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Cover: One-fourth scale ASK-13 just after launch at 1981 Clwyd scale competition, Moel Famau, Wales, June 28, 1981. Model designed, built, and flown by Cliff Charlesworth, Essex, England, has placed high in many contests. All built-up construction, nylon covered. Controls include ailerons, elevator, rudder, and airbrakes. Plans and canopy available directly from designer. MB has a set, also complete ordering information. Large format transparency by Keith Thomas, Frome, Somerset, England.

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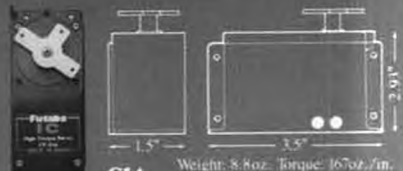
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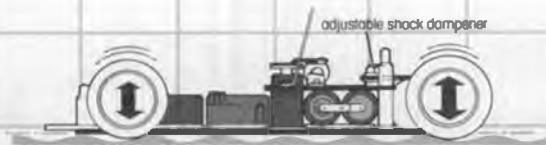
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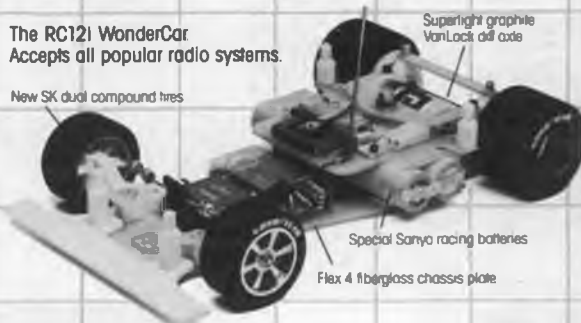
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from Bill Northrop's workbench

• • •

• On our recent trip to the Toledo Weak Signals R/C Exposition, we had a long enough layover at Chicago's O'Hare Airport on our return trip to wander around the terminal, have a leisure brunch, and take in the sights. At one huge rotunda area (great for indoor flying!), a little away from the rushing commuters and travelers, we found a lighted glass case containing a large bronze plaque. The plaque depicted a World War II Navy flier and enough of his plane's cockpit canopy to identify it as an F4F Wildcat. Below it were the words of Franklin D. Roosevelt, commending Lt. Ed. H. O'Hare, who, on February 20, 1942, in his lone fighter from Squadron 3, took on nine twin engine enemy bombers. Conserving his

ammunition with short, accurate bursts, he downed five and damaged a sixth, thus saving his carrier from serious damage. Certainly a more appropriate name for an airport than Los Angeles LAX, which seems to have been named after a medicine for people with certain functional difficulties.



JOHNNY OSBORNE

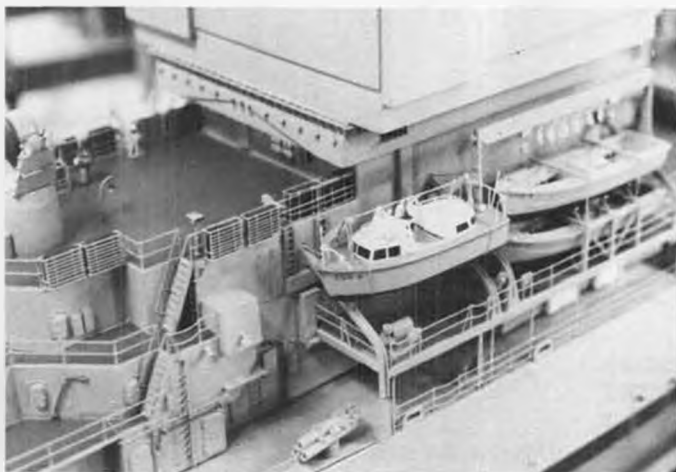
One of the bad things about being a magazine editor is that it becomes your

duty to have to write about the passing away of people you have known and befriended through your association with the hobby. We knew Johnny Osborne for many years in his capacity of running the operation at Midwest Model Supply, in Chicago. His favorite subject of conversation was full-size flying. He owned a Pitts Special and was also a very enthusiastic glider pilot. At less than 54 years of age, he left us much too soon, and wherever he is now, we hope it's CAVU and lots of thermal lift.

R/C FOR THE BIRDS

It always seems that the only free publicity our hobby receives is negative ... when someone gets electrocuted trying to recover a "toy airplane" from overhead wires, or when flying too high and near full size aircraft. Recently,

Continued on page 98



Judged the Best of Show at Toledo, and deservedly so, was this magnificent nuclear powered cruiser, the U.S.S. Longbeach, by Loren Perry, Jr., Jacksonville, Florida. Even the close-up can hardly do justice to its accuracy and detail. Nothing was left to the imagination.

OVER THE COUNTER

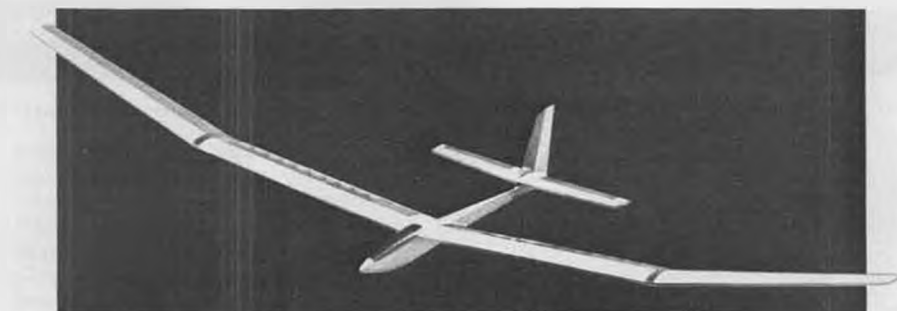


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• Once again, Enya Model Products has produced a powerhouse side exhaust Schneurle-ported .40, featuring Enya's exclusive high silicon aluminum alloy piston and hard chromed aluminum cylinder formed by the lost wax casting process. This process produces a more uniform liner with less machining and greater accuracy for better performance. The ringless piston running in a chromed liner will provide high RPM's and long life. The G-7 R/C carburetor, with a 7mm air intake, provides for better "breathing" in top end performance and yet assures a steady idle as well. The sturdy, three-piece crankcase comes with two ball bearings to support the heavy-duty crankshaft for smooth running. A special muffler, the M200CX, or a tuned pipe is available for the 40CX engine, to give a choice of what is needed for your particular installation. Once again, Enya has given you high performance, high technology, and long life in one package; the new 40CX R/C engine. Specifications are: size: .40 c.i., weight: 12.2 ounce, power without muffler: 1.3 hp, with muffler: 1.1 hp, and an RPM range from 2,500 to 17,000. See your dealer or contact: Enya Model Products Co., P.O. Box 286, Fords, NJ 08863; (201) 572-5792.

★ ★ ★

The Eldon J. Lind, Co., has just introduced the Deluxe version of its DUPLICATOR MK 1. Eldon, a long time modeler, has responded to customer



The Paramount, by Pierce Aero.



Pierce Aero's Gemini MTS.

requests to add more sizes of patterns to the basic DUPLICATOR MK 1, introduced last year. The new Deluxe package contains 17 pattern blocks containing 41 patterns, from 1/8 to 1 inch in 1/16 increments. The patterns, machined for greater accuracy, are formed with a tangent of either 90, 135, or 180 degrees, to enable the modeler to set the Duplicator to finish contour sanding stringers, tail surface edges, fuselage edges, and wing leading edges, regardless of whether the fuselage edge is 90 degrees or the wing leading edge requires a setting of 135 degrees. A new Duplicator 'Gauge' is supplied to be placed over the



Schneurle-ported Enya .40 from Enya Model Products



Pacesetter's industrial ignition engine powered "Outlaw", for less than \$400.



More new cowls from T&D.



AT-6 in 2.4-inch scale by Nick Zirola Models.



Deluxe Duplicator Mkl, by Eldon J. Lind Co.



Astro Flight's Astro 40 electric motor.

Long servo leads in big models have been a source of concern with many R/C systems, as they can pick up electrical noise, like an antenna, and feed it back into the receiver. Chokes have been used and recommended to solve the problem, but what value to use and what lead to install it in? Does it cause a voltage drop? Ferrite Beads? How do they work? Ace has developed the 'Noise Trap' utilizing solid state IC technology that will work with any R/C system. It should be used any time the lead length between the servo and receiver is over 16 inches.

The kit contains the electronics and enough wire to do a six foot extension, or a three foot "Y" hookup, you finish the proper connectors for your system. Use one for each channel that requires remote servos. #26K17 Ace Noise Trap Kit, \$3.95.

Ace has also made available, packaged 24 for 98¢, some of the smallest almost indestructible, polypropylene hinges you'll find anywhere. They're easy to insert because of the tapered edges. Work's from 1/2A's to .60's, simply slot the surface, epoxy, and insert. #50L316 Ace Hinges. Add \$1 for handling, on above items. Send \$2 for the new, 1982 Ace catalog, chock full of items for the experimenter and do-it-yourselfer! Ace R/C, Box 511D, Higginsville, MO 64037.

★ ★ ★

profile view of the edge to be sanded, thus making it easier to set-up the Duplicator.

The Deluxe Duplicator is available for \$49.95 plus \$3 shipping, while the standard Duplicator is available for \$19.95, plus \$2 shipping, California residents add 6% tax. Please send a SASE for more information. Distributor inquiries are invited. Eldon J. Lind, Co., 2912 Walker Lee, Los Alamitos, CA 90720; or call (213) 439-0231.

★ ★ ★

Ace R/C, in its efforts to make R/C flying much safer and a lot more fun, has made available in kit form a 'Noise Trap.'

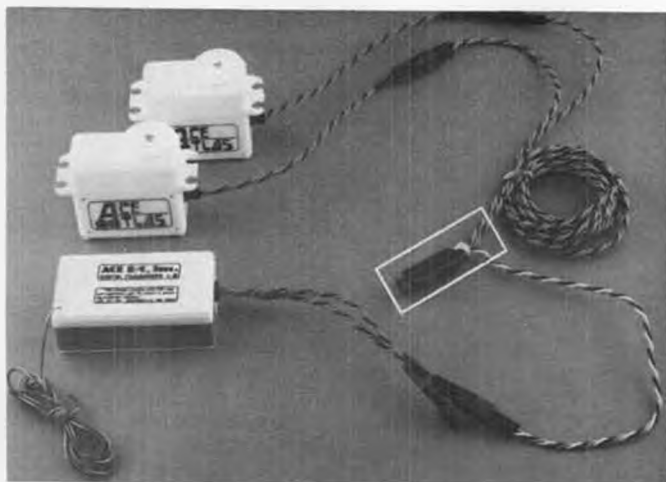


Hinge sets, from Ace R/C.

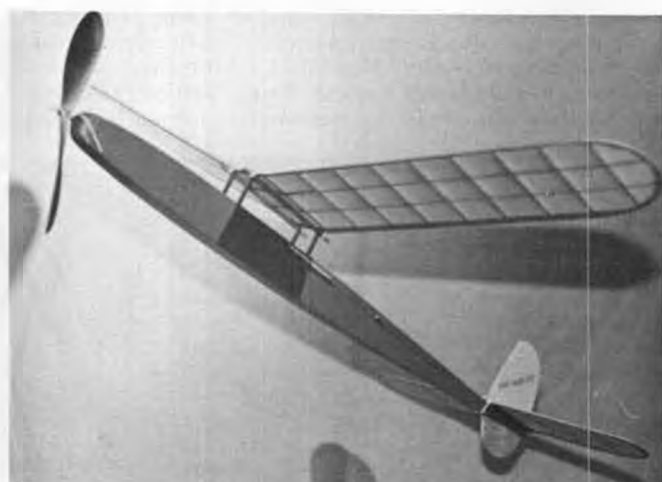
Pacesetter Products, the people who introduced 1/4-scale dirt track car racing with a .60 powered, one-fourth actual size sprint car over a year ago, now introduces the "OUTLAW," the latest offering in the field. Kits for these fantastic industrial gas engine powered cars start at under \$400, factory direct. For additional information, send \$1 for brochure to: Pacesetter Products, Garner Valley Box 257, Mountain Center, CA 92361; or call (714) 659-2318.

★ ★ ★

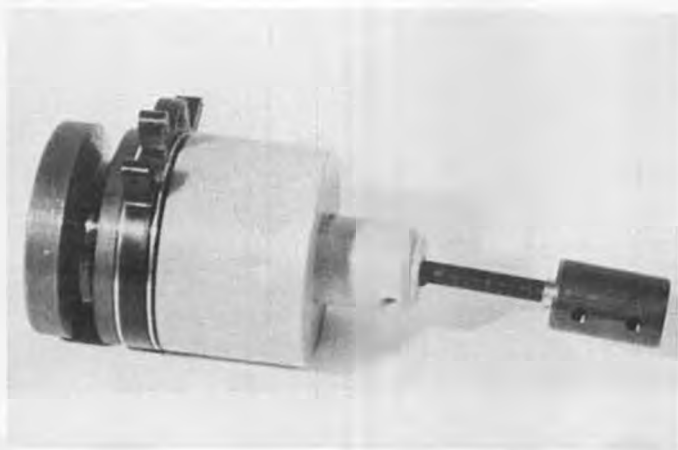
T & D Fiberglass Specialties has been busy adding new molded fiberglass items to its fine line of cowls, wheel



Ace Noise Trap kit (in white rectangle) for those long servo leads.



CR-1 Fun Bird 30 by Flite-Rite Models.



Reverse coupling device for gas powered boats, from Dynamic Models.



The "Feather Merchant", from Lehmborg Enterprises.



Sig's latest catalog ("wish book").



"CP-1 Maverick" canard/pusher from O.V. Engineering.

pants, and boat hulls. Recent additions include a glass cowl for the 1/3-scale J-3 Cub by Cedarbridge Scale (Nelitz) with or without engine detail, a glass cowl for the 1/4 scale 'Great Lakes' as featured in the March 1982 issue of *Model Builder*, glass cowls with and without engine detail for the Balsa USA Flybaby, and glass cowls for the 'Heath Parasol' featured in the October, 1981 issue of *Model Builder*; one as shown on the plans and one with a Model A engine

molded in! Look for a glass cowl and wheel fenders for the 1/4 scale Bucker Jungmann that appeared in the May 1982 issue of *Model Builder* in the near future . . . Now, you can start that favorite project, knowing that quality fiberglass parts are available to ease construction problems. For a complete listing of all the special fiberglass parts, assembled cabanes for some biplanes, and plans, send a SASE to: T & D Fiberglass Specialties, 30925 Block, Garden City, MI 48135.

★ ★ ★

Astro Flight now has the Astro 40 motor back in stock. Suitable for powered gliders or Old Timers in the 1,000 to 1,200 square inch wing area range, or sport and scale models in the 600 to 700 square inch wing area range, a 3-1/2

minute power burst will take a powered glider up to 1,000 feet or more, while a 'cruise' power setting will yield a flight of from 6 to 10 minutes in an average sport model. The 72 inch span Sig Cub or Goldberg Sr. Falcon are recommended kits, as are the Astro Flight Porterfield and the Midway Models Dallair Sportster. Total all up flying weight (model, R/C system and electric power system) should be between 6 to 8 pounds for optimum performance. The Astro 40 motor is available for aircraft as #2104, listing for \$89.95, for boats as #2124 for \$89.95, or as a complete aircraft system, #2004 completely wired, with batteries for \$199.95. A radial motor mount and speed reducer is available

Continued on page 97



The Leisure 05 electric motor made by Sagami of Japan.



British made R.V.E. 60 four-stroke from TEJA Engineering.



HOLY TOLEDO!

By BILL NORTHROP



House of Balsa F-86 for RK-20 Axiflo ducted fan.



Byron quarter-scale Staggerwing Beech coming this summer.



JR's Tony Bonetti. No, you can really ride it!

• I have written an article about the Toledo R/C Exposition, almost without exception, for the past twenty years. In fact, I even managed a couple of times to bring home trophies won in the static model competition!

This year, for a change, we're going to let the camera do the talking. If a picture is really worth a thousand words, this will be the longest article I've ever put together on the show. Incidentally, for the benefit of any photo nuts reading this, I've become kinda disenchanted with flash. When I want to get in close for detail, the flash produces a horrible glare, and when I back off, it somehow produces shadows in the wrong places, or it takes too long to recharge and I miss the shot I want. Having experimented a little with "pushing" film and getting pretty good results, I tried it this year at Toledo. Pushing the film means that you shoot it at two or three times its rated ASA number, and then the developing time is adjusted to compensate. Before trying this trick, make sure your local film processor understands and knows what to do. You can almost bet that the clerk in your corner drug store will give you a blank stare when you bring up the subject. For Toledo, I used Kodak Tri-X film rated at 400 ASA, but "pushed" it three times, to 1200 ASA. At this setting on my Nikon FE exposure dial, I was averaging around f4.5 at 1/60 or 1/125 of a second, and out of about 270 shots (7 1/2 rolls of 36 exposure) there were only three or four shots that were not correctly exposed . . . no waiting, no calculating, no mis-fires . . . try it, you'll like it.

My other resolve this year was to concentrate on products, rather than the people behind them. I'm sure the average modeler couldn't care less what the manufacturer looks like as long as his products do their job.

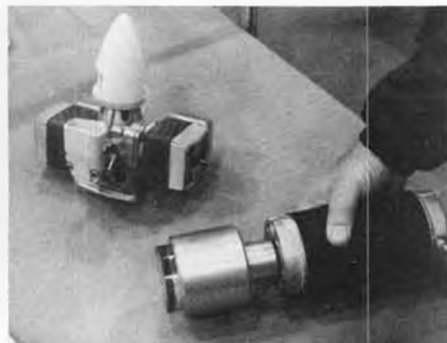
And . . . that's enough gab. Let's get on with the photos. ●



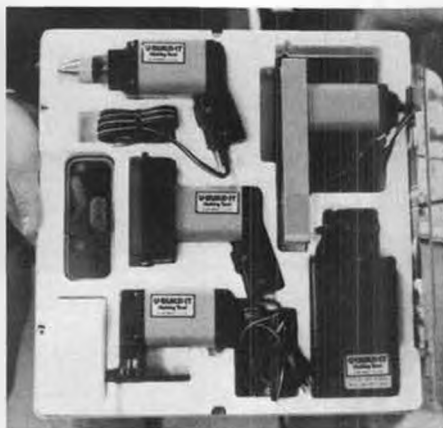
Jet Hangar Hobbies Grumman F9F, Panther, due this fall.



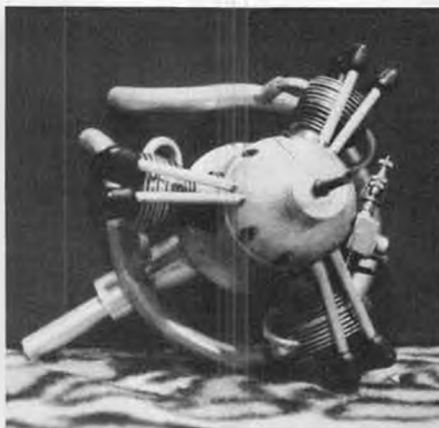
Completely built (ERF) N.E. Aerodynamics Train-Air by Columbia Model Crafts.



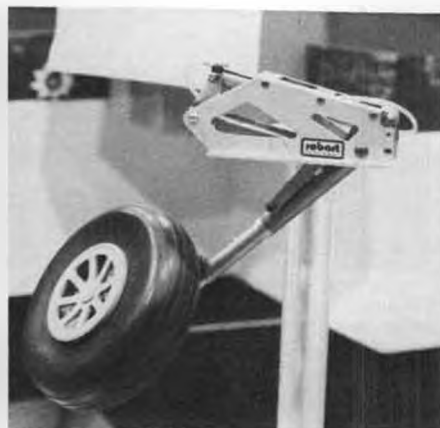
Mallory Models' no-foolin' starter for the big engines, such as twin Tartan.



Hit-of-show miniature 12-volt electric tool set with converter. See Hobby Shack.



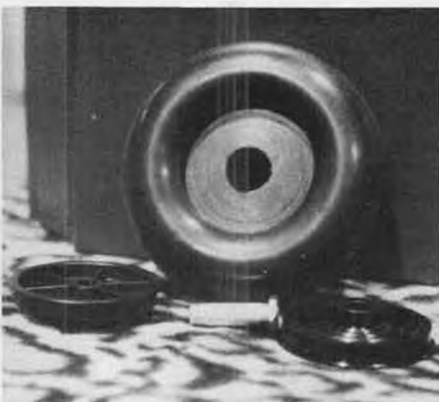
Technopower's three-cylinder .90. Due in about six months.



Robart's rotating retract for medium biggies.



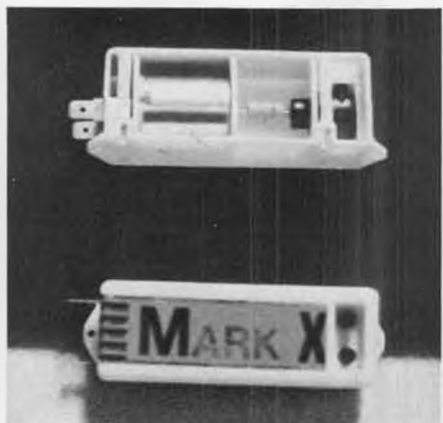
Art Bauer, Dynamic Models, molded hull and superstructure for tug.



CB's lightweight big wheels. Solid foam rubber with smooth outside.



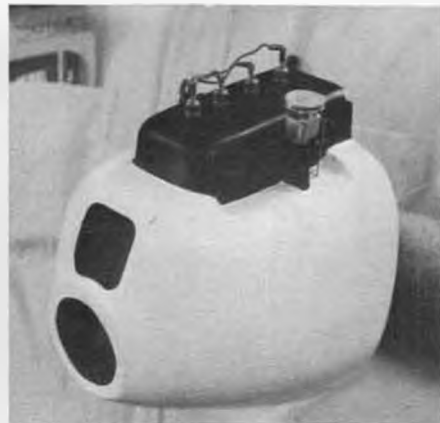
YS 60 engine. See Reading Hobby.



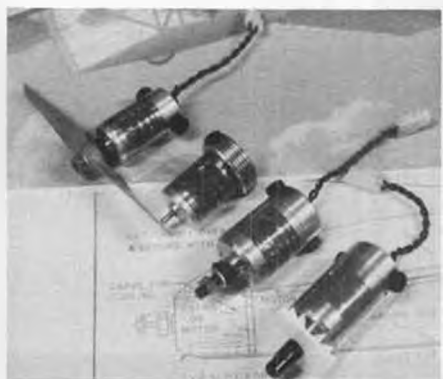
Compact electric fuel pump by Sonic Tronics. Less money too.



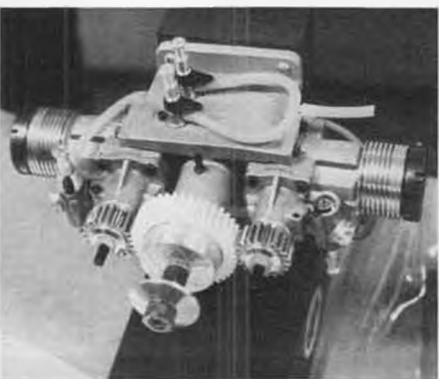
Top-of-line Airtronics Champ Series with all types of switchables.



Cowl for Model Builder Heath Parasol (Model A version) by T&D Fiberglass.



Fleet of Astro Flight samarium cobalt electric motors, all sizes.



An OPS times two. Two left cranks. Think about it . . .



Long awaited "Big" Bantam by Ben Sheresaw. Very light!



Wandit . . . one heck of a sanding tool. Very effective on ridges and high spots.



Delta's one-gulp fuel tank. Fill from a bucket without spilling!



The 3.1 Quadra. Wraparound muffler on right.



Craft-Air Cowboy 15 for .09 to .19 engines. Span 50 inches. Ply fuselage sides, three or four channels.



Byron's Cap-21 in quarter scale is a few months downstream. A good pick for aerobatics.



Very light, foam cored, flat-bottomed floats, by Northeast Aerodynamics.



Jim Gager, MB Pylon columnist, is producing this fine sport 40 ship.



Galaxy by Micro-X. Not for indoor! For .25 to .35 engines.



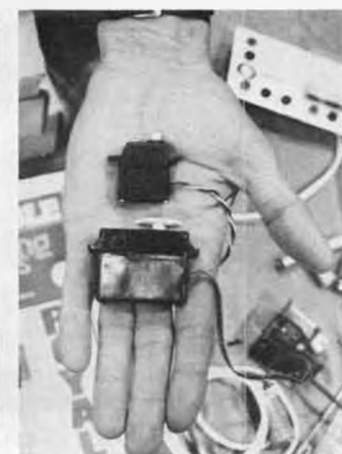
Dumas "Nonsuch 30". Glass hull, wishbone boom.



Tom Keeling's "Cowl Pasture" T&D Fiberglass.



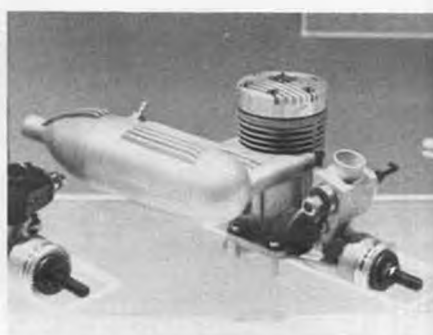
Pro Launch System II sailplane electric winch.



Royal Micro Titan and Maxi Titan servos.



Soaring Products now producing own Sniffer monitor, for earphone only. Pocket size.



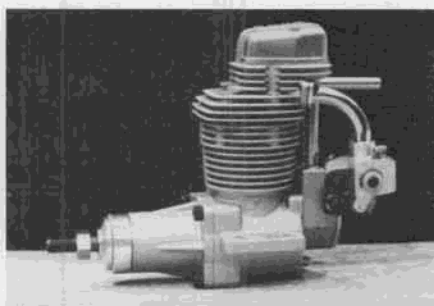
New all-metal throttle by and for K&B 40 and 60 engines.



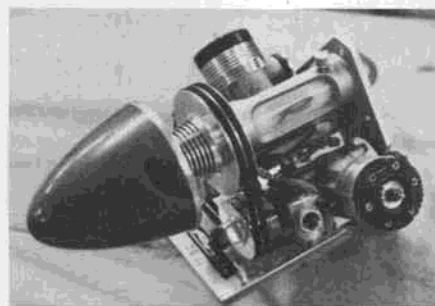
PB Y 5 Catalina by Mr. G's Products and Supply.



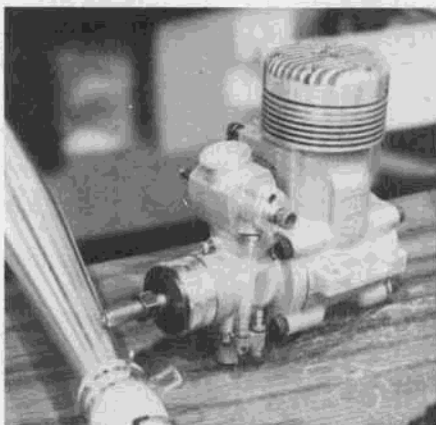
Kavan's big twin, displayed by Condor Hobbies.



Enya Model Products, the Enya 60 four cycle, joins the 35 and 40.



Two Rossi 60's in a belt reduction drive unit, shown by Bill McGraw.



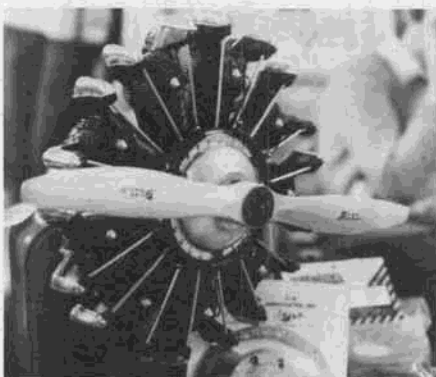
The YS 1.2 brute. Check with Ralph Camilli, Reading Hobby.



Shift gate/throttle control used with the four-wheel drive Toyota by MRC.



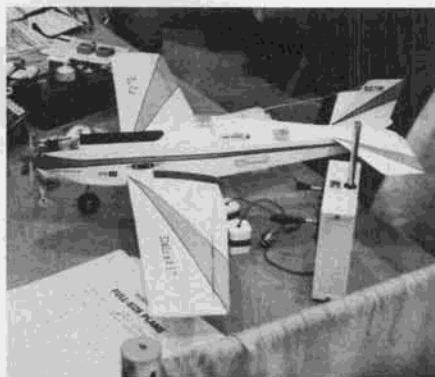
Leisure Electronics modular electric motor with compact gear reduction unit.



Quarter-scale P&W in plastic and foam. Shown by Jim Messer.



Ready-to-assemble Christen Eagle by Pilot. Check with Hobby Shack.



Bill Cannon's G-Mark .03 powered Griffin III, or .06 IV. Future MB construction article.



Dick Penrod holds digital tachometer by Giezendanner USA.



Genuine, eye-hurting strobe light by McDaniel R/C. Not just a high jolted lightbulb.



Coverite's Art Kramer needs a lot of spray to control his wild hair!



A bunch of hi-powered Webra machinery; 4-cycle, twin, gear driven.



Extensive line of Irvine engines, available from Midwest Model Supply.



Interesting out-drive unit shown by International Hobbies.



Interesting BA Swallow, with folding wing. Seven cylinder Technopower radial.



Bill Hinant's Mallory Models Laser 200. Fine aerobatic ship.



Joe Bridi's "4 Season 40", one of new kits marketed by Kraft Systems.



MRC's all-in-one package. Ready-to-fly Cessna Cardinal, with Enya 35 and Vector 4 radio.



Flyline Models' "Megowcoupe" is a real attention getter. A good subject for electric power.



Kiortz 1.3 "Baby" alongside 2.2 bigger . . . but not biggest brother.



Two small direct drive tachometers by Royal Products.



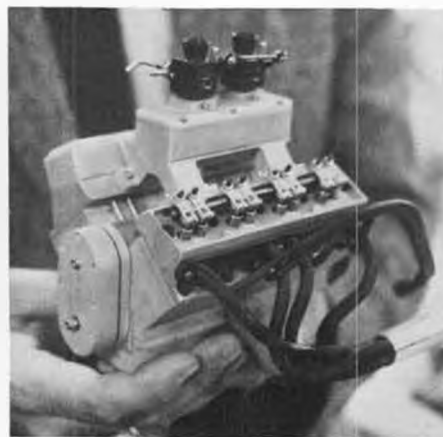
Sturdy molded fiberglass field box by Aerotrend.



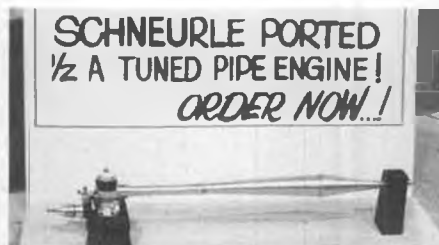
New spout gives good control of Jet cyanoacrylate glue from Carl Goldberg.



Eastcraft, the ones who started the starters. This one on an H.B.



Place your order with Gary Conly, 825 Duane, Glen Ellyn, Ill. 60137. Running V-8!



Like it says . . . from Kustom Kraftsmanship.



Two new ones from Pierce Aero . . . Paramount and MTS.



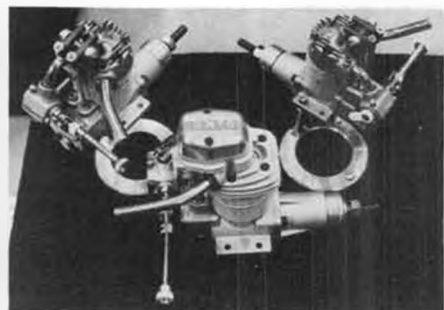
Wendell Hostetler's Art Chester "Jeep" . . . big and beautiful.



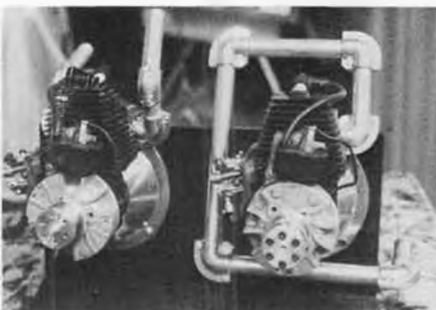
Klaude McKullough's Kompact Kobra, from K Sig Mfg. Co., for 19 to 30 engines.



Johnnie Ka . . . whoops . . . Casburn's JC Trainer, with cap stripped foam core wings for fast building.



The whole Enya 4-cycle family; .40, .60, and .35.



Kawasaki engines, showing new CB built-it-yourself exhaust plumbing.



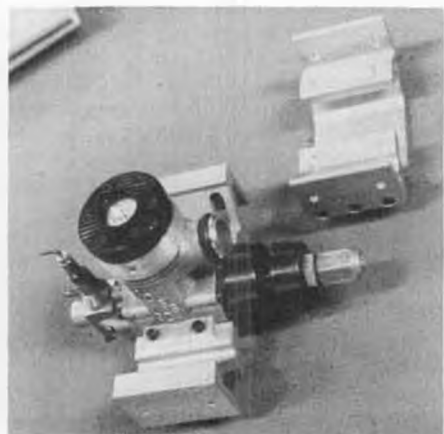
Quarter-scale Piper Tomahawk by Don's Custom Models.



Variety of Head Lock systems by M.R.C. including new remotes, for cowl, etc.



"Tommycat" for RK-20 Axiflo fan, by Kress Technology, Inc.



Octura's "Swift Switch" motor mount, with Rossi 60 on board.



Glitch stoppers by E.M.S. eliminate chokes and beads in long leads.



Variety of Dave Brown products, including Pro Retractable replacement parts.



"... my first impression was that someone was having a motorcycle motorcross ... and suddenly out of the corner of my eye I saw a model gliding."

WAY OUT WEST

By DICK EVERETT ... A well-known model columnist from two decades past, who wrote under the above headline, takes a look at what has happened (or hasn't happened) while he was away from the hobby.

• "What do you think of modeling today?" This was the question asked me at dinner one night in Hawaii; the question came from Bill Northrop, shortly after I had met him. I told him, and he requested I write about it, so here goes.

When I came around the curve in the road at Taft and saw a rather large gathering of people, my first impression was that someone was having a motorcycle motorcross, which is quite common in California. I continued driving, looking for the contest, and suddenly out of the corner of my eye I saw a model gliding. I put on the binders and stopped and took a second look. Lo and behold, the gathering looked like it could be a contest. I turned the camper

around, went back to a dirt road, went down to the gathering, and parked.

I got out of the camper, still not sure it was a contest. I walked on the field and saw 15 or 20 guys holding models, they were surrounded by a forest of tall thin poles with ribbons on them, also numerous electronic instruments on poles. Then suddenly someone went dancing into the wind waving a wand of some kind. All of a sudden somebody threw a model into the air (I found out later that this was usually Bob White), then everyone else who had models threw their models into the air, until the sky looked crowded with overgrown mosquitoes; this was a model contest circa 1981.

There were several things I did not immediately understand; one was holding the wound rubber motor for 10 minutes. When I flew rubber models eras ago, we launched as soon as we wound, to get the most power. We also picked up the timer, went out to the launch area and launched; we did not wait 10 minutes. Those electronic instruments, the tall ribboned poles, and the dancer were all new to me. Most models reminded me of Caldwell Johnson's "Slick Stick" of the 40's.

I then walked over to the gas area; the very high RPM engines really hurt my ears (I wondered what OSHA thinks of this). The models all looked like variations of the Brainbusters Pencil Bombers of the 1940's. The big difference was the more than double RPM's, and as I later discovered, the pre-programmed flight. The models were thrown like a javelin, not launched; the bigger and taller the thrower, the higher the model got

under power.

Then over to the glider area; the gliders had not changed much; a lot of them reminded me of my A/2 "El Sobo" of the late 50's and early 60's. There was one big difference though, they were towed around like kites for up to 30 minutes while the flier was looking for thermals. Every glider had all kinds of "Mickey Mouse" gadgets on it to supposedly enhance its flight. I still wonder which part of the model did the job; the design, the kite flying, or the gadgets.

I then went over to the "old timers" contest where I ran into guys I hadn't seen for the past 15 to 20 years; guys like Swaney, Bicknell, and Taibi, still flying the same type models that I used to fly. The models still looked the same, though some went back a few years; they flew the same, no forest of poles, no screaming engines and no kites ... back home again.

Later in the day I went back to the forests, etc. and looked closely at some of the models. They are much more complicated now; fiber glass, Kevlar, carbon fibers, Hot Stuff, and epoxy all have taken a place in the design and construction of these new era (to me) models. With all the new materials it is possible to design and construct models that were not really possible many years ago. The winders for the rubber models are really beautiful, very smooth and powerful with turn counters, so that you don't have to worry about losing count. The torque indicators that just about take the guess work out of the number



"... they were surrounded by a forest of tall thin poles with ribbons on them, also numerous electronic instruments on poles."

Continued on page 76



MONARCH

By BILL YOUNG . . . Not to put down the fine performance of most "plank" type flying wings, this tailless bird has a graceful beauty that deserves special attention. Worth the extra building effort.



• As the editor of this magazine correctly remembers, this flying wing got its start with a design published in the 40's, probably (*definitely. wcn*) in Air Trails. He, like I, built one and flew it. He says his didn't. Mine did. (*Not quite right! Never actually completed it. Built back in escapement days, I gave up on it because of inadequate control availability. Now it can be done. wcn*) Over the years when ever I've been bored or stuck in a rut, I have resurrected, modified, improved and built different sizes of this basic layout. I'm not sure how closely this ship follows the original, as I long ago lost the original article. So whoever it was who started me on this

journey . . . many thanks.

As the name implies, this ship is majestic in flight, and resembles its namesake in appearance. I have been interested in flying wings since early in my modeling career. I find them beautiful, even if I and others are unable to make them perform as well as the conventional layouts. Once trimmed, the ship is very stable and easy to fly. Yes, every rib is different, and the washout section doesn't lend itself to the stacked rib technique. However, I believe that you will find the effort well spent.

WINGS

Start by cutting out all of the parts for the wings. This is the most complex part



Not all flying wings are as graceful in appearance as the Monarch. The wing tip control surfaces act only as elevators. Turns are accomplished with the generous rudder area.



All fuselage parts "kitted out" and ready for assembly. Sides are 1/8 thick Lite Ply.



Completed fuselage and vertical stabilizer assembly, ready to receive wing halves.

of the ship, and it helps to do it first. The structure does not require the use of heavy or extra strong balsa wood. I use Hot Stuff for all assembly. Don't forget the vertical grain webbing between the spars as shown. Plug the ends of the wing mounting tubes. Inset the 1/16th balsa sheeting at the root of the wing and the sheeting where the push rod exits the tip. Leave the exact location of the tube-in-tube control linkage in the root rib until you have determined the location of the elevator servo.

FUSELAGE

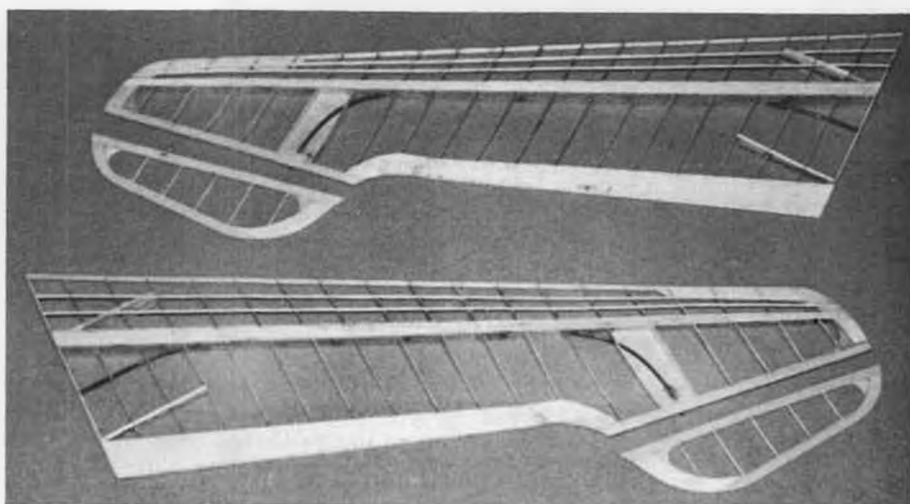
The width of the fuselage is determined by your radio gear. If it is wider than the Futaba S-20 servos and two-channel receiver shown, now is the time to make adjustments. Cut out all parts and assemble the main fuselage. Lay out the location of the wing wires and servo mounting beams. Carefully bend the wing wires to a 10 degree angle and install them. Use some scrap balsa to fill in around the wires. Cut out the wing root pieces and assemble. Drill holes for the wing wires, slide the assemblies over the wires and glue in place. Use of a dowel wrapped with sandpaper will make the shaping of these pieces easier. Sand the top and bottom of the fuselage to round shape. Paint the cabin area black and install pilot if desired. Finally, install the sections of the cockpit.

FIN AND RUDDER

Cut out all parts of the fin and rudder and assemble. Sand to airfoil section and install on the fuselage. Install rudder control rod and determine the exact location of the elevator pushrods now. Now's the time to make a final inspection to make sure that all wood work is complete and sanding finished.

FINISH

Cover with your favorite covering and color scheme. Install radio gear and hook up the push rods. Use your favorite method of hinging and install the elevators and the rudder. Check the balance point and adjust, if necessary. I use 30 degrees rudder deflection and 20 degrees elevator deflection. Don't forget the antenna. I run mine inside of one of the elevator push rods.

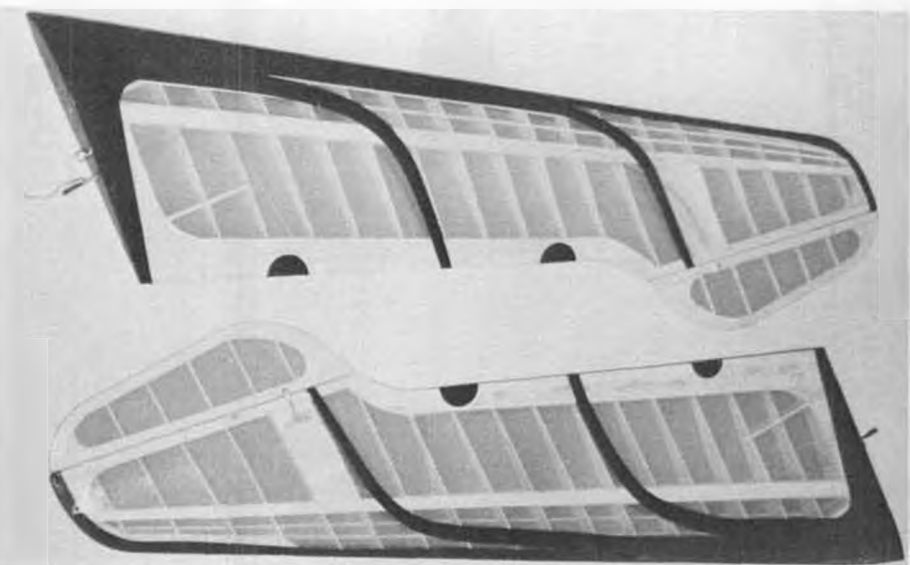


Wing frames ready for covering. Exact location of "wingevator" push-tubes varies with servo installation. Play it by ear.

FLYING

Make a few hand launches to check the trim. Make sure that the elevators are not trimmed differently. They work just like conventional ailerons as well as elevators. Balance them for level flight.

Now you are ready for a tow launch. The controls are fast and sensitive, so go easy on the first few launches until you get the hang of it. Then go looking for a thermal or a slope.



Wings have a variety of rib cross-sections, need extra care to get true assembly. No, there aren't two rights . . . one is upside down!

the *Electronics* Corner

By ELOY MAREZ

• I recently decided I needed (wanted) a new transmitter; one with a few more bells and whistles than I normally use. The results are shown in the photograph; it incorporates the mechanical features which I like and which are not always available on commercial models.

My dream transmitter starts off with a good set of metal open gimbals, in this case, the one's being manufactured by DaCa Model Products, available from Ace R/C and Royal Electronics. These gimbals are solidly built from machined aluminum, smooth working and precise. The springs can be adjusted to whatever tension you prefer. There is no mechanical trim, which frees you to use electronic trims, placed exactly where you want them, and wired to standard or cross trim configuration . . . the latter in my case. The trims themselves are another Ace R/C distributed item . . . manufactured by Dunham's R & R. They have a number of features I like. For one thing, there is a neat little bezel which very nicely dresses up the hand-cut slot in the case, the tension's just right, and the lever is long enough so that there is no fumbling around when you need it.

I'm something of a bug about switches, I distrust those that lack mechanical quality, both in operation as well as in looks. I have found that a good

solid click and snap usually adds up to reliability.

Switch manufacturers are almost as common as car dealers, so there is plenty to choose from. I settled on a line made by a company called C & K, located at 15 Riverdale Ave., Newton, MA 02158. It has just about every type of miniature switch you can think of, all of extremely high quality. They are available in basic body and function types, with a wide variety of mounting bushings, actuating levers, and terminals.

For the ON-OFF switch, I chose C & K No. 7201-K-D-Z; being a DPDT model, pull-to-operate lever, 1/4-40 threaded bushing, wire solder lugs. No accidental turning off the transmitter while reaching for a dual rate with this one. Talking about the dual rates, I hate those little, round, pointy, skinny, slippery levers often used; I chose switches No. 7101-P3-D-Z; a SPDT model with a flattened .2-inch wide lever which you can always operate reliably even with slightly oily hands.

The retract switch is always something of a problem, both in location and type. I like it on top of the transmitter, to be operated with the index finger. A toggle there is somewhat inconvenient, as the finger can't grasp it comfortably, and doesn't move naturally in the required

direction. For this one, I chose a sub-mounted rocker, No. 7101-J11-Z, with black lever and frame, which matches my case fairly well. You'll see two similar switches mounted on top, the other one is to start an internal timer, could also be used for buddy box if so desired. This one is spring loaded on one side, otherwise it is physically and electrically the same as the one that operates the retracts. It is a No. 7108-J11-Z.

Last but not least, the programmable maneuver buttons . . . nice small neat ones that have a definite "click" when operated, telling you that the desired action has taken place and to stop trying to push the switch out the bottom of the case. For these, I chose C & K's No. 8121-H-Z; SPDT, 1/4-40 bushing, wire solder lugs, equipped with a .310 diameter cap, No. 8018. All of the switches are mounted with No. 7099 Dress Nuts on the outside, for a cleaner look than that obtained from ordinary hex nuts.

The only deviation from C & K products is the "POWER-OFF" switch plate mounted under the ON-OFF switch. It's made by Alco Switch (1551 Osgood St., N. Andover, MA 01845, Part



Engraved name-plate on the author's new Silver Seven based transmitter. More about this custom touch in text.



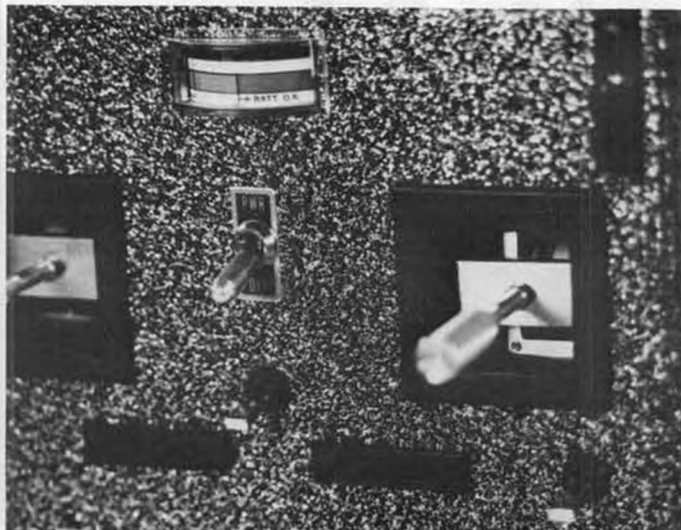
Close-up of author's transmitter, showing two-in-one meter and various switches as described in text.



Three-quarter front view of custom-built transmitter. Everything where you want it.



Another example of metal photo engraving. Limited only by your imagination.



All-metal sticks are Dunham R&R design, now being built by DaCa. Available through Ace R/C.

No. SPA-33. C & K and Alco both have distributors and dealers in most large cities, look in the Yellow Pages under Electronic Equipment and Supplies, Dealers.

Further features of my newest are a dual reading meter, switchable between battery voltage on an expanded scale, and RF output. The switch is a small slide type, located in front of the antenna receptacle.

Now, the *piece de resistance*, the name plate. After all, your best efforts have to have a bit of window dressing, right? The one shown, which bears my ham call, is engraved. Not silkscreened, painted, decal-ed, etc, but actually engraved on an aluminum alloy sheet. Some time ago, I fortunately discovered an engraving service that does the most fantastic work of this type that I have ever seen. Depending on the subject, and contrast, some of these engravings look so realistic you have to touch them to convince yourself they are not two-dimensional . . . I have enclosed a photo of another example.

This work is done with an optical scanner that in turn controls the cutting of the metal, and can be done from any good photo, color or black and white, or

any printed matter. Obviously not limited to transmitter name plates, these engravings mounted on a suitable plaque make great contest trophies, presentations, etc. A photo of your favorite airplane, full scale or model, so engraved, would look great on the shop or office wall! And they are not all that expensive, considering they will last a lifetime, and longer. A transmitter-sized nameplate as shown is about \$3.50; an 8 x 10 of a line drawing is \$23.68, same size photo is \$27.68.

My transmitter name plaque was made using rub-off letters, available in so many styles, including the border. Naturally, the design can be as plain or as fancy as you like; the important thing is that it is YOU! For full price information on the engraving of your choice, contact the folks at Otis Engraving, 3165 Harbor Blvd, Costa Mesa, CA 92627, (714) 549-2711. Tell 'em Model Builder sent ya!

Oh . . . the transmitter electronics? Silver Seven, naturally!

Our first letter of the month comes from the not too distant city of Santa Maria, California:

Dear Sir:

After maybe 42 years, I am planning to get back into "gas models" and almost certainly it will be (to start anyway) with Old Timers, but with three channels of control. I have been advised to use Mode II, except with rudder on the right. This would help whomever instructed me, since they would have lateral control where they are used to it for ailerons.

Then, when and if I went to full house control, I would have to move the rudder to the left gimbal to accommodate my new aileron control.

It seems to me that I could accomplish what your January article proposed and still accommodate another flyer, if I started with a REVERSED Mode I; that is, with rudder and elevator on the RIGHT and throttle on the left (as in paragraph 1), but then, if and when I added ailerons, have the aileron control on the LEFT gimbal. In this way I could fly either

3 or 4-channel interchangeably, would not (unduly) confuse other flyers on my equipment, and also provide separated primary controls while on full house.

Have you ever tried this, heard of it, or do you have any reasons why it would not make sense for me, since I have yet to fly my first R/C plane?

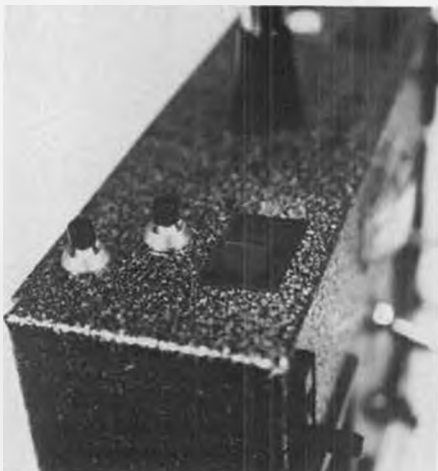
(It will probably be clear that I have no ideas of getting into pattern, pylon, or other hot-shot activities).

Sincerely,
Bob Bostrom

Well Bob, welcome back to the hobby. As the Aunt Jemima commercials say, what took you so long?

What you propose in the way of a transmitter configuration is not new, at least your initial thoughts, and is rather common practice for three-channel airplanes. However, I cannot recommend your second step of putting ailerons on the left stick, leaving rudder on the right. By so doing, you would be completely out of step with the rest of the world and not be able to get help when you need it or fly your friends'

Continued on page 69



Rocker-type switch for retracts. Click-type push-buttons. Sources in text.



Royal Electronics Digital Pulse Meter in new case, as described in text.

ACE R/C



SILVER SEVEN TRANSMITTER

By ELOY MAREZ

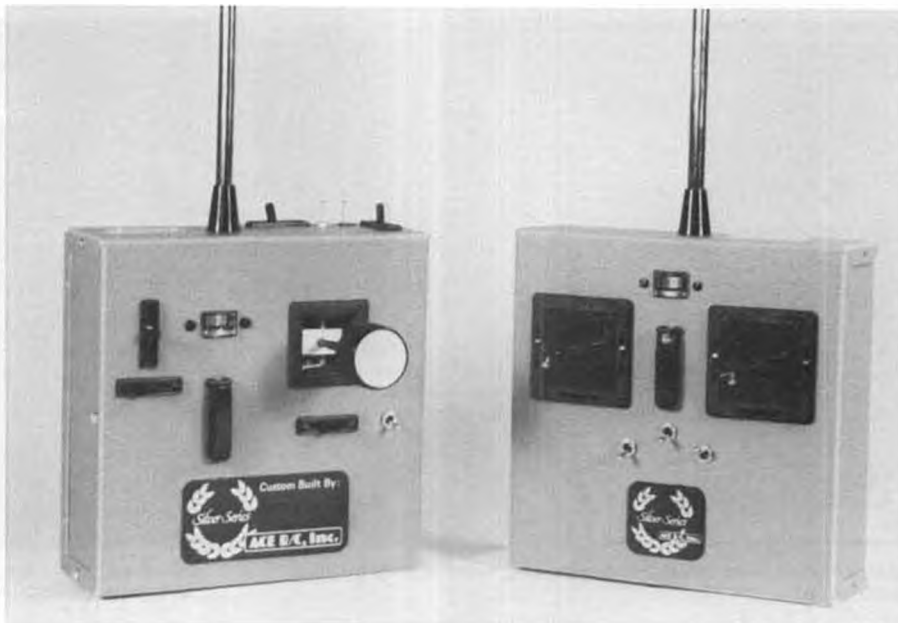
• The Silver Seven R/C transmitter, introduced by Ace R/C during 1979, the company's 25th anniversary, does not need much in the way of introduction. It was designed by Fred Marks, one of the country's leading R/C engineers, who was one of the first to explore the possibilities of the then new Signetics NE-5044 "transmitter in a chip" integrated circuit. This sixteen-pin device contains in a 1/4 x 7/8 inch package all of the electronics necessary to generate seven channels of R/C information, in such a manner that they can be easily tailored to any specific requirements, and lucky for we kit builders and tinkers, can be done so with a minimum of test equipment and electronic knowledge.

Ace R/C's NE-5044 transmitter measures 6-7/8 x 6-3/4 x 1-15/16; more or less nominal size. It weighs 28 ounces. Power output is claimed to be 600 milliwatts, and it is available on all 27, 53, and 72 MHz frequencies. The RF deck can be made interchangeable if desired. Power is supplied by eight 500 MAh Ni-Cd cells at 9.6 volts, power consumption is 140

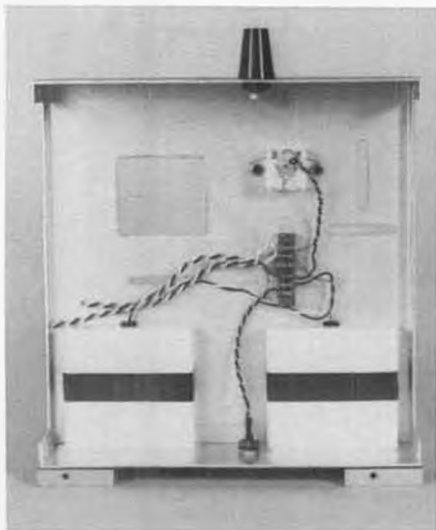
MA average. The modulation is AM, pulse position, at 96%, with a nominal 1.5 plus or minus .5 MS pulse width.

Not content to rest on the 7th day, Fred Marks and Ace R/C's Tom Runge have continued to update and improve the Silver Seven transmitter, based on their own experiences, as well as those of many fliers who have asked for, developed and tested both the original kits and various optional features as they have become available.

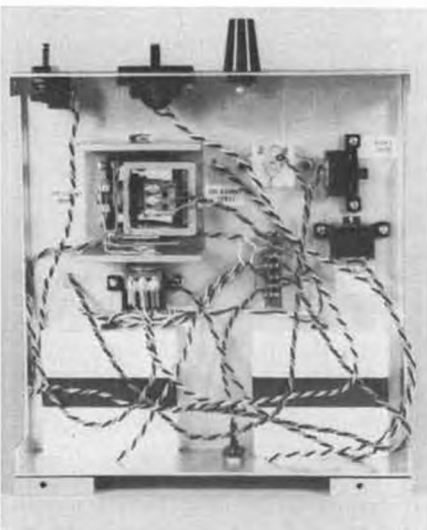
At present, the Silver Seven is available in four distinct and somewhat different models, all sharing two important features: You can assemble one, and you can tailor it 100% to your individual needs, with the modes and controls exactly where you need them... limited only by the available internal and external mounting requirements. You get to do it all, with the exception of the gimbal assemblies and the RF deck, which is received assem-



Main encoder board is the heart of the Silver Seven, contains all of the electronic wizardry that takes full advantage of the Signetics IC chip.



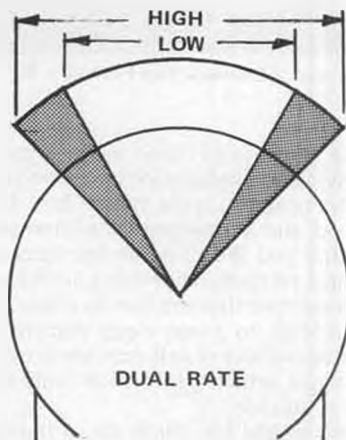
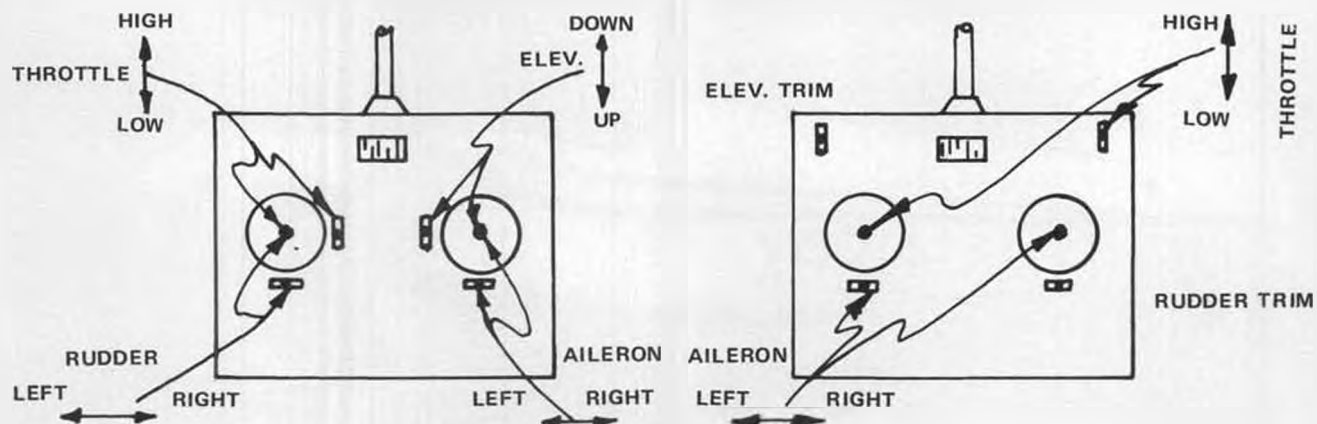
RF deck comes factory assembled, tested and tuned, meeting Federal regulations.



First step; installation of battery, switch, charger circuit, and meter, is a warmup for... the marriage of encoder board to control mechanisms. Not as bad as it looks.



CONVENTIONAL & CROSS TRIM TRANSMITTER CONFIGURATIONS



bled, tested, and tuned. This latter eliminates the need for an extra bit of electronics expertise and test equipment, as well as complying with the FCC requirements that require RF tuning to be done by a licensed technician.

INSTRUCTIONS on a Bo Derek scale: 10! For a kit, the instructions are a very important part of the project, and these are beyond criticism. By nature, parts of

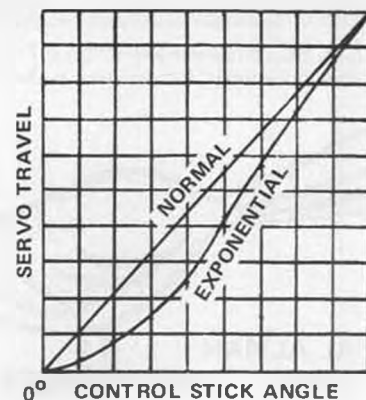
this transmitter are mechanically complex, but by reading carefully, checking thoroughly, and doing the steps in the sequence presented, you can't go wrong. I would be more concerned about a person's ability to solder well, than about any deficiency in the instructions. And just in case you never have, instructions on how to solder properly are included; you should have absolutely no problems in creating your own customized transmitter.

There are four basic Silver Seven Transmitter configurations, two dual, and two single-stick types. One of each use the D & R plastic open gimbals; well engineered, smooth working stick assemblies, previously used by a number of system manufacturers. Each basic assembly contains separate trim pots in their usual locations adjacent to the stick, plus another lever-actuated pot which, in this case, becomes one of the auxiliary control channels. This separate electronics trim feature permits one complete freedom in the arrangement of the trims; you can wire them in the usual *under* and *next* to position, in the cross-trim configuration, or a combination of the two to match the dexterity of your fingers. See sketch for possibilities.

These transmitters are Stock Number 11G27 in the two-stick, and 11G237 in the single-stick models.

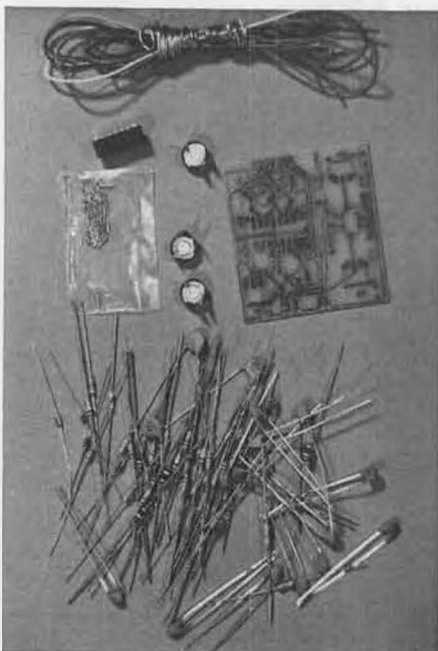
The other two choices use an all metal open gimbal, designed and developed by the old Maestro himself, Bob Dunham, and currently being produced by DaCa Model Products, and in turn being supplied to Ace R/C. These types of stock assemblies are generally considered as competition or professional necessities; they provide an added control precision that the expert flyers can take advantage of. Obviously, they are also an additional aid to the champion-to-be, as they do provide some increase in the fineness of the linkage between fingertips and control surfaces. This stick is more expensive to manufacture and the price increase is reflected in the cost of the transmitter kit. The dual stick model is Stock Number 11G227, the single is 11G207.

These metal open gimbals are made completely sans trims, thus separate

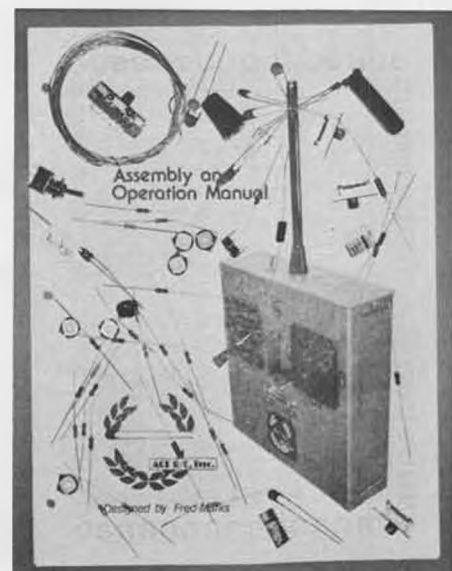


electronic trims are necessary, which in this case allows you even more leeway in their placement. Trim and auxiliary channel functions in this case are handled by another Dunham product, a nice neat lever-operated, single-pot assembly that is simple to mount and which contains an integral external plate that attractively dresses up the trim lever slot. Both single-stick models use one of these assemblies for rudder trim, instead of having a trim lever right on the top of

Continued on page 90



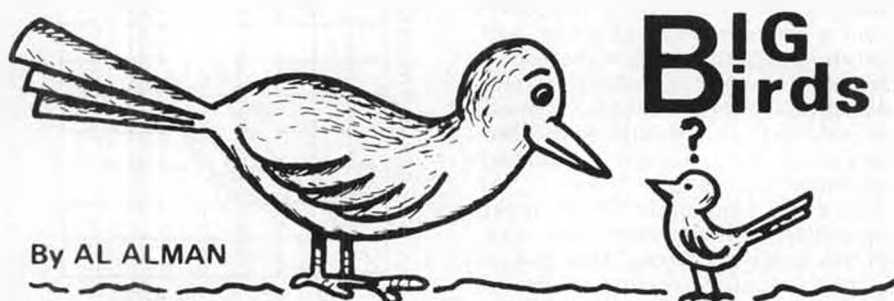
Optional mixer, exponential rate, etc., assemblies on smaller boards, plug into encoder board.



Top quality components, very clear instructions, well designed radