

MODEL BUILDER

ICD 08545

MAY 1983

\$2.50

volume 13, number 136



COMPLETE

Model Builder Plans List!

See Page 98



Recognized for Quality
THE WORLD OVER



Taggerwing Beech
1/5 scale



Christen Eagle II
1/3 scale



V-35 B Bonanza
1/6 scale



T-34B Mentor
1/6 scale



MiG-15 (ducted fan)
1/6 scale



F-33A Beechcraft
1/6 scale



Pitts Special
1/3 scale



T-34C Mentor
1/6 scale



Mirage (ducted fan)
1/7 scale



Beech Baron 58
1/6 scale

CAP 21
1/4 scale



F-86 Sabre Jet
Avail. in D & H
models (ducted fan)
1/8 scale



Kfir
1/7 scale



P-51 Mustang
1/5 scale



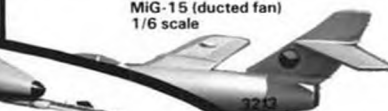
A-36 Beech
1/6 scale



A-4 Skyhawk (ducted fan)
1/7 scale



F-16 (ducted fan)
1/8 scale



MiG-15 (ducted fan)
1/6 scale



Byro-Jet ducted fan
(for .60 engines)

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against the commutator in precision brush tubes to eliminate power loss and allow accurate timing.

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The Leisure Playboy is an extremely stable sailplane, a perfect kit for beginners and contest flyers alike. Scaled from the winning free flight original of the 40's, our 67" span Playboy is already 3-for-3 in Old Timer competition.

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volume 13, number 136

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Cover: Can anyone offer a more scenic spot for slope soaring than this? It's Grouse Ridge Lookout, altitude 7707 feet, near Grass Valley, in northern California. The gentleman launching his stock "Gentle Lady" is TWA pilot Eli Whitney . . . honest . . . Photo taken last summer, on Kodak color print film, by Tony Palethorpe. Oh yes . . . there is a large, grassy landing spot well out of the turbulence, behind the ranger station just visible at the left.

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SIG KITS AROUND THE WORLD



Anthony Cantarella of the Simi Valley (CA) Fliers did this Kadet MKII conversion to a low wing. He changed the dihedral to 1" under each tip, recessed the wing into the fuselage 1/4" from the bottom and mounted the engine at a 45° angle. "The plane flies beautifully."

Above: Ed Wisser (McKeesport, PA) added a lot of scale detailing to his beautiful 1/4-Scale J-3 Cub, including inspection panels, rivets, control pulley's and a full cockpit with upholstered seats and seat belts. Ed said, "You did an excellent job in designing this airplane to 1/4-scale kit form. Your plan drawing's are good and very accurate. The building instructions are also good and easy to follow. As with all Sig kits, this J-3 could be built by a beginner. There is nothing I can add to your instructions, you covered it all."

He used Sig Koverall covering and installed a Kioritz Jr. 1.3 cu. in. gas engine. Ed expects to display this fine piece of craftsmanship at Toledo.

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ENGINES: .60 or 1.5 Glow or Gas		ENGINES: .40 - 50	



Butch Ranger and Dick Krueger (Watertown, WI) built these two sharp looking Como .51 powered Kougars. Dick said, "Both fly super great. We just can't say enough about the flight performance of these planes!"



J. Holdsworth (Liverpool, England) wrote, "I am a member of the Liverpool and District Model Aircraft Society and the Super Chipmunk always attracts a lot of attention from members and spectators at the club flying field. During the plane's life it has been put through practically all aerobatic maneuvers and has handled beautifully. It is a model that can be truly recommended for performance, stability and looks."

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PH: 713-488-6313
HURST
1309 Newwood
SULLY SPRINGS
Miller's Hobbies
624 Bethune St
OREM
Miniature Aircraft Prod
811 W 400 N
PROVO
The Model Shop
42 W 300 N
VERMONT
NORTH FERRISBURG
Yandow's House of R.C.
Route 7
SWANTON
The Hobby Shop
RFD 1 R 7
PH: 802 524 2715
VIRGINIA
ANNANDALE
Model Masters Inc
6920 Braddock Rd
RICHMOND
Gee's Hobby Center
3002 Cary St
ROFLINIA BEACH
Hobby Craft Centers
#1 967 Providence Sq. apt
#2 62 Princess Ann st
WASHINGTON
BELLEVUE
RC Model Shop
14020 N.E. 21st St
PH: 747 9914
BELLINGHAM
Hobby Hive (Graham's)
131 E Margale St
RENT
Kent Hobby Craft
Kent W. Mall 1343 W Maple

PUYALLUP
Frogrove Model Supply
10611 136th St East
PH: 845 7675
SEATTLE
Webster Supply Co
17819 Aurora Ave N
TACOMA
Beli's Hobby Town
14914 Pacific Ave
PH: 509-529 2618
WALLA WALLA
Harley's R/C
Route 1, Box 277A
PH: 509-529 2618
WEST VIRGINIA
CHARLESTON
Fountain Hobby Center
200 W Washington St
WISCONSIN
BEAVER DAM
Parks Electronics Hobby
713 Park Ave
GALESVILLE
R/C Unlimited
825 Park Drive
PH: 608-582 2833
MARSHFIELD
Mid Wisconsin Hobby Center
Northway Mall
50 S. Ives St
MINNESOTA
MINNEAPOLIS
Trus Value Hardware
1512 9th St
L. Marlin's Shopping Ctr.
MILWAUKEE
Casanova's Hobby
1423 S Milwaukee Ave
PH: 414-672-2700
CANADA
BARLW ALBERTA
B & P Transport Ltd.
Box 9
PH: 373-3953
CALGARY ALBERTA
Hobby World Canada
5655 56th St. N.E.
CALGARY ALBERTA
P M S Hobby Craft
Calgary North Hill Centre
WINDUP MANITOBA
Callar Duster Hobby Ltd
1354 Main St
PH: 589 2037
WINNIPEG MANITOBA
Gooch's Hobbies
646 Por-Lage Ave
ST JOHN'S NLFD
Capital Hobby Centre, Ltd.
6 Freshwater Road
DUNDAS ONTARIO
Shaynall Hobbies Inc
138 York Road
SCARBOROUGH ONTARIO
Toronto R/C Hobby
1869 Lawrence Ave E
PH: 416-755 1766
WILLOWDALE ONTARIO
Keith's Hobby Shop
5205 Yonge St
PH: 416-722 4721
ARVIDA QUEBEC
Lalonde Radior Ent
118 Mathias - CP 341
PH: 514 549-1348
HAUTIERE QUEBEC
Le Centre Du Modelisme
Alard 1223 Laval
MONTREAL QUEBEC
Can Aer Hobbies
5850 Gouin Blvd Ouest
PH: 514 332 3565
ST GEORGES QUEBEC
Le Mur du Son
1050 157 Rue
PH: 418-228-1374
SASKATCHEWAN SASKATCHEW
Collins' Aero Craft
238 First Ave North
PH: 632-4775
YORKTON SASKATCHEW
Radio Control Hobbies
39 Bertha Ave
WHITEHORSE YUKON
Ker's R/C Supply
8 Tetchum Road
ALBERTA
667-4984
ALBERTA
SUNSHINE QUEBEC
BROSIAE QUEENSLAND
Underwood 4119
The Hobby Warehouse
30 Kingston Road
COLUMBIA S AMERICA
Aeromodels Britania Ltd
Aparado (P.O. Box) 52530
Bogota 2, Colombia
PH: 212 7309
ENGLAND
LONDON N7 6NP
Henry J. Nichols & Son Ltd
308 Holloway Road
ISRAEL
REHOVOT
Tasman Rahovot
70 Derech Yavne
NETHERLANDS ANTILLES
CURACAO
Cooper's ModelHobby N.H.
AVVC Building Room 13
Schouburgweg 44
P.O. Box 3101
NEW ZEALAND
INVERCARSI
Model Shop
55 Arcade Dee St
PH: 69439
SPAIN
SITGES BARCELONA
Mito & Paul Paslaciak
Calle Juan Maraga 26
SWEDEN
S-871 02 HARNOSAND
Model Producer
Box 2060
CHILE
CARACAS 1070-A
Hobby World, C.A. (Dist.)
Apartado Postal 75094
PH: 021 34 33 02
CALIFORNIA (Foreign Dist.)
IRVINE
Exportations Ltd
17835 Sky Park Circle E
PH: 714 957 1331

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



**from
Bill
Northrop's
workbench**

• • •

• Spearheaded by the quote from Fred KomLosy's comments in his Palm Beach (Fla.) Aeronauts newsletter, our "Whither Guest Model Airplanes" editorial in the March *Workbench* column stirred up lots of commentary from readers. If nothing else, the reaction confirms our belief that no matter what becomes of the model airplane hobby as we've known it in recent years, there will always be a hard core of designers, innovators, scratch builders, and experienced fliers who will keep the genuine hobby alive for future generations.

We offer two letters of special interest. First, from Bob Buck, Boston, Mass.

"Was most interested in [your] "Workbench" in March . . . "Whither Goest Model Airplanes?" I've moved to Beacon Hill in Boston . . . the city life for a bit, to provide new horizons, etc. However . . . finding model building there (and associated hobby stores with wood models and supplies), or in most any metropolitan environment, is a mission the FBI would be proud of.

"Course, I am the minority, but the convenience of plastic, Atari, and so many other diversions, certainly seems to challenge the future of model building. Guess one way to practice our hopes of model building's future is to offer our happiness in hobby to the youth.

"By the way, I'm curious how downtown Boston might handle an active model builder chucking HLG's amongst the Boston Common. Maybe I'm not such a minority . . . we'll see. Suppose jogging or roller skates would allow more meetings of the opposite sex, but maybe we're just in time for a new fad



While "Pug" Henry was having trouble getting a command after Pearl Harbor, your editor/publisher was finding it increasingly difficult to indulge in his favorite hobby while participating in the Naval ROTC program at college. Those are the freshman dorms at Rensselaer Polytechnic Institute, and we're holding a just finished Thermic 72.

. . . the 'Boston Glider Chuckers'."

Thing to do, Bob, is to convince the gals that glider chucking is good for . . . er . . . upper chest development.

And from Don Ross, Cresskill, NJ . . . "I read with interest your March 1983 *Workbench* article in *Model Builder*. In general, I guess you are right that the old time stick-and-tissue, problem solving model builder is dying out. However, a few of us are making a valiant fight to preserve some of the old time values.

"Last year we held a Pacific Ace One Design Contest at Galeville, New York, along with the East Coast FF Champs. With almost no publicity, we got over 20 contestants and we had a world of fun. Our Toilet Paper Tow event and my on-the-field flight of 14 minutes in that event turned our contest into news that appeared in several magazines. So far this year, because of the few paragraphs of publicity we got last year, we have over 45 people eager to enter this year's contest. Most of them are over 45, but we have a few young recruits who will help to keep the hobby alive. In my area alone (North New Jersey), five people have called me and gotten active in modelling again . . . some after a 20-year layoff!! One fellow is finishing a Puss Moth covered with silk!! That's the first silk covered rubber scale FF I've seen in many years.

"I think we can keep this thing alive a little longer if we try to emphasize FUN rather than setting records. A lot of the guys who flew with us last year came along to get into a relaxed contest that anybody could win. Events like the Time Target (Joe Beshar's ideas, I think) and the Mystery Time (the winning time is picked from a hat after all the flights are over), Toilet Paper Tow and this year's Fly 'N' Run are sure to provide fun without pressure. We've even got a few RC'ers who want to try rubber so they can fly something slow for a change."

According to a flyer that Don attached, there will be another One Design contest, at Galeville, NY, in conjunction with the 1983 East Coast FF Champs in June. This year's one design is the "Black Bullet". Kits for the BB are available from Schlueter F/F Models, 3508 Poinsettia Ave., Manhattan Beach, CA 90266. See our Jan. '83 "Over the Counter", or write for information.

The new Fly 'N' Run event works as follows: You get a 15 minute time window in which to get all the air time you can. You must retrieve your model and return to the flight line for each launch, and flights of under ten seconds don't count. The kids should do well in this one. You may wind while retrieving . . . if you can! (Hmmm . . . maybe they

Continued on page 96

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.

- Do pinstripes have you down? Do you hate working with masking tapes? Well, Model Rectifier Corporation (MRC), 2500 Woodbridge Ave., Edison, NJ 08817, just might have the answer to your pinstriping problems.

The answer comes in the form of Tamiya's new Paint Marker pens. MRC is the distributor of these labor saving pens that look like felt-tipped marking pens (a la Marks-A-Lot, etc.). In use, the Tamiya/MRC Paint Markers are actually quite different than common marking pens. First of all, they are filled with enamel paint, *not* ink. Secondly, the body of the pen is metal, *not* plastic. Thirdly, and most apparent when one shakes a Paint Marker, there is a mixing ball inside which rattles around like one of those aerosol "paint bombs" or spray cans which we have all used at one time or another.

The felt tip of the Paint Marker is



New "Hornet" Embryo kit from Micro-X.

chisel-shaped and measures four millimeters by one millimeter. This tip is used to break the seal in the main body of the pen (thus allowing paint to flow) by pushing it against a piece of cardboard four or five times as if to make four or five dots or periods. Once the paint begins to flow, you can use the Paint Marker on wood, glass, metal, or plastic to paint fine detail or large flowing areas with ease. There are no brushes to clean up when you are done, or paint jars to spill in the middle of a project.

Tamiya/MRC Paint Markers come in

12 assorted colors. Seven of the 12 are glossy: black, white, royal blue, green, orange, red, and lemon yellow. Two colors are metallic: chrome silver, and



MRC's new Tamiya Paint Markers.



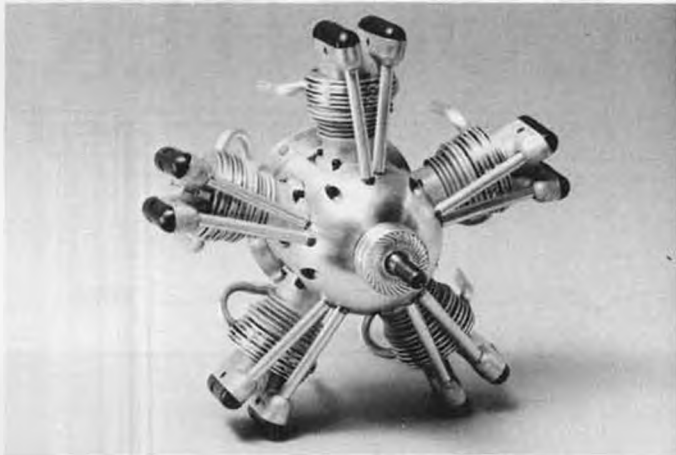
World Engines' new O.S. 25VF DF ABC



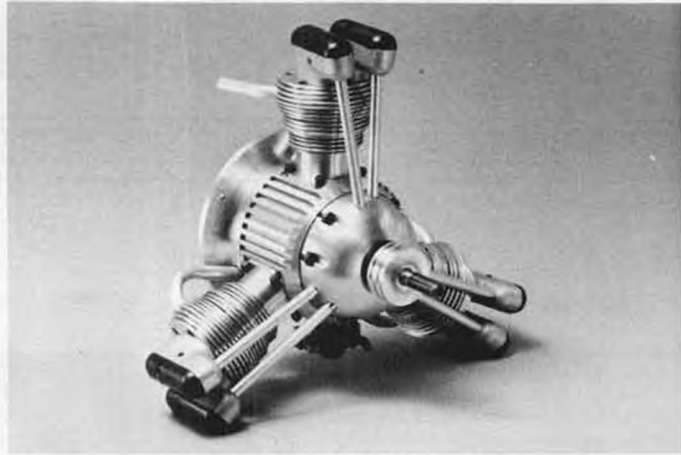
Dynamic Models' WW-II "Castle" Class corvette hull in fiberglass.



T and D Fiberglass Specialties' newest fiberglass cowls.



Big Bore 5 radial glw powered engine from Technopower II.



Three cylinder, 1.3 cid radial also from Technopower II.

gold leaf. The remaining three are matte finish: black, flesh tone, metallic gray. Also worthy of note is the fact that these Paint Markers are expertly matched to Tamiya's regular line of acrylic paints. They are identified with the same names and numbers, too; and each Paint Marker contains eight grams of enamel paint . . . enough for fifteen 1/24 scale cars. Give 'em a try!



T and D Fiberglass Specialties, 30925



P-51 check from Identity Check Printers.

Block, Garden City, MI 48135, (313) 421-6358 has announced the availability of four new fiberglass cowls for your scale and competition modeling convenience.

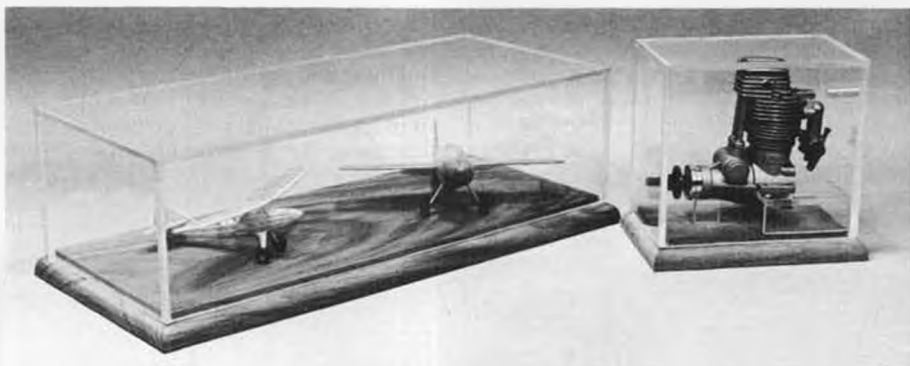
In the photo from left to right are: a 1/4-scale cowl for Wayne Ulery's Laser 200 (one-piece wheel pants and canopy are also available); a cowl for Jim Messer's Ercoupe, which comes in two lengths, one as shown on the plans for mounting a Quadra at a 45 degree angle, and the other (1-1/4 inches longer) for mounting a Quadra vertically so that nothing sticks out except the exhaust

stacks; the next cowl is for the T and T Models 1/5-size Globe Swift; and finally a cowl for the Art Johnson P-43 as featured in the March '83 **Model Builder**.

Write to T and D for further information, and send an SASE for a complete price list.



Identity Check Printers of Park Ridge, Illinois has announced two new additions to the World War II Warbird Check assortment. As of *right now*, you can have bank checks with backgrounds showing eight popular WW-II aircraft. The new, expanded assortment features



Brufen Products Galaxie III display cases can be ordered in any size.



World Engines Expert Mark 9 transmitter.



Sailplane beefed-up with cured carbon fiber composites from Twin-K.



WW-I style Standoff Scale biplane from Balsa USA.

the P-51 Mustang, the world's fastest and most popular single engine fighter plane and popular R/C model; plus the F4U Corsair of "Baa Baa Black Sheep" fame, the P-38 Lightning, the B-29 Superfortress, Avenger, Wildcat, AT-6, and B-25.

Identity Check Printers also produces check assortments for Piper, Cessna, and Beechcraft buffs. For those hooked on nostalgia, a Golden Age of Aviation assortment which includes the Beech Staggerwing, Curtiss Jenny, and J-3 Cub, is available.

Aircraft Modelers can order 200 of these exciting checks direct from Identity Check Printers by sending their current check for \$10, a voided sample check, and a sample deposit slip. Mail to Identity Check Printers, P.O. Box 149-D, Park Ridge, IL 60068 or call (312) 992-0882 for additional information.

★ ★ ★

Micro-X, manufacturer and supplier of indoor model kits and hardware, has

announced the availability of its newest kit, the "Hornet" Embryo. It is a rubber-powered contest model for beginners and experts alike. With its 18-inch projected wingspan, half-ounce weight, and stick-and-tissue construction, the model has been designed for maximum performance with the least amount of construction effort.

Included in the Hornet kit are full-size illustrated plans with building and flying instructions, quality printwood, 18-inch stripwood, colored Japanese tissue, plastic parts pack, and rubber motor for testing. The Hornet is designed to meet the Embryo rules, including all bonus point requirements. Micro-X technology assures an easily-built kit that not only looks good, but achieves flights of long duration for the competitive flier!

See your local Micro-X dealer, or write to Micro-X, P.O. Box 1063, Lorain, OH 44055, for further information.

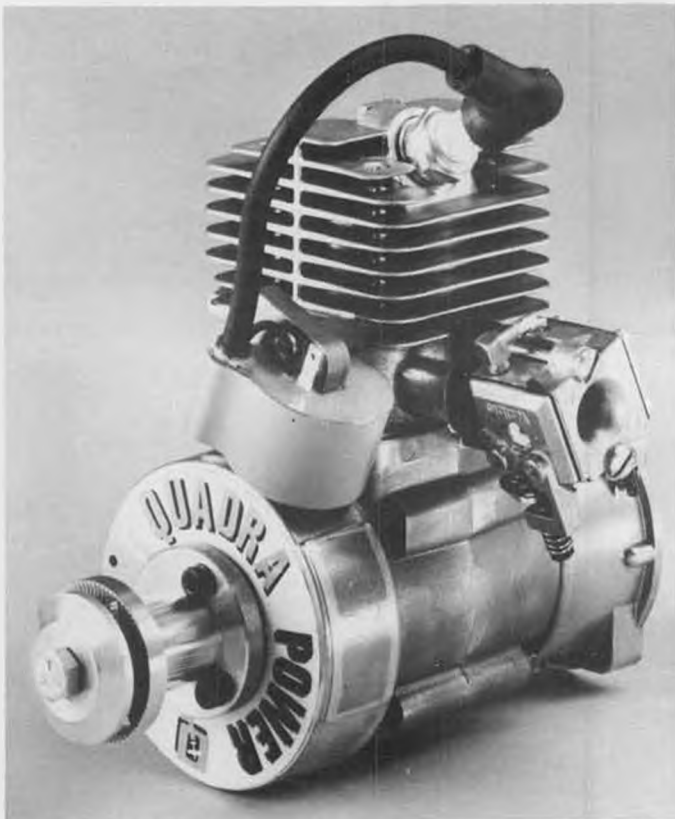
★ ★ ★



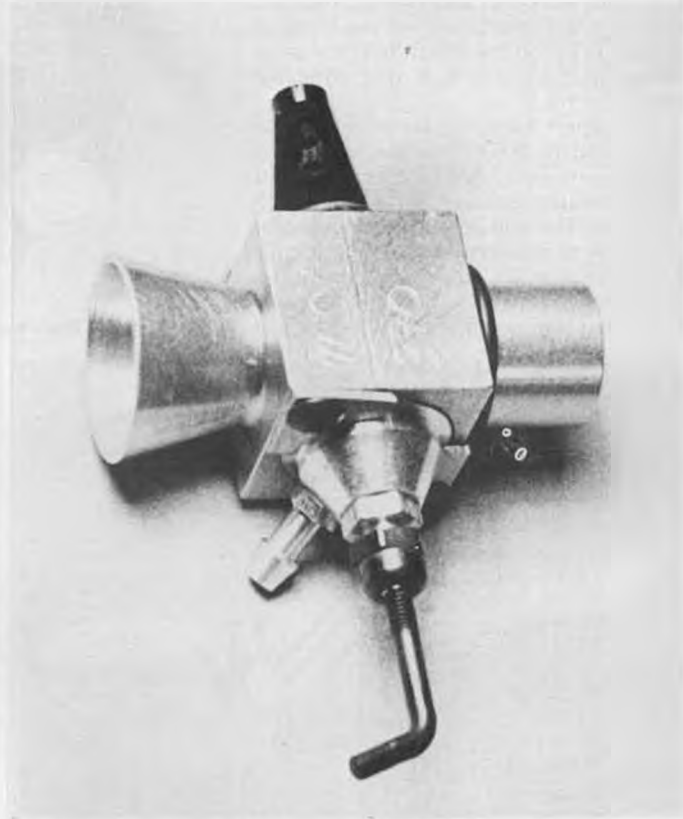
Nerf bars, rear cage, and wing for Bolink Digger 10.

World Engines, 8960 Rossash Ave., Cincinnati, OH 45236, (513) 793-5900, proudly announces the availability of its newest powerplant for ducted fan models, the O.S. 25VF DF ABC.

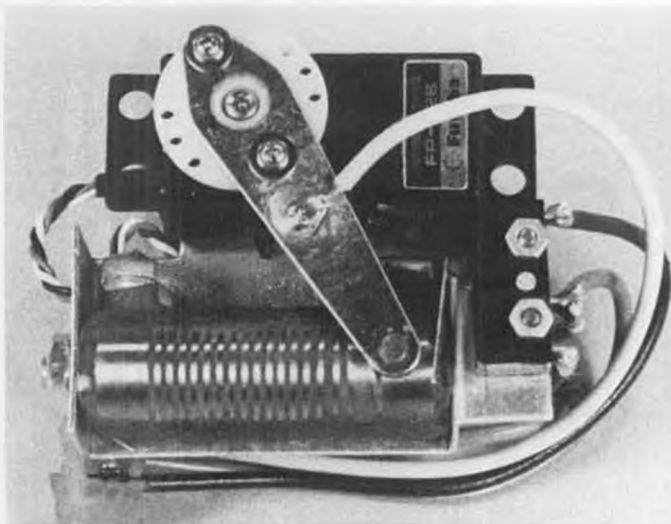
The new O.S. 25VF DF ABC is a powerful entry into the .20 size ducted fan area. This front induction/rear exhaust engine is housed in a crankcase that is the same size as most of the 3.5 engines currently used, yet its added displacement and higher exhaust timing pack considerably more punch than any ducted fan engine previously available in this class. The 25 VF DF is Schneurle scavenged, with twin ball bearings, and an Aluminum/Brass/Chrome (ABC) piston/cylinder configuration. Exact specs include a displacement of .248 ci (4.07cc), bore of 18mm, stroke of 16mm and weight of 8.11 oz. When run on 15 percent nitro, the engine will develop maximum thrust between 20,000 and 26,000 rpm.



TML Manufacturing's new 4 hp Quadra (Q50).



Metal Concepts' carb for .65 engines.



Bolink speed control unit for R/C cars.

(Please note: This engine is designed specifically for ducted fan usage and is not designed to perform as a standard aircraft powerplant. O.S. makes an aircraft version of this engine, the O.S. 25 VF.)

This engine is available exclusively from World Engines.

Now, for those who may be in the market for a new radio, consider the fact that World Engines' Expert Mark 9 Radio Systems are now available on all the new frequencies recently approved by the FCC. World's Radio Repair Dept. is also able to convert any Mark 2, 3, 4, 5, or 9 System over to the new bands, although they caution against jumping frequencies unless there is a really good reason to do so. The existing frequencies (pre-FCC Rule Change) will still be legal for the next five years, and unless there is interference on those bands, there is no reason not to continue operating on them.

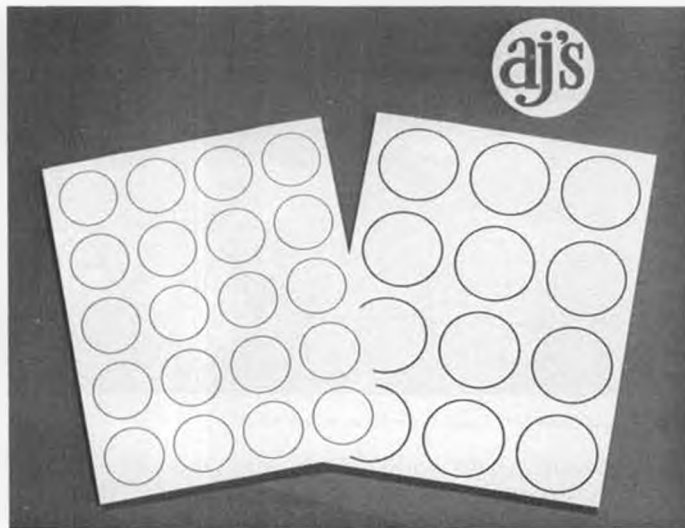
The Expert Mark 9 Transmitter can be purchased in four, five, six, or seven-channel models. Servo reversing and throw adjustment are standard on all channels. The transmitter may be bought as a four or five-channel unit and later expanded to six or seven channels, providing a radio system which can grow along with the user's abilities. Expansion

is done by means of a simple plug-in pigtail braid . . . no soldering or return to the factory is necessary. Another feature is a new gimbal stick with all mechanical trim.

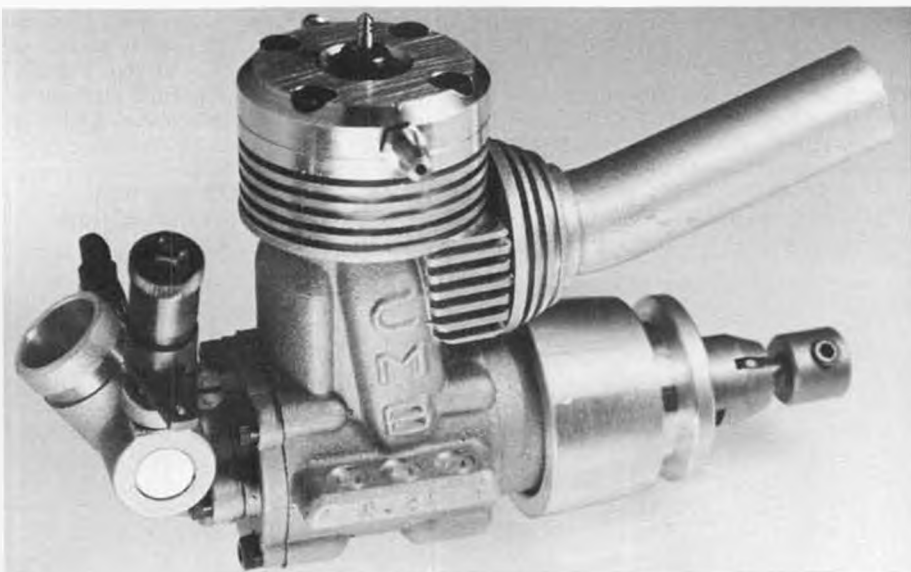
The best news about the Expert Mark 9 is the price. World has priced the Mark 9 Systems to compete with any entry-level

system on the market, and with the expandable number of channels, a novice flier can start small, expand the radio to fit later projects, and not be stuck with buying a new radio every time he starts a plane that needs additional

Continued on page 87



Twin-K R/C car racing "meatballs" in 1/8 and 1/12-scale sizes.



New CMB/3.5 Marine engine available from TEJA Engineering Co.



Craft-Air's new aerobatic sport trainer, the Scout 15.



Wendell Hostetler's Plans' 1/3-scale Piper Vagabond.



Hungarian Moki 25cc two-cycle has mild timing, but should pull 30 lb model.

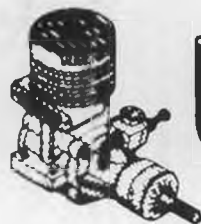


Dave Williams' bar stock .049 will turn over 40,000 rpm with tuned pipe.



One of Dave Williams' monoline 1/2A speed models. F/G fuse on Cox 1/2A pan.

FUEL LINES



JOE KLAUSE

P. O. Box 2699
Laguna Hills, CA 92653

• Any honest columnist probably will tell you that one of the most difficult parts of writing any column is to come up with a good lead-in. Well guys, this month I don't have a particularly good one ... not that I ever do ... nonetheless, here goes. The background theme of this month is, "Once again, you read it first in **Model Builder**."

Naturally enough, the subject is an engine ... correction, several engines. First on the list is one called the Moki. Take a glance at the first photograph. *That's a Moki.* Please, resist the temptation to coin a slang expression about the name. The engine is manufactured in Hungary, and without any moneying around, this Moki is monstrous! In fact, its displacement is 25 cc! Unless my conversion calculator screwed up, that's a bit more than 1.5 cubic inches. Yes, it's a two-cycle glow engine, ringed, and well ... it's *big*.

Without going into a lot of other details, the manufacturers claim that it will readily power a 25 to 30-pound

model. Whether something that massive is still a *model* is a moot point to me. Undoubtedly, many modelers will disagree with me on that last comment. My apologies for perhaps a narrow viewpoint.

Regardless, the Moki is obviously well constructed, its timing is quite moderate, and although I did not have an opportunity to test run it, its design would seem to indicate that it will be mild tempered to operate.

OK, depending upon your viewpoint, we'll now go from the ridiculous to the sublime, or vice versa. The second photograph shows a bar stock .049 engine built by Dave Williams of Yorba Linda, California. Dave has been developing this design for more than a year, and it seems like a good possibility that his efforts may soon result in a new speed record. It's designed for tuned pipe operation, and while I can't go into finite detail, let me say that I have seen it bench run at over 38,000 rpm on an honest tachometer. Guys, that's not a

misprint. I said *and meant* 38,000! Dave told me that under ideal conditions, it has turned 41,000. Eat your heart out Gene Hempel!

How is it constructed? What's it look like inside? Here are a few general observations. It has twin ball bearings, schneurle porting, a steel piston and wrist pin, hard chromed steel sleeve, and a very specially designed and constructed tuned pipe.

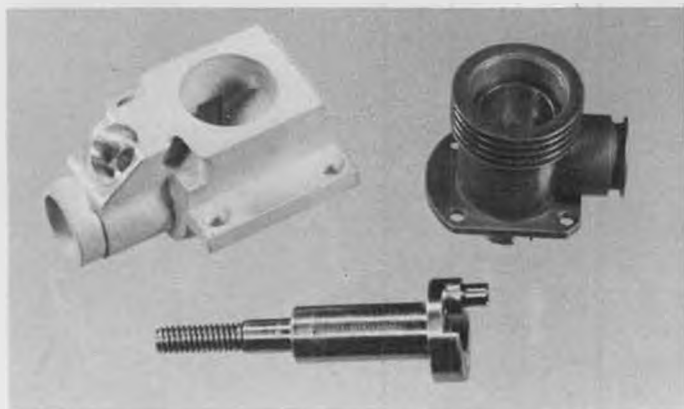
The third photograph will give you a bit more of an idea of its construction. Just one glance at that massive crankshaft will convince you that it's designed to *not* come unglued.

The fourth photograph shows one of Dave's speed models. Beautiful work-

Continued on page 89



This Rossi Brothers twin mount unit will V-mount two .61 to .81 ci engines.



Partially completed Williams bar stock 1/2A engine. Crankpin is pressed into hefty crankshaft.



One of the latest four-stroke engines to appear on the market is this .90 ci Enya.



R/e **WORLD** IN PUYALLUP
By BILL NORTHROP



This Spitfire Mk XII was 1st in Military Sport Scale, built by Frank Rouse, Valley Aero Modelers, Yakima, Washington.

- There are four open-to-the-public model trade shows that we will have attended by the time the 1983 winter/spring season is over; IMS, Northwest Model Exposition, WRAMS, and Weak Signals; located in Pasadena, California, Puyallup, Washington, White Plains, New York, and Toledo, Ohio, respectively.

If you were to attend and/or exhibit at all of these shows, as we do, you see many of the same faces, exhibits, and products. The only variation comes from the smaller manufacturer/exhibitors who only participate in the show that is nearest to them. The exception to this is the Toledo show. Being more centrally located, and being the oldest show of its type, it draws the largest crowd, and consequently, the largest number of



Interesting HO articulated locomotive pulls passenger cars out of a tunnel on one of several layouts on display.



First in Precision Scale, Best Aircraft, and Best of Show, this Curtiss Fledgling by Fred (Pas-M-Co) Pierce, of the Boeing Hawks.



Fokker DR-1 was 2nd in Precision Scale, built by Erv Solberg, SRAC, Snohomish, Washington.



Remember the all sheet balsa Veco Dakota? Here's one with pulse rudder R/C by Trevor Johnson, of the Boeing Hawks.



Harvey Wagner, Auburn, Washington, really put detail on this USS Missouri, BB-63. It was second in Stand-Off Scale.



Sprint cars looking wilder every year. This one built by Sand Kahne was second in Plastic Models.

exhibitors. If a manufacturer can only travel to one show a year, this is it. By the same token, many manufacturers plan the announcement of their new products to coincide with the Toledo show, and consequently, there usually aren't any truly new products to report on until then.

With all the above in mind, and considering that the Northwest Model Exposition is the newest kid on the block (second year), we felt we should, for the benefit of those manufacturer/exhibitors and modeler/spectators who did not participate, give you our overall impression of the show in case you'd want to consider attending next year.

First of all, there's the matter of pronouncing Puyallup. Al Alman has already tried to help in his column, when he moved from Arlington (you can't go wrong on that one), Texas to Puyallup. When pronounced correctly, it sounds like "Pew-all-up", but all shoved together into one syllable. We're not sure if it's an Indian name, or if someone was trying to imitate the sound of a large raindrop striking a water puddle.

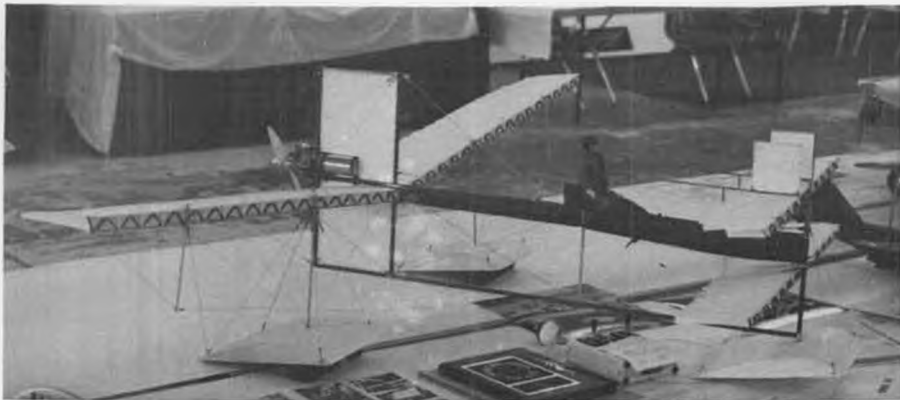
If coming by air, you fly to Sea-Tac (Seattle-Tacoma) Airport. We're not sure about limousine service to Puyallup, but if you rent a car, it's about a one hour drive south on Interstate 5, and then east



Second Prize in Sport 40 Class went to Gary Teeter for his "Miss Circus Circus" V-31, Puget Sound Model Boat Club.



Nice finish is obvious on Tony Huber's Little Toni, which placed first in Pylon static competition. PROPS Club.



The world's first (1910) seaplane, the Fabre Hydravion Canard, as modeled by Francis Reynolds of Redmond, Washington. Pilot had excellent visibility!



OrLine's latest is this giant scale Fairchild 22, for reduction drive or up to 2 cu. in. gas engines.



A line-up of unlimiteds on display. Dick Strep's "Miss Budweiser" placed 3rd in class. "Miss Lynnwood Equipment", U-7, by Howard Price, RCU Club.

on 512. There are a couple of other roads to Puyallup from I-5 that look shorter, but using 512 makes it all freeway driving.

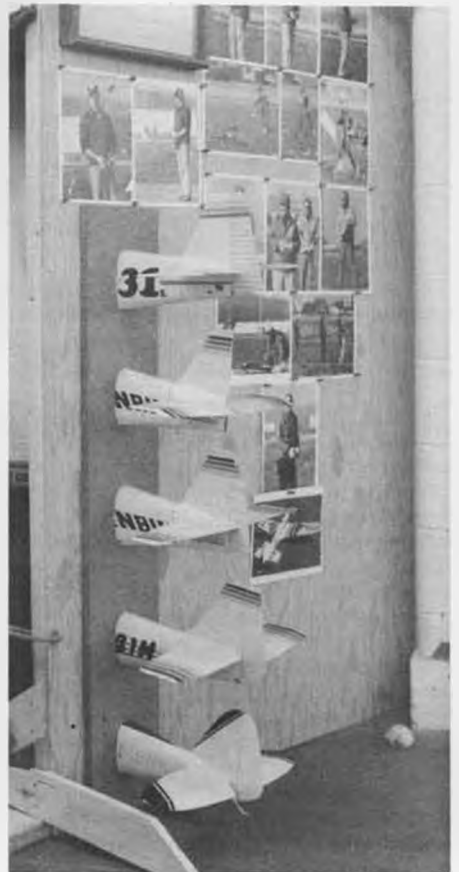
Accommodations, for those traveling from far enough away to stay overnight in the area, are more than adequate. Having conquered the correct pronunciation, we weren't afraid to contact the Motel Puyallup, which is within walking distance of the fairgrounds. Only a stone's throw away, is Jason's restaurant, open 24 hours a day . . . not real fancy, but good food . . . sort of a Denny's with a liquor license. By driving

about nine miles to I-5 on 512, there are plenty of large motels to choose from.

By the way, this writer was stationed in the Seattle area during a portion of WW-II, including Sand Point NAS, Pasco NAS, and Whidbey Island. In late 1944 or early 1945, I was assigned to a new CVE type aircraft carrier that was built in the Tacoma shipyards. It was the U.S.S. Sidor, CVE-117. I was a meteorologist (the Navy called it aerologist), and a plank owner (member of the commissioning crew). Do you need more than one guess as to what room number I was assigned at the Motel Puyallup about 38



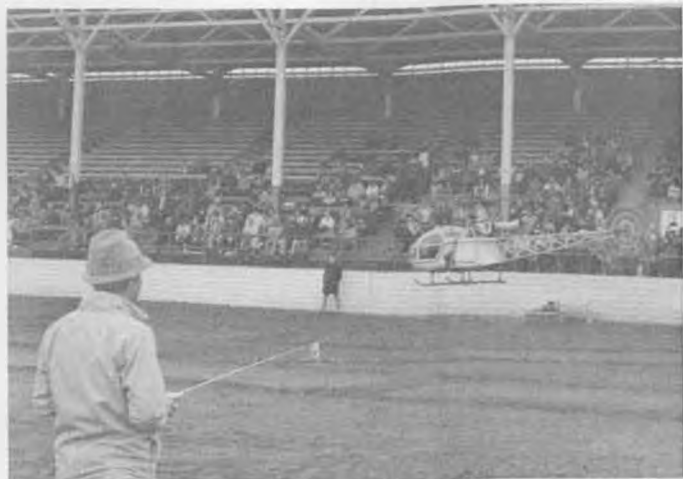
This Outlaw Off Road Sprint car by Bud Coffman, WORRCA, won Best of Show Car trophy plus first in class.



Five sad tails from the Northwest Pylon Racing Association. Oh well, you can't win 'em all.

years later?

Our impression of Puyallup is that it's kind of a laid-back, semi-suburban, semi-farm town, about 10 miles south-east of Tacoma. The Western Washington State Fairgrounds occupy about 12 city blocks (three x four) on the edge of town, near the exit from 512. With a complete baseball park, an amusement center that includes a roller coaster, the huge exposition hall, and many brightly painted smaller buildings, and animal exhibit stalls, it must be one heck of a



John Gorham flies the scale Hirobo "Lama" for the grandstand audience in the fairground ball park.



And Tony Frackowiak does the same with Miniature Aircraft Supply's Schlueter Heli-Boy.



Excellent selection of scale models. Part of 450-model display.



Frank Macy (seated behind box) is bringing back many of famous Jim Walker models.



Lots of precision aerobatic aircraft. Photo taken before show opened Sunday.

colorful sight when the fair is in full operation. It is billed as the eighth largest fair in the U.S.

Of course, fairs are for summer weather, and as such, none of the buildings, including the Exposition Hall, are normally heated. Last year, during the model show, the temperature was said to have reached a high of 42°F in the hall! This year, two huge space heaters with powerful blowers had been suspended from overhead, making it very comfortable for light sweaters or sport

jackets.

The Northwest Model Exposition is put on by the Mt. Rainier R/C Society, with Bob Pfeiffer as overall director. Under Bob's leadership, assisted by Bob Bean, Don Sweasy, and about 75 of the Mt. Rainier club members, the whole show was very well organized and maintained a relaxed, laid-back atmosphere throughout the weekend. This is its second annual show, and considering its newness, it is doing very well, with a gate count of over 12,000 by noon time

on Sunday. Based on the favorable reports from last year (in spite of the temperature), there was a substantial increase in both exhibitors and spectators for this second show.

The Exposition Hall is divided into four bays, by solid walls, with a wide, open passageway in the center of each wall, connecting all bays. The largest bay, at the north end, was occupied by the exhibitor booths and model display

Continued on page 87



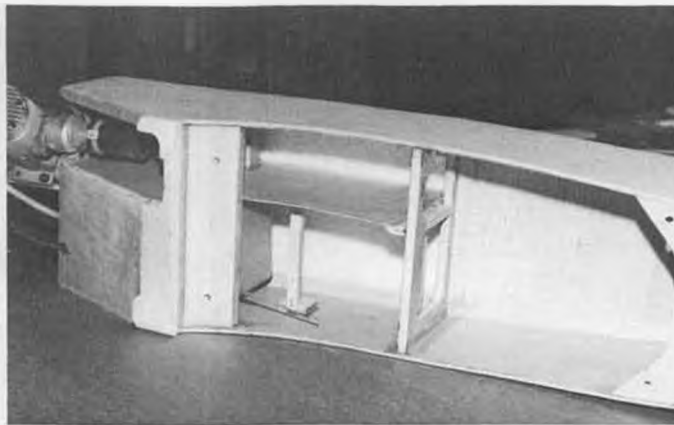
Sleek Monocoupe 90A by Ikon N/West. Latest 1/5 scale Hawker Hurricane nosing in from left, not yet in production.



Nice Grumman F6F-3 Hellcat placed in Military Sport Scale, by Bill Osterhoudt.



4. Guy Hanson holds the latest Team Hanson FAI model. Jittery servo motion was cured by switching TX module and receiver.



2. A 1/32 ply wall extending from the wing saddle to the top of the fuselage effectively seals the pipe from tank and radio.

Pattern *De* x Flying

By DICK HANSON

• Spring flying is here for most of us now, and with it come the latest winter projects, ready for test flying.

This hobby would get old fast if it wasn't for the limitless approaches to design. Just when you think, "I guess I've topped out," something new comes up which starts the old brain humming again. For me, the greatest pleasures come from working the problems out of a new project, be it a design, a kit, a radio, or whatever!

One problem which plagued me was finding a good exhaust system for some new projects. Photo No. 1 shows the new "Mac" muffler. Although the Mac is designed for Tipos and Curares, it's perfect for internal systems. The following photos (Nos. 2 and 3) show how the pipe actually fits in my C.A.P. 21.

The real benefit of this ten-degree bent pipe is that you eliminate the need for specially bent header pipes. In most cases, rotating the pipe a few degrees will point the inlet at the engine exhaust port. A simple but effective trick. We also eliminate the need for a second coupler at the header pipe which is usually the case when installing special headers.

On the C.A.P., we can now seal the

pipe at the No. 1 bulkhead, and be left with just one potential leak problem . . . the tailpipe. The pipe's shape solves this problem because it points almost straight out of the aft fuselage so that a small silicone coupler and a short tube complete the job. By sealing the pipe at bulkhead No. 1, we need only minimal heat shielding inside the fuselage for radio protection.

A few well placed slots in the fuselage take care of internal cooling. Exit slots for cooling air flow should always be on the upper areas and preferably in low air pressure points on the fuselage. The best place is just behind the canopy. The combination of low air pressure and thermosiphoning will keep everything cool. Air intakes for cooling can be just about anywhere on the front lower surface of the model. In our case it's on the lower edge of the fire wall on the *radio side* of the fuselage.

There have been some writings about the horrible problems of heat buildup in fuselages using internal systems, but the most elementary rules of heat flow, properly followed, will keep you out of trouble; it's just like making a fireplace work properly, the draft is at the front and the chimney goes up!

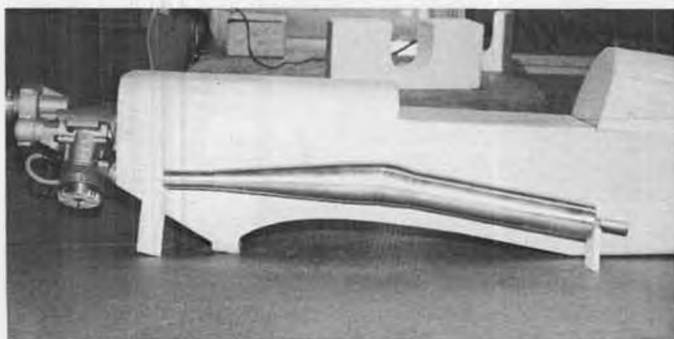
Another project we have been working on is a direct drive (no gearbox on the engine) model for F.A.I. This model has been rehashed thrice, starting with the Formula 750, and it is now 825 square inches, 7 lbs. 10 oz. with retracts, and still goes like a shot.

The model in Photo 4 flew fairly well, but just wasn't solid-feeling. I was testing some potent servos in this plane, and suspicioned that the problems it had may have been due to the servos jumping around in tiny, unpredictable movements.

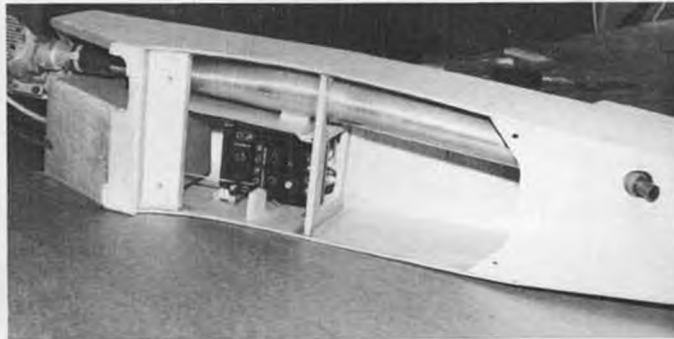
My suspicions were confirmed by changing the transmitter module and replacing the receiver. The new frequency tested was on F.M., and the results were profound. The model was now rock steady. The earlier lack of solid feel was probably due to a spurious signals going to the servos.

It seems we are all presently caught in a technological paradox. As our equipment gets more sophisticated with accuracy reaching new plateaus, the same technology is filling the air with signals from radiophones, paging systems, industrial RC, and god-only-

Continued on page 84



1. The exhaust pipe is temporarily blocked up on the outside of the fuselage to show how it fits around the top of the wing.



3. The receiver is placed under the servos while the battery pack is placed under the fuel tank.



PLEASER

By STAN WILSON . . . Here is a really versatile electric sport plane that can be built in either rudder/elevator or aileron versions with either 05 or 075 electric motors. It builds quickly, too!

• As a youngster of 34, I do not remember the excitement that came with the first glow engines. However, I was obsessed with the first stories about flying radio controlled models using electric motors. I started using windshield washer motors and motors from cordless trimmers. I destroyed four of these home-brews before I bought my first Astro 05. I stuffed it in a Super Malibu, and the thrill was worth the effort. My next success was with the Kraft electric Cardinal. I retired it with about 200 flights . . . and several ounces of epoxy. I then built and flew the Astro Sport. This is a fine model, but I wanted something that more nearly resembled a real airplane. I have been building and flying rubber scale for over 10 years, and

I think that a model should look like a real plane.

I wanted a plane which would be capable of simple stunts, capable of flying in 10 mph wind, and steady enough for relaxed Sunday flying. I searched over 200 magazines for models which had these characteristics. After noting the dimensions of over 20 cabin jobs and about 10 airfoils, I settled down to put them all together. I eventually came up with what I call the Pleaser.

The original model now has over 100 flights using two power plants. I first used the Astro 05XL. This gave very pleasing flights, and was very stable. It would climb to about 300 feet easily, and could perform loops and very slow rolls. I fly with a four-channel, miniature Cannon radio. For all of my flights with the 05, I used coupled rudder/aileron. After mastering this power plant, I installed my Astro 075. What a per-

former. It almost jumped out of my hand on the first launch. It climbs to about 300 feet in the first 30 seconds. I have performed multiple loops, rolls, and split-S maneuvers with very little loss in altitude. The only drawback of using the standard 075 is its short motor run (three to four minutes). I cured this with a throttle, which I will explain later. With this throttle, I can climb to the desired altitude, perform a few stunts, then switch to low speed and just putter around the sky for five to seven minutes.

I am currently flying my second Pleaser. With this one, I extended the wing by one bay on each side, which slowed down the glide speed substantially. I would not, however, recommend the longer wing for use with an 05.

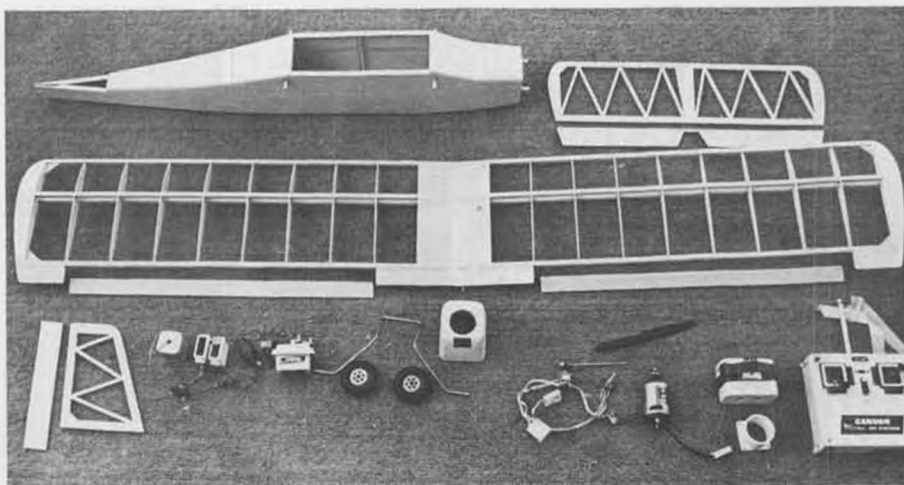
CONSTRUCTION

FUSELAGE: I designed the Pleaser to

Continued on page 72

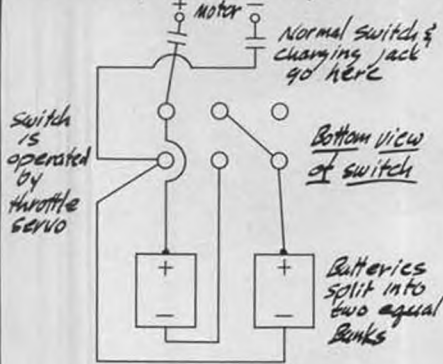


Stan Wilson launches his Pleaser into hot Oklahoma afternoon air. Hat is a necessity.



This is what the Pleaser looks like just prior to covering and final assembly. The equipment is actually more complicated than the model!

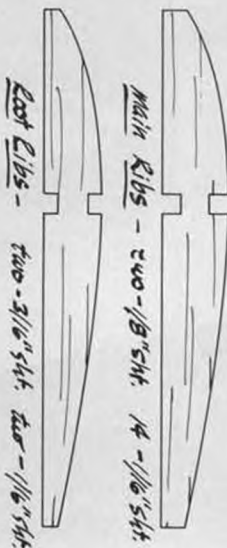
Hi-off-low switch for
Electric Powered aircraft
- Double flight time in low position -



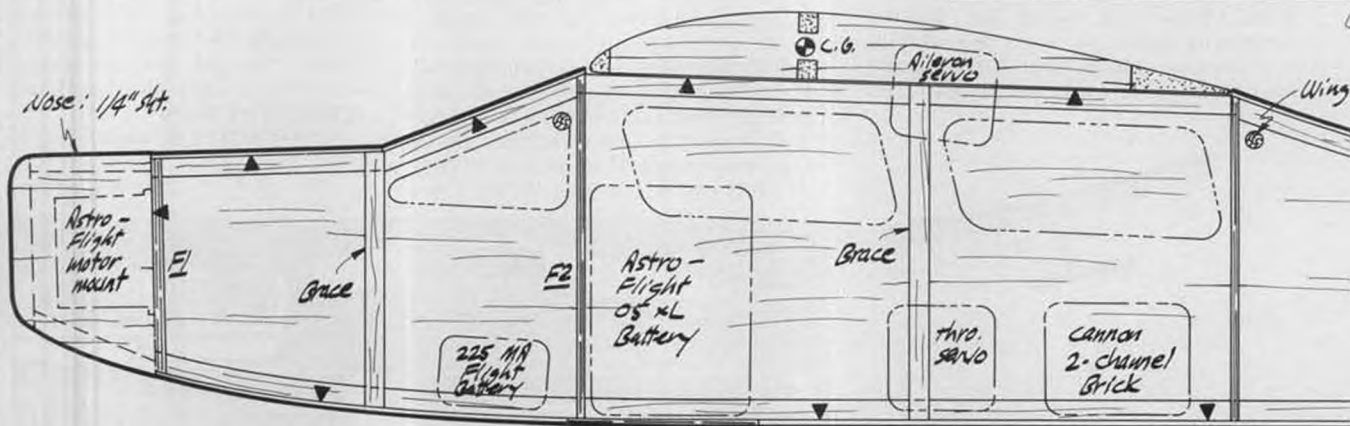
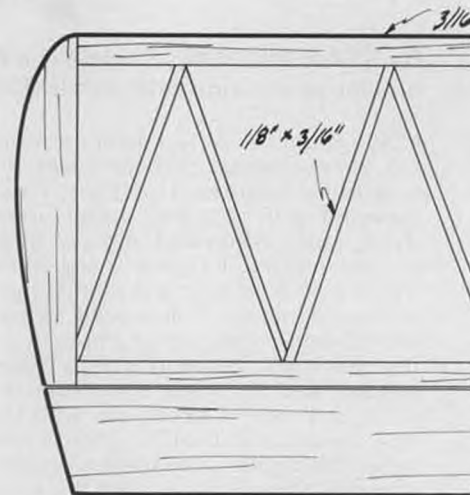
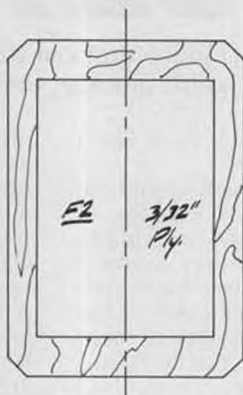
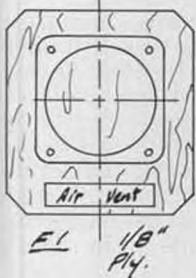
Switch is operated by throttle servo

Bottom view of switch

Batteries split into two equal banks



1/16" sht. T&B



specs
2-3-4 Channel
05-075 Electric Powered
span 46"
Length 32"
Weight (4d+05) 38 oz.

9" alum. or
make from
1/8" wire

Plywood Lg.
Mount

* Top & Bottom
1/16" sht.

* Note: L

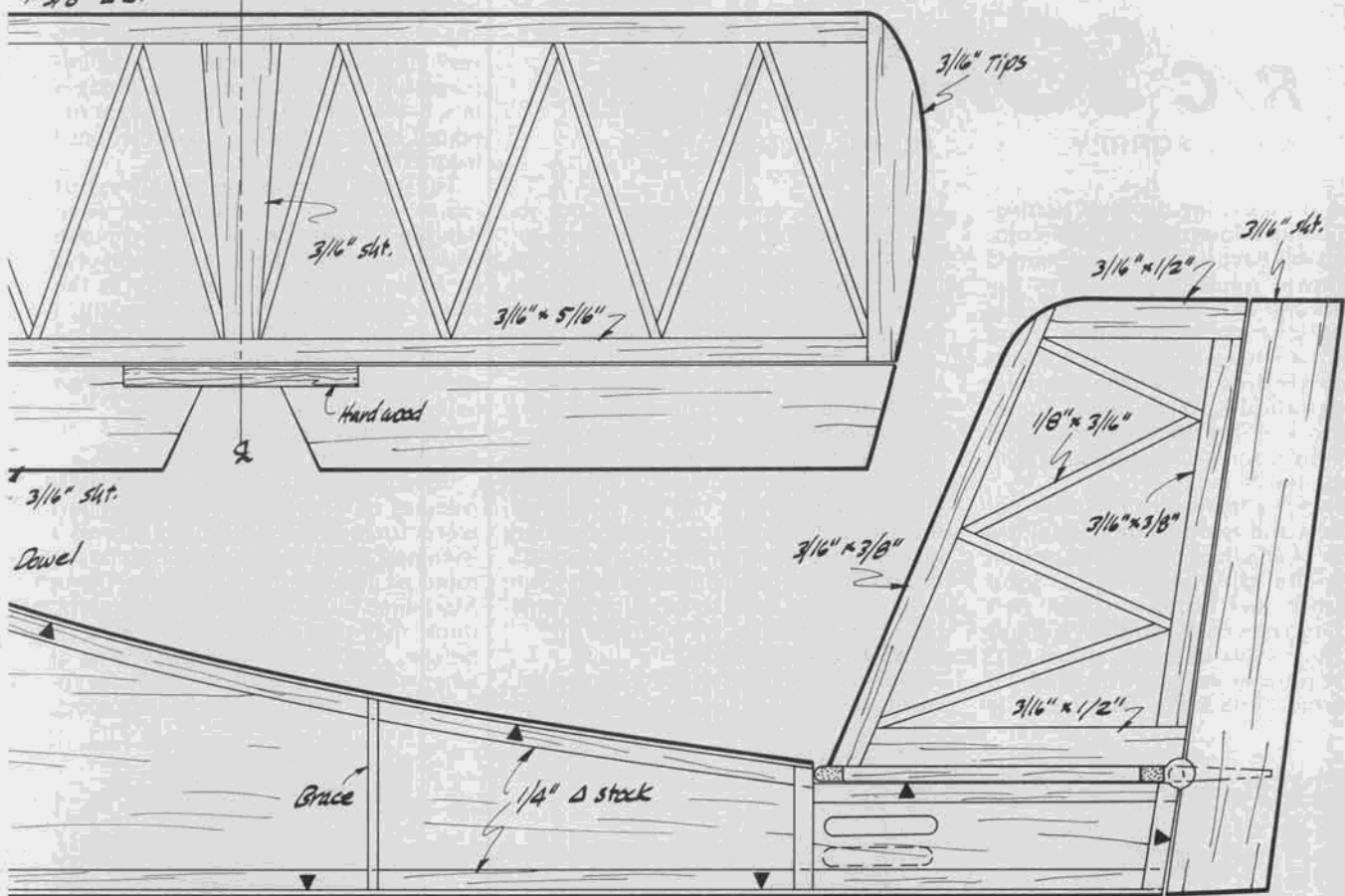
* Note: All parts balsa unless oth

sq. L.E.

* optional wing: add 2 1/2" for O75 Power



" x 3/8" L.E.



▼ = Denotes 1/16" side slit.

▲ fuselage side not shown.

otherwise noted.

PLEASER

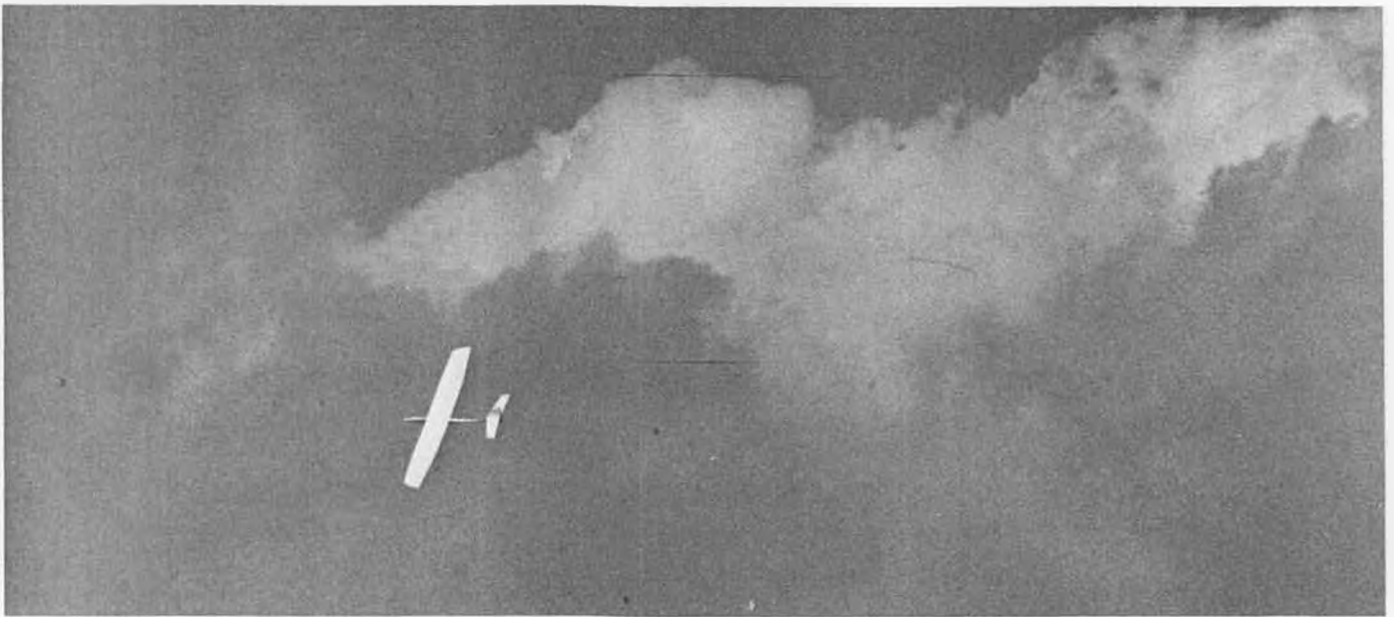
Designed & Drawn by: Stan Wilson
traced in ink by: Al Peterson



MODEL BUILDER
magazine

821 West 19th St., Costa Mesa, CA 92627

Plan No: **5831**



Storm systems, like this one which passed through Southern California last January, often bring fantastic slope soaring conditions with beautiful cloud formations and strong lift. Ross Keim's aileron Sagitta 600 is captured on film in the midst of a turn.

R/C SOARING

By BILL FORREY

PHOTOS BY THE AUTHOR

• If you are a soaring devotee, particularly one who follows the contest circuits, you probably have heard of a guy named John Brown. John likes to go to the Nationals and enter his two meter class Icarus in unlimited class events . . . and win. He has thermal duration contests pretty well figured out, and he flies them very scientifically. Well, here's something you may not have known about the guy: he's an altruist; someone who cares about others.

I call your attention to the photo of two adults and two children sitting on the grass of an athletic field. The person holding the glider fuselage is John Brown. If it isn't obvious to you, he's instructing a newcomer with a Wanderer in the fine points of setting up an R/C sailplane prior to the tyro's first flight. If you ask me, THIS is the mark of a true

champion . . . someone who is not so wrapped up in himself that he can't or won't help someone else. You could say that I'm impressed with people like John who give of their talents and abilities so that others may profit from them.

I love R/C soaring. I have from the very first time that I brought my first R/C glider to a slope site in Westchester, California back in 1975 . . . and someone like John Brown was willing to take the time to teach me how to fly my Astro Flight Monterey. It's not just the flying that I love, it's also the people, and glider guiders are among the best in the world! If someone at your flying site needs your help, take the time to be a friend and help him or her . . . it's worth it!

NEWS FROM ENGLAND

One of the most interesting and worthwhile publications I read in the

area of R/C soaring is the White Sheet Radio Flying Club's newsletter, the *White Sheet* (appropriately enough!). It is a very informative and entertaining mini-magazine that runs about 20 to 28 pages (6 x 8-1/4-inch format), and is expertly edited by Sean Walbank, with whom I frequently correspond.

The following rather lengthy, but rather complete description of Sean Bannister's wing construction technique and philosophy is (believe it or not) only an excerpt from a larger story in the *White Sheet* about the Algebra VIII. I believe you will profit from what you are about to read, and who knows, you may even want to give this technique a try on your next sailplane.

"THE WORD ACCORDING TO BANNISTER, BY SEAN WALBANK

"On Wednesday the 19th of May, a number of White Sheet RFC members were fortunate enough to attend a 'seminar' given by Sean Bannister on the topic of F3B to the Boscombe Down Modeling Club. To those of you who think that they have heard the name before, but can't remember where or when (one assumes that you have so-journed the last five years in Dahomey),



John Brown, three-time national soaring champion, instructs a small group of first-time fliers.



When the winds are up, Ross Keim can be found flying one of his slope machines over the cliffs of Costa Mesa.



Sean Bannister (Great Britain) waits for the start of "prep time" at 1981 WC's in Sacramento. He holds the Algebra VIII.



The British team held "repair demonstrations" periodically at the 1981 WC's. Geoff Dallimer, foreground, was chief fixer-upper.

then it should be sufficient to remind you that Sean Bannister has represented Great Britain at all three World Soaring Championships to be held, and at the last one he placed second. He is generally accepted to be one of the finest fliers in the world, and his Algebra design and its imitators are to be seen at competitions throughout Britain. . .

"ALGEBRA

"The following piece is a long-hand version of the notes that I managed to jot down when Sean (discussed) his Algebra. This is the actual model which he flew at the last World Champs and, as he is quite satisfied with it, he intends to continue with its programme of refinement over the next season or two. This policy of gradual refinement is one that Sean firmly advocates . . . once you have decided upon a model, stick with it and don't change until you have a very good reason to do so. Sean admits that when he first flew his Algebra, he thought that he had made a mistake . . . his contest record shows just how wrong that first impression was." (The photo of Sean Bannister reveals an almost perfect top view of the Algebra VIII. wrf)

"I have divided the points that Sean

made concerning the construction of the Algebra into various sections as this is how he dealt with the topic.

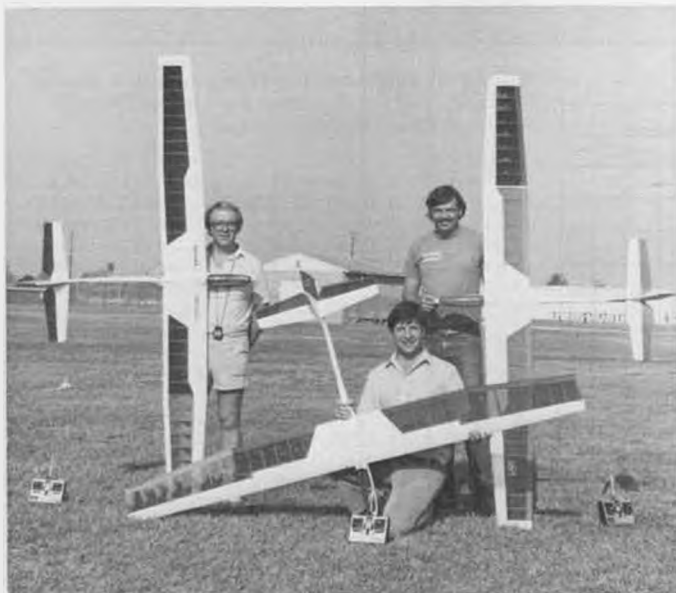
"*Airfoil Section:* The Algebra uses an Eppler 193 at the root and there is a linear transition out to an Eppler 201 at the tip." (See this month's airfoil. wrf) "In fact, the tip section isn't an exact E-201 . . . what Sean did was to have a computer plot the transition from the 193 to the 201 out to an imaginary tip rib of 14 cm chord and then used the section given for 17 cm which is the actual chord width at the tip (the span of the current Algebra is three meters). The E-201 has virtually the same zero lift angle as the E-193, and therefore there is no need for any wing twist (*washout*) to be built in. If the wing were to be built on a perfectly flat surface, then there would be four thousandths of an inch washout . . . try measuring that!

"When questioned about alternative sections, in particular the Epplers 205, 211, 212, and 214, Sean referred back to the principle of finding a section that you get on with and then sticking with it for at least a year or two. Sean finds the E-193 competitive, and therefore sees no need to change. His comment on the

E-205 is that it has a theoretical polar advantage insofar as its glide angle, but it is inferior in minimum sink (duration). He believes that he can overcome any slight disadvantage that the E-193 might possess with its 'inferior' glide angle by practice and smooth flying . . . his results speak for themselves!

"*Wing construction:* As you can see from Figure 1, some of the construction is already shown. Sean begins the wing by cutting the bottom sheet (from 1/8-inch medium sheet balsa) to exact shape. The ribs are drawn on, and the trailing and leading edges are brought up to the sheet. The majority of the ribs are made from 3/32 sheet balsa, and these are glued in with Hot Stuff. The ribs are spaced 30mm apart.

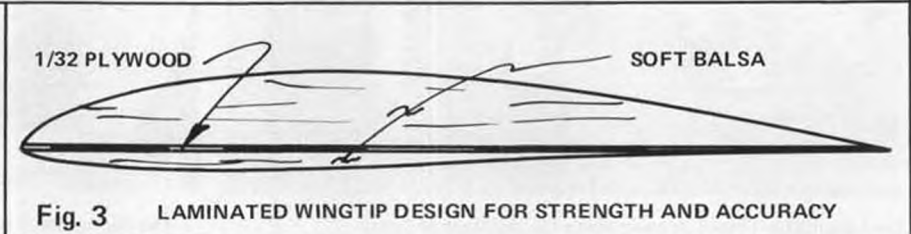
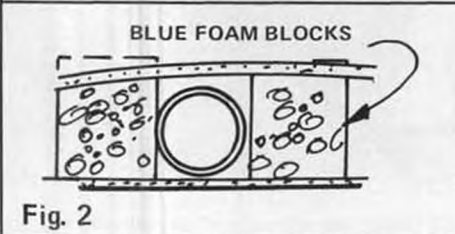
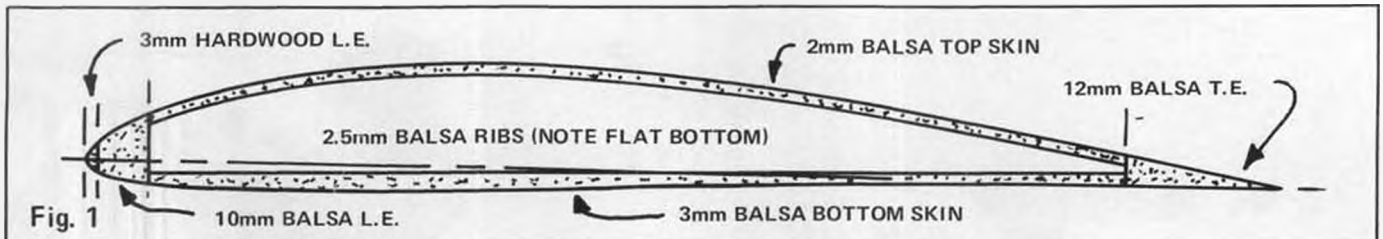
"There is no conventional spar in the wing of the Algebra. This is *not* to say that it is weak however, as there are certain structural members which act in the same manner. One of these is the ballast tube which is made from 1/2-inch o.d. high tensile aluminum. As this tube stretches from the root out to almost 2/3 of the span, it can be seen that it adds considerable structural strength. The original weight of the tubes came out to



Team Pantera fliers Roger Roth, Larry Jolly, and John Brown pose for the author's camera at P.S.A. field. See text.

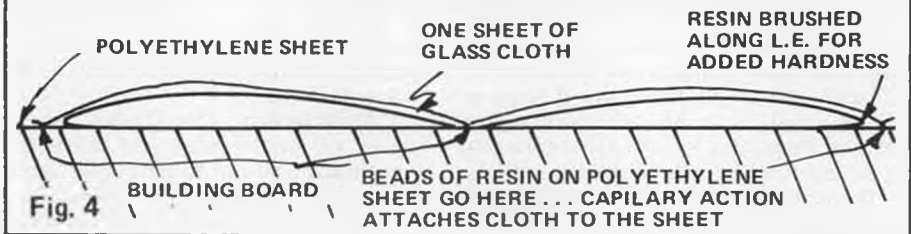


Dennis Brandt will probably enter his modified Sagitta 600 in the 1983 2MWC this June 11 and 12. See April MB, page 93.



9-1/2 oz. for the pair, but Sean has had them turned down so that they taper which has saved about three ounces of weight out near the tips where it is important to keep things light. This ballast tube runs down the middle of the wing.

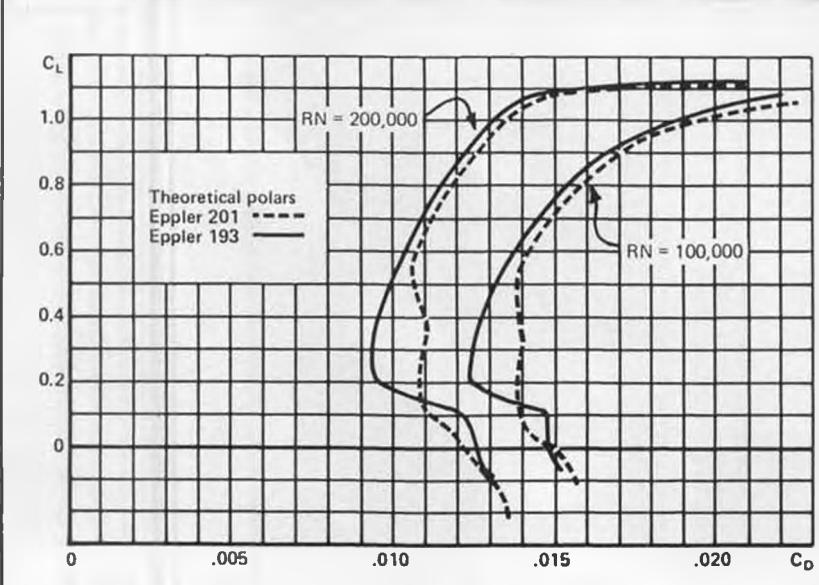
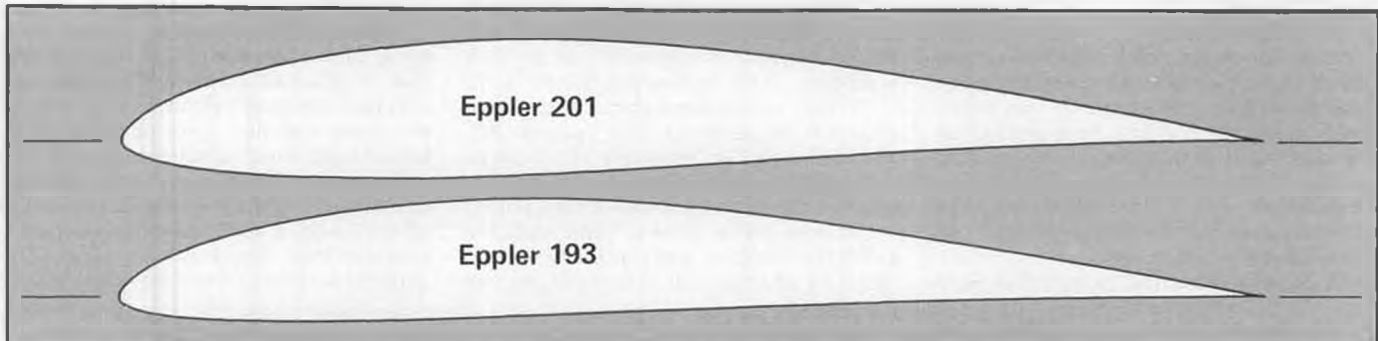
"As mentioned earlier, there is no main spar, but in between each rib there is webbing which takes the load. On earlier Algebras, Sean used 1/2-inch vertical blocks of balsa as webs, but on the most recent version he has changed the material. Now he cuts one-inch cubes of blue foam (2 in x 1 in x 1 in at the root) which he then glues between the ribs using a mixture of wing skinning epoxy and micro-balloons. These webs are put in both in front and behind the



ballast tube for most of the wing (see Figure 2), but outboard of the aileron servo (again, approximately 2/3 of the wingspan) they taper down to just one row of one-inch cubes in front of the tube. After the webs have been glued in place, Sean simply uses a 'hot wire' to cut off the excess material, and in this way he ensures that they provide the maxi-

mum area for the top sheet to be glued to. This process is much quicker than the original use of 1/2-inch balsa blocks. After the top sheeting has been added, this structure forms a wide I-beam which is fully capable of spreading the loads imposed upon it.

Continued on page 81



Theoretical glide polars (left) and coordinates (below) for Eppler 193 and 201. Data from *Model-Technik-Berater 2, Eppler-Profile*.

EPPLER 193										
X:	100.0	99.66	98.64	97.11	95.02	89.41	82.10	73.48		
Y:	00.00	0.051	0.220	0.522	0.932	1.957	3.214	4.642		
X:	64.05	54.31	44.67	35.40	26.70	18.78	11.97	6.525		
Y:	6.112	7.436	8.332	8.603	8.213	7.284	5.957	4.352		
X:	4.383	2.652	1.344	0.465	0.026	0.129	0.819	2.044		
Y:	3.487	2.608	1.740	0.915	0.190	-0.375	0.838	-1.252		
X:	3.791	6.049	12.03	19.78	29.00	39.28	50.15	61.06		
Y:	-1.588	-1.841	-2.098	-2.061	-1.807	-1.430	-1.019	-0.645		
X:	71.48	80.88	88.79	94.79	97.00	98.64	99.65	100.0		
Y:	0.350	0.153	0.048	0.010	0.032	0.034	0.014	0.000		
EPPLER 201										
X:	100.0	99.65	98.65	97.07	94.98	89.37	82.05	73.43		
Y:	00.00	0.058	0.250	0.589	1.042	2.141	3.454	4.923		
X:	63.98	54.22	44.57	35.28	26.56	18.64	11.83	6.396		
Y:	6.419	7.754	8.644	8.895	8.471	7.496	6.112	4.443		
X:	4.264	2.547	1.258	0.407	0.011	0.187	0.964	2.258		
Y:	3.545	2.632	1.731	0.876	0.128	-0.488	-1.046	-1.574		
X:	4.055	6.341	12.30	19.91	28.88	38.82	49.44	60.27		
Y:	-2.041	-2.437	-2.993	-3.227	-3.157	-2.776	-2.131	-1.444		
X:	70.75	80.30	88.42	94.62	96.91	98.60	99.64	100.0		
Y:	-0.839	-0.386	-0.107	0.025	0.051	0.045	0.017	0.000		



One of the many new electronic devices at the IMS show was this Ace R/C RF Interface unit which attaches to the Ace Datamaster and increases its versatility.



Condor Hobbies' new Tele-Tachometer, a Tx/Rx system for obtaining airborne info.

Electronics Corner

By ELOY MAREZ

• This year's International Modeler Show had some unexpected competition. The beaches! The Southern California temperatures over the weekend of January 8 and 9 were in the 80s. Even so, thousands of us gave up the sea and sun (and the bikinis) to spend the weekend in Pasadena viewing the latest goodies on display by dozens of the nation's leading model manufacturers and suppliers. The show received general coverage last month in the "R/C World" column of this magazine. This month, I will touch briefly on the new, and not so new, but still interesting and worthwhile, electronic products that were on display.

ACE R/C

As usual, the Ace R/C booth, one of our main suppliers of everything from the smallest electronic component to

complete R/C systems, was a veritable cornucopia of electronic items. The recently introduced Silver Seven Receiver, a companion to the transmitter of the same name, looks extremely interesting, with some impressive specifications and modern design features. A large number of accessories and test equipment was on display, all intended to provide more flexibility in the use of our equipment, or to help us keep it in top-notch shape. The newest, not-yet-advertised item from Ace, a most useful and interesting device, is an RF interface for the Datamaster. It greatly simplifies the measuring and setting of transmitter channels, as it is no longer necessary to read the output at the receiver. This new device attaches to the transmitter antenna with a clip, and plugs into the Datamaster. A switch selects the channel



California Slope Designs Duncan Lites for night flying: ready to install and fly.



Cannon R/C Systems Protacho tachometer works off of prop or flywheel.



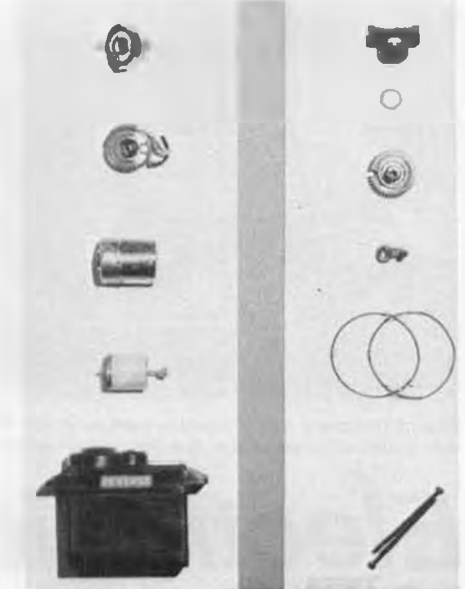
DaCa Products displayed its new Power and Test Panel at the IMS show. The unit comes in two models: digital or analog meter readout.



Electronic Model Systems featured a wide variety of servos and accessories.



Thunder Tiger Tachometer from Hobby Shack is an optical, handheld unit.



Kraft Systems has nothing to hide . . . here is a look at the "guts" of the KPS-28.

being displayed, and the pulse timing is read on the Datamaster.

To review, the Datamaster is a pulse meter, used to measure the transmitter's pulse timing, the basis of the servo's center and travel. Using one, you can center all channels exactly alike, and adjust their travel with great precision. You can set low rates to the exact degree desired, and if you have two airplanes, you can adjust the trims for each one prior to flying. The more you use it, the more you wonder how you ever got along without it.

The Datamaster RF Interface will be priced at less than \$15, and will be available as an add-on for those who already own a Datamaster. Sometime in the future, a Datamaster II, or something, with the RF interface included, will probably be available.

For more information, write to Ace R/C Inc., Box 511D, Higginsville, MO 64037, and include \$2 for a 100-page catalog of Ace products.

ASTRO FLIGHT

This year, we saw once again a complete line of motors, batteries, and chargers for all phases of electrics at the Astro Flight booth.

Relatively new, and certainly impressive, are Astro Flight's cobalt motors, brought to you by the same technology which has brought miniature stereo systems to all those funny, headphone-wearing people whom we see jumping and bobbing just about everywhere these days.

These are probably the most efficient electric motors, in terms of power to weight ratio, of any being made today. The secret is the stronger magnetic flux available from cobalt magnets. However, a lot of research was required to arrive at the best combination of armatures, commutators, brushes, etc., But arrive they did, Astro Flight cobalt motors are available in four sizes, 05, 15, 25, and 40. Contact Bob for complete information, and for all your electric

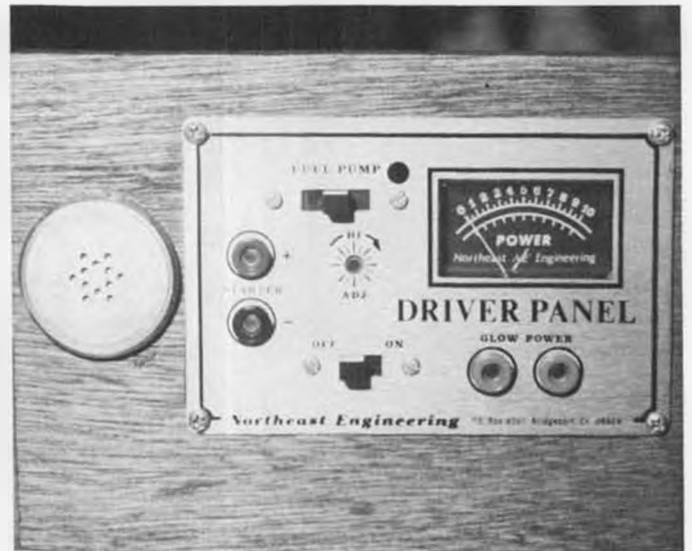
power needs: Astro Flight, Inc., 13311 Beach Ave., Venice, CA 90291.

CONDOR HOBBIES

Condor Hobbies, 17835 Sky Park Circle, Suite F, Irvine, CA 92704, was here with a large assortment of electronic goodies gathered from all corners of the world. Most interesting, and certainly unique, is something called a "Tele-Tachometer", which, believe it or not, accurately tells you the engine's rpm, and actual airspeed of your model . . . while you are in the air. It does this with a radio system that is used in a manner which is reverse to our normal way of thinking . . . the transmitter is in the air with the airplane while the receiver is on the ground! The airborne unit is very small, lightweight, and easy to install or move from one aircraft to another. The receiver is a hand held unit, which at first glance, one takes to be a tachometer, as it is in that size range. It even includes an on-the-ground adjustable stall warning. When



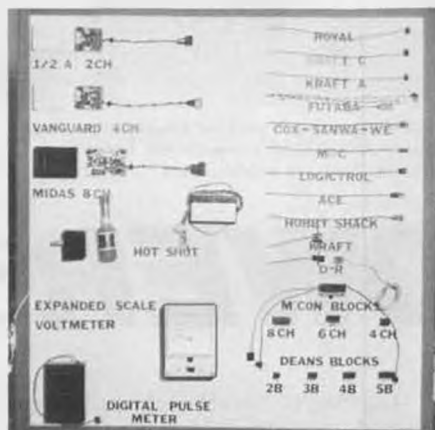
Owners of EK R/C equipment will be glad to hear that Full Command Systems now has EK replacement parts and accessories.



Did you ever hear a drowning glow plug? Northeast Engineering's new audio transducer helps you get rapid starts.



No, it's not a Star Wars movie prop, its a Powermax wind speed indicator!



Just a few of the many accessories and components available from Royal Electronics.

the model reaches a preset speed, an audible alarm goes off. Seems like an ideal way to test models, props, fuel, engines, etc. This device can also be used with boats and helicopters. Considering the capabilities, it is not that expensive at \$149.95.

CALIFORNIA SLOPE DESIGNS

Would you believe pylon racing at night? Or night flying at all? Well, it is being done . . . in both cases. One wonders if maybe they use bats for co-pilots?

Anyway, California Slope Designs,



Royal Products had an unusual way of calling attention to its line of Titan servos. Take a look at that price!



Here is a complete line of Ni-Cd powered glow plug starters from McDaniel's R/C.

31932 Calle Winona, San Juan Capistrano, CA 92675, has available the most popular light system as used locally by these night people. It's a complete system of high intensity lamps, lenses, wires, prebuilt and tested printed circuit board assembly, that comes ready to install. Being lightweight and self-contained, it is easily movable from one model to another. Order yours directly from CSD for \$24.95; Californians don't forget the six percent tax!

CANNON R/C SYSTEMS

In addition to producing what is probably the smallest and lightest R/C equipment in the world, Bill Cannon has been slowly but surely filling out his product line to include more and more high quality items of necessity for the modeler. And what can be more necessary to the serious modeler than a precision tachometer; the volume of the noise by itself is not the best measure of an engine's performance. Cannon R/C



Radio Controlled Models' most complete line of electronic lighting equipment.

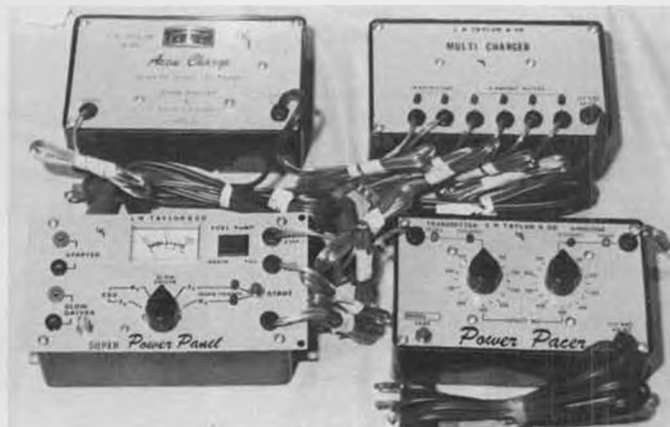
has available the Protacho, a small 3-1/2 x 5-7/16 inch direct drive tachometer which reads engine rpm in three ranges. Proper positioning of the switches will give you 0 to 3200, 0 to 11,000, or 0 to 28,000 rpm. Pickup from the engine is done with a direct drive sensor, which is held lightly against the spinner for the duration of the reading. A rubber tip cone is furnished on the sensor which can also be held against the side of a flywheel, for readings on engines so equipped.

Contact Cannon R/C for complete information on this and all of its other fine products: 13400-26 Satcoy St., North Hollywood, CA 91605.

DACA MODEL PRODUCTS

Operating under new ownership, DaCa still has available those handy, extremely well designed and built field boxes and caddies. It also showed a new power panel, more accurately described as the Power and Test Panel, in two models. It provides all of the normal electrical field requirements from a single 12-volt source, for starter, 1.5 or

Continued on page 76



L. R. Taylor and Co. displayed its fine line of power panels and chargers. The Power Pacer detects bad Ni-Cds.



Wilshire Model Center's Hans Weiss launches Bill Winans' Olympian F3E model over the beautiful Pacific Ocean. Unfortunately, this Malibu site may be sold soon.



Bill Winans poses with his Olympian, a Larry Jolly Model Products kit, between flights. Both are superb fliers.

ELECTRIC POWER

By MITCH POLING

• The two geographic leaders in electric power, without much question, I feel, are Germany and Southern California. This is so because of individuals, and it goes to show that one or two people can really make a difference in how and what happens. The Boucher brothers (Bob and Roland) are what made it happen in Southern California, and Fred Militky, Heinz Keller, and Fritz Geist were (and are) the ones who made it move in Germany.

Fred Militky passed away (of cancer) a few years ago in Germany, and I would like to make a belated acknowledgement of his achievements, which included electric free flight, R/C electrics, solar power, plus man-carrying electric flight, all in the early '70s, when most of us hadn't even realized that electric flight was possible. His death was a great loss to the electric flight movement.

Fortunately, in Germany, Keller, and Geist had taken up the challenge, and produced their samarium cobalt motors. These motors really revolutionized what could be done with electrics, making even pattern flight possible. The planes flown in Europe rapidly became quite sophisticated compared to those here in the U.S.

The benefits of these technological advancements are available here in the U.S. from Wilshire Model Center (3006 Wilshire Blvd., Santa Monica, CA 90403). Wilshire imports the Geist motors, and many of the German planes. During my Christmas vacation, I had the chance to

visit Hans Weiss at Wilshire Model Center, and take a look at the latest Geist motors and the ready-to-fly models built by IBA Fertig-Modelle.

The IBA line of planes is quite impressive, unlike most ready-to-fly planes, they are handmade of balsa and plywood. They are finished in clear resin, so the natural color of the balsa shows through. The result is a model that really looks classy. The workmanship is immaculate, it says "German precision" all over it.

The IBA PB-26 is a fiberglass-fuselaged, electric sailplane of 2.6 meter span (eight foot), which is designed for the Keller 50 or the Geist 40 series of cobalt motors, and flies 4-1/2 pounds all up with eight to 12 sub-C cells. This plane is competitive; it was flown to first place in both the European championships and the German championships in 1982! I can believe it after seeing the plane.

Such high quality and performance from a plane that requires so little work other than the installation of a radio and



Here's Bill with another LJMP kit (and MB plan No. 3831), the Electricus, which is a perfect beginner's electric model or S.E.A.M. 2-Meter/05 Class competitor.



Hans poses with the Carrera Primus, a German-made electric with folding prop, gear reduction, and U-joint drive shaft.



Hans the philosopher contemplates all the aerobatic maneuvers which can be performed with this IBA PB-24 pattern/pylon model. Clear satin-like finish.

a motor does have its price though . . . it is \$259.95 from Wilshire Model Center. On the other hand, those with a desire for high performance and having little time for building will find that this plane will do all they could ask for.

The other IBA plane, the PB-24, is designed for speed, sport, and pattern. Again, it is entirely made of balsa and plywood, with the satiny smooth, clear resin finish, which shows off the wood grain so well. It spans 48 or 52 inches (you have an option), with a very thin

airfoil (my guesstimate is that it's about eight percent thick). It is designed for motors in the Astro 15 to 25 range, or Keller 30, Keller 50, or Geist 40 motors. It is obviously designed for speed, and I think that cobalt motors are the best way to go to get the ultimate performance in this plane. The flying weight of the PB-24 is about 4-1/2 pounds with a four-channel radio. Again, high quality is not

cheap, the price is \$240, ready-to-fly except for the radio and power package. At this time, a plane like this with a cobalt motor is the ultimate in performance in electric flight, so you get what you are paying for.

The Geist motors for powering these planes are at Wilshire Model Center too, in both direct drive and gear drive. The model EM 40/14 is the most popular, the 14 refers to the number of sub-C cells usually used. There are also models EM 40/16, and 40/18 as well, for even higher

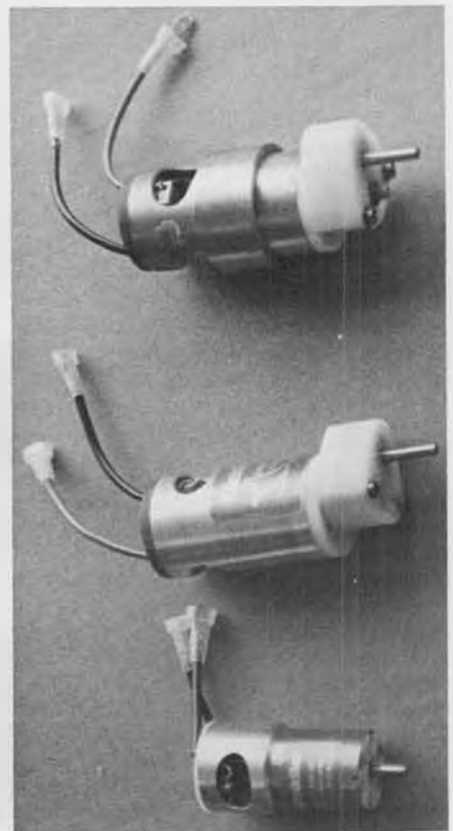
Continued on page 80



Airtronics Kitty on takeoff over the Pacific Ocean at Malibu, California.



Hans' student Jose Prado is all smiles after his first solo R/C flight.



Geist motors top to bottom: EM 40/14 with slip-on torque ring, EM40, and EM30.



Inside the Carrera Primus lies a clever universal joint between the motor and the folding prop. Carrera motors and other accessories are carried by Wilshire Models.



Bill Winans' Olympian carries the Geist 40/16 motor with gear reduction and folding prop. With 16 sub-C cells for a power source, the combo really performs.



Stuart Richmond really enjoys two things: "his ever-present stinkin' Sunday cigar", and flying his R/C Clipper on weekends.



Many flights require intentional spins, spiral dives, and holding "down" elevator to escape Florida thermals.

R/C CLIPPER

By STUART RICHMOND . . . Here's a medium-sized Clipper for .09 to .15 engines that fills the gap between the rubber powered Clipper Junior and the original gas powered Clipper . . . with Carl's blessing!

• The most beautiful curves in the world are on a woman's body! I think the next most beautiful curves appeared in the graceful, elliptical wing planform of R.J. Mitchell's Spitfire fighter, and a series of historical free flight models designed by Carl Goldberg. The Carl Goldberg designs started about 1937 with the Valkyrie, included the Clipper in 1938, in 1939 the Clipper Junior for rubber power, and shortly there after probably climaxed with the Zipper and Sailplane around 1940.

As I was too young in 1939 to know about the curves on a woman's body, I was attracted to the Clipper Junior that was kitted by Comet Model Airplane and Supply Company, and sold for \$1.00 complete with enough rubber to make it really fly . . . and fly it did! It was the first model I ever built that consistently

turned in flights of over a minute. It was my favorite model for a long time.

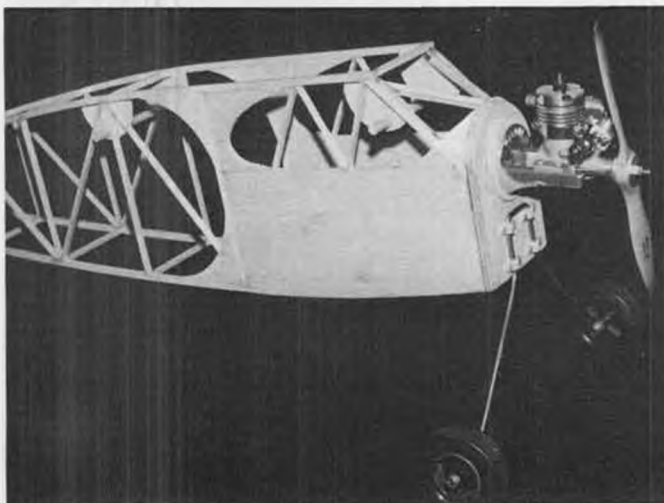
During WW-II's earliest days, I was lucky enough to get a Super Atom as my very first engine. Quickly, I built another Clipper Junior kit, bolted on the Super Atom, installed the Smith coil and condenser, the Austin timer, the pen cell batteries and related wiring.

Test glides are remembered as being pretty fast . . . and the wing seemed to increase its dihedral a bit during those glides over the tall grass. The maiden powered flight saw the wing's dihedral increase moments after launch . . . then increase more as speed built up from the Super Atom's thrust . . . then rapidly the dihedral increased until the wing folded and structurally failed, only seconds after the launch. I was about 10 years old . . . I knew nothing about changing a

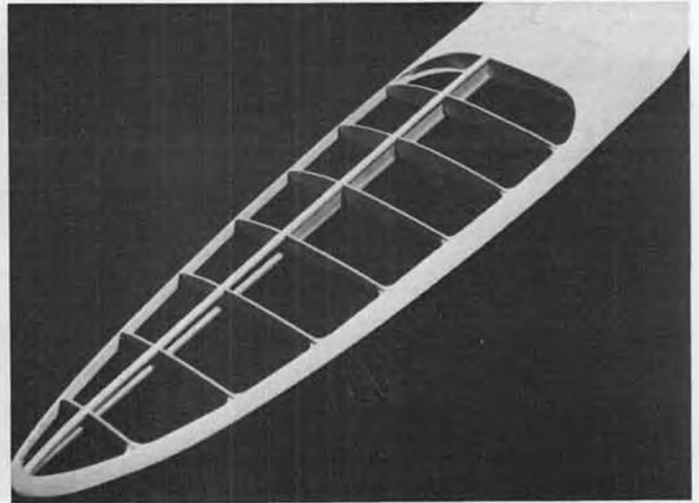
good rubber powered design to carry the increased weight of an ignition engine . . . the crash was complete . . . I had failed!

About 1970, while at the Nats with my sons, I met Carl Goldberg for the first time. During that brief but ever so cordial conversation, I mentioned my fond memories for the rubber powered 36-inch wingspan Clipper Junior of bygone days. From the conversation, Mr. Goldberg kindly sent me a complete set of plans from the long-out-of-production model with the beautiful elliptical curves. I put them away with my few other modeling treasures for over 10 years. Frequently they were taken out and admired . . . then carefully refolded and put away.

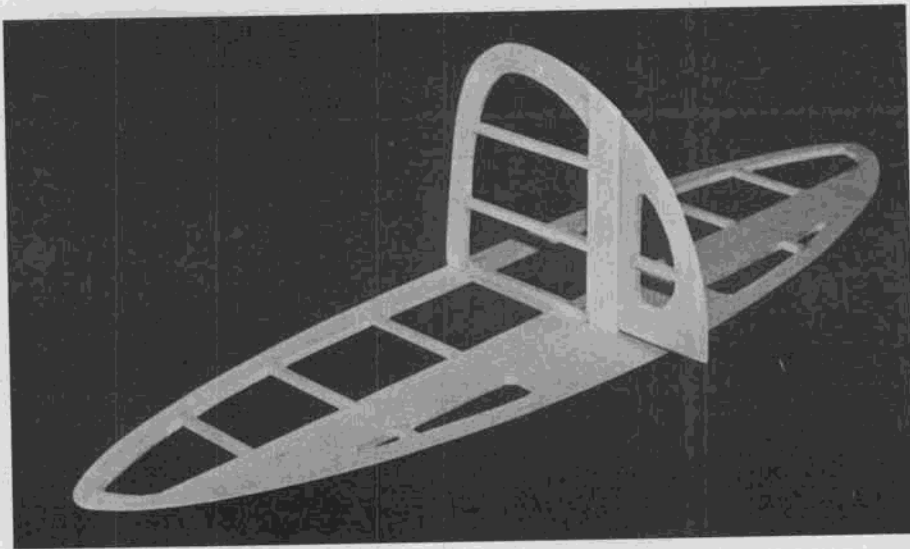
About a year ago, I had the plans out



Two fuselage sides are built on top of the plan to ensure accuracy. Hot Stuff bonds sides to 1/4-inch ply firewall.



The R/C Clipper's wings are strengthened by a spruce and balsa I-beam spar system. Center sheeting retains graceful curves.



The R/C Clipper's tail group is super-simple and strong. Elliptical curves are typical of classic old timer designs.

again, and this time I decided I just *HAD* to have a Clipper Junior flying by radio control. Now, with years of modeling experience behind me, I carefully calculated a total planned weight, chose a 12 to 13-ounce per square foot wing loading, and determined that a simple, 50 percent enlargement of those old rubber powered plans would be just about on target for today's range of .09 to .15 R/C engines. Finished weight was to be between 32 and 36 ounces.

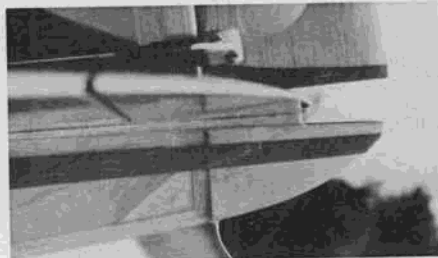
It probably would have been simpler and quicker to just buy a set of plans from John Pond for the big six-foot wingspan original Clipper for gas power, but I lean toward smaller models and smaller engines. At the Toledo show in April 1982, I again spoke with Carl Goldberg and mentioned my scaled-up project. His enthusiastic words of encouragement left me "all fired up" with the R/C Clipper project which is now complete and presented here.

Many local modelers have enjoyed flying my R/C Clipper . . . it is simple to build . . . an .09 to .15 engine with an 8x3 or 9x4 prop is ideal for power, although you could probably use a .19 with a 9x4 prop on *backwards* to lessen thrust. The R/C Clipper loops well, spiral climbs

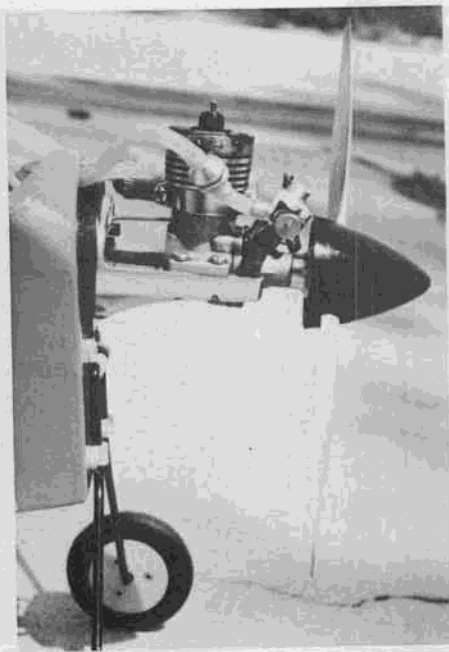
beautifully, tailspins in both directions from a stall, can be coaxed into snap rolls, and it will even fly inverted for a short distance. It thermals really well here in Florida.

So why not build your own R/C Clipper? You too can build this simple, beautiful, fun-filled old timer, scaled up from yesteryear for today's R/C fun.

One prototype was built by Al Tuttle on Maui, Hawaii. I saw videotapes of it in flight before mine was even finished. Many thanks to Al for the building tips and improvements that are incorporated in the plans. Like 40 years ago, no worded building instructions are needed . . . just follow the simple plans and use the photos as your guide.

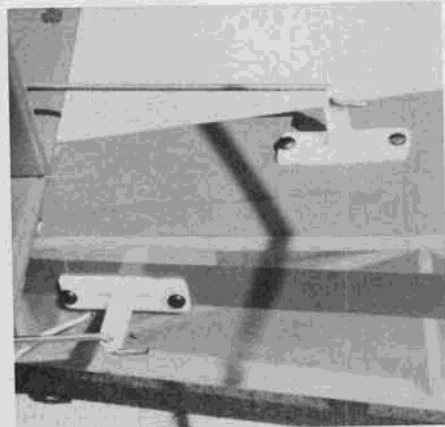


Make sure there is wood-to-wood contact between 1/8 in. wedge and stab before gluing.

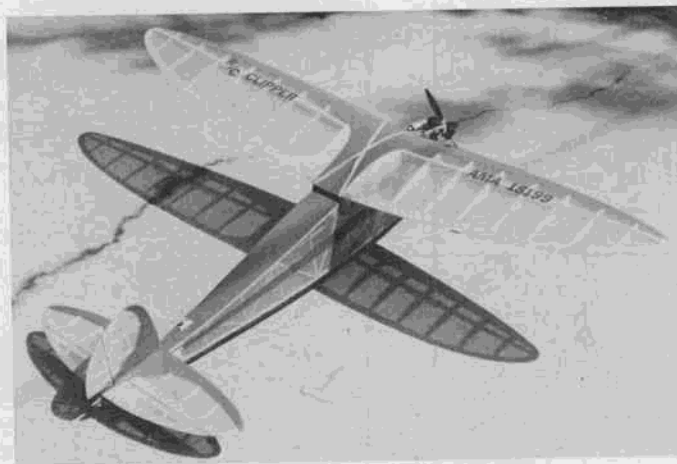


This side view clearly shows the downthrust wedge required to minimize stalling tendencies while under power.

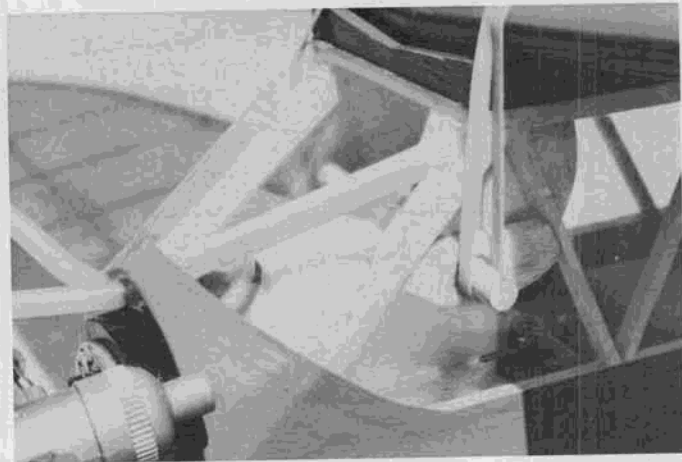
Special gratitude is extended to Carl Goldberg for adding to my many years of fond modelling memories, and for helping make possible the hours of flying fun being enjoyed with the R/C Clipper.



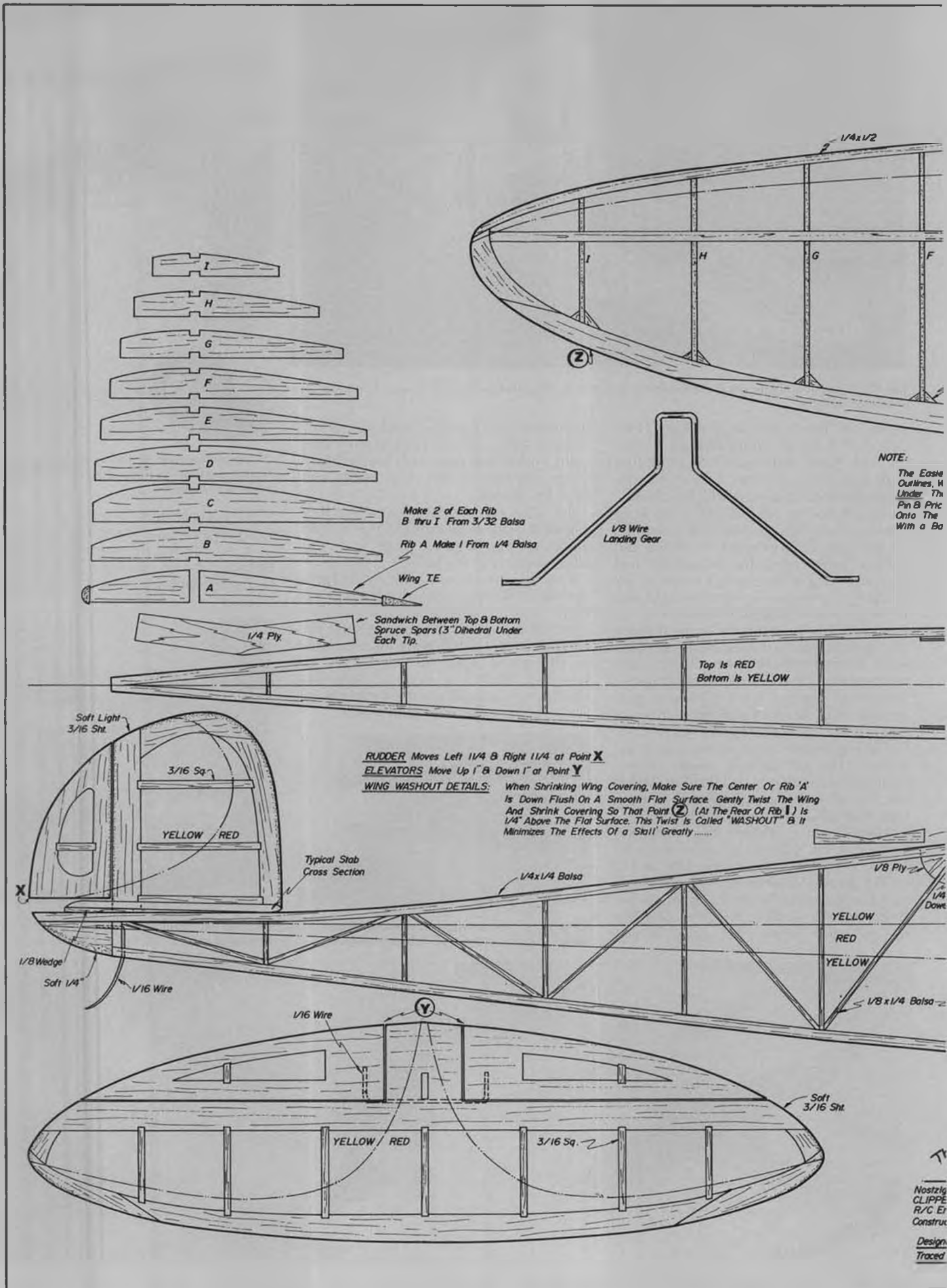
Micro-Mold Products (England) transfer linkages used here. Klett linkages could be used.



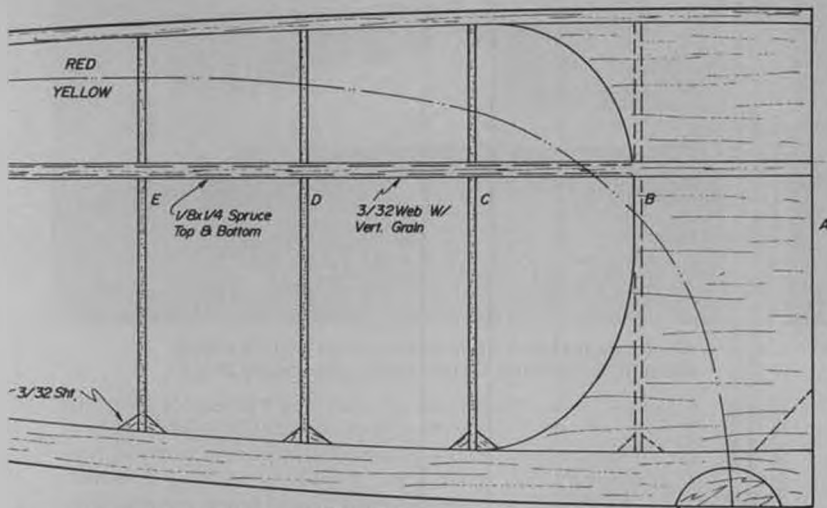
Super Monokote covering is opaque red over transparent yellow. Air bubbles are pin-pricked away.



Install windshield before covering. Hot exhaust gases come within 1/4 in. of Super Monokote, yet do not melt it.



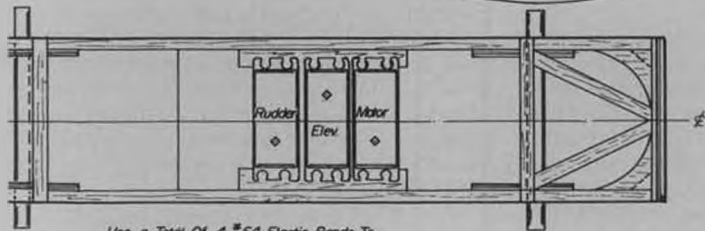
Nostalg
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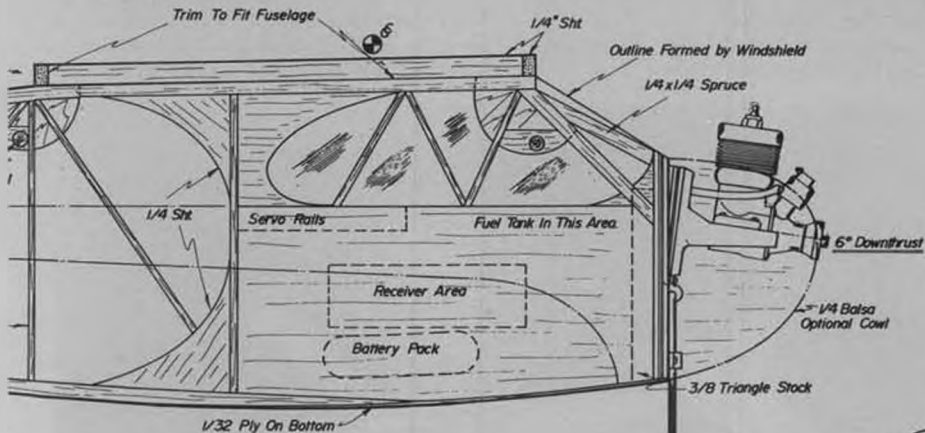
1st Way To Make The Sheetwood Parts Such As Wing & Tail Wing Ribs etc. Is To Put A Sheet Of Appropriate Thickness Wood Plan With Grain Running As Shown On Plan. Then Use A T-Punch The Outline Of The Desired Piece Thru The Plan and Wood. Remove The Wood, Connect The Pin Marks In The Wood With A Point Pen and Saw Out On A Dremel or Jig Saw.....



1/32 Ply On Top Only



Use a Total Of 4 #64 Elastic Bands To Hold Wing In Place.....



1/32 Ply On Bottom



2" or 2 1/2" Wheels



1/4" Ply Down Thrust Disc



MODEL BUILDER magazine

Plan No: 5832

R/C CLIPPER

1/2" Type 54" Old-Timer Scaled Up From The COMET Rubber Powered R JUNIOR From The 1939 era. Suitable For .09 R/C Engines thru .15 gins. Suggested Covering Is Transparent MONOKOTE (Yellow & Red) tion Modified/Strengthened For Modern R/C Use.....

Drawn by STU RICHMOND

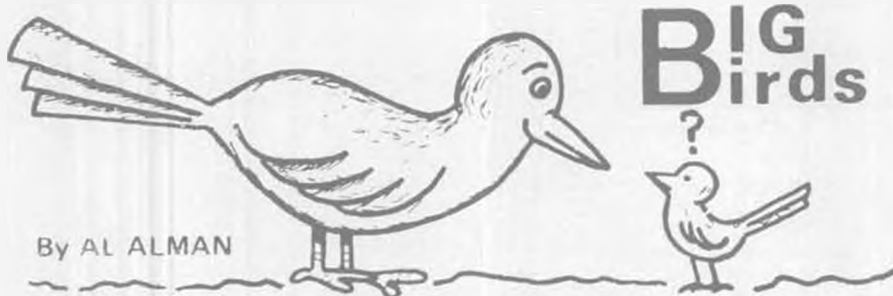
Inked for MODEL BUILDER by Al Novotnik



Al "takes five" inside the BIG Bird Carrier and reads his favorite mag. Note wing slings under van's ceiling.



Bruce Edward's beautiful Canadian Fleet biplane weighs about 20 lbs and uses Quadra engine with Zinger 20 x 8.



RUFFLED FEATHERS

From the amount of letters and calls received, it's apparent that I've ruffled quite a few Mode One feathers. And really, all I did was postulate a very obvious theory of evolution. Now I have an inkling of what poor-old Charlie Darwin must have had to put up with. . .

As most of the communications that I received on this subject were similar to the "open letter" by Eloy Marez (although none were as eloquently verbose), I'll direct my comments to Mr. Marez . . . especially as he seems to have volunteered to champion the Mode One Cause.

First on the agenda, Eloy, is the fact that you referred to the kiddie programs I mentioned as "cartoons." You should have done your homework before pecking at your typewriter, because although "Sesame Street" does have some animation, the bulk of it, and "Mister Rogers," and "Vegetable Soup," and "Electric Company" are *not* cartoons, but "live" programs tailored to help tots (of all ages) learn. (And for your information, I happen to enjoy the skits on "Electric Company.")

Second is the sneaky way you poked fun at my weight problem, all the while revelling in your being able to disappear by simply turning sideways. You couldn't know of the anguish I faced every year trying to convince those smug, skinny, flight surgeons that being overweight was not my fault: that I had a gland problem . . . and the gland, itself, weighed over 200 pounds.

Third, like most all Mode One types,

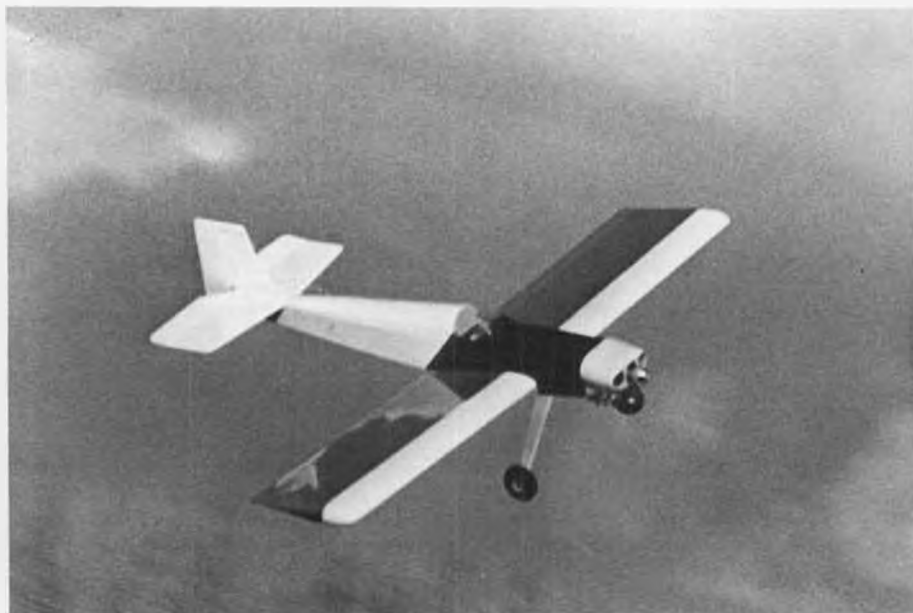
you wouldn't let emotions prevail, and just had to confuse the issue with cold, hard facts. I've never denied that some of the top T.O.C. fliers used Mode One, including Hanno himself. But so what? It only goes to prove that these particular people are "faulted" and unable to cope with primary controls on the right stick as God meant them to be; so, as a result, they need a mechanical crutch in order to get the job done.

Fourth, and last . . . the disparaging remarks about backhoes. Tsk! Tsk!

Shame on you, Eloy Marez, for belittling an American invention and tradition. Have you ever stopped to wonder how well your indoor plumbing wouldn't work, or how impossible it would be for you to charge your batteries, if it weren't for the ubiquitous backhoe, and its ability to make a place for all that outside pipe and conduit? Watching a good backhoe operator is akin to watching a good ballet; we're talking about sheer poetry in motion. And also, being familiar with the old overnight ferry between Christchurch and Wellington, New Zealand, I'd have to agree with you that it probably was the original "Love Boat" . . . but how can even *that* kind of stimulation compare to watching a "natural" backhoe man working a septic tank? Gad, now there's a memory. . .

MAG-AERO K-21

The K-21 was not a very popular engine because of its lousy power-to-weight ratio . . . weighing almost as much as a Quadra does with its mount, a decent muffler, and a six-bolt hub . . . and because it put out hardly more than



Here's another Bruce Edwards BIGgie doin' its thing . . . This one's an Aero-Fly powered by a Mag-Aero which hauls the 11-3/4 pound bird around pretty well.



If done right, this "poor man's supercharger" or velocity stack does make a performance difference. (Edwards' Fleet.)



This low-cost K-Mart Spark Plug Cleaner comes complete with bag of abrasive and gap gauge. Other brands are similar.

half the Quadra's thrust. Two other reasons the K-21 has been ignored are its forward facing spark plug, and its excessively long magneto cover and mount.

Local BIG Bird lover, Bruce Edwards, has been working with and flying this 21cc Mag-Aero in an attempt to overcome some of its drawbacks . . . and here's what he has to say:

"Couldn't do anything about the forward-facing plug, although I don't consider that to be such a problem; there's a good half-inch of clearance between the prop and the plug lead. Pulled the head to see if the plug could be put to the rear, but found that was not possible because of the porting.

"However, I was able to do something about increasing the power and reducing that awfully long overhang. I've seen an increase of 800 rpm (static) just by going to an RC-J-7Y plug, adding a velocity stack to the carb, and using a 40:1 McCullough gas mix . . . with four ounces of Nitroethane added to the gallon of fuel. After trying out a small fortune in props, I found that the K-21 in my "Aero-Fly" does best in the air with a 16x8 Zinger.

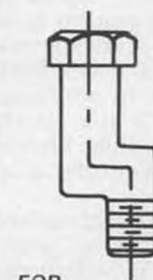
"About the velocity stacks: they're (approximately) two-inch long pieces of copper tubing, the one in the Mag-Aero being 3/8-inch ID while the Quadra's has a 1/2-inch ID. The smaller diameter

stack is soldered to a tin plate which is held to the Mag's carb by its long mounting bolts; the Quadra stack is flared at the bottom, inserted into the white plastic carb plate and then epoxied to that plate. (Bruce roughed up both the plastic and the flared tubing area prior to epoxying, and has had no problems for the 15 hours he's put on it since.) The 60 to 70-degree angle that the stack tip is cut to should, of course, be facing forward to take full advantage of the ram effect; in a sense, a velocity stack is nothing more than a "poor man's supercharger" . . . that works."

And here's Bruce's explanation about how to get that Mag-Aero closer to the firewall . . .

"Take a 3mm Allen wrench and remove the flywheel cover/engine mount combination; this leaves the flywheel sticking out 1.3 inches. A new mounting plate is made from 1/8-inch hard aluminum and a 3.2-inch hole is cut in this new plate . . . and new mounting holes are drilled for the engine case and firewall. The case mount bolts will have to be metric and preferably of the countersunk type. You'll also have to cut a 3.2-inch hole in the firewall to accommodate the flywheel and it's a good idea to have a thin ply bulkhead separate the

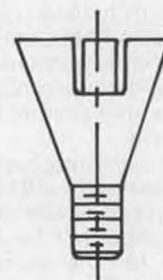
CUSTOM BIG BIRD BOLTS



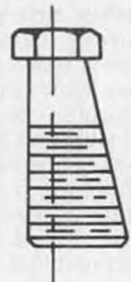
FOR MISMATCHED HOLES



FOR HOLES TOO NEAR THE EDGE



FOR HOLES COUNTERSUNK TOO DEEP



FOR HOLES DRILLED CROOKED AND COCKEYED

Continued on page 74



Here's what last month's BIG Bird Stogee looks like all put together and in use. There's something beautiful about simple things that work really well.



E&L Manufacturing's Big "E" is an Evra-powered, sporty, tail-dragging low-winger.

CHOPPER CHATTER

By RAY HOSTETLER

PHOTOS BY THE AUTHOR



REVIEW UPDATE

As with all reviews, I like to follow up and let you know of any changes the products have undergone since that time. In the July and August '82 issues of **Model Builder**, I reviewed the American R/C SuperMantis. Two weeks ago at the IMS trade show, I had the chance to sit down with John Simone Jr., and to go over the new additions to the SuperMantis. I was quite pleased with what John had to say.

The SuperMantis' performance will be enhanced with an optional tail rotor shaft drive. This eliminates the green belt that has been with American R/C for years. The shaft drive option kit includes a new tail rotor gearbox as well as the front-end gears from the main shaft. The retro-fit kit will sell for \$60.00, and will be adaptable to all present Mantis or SuperMantis kits. (Highly recommended by yours truly. I haven't seen the kit yet, but the gear setup and the ratios are correct.)

There is also a cone start kit available. This consists of an extra "starter" shaft in front of the main shaft. At the bottom of the starter shaft is a timing gear. In place of the belt groove on the engine is another timing gear with a one way bearing (sprague clutch theory). A timing belt runs around the timing gears. Now you have a cone start system without all of the alignment problems and vibration complications present in a typical cone start system.

To fit the cone start to existing SuperMantis side frames, a few holes will have to be drilled to accept the cone start bearing blocks. This shouldn't be too much of a problem for the average modeler to contend with. The cone start add-on presently sells for \$54.95, but rumor has it that this price may be coming down soon.

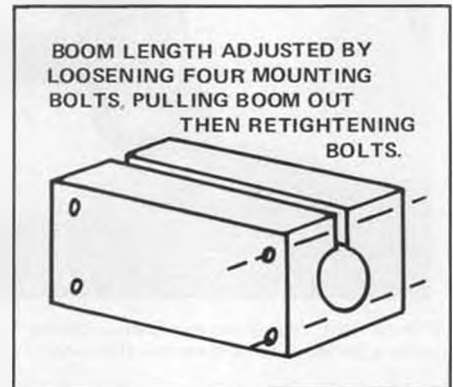
The best news about the SuperMantis is that the newer-style kits will have the new gearing of engine to main shaft to

tail rotor as standard equipment. You may recall that the SuperMantis that I reviewed had an engine to main rotor gear ratio of 5.6 to 1. This gives an extremely high rotor speed with the engine running below its peak power curve. The new gearing for the SuperMantis (as well as the fixed-pitch Mantis) will be 8.5 to 1. This brings the engine speed up and the rotor speed down. Now the engine as well as the main rotor will run happier. From the main rotor to the tail rotor the ratio will be 1 to 4.75. To put all of this in terms that make some sense, if the engine is running at 12,000 rpm the main rotor speed will be 1,412 rpm and tail rotor speed at 6,707 rpm. Compare this to the old ratios of 12,000 engine, 2,143 main rotor and 9,644 tail rotor.

A few other notes tell me that there will be an extended collective yoke for those who want to try inverted flight. This goes for around \$10.00. If you do want to try inverted, I would suggest that you stiffen-up the head rigidity more than what moving the damper pins all of the way in will do. Fit a piece of plywood between the yoke and damper pins, at least. . .

There is also a new tail boom mounting block (see sketch). This will eliminate the old screw-stripping-out-of-the-mounting-block syndrome that happened with tail boom ground strikes on the old attachment method. And, the main frames are warranted for life assuming that they are kept to factory specs. (No extra holes drilled in the frames.) Sounds like American has been pleased with the performance, as well as customer acceptance, of the molded side frames.

At this point you might be asking why American doesn't put all of this into a

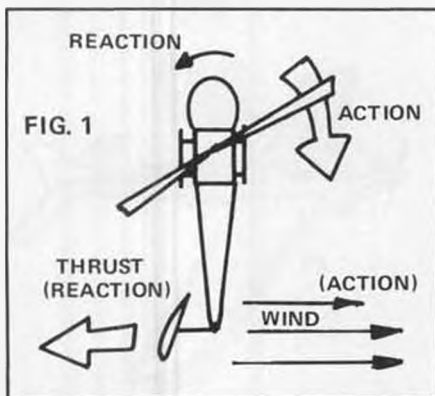


Modified SuperMantis tailboom mounting block.

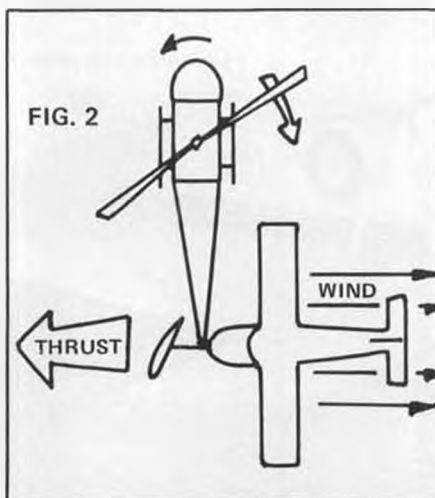
standard kit. Well, they're going to. It will be called the "UltraMantis" and sell for under \$300.00. The factory hopes to have it released a month and a half after the Toledo trade show. This puts the release date anywhere from late May to sometime in June.

Standard features will include: cone start with holes drilled in the side frames to accept the cone start assembly; tail rotor shaft drive; all red anodized aluminum with black offset trim; long yoke on the rotor head for inverted flight; and the new-style tail boom mounting block. The only other changes will be a slightly modified canopy, and an engine to main rotor gear ratio of 9.5 to 1. (Tail rotor stays at 4.75 to 1.) This will let you run a tuned pipe with a higher engine rpm and still keep the rotor speed at 1,400 to 1,600 rpm. There is also the possibility of an optional auto-rotation assembly.

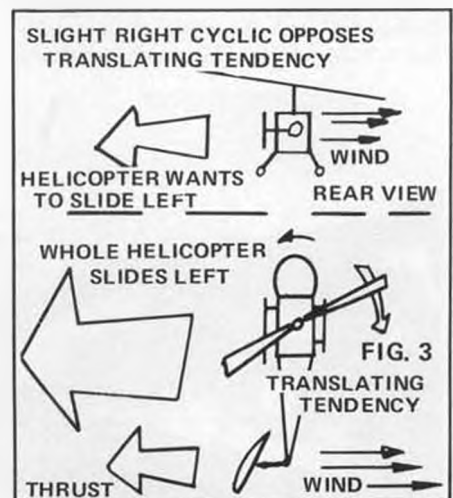
To make a complete package, American will be offering a scale fiberglass fuselage of the Hughes 500D and 500E models. The 500E is a new version of the 500 with a slightly pointed nose instead



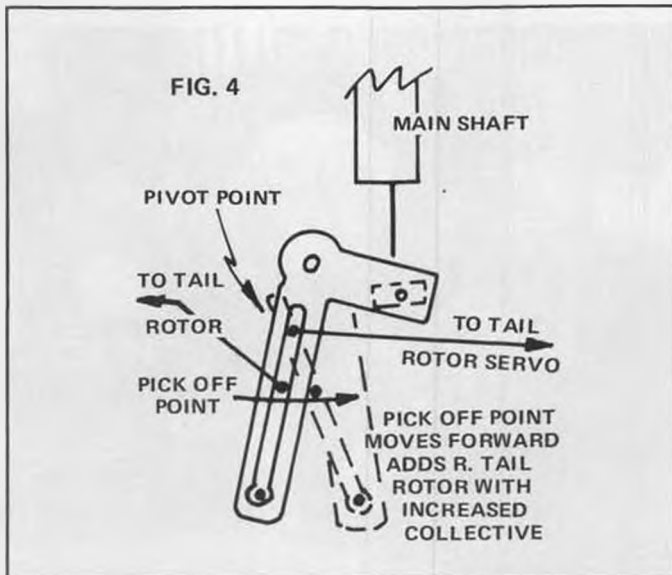
Newton's Third Law states: "For every action there is an equal and opposite reaction."



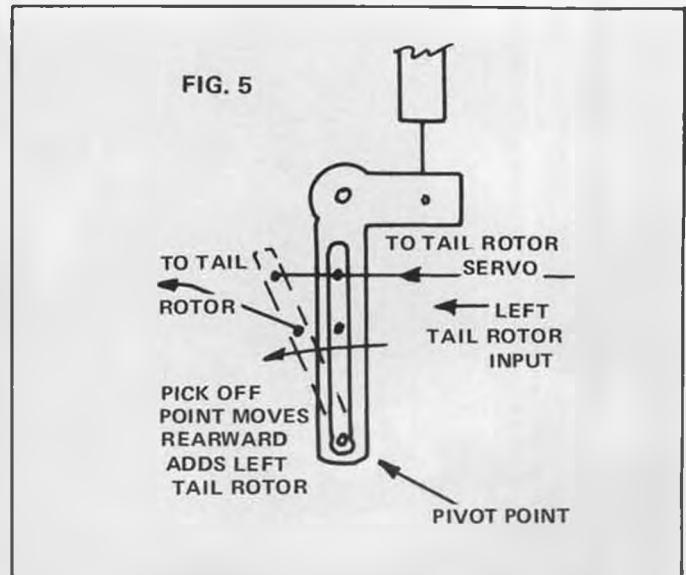
Here's an easy way to visualize the function of the tail rotor (just for plank pilots!).



The tail rotor's sideways thrust causes some "side slipping" known as translating tendency.



This sketch shows what happens to the tail rotor when collective pitch is added to the main rotor on a Heli-Boy helicopter.



This sketch shows what happens when a tail rotor command is given. Note the change of pivot points.

of the eggshell shape that has characterized the 500D. If you like both versions, then you can have your cake and eat it too, because the canopy alone changes the D to the E. One fuselage, two canopies, and you can fly with two different looks. The fuselage is fashioned from epoxy glass and will be high quality. I know that at last year's MACS show, American showed some prototype 500's that looked very realistic. The fuselages will sell for \$175.00, and are recommended for the SuperMantis or UltraMantis, just so the SuperMantis has the tail rotor shaft drive. John suggests that if you have a fixed-pitch Mantis, do not add the scale fuselage since the extra weight will not handle well with fixed pitch.

Look for the 500 fuselages to be out at the same time as the UltraMantis. For further info, write or call American R/C Helicopters, 635-11 North Twin Oaks Valley Road, San Marcos, CA 92069. Phone (619) 744-7533.

BACK TO BASICS: TAIL ROTOR THEORY AND MIXING SIMPLIFIED . . . WHY A TAIL ROTOR?

It is Newton's third law of motion that states, "For every action there is an equal and opposite reaction." He would have made a good helicopter pilot because he realized that *something* affects *everything* else. Nothing could be more true as we look at tail systems in helicopters.

As most of the helicopters on the market today have clockwise-rotating rotors, I'll use that rotor rotation for my illustrations. Consider Figure 1. The rotor rotates clockwise. Given Newton's third law of motion, the nose wants to rotate OPPOSITE, or counter-clockwise. All single-rotor helicopters must have some torque compensation device, so a tail rotor is added to prevent the unwanted rotation of the fuselage. (I have purposely exaggerated the size of the tail rotor airfoil so that you can easily see the airfoil and the thrust that it is producing. . .)

If the nose wants to go left, naturally the tail wants to swing to the right of the chopper's centerline. The tail rotor must produce a thrust to keep the nose straight. It does this by blowing air to the right, which provides thrust to the left. To make this easy for all you plank pilots who are reading this, refer to Figure 2, where I have stuck an airplane onto a helicopter. Essentially, the propeller blows air back, and the airplane moves forward.

LIKE A SMALL MAIN ROTOR

You can also think of the tail rotor as a small main rotor which has been laid on its side. Notice that the tail rotor increases or decreases thrust by collective pitch. Both blades change lift together to produce more or less lift in the horizontal plane. Collective pitch in the main rotor produces more or less lift in the vertical plane. There is no such thing

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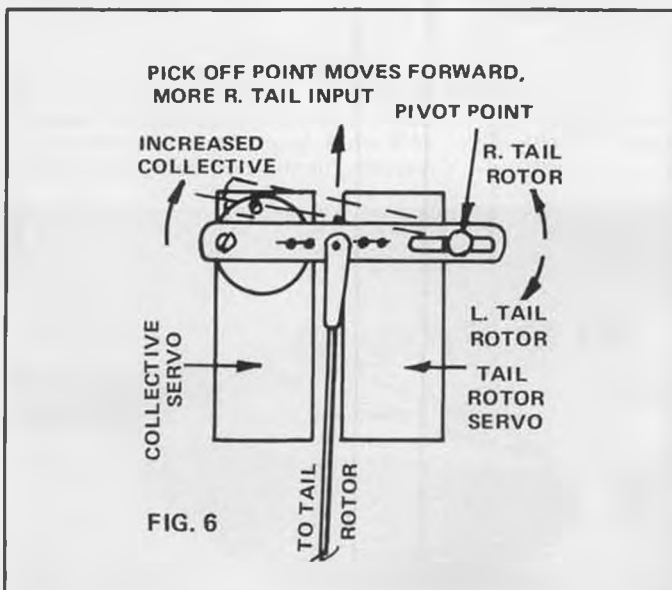
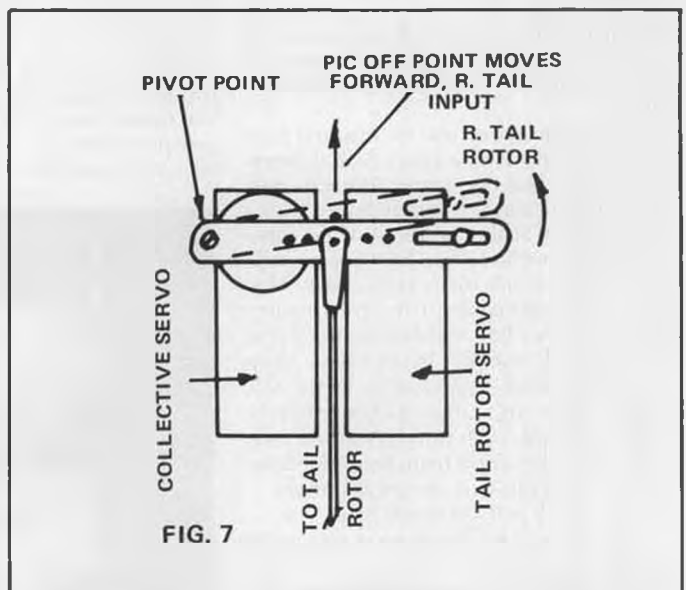


Figure 6 depicts the Kavan-type mechanical mixer going through a collective pitch command.



Tail rotor inputs look like this with the same Kavan mechanical type mixer. The pivot point becomes the collective servo.



This month's photos were taken at the 6th Annual IMS show in Pasadena last January by Roland Baltes. The P-39 pictured here is Joe Zimmerman's Best Military R/C Sport Scale winner (also Q.S.A.A. winner).

1 TO 1 SCALE

By BOB UNDERWOOD

• I don't know . . . would you consider a year a small one, if it was a "scale" year? Well, 1983 looks like a BIG scale year. Contests are bubbling up all over the place, scores of new kits are appearing on the scene, engines are popping up all over the place (especially four-stroke), and interest is running high among "scalers". In order that you can prepare for the super year, let me pass on a few little facts.

One major event will be the first East Coast Nats in many a year! As has been true for the last two years, the Nats will offer Giant Scale, Sportsman Sport Scale, Expert Sport Scale, and FAI Scale. The last event mentioned, FAI Scale, will differ quite a bit from years past. The international community, more precisely the FAI, has highly modified the R/C and CL events. In essence, they have eliminated precision as there will be no "hands on" judging of the models in the future. Certain areas of the judging will be done from three meters, and others from one meter distances.

A ruler will not be used, however.

A problem then developed concerning this year's Nats. The old "AMA Scale" became the same as the prevailing FAI rules during the last rule-making cycle. As the new FAI F4C rules will not

be used internationally until the 1984 event in Paris, it was determined that they would be used this year at the Nats at Westover. The reasoning for this decision was based on the following: as we would not be eliminating any event or model, and would indeed be broadening the base of competition, this would be of value. Any type of scale model, be it an old precision, or one of the newer breeds of stand off (that many people have considered "precision") would be acceptable as no measure-

ments would be made. A second reason for using the 1984 FAI rules for that one event is that just about two weeks after the Nats, we will be selecting an FAI team using those rules when we meet at Louisville, Kentucky.

In a nutshell then, the Nats will encompass the usual R/C and CL events. However, the events listed as CL No. 27, Precision Scale and R/C No. 36 Precision Scale (FAI) will both be using the FAI rules accepted at the last CIAM meeting in Paris. As a result we will in essence have four sets, or levels, of sport scale: Giant, Sportsman, Expert, and FAI (a kinda precision, kinda stand off) Control Line will have the usual Sport Scale and FAI. Now that was easy wasn't it!?

A new feature of the Nats this year will be something that old time free fliers will smile at and say, "Tain't completely new." There are a number of seminars and workshops being developed to provide for the non-competitively ori-



George Harlan of Irvine, California brought this 1/4-scale Monocoupe 90-A. On Sunday, he took home his Webra .91 powered model along with a Best Giant Scale trophy.



Bob Parcell of Riverside, California showed this beautiful A-26 Invader, and took home 2nd in Military Sport Scale.



Another beautiful warbird was this P-38 by James Burnett of Irvine, California. Model was Best Military R/C Precision Scale.

ented scale modeler as well. All AMA special interest groups and manufacturers have been contacted and asked if they would participate in this program. NASA (National Association of Scale Aeromodelers) has agreed to develop some programs. Well-known scale modelers will be on hand to provide demonstrations, and pass on hints and techniques for such things as detailing, documentation, construction techniques, etc. These will not be limited specifically to R/C.

At the Quality Inn HQ there will be manufacturers' display areas as well as hands-on demos and seminars. This convention will take place toward the end of competition week, most likely Friday, Saturday, and Sunday. There is the possibility that Thursday may be added as the response in these early stages of development has been quite enthusiastic. The planning meeting in Springfield, Massachusetts revealed a high level of interest in the Nats. The local modelers were very helpful to the committees, and local businesses have been very supportive. There are many points of interest for a family staying in the area, perhaps turning the Nats into a family vacation as well.

A second big event this year would appear to be the Team Selection Event to be held August 12 through 14 at E.P.

"Tom" Sawyer State Park in Louisville, Kentucky. We will be selecting both the control line and radio control teams to represent the United States in Paris, France in 1984. The complete program for this event was given in the March '83 issue of **Model Builder**. The co-CDs for the weekend will be Monty Groves of California and Dale Arvin of Indiana. While NASA is chiefly responsible for the development of the event, the Southern Indiana R/C Modelers will provide the local support. The static judging will occur on Friday, and flying is scheduled for Saturday and Sunday. The facility at the park provides very nice services for this type of an event. There is a large indoor area to accommodate static judging, and there are very nice flying areas.

The selection process will employ those rules which will be in effect at Paris in 1984. Therefore, instead of selecting nine members (three Precision R/C, three Precision CL, and three Standoff R/C) we will be selecting six members as the Precision and Standoff have been merged into one event on the FAI level. I would love to be able to give some solid hints on how this event will work, but golly, I'm just as far in the dark as most of you must be. I am certain that out there in Scale-land there are a number of people pondering the many aspects of

this change. It would seem to me that a model would have to be somewhat more flyable than some, or most, of the old precision models. On the other hand, it will probably require a model to have a greater amount of detail than some of the sport scale models we have been campaigning through the years. The models, as friend John Preston suggests, that have to have "mud on the rudder pedals" to fit the documentation and the judges scrutiny, just are not necessary any longer. We can understand how much detail will show up when judged from the one-meter distance used for part of the judging procedure. What won't be nearly so evident, will be that part of the model which is a tad over or under size, or the missing needles on the instrument faces.

As an editorial aside, may I say that I view this with mixed emotions. I mourn the passing of precision, but I certainly understand the rationale for its demise. Catering to the very small group, that was to be found in the precision ranks, was suspect. By moving in this direction, it is possible that we will see an increase in the "population base" as the event interests many more people. On the other hand, I sincerely trust that it will not weaken the quality of the scale

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This beautiful 1918 Curtiss JN4-D2 "Jenny" earned Ron Karwacky of Riverside, California a 2nd in Military Precision Scale.



This four-cycle powered Handley Page O/400 by Steven Pfister of Santa Paula, California took 3rd in Military Sport Scale.



Fiberglass Dumas Hotshot 45 at rest. Model belongs to Jim Burba.



Dumas Hotshot 45 at speed. Author's wooden version was slightly faster, but Jim's F/G Hotshot 45 wasn't completely "worked-out" due to its relative newness.

R/C POWER BOATS

By JERRY DUNLAP

DUMAS HOTSHOT 45 IN FIBERGLASS

Recognizing that many model boaters prefer the convenience of a prebuilt boat, Dumas Boats released a fiberglass version of the Hotshot 45 about halfway through last year's racing season. Having designed the Hotshot 45, I certainly had considerable interest in how the fiberglass version of the wooden kit would perform. I was able to talk Jay Brandon, "Mr. Dumas Boats," out of a prerelease version of the boat. What I mean by this is that the boat came without instructions that would normally be provided for the individual purchasing the boat.

The most noticeable difference in this fiberglass hull, compared to previous fiberglass boat hulls from Dumas Products, is the lack of a gelcoat finish. The fiberglass Hotshot 45 is available only in a clear polyester resin version. There are a couple of advantages to not using gelcoat on the model. The first one is the price. It is less expensive to produce a clear resin hull than one with gelcoat. There is also a savings in weight when the gelcoat is not used. As most model boaters will paint over the gelcoat

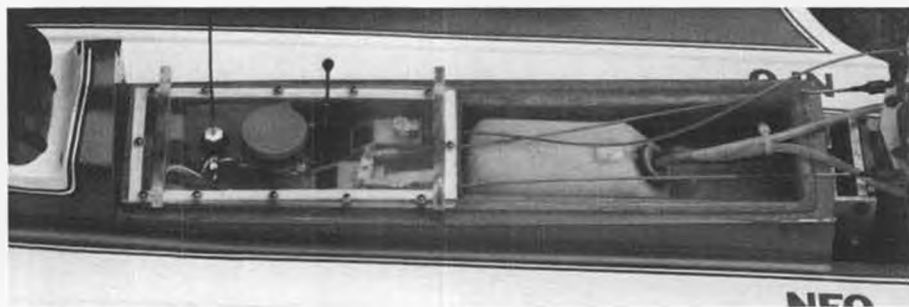
anyway, it seems like a reasonable decision on the part of Dumas Boats. I don't know if this same decision has been made on all their fiberglass hulls. It shouldn't really affect the sales of the boat.

The quality of construction on the Hotshot 45 was very good. Sure, you think to yourself... Like he's going to knock his own boat? Well, the evaluation of the 'glass construction was done by one of my model boating friends to whom I gave the boat. My friend, Jim

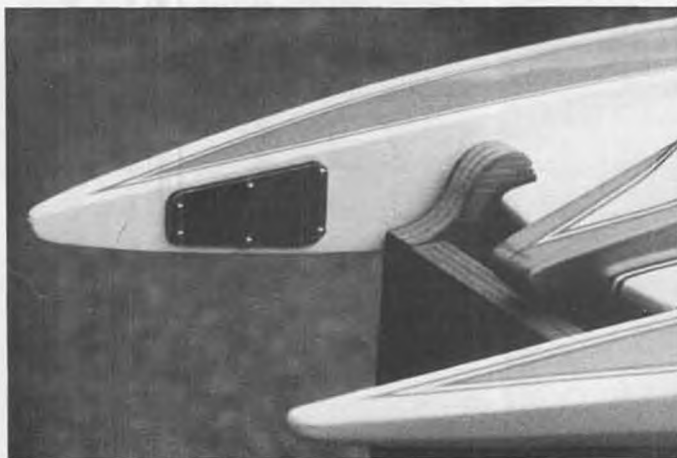
Burba, is a finish carpenter at one of our area's ship building firms, and he knows what to look for when evaluating boats, whether they are models or full-size.

The area I feel is most critical on a fiberglass tunnel hull is the bottom of the sponsons. When a straightedge was applied to the sponson bottoms of this boat, the surfaces were flat, both length and width-wise. This is something that needs to be checked carefully on all

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Radio and fuel tank compartment details include rudder and throttle linkage, on-off switch linkage, and water-tight plastic film can lid for charging lead access.



Jim's Hotshot 45 features this trick weight compartment for trimming hull. F/G hull is foam-filled for floatation.



The use of an adjustable motor mount is highly recommended. K&B 7.5 with Octura 447 or 450 prop is good combo.



1. Ray Van deWalker, CD of the SAM 49er 1982 Fall Bi-Annual contest says, "The girls really ran this meet!"



2. The only way to fly . . . Texaco! Note Otto Bernhardt's method of timing. Taken at SAM 49er contest, Taft, California.



PLUG SPARKS

By JOHN POND

• This columnist has been neglecting the Southern California contingent in his reporting of old timer activities simply because he could write a column devoted strictly to the myriad of events staged all year-round in California. However, the provincial look is something this columnist tried to avoid, i.e., the reporting of activities only in local areas. This can get a trifle boring after awhile.

However, with nothing cooking for the rest of the year, and looking at a two to four-month dearth of old timer contests, the information and photos submitted by Ray Van de Walker, Contest Director, was most welcome.

Ray reports the SAM 49er 1982 Fall Bi-Annual held on November 20 and 21 enjoyed good weather for that time of the year at Taft. Most modelers will recognize that at this late time of year, the valley does suffer from a consider-

able amount of tule fog. To boot, the weather forecaster had predicted rain on Saturday, but Ray knew what he was doing as a contest director . . . he put in a reservation for good weather, and most of the time he got it!!

To show you how good Ray had things organized, Photo No. 1 shows the registration desk as manned by the girls: barely visible on left is Mrs. Fred Lemberg in charge of frequency control, Marge Bernhardt on registration, Wanda Patterson on recording, and Mrs. Doig generally available for timing and relief. No wonder Ray had time to fly and have a good time!

Photo No. 2 will probably bring a loud outcry from the ERA girls when they see how hard Otto Bernhardt is working. As can be seen, this is a typical Texaco flight . . . everyone is relaxed. This is what we are talking about when we say to join SAM!

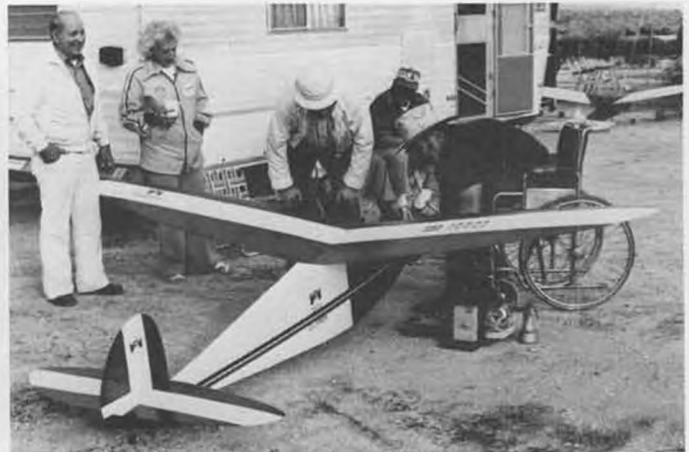
At the same time this contest was being held, the SCAMPS were putting on their SCAMP Fall F/F Annual. For this reason, Pond did not enter the R/C events on Saturday, preferring to try his luck at free flight. Naturally, the needle valve was plugged up! When cleaned the motor could not be leaned out. About that time, as seen in Photo No. 3, Otto Bernhardt came by and said, "Let me try my luck on the motor."

The first thing you don't do is to prime the motor with Coors! Despite objections, the motor was again assembled with some careful eyeballing of parts, and the motor would still not get above a four-cycle run! General conclusion was that the needle valve was too small in diameter (there are three or four variations of Ohlsson 23 needle valves) as the valve was all the way down, yet fuel leaked by the sides! That's Otto's story; I still don't think Coors was the answer! (For those who were unable to decipher the title on the hat, it reads, "I love beer".)

Everybody has to have a big model, and Bill Cohen is no exception. Photo No. 4 shows his huge, 10-foot Comet Clipper undergoing some trouble shooting. One thing about these large models, you never suffer from lack of spectators, advice, and misguided help.



3. Whadaya mean Coors won't make it run?!! "King Otto" explains the intricacies of an Ohlsson 23. Note Pond's hat!



4. Bill Cohen's ten-foot Comet Clipper always attracts a crowd, especially when having motor problems!



5. Gordon Codding of Kingman, Arizona sent in this 1940 vintage photo of modeling activity at Western and Rosecrans.



7. Art Thoms of New Jersey, seen here with an .020 Request, showed up for the R/C events at the AMA Lincoln Nats.



6. Al Grier says the only way to beat John Pond's Dallaire is to *beat* it with a claw hammer. Omahawk Field, Nebraska.

Although Bill didn't win Texaco, he did win the beauty for Old Timers at the recent IMS Trade Show. As one wag put it, "It may not be the most beautiful, but there sure is a lot of it."

If Saturday wasn't so good for weather, Sunday afternoon between two and three saw all the models that flew during this time emerge as winners. This was particularly true of the Texaco Event.

Looking over the results, if there had been a Sweepstakes Winner, it would have been Doc Patterson going away. As it was, George Wagner of the SAM 41 San Diego Aeroneer Club took top honors in Texaco, thereby earning him possession of the "Bent Prop" Trophy for a year.

Let's look at the results:

Class A

- 1. Ross Thomas 19:32
- 2. Doc Patterson 12:58
- 3. Bill Hamner 3:34

Class B

- 1. Don Carl 17:27
- 2. Ross Thomas 13:16
- 3. Doc Patterson 7:00

Class C

- 1. Ross Thomas 21:00
- 2. Doc Patterson 19:26
- 3. Fred Lehmborg 17:37

"Pure" Antique

- 1. Doc Patterson 25:59
- 2. Ross Thomas 24:04
- 3. Don Carl 18:44

Texaco

- 1. George Wagner 37:22
- 2. Ted Sato 25:01
- 3. Ron Doig 22:51

1/2A Texaco

- 1. Don Carl 25:52
- 2. Bob Angel 24:35
- 3. George Wagner 23:34

Before wrapping up the report, it might do well to point out a new event being tried by the 49er Club. This is the "Pure" Antique Event where all motors must be pre-1950 ignition, and models are not to be scaled. It will be interesting to see if this catches on.

SAM CHAMPS 1983

As probably most of the readers are aware, the Society of Antique Modelers Annual Championships will be held on July 19, 20 and 21 at La Junta, Colo-



8. Frank Fisher (left) and Art White team up to get Art's Kloud King airborne for an official Texaco flight.



9. Buck Zehr flew R/C O.T. and F/F O.T. on Wednesday and Friday of Lincoln Nats. Busy boy!



10. Now this is what a well-built Kload King should look like. Master craftsman Bob Oslan made this one and supplied the author with this picture of it.

rado. More information will appear in "SAM Speaks" as so ably edited by Jim Adams.

We don't have much info on the free flight events, but we did receive a letter from the Eastern SAM Vice President, Woody Woodman, who is directing the Old Timer R/C Assist Events. He has submitted the following schedule:

Tuesday, July 19

Class C R/C Glow
Class A R/C Glow
Class C R/C Ignition
Electric R/C (morning only)

Wednesday, July 20

Antique
Antique "True Ignition"
Class A Ignition
Class B Ignition
Class B Glow

Thursday, July 21

R/C Texaco
R/C 1/2 Texaco

The 1982 SAM Rules will apply in all cases except where the contest director may change flight times and engine runs if he finds the field is overcrowded with entries in a particular event.

Of special note is the so-called "True Ignition" Event where nothing but pre-1950 ignition engines may be used for power. However, a tricky deal evolves on the glow and ignition events.

If you are trying for Sweepstakes (or All Events Champion), you must decide which of the basic events you will fly for points. In other words, if you goof in

Class C ignition, you can't fly Class C glow for points. Here are the point events:

- 1) Class A Glow or Ignition (not both)
- 2) Class B Glow or Ignition (not both)
- 3) Class C Glow or Ignition (not both)
- 4) Texaco Only
- 5) Antique or "Pure" Antique (not both)

All events must be declared prior to the start of the meet if you are competing for the All Events Championship.

On the electric event, at present, this has not been fully defined as to whether there will be an 05 size event and/or an unlimited event(s). This is yet to be resolved. Contest Director Woodman does note that if entries in the regular events are too high, there is no question that the electric event will be restricted to one.

Just as soon as Jim Thomas, Contest Manager, and his free flight contest director firm up the free flight events, we will publish them. However, you can depend on the BASIC EVENTS to be



11. Have you ever seen a C.H. Grant twin tractor? Jim Adams says this design is a bit tricky to launch. Taft, California.

run. If in doubt as to which ones these are, refer to your 1982 SAM Rulebook. You know these events are required to be run!

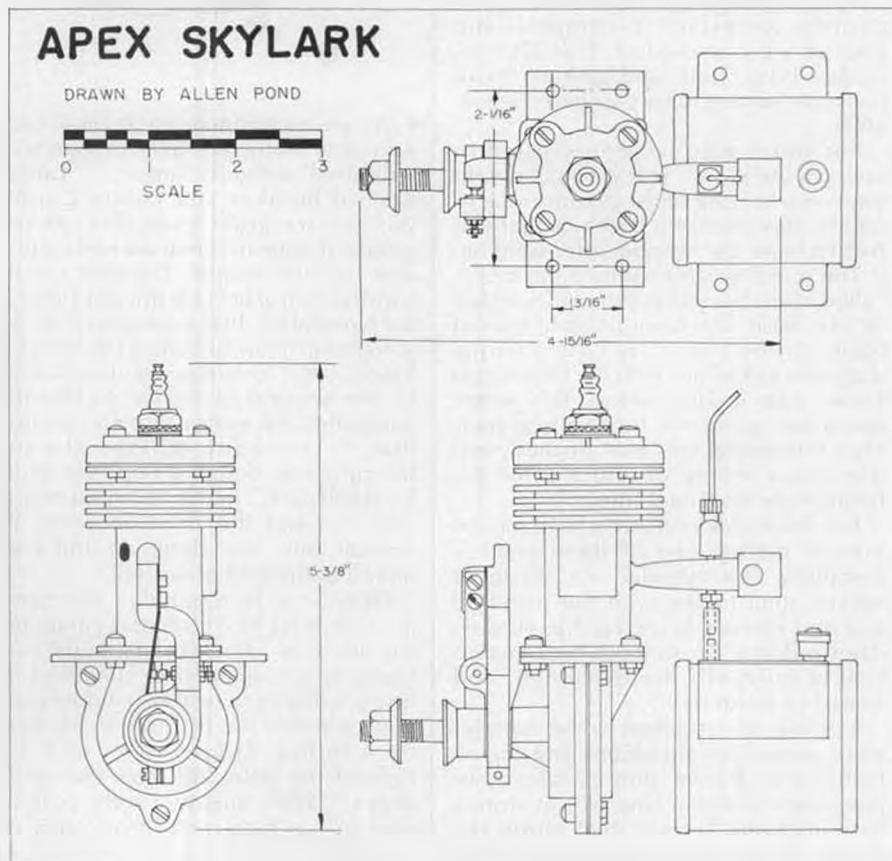
ENGINE OF THE MONTH

This month's feature engine is another one of those little known engines originating in the San Francisco Bay Area. We are indebted to David Brodsky for the kind use of his engine to make the correct drawings. (This writer no longer trusts manufacturer's drawings, etc.)

The Apex Skylark as it was known in the '40s, was produced by Apex Motors, Berkeley, California. Actually, the engine was produced in three variations, completely ready-to-run for \$14.75; a semi-finished kit for \$5.75 each; or a semi-finished kit with unfinished cylin-



12. This is Henry Struck's classic method of designing a removeable motor mount as recreated by Don Dodds.





13. Bob Stalick sends this shot of John Rossello launching his nice-flying American Ace. Near Albany, Oregon.

der at \$5 each.

The Skylark was aimed at the machinists and students taking machine shop practice. The semi-finished kit was extolled as a good deal for pleasure and profit. The company claimed the finished engines would find a ready sale among their friends. The company recommended using a regular auto coil and battery for testing to avoid the more costly coil which was also offered.

For the neophyte machinist, a complete set of assembly and working drawings were provided showing every operation quite clearly and simply. Fortunately, for the newcomer, finished parts in the kit included: cylinder assembly, piston pin, piston ring, spark plug, timer spring, ignition parts, and gas lines.

To top things off, all materials and castings necessary to complete the engine were provided. This also included bolts, nuts, and gaskets. Spark coils would have to be purchased separately.

For those who were interested in saving a buck, for 75¢ less you could do your own brazing of the cylinder attachments. However, the trick was that you had to hone the cylinder after welding.

The directions for running the motor called for six parts of gasoline to one part of SAE 70 oil. The description of how to hook up the motor (without a wiring diagram) was rather sketchy. Unless you knew your ignition setup, this writer could see problems for the beginner. One interesting fact was gleaned, and that was a setting of .010 gap for the ignition points. Good info!

For those collectors who have missed out on getting one of these engines complete, the cylinder was made of special steel tubing with the manifold and port housing brazed to the cylinder. After welding, the unit was heat treated (stress relieved), bore reamed, and honed to finish fit.

Cooling fins attached to the cylinder were pressed-on aluminum. The engine featured a silicone alloy piston; other parts were a piston ring of gray iron, a hardened and lapped steel piston pin (hollow), a connecting rod of light-



14. Simply gorgeous Miss World's Fair being wound by Tom Alden. Note holding jig on inside of fender.

weight dural with phosphor-bronze bushings, a crankshaft of hardened and lapped steel, and a balanced dural web. The crankcase was made up of split aluminum castings utilizing phosphor-bronze main bearings.

A dural timer of "banjo" design, employed auto ignition type adjustable points with the breaker cam and propeller washers made from dural. The carburetor was quite simply an Austin type needle valve with a choke quite reminiscent of the Brown Jr. engine.

Running instructions revealed that the engine was rated from 400 to 5000 rpm, propeller size not specified. Interestingly enough, when starting the



15. Dave Saso of SAM 21 really likes this 1/2A Texaco version of the Eastern States Gas Champ.

engine with the spark lever perpendicular (so that the spark would occur at top dead center of the piston travel), it was claimed the engine would do equally well in either direction. This meant you advanced the timer against the direction of the propeller rotation. How about that?

The last bits of technical dope would be the bore at 7/8 in. with a stroke of 7/8 in. giving .67 cu. in. displacement. Rated horsepower was 1/5, either air or water cooled. Weight of the air cooled version

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Shrimpo

OLD TIMER Model of the Month

Designed by: Malcolm Abzug
 Drawn by: Al Patterson
 Text by: Bill Northrop



• We've mentioned on several occasions that many old-timer designs were published without names . . . Lanzo's Record Breaker and Ehling Contest Winner are good examples. At first glance, it appeared that we had another one for this month. The title for the construction article for this old-timer, in the November, 1937 issue of *M.A.N.* was as follows, "How to Build a Pee Wee Gas Model." But luck was with us this time. In the second sentence of the first paragraph, the author casually mentions that, ". . . in a few months, the first *Shrimpo* was dodging pop flies at the local ball park." In the next sentence, he said, ". . . and the third *Shrimpo*, the present one, was designed and completed at the end of last fall."

Okay . . . so far so good . . . *Shrimpo* it is . . . or is it? In the second paragraph, we are told about (what might have been, as it happened in late 1936) the first gas model to be flown indoors, and quite possibly the first one to be flown on a tether, G-line style, or R.T.P. ('round the pole). But now the author writes, "With engine barely popping over and set for a run of 45 seconds, the S-3 rolled along the polished (gym) floor

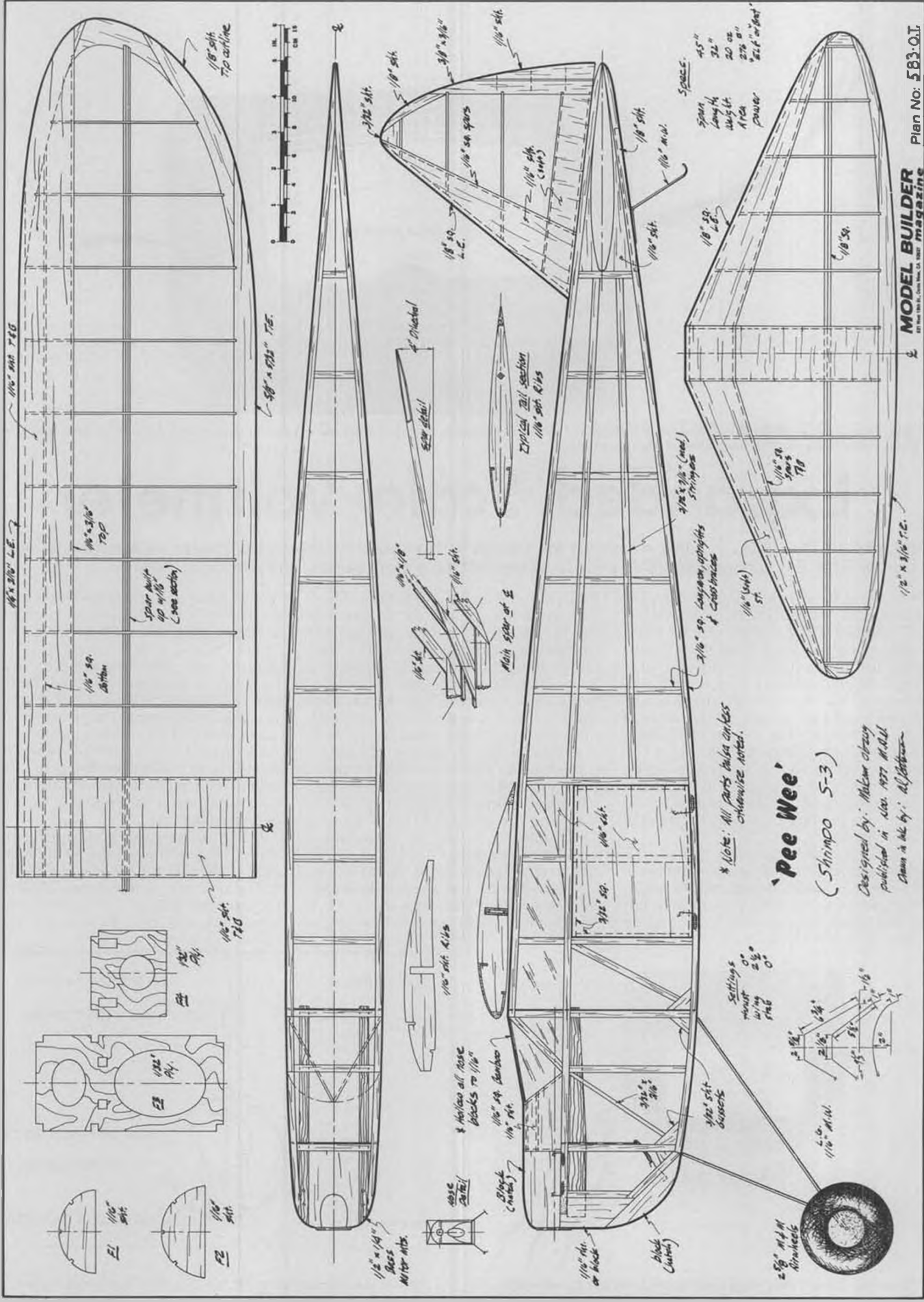
and gaining speed, picked up." And from here on, the model was called the S-3.

Now then . . . the byline for the article gave two names . . . Malcolm Abzug and Richard Wachtell. Did Abzug design it, or did Wachtell? The drawings were done by Abzug. Maybe Abzug designed it and Wachtell wrote the article. Or maybe Wachtell built the model from Abzug's plans.

Hmmm . . . S-3 . . . Didn't we do an S-4 old timer a little while back? Yup . . . in October 1980, we published Malcolm Abzug's plans from January '39 *M.A.N.* for a 36-inch span gas model called the S-4. Looks like Abzug gets design credit for the S-3, doesn't it? If anyone can confirm it, let us know.

Anyway, the *Shrimpo* . . . or S-3, is a clean little model with a 44-1/2-inch span. Just right for an .049 or an .09, depending on whether you like 'em cool or hot. It should also be just right for 05 electric power and three-channel lightweight radio. The article calls for balancing at one-third of the wing chord back from the leading edge.

Enjoy your *Shrimpo* S-3 Pee Wee gas model!



Plan No. 583-Q.T.

MODEL BUILDER magazine

'Pee Wee'

(SHIMMO S-3)

Designed by: Nelson Gray
 Published in: Nov. 1977 M.B.M.
 Drawn in ink by: A. J. Johnson

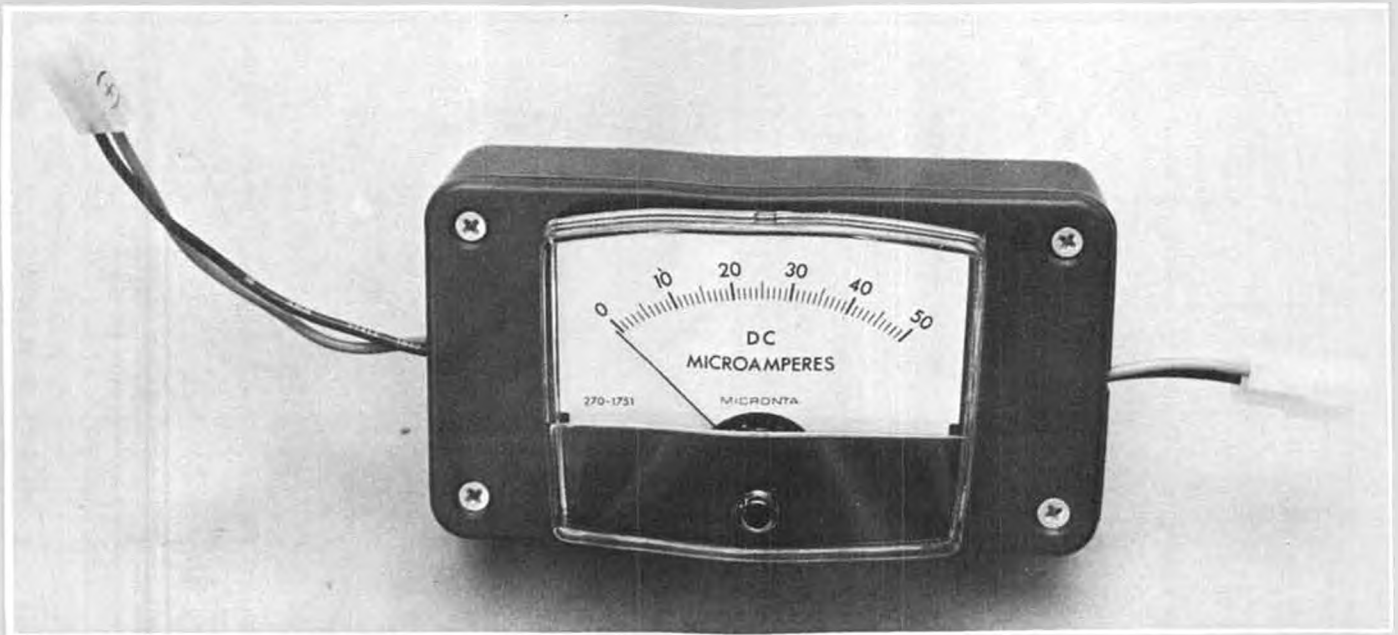
Space:

Span	45"
Length	32"
Wing Lt.	20 gr
Area	278 sq"
Power	25.1 cc/min

* Note: All parts taken across centerline noted.

Settings:
 Mount wing
 0°
 2°
 0°





This is the fully assembled Expanded Scale Voltmeter (ESV). The package that the actual meter came in doubles as a pattern for cutting the holes in the mounting box. This saves a lot of assembly time.

Expanded Scale Voltmeter

By MITCH POLING . . . Keep an eye on the voltage level of your six-cell Ni-Cd battery pack during its next charge with this economical ESV. Your batteries will have more power, and live longer too!

• Do you have a six-cell pack for your Leisure 05, Astro 05XL, Cox Fibrini, or 1/12-scale car or off-road vehicle? If you have, then you have most likely heard about the advantages of "digital charging". Digital chargers have a voltmeter that shows the voltage increase in hundredths of a volt as the charge approaches its peak. When the voltage peaks (stops rising), you turn off the charge, and go fly, or race. You have the maximum power and endurance, because you have the most charge in the pack that it will accept before it starts to overcharge.

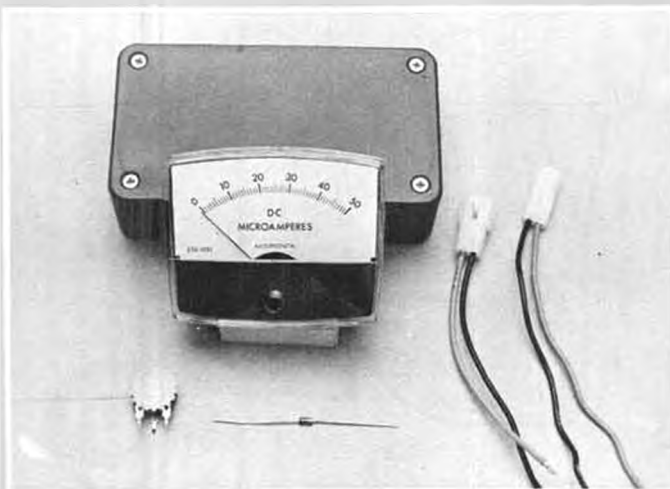
This method is so good that serious competitors nearly all use it, whether in car racing, pylon racing, or FAI glider competition. The only drawback to this is the price, usually close to a hundred

dollars for the charger. A Sunday flier or Sunday driver is hesitant to put that much into a charger; he is, after all, in it for fun, not competition. But if it were cheaper, wouldn't it be neat to have that extra edge on power and endurance? Well, you, can, for less than fifteen dollars! An expanded scale voltmeter can display voltage changes in hundredths of a volt too, and you can see the meter needle move up to the peak. It's dramatic, and as you can see the motion, it is not a "numbers game", it's more like watching the second hand of a clock. That is more "real" in many ways, compared to a digital display, as you do not have to worry about exact values.

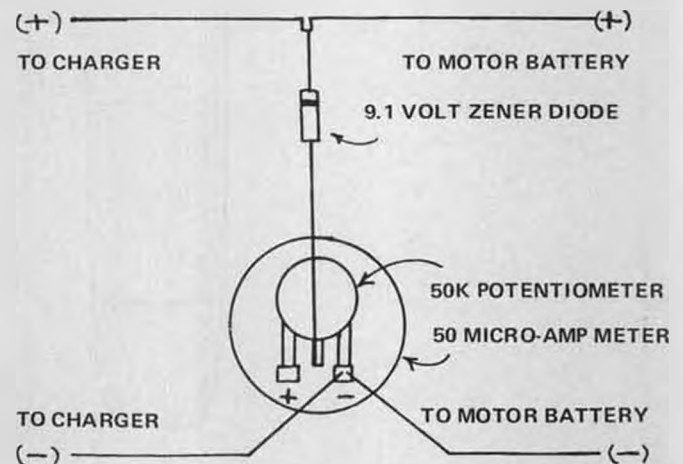
This meter has been kept very simple, to encourage those who have never built anything with "electronics" to give

it a try. It has only three electronic parts: the meter, a zener diode, and a potentiometer, all readily available from Radio Shack. When it is finished, it is just plugged into the charger you already have, then plugged into the battery pack, so there is no rewiring of anything you are already using. That's simple, and easy! Now, of you have one of those "black box" chargers with no meter, you can see what is going on. You won't have to start with a fully discharged pack, and you won't have to wonder if you are overcharging.

If all this sounds good to you, let's get started! You will need the 50 microamp meter, 270-1751, a 9.1-volt zener, 1N4739, a 50 kilo-ohm potentiometer, 271-219, a project case, 270-221, and a pair of male/female connectors. All but the con-



There really aren't that many parts to the ESV, just a box, meter, 50k pot, zener diode, and connectors.



Here is the wiring diagram for the ESV. This is intended for fast charging six-cell packs.



Using a 9-volt and a 1.5-volt battery in series, set the meter to full deflection. Each division is now .030 volts (1.5v/50).



Remove the 1.5-volt battery and check the zero point on the meter. With the 9.1-volt zener diode, needle shouldn't move.

nectors are from Radio Shack. The connectors will depend on what your charger and battery pack use. Some of these connectors are "rare birds", so it may be easier to buy whatever connectors are available and use them to "splice" the meter into the charger output cord, and use the charger output connector for the output of the meter. Molex plugs, or the quick disconnect plugs, 270-026, from Radio Shack, would do fine.

Now for the assembly. You will need a 25-watt pencil iron and rosin core solder. Start by soldering the zener diode to the center terminal of the potentiometer, with the banded end away from the potentiometer. Keep the soldering simple, just pre-solder the leads on the zener and the potentiometer, then hold them together and "melt" the connection together. This gives a good clean joint. Resist the temptation to wrap lots of turns of the lead around the pins, and so on. It makes a mess, and is hard to solder, and even harder to take apart if you need to later on. Keep it simple! Just touch them together, and that's it!

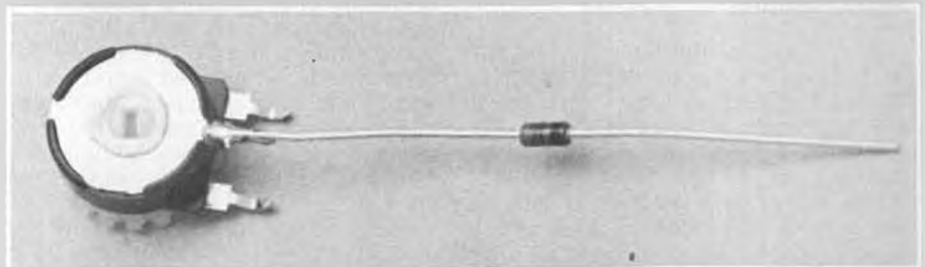
Now solder the potentiometer across the meter lugs, as shown in the photo. Again, pre-solder everything, then touch them together and solder. Note one lug is labeled with a plus sign, the other with a minus sign. Now solder the

minus leads of the input and output plugs to the lug with the minus sign. Solder the minus leads only; these are always coded black if there is color coding. If parallel molded cord is used, the minus lead will be smooth, the plus lead will have a ridge or ridges molded on it, and occasionally will have a white stripe as well. If Molex plugs are used, the plus lead will go to the pin on the triangular, "house roof" side of the plug. Do the soldering by stripping a quarter inch of insulation off the ends of the leads, then pre-solder them. Con-

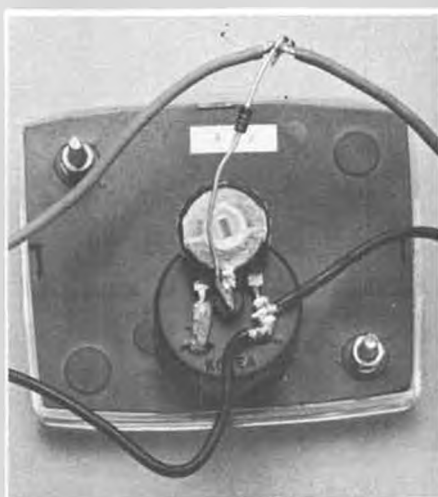
nect them to the lug as before, by touching them to the lug, then melt them on. As there are two ends to do this way, it will take a little ingenuity to hold it all together, but persevere!

Now connect the plus leads together, along with the banded end of the zener. Make a hook at the end of the zener lead, put the pre-soldered ends of the leads in the hook, and melt them together. You are done, that's all there is to it! Use the drilling guide drawing that

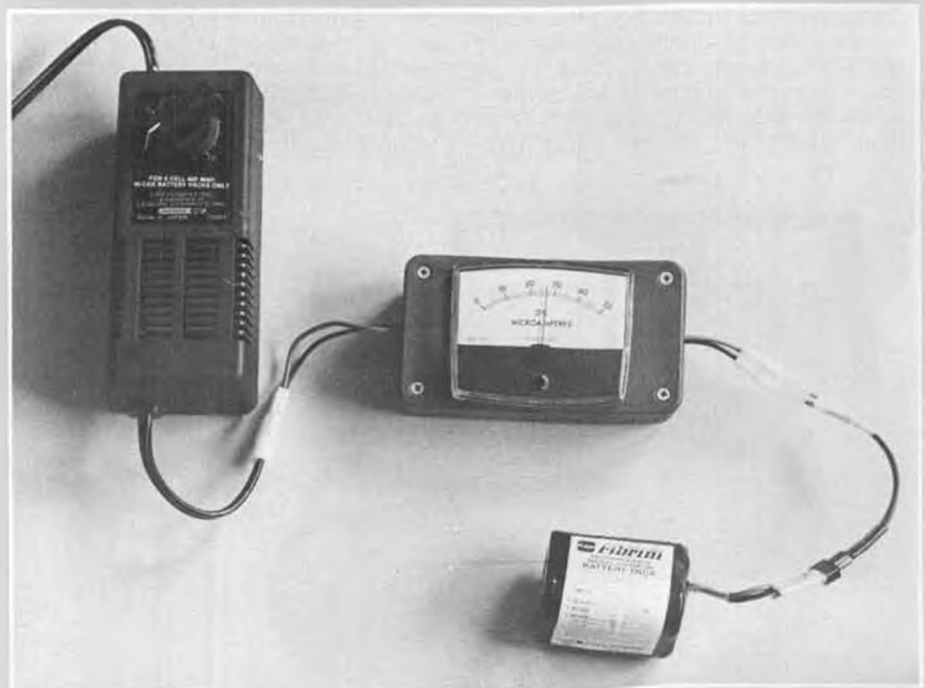
Continued on page 95



Solder the zener diode to the center terminal of the potentiometer with the banded side facing away.



The positive leads (red) are soldered together. Banded end of zener soldered to them.



Here we see the battery pack nearing the top of its charge. The meter reads "26". To convert this to actual voltage, multiply 26 times .030 and add 9-volts.



Delta's newest 1/12-size racing car is the Super Phaser, seen here minus a body. Best handling 1/12 available?



New set-and-forget charger from Delta. Just push a button to reset and when it senses 100% charge, it'll trickle charge.

R/C AUTO NEWS

By DAN RUTHERFORD

PHOTOS BY AUTHOR

- Why I do it, I am not sure. . .
Do what?

Promise in one article to cover a certain subject in the next. I've done it many times in my years of writing for **Model Builder** . . . and still haven't learned.

So . . . I have no full-blown test of one of the latest in 1/12 cars, the Delta Super Phaser. The road pack that I was waiting for came in as a receiver only, and then too late to bolt it all together and race it at least a couple times.

However, I have run the car about a dozen times here in the cul-de-sac and it is really super. It's very smooth, turns well, is easy to drive . . . It seems to do everything you want a 1/12 car to do, it just does them all better than any other car currently available. Yes, I know that is a fairly strong statement to make, but I make it for three reasons. One, I have now driven the car enough to see what it is capable of doing, and where it is better than other cars. Second, there have

been a number of phone calls coming in here, and most of the callers mention the Super Phaser as being the best handling 1/12 car that they see being raced in their area. Third, there is a wholesale change taking place in the design of 1/12 cars as all the other manufacturers first figure out how the Super Phaser works, and then how to adapt their car to a similar setup. Check it out, everybody is making changes; some are detail refinements, others are a complete reversal on previously held ideas.

For those who don't already know, the real trick to the Super Phaser is the T-bar used as a link between the rear pod and the chassis pan. The shock looks trick, does an awful lot for getting the maximum performance from the T-bar idea, and is very handy in setting the ride height for the chassis pan. But the T-bar is what makes the Super Phaser do its thing so well. It has also been proven to work on other cars. However, I don't

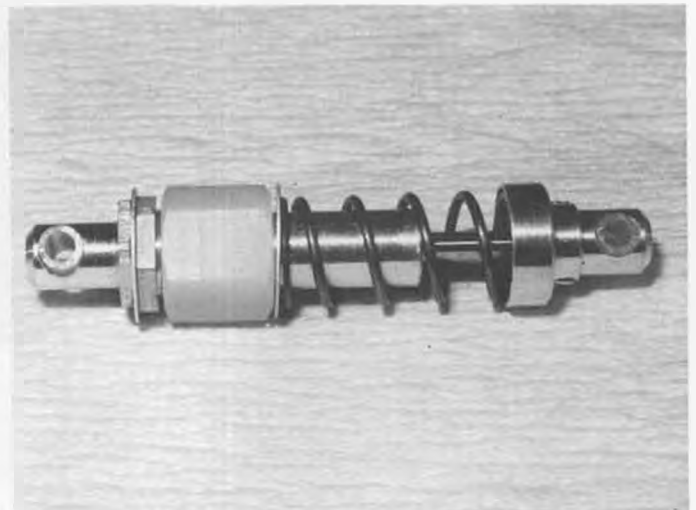
have suggestions on exactly how to modify your particular car. I do know that the folks at JoMac took a long, hard look at what Delta has done, and they do have a couple of ways to modify the Lightning 2000.

Along with release of the Super Phaser, Delta has a few more things of interest, the first of which is a new compound of rubber for rear tires, the 1241 series. As many of you have figured out, most of the manufacturers use the same source for their rubber sheet, which they then cut up into tires. There can be considerable variation in the rubber, as it seems that the folks making the sheets can't hit the exact same compound each and every time, which leads to speculation that one manufacturer's rubber is better than somebody else's. With Delta the difference has always been that they grade each and every ring of rubber so you can order the compound that you

Continued on page 85



Delta's self-contained starter battery for glow plugs. Meters indicate voltage of Ni-Cds, and condition of plug.



Associated's new shock absorber designed for the RC 500 suspension car. Excellent design is adaptable to other brands.



The author's old timer fleet rests on the slope of his backyard lawn. How many can you identify?



Playboy. Potentially the best performer.

Born Again Free Flight

By WILLIAM LANGENBERG . . . If you've ever wondered what all the fuss is about over the Old Timer and Nostalgia movements, read on, you'll see why they are gaining popularity and support.

THE GOLDEN AGE OF FREE FLIGHT

The year was 1940. Millions of young men in the United States were fascinated with aviation and aircraft. The Battle of Britain was in full swing, and Spitfire pilots were the current heroes of countless young aviation fanatics. In America, the threat of war was stimulating new aircraft design and production, and the entire aviation industry was coming out of the doldrums forced upon it by the Great Depression.

If there ever was a Golden Age of free flight in the United States, it probably culminated around 1940. U-control had not yet developed popularity, and radio control was an esoteric science practiced only by a relatively few dedicated modelers. The success of the Brown Juniors and other reliable engines had permitted gas models to challenge their established rubber powered brethren for predominance. Korda's Wakefield had won the last major international contest in 1939, and Goldberg's Zipper had burst on the scene to popularize gas models seemingly overnight.

THE WAR INTERVENES

What happened to those millions of young men who were fascinated by full-scale and model aviation around 1940? Some, tragically, went to war and never returned. Other, more fortunate, served in the military, then came home to education, jobs and new families. The remainder either were ineligible for military service in World War II, or entered too late to see combat. As the years passed and the entire group matured, however, many of its members once again became more homogeneous.

THE GENESIS OF OLD TIME FREE FLIGHT

As the young men of 1940 reached their 40's and 50's, with relative job security and more stable family situations, many developed nostalgic thoughts of their carefree youth. Among these pleasant memories was free flight: the rubber and gas powered models of circa 1940. On such a note of nostalgia, repeated in hundreds of cases, the Old Timer program was born.

THE AUTHOR IS HOOKED

For many years, the author resisted the Old Timer movement, probably

based on a reluctance to repeat mistakes made over 30 years prior. As the nostalgia craze swept the country, however, and dances, movies, plays, and clothes reflected yearnings for the past, I succumbed to the lure and built my first Old Timer . . . a Korda Wakefield. The choice



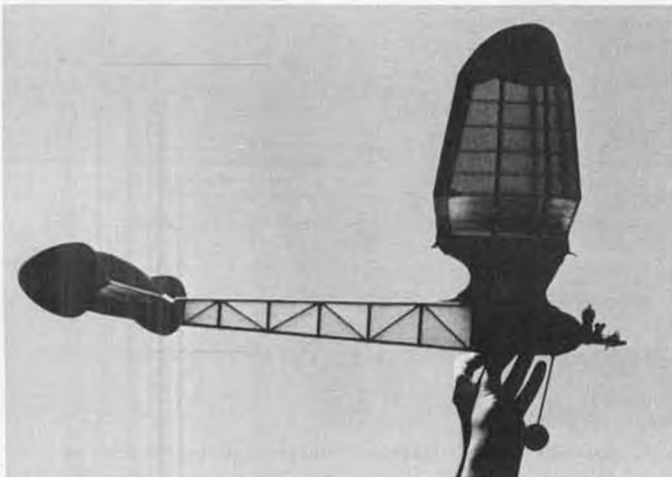
Here's a pair of rubber powered models: Lamb's Climber and Korda's Wakefield.



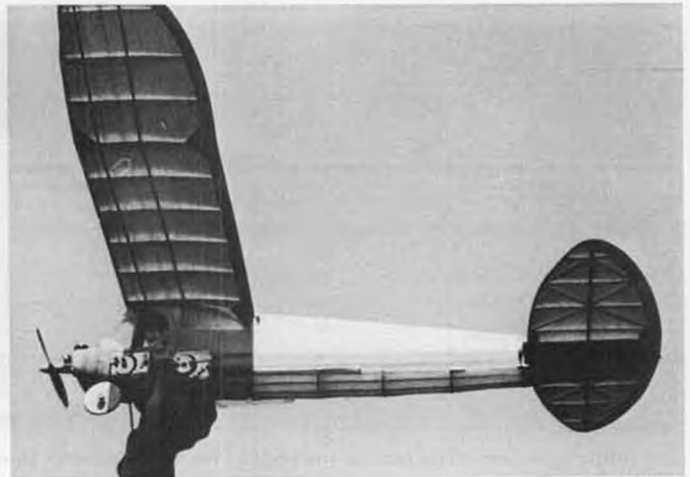
Ranger. Note wing and stab keys.



Without reading the following identifications, how many of these .020 replicas do you recognize? . . . They are (left to right): Stratostreak, Playboy, Ranger, Brooklin Dodger.



Stratostreak. Probably the most consistent winner.



Brooklyn Dodger. The author's favorite.

was a good one, as the model was simple to build, readily available, and almost universally recognized on the flying field. In addition, it was not difficult to improve upon my original model of this type, completed without assistance before I reached my teens. The fact that Korda's Wakefield is currently uncompetitive is the only disappointment experienced with it to date.

Because Korda's model was disappointing in terms of performance, I chose to build a second, more competitive rubber ship. As I had also built Ed Lamb's Climber as a youth, I produced the plans and completed it the following year. There is no question, based on my experience, that the Climber is an attractive and strong competitor. It climbs rapidly to impressive heights, and glides well in thermals. In dead air or down drafts, however, my Climber glides like a brick. There seems to be no question that the higher aspect ratios, thinner airfoils, and longer moment arms developed in rubber models since the 1939-1941 era have significantly improved their dead air performance.

THE FLEET EXPANDS

As existing Old Timer rules provide for only two classes of rubber models, cabin and stick, there seemed no need to augment my fleet in these categories.

Neither possessing nor being interested in acquiring any ignition engines, I opted to expand my Old Timer fleet into the Replica .02 Power category.

This decision proved fortunate for several reasons: Cox .02 engines are powerful and readily available; there are several .02 kits on the market of well-known designs; the models are simple and quick to build; they are small and easily transportable; and the completed models are light and relatively durable.

SUGGESTIONS FOR NEW OLD TIMER PARTICIPANTS

As indicated in the accompanying photographs, my Old Timer fleet now numbers six models, built at my usual snail's pace of one per year. As there may be other circa 1940 modelers who are attracted by the photographs and may be reading this article, I offer the following suggestions, to be used or discarded as you see fit:

1. Join the Society of Antique Modelers (SAM). They publish an official rule book and need your support.

2. Old Timer rubber cabin and stick classes are frequently combined at contests. Accordingly, if you opt to build only one rubber ship of the most competitive type, Lanzo's big stick model is probably the best selection.

3. Start your participation in gas

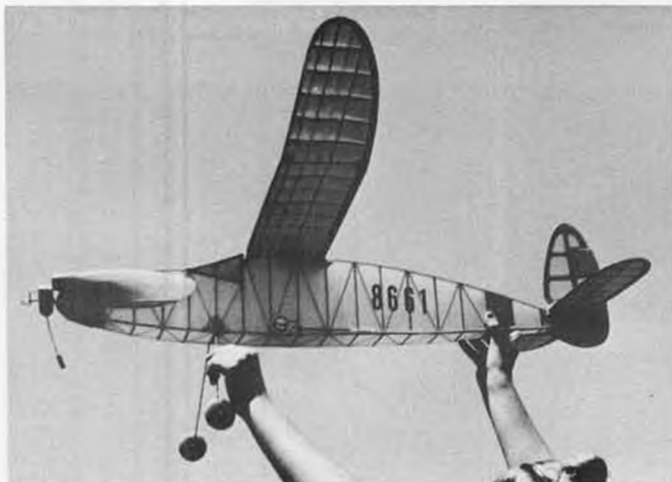
events with Replica .02 Power. Engines and kits are readily available, and the models are cheap and practically indestructible. The Stratostreak is probably the biggest winner in this class, although the Playboy is also very competitive. I personally favor the Brooklyn Dodger, as it is distinctive, stable, and competitive with a hot engine.

4. SAM rules state that, "All changes must be in the character of the original model . . . beef up the built-ups!" As the Replica .020 Power models are particularly susceptible to warps, I strongly urge they be strengthened by cross bracing, additional ribs, etc. See the photographs for details.

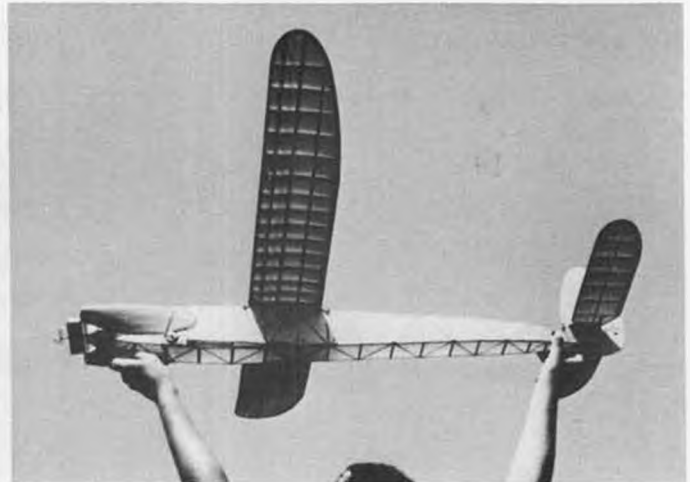
5. The preamble to the SAM rule book states that competition flying of Old Timer models, ". . . is intended to be casual, enjoyable, and interesting for both competitor and spectator alike." I suggest that precept be kept in mind constantly when building, flying, and competing with Old Timer models.

My experience with Old Timer models over the past nine years has been rich in nostalgia. It is good for the aging ego to demonstrate that you can do at least one thing better at 45-55 than you did as a youth of 7-17, i.e., build and fly an Old Timer.

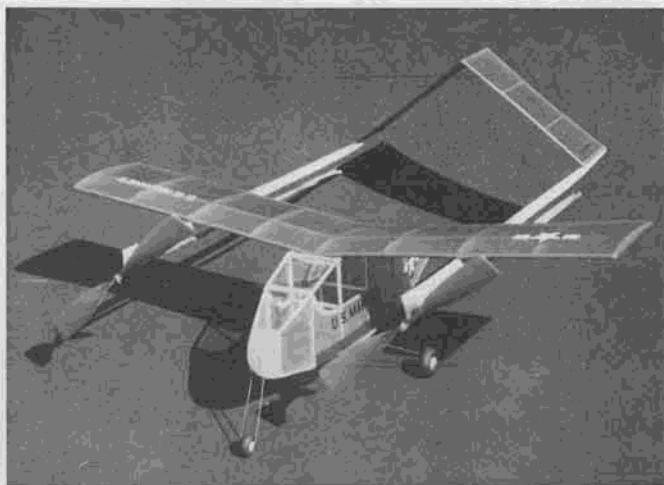
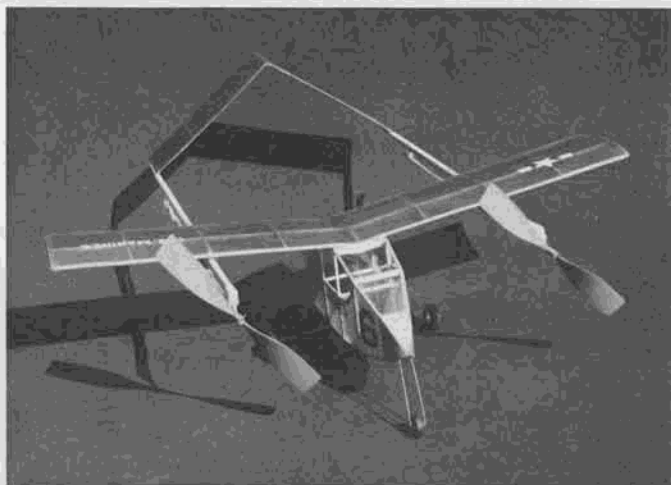
Try it! You can boost your ego too. ●



Korda's Wakefield. Most recognized at the flying site.



Ed Lamb's Climber. Climbs like a rocket, glides like a brick.



This Peabody Packet twin Bostonian is covered with yellow tissue on the body and red tissue on the wings and inverted V-tail. Military markings make it look similar to an OV-10A.

PEABODY PACKET

By WALT MOONEY . . . Perfferer Peanut diverts his creative peanutty-talents to the world of western style Bostonians with this cute little twin boomer named after the Fairchild C-82 Packet.

• Here is a simple little multi-engine model that flies well, is easy to construct, and is kinda cute to boot. The structure is so simple that the plan is almost self-explanatory. All the sticks are medium balsa, and are sized according to the plan. Use good, firm balsa for the ribs, as indicated. If the sheet balsa that you have available is soft, use thicker sheet than shown for the ribs. Note the simple corner gussets on the flying surfaces and use them. I forgot the gussets, and as a result, my model has some wrinkles in the corners of the covering. (I note that none of the wrinkles can be seen in the photos, so I could have kept quiet, but the wrinkles irritate me.)

Sleek Streak thrust bearings are ideal for this model, and if you bought two of these models for the bearings, you also have ideal propellers. (That's what I used.)

Balance is important and will be determined to a great extent by the propellers you use. I suggest that for your early testing, the booms be cemented to the tail and attached by rubber bands to the wing. That way you can move the booms forward or backward to get the proper balance point.

On the model in the photos, the booms were moved back three-quarters of an inch, and the model still needed a little up elevator to fly nicely. Moving the booms back, of course, gives the model a longer tail moment which is good from the standpoint of increased stability.

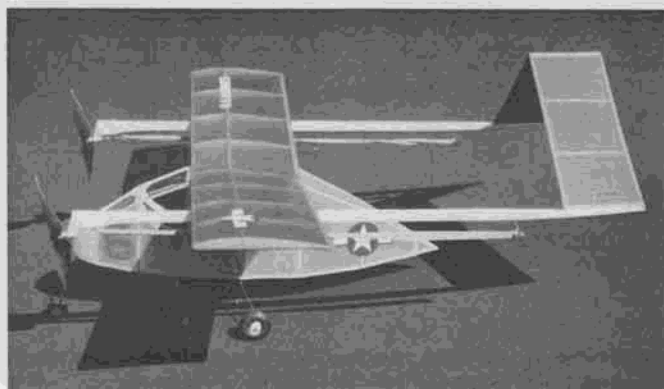
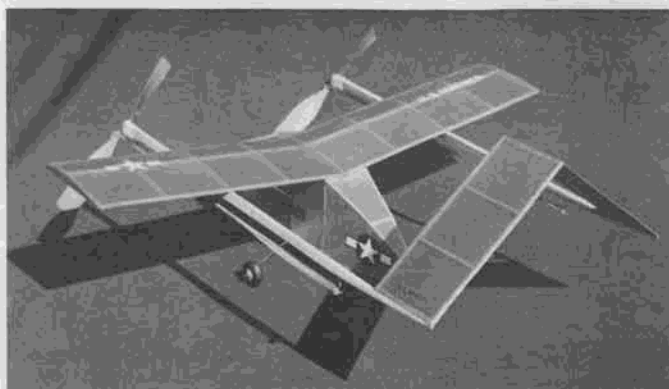
As this is strictly a fun model, any color

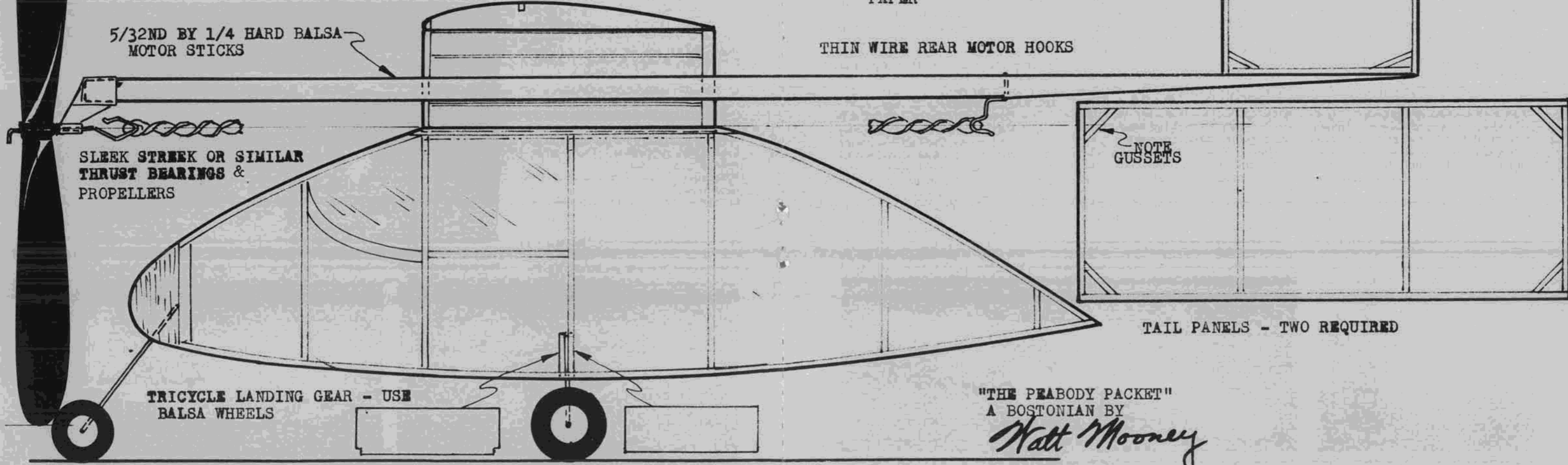
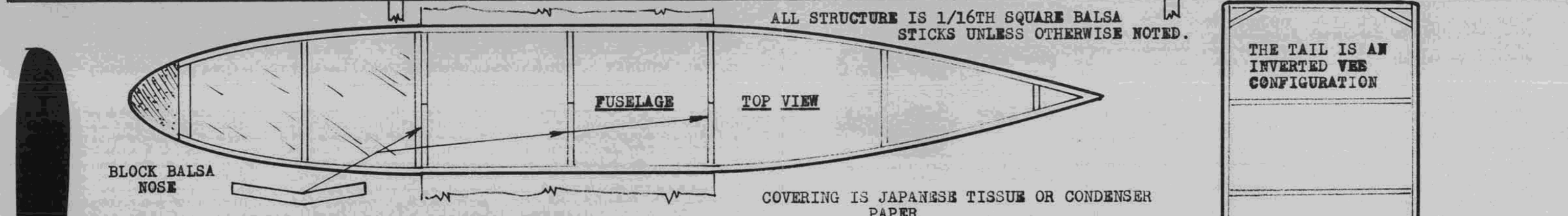
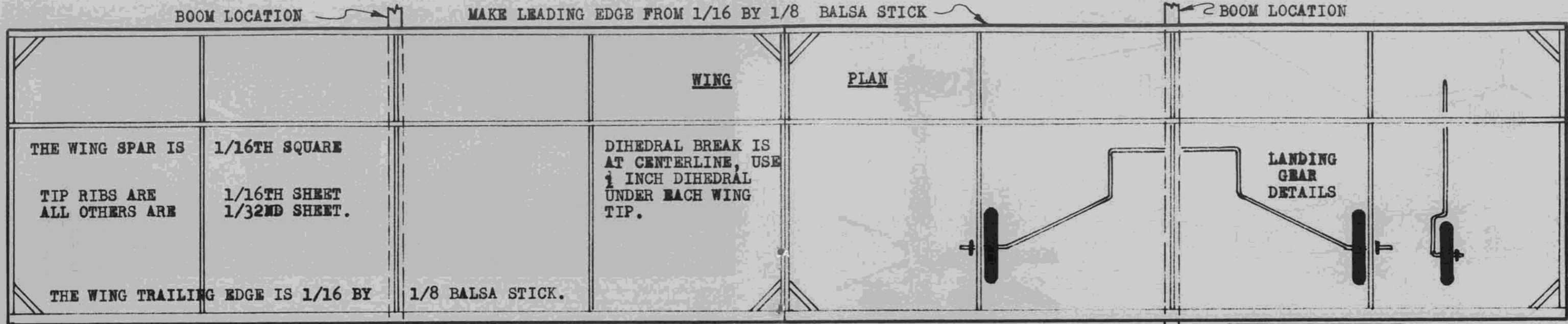
scheme is OK. The model shown has the body covered with yellow tissue, and the wings and the inverted V-tail covered with red tissue. As the model resembles the OV-10A Coin, the military insignia and the "U.S. Marines" name were added in appropriate places.

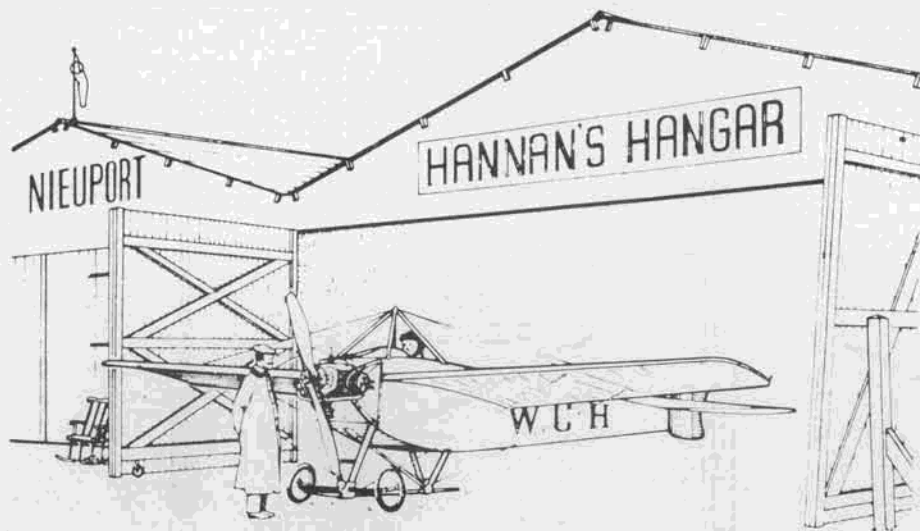
Have fun with your twin Bostonian. •



The basic framework is now complete and ready for covering. Sleek Streak props and thrust bearings are used.







"Some books are to be tasted, others swallowed; and some to be chewed and digested."

• Our lead-in line this time is from Francis Bacon (1561-1626), and serves to introduce:

BOOK REVIEW MONTH

New aviation publications appear on the market faster than we can keep pace with them, but thanks to our readers, here are some mini-reviews of recent releases:

Pilot's Sketchbook, by Joseph P. Tracy (Aero Publishers, Inc., Fallbrook, California) was sent to the Hangar by Bill Kee. The author, Tracy, has a 50-year background as an aviator, writer, illustrator and magazine editor. His *Sketchbook* is just exactly that, a collection of freehand drawings accompanied by stories, anecdotes, and poems relating to his experiences with aircraft and aviators.

Beginning with 1927, the Lindbergh era, and extending well into the 747 age, the publication includes plenty of biplanes, a Zeppelin, autogiros, and more than a smattering of philosophy. Tracy also stirs in some provocative commentary on detours in aviation efficiency brought on by political "water-walkers," and high-level ineptitude: "Hopefully we will get some updated Spads or even Fokker D-VIIs soon."

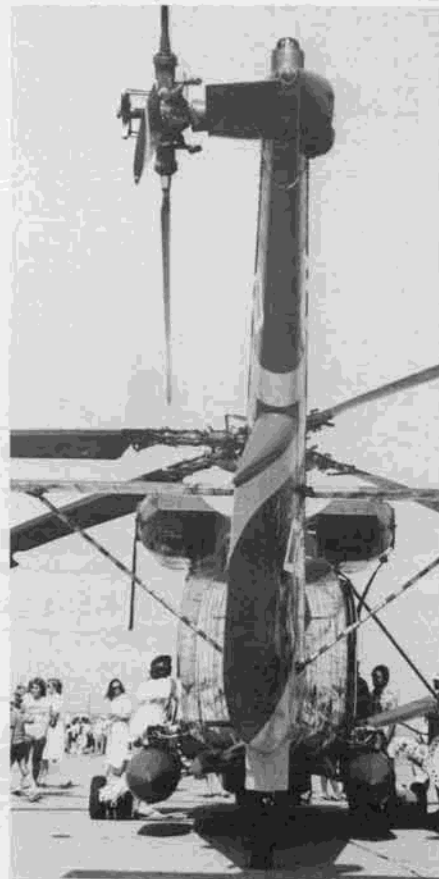
Bill Kee also alerts us to the availability of the *Travel-Air Story*, which ought to be worthwhile, as it includes scale drawings by **Model Builder** contributor, Peter Westburg.

THE DELTA WING

Unorthodox aircraft have long held special attraction for modelers, and no designer ever produced more of 'em than the late Alexander Lippisch. His book *The Delta Wing*, published by the Iowa State University Press, Ames, IA 50010, at \$15.95, is a winner. Translated from the original German by Gertrude Lippisch, this volume documents more than 25 years of research efforts which culminated in the rocket-powered Me 163.

Lippisch was a long-time model builder, and in fact, published several books on the subject during 1929-35. And later, while working in Iowa for Collins Radio Company, he was supportive of such well-known American builders as Larry Conover and Paul McIlrath.

Although Lippisch explored all manner of designs, including Dooling powered R/C drones, wingless aircraft, ramwings and aerofoil boats, the majority of his creations were flying wings. These were produced in an astonishing variety, including gliders, powered prop-forward, pusher, and pusher-puller types. Configurations ranged the spectrum from open cockpits to enclosed cabins; high wingers, parasols, shoulder-wings, and low-wingers. Three-view drawings are provided in this book for most of 'em! These vary in quality, but do offer useful starting points for scale modelers,



Note the offset tail on this helicopter seen at a recent airshow. What a trim tab!

as do the many rare photographs.

We were sufficiently inspired by the Storch IXb of 1933-34 to quickly construct a small model for the Northrop Wing Contest (see photo). Although its flying problems have yet to be sorted out, it is a fascinating craft. If you are at all intrigued by unusual flying machines, this book is for you.

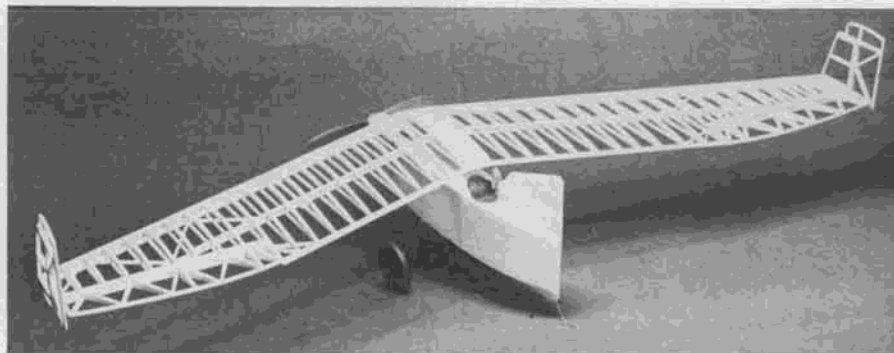
THE KASPER WING

This recent arrival, courtesy of A.T. "Lu" Lundgren and Richard Miller, may provide the answers to our flying wing model trimming problems. Written by Witold A. Kasper, *The Kasper Wing* is quite an unusual publication. Attractively packaged in a silver, soft-cover binding, adorned by a flying wing and a bird, the book promotes Kasper's principles called "extended aerodynamics."

Continued on page 64



Ken Johnson's Whitehead 21 at a recent Flightmaster contest. Model is a TV star!

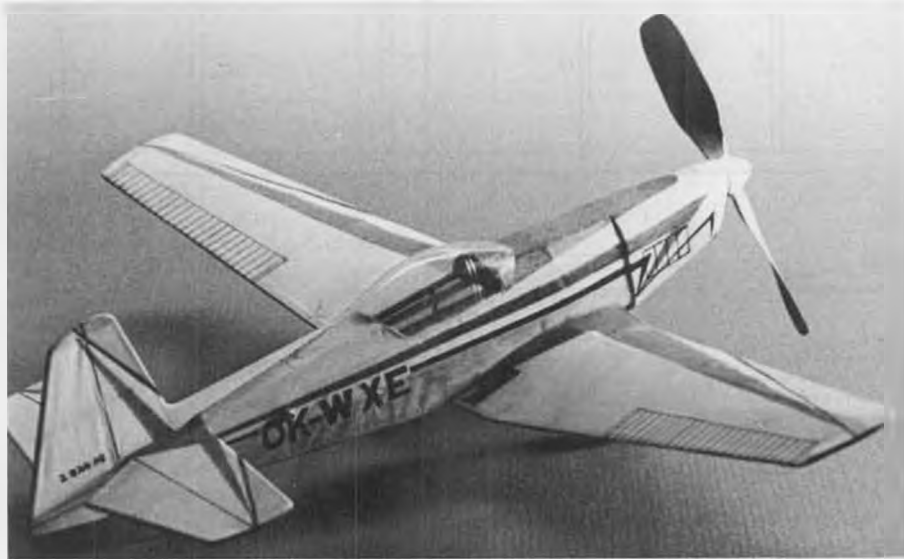


The structure of this model Lippisch Storch IXb, inspired by the book *The Delta Wing*, is powered by a Brown Jr. CO₂. Flight tests have so far proven "non-successful".



ZLIN 526 AS AKROBAT

By STEPHEN HALES . . . This month's Peanut takes us back 14 years to 1969 and the World Aerobatic Championships where the Akrobat flew as the Czechoslovakian contender.



• The Zlin 526 AS was built specially for the Czechoslovakian aerobatic team. It was used to compete in the World Aerobatic Championships, and as of 1969, the Zlin was considered the top aerobatic airplane in the world. There were five planes made; the factory numbers went from OK-WXA 1026 through OK-WXE 1030. They all had the same trim colors, white with red and black, but the base colors were all different. OK-WXE had yellow as its base color; this is the plane I chose to model.
BUILDING THE MODEL

Carefully select the wood to be used. You won't need any wood that is over six pounds per cubic foot density. My model weighed eight grams without rubber.

FUSELAGE

First, pin down the plan, then cover it with waxed paper. Build one side over the cross-hatched areas. Use stock of equal firmness for the longerons. When this side is dry, cover it with plastic wrap, then build the second side directly over the first. Separate the two sides carefully when dry.

Glue the tailposts together and use the top view for finding the cross-brace lengths. Add the bulkheads and stringers, then sheet the nose from A to B with 1/64 or 1/32 sheet balsa. Carve the nose piece to shape from a block of 5/16 medium hard balsa. Fill in the bottom of the fuselage from G to the tailpost with light 1/16 sheet.

TAIL SURFACES

Build the fin and stab out of 1/20 square balsa. If you don't have 1/20 sq.,

use very light 1/32 sq.

WING

Use medium hard balsa for the leading edge. Lay out the leading edge, trailing edge, and the wing tips, then install the ribs. Glue in the 1/16 sheet saddles for the landing gear. Next, cut the dihedral breaks, and prop up the wing tips 7/8 of an inch. Then install the corner braces, and main spars.

Bend the landing gear wire to shape using 1/32 wire. Install the landing gear wire in the saddles, and glue securely. Carve the wheels out of balsa, and insert 1/32 aluminum tube bearings. The tail wheel is a 1/16 sheet disk glued to a straight pin.

For covering material use good, Japanese tissue from Peck-Polymers or Sig to cover your model. My tissue was put on with white glue, then shrunk with rubbing alcohol.

FINISHING

On my model, I sprayed a very thin coat of white paint on the entire airplane. The trim and yellow base colors were done with ballpoint and felt pens using a straightedge. The registration numbers were cut out of black tissue and doped on. The word "Akrobat" and the "Z 526 AS" were done freehand with a fine felt-tipped pen.

FINAL ASSEMBLY

Install a 1/16 aluminum tube, or a Peck-Polymers thrust button, in the nose block. Be sure to include the two degrees of downthrust. Use a 3-1/2-inch prop; mine is from a North Pacific Skeeter. The spinner is carved from balsa, fitted to the prop, and painted white. Drill the 3/32 hole for the rear rubber peg. Use a 3/32 aluminum tube or a wooden dowel for the peg. Carve a plug for the canopy, and stretch form or vacuum form the canopy out of .007 butyrate sheet. Install the main, and tail wheels.

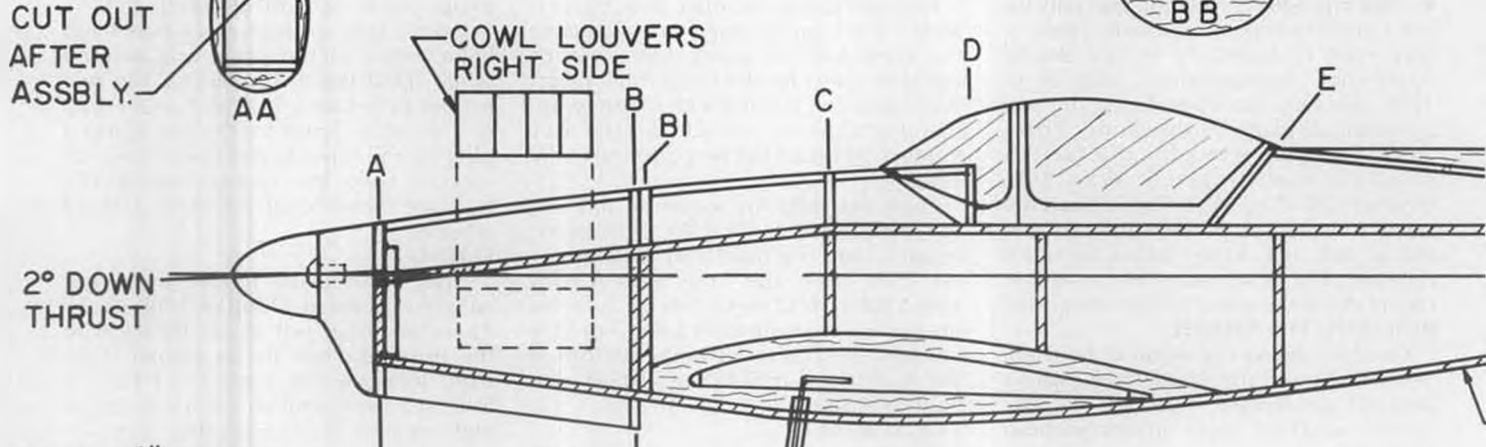
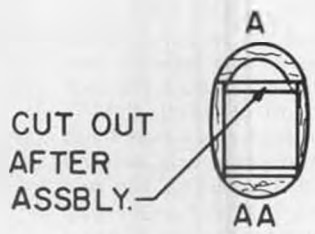
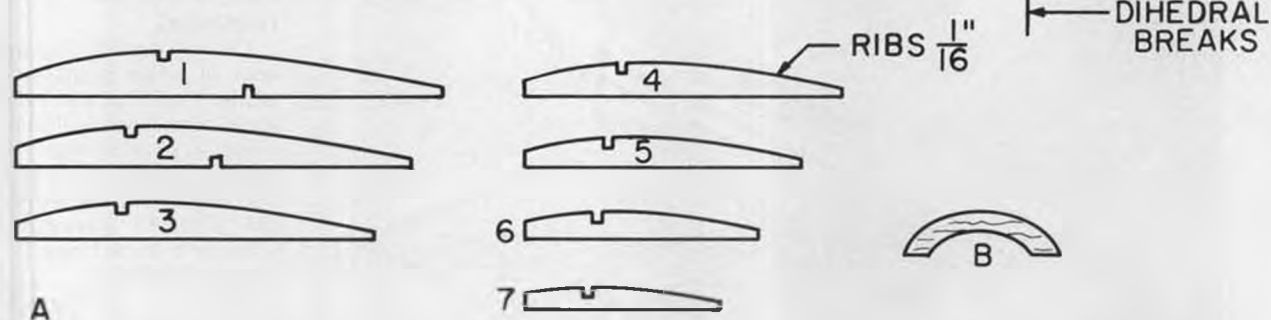
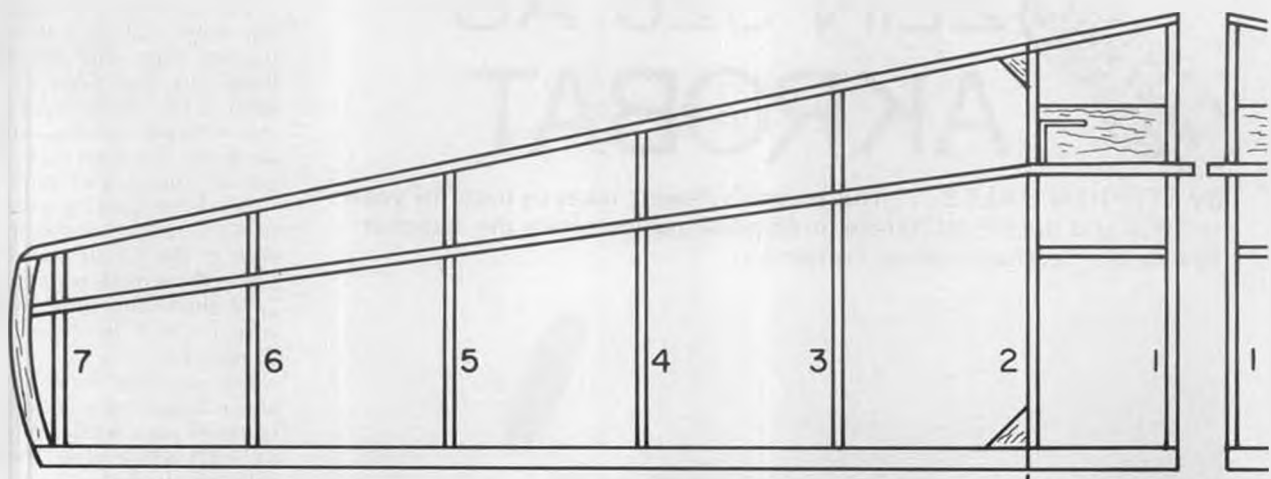
FLYING

First, balance the model at 1/3 the wing cord. Install a loop of 1/16 rubber 12 inches long; put about 100 turns in the prop, and test fly for proper flight trim. Increase the number of turns a little at a time until you reach a max of eight or nine-hundred turns.

I hope you have as much fun with your Zlin as I have. Good flying. •



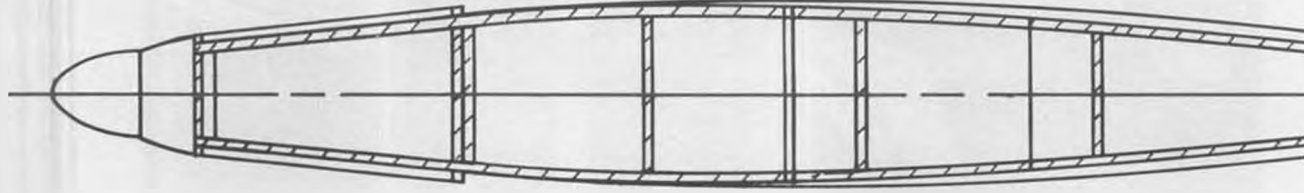
The Zlin 526 AS Akrobat Peanut model pictured here is yellow with red and black trim. The author's method of obtaining the yellow base color is to give the model a light coat of white paint followed by a coat of yellow felt pen ink.

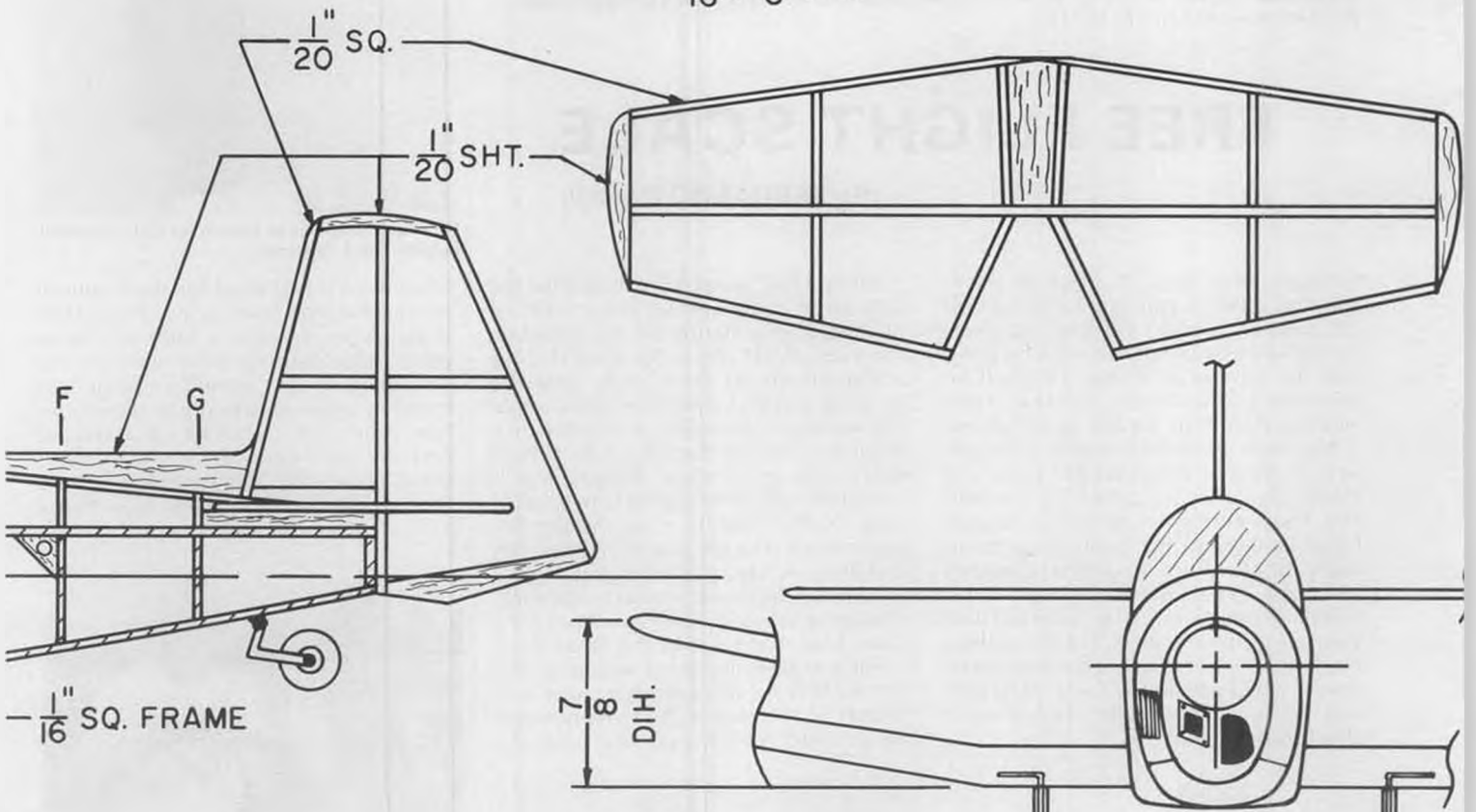
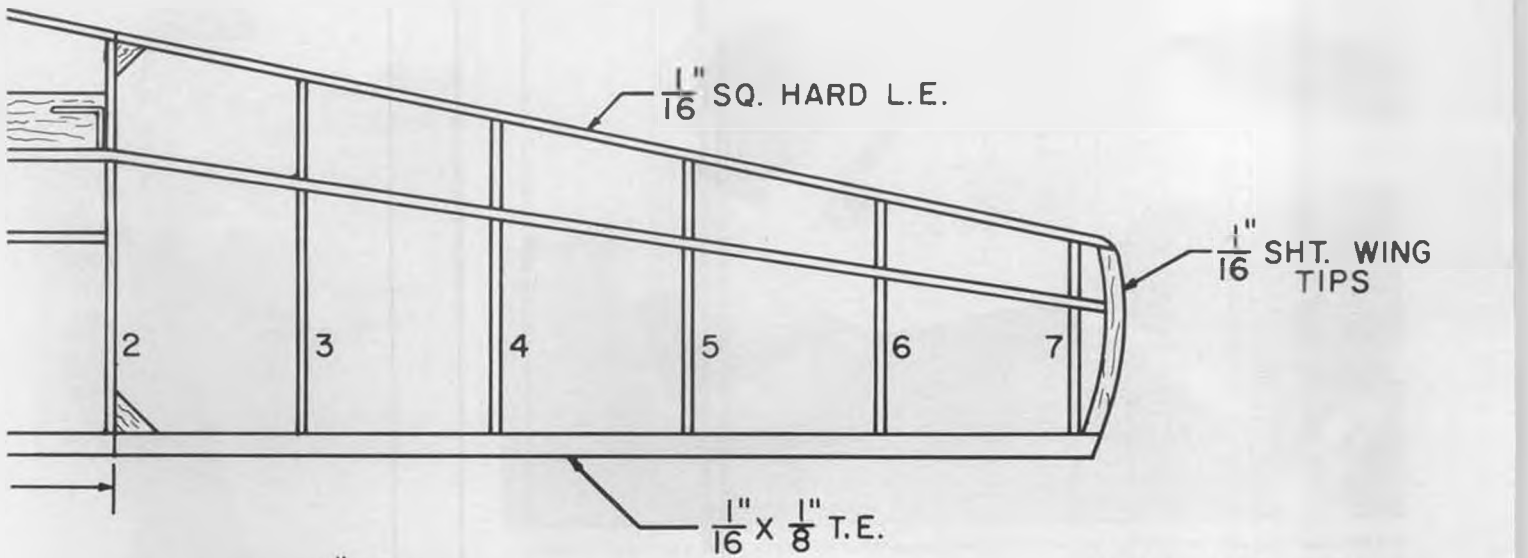


USE $3\frac{1}{2}$ " PROP.



COVER A TO B WITH $\frac{1}{32}$ " SHT. SIDES, TOP, BOTTOM.





ZLIN 526 AS.
 PEANUT SCALE
 BY: STEPHEN J HALES
 REF. DEC. 69 M.A.N.
 10/8/81



Bill Noonan inspects his Fokker Universal rubber powered scale biggie after a successful flight. Bill is quite a gifted builder and flier.



Dr. Harris prepares to launch his CO₂ powered Fokker DR.1 Triplane.

FREE FLIGHT SCALE

By FERNANDO RAMOS

• Happy New Year! At this time (early January) it seems appropriate to start off this month's column this way, however, by the time you read this we'll be deep into the new year. I hope 1983 will be everything you desire, and that there will be ample time for our great hobby!

My time schedule doesn't always permit me the opportunity to go out model flying as frequently as I would like. The other day I readied four models I had hanging in my barn. It had been many months since any of these models had flown. What I'm about to say is in the form of a suggestion, so you will not find yourself in my situation. On the rubber models, I had forgotten what amount of power I had previously used. Prop size and pitch on the power models were also forgotten, etc.

When I had wound the model for the first time, another forgotten bit of necessary information hit me between the eyes. What about the thrust? I use adjustable thrust front ends, and the locating marks I had previously made had worn off. Needless to say, this first flight was a bit on the hairy side. What's the point of all this? Simply that a complete record should be kept on all of your flyable models. I say flyable, because even though you may presently feel that you have had enough flying out of some ole bird, you may, at a later time, change your mind. Then you'll be in the same boat that I was in the other day.

For a rubber model, I would record the following information: size and length of the motor, how many winds were used on an average, and the

amount of thrust used for the required power. Balance point is also important. If you have removed a blob of clay or other ballast from the nose or tail of your model so that it wouldn't look bad hanging up, are you going to remember how much clay or ballast was removed on that fateful day when you go to fly it? What about the flying surfaces? Were they deliberately tweaked, or is that a



George James is obviously pleased with his Cessna CR-3 racer.



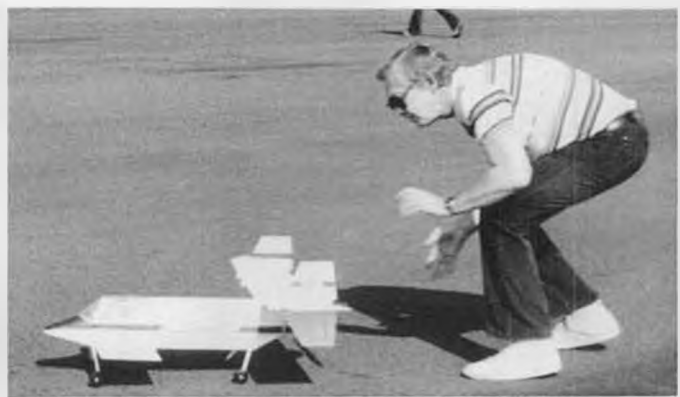
Walt Mooney prepares to launch his mono-plane crop duster.



Bill Krecek holds the prop of his sport rubber model "Baby Duration."



Would you believe this Grumman Wildcat of Dr. Harris' is covered with Kleenex tissue?



Model Builder columnist Ken Johnson lets go of his Lockspeiser LDA-01 jumbo rubber powered scale ship. Excellent flier.

warp? What about the prop? If you are like me, sometimes it is easier to steal a prop from another model than to carve a new one. Did the model you hung up use a wooden or a plastic prop? What diameter was it? Do you get the picture? Write this information on a 3 x 5 file card, and keep it in a file box.

With a power model, particularly diesel or glow, the following should be considered: prop diameter, pitch, and make. I have an abundance of good, wood Tornado propellers, and when-

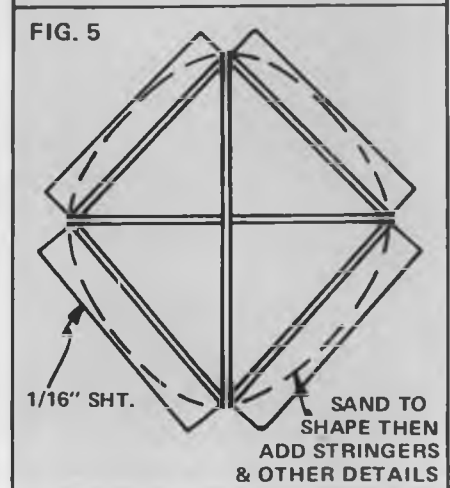
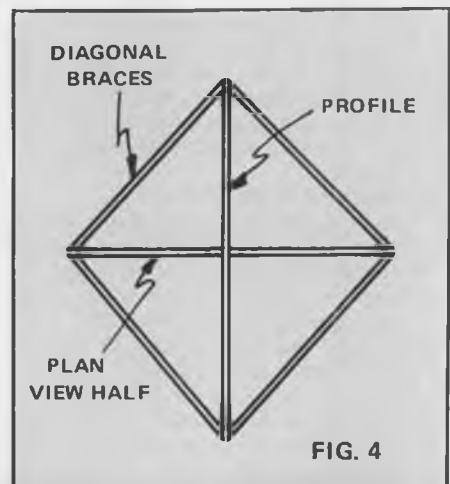
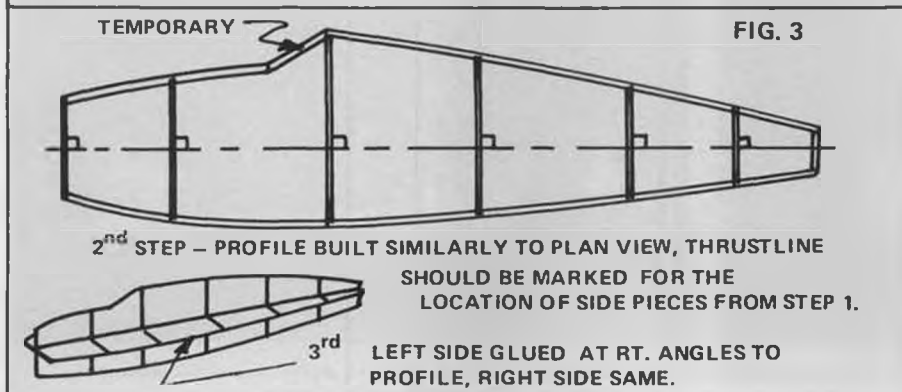
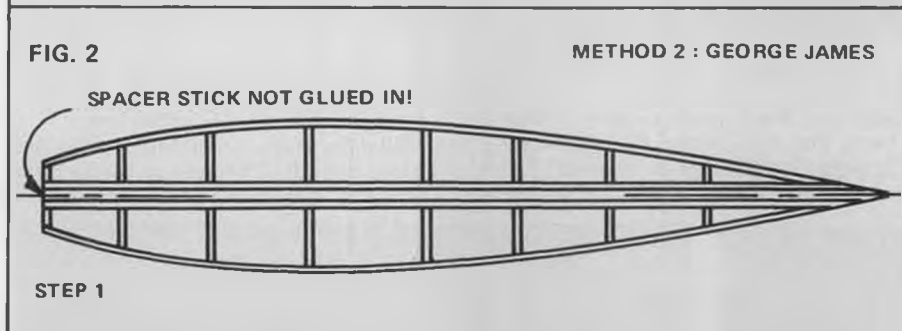
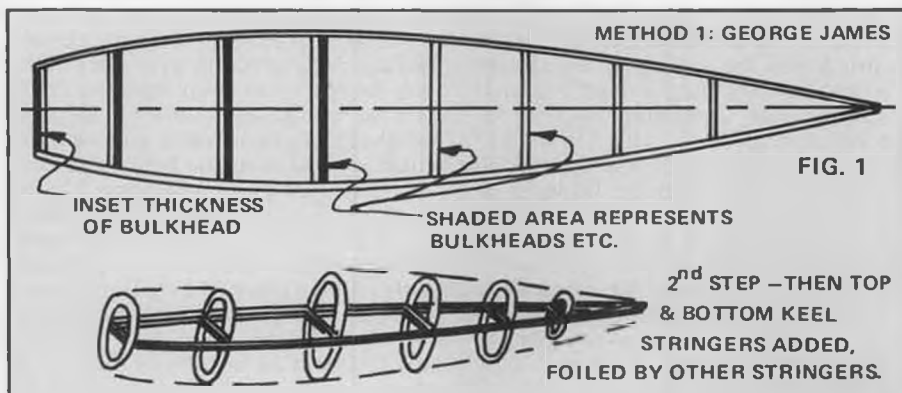
ever I change to a different brand, there is a substantial difference in performance. I always make adjustable flying surfaces (for more realism as well as for trim changes), and these are usually glued in place after establishing the correct flight characteristics. However, they can get bumped, leaving the model with either too much or too little adjustment. Naturally, this can lead to the quick demise of a favorite model. Therefore, record exactly how these surfaces were set when the model was last flown.

Another consideration might be the fuel used: sometimes an engine needs a hotter fuel to propel the model properly. If the correct fuel is not used again, it could result in an unwanted crash.

You may remember that the model ROGs beautifully, but does it take off while going directly into the wind, or do you have to launch it with a quartering wind? Maybe one tire has to have a bit of drag, in order to prevent ground-looping. All of these are important items to remember, yet so easily forgotten. Write them down.

I remember, at the '63 Nats in Los Alamitos, California, that the famous, grand old scale modeler, C.O. Wright

Continued on page 68





Moment of release. Harry Griffin launches his latest creation, a twin pusher canard complete with . . . a mallard's head?

FREE FLIGHT

By BOB STALICK

• It's that time of year again. The winter indoor season is winding down (pun intended), and the outdoor season is looking up. For me, it's time to put away the microlite and .045 rubber and get going with the Rossi-powered FAI ships. What a great hobby! Build and fly all year long. Lately, I seem to be doing more *talking* about building and flying, than *actual* building and flying. So, let's get on with this month's talk about the F/F scene.

MYSTERY MODEL FOR MAY

For years this feature has been a mainstay of the column. Just about when I thought I had exhausted my supply of unusual-looking, semi-vintage aircraft, along comes a letter from Charles Cortwright with the enclosed feature model of the month (mystery style).

This one, published in *Mechanix Illustrated*, was an Atwood ignition, .60-powered, six-foot wingspan ship. Paul

Plecan, ex-*Model Builder* staffer, did the plans. It was the earliest model design I've run into that had a timer-actuated stabilizer with a different setting for power and glide . . . the "first" VIT system. It also featured a spring loaded retracting landing gear. So, for those of you who saved your old issues of *Mechanix Illustrated* from the early '50s, you might try to locate the name of this mystery ship. If you find the name, drop a line to the editor of *Model Builder* . . . first in line gets a prize. And thanks to Charles Cortwright for the lead.

THREE VIEW FOR MAY:

Throwaway P-30, by Bill Giffen

P-30 is one of the few events that I haven't gotten involved in. However, I know that the folks who fly it, love it. Bill Giffen, of the Canada Giffens, is one of them. He says, about the Throwaway, "It's my first attempt at P-30 and rolled tube fuselage. The rather small diameter



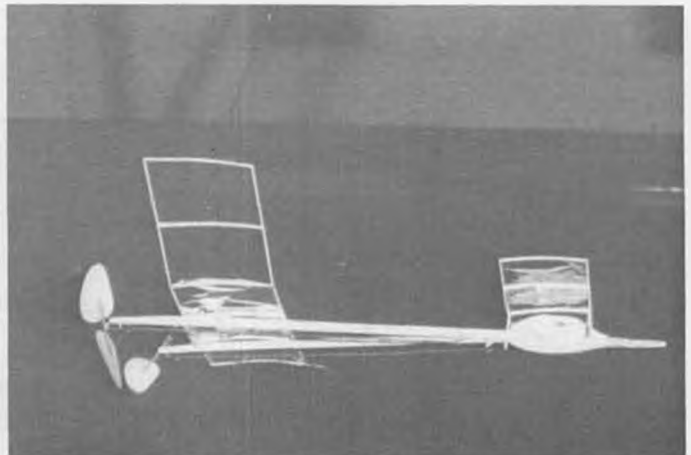
Avery Clark launches his K&B .21 powered Hutchinson Zingo . . . built from the R.M. Models kit. Hutchinson photo at Harts Lake.

was arrived at by much thought, theory, calculation, and mainly by the size of the only straight dust mop handle I could find in the garage. Original airframe weight of 57 grams was surprising as no effort was made to use light balsa, only what I had on hand. The name Throwaway was used as I didn't bother with a DT, as it took only six hours to build and I figured, 'What the heck, it probably won't fly anyway.' First flights were made at one of our monthly Coupe and P-30 competitions. One short test flight was followed by an official flight at 50 percent turns, in dead calm, foggy air (100-yard visibility), and yielded 65 seconds. It went on to win over two other coupes and another P-30, with a five-flight total of 478 seconds. Needless to say, it now has a DT installed."

Bill didn't say so in his letter to me, but I know that the Throwaway is equipped with the standard, 9-1/2-inch plastic



Here's a closer look at Harry Griffin's indoor canard. Harry is securing the left motor to the hook . . .



. . . And just in case you had any doubts about the mallard's flying abilities, this should put 'em to rest!

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prop (as required in the rules). He also flies the ship with one loop of rubber, so the power burst may be a bit puny, but I'll bet the motor run goes on, and on, and on. For all of you airfoil freaks who read this column, please note that Bill uses the ubiquitous Adidas 9A airfoil . . . coordinates unavailable, but if you've got the right size running shoe, trace around the outside edge of the sole, and you're close enough for this event.

**DARNED GOOD AIRFOIL . . .
NACA 4406**

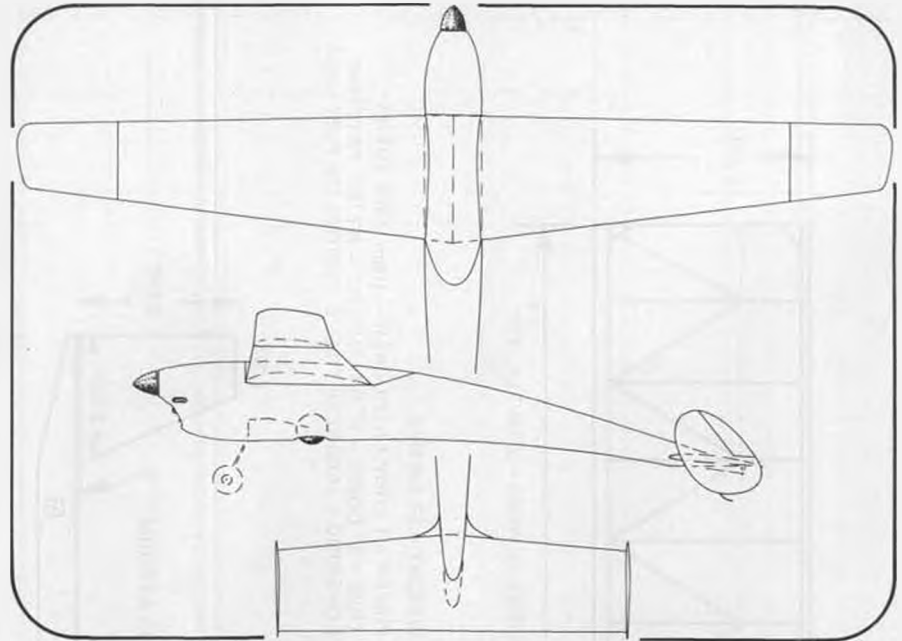
More from the NACA stable . . . this month the 4406. The word on this section comes from an early article on airfoils from Gerald Ritz, who suggested that this was the section for FAI power, combining both controllability in the climb with speed and a better-than-average glide. At the time that Ritz's article was written (early '60s), Bob Sifleet was using this section on his power models. Streamlined models, such as those in use today, especially with the power available, should benefit from using this month's DGA. It's just a thinner version of Rocca's section from his World Champ's FAI ship. For those who don't like undercamber, try it flat-bottomed.

**A POTPOURRI OF INDOOR
ODDS AND ENDS**

Tony Italiano announces the Second United States Indoor Championships at West Baden, Indiana. The dates are June 12, 13, 14, 15. Fourteen events are on the schedule, and the location is rapidly becoming a legend in indoor F/F circles. The event is sponsored by the NFFS and NIMAS. Tony says that a full practice day is scheduled for June 11. Want more info? Drop Tony a line at 1655 Revere Dr., Brookfield, WI 53005.

★ ★ ★

Dave Linstrum sends along information that the MIAMA club is sponsoring

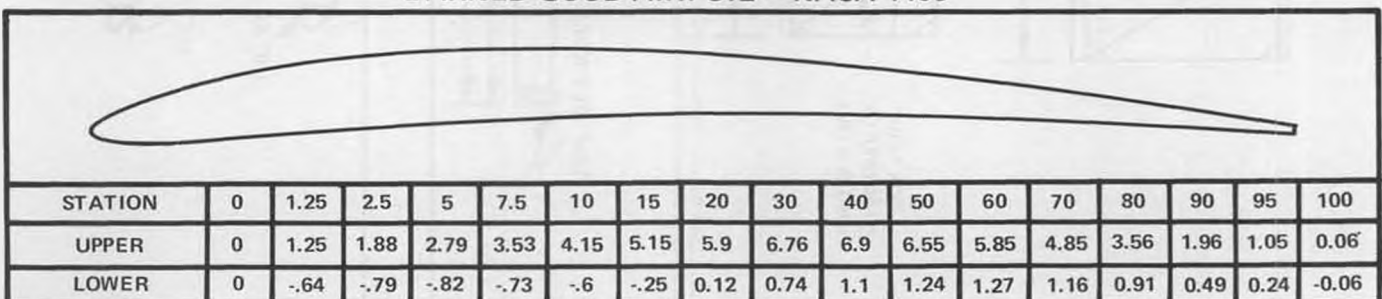


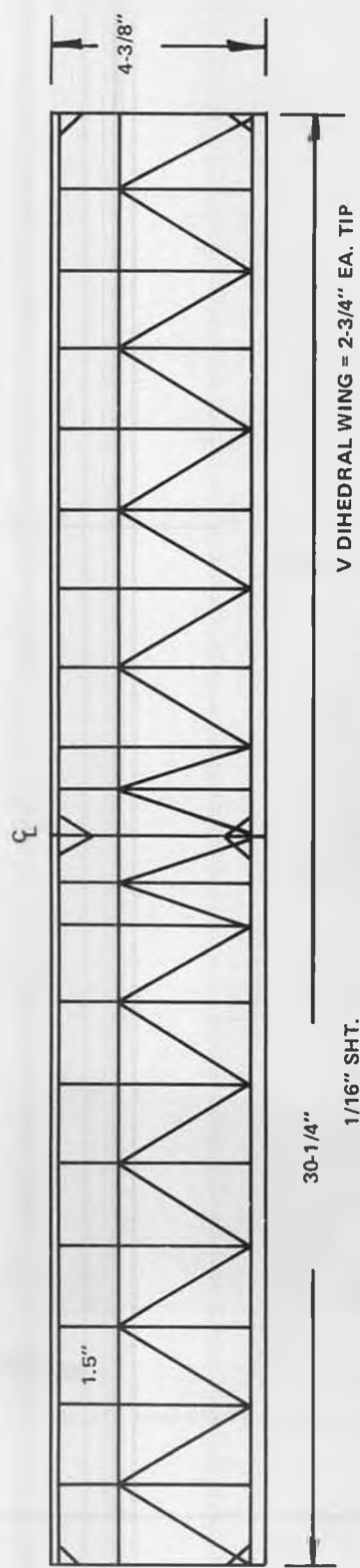
MAY MYSTERY MODEL



Dick Williamson readies his RamRod 250 for an official flight at a WMC meet. This ship is a hot performer in Nostalgia circles. Hutchinson photo.

DARNED GOOD AIRFOIL – NACA 4406

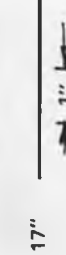
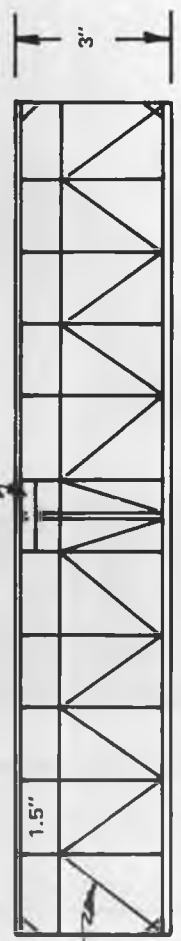




1/8" x 1/16" DIAGONALS WING & STAB.

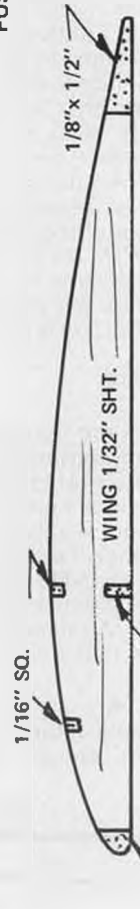
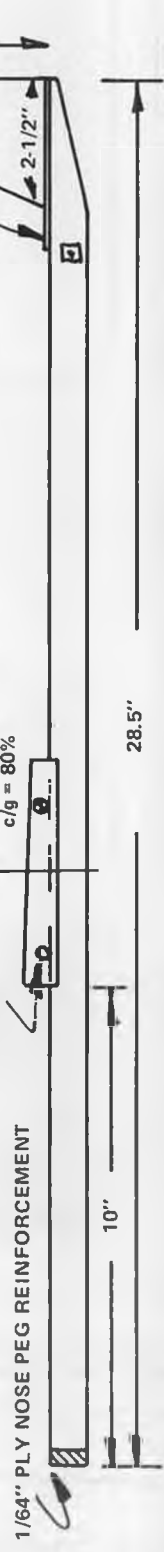
WEIGHT = 57 GRAMS
 POWER = 1 LOOP FAI RUBBER - 10gm, 1200 TURNS
 TRIM = 3° DOWN - 2" RT. THRUST - RT. RT. PATTERN
 COVERING = JAPANESE TISSUE - SPIRAL ON FUSELAGE

V DIHEDRAL WING = 2.3/4" EA. TIP



PYLONS - 1/8" SHT. = 4.1/2" x 3/4" x 1/2"

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ALL AIRFOILS = ADIDAS no.9



Throwaway P-30 by Giff

BY: BILL GIFFEN
 CALM AIR DESIGN



Harry Griffen's technical center for indoor flying . . . the ultimate scientific approach to winding rubber . . . H.P. calculator counts winds, torque meter measures torque.

a one-design event at their 1983 contests. The design is Tom Hutchinson's "5¢ Plain." This design was featured some time ago in the "Free Flight" column of **Model Builder**. It was designed for an event that has enjoyed excellent participation in the Oregon Indoor Contest schedule . . . P-24. P-24 is a simple beginner's level indoor rubber event, with plastic prop, and a maximum 24-inch wingspan and fuselage length. For awhile, Tom's model held the Northwest record of four minutes and five seconds. If you would like a three-view of "5¢ Plain," drop me a self-addressed stamped envelope, and you'll get one by return mail. Address: Bob Stalick, 5066 N.W. Picadilly Circle, Albany, OR 97321.

★ ★ ★

Harry Griffen is one of those modelers who is perpetually coming up with new ideas. Some of the pictures this month show Harry's latest creation . . . a canard indoor twin pusher. Harry even put a

mallard's head nose on the ship . . . it flies, too! Over two minutes at its first-ever contest. The neat thing about Harry's recent venture into the indoor world is that he used his job skills . . . he's employed by Hewlett Packard, and attached a pocket programmable calculator to a sensor attached to the winding handle on his indoor winder. Every time the winder made a turn, it registered on the calculator, thus giving the exact winds that he has put into his rubber motor. The pictures may not be that clear, but trust me, it works like a champ.

★ ★ ★

Don't throw away those old, disposable Bic shavers. The sketch in this column shows how to make one of them into a great balsa stripper. Carl Taylor, reporting in the "Satellite," says to glue a Bic razor to a strip of balsa that is the same thickness as the strip of wood you want to cut. To cut strips, start from the



Magnetic sensor/switch inside winder tells H.P. to: "add one . . . add one . . ." etc.

end that is facing the slant of the blade. Remember to keep your fingers clear of the blade . . . it's tough on fingers.

★ ★ ★

Ken Rice, reporting in the "Bat Sheet," describes his latest attempts at using a dry-copy machine to transfer designs, etc. to Japanese tissue, and other covering materials. Tom Hutchinson reported in this column a short time ago that Ken had discovered that if you adhered all of the edges of a sheet of tissue to a regular piece of copy paper, you could transfer most designs to the tissue. The example Ken used was the AMA registration form most of the local free flieters use. Ken has now tried the same process on condenser paper and Microlite. He says both work very nicely, thank you. Although, he expected the Microlite to shrink due to the heat of the copy machine, such was not the case. He tried similar tests with silkspan and aluminum foil. Neither of these worked. I like the



Dick Williamson's RamRod gets airborne. Hutchinson photo.



The lid of Jim Thurmond's indoor flight box has "all the right stuff" on it! Care to guesstimate the ratio of weight between the models and the box?

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TOM RUNGE

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HUMOR FROM MURPH

The "CIA Informer," edited by Harry Murphy, is one of the best two or three newsletters about free flight that exists today. Not only is it chatty and informative, but it is also humorous. Some recent examples:

"Murphy's Law of Model Designs: . . . Your buddies always think your designs look like someone else's."

"Corollary to Murphy's Law of Model Designs: All great designs are created by accident . . . and destroyed by the same method."

"By the Numbers: Names of engines have always intrigued me. Recently, I got to thinking of neat names, such as: Heinz .57; a Cutlass .442; Rocket .88; and for giant scale, The Rocket .98. Then there is Catch .22, Sweet .16, or a neat one for a diminutive 002 engine would be the Agent .007. How about thinking up some of your own. Maybe we should have a contest. How about the Roarin' .20? Then there was my masterpiece . . . a sexy little number for sport flying, complete with a pink anodized head. I called it the Bo Derek .10."

Hey, Murph, did you consider the Dolly .44 (it's a D class, so I'm told).

THE END

For those who have stuck with me this far, and who have contacted me regarding the whereabouts of the February column, let me tell you that I gave up the space so that Bill could use the excellent article by Simpson about the FAI big-do.

However, I'm back for the duration (until Bill gets tired of me). In addition, you have just reached the end of my May column. Cheers and thermals. ●

Hannan Continued from page 54

The author holds degrees in both mechanical and aeronautical engineering, has served as a fighter pilot, and has design experience spanning more than four decades. His projects have included gliders, powered gliders, and ultralights. He has worked with manufacturers in Rumania, Canada (Canadair), and the United States (Boeing).

It is Kasper's contention that in spite of some 75 years of progress since the Wright brothers left the ground, aircraft still fall short of the standards of maneuverability, safety, and slow landing characteristics of the bird, and we savored his remark: "birds seldom stall." He also feels that the flying wing configuration represents the best approach toward achieving such goals.

Having carefully studied the work of the world's best-known designers, Kasper concludes that they all were lacking in positive control at low speeds. His points are clearly explained in easy-to-understand language, supported by explicit illustrations.

To conclusively demonstrate his theories in actual practice, Kasper constructed his full-size BKB-1 glider which

showed its ability to be tumbled, both forward and backward under perfect control, at air shows near Seattle, Washington.

The final portion of the publication is devoted to vortex motion and its application to aircraft, dealing with delta wings, increasing lift, controlling tip vortices for drag reduction, etc. We found the book most interesting, and suggest that many of its ideas might prove useful in the solution of model as well as full-scale aircraft problems. Priced at \$10, *The Kasper Wing* may be ordered either from the Meheen Corp., 7550 W. Yale Ave., Suite 220, Denver, CO 80227, or directly from Witold Kasper, 1853 132 SE, Bellevue, WA 98005. Please say MB sent you!

MENTIONS IN PASSING

While visiting the book shelves, we note that cartoonist and aviation safety poster designer Robert Osborn, who recently produced a book *Osborne on Osborne*, lists his wife, Mozart, model planes, and fresh green figs as some of his favorite things!

A new Readers' Digest book *The Unexplained*, dealing with assorted mysterious phenomenon, might have entirely escaped our notice, except for one advertising caption which asked: "Who made the 2,000-year-old model aeroplane?"

KEN JOHNSON ON TV

Contributing Editor Ken Johnson was featured on ABC television's "Ripley's Believe It Or Not," flying his scale model Whitehead No. 21 monoplane. Regular readers will recall that this machine, one of three that Ken has constructed, appeared as an article in the July 1982 *Model Builder*.

The TV sequence concerned various aircraft thought to have flown prior to the Wright brothers' *Flyer*. Host Jack Palance held, while Ken wound the rubber-driven model's twin power units, and the cameraman did a commendable job of following the craft in flight at close range. This remarkable model was also flown repeatedly during a recent Flightmaster contest at Mile Square Park, and we can vouch for its clever construction and outstanding flying abilities.

HISTORY BY CONTRACT

Which leads us, fittingly, into our final book review this month, *History by Contract*, authored by William J. O'Dwyer and Stella Randolph. Miss Randolph had written *Lost Flights of Gustave Whitehead* during 1937, and later wrote *Before the Wrights Flew*. During the 1960s, O'Dwyer joined her in an extensive search for additional information about Whitehead and his aeronautical activities, an odyssey which continues today. The fruits of their combined labors as of 1978, are collected in *History by Contract*, which was published in Germany, in a beautifully produced volume.

The book's title reflects its authors' conclusions that the Smithsonian Institution has ignored or suppressed in-

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formation relating to aviation pioneers who may have successfully achieved controlled, powered flight prior to the Wright brothers. The motive, according to *Contract*, is fulfilling stipulations of a signed agreement between the Institution and the executors of Orville Wright's estate, which granted custody of the Wright Flyer to the museum. To say the wording and terms of the contract itself are peculiar, is a masterpiece of understatement, but to understand the Institution's sensitivity in the matter requires consideration of their previous embrogles with the Wright brothers, which have been well documented elsewhere.

We had heard of this book, soon after its publication, via rather timorous reviews in other publications, but only recently was a copy actually delivered into our hands, thanks to model book collector John J. Brown. As John specializes almost exclusively in model aircraft related items, his enthusiasm for *Contract* seemed a bit strange. We soon found the connection... almost startling is the number of model builders involved in the controversy. For example, Bill Winter, former editor of many model publications; Harvey Lippincott, of United Technologies; Paul Garber, of the Smithsonian; Jesse Davidson, former editor of *Flying Aces*; and even Robert S. Thompson, co-innovator of the Peanut Scale concept! And, in Germany, Wal-

demar Leinert has constructed and flown a whole range of Whitehead models including gliders, free flight power, and R/C types, which are illustrated in the book. Not to mention Gustave Whitehead himself. For a tantalizing glimpse of his modeling involvements, consult *The Complete Book of Model Aircraft, Spacecraft and Rockets*, by Louis H. Hertz, 1967, Crown Publishers, Inc., New York.

Reading *History by Contract* thoroughly is a formidable undertaking, and one that sent us scrambling for other sources of information, of which there are many. What started as a simple review turned into a monumental task that side-tracked other projects for some weeks. During our probing, we encountered this comment by the late J.D. Gillies, Scottish aviation historian and modeler, which may be appropriate: "Historians open doors which reveal skeletons of the past — what to do? This is a difficult problem requiring personal inquiry of the owners of the skeleton and observance of his wishes."

Likely, more will be heard about this subject, as the cast of characters change on both sides of the fence. Meanwhile, O'Dwyer is interested in contacting anyone who may be interested in: 1) conducting technical studies of Whitehead's 1901 monoplane and engine; and 2) building a full-size flyable reproduction. A Whitehead engine will be furnished with which to power the craft.

History by Contract is available from:

Herr H. Majer
 Achtung M. Lechner
 Fritz Majer & Sohn, Verlag
 Industriestrasse 3
 D-8801 Leutershausen
 West Germany

The price is \$25 and delivery may require about five weeks.

UNITED STATES INDOOR CHAMPIONSHIPS

A.J. Italiano, 1655 Revere Dr., Brookfield, WI 53005, now has entry forms ready for the 2nd U.S. Indoor Championships, to be conducted June 12 through 15 at the Northwood Institute, West Baden, Indiana. This may be the last opportunity to fly models in this historic facility, which is soon to be sold.

Categories offered include: Hand Launch Gilder, Paper and Stick, ROG Cabin, F1D microfilm, Easy B, Pennyplane, Novice Pennyplane, Manhattan, Bostonian, Indoor Stick, Peanut Scale, AMA Scale, Peanut Speed, and Unlimited Speed. A new event, "Kit-Plan Scale" will also be offered. Rules and registration information may be obtained by sending a stamped, pre-addressed envelope to A.J.

FINAL VISION

According to the late Jack Northrop's son, who spoke during the 40th anniversary of Northrop University, in his final month of life, Jack asked for a picture of the Gossamer Albatross man-powered aircraft to be placed where he could see it every day.

THE HUNDRED YEAR SHAY

Two famous works of the French engineer/aerodynamicist Gustave Eiffel have been in the news lately. Both the Eiffel Tower and the Statue of Liberty are undergoing work required as the result of long exposure to the elements. Both the tower and the internal structure of the statue designed by Eiffel are nearly 100 years old. Renovators have deleted approximately 1,000 tons of weight from the tower, and plan to equip it with new elevators plus a new coat of traditional chestnut brown paint, which weighs an astounding 52 tons!

Miss Liberty may require extensive repair because although her exterior copper covering is still sound, the internal iron framework is badly rusted. Cost estimations for the job, to be privately funded, are in the neighborhood of \$25 million. Wonder what it cost new?

UP IN SMOKE

Dave Gibson, of Canton, Ohio, sent in a clipping about *New York Air* airlines. The company claims to save \$100,000 per year in fuel costs by seating nonsmokers in the rear of its aircraft. An abundance of nonsmokers puts more weight aft and less fuel needs to be used to keep the plane properly balanced, it is said.

SUSPICIONS CONFIRMED

Frank Scott attributes this quotation to Wernher von Braun: "Basic research is what I'm doing when I don't know what I'm doing."

CLAUSEN AND RC12i

OUT HANDLE THE WORLD



IFMAR INTERNATS / 1982 Stock Class World Championship

1. Kent Clausen / USA	RC12i
2. RePete Fusco / USA (70)	RC12i
3. Frank Killam / USA	RC12i
4. Jimmy Davis / GB	Parma
5. Mike Lavacot / USA	JoMac
6. Bud Bartos / USA	RC12i
7. Ralph Burch, Jr. / USA	RC12i
8. Mike Toland / USA	RC12i
9. Bruce Hickman / USA	Delta
10. Art Carbonell / USA	Delta



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F/F Scale Continued from page 59

was flying his beautiful .049 powered Antoinette. Most likely, the model had not flown since the previous Nats, but he had a file card that had all the necessary data on that model. He fired up the engine, adjusted the rpm with a tach according to his record, took a few steps, and launched the antique airplane for an outstanding ROG and flight. There was no horsing around here. He knew his model, and the data he had written down provided him with the necessary information required for a winning flight. I guess the bottom line here is organization! Life seems to be more exciting without it, but certainly there are more headaches. So, you too can fly with fewer headaches with a bit of organization.

George James strikes again! The other day, I had a chance to visit George at home, and to see his most interesting workshop. Like most of us, he has a zillion projects underway, each one a bit more interesting than the one before as different techniques and ideas flourish. I've talked about my method of building multi-stringered fuselages on a fixture many times in the past. George, who likes to work in the third dimension, so to speak, has come up with a new wrinkle to my jig method. In other words, George doesn't like to pin things down on a board and work on a flat

surface any more than he has to. His preferred method of building models involves holding the work in his hands.

Instead of using one of my type of fixtures, he lays out a structure using the plan view (top view) of the fuselage (see Figure 1). The cross-members are placed just ahead of the bulkhead location, except at the front. This cross-member should be placed just behind the bulkhead. When this structure has dried, it is then removed from the workbench, and the bulkheads are then glued immediately behind each cross-member, except the front one which is glued in front. The use of Hot Stuff Super 'T' will speed this process along. The top and bottom stringers (one of which would normally be the keel) are next to be glued onto the structure. Care should be taken to see that they are aligned perfectly straight. The following step is to add the remainder of the stringers, alternating from one side to the other, so that a banana shaped fuselage will not occur. This whole operation is done in your hands, and in a sense, you can keep the stringers aligned very easily, as rotating the fuselage about and sighting down its length are possible.

If the bulkheads do not fair with one another by sighting down the structure, carefully sand them with a long sanding block. By doing it this way, a smooth flowing fuselage is possible. George finds this to be the quickest and easiest way of building fuselages with compound curves.

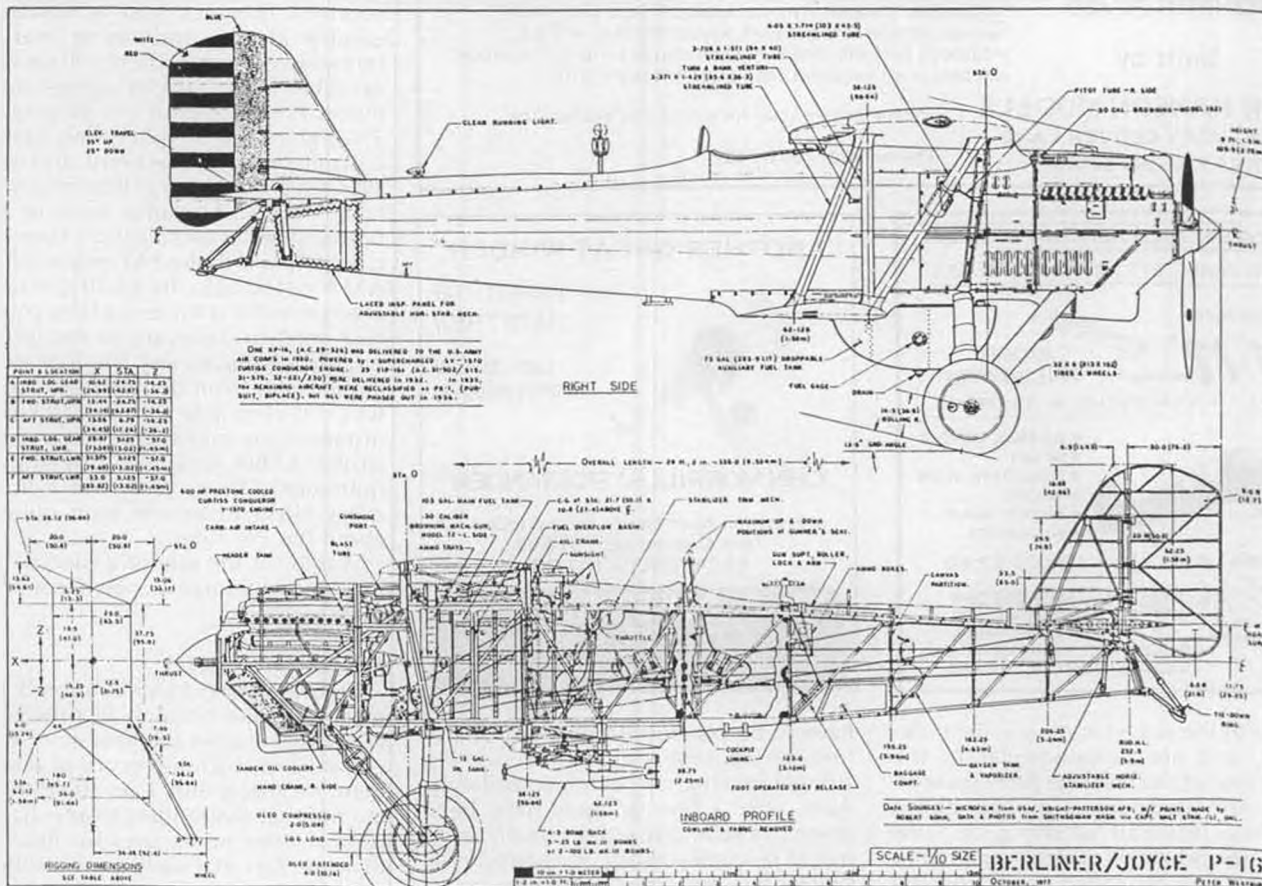
From time to time our memories have to be refreshed, and as long as I've mentioned George's latest way of building a fuselage, let me tell you about another one of his building techniques which I covered about a year or so ago. This other method eliminates having to know how to loft fuselage cross-sections . . . that's for me! (See Figure 2.)

You start by building a crutch of the plan view (top view) of the fuselage. The two longerons are pinned down first. (Let's say, for the sake of discussion, that the material used here is 1/16 square balsa.) Next, directly over the center line, place another 1/16 square stick. Using fine pins (dissection pins are great for this), pin right through this stick to hold it down. This is followed by placing another 1/16 square stick on either side of this center stick. The cross-members are cut and glued into place everywhere there is a bulkhead location. These cross-members are perpendicular to the sticks that are on either side of the center stick. The center stick is only a spacer.

If you draw like I do, one side of the plan view might not be exactly the same as the other. If this is the case, just build one-half of the plan view, and when this dries, build another half directly on top of the first one. While those structures are drying, proceed to the next step.

The side view of the airplane is framed similarly to the plan view, however, there are no sticks running down the center. The vertical members are also

Peter Westburg's SCALE VIEWS



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Curtiss P-1B Hawk
Curtiss XP/YP-23
Curtiss SBC-4 Helldiver

Shts \$
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Czech Avia B-534
Davis D-1K
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General Western Meteor
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Grumman F3F-2
Stearman 4E Mailplane
Travel Air 2000

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Waco ATO Taperwing

1/10 scale: 1.2" = 1 ft.

Berliner/Joyce P-16
Curtiss BFC-2 Goshawk
Curtiss F9C-2 Sparrowhawk
Curtiss P-6E Hawk
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Hawker Persian Fury
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placed in the same location as the bulkheads, and are perpendicular to the thrust line of the fuselage (see Figure 3). While this structure is pinned down, take the left half of the plan view structure and glue it at right angles onto the side view structure exactly on the thrust line. Use a right triangle to prop it up until dry. Glue diagonal sticks from the top longeron to the side longeron, and from the side longeron to the lower longeron (see Figure 4). Do this all the way down the line. When dry, remove from the workboard, and repeat the same thing on the other side. At this point you will have an odd looking diamond-shaped fuselage, but not for long.

Take a look at Figure 5. You are going to need several lengths of balsa sheet cut into strips that will be wide enough to give the proper contour at a given location. These strips are glued to each diagonal brace. I would use 1/16 sheet from the front to just aft of the wing's trailing edge. From there back, I would use 1/32 sheet.

The next step is the fun one. By using a long sanding block, sand each balsa strip so that it has some contour. Do this with each one. Now, sand carefully several bulkhead stations at one time, giving them the proper shape from the front to the back of the fuselage. Because of the initial framework, contouring the fuselage properly is done quite easily. With this type of construction, the stringers

have to be placed into notches. Therefore, at this time you must decide the stringer spacing, and notch accordingly. After only a few stringers have been glued in place, take either a really sharp pair of pointed scissors, or a pair of small side cutters, and snip out the now excess internal structure. Add a noseblock, wheels, canopy, or whatever else may be required. Guaranteed, this type of construction will save you lots of time! ●



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Scale Continued from page 37

event. I honestly can't see this happening. The almost unbelievable improvement in the quality of Sport Scale entries over the last few years certainly reveals that modelers do wish to create a first class machine.

At any rate, this team selection event ought to be a real horse race. I have received inquiries from a number of people already indicating that they intend to compete. There will be a form available from AMA to register for this event. Preregistration will be required. The \$50 fee will be split evenly between costs incurred for the event, and for the 1984 team fund. You will be required to have the \$5 FAI stamp on your AMA license. The FAI specifications for models can be found in the FAI section of your AMA rulebook. In addition to the changes listed at the end of this column, you need to be aware of the fact that engine displacement for four-stroke engines has been doubled beyond that which is allowable for two-strokes. For instance, you may use 1.20 ci as a four-stroke. Other weight and loading requirements are as listed. We will make every effort to answer your questions about the FAI rules.

Watch for the sale of a special "Paris '84" commemorative patch coming in early spring.

OTHER THOUGHTS

In 1977 when NASA was formed, I was elected to the position of president. I really wish that in the time since then I could point to a long record of achievement for that group. I am afraid that we are not that outstanding in any shape or form. I offer no excuses for this other than the fact that early on in its life we encountered some rather serious communications problems within our structure. These made it very difficult to sell the group to prospective members. In the last two years, I have been very proud of the manner in which NASA has conducted scale at the Nats. It would appear that we have provided a friendly, relaxed, competitive atmosphere.

Recently, I was elected AMA District VI Vice President. This post requires a considerable amount of time, and I feel that it is important that I not try to serve in both capacities. In addition, I feel that it is also important that we infuse new blood into the leadership of the organization. By the time that you read this, there will be a new president of NASA. Please give this person your wholehearted support. I know that the organization can make a significant impact on the scale community. I will be continuing to help in whatever way possible, and will run scale at the Nats again this year.

FAI RULE CHANGES

Proposals from the Scale Subcommittee for the 1982 CIAM Agenda

6.1.6.c

After the word 'removed' ADD 'nor

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may anything except a dummy pilot be added to the model . . . (see minutes).

Reason: Model must be presented for flight in the same condition as when static judged.

6.1.9.4 Proof of Scale

a) Delete and replace with the following:

An accurate three-view scale drawing or color drawing of the full-size airplane having a minimum scale of 1/72 and a maximum of 1/24. A selection of photographs showing the aircraft in side view, front view, and plan view can replace the three-view drawing of early aircraft for which no drawings may exist.

b) Delete first two sentences.

Third sentence, add: An authenticated written or printed description is also acceptable.

Next paragraph. Delete last sentence: 'If the drawings . . . source.'

e) Delete.

Reason: See reason under 6.1.10 below.

6.1.10 Judging for Fidelity to Scale and Craftsmanship (Annex 6A)

Delete and substitute the following: (Three-meter distance):

1. Scale Accuracy	K Factor
Side view	10
End views	10
Plan views	10
2. Color	6
3. Markings	6
(One-meter distance)	
4. Surface texture	6

5. Craftsmanship	10
6. Scale detail	7
	Total 65

Items 1-3 to be judged at a minimum distance of three meters from the model.

Items 4-6 to be judged at a minimum distance of one meter from the model.

Reasons: Entries in F4C in its present form are decreasing. The standard of scale models in Standoff Scale is almost indistinguishable from that of F4C entries. The above proposals to modify the proof of scale requirements and the static schedule will make for one strong class, and will also reduce the time required to judge a model by 60 percent without impairing the accurate assessment of the model. Acceptance of the proposals will eliminate International Standoff R/C Scale as a separate class. The simplified Static Judging Schedule will also apply to F4B.

(While you may experience some difficulty fitting this section into the FAI section of the AMA rulebook because of missing paragraph numbering. This will set the flavor of the changes for you.)

Annex 6B, Judges' Guide for Static Judging

The following proposed amendments to the Judges' Guide are major simplifications and are a corollary to the simplified 6.1.9.4 Proof of Scale and 6.1.10 Static Judging Schedule proposed amendments above.

General Para. 2

Delete first sentence and replace with

'The evaluation is broken down into six items.'

6.1.9.

Para. 2. Delete last sentence.

Para. 3. Delete entirely.

Judging

After the heading 'Judging' add:

Items 6.1.10.1 to 3 must be judged at a minimum distance of three meters, and a handler who is not the contestant should be present to position the model as directed by the judges. Items 6.1.10.4 to 6 must be judged at a minimum distance of one meter. No measurements are to be taken.

6.1.10.1

Delete entirely and replace by: Scale Accuracy.

Firstly, have the model positioned in a pose similar to that in the best photograph and check for any obvious discrepancies, also assess the 'character' and realism of the model. Repeat this procedure with other suitable photographs. Then, using photographs and drawings, check:

a) The side view, including the fuselage outline, cabin or canopy shape, cockpit aperture shape, engine cowling and spinner shape, outline of fin and rudder, wing and tailplane sections, wing stagger and struts on biplanes, shape, angle and position of undercarriage legs and tailwheels or skid, size of wheels and tires.

b) End views, for dihedral, wing thick-



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1938 Power House-84"--\$43; 1940 Sailplane-78"--\$74
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ness and taper; wing struts, bracing and gap on biplanes, thickness of fin, rudder and tailplane, cross sections of fuselage and engine cowling, cowling shape and cut-outs, dummy propeller size and shape, shape of cockpit canopy or windshields; size, shape, position and angle of undercarriage; wheel track, tire thickness.

c) Plan views (above and below) for wing outline and fairings, aileron size, flaps; tailplane size and outline; elevator size, shape and cut-outs, trim tabs, fuselage shape and taper, cockpit or canopy shape, engine cowling shape.

Note: The photographs must take

precedence over the drawings when there is any doubt concerning any item of scale accuracy.

6.1.10.2

Delete entirely and replace by:
Color.

Correct color may be established from color photographs, from accepted, published descriptions, from samples of original paint, or from accepted, published color drawings. Also check colors of national markings, lettering, and insignia. Camouflage color schemes should show the correct degree of merging of the shades.

6.1.10.3

Delete entirely and replace by:
Markings.

Check the size and position of all markings and lettering. Check that the style and thickness of all letters and figures are correct. Check that any trim strips are of the correct dimensions and are correctly positioned. Check camouflage patterns.

6.1.10.4

Delete entirely and replace by:
Surface Texture.

The texture and appearance of the surface of the model should reflect that of the full-size aircraft.

Fabric covered types should be covered in the correct material, and the outline of stringers and wingribs should be visible.

Ply-covered or wooden monocoque types should be correctly simulated and any sag between ribs and formers should be apparent if this is present on the full-size.

Metal stressed-skin types should show simulation of panels and rivets. In all instances, the appropriate gloss, semi-matte, or matte finish should be correctly reproduced.

6.1.10.5

Delete entirely and replace by:
Craftsmanship.

Model should be checked for quality of workmanship, with particular reference to filling of grain; clean, sharp edges, especially trailing edges of wings and tail surfaces; correct gaps at hinge line of control surfaces; close fit where wings are attached to fuselage, and general finesse.

Check for any components which have not been made by the contestant (see 6.1.9.4.d) and adjust the mark awarded accordingly. A complex subject should be awarded slightly higher marks than a simple subject.

6.1.10.6

Delete entirely and replace by:
Scale Detail.

Check that items such as those listed below are present on the model where applicable, and that they are accurately reproduced and correctly positioned.

- Hatches
- Handles
- Footsteps
- Doors
- Armament

- Bomb racks
- Control cables
- Control horns
- Fairings
- Bracing
- Turnbuckles
- Struts
- Lacing or stitching
- Aerials
- Venturis
- Brake pipes
- Undercarriage springing
- Tire treads
- Wing slots.
- Navigation and landing lights
- Pitot head
- Walkways
- Tanks
- Radiators
- Filler caps
- Louvers
- Cooling gills
- Mass balances
- Instrument panel
- Cockpit or cabin interior detail

Pleaser Continued from page 17

build very quickly. Cut the sides from hard 1/16 balsa, the firewall from 1/8 plywood, and the other bulkheads from 3/32 plywood. I like rounded corners, so I use 1/4-inch triangle stock for the longerons.

Glue bulkheads two and three to one side at 90 degrees. After this dries, glue the other side to the bulkheads. This forms a rectangular box as both bulkheads are the same width.

I then glue the bottom sheeting between the two bulkheads. This helps prevent warping when the firewall is installed, and when the tail posts are glued together. Next, glue in the firewall. I use rubber bands to hold the sides together for this. Next, bevel the triangular longerons starting about three inches from the tail post so that the fuselage sides are as wide as the 3/16 fin at the tail post. Glue together the fuselage sides at this time.

Complete the fuselage by gluing the remaining bottom sheeting and the top sheeting.

COWL: One of the advantages of electric power is that you can completely cowl in the motor, except for air holes. I cut the top, sides, and bottom from 1/4 balsa. Glue the top, sides, and bottom together to form a four-sided box. You then sand the rear of the cowl so that it will fit flush with the firewall.

Securing the cowl is somewhat of a chore. I made two brackets using 1/16 brass, each a 1/4-inch wide and a 1 inch long. I bent each in the middle to form an L-shaped bracket. Next, I located two places on the firewall to mount the brackets. I secured each with a wood screw. I then drilled a small hole in each bracket about 1/4 inch from the firewall. While holding the cowl in place, I marked the location of the brackets on the inside of the cowl. The next step was

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BYRO-JET SPEC:
Wt: 11 ounces
Shroud Dia: O.D. 7 1/2", I.D. 6"
Overall length, including engine mount: 6 1/2"
Material: Glass-filled nylon



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to drill a 1/4-inch hole in each side of the cowl at this location. After this, I cut two pieces of 1/16 plywood, each a 1/2-inch square. In these ply squares, I drilled another small hole in the center. Using sheet metal screws, I attached the plywood squares to the brackets. Next, I slid the cowl on so that the screws could be seen through the 1/4-inch holes in the sides of the cowl. I then glued the plywood squares to the insides of the cowl so that the cowl was perfectly aligned with the sides of the fuselage. All that remained for me to do was to glue on the front of the cowl, and sand the entire fuselage and cowl to shape. Cut holes in the front of the cowl to allow for motor and battery cooling. This completes fuselage construction.

WING: The model flies very nicely using rudder-only control with two inches of dihedral under each wing. The following instructions are for building without ailerons.

Begin construction by cutting the ribs from the appropriate sheet material as indicated on the plans. Next, over the wax paper-covered plans, pin down the trailing edge, bottom spar, and bottom sheeting of the right wing. Follow this by gluing the ribs in place, then the top spar, leading edge, top sheeting, and finally, tac-gluing the wing tip in place. After sanding the wing tip to shape, remove it, and hollow it out.

Reglue it to the outboard rib at this time.

After building the right wing, tape the

plans to a window, printed side out, and trace the left wing on the back of the plans. Construct the left wing as you did the right.

Sand the leading edge of both wings to an airfoil shape, and lightly sand the ribs and trailing edges. Block up each tip two inches and sand in the dihedral. Epoxy the wings together, and epoxy a one-inch wide strip of fiberglass cloth along the bottom seam.

The aileron version of this wing is constructed the same way as the two-channel version with the following exceptions: block up the tips only one inch each; cut out the ailerons; and install the servo and torque rods.

TAIL SURFACES: Simply glue the appropriate balsa directly over the plans, remove and sand. I use a piece of hardwood to join the elevator halves.

FINAL CONSTRUCTION: You have completed the basic plane. You may now install the wing hold-down dowels, hinges, and cut holes for the rudder and elevator pushrods to exit. I cut these holes rather large to allow for the air to exit after cooling the batteries. If you wish, you may use either a ready-made landing gear, or make your own from music wire, or just fly without gear. Give the model a final sanding and vacuum the dust off. Cover with your choice of coverings. I used Super Monokote. You can trim with almost anything as it does not need to be fuel proof. I have found that the only motor thrust adjustment needed is one washer behind the top

right motor mount (viewed from the front). Install the motor and radio of your choice, and head for the nearest flying site.

FLYING: The first flight of the Pleaser required only a slight trim adjustment of the rudder/aileron, and she flew like a dream. Aileron turns are fairly slow, even with the long wing version. The short wing version has a rather fast glide. It does not drop like a rock, but it is wise to plan your landing approach.

The throttle described below allows you to come in slower, and add power if needed for landing. I have always hand-launched the Pleaser, but it should ROG if you have a paved strip. Allow ample altitude before your first turn. The Pleaser handles the wind very well. I have flown in winds up to 15 mph with no trouble.

Build a Pleaser, and show those pattern guys what an electric ship can really do. They'll be amazed, and you'll be PLEASED.

THROTTLE: As I like flying for relaxation, I wanted to be able to throttle down. Astro Flight sells a throttle kit using a resistor which works fine, but your flight times on low are the same as on high. I wanted to be able to increase this time while flying on low. I know enough about batteries to know that if you wire them in a parallel, you will get twice the capacity. The switch provides this extra time on low. All cells are in series for high, and two sets are in parallel for low.

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in series, but you can use your 12-volt car battery as a power source with this new switch.

When flying, I usually pause at the off for a split second when switching from low to high. You may blow a fuse if you do not give this brief pause.

Keep your batteries up, and join the QUIET REVOLUTION.

Big Birds Continued from page 33

flywheel area from the fuel compartment. This alternative mounting method will shorten the engine overhang by 2-1/4 inches, which makes for a more compact and sturdy attachment to the airframe."

The Mag-Aero Bruce has been playing with has about eight hours flying time mounted on the front of a homebrew he calls the "Aero-Fly." When planning this bird, Bruce laid out three basic requirements: it must be quick to assemble; it must fit inside of a Toyota Corolla; and it must fly well with the 1.3 cid Mag-Aero. From what I've seen, there's no doubt in my mind that all three requirements were met. Sporting a Quickie 500 airfoil, the prototype handled nicely, even though it was a bit on the heavy side at 1-3/4 pounds. The Mk II version will be one pound lighter and should be "snappier."

Bruce sez that if he can design a good-

flying BIG Bird, then most anyone can . . . So what are you waiting for???

ARE YOU CRAZY?

That's what my wife wanted to know when she caught me hotstuffing my left thumb and pinkie together.

"Why did I ask? You must be crazy to do it on purpose," she mumbled while searching my cluttered workbench for a blade to commence operating with.

In a voice almost free of bravado, I tut-tutted her . . . and then applied some of Golden West's "Ultra Super Solvent" to the bonded fingertips. In about a minute, my fingers were separated . . . with ease; no sore spots or pulled skin.

However, my smile of victory meant nothing to her. She eyed me curiously. "And what if that stuff hadn't worked, or worse, burned away skin while still leaving your fingers glued together?" she asked.

Wife, Dee, was right, of course . . . but how else was I going to make sure that the solvent worked as advertised? She also noticed the bottle of Pacer's "Debonder," realized what it was, and informed me in no uncertain terms that all other experiments were cancelled . . . so I never did give Pacer's stuff the acid test. I have heard from a few users that Debonder does equally well in removing unwanted bonds and cleaning up cured CA. Both products are touted as being non-toxic and safe, and are definitely very handy items to have within reach. . .

THE 24-OUNCE ALTERNATIVE

Most BIG Birds have room for something bigger than a 16-ounce fuel tank, but often a whopping 32-ounce vessel either won't fit, or isn't desired . . . and for those special occasions, Kraft now offers their 24-ounce alternative. Not only has the tank size been tailored to our needs, but the innards also; according to Kraft, "all components are compatible with glow, gas and oil, and diesel fuels" . . . and this includes a "new, larger fitting for maximum fuel flow."

It's a step in the right direction, for sure. No more forgetting (or not knowing) to replace the pick-up tubing with something that won't deteriorate in a gas or diesel mix. And because this new black fuel line is so l-i-m-b-e-r, the old standard Kraft clunk is able to move around and do its job well. Must admit that I was curious about this fuel line so I gave it a two-day soak in raw gas . . . and so far it appears to be unaffected.

Although the new, larger fitting now has an ID of .90, the fuel line and clunk only have an ID of about .60 . . . which made me wonder how well the tank could deliver when something like a 3.15 Kawasaki was demanding its full takeoff rations. Kraft's Dan Lutz assured me that they had tested this new tank with the big Kawasaki, and that fuel flow was not a problem . . . AS LONG AS LARGE-SIZE ID FUEL LINE WAS USED TO CONNECT THE TANK TO THE ENGINE. According to Dan, "There's no fuel flow restriction because the smaller ID of both the tank tubing and clunk are so far away from the engine." I know that Quadra-size

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Wing area 621 sq. in.

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Ballast option - includes 24"

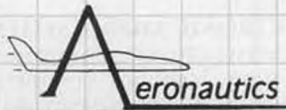
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engines are compatible with the tank because I tested that combination.

Some of the guys I showed the tank to questioned the continued use of "that plain old clunk . . . instead of a clunk-filter." As far as I'm concerned, a clunk-filter would be bad news . . . because unless that filter is cleaned very frequently (and who wants to have to keep getting into a tank), it's going to do its job and get choked up, which won't help engine reliability one bit . . . and will, sooner than later, be responsible for your nice BIG Bird going boom. As a matter of fact, I don't use any on-board filters for this very same reason. Granted, in-line filters are a whole lot handier and easier to get to than clunk-filters, but even they aren't checked and cleaned as often as they should be. In fact, the only time we think of the filter is when an accident or near accident on takeoff occurs due to fuel starvation. I double filter the fuel coming out of my gallon can, and make every effort to keep the on-board plumbing clean; so far it's worked well for me.

This 24-ouncer should also find widespread use as a smoker tank. It'll give those who "love to smoke" a chance to carry a bigger load, and pump out one helluva smoke-screen.

**MOVE OVER CHAMPION,
HERE COMES AUTOLITE**

Like so many of you guys, I've also changed over to RC-J-7Y plugs and have been very happy with the results; that extra thrust has been most welcome, especially as it's accompanied by less

fouling and no detonation.

Shortly after moving up here, I found out that many guys in the Tacoma area have been using the Autolite No. 85 sparkplug with consistently good results. I haven't had a chance to confirm their findings yet, but these natives insist that their Quadras do even better with the No. 85 than with a 7Y. It very well might be that our cooler (and moist) climate has something to do with this. At any rate, I thought I'd pass this on; you might want to try the Autolite plug in your own engines. After all, who can't use more power?

CLEANING SPARK PLUGS

No matter which brand you use, plugs have got to be cleaned after every two hours of running time. Your reward for such diligence is twofold: superior engine performance, and interference-free radio control. And the fastest, easiest, and best way to handle this chore is to use a spark plug cleaner. They're available just about everywhere (K-Mart, Sears, auto parts stores, etc.), and cost between five and eight bucks . . . and that includes a gauge and a bag of abrasive (this stuff lasts a long time, although extra bags are only about a buck).

These cleaners are simple to operate: first, put the abrasive into the cleaner; then, wipe the plug free of excessive oil and dirt, and following polarity, connect the plug cleaner to a 12-volt source; insert the spark plug, and, holding the switch down, slowly rotate the plug counter-clockwise for one minute . . .

that's all you have to do 'cause the spark plug will come out looking all nice and shiny. Oh yes, please don't forget to reset the gap . . . it do make a difference.

Keep in mind that no plug cleaner can work miracles: any plugs with broken insulators or badly eroded tips should be replaced. You'll get a lot of mileage out of this tool as it'll help keep your car, van, boat, airplane, lawnmower, chainsaw, and weed trimmer engines in prime shape.

HALF-SIZE PLANS FOR \$199.95???

Well . . . yes and no! You do get a lot more for that \$199.95 besides the plans, like a complete "Big E" kit that's partially pre built: the foam wings and turtle deck are precovered; and the full length fuselage sides have all longerons and uprights glued in place.

The four sheets of plans really do contain half-size drawings . . . but only because they don't have to be any bigger with the amount of prefabrication in this kit. There are enough sketches and cutaways to simplify and speed up construction and assembly (aided and abetted by good, clear instructions) . . . and, in fact, designer Ernie Pritchard touts, "Twenty-four hours from box to sanding." However, based on reports from some "Big E" builders, I've got to be honest and tell you that Ernie lied; the guys I talked to were ready for sandpaper in less than 20 hours. . .

This "Big E" is a sporty-looking, 84-inch low-wing taildragger that comes in at 14-1/2 to 15 pounds (the firewall is

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predrilled for an Evra mount). The plane has a delightfully low wing loading, which makes it a good match for the Evra . . . although many Quads, and such, are bound to find their way onto the front of this BIG Bird.

Before we go any further, a few words about the Evra are in order. I've known very few Evra owners who've been happy with the engine, and they've all had the same complaints: too much vibration, too little power . . . and impossible to hand-start. Well, as he designed the Big E for the Evra, Ernie would love to see all those engines installed on his airplane, instead of continually being used as doorstops and boat anchors . . . so for only \$45 Ernie P. will breathe new life and fire into your present clunker. By balancing both the shaft and flywheel, installing new rings, and changing the timing, Mr. Pritchard eliminates these three major problem areas, and ships back an engine that'll perform the way you expected it to in the first place.

If the Big E looks, or seems to be, vaguely familiar, it's probably because Ernie really liked Ed Kazmirski's "Taurus," and designed a similar wing planform, thick root airfoil, and long tail moment into his bird . . . ending up with a flying machine that's smooth and gentle, and flies at a constant speed, even in a dive. I like this new offering because it helps to fill the need for good, sport-type BIG Birds. For more info, contact: E&L Manufacturing, 8631 E. Laredo Lane, Scottsdale, AZ 85253, (602) 941-0633.

IMAA FESTIVAL

Another reminder that time is getting short if you're planning on being at Ida Grove on August 18 to 21 for IMAA's third annual International Fly-In Festival. Now's the time to make those reserva-

tions, and to get crackin' so your new BIG Bird will be ready for its debut . . . and all you've gotta do to get complete info is send me a 20-cent stamp and your correct mailing address. Don't drag your feet, because we expect a HUMUNGOUS crowd . . . and preregistered guys and gals are gonna have absolute preference over the forgetful and lazy-bones types. Love to see you there. . .

THE PUGET SOUND ROCS

Washington State's first IMAA Chapter (No. 108), the Puget Sound Rocs, are off and running with the "Roc's First Annual BIG Bird Fly-In" scheduled for July 16 and 17 at the Mt. Rainier Radio Control Society flying field . . . also known around these h'yar parts as "Hog Hollow." Gotta admit that we probably won't be able to quite match the '83 Ida Grove BIG Bird Bash (at least not this year), but we're dedicated to making this the best and most relaxed BIG Bird Fly-In this part of the country has ever seen.

So here's a personal invitation from all us "Rocs" to all you folks in and around the West Coast to help make our First Annual Fly-In a weekend to remember. I'm the Director, so you can seld all your queries my way; by the time you read this, we'll have our flyers and a complete informational package to send back to you.

The MRRCS' flying field is BIG and ROOMY, so don't worry about being the guy to cause an overcrowding problem . . . just bring as many BIG Birds as you'd like to. We will be both AMA and IMAA sanctioned, so you'll have to have current AMA and FCC tickets in order to fly) . . . but you certainly won't have to be an IMAA member in order to participate in the fun. All AMA and IMAA safety rules and recommendations will apply, including the IMAA

Airworthiness Inspection on all aircraft before they fly.

Y'all come. . .

TIP OF THE MONTH

This really has nothing to do with airplanes, but I thought perhaps it might make a lot of you guys feel better to know that . . . "Celibacy Is Not Hereditary."

FLYING SAFETY IS NO ACCIDENT

Al Alman, 2713 Alderbrook Court, North, Puyallup, WA 98373 (and please keep those cards, letters, photos and fly-in announcements coming, folks!). •

Electronics . . . Continued from page 25

2.0-volt glow plugs, and fuel pump. In addition, it fast charges both transmitter and receiver batteries, and discharges them for capacity testing (automatically cuts off at the proper point). The two models, one using an analog meter, and the other an LED meter, also provide voltage and current readings of all important functions. Completely solid state, the DaCa Power and Test Panel is priced at \$149.95; write for more info: DaCa Model, 14573 Grover St., Omaha, NE 68144.

ELECTRONIC MODEL SYSTEMS

EMS was showing an impressive variety of items, including complete airborne systems designed to work with all of the major R/C brands. Two rather unique items drew my attention, one being called a Logic Link. It is a plug-in module for Kraft 7C, 7CS, and Signature Series transmitters which replaces the frequency module, and is connected via a cable through a Kraft 200-121 Switch Harness to a 5C or 7C receiver. It then allows complete operation of all system functions without transmitting a signal. Extremely useful when control adjustments or tests are necessary at the field!

Another interesting EMS product is the "Eagle" servo, 3.6 ounces of pure muscle. Using proprietary electronics in a World Engines S-16 mechanics, the EMS "Eagle" produces 156 inch ounces of thrust in a 1.7H x 1.14W x 2.60L package. Transit time is reported to be .5 seconds for 100 degrees; additional features include ball bearings, and a watertight case. Many other items of interest to large airplane builders are listed in the EMS catalog, write and ask for your copy. The address is: 6175 Palo Alto Dr., Anaheim, CA 92807.

FULL COMMAND SYSTEMS

Under the leadership of owner Bruce Batch, Full Command Systems had on display a number of newly developed items, including some futuristic-looking transmitter designs which could easily be the shape of things to come. Of immediate interest to thousands of owners of the old Texas-based EK Systems radios is the fact that Full Command has a complete inventory of all parts, from the smallest servo gear, to complete replacements, as well as rapid and expert service available for all EK's manufactured.

Amongst all the familiar items, I was glad to see that Full Command is still making the airborne switch mount, which in my opinion was the best one ever devised. Like everything made in those days, it fits the Noble switch, provides free and positive switch operation, does not require drilling a hole in the switch knob, and has a small, neat, almost invisible operating knob outside the plane. Anyway, for this, and all other EK parts and service, Full Command is the place to go. Write to Full Command Systems, 908 E. Rosewood, Spokane, WA 99207.

HOBBY SHACK

Hobby Shack's electronic offerings cover all phases of the hobby, not only with a variety of imported and domestic products from other manufacturers, but also with its own brand. It now markets two complete R/C systems, the basic no-frills Aero Sport, in four and six-channel systems, four servos, fully Ni-Cd equipped. For the more advanced flyer, Hobby Shack has its seven channel Cirrus 850 XLC, which in addition to enough channels for most competition applications, also features full Ni-Cds, servo reversing, three dual rates, and a full one-year warranty.

Another new and useful item which caught my attention is a new Thunder Tiger optical tachometer, claimed to have better than plus or minus 3.5 percent accuracy over the entire operating range. In addition, it is switchable over three ranges, 0 to 8,000, 0 to 16,000, and 0 to 32,000 rpm, and is also switchable for two, three or four bladed props. All indications are made on a wide, high legibility meter, which also displays battery condition on the proper setting of the function switch. Power is provided by one internal nine-volt transistor battery. This is certainly a worthwhile addition to any serious flyer's accessory list.

Hobby Shack is located at 18480 Bandilier Circle, Fountain Valley, CA 92708.

KRAFT SYSTEMS

A complete line of from two to seven-channel systems was on display at the Kraft Systems booth, as well as everything for the car, boat, or airplane modeler, from beginner to expert.

A new servo was being shown, similar in size and weight to the popular KPS-24, which is designated the KPS-28. Its claim to fame is the fact that it provides 60 ounce inches of torque, compared to 45 for the KPS-24. The KPS-28's size is 1.61 x 0.83 x 1.39 inches weight is 1.6 ounces; includes ball bearings; is watertight; uses a sealed pot; and has a splined output shaft for offset output wheel settings and maximum strength. The KPS-28 looks like a good choice for high performance aircraft, in which it could be used for the primary flight controls, and mixed with KPS-24's on throttle and auxiliary functions not requiring quite so much servo power.

For more information, contact Kraft Systems, 450 W. California Ave., Vista,

AIMING FOR THE BEST?

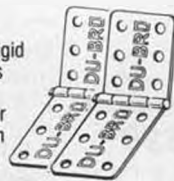
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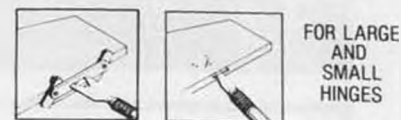
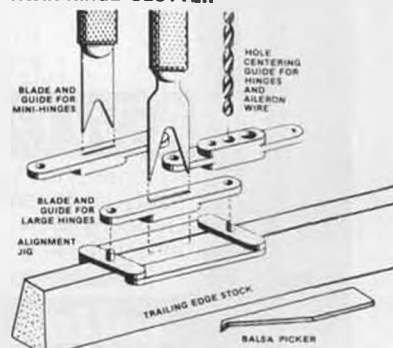


HEAVY DUTY 1/4 scale HINGES

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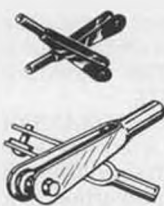
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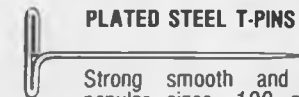
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Cat. No. 130 (6-32 x 1) \$1.10 (4)



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A new kid in town, Powermax, (well, new to the U.S., it's old hat in England) appeared with a variety of accessories and kits for show and tell. Included was an interesting Windmeter, a small, self-contained electronic unit that accurately answers the old question, "Do you think it's too windy to fly?"

The Powermax Windmeter needs only to be placed in unobstructed air to read the wind velocity on an easy-to-read analog meter scale (up to 25 mph/45 kph). Price is \$33.99. More info on all products is available from 359 Trousdale Dr., Suite A, Chula Vista, CA 92010.

RADIO CONTROLLED MODELS, INC.

Boats, boating accessories, and pilots were some of the things seen at the RAM display. But naturally, we were more interested in the extensive assortment of electronic items, which break down roughly into three categories: lighting systems, control devices, and fail safe devices. The first group includes nav, strobe, and landing lights for airplanes, and complete lighting systems for cars. In the control device category, we have electronic throttles and timers. The last group, fail safe devices, comprises such worthwhile devices as battery cyclers, battery alarms, battery backers, and a personal frequency monitor that should be just the ticket to help with some of the confusion that is bound to occur at crowded fields as the new frequencies begin to show up. The RAM products sheet is certainly one worth asking for. Write to Radio Controlled Models, 4736 N. Milwaukee Ave., Chicago, IL 60630.

ROYAL ELECTRONICS

This Colorado-based company has a wide variety of R/C equipment and electronic accessories to offer the modeler. Some are unique, such as the expanded scale optical tachometer, the Protach, and the dual LED timer Cycle/Charger which tests and charges five and eight-cell transmitter, and four-cell receiver battery packs. There are also a couple of very interesting receiver kits, two and four-channel, in 1.64 x 1.45-inch cases, only .8 inches high, weighing only one ounce.

Royal Electronics is also a good source of many of the individual electronic components used in R/C equipment

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which can be difficult to locate on the market in small quantities. Included is a large variety of ready-made harnesses for many of the most popular R/C systems currently on the market. Keep them in mind when that need comes up. Royal Electronics is at 3535 S. Irving St., Englewood, CO 80110.

ROYAL PRODUCTS

Royal Products (not to be confused with Royal Electronics, which is an entirely different company), was showing its Titan Servo, in two sizes. The Maxi Titan has overall dimensions of 2.31 x .87 x 2.5, weighs 1.8 ounces, and is rated at 54.1 oz.-in. of torque. It is built around the successful Signetics 544 chip, and includes other features like ball bearings and carbon pots. The Micro Titan, at .64 ounces, measures 1.52 x .5 x 1.25 inches overall, with a torque output of 18.08 oz.-in. It uses an European SAK150A chip, coreless motor, and carbon pot. These servos are available with cables and timing for most of the R/C systems now available here in this country. Royal Products' address is 790 W. Tennessee

Ave., Denver, CO 80223.

L.R. TAYLOR & CO.

A number of familiar "faces" were on hand at Taylor & Co., such as the Accu-Charge, an automatic charger for 12-volt wet or gel cell batteries, and the Multi-Charger, designed to simultaneously charge two transmitter and four receiver battery packs. The Super Power Panel provides all of the voltages necessary for a wide variety of field equipment, including quick chargers for the receiver and transmitter, and a meter to monitor all of the important functions.

The Taylor Power Pacer, made in various models for different transmitter battery supplies, is a combination capacity tester and charger; a very valuable piece of test equipment which will pay for itself the first time it points out a defect in your batteries, thus saving you an airplane. L.R. Taylor & Co. is at 20831-1/2 Roscoe Blvd., Canoga Park, CA 91306.

SWITCH OFF!

Such was this year's electronics at the IMS. There wasn't a great deal that can

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be considered startlingly new, but it is good news, that while not mentioned individually, I did notice little in the way of price increases since last year. In fact, considering the general state of the economy, R/C systems are one of the few bargains that I know of; they are better and cheaper than ever. I hope you'll plan to be with us at the 1984 International Modeler Show in Pasadena. ●

Electric *Continued from page 27*

power. The EM 40/14 will turn an 8x6 at 12,000 rpm on 10 cells, the EM 40/18 will turn a 9x6 at 12,000 on 16 cells, according to the factory literature. On 12 cells, the 40/14 will turn the Geist 16-inch folding prop at 4600 rpm. The Geist folding prop is one of the best available, with a machined aluminum hub and fiberglass blades. The EM 40 direct-drive models are \$149.95, add \$34.95 for the gearbox for folding props.

Geist now has a new motor for smaller planes, the EM 30, which is about the same size as the 05 Leisure and Astro motors. It is samarium cobalt, and should really make potent performers out of any 05 electrics. The brushes in this one, and in the 40 models, are really beefy, they are made to take a lot of abuse and high current. This is very important in cobalt motors, as they are

often driven harder (by competition and competitors) than the regular motors. The Geist literature mentions currents of 30 amperes if you want to push it that far. Wow!

The best part of my visit to Wilshire was talking to Hans Weiss, the owner and chief guru there. Hans knows his electrics forwards and backwards, he flies what he sells, and he makes trips to Germany fairly often (to visit family) so he knows what the state of the art is in Germany. Hans is something of a philosopher as well, by the end of the visit we had covered everything from electrics to how the world could be improved (more modelers!).

Hans really backs up what he sells, and gives instruction both for electrics and sailplanes. The visit ended with an invitation to come to the Malibu flying site the following Sunday and see some electric flying. That was an easy invitation to accept! Hans even has a map and checklist for his students, which I took along.

For those who have not been to the Malibu area, I have to say a few words. There are a couple of sights you shouldn't miss if you do have a chance to visit that area. One is the beach just north of Pepperdine University, it is beautiful, and at this time of year (winter months), deserted. To a northerner like me, that's amazing, because the day was warm and pleasant, and Sandra and I spent a happy hour walking along the sand picking up sand dollars and broken seashells that had washed in from a recent storm.

The other sight is the Malibu Canyon road, which starts at Pepperdine University, and winds into the canyon. The mountains here are spectacular, with the rock layers tilted almost straight up. You can almost see the land being pushed up.

Farther back is lovely ranch country, where we bought oranges and tomatoes (in December!) for 10¢ a pound. Neat! One other item that we "discovered" was the Sea Lion restaurant, on the beach just south of Malibu. The restaurant has a panoramic view of the ocean, and we had seafood while we watched brown pelicans fishing outside. The

prices are quite reasonable too, nearly at the "poor graduate student level", so we felt it was quite a bargain. But, I digress, back to the flying!

The flying site is beautiful, it is just north of Pepperdine University, and is on top of a buff overlooking the ocean. Unfortunately, the site is for sale, even though it is not really suitable for building (it is unstable). Hopefully, the state will buy it as a park, but that is uncertain in these times of "no money."

Bill Winans was there with his Olympian F3E with a Geist 40/16 powered by 16 red Sanyo sub-C cells. This electric airplane was advertised in the January issue of **Model Builder**. It is designed by Larry Jolly, who is well known in electric circles as a leading designer. The overall impression that you get looking at this plane is power, it is big (10-foot span), and sleek. The Geist folding prop hauls this seven-pound plane up easily, the climb is powerful and rapid. Once the power is off, the plane flies like a thoroughbred, it moves fast, but it has a low sink rate. It has a "Mercedes" look in the air, smooth, fast, and powerful.

Bill is an excellent pilot, and he could make the Olympian do anything he wanted, but I think an intermediate pilot could handle it well too, and would have a lot of fun learning how to use its high performance. Bill says it stays up longer than the floaters every time! I was very impressed with it. The spoilers are very effective, and when they are deployed, the plane comes down *right now*. If you want a very high performance kit plane, I think that this is the best I have seen.

Bill also had an Electricus powered by a Challenger 05 motor (Astro cobalt). This electric plane was also designed by Larry Jolly, and was a construction article in the March '83 issue of **Model Builder**. Bill's plane uses seven Sanyo sub-C cells and an 8x4 prop for a flying weight of 46 ounces. This plane is like the Olympian with its fast climb and smooth flight. Like the Olympian, it has an air of authority, it goes where you point it.

It would be interesting to compare the Olympic 650 and the Electricus in flight, the 650 is much slower, so a beginner would find it easier to fly. An intermediate flyer would find that the Electricus could cover more ground, and in a contest where the need is to find thermals, this would most likely give the edge to the Electricus. The sink rate of the Electricus is excellent, even though the Olympic 650 has a little more area, I think the sink rates are about the same.

Hans Weiss had a Primus by Carrera (which has an extensive line of electric power units and planes). Hans carries the Carrera line as well in his shop. The Primus has about an eight-foot span, and weighs four pounds with three channels. It was powered by a Carrera system, which is about equal to an Astro 075. It is geared and drives a folding prop through the most ingenious drive system I have ever seen. The shaft has a universal joint in it made of nylon and rubber O-rings, with a ball bearing in the center. Very clever! It allows a bend

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in the drive shaft, plus the rubber rings act as shock absorbers when the prop opens up. The Carrera system is not cobalt, and this did show in the climb rate, it was about half that of the cobalt Astro and Geist systems. (I guesstimate that the Carrera climbed at 300 to 400 feet-per-minute.)

With all this sophisticated equipment around, guess who had the biggest thrill? One of Hans' students bought a Kitty. After flying it, he had a rough landing. While Hans and Bill flew their electrics, he patiently repaired the damage with epoxy, and at last, he was ready to fly. Hans looked him in the eye and said "You're ready to solo!" So, he did the whole thing by himself; he hand launched it, and circled it above the beach while he climbed. And did it climb! Slow and steady, it climbed up till it was almost too small to see, and it flew and flew! He got close to a ten-minute flight and a perfect landing, all on his own! His was the biggest smile there for the whole day!

So, electrics are fun, from simple to sophisticated, perhaps that is why there is such an appeal in it, there is something for everyone. Have fun till next time!

Soaring Continued from page 22

"The root section of the wing varies slightly in construction as it carries the wing joining rods in addition to the ballast tubes. The first two ribs are made from ply (1/8 in I think) and these are spaced one inch apart. After the holes for the ballast tube and the two wing rods (which are quarter-inch piano wires prebent 9-1/2 degrees for the correct dihedral) have been made and the tubes installed, vertical blocks of one-inch balsa are glued in between the ribs filling all of the space. This whole unit is made up separately and then is glued in place on the bottom sheeting.

"The top sheeting is glued in place using an impact adhesive (*contact cement*), although the sheeting is attached to the leading and trailing edges using a P.V.A. type glue (*or Hot Stuff*). It ought to be pointed out that the servos are not

installed until after the wings have been fully sheeted. A triangular section is cut out from the bottom sheeting, and then the servos are mounted in place (obviously, holes for the servo wires have been predrilled in the ribs). After installing the servos, the sheeting is glued back into place . . . as this is a fairly permanent fixture, it pays to follow Sean's advice of choosing a servo that you know is reliable! Interestingly enough, Sean has found no need to install electrical 'chokes' on the servo wires in spite of their length. He is of the opinion that a combination of FM radio plus twisting the wires together prior to installation provides a satisfactory method of 'shielding'. As he has experienced no problems over a number of years using this method, who are we to argue?

"After the wings have been sheeted, the tips are then glued in place. These are made of soft balsa with a 1/32 ply core making a sandwich construction (see Figure 3).

"Although this construction sounds quite heavy, Sean finds that tip weighs under one ounce *before* the final shaping takes place. The ply core has a couple of other advantages. Firstly, it makes the end of the wing more resistant to minor 'bangs' (or 'hangar rash' as our colonial cousins describe it). Secondly, by lining up the ply with the trailing edge and a centre line drawn on the leading edge, it provides a constant reference aid when sanding the wing tip to shape.

"On the subject of the leading edge, this is made up of two materials. As well as the standard balsa leading edge, there is a 1/8-inch hardwood strip (ramin, I believe) glued to the front (see Figure 1). This obviously makes the leading edge more durable at the expense of a very minor weight penalty. Sean recommends that you buy the hardwood from a hardware store rather than a model shop as it is likely to be cheaper, and it is available in single lengths long enough to use on each wing.

"The final step before covering the wing is to attach the epoxy sheet facing rib, and then to sand in the 'undercamber.' The epoxy rib is cut to the exact shape of the airfoil. By using it as a template and carefully working away

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with a razor plane and a sanding block, Sean is able to judge the lower surface curves. Admittedly, this is not a particularly scientific approach, but once again, it works, and it is certainly within the capability of the 'ordinary' modeler (is there such a being?). On the subject of 'undercamber'; Sean suggests that if in doubt, too much rather than too little is the best bet.

"Covering: Contrary to some of the rumours flying about prior to the meeting, Sean's method of skinning his wings with fiberglass is remarkably straightforward and is, therefore, applicable to the models we use on the slope.

"The cloth that Sean uses comes from Germany, but can be obtained over here . . . its weight is approximately 27 gm/sq m (or 3/4 oz/sq ft). Although using fiberglass as a finish sounds heavy, Sean pointed out that it adds 3-1/2 ounces whilst covering in Solarfilm adds five ounces. Guess which is the stronger?

"To attach the cloth to the wing, Sean uses a German epoxy, but he has recently tried some resin available from Avicraft (Bromley) and he reports some very satisfactory results." (*I would use Safe-T-Poxy from Aircraft Spruce and Specialty, P.O. Box 424, Fullerton, CA 92632, also a good source of contact cements, and micro-balloons. wrf*)

"Before commencing the application of the resin (and hardener), it is necessary to cover your building board with a polythene (*polyethylene*) sheet . . . the reason for this will be explained shortly!

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Sean covers both wings at the same time, doing the top surfaces first. As to the amount of resin used, Sean finds that 15cc of resin per sq ft of wing area (measured before the methanol thinners is added) is just about right.

"The wings are laid 'back to back' (trailing edge to trailing edge) on the board (see Figure 4), and the resin is brushed through the cloth using a wide, soft brush and working from root to tip. Where the cloth comes into contact with the polythene sheet, the capillary action of the resin will draw the cloth down onto the surface of the wing. To aid this action, Sean advises that a thick line of resin should be brushed onto the leading and trailing edges of the wings as this gives you something to sand back to at a later stage.

"After brushing on the resin, a standard roll of lavatory paper (soft!) comes into action. This serves two purposes. Firstly, it gets rid of any excess resin (a warning was issued here as it is apparently very easy to take off too much resin, and then the wing will need sealing). Secondly, and more importantly, it allows you to evenly distribute the resin over the surface of the wing.

"Sean reckons on doing the top surface of the wing in an evening, allowing them to dry overnight, and then completing the bottom surfaces on the following evening.

"When trimming the excess cloth after the top surface has been covered,

Sean recommends leaving a strip of cloth about 1/16 in wide at the trailing edge. When the bottom surfaces have been attached, this makes a very robust (and sharp) trailing edge. The final sanding is done with 240 grade paper which Sean uses *dry* in order to avoid cutting through the cloth in his enthusiasm."

Sean Walbank continues with instructions for making Bannister's aileron hinges (basically the notch and tape method), for making Algebra tail feathers (carved out of 1/2-inch balsa!), and how to ballast the Algebra using tungsten-silver rods which weigh almost 150 percent more than lead rods of the same dimensions.

I hope you found the construction techniques of one of Britain's best modelers profitable, I did. Thank you again, Sean Walbank, for sharing them. See you in York this July!

BUSTED FOR BAKING SODA

For years now, I have been carrying a small, metal photo film can full of baking soda. Why? Because until recently, it was the only substance available that could be used with Hot Stuff or similar CA adhesives to form fillets or to "kick off" stubborn cures.

Often, and I do mean often, I would look at that stuff and think, "I hope no cops stop me with this stuff . . . it could be tricky to explain as it looks just like cocaine or PCP or ????" But I was never REALLY worried by it . . . I mean, "It's

just baking soda, officer, re-e-ally!"

Well, get a load of this page one story in the *Orange Coast Daily Pilot* that appeared on January 8, 1983 entitled, "Laguna sued for \$100,000."

"A woman who said Laguna Beach police arrested her on suspicion of possessing cocaine when the substance in a film canister turned out to be baking soda has filed a \$100,000 claim against the city."

I don't want to quote from the *Pilot* extensively here for copyright reasons, but what followed the poor gal's arrest was kinda scary. A field test was conducted at the scene of the illegally-parked-car crime which proved positive . . . some kind of narcotic was in the can. A second test was performed in police HQ after the gal insisted it was just baking soda . . . same results, but this time the police said it was either "cocaine, Novocaine . . . one of the caines."

Picture yourself in this predicament! What would your reaction have been! I'd want a competent lawyer, FAST, and a soft chair to sit down in and quiet my shaking knees.

Well, somebody must have wanted a third opinion, because the substance in question was "...sent to the Orange County Sheriff's Department crime lab for analysis, 'we received a report back that they could find no narcotics in the substance. . .'" The county tests said, yep, it's bakin' sodie all right! So, back the film can went to Laguna Beach . . . and more tests there.

Test number three in Laguna Beach proved positive AGAIN . . . and the department went out buying different types of baking soda for testing! Lord, save me from Laguna Beach police if I am ever caught there with my field box!

GOOD NEWS FOR SLOPE FLIERS

Just so that you don't think that everything you see in the newspapers is bad news, pay attention to this next story. The headline reads: "Hilltop added to Niguel Park." Big deal, right? I wouldn't have noticed it except that I got a call from Curt Stevens who pointed it out to me in the Wednesday, January 5 issue of the *Saddleback Valley News*, Mission Viejo edition.

It seems that quite a few slope glider fliers have been using a site in Orange County, California known to them as "Kite Hill" and known to the land developers as "La Paz Hill." Well, last December 21, S and S Developers donated 19 acres of hilltop land near the northwest end of Laguna Niguel Regional Park to the County of Orange in Southern California . . . including this slope site.

County designer Denny Turner said that improvements would be made to accommodate the R/C glider fliers who continue to use this barren, steep grade for their flying.

"Improvements considered include a paved road to the top of the hill, a possible restroom building, parking lot, picnic area, and lawn area."

Turner indicated that the R/C soaring pilots that were heard from regarding these improvements said that they

didn't want trees planted or a landing strip put in. What a nice thing for a county government to hear: improvements, yes; lots of 'em, NO! Turner also said that \$50,000 was allotted for the design work . . . and that this was "probably more than would be needed."

The bottom line of the story was, "some improvements could be expected soon." THAT, my dear readers is encouraging . . . not just for people in this area, but elsewhere as well. If more county designers and planners knew how little we slopers ask for in the way of improvements for existing county lands . . . perhaps we would see more official flying sites. If the opportunity arises (and it did here in Los Angeles County about two or three years ago) where there are public hearings about proposed land use plans, or whatever, get a few buddies together and invade the place. Let your voices be heard, in numbers, and don't wait for "somebody else" to do it, either, because nobody else will . . . it's up to you! Don't be shy! And join the AMA while you are at it, the insurance is good PR and a strong bargaining point for organized flying.

JUST FOR THE RECORD

Two months ago when I introduced the Larry Jolly Model Products new Pantera sailplane, I inadvertently omitted a few facts. Larry Jolly and I are good friends. We belong to the same soaring club, the Pacific Soaring Association. When Larry first showed me the very first production line Pantera, he explained to me where the design originally came from and how he modified it for the kit. (Fuselage now one-piece molded 'glass, wing now standard built-up construction, stab slightly smaller, fuselage slightly larger, modified tail fin and rudder.)

Well, to me the design was brand new, and for LJMP it was a new kit . . . so I called it "new," and soon after received the following letter from Don Chauncey of Plano, Texas reminding me of what Larry told me regarding the Pantera heritage. I thought it would be of general interest to you, so I am reproducing it here:

Bill,

I thought you might be interested in some more information on the "Pantera". The ship is not a new design! Larry first became interested in the design at the 1979 Nats where we had seven of the ships there between four people. Some of these seven were almost two years old then. The Pantera is actually older than the Saggita!!! Most of all, Pantera is a pure-bred Texas design. (All the good ships don't come from California!)

My original design had a foam core D-box with a vertical full depth spar. The fuselage was made in two pieces consisting of the main pod and a special tail boom. Larry didn't feel the foam lent itself to mass production, so he changed the structure back to a conventional D-box of all wood.

The Pantera has been flown in the '79, '80, '81, and '82 Nats placing in the top 10 in each. I personally have won the NSS

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contest here for three years running with the same ship. This year I was third over all nationwide. I also won the LSF tournament this year and placed second two years ago. Pantera has dominated the skies over North Texas, Oklahoma, and Arkansas now for several years. It has a well established contest record.

I made partial kits and sold them for about four years, but time and expense got in the way, so Larry and I got together, and hence the full kit.

I do not fly the polyhedral configuration any longer. I have gone to full foam wings and tails, and of course ailerons. I still have the original ship; I keep it for a back-up and drag it out every year to fly the NSS contest.

This information is mainly for your files as I thought you might be interested to know Pantera is an older, well established design. Keep up the good work in your column. It is very interesting reading.

*Good lift,
Don Chauncey*

Thanks Don, I didn't mean to imply that the Pantera was an LJMP design, my mistake. Besides, a design as good as the Pantera deserves proper recognition.

2MWC: JUNE 11 AND 12

This is just a reminder for those of you planning to attend the fourth annual Two Meter World Cup that preregistration begins and ends in the month of May (deadline: May 31, 1983). It's not too late to get a registration form from Ed Slobod at 9626 Jellico Ave., Northridge, CA 91325, but you had better not put off writing Ed for very long . . . the days are fast approaching!

Above all, don't miss this 2MWC. It is going to be the best yet (by far) in several ways: it will be held on a grass field (not dirt and rocks as before); it will have the best contest winches ever seen anywhere in any contest, there will be five standardized 12-volt winches; it will be

the warmest 2MWC ever held (June in the San Joaquin Valley of California is a heck of a lot warmer than the Mojave or Las Vegas deserts in mid-winter); and there will be plenty of sunlight left to fly in before sunset and the end of the contest (no more trophy award pictures in the dark!). Man, if you miss this one, I feel sorry for ya.

AIRFOIL OF THE MONTH: E-201

I'll have to plead ignorance on this one, folks. I've never tried the E-201, so I can't speak from personal experience. However, this is the section that was mentioned more than a few times in this column in regard to the Algebra VIII F3B ship that Sean Bannister designed and flew to second place in the 1981 WCs.

This much I can say: the zero lift angle of the 201 does appear to be the same as the 193 as Sean said; it is a thicker airfoil (11.9 percent) than the 193 (10 percent) which might allow a slower stall speed for the wingtips as used on the Algebra. It has a flatter glide polar (L/D polar) curve than the 193 which looks like it has a definite "drag bucket."

The E-201 was originally intended not as a wingtip section, but as a root section where its extra thickness allows extra strength without the added weight of heavy spar material. The E-203 is its thicker (13-1/2 percent) brother, also designed for this purpose. Now, if I could only read German. . .

WHERE TO WRITE

Please note that my mailing address is either 1843-C Pomona Ave., Costa Mesa, CA 92627, or c/o Model Builder, P.O. Box 10335, Costa Mesa, CA 92627 . . . many of you out there still have me on your mailing list as 487 Mesa Rd., Santa Monica, CA 90402 . . . this is NOT CORRECT and I would appreciate greatly any steps that you could take to remedy this situation for me.

Remember, the Q and A Forum that I mentioned in my February column is still

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going, so if you have any questions that you would like to have answered, just drop me a line . . . I won't consider any question too simple or too complex to answer (within reason).

Pattern Continued from page 16

knows-what-else. The receiver now becomes the weak link in that it must select from signals that are very close together, and in some cases those unwanted signals are unintentional splatter that no one knows about.

The price of new radios has dropped dramatically over the past few years, so it seems like it is time for someone to build a super-doooper receiver that will handle these problems. I'm sure that there is a market for a truly improved, though more expensive, receiver design . . . Any takers?



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Choppers Continued from page 35

as a tail rotor having cyclic pitch like a main rotor. There are also no "fixed-pitch" tail rotors because for every change of lift in the main rotor, the tail rotor has to change its thrust to vary the lift which keeps the nose straight.

CONTROLLING THE TAIL ROTOR

When you give a right tail rotor command, you are really overcorrecting for main rotor torque. The tail rotor provides thrust to keep the nose straight, plus additional thrust (when needed) to continue to rotate the fuselage against main rotor's torque. When you give a left tail rotor command, you are essentially taking out some corrective tail rotor thrust, and letting torque turn the nose to the left. Very rarely (if ever) will the tail rotor actually push the nose left.

That's why the nose always wants to turn easier to the left than to the right. One way it lets torque take over, the other way it fights torque. When the

nose is straight, the tail rotor is producing enough thrust to oppose main rotor torque. No less, no more. A tail rotor is usually kind of touchy to fly. It has a very narrow range where it will keep the nose dead straight. Any little change in the main rotor will require a tail rotor correction.

ONE CHANGE PRODUCES ANOTHER

Please refer to Figure 3. Now, as the tail rotor blows air to the right, it actually pushes the whole helicopter to the left. This left drift is corrected by giving a touch of right cyclic. Makes sense, right? This drift of the fuselage is called *translating tendency*. Follow me closely on the next point, because you'll realize something that you probably have never directly thought about.

Each time you make a change in tail rotor trim it varies the amount of thrust produced by the tail rotor. This changes the amount that the helicopter fuselage wants to drift. So there is a slight roll correction needed to eliminate the different translating tendency. In short, every time you trim the tail rotor, you'll have to retrim the right/left cyclic! You don't have a bad roll servo, you simply have the translating tendency which changes very quickly and in small increments. Here is a typical example for anyone flying helicopters:

Pilot is hovering, very small up-gust of wind hits nose of helicopter. Helicopter starts to lift higher, pilot reduces collective pitch. Less collective pitch, less torque, but with the same tail rotor pitch the nose starts to go right. Pilot gives a touch of left tail rotor to keep the nose straight. Pitch comes out of the tail rotor and the tail rotor blows less air. Now there is less translating tendency, but the right cyclic is still in, so the helicopter starts to drift right. Pilot gives slight left cyclic to keep the chopper over one spot. Helicopter now settles down to original hover altitude, and the pilot adds throttle to stop the descent. From here the whole scenario starts again, but there is more torque, nose wants to go left, pilot adds right tail rotor, etc., etc. . . . (Good grief! wcn)

TAIL ROTOR COMPENSATION

The easiest way to keep the tail straight is to use some sort of compensation system. There are basically two ways to this end, mechanical or electronic mixing. Please refer to Figure 4. Here is a simple mechanical mixer as found on the SuperMantis and Heli-Boy. When collective pitch is added, the collective yoke swings forward. As there is no tail rotor input in this example, the point where the tail rotor pushrod attaches to the mixer acts as a pivot point. The "pick-off" point is where the tail rotor pushrod comes off of the mixer to the tail rotor.

As the yoke swings forward, the pick-off point moves forward, automatically giving more right tail rotor. By this "right tail rotor," I mean the tail makes the nose turn right. Always think of the nose being moved right or left as the case may be.

To set mixing, hover the helicopter.

Add power to start a vertical ascent and note which way the nose goes. If the nose goes left you are not getting enough mixing. Adjust the pick-off point down. If the nose goes right, you have too much mixing, move the pick-off point up.

Please note that when the pick-off point is moved up, tail rotor sensitivity will be increased. Conversely, when the pick-off point is moved down, sensitivity will be decreased. Feel free to adjust tail rotor throw by moving the link in or out on the servo arm after final mixing has been set.

Figure 5 shows how the collective attachment point acts as the pivot point for tail rotor inputs. As the tail rotor servo moves the lever, the pick-off point moves, which gives a tail rotor input.

Figure 6 is the second way to add mechanical compensation. Exclusively used in Kavan helicopters, this method can be used on any helicopter (fixed or collective) where the collective and tail rotor servos can be arranged to be located side-by-side. Order a mixing lever with bushings from Condor Hobbies, part number 2508 at \$1.50. This is surely the easiest way to add mechanical mixing to a helicopter that has no provision for it.

Referring again to Figure 6, a collective input swings the mixing lever while the right servo (tail rotor) acts as a pivot point. This moves the pick-off point forward which gives the compensation. To set this mixer, hover the helicopter and add power to start a vertical ascent. Note which way the nose goes. If the nose goes to the left, you need more mixing, move the pick-off point toward the collective servo. If the nose goes right, you need less mixing, move the pick-off point toward the tail rotor servo.

Again, let me note that the tail rotor sensitivity will change as the mixing is changed.

One more point. I have given illustrations and directors for clockwise rotating helicopters. For counter-clockwise machines the torque is reversed, so all left movements become right, and vice-versa.

ELECTRONIC MIXING

This is the easy way to set mixing . . . from the transmitter, while you're flying. The system is simple to set up, as the tail rotor control rod runs directly from the tail rotor servo to the tail rotor. When the collective/throttle stick is moved, the electronic mixing in the transmitter automatically gives a throw command to the tail rotor servo. Normal tail rotor commands remain as usual, through the tail rotor servo. It might be easier to understand if you just think of the mixing function added "on top of" any ordinary tail inputs.

Two knobs control this additional input. The "mixing" (Revo on JR Apollo) knob governs how much input the tail rotor servo gives with collective/throttle changes. The "overshoot" (Acc on JP Apollo) knob senses how fast the collective/throttle stick is moved, and gives a

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temporary, additional "kick" to the compensation system. If the collective/throttle is moved very slowly, the overshoot doesn't do a thing. On the other hand, large, quick collective movements give maximum overshoot. (With mechanical mixing the "overshoot" is not available. . .)

One thing you do have to be careful with, when setting up this kind of radio system, is to make sure that the electronic mixing switches under the transmitter panel are set for the direction of main rotor rotation of the helicopter you're flying. Carefully check this point, then stand over the helicopter and add collective pitch. Make sure the compensation system fights torque by following the examples I have given you. Backwards mixing is worse than no mixing at all! Reversing the throttle (via the servo reverse switch) to get correct throttle movement will reverse mixing too. Take care here if you are running throttle and collective independently on the new helicopter radios. You may have to use an opposite rotation servo to make things work properly. Anyway, when using electronic mixing, set the mixing knob first, then adjust the overshoot knob to correct for the quick ascents.

Whether you choose mechanical or electronic mixing, either will give a perfectly mixed helicopter that lets you forget about all of the minor (but pesky) tail rotor inputs necessary with no mixing at all. See you next month. ●

R/C Auto . . . Continued from page 48

think works best on your track. This has been common practice for Delta in tires for 1/12 and 1/8 scale sizes, by the way.

Now they have a new compound that looks great and works even better in the 1241 series. So far, I have used it just on the Super Phaser and in the AA (softest) compound, as the pavement here at the house is fairly slick. Also available are A and B compounds. The A compound is probably the most universal, and the one to try first. A word of warning is that this 1241 compound is pretty soft, and may cause some cars to hop in the corners. With all of its chassis tricks, the Super Phaser is much less prone to hopping through the corners, but older cars that are quite rigid may have problems with the very soft AA compound.

As an aside, we have the same situation in 1/8 cars. With a Delta Super J, for example, when the traction comes up you have to put B rubber on the rear, or the car will hop in the corners and won't turn as well as desired. But on the same track with the Delta Eagle (a suspension car, for those who don't know), the A compound is used for the extra traction it gives; if it won't turn, you go softer on the front tires, and the suspension will do its job of eliminating any wheel hop or bouncing.

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Whatever you do with this new found spare time, your pack will still be charged and ready to go when your heat comes up. This convenience will cost some bucks; this new charger is \$65, but it is worth it, especially noting that the same thing with all the whistles and bells sells for \$125.

As long as we are talking about Delta products, latest word is that they are just now finishing the tooling for production of a (get this!) gear-type differential for 1/12 cars. All of us have been happy with the ball diffs, especially the Associated version, now we are seemingly taking a

step backward with a gear diff.

Actually, I don't know the whole story on Delta's gear diff, however, I suspect that Art Carbonell has a lot to do with it, as he is extremely sensitive to what an R/C car is doing on the track, he is very good at trying detail changes, and he is able to see what effect each change has on the car. The way I get the story, Art was noticing some unusual differential action on his Super Phasers which were using the Associated ball diffs. The cure (for a problem that I have never noticed at all) was to simply use a new main gear, fitted with clean balls, for each run. Just using a new gear was found to pick up a few inches on the competition at the exit of each corner.

With that knowledge, they went on to work on a new diff that would give the desired differential action in the turns, yet not slip excessively when coming off the corners. A gear-type diff was proven to be the answer. Then it was up to Bill Campbell to make one small enough to fit on the car. This diff does not get plunked into the middle of the axle, as you might suspect. Instead, it is installed right where a regular main gear goes, so you can see the packaging problems! But that has all been solved, and the new Delta gear-type diff will probably be available by the time you read this. It will install easily on the Super Phaser, all models of Associated electrics, and most other 1/12 cars as well.

SPEAKING OF ASSOCIATED. . .

They got a chance to send along one of the new/old (take your pick) kits of the RC150. It is new because this is the first time this exact car has been marketed, it is old because all of the components come from either the RC100 or RC200, in fact, some of the parts can be used interchangeably on the RC300. Plans (previously mentioned), to actively campaign the car this season are falling into place as friend John Snyder has agreed to build the car and race it. As John and I race and practice together, I will get plenty of chances to drive and work on the car. And in case you're wondering why I'm not going to race the car, it's because I am presently hung up on the suspension cars, so my personal pecking order as far as race cars is concerned is the Delta Eagle suspension car first, Associated's RC500 a close second, and the Delta Super J third, even if it is a pan car. Beyond those three cars, my interest in racing takes a serious drop.

That doesn't mean the RC150 should be overlooked; it is a good, solid club racer, just as the Associated label suggests. Besides, for the \$75 retail price, how could anybody with an interest in car racing (and not already owning a 1/8 car) pass it up? How about the guy who wants his kid to race with him? Maybe you just want to rat around a parking lot close to home, and you definitely do not want to plunk down the hundreds of dollars asked for a contemporary race car.

Even though the Dirty Racing Team's RC150 isn't built yet, it does look like a good club racer. All you have to do is to build it right . . . and that may be a little tough, unfortunately. The instructions leave many things to the imagination; I am having trouble with some of it! You see, I live in MRP's backyard, and there never have been many Associated 1/8 cars around, so I'm not familiar with all of the details. Even if it takes a couple phone calls we'll get it running, and then pass along some help via pictures and the written word.

Staying with the subject of Associated, the front end setup on the RC12i has been modified, production parts should be available as you read this. The main change is to make the front end a springer.

I heard from Gene Husting at Associated after my column on Kent Clausen's RC12i (which won the Stock class at the World Champs) was published. Gene relates that all of the detail setup done by Kent was found here in the Dirty Workshop, so none of you have any reason at all to claim that you aren't current with what Associated is doing. OK, they have probably been doing more fine-tuning since the Worlds, but there comes a point in time when the car is better than you are. If you have built a car like Kent's, and still can't crack that A Main at club races, it is time for more practice and less fiddling.

One point that I mentioned concerning Kent's car, but did not elaborate on, was that he had insulated the an-

tenna from the graphite radio tray with the use of a nylon button. The reason for this is that mounting either the antenna or receiver on a chunk of graphite detunes the receiver considerably, and this applies to any brand of radio system. Don't do it!

R/C World . . . Continued from page 15

tables. The next bay contained various model association exhibits, along with an information center and raffle booth. In the third bay, there was a large concession area on one side of the passageway, and an indoor electric R/C car race layout on the other side. In the last bay, about half a dozen model railroad groups had set up and were operating their layouts, the largest being at least 20 feet on each side. Back to the model and manufacturer exhibit bay, double swinging doors in the north wall led from the passageway to a huge set of grandstands facing onto the ball park. A large dirt area just in front of the grandstands was separated from the ball park by a white, wooden, post-and-rail fence. A dirt track was set up for off-road car racing, and the ball park area just past the fence provided plenty of room for live helicopter demonstrations. As buildings and fences completely surround the fairgrounds and admission (adults \$2, children \$1) is paid as you enter through one control gate, there is no need to display ticket stubs or hand stamps as you wander freely between the live demonstrations and the manufacturer displays.

There was no program listing the manufacturers who displayed, so we're guessing that there were about 50 exhibitors, with Miniature Aircraft Supply traveling the farthest (from Orlando, Florida), whereas Brooke Model Products (that's Ralph and Jeanie Brooke) is only two minutes away from Sea-Tac Airport.

From an exhibitor's point of view, this show puts you in touch with a large segment of U.S. and Canadian modelers whom you'll otherwise never see. It was a similar situation with the Dallas show, which unfortunately, has folded. There is no doubt in our mind that this show will continue to grow and prosper.

One thing for sure, the Northwest is a hot-bed of R/C boating activity, as evidenced by a total of 125 entries in the static competition! Most of these were racing-type boats, built to national rules specifications. In fact, the turnout of all types of models for the static competition was the highest in proportion to show size that we have seen . . . around 450 in all! Trophy plaques were awarded the top three in each category.

Actually, this writer was so impressed by the static model display, that most of the show photos taken feature these entries. As stated earlier, we'll see the newest products at Toledo.

In closing, we suggest that those manufacturers who are playing the "wait and see" game wait no longer. This

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Counter Continued from page 10

radio capacity.

★ ★ ★

TML Manufacturing proudly announces the addition of the new Quadra Q50 engine to its quality line of R/C aircraft and model engines. The model Q50 represents the top of the line, producing 3.6 to 4 hp at 8000 rpm with open exhaust, or with a tuned muffler specifically developed for this engine and available as an accessory.

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A list of new TML distributors is available for an SASE. For further information, write to Klaus Nowak, TML Manufacturing, P.O. Box 544, Huron Park, Ontario, Canada N0M 1Y0, or call (519) 228-6514.

★ ★ ★

Wendell Hostetler's Plans, 1041 Heatherwood Lane, Orrville, OH 44667, (216) 682-8896, announces the release of its latest giant scale design, the Piper PA-15 Vagabond, designed to accommodate engines from 1.9 to 3.1 ci. The Vagabond plans follow the tradition of quality established by the Hostetler Skybolt, Liberty Sport, Bucker Jungmeister, Curtiss Hawk, P6E, and Art Chester's Jeep.

The Vagabond was designed from factory drawings at a scale of 32.5 percent. Specifications are: span, 114 inches; length, 73 inches; wing area, 2250 square inches; weight, 20 to 24



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pounds; and wing loading, approximately 24 ounces per square foot.

All 1.9 to 3.1 ci engines are completely enclosed in the cowl. The 3.0 ci Kavan twin is a perfect fit. T and D Fiberglass can provide you with a ready-made fiberglass cowl and heat-treated landing gear if you wish (see address elsewhere in this "Over The Counter").

The Vagabond's simple construction and gentle flight characteristics make it an excellent plane for the beginner in giant scale. The more experienced will find the float version an exciting and challenging model.

The price for the Vagabond plans is \$24.50 postage paid (Ohio residents add 5.5 percent); and just in case you were wondering, yes, those two girls do look like they could be Ray Hostetler's sisters . . . they are! Introducing Linda and Elaine Hostetler, the original Hostetler plans!

★ ★ ★

If you are a model engine manufacturer, what better way is there to celebrate a fifth business anniversary than to introduce a new five-cylinder radial engine. This is exactly what Techno-



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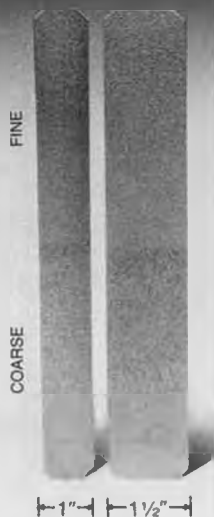
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power II, Inc. has done with its Big Bore 5 glow powered engine.

The Big Bore 5 is the same physical size as the older five cylinder radials (six-inch diameter), but it has a displacement of 1.3 ci, which is accomplished by eliminating the cast iron liner and running the piston in a hard chrome bore. The Big Bore 5 also has heavier articulating rods and an extra heavy crankshaft. Cast aluminum rocker boxes help dissipate the heat generated by the increased power of the Big Bore 5. This radial will run with a minimum prop size of 14x6. The price is still only \$795.

The icing on the five-year cake is the Technopower three-cylinder radial which has had a carburetor relocation

this year for easier installation. The three-cylinder radial is the same 1.3 ci displacement as the Big Bore 5, and its eight-inch diameter fills out the cowls of two-inch scale aircraft nicely. As with the Big Bore 5, the three-cylinder radial swings a minimum prop size of 14x6, but unlike the Big Bore 5, its price is \$695, which makes it the bargain engine of the Technopower line.

Both engines are in full production and are available immediately. Write to Technopower II, Inc., 16650 S. 104th Ave., Orland Park, IL 60462, or call Technopower at (312) 349-1998 for additional information.

While we are on the subject of engines, here's one from CMB that's specially designed for marine use. New for 1983 is the CMB/3.5cc Marine, the ultimate .21 ci size marine engine!

The CMB/3.5 is built with the same quality and design as its record-holding big brother, the CMB/90 Marine. The specs on the 3.5 are: bore, 16.4mm; stroke, 16.4mm; horsepower at 30,000 rpm, 1.5 Standard equipment on the 3.5 includes: flywheel; universal; slide carburetor with adjustable needle valve trim; and muffled tuned pipe.

Direct and dealer sales invited. Send SASE to TEJA Engineering Co., 16201 Brimhall Rd., RRT9, Box 399N, Bakersfield, CA 93309, or call (805) 589-0554 for information.

Twinn-K, the racing people from Indianapolis, have new "meatball" decals in both 1/12 and 1/8 scale. A great aid to a busy race director. The white and black meatball decals are adhesive backed for easy use... just peel off and stick on for fast and easy numbering of cars with a simple ink marker.

The decals come 12 meatballs per sheet and retail for only \$2 per sheet. For the 1/12 scale decals, ask for catalog No. 0987, and for 1/8 scale, ask for No. 0988. Write to Twinn-K, Box 31228, Indianapolis, IN 46231, (317) 839-6579.

Also available from Twinn-K is a wide selection of graphite composite materials. Ranging from sheets of cured carbon fiber reinforcement (nine different sizes) to quarter inch, 90 degree corner strengtheners, Twinn-K can

supply you with just about anything you need to beef up your models without adding weight. Write to Twinn-K for latest information on application and other particulars on these fabulous products.

Balsa USA is proud to announce the release of its new Standoff Scale biplane, the Der Jager D 1X. Designed in 1969 by Marshall White, the Der Jager D 1X is a current WW-I type homebuilt that's just for fun.

The deluxe Standoff Scale kit is 1/3-size (80 in. wingspan) which makes it ideal for the large gas engines of 2.2 ci and up. Both wings are one piece, so there are no flying wires to hinder fast field assembly.

The deluxe kit includes full hardware (except hinges), rolled full-size plans showing all wing panels, formed ABS cowl, wheel pants and aft deck, formed and shaped spring temper aluminum landing gear, giant instruction booklet with four pages of photos and instrument sheet, decals, rubber cockpit padding, etc. All balsa, plywood, and hardwood is AAA quality. Die-cutting is fall out quality.

Other specifications for the Der Jager D 1X are: length 68 in., and weight 20 lbs. Price is \$124.95 plus \$2 handling, and \$12 if C.O.D. Balsa USA pays UPS. Accessories available are: five-inch Du-Bro wheels, \$7.99; 4-1/2 inch aluminum spinner, \$8.99; dummy engine, \$9.99. Contact Balsa USA, Inc., P.O. Box 164, Marinette, WI 54143. (906) 863-6421. The Der Jager D 1X is available directly from Balsa USA.

Dynamic Models, Drawer C, Port Jefferson Station, NY 11776, announces the availability for immediate delivery of its new 1/4-inch-scale fiberglass WW-II "Castle" Class Corvette hull.

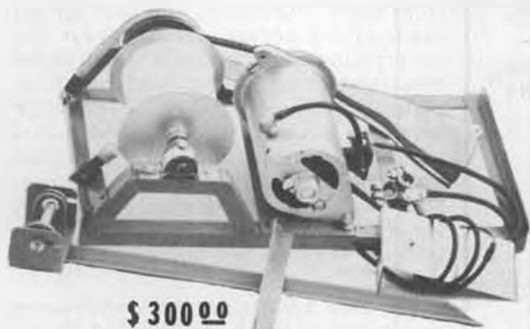
The fully detailed hull shows all plate lines, port holes, panama ports, and hawse pipe holes. It has a length of 63 inches with a beam of nine inches. While being suitable for any corvette, it should be noted that this hull features "joggled" plating which makes the plating larger and more noticeable.

The hull is supplied complete with a full-sized, highly detailed plan that will produce award winners. All of the fittings shown on the plans are available from Dynamic Models. An interesting alternative for this hull would be a weather ship, as some of the hulls of this class were rebuilt after the war as ocean weather ships.

Ask for catalog No. 124 if you wish to have the 1/4-inch-scale corvette hull with plans for only \$124.95. For just the plans alone, ask for No. 124P, full-size corvette plans, only \$10.

The new, 1983 Dynamic Models 64-page catalog displays this hull as well as over 25 more large scale fiberglass hulls and over 400 fittings and accessories for the R/C scale model boater. The price of the catalog is \$4 via first class mail, which is refundable on your first order.

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Craft-Air has just released a new aerobic sport trainer named "SCOUT 15". The Scout 15 was shown at the IMS show in Pasadena, California, January 8 and 9, and was tremendously received by both the public and trade alike.

The Scout 15 is the ideal transition airplane from high wing trainers, to more sophisticated low wing aerobic planes. The Scout 15 is very easy to build, and exceptionally easy to fly. This airplane is highly maneuverable, extremely stable; and capable of doing nearly all the aerobatics of pattern airplanes.

The Scout 15 has been available since the end of February. For more information, write to Craft-Air, Inc., 20115 Nordhoff St., Chatsworth, CA 91311.

★ ★ ★

Metal Concepts, Inc., 10635 N.E. 123rd, Kirkland, WA 98033, (206) 821-9263, introduces its new high performance carburetor for .65 engines. It was developed for the high stress, competition environment of the racing model boat. Its body is heat treated aircraft alloy aluminum made to fit a back plate bore of .550 (OPS). It can be sleeved to other sizes. The carb's barrel is brass with a bore of .390. It's made so that control linkage can be taken off either right or left sides, top or bottom, to suit individual needs. Fuel intake can also be rotated 360 degrees to fit your requirement.

As with all Metal Concepts products, your satisfaction is guaranteed, or your money back. Price is \$39.95 plus \$2.50 mailing and handling. (Washington residents please add sales tax.)

See the April "R/C Power Boats" column of **Model Builder** or write to Metal Concepts for more information.

★ ★ ★

If you are into racing on or off-road R/C cars you should know about the many fine products from Bo Link, 420 Hosea Rd., Lawrenceville, GA 30245, manufacturers and distributors of quality model car racing accessories.

Here are just three of the many outstanding accessory items and competition hardware items available from Bo Link.

First, take a look at the photo of the Bo Link off-road speed control unit. Bo Link's "Digger 10" speed control is

becoming very popular in the off-road scene. Designed to give variable speed control, this unit can replace your two-speed Tamiya speed control. The Digger 10 speed control features a heavy-duty resistor mounted on a bracket which mounts right to the servo, and comes with a micro switch for reverse, completely wired and ready-to-go. Ask for Part No. BL-4610 (\$24.95).

Items two and three are closely related and are often used together; they are the Digger 10 side nerf bars and rear cage. These tubular steel bars will protect your 1/10-size off-road car from hits from the side and rear. Both are painted black. Ask for Part No. BL-5110 (\$8.95) for nerf bars, and No. BL-511 (\$10.95) for rear motor cage.

For a complete Bo Link catalog, send \$2 (refundable) to the above address.

★ ★ ★

Brufen Products, Box 334B, Elgin, MN 55932 is pleased to announce the release of its new "Galaxie III" display case kits. Expertly designed and engineered in sparkling clear acrylic plastic, they will compliment your masterpiece and keep it dust free.

The new and unique fabrication process installed in its modern 3024 sq. ft. facility enables Brufen to precision cut all parts to whatever size you require. Four simple steps (no cutting, grinding, or sanding) complete the assembly. Each kit is shipped complete with all necessary items and illustrated instructions.

Expertly cut and smoothly shaped bases and stands are also available in either walnut or basswood, ready for light sanding and the finish of your choice. These will display your model at its best, whether used alone, or with the Galaxie III display case.

Brufen Products invites those of you who require something special or unusual in a display, to send them a sketch for a quotation.

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Fuel Lines . . . Continued from page 11

manship, is very evident. Although I am not personally a Ukie speed flyer, I look forward to seeing his models fly in the coming months.

What else? What else? The fifth photograph . . . that's what else. It is truly a superbly constructed engine. As you suspected from seeing the rocker box on top of the cylinder, it's a four-cycle engine. If you turn the photo upside down, the name on the top is Enya. Guys, it's an Enya .90 four-cycle. Although I only had it in hand for a day or two, I showed it to half a dozen modelers. Their unanimous opinion can be summed up as, "Gads, I wish I had one!" More about four-cycle engines in a moment.

Take a look at the last photograph. If it looks a bit strange, it will be more obvious as soon as you recognize that it's an adapter fixture for two engines mounted in a Vee position. Made by Rossi, it will readily mount any Rossi engine from a .61 to an .81. You can't help but realize that there are many possible applications for it in our hobby.

Moki, Enya, Rossi mount? Where can you get them, or information about them? Try contacting Condor Hobbies, 17835 Skypark Circle, Suite E, Irvine, CA 92714. Their telephone number is (714) 957-1331.

Back to four-cycle engines. . . How would you like to be able to buy a 3.5 cc

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four-cycle engine? The advance publicity touts that it's just about as quiet as an electric. That may be a slight bit of exaggeration, but it's probably true that it will not generate a lot of typical complaints about noise. As this is written in late January, the information available is that the first production models should arrive in the United States in about a month. The manufacturer? HP of Austria. That same company also expects to market 8, 10 and 15 cc four-cycle engines during 1983.

What else? Well, Webra also will soon offer a .40 four-cycle. Now it may be only my imagination, but I have a distinct, visceral feeling that we're about to be inundated with four-cyclers. . . . And just when I was beginning to understand the two-cycle. . . . Well, at least you read it here first (hopefully).

Guys, take care. . .

R/C Boats . . . Continued from page 40

tunnel hulls. Should there be hollow spots along the bottom of the sponsons, they can be filled with automobile body

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putty, and the surface can be block-sanded flat.

Appearance-wise, the most noticeable difference between the wooden kit and the fiberglass Hotshot 45 is the cowling. And this isn't a really noticeable difference. There is a difference in the method of installing the radio equipment between the fiberglass and the wooden hull. In the wooden boat, the radio equipment is installed in a forward compartment under the area of the driver. The glass version employs a molded pan for the radio and fuel tank compartments. In the fiberglass version, the radio compartment is immediately aft of the driver's cockpit.

The actual methods of installing the radio, engine, and fuel tank are almost identical to those used on the wooden version. As I do with any model tunnel boat, I strongly urge the use of a motor mount like those available from Prather Products or Teague's Model Marine. Motor adjustments on tunnel hulls are so critical when attempting to obtain optimum performance that these mounts are worth the additional \$25.

As with any fiberglass boat, some type of arrangement should be made to add flotation inside the hull. I'm not sure what the instructions will suggest. However, Jim Burba uses a two-part expanding foam to fill the inside of the sponsons. Sig Products has a two-part foam that will work very well for this application. It is also possible to fit pieces of white sheet foam into the sponson cavities. Some silicone sealer applied to the foam sheets will keep them attached to the inside of the hull. Just be certain to make some type of provision for adequate flotation. . . . fiberglass will sink! I know because I've had two fiberglass boats sink after flipping. Luckily, I got both of them back. But I know of folks who never did find sunken fiberglass models. Better safe than sorry is the old adage to follow here.

Jim did a rather interesting modification to the front inside of the sponsons. As it is often necessary to add weight on the front of a tunnel boat to move the center of gravity forward, Jim decided to build a small compartment in the front of each sponson. Having already filled the sponsons with foam, Jim was able to

cut a hole in the inside of the sponson, and then hollow out a compartment in the foam. He fashioned coverplates from sheet aluminum, and uses gasket material to create a seal when the coverplates are in position. Small sheet metal screws are used to hold the coverplates in position. Adding or removing weight is a simple process, and it certainly is more pleasing to the eye than the stick-on weights that most of us use. Don't misunderstand me. . . . stick-on weights work fine, but they certainly do little to improve the appearance of a boat.

Jim used K&B Super Poxly undercoat and paints to finish the Hotshot 45. He said there were very few pinholes or blemishes that needed filling prior to applying the paint. Prior to painting any fiberglass boat, wash it thoroughly with thinner (of the same type as used to thin the paint itself) to remove any substance that might be on the hull. It is somewhat difficult to see pinholes and blemishes in clear resin hulls. However, after applying a layer of undercoat, such things become much more visible. Jim's Hotshot 45 is painted mostly white, with K&B metallic blue used on the cowl and deck. Trim tape was used to accent the paint scheme.

Jim and I have had our two boats out together, and they are very comparable in speed and handling. I think my wooden Hotshot 45 might be slightly faster at this time. However, Jim hasn't had nearly the time to work with his fiberglass hull as I've had to work with my wooden version. Knowing Jim like I do, he's going to have this fiberglass Hotshot 45 working well by the time we get serious about racing this season.

Later this summer we are looking forward to entering our boats in the 100-lap team marathon at the NAMBA Nationals in Vancouver, Canada. We realize that our tunnels won't be able to match the speed of the outrigger or monoplanes, but we're hoping that reliability will be on our side. It should be fun.

FAMILY FEUD?

This television game show reminds me of what happens at model boating events when family members get involved in racing activities. I've witnessed the same scene played out at other competitive events where family members were physically and emotionally involved in the competition. I have even had firsthand experience with this situation, as both my wife, Maren, and son, Paul, have raced model boats. Maren races only occasionally, but Paul is getting to the point where he is doing as much or more racing than I am. He turned 11 in February, and has been racing for the last four years.

Up until just recently, I was the only one who would help Paul during a race. I'd start the engine, launch the boat, and then serve as pitman during his race. When things went well during a race it was a satisfactory arrangement. However, when things didn't go right (and that happened quite often), the relationship sometimes became rather

strained. My problem is I get just as "pumped" helping Paul during a race as I do when I'm racing myself. My expectations and his abilities are not always in sync, and this has created some stressful situations. There are already enough stressful situations in everyday family living without adding to them while we're supposed to be having a "meaningful, shared, father and son experience."

This past racing season, an incident happened that proved significant to both my son and myself. He flat beat me in a 3.5 tunnel race. He did this with someone else doing all the things that I'd been doing for him. This might be compared to the "cutting of the apron strings."

Since then I have attempted to get other model boaters to help Paul during his races. Typically, I'd start the engine, launch the boat, and then get out of the way. It seems to me that this arrangement is paying dividends for both of us. I don't think Paul feels quite the pressure when someone else is helping him during a race. I find it much more enjoyable to simply watch him race rather than attempting to serve as his pitman and race helper.

Model boating does offer an opportunity for families to share an activity. However, it can also present opportunities for problems to arise if careful attention is not paid to the relationships between family members during the activity. From my observations, I would estimate that over half the "family racers" I've observed exhibit considerable amounts of stressful or negative relationships. (Also known as *Little League-itis*. wrf) In almost all of these cases, the problems stem from the adult male having a low tolerance of the limited abilities of his son, daughter, or wife. The problem almost always occurs when the adult male is attempting to help during the racing event. The results are heated exchanges of words between the family members, often tears, and lots of frustration.

I've been there. I'm not planning on going back. There's always someone at the races that can call the race for your child or wife. You can still do the important things like start the engine, launch the boat, row after it, wipe it off, refuel it, and check the glow plug. But get one of your boating friends to take your place as helper during the actual race. You'll be amazed at the difference it can make in improved family relationships.

BREAKING IN AN ENGINE

One of the members of the local boat club called the other day asking my thoughts about breaking in new engines. I gave him my usual suggestions . . . use your regular fuel, set the needle valve at a rich setting, run the engine for 15 to 20 minutes at the rich setting, and then begin leaning the engine until it runs at its power peak.

"That's interesting," he said. "You're the fourth person I've talked to, and everyone seems to do things a little

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differently."

I asked what some of the other suggestions were, and received the following information: One person recommended the use of a smaller prop during the break-in period so as not to load the engine excessively. Another suggested the use of low nitro fuel, like 15 percent, to be used to break-in the engine. The addition of a couple of ounces of castor oil to a gallon of fuel during break-in was offered. However, the one item that was common to all suggestions was a few runs with a rich setting on the needle.

Breaking in a model boat engine is something that can be done while running the boat. This isn't the case with an engine used on a model airplane. Should the engine on the model boat stop, you simply row out and get the boat. When the engine on a model airplane stops, you have to make a landing. And should the engine stop during the takeoff part of the flight, you can have a really bad experience. It is better to take the time to break-in an engine properly than to take the chance of breaking it.

OUT IN THE SHOP

My project of recent days has been the repainting and detailing of my Dumas Hotshot 45 for entry in the Outboard Class at the Second Annual Northwest Model Exposition in early February. I know fixing up a model for a show isn't everyone's idea of what modeling is supposed to be about, but I

think there's something to be said for making an effort to create a model that is pleasing to look at. There are those who would contend that the only true modelers are those who create replicas of full-size airplanes, boats, cars, or whatever. . . Well, let's not get into an argument about what constitutes modeling.

One area that I've taken a little more time with this year is the driver's cockpit. Close inspection of my 7.5 tunnel would reveal patches on the lifejacket of the driver, black upholstery throughout, a custom spoke driver's wheel on a aluminum dash with two instruments. Granted, not one of these items will make my boat go any faster. On the other hand, they won't cause it to go any slower either. I feel they add much to the realism of racing a model of a real boat. Making a model boat look nice can be every bit as satisfying as making it go fast. With a little effort it's even possible to come up with a nice looking, fast boat.

Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498. ●

Plug Sparks . . . Continued from page 44

was 7-1/2 ounces.

Actually, for the price, the Apex wasn't a bad motor. One often wonders what happened to its production. No question about it, the war did stop a

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lot of would-be manufacturers, but there doesn't seem to be much postwar information on this engine.

THIRTY YEARS AGO, I WAS. . .

Gordon Coddling of Kingman, Arizona is a veritable treasure trove of nostalgia regarding early gas modeling in Southern California. Being a member of the Southern California Gas Model Assn., Gordon got to know almost all the early gas modelers. Fortunately for you, the reader, he has also taken pictures of that early era at Western and Rosecrans.

Photo No. 5, taken in 1939-40 at this marvelous Los Angeles area, shows the test bench (left hand in this case as there were two) and general area, spectators, etc. Inspection of the photo shows the lines for the pit areas in the background.

The low wing model on the left



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belongs to Coddling, rebuilt from an earlier semi-gull wing design started in New York before moving to California. Coddling goes on to say, "The kid holding the model is unknown to me. That's me, second from the left, with hands on my hips watching Bill Lane (our club prexy) running his inverted Phantom engine in his Ceph gas model. I often wonder whatever happened to Bill Lane.

"As can be seen, the model was an excellent example to the rest of us club members having a mirror finish multi-coat dope over silk covering. If you tapped the covering with your finger, it sounded like sheet metal! Real tight and hard.

"You can see the chalk lines designating the pits and flight line setup. There was a parking area with old telephone poles laid in a line to act as a stop for the parking slots which were chalk-marked in neat rows.

"Beyond the poles, an entrance-way gave access to the test and assembly area with two tables/benches (one on each side) where all mechanics and helpers assembled, not to mention a few sidewalk supervisors, know-it-alls, and spectators.

"Spectators were not allowed beyond this line, as the flight lines extended straight out from the entrance. The pits ran all the way down the field, one on each side to allow for wind change. The

wind could come from the west (normally) or from the east, so flight lines ran north and south. On one side of the parking area, poles and pits ran parallel with Rosecrans. The telephone lines (!!!), flight lines, etc., ran parallel to Western Avenue, a whole bean field away. Besides the telephone lines, there was another hazard in the form of an old windmill in the field north of the model flying area. A perfect airplane magnet just like Charlie Brown's kite-eating tree!! Ah! those were the days!"

READERS WRITE

Wouldn't you know it! About three months after this writer was tearing his hair out (no cracks about what hair) for photos to accompany the write-up on the Old Timer Events held at the Lincoln, Nebraska Nationals, two fellows, Dean Everetts and Al Grier, sent in photos. As a matter of fact, Dean sent so many, this columnist was hard put to recognize half of the fellows.

Anyway, after witnessing the sensational flying by Olie Olson of Pond's Dallaire, Al Grier says there is only one way to beat that model. As can be seen in Photo No. 6, the appropriate way is shown . . . with a hammer!

Most of the shots received from Dean Everetts were excellent. However, we can only use a few at a time. Photo No. 7 shows a long-lost modeler that this writer hasn't seen since winning at Oshkosh with an .020 Request as designed by Frank Ehling. We are referring, of course, to Art Thoms, who was immediately identified much to the surprise of Art. As can be seen, the model is still in great shape after all these years!

Another nice shot taken by Everetts is Photo No. 8 showing Art White cranking up his Kloud King as Frank Fisher casually holds on. Note the background: the lake surrounds the field which is actually located on the top of a large knoll. Up to now, no one has put their model in the lake, but there is always a first time!

While we are at it, Photo No. 9 shows the field to the immediate west. Outside of the trees, hay fields, corn, etc., it isn't a bad place for retrieving in case of a fly away! Shown is Buck Zehr with his Super Cyclone powered Playboy. Buck did what this writer did; flew at the wrong time for lift!

Just as soon as we get a few more identifications on the rest of the photos sent by Dean Everetts, we'll run them!

The recent IMS Trade Show sponsored by Model Builder magazine turned out to be a bonanza for photos. Bob Oslan stopped by and gave this writer a shot of his gorgeous Kloud King as can be seen in Photo No. 10. Oslan needs no introduction to this column as his very well finished models have been featured in this column before.

Of course, the model is radio controlled as Bob no longer has those large fields readily available. Actually, Bob confided he is getting a little tired of shagging free flights. Well Bob, now you know what us old men are complaining about! Haw-w!

Photo No. 11 is a shot of Jim Adams,

the very able editor of "SAM Speaks," who took time out to pose for a shot of his Charles Hampson Grant Twin Tractor as featured in an early 1934-35 issue of *Model Airplane News*.

While twin pushers are fairly easy to launch (simply push the model away from you), twin tractors are a little more clumsy as you must hold both propellers and the rear of the stick to launch. Jim says it takes a bit of doing!

STALICK STRIKES AGAIN!

A recent letter from Bob Stalick to this columnist reports that some progress has been made on the "Red Zephyr Project" by Erle "Foggy" Moorhead. Bob sez that Erle has taken notice of being put on notice, and has retaliated with some idle threats and vague promises. Action is quite slow at present, but there is always hope! More later.

Bob submitted several pictures worth running in the column, although they are quite dated. Photo No. 12 shows the engine mounting arrangement on a New Ruler as constructed by that late immaculate craftsman, Don Dodds. Note how the needle valve has been secured to keep the fingers from getting trimmed; this also keeps the valve out of the way of the timer. Also worth commenting on is the fuel filter employed. How many of you fellows use these things? They are great on a field full of dust and dirt. One would do well to study the simple, yet functional, setup of the Anderson Spitfire.

Photo No. 13 is another by Stalick, picturing John Crosselo with a real neat American Ace at a WMC Albany meet. Many modelers will remember Crosselo for his Super Glider, a foam hand launched glider that attracted considerable attention.

While we are talking about modelers in the Great Northwest, we simply had to run a close-up shot of Tom Alden's marvelous Scientific, Miss World's Fair while being wound. Photo No. 14 shows the special winding jig and method of attachment to the car. Most fellows have an attachment that works off the trunk latch. You won't scratch your paint job that way!

STUNT-A-THON

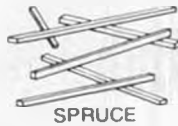
Frank Macy (Jim Walker II in disguise) writes to say the Jim Walker Air Show and Old Timer Controlline Fun-Fly will be held on October 9, 1983 at Jim Walker Memorial Field (formerly Delta Field) in Portland, Oregon. Macy reports this funfest is growing every year and attracts more and more spectators. As more details become available, we will publish them. In the meantime, paste this date in your hat if you like nostalgia by the reams.

SAM 21

Received a nice shot of an Eastern States Gas Champ by David Saso of SAM 21 (Photo No. 15). He says at half-size, it is the greatest flying model he has had to date. This 1/2A Texaco Event is the best!

For readers wondering where Dave got the plans, the Gas Champ as published in *Model Airplane News* or the *Air Age Book* are printed half-size.

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HANDICAP REBUTTAL

Boy, did this writer ever stir up a hornet's nest when he proposed handicapping certain designs in the hope of encouraging lesser-known designs to be seen on the field.

First off, at the IMS Trade Show, this columnist caught the dickens from Gene Wallock (P&W Models) for the gall to even make a suggestion like that. His argument is that it doesn't make any difference what the experts fly as they will invariably win. True enough! But why the same monotonous models?

Got a letter from John Sattler of San Diego taking the writer to task and saying that I missed the point completely. Instead of penalizing the model, we should be *penalizing the flyer!* As John sez, "Make him pay dearly for his expertise and constant winning." Haw! Sattler further claims that this would cause a real can of worms to be opened which would only lead to more haggling, arguing, and bickerings. In the overall picture it would accomplish nothing!

As far as penalizing the models goes, there are so many other good designs, like the Eastern States Gas Champ, New Ruler, KGS, etc., that you would end up doing the same thing to these designs. Experts are going to win, whether you are flying models or pitching pennies, it doesn't matter.

HOT STUFF ACCELERATOR?

Even for a fast framer like this columnist, when he received a sample of "Hot Shot", a cynoacrylare accelerator, the immediate reaction was, "I've got a problem with too fast cures now".

However, after inspection, it turns out this is the greatest stuff for making those joints stick that simply refuse to bond! This is particularly noticeable in repair work where joints need to be reglued.

Many times, the action is much slower when regluing a joint formerly bonded with Hot Stuff.

Nothing to it now! If you are tired of holding the wood pieces, simply pick up your accelerator pump bottle and gently spray the stubborn connection. Voila! Almost instantly, a foam forms indicating the joint is bonded. This little item will be a real godsend at the contest when you try to make field repairs with no clean surfaces.

Gotta hand it to the Hunter boys, they are on their toes all the time!

SAN DIEGO AERONEERS

How about a little history lesson. This writer was struck by the way the San Diego Aeroners have been so successfully revived. Anyone who reads the old *Model Airplane News* issues between 1936 and 1941 would be immediately impressed by the amount of activity and news emanating from San Diego, specifically the Aeroners.

According to George Wagner, newsletter editor of the Aeroners, the Aeroners first operated under the name, "The Aviation Advancement Club" (pretty fancy handle!). This was the first organization devoted to the construction and flying of gas models. The club started in the latter part of 1935.

Of course, the first contest was won by Mel Anderson (1), Bill Atwood (2), and Joe Weathers (3). Due credit should be given to Weathers for the first successful gas model in San Diego. Of course, nothing succeeds like success, so two more meets in April 1937 and April 1938 were staged by this organization.

By this time, July 1936, the club was completely revamped under the name of "San Diego Gas Model Club". Not satisfied with that name, the club finally adopted the name it now carries today: "The San Diego Aeroners".

Like all good things, the Aeroners

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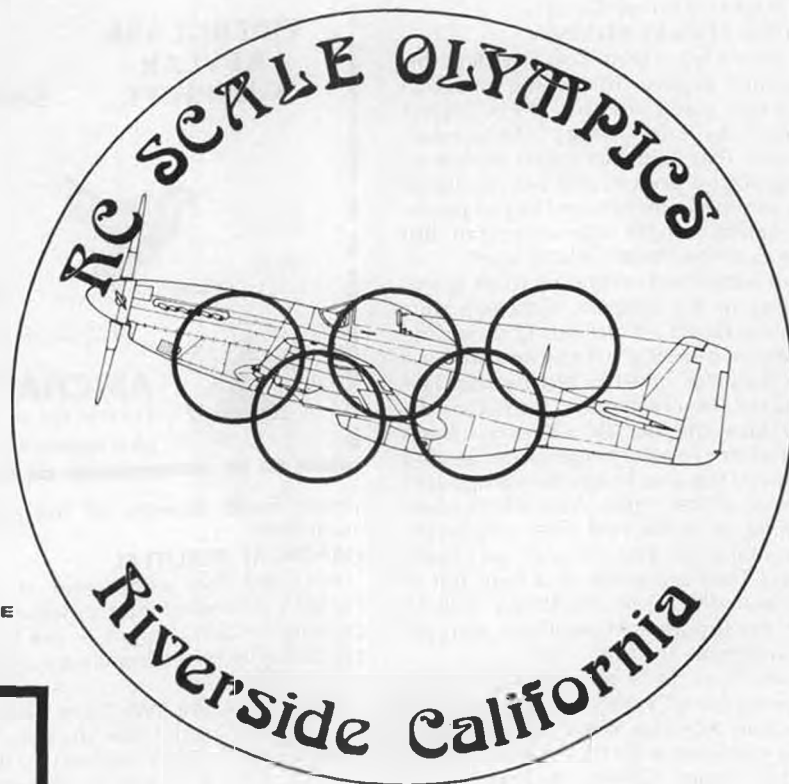
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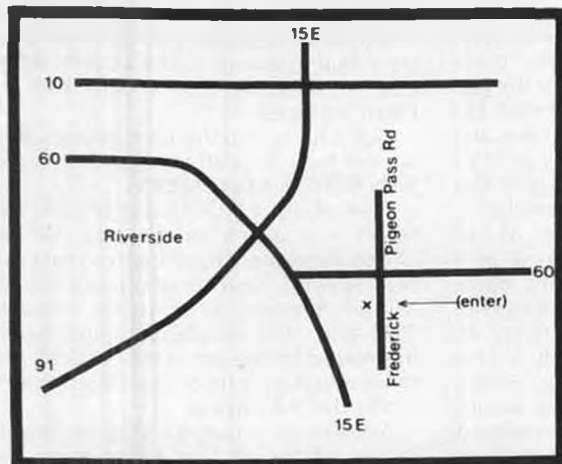
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finally dissolved in the mid-'50s when interest waned and just plain died out. For quite some time (about 25 years), the name of "Aeroneers" was lost to limbo.

In the fall of 1979, George Wagner, in cahoots with Don Hoyle and Leroy Brooks, hit on the happy idea of reviving the Aeroneer name. Needing a SAM Chapter badly in the San Diego area, it was only natural to again revive the old name.

Surprisingly, when notices were sent out, 50 percent of those responding were old Aeroneer members. All that was really needed was someone (or group of people) to exhibit some drive, and spark the old club into life again. Although the actual number of enthusiastic fliers is small, the club still continues to grow on the premise that model flying should be fun. Actually, that is what SAM is all about!!

OBIT NOTICE

This columnist just received a letter from Gordon Coddling who wrote a letter to Marge, wife of Raymond Hunter Bowles, commiserating over Ray's death on December 28, 1982. It is so good, this columnist simply had to reprint the letter (with some editing).

"Received your notice on Ray ... sorry is hardly the right word. I went out to find an appropriate card but there simply wasn't anything that said the proper words or expressed the right sentiment. What can I say that hasn't already been said in the American-English language?"

"Besides, I don't really feel Ray is gone. I subscribe to an old idea that we live on in the memories of those we knew and touched. Sitting in front of me is a bottle of orange dope with the label, Pico Model Airplane Co. Everytime I see it, the company and the people come alive. Everytime I look at my photos of the Lockheed Vega I built, or the plans themselves, Ray and the company come alive. This happens everytime I send out a plan of the Pico Lockheed.

"Then there is the memory of the original shop with that red and white streamlined model hanging in the window (on the left side as you went in, as I recall) and last but not least, Ray explaining his clever use of brown gummed paper tape to make cowls.

"No, he's not gone, he's just on an extended trip ... a long visit someplace else in good company with Clyde Austin, Bill Atwood, et al.

"Whatever happened to ...? Well, he is visiting some old friends."

Now, how about that! Think you could put it any better! Thanks again Gordon!

THE WRAP-UP

This year, as it now appears for the first time in 20 years, this columnist will be unable to attend the Nationals at Westover AFB in July of 1983. The main reason is lack of a driving partner and the high cost of traveling. The 1982 trip to Massachusetts cost the pair of us \$700 apiece!

However, all is not lost. The rising popularity of O/T control line stunt, plus the close proximity of the Nats to all

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eastern states, has caused John Miske and his club members to volunteer to run the O/T Stunt Event at the Nationals. Rules will be the same as they have been for the last six years, but all questions should be directed to John Miske, 415 Clifton Blvd., Clifton, NJ 07013.

On the other end (R/C and F/F), this writer has been engaged in telephone calls with Joe Beshar. Although Joe has not yet committed himself, there is every chance he will run the O/T R/C and O/T F/F events at Westover. Details will follow when this is confirmed. Meanwhile, get your O/T models ready for the 17th Annual SAM Championships at La Junta, Colorado over July 19, 20, and 21. The location is great, the site is out of this world, and it has probably the best all around weather for model airplanes. Don't miss this one. See you there!



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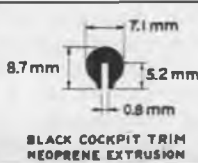


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ESV Continued from page 47

comes with the meter to drill the project box, and cut a couple of notches at the ends of the box for the input and output leads to pass through, and you have a neat looking ESV ready to go.

Now for the calibration. The bottom end of the meter is already calibrated by the zener, at 9.1 volts. We want the top end of the meter to read 10.5 volts, so we need a 10.5 volt source. This is easy, if you have a "freebie" battery card from Radio Shack, use it to get a free 9-volt battery. Use a 1.5 volt flashlight battery in series with it to get 10.5 volts (use a good battery!). Just place the minus end of the flashlight cell on the plus terminal of the 9-volt battery, and you have it. Now connect the minus end of this combination to the minus lug of the meter, or to the minus pin of either the input or output plug. Connect the plus end of the battery combination to the plus pin of either plug, or to the banded end of the zener. Turn the potentiometer

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meter dial until the meter reads maximum (50). The meter is now set for a top reading of 10.5 volts. Now you are ready to go!

Before you use the meter, a word about troubleshooting. There is very little that can go wrong with it; the two major problems could be that that positive and negative leads got mixed up in the wiring, or that the zener is way off in its rating (9.1 volts). Check all the leads and make sure the plus and minus leads are where they should be. Zener diodes can be a problem. I have seen some that weren't even within 50% of their claimed value (usually they are too low). So, one last check. Connect the 9-volt battery to the meter as before, plus to the plus pins or banded end of the zener, and minus to the minus pin of a connector or to the minus lug of the meter, and see if the needle on the meter moves. It shouldn't move at all, or, if it does, it should move only slightly (one mark on the dial or less). If it does pass this test, and the meter was adjusted to its maximum in the previous steps, the zener is OK.

Now for charging! Plug in the charger, and the battery pack, and start the charge. Be sure your charging battery is good. If it decides to go downhill during the charge, the meter will not rise! This could lead to overcharging your motor pack. The motor pack should also be

"even," that is, all cells should be in about the same state of charge. Do this with a slow (1/10 rate), overnight trickle charge, or discharge all cells individually to 1.0 volts. Otherwise, some cells will go to overcharge while others will still be undercharged. If the pack was low, the meter will not show anything at all, if the pack is almost charged, you will see the needle start to move. In either case, once the voltage passes 9.1 volts, the needle will start to rise. Watch it closely at this point, as the charge is on the last 25% or so. The needle should rise quite steadily, and the motion should be quite easy to see. When the needle starts slowing down, the charge is almost done, and when it stops rising, the charge is done and the charger should be turned off.

If you are conservative, turn the charger off once you see the rise slow down. How far the needle goes to the right depends on a lot of things, so the rate is the most important item, not some "magic ideal" point at which you expect it to stop. A cold battery will charge to a higher voltage than a warm one, i.e., the needle will get farther to the right. Once the pack has been flown or run once, it warms up, and the peak will be lower. The brand of the pack matters too; a Sanyo pack will charge to a lower voltage than a G.E. pack. Even the capacity makes a difference. A six-

cell .550 Ah pack will not have the same peak as a six-cell sub-C pack.

They all show on the meter, and they all show the same sort of rise, slow down, and stop, so who cares if you don't have an exact point on the dial you can claim as being "it"? Because of this, I did not mark the meter in volts, and left it "as is". If you do wish to mark it in volts, assign the zero as 9 volts, and each mark as an increment of .03 volts, up to 50, as 10.5 volts. This can be handy if you wish to use the ESV to check your transmitter batteries, which it does very nicely. Use either plug and an adapter to connect to the transmitter battery, and note the value when the transmitter is turned on. Hopefully, it should be 9.6 volts or better, more than halfway up the meter.

So there you are . . . you have a super battery charger for six-cell packs that will tell you just how close you are to a max charge, and a transmitter battery checker too!

Charge with an ESV, and run longer! ●

Workbench. . . . Continued from page 6

should limit it to digit winders only.)

CORRECTION

In the March "Over the Counter", the new Ace R/C Ultra servo was described as having an output of over 50 inch-ounces. The correct figure is 35 inch-ounces, which is still no slouch!

BIG FOX

Just received word from Duke Fox that he intends to produce a 3 cubic-inch airplane engine, which will be available by late spring. To be modestly priced, the engine will have several advantages over the currently popular "chain saw" units.

"The motor incorporates two symmetrical crankcase counterweights which completely eliminate the rocking motion of some of the motors on the market today, and this also reduces the reciprocating vibration to lower than average levels."

Duke also enclosed an outline drawing of the engine, which indicates several other features. The engine is designed for beam mounting (3-1/2 inches to bolt hole centerlines), but a motor mount will also be available for radial mounting (3-1/2-inch square bolt pattern). A small diameter magneto mounts on the rear of the engine, and the carb is in the conventional model engine location, all of which should allow the engine to fit into more types of aircraft without unsightly protrusions. Firewall to back of propeller is 7 1/4 inches.

Weight of the engine less radial mount is expected to be 4-1/2 pounds, and it should develop about four horsepower.

G-MARK 03 HINTS

Bill Cannon forwarded the following notes from Don Stephens, Oklahoma City, regarding some of his experiences with the G-Mark .03 engine, distributed in the U.S.A. by Cannon R/C Systems.

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"I bought one of your G-Mark .03 R/C engines about a year ago. I tested it pretty carefully, because I was looking for a very reliable engine of about that size to power a B-24 I'm building. Your engine worked out very well, and I recently ordered three more of them through Campbells Hobbies.

"During the tests, I came across some interesting things I thought you might like to know about.

"The engine, so far, has never run on any higher nitro fuel than Sig 10%. Based on experiments with a Cox TD .049 with Tarno throttle, using both the Sig fuel and Cox fuel, I'm sure the .03 will do even better on the Cox fuel.

"Over the years, I have often wondered why 1/2A engines 'crackle' when they run. When the cylinder of my G-Mark unscrewed about a half a turn while it was running, I thought the muffler had vibrated loose, but at the

same time the crackling quit, and the engine ran as steady and smooth as my .60. I found no noticeable loss of power, and the idle was drastically improved ... very smooth and steady.

"I believe a shim washer or spacer about .020" to .030" between the bottom of the cylinder and the crankcase (actually about the distance the bottom of the piston is above the bottom of the exhaust port at TDC) will improve the overall performance and reliability of these engines. I found, also, that there was no noticeable change in noise level nor idling reliability without the muffler, as the engine was when I received it, because compared to the exhaust volume on an engine of this size, any very small leak between the cylinder and collector ring is a lot of leak.

"I found that oil and exhaust gas spew out around the collector ring in volumes, so there is no back pressure to

keep the fire hot at idle, but this is easily fixed with a bead of high temperature silicon rubber seal where the collector ring contacts the cylinder, and where the muffler halves fit together. I hope you continue to distribute these engines. I just read about someone using four Cox .049s in a Guillows B-17 kit. I believe your G-Mark .03s would work as well or better, and I may just find out."

AMA HAS MOVED

It's hard to believe that anyone in the model aircraft hobby doesn't know it by now, but just in case this is the first model magazine or other communication media you've come across in the past two to three months, AMA headquarters has moved from its old address of the past 47 years.

As of February 14, 1983, the AMA is open for business at 1810 Samuel Morse Drive, Reston, VA 22090. The new phone number is (703) 435-0750. ●

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R/C slope soarer quickly built from Ace foam wings, 54" span. By Larry Renger.
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Sleek, 26" low wing sport rubber ship, reminiscent of late '30's. John Morrill.
- No. 2794 HALF-A SCALE RACERS \$2.00
Two-for-one plan with 'Little Mike' and 'Shoestring' ukies. Jim & David O'Reilly.
- No. 279-O.T. S/S PUSHER/CANARD \$2.00
Single stick, 32" pusher/canard rubber ship from '33 M.A.N. By Harry Edsall.
- No. 1791 DFH-21 \$4.00
Smaller FAI pattern ship for .15 power by top Swedish flier. Bengt Lundstrom.
- No. 1792 MAC'S "ROBOT" \$6.00
Famous R/C Aircraft Series, No. 3. First published in 1951 AM. Fran McElwee.
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Super-mini 24" stunter will fly on up to 35' lines with Cox .010. Randy Heydon.
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Rubber powered scale model of WW-1 biplane fighter, span 26". Bill Noonan.
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Mammoth 2 1/2' R/C scale biplane, for 2" engines. Span 7.5'. Floyd Fitzgerald.
- No. 12782 COUPE DE PLASTIQUE \$3.00
A proven contest winner with tube fuselage and plastic propl. Harry Steinmetz.
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Rare Antique designed by Ehling. Used O&R 23, 1/2A with R/C. B. Shulman.
- No. 11781 TRAVEL AIR D4D \$8.00
Accurate 2-inch R/C scale model of famous Golden Era biplane. By Bill Seidler.
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- No. 10781 GUSSETS \$5.00
Sporty, mid-wing, aerobatic "could-be" R/C scale, for .29 - .35's. Brad Shepherd.
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Compact 54" span, highly maneuverable V-tail R/C slope soarer. Randy Wrisley.
- No. 10783 ATAVIST \$3.00
Quickly built, highly competitive, half-A free flight, 252 sq. in. Bill Langenberg.
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Modern construction featured in this '37 cabin ship, 78" span. By Francis Tlush.

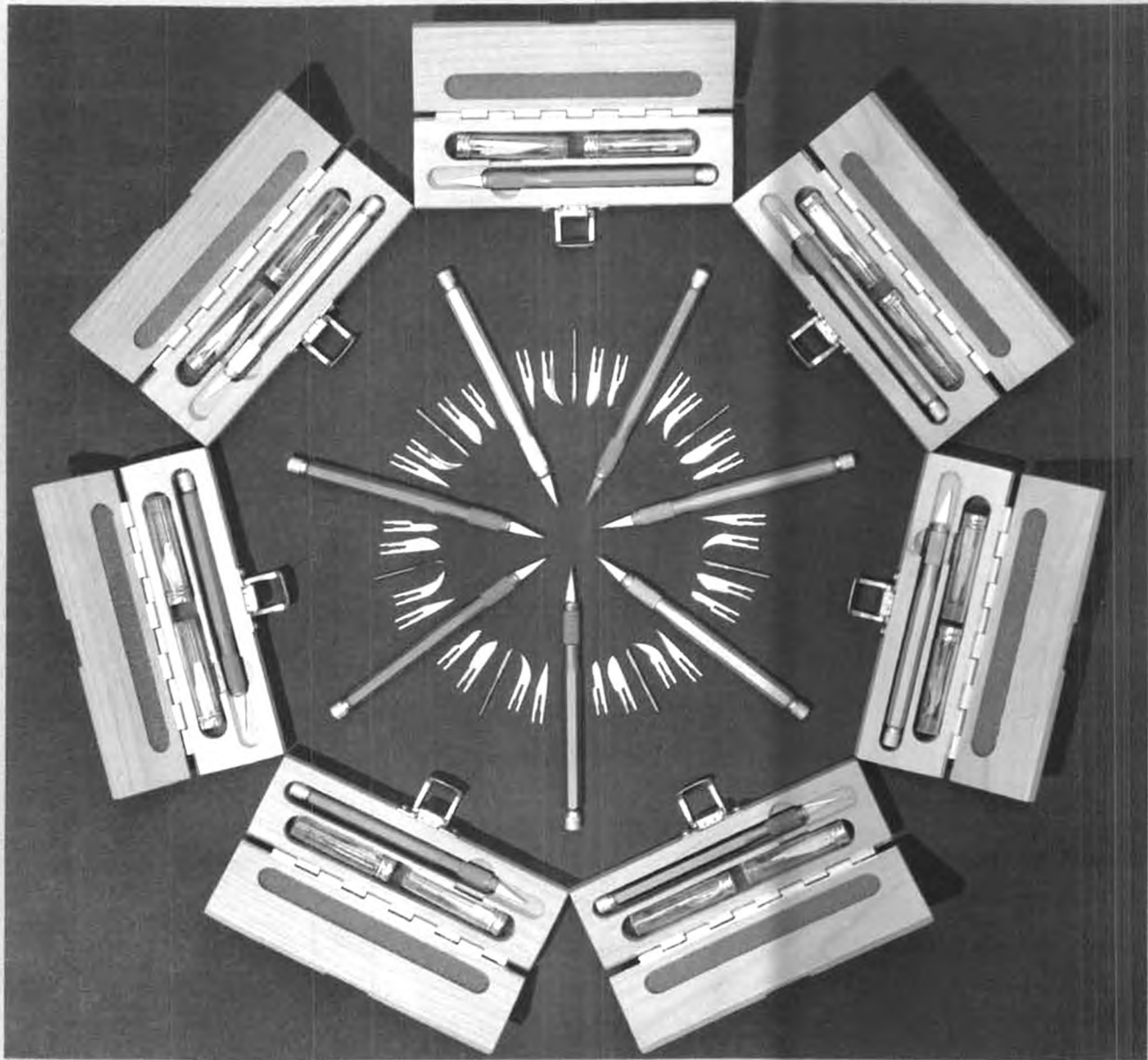
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Sport scale biplane for 3-4 channels and .19 engines, 40" span. By Bill Northrop.
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Classic Henry Struck design. Could dominate .020 Replica class. Dave Sweeney.
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Small R/C parasol for .020 and mini-multi or pulse rudder. Span 29". Tom Houle.
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Low-wing, trike, sport/pattern for advanced flier, 42" span, .19. Randy Randolph.
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First in Famous R/C Aircraft series. Original 6' span version. Good and Northrop.
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Latest FAI C/L Combat "weapon", designed by top competitor, Rich Lopez.
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R/C trainer combined with the nostalgia of old timers. Span 76". George Clapp.
- No. 34782 LATHROP TRACTOR \$2.00
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- No. 34783 WINGS \$2.00
An .020 powered biplane canard sport model. Stick fuselage. By Randy Wrisley.
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An .020 Replica of a fast-climbing pylon design by Jack Roeser. By Paul Marchal.
- No. 2781 LI'L DUBLR \$3.50
Two-for-one 1/2A R/C pylon racer and/or sport flier. Two wings. Brad Shepherd.
- No. 2782 XP-55 ASCENDER \$2.00
Rubber powered scale model of unusual WW II pusher/canard. By Tom Nallen.
- No. 2783 PEARL TRUCKER \$4.00
High performance Class A/B gas model. Won Class A, '75 Nats. By Jerry Murphy.
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CO₂ or rubber powered amphibian. Slow and graceful flier. By John R. Walker.
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Class A/B cabin-type gassy by Alan Orthof, from 1939 Handbook. Al Patterson.
- No. 1781 STINGER \$5.00
Proven Form 1 R/C Pylon racer. All built-up wood structure. George Baynes.
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Half-A R/C (18% reduction) version of famous C/L stunt ship. By Floyd Carter.
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Winner of Model Builder's 1977 Peanut contest. Flies 2 min. By Kurt Enkenhus.
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Two WW II pseudo-scale 1/2A push-pull R/C twins. Ace foam wings. Ken Cashion.
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Superb rubber powered 1 inch scale (44" span) cabin monoplane. By Bill Noonan.
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Competitive 1/4 Midget R/C pylon racer. All wood construction. Austin Leftwich.
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Unusual scale twin-boom pusher for CO₂ engine. 24" span. By Walt Mooney.
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Easy-to-build profile stunt/sport/trainer for .35 engines. 44" span. Dave Horvath.
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Manhattan class indoor "cabin". V-tail, and plug-in wings. By Ronald Williams.
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1-1/2" C/L scale model of popular home-built. 36" span, .15 eng. Vern Schroeder.
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Streamlined, retract gear Wakefield, built and flown in 1940. Design by Ed Lidgard.
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A different, but efficient, twin-boom R/C Standard Class sailplane. Bert Striegler.
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Clever all-sheet balsa twin-boom pusher for indoor or outdoor CO₂. Ray Harlan.
- No. 9773 HI DUMMY \$2.50
National record holder and 1977 USFF Champs winning Pay Loader. Ed Eliot.
- No. 977 O.T. "GUFF" \$4.00
Walt Good's 1938 Class 'C' gas winner, from '40 AT. Span 72". Al Patterson.
- No. 8771 CLEOPATRA \$6.00
Scale-like, twin-engine R/C flying boat. Span 98", uses .40 engines. Pavel Bosak.
- No. 8772 SBD "DAUNTLESS" \$4.00
Designed for C/L Carrier or Sport Scale. Uses .40 size engines. By Roland Baltas.
- No. 8773 TYRO A/2 NORDIC \$2.50
All-balsa, Jedelsky winged competition glider for FF beginners. W. Langenberg.
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Payload gas model winner from Aug. '38 M.A.N. Spans 8 feet. By Tracy Petrides.
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Sport R/C Scale of famous WW II Navy floatplane, 48" span. By Eliot Kimble.
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"Quick-Pit" field box especially designed for Combat. Good for all. Rich Lopez.
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Easily built design for new P-30 rubber class. Use plastic prop. John Oldenkamp.
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Frank Zaic's 1938 Stout Trophy winner, also for Wakefield, Patterson & Northrop.
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Exact quarter-scale (7-1/2 ft. span) R/C of famous H.D. biplane. By Bill Northrop.
- No. 6772 SC-1 \$2.00
Slow combat ship designed for easy parts replacement. Foam wing. By Phil Cartier.
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High performance outdoor hand launch glider, with O.T. stabilizer. By Ed Franz.
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All sheet balsa pylon-type 1939 gassy for small 'C' engines, 48" span. Tom Laurie.
- No. 5771 POLLIWOG \$3.00
Easily-built pod-and-boom electric powered single-channel glider. Jack Headley.
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A typical stick-n-tissue rubber powered fuselage model, 24" span. John Walker.
- No. 577-O.T. GLADIATOR \$5.00
Class C free flight from March 1941 Air Trails, 68" span. M. Schoenbrun design.
- No. 4771 "MISS ARPIEM" \$5.00
A rare '38 Steve Kowalik old timer. Perfect R/C trainer, 64" span. Doc Mathews.
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This .29 powered C/L stunter built mostly of corrugated cardboard. Dave Jessee.

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Highly competitive 85" span Nordic A/2. Complex, but not difficult. Ron Roberti.
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This 30" span stick job from 1938 MAN is OT, FF trainer, Unlim. Bruno Marchi.
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Full-size parts and installation drwg. for Tucker's Jet Ranger-Shrike conversion.
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Stand-off R/C scale (1.8"=1') of one of the prettiest Waco biplanes. Span 54". R. Steely.
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The famous 1940 "Eastern States Champ" by Russell Simmons, span 76". Al Patterson.
- No. 3772 DIRTY BEAVER \$3.00
Hot Half-A combat ship for popular new event, by MB's C/L editor, Dan Rutherford.
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Winner of first Nationals based Thompson Trophy Race for rubber scale. Tom Nallen.
- No. 2771 SEALANDER I \$4.00
Single engine R/C seaplane based on Gee Bee float. 20 to 40 eng. George Wilson.
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Twin engine R/C seaplane based on Gee Bee floats. (2) 20-30 eng. George Wilson.
- No. 277-O.T. BERLINER JOYCE \$6.00
Scale military biplane from 1935 mag. Span 6 ft. Great for R/C assist. Donald Evans.
- No. 2773 FOKKER TV \$2.00
Profile scale WW II twin engine (.049) C/L bomber. Span 34-1/2". By Mike Keville.
- No. 2774 OFFSPRING \$2.50
Excellent A/1 Nordic glider. All sheeted surfaces cleverly built. By Ron Roberti.
- No. 1771 CURTISS HAWK XP-23 \$7.00
Two inch R/C scale of last biplane in Hawk series. Much detail. Charley Smith.
- No. 1772 SHOESTRING SLOW RAT \$2.50
Semi-scale slow rat racer for .29 to .40 engines. Consistent winner. Bill Melton.
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Lars Olofsson's 1976 FAI power model. Won 2nd in '76 Nats A Gas. Bob Stalick.
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Beautiful 10 ft. span twin-boom pusher. Left and right wing plans. Phil Bernhardt.
- No. 12761 DON QUIXOTE \$8.00
R/C scale model of Polish homebuilt, 86" span, pusher engine. Laddie Mikulasko.
- No. 12762 STAR INTERCEPTOR \$2.00
Winner of Senior 1/2A Stunt at the 1976 Nats. Two fuselage plans. Felipe Alvarez.
- No. 12763 "GOOD TIMES" \$1.50
Competition model for Rocket (Jetex) F/F class. Easy to build. By Bob Stalick.
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Coupe d'Hiver class rubber F/F model, with balsa tube fuselage. By Ron Roberti.
- No. 1276-O.T. RAMBLER \$4.00
Good 72" span contest gas model from 1939 Flying Aces. By Gilbert Shurman.
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Hull lines drawing and dimensional sail plan for A-class sail yacht. Adrian Brewer.
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R/C Sport Scale of famous Thompson Trophy "Mystery Ship". Dale Sebring.
- No. 11762 BEARCAT \$2.00
Easy-to-build, all sheet balsa, 1/2A profile scale control liner. By Dick Sarpolus.
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Scale ship from Dec. '40 F.A. Suites O.T. or R/C Sport Scale. 90". Tom Mountjoy.
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Half-A, 2-channel, R/C pusher canard. Easy to build, fun to fly Randy Wrisley.
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FAI Combat ship for hot .15 engines, by Aeromodeller C/L editor, Dave Clarkson.
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Early lightplane ancestor of ME 109, for rubber power. Span 39". Bill Noonan.
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A/2 Nordic winner at 1975 Taft NFFC. Uses NFFS tail boom. By Jim Haught.
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1940 Wakefield with retract wheel, twin rudders, anhedral stab. Tom Engleman.
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Full-house R/C trainer, using cardboard tube wing spars, 19-40 eng. Stan Johnson.
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Rubber scale French home-built biplane. Spans 30-1/2" for Jumbo. Walt Mooney.
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Indoor rubber scale model of famous OT gassie. Rules included. By Bob Stalick.
- No. 976-OT WINGED VICTORY \$5.00
Classic and realistic gas model from 1937 MAN, Radial cowling, 5' span. Joe Weathers.
- No. 976-S3 SONIC BOOM MK II \$1.50
Hull lines drawing and dimensioned sail plan. Third in series. By Adrian Brewer.
- No. 8761 FOKKER TRIMOTOR \$5.00
R/C Sport scale of famous Atlantic flier Span 71", .40 engine. By George Clapp.
- No. 876-O.T. RECORD HOUND \$5.00
Shoulder-wing mono-wheeler with anhedral stab. Span 72". Hank Struck design.
- No. 8762 JAVELIN MK. 5 \$3.00
Modern Unlimited rubber design with a rolled balsa tube fuselage. Ron Roberti.
- No. 7761 TWIN OTTER \$10.00
R/C scale twin eng. commuter transport. Span 86", .30's or .40's By Roy Scott.
- No. 7762 SNIPER \$2.00
C/L combat with variable length tubular boom. Unique construction. Bill Allen.
- No. 7763 GYSOB \$5.00
Set new Class C record, Taft, May 1976. Span 88", .40 engines. By Ed Bellinger.
- No. 776-O.T. RASSITOODUS \$4.00
Novel canard design from '39 handbook. Span 60", 1/5 hp eng. By Herb Lozier.
- No. 6761 DFH 18 \$6.00
Highly refined Swedish pattern ship from '75 FAI R/C Champs. Bengt Lundstrom.
- No. 6762 OLD WHITE AIRPLANE \$4.00
Sturdy, consistent, easily-built C/L stunt ship for .35 engines. By Fritz & Chappa.
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Super, 45" span, F/F scale, early WW I ship, 020 electric power. Bill Stroman.
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Hot Half-A-A competition F/F canard. One of many designed by Doug Joyce.
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R/C sport scale post-war German lightplane Span 74", .36 eng. By Jeff Breece.
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C/L scale model of 1927 Schneider Cup winner. For .049 power. By Jack Bale.
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A 50/800 Marblehead yacht. Good performance in all weather. Forest Godby.
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Clean Class C cabin job from July 1938 Flying Aces. Span 83". Heit/Patterson.
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Six-tenths scale model of great old timer for pulse R/C. Redesign by Doc Mathews.
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Popular design for Profile Carrier event. A consistent winner. By Bill Melton.
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Dimensioned, half-size plans for easily-built vacuum former By Ron Williams.
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Interesting all-sheet experimental sport F/F rhomboid, for .010. By Ken Willard.
- No. 476-O.T. CABRULER \$4.00
Never-before-published Class A cabin model New Ruler, by designer Hank Struck.
- No. 3761 SEASQUARE \$5.00
A .19 powered flying boat for 3-channel radio. Span is 50". By George Wilson.
- No. 3762 FLIP \$1.00
Easy-to-construct, all balsa 1/2A sport/stunt control liner. By Dick Sarpolus.
- No. 3763 ORCA \$4.00
Hot FAI power model with all gadgets. Sheet covered surfaces. Larry Sicuranza.
- No. 376-O.T. A.T. TRAINER \$1.50
Sport rubber model from 1936 Air Trails. Good flyer, 30" span. Chuck Blackburn.
- No. 2761 DRAGONFLY \$4.50
R/C funship, looks like giant rubber stick model. Superb trainer. By Tex Newman.
- No. 2762 "KILLER" SAUCER \$2.00
For C/L combat, or just attracting attention. 22" diameter. By Howard Evanson.
- No. 2763 AMERICAN "EAGLET" \$4.00
F/F scale 1930 lightplane, for rubber or electric power, 48" span. By Tom Laurie.
- No. 276-O.T. "LONG CABIN" \$5.00
Good looking, stable cabin gas model of the 1937 era. Span 78". Phil Bernhardt.
- No. 1761 PATTERN SPITFIRE \$5.00
Scale-like 61 powered pattern ship flown at 1975 World Champs. By Tore Paulsen.
- No. 176-S1 MINI-MAXI II \$2.00
An AMYA A-Class model sailboat, with 1400 sq. in. sail area. By Ben Hogensen.
- No. 1762 TEXAN 750 \$5.00
Popular Class B-C free flight, modified for today's engines/rules. Jim Scarborough.
- No. 176-O.T. KORDA WAKEFIELD \$2.50
The classic of all rubber powered competition free flights. By Phil Bernhardt.
- No. 12751 CLIPPER AMERICANUS \$4.00
Composite scale R/C model of modern jet airliner. Span 48", .09 eng. By Art Hall.

- No. 12752 FOUND \$1.50
Scale rubber powered seaplane of Canadian design. Span 26". By Walt Mooney.
- No. 12753 SOLIDIFLIER \$3.00
All-balsa A/1 Nordic with ribless Jedelsky wing. Span 47". By George Perryman.
- No. 1275-O.T. THE PIONEER \$5.00
Earliest gas job by Ben Shershaw. Parasol, 80" plug-in wing. By Phil Bernhardt.
- No. 11751 NAVY FLYING BOAT \$7.50
"Composite" scale R/C flying boat biplane, 6 ft. span, 40-61. George Clapp.
- No. 11752 "TWIRP" \$1.00
Beginner's fuselage rubber powered ship. Teaches stick 'n' tissue. By Dave Gibson.
- No. 11753 "LUNAR-TIC" \$3.00
Classic-looking, high performance Half-A free flight. Easy to build. Harry Murphy.
- No. 1175-O.T. FOO 2-U-2 \$3.00
A pre-Zipper design by Dick Obarski, reduced to .020 Replica, by Ron Sharpton.
- No. 10751 THE LITTLE ONE \$4.00
Economy size, .40 powered pattern ship has rolled ply fuselage. By Dick Sarpolus.
- No. 10752 MISTER MULLIGAN \$4.50
Jumbo scale rubber model of famous Ben Howard racer, spans 56". Tom Houle.
- No. 10753 SUPER PUP \$3.00
Profile C/L stunt ship for .29 to .36 power, 42" span. Easy-built. Mike Parenteau.
- No. 1075-O.T. SKYLARK \$4.00
Pleasing Class A/B Louis Garami design. Shoulder wing, 50" span. Phil Bernhardt.
- No. 9751 BABY ALBATROSS \$10.00
Exact R/C scale model of famous Bowlus sailplane. Span 122". Col. Bob Thacker.
- No. 9752 FIREDRAKE \$3.00
Half-A free flight featuring fast climb, flat glide, penetration. Larry Sicuranza.
- No. 975-O.T. PURSUITEER \$5.00
Smart looking 1938 Pete Bowers design. Span 60", area 575. By Phil Bernhardt.
- No. 8751 SOPWITH TABLOID \$4.00
Sport Scale WW I biplane for 3-channel radio. Span 42", .19 eng. By Chris Moes.
- No. 8752 VOLKSPLANE \$2.00
Great performing rubber powered profile scale. Span 24". By John Oldenkamp.
- No. 8753 FRITZ, HLG \$1.00
A pylon style, high performance HLG, with DT system. Different! Jim Parker.
- No. 875-O.T. '38 MOFFETT CHAMP \$3.00
Canadian Roy Nelder's beautiful rubber ship. A real classic. By Phil Bernhardt.
- No. 7751 LITTLE BOMB \$3.00
Minimum area 1/2A pylon racer for two channel radio. By Wm. R. Nielsen, Jr.
- No. 7752 THE ALIEN \$2.50
Pendulum controlled flying wing pusher for Brown CO₂ power. Daniel Walton.
- No. 7753 ULTRA DART \$2.00
Monster 39" span Delta Dart for sport and Unlimited Rubber. Dave Linstrum.
- No. 775-O.T. BOMBSHELL \$4.00
Famous winner of Class C gas at the '40 Nats, by Joe Konefes. Phil Bernhardt.
- No. 6751 SQUARE HARE R/C \$3.00
All sheet balsa trainer with long history. Span 52". .19 power. By Bill Northrop.
- No. 6752 SKYFARER \$3.00
Rubber powered 1" scale model of trike geared high wing cabin. By Earl Stahl.
- No. 6753 SHRIKE \$3.00
Hot Half-A free flight, with good looks, and top performance. Bill Langenberg.
- No. 675-O.T. DIAMOND DEMON \$3.00
Popular .020 Replica of Bay Ridge cabin Cl. B job. Span 34". By Phil Bernhardt.
- No. 5751 FLEET BIPLANE \$5.00
Fast-building 2" Sport Scale R/C model of famous 1930 biplane. By Romey Bukolt.
- No. 5752 SEA FURY \$3.00
Semi-scale model of WW II British fighter, for 1/2A R/C pylon. Jerry Holcomb.
- No. 5753 GREMLIN \$2.75
Sharp little Half-A C/L Stunt model. Will do complete schedule. By Tom Dixon.
- No. 575-O.T. MERCURY \$5.00
Designed by Ben Shershaw, kitted by Scientific. 72" span. By Phil Bernhardt.
- No. 4751 R/C AUTOGYRO \$4.00
Semi-scale twin rotor R/C autogyro for .35 engines. Very stable. By Skip Ruff.
- No. 4752 OKIE BIRD \$4.00
Red hot Class A/B free flight. Plans show sub fin and rear fin types. By Jim Clem.
- No. 475-O.T. G.H.Q. SPORTSTER \$5.00
From July 1936 M.A.N., also kitted by G.H.Q. By Louis Loutrel. Phil Bernhardt.
- No. 3751 CURTISS F9C-2 \$6.00
Navy airship-based "Sparrow Hawk" biplane. 1-1/2" scale C/L. Charlie Smith.
- No. 3752 CALL AIR SNOWCAR \$3.00
Radio controlled, semi-scale prop-driven snow car. .30-.40 engines. Fred Sanford.
- No. 3753 GROOVY TUNA \$3.00
Top-notch Wakefield design from 1973-1975 FAI U.S. team member. Jon Davis.
- No. 375-O.T. 1936 WAKE WINNER \$3.00
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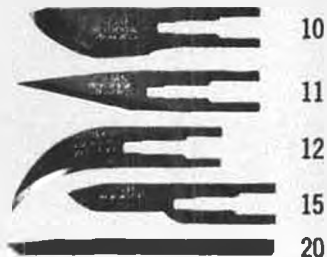
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