even here in the boundless reaches of the U.S.A. It looks like we're back to the large, lightly loaded pattern designs which fly at low speeds. Not a very attractive thought for a lot of pattern enthusiasts. Also, the big Tournament of Champions models which are designed specifically for the "close in" pattern, apparently are being used as examples of what is required for this type of flying.

The points which really cause concern here are size, complexity, expense and new building techniques. But one thing we have going for us now is a choice of very strong A.B.C. .60 engines which deliver tremendous power with little attendant tinkering. By adjusting pipe length and playing with propellors, many of these engines will pull large propellors very well indeed.

The basic shape of the current pattern birds has been worked out to offer good flight performance, so the only missing link is arriving at a weight which will permit a wider speed envelope . . . that is, allow the model to perform well at low speeds as well as high speeds *plus* accelerate and decelerate quickly. It's possible, and our experience shows that you can build a perfectly conventional pattern design of foam, balsa, epoxy glass, using retracts, pipe, etc. at 800 sq. inches for 8 lbs. to 9 lbs. with no tricks, i.e., lightening holes etc. Attention to detail is the key to getting the weight off. Here's how.

First, lay out all the hardware you plan on using and determine what pieces are really necessary . . . it's possible to find that choosing a lighter component results in being able to use lighter mounting or structures. This is double

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Photo E. Lightweight fishing line in tubes for nose gear steering . . . much lighter than wire.

Photo Co. Normal landing gear position. Compare with wing in Photo A.

Photo D. Monokote saved weight of 8 ounces compared to painted version.

Beautiful two-inch scale Beach Staggerwing by Roger Stern, Harare, Zimbabwe (formerly called Salisbury, Rhodesia). Working retracts, flaps (obviously), 60 power. Possible future construction article. Remember his big Liberty Sport?

1 TO 1 SCALE

By BOB UNDERWOOD

• By the time you reach age 50, you have learned (hopefully) that it's not hard to say or do something that upsets somebody's apple cart. If you're lucky (or really work at it), you don't spill *too* many apples along the way. What's hard to control is when someone else spills them for you. In the May issue, this column carried a photo of George Clapp's very nice Fairchild FC-2. The caption which ran below it alluded to the continuing controversy of Sport Scale — Precision modeling. At the risk of spearing my boss, the comments in the caption were not mine, but rather the management's. *(Right. WCN is reponsible for all captions! wcn)* As a result of the caption, I received mail. Two of those letters are included.

Dear Mr. Underwood,

I noted in your May column the photograph of George Clapp's Fairchild FC-2 and the accompanying caption. I assume from the caption that you are expressing your disapproval of the entrance of this "alleged" A.M.A. Scale class model into a Sport Scale class. As it appears that almost everyone is doing it these days, including maybe *one or two scale columnists, is it not a little bit like the pot calling the kettle black?*

What is your solution to this problem? Is it even a problem? Perhaps the A.M.A., the C.D.s, the scale judges, the trade shows, the Nats, and the builders should stop kidding themselves and call a spade a spade?!? Or, shall we invent more scale classes to lure the "beginner"? Would they too "grow" as the Sport Scale class did?

Perhaps it is high time to rethink scale competition. Sincerely, Gary E. Brown, A "former" Sport Scale Enthusiast.

Dear Bob,

Sorry I didn't know about your publishing a photo of my Fairchild FC-2 when we met in Toledo. Would like to have talked to you about Sport Scale vs. Precision Scale at the time.

I have long objected to details not seen at the prescribed distance on a Sport Scale model.

My Fokker trimotor "America" on **Model Builder** *cover '76 and shown flying in "Those Marvelous Miniatures" is a true Sport Scale model aircraft. It is now the property of the AMA for the forthcoming model museum. There are no details that can sway a judge other than at the distance quoted in the AMA rule book. But I soon found that the dummy "Whirlwinds" which were only dowel cylinders without the fins and other long distance details, weren't in competition with other so-called Sport Scale models.*

It is hard to build a model as large as my Fairchild and with an exposed radial engine without using the Williams Bros. cylinders. There are other details such as the fuel tanks on top of the wings that are clearly visible from Sport Scale distance. The doors don't open, the wings do not fold, there is no inside detail that couldn't be seen at the prescribed distance. The point being, there is only *enough detail to be competitive* today *in Sport Scale.*

I have judged Ralph Jackson's Windecker when it was in the Precision category. Since then he has had *to down grade it to even be competitive in Sport Scale.*

In my opinion and many, many others it is high time that judging be as originally conceived in Sport Scale. This would separate Sport Scale from AMA scale as it was intended. If this could be done we could get back to Sport Scale as it should be . . . a competition for the many. It would also benefit AMA Scale in the long run.

Much has been written about this and for some time. I hope you find it possible to print this letter in your column, because with the photo published last, it might reopen a can of beans that has too long needed to be reopened. Sincerely, George Clapp

I have tried to steer a center course on this subject. Over the several years writing this column, I have shared some of my thoughts at various times. First, I feel that it is impossible to legislate mediocrity. Everytime you try, you'll find someone able to produce a better mousetrap, somehow or other. To eliminate the problem of detail, etc., you'd have to place the model many times the distance away from what we presently use. This would certainly produce some leveling of scores in static and would come closest to "legislating mediocrity." But what you would produce at that point is not so much a scale event as a *flying* event. There are a number of people who feel strongly that way and I can understand their feelings. Personally, I prefer to try and keep it a *"scale flying"* event with an even split. The majority of contests I've attended in recent years have made a genuine effort to keep most everyone in the competition. They have done this by keeping the point *spread* in a reasonable range; something in the order of a ten-point max. Seasoned contesters will argue that a ten-point spread is impossible to make up with flying. Looking back over the very accurate records that my wife keeps of the competitions we've been involved in, I find I would not completely agree with this. There are, of course, those obvious judging necessities when you have to zap an *extremely* poorly done

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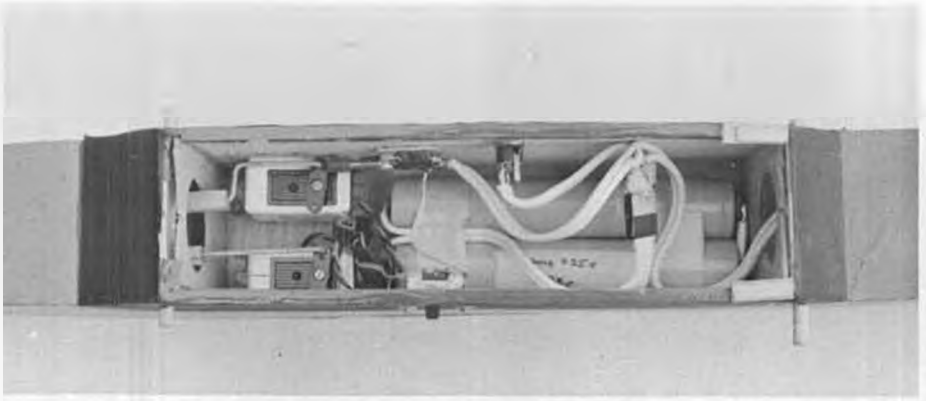

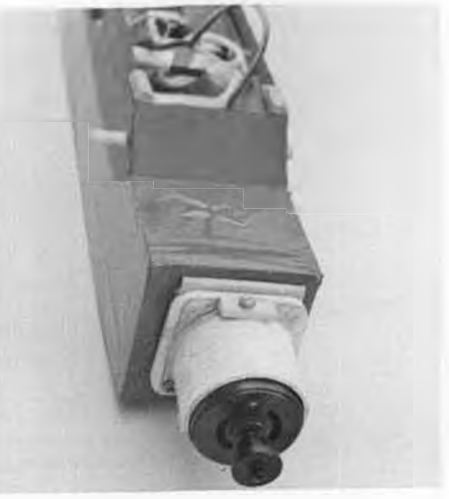

Will wonders never cease! An Astro Sport model with a Leisure 05 for power. This Mitch Poling will stop at nothing! Ten minutes in the air.

ELECTRIC POWER

By MITCH POLING

• At last! Some decent flying weather (this is written in late April). So, hot from the field, here are the results of using the Leisure 05 pattern wind in the Kraft Cardinal (with landing gear removed); 6x4 Cox gray Prop, flying weight 37-1/2 oz.

First day: Cloudy, temperatures in the 50's, light wind. Battery pack: Sanyo six-cell sub-C.

First flight: charged at 4 amps for 15 minutes, flight time eight min., 15 sec.

Second flight: charged to a peak voltage of 10.02 volts, flight time eight min., 30 sec.

Second day: gusty, winds 10 mph, clear, about 60° temp.

First flight: charged to peak of 10.16 volts, flight time seven min., 15 sec.

Second flight: charged to a voltage peak of 10.00, flight time nine min., 0 sec.

Third day: Leisure system in the Astro Sport, flying weight 32 oz., overcast, about 50°, winds 10 mph.

First flight: charged to voltage peak of 10.10 volts, flight time 10 min., 40 sec.

I also did the same for the Leisure system with six G.E. sub-C cells, and the times were consistently about a minute less than with the Sanyo pack. The difference in power was significant; my guesstimate was that the Sanyo pack delivered about 15% more power. Now that I have tried both, it is going to be hard to go back to G.E.! It was like flying with nitro versus no nitro (for those with gas experience), and I really enjoyed the extra edge in power.

You will probably notice that the first flights are shorter; this is always true, as the batteries need to warm up for their maximum performance. "Body temperature" seems to be about right for the best from NiCds, both in power and duration. You will also most likely notice that the voltage peak is not the same for each charge. This seems to be a function of temperature, as the battery pack warms up, the voltage peak gets lower.

I have read and heard many times that the Sanyo cells are more sensitive to overcharge than the G.E. cells, so it is often recommended that the charge rate should be at 2 amperes, rather than the 4 amperes that G.E.'s are charged with. This means over 20 minutes charge time. I am not that patient, and I have been charging the Sanyos at 4 to 4-1/2 amperes, which gets them up to the peak voltage in 15 minutes. With two battery packs (which I have), this gives nearly continuous flying all day. So far, the Sanyos have thrived on this, with absolutely no problem at all. My feeling is that the Sanyos can handle the higher charge rate quite well, **provided** that you keep an eye on them and do not overcharge them. My procedure is to touch them occasionally to make sure they are not getting hot, and when the voltage stops rising, I turn off the charge. Note, I did **not** say to wait until the voltage starts to drop. Don't! This probably would cause damage occasionally. This is all easy to see on a digital voltmeter, the voltage shows a steady climb until just at the end, where it hesitates, stays the same, or oscillates up and down for a minute or so, then may begin to drop. The hesitation or oscillation is easy to see, and that is when I stop the charge.

Anyhow, the bottom line on all this is that flight times of eight to 10 minutes

Solar Scamp solar powered free flight by Bill Morez. More in text.

The Astro Challenger Cobalt 05, samarium cobalt magnets, HD brushes.

Leisure 05 motor taped into Kraft Cardinal. See text for test results.

The Kraft Cardinal with gear retracted (well, it looks that way!) and Leisure 05 power. Note Hoerner tips.

Leisure 05 battery pack in bottom of Cardinal. Plenty of room.

Leisure 05 motor, LT 50, with the heavy duty brushes.

are not only practical, but routine, on Sanyo cells charged to their peak voltage. Furthermore, these include loops, rolls, and climbs to out-of-sight altitude. These flight times do include two on-off periods, on each flight, because the plane was getting too high. These were not glides, but power-off descents, so the overall time might include about a minute of power-off time. A few months ago I was getting six minutes as the routine time, but that was on G.E. cells and on a four-ampere charge for 15 minutes, and was very conservative. Now that I've gone "Sanyo digital," I don't think I will go back! I owe thanks to Leisure for advice on how to get better flight times, it all goes to show I'm not an "expert" yet! The Leisure motor, reviewed last month, has thoroughly lived up to its promising bench tests, I like it and recommend it as one of the best on the market.

I have not had a chance to really find out what the limits are with the Astro Sport and the Leisure 05; the one flight of 10 min., 40 sec. is all that I have gotten done at this time. This is really impressive, especially since it was the first flight of the day and the battery was cold. The plane was out of trim on top of that, I had had floats on it, and the plane was trimmed for floats, with a shim under the leading edge of the wing. I took off the floats for this test, and found, after launch, that I had to use full down trim to keep the plane from nosing up. So, over 10 minutes on a cold battery and out of trim! The flight included loops and rolls, and four off periods to get the plane back down to visual range. The Astro Sport is much more efficient than the Cardinal, and is the best sport 05 plane I have ever flown. It'll be interesting to see how long it will fly on a warmed up pack and in trim, maybe next month I can report on that.

There are no plans, as yet, for a motor mount for the Leisure 05, so the photos show how I made one for the Astro Sport. I rolled a 1-1/4 inch wide tube out of file card stock around the motor (three wraps is enough) using five-minute epoxy. This is then epoxied onto a 1/8 lite ply (Sig) back plate 2 inches square. I used a 1-1/2 inch diameter hole saw to cut out the hole in the back plate. A 1/8 spruce piece with a screw in it serves to lock the motor in place. This fits just right in the Astro Sport and does the job quite well. The Leisure motor (LT 50) is just a little oversize for the Cardinal mount; I forced it in anyway, which cracked the mount a little, but it works, crude, but good enough. The motor is secured in the Cardinal mount with duct tape.

Homemade mount for Leisure 05 (see text). Leisure doesn't make one.

Leisure 05 in homemade mount.

Bob Kopski wrote an announcement for the Keystone R/C Club Electric Fly this fall, so here it is: September 18 and 19 (two days!), starts at 9 am each day, at the KRC flying field, Hatfield, Pennsylvania. There is something for everybody, and it's fun fly with awards for the best looking plane, the longest flight time, the most aerobatic, and one surprise event. There will also be seminars, displays, and an electric clinic for those who need help on their planes. Write Bob Stumpf, Snyder Road, K-15, Lansdale, PA 19446. (phone 215/368-8583) or Bob Kopski, 25 West End Drive, Lansdale, PA 19446, if you need more information.

The Electric Fly is in its third year, and the electric help clinic alone is well worth going to, not to mention all the rest. Bob does his own electric designs, and his latest effort is a "something for everyone" plane, with three wing options for the same fuselage. All would be 8 inch chord; one a 64 inch turbulated glider wing, one a 40 inch flat bottom

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Herb Smith, Denver, Colorado, scratch-built this quarter-scale Super Cub (Quadra power) weighing 22 pounds to tow his also scratch-built quarter scale ASK-18 aloft. And remember, Denver is a mile above sea-level.

R/C SOARING

By Dr. LARRY FOGEL

• R/C soaring and sailing are similar in many ways. Both are elegant sports. Yet, there are distinct differences. For example, in soaring, competitive events are held among sailplanes of the same class with respect to size and controls. The pilot with the better plane has a distinct advantage. You can't expect to win a two-meter contest simply because your plane qualifies for that event.

In sailing, the competition is clearly separated into open class and one-design events. In the former, rules define the acceptable ships. For example, Marblehead 50/800 races are limited to boats no longer than fifty inches carrying no more than 800 square inches of sail. But to win such an event you've got to have a truly competitive ship . . . and be a good skipper to boot. Each year the winning boat takes a new shape. If your hull isn't of recent vintage, you're outclassed even before the race begins. Open class sailing is a combined test of the designer/builder/skipper. Similarly, *all* of the recognized R/C sailplane competitions measure the designer/builder/pilot.

In contrast, the one-design sailing events focus only on the skipper's skill. Every boat in the event is of the same design and construction. Once you invest in such a boat, you're in for many years of exciting competition.

Nowadays there are a number of active one-design classes. For example, the East Coast-12 consistently draws competitors from all over the Eastern United States, while the Santa Barbara is popular on the West Coast . . . and I could cite other active classes.

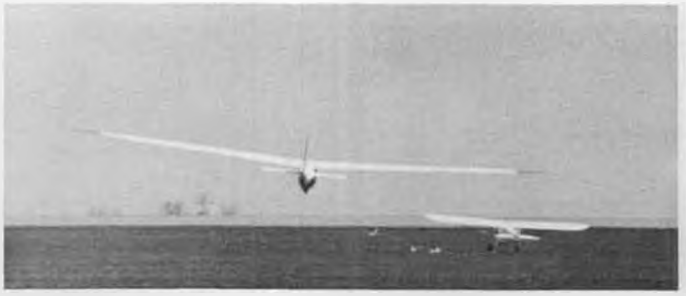
Trouble is, there's always someone looking for loopholes in the rules. His Santa Barbara has a slight advantage because of its lighter deck (and perhaps heavier keel to increase stability while staying within the weight limit). And there are other ways to "cheat". To make matters worse, over the years, the class rules may change. Then there are grandfather clauses to allow the older boats to compete. After a while the "one-design" has become a "some-design."

Terry Allen, John Amen, and Roy Langbord pondered this situation at last year's National Championship. "Perhaps it's time to establish a new class with rigorous rules so that skippers across the land (and overseas) can compare their sailing ability." Terry and John have now come up with such a design. It's the right compromise. It's fast in light air, yet capable of sailing under heavy wind. It's big enough for smooth handling quality yet small enough for ease of transport and storage. And it's competitive in at least one of the recognized open classes.

The result is the "Infinity-54" . . . a beautiful boat that's 54 inches overall, carries 1,300 square inches of sail, weighs seventeen pounds and has a 10-3/4-inch maximum beam. The hull is oblate, to allow it to plane downwind in heavy air. The leading edge of the 51-inch waterline cuts the waves. The 14-inch long keel with ten pounds of ballast

Herb Smith and his ASK-18, adapted from Cliff Charlesworth's ASK-13 plans.

Radio controlled tow hook located in nose of glider. Line can also be released at "tug" end.



On tow, the glider is already airborne, while the Cub appears to still be on the ground. Beautiful sod farm!

The ASK-18 on final approach. Note the sod farm sprayer in action at far left.

provides considerable stability. High aspect sails are rigged on a carbon fiber mast with stainless steel fittings. A shorter storm rig is available for racing under the kind of conditions that rarely occur in San Diego.

This One-Design is governed by rules that would defy a Philadelphia lawyer; (incidentally, Roy Langbord is a lawyer originally from Philadelphia). I've seen this boat in action. It looks great, handles well, and can compete successfully in the open 10-Rater class!

To get this class going, Terry and John offer a complete kit including only top-quality components. The white gel-coated epoxy fiberglass hull is ready to receive the finished keel. All you have to do is secure the deck to the hull, mount the mast and sails (dimples indicate where to drill the holes), install the sail control unit and the radio and you're ready for a challenge . . . about ten to fifteen hours from package to pond. By the way, either Amen or Black sails come with this kit. Both are recognized to be of top quality. To get more information about this new one-design and the kit, why not contact the Interim Class Secretary, Roy Langbord, 302 West 77th Street, New York, New York 10024, telephone (212) 362-4965.

Sailing is every bit as competitive as soaring, but somehow the sailors have failed to diversify the events. From what I've seen, a course is laid out; the boats proceed through the entrance gate in an appropriate manner, and the winners are those who first reach the finish line. Surely, there must be more imaginative challenges. R/C sailplanes can enter duration tasks with precision required in landing, cross-country events, aerobatic contests, and a wide variety of fun-fly gambits. Perhaps sailing would gain a greater following if the events were more diverse. Perhaps such events might challenge the designer to provide new capabilities for the skipper . . . and the skipper to acquire new skills.

For example, why not a slalom event? The markers can take the form of dowels held vertical by weights attached to one end, held in position by a line stretched between the weights. First, the line is stretched across the narrow end of the pond, then walked to a suitable position where it is dropped in the water, the ends being staked. The rods are now clearly visible protruding from the water.

The task is to maneuver through these without touching them and perhaps do this in minimum time. The difficulty of the challenge also depends upon the orientation of the markers with respect to the wind. The course can be sailed in a single direction or in both directions, up and down the slalom. The task could be made more stringent by decreasing the spacing between the markers or by allowing the markers to be spaced closer and closer together toward one end . . . the challenge being to go as far

Continued on page 73

Super Cub tow bracket and release mechanism. Herb has towed two gliders at once.

Terry Allen (above), John Amen, and Roy Langbord are attempting to start a new One-Design class for R/C sailing. This "Infinity-54", with 1300 sq. in. sail area is their design. To promote the class, complete kits are being marketed. See text for details.

American R/C Helicopters, Inc.

PRODUCT$ IN U$E

AMERICAN R/C HELICOPTERS' SUPER MANTIS Part II

by RAY HOSTETLER

• This month I'll finish the American R/C Helicopters Super Mantis review that I started last month. If you are contemplating the purchase of one of these ships, obtain last month's issue and follow along closely.

Radio

I installed JR's new Apollo 6-channel helicopter radio, known as system D6C-4SHM, in the Super Mantis. This radio retails for $229.00 direct from Circus Hobbies, Las Vegas, Nevada.

Most of you are probably familiar with JR's Unlimited series radio with all the bells and whistles you can think of. The new Apollo series retains the most valuable functions, eliminating functions that the average sport flier rarely uses.

The thing that I really liked about the Apollo is what you *DO* get for $229.00 . . . six channels, four servos (2 NESL 501's and 2 NESL 502's [reversed]) delivering 40 oz/in of torque, electronic mixing for the tail rotor (ATS system), throttle hold, servo reverse switches, plug in RF modules for TX and RX, adjustable stick lengths, dual rates on roll and pitch, 5th channel for collective mixing, and the 6th channel for "gear."

Never had you been able to get so many features for such a reasonable price. My only regret is that I have not had the chance to fully flight-test the radio. I will let you know how the system performs in the air as soon as I have a chance. However, if it is a reliable, trouble free system and flies as good as it looks, I am sure that I will be *very* popular.

RADIO INSTALLATION

The radio gear is mounted on plywood plates that form the front end and provide canopy attachment points. Like I detailed last month, cut these pieces out with care, and fuel proof them with paint. Your time doing this will be well spent.

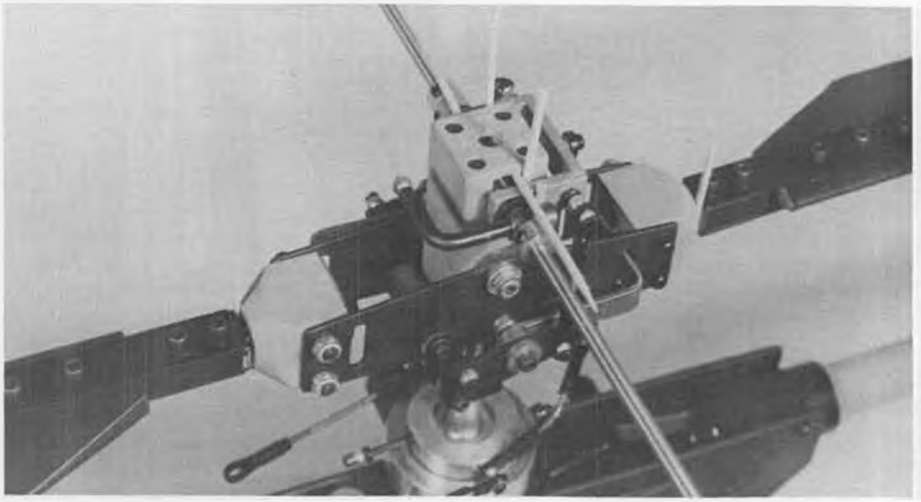
The approximate cut out holes for servos are shown; these will vary depending on which radio you install. Make any necessary changes in hole size before you cut out the marked areas.

The servos are mounted on two "decks," cyclic servos above and throttle/collective servo(s) below. The plans show the upper deck glued in place. If you do it this way it is difficult to gain access to the lower deck. I strongly suggest adding a 1/4-inch square rail to each side plate just below the upper plate, using four small wood screws to hold the plate to the rails. (See photo). This way it becomes easy to get to everything else below.

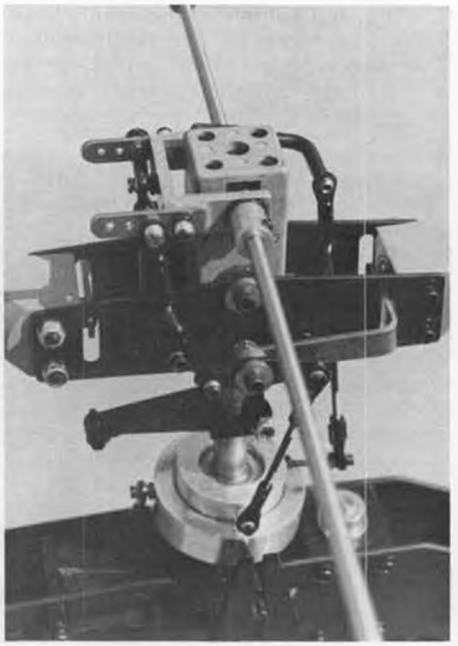
The author making first test flights with his Varient radio, prior to installing J.R. system.

The tail rotor servo mounts in the middle of the right side plate. Again, double check hole size for the servo before cutting. The side plates are shown as solid 1/8-inch plywood. This gives a strong front end to say the least.

As I felt the 1/8-inch ply offered a

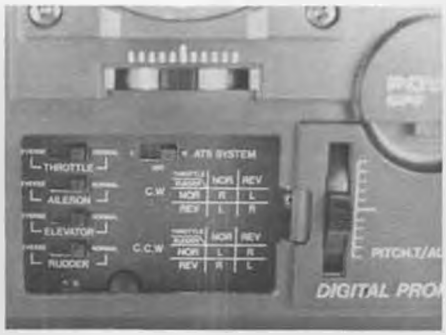


Everything toothpicked in place prior to making linkages. Also a good time to use balancing procedure explained in recent columns.

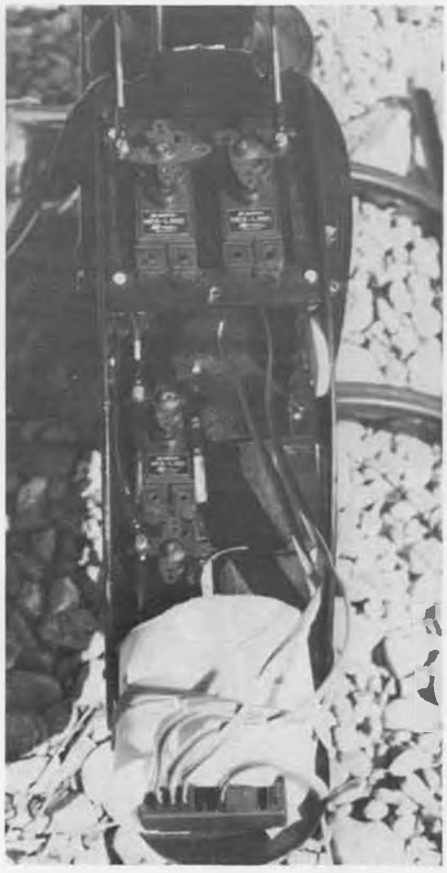


Head after balancing. Note wheel collar moved out on far flybar.

JR Apollo 6-channel helicopter radio, marketed by Circus Hobbies.



Close-up of JR switch panel on transmitter, for reversing and ATS system.



Upper level servo board is made removable, for easier access to other servos.

good strong base, I cut openings in the side frames. This makes servo access easier and it gives open areas to route servo wires and the switch harness. This is purely optional, do whatever you like.

The bottom plate gives room for the collective servo. The plans show this servo driving throttle and collective. Since the radios I fly have provisions for collective trim, I need one servo for throttle and one for collective. It is nearly impossible to achieve this by mounting the servos side by side. The simple solution is to extend the lower mounting plate 4-1/2 inches. Now two servos easily mount in line; plus there is enough room to wrap your receiver in foam and lightly rubber band it to the front of the plate.

The ball links provided are made by Rocket City. These are very similar to the Kavan link except the ball is made of aluminum instead of brass. They snap off and on nicely, but they are plenty stiff when new. I would recommend that you snap the links onto the balls, then lightly "work" the outside diameter of the plastic link with a pliers. This squeezing process helps to "break in" in the link and makes it much smoother to operate.

American furnishes long pushrods with a large threaded area on each end. This enables you to mount your particular brand of servo, then trim the rod to length. The only problems I encountered with the pushrods were the connections between the swashplate up to the mixers. There were no rods the correct length, threaded or not. I made my own from material on hand.

To finish up the radio installation, mount the switch harness and charging jack to the back plate, preferably on the opposite side from the muffler.

CANOPY

The canopy mounts to the back plate in a nifty fashion. It is difficult to explain how the canopy mount works . . . Let me just say that it is very simple and gives excellent results. Much better than the old "rubber band it on" routine of early Revolution and Heli-Baby canopies.

SETUP

Level the swashplate in all directions when the cyclic servos are neutral and neutral trim. The provided instructions do a good job of getting the servos, swashplate, pitch input bellcrank, and tail rotor mix. Set your throttle at 1/2-5/8 carburetor opening with your transmitter at 1/2 stick, high trim.

Stick toothpicks under the grey plastic head just above the flybar (There is a little opening between the two). This will level the flybar. Then insert toothpicks between the out bearing of the axle holders (grey) and the black rectangular block where the blade assembly bolts to the head. This puts friction on the blades and they can be set to lift-off pitch. From experience I eyeballed the blade angle. There is no pitch gage provided in the kit, and the instructions take you through linkage hook ups with no reference to blade pitch. Blade pitch will vary with altitude, but I think American should consider including a pitch gage in the kit. Most people are used to a gage from other kits, and it makes setup easy and accurate.

Assuming that you had a pitch gage available, set the blades so the top of the pitch gage is level with the flybar at 1/2 stick, high trim. The toothpicks you inserted earlier will hold the blade angle that you set. Repeat for the other blade.

Now eyeball both mixers level and insert a small wedge of balsawood to hold them level. Position the collective yoke horizontal and connect the collective push rod. (Make sure the linkage under the plastic gear is centered between the gear and the cooling shroud).

Cut, adjust and connect the pushrods from the swashplate to the long end of the mixer arms. Do not disturb the mixers or blade pitch as previously set! Then connect the short pushrods from the short end of the mixers up to the sides of the collective yoke.

This will complete the hookups to the head. *I would strongly urge you to balance the rotor head as I have described in recent Chopper Chatter*

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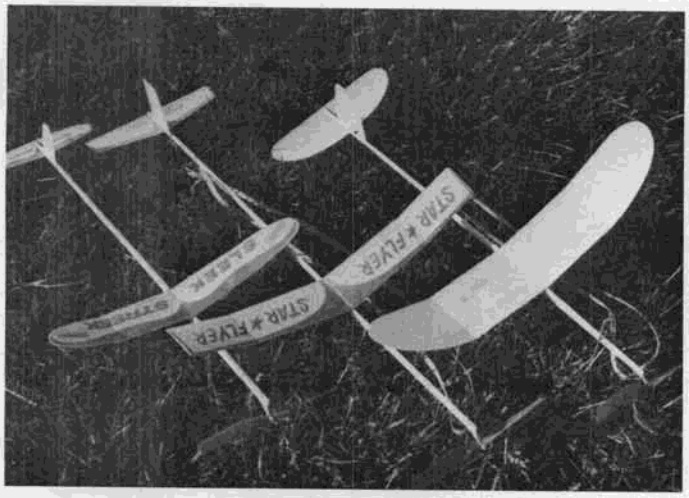
The completed American R/C Helicopters Super Mantis at rest. Appealing to the advanced sport flier, it's a lot of aircraft for very reasonable price.



Trio of Twilight Flyers, two modified from commercial kits, one scratch-built.

The ingredients for twilight fun: two kits, rubber lube, Sig rubber, glue, and winder. Long fuselage stick not shown.

THORNBURG AT LARGE

By DAVE THORNBURG . . . Let's hear it for a loop of well lubricated Sig rubber!

• After a long day's work, when the evening meal is over and the summer's daylight hangs on until nearby bedtime, that's when a certain type of rubber model comes into its own.

The model I mean has to fit the mood of such evenings: long and calm and gentle and relaxing. Twilight is no time for packing max turns into a cobra-sized wad of rubber that threatens to explode like a grenade inside your hard-earned fuselage. And who needs a 300-foot vertical climb and a ten-minute chase at this time of day?

What's needed at the end of a long summer day is (1) a schoolyard within walking distance, (2) a shoebox full of field supplies, and (3) a small all-balsa rubber model of the type that I call a "twilight flyer."

A twilight flyer won't win any contests. A good one won't take a full hour of shop time to build, and it should match that time, minute-for-minute, with airtime, within the first week.

The simplest example of the twilight flyer is shown in the photos. It's built from the combined parts of a couple of dime-store kits, the North Pacific "Sleek Streek" and "Star Flyer." Plus a piece of hard balsa or spruce for the fuselage.

The extra-long fuselage is the key to the twilight flyer's performance. What you're looking for in this type of model is not a hot climb; fifteen to thirty feet is plenty of altitude. And you don't need a terrific glide, either. But in between the climb and the glide you want a smooth, docile motor run of at least 60 to 90 seconds. So you need the longest loop of rubber you can carry, and that means a model that's almost all fuselage.

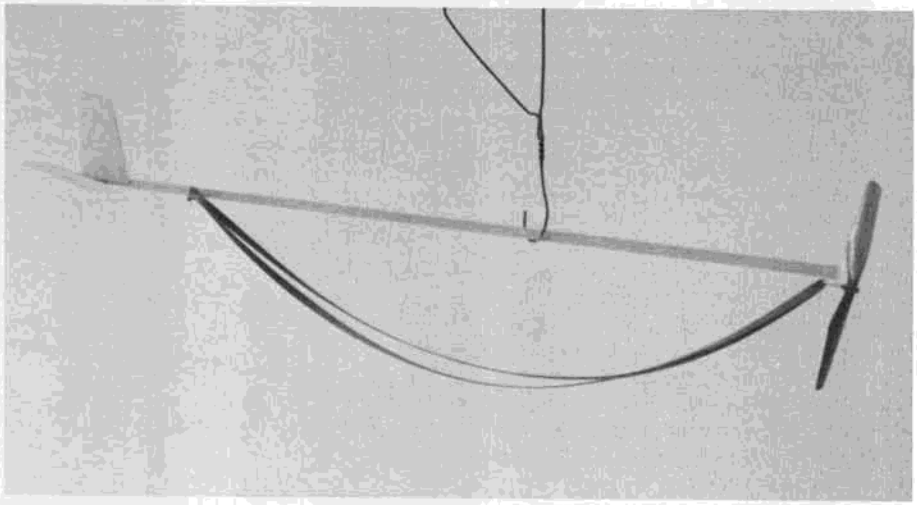
Your basic twilight flyer is just a miniature, all-balsa version of those giant Unlimited Rubber models that guys take to the Free Flight Champs at Taft every year and turn loose at six o'clock in the morning for the annual "Champagne Flyoff." Most of those models spend their initial power burst quickly, then settle into a smooth and endless cruise in the still morning air.

To get this kind of long, gentle motor run from a small model you have to strike a happy balance between your rubber motor (which supplies the torque) and your prop (which supplies the resistance to that torque).

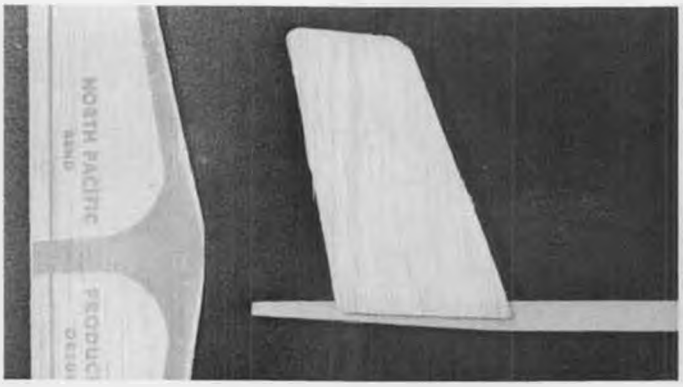
You can achieve this balance in two ways; by varying the prop or by varying the motor. I've flown with people who got into heating their plastic props with a Monokote gun and twisting them to get more pitch. This violates my idea of "simple." Also, it burns my fingers. And sometimes my lips, because you have to hold the Monokote gun in your mouth and twist the prop with both hands.

I prefer to play with the rubber to maximize the motor run, and leave the prop alone. In fact, some of the longest and most satisfying twilight flights I've had were with a stock "Star Flyer" prop mated to a long loop of well-lubricated 3/16 rubber. The simpler you keep this kind of schoolyard model, the more fun you'll get from it. And the more likely you'll be to attract newcomers to the sport. That's one of the reasons I do all my sanding on the North Pacific wings *on the bottom:* this leaves the wing looking stock, and is much less off-putting to would-be imitators.

So here's my formula for the airplane. Take the wing and tailfeathers from a Sleek Streek package. (Buy the package first.) Sand all these surfaces to feathered edges with 240 to 320 grit paper. This



High-tech method for determining balance point, and where wing will be mounted permanently.



Rear of fuselage is tapered on bottom to give stabilizer its negative incidence.

Kit wings have sweepback . . be sure to allow for this when cutting polyhedral breaks.

takes a sanding block and about five minutes of concentrated patience, but it pays off: weight is deadly on these small models.

Now you can cut a polyhedral break in each wing panel, or not . . . just as you wish. I do it to stiffen the wing and fix the camber, as much as for appearance. (Full-scale planes have dihedral, model planes have polyhedral. That's how you tell 'em apart.)

Don't be lazy and use the plastic wing joiner . . . it weighs a ton. Glue the wing together in the center, instead.

The fuselage can be built from spruce or balsa. If spruce, use 1/8 x 1/4 at the most, and pick a straight piece. Balsa can be 3/16 x 1/4 or 3/16 x 3/8. How long? At least 16 inches. I've flown them to 24 inches on the little Sleek Streek wing, but you reach a point of diminishing returns; too much fuselage, too much rubber, not enough lift . . . A bomb.

I usually taper the rear half of the fuselage a bit, to add lightness. But this is a long and tedious razor cut; skip it if you like.

Glue the tailfeathers in place. If you set the stab flat on the bottom of the stick, then you'll have to jack up the front of the wing about 1/16 to make the model fly right. I prefer to taper the fuselage upward where the stab mounts. This sets the stab at a negative angle, like the original Sleek Streek's stab. (Study the angle of the slot in the stock fuselage if you have any doubts. It isn't critical.)

Now add the 7 inch Star Flyer prop and hanger. If your new stick is too wide for the hanger, bevel the left side (looking from the rear) to give a bit of right thrust. You may also want to bevel the bottom to reduce the hanger's built-in downthrust . . . a low-powered ship like this doesn't need much downthrust.

I like to glue my prop hangers permanently in place, using Super Jet. This allows me to cut away a large chunk of the bottom of the hanger in the vicinity of the rubber hook. Reason: a tightly-wound motor often forms large knots (called "strawberries") that catch on the hanger and stop the prop. Cutting away this area is the only cure.

A final bit of finesse; fill the gap in the prop hook with solder or Super Jet and baking soda. This means you have to slip the rubber through the hook before tying the knot, but it solves the problem of a tight, lubed motor trying to climb the wire and escape.

Next comes the rear rubber hook. It would seem ideal to put it at the very rear of the fuselage stick, no? After all, the longer the rubber, the longer the flight. But this usually isn't a good idea, especially if you tapered the fuse bottom for a stab mount. The strawberries necessitate a lot of fuselage clearance, yet you want to keep your hook as short as possible for weight considerations.

For this reason I move the hook slightly forward of the stab, and make it from light piano wire. (A paper clip will do in a pinch, or a large straight pin.) Wrap it and glue it to the stick; running it through the entire fuselage weakens the wood.

Make your first motor from 3/16 rubber. How long should it be? Rule of thumb for rubber flying says 10% longer than the distance between the motor hooks. This is a good starting point. Optimum for each plane will vary according to the plane's weight and trim. Generally speaking, long rubbers give long, soft runs; short rubbers give short bursts of higher energy.

Tie your motor with a simple square knot, and clip the ends short to save weight. Flying buddy Leon Joffe, of Rio Rancho, New Mexico, says to put a dab of a rubber cement called "Goo" on the knot before you lube it, to keep it from coming loose.

And you are going to lube the motor, aren't you? It will only double your flight time, and make your rubber last longer. I've used castor oil, I've used a 50/50 mix of glycerine and green soap (try your druggist), and I've used Sig Rubber Lube. Put a dab in one palm and rub the motor between both hands until it's well coated. You can use the excess lube to grease the prop shaft now and again.

Now hang the rubber motor in place and determine the fore-and-aft balance

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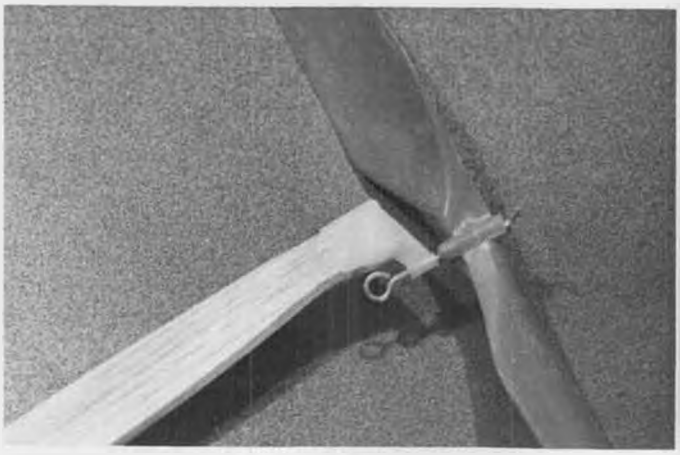
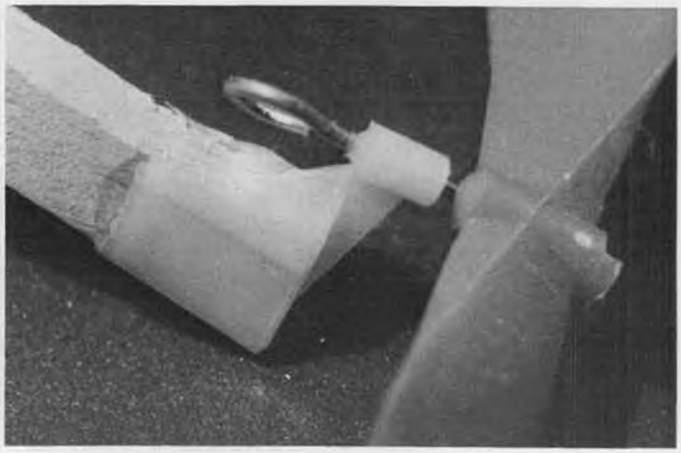


Cut away a portion of the prop hanger as shown, to give better clearance for rubber motor.



Close-up of prop hanger, showing cut-away portion for rubber clearance.

R/C AUTO NEWS

Delta Eagle under MRP Spyder body. If this super-swoop body can be mounted, *anything* else will fit!

• Instead of doing the usual general-interest car column this month, I have decided to use the space for what will hopefully be an equally "general interest" type of article, a race-test of a new car, the Eagle from Delta. In the future, it is possible to have a regular column, with race-tests being separate articles, depending upon the response to last month's column and this one.

THE DELTA EAGLE

You've already heard about it; this is Delta's new suspension car, and suspended 1/8 cars seems to be all the rage this year, with AMPS having done one that worked OK a couple of years ago, PB following up with a better car, good enough for MRP to spend the bucks to import kits and spare parts, in turn allowing development of their own pan car to almost stop completely while they pursue the 1/12 scene with their GP-12 car. While the PB car is still effective, it wasn't long before it was obvious that there were a few problems, most noticeable being a strange wear pattern to the rear tires when the chassis ride height was set down low, as needs to be done on high traction surfaces.

So it was obvious that, while the AMPS and PB cars showed the way, there was still plenty of room for improvement. Enter both Delta and Associated, intent on developing the suspension concept to a higher level of performance and ease of maintenance, which is a reversal of previous trends with the U.S. manufacturers, having enjoyed the lead in chassis development . . . until the suspension cars came along and, truth be known, caught both Associated and Delta looking the other way. Yes, all the Big-Gun factories were at the '81 World Champs and they had the latest in suspension cars with them, only to have Art Carbonell and a flat-pan Delta Super J, which probably represents the ultimate development of a flat-pan race car, smoke them off with ease in the 200 lap final. But Art was racing almost in his backyard, a definite plus, the track was tight, smooth, and the traction was high enough that some of the PB cars, even set down low, were simply rolling over in the corners.

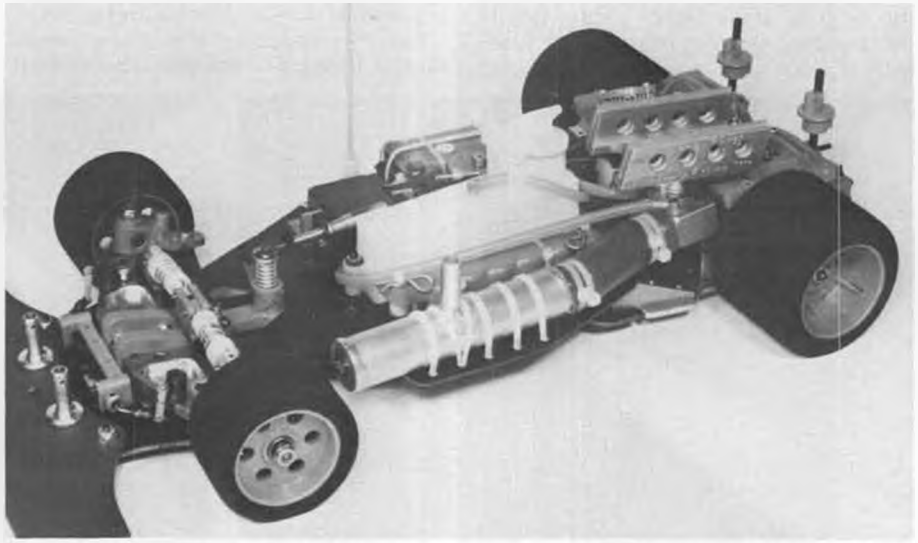
Even having the W/C's crown in their back pocket, Delta was hardly about to wait on introduction of the Eagle. Both Team Delta and Team Associated headed back home to finalize their designs, with the Eagle being the first to appear in production, Associated's RC500 being just about due as this is written. So the word is out: suspension cars look to be the way to go in Open Class 1/8 racing, judging by the commitment to the concept and the bucks required to back up such a commitment.

To a racer who has campaigned Delta Super J's for awhile, and I have, the Eagle looks both very familiar and quite different at the same time. The overall robust construction and logical layout of components, along with beautiful workmanship throughout is the familiar part. All the stuff that goes boing on the track does not.

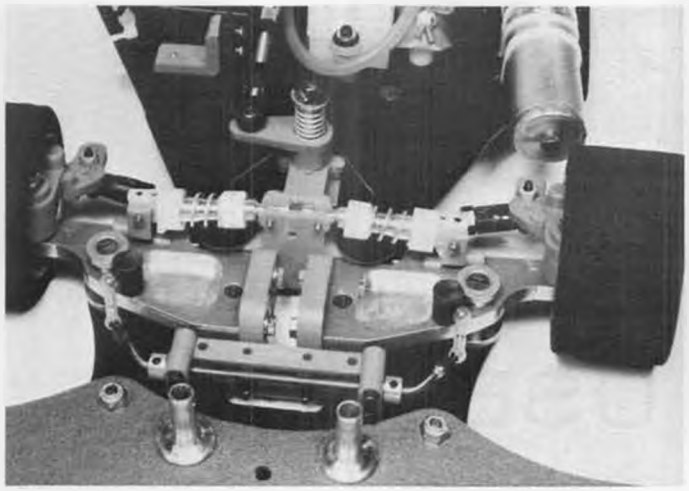
Tying all of this sproingy stuff together, front to back, is a 'glass pan (yes, it looks like a graphite piece, but it is black 'glass) that has an aluminum rear grafted on. This pan assembly would flex, just as in a regular pan car, if not bridged with a stiffener of some kind and in this design the 'glass radio tray provides the required stiffness, attaching at the front to a suspension pivot block, just in front of the tank, to a cross-wise stiffener and at the rear to a hanger on the right and a chassis splice on the left. In order for the suspension to do its work properly and consistently, this portion of the car has to be quite rigid, and it is.

At the front, Delta decided to go with a single suspension arm. It does cut down on the number of parts required, but the real reason seems to be to get everything down as low as possible. It does that, but also means that as the front wheels go up and down they also go through camber changes. Theory and past experience with full-size race cars says there is a better way. On-track racing tells me that you can't tell the difference, as this front end does a terrific job of steering the car with great accuracy and smoothness. From the pictures, you can probably see the vertical posts located in the area of the outboard ends of the shocks. These are a typically Delta touch; up- and down-stops for the suspension arms, keeping the suspension from pulling or pushing against internal stops in the shocks.

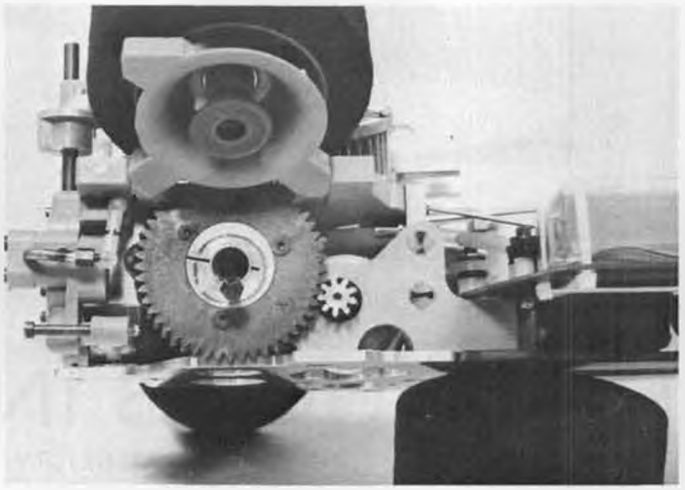
The steering blocks are not real new, instead the "quick steering blocks" used as an option on Super J's. Front wheels are sorta new, same design as before, but now they have holes in them. Before they were a little plain-Jane, now they are better looking but harder to clean.



Overall view of Eagle, with body removed. Very clean car, with all components laid out very logically.



Swinging front end; note anti-roll bar, lay-down coil-over shocks, adjustable caster.



Loosen one screw and carrier pivots upward, for access to main gear. Note half-shaft hanging from inboard socket.

And they are interchangeable with Super J wheels, which is nice if you are already a Delta racer and have lots of front wheels.

Even though the swinging front arms are different and attract a lot of attention, the anti-roll bar also gets its share of notice, as it seems stiffer than you would expect it to be, but it does the job without binding, being very free in operation. We'll leave the shocks for later. . .

Skipping to the rear end, there are a lot more parts, necessary to keep the rear wheels flat on the ground through the limits of suspension travel. A molded carrier has three attach points, the two on top picked up by a steel pin that runs through an upper suspension arm, the carrier, and then into the other side of the arm. Neat and positive. The third and lower attach point picks up a threaded rod that has specially-made super heavy duty clevises fitted on each end. The outboard ends attach to the carriers, the inboard ends hook up to steel pins that anchor the lower ends of the shocks. These clevises can easily be adjusted to change the camber of the rear tires, so that once the proper ride height is set the tires will wear flat. It all results in quite a few parts, although I'm not sure how the parts count could be cut significantly while still getting proper suspension action. And it also results in a certain amount of vulnerability from crashes; more on that later.

All of these arms, pivot pins, backplates, etc., mount directly, or almost so, to very accurately machined aluminum hangers, which in turn are mounted to the aluminum rear chassis plate, with the right hanger, the larger of the two, also serving as a splice between the glass and aluminum pans (plates). In fact, the right hanger is pretty busy; it also houses the sealed ball bearings that the pinion gear and the rear axle ride in. In all, the rear end looks very busy, and is, but is also very efficient, as well as easy to work on. OK, it doesn't *look* like it would be easy to work on. But it is, believe me.

Before leaving the suspension stuff, the shocks designed by Delta deserve almost a whole article themselves. These pieces gave Bill Campbell a real fit. He knew what he wanted, yet getting it, at a reasonable price, was the problem. Recognizing that while other suspension cars did work pretty well, all had a serious problem with shocks, both in the action they gave and in reliability. So, by dismembering Koni and Bilstein Shocks, he saw what they were doing and came up with a simpler way of doing the same thing.

And here I sit, trying to figure out how to describe the things. I *think* I could do it so it would read right to me, but would it come across properly? Doubtful. So . . . these shocks are made in such a way that there is absolutely no air in them when assembled and there is a floating washer, backed up by a pressurization spring, that determines compression and rebound damping. They are also completely sealed, as well as pressurized, so when compressed, the shock rod automatically extends to the relaxed position. I would suppose that isn't an adequate explanation of an item that is a real breakthrough for suspension cars, but the shocks don't fade, require very little maintenance (even then only very few hours of running time to be sure the shock oil is topped up), are strong, and work.

Oh, and the shocks are the coil-over type, with the springs that hold the car up slipping right over the body of the shock. Ride height is quickly and easily adjustable with the threaded adjust nut, then locked in place by the jam nut. Simple, neat, and effective.

The drive train is really interesting, especially as Delta was determined to eliminate jackshaft and chain drive

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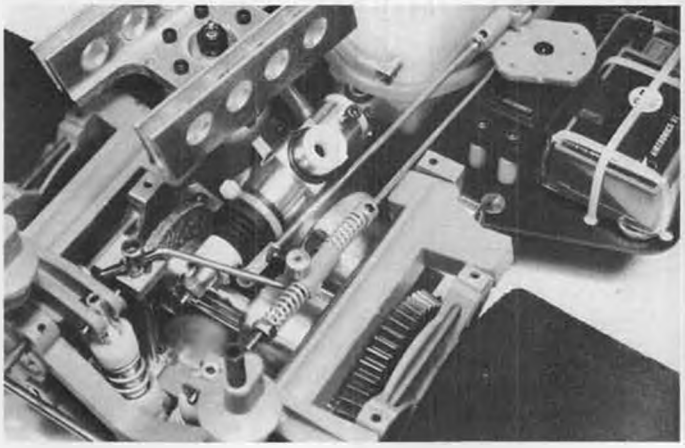
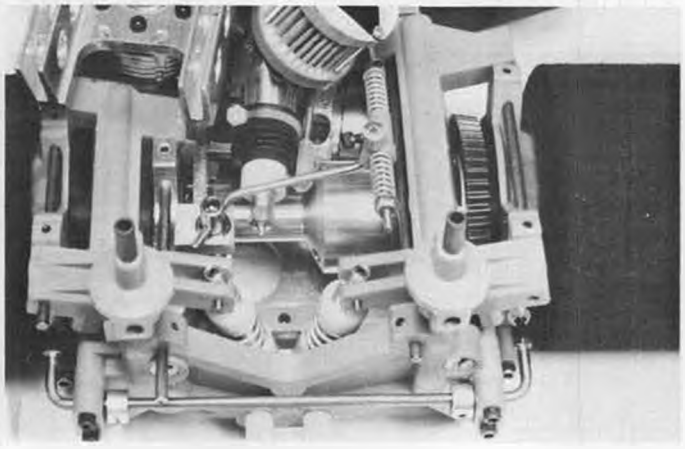
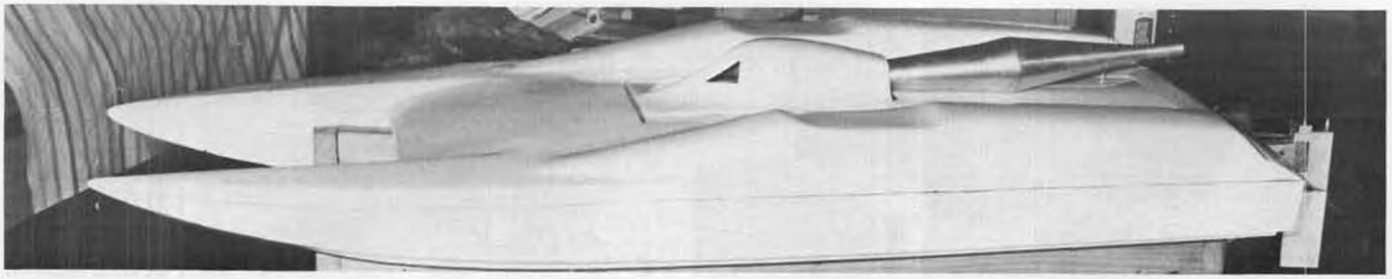


Busy rear end, but accessible. Delta slide valve carb on Picco .21, .200 bore restrictor in place. Good photos, Dan!



Ball-type adjustable limited-slip differential offset slightly to right of car, disc brake on left. Note anti-roll bar.



The author's JVS Offshore Tunnel, all set for test runs prior to final paint job. Speed cowl built from an Octura Wing Ding 20 speed cowl.

PRODUCT$ IN U$E

THE JVS OFFSHORE TUNNEL . . . By AL BERRY

• Is it a hydro? Is it an offshore? Well, it's both and can be run as either or both. The hull is legal in N.A.M.B.A. and I.M.P.B.A. Hydro and Offshore classes. In other words, you can run it as a tunnel hull hydro or as an offshore racer whichever you prefer.

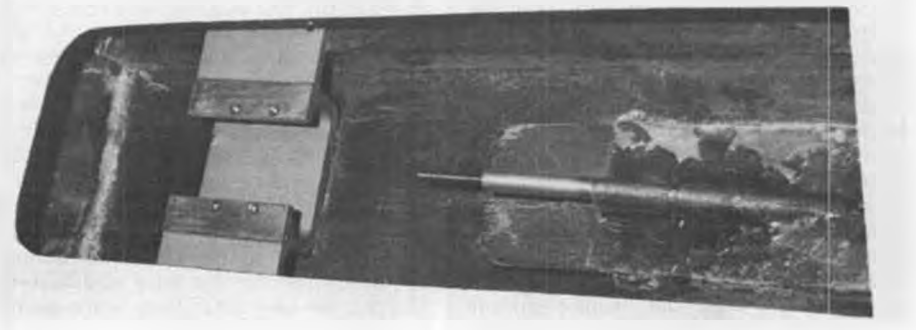
Stock K&B pipe. Prather pipe (above) gave 700 to 1000 more RPM.

The man who manufactures the JVS tunnel has been around boats all his life. He was a naval architect, designing engineer, yacht captain, yacht surveyor, shipwright, and has designed and built over 300 boats 14 to 34 feet in length. Most of these designs were drag and ski type hulls. He began model boating back in 1951 (tether line) and went into R/C boating in 1969. He began manufacturing fiberglass model boats in 1971, and has been at it ever since. Vern Schmidt, the VS of JVS (the J is his son Jeff, who makes the Pacesetter 1/4-scale R/C sprint cars), is the man who we are talking about and the man with the "new" catamaran or tunnel, whichever you prefer to call it. This tunnel hull is for the 40 engine class, with a length of 36 inches and a beam of 14 inches. It has a 7-1/4-inch wide tunnel in the center that is not flat like most tunnels. It has a small vee angle at the transom. It also features things like anti-air build-up sponson bottoms, and on, and on.

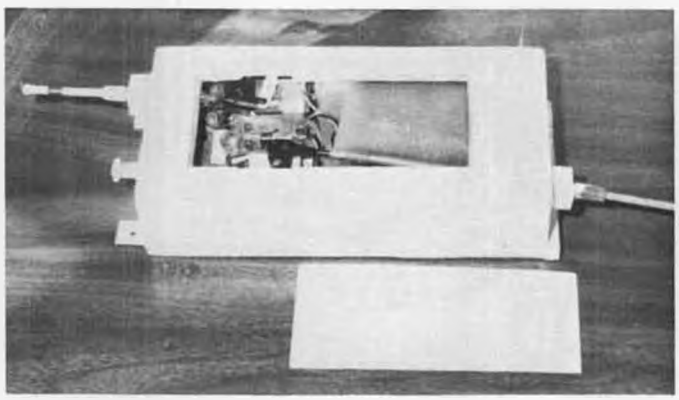
CONSTRUCTION

The cat is very easy to put together. It comes with the deck already installed. The motor mount rails and an Octura five-inch omni mount are also drilled and tapped and installed. I chose the K&B 7.5 engine for this hull. The engine was bolted in, then the holes were marked off for the hardware. Once the hardware was in place, I aligned and cut the hole for the flexcable stuffing box.

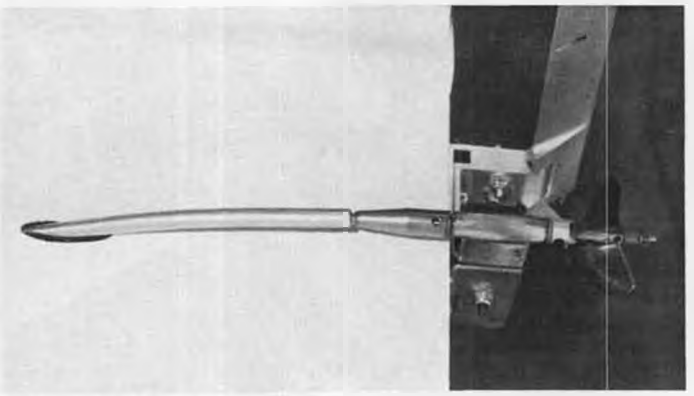
Continued on page 87



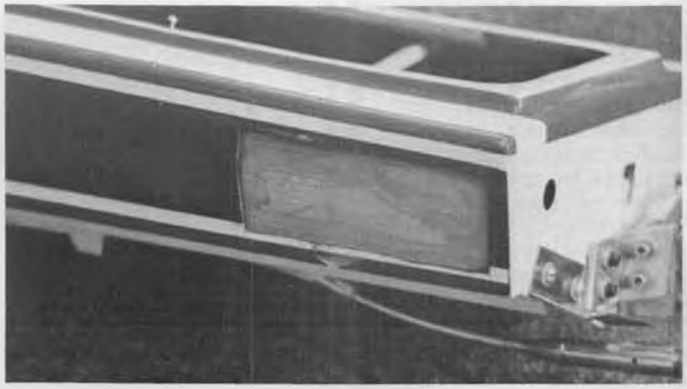
Aluminum stuffing box is glassed into hull with polyester resin and fiberglass tape. Octura omni mount comes already installed in the hull.



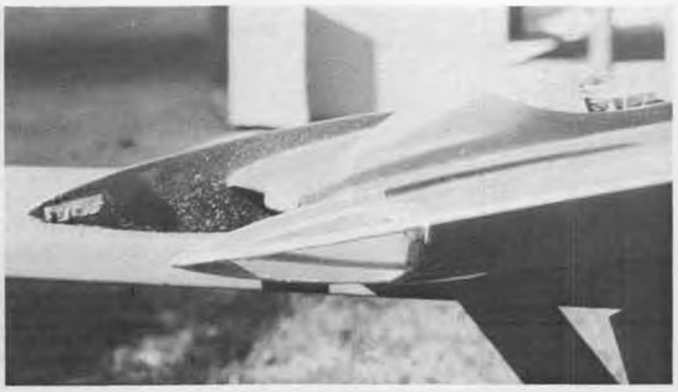
Finished built-up wood radio box with push rods installed. Box waterproofed with paint. Spruce frame, 1/32 ply skins.



Strut, with stainless steel ball (not needle) bearings. Note Norco ferrule in front of the strut.



Author's Prather Deep Vee partially repaired after ramming by wife's Deep Vee. Backing of 1/16 ply epoxied in place.



Damaged sponson front on author's Excalibur 3.5 Tunnel after new framing has been installed.

R/C POWER BOATS

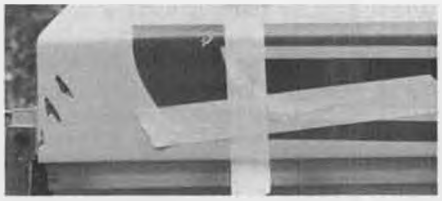
By JERRY DUNLAP

PHOTOS BY AUTHOR

JERRY, I'M GOING TO QUIT MODEL BOAT RACING

I received a phone call the other evening from one of the members of my local model boating club. Nothing new about receiving phone calls from model boaters. It happens fairly regularly around the Dunlap house. The main topic of this conversation was presented in the lead caption. In the sixteen years I've been involved in this hobby, the topic of quitting has been discussed over the phone a couple of times. Since I've been involved in this activity I've seen many people enter and exit the hobby. Before exiting, some of them do talk to me about why they are quitting. As editor of our club's monthly newsletter, I'm often asked to have boats, engines, radios, and equipment offered for sale in the newsletter. So over the years, I've heard my share of, "Jerry, I'm quitting model boating."

Tear in glass hull caused by collision. Also note propellor "teeth marks."



Tape on outside backs up fiberglass resin and cloth applied to inside of tear.

Auto putty used to fill prop marks and repairs to torn area. Sand out and paint.

This opportunity to listen to those who no longer desire to be in our hobby has given me some insights into why people quite. Since involvement in model boating can become an expensive form of recreation, these thoughts might save a potential model boater money and frustration. There are job counselors, marriage counselors, investment counselors, and counselors for your psyche. Add one more counselor to the list, counselor for discouraged model boaters.

The fellow who called the other night actually said, "Jerry, I'm thinking of quitting."

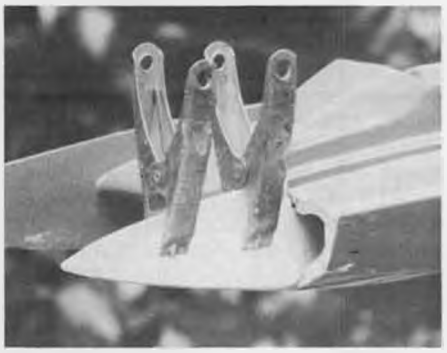
To which I responded with this brilliant question, "Oh, why?"

"I'm not having any fun," replies discouraged boater.

When I heard that, I had sufficient information to begin my counseling. I attended the last race where discouraged boater didn't have any fun. He was right, he wasn't having any fun. This particular model boater suffers from "acute untestednitous." More often than not, he'll show up on race day with new boats, engines, or untried setups, figuring they'll work fine. On this particular day, he stripped the gears in a servo on his 7.5 outboard and blew an engine in his Sport 40 when linkages and connections all shook loose. "Acute untestednitous" is a malady that you'll see if you go to enough races. Actually, the prescription for recovery is fairly simple. Don't attempt to compete with a boat that hasn't been thoroughly tested prior to the race. Is it Murphy's Law that states, "If something can go wrong, it will?" This has special truth when it comes to a model racing boat. I pointed these things out to my discouraged friend and told him he probably won't have any fun if he continues to drag out untested boats for contest days.

It seems to me that "lackadus commitment" is a big reason many decided to give up on model boating. It doesn't matter what the pursuit, be it golf, tennis, archery, or any activity that people attempt to master, it takes commitment to achieve some degree of mastery. Too often, I've seen guys come

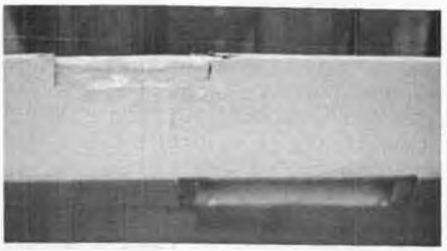
Damaged sponson shown above before repair. First cut away damaged portion.



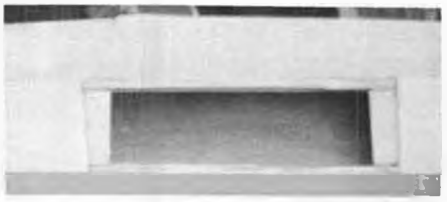
First "sister frame" is spliced inside existing frame, followed by replacement.

Bill Brazzle's Klampon Kai shows collision damage. Bottom of sponson, too.

Patches of 1/16 ply glued to inside of hull, followed by outside patch. CA handy here.



Side view of inside patchwork. Bottom hole ready for outside patch piece.



Better view of bottom hole. Inside support piece ready to hold outside patch.

out with the best equipment money can provide and think they're going to immediately begin hauling home the trophies. Such usually is not the case. There's a father and son racing team I know who did rather well last season. Their boating efforts were rewarded when both won district highpoint awards. However, for the three years previous to their successful season, they hardly won anything. I know how committed they were because I raced with them and helped them out when I could. They asked lots of questions, tried different things, built lots of boats, and finally hit on combinations that proved successful.

"Expectations unfullfillious" drives many from the hobby. All of us have expectations about what we think we should be able to do with our model boats. Unfortunately, the reality of what we are able to accomplish and our expectations are sometimes rather divergent. This separation of expectations and actuality may be a source of great frustration. For some, this frustration may serve to increase their attempts to close the gap between their expectations and reality. For others, the frustration isn't worth enduring and they head for the exit. With the frustrations many people face in their business efforts, or family life, why does one need to spend the weekends getting frustrated? Frustrated folks aren't much fun to be around and I've been around my share of them at boating events. Since no one is forced to enter a model boating event, it could be assumed that those entering did so because they enjoyed the activity. I've certainly seen some unusual methods used in displaying this enjoyment.

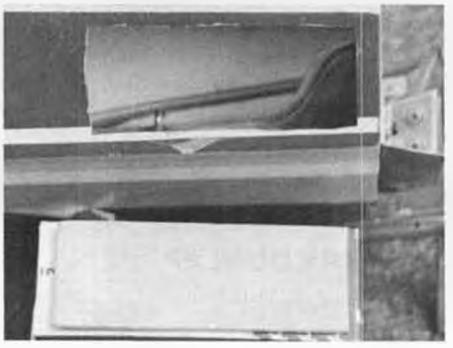
It is not my purpose to try to persuade folks from quitting this hobby. In many cases, quitting is probably the best thing the individual could do. I'm actually thankful that this hobby doesn't appeal to great masses of people. If it did, I'd have to wait my turn at the pond every time I wanted to test out a new prop. Maybe we all need to examine our motives for participating in the hobby. Are we getting out of the hobby the rewards, satisfactions, or fulfillment we seek? Do we measure our success only in terms of trophies accumulated? It's certainly something worth more than just casual consideration.

IF IT WON'T DRAW, IT WON'T RUN

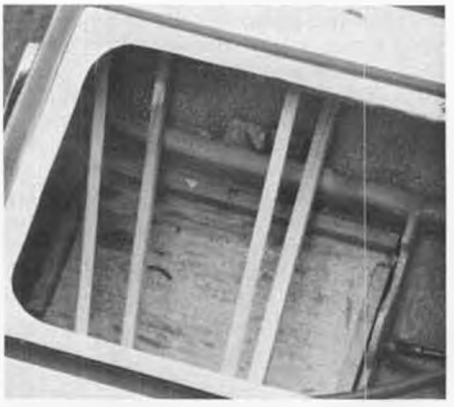
It has come to my attention that probably the biggest factor in poor engine performance is fuel draw . . . actually, lack of proper fuel draw. Now this isn't a pond draining discovery by any means. It is, nonetheless, a real problem area for many folks just starting out in our hobby. It happens to come to mind because of something that happened the other day while I was helping a couple of new model boaters with their Sport 40 powered by an O.S. Max 46.

The guys called me up and asked me to come down to the pond on Saturday to help them with their boat. They were having a problem keeping the engine going. I showed up to see if I could figure out the problem. I richened up the engine to where it was almost in a four cycle and it still quit shortly after the launch. I figured it had to be fuel draw so I had them strap the tank on top of the driver's cockpit to see what would happen. Needless to say, it did look peculiar having a fuel tank mounted where the driver usually appears. However, the boat ran for the first time since the guys began testing it. It should be noted that I've seen this type of boat run with a different engine and the fuel tank mounted down in the boat and there wasn't a problem with getting the engine to run. But different engines may require a higher tank setting to allow for adequate fuel draw. Another thing that might be helpful is the use of pressure from the tuned pipe to assist the fuel flow to the carb. The point to remember here is the importance of proper fuel draw for engine performance.

Author's Deep Vee, shown on previous page, before patching begins. That hurt!



Damaged area completely removed and inside area cleaned to receive epoxy adhesive.



Internal bracing holds ply patch in place while epoxy cures.

WHEN IS A 46 ENGINE NOT A 46?

The answer is when it's an O.S. Max 46. Actually it's a good thing it isn't a true 46 cu. in. displacement engine. If it were, it wouldn't be legal for B Class in NAMBA or D Class in IMPBA. The NAMBA B Class limit is .45 cu. in. while IMPBA allows .458 cu. in. in D Class. According to Peter Chinn, who writes excellent engine reviews in *Model Airplane News*, the O.S. Max 46 is actually a little less than .45 cu. in. in displacement. The figure .447 cu. in. seems to be what I remember. Although I don't have one of these engines, I will say that they are a very fine looking and performing unit. They are comparable in price with the K&B 7.5, if you consider that few people use the K&B 7.5 stock exhaust throttle, electing instead to use a different ex-

Continued on page 78

John Simone JR's American R/C Helicopters Super Mantis with a wild color scheme. Mantis and Super Mantis economically priced.

Schluter Heli-Boy and Mini-Boy as marketed in the U.S. by Miniature Aircraft Supply.

CHOPPER CHATTER

By RAY HOSTETLER PHOTOS BY THE AUTHOR

• This month I'd like to cover the helicopter high points of the '82 MACS show. It seemed that the overall number of booths was down from last year, but the helicopter turnout was very good and interest seemed high. It's always partly frustrating to go to the big trade shows: All of those nice new helicopters displayed, and I'd like to have one of each!

The major manufacturers displaying their products were American R/C Helicopters, Circus Hobbies, Gorham Model Products, and Miniature Aircraft Supply.

In one of the booths, California Model Imports (CMI) displayed its Hughes 300 and incoming aerobatic Stunt Homer. The Stunt Homer is a fully aerobatic .60 powered helicopter with a beautifully machined main transmission case. The mechanics in this machine are incredibly smooth; when the helicopter is flying with a quiet muffler, about all you can hear is the rotating blades. Several months back I reviewed the Hughes 300 in the *Chopper Chatter* column. Look for more information on the Stunt Homer in the future.

CMI is run by Dave Robertson, who imports the Kobe-Kiko helicopters from Japan. I might add that Dave will be carrying balancers and counter-weights for the Hughes 300 head set-up as I described a month or two ago in *Chopper Chatter*. You can look for CMI to grow and gradually carry a more extensive line of helicopters.

Not new, but under a different U.S. outlet, was Kavan. Condor Hobbies has purchased Kavan's U.S. inventory, and will distribute Kavan kits and parts. The new Kavan ball links have little tabs on the front of them, making it easier to extract them from the ball. Other than that, I haven't seen anything else new from Kavan.

Continued on page 77

Trio of choppers from Gorham Model Products' Heli-West: Hughes 300 based on Cricket mechanics, Cricket, and gasoline powered Bell 47.

Hughes 300 and Stunt Homer (foreground), a 60 powered aerobatic ship. Hughes was reviewed a few months ago by the author.

The Kalt Custom Baron 50, one of many Kalt choppers, and marketed in the U.S. by Circus Hobbies.

1. A Shereshaw Eaglet by SCIF Larry Clark. Seen at SCAMPS Texaco meet, Taft, California.

2. Cute little 1/2A Texaco Miss Philadelphia F/F by Bob Dittmer. Flies as good as big one.

PLUG SPARKS

By JOHN POND

• Not too many readers realize that this reporter could write a monthly column on the activities of the West Coast only. There are so many contests being held every weekend, it is not a question of going to a contest, but which one! For this reason, if it seems like the column is occasionally overloaded with west coast activities, it is because flying is available year around.

To keep the column from getting a provincial look, this author attempts to cover as much as possible of the old timer activity all over the nation and abroad. If you, the reader, feel your club or area has been neglected, it is only because this columnist has not received any letters, writeups, photos, or even clippings from that area. After all, fellas, we can't print what we don't get! End of soap box!

Hence, it is will mixed feelings, we report the April 17-18 Texaco meets held at Taft. Would you believe there were four distinct meets going on that day? How would you like to try your luck on the following: (1) SCAMPS Texaco F/F plus other O/T events; (2) SAM 49 Texaco Annual plus other O/T events; (3) a Silents Please meet featuring rubber and glider; (4) a regular modern F/F meet featuring FAI models. Seemed like every time you turned around there were at least three models in the air.

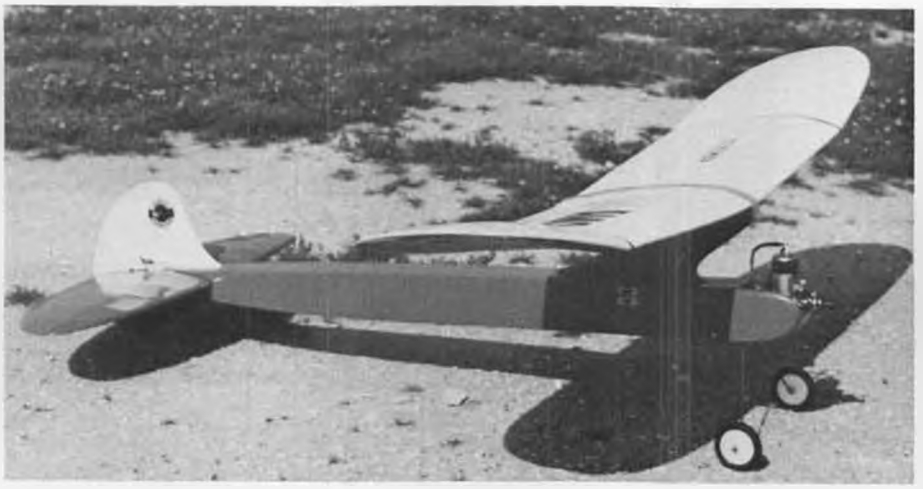
The favorite free flight event of this columnist is the Texaco Event as revived and inaugurated by the SCAMPS, SAM 13. It is hard to believe this meet has been run over 15 years to date! The best portion of the meet is the so-called "Dawn Patrol", where flying starts at 6 a.m. and closes at 9 a.m. This year, flying closed at 10 a.m., thus allowing some very good thermals to generate, with Brad Levine using a Powerhouse to win with a flight of 58:30.

Photo No. 1 shows SCIF Larry Clark of 3626 Cadman Dr., Los Angeles, California 90027, with his second place winner, a Shereshaw Eaglet *(not* the Scientific Co. version), with a long flight of 40:16. This design appeared in the short lived Brown Jr. Co. newsletter called Arpiem (RPM to you!).

In the four issues, two gas models appeared: one by Steven Kowalick called the "Miss Arpiem" (MB has plans)

3. Another Miss Philly VI, R/C by Ray Van De Walker (on transmitter). Stationary prop could mean electric power. Just switch on at launch.

4. Ray Van De Walker, Chicago, 1938, with original design by Hatelstead. Dennymite.



5. Jack Albrecht's "Kerswap" looks like it's going 60 mph just sittin' still! A potent machine.

6. That hot ignition McCoy 60 looks mean on Ross Thomases Swoose with 2-wheel gear.

and the second by Ben Shereshaw named the "Eaglet". The latter model bears only a superficial resemblance to the Scientific version, being larger and featuring sweepback in the wing plan.

This model has been successfully scaled by Ross Thomas for R/C Texaco work. Ross, at present, holds the unofficial high time for Texaco of 1 hour, 40 minutes. Ross was quite fortunate he didn't run out of battery like Bruce Norman did when he actually broke the Thomas record but was unable to get back to the field. Result: a zilch flight.

While on the Texaco kick, the biggest thing to hit free flight since the 020 Replica Event is the 1/2A Texaco event. This has proven to be extremely popular in free flight and even more so in radio assist. Photo No. 2 depicts Bob Dittmer, of 16332 Redlands Lane, Huntington Beach, California 92647, with a 1/2A version of Maxwell Bassett's Miss Philly VI. This little cutie flies just great. Although he didn't win this time, Bob figures there is always another day. Winner of the 1/2A Texaco Event was John Zaferius, flying a Powerhouse, with a time of 32:03, followed by Taibi and Calvo with Powerhouses and times of 25:19 and 25:04 respectively.

While we are on this kick, Photo No. 3 shows Ray Van de Walker, of 15619 Leibacher St., Norwalk, California 90650, with his R/C version of the Miss Philly VI. Like Dittmer, he didn't win either, but Ray says you can't beat this event for fun.

Couldn't resist showing a now and then photo comparison as Photo No. 4 depicts Ray when he was 17 years old. Surprisingly, he still has the same blonde hair albeit some of it is now grey. This model he is holding is a diamond pylon model, 6 ft. in span with a Dennymite for power, somewhat resembling the very successful Alva Anderson Pylon. This design by Harold Hatelsted indicates the drastic changes going on in 1938 to pylon type models, based on the successes of Anderson and Goldberg at the meets in 1937-38.

This is a natural lead-in to the 9th Annual R/C Texaco Contest as held by the SAM 49 boys, headed up by Otto Bernhardt. This meet, formerly run by SAM 21, is now called the Spring Bi-Annual. I like the other title better!

Bernhardt couldn't complain about lack of help this time, and the facilities were excellent, with a loud speaker for paging the contestants, a monitor for the transmitters, two people on registration, and John Targos as the assistant Contest Director. The meet went off quite smoothly, except for the one inevitable transmitter being left on.

Actually, the contest enjoyed a great day for weather, times kept improving as the day wore on. The best time of the day was registered at the very close of the contest by George Wagner, as he beat Thomases time of one hour and 2 minutes by several minutes. However, upon checking the records, somebody slipped up, as it was his third flight; hence, disqualified. (Only two official flights with three attempts are allowed in Texaco. The one long flight wins.) That was a tough break.

This columnist has no reason to chortle over the above, as he pulled a "Bruce Norman" and landed off the field after a particularly long flight. Jack Albrecht put it quite succinctly when he answered Pond's complaint with the simple statement, "Greedy!"

While mentioning Jack Albrecht, the Service Manager for Kraft Systems, Photo No. 5 shows a recently approved design by Gil Robbons called the "Kerswap", so-called by the designer as the noise it made when it spun in. This Torpedo 29 powered version really gets

7. Norman Burnett with his Alva Anderson Pylon with a Mel Anderson Spitfire up front.

8. Don Lampson and his record setting American Ace, at Woodland, California, April 27, 1941, the day of the record.

9. Col. Bob Thacker does it again! It's a Don Donohue Five Ft. Gas Model, with OS 19, on R/C.

11. Early gas job by Louie Shocke, Los Angeles circa 1935, powered by one of first Atwood engines.

up in the blue on a 55 second motor run, an overkill if this writer ever saw one. Still can't understand why he did not win with this very slick looking model.

Backing up, we would like to run Photo No. 6 of Ross Thomases "Swoose" with a McCoy 60 red head ignition in the front end. Ross Thomas, who resides at 1013 S. Austin, Santa Ana, California 92704, says even with 4-1/2 pound weight, the model gets up so darn high, it takes almost seven minutes to fall down. Also worth noting is the two wheel gear on the normal single wheel setup. Under SAM rules, you can substitute two wheels for one, but not the other way around.

While wandering around the field, this writer simply had to take a picture (Photo No. 7) of Norman Burnett and his latest R/C Texaco model, an Alva Anderson Pylon model with a Mel Anderson Spitfire for power.

It always is amazing to see Norman doing with one arm what half of the other guys can't do with both arms! Although there were no reports of how it flies, Norm doesn't have to take a back seat to anyone when it comes to building a nice model.

It is consoling if someone else provides the comic relief, as this writer has been flying his Miss Model Craftsman for eight years now with varying degrees of success. Now, along comes Ernie Payne, making a free flight model out of his R/C version by launching with the switch off. Of course the model disappeared in the blue after 11 minutes, and guess what? That long time free flighter, Sal Taibi, found it while on one of his retrievals and brought it back!!

We have yakked about the R/C version of Texaco more than we had anticipated, but with the new 1982 SAM R/C rules in effect, it is interesting to see what the results and models used are:

CLASS A/B

1. Pat Patterson	21:00
2. Jack Albrecht (Kerswap)	20:06
3. Ross Thomas	19:53

CLASS C

1. Ross Thomas (Swoose)	20:48
2. Ray Van de Walker	20:39
3. Ed Hammer	19:31

ANTIQUE

1. Pat Patterson (Lanzo)	34:49
2. Jack Albrecht (Anderson)	33:01
3. Ross Thomas (Bomber)	22:02

TEXACO

1. Ross Thomas (Bomber)	1:02:35
2. Jim Adams (Laurie)	39:23
3. Bob Oslan (Commodore)	30:43

1/2A TEXACO

1. Ernie Payne (Lanzo)	26:28
2. Don Hoyle	21:56
3. Don Carrl (Mike)	19:38

In closing off, it is interesting to note the Electric event, flown over two days with seven minute maxes, was won by Pat Patterson, followed by Jack Albrecht, and Ray Van de Walker, all using Leisure Playboys with .05 electric motors. With a minute and a half motor run, these models get pretty darn high as the new cobalt electric motors have the power now!

NATIONAL O/T EVENTS

About time to get this in the news, as this columnist has been too involved with the SAM Champs at Chicopee, Massachusetts to get out any announcements.

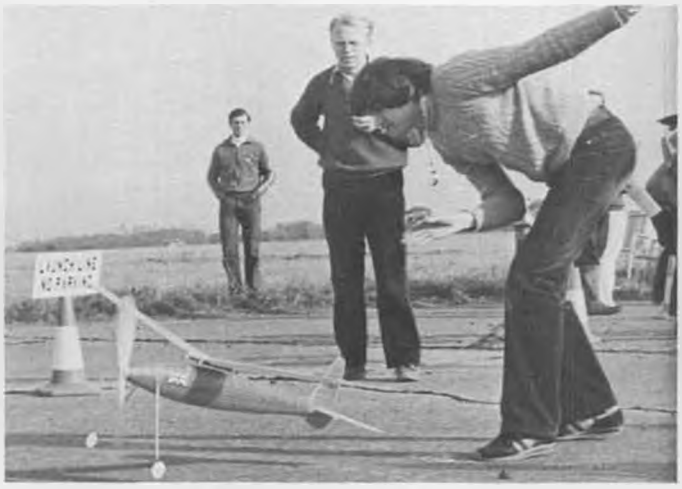
As usual, this writer will hold the old timer events at the Lincoln, Nebraska AMA Nationals. Events will shape up like this:

1. Wednesday, August 7
   O/T R/C ASSIST
   Class ABC
   Antique
   Texaco
2. Thursday, August 8
   O/T CONTROLINE
   Stunt, Ignition Power
   Stunt, Glow Power
3. Friday, August 9
   O/T FREE FLIGHT
   Class A

10. Compare with photo No. 9. This is original Donohue model at Burbank Airport, 1937. Ced Galloway photo.

12. Mark Fineman's neat Earl Stahl Schweitzer TG-2 glider, to be entered in the '82 SAM Champs.

14. Really dooded up Comet Clipper with wheel spats and cowl, by Woody Woodman. Super Cyclone power.



15. Beautiful "Flying Minutes" by Brian Yearley. Winner of Aeromodeller Cup at Model Engineers Exhibit. Also winning flier!

Class B
Class C
Rubber Stick
Rubber Cabin
Junior Rubber
Antique 30 Sec.
020 Replica
Junior Rubber
Twin Pusher

Notices will be posted around the central hangar giving times and locations. Trophies will be given to third place in each event. Entry fee will be $3 per event. Hopefully, we will break even this time.

As soon as it can be firmed up, there will be a Victory Awards Banquet Friday night, probably at the same place as last time; the Nebraska University Faculty dining room. Was real nice and even better eating. See you there!!

In case of questions, please feel free to write this columnist. Remember, the emphasis is on fun!!

ENGINE OF THE MONTH

One of the earliest companies to feature a gas engine to complement their gas powered kit models was the Cleveland Model Supply Co., then of 1866 N. 57th St., Cleveland, Ohio. Reginald Denny, on the West Coast, was the other manufacturer to feature a combination motor-kit, but that is another story we will feature in a subsequent issue.

The first advertisement appeared in the November 1937 issue of *Model Airplane News* announcing the availability of the new "Tom Thumb" engine. The prospective buyer was offered two ways to go, in ready-to-run form at $17.50 or the kit style at $9.75.

There was no doubt about who was producing this engine for Ed Packard of Cleveland. The engine was a carbon copy of the "Muff-head" Mighty Midget engine. Interestingly enough, the Tom Thumb was marketed in the same manner as the Bunch people; i.e., assembled or in kit form. However, the Cleveland engine was priced higher.

The Instruction Manual which accompanied the Tom Thumb engine was very heavily based on the Bunch Model Airplane Company's Might Midget Brochure. All features of the MM Manual were adopted in the Tom Thumb brochure even to the instructions on how to carve a "Tom Thumb" (Mighty Midget) propeller. No questions about it, the Cleveland Co. had picked a thoroughly proven engine to go with their new Stinson Reliant and Rearwin Speedster gas model kits.

The drawing of the Tom Thumb engine we are presenting this month is actually a simplified version of the original plan. The original three-view drawing showed methods of assembling the crankshaft, connecting rod, and piston. The wiring was shown both in the form of a wiring diagram and a pictorial hookup on the three-view. Special emphasis was made on this point, as many a modeler will recognize the majority of engine starting problems was the weakness or lack of spark to the plug.

Not many of the old timers will recall the old way of describing carburetion in those days, regarding only "four-cycling" for slow running and "two-cycling" for top power setup. In the early pamphlets, running of motors was

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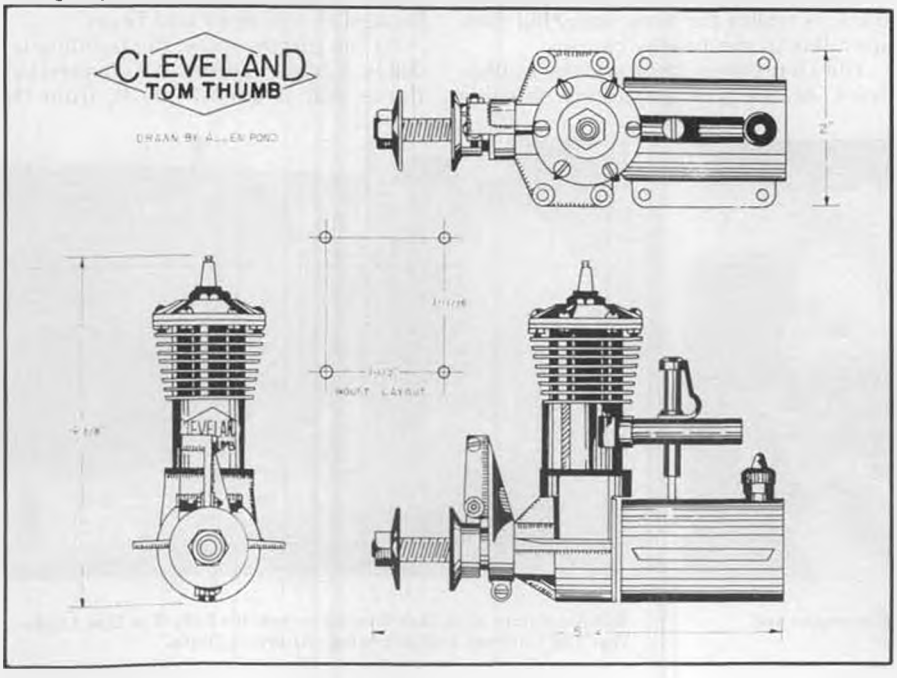


13. The late Hi Johnson, in early '50's, with original glider design. Photo by Galloway.

Panoramic view of atrium, West Baden, as it looked in 1902 on completion. World's largest ceramic tile floor. Hotel rooms faced in and out . . . 700 all together.

INDOOR

By KEN JOHNSON

THE "IN CROWD" GOES TO WEST BADEN

(Editor's Note: Through a slip of the calendar, Ken Johnson thought this article would appear a month prior to the big one at West Baden for 1982. As your read this, it has already happened! Even so, the background material should be of interest to indoor modelers. wcn)

June is traditionally the month for weddings. If you're a freeflight modeler and specifically an indoor modeler, then June is the month for the big indoor meet at West Baden, Indiana.

For those of you who are new to indoor modeling or have been away from it for awhile, here is a little history on this exceptional indoor flying site.

The original building occupying the site was called the West Baden Hotel. On June 14, 1901, it caught fire and burned to the ground. The owner, Col. Lee Sinclair, decided to rebuild on the same site. The new building would be circular and surround a vast domed court. He took his idea to several architects who turned thumbs down on it. The weight of the dome, they said, would collapse the building. He finally approached a young architect named Harrison Albright, who drew up the plans.

Construction began on October 1, 1901, and 500 workmen labored throughout the winter and spring. On June 14, 1902, Col. Sinclair entertained guests in his new hotel.

The new endeavor was a huge success. The wealthy came to "take the waters" of the nearby mineral springs. There was golf and strolling on the beautifully manicured grounds. Many just came to bask in the magnificent Edwardian splendor.

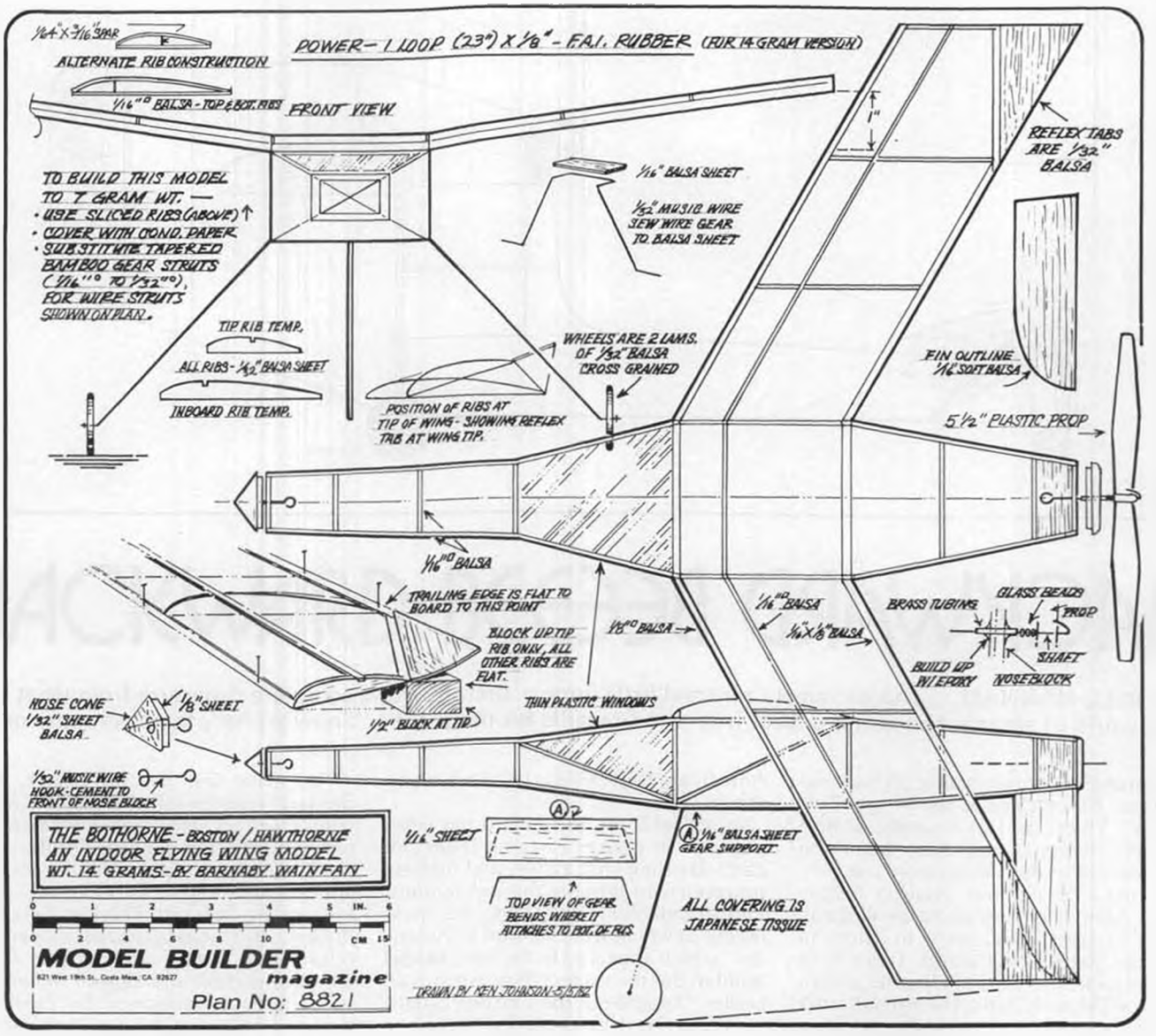
The hotel was sold after Col. Sinclair's death, to Mr. Edward Ballard. It was the "Roaring Twenties," and there were vast banquets in the Pompeian Court, productions in the opera house, and bicycle rides around the double decker track. A trolley car took many big time spenders to the nearby casinos.

The Depression came and the bubble burst. At one time there were only five guests in this hotel of over 700 rooms. The hotel was closed in 1931, and later donated to the Society of Jesus. On June 28, 1934, the hotel became a Jesuit Seminary. In 1966, it was taken over as one of four Northwood Institute campuses. Other Northwood campuses are located in Michigan and Texas.

As the photos show, the building is a 208 ft. diameter atrium. It is covered by a dome that is almost 100 ft. from the

Florida's Dick Kelso and his indoor air armada. Twin engine and biplane his specialty. Photo by Bob Andrews.

Retired airline pilot Walt Everson winds his Easy B at Opa Locka. Was 1981 Florida indoor champ. Andrews photo.



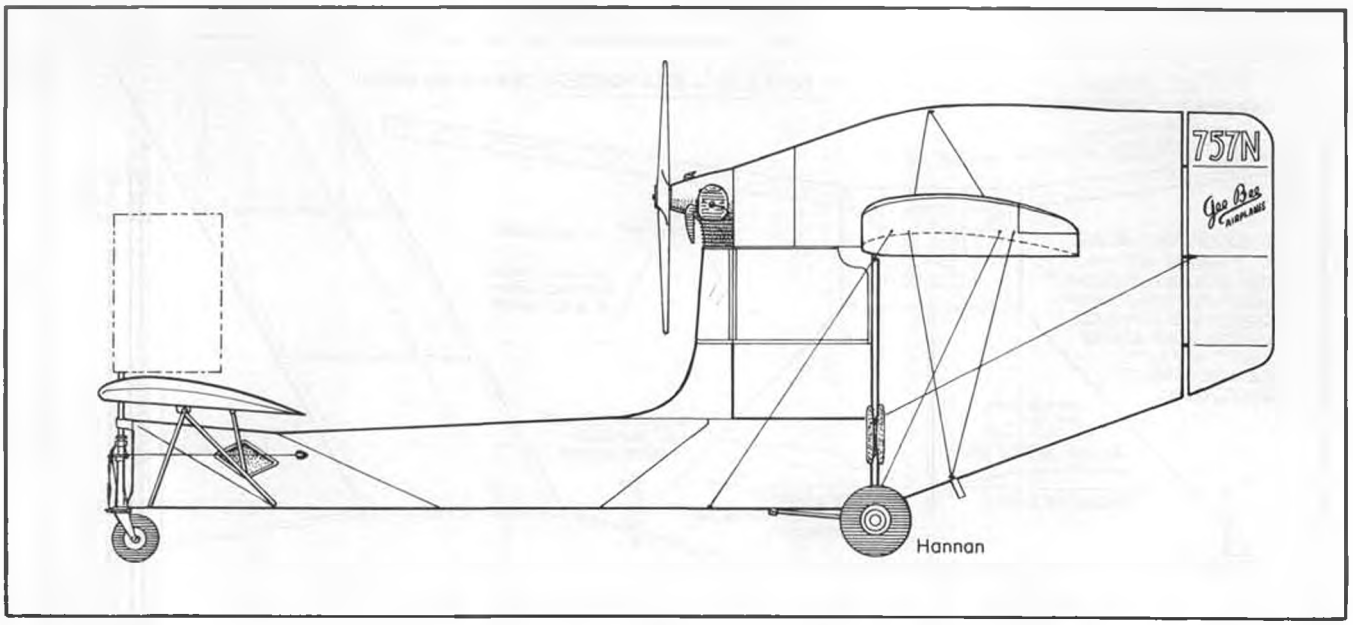
FULL SIZE PLANS AVAILABLE – SEE PAGE 100

floor. The Italian Terrazo tiled floor is the largest in the world. The building has rooms facing the atrium and rooms facing the outside. Many of the rooms facing the atrium have balconies. Elevators connect the six floors of the building. Around the edge of the atrium floor one will find very large potted plants and statues. A circular bandstand is located in the center of the domed ceiling. At one time, this unit was lowered to the floor, with it's band members playing Charleston Era music for the dancers on the atrium floor. This bandstand is now permanently fixed to the ceiling. A plastic shroud is draped over it when indoor models are flying.

WEST BADEN AS A FLYING SITE

Everything good you've heard about WB is true. The air is dead calm and is warm and bouyant from mid-morning throughout the day. Since the room is

New event introduced in Burbank, CA meet. Blacksheep Club member Bill Brown launching his Gee Bee Sportster in Catapult Glider Scale profile.



BACKWARD BEE

By BILL HANNAN . . . An extremely rare and little known aircraft, and a complete departure from what the world of aeronautica would expect from the Granville brothers. Like "Snow White", there was only one.

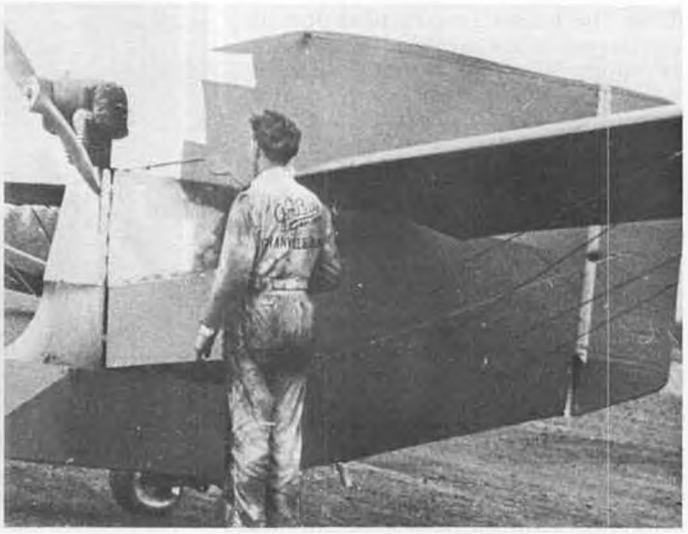
• Canards are fascinating flying machines. As long ago as the Wright Brothers' "Flyer" and as recently as Burt Rutan's designs, they have been the subjects of endless discussion and controversy. Throughout aviation history they have been dismissed as illogical, only to arise again every so often, in various parts of the world. There have been, for instances, the Franco-Brazillian Santos-Dumont 14-bis, the British Barber Valkyrie, the French Bleriots (at least three different types), the Italian Anitra, the German Focke-Wulf Ente, the Soviet Ytka, the Japanese Shinden, the American Curtiss Ascender, and the North American B-70 Valkyrie. And many others.

In model form, the canard has been popular in genres ranging from the early-day sling-shot gliders and rubber-powered twin-pushers, through modern radio-controlled examples, the most recent of which was Skip Ruff's "Ascender" which appeared in the June **Model Builder.** But the subject of our story is an earlier "Ascender," the Gee Bee canard of 1931. Overshadowed by the more famous barrel-shaped racers, this unique craft deserves examination, both for its unusual features and for its modeling suitability.

The name Gee Bee, of course, was derived from the initial letters of Granville Brothers, an unusually talented group of craftsmen. Leader of the clan was the dynamic Zantford D. Granville, affectionately known as "Grannie," ably assisted by brothers Thomas, Edward, Robert, and Mark, as well as people outside the family, such as the now-famous Bob Hall and Howell Miller.

The canard envisioned by Zantford was radical even by his innovative standards. Beginning with the remains of a damaged Aeronca C-2, the design was constructed in about one week, at a reported total cost of $500! (They sure

Poor quality photograph, but significant as it shows Zantford "Grannie" Granville at the controls.



Mark Granville, with Gee Bee logo on back of well-used coveralls, about to crank Aeronca engine in Ascender.

Mark Granville about to take Gee Bee Ascender aloft. Although a low-time pilot, he adapted easily to machine's flying characteristics, but discovered its shortcomings the hard way. See text.

don't build 'em like that anymore). When the Ascender was first rolled out, it attracted a great deal of public attention, which was most embarrassing to its builders, since the tired Aeronca engine simply refused to run. The culprit seemed to be a compression leak, so chief engineer Bob Hall volunteered to fly to New York to obtain a replacement cylinder and piston.

Early the following morning, the reassembled two-banger was putting out somewhere near its full 28 horsepower, and Zantford was eager for the first test-flight. A local newspaper reporter saw it this way: "FREAK PLANE RUNS WELL IN FIRST FLIGHT" "Just before 6 o'clock he taxied his craft to the end of the field, opened the throttle and waddled . . . the plane looks as clumsy as a duck on the ground . . . to the takeoff. The machine climbed well and Granville flew it back and forth across the airport twice before he made a slow and easy landing. He expressed entire satisfaction with the performance of the ship and plans on his return from the West to extend test flights to cover climbing and speed rates."

Later, a forward rudder was added to a tall tube extending up from the nose wheel. The handling was tested with it actuated separately and in conjunction with the rear rudder.

From an aerodynamic standpoint the canard was quite stable and easy to fly, with one notable exception: The aileron response was very sluggish, and this was to contribute to the Ascender's demise. Young and inexperienced Mark Granville had flown the craft a few times and enjoyed it thoroughly. But on New Year's Day, 1932, he managed to bank the Ascender so steeply that the limited aileron authority could not effect a recovery, and it spun into the ground. Mark was seated upon bare steel tubing fuselage structure without any seat cushion, and the impact of the crash inflicted a painful injury to his back. Yet, his good-natured reaction was to cut the offending assemblage of tubing out of the wreckage and mount it on a wooden display base along with the Ascender's identification plate. This curious artifact is displayed today in the Springfield Science Museum in Massachusetts.

The late Bob Granville, who helped build the Ascender, exchanged a number of letters with the author during 1977, in which he said, in part: "I do not have a three-view and I doubt if one was ever made. The ship was built with very little money, just to prove or disprove two things: 1) Would there be any advantage to having stabilizer and elevator controls in front? 2) Would a three-wheel (landing) gear be better than a conventional tail dragger? . . .the ship flew well and made excellent landings in almost any position. . . Grannie concluded that the three-wheel arrangement was great but could find no advantage in the forward tail."

Zantford did design a follow-on aircraft to utilize some of the knowledge gained from the Ascender experiments. It featured a pusher engine, wheel pants, and a conventional tail location. Unfortunately, the machine was never constructed.

The Gee Bee canard should be quite suitable as a flying scale model, either as a free flight or R/C type. A Brown Junior twin CO2 engine would be a natural for a small project, while one of the two-cylinder, four-stroke larger engines would be ideal for an R/C version, which might even *sound* similar to the original!

Tom Walker, of New York, has already built an R/C model and hopes to present information about it in a future issue of **Model Builder.** Meanwhile, if you care to try one of your own, the accompanying side view drawing, which was checked over by Bob Granville, may serve as a useful starting point. The wing

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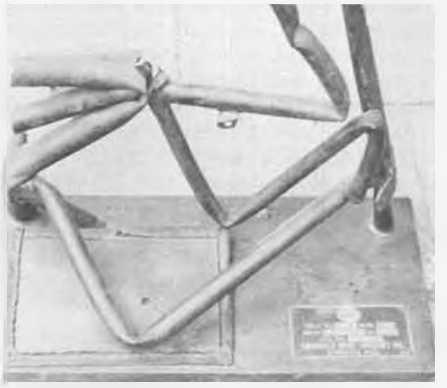

All that remains today, whimsically created by Mark Granville.

Experimental forward rudder. Normally flat-bottomed Aeronca wings appear to have trailing edge droop. Anyone ready to give it a try?

"Don't put aeroplanes in stalls . . . put them in hangars!"

Proof that most anything will fly . . . if your approach is proper (see text). Photo by Alain Parmentier.

• This month's lead-in line is via Clyde Howard, who claims no originality for it, saying that it goes way back in time.

ABOUT TIME

Model builders never seem to have enough of it, right? Bill Warner, in a philosophical mood, muses about the problem: "I found that there is no such thing as time compression when you are bored. Any time one feels that time is zipping by and you want to slow it down, just stare at your watch's second-hand or something else like that. Time *will* slow down. It will drag. I'll bet I could live 200 years (in perceived time space) if I arranged to be bored all the time. Instead, what do we do? All sorts of interesting things which make our perception of time seem as if it was passing rapidly. What a choice to have to make!"

Ever notice how time flies the night before a contest?

WHO ARE WE?

The National Free Flight Society recently completed a member survey. As is usual with such an investigation, only a small percentage actually replied, but the results, as presented by President A.J. Italiano, make fascinating reading. Answers were received from 36 of the United States and 7 foreign countries, and the age ranges represented are particularly revealing: By far the largest number were in the 31 to 50 year old category, closely followed by those in the 51 to 70 range. Of these, the majority began building model while they were between eight and 11 years old. Only a tiny percentage took up the hobby after their 30th birthday.

(The implications of this survey are rather disconcerting, and confirm a suspicion I've had for several years. Unless the present trend changes, the hobby of building and flying model airplanes will continue to diminish as modelers die off, and will eventually disappear from the earth! The chances of the trend reversing are as unlikely as a return to all types of stores of 10 cent stick and tissue model kits. Nevertheless, we steadfastly support Ed Whitten and BAMA . . . see Bill's next subject. wcn)

Interestingly, many of these avid free flighters also pursued other modeling facets, including R/C (especially gliders), cars, boats, and control-line aircraft. Among the divisions of free flight, rubber-powered models and old-timers appeared to lead the pack.

Rather highly educated as a group, the free flighters drew this commentary from Italiano: "One would not think that free flighters were that well-educated . . . considering letting a model go free in the air, not knowing where it will come down, and then chasing after it to retrieve it! And with the technical expertise of the membership, one would assume immediate embrace of a wireless means of control! But, no . . . these strange people are health nuts and insist upon a footrace for the exercise involved."

The National Free Flight Society is open to any interested persons, and a

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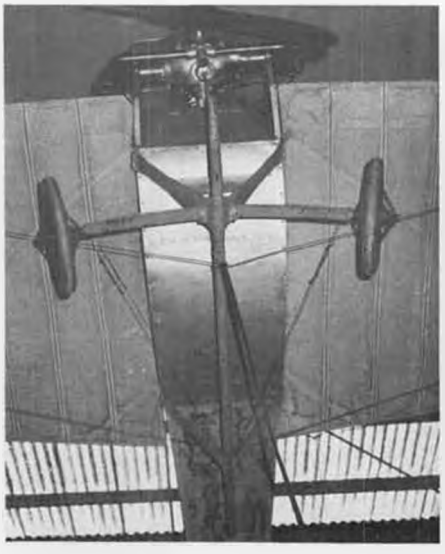
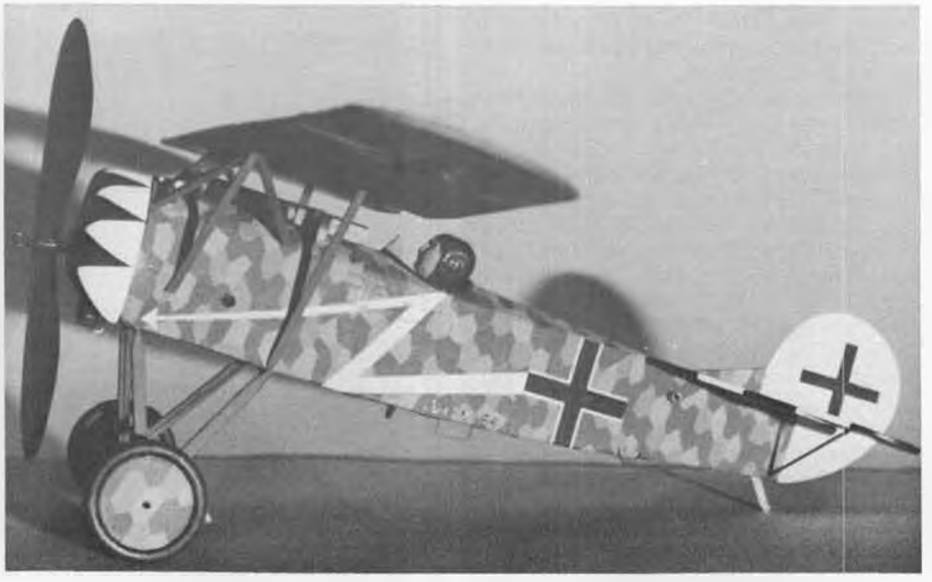
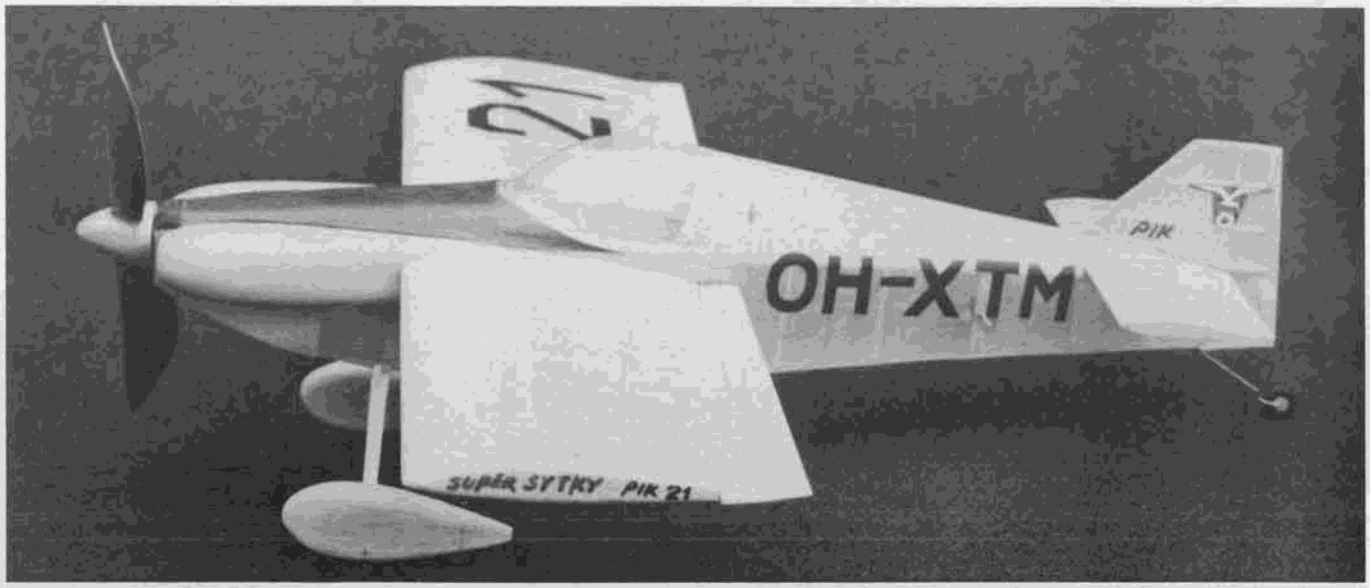


Full-size Nieuport monoplane similar to Hangar logo, submitted by Michel Benichou, Editor in Chief, *le fanatique de l'Aviation.*



Intricate hand-painted color scheme on Peanut Scale Fokker D-VIII is the patient work of Australian Bruce Kennewell.



SUPER-SYTKY

By WALT MOONEY . . . Our Peanut Potentate brings up another one from left field, left field this time being Finland. It has the potential of being a "Fike Fighter". See what you can do with it.

• In a never-ending effort to find something that might beat the "Fike" the sight of a three-view of the PIK 21 was an inspiration. Unfortunately the model in the photos came out to weigh 21 grams, and is too heavy to be competitive with the lightweight Fikes that abound in this part of the country. However, it has lots of wing area and flies quite well. Some of you enthusiasts who see this model will be able to build one a lot lighter, and it just may turn out to give the Fikes in your area a hard time.

There are no intentional deviations from scale on this model except propeller size. Internal structure is all in, and in the right location. The real airplane is covered with plywood and we have used tissue almost everywhere, that it doesn't look out of place.

With the scale tail, something needed to be done to provide enough stability. Well, people have flown flying plank tailless designs, so why not us! Simply use the strip ailerons in a slightly up position to achieve a stable airfoil and keep the CG somewhere around the quarter chord line and the model ought to fly. And what do you know . . . it does!

The model follows fairly conventional construction practices throughout. The wing and the horizontal tail are built to pass through the fuselage. It's important to get the wing and tail slot correct. The ailerons are installed after the model is covered and assembled. The horizontal tail is slipped in from the rear of the model since its airfoil section would require the elimination of the top longeron if it was slipped in sideways.

The real airplane is a sort of off-white in base color, so white tissue and bare balsa look about right. All lettering is black except the "SUPER SYTKY" on the wing tips, which is red. The Finnish flag and the vertical tail insignia are a medium blue and true white. They look whiter than the rest of the airplane because that's how they are on the real plane.

The propeller is a seven-inch Peck Polymers plastic that has been cut down to six inches. The cheek cowls are carved from soft balsa blocks and hollowed out for lightness. The openings in the front of the cowl are part of the hollowing out job and look a lot more realistic than black painted spots.

The canopy is molded from thin plastic. The one in the photos was molded on an old Mattel vacuform. It is just as large as can be done on the Mattel, and took several tries to get a satisfactory one. A bigger vacuform system would be somewhat better.

My three-view seemed to show a windshield frame, but when I found a picture of the real airplane, there was no frame. A closer look at the three-view showed that it had been folded right at the spot and the fold looked like a line. The first four windshield molding attempts had a frame in them. I installed the best of these on the model structure and then found the photo of the real airplane. Back to square one and a new mold without a frame, several more molding attempts, etc.

The top of the fuselage is covered with soft thirty-second sheet. Use some masking tape to keep it from splitting when you bend the sharp radius at the

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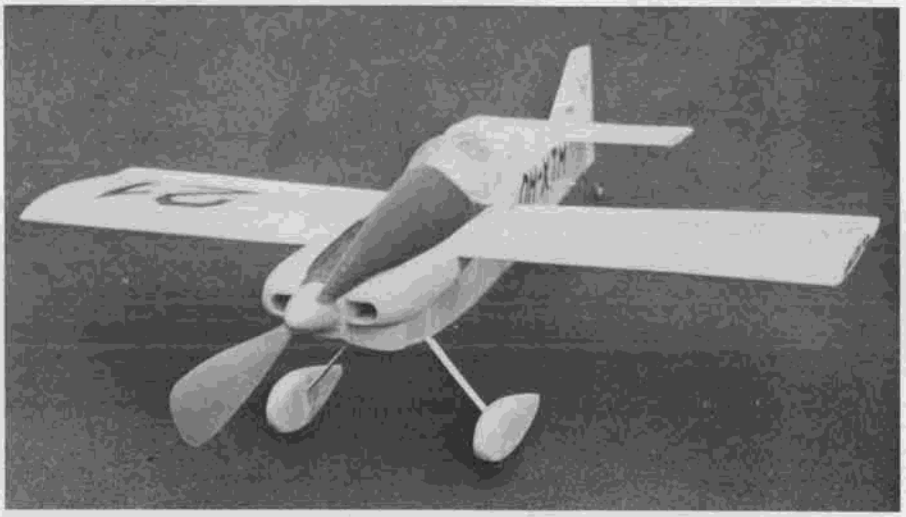


After reading about this one, every modeler will be jacking up the trailing edge of the wings on their models that are reluctant to fly well . . . and it may work!

3/32ND SQUARE LEADING EDGE

1/32ND SHEET COVERING BACK TO SPAR

1/16TH SQUARE SPARS

WING PLAN

3/32ND SQUARE TRAILING EDGE PIECE

1/16TH SHEET AILERONS, NOTE OVERHANGING BALANCE

WING EXTENDS IN ONE PIECE THRUOGH FUSELAGE

ROOT AND TIP RIBS ARE 3/32ND THICK,
ALL OTHER RIBS ARE 1/32ND THICK

EXTREME TIP PIECE IS 1/16TH THICK

HORIZONTAL TAIL PLAN

TYPICAL TAIL RIBS

TIP DETAIL

CARVED BALSA CHEEK COWLS

1/32ND SHEET COVERING ON TOP OF FUSELAGE

NOTE THAT THE BOTTOM OF THE FUSELAGE STRUCTURE IS NARROWER THAN THE TOP

REAR MOTOR PEG

TOP VIEW

THIN PLASTIC CANOPY

FORWARD FORMER SHAPES

AFT FORMER SHAPES

ALL WING RIBS ARE ALIKE

FUSELAGE SIDE FRAMES SHOWN HATCHED FOR EMPHASIS

PLASTIC NOSE THRUST BUTTON AND PLASTIC PROPELLER

ALL STRUCTURE IS BALSA UNLESS OTHERWISE NOTED.
USE LIGHTWEIGHT TISSUE FOR COVERING

USE BALSA WHEELS AND LAMINATED BALSA WHEEL PANTS

VERTICAL TAIL RIBS

PIANO WIRE LANDING GEAR PATTERN

SUPER-SYTKY

A FINNISH PEANUT BY Walt Mooney

12-20-81

Fantastic camouflage job using four printing plates, by Bill Noonan, San Diego, CA. Yes, it's a 3/4-inch scale D-VII.

FREE FLIGHT SCALE

By FERNANDO RAMOS

• Vince Costanzo has the greatest way of making easily removeable props that are free wheeling. You'll have to look at the sketches to see how it is done. Instead of the free-wheeling device being in the front, it is behind the prop. This way several different prop diameters and pitches can be experimented with, without the usual toil of making new prop shafts or noseblocks.

There are two things that have to be done correctly. The first one is the wire peg that engages the prop should be silver soldered onto the shaft; this can't be allowed to slip. The cam that the peg slips onto must be shaped correctly or the peg won't engage the prop after the motor is wound. Also, the cam should be free of any burrs caused by filing. That's all there is to it!

Starting this month, I am going to present a comprehensive article, written by Wally Batter, on the finish of WWI airplanes. There has been a lot written about this subject, some good, some bad. There still is much controversy regarding this topic, and I felt the explanation Mr. Batter gives is first rate. Due to its length, this article will be spread out over several months, but I feel that the wait will be worth it, plus in between, I still want to maintain the usual format of this column. I know that there are a lot of you who enjoy this period aircraft, but lack the necessary information about the proper finishes. With this article, this will no longer be the case. This article was especially written for *World War I Aeroplanes*, whose numerous readers are builders of replica WWI aircraft. Many builders rely solely on this publication for hard-to-come-by information, and as a source of where rare parts can be bought and sold. Those of you who have never seen this publication and are interested in WWI airplanes, should definitely subscribe. First off, *World War I Aeroplanes* is a non-profit organization, so your "contribution" is tax deductible. Cost is anything you want to send in over 20 dollars. For this you will receive five outstanding issues. Send your money to Leonard Opdycke, 15 Cresent Road, Poughkeepsie, NY 12601-4490.

Lastly, it is recommended that you acquire *Methuen's Handbook of Coulour*, available from the Aviation Bookshop, 656 Holloway Road, London N1P 3PD; 252 pp, L 850 Another good source is, *Munsell Color*, McBeth Div. of Killmorgen Corp., 2441 N. Calvert St., Baltimore, MD 21218. This book has actual color chips. No price given.

COLOR FULL NOTES

The desire to build a replica or scale model of some entrancing WWI aeroplane is free of detail — while still a dream. Tossed by the mind in graceful manoeuver, viewed from fascinating angles; scenes are created that reinforce the desire to build. Dismissed, for the while, are the realities of the task to come. Imagination sees everything completed and perfect.

Research is very much back to earth. Where construction drawings exist, the task can be easy. If details are missing, the employment of logic, sound engineering practice, and an awareness of the style of the designer can bring to fruition a representation that is, most probably, very accurate. Too often, the real sense of troubles begin when the time comes to apply paint.

The colors of WWI aircraft have served as a stumbling block for restorers, replica builders, and modelers. So little definitive information exists that the subject has provided a vast, but barren, research ground for a few hardy explorers. Without their efforts we would be sorely impovrished. Our gratitude goes out to all of them and, most particularly, to the likes of Alex Imrie, Ian Huntley, Peter Gray, Peter Cooksley, Peter Grosz, Dan San Abbott, Bob Bradford, Fred Shortt, and those whose names have, momentarily, evaded my memory. The contents of this article have drawn freely from their work, and others, with the full knowledge that they produced their works so that it might be shared.

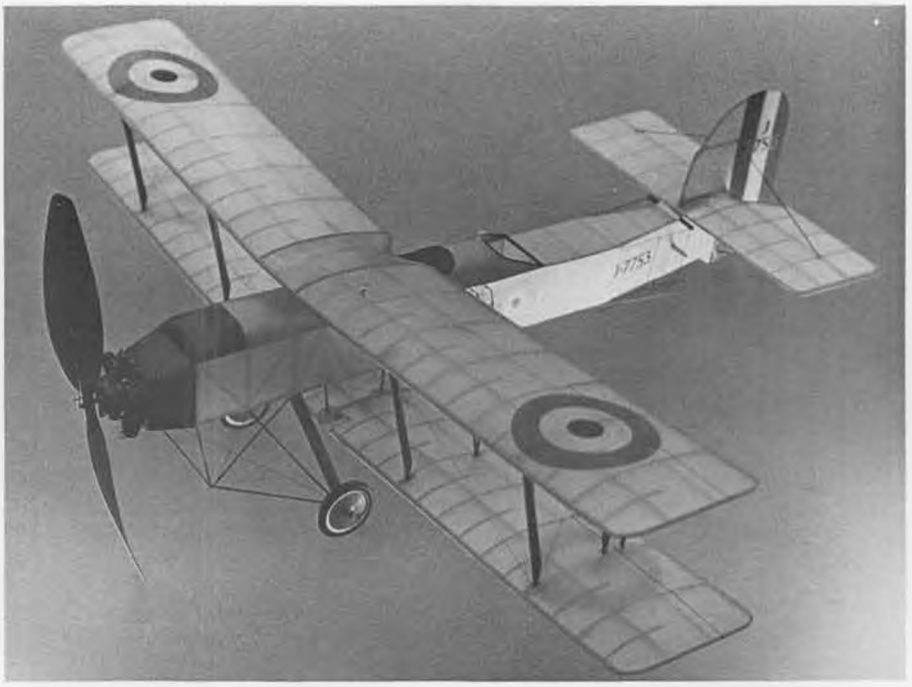
It is probable that the most contentious subject within the realm of WWI colors would be that of the basic color of British a/c. Pigmented Cellulose No. 10 (PC-10) suffers more from varied interpretation than does any other color of those times. And well it should:

during its life it was, itself, varied!

Whilst it is true that we paint an aircraft for a number of very good reasons (waterproofing, air-proofing, decoration), one of the foremost reasons for the use of pigmented finishes has been the need to cut down on the ravages of sunlight's injurious rays. The degredation of our modern world's garbage is related, in part to the problem of deterioration of aircraft fabric. We seek materials that will return to the earth as inoffensive muck that will remove from view the "benefits" of our civilization. Bio-degradable is a popular work today. Sunlight, assisting in such degration of an aircraft's covering was, as you can well imagine, far removed from the list of happy events. A sun-screen was the answer, ergo: PC-10.

So often referred to as "khaki" - a word for dust colored in Urdu - the color seldom brings to my mind the hue we know of as an a/c color. No, Khaki No. 7 (much lighter) reminds me of dust. It is a light yellowish grey. We used a darker version after the war (No. 9? No. 12?), and though it would be close to PC-10, all it reminds me of is wet webbing brushed by hand until it was dry, hard, and shining! Both colors were khaki by definition. They used, of course, different pigments. So it was with the various paint manufacturers who sought government contracts for the supply of PC-10. Forced by pigment availability, and the need to avoid patent infringement, they matched the desired color as near as they could from their own formulations. A perfect match would be possible only when the same materials were used. The result has to be variation. The use of different pigments would also result in variation of chemical reaction of time and weathering agents - further accentuating the color shift. Perhaps it would be appropriate to note at this point that there were two khaki's in use at the beginning of the war: the Royal Aircraft Factory's specification for PC-10, and the color used by the Air Department Admiralty. It was not until the adoption of unified standards under the Joint Air Board that the RFC and the RNAS used the same pigmented cellulose.

PC-10 was, originally, a top coat varnish. When it was changed to be a shrinking dope, there was a need to vary the amount and type of pigment used. This brought further variation of color into the picture. The German submarine campaign caused severe shortages in Britain during 1917. Guided by the Air Board, many manufacturers found a market for their equivalent of PC-10. The need for standardization also warranted the issue of doping schemes by the Air Board: Class A, B, C, and, eventually, D. It can be said that these doping schemes, themselves, caused further variation in the basic khaki color as appreciated by the eye. Like Alice in Wonderland, it does become "curiouser and curiouser," but don't get the idea that any old choice will be correct color.



Another Bill Noonan gem, this 30-inch span Armstrong-Whitworth "Ape". Both ships prepared for the 1982 FAC meet.

The standards of manufacture and the doping schemes issued by the Air Board kept the colors within a reasonable range. If you wish to be perfectly accurate, it would be necessary to precisely duplicate the pigments and the doping scheme. And you would also face the fact that PC-10 eventually meant five individual preparations which were subtly different one to another. The range of color, as determined by Ian Huntley, would be from 3(E-F) to "almost 5F8" (using Methuen as the color scale). Such a range would take the color from an olive green to raw umber. Although the range would seem to be fairly considerable, a consideration of the effects of the doping schemes will assist in the realization that the basic color could be closer than the final result might indicate.

CLASS A doping was introduced during April 1916. Five coats of clear dope were followed by two of pigmented varnish. It in obvious that the number of man-hours required were high and, it should be noted, that the results were not as durable as might have

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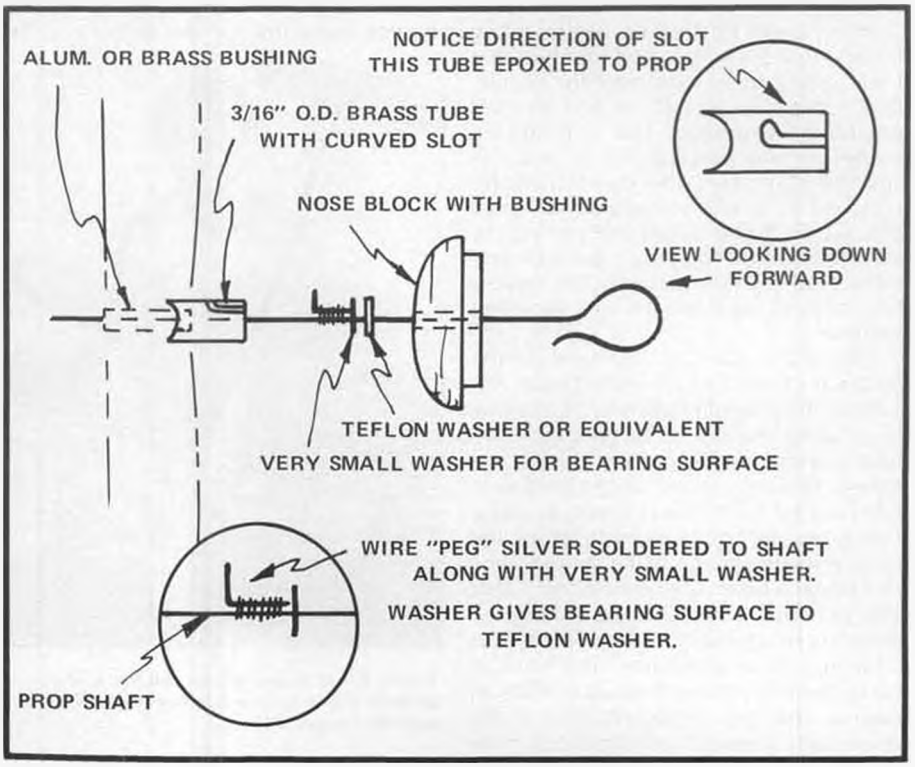


Bill Hunter at San Valeers monthly contest, Moor Park, CA. Satellite (what else!) A/B FAI with Supertigre. No chase bikes allowed. Photo by Bob Ohly.

Ed Hopkins, Fillmore, CA at San Valeers monthly. Original 1/2A, Cox .049, Tatone tank mount. See text for Ed's comments on breakaway tips. Photo by Bob Ohly.

FREE FLIGHT

• Since my last column, I've had to undergo some additional surgery, this time at the Memorial Sloane Kettering Hospital in New York City. (I'm recuperating nicely now . . . should be ready for this summer's contests.) While not an ideal way to spend my spring vacation, my stay there did enable me to re-establish some old contacts and make some new ones with East Coast free flighters.

In my case, I called up old traveling buddy, Bob Hatschek, and told him that I was going to be confined for awhile. Bob's response was above and beyond anything I expected. Not only did he come by the hospital for a visit the second day after the operation, he checked in by phone each day and had other free flighters call me during my stay. In addition to being a great morale booster, these contacts gave me quite a few tidbits to share in this month's column.

One of the items we discussed was the location of the FAI FF Team Finals. Results of the vote of finalists had just come in, making the site as Taft for the third time in a row (and four out of the last five times). This has caused quite a decline in FAI interest on the East Coast, as many flyers are declining to even enter the team selection program if it means going to Taft each time. The other effect is that a lot of people who qualified at the semi-finals are dropping out of the Finals, thus allowing those alternates who want to make the trip to take their place. This, of course, changes the significance of the semifinals, since virtually anybody from the East who wants to go to the Finals can count on enough qualifiers dropping out to permit him to go.

As time passed, I got phone calls from Joe Wagner, Cliff Montplaisir and Dave Rounsaville, who clued me in on how things were going in other areas. Both Joe and Dave are very active FAI flyers, so I asked them for the latest scoop on the new Rossi .15. The prevailing opinion is that all the changes made in the engine were not for the better . . . the new version is not much better, if any, than the old ones. Some samples ran good when new, but deteriorated rapidly in performance, while others just wouldn't put out at all. Several European teams who received them before last year's World Champs ended up sending them back to the factory. One possible bright spot in the FAI engine supply situation will be the K&B production version of the Cox Conquest. Production is being delayed by the regular "bread and butter" engines, but they should appear this summer.

Young F/Fer of the month, Ed Mate, Jr., proudly shows off his original design Nats winning Coupe D'Hiver.

Dave also has received one of Tom Koster's electronic timers, and has been using one of his folding carbon-fiber props since last fall. He's promised to send some photos soon.

PRESS RELEASE

The National Free Flight Society is very proud to announce its selection for the 10 Models of the Year Award.

International Class

F1A - NORDIC 811 by Ivan Horejsi (Czechoslovakia)

F1B - RUBBER ESPADA by Lothar Doring (West Germany)

F1H - GLIDER HOT MAX by Jorgen Korsgaard (Denmark)

AMA/Outdoor

Large Power: SWEET DADDY PEARL by Richard Covalt

Small Power PAY-TRIOT by Harry Murphy

Rubber MONARCH II by Chris Matsuno

Indoor

Paper Stick PAPER TIGER II by Jim Richmond

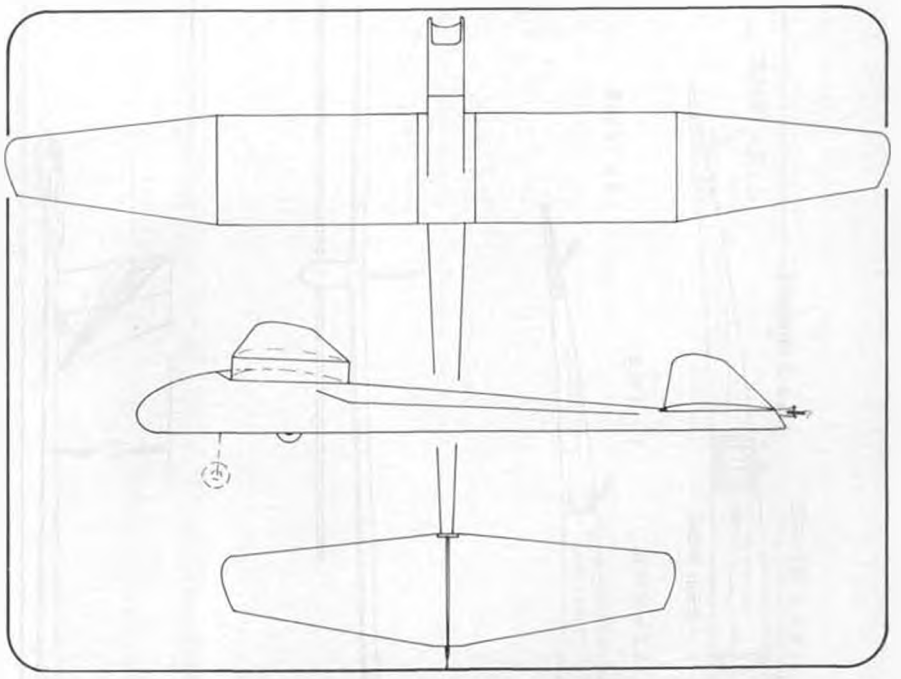
Hand Launched Glider UPSTART by

Mark Drela
Special Awards
MODEL AERONAUTIC YEARBOOK by Frank Zaic
CHAMBERMAID by Bill Henn

MYSTERY MODEL

This month's MM comes courtesy of Dennis Phillips, who accompanied Bob Hatschek to the hospital. Dennis is a West Texas native now ensconced in the big city, very interested in FAI power. In real life, he deals with composite materials for use in helicopters, which is useful experience for forming all those fancy glass/Kevlar/etc. parts now in vogue in the F1C event.

Such sophistication was not in vogue when this model appeared. It was designed by one of Dennis' West Texas flying buddies, spotted at a postwar Nats and published. Major identification feature should be the fuselage's distinctive shape, as the wing and tail are more conventional in outline. If you think you've got the design spotted, send in your entry to the **Model Builder** office (621 W. 19th, Costa Mesa, CA 92627) to see if you win a subscription.



AUGUST MYSTERY MODEL

MODEL OF THE MONTH . . .
Hot Max A/1

I've always felt that the A/1 class glider has been neglected as a means of starting out. They're small enough to be cheap to build, but fly well enough to make good contest models. The problem, I feel, is that the class is too often combined with its big brother, the A/2, in local contests. A good big model will beat a good little model most of the time, so the A/1 flyer usually ends up building the bigger class. This is not bad, but the class is interesting enough to warrant a little fairer chance in competition. With the new heavier weight and more reasonable two-minute max, A/1 could be profitably combined at local meets with Coupe and/or P-30.

Hot Max's designer, Jorgen Korsgaard, works as a teacher with the Danish speaking minority in northern West Germany, less than two kilometers from the German/Danish border. He's got a club going at his school, 12 members, most of them flying A/1. Jorgen used to fly Wakefield (he was on the Danish team four times), but became tired of the greasy rubber stuff, and began to build and fly A/1 with his clubmates. According to him, the competition in their contests is as hard-fought as flying for the Danish national teams. Here's some more about the design (from Free Flight News), which was named as one of the NFFS TOP 10 Models of the Year for 1982:

About the Max's: It all began in 1974 when I designed a novice model, with square wings and Koster Wakefield airfoils. This model has been developed through the years and is now still easy to build, but tough, and easy to fly. However, by 1979 Heinzi (one of the students) was no longer satisfied with this type model, so I designed the first Super-Max *especially for him, and it flew 'off the board'. It was the first model in the club to use a Ronytube fuselage, but the normal spruce/balsa one which I produced for* Easy-Max *seemed better. It was lighter, stronger, and did not 'whip'. Six such fuselages have been built so far and not one has broken yet. It is not so easy to build, but we think it looks better.*

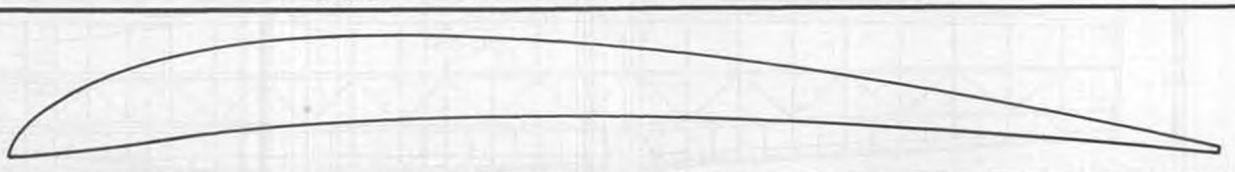
A main feature of the models is the normal towhook, which we cling to. This makes thermal detecting on the ground necessary if piggybacking is not possible. When we presume the air to be good, we launch very fast and 'zoom' the model off the line to the right side. When the trim is correct, they will gain height similar to an F1A glider under catapult launch. The models need a little wash-in in the inner wing and show a very slight tendency to drift right on the tow. To prevent too much looping tendency they have a 54-57% CG. Still air times are well over two minutes, and the models are very stable in all kinds of weather. We believe that the pointed airfoils with the maximum camber well forward helps here. The wing tip airfoils are kept thin, with a little more camber than the root sections.

DARNED GOOD AIRFOIL . . .
KOSGAARD A/1

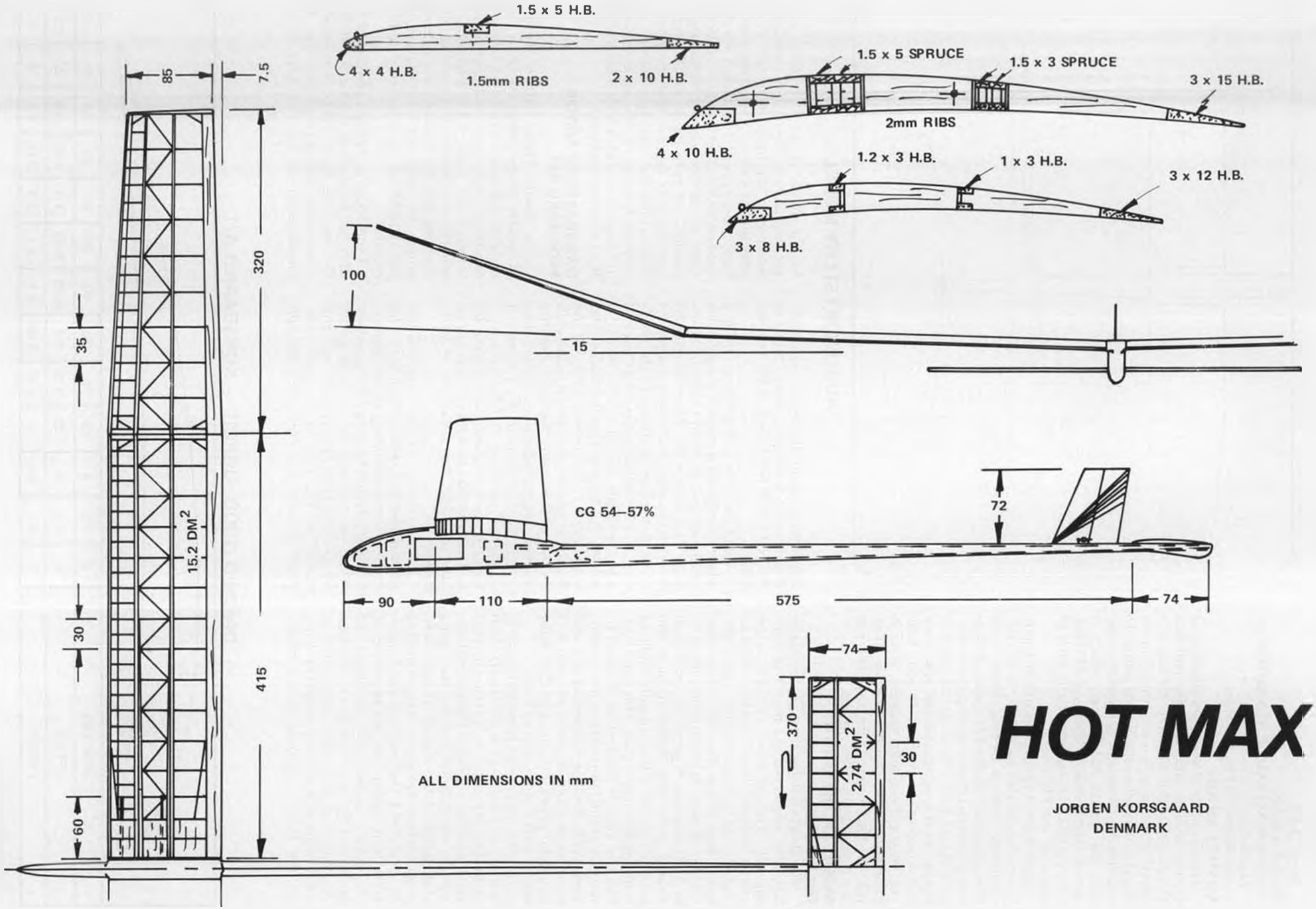
One reader, David Glassey, wrote in to inquire where I find the DGA's featured in this space. Well, I do have a file of airfoils collected from various sources through the years, I keep looking for others in newsletters, and if all else fails, I find one in John Malkin's book. Sometimes, the right airfoil to feature just jumps right out at you, like it did this month.

I was looking through an issue of *Vol Libre*, after plotting the Gard airfoils a few months back, when I spotted a three-view of Kosgaard's *Easy Max* A/1 (predecessor to the *Hot Max* in the

DARNED GOOD AIRFOIL – KORSGAARD A/1



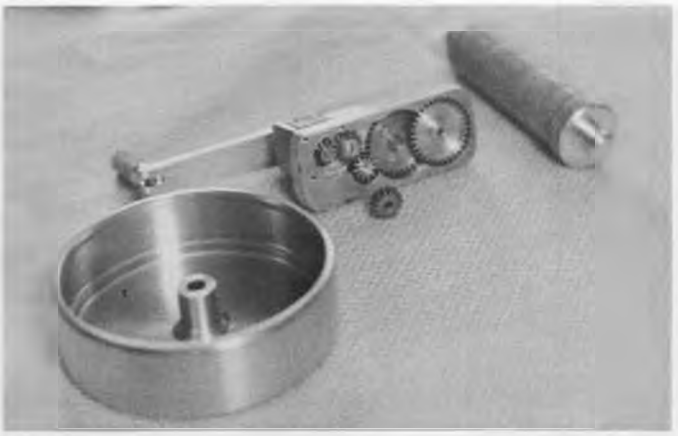
STATION	0	2.5	5	10	20	30	40	50	60	70	80	90	100
UPPER	0	3.1	5	7.25	9.25	9.8	9.55	8.75	7.7	6.25	4.5	2.7	0.6
LOWER	0	0.1	0.4	1	2.15	2.85	3.1	3.1	2.9	2.45	1.8	1	0



HOT MAX

JORGEN KORSGAARD
DENMARK

Bob Hatschek shows off panic release of his homemade towline winch. Note folding handle and counter.



Internal mechanism of Hatschek winches . . . nice workmanship is evident.

three-view), and the ordinates for the airfoil were also presented. The Kosgaard A/1 airfoil features the typical Scandinavian pointed leading edge popularized by Sigurd Isaacson. As Jorgen says in his model notes, this seems to help. The section seems like it would make a nice all-around rubber or glider section. The maximum camber is far forward, which helps make a strong D-box section if desired. The 7% thickness is a good compromise between the ultra-thin and thick sections. Try it!

HATSCHEK DOESN'T ONLY MEAN HOOKS ANY MORE!

Bob Hatschek brought along a few goodies for my perusal when he visited me in the hospital. Most of you out there are probably aware of the fine Nordic towhooks he's been manufacturing (he's sold about 750 of them!), but his latest bits of handiwork are some neat-looking towline reels. Bob said he had enough Nordics ready for the upcoming finals, so he's spent some time in developing some new reels. (These reels are purely for his own enjoyment, and are definitely not intended for sale, he wanted me to make that clear.)

Before starting the project, Bob listed the capabilities/specifications he wanted to have in a towline winch. His mandatory ones were:

1. adequate line capacity
2. resistance to snarls, tangles, jams
3. low friction and smooth running (the glider must pull out the line)
4. a panic-button release to be operated with one hand
5. comfort and convenience in use (good grip, clearance for knuckles).

He also thought that these would be desirable: a quick line reattachment; gear ratios that permit cranking the model UP in calm, DOWN in wind; a display of line still on reel; a fast rewind (without jeopardizing winching ability); ruggedness, durability, corrosion resistance, and dirt exclusion.

Bob put these in the luxury class: a reel lock, pocketable size; light weight; an ability to install a pre-loaded reel for spares; storage space in handle for adjustment tools; and a lug for hanging on the belt. Bob pointed out that his goals list ignored such factors as low cost, ease of construction, etc. Once made, he considers his winches to be priceless!

The first winch he made even had ball bearings, which proved to be quite unnecessary, as an A/2 easily pulls out the line even with plain bearings, such as the winch in the photos. I took pictures of a winch that was used all last year . . . this year's version is going to be even better, according to Bob!

YOUNG FREE FLIGHTER OF THE MONTH . . . Ed Mate, Jr.

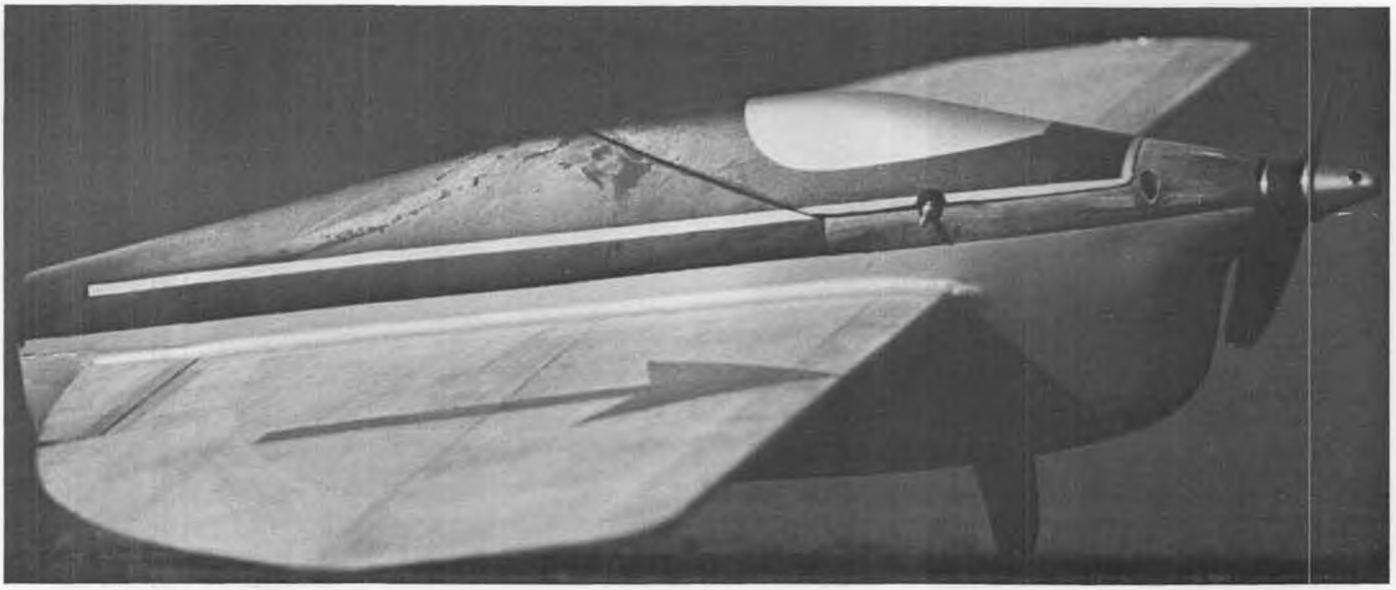
This month's nomination for young FF'er of the month comes from proud papa, Ed Mate, Sr. (who is vice president of the Illinois Model Airplane Club, probably the oldest continuing club in the country). Ed, Jr. is now a Senior class contestant, but has won the Coupe at the Nats twice, along with a bunch of other places. He's done well at local contests, too. The Coupe design he's showing off so proudly is of his own concoction.

If you know of any deserving young free flights who you'd like to recognize, don't be shy about sending in a photo and a paragraph or so describing his accomplishments. But remember that clear *black and white* pics are the only kind that we can print . . . Polaroid color shots are a no-no!

Continued on page 94

Andy Tagliaficco concentrates on preparation of his outstanding P-24 ship for Albany contest.

Photo by Toni White, from Alberto Lozano International contest in Mexico City, Oct. 1981. Antonio Abaunza with Nordic.



The McCollum-Knoppi team racer. Wheel kinda disappeared during landing!

Control line

By "DIRTY DAN" RUTHERFORD

PHOTOS BY CHARLIE JOHNSON

• Say, quite a large and interesting response to the column that made fun of the RC cross-country rally and that also hinted at a challenge from the CL guys, with us "Rock on a string" folk wind-flying a CL model from the back of a flat-bed truck, doing it non-stop and setting a cross-country record that the RC guys couldn't possibly touch. As is usual with this kind of thing, the people who immediately see the potential write in very quickly, Tom Dixon did so, and his was easily the most entertaining letter. . . *Dirty,*

Just picked up the May **Model Builder** *(thank God they dropped that "RC" stuff) and I want to be the first to sign on for the Dirty Dan Sea-to-Shining-Sea Toy Airplane Rally Race and Trophy Dash. It could rival the old Car & Driver "Cannonball" in fun, decadence, and generally sticking it to the powers that be. How about that; the cops, the AMA, the 55 mph speed limit, fuel economy, glow fuel, engine markers, and the RC guys all in one fell swoop! A masterpiece!*

Actually though, a ragged old Stunter like a Veco Chief is the ideal wind flyer. It's big, light, close-coupled, and has enough "sail area" in the form of side area and barn door wings. The more modern a Stunter is, the worse it seems to wind fly. I suspect Combat models are similar, only worse, what with no real fuselage and all. Side area seems to help. My experience tells me that a wind flyer has to have enough area for the wind to push it and be heavy (dense?) enough to penetrate into the upwind side of the circle. That's where I think your Combat thingies would let you down. They'll probably make it through the tunnels better, though.

If the Dirty Dan Sea-to-Shining-Sea, etc. thing falls through, maybe we can promote CL flying with flying dog houses, lawn mowers, bathtubs I guess a flying hot tub would be needed in California) or what have you. Maybe a Super Nobler powered by the biggest freaking chain saw engine we could find would be neat. Think of it, a ten-foot red Nobler flown on 1/2 inch cables. "And it sounds just like a real airplane", as they say (Funny, I think it sounds just like a damned chain saw!).

It seems the possibilities are nearly endless. Maybe RC stands for really conservative. Or relatively competent. Or repeatedly constipated. I don't believe I've ever seen anyone in RC be creative to the degree CL people seem to be. Or funny, either.

A word about this letterhead. You'll note that it is "shrink" related. I am not the above person's patient. I am he. Having to use up the stationery, 'cause I just moved out of my office. I am the

Jarl Boles (Salt Lake City) launching for Myles Lawrence at Buckeye.

same Tom Dixon of PAMPA, the Gremlin in MB in '75, and the Stilares in MAN in '77. Haven't been doing much flying last few years due to lack of time due to work. Stunters just take so damn long to build right, and it's not worth it to build a bad one, hence little flying. I am hoping to get back into it more with a new group practice association which should increase both income and available free time during the next year or so.

Please keep on being outrageous. It's a real wonder Northrop lets you get away with it, but it's good for him, you, and us the real modelers. Keep it up.

Let me know when the Race Rally begins and where. I'll be there with something neat to fly. If I could find someone with a Porsche 930 with a sunroof, it would be tough for you California guys!

Keep the column going . . . remember us Stunt guys from time to time.
Tom Dixon

First off, Tom, you sound like a loyal reader, have even submitted a for-real CL article to MB, so are part of an elite group. Yet you have me living in Cal!! Man, I don't live there, don't even like visiting the land of fruits and nuts, or at least none of it that is much south of The City (San Francisco, of course).

Ahem. Although it only took you a flash of the eyeballs to get from up there to this new paragraph, it has taken me a half cup of coffee and a few moments of thought. The coffee because it is good and I like it (fresh ground Maple Walnut, believe that or not). The thoughts because everybody is always picking on SoCal, and do I really want to be part of that, because it seems as if most of the people laying it on the Californians are those who deep down simply resent all the good times they imagine the Tanned Ones to be having year 'round. Hey, I don't want to be tucked into a classification like that. So, . . .

To Tom and all, I live in the Seattle area. And love it. Wouldn't hardly even consider moving anyplace else. But I also know that *all* of you people reading this would absolutely hate Seattle. It rains here, you know. Buckets and buckets, day in and day out. We don't have hot tubs in the backyard, we have arks . . . arks with built-in bilge pumps, as it would be a shame to have to load up the ark only to find it full of water. In fact, our arks actually sparked the whole idea of hot tubs, a visiting Californian was here on the last day we had sunshine, it was a number of years ago, so nobody can remember the exact date, the bilge pump had shorted out a day or so earlier, letting the ark fill with water, the pump got very hot, but all that did was to heat the water. Our visitor jumped in, enjoyed the soak, flew back south the next day and kicked off another of the fads we always see coming out of SoCal. *(Fresh ground what? wcn)* But the point is that none of you would like Seattle. So don't come to visit. Don't *ever* consider moving here. Please.

Gosh, what were we talking about? Oh, right, the race across the country.

"It's a good idea to clean out your tool box once in a while."

Laugh if you want, at least a couple of us are talking very seriously about actually doing it. In fact, I have spent more than just a few dollars talking to Charlie Johnson about it, he lives in San Diego, so we're considering laying out a proposed route, running it backwards from SD in a car just to check it all out, then making the mad dash back across the country, wind flying a CL model from the back of . . . a vehicle, we aren't sure what would work the best. A big tractor-trailer rig would be ok, but they aren't very fast, accelerate quite slowly and are very easy to track with radar from great distance. Late model Corvettes are almost invisible to radar for some strange reason, not just because the body is 'glass, as there is a *lot* of steel in them, even in the roof, but how can you fly out of one of them, aren't they too much of a ticket-bait item and how can you find an emissions-equipped one that is faster than a truck? Trucks are slow, but have you ridden in a new 'vette lately?

For speed, a good, strong bike would be neat. Charlie has a CB900 that would be almost enough, but the trick would be to hook up a sidecar to an 1100 Suzuki or a 1300 Kawasaki, mounting the sidecar's "chair" backwards, so the passenger could fly while seated and be fairly well protected from the wind blast and in an easy position to communicate with the driver. The sidecar would hold the top speed down some, but we don't want to run at 130 mph anyway. . .

But we have to be somewhat practical, as in using something that works, and that is also at hand or can be had cheap. No way are we going to spring for several thousand dollars required to outfit a hot-rod bike, just for one cross-country blast. Hmmm, the bad 'n nasty Dirty Jeep is only a short 140 mile trip away, kept as it is in the home of true Jeeping, Yakima, Washington. Look it up in the Atlas if you don't believe the name. And you aren't pronouncing it properly. Correct pronunciation is "Yakima". Got it? The Jeep is fast, even without regearing it the camel will run a little more than twice its safe speed and it gets decidedly unsafe at around 60

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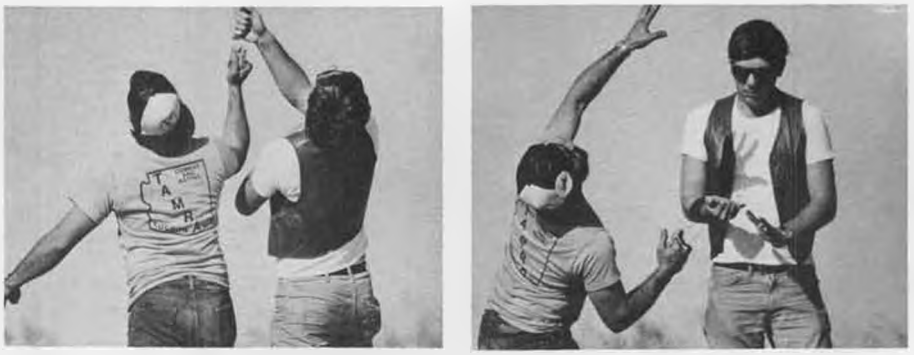

Trouble brewing and then happening, as combat lines get a little tangled. Myles Lawrence is down and trying to disengage.

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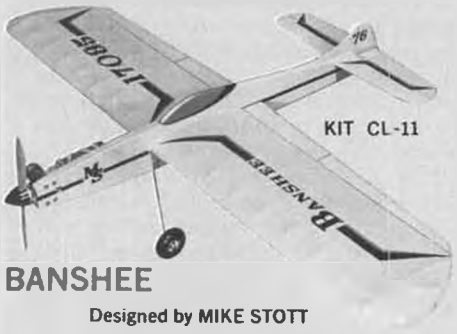

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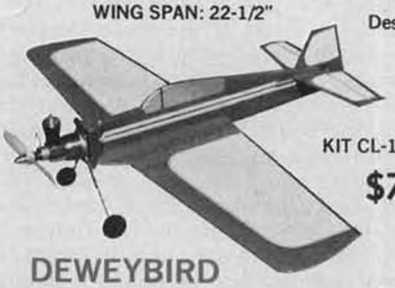

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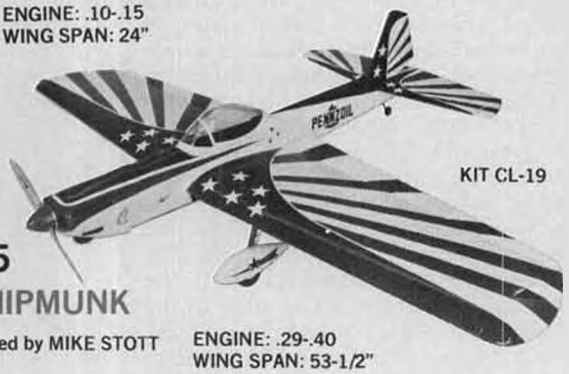

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Orange Blossom Hobbies, Inc
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Bobe's Hobby House
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Universal Hobbies
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Bob's R/C Supply
432 Ardmore
WATERLOO
Howard's Hobby Shop
110 East 4th
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PH 615 883-1648
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ABILENE
The Hobby Center
3421 S 1st
ARLINGTON
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903 A Pioneer Parkway West
AUSTIN
J & J Hobbies
610 Kennerston Dr
CORPUS CHRISTI
Leisure Time Hobbies
1326 Airline
EL PASO
Hal's Hobby Shop
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Hobby Stop
3414 W 7th St
PH 817 334-0197
FORT WORTH
Mott's Hobby Shop
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PH 817 281-0921
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Clear Lake Models
117 Camino S Shopping Ctr
PH 713 488-6315
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OREM
Miniature Aircraft Prod
811 W 400 N
PROVO
The Model Shop
42 W 300 N
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Fountain Hobby Center
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P M S Hobby Craft
Calgary North Hill Centre
DRAYTON VALLEY ALBERTA
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Cellar Dweller Hobby Ltd
1472 Main St
PH 589-2037
WINNIPEG MANITOBA
Gooch's Hobbies
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Pwanjo Enterprises
45 Washington St
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Hobby World
Mic Mac Mall
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Ed's Hobby Lobby Ltd
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Keith's Hobby Shop
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LeModele Radiotl Enr
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Le Centre Du Modelisme
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LAVAL QUEBEC
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Can Ae Hobbies
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Le Mur du Son
1050 157 Rue
PH 418 228-1374
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Collins Hobby Centre
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PH 242-4683
YORKTON SASKATCHN
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ISRAEL
REHOVOT
Tisaney Rehovot
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CURACAO (Caribbean)
Curacao Modelbouw
Esperanzaweg 92
P O Box 470

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Engineering Center
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Modell Produkter
Box 2060

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CARACAS 1070 A
Hobby World C A
Avenda Principal Boleita
Edificio Alta No 25
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Control Line . . *Continued from page 61*

mph, what with a small-block Chevy pushing and pulling a chassis designed for a teeny little four-banger or that effectively put a red-line of about 45 mph on the running gear. So that's out, don't want to run off into the woods in the middle of the night. Honest, officer, a deer ran right out in front of me. . .

We could take the back doors off the Ford van, I suppose, mount a nice seat back there (anybody want to kick in with a new model Recaro?) to do the flying from, but again, the problem of speed comes up as the van is equipped for laid-back trips, not cross-country blasts. That 300 inch six is a nice truck motor, but speed is not one of its strong points, the motor noticeably straining at a cruise of much over 75 per.

But these are relatively small problems, a proper vehicle can be found and outfitted, we know a model can be wind flown from any fairly stable platform, there are several routes to take in getting coast to coast quickly and as nobody has ever done it before, somebody probably should. Unknown factors include human endurance, as the model will be tugging away constantly. Maybe we should get John Ballard, Iron Man of the Racing Circles, signed up as a pilot. And we really don't know how well the flying will go at night. Sure, the model could be flown without watching it, neither Charlie nor myself would have any problem there, at least for short stretches. When fatigue and lack of concentration set in, we might find the model being dragged along the road as much as it would be in the air. Of course, those over-passes and tunnels would be real interesting, especially the tunnels. Not because we couldn't fly the model within the confines of the tunnel, but because you would have to fly it precisely in one traffic lane, directly behind the tow vehicle. Imagine a two-lane tunnel, semi truck going the other way and us flying a model in his lane. Maybe we should just cheat a little, either avoiding tunnels or carrying the model through.

Anyway, if and when we actually do this, don't expect an announcement here or anyplace else! Only a very few people will know The Plan, for obvious reasons. No sideshow stuff in all of the towns, we will be honkin' the whole way, watching the radar detector and listening to the CB.

But if you have ideas for us, or want to get involved, let me know, as Charlie and I don't plan on it being a two-man show, in fact we will definitely be needing some help with flying and driving chores. Write to me in care of **Model Builder**, or direct at: Dirty Dan, Inc., 4705 237th Pl. S.E., Bothell, WA 98011. *(As a trusty at the funny-farm, Dan has no trouble getting home to pick up his mail on weekends. wcn)* •

Futaba . . . *Continued from page 23*

on all three primary flight controls. This permits one to adjust for same rate full stick manuevers in both directions, desensitize down elevator, and handiest of all, you can adjust any of these controls for the desired throw without having to change holes in either the servo or control horn. In fact, with a friend working the screwdriver adjustment, you can adjust these controls for optimum while in the air.

"ATL", the Adjustable Throttle Limiter, is operated by the normal throttle trim lever, in this case being effective only on low throttle position. This simplifies throttle installation and adjustment, in that you only need to make a mechanical adjustment in the high throttle position, then adjust the idle or cutoff as desired with the lever.

Power for the "G" Series transmitters is furnished by the normal complement of eight 500 mah capacity/Ni-Cd cells, for the total of 9.6 volts nominal. Current drain is stated to be 150 milliamps, which ought to make it safe for three hours plus one landing. Charging is done via a one-prong connector located on the lower left hand edge; a dual 15-hour transformer type charger is furnished which may be used independently or simultaneously with the receiver battery, There are no power output figures furnished, though our flight tests prove conclusively that it is adequate for all normal flying.

This transmitter also includes something we are beginning to see in the Japanese made radios . . . fuses. You'll have to take the back cover off to spot it, but it is otherwise easy to find, being located right on the P.C. board, about a third of the way up on the right edge. It is rated at 3 Amps, the American equivalent is a Buss GMA 3, available in electronic stores and possibly some auto parts houses that cater to imports This fuse is not mentioned in the manual, I can only speculate as to the reason it is there. Naturally, it is going to provide normal fuse-type protection to the rest of the circuitry in case of a component breakdown in such a manner that it draws excessive current. Another thing it will do is blow if any type of fast-rate charger

is plugged into the transmitter, which is not equipped with such types of cells. The symptom of a blown fuse is no reading of the meter, and of course, no output. If it goes west while you are trying some charger other than the one furnished, you are probably safe to install a good fuse and go fly, but if it goes otherwise, I would be reluctant to just replace it and take-off, there has to be a reason. At least operate the transmitter on the ground a number of times for periods in excess of your normal flight times.

The top located switches are all equipped with physically different levers, so that once you learn their location, you can operate them by feel without having to take your eyes off your airplane, which is certainly not recommended. The last one not yet mentioned is the one that operates the Trainer, more commonly referred to as the "Buddy-Box". This is a training system during which two transmitters are used, connected through an umbilical cord which plugs in right under the charge connector. In use, the Instructor can transfer control to the student by pressing the spring loaded switch, immediately regaining control any time he wants it by simply releasing the switch. In my opinion, this is the best method of teaching R/C flying ever devised. It not only gives both instructor and student much more confidence, but it actually allows some last-minute saves when you finally get around to landings, that would not be possible with the "grab the transmitter" method. It is a great feature when you need it, though admittedly you might not use it much. For example, I recently had the pleasure of teaching a young beautiful blonde girl to fly . . . I never once mentioned "Buddy Box"... sometimes the old-fashioned ways are best!

For those so inclined, the "G" Series transmitter is equipped with a heavy lug between the swtich and the meter, right at the CG, to which you can connect the furnished neck strap. A collapsible stand is installed on the back, to hold the transmitter upright when desired.

RECEIVER

The FP-R7F receiver is of medium size, measuring 1.5 x 2.4 x 0.8 inches, and weighs 1.6 ounces. All of the connections are made through board-mounted plugs on one end, there are no pigtail harnesses used. The plugs are the standard, older Futaba connectors, not the newer type as seen on the "J" series. The plastic two-piece case is held together with two self-threading screws on one end.

Electronically, the receiver is rather standard design, crystal controlled, double-tuned front end, three stages of IF amplification at 455 kHz. It does contain what appears to be a ceramic filter, and an extra set of shielded RF coils, probably for additional front end amplification. The decoding chores are handled by one IC, of the extremely small top-of-the-board mounted types now beginning to show up in R/C equipment. The receiver is quite rugged mechanically, being compactly built on a heavy two-sided, plated-through hole board.

The specs list a sensitivity of 3kHz/-3dB, and further give a range in a manner not previously seen: 550 yards on the ground, 1100 yards in the air. One would assume that this is with the companion transmitter, but this cannot be an absolute figure, as there are too many variables to a system's range. In actual practice, we flew the system in a five-foot model, to an overhead altitude as high as we could and still see it to maneuver, then started collapsing the

antenna one section at a time. We did this until we had it down to one section, boresighted it at the model, all the time with perfect control. There is no doubt that this system has more than adequate in-the-air range.

Power for the receiver is the usual 4-cell, 4.8 volt Ni-Cd pack which it shares with the servos. The current drain of the receiver alone is 12mA.

SERVOS

The standard servo of the "G" Series is the /ball-bearing equipped FP-S-26, for which the rather surprising output torque of 43.1 oz. in. is claimed. This is impressive moreso as it is not particularly large, being only 1.6 x 0.8 x 1.6 inches, not much different from the better known but older S-16, for which only 27.8 oz. in. is claimed. The literature credits some of this performance to a custom power-saving IC; it does not utilize a core-less motor.

The S-26 weighs only 1.7 ounces. It has a standing current consumption of 8mA at rest, 80-100 during steady unloaded running, and *don't* at full stall.

Mechanically, the S26 is extremely rugged, being molded of a fiberglass filled material referred to as PBT-Poly Butylene Terephthalata, with fairly thick sides. The gear train is smooth and tight, with little backlash, operation in the system is precise and accurate. The pot is indirectly driven; that is it is not directly attached to the output arm, and thus is not subjected to the strains imposed back on it by the pushrod and control surface pressures.

Timing of the S-26, like most Futaba servos, is 1.31 mS neutral, plus or minus .5 mS for full movement. This makes it compatible with all Futaba E through H, and L Series R/C systems.

GENERAL

The Futaba "G" Series is available on AM only, on all 27 and 72 mHz frequencies. Though no mention is made of modes, and all of the literature refers only to Mode Two, it is available as Mode One, but it must be ordered as such. This is not a transmitter that can be easily modified from one mode to another. Nor is it available as a single stick.

The airborne weight of the "G" Series is 12-1/4 ounces, less servo trays, which may or may not be used, depending on your choice and installation.

Considering that this is not a rank beginner's system, the instruction book is excellent, with the already mentioned exception that there is no reference made to the fuse. This could lead to an unnecessary trip back to the repair facility. The manual does not contain basic R/C flight and control information, but bear in mind that this is not a beginner's radio. It does contain everything that a relatively experienced flyer will want to know about his system, including all installation, charging, preflight instructions, and explanations of the various switches, controls and their use. The illustrations are crisp and clear; even an exploded view of the servo is shown, for those who like to do their own maintenance and parts replacement.

The warranty, for which you must return the enclosed card within ten days, is for 180 days, "against defects in material and workmanship." This is average and fair in the R/C world as technology now stands. With rare exceptions, any new radio that has a "defect in material or workmanship" will let it be known long before 180 days.

FLYING

At last comes the fun, that of getting the "G" Series in the air. As it is the wrong mode for me, which I can fly but compound the problems when things go wrong, I decided it best to get a co-pilot. God being busy that weekend, I had to settle for my good friend, skilled Mode Two-er Col. Bob Thacker. We did all the flying in one of MRC's ready-to-fly .35 powered Cessnas, which is an excellent flyer, and agile enough to put the "G" series to a good test.

The installation was no problem; neither would it have been in a plane with half that fuselage space. The fateful day finally came, we rechecked for proper control movement, fired up the Enya, and Bob took her up there where she belongs.

The "G" series performed in a manner to make them happy all the way back to Japan. We flew it under normal conditions of throw and with full antenna, then high up and antenna down. Not a single momentary loss of control! We flew it further, testing and setting the dual rates, one at a time, then put in, adjusted, and flown with the aileron and rudder mixed. The only functions we didn't try were the rudder/elevator mixer, and the buddy box. Then we flew it just to fly it. Throughout it all, the system worked flawlessly, we both liked it and soon were rid of the "new radio" jitters.

PRICE

Comes the bottom line: seven channel at $399.95; six for $369.95, and five for $349.95, recommended retail prices, though a little judicious shopping will shave quite a few bucks off those figures. Compared to other systems in that price

range, and keeping in mind the overall high quality of this system, I am of the opinion that it is fairly priced, and well worth the cost! •

Plug Sparks . . *Continued from page 45*

described as "Rich" (sluggish and cool), "Normal" (correct and reliable), and "Lean" (sensitive to temperature, hot, and unreliable). Operation of the gas needle valve was outlined stating that a "4-cycle" running could be obtained by screwing the needle valve out, producing a considerable amount of smoke. On the other hand, screwing the needle valve in produced extreme speed with a very clean exhaust. To this writer, it is amazing that 45 years later, many modelers still don't know the difference!!

Performancewise, claims were made for 500 to 7500 rpm using the "Tom Thumb" propeller. However, these figures could vary considerably depending on the skill of the modeler carving the propeller and the particular airfoil and shape of propeller selected (assuming 12 in. diameter was maintained).

The Tom Thumb specifications were very slightly different from the Mighty Midget, with a 7/8" bore (instead of 13/16") and a 13/16" stroke. Flying weight probably with two standard flashlight batteries) was listed as 18 ounces.

Like the Mighty Midget, the Tom Thumb engine was made of steel with aluminum alloy crankcase. Surprisingly, the head was of lead, presumably for better heat dissipation. All bearings were bronze, SAE64 specification. The coil was the standard Bunch coil, supplied with a Bubulier condenser.

The Tom Thumb engine was no "hokey" engine like the later "slag" engines that followed in the early forties. However, with the closeness of design to the Mighty Midget, the Tom Thumb engine really offered nothing new except for the highly regarded C-D emblem, a symbol then of good quality.

Around 1938, Bud Warren took over the Tom Thumb line of engines that were stockpiled in the Bunch manufacturing plant. With on-the-field demonstrations and good publicity, Warren was able to maintain a steady flow of sales until the outbreak of WWII. At the close of WWII, the engine was never produced again, as the newer designs had passed it by.

THIRTY YEARS AGO, I WAS. . .

This columnist is pleased to acknowledge a letter from Mathias Vols, 3754 Edmundsen Road, St. Louis, Missouri 63114, wherein he recalls the days when he just became a modeler. Here's what Matt says:

I started modeling in Chicago at Carl Goldberg's store on Western and Addison Avenues, across from Lane Technical High School, in 1944. I joined the club Carl had organized called the "U-Liners". To get me started, Carl sold me an old blue staggerwing biplane with a Forster 29. The model was a real dog, but Carl did teach us kids how to fly controline models in the school stadium field.

Later on, Carl sold me a new Ohlsson and Rice 23 plus a Fireball kit, which flew just fine. Still later, in 1946, I put the O&R 23 in a Playboy Jr. and became introduced to free flight. Encouraged, I also made a Piper J-3 with an Atom 09 for power.

I can't say how much I appreciate the 1946 green, hard bound cover edition of Bill Winter's "The Model Aircraft Handbook". From it, I learned all of the hobbycraft and used his tips to build and fly with good success.

I have been reading your Plug Sparks and enjoy the photos and accompanying writeups so much. The column refreshes my memories of the contests out at the old Chicago Municipal Airport. We only flew on weekends for the sport of it, helping each other, swapping equipment and stories. We had to, we never had much money then!

In your articles in the magazine I see the same sort of idea coming around in the form of "No-Contests" or "Un-Contest" meets. Everytime I look back on why I quit the hobby, I was led to believe it was on account of my homework getting to be too much. However, after being in the service in the fifties, I found the reason was high pressure (gotta win!) and increased costs of contests. This does not take in the agitation of changing AMA rules, controline and free flight events turning into hot dog events. It all caused me to walk away.

Now, SAM is here. I need the nearest Chapter in my area. I'll try again. To that, this writer says, good man!

ANOTHER "40 YEARS AGO". . .

From Skip Paplow, Box 91, Upper Lake, California 95485, comes word that a former record holder, Don Lampson, is alive and well, and hoping to hear from some of his old flying buddies. See Photo No. 8.

Don started modeling in 1938. He built several free flight models including the Quaker Flash and the American Ace.

At Woodland, California, on April 27, 1941, he set an official National Class B, R.O.G. endurance record of 14 minutes, 13.6 seconds with the American Ace. Engine was a Forster .29. The timer was in the cockpit.

With World War II looming, and the draft getting closer, he decided to follow in his father's footsteps and learn to fly. He and his brother, Chester, purchased a 1936 Piper Cub (40hp) and each logged 150 hours.

With his new flight experience, Don spent the war years as a flight instructor for both the Army and Navy reserve.

After the war, Don and his brother built the local airport in Lakeport, California. It is still known as Lampson Field. Don sold the airport and quit flying in 1972 when Chester was killed in a crop dusting accident.

Since talking to me, and looking over some of my magazines, and seeing the interest in old time free flight, Don says if he could get plans for the American Ace, he might just start building again and take a shot at Taft.

Don was born February 2, 1910. That makes him 72 years old. He looks about 55 . . . disgusting! *He says he would like to hear from some of the old timers, maybe someone who was at Woodland on the day he set the record. His address and phone number are as follows: Don Lampson, P.O. Box 968, Lakeport, CA 95453, Phone: 707-263-5859.*

We sure have some nice flying sites here in Lake County. The lake itself (Clear Lake) is 20 miles by 8 miles at its widest, for seaplane types and boats. Also, there are a couple of small aban-

doned airports for the majority who fly landplanes and sailplanes . . . and several good U/C sites.

I myself have permission to fly at the local high school, which is only about a half mile from home. (I sure don't abuse the privilege.) All I have to do is get out the Nobler or Flight Streak and go flying (when the weather is good). Skip Paplow

MAIL BAG

Received a most interesting picture in the form of Photo No. 9, from Col. Bob Thacker, 1703 Calle Maria, San Clemente, California 92672, showing his latest old timer creation, a Don Donahue Five Foot Gas Model as featured in the 1936 Zaic Year Book.

As the "Kunnel" sez, "I waited 45 years to build one of the most beautiful flyers of all time. At 3-1/2 lbs. dry, O.S. 19 power, polyester dress lining for covering with Coverite "Quick-Stick" . . . it's great! I used three coats of nitrate dope followed by K&B blue epoxy with everything painted with K&B clear.

"Just got back from Lake Elsinore where I tried it out with floats. What a dream on water! I found that the controls (elevator and rudder) on radio control are very touchy. But, it is great to fly around on half power!"

We had no sooner finished titling the above photo, then we received several old time photos taken by Cedric Galloway, 14624 Willow St., Hesperia, California 92345, of the old flying days at Burbank Airport in 1937. Photo No. 10 shows the original Don Donahue Five Foot Gas Model (later bought by Owen Chapman) at the Burbank lineup. The reader would do well to compare the models. Bob did a masterful recreation of this particular design!

While on the subject of old time photos, we had skipped the monthly picture from Bruce Lester in the last issue, and in its stead we had a photo from Art Suhr, who in turn had inherited this from the Bunch Co.

Photo No. 11 shows Louie Shocke with his first gas model powered by an early Atwood engine. Note the resemblance of this large engine to the later Atwood Bullet engine.

Louie used to come up with the L.A. boys all the time to compete in the big Sacramento State Fair meet. He finally won the flying scale event three times in a row and won the scholarship award put up by Boeing at this time. Never did see Louie after that. Any guesses out there?

OBIT NOTICE

Just received the word from former MECA District II Coordinator, Dick Dwyer, that one of the more respected engine collectors, Art Suhr, died of a heart attack about a week or so after the Toledo Weak Signals Trade Show.

This comes as quite a shock to most of the MECA members, as Art Suhr has been most active in preserving old memorabilia on old engines. His reprints, in the form of soft bound books, have been extremely useful for reference work. His latest, the reprinting of all of the old engine catalogs and instructions sheets, have been invaluable to those wanting an absolute N.I.B. (new in the box) engine with all pertinent instructions.

Although this notice will be a little late those wishing to express their condolences may write to the Suhr family, W218 N5866 Maclynn Ct., Menomonee Falls, Wisconsin 53051. Surely all cards will be appreciated.

TOWLINE GLIDERS

Mark Fineman at 73 Charlton Hill, Hamden, Connecticut 06518, writes to say his Eal Stahl Schweitzer TG-2 as shown in Photo No. 12 is a real honey. He built the model primarily for SAM O/T Towline Glider events and it just so happens SAM 7 is running the SAM Champs this year and will be offering the Towline Glider Event. Mark hopes to cop a trophy at the O/T Nats.

Couldn't resist sticking in another nostalgia picture of Hi Johnson as shown in Photo No. 13 with an original glider that was a twin to that of his flying buddy (forgot his name).

Hi was always partial to gliders, whether they were model or full size.

HOT STUFF REVISITED

Trust those enterprising Hunters, Bob and son, Bill, to come up with the latest idea to help modelers find a better and quicker way to build models.

Just received, reviewed, and had the various clubs up in Northern California see the hour plus long tape showing Bill as the commentator and Bob actually constructing a wing is less than ten minutes before your very eyes. Very impressive!

To get this film, simply write to Satellite City, P.O. Box 836, Simi, California 93062, or better yet, call at (805) 522-0062. There is a $30 deposit, refundable upon the return of the film. If you like the tape well enough, Bob says, "Go ahead and make a copy. We want to spread the word."

SAM NEWS

East Coast SAM V-P Everett "Woody" Woodman at 223 Longview Drive, Bayville, New Jersey 08721, writes to say activity is very high in their area with nine O/T R/C meets scheduled. At present, the contest committee is working on a combined awards banquet at the end of the season for all SAM Chapters.

To show you that Woody is still active, Photo No. 14 shows his latest project, a "gussied-up" Comet Clipper MKI with wheel spats and cowling. Neat! Also worth noting is the ignition Super Cyclone in the nose. This ground swell for the use of ignition engines is a very noble idea, but fellows, remember how you got started with glow motors. Don't make it too tough for the newcomer to get into the fun.

Woody also announces the revival of the "Over the Hill Gang", Chapter 37 in

Our FOX .36 "COMBAT SPECIAL" wins every place in Slow and Fast Combat at the 1981 Nationals!

Our FOX .36 "COMBAT SPECIAL" is now delivered set up for suction. Try one on a .35 profile model such as the Top Flite "Streak", Midwest "Magician", "Mustang" or "P-40", Goldberg's "Cosmic Wind" or Sterling's "Ringmaster". You'll find it balances out nicely, and performs superbly with a 9-7 size propellor. If you prefer the .15 size profile models, install our .15 BB and experience contest caliber performance.

#13700 FOX .36 "COMBAT SPECIAL"

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FOX .15-BB Wins every Place in F.A.I. at the 1981 Nationals!

FOX .78 BB-RC

This big willing brute has the torque to handle a 12-6, 12-7, 13-5 or 14-4 prop. Improvements for 1982 include a sturdier piston, new head with offset plug, new Mark X carburetor, improved taperlock and thrust washer. It runs great on FOX "Gold Star" No-Nitro Fuel. Muffler is available with Tilt-Up or Tilt-Down flange. Select the one best suited to your installation. Fuel cost for 10 minutes flying approximately 25¢ based on drum prices.

Bore: 1.00 Stroke: 1.00 Displ: .785
R.P.M.: 12,500 on 12-6 Prop
Fuel Consumption: 1¼ oz. minute

#27800 FOX .78-RC	$125.00
#90264 Tilt-Down Muffler	19.95
#90265 Tilt-Up Muffler	19.95
#50603 Engine Mount	10.00

FOX "EAGLE III" .60 BB-RC

The FOX EAGLE III has many improvements over the EAGLE II, resulting in considerably more power, longer life, and a less cranky nature. Also, the EAGLE III runs best on our lowest cost fuel. Physical improvements are a re-designed piston, shorter conn rod, improved cylinder porting, new head contour, heavier duty rear main ball bearing, improved taper lock and thrust washer. Muffler is available with Tilt-Up or Tilt-Down flange. Select the one best suited to your installation.

Bore: .907 Stroke: .937 Displ .61
R.P.M.: 13,000 plus with 11-7 Prop
Weight: 17 oz.
Fuel Consumption: 1¼ oz. minute

#26500 FOX .60 EAGLE III Side Exh	$125.00
#90262 Tilt-Down Muffler	19.95
#90263 Tilt-Up Muffler	19.95
#50604 Engine Mount	10.00

FOX .78 BB-RC

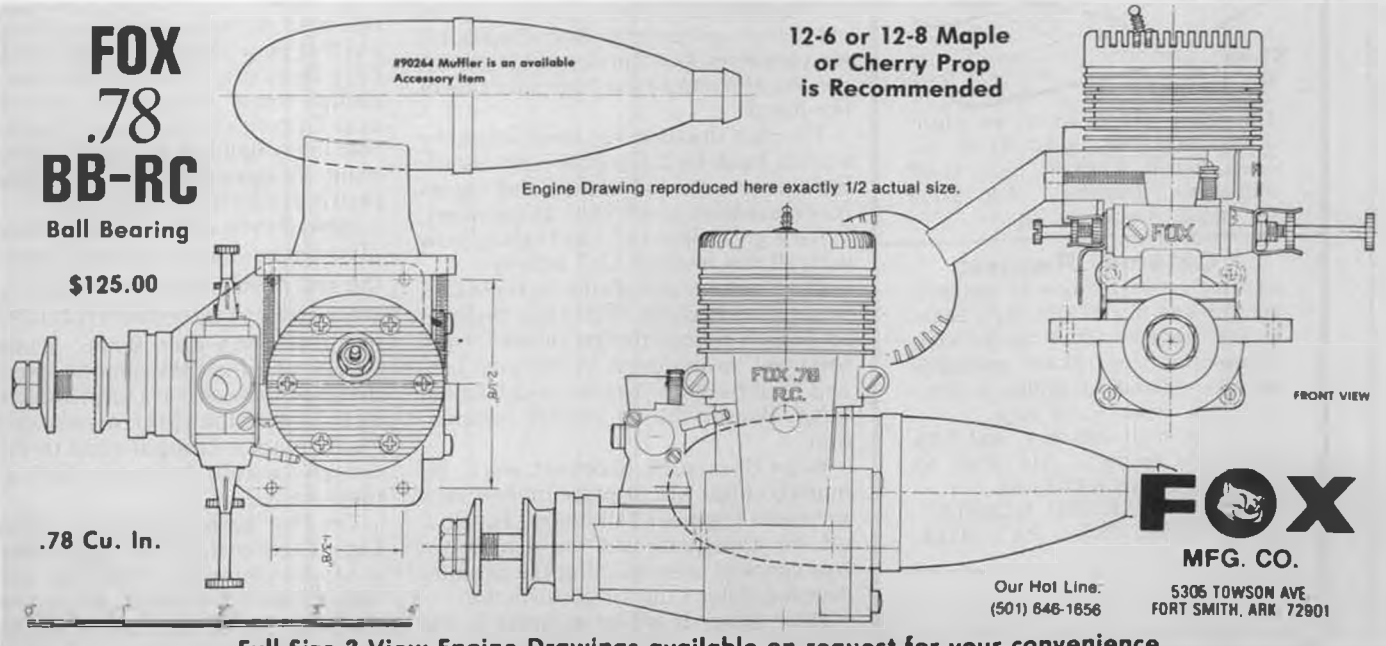
Ball Bearing

$125.00

#90264 Muffler is an available Accessory Item

12-6 or 12-8 Maple or Cherry Prop is Recommended

Engine Drawing reproduced here exactly 1/2 actual size.



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central and south New Jersey. Several organizational meetings have been held and 25 members have resulted. They are looking for new members to help bolster O/T interest. Call Woody at (201) 269-0807.

SAM 35 ENGLAND

Received a letter chockful of news from the English sparkplug, Dave Baker, 22 Ellington Rd., Muswell Hill, London N10, and was absolutely amazed at the stunning progress made by SAM 35 or SAM(E) as they are gradually becoming to be known by. Dave writes to say:

After the initial push to get started with SAM 35, we are now on course with a paid membership of 440 (!!) and still growing. I used to think the limit would be 100-300 members top but now anything is possible!

The major breakthrough for oldtimers is Alex Imrie's O/T column in Aeromodeller and lately the participation in the prestigious Model Engineer Exhibition. We are now in the situation that the parent modeling organization, S.M.A.E., has been giving us attention to the point a joint effort is scheduled at RAF Odiham in the form of a pre-1950 event for Wakefields.

The exciting part is that for the first time in many years, we will see Judge, Copland, Warring, and Dubery lining up with the not-so-well-knowns. (Note: How about that for getting the old timers out!!)

Full credit for our terrific expansion should be given to Ray Alban, our Chairman, Peter Micher, our Treasurer, and Don Knight for the bulk buying service. Of course, without our President Alex Imrie, the movement would not be where it is now. (Note: How about SAM on a bulk buying service. They have the best and most comprehensive insurance as a starter.)

The SAM 35 newsletter is professionally printed now and features on the cover one of our Hall of Famers like Col. C.E. Bowden, Bert Judge, G.W.W. Harris, Dr. Fostore Lawrence Sparem, not to mention upcoming Bob Copland, Howard Buys, Ken Tansley, Leo Hornsby, etc. We also need a few from your side of the pond.

The plan situation has been solved by a plans bank by Dave Baker. All contributions are carefully saved and copies made available to all SAM 35 members. What a great time to be in England now with all this feverish O/T activity!!

Dave sent several photos to show O/T progress in England. Photo No. 15 shows an English rubber design called "Flying Minutes" as designed by Norman Lees and built by Brian Yearley and taken at R.A.F. Watton during an O/T competition.

Brian does such excellent work, his models either win or place in their class at Model Engineer Exhibition. To top it off, his models fly well enough to win two contests after winning the premier Aeromodeller Cup for construction!

Dave Baker is acting as timer in the photo and he says his expression is a combination of admiration and frustration. How can anything that beautiful fly so good?

NICKNAMES

Manford Helwig of 762 Cleveland Ave., McMinnville, Oregon 97128, writes to ask if I saw Joe Konefes and if he remembered him by the nicknam of "Man". This title was hung on him by Chuck Hines, hobby dealer in Des Plaines, Illinois where the Sky Wolves MAC was born.

Incidentally, Helwig claims this is where the pull test and other associated controline safety rules began. "Chuck, Russ Weber, and I were the first place winners in the first ever Controline Contest held in Garfield Park in Chicago in August, 1942. This meet was sponsored by the Times Air Cadets, hence, the meet was published in the Chicago Times via their reporter, Maurice Roddy." Anyone else remember this meet?

THE WRAP-UP

This month we have some food for thought in some ideas proposed by Harry Murphy, newsletter editor of the C.I.A. Informer. Harry wants to know why the cutoff date for old timers is still at December 31, 1942, when there are so many good ignition powered designs available that most of us are acquainted with.

Harry claims the present cutoff date chops the total ignition era nearly in half; i.e., if you consider the spans of '34-'42 (8 years) and '42 to '50 (8 years). The demise of the ignition engine occurred about 1950; hence, the second half of ignition powered flying remains without proper recognition and sponsorship.

Now that the Nostalgia Event is picking up momentum for designs of early glow models from 1949 to 1957 (another 8 year span!), this brings out the apparent conclusion, the postwar year designs are orphans.

As expected, there is opposition to this idea as there are those who point out that pencil bomber types such as the Civy Boy, etc. would dominate. Although their competitive superiority over Zippers and Sailplanes is questionable in my opinion, for the sake of argument, I'll agree their point is well taken; pencil bombers are a no-no.

Now, if their argument against the use of pencil bombers is correct, then could the real problem be the deletion of the cross-section requirement (L2/100) from the 1941 AMA Rule Book? A random survey of post-1943 ignition powered designs discloses that a surprising majority still honor the 1941 cross section rule. Performance comparisons to earlier designs would be most difficult to measure.

On that basis, could you argue an Eagle Vagabond, a 70" wingspan Playboy, a Modern-Aire, or other late designs would be more potent than our present standbys? Just think, a rule to permit any post-1943 design as long as it still meets

the minimum cross section requirements would make a few more fellows honest with their 46 Zippers.

Well, how about it? This columnist would be most interested to hear your views. Write when you get the chance. •

Hannan . . . . . *Continued from page 50*

year's membership, including the excellent NFFS Digest, edited by Bob Meuser, costs $15 for modelers over 19 years of age, and only $7.50 for those under 18. Contact NFFS, 707 2nd Street, Davis, CA 95616.

BAMA!

Everyone talks about the "beginner problem," but few really do much about it. But now, Ed Whitten has taken up the baton personally, trying to bring about some changes. His solution centers upon the creation of the Beginning Aero Modelers Association, which will seek out ways to help tyros of all ages (not only juniors). Among the goals are introducing aeromodeling activities into public schools, gaining greater recognition for the hobby/sport/art, persuading manufacturers to produce more good, yet inexpensive beginner kits, and other equally ambitious undertakings. All told, a mighty tall order, but one worthy of support. Ten dollars will enroll you as a member of B.A.M.A., which will include 12 issues of its STAR SKIPPERS newsletter. Ed solicits suggestions, donations and assistance in helping to answer questions from beginners. Note that this is strictly a private venture with no support from the AMA. Contact Ed Whitten, Box 176, Wall St. Station, New York, NY 10005. And please tell him you read **Model Builder!**

IN OTHER WORDS

Scale model builder Bill Kee, of Idaho, enjoyed our March Hangar lead-in line, and says that while he was a draftsman at Rearwin many years ago, he heard the same idea expressed in a less sophisticated manner: "It it looks good, it is; if it doesn't look good, it ain't!"

HISTORIC SPEED MEET SITE

During April the Flightmasters model club conducted a contest for rubber-powered speed models. Classes included both scale and non-scale types, resulting in a remarkable variety of entries. Contest Director Carlo Godel kept things moving along at a brisk pace, and the entire event was of a relaxed, low-key nature with the accent upon humor.

The scale models were flown over an 88 foot course, while the open models were required to traverse 176 feet. Neither distance sounds particularly formidable . . . until one attempts to make a model go that far in a reasonably straight line! Some models described several circles enroute to the finish line, producing very low scores but very big laughs. Entries ranged from lightweight Peanuts through highly over-powered Juggernauts that thrashed their way through the air (and sometimes into the ground). Evidently those were the types kept in mind when this rule was posted: "No more than three barrel rolls allowed during flight!"

An added distinction to the contest was its location in Dominguez Hills, near Los Angeles, made available through the cooperation of the SULA R/C glider club. On these historic grounds, the first large aviation meeting in the United States of international stature, was held during 1910. Oddly, few people are even aware of this epic production, which lasted an amazing eleven days. Thanks to Captain Ed Toner, we were able to review the entire story in D.D. Hatfield's book *Dominguez Air Meet.*

Conceived by two pioneer aviators, Charles Willard and Roy Knabenshue, the spectacle was financed by local businessmen who had never actually seen any sort of aeroplane fly, certainly a venturesome risk at the time. But so effective was the planning and publicity that entrants were attracted from as far away as Europe. The super-successful French Reims air meet of 1909 served as a guide for the American promotors and the message was clear: Offer big enough prizes and you will have plenty of entries, and the public will flock to see them. And that is exactly what happened.

Some $80,000 in prize money was offered, which attracted about 57 entries (including lighter-than-air craft). Naturally all of them did not appear, but those who did were amply rewarded for their efforts, and performed before crowds as large as 60,000 spectators.

Featured "stars" included Glenn Curtiss, Louis Paulhan, Tom Baldwin, Lincoln Beachey, Waldo Waterman and many more. Aircraft representatives included Curtiss and Farman biplanes, Bleriot monoplanes, helium balloons and dirigibles (which flew) plus ornithopters and multiplanes (which did not). Total public attendance was 176,466 with actual gate receipts amounting to $137,520. Truly the Dominguez Air Meet was an important milestone in U.S. aviation history, and yet it has been largely forgotten or overlooked.

But for those willing to search, reminders exist today, in the form of commemorative plaques in Dominguez Hills. However, much more impressive is a room in the restored Dominguez family home, devoted to the air meet. Here may be seen an elaborate diorama, complete with tiny aeroplanes and balloons, beautiful scale models of the Curtiss, Farman, and Bleriot aircraft (some meticulously constructed by Flightmaster Bill Stroman) plus posters and phototgraphs. History can be exciting!

ALSO FROM 1910

As common as air transportation is today, we tend to forget how it was regarded in the pioneering times, as witness this item from *AERO* magazine for December 10, 1910: "A New York scientist gives his opinion that many of the mysterious accidents in the upper air result from carbonic-acid gas. This is the impure air that is exhaled from the lungs, and, in the case of an aviator, it is crowded back into the lungs by the rush of air, causing a sort of torpor or lethargy, which is very dangerous. He recommends that fliers wear a U-shaped tube, with openings at the back of the head, which will permit them to breath properly."

NEW GLIDER POSTCARD

Newly issued is a 28¢ U.S. airmail postcard intended for overseas mail. Although soaring aircraft have been portrayed previously on foreign postage stamps, it took some twenty years of lobbying by members of the Soaring Society of America to have such an idea accepted by the post office hierarchy, according to an item in *Soaring* magazine. The three sailplanes depicted on the new postcard were rendered by Robert E. Cunningham, of Fort Worth, Texas.

OUR CUP RUNNETH OVER

Once again our readers have responded with flying colors! Our request for information regarding the original White canard "homebuilt", resulted in several responses. First off the mark was Donald "The Wiz" Assel, of Ohio, who should have a Peanut scale version flying by now. But next to reply was Gordon Codding, who sent in actual drawings for constructing the rare machine. As it turns out, Gordon specializes in vintage aircraft plans, and he offers quite a variety of them for sale. We suggest you send him a couple of unused 20¢ stamps and ask for his list: Gordon Codding, 3724 John L. Avenue, Kingman, AZ 86401.

LES FOUS VOLANTS

A few issues ago we reported a flying scale model of the Eiffel Tower having been entered in a French indoor contest, which apparently piqued Editor Bill Northrop's curiousity. This month we are able to show an actual photograph of the aerial oddity, along with a few others entered in the "les fous volants" (the flying fools) category. Kneeling near two MRA autogyros is Georges Chaulet, who designed them. In the lower right-hand corner appears Andre' Meritte's ornithopter which is propelled by the action of its whale-like tail. And in the middle is the remarkable flying Eiffel Tower of Claude Weber, which is propelled helicopter fashion via its contra-rotating propellers, one at the top, the other beneath its base. Magnifique!

SIGN OFF TIME

Some of you may have seen the clever paper gliders offered by Washington's Hotel Harrington. Leave it to Buzzer Model Airplane Company proprietor and wit, Ed Toner, to adorn his paper glider with the message: "Send up a large anchovie pizza to Room 1103"! •

Soaring . . . . . *Continued from page 31*

as possible before touching one. You could have more complicated slaloms by placing parallel lines of markers, crossed lines, and so forth.

And it's not difficult to come up with other ideas for new and interesting events suitable for R/C sailing. How about blindfolded skipper events? (Here your teammate talks you through the race.) How about night sailing with suitable running lights? How about some ideas from all those who believe there's more to sailing than simply slipping silently through the sauce?

★ ★ ★

Herb Smith, of Denver, Colorado, has been modeling for some forty years. He's explored both extremes. After building hand-tossed and rubber powered models, he built two full-scale airplanes. He soon learned how expensive "really giant" scale can be, so he returned to R/C soaring, creating his own designs to win a variety of contests. In recent years he's been right up there among the top contestants. You may have seen his Assassin, a fiberglass fuselage FAI contest ship having 120-inch built-up wings that cover 960 square inches. The semi-symmetrical airfoil has large flaperons (covering 300 square inches) so that there's plenty of opportunity to change the camber. According to Herb, you take off with a bit of flaps down then return to neutral until you find a thermal. Herb ballasts up to seventeen ounces per square foot for the speed run and has covered the two laps in as little as 9.5 seconds. Kraft KPS-18 servos in the wings operate the flaperons with minimum play.

More recently he's been exploring scale towing. In six months he scratch-built a 1/4-scale Super Cub with a Quadra engine (about two horsepower) driving a twenty-inch prop. It flies with ailerons, rudder, elevator, throttle and tow release controls. This 108-inch span plane weighs twenty-two pounds and takes off at about twenty miles per hour. Here's realism, especially when the sailplane being towed is also 1/4-scale.

Herb has been towing a number of different sailplanes . . . even two at a time. He devised several clever tow control and release mechanisms. One of these consists of a simple wire bracket that sets in the nose hole and at the same time is held in place by a releasable towhook under the c.g. This allows you to use either a tow plane or a conventional high start or winch launch.

Herb is now completing a 1/4-scale ASK-18 that includes a more sophisticated nose tow mechanism. Here two rods are separately driven to ensure capture or rejection of the tow line. (You can't help but notice his top-notch skill as a toolmaker in each of these devices.) This thirteen-foot span sailplane is primarily constructed of spruce spars and plywood formers (following the design of Cliff Charlesworth of the United Kingdom). It's controlled by elevator, rudder, releasable towhook, and remotely controlled disc brakes for precision landing.

Herb and his flying buddies operate from a sod farm. That's great for smooth takeoffs and landings. But, remember, the sod farm is about a mile high (the altitude of Denver). I've flown in that area and learned first hand about the extra speed you get from the thin air. You cover a lot of ground, like it or not. Here's wishing Herb and his friends the best soaring.

★ ★ ★

You've heard of Murphy's Law . . . "If something can go wrong, it will." Well, I don't believe that nature is intentionally perverse, and yet unusual unhappy events do occur . . . and are worth noting to avoid making that unlikely mistake again.

This last week-end I went flying in the high desert. I strongly recommend the thermals generated from early morning to late afternoon by the dry lake between Joshua Tree and Twenty-Nine Palms, California (just north of Route 62).

The wind was light and variable in direction, so I punched a stake into the dry mud near the center of an immense open expanse. You launch, then cruise around the sky until you run into lift. The higher you go, the stronger the lift. Soon the question is "How high dare I go?"

I had a number of enjoyable high flights with my Curio and Legionaire 100. Then disaster struck! I stretched the line to launch the Curio in a new direction, as defined by the fallen line and parachute. As I released the plane, it rose in a normal manner, then suddenly it pitched down and slammed into the ground. I couldn't believe what had happened. The flight path was more abrupt than could have been possible from a hardover reversed servo.

After retrieving the pieces and recreating the situation, I discovered that the line had become snared on a steel wire that was partially embedded in the dry mud. The launch started normally, but at about twenty feet the steel wire prevented the line from rising any further and pulled the plane straight down to the ground. I've now learned another lesson. I'll make certain that the launch line is free and clear before takeoff. Now back to the building board!

If you enjoy catching the latest thinking on the origin of natural flight, read "Running, Leaping, Lifting Off" by Kevin Padian in the May/June, 1982 issue of *The Sciences*, published by the New York Academy of Sciences. ". . . Among the vertebrates, active flight has evolved independently at least three times:

"Since late last century, two theories have been under study. The 'aboreal

theory' suggests that wings evolved as a result of gliding down from trees, while the 'cursorial theory' maintained that flight evolved from the ground up . . . creatures running after their insect prey evolved wings to help stabilize their pursuit. First, around two-hundred-million years ago, in pterosaurs, a group of flying reptiles contemporaneous with the dinosaurs and quite closely related to them; second, some seventy-million years later, in birds; and finally, another seventy million years after that, in bats."

Padian argues for the ground-up approach. "Bats, like the pterosaurs and birds before them, probably learned to fly directly, without having to learn first to glide. If, despite the conspicuous differences among the three animals, the general arrangement of the wing joints and muscles and the flight stroke itself follow such similar lines, it is because they all faced the same aerodynamic problems. They independently discovered the kinematic pattern that produces a vortex wake. These animals differ in kind, not merely in degree, from animals that glide. And they perfected the identical technique because it is the best way possible for a vertebrate to take to the air, and control its course, on extended wings." Here's an article well worth reading.

See you next month. •

F/F Scale . . . . *Continued from page 55*

been expected. The varnish was a non-shrinking cellulose. The varnish was applied to metal and ply parts if desired.

CLASS B doping was an improvement: three coats of shrinking dope (color) covered by two of clear. The latter provided waterproofing. Although this scheme was faster in application, using less dope and man-hours, the three coats of pigmented dope ate into the supply of coloring agents more rapidly because of increased concentration of that medium. When this class of doping was introduced in the latter part of 1917, it was found that valuable cellulose materials could be saved by the use of Pigmented Oil Varnishes (POV) on ply and metal parts. Even so, the drain on khaki pigments was so great that grey POV was used on painted cowlings and plywood parts. Durability of Class B doping was superior to Class A. The next scheme was better again.

CLASS C doping, introduced during early 1918, was both opague and waterproof and consisted of three coats of shrinking dope. This finish was faster to put on, lasted longer but, like Class B, it used more of the khaki pigments than did Class A. The solution was to employ POV greys as for Class B.

It should be noted that no doping scheme completely superseded another: all three were in use until the end of the war. The number of coats stated above were typical. Doping was done to achieve a standard of finish, therefore, in any scheme the number of coats might vary.

During 1917, some aircraft could be seen with cellulose PC-10 on all upper and side surfaces except where POV Standard Khaki was used on the cowlings and ply areas. This khaki POV was darker than its cellulose counterpart.

Clear dopes were either cellulose acetate or cellulose nitrate, the latter being noted for its flammability. Clear varnishes were also of two forms: a modified nitro-dope (the standard non-shrink waterproof varnish) and a refined linseed oil varnish. The former was used over clear dope and gave protection against the oils used in non-rotary engines. The latter was used on rotary-engined a/c. Both clear dopes and clear varnishes show a honey color when viewed in depth (as in the can) but the dopes did very little to modify linen or pigmented finishes, whilst the varnishes would add a very slight golden glint (modifying linen color and adding a yellow-orange factor - very slight - to pigments). We will cover this effect more completely under the subject of natural fabric.

There are a number of markings on aircraft surfaces that have been a puzzlement to modelers and replica builders alike. When you realize that they are, in part, the numbers required to be placed on almost every component of an aircraft (both within and without the structure) so that accident investigation can be aided, then they begin to make some sense. I have before me a photo of a Bristol F2.B rudder. Additional to its scripted logo "Bristol,' it has the part number (25351) and the letters "CB." Pertinent to the subject at hand, the letters "CB" tell us that this particular aircraft was painted in Class B doping scheme using Celion, limited dopes and varnishes. So that you might mark your aircraft intelligently, the following list of code and manufacturer is presented:

A - Standard Collar Co. "Armoid"
B - Robert Ingham Clark "Brittania"
C - Cellon, Limited "Cellon"
E - British Emaillite
R - Royal Aircraft Factory "Raftite"
N - Seibe, Gordon & Co. "Novellon"
T - British Aeroplane Varnish Co.

"Titanine"
The combination of a manufacturer's code letter with that of the doping scheme used provides full information as to whose product was used and to what standard they were applied. Apparently, there could be combinations: a production Sopwith Snipe (E7989) was marked "CD & E" which would read as Cellon Class C doping scheme plus Emaillite. According to one source, the use of the color red when marking a "B" indicated that the materials used were Clark's "Brittania" Nitro-Dopes. The marking of an aircraft with an "EC2" meant that three coats of Emaillite had been applied, whilst the "EC2" in blue meant that three coats of Emaillite Nitro-Dopes had been applied. (The doping scheme identification was marked in black.) Nitrate dopes were restricted from the Front.

The Class D doping scheme causes this writer certain confusion (perhaps someone can supply more detailed information), because it was designed, apparently, to provide a method of aircraft finishing that was other than of the first three schemes, but the one detailed description found for it seems identical to Class A! There is the possibility that the aforementioned reference is not at variance with a Class D doping scheme IF the only alternation was due to the substitution of different pigments to achieve the Khaki color.

Before passing on to the next subject, it seems wise to present a short treatise on the method of application of these doping schemes. Manufacturers prepared notes for the guidance of their employees which were used on combination with the official scheme instructions. The objective of these notes was largely economic.

Prior to shrink doping, the nap was to be laid with a solvent pad. The correct number of coats were to be evenly applied.

Fuselage brush strokes are to be vertical. (Top and bottom would be, presumably, cross fuselage; although one might wonder if they ran fore and aft on the top decking of the SE5a—as one example . . . ed) Pressing too hard with the brush was avoided because it stretched the fabric and would promote the collection of the medium in "pools".

Wing and tail finishing brush strokes should be parallel to the ribs of those structures.

Overbrushing was to be avoided as a thin coat would not protect the fabric and would soon craze and peel. The finished fabric must appear to be of even hue density.

Identifying colors were applied to fabric after shrink doping. These colors would crack easily and so were clear varnished after application.

Early dopes were too viscous for application and were thinned. Oil varnish was necessary as a top coat because these early dopes were, of themselves, not very waterproof. The dopes of Class C were so much better than those of the prior schemes that thinning was not found necessary, nor was a waterproofing top coat required. However, RNAS seaplanes has the classic three coats of Class C doping schemes with an added oil varnishing for more protection." •

Peanut . . . . . *Continued from page 51*

aft end. Use sheet balsa to cover the first bay of the fuselage structure on the sides and the bottom.

The model did not need any thrust adjustments, but the setting of the ailerons may be critical. On the model in the photos their trailing edge is up about 3/64 of an inch above their true neutral position.

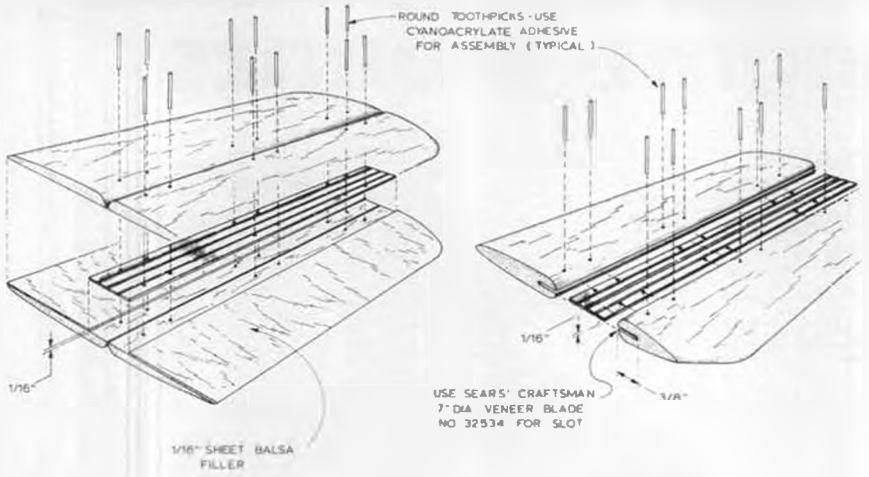
See if you can build a lighter Super Sytky and give the Fikes a run for their money. •

Scale . . . . . *Continued from page 27*

subject due to problems of something way out or documentation that is very poor.

At the recent Mint Julep, I competed with two Hiperbipes. My older precision model was entered in the FAI F4C event. The second one, just completed, was entered in Sport Scale. During the course of the weekend, a number of persons commented about the "twin models". Be assured they are a long way

1/4 SCALE - HEAVY DUTY HINGE



BUILT - UP SURFACES

SOLID SURFACES

from being twins. In outline and size, they are the same, but beyond that point you'll find many things not evident on the sport scale version. These little differences add up to almost two pounds of weight and probably 250 hours of working time. If I entered the Sport Scale version in a Precision event, I would not be very competitive. I'm not just speaking of the austere cockpit, the missing rivets and screws, or the missing luggage compartment, but the subtle little craftsmanship items which just are not evident from 15 feet. The wire attachment items on the precision model took many hours to fabricate. They didn't on the Sport Scale. The folded aluminum ailerons took weeks to figure out how to form and I made probably forty of them before I got four that worked out right. Neither of those items can be determined from 15 feet (without binoculars!).

Enuf said on the subject. I did not write the caption, George. And Gary, stick with your Sport Scale. Everybody really does have a shot at it.

SOAPBOX ITEM #2

Golly, this month seems filled with items of concern from several quarters. The decision by the Southern California Scale Squadron and the Scale Masters crew to lump Giant and Sport Scale in one class has created concern from at least one quarter. Dan Santich ran a survey at the recent Mint Julep and got signatures to send to Harris Lee supporting his view that disagrees with the concept. A copy of the petition was sent to me and it contained three votes for the idea and sixty-five against. In looking at the list, it shows that most of the signatures were actual competitors at the Julep.

I guess I'm a fence straddler at this point. My first impulse was to say bad news, no, nyet, or whatever. But after mulling it over I can't think of any *really serious* reason to say no to the idea. I do feel that it puts a smaller sport scale airplane at a definite disadvantage, especially against a highly detailed giant model due to detail size and the distance involved in the judging. Perhaps my proposal mentioned in last month's issue would help here. That is, if two 15 feet lines are established and the model placed *completely* on one side of the line and judges at the other line, the larger model would be placed correspondingly further away, at least in some views. It's not a *huge* difference, but some.

At this point, I suppose it becomes an experiment to see what impact it might have and there is nothing wrong with that at all. Many clubs and contests have experimented to determine the workability of rules and proposals and procedures. It is sad that the stakes are so high for the experiment. Competing for trophies or smaller merchandise prizes is a lot different than when the grabber is a many thousand dollar car.

But, guys, in the final analysis all this dialogue is very academic. After all, the contest was developed, given birth, and nurtured by the Scale Squadron. They have every right to call the shots as they see them. If they feel that you can only use Widget 10's flown inverted, on the third Friday in July, they have every right to do so.

MINT JULEP 1982

They came from far and near, some for the first contest experience, others to campaign for the umpteenth time. Fast and slow, big and little, the models crowded the sky. Four lines at two sites provided many thrills over the two days. My wife's listing shows 82 names sharing FAI F4C (Precision), F4-Stand-off, Sportsman Division I and II, Expert Division I and II, and Giant Scale.

The static judging started Friday evening and continued Saturday morning until noon. Everybody had an opportunity to fly four rounds. The first round flying order was rather flexible in that some models had not been static judged; therefore it became a "fit into the pattern" arrangement, which really wasn't awkward at all.

John Guenther, his co-CD Dale Arvin, and the membership of the Southern Indiana RC Modelers, worked hard to develop a good contest. Their efforts were rewarded and appreciated by the contestants and the spectators as well. As usual, the Kentucky Park crew made the stay at this beautiful park a memorable one. The weather cooperated until Sunday about noon, when showers moved in. It didn't stop flying but it made it less than enjoyable to sally forth to do battle in the sky.

The one problem that develops at this contest which is difficult (or maybe impossible?) to overcome is the early date in the flying season. It was most evident, especially among the more northern midwest modelers, that the drastic winter weather and severe winds and rain in March and early April did much to corrode flying skills. This, combined with the "early season equipment whatevers" resulted in some crashes and irratic flight scores. If the contest had gone on any longer, at least at our site, we'd have had to call in the troops to fill in for dead starters and starting batteries.

For this writer's part, I can pont to one flight that I have to count as the *very worst* I've ever presented. I violated a number of "rules" relative to presenting a good competition flight. On Saturday evening, I had two flights to make up with the F4C (Precision) Hiperbipe, as it was last judged and missed the regular rounds. On the first of two, I noticed a horrendous amount of vibration; this resulted in an aborted flight due to little funnies on the elevator, aileron, throttle, et al. It was the result of using a prop that was bored out for the larger shaft diameter of an HP, but where the spinner back plate eats up most of the larger diameter shaft length. The resulting wobble was not good. On Sunday, a non-bored prop was fitted and the vibration was virtually gone.

Sin number two developed when I flew both Bipes from the same transmitter. This, of course, resulted in trim changes between aircraft. Sin three developed because I had not flown the F4C version since last season.

As a result, when I called taxi complete and prepared to tool off into the sky, I had cold hands and allowed myself the negative luxury of being up tight. Cathy, my pit crew daughter, senses this very easily and was working on getting me settled down. Bless her heart, it didn't work. I ran off the runway, almost taking a landing light with me. I *then* adjusted the rudder trim and took off. Better I should have hit the light and stayed on the ground! I spent the first five minutes wondering when I'd get twitches. The roll angled across the runway, lost alti-

tude, and was not even! The loop wasn't! The Split-S occurred somewhere east of Kansas City! In short, the only thing I did right was to remember to call the maneuvers. At least that way the judges could tell what it was they were *supposed* to see! Competitive-wise, the only thing that managed to help me place was that there were only three F4C and George Rose didn't have a complete flight with his P6E.

I loved Dolly Wischer's comment following the flight. Kind, gracious Dolly suggested that it would have been a good flight to use as a judge's practice flight at Reno for the Championships. Dolly was right, except that the critique following the flight would have eaten up the remaining days for the event! I'd love to be able to say that the flight was planned that way, but t'ain't so. I just messed up royally!

Some very nice models were in evidence. When the smoke cleared, the following names were found at the top.

Sportsman Division I: Steve Meyer, Doral Drew, Ron Krummer, Ron Pound, and Charles Duvall.

Sportsman Division II: David Riley, Dick Konkle, Gary Wild, Joe Cohen, and Jim Chandler

Expert Division I: Hal Parenti, Ralph White, Garrie Taylor, and Dale Drew.

Expert Division II: Don Srull, Bob Underwood, Al Kretz, Bob Hanft, S.W. Kleinhaus, and Dale Cordes.

F4C (FAI Precision): Bob Wischer, Bob Underwood, George Rose.

F4 (FAI Stand Off): Bob Underwood, Phil Sibille, Hal Parenti, Lynn Elston, Cliff Tacie.

Giant Scale: Bud Atkinson, John Workman, Larry Scott, John Morris, and Dan Santich.

Maybe an even hundred for 1983?

Fly high, have fun, think scale. One to one, Bob. •

Choppers . . . . *Continued from page 41*

Kavan does not have the market share it used to have, so hopefully Condor Hobbies can re-vitalize the Kavan line and continue to supply kits and parts for the Jet Ranger.

American R/C Helicopters displayed and demonstrated its .40 powered Super Mantis. This kit has been gaining popularity, as some of the earlier problems have been worked out of it. Basically, the Super Mantis has very good potential for a reasonable price.

American's new gear ratios should be available in the near future, and hopefully an optional gear driven tail rotor will be made available too. Other than the Mini-Boy, the Super Mantis is the only other collective pitch .40-size helicopter on the market.

Circus Hobbies displayed its growing line of Kalt helicopters. The major machine in the Kalt line is the Baron 50. Variations of these basic mechanics are used in the Kalt's other helicopters. Kalt's scale ships available include the Huey Cobra, Jet Ranger, A-Star, Hughes 500, and the Bell 222.

Circus has also made available the Baron 20, a small .20-.25 collective pitch helicopter which should experience growing popularity.

The Custom Baron 50, head of the line, is very cleanly made. It has the best tail rotor blade holders that I have seen to date. Ball bearings throughout, these blade holders do not have the chordwise slop in them that most other holders have.

Likewise, the main blade holders have two ball bearings and one thrust bearing in each side. This really gives smooth feathering of the blades, resulting in a nice cyclic response.

Larry Jolly flew a Custom Baron 50 in the demos until he had the misfortune of a main rotor blade parting company from the rest of the helicopter as it hovered three feet over the lagoon. The free blade popped out over the concrete landing area, nearly settling at Larry's feet. Meanwhile the rest of the ship instantly disappeared into the bottom of the lagoon. It all happened so fast . . . One second it was hovering, the next second it was gone! Since the water was only three feet deep, the ship was recovered without too much problem.

Gorham Model Products displayed its Cricket, popular with beginners for its ease of assembly and excellent flight performance. Gorham also displayed

the Hirobo .60 powered Lama, and a new, large gasoline powered Bell 47. This large 47 is similar to the large Alouette that Gorham sells, but it will sell for less, around $900.00 if I remember correctly. Seems it is impressive enough to satisfy anybody's taste for a Bell 47. (Dick Hausfeld, are you reading?)

John has also taken the Cricket and developed a new Hughes 300. Many of the Cricket parts are interchangeable with the new 300, and adapter kits are available for those of you who already own a Cricket. For .25-.40 power, the Hughes has a new cooling shroud on it. This should eliminate the need for a large heat sink that the Cricket felt most comfortable with.

This helicopter is really cute; even the experts would enjoy having this little scale ship around on a calm summer evening.

Walt Schoonard's Miniature Aircraft Supply displayed the full line of Schluter products. The Heli-Boy, Mini-Boy, and the additional fuselages that will fit the basic Heli-Boy mechanics. Walt had the new Twin-Star fuselage, with a nice front hatch that exposed the entire front end of the helicopter for servicing.

Walt will be putting on the Schluter Helicopter Cup meets this summer. He'll be traveling across the country promoting these "regional" meets, and of course, Schluter helicopters. Significant prizes will be offered, so look around for the closest meet in your area.

Miniature Aircraft Supply also has some nice accessories available. One is a ball link pliers. It will help you pull off ball links in those hard to reach areas.

Another item that I must try as soon as possible is metal foil covering to strengthen rotor blades. This material is 99% aluminum with adhesive on the back. It should be perfect for those of you doing aerobatics, or for blades that are long and thin such as the Jet Ranger's.

That about does it for the MACS show, next month will be especially for advanced intermediate or expert pilots who want to consider a simple governor to give more constant blade speed. See you then. •

Electric . . . . . *Continued from page 29*

sport wing, and the third a 36 inch semi-symmetrical aileron stunt wing. The plane would accommodate all 05 and 075 systems. Sounds good, Bob, let's hear more about how it all works out!

Speaking of electric designs, Bill Morez, of Solarcraft Design, sent in some neat photos of his solar powered free flight design. It is 24 inch span, with five three-inch solar cells driving a Mattel motor. Bill says it is just on the short side of marginal, which is just as well, since I don't see any timer on it! About two watts per ounce is needed for good flight; with about a three ounce weight, I figure Bill needs two more cells to really go. It looks like there is room for them, and with a lightweight timer (the Tomy wind up toys can be converted to timers) it should go. Bill manufactures this design for rubber power, in that configuration it is called the Solar Scamp (Solarcraft Design, 920 Via Brocha, Santa Barbara, CA 93110). Has anyone else tried solar powered free flight? If so, let me know how you did. The Solar Challenger (man carrying solar powered plane, flew from Paris to London on solar power) is on display locally, I went to see it, and it is very impressive. The motor is samarium cobalt, and was built and designed by Bob Boucher, of Astro Flight.

Speaking of samarium cobalt motors, Bob sent me the latest top-of-the-line 05 at Astro Flight. It is a samarium cobalt 05, called the Astro Challenger 05 (in honor of the solar flight). It really is the ultimate in 05 design, absolutely beautiful workmanship, excellent lathe work throughout, silver graphite spring loaded brushes, and an armature that can handle up to 25 amperes input. This is really the Rolls Royce of the 05 class; I'm doing the bench and flight tests now, and hope to have the results out soon. So far, the tests show that it will outperform any 05 on the market. The price is set at $75, which, though not cheap, is less than any cobalt motor available, in fact, the next cobalt motor (Keller) starts at about $130, nearly twice as much. For those who want the best, it looks like this is it. I'm running a photo as a "teaser," more later! Contact Astro Flight, 13311 Beach Ave., Venice, CA 90291, phone 213/821-6242 for more information.

Well, enough for now, try the new electrics, and enjoy the power! •

R/C Boats . . . *Continued from page 40*

haust throttle or a modified carb. The O.S. Max 46 comes with a good carb as original equipment.

FROM THE FIX-IT DEPARTMENT

Anyone who participates in model boat racing any length of time is sooner or later going to be making repairs on his racing boat. It isn't a matter of when but of how bad the damage will be. Over the past few years I've been taking photos of some of the things I've repaired after

two models attempted to occupy the same space on the pond at the same time. Sometimes this joint occupancy results in little more than a "bump." On the other hand, if things get lined up properly, the results can be rather unpleasant.

I believe the most important item to consider when beginning to repair a damaged boat is tying together of the repaired area to the original framework. In a wooden boat, this may mean cutting away damaged sheeting and framework and rebuilding with entirely new structure. This type of repair is shown in the photos of the rebuilding of the left front sponson on my Excaliber 3.5 Tunnel. By gluing extension pieces to the inside of the existing framework, it is possible to graft a new framework onto the extensions. Add glue blocks to areas where sheeting will be butt jointed to existing structure.

What seems like a common repair, is fixing holes in the sides of boats. The photos of the repairs to the Klampon Kai show how internal patches followed by external patches can repair damaged side areas. Another set of photos shows repairs made to my Prather 31" Deep Vee when it was rammed in the aft section of the side. In this repair, it was necessary to remove a rather large section of broken material. Once again an internal patch was glued to the inside of the hull. The external patch was then glued to the internal patch to fill in the area where the original side of the boat had been. This internal/external patching method gives a double-walled repair which is stronger than the original side.

It sometimes happens that when fiberglass boats are hit in the side, the material may rip and not be seriously damaged. This is a fairly easy repair to make if no new material has to be used to repair a hole. The photos of the tear in the side of my Wardcraft Offshore hull show how a rip in fiberglass can be mended. Masking tape or plastic tape can be used to prevent the resin from running through the ripped area while repairs are being completed. A paste made of resin and micro balloons can be worked into the rip to fill the cracks. A piece of glass cloth is then applied to the inside of the hull over the damaged area. Coat the area with resin prior to applying the cloth and then apply resin over the cloth to complete the repair.

It is sometimes possible to make temporary repairs at the pond by covering the damaged area with a couple of layers of tape. There are a couple of good tapes for this type of on-the-spot repair work. One that I've used is the two-inch wide Scotch Brand Clear Plastic Mending Tape. If you can get the surface to which the tape is to be applied real clean, this tape will really cling. This type of repair can be especially successful to areas that are not running surfaces for the boat. Included in the photos submitted with this article were a few shots of Dave Blacksten making such a repair to his 3.5 tunnel.

I hope the photos and ideas will help

the person who has yet to experience the joy of repairing a banged-up boat. It would be my hope that you might not have to put this information into practice. However, if you do much racing, you'll end up fixing a boat sooner or later. It sorta comes with the activity. Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498. •

Fuel Lines . . . . *Continued from page 16*

at least to me, lubricants that I hope to give you a report on in the forthcoming months.

DYNOS AGAIN

As you may recall, several months ago, I did a mini-series on dynomometer tests on our model engines. When they were written, I thought that, at the most, I might have one or two inquiries about building a dyno. My judgment was poor. There have been more than thirty requests for additional details. Surprised? Yes, but it's also been most enjoyable to realize there's that amount of technical interest.

OK guys. You've prompted me onto another project. The previously described dyno was expensive to build and required considerable machining. The new project will be to design a dyno that many other modelers will be able to build for less than $100 — complete. Ambitious, yes, but it just may be possible. It may be another four or five months, but it will be in this column.

PORTING

Pat Rose, of Sunnyvale, California, wrote and asked for an explanation of what Schneurle porting means. Hey guys, don't give any condescending grins. Chances are that a lot of modelers don't really understand the basic fundamentals of it. Next month, I'll try to explain. Thanks Pat, for your forthright refreshing letter. In September, the topic will be porting.

Hope you'll have, or have had, a good Fourth of July. •

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

assemblies used on other suspension cars. The answer was to simply mount the motor at an angle, with the pinion gear driving directly on the main gear. As is usual Delta practice, the motor position is not adjustable, hence it also can't shift around in a hard crash. This also means that the centerline to centerline distance between the drive gears is constant, resulting in large changes in ratios made by changing both the pinion and main gears. Not near the hassle it sounds like, as Delta uses quite small main gears that are not prone to damage and so very rarely need replacing. In over four years of racing Super J's, the DRT has *never* had to replace a broken, melted, or stripped gear. With the Eagle, the same type of gear and gear material is used, but with a new twist in the set of the teeth; they are both coned with the small end outboard and set at a very slight angle, giving a very smooth mesh to the pinion gear. A prototype Eagle had problems with main gears, most noticeably at the most recent Miami 24 Hours Endurance Race, but that was before the new gear mold was finished.

In order to get the necessary low gear ratios, small pinion gears are used, the lowest ratio available using an 8-tooth number. When used with a 52-tooth main gear, that comes out to a very low 6-1/2 to 1 ratio! Other ratios available are 6.1, 5.8, 5.4 and 5.1 to 1, something there for every track.

Drive from the main gear goes to a left side mounted ball-type differential, the diff being of basically the same bullet-proof design used for several years in the Super J. This diff is very trouble-free, as well as having the adjustable limited-slip feature that helps so much when getting the car dialed to the track. The outboard ends of the diff assembly ride in sealed bearings carried in the previously mentioned aluminum hangers. From there, half-shafts carry the power to stub axles that also run in bearings, this time two of them pressed into the molded carriers. Large diameter pieces of surgical tubing shield the half-shafts and their sockets from dirt. But the neat thing here, and representative of the small touches Delta engineers into race cars, are small "buttons", one each in the half-shaft sockets, with the outboard button backed up by a small spring. These buttons, and the springs, serve to keep the half-shafts centered, both to avoid any possible binding, and to prevent the shafts from bottoming out in one of the sockets.

Bringing all of this drive train stuff to a halt is a disc brake housing attached to the left hanger, and a floating disc driven by pins common to the diff assembly. It is of the single-disc design, while many other cars are now using double-disc brakes. Still, this brake is effective enough that I can't see any real need for change. It is smooth, reliable and doesn't fade.

That pretty much covers the basic car, but there are quite a number of small detail types of items, many of which were developed for the Super J, and so not all-new. The clutch assembly is one, it is of the clamp-on design originally used by Delta and now also used in the PB car. This Delta clutch is absolutely trouble-free; assemble it and forget it. The clutch in my four year old Super J hasn't been touched for three years.

A fastener that Delta refers to as Super Screws is used almost exclusively in the car. They are very expensive (two for $1.50), but there is nothing better. They can be tightened down hard, but never do the heads get stripped out as so often happens with phillips head screws.

Throttle and brake linkage is simple to install, straightforward in operation and adjustable. Steering linkage is about like everybody else uses with the exception of the machined aluminum Super Clevis that is attached to the servo. The servo saver works, is trouble-free, and has been copied by most other manufac-

turers of 1/8 cars. Ball bearings are used throughout the Eagle. Two at each wheel, two in the clutch, and one each in the rear hangers for a total of 12. The all-new molded tank is really super; it's light, doesn't leak, is easy to fill quickly, and gives very consistent engine runs. It also (usually) measures 130 cc, which is over the limit of 125 cc allowed by ROAR rules. If you want the tank to be legal, best figure out how to reduce the capacity slightly.

PUTTING IT ALL TOGETHER

Don't worry, I'm not going to go over the assembly of the car. If you build one, Delta supplies the directions, so no need to go over it here. And the directions are pretty good. Not as good as supplied with a number of model airplane kits, and a couple of steps behind the completeness of instructions supplied with at least a couple of 1/12 cars. (JoMac and Associated, for instance, supply instructions that are excellent.) What keeps the Eagle out of the woods as far as instructions are six pages of very complete and easy to read drawings with most views being isometric blow-up drawings. Anybody with any mechanical ability at all could build the car with the drawings as the only guide, they are that good.

Even though the car looks complex when assembled, and even worse when the box is opened and all of those plastic bags full of parts are seen, the whole car is so logical in layout it just all falls together. Everything fits like it should, parts don't have to be modified or forced into position, resulting in assembly being an enjoyable process. Well, it might not have been so enjoyable when I discovered that all of the shocks weren't identical after all, there being lighter springs for use on the front end and no mention of this in the instructions, but overall, assembly is a great way to spend a few evenings.

EXTRA (BUT VERY NECESSARY) STUFF

Airtronics supplied one of its new radio systems for this test, and it is easily the best system I have ever used in an RC car. So good that I refuse to bury a look at it way back here in the latter part of the article. So next month's column will lead off with a look at this radio system. Until then, a couple of short comments. The servos are strong and very fast; so fast that I actually raced the Eagle the first time out on a 4-cell pack. I have since gone to a 5-cell pack, just because I like super-fast servos, but a 4-cell pack is lighter and gives as much servo speed as everybody else's servos on 5-cell packs. Don't have much to say about the receiver, except that it works. Lots of range, no funny glitches. . . What else can I say?! The transmitter has all sorts of whistles 'n bells. Reversing switches, end point adjustments on steering throw, high and low rates, exponential or linear servo movement at either high or low rate, a third channel if you can figure out a use for it (ROAR rules allow only two channels/two servos), fine trim adjustment on the throttle lever, external charging jack, an arrangements that allows operation of the radio system without turning the transmitter on, a cord that lets the transmitter meter read the receiver's battery pack voltage, ball bearings in the steering wheel. . . And a couple of other things that I have forgotten to mention! Finally, a radio manufacturer has put all of the proper options into one package, and while it will be the rare racer who needs and actually uses *all* of the trick stuff, at least it is there when you need it. More next month. . .

The Picco .21 was supplied by Delta, as they import them, as well as a huge stock of replacement parts, from Italy. A better, more powerful RC car engine would be very hard to find. Remember that Art used a box-stock Picco at the World Champs, and at that race were all of the high-output .21's available, many radically modified, and still a stock Picco won the race without even being pushed hard. This particular engine is available several different ways from Delta, the one used here is a "kit" type of engine, where the racer is supplied all the parts and has to put it together. That may sound unhandy, but most racers take new engines apart anyway, so you are saved that trouble, plus it allows Delta to substitute a grenade-proof rear bearing that uses a phenolic retainer and a special heavy-duty all-aluminum machined rod. Topping the motor off is the proven Delta heatsink head, but of much more value is the Delta slide valve carb. A better carb is simply not available; needle settings are very positive and don't change, the carb is a very long-lasting piece, the air cleaner sup-

plied with it is extremely effective and, best of all, through use of nylon restrictors, the amount of power can be changed easily. Wide open, the carb has a huge .375 venturi, available are restrictors in .312, .250, and .200 sizes, and I normally use the .200 restrictor, as that level of power ideally suits the tracks I generally race on.

BUT HOW DOES IT WORK?

To be honest, I never thought I would see a 1/8 race car that is so easy to drive. . . Rather, so easy to drive quickly. You point it where you want it to go, and it goes, simple as that. Actually, that is also true of the Super J, but the Eagle does everything the Super J will do, only will do it smoother and you get out of shape so much less with the Eagle. Blast down the straight, haul it down with brake, turn into the corner, squeeze the power on and the car just floats through. If the line is too tight and the car is hung out and sliding, no need to back off the throttle, just steer the sucker on through. Through corners separated by a short chute, as in a chicane, you enter the first corner at or near full throttle, and with the car hung out in one direction, simply flip it the other way, if anything adding *more* power for the second corner. Delta 1/8 cars have always been highly regarded for being able to get the power to the ground without throwing the chassis into an uncontrollable mess, the Eagle simply advances that reputation even further.

RACING IT

First race was, uh, interesting. Before I even got to the track, I was concerned that the car would push a lot in a big sweeper we have that leads onto the long straight. Suspension cars have had this problem; the rear end gets hooked up so well that the front tires have a lot of difficulty in getting the car to turn. So there were medium soft front tires on the car, the same ones supplied in the kit and that have proven to give too much steering on a Super J, at least at our track. It only took a couple of laps to see that steering was not going to be near the problem I feared. I was hitting stuff on the *insides* of corners, things that I very rarely hit before.

Second practice session I went to good ol' 318's on the front, a combination tire that has a hard ring on the outside edge and softer sponge inside. Still plenty of steering. So much that coming off the sweeper I got the car down very low and caught the end of a 200 foot long steel channel with the right rear wheel and that impact was enough to deform the right hand carrier far enough to let that side's half shaft drop out of a socket. Took a couple of minutes to flip the carrier up and replace everything, getting the car back on the track and finishing the practice. But the carrier was bent, causing the tire to wear in a coning pattern. Couldn't tell it from driving the car, though, which was surprising. New rear tire set and readjusting the ride height got everything, except for a slight toe-out in the right rear wheel, back to specs. Still the car worked super, you could not tell from just driving it that one of the rear wheels was pointing anywhere other than straight ahead.

And that brings us to another strong point of this car, its lack of sensitivity to adjustments that on a pan car would drive you crazy. Sure, the car probably works best with everything just perf, but it also can get the job done very well with a bunch of tweak in the chassis, stagger in the tires, different amounts of steering lock at full left and full right, and so on.

But back to the bent carrier. Turns out I'm not the only one to bend one and Delta is presently working on a mechanical stop of some kind that will allow the carrier to give a little, as designed, yet not go so far as to take a permanent set. Still, having spare carriers sounds like a good idea.

Only other problem was with the two steel pins that hold the lower ends of the rear shocks, terminating in the small rear bumper/wheelie bar. While showing the car to a friend, he picked it up by the bumper, only to have the pins come sliding out, neatly releasing the bottoms of the shocks, as well as the ride height adjusters! Stuff went sproing! pop! all over the place and we solved that problem by cutting longer pins and fitting 1/8 inch wheel collars to trap the pins in place.

Oh, yeah, we also blew the motor up. Well, almost. Out practicing one day and while listening to the motor howl on a long straight, it just went dead and coasted to a stop. Beat the bottom end out of the rod, and this was one of those special heavy duty numbers. So far, no explanation as to why, as these rods have been living two and three times longer than the stock Picco rod, which is very good. Possibly it was just a too-tight fit to begin with and after galling slightly just got worse until it went in a big way. The motor was rebuilt, but with a Picco rod this time, and since then we have literally thrashed the motor, actually *trying* to make it break another rod. Nothing at all, it is still a very good fit, so breaking the first rod was (evidently) just one of those things that happens, even with the best of high-performance engines.

SO, HOW GOOD IS IT?

The Eagle is very good, but what you *really* want to know is if it is the best, don't you? Sorry, folks, too early to tell on that one. The RC500 is an unknown quantity at this time, but sounds quite good. An '82 version of the PB car is due shortly, either as a completely new car, an update kit for existing cars, or both.

What is known is that the Delta is expensive, but they have always been more money, and for fairly obvious reasons, especially when compared head-to-head with any other 1/8 race car. The Eagle kit, less radio and motor, of course, sells for $580, the RC500 will go for $475, and the new PB for about that amount,

give or take a few bucks.

Take that as you will, but it has been my experience that a Super J pan car, selling for almost $400, is, in two seasons of racing, actually cheaper to race than a pan car costing half that much, plus at the end of two years, is in much better condition than the cheaper car. As proof, I still race my original Super J, with our other two SJ's being two and three years newer, but my four year old car is in such excellent shape there is no reason to give it up.

Whether or not the Eagle can live up to the reputation of the Super J is something that only time will tell, but I suspect that it is well developed enough, and built stout enough that its chances are quite good.

So . . . you got this far in reading because you're interested in racing a suspension car. The Eagle is not the only choice available to you, but if you fail to give it very serious consideration, your racing season many not be everything you hoped it would be. •

Big Birds . . . . . *Continued from page 15*

doing damage to people or things is ever-present, and the uninformed and unknowledgeable BIG Bird Buff becomes a severe hazard to himself and everyone else when he's on the flight line; that tail-heavy and out of trim aircraft can end up anywhere. . .

Look, I'm probably one of the world's worst mathematicians and I avoid getting involved with numbers as much as possible; however, I fully realize that safety has got to be the name of the game, and as a well trimmed and balanced bird is both safer and a joy to fly, I willingly take on the few basic formulas and accompanying math that are necessary . . . especially since my trusty $5.95 calculator does all the work.

Now it so happens that every full-size airplane, big or small, civilian or military, has some kind of weight and balance form. For small birds like the Cessna 150, there's little or no slip-stick work to be done because the variables are very limited. But on a multi-engined flying machine, where fuel can be transferred around, in addition to the large amount of people and cargo that are carried, the weight and balance form takes on even more importance. Before takeoff, the pilot knows exactly where his BIG Bird is balanced, or *what* amount of fuel has to be moved to *where* in order to achieve that desired percent of the Mean Aerodynamic Chord (MAC). For most of those twenty years I flew for Uncle Sam, I was fortunate to have exceptionally fine co-pilots; yet, I often took the time to check over the "Form F", just to be sure that all 585,000 pounds of B-52 balanced where I wanted it to.

So why not a weight and balance summary for each and every one of our BIG Birds? It makes one helluva lot of sense, and puts you in the drivers seat . . . with no unhappy surprises biting you in the butt just when you're ready to fly, or worse, seconds after you're airborne. And here are a few more bonuses you get for planning ahead: a first flight that'll be much easier on the old nervous system; a better appreciation and understanding for weight and its distribution; a plane that'll be safer and easier to fly; a plane that's going to last a lot longer; and because it'll last longer and be more fun to fly, you'll be getting much more satisfaction from your hobby and saving many bucks that would have had to go into radio, engine, and aircraft repair or replacement.

Surprise! I didn't include an explanation, sample or example of a weight and balance summary . . . simply because Brad Powers (bless his heart) did an outstanding job on all of this in his three-part series, "Let's Talk About The CG," (**Model Aviation,** April, May and June, '80). Part I covers CG and its effect on stability; Part II explains about MAC and how to find it on various wing shapes and configurations; and Part III is the "piece de resistance" . . . how to position everything so that your CG will come out where you want it to.

This is absolutely *must* reading for everyone who flies, or wants to fly, a BIG Bird. Brad, being a nice guy, kept it simple so that even I had no trouble reading and understanding everything he had to say. Part III is probably most

important, because here, Brad clearly shows how to make out a weight and balance form . . . although I'd have to rate Part II as running a *very* close second; the reason being that this article shows how to find the MAC on different wing shapes and planforms . . . and an accurate balance point is the foundation that all the rest of the balancing and trimming (static and inflight) are based on.

The majority of you probably do receive MA and shouldn't have any problem digging out those three issues and getting with the program. Since only a relatively few might not be AMA members, or don't keep magazines (I'd call that heresy), or don't know anyone who does, I'd be willing to send copies of this trilogy . . . *IF* . . . you remember to include two and a half bucks, American with your request. This amount will exactly cover the cost of reproducing and mailing (including the envelope). To say the least, I'm not in the xeroxing business, but I feel that this info is vital and should be read by all.

Last month I mentioned about a balancer I was working on; well, I plain ran out of time and wasn't able to get the photo work completed. Look for it next month. . .

Almost forgot about the static trimming I referred to; you can't afford to guess about incidence and thrust angles, because you'll never win at that game . . . so get yourself a Robart Incidence Meter and make life so much more enjoyable for yourself. It's useable, as is, on most BIG Birds . . . and with a simple extension can accommodate those few unusually large wings.

HEAVY DUTY BATTERY PACKS

Seems like more of you guys are recognizing the need for heavy duty battery packs, 'cause I've received a surprising number of letters asking about what size cells to use, how to install them, how to charge them, and how to keep them perkin' along.

Since the HD servos you *should* be using have a normally high current drain, and pull close to one full amp when stalled, that airborne battery has to have the capacity to handle this kind of demand. And by the way, if you're foolish enough to insist on using "standard" servos to drive your control surfaces, don't be lulled into a false sense of security; those "standards" are being forced to do considerably more work than they were designed for and, while on their way to that inevitable double-hernia, are gonna eat up current like a hypercondriac pops pills . . . so using your 500mah pack along with regular servos is like playing Russian Roulette with all the chambers loaded.

Common sense and practical experience dictate the use of nothing smaller than a 1000mah battery pack for that airborne system. I've been using 1200 mah packs for years, and have never run out of juice; the Gold'N Rod push-pull control system I use (BIG Birds, May '82 MB) allows my servos to work with maximum ease, which in turn insures minimum current drain. You can choose to go with higher rated packs, such as the 1800mah and 2000mah packs available now.

Installation shouldn't be a problem, in spite of the huge amount of room available. As the HD pack weighs about ten ounces, it makes sense to use it in helping to balance the bird. After deciding where the pack is going to take up residence, custom fit a piece of foam in that area and cut a pocket out of the middle for the battery. Then, after sliding the pack down into this pocket, a piece of foam is stuffed in on top, allowing the battery pack to ride in a cushion of foam (I find it a good way to install receivers, also).

Charging HD battery packs, and keeping them in top shape, all come under the same heading. First, a caution: do *not* try to charge your HD battery with the charger that came with your radio . . . because that standard charger was designed to service your 500mah pack, and therefore its output wouldn't be much more than a trickle charge for most HD cells. You'd be setting your BIG Bird up for a BIG bust, thinking you've got a fully charged battery to rely on . . . when, in fact, that HD pack would barely have a third of its capacity available.

What you need is a charger that puts

Continued on page 86

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Thornburg . . . *Continued from page 35*

point of the fuselage, sans wing. Mark this point with a pencil and glue the wing in place just above it, so the pencil mark falls at about the middle of the wing chord.

Can you test glide a model like this? Barely. I prefer to hand wind it about 100 turns and give it a chuck.

To fly your twilighter at all seriously, you need a few supplies. Most important is a winder. Mine is a 6:1 plastic job sold by Sig for about four bucks, and worth it. I also own a small Sterling (5:1) and a big old Wilson (16:1) with brass gears and a metal case. All good winders. And a small hand drill (3.5:1), too heavy and slow. Does anybody wind with converted eggbeaters, like I used to read about in the mags? *(That was for twin pushers. wcn)*

In addition to a winder, your field box ought to contain various sizes of spare rubber. Sig sells 25 foot hanks in small cardboard tubes. And rubber lube. And a razor blade. And some Super Jet.

Now you're ready to fly.

Learning to wind for max safe turns is an art I don't pretend to have mastered. The experts stretch the rubber way out, almost four time its length; then relax it; then stretch it back to around three times its length, say a few Hail Marys, and wind. To do this, you need a friend . . . a friend with steel fingers, in case the rubber snaps. I don't have any friends, so I hook the prop in the chain-link fence that surrounds every schoolground, rotate the model so that it dangles clear of the stretched rubber, and wind.

A piece of 3/16 Sig rubber, well lubed, should take 60-70 turns per inch (of unstretched length) without breaking. Thus, on a typical 14 inch motor, I stretch it out to around 42 inches and wind it about 800 turns, for a start.

A proper twilighter should climb to fifteen or thirty feet, then settle into large, lazy circles, slowly descending as the motor runs down. It will usually land with a few turns left.

Winding to max turns is hard on rubber. It won't last more than eight or ten flights before it either breaks or loses so much power that it isn't worth it. I try to work up to max winds (around 1000 for a 14 inch motor) by about the fourth or fifth flight, and hold that number through the remaining flights maybe you'll find a better method.

If you are the stopwatch type, you may want to order some rubber from F.A.I. Model Supply (P.O. Box 3957, Torrance, CA 90510). Their catalog is only two bits, and worth it. Otherwise, you can get your supplies for this type of flying from Sig Mfg, Inc., Montezuma, IA 50171. They'll even sell you a fatter 7 inch prop and hanger for 45¢, and you can use it to build a slightly larger twilight around the Star Flyer parts. Catalog number for the larger prop is SP-004.

Now go forth on calm evenings and churn the air above your favorite schoolground. With my blessings. •

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Big Birds . . . . . *Continued from page 84*

out at least 100ma at 5 to 5-1/2 volts; it can be the plug-in wall type that has a fixed ouput, or a variable charger (one with a meter is preferable). A good source for either type is Ace Radio Control, although there are other makes on the market, also.

As for charging time, just use the standard C10 rate, which is safer because there's less danger of overcharging. Arriving at this "mysterious" C10 rate is just a matter of dividing the batteries rated capacity by 10: a 1000mah pack at 100ma; a 1200mah pack at 120ma; an 1800mah pack at 180ma, etc.

I mentioned earlier that I use 1200mah airborne packs and have never run out of juice. Actually, I could say that I've never even come close to running out of juice . . . because I use a load device like L.R. Taylor's "Power Pacer" and Ace's "Digipace" for cycling my battery packs . . . only I don't just cycle them in a random manner. As you can see from the photo, I keep a log for each and every NiCd pack (including my transmitters), and establish a base time for each pack when it's brand new . . . using the C10 charging rate and an 18 hour charging time as standards.

I completely cycle a new pack through three times, and use the third discharge time as my base for comparison to all future discharge times (you've got to maintain standards or else your comparisons will be worthless).

Then, on the first day of each month, whether or not I've flown during the preceding month, I start cycling *all* my battery packs through. First, I fully discharge each pack, disregarding any clock reading. But then, after charging at the proper rate for 18 hours, I fully discharge, log that time, and compare it to my base. If they're withing 10 minutes of each other, it's no sweat; however, if the latest discharge time is more than ten minutes less than the base reading, I do *not* use that battery pack (or transmitter) until I find out why. It could be a bad cell, I could have misread the clock, or I could have charged for less than the 18 hours. The point is that I find out exactly what caused the difference in time before relying on that particular pack again.

To get a feel for how much battery that's left, I occasionally discharge my airborne pack right after a flying session. I've found that two hours of flying, which includes a fair amount of violent maneuvers and cross-controlling, leaves me with about two hours and thirty minutes on the clock; a very healthy reserve considering my total discharge time from a full charge is a tad over five hours. There's no doubt that my push-pull control system, good hinging and balanced control surfaces, all contribute toward this comfortable safety margin.

Since I like to KISS (Keep Things Simple, Stupid), I don't install charging jacks in any of my BIG Birds. And here's why; I totally destroyed one of the nicest flying birdies I've ever had because the battery pack rotated over a period of three consecutive flying days and pulled a lead loose. Had I not installed a charging jack to make things "easy," I would have had to go into the bird in order to charge the battery and probably would have noticed the rotation taking place.

Now, of course, I'm forced to go inside after that battery plug, and while there, take advantage of the opportunity to make a complete internal inspection. Yeah, I do bitch to myself now and then about the inconvenience, but I'm able to pull a good internal postflight and know for sure that everything really is okay . . .and that I'm not just doing some wishful thinking.

I know that many fellows also use that charging jack for plugging in their Expanded Scale Voltmeter (ESV) and keeping tabs on the condition of their battery from flight to flight. Since no one way of doing things is perfect, perhaps following my procedure for charging and inspecting, and using the ESV for monitoring the battery might help to cut the odds down even more.

And one last bit about the airborne battery . . . for years I've been using, and recommending, a 5-cell, 6-volt battery pack. There's certainly no problem from a standpoint of room, and you're looking at a good 20% more thrust and speed for the servos. Most radios can easily handle this increased voltage, although you might check with your radio's manufacturer if you're unsure. I picked the idea up from boat and car people and don't understand why us BIG Bird types haven't jumped on this before now.

TWO-BY-FIVE

The preceding paragraph on 5-cell packs gives me a perfect lead-in to a short review on Ace Radio Control's "2x5 Redundent Power Supply." It works off of two 5-cell packs at the same time, and if a cell fails or a pack loses its capacity, the 2x5 switches over to the good pack and also lights up an LED to tell you what's happened.

I hooked up an almost depleted pack on purpose prior to flying, and checked the 2x5 after a twenty minute flight. It had done its thing, alright; the low pack was out of the circuit and that fact was advertised by the appropriate light being on. Another handy item that comes under the heading of "insurance."

SAFETY THAT HUB

I've explained how vital it is to balance those props and track those prop tips, and to use a six-bolt hub . . . but neglected to urge you to safety wire those six hub bolts to make sure that they don't come loose and chew up the prop, and to insure that the prop itself stays put.

Your wiring doesn't have to be as fancy as the way I did it in the photo (it's been a few years since I worked for Pratt & Whitney, but I think I got the twists right), but any kind of safety wiring would be better than none at all.

MAD

It stands for *M*iniature *A*ircraft *D*irectory, which I just received from Bill Wilbur, otherwise known as "Data Resources."

At first I thought he was mad to go through all the time and trouble compiling this vast amount of data, and that I was equally mad to start leafing through the book. But it wasn't long before I did an about face; there's a bunch of good stuff in MAD. For example, he not only lists 219 BIG Bird plans, but includes very handy info about the airplanes vital statistics, including the price and who to get it from.

Bill also covers engines and servos, and has some great listings under Section F-88 books and such, Section G-367 Sources, and Section H — Ideas for Giant Scale.

For your 1982 edition of the BIG Bird Buff's MAD, send ten bucks to Bill Wilbur, c/o Data Resources, 6 Laurel Avenue, Kittery, MN 03904.

IGNITION

Hope to get some flight testing completed on a new Breakerless Capacitive Discharge Ignition System (CDI) put out by C.H. Electronics up in Riverton, Wyoming. Bill Carpenter, the head man at C.H., says he's just about ready to market his ignition system. Bill claims the installation takes less than an hour, and that virtually any engine from a .19 can be converted. In fact, this same ignition can also be used on the larger gas engines to eliminate the heavy magneto and the points, according to Bill's flyer.

I plant to start with either my ancient Enya .60 or a new Fox .78, and of course, using my venerable Flying Bathtub. . .

A COUPLE OF REMINDERS

First, that you've only got a handful of days left before it's time to head for the 5th Annual Southwestern Jumbo Fly-In here in Ft. Worth, on July 17 and 18. From the large amount of queries received so far, it looks like the Jumbo is really going to be a "Jumbo."

But even if you ran out of time perparing for our Ft. Worth Fly-In, you've still got almost two months to get ready for IMAA's 2nd Annual International Fly-In Festival. As most of you probably know by now, it's being held at the R/C Disneyworld-like flying site of Byron Originals in Ida Grove, Iowa, on August 27, 28 and 29.

Don't drag your feet any longer, or you'll miss out on the greatest gathering of BIG Birds, ever. Make that motel reservation now (if there are any rooms left). If you want to register as a pilot, send your SASE to . . . Don Godfrey, 254 Washington Street, Binghamton, NY 13901. If you want to go, but not to fly, I've got the brochures you'll need . . . and you don't have to be an IMMA member to attend this Fantastic Fly-In Festival!

TIP OF THE MONTH

This is an especially handy tip for those last minute adjustments required on all BIG Birds: DON'T FORCE IT . . . USE A BIGGER HAMMER!

Al Alman, 2609 Burningtree Court, Arlington, TX 76014 •

JVS . . . . . *Continued from page 38*

Then polyester resin was used to glue the tube in place in the hull. There isn't much you have to do as far as putting it together.

HARDWARE

Vern has a little different setup on the strut. His strut is made from all stainless steel and uses two small stainless steel ball bearings on each end of the strut . . . not needle roller bearings, but ball. The bearings are instrument quality stainless and require no lubrication while running. You just squirt a few drops of oil on them at the start of the day and again that night when you put it up for the rest of the week. They do not require oiling after every race. The flexcable is 3/16 and has a Norco ferrule silver-soldered to the end of it. The flexcable runs inside an aluminum tube, the stuffing box. This stuffing box works very well, because aluminum tubing around the cable forms a natural bearing surface for the cable to run in. The way this unit is put together, if you should happen to break the cable you can't lose the prop, drive dog, stub shaft, etc.

RADIO BOX

The radio box has to be built to fit the center opening in the hull. It has to be no wider than 3-7/8 inches and can be as long as 8 inches in length. If you use these measurements, the box will fit

between the four-inch rails like a glove. I made the box from 1/4-inch square spruce and 1/16 aircraft plywood for sheeting. I used the 1/4-inch square spruce to build the frame work, then took the 1/16 plywood and sheeted the entire frame. Five-minute epoxy was used to put it together, and then a heavy coat of slow-cure epoxy was applied inside and out. This will seal and make the box completely watertight. After the epoxy was cured, I sanded it lightly with 240 grit sandpaper and made it ready for painting.

FUEL TANK

The tank is a little different in this hull. Instead of having the tank in front of the engine as on most boats, it is in the back of the left sponson, by the transom. I used a standard 12 oz. Pylon brand tank and siliconed it in place. Pressure from the tuned pipe is used to push the fuel to the engine. No problems here at all.

PROPPING

To prop out an inboard tunnel, you would think it would be either like propping out a hydro, or a mono, or like something you had propped out in the past. Well, to my surprise it was totally different. I started with an Octura X-455, which is what I use on my 45 powered Deep Vee. Then, I went to the 1462 through 1450 size Octura props. By this time I was totally confused. Note the props are getting smaller. The boat and engine (K&B 7.5), would pull all of the above props, but had no smoking speeds to speak of. I then went to the JG line of props, starting with a J-30 and working down to an H-25. I even tried the three blades. The JG H-25 prop made the boat come alive and turned the tunnel into a real smoking machine. Wow! The bow came up and the speed was very fast. The boat handled like a dream. It was stable, it would turn left or right with the greatest of ease at full speed. That is an outstanding feature in itself. I even tried to make it blow over by turning it hard into the wind at all different angles, and it wouldn't. The wind that day was blowing at about 15 to 20, with gusts up to about 25 or better.

SUMMARY

As I said earlier, the tunnel ran at very fast speeds and had stability like no other tunnel I've ever seen in my boating lifetime. This boat is not just a dual class boat. It's an outstanding Hydro and, or an outstanding offshore. Call or write Vern at JVS and check one out for yourself. (JVS, P.O. Box 452, Anza, CA 92306.)

Happy Boating, and please don't forget to take a friend along to show just how much FUN boating can be. •

Counter . . . . . . *Continued from page 9*

Ave., San Francisco, CA 94112.

★ ★ ★

Wendell Hostetler does it again! This time a 'monoplane' in 42.5% scale, the famous Art Chester 'Jeep.' Drawn exact scale except for slight dihedral and a minor change to landing gear replacement, after one year in the development stage, it is said to be an excellent flyer with gentle aerobatic performance with engines from 2 to 4 h.p. Spanning 84 inches with 1,350 square inches of wing area and an approximate wing loading of 35 ounces per square foot, excellent flight characteristics are assured. Plans come on two 42-inch by 88-inch detailed sheets for $21.95 post paid in the U.S.A. Complete landing gear, epoxy glass cowl and wheel parts are available from T & D Fiberglass Specialties. Wendell Hostetler's Super Scale Plans, 1041 Heatherwood Lane, Orriville, OH 44667.

★ ★ ★

From the Millcott Corporation, the company that *FIRST* introduced "exponential" to the R/C world with the 'Specialist' system in 1977, comes 'A Very Special Sailplane Radio System.' Consultations with many sailplane flyers has shown the need for a specialized system that's able to cope with various aircraft designs, flight or task requirements, and changing weather conditions. With features like electronic trims, high gain on elevator, switchable rate control on elevator, exponential control on low rate elevator,internal servo reversing on all channels, mixer for coupled aileron and rudder, mixer for Vee-tail or Delta operation, mixer for flaperons, droopable ailerons, differential aileron control; these are just some of capabilities of this 'Special' system. 'Standard' features such as a precision all-metal open gimbal fitted with top quality conductive plastic pots, expanded scale voltmeter that checks a/c batteries, too, and ITT Centiloc and Deans harness connectors are just a small part of this system concept. For a brochure describing this system in greater detail, send a SASE to: Milcott Corporation, 177-F Riverside Ave., Newport Beach, CA 92663. •

R/C World . . . *Continued from page 13*

special part of America's Aviation history.

Others have described the HK-1 technically, this is just one person's feelings and impressions. For example, the interior of the big Hughes gives the impression of a plane that's not more than five or six years old, it has been that well cared for and maintained. Sitting in the left 'front office' seat, one is in awe at the instrument panel/console complex. The location of instruments and controls is as fresh as today. Going out *into* the wing to the number eight engine, is a special kick, and observing the high quality wood work that is so evident is hard to believe. No oozing glue joints here! Imagine how the flight engineer of number eight engine must have felt on that day, many years ago. Going back in the hull and peering 'way up' into that monsterous vertical fin is difficult to describe, but the real treat was being allowed out *ONTO* the wing and being able to 'wing-walk' Mr. Hughes creation from one tip to the other was an experi-

ence. Containment of ones emotions was quite difficult. As one photo depicts, Bob Walker got right to work and began to sweep off the 'N' number to show his gratitude. . . A day to remember by all of us, many thanks Darrell, AND to the Wrather Corporation for allowing us to taste history in this very privileged and special way.

★ ★ ★

To those who have been around the R/C scene for some time, and have not heard much about RS Systems in recent years, they are quite busy producing the Army's FQM-117A, better known as RC-MATS, or radio controlled miniature aerial targets. These RC 'delta's', when flown for a ground-based Vulcan gunner, or infantryman for that matter, takes on the characteristics of an attacking aircraft, including speed, attack profile, and radar signature. Being more readily available, easy to use and maintain, and having a relatively low cost, they provide the essential realism necessary for effective training. Basically of foam-core construction covered with fiberboard, aluminum components are utilized for radar enhancement. The original five to seven week course for RC/MAT training has been disbanded and hands-on training by qualified model pilots has now been implemented. Testing is in progress to develop means by which the RC/MAT can be tracked in target practice via "Red-eye" infrared air defense weapons systems . . . interesting to note how over the past 10 or so years, R/C model aircraft have been recognized as a *very* useful tool. •

Workbench. . . . . *Continued from page 6*

Getting back to Dr. Stow's letter, I think the safety emphasis should not be so much on the model, as it should be on the where, when, and how of its being flown. The FAA has certain spectator limitations at full-scale exhibitions, to protect the spectators in a reasonable manner. So should AMA. Our pylon rules are the only ones that clearly specify spectator proximity limitations. Sure, it's dandy - peachy to be right up close to the action, but because many spectators have no idea of the potential hazards involved, AMA rules must be established to protect them from their own ignorance. Lord knows, all of us have seen whole families, with "rug rats" in hand, pushing baby carriages, strolling right across the runway, to get a "better view" from the other side.

Just as there are competent full-scale aircraft builders and fliers, so are there competent model builders and fliers. And there are grossly incompetent ones in each category. It is more important to protect the innocent from the incompetents than to rule against all . . . like cutting off your head to get rid of a toothache, there is a better way (oops, Dr. Stow is a dentist!).

Accidents do happen in all kinds of vehicular sports, and occasionally it involves spectators (Le Mans is a good example). In most all cases, the spectators are allowed too close to the action. I was not present at this Mint Julep contest, but have been to the Rough River site in the past, and am familiar with the layout. If spectators were allowed that close to the runway, then event officials were grossly negligent. If the "spectators" were officials, that's another story. Frankly, I'd feel less discomfort in the presence of a troubled "heavy" than if it were a runaway lightweight Formula I Pylon Racer!

With proper limitations and regulations, the incident at Rough River would not have been cause for alarm, however, I'm glad Dr. Stow has raised his voice in this matter. Whether or not I agree with him on the proper means to an end, we certainly agree there should be an end . . . to needless risk of human injury from our hobby/sport.

BAD NEWS, GOOD NEWS

I'm sure that most modelers in the Southern California area assumed that the great model flying site at Lake Elsinore, about 30 miles south of Corona, California, was city or state owned property. Not so, and it all came to light last weekend (May 16) when some of us gathered at the lake shore for some R/C float flying. The area at the southeast end of the lake, so popular for many years to both R/C and F/F modelers, is and has been private property.

On Saturday, May 15, this property, 165 acres in all, legally changed ownership. The previous owner was so low key that most everyone just assumed the site was the same as most all of Lake Elsinore, city owned. Although in many ways ideal, the area was overgrown with weeds, litter, broken bottles, etc., and generally not too nice for families who came along to spend the day with their modeler type relatives.

Our first awareness of the new owner was a bit abrupt. A young couple came by to collect $3.00 per car from car owners who were flying models. When we finally realized that what seemed to be a fast buck scheme was actually legit, a somewhat calmer investigation was made.

The new owner is Fred Feinberg, of Anaheim. Fred is proprietor of what is now Elsinore Ultra Lite Aviation Park, and as he was on site this particular day, we (Harry Apoian and I) were able to talk with him. Fred's intention is to turn the area into a clean and tidy recreation park, primarily for ultra-lites (naturally), its pilots, and all related individuals. The weeds and debris is being removed, trash barrels will be set out and maintained, a fence will go up (probably by now), overnight motor home and trailer camping will be allowed, and model flying will be welcomed . . . but you'll pay the fare.

Things can change. If models and ultra-lites tangle, just remember who owns the property. If the lake continues to dry up and return to normal (or what it was before the big rain), city owned area may again be available at the previous rate . . . nothing. And, if the FAA finally moves to regulate ultra-lites (and that seems inevitable), the present rapid increase in activity may take a different turn.

So . . . in the meantime . . . be prepared to spend three bucks, which really isn't all that bad, and if you plan a contest or organized flying session, call Fred and let him know in advance, at (714) 675-4575.

LET YOUR FINGERS. . .

Beginning with this issue, you will note that Sig Mfg. Co. Inc. has shifted its dealer listing ad page to **Model Builder.** While we can hardly say "Welcome Aboard" to a company that has already been with us as an advertiser for many years, we can surely welcome all of the Sig hobby dealers listed, and encourage others to join in. Though it may not be a "yellow page", this listing does allow your "fingers to do the walking" when you're visiting an unfamiliar area. Modeler/travelers often find the local hobby shop to be a home away from home. It's a good way to locate the local flying field if you're stuck for the weekend, and who knows, the dealer may have some item in stock that you've been wanting to pick up!

BEST WISHES, DAVE AND GAIL

Our congratulations and best wishes for a happy marriage to Gail and Dave Linstrum. The ceremony took place in Captiva Island, Florida, on May 8, 1982.

Dave has been the VTO (free flight) columnist for **Model Airplane News** for many years, though at last word, the continuation of this column was doubtful. His primary occupation is in the field of architecture.

INDUSTRY NEWS

Kraft Systems has announced the formation of a separate hobby products group, and the appointment of Ray Forbes as group vice president. This restructuring primarily reflects increased internal emphasis on the hobby market, according to Kraft President, Art Leighton, and will separate its specialized engineering and other dedicated services from the expanding industrial and computer oriented business activities.

The above changes indicate the success of Kraft's dealer-direct sales program, instituted by Ray Forbes ten months ago, and will assure more deliberate R/C product line expansion and better customer service.

OUCH!

A few months back, we mentioned the possibility of supplying enlarged drawings for some of our construction prospects, specifically the Lockheed Vega by Walt Musciano, from 1-1/4 up to 3-inch scale. While the cost of prints for a 10-foot span version of this classic aircraft was not unreasonable, we had completely misjudged the cost of enlarging the original mylars to be used for making the prints . . . MONUMENTAL!

Actually, experienced modelers are enlarging and reducing plans every day. Though we're not entirely in agreement with the idea (except for a specific class, such as 020 Replica or 1/2A Texaco) old timer modelers are enlarging or reducing old time classics to fit various engine sizes, in order to set maximum displacement vs. wing area. Complete plans aren't needed. Bulkheads and ribs must be carefully enlarged (or reduced), but wing plans and fuselages usually need only a centerline and/or spar locations in order to build them.

Perhaps an article or series along these lines would be in order. A few simple drawing tools and a large roll of shelf paper can put you in business. Interested?

We've also had inquiries about the techniques of converting O.T. free flights for R/C assist. Usually we present O.T. gas model plans without alteration, figuring that most modelers who wish to make conversions, would prefer to use their own ideas. Would an article or series on R/C conversion be of interest? Let us know. •

Indoor . . . . . *Continued from page 47*

round, it is ideal for indoor flying. In fact, it is so large that three flight circles may be flown at the same time. The girder work at the ceiling is minimal and it is not easy to hang up a model in the steelwork. I have timed microfilm models that flew through the girders

and touched only a few times during their long flights. When a model does hang up, it can be freed by gently bumping it with a tethered balloon sent up from below.

It is possible to fly around the clock at the atrium, if you can stay awake that long. Daytime lighting is excellent, and nightime is fair to good. Since the building has many sleeping rooms, you can stay on the premises and eat all your meals in the restaurants without stepping out of the building all week long. West Baden could be the best all around indoor facility in the United States, if not the world.

INDOOR WEEK AT WEST BADEN 1982

All day Sunday is a practice day. It is the opportunity to get to know the area, get your scale data together, repair damage done in transit or whatever. Most of the top indoor flyers are there for you to meet and learn from their expertise. Indoor model writers and columnists are covering the many activities. This contest is so popular that some flyers have never missed one. Rumor has it that someone even changed their wedding plans so as not to miss this year's event! Twice Indoor World Champion Jim Richmond hasn't missed a NART meet yet. Contest flying started June 14 and ran through June 19, 1982.

MONDAY, TUESDAY AND WEDNESDAY

The United States Indoor Championships run through Wednesday and are sponsored by The National Free Flight Society. This AAAA meet was directed by Charlie Sotich, Hardy Broderson, Tony Italiano (NFFS Prez.) and Gordon Wisnieski. Events included: Manhattan Cabin, Bostonian, Easy B Duration, Handlaunch Stick, ROG Cabin, AMA Scale, Hand Launch Glider, Kit Plan Scale, and Peanut Scale. Also included were Paper Stick Duration, Pennyplane, Novice Pennyplane, FID Duration, Peanut, and Unlimited Speed.

The festivities are capped off Wednesday evening with a banquet and special guest speaker, Dr. Paul MacCready. In case there is anyone who doesn't know, Dr. MacCready is the aviation pioneer who designed the Gossamer Condor and Albatross pedal-powered aircraft. The Solar Powered Penguin and Challenger were also built by the same gentleman. Earlier, Paul was World Soaring Champion. And to think he started it all as a model builder!

THURSDAY, FRIDAY AND SATURDAY

June 17, 18, 19 were slated as the 7th NIMAS Annual Record Trials. All indoor classes were flown for national records. The "Index of Performance" format was again to be used. The best times you fly are scored against the existing national records for your age group. Ornithopters, Autogiros, Helicopters, Mic Cabin, Class A ROG, Hand Launch Glider and others were expected to be setting records.

ADDITONAL DOINGS

Also included were events for Rubber Speed and FAC NO-Cal Scale. Movies and Symposiums took place in the evenings, after daytime contest flying was concluded.

BIG BONUS

On the last day of the VII NART meet, the only 24-hour indoor model contest ever held was to take place, the 3rd World Peanut Grand Prix. All peanut scale models were welcome here.

One of the unique features at West Baden is that you can set up your boxes for flying in your chosen area and leave them there all week. If you wake up at 4 a.m. and want to go to the Atrium and fly your models, do it. Just be sure to put your clothes on first. There will be other modelers out there flying at the same time! Anytime you care to you can wander over to Club Miama for some socializing with the Hangar Pilots of the Sunshine Squadron.

As the MIAMA Indoor Group (one of the yearly organizers of WB Indoor Week) says, "INDOOR ISN'T FOR EVERYONE, BUT INDOOR WILL NEVER DIE!"

FINAL NOTE

We in indoor modeling respectfully thank The Northwood Institute people responsible for allowing us the use of this great facility. You are making many model airplane enthusiasts happy again for another year. We hope this hospitality continues for a long time.

THREE STRAND MOTORS

The last time we flew indoors, I decided to put up the new Grapenut Scale Caudron (from last month's column). Two .020 strands of Pirelli didn't give the tiny monoplane enough power to do little more than cruise. A new motor of four strands of the same rubber was substituted. I didn't have any .025 or .030 rubber along. The plane climbed straight up and torqued over to the left. It was at this point that I decided to try something new for me. I folded over three strands of the .020 rubber and tied an over and through knot at each end of the motor. The end of the one strand left sticking out was trimmed off close and the motor was lubed, being careful not to get any lube on the knots and loops at each end. The three-strand combination worked great. Just the right amount of power. Next time you're stuck with in-between sizes of rubber, try an uneven stranded motor. It just might work.

WANDERING MODELS

On occasion, a flyer will notice that his model is flying in a zig-zag pattern. It will turn right and then begin to turn to the left. This is usually caused by lack of fin area. Next time this occurs, try a slightly larger fin and note the difference. On scale models, a transparent plastic outline that is larger can be cemented to the original fin and not be noticed more than a few feet away. This is better than not having the model fly at all.

ROSIN TO THE RESCUE

Having motors slip over the shaft hook is frustrating and often disastrous (in Mike ships). If you have a violinist in the family, the problem may be solved.

Take along the block of rosin used on the violin bow and rub a small amount on your thumb and finger, and from there onto the prop hook. This should stop the rubber from climbing. The other reasons could be that you are lubing the rubber where it loops over the shaft hook. I never lubricate the extreme front and back of the loop of rubber.

I have also noticed that most abrasions (tears) in motors seem to occur where the rubber passes over the front or rear metal hooks. It strikes me that small wire S-hooks could prevent this from happening. The abrasions that occur from slipping the rubber on and off the winder hook can also be eliminated. This small S-hook attached to the motor could be slipped onto the winder hook instead. The added weight is negligible and it could save your model.

THE WAINFAN BOTHORNE-MODEL OF THE MONTH

How about a Boston/Hawthorne combination model. That aeronautical tinkerer, Barnaby Wainfan has done it again. A plane that is legal in two classes. A Boston cabin model that's a Hawthorne Flying wing. I guess Barnaby just hates to build stabs. He has come out to the sessions with only one model (a Drednaught) that had a stabilizer. With the exception being his canards, of course. Well, this month's model flys great. Look at that long, long motor, too. I drew up the plan and prettied it up some, but it's still Mr. Wainfan's brain child. The original was a little nose-heavy so we lengthened the tail moment a little. Don't forget the reflex at the wingtips. It's essential. You'll like the way this little dandy performs.

A BEGINNER THAT'S A WINNER

Getting that youngster to build a few models and fly them in a local contest is the first step. How do you get him or her to keep coming back? In my opinion it is important that the novice get your positive comments. If you tell him how bad his model is or how poorly it flys or how much he has to learn, you're just going to turn him off. The rule of thumb is: if you can't say anything nice, keep your mouth shut. When he sees how well your models fly, compared to his, he's going to realize he's got much to learn. Also, he's going to see how capable an indoor model is of flying.

Another important thing is that beginners, be they youngsters or oldsters, go home with something in their hands. A trophy, a certificate, a kit, etc. Maybe you give a trophy for the most original subject, or the most promising newcomer, or just for someone who has never won a 1st, 2nd, or 3rd. Several times, seasoned modelers have given my son Chris the model they flew in the meet. He was so thrilled he could hardly speak. He took the airplane home and just stared at it for days, then tried to build one just like it. It's such a joy to see a kid wake up in the morning and the first words out of his mouth are, "When's the next indoor session, Dad?"

THE WILDER WINDER AND TORQUE METER

Several times over the past few years I've seen people using the Wilder Winder. I knew it was a good piece of equipment, but I didn't realize how really fine it is.

Having decided to finally order the winder, I fired off a letter to Bob Wilder, in Texas. In a while, the reply arrived, stating that a new batch of winders would be built sometime after Christmas. In February, a card arrived stating that I could now send my check for $32.00, incl. postage, for the winder. The torque meter sells for $19.00 plus $1.00 postage.

When the package came, I was amazed at how beautifully my Wilder Winder and torque meter were made. The winder is 3 inches in diameter and 1-1/8 thick. The throw on the crank handle is 1-5/8 inches and the length of the hookshaft is 2 inches. The most visible feature is a turn counter that revolves like the minute hand on a clock. The ratio on the crank is 20 to 1. One complete revolution of the counter hand is equal to 500 actual turns. The crank handle has a black plastic sleeve that stops friction to the thumb and forefinger. On turning the crank, it is evident that there is absolutely no friction through the gears. The action is so effortless that the weight of the crank handle will rotate the gearwheels. The surface of the winder is brushed aluminum and it is flawless. The 1/32 inch wire hook shaft is even beveled on the end of the hook. A handsome nameplate is attached to the back surface of the winder, stating that it is custom made by Bob Wilder.

The torque meter is machined with equal perfection. It is evident by the smaller diameter of the hook wire that the meter is to be used for smaller rubber sizes only. An aluminum disk, 2 inches in diameter, has a number scale around the rim measuring from 0 to 10. As the small hook wire twists under power in the rubber motor, the attached red-tipped hand rotates around to the appropriate number to register the torque reading. The niftiest feature of the torque meter is that it attaches to the rear of the Wilder Winder. To achieve this marriage, the winder hook is removed (one set screw). Then slide the torque meter mounting sleeve over the

winder shaft and tighten a set screw on the sleeve and you are ready to wind.

Both pieces are made like a fine watch. If you are interested in the winder, I suggest that you write to Bob Wilder, 2010 Boston Irving, Texas 75061. A recent note from Bob states that it may be next year before more winders are made. But you may want to get on the waiting list for these wonderful products.

Doc Martin writes with a great suggestion from one of his people. Why not use the glass display cases in schools, YMCA's, etc. to promote model clubs and announce upcoming contests. I'm sure schools would welcome promotions of activities like model flying. After all, what's a more wholesome pastime for kids than flying indoor model airplanes?

Write your comments and send photos (please) to Ken Johnson, 16052 Tulsa Street, Granada Hills, CA 91344 •

Am Heli . . . . . *Continued from page 33*

columns. It is simple to do it *now*, as the head is already frozen in the lift-off position. Believe me, this is the only way to balance rotor systems.

PRE-FLIGHT

I'm saying it again: If you are a novice, get some help to trim out your helicopter. If you can't fly to start with, it is very difficult to tell whether it's you or the helicopter that needs adjusting. If you have to drive five hours to spend a day with someone experienced, *DO IT.*

FLYING

Through all flights the HB .40 PDP performed flawlessly. High end power was good, and the carburetor's mid-range adjustment and performance was accurate and reliable. And all of you know how important the mid-range is in a helicopter.

As I described last month, keep the damper pins *in* and limit cyclic throw if you're learning to fly. Intermediates can set up "normal" throws, and experts can run stop to stop.

The Bell-Hiller rotor head provides excellent cyclic control in all areas of flight. The collective system is good for beginners and intermediate pilots; advanced intermediate and expert pilots may want to increase collective travel for crisper collective response. Since the pitch input bellcrank is limited to travel between the bottom of the mainshaft and the cooling shroud, you may want to extend the collective yoke up on the head. (See photo.) Be sure to rebalance the head if you do this!

Tail rotor response is smooth and clean. The tail rotor compensation system works perfectly, just set it up per instructions.

A word about the instructions. Overall they are quite complete. The great number of photos really help assembly. The written text will seem oversimplified to the experienced pilot, but the beginner needs to be told every step. In this respect I put up with checking all of those little boxes at the completion of each step.

MODS AND SUGGESTIONS

Last month I briefly talked about how the head felt "stiff" in certain applications of cyclic. This is caused by portions of the disk dipping into and then out of a negative angle of attack. The stiff hardwood blades, while very good for hot-dogging and ram-rodding, do not help this characteristic of the head. The reason all of this happens in the first place is because of the very high blade speed, forcing the blades to operate at low angles of attack. The easiest solution I talked of last month is this: Cut 1/2-3/4 inch off the tip of each blade. Do it accurately! This reduces the disk area and lets the blades work at higher angles of attack. Another nice benefit of this change is that there is less "parachute effect" on descents; i.e., the ship will come down easier from forward flight. The blades will still be turning too fast, though.

However, my latest talk with John Simone has confirmed that there will soon be a modification kit available to change the gear ratios from 5.6 to 1 to 9.5 to 1. This is surely good news, and will remedy the Super Mantis' largest drawback in stock kit form. I would encourage all of you with a Super Mantis to order this option. (Same goes for Mantis owners too, as I believe the option kit will fit both ships. In fact, the fixed pitch Mantis needs this mod even more than the Super Mantis.)

The tail boom has been known to come loose easily when a beginner whacks the tail into the ground. After aligning the tail boom and checking belt tracking the forward rectangular block of the boom should be Hot-Stuffed between the side frames. This will help quite a bit. The latest Super Mantis has a molded ridge in the side frames to hold the boom more securely in position. This is the best solution.

Do not use Super-Poxy to paint the inside of the canopy! Super-Poxy will lightly affect the canopy material, drawing the edges inward. This makes it very difficult to join the canopy halves once they are painted. I think R&S Perfect Paint, or other polyurethane paint would work better, but I haven't run any tests myself.

The collective bellcrank will interfere with the tank at low pitch. It should be bent forward a bit to allow full collective travel and adequate tank clearance.

MISCELLANEOUS OBSERVATIONS

There are lots of little things in my kit that were not quite right. Some were listed last month, here are a few more examples:

Some holes in the collective pitch change unit needed to be enlarged to accept 4-40 bolts. There were not enough brass bushings or black washers. The collective pushrod provided was not long enough. The machined slot in the main rotor shaft had to be enlarged to allow room for the collective rod to exit.

The bags containing the sub-assembies were poorly marked, and there were way too many sub-assembly bags. The tail rotor pitch change linkage was missing. The main plastic gear tracked unevenly. the swashplate uniball was very stiff out of the box, and needed working in to allow sufficient smoothness. (Slip a pencil in the hole and work it 'round and 'round with some oil for lubrication.

Most of these things are not too serious, and American R/C gladly sent the missing parts upon request. The major parts (i.e. side frames, drive train, engine mount assembly) all fit together nicely.

CONCLUSIONS

The Super Mantis as advertised will appeal most to the advanced sport flier. It does not carry great sophistication, but it does not have a large sophisticated price tag either. The following paragraphs will list what I feel are the most needed improvements, and most obvious strengths.

I was going to list the high gearing as the number one problem, but American has rectified this with its new option kit. The factory deserves credit for recognizing this need and making it available.

NEEDED IMPROVEMENTS

1. The little things that I listed in the last portion of the article are the most bothersome, time killing items. Each on its own is not so bad, but they all add up. In short: the quality control needs improvement.

2. The radio compartment formers could use updates for easier access, my suggestions are shown.

MOST APPARENT STRENGTHS

1. If you can overlook #1 above, you get a lot of helicopter for your money. If you can't, then there is good *potential* in the kit if you are willing to make (or wait for) corrections.

2. The nylon filled side frames and landing gear bows are very nicely done. Also strong and crash resistant.

3. The design size is just right for a .40 power, giving a good power-to-weight ratio. Engine cooling is excellent.

4. Control hookups are fairly simple and the tail rotor mixing works very well.

That about sums it up. I hope you enjoy your Super Mantis if you have one, or are contemplating the purchase of one. If you take care with the little items and assure that everything is set up smoothly, it will fly nicely and allow you to expand your flight skills; all on a very reasonable budget. •

F/F ..... *Continued from page 59*

BREAKAWAY PANELS by Ed Hopkins
(reprinted from the *Satellite*)

"If you look over the plans for a typical AMA gas model wing, you'll see that the designer nearly always calls for plywood braces to reinforce the LE, TE, and sometimes the spars, at the polyhedral joint. This is done, of course, to reinforce all of the end grain butt joints that occur where the panels join. These braces strengthen the wing considerably, but . . .

"BUT, I'm not so sure that all of that beefing up is a good thing. Several years ago I read something by Bill Bogart that suggested wing breakaway tip panels. His idea was that, if the plane came in under power or made some other equally nasty landing, damage could be minimized by having the tip panel shear away at impact. In other words, if the tip panel was built structurally independent of the main panel, it could absorb much of the impact shock without allowing damage to spread throughout the entire wing.

"The idea of deliberately designing a weak point into the wing kind of goes against the grain, but I think it's worth considering very seriously. The trick is to make the polyhedral joint strong enough to withstand all normal flight loads and the occasional hard DT landing, but weak enough to give way first in the event of a 'kamikaze' landing. I did this on a 1/2A by first designing the wing so that the main panel and the tip panel both ended with a rib at the polyhedral joint, then just glued the two ribs together. Unfortunately, I had a chance to test the idea at last year's USFFC when the plane went left at 7 or 8 seconds and came in under power. SPLAT! Both tips were demolished, but the main panels survived with no damage other than a few tears in the covering."

Those of you who are familiar with my designs may have noticed that the plans never call out for polyhedral reinforcements, except for gussets at the LE and TE. I went through the same sort of reasoning outlined by Ed, plus the fact that whenever a tip would break off, it would usually happen right where the brace ended. Damage usually occurred to leading edges, trailing edges, and spars. I figured that epoxy glue alone would be enough to hold the tips on, without need for further bracing. I used double ribs at the joints, with gussets to make sure each rib stayed attached to the correct portion of the wing. This system worked well for me.

Before I started using epoxy for the joint, I was able to achieve a nice breakaway tip action on an early FAI design . . . sometimes both tips popped off on a hard landing! So, based on these experiences, here are some additional thoughts on the subject. Use soft 1/4 inch ribs on both sides of the joint. The soft wood will tend to shear apart easier, leaving an easy repair for Hot Stuff. (You could even take a tip from some RC glider kits and use a piece of trailing edge stock for one of the ribs, so you won't even have to sand in the dihedral angle at the tips.) Use gussets to make sure the ribs stay in place, and that the breakaway action will occur at the proper location. Small gussets at the spars/rib junction will also help here. Use 'old-fashioned' model cement like Ambroid or Testors to make the joint.

Make sure the tissue doesn't overlap . . . if necessary, run a razor blade over the joint to make sure. I think you'll find that breakaway tips will be just the ticket for windy weather flying, where the model tumbles around after landing. This is when most damage occurs . . . with breakaway tips, you can be back in the air in 10 minutes, usually without having to patch tissue.

NITRATE AND BUTYRATE DOPES

A few months back, Harry Murphy listed some problems he'd been having in trying to fuel-proof his models by brushing butyrate dope over a nitrate dope base. Apparently, some dope formulas had changed over the years, because when Harry tried to continue the same procedure he'd been using for years, with the same brands, he ended up with an awful mess on his hands. Several people wrote in to give him some helpful hints. John Oldenkamp suggested putting the nitrate over the butyrate. George Aldrich suggests using all Aero-Gloss or all butyrate, or a mixture of these two, which he's done with no problems.

There was also a discussion as to whether Aero Gloss was a nitrate or a butyrate dope. My opinion is that it's neither. About a dozen years ago, I won a gallon of Aero Gloss at a contest and used it on my models. After a year or two of exposure to the California sun, I noticed the covering was much more brittle than ever before when using Aero Gloss. I promptly switched over to nitrate dope and the brittleness disappeared. I discussed the problem one morning with Ray Harper, who had been using Aero Gloss for his superb HLG finishes. He had been in contact with the factory and confirmed that the formula had been changed . . . to an acrylic lacquer! This explained the brittleness problem, as well as the one reported by Bob Stalick of not being able to stick on tissue with it.

So, how DO you fuel-proof a nitrate finish? Out west, free flighters have been using a product called Fuller-plast, which is a sort of bar varnish. It goes on very nicely, can be thinned with dope or lacquer thinners, and can be patched over without problems. Dries quickly, too. It's not proof against more than 25% nitro, so I wouldn't use it on fuselages. Availability on the other side of the Rockies is probably non-existent.

Hobbypoxy and Superpoxy clear are very good fuel-proofers, though more complicated to use, as spraying is needed for best results. An epoxy paint is mandatory on your fuselage if you use high nitro fuels. Epoxy is a little heavier than Fuller-plast, but does have the bonus of being completely waterproof.

Another alternative would be to use a polyurethane varnish, like Pactra Formula U, or Varathane. These can be thinned down with regular paint thinner. Main disadvantages are weight and patchability.

One last tip . . . you can really cut your thinner costs down by using acrylic lacquer thinner for thinning nitrate, butyrate, or Aero Gloss. Look at your local auto parts store and you'll find it for about $8 a gallon. •

Pattern . . . . . . *Continued from page 26*

weight savings. Photos A and B show an example of this effect. The small servos mounted outboard of the landing gear are affixed to the gear plates. This eliminates torque tubes and the additional servo cutout in the wing center which needed extra cloth or wood to strengthen the center section. The servos set up like this weigh the same as the torque rods formerly used! This will vary depending on the servos used. Be sure to use *good* servos. The landing gear has been moved in (see standard arrangement in photo "C" and compare with "A") to reduce rolling weight and spar structure. As a side benefit, the wheel cutouts are in closer, which minimizes drag and possible asymmetrical drag effects.

The entire 825 sq. in. wing assembly as pictured in photo "D" weighs exactly two pounds, eight ounces, ready to bolt to the fuselage. The finish on this one is Monokote, which contributes to the weight saving. The total saving over our standard painted wing with normal servo and linkage, etc., was 8 oz. (one half pound). This may be only a piddling amount to some folks, but the resultant effect on rolls, snaps, point rolls, etc., is very evident.

The fuselage can be a real haven for dead weight. Thick tank floors, extra bulkheads, pipe compartments, tail pipe extensions, hatches, heavy epoxy fiberglass pushrods, all add up rapidly to produce mysteriously heavy planes. We have found that a tapered 1/4 inch spruce pushrod weighs half what the glass rods weigh, and is totally capable of handling the loads . . . both push and G-load deflection. Remember, the lighter the rod, the less the inertial load. The old wives tale of "matched expansion with fiberglass fuselages" is bunk, and is no reason for using heavy glass rods. Light birch plywood is great for tank floors and any extra bulkheads. You're not building a truck, you know. Nose wheel steering cables can be made from 20 lb. test woven fishing line and run through light vinyl tubes to eliminate catching them on components along the way. The vinyl can easily be bonded using C.A. adhesives . . . ditto for the fishing line. The entire assembly weighs just a few grams, and will last for the life of the airframe, as there are *no* moving parts to wear out. (See photo "E")

The receiver mount in photo "E" may give you second thoughts as to protection, but it's mounted in a foam rubber block and the foam block on the wing covers all connections and holds it firmly in place. The all-up weight on the plane in photo "D" is 8 lbs. 2 oz. (Tipo 825).

This one is Monokoted, with an epoxy finish on the fuselage *only*. The weight on the 825 in photo "C" is 8 lbs., 4 oz., and it's all painted. The radio used in this bird is very light, Bantam Midget servos . . . Novak receiver, etc., so the weight difference between planes is not entirely in the finish, *but* the finish is extremely light.

Steve Durtchsi painted both this plane and the fuselage on the 825 in photo "D". The technique used is: one part talent plus one part work. This varies depending on the scheme. The colors on the painted bird are silver, yellow, purple, blue, red, orange, black, white, green, plus a few others. Actually the colors are candy colors which fade from deep purple to lime yellow on the top of the fuselage. The distinct color areas on the rest of the model are also candies.

We start the finishing process by squeezing a couple of ounces of Tapox 4-1 epoxy into the balsa areas, wing, stabs, rudder, etc. This is warmed with a hair dryer as it is applied and the dried finish is simply a crisp hard balsa surface that can be completely sanded with 180/220 openkote paper in about 15 minutes. A good quality white epoxy undercoat is then applied using a roller or a gun. The well known hobby brands such as Hobbypoxy, Super Poxy, etc., are just fine. We use Tapox brand Copon, thinned liberally . . . it's a commercial hobby product for boats or industrial use. When dry (24 hours), the white epoxy undercoat is block sanded down to an almost transparent film, it's quite easy to sand. At this point, all the wood grain and scratches should be filled. If not, spray it and sand again. The epoxy colors are now masked off and sprayed on using a quality professional spray gun in a dust-free spray booth.

The lacquer paints, when used, produce the lightest finish. The trick to keeping the weight down using these lacquers is to spray on a very light coat of silver. This provides a bright, even base for color . . . the candy colors obviously require a metallic undercoat as well. The top coat is clear epoxy or urethane, well thinned. We have compared the weights of dozens of pattern planes and have found that it is fair to say that the difference in a quality, light paint finish vs. a Monokoted wing, stab, rudder and painted fuselage is about 6 oz. at best, and at worst, a pound or more.

A new finish on the market is the Micafilm . . . we find that it is as advertised . . . light, and very strong. However, if you stick it down over the entire model surface and paint it, it will probably weigh the same as Monokote.

Our finished weights on these airframes have been quite good using the above mentioned techniques. As an example, we have seen a number of 750 Tipos which weigh 3 lbs. 8 oz. less hardware. These were all Monokoted. The Hippo's (825) weigh 4 lb. 4 oz., done the same way.

The all-up weights on the Monokoted 750 Tipos have been 7 lb. 6 oz., to 8 lbs. The painted 750's run from 7 lbs. 8 oz. to 8 lbs. 8 oz. The 825 Tipos Monokoted average 8 lb. 4 oz., plus or minus 4 oz. Painted they weigh 9 lbs. to 11 lbs. Obviously the larger model can gain weight more easily because the surface area is larger and the volume is much greater.

What we are trying to show here is that you can build a lightly loaded model (like the old timers) but still maintain the smoothness and speed that we like on the present designs by just keeping the weight down. The big plus is that it is not necessary to run flat out to achieve good performance in vertical maneuvers and the speed-killing square maneuvers. The new FAI pattern which has been widely cussed and dis-cussed, can be flown quite nicely with designs such as these *if* you pay attention to the weight. You will find that they react dramatically to power settings when the wing loading is low . . . chop the throttle and the model slows quickly but doesn't sag. Advance the power and the acceleration is immediate.

The new patterns are going away from the heavy bias toward rolling maneuvers and the trend seems to be directed to a pattern copied from the full scale FAI schedules, which are really fun to fly and interesting to watch.

Our parting recommendation is to purchase some good quality scales, both gram and 0 to 20 lb. types, and simply watch the weight of your next birds. The difference in performance will be a pleasant surprise. Before you know it you will find yourself tinkering with squares, rolling circles, snaps, and all kinds of maneuvers the old lead sled wouldn't do.

The new snappy maneuvers will also be good exercise for the model and will help keep it slim and trim. I learned this from the Richard Simmons Show!●

Electronics . . . *Continued from page 25*

last milli-amp in, and thus out, of his motor batteries, the charging to take place in the shortest possible time. I know that this is a critical item with the 12th scale R/C car competition drivers also, as they have to start off with a full charge if they expect to go the required number of laps. Frankly, I do not have that kind of experience with Ni-Cd charging, though I know that some rather elaborate chargers are seen at the local track to accomplish the desired results.

There are some basics to remember, though, one being the matter of terminology, just so we all speak the same language. In the matter of charging rates, there are four common ones in use:

Trickle — .02% of the battery capacity.

Overnight, or Standard — .1% of capacity; the usual charger furnished with our R/C systems.

Quick — .3% of capacity, normally requiring 3 to 5 hours.

Fast — 1 to 4 times capacity, taking one hour or less.

I mention this because we R/C'ers tend to use 'Quick' and 'Fast' interchangeably, though we most often mean 'Fast'.

An important thing to remember when dealing with battery chargers of the automatic kind, which Phil specifically asks about, is that they are asked to measure and react to very small voltage changes, which makes them critical, complicated, and *expensive*. Another culprit that complicates matters is temperature . . . both that of the cells, which then feed erroneous information back to the sensing circuits, and within the electronics themselves, in which case their own calibration goes off. There are temperature compensated IC's and other components . . . at greatly elevated prices, which require more complex circuitry, greater calibration accuracy, and on and on to more $$$.

There have been some attempts by some manufacturers, such as M.E.N., which Phil mentions, to develop the better charging mousetrap. I know that that one in particular was stopped during early engineering stages, when it was decided that it would not be a marketable item due to price. No information or units are available.

At the current state of development, I believe that the best and least complicated way to go is with one of the digital voltmeter equipped chargers available from Leisure Electronics and a couple of the other 1/12th scale car makers. Be sure that your batteries are the fast charge type . . . all Ni-Cds are *not*. Read the battery and charger manuals carefully to determine the recommended procedures, and follow them to the tenth of a volt. If possible, a cooling off period, with a touch-up just prior to launch seems to help also.

And finally, we will ask for comments and suggestions from those more experienced in the field. . .

While on the subject of books, there is another publisher you should know about: TAB Books, Inc., Blue Ridge Summit, PA 17214. In its latest catalog, Tab lists a number of model radio control books by such well known authors as Edward L. Safford, and George Siposs. But the list of interesting publications doesn't stop there; there are many books on general aviation, hobby electronics, electronics test equipment, electronics technology, and small gasoline engines. There are many books on subjects outside our hobby, but still of general interest: automotive, computers, marine and boating, solar and energy, woodworking, etc.

Tab books are found in general book stores, and on the bookshelf at electronics stores here in California, you might take a look next time you are in one of these places in your area. Or write to the address above for the latest list of titles and prices.

★ ★ ★

I had another query from down "South of the Border". . . my good friend Benny Sanchez down in Mexicali is planning some long distance cross country R/C'ing, and wants to know how to connect external batteries to his transmitter to extend the operating time. For a final destination, I would recommend chips, guacamole, and margaritas by the pool at the San Carlos Hotel in Ensenada. . .

Since most R/C transmitters work off a 9.6 volt, eight Ni-Cd cell battery, we will use that as an example. Actually, the connections and procedures are the same, regardless of the voltages used. There are two common circuits in use, per the diagrams. Notice that in each case, the internal battery is connected to the center section of a two position switch, and is thus switched between the charger when the latter is connected, and the transmitter electronics. Connecting an external battery requires only bringing in the proper voltage and applying it to the transmitter side of the switch.

In this configuration, the transmitter will operate normally, until the outside voltage source is connected, at which time it will come "ON", even though the switch is in the "OFF" position.

How to get the voltage in is another matter, and will depend on the particular transmitter. If you have one with a multi-contact connector accessory socket on the bottom, and it has a couple of open pins, you can come through there. If not, you'll have to either make a hole, or possibly temporarily remove a screw or unused switch and come through that hole. If this is to be a permanent installation, of course, a socket can be installed wherever space is available.

Now, for the battery source. You can make up a pack of Ni-Cds, figuring about 150 milliamps per hour usage for the average transmitter. Or, you can make up a voltage regulator circuit per the schematic, and operate it off a 12-volt auto or R/C starter battery. You could make up a pack of alkaline "D" cells, using seven of them, to get 10.5 volts, which will operate most transmitters for at least 50 hours. Don't forget also, that should the external supply get used up, you still have the internal battery to work from.

If you wish, a switch can be installed in the external supply cable, to turn the system on and off without unplugging it. The usual R/C wire is good enough for the short internal connections in the transmitter, but use heavier wire, such as lamp cord, for the external supply to keep down the voltage drop. Be sure that the proper polarity is maintained, or it is "Adios, Transmitter".

TWO FOR THE MONEY. . .

There are so many, many goodies available to we R/C'ers now that just a very few years ago were merely dreams. One of them is the number of reliable twin-cylinder engines now being made by a number of firms, both foreign and domestic. They come in various sizes

and types, but they all have one thing in common, they require power for two glow plugs during starting.

There are any number of ways to furnish this glow plug power, but those of us who have experience with electronic supplies, glow-drivers, plug-drivers, or whatever name they bear, can attest to their superiority over a plain 1.5 volt battery, especially for those engines that are a little critical to get going. C & D Enterprises, manufacturer of the very popular Glo Driver that bears its name, now has available a driver for twins, two completely independent driver circuits, sharing only a common 4.8 volt, 1.2 amp Ni-Cd supply.

Each circuit is metered independently, allowing easier diagnosis of each plug condition and demands. A single switch is used which turns off the entire unit, allowing you to leave the plug connectors in place till you are satisfied with the operation of the engine and you are certain that a re-start will not be necessary. Obviously, each section can be used alone, so that either one can be used to start your single-cylinder mills.

The Twinn Driver comes complete with two "HEADLOCK" glow plug connectors and a multi-contact plug for attachment to the driver, which allows you to assemble cables with whatever connectors are most suited to your needs.

The Twinn Driver is manufactured by C & D Enterprises, 10042 Merimac Dr., Huntington Beach, CA 92646, and is priced at $89.95. There is a nice descriptive brochure you should write for. Tell 'em MB sent you.

DON'T JAM IT

One of the avoid-at-all costs rules during a R/C system installation is to never permit a servo to continue to operate against a mechanical stoppage. To do so makes the servo pull some pretty stiff currents, as much as half an amp for a normal servo, and surely much more for those high power jobs that have appeared recently. This can damage a servo amplifier, but even worse, it can run down the receiver battery long before its time, leaving you up there in the wild blue yonder without enough electrons to get you home in one piece.

Probably the greatest culprit in this respect is the throttle servo, and the fact that the exact amount of throw required by the throttle is not always available from the fixed amount obtained from the servo output arm. What is needed is an adjustable length servo arm, furnished by some of the manufacturers who recognize this problem, but so far, not available from all of them. However, relief is spelled "Robart", in the form of its Super Trim Arm, which is variable in length, plus a large number of adapters by means of which it can be used with most popular servos. A sketch of the arm and how it works is included. The Super Trim Arm is Robart No. 397, four for $1.98, while the Adapter of your choice is 98¢ each. Tested and recommended...

HATS OFF TO WORLD ENGINES

For some months, World Engines, Cincinnati, Ohio, ran an ad asking that we "Help us find the R/C Service Expert in your area", and offering schematic diagrams of its R/C equipment to "technical type model builders who fix R/C systems of club members and others in their respective areas".

Well, I for one think this is great, and wish to thank John Maloney and crew on behalf of all of us 'tinkerers' out here. Now I am the last one to recommend gambling an airplane and the people and property in its vicinity to a questionable radio, and the experts on a certain system are those who have the most experience working on them. But there are some rather basic things to electronics, and all inoperative radios don't necessarily need a trip back to the maker, with the subsequent expense in time and money, to get them back in the air. Toward this end, a schematic diagram is a tremendous help to a technician. I sent for mine, it arrived promptly the next week, and has been filed in the information file until the day it is needed to help someone make it to that contest he has been waiting for.

If other companies have similar programs, we'd like to hear about it so we can spread the word. •

Snow White . . . *Continued from page 20*

aviation Bill Effinger has, but to give credit where it's due!

I believe Joe would have given the Snow White to anyone who wanted it, providing they could come up with a set of plans. After all, he gave her to me . . . all I did was ask!

Now take a look at page 47 of the June '82 issue of *Model Aviation* and you will see where Bill Effinger said the Snow White was not a great flyer, powered with the Brown Junior. Bill would be more than correct in his estimate of

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Twelve full pages of ready-built models plus used equipment bargains in the last issue of "Hobby Swap News," Buy-Sell-Trade, your first ad free (35 words max, B&W photo $2 extra) with subscription: $10/yr. (10 issues), $19/2 yr., $27/3 yr. Add $3/yr. for 1st class postage, (required for Canada & Mexico), MC & Visa accepted. Hobby Swap News, Dept FLC-32, P.O. Box 834, Santa Maria, CA 93456.

FOR SALE: R.C.M. 1965 thru 1981 $150.00; M.A. 1975 thru 1981 $50.00; R.C.M. & E 1963 thru 1975 $75.00; R.M. 1970 thru 1981 $50.00; Aeromodeller 1971 thru 1981 $40.00. All magazines in volume with binders. All for $350.00. Enrique A. Blandino, 549 Washington St., La Cumbre, Rio Piedras, PR 00926.

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Entire complete collection of beautifully bound Model Builder magazines in 12 volumes $300. Entire complete collection of American Aircraft Modeler in 16 beautifully bound volumes $352. Phone (408) 266-9796.

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RET has 'um! The Trail Blazers — full size 3 views — and others: Those Flying Aces models that are classics. SASE for list. RET Plan Service, P.O. Box 7893, Midfield, AL 35228.

PEANUT & WALNUT SCALE PLANS. Send SASE for list or $1.00 for sample plan and list. David Diels, Box 101, Woodville, OH 43469.

flight performance if the large and heavy Snow White was indeed powered by a Brown. The *fact* is, it was powered (and very ably) by a Forster "99". Surely, the designer would remember that! *(Sal Taibi recalls that Joe did try a Brown, found it was inadequate, and went to the Forster 99. Sal says it was a fine flier. wcn)* Joe's reason for not flying Snow White every weekend and in open free flight competition was a simple one. The ship was a "Beauty" model and he didn't want it smashed up, or end up in the trash as did most competition ships (then and now).

For you under 40 types, who may not know about "Beauty" events at contests, I have to mention that even "Beauty" models had to make qualifying flights. In other words, you had to fly to win, it was *not* a static display!

Let's turn to page 107 of this M.A. feature, paragraph two, where it states, the full sized Snow White has a 90 inch wing span. Wrong again, it has an eight foot wing span (that's 96").

Last, but by no means least in my case for Joe Raspante, turn back to page 46 and take a casual (not careful and close) look at what Bill Effinger calls the "redesigned Snow White 20". O.K.? Now look at the plans pictured in this Model Builder article, I say to you, there is *no way* that the "20" is a copy of the Snow White, re-design, reduced or otherwise! You be the judge! As far as I am concerned, one is Snow White and the other the Wicked Witch!

There can be no doubt about the authenticity of the Snow White plans herein, they were drawn by taking apart the *only Snow White ever built* and tracing the parts.

"MIRROR MIRROR ON THE WALL... WHO IS THE FAIREST OF THEM ALL?"

Now that I have the debate out of the way, let's talk models.

I first saw the Snow White in a book at the Baltimore, Maryland Public Library, when I was a boy. The book in which it was pictured was, *The Theory of Flight* by Air Age Inc. This was late in 1941. I know it was in December 1941, because I had asked my Mom and Dad to give me this book as a Christmas gift. This was not just any December, way back when, but December, 1941. You see, my Dad was a career army officer, and I recall he was more concerned about the war we had just entered, than model airplane books. (I got the book anyway). In this book, on the first page, was a full page photo of Joe Raspante's "Snow White". It was love at first sight. However, some 36 years would go by before Snow White would enter my life again.

It was the summer of 1977, I was reading a 1938 copy of *Model Airplane News*, that belonged to a collection of a good friend, Tom Feicco. I couldn't believe my eyes when I saw Joe Raspante's name in the caption. The next day I called Joe and asked if he still had the plans. My heart sank when he said no. He explained the drawings were done on brown paper bags, and after the model was completed, they were discarded. I understood how that could happen, because in my own miss-spent youth, I used to tape pages of loose-leaf notebook paper together to make sheets

large enough to draw plans on. I designed and built a lot of airplanes back then, and if my life depended on it, I couldn't come up with a set of plans today. Needless to say, I felt great disappointment. However, Joe's next statement was, "I think I still have the Snow White somewhere up in the attic. If it's still there you can have it."

Burning rubber all the way to Joe's house, I arrived before the phone line had cooled off. There, in Joe's immaculate shop (more about the shop later) was that beautiful ship I had fallen in love with so many years before. It was like going home again. My thoughts filled with boyhood memories of the Sunday contests at Model Haven. Nostalgia dripped from every pore. The next step was to figure out how to draw an authentic set of plans, without destroying that magnificent old girl.

Snow White sat on a drawing table, in my studio, for two months or more, while I contemplated my next step. Finally I came to the agonizing conclusion; the only way to save Snow White for future generations of modelers was to systematically destroy her! The next morning, I called Joe with the bad news. Without any hesitation he said, "Do whatever you have to do, but let's make her live again."

The model was in fairly good condition considering it had spent the past 20 years or so in the attic, with temperatures as high as 110° in the summer and as low as 0° in the winter. At one point, it had even been used as a tricycle by his grandson! There was almost no silk at all on the open frame work, none at all on the wings. The exposed wood was in very bad shape, dry, broken, it almost crumbled at the touch.

The wing seemed a good place to start, so after selecting the one in the best condition, I carefully traced the wing outline, both panels. The rib locations were marked in position. Using thinner and model knife, I began removing the top planking, thereby exposing the structure beneath. Then the trailing edge and wing tip pieces were removed, dried, and sanded. A large razor saw was used to cut through the spars and leading edge to remove the ribs. The spar sections, leading edge chunks and cap strips where then removed from the ribs using thinner. Most of the ribs were in poor shape and care had to be taken not to destroy them. In a few cases the ribs had to be "rebuilt". After the set of ribs was assembled and sanded smooth, the wing parts were traced. None of the parts of Snow White, except those made of plywood, were worth saving, so no effort was made to save anything.

The other day I was talking with Joe and asked how he plotted the wing ribs. He laughed, and then described an incredibly simple procedure. I must confess it would never have occurred to me in a hundred years. After selected a suitable airfoil, you make *one* rib out of balsa or even cardboard. Using a D.C. light (A.C. will not work), you adjust the distance between the rib and the light. The resulting shadow will give you a perfect rib outline, of whatever size you want. This is an indication of how the inventive mind of Joe Raspante works.

The tail group was next in line for disassembly. Using the same technique as with the wings, it proved to be much simpler to put down on paper. While we're talking about the tail, check the really neat *Track* and *Key* method used to align and hold it in place. The only rubber bands needed are between the two hooks, on the bottom of the sub-rudder.

The most difficult task was taking apart the fuselage. You can learn a lot about a modeler by taking apart his airplanes. The strip planking was just unbelievable, every strip was carefully tapered to an *exact* fit. There was not one trace of wood filler. All the fillets were carved balsa wood. All the markings on the ship were hand painted. No masking tape or decals were used; the pin stripes were hand painted. There were traces of an AMA number on the cap strips. They too were hand painted, red numbers and letters with a black outline. The entire ship was covered with white silk. The fuselage and tail were painted all white, the wing was painted white on the planked area only, the open area of the wing was clear doped. Around the edge of the open area of the wing was a hand painted red line, about 1/8 inch wide. This is "Craftsmanship" with a capital "C"!

It was just about impossible to remove the strip planking with thinner, without damaging the structure beneath. So out came the razor saw again. The fuselage was taken apart one bulkhead at a time, starting at the tail. The distance between the formers was carefully measured at the time of removal, and that information transferred to paper. This way the airplane kept getting smaller and the drawings kept getting larger. Using this method, there is no chance of missing or misplacing any parts. It also makes it possible to stop at anytime and pick it up again weeks later, without missing a trick! The bulkheads were disassembled using the same thinner, saw, and knife routine, then carefully sanding and rebuilding where needed. Making construction drawings using this technique is very time consuming and often a frustrating business. In writing about this project, it seems things went along fairly quickly. Not so! Between earning a living, working on other projects, and repairing my oft-damaged flying machines, almost five years passed, from start to finish.

This is the first time I have drawn plans for an airplane I didn't build. There is no need to prove the design or check that parts fit, because the parts all came from a ship we all know was a winner. I have every intention of building Snow White, one day, but was very anxious to get this article into print, for reasons that should be very clear by now.

I won't include any building instructions, a few pointers, perhaps, but that's all. First of all, this ship should only be built by a modeler with some experience. It is not an easy project. There were many times, while drawing the plans, I thought of different, perhaps easier ways to do things, but decided to make no changes in the structure at all.

Joe used "plug-in" landing gear for two reasons. First, it made it simpler to plank and finish the fuselage. Second, he didn't want to take the chance of dinging-up the wheel and strut fairings. So he made two sets of landing gear, one without fairings for flying, and one for show.

I was tempted to bolt the wings on with nylon screws, but thought better of it. By the way, the wings of the original were held on with a long strand of 1/4 inch rubber (6 to 8 feet) attached to the front landing gear wire, over the wing and under the belly of the fuselage. The engine mount is for the Forster 99. There is no suggested radio installation or anything else not in the original. The engine top hatch was held in place with an internal rubber band and hook.

In looking at some old photos of Snow White, just before this writing, I found I had omitted one detail. That was the cover for the access panel on the right side of the fuselage. This part was lost years ago, so was not with the ship when I took it over. Very close inspection of some of the old photos will show that Snow White went through some very minor changes, before her completion. The only change I would suggest is at the leading edge brace. The plan view of the wing shows the part just as on the original. However you will note the leading edge brace drawn with the parts is longer . . . it will go from rib to rib. I feel the longer brace and some glass tape would make a much stronger wing, but the choice is yours. Other than that small change, you have the "SNOW WHITE" as designed and built by Joe Raspante in 1937.

About the designer: Joe Raspante is a most unique person. His interest and talents range in every direction. Today most of his time is spent with his model airplanes and boats, and his TV ham station (that's right TV). When I first met him, years ago, it was only a radio station. Every item in his station is hand made by him, with the exception of TV monitors, cameras (color and black & white) and a recorder. He has a servo system, he made, to operate a robot that moves, focuses, and zooms his cameras while he broadcasts. It's far out!

Joe was one of the nation's pioneers in early R/C flight, with equipment of his own design. His first R/C airplane now hangs in the Long Island Air Museum, at Mitchell Field. He has been honored by the AMA on a number of occasions, including the AMA Distinguished Service Award, for outstanding service to the hobby since 1924. Also, he was honored by the Long Island Drone Society with a life membership.

This man seems to be able to make anything he sets his mind to. He has scratch-built a four-stroke, four-cylinder, overhead valve, water cooled marine engine that powers a P.T. Boat that is nothing short of awesome!

His shop is the best equipped, best organized and cleanest shop you have ever seen. It is disgusting to see someone so neat! My shop looks as if it was bombed, and that's after I've cleaned it up! There is never a chip of wood or scrap of paper on the floor. Not even dust! One would think he never did a thing but clean up.

I have yet to meet anyone who is not fond of this gentle, kind man. The first thing that impresses you about him is, he is a "gentle" man, thoughtful, always helpful and completely unaware of his value to the rest of us. After all, don't you think it would take this type of man to dream up "SNOW WHITE"? . . . I do!

★ ★ ★

ADDITIONAL CONSTRUCTION NOTES BY WCN

In this day and age, only the most stubborn purist would build this magnificent model as a free flight, to be turned loose into our rapidly decreasing, unencumbered air space. For this reason, I have indicated suggested R/C control surfaces in dotted lines. Note that S/W's outline has not been disturbed. As the horizontal stab is located at about the mid-point of the vertical stab, I split the moveable rudder area into two parts, connected by a typical wire joiner normally used on two-piece elevators. The elevators, in turn, are spaced far enough away from the center line to clear rudder action, thus avoiding a V-notch in either surface. Naturally, the elevator pushrod will have to be split into two units.

Note that the wing leading edge is made up of 1/8-inch sheet laminations. For sturdier but light construction, I'd suggest the trailing edge and tail surface outlines be laminated also.

Though it's too soon to know the price or when they will be ready, Gene Wallock and Bob Sliff are working on the preparation of partial kits for Snow White. These will be marketed through Bob's "Hobby Horn", Box 3004, Seal Beach, CA 90740, phone (714) 894-6223, and by the time you read this, will probably be available.

Ah yes . . . the balance point. In the best tradition of old timer plans, it's not available, but try one-third, or five inches back from the wing leading edge at the fuselage. •

Back Bee . . . . *Continued from page 49*

configuration could be easily determined from any published Aeronca C-2 drawings, such as those available from Historical Aviation Album, Box 33, Temple City, CA 91780.

Bob Granville also graciously supplied color information, recalling that the Ascender wings were dark orange while the fuselage was green.

Grateful acknowledgment is extended to the following individuals for their contributions to this article: The late Robert H. Granville and his wife Eva, Granger Williams, Frank T. Courtney, Tom Nallen, Henry Haffke and Jim Page. •

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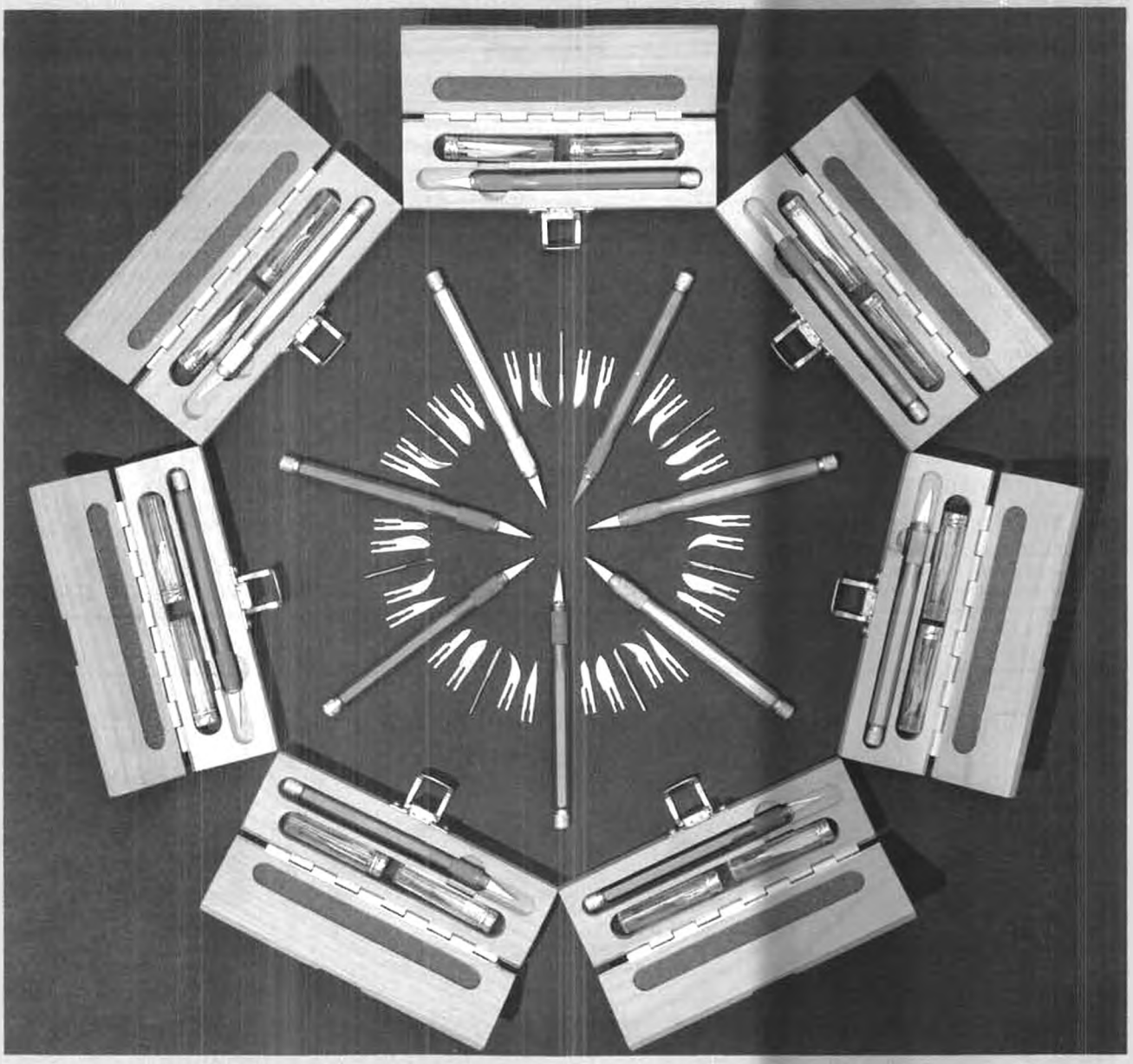

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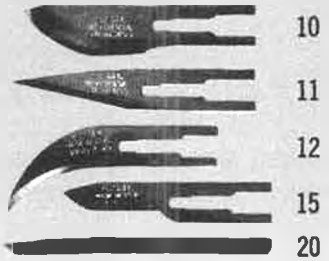

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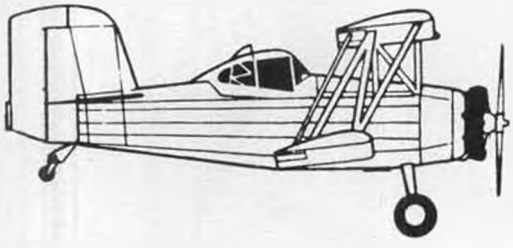

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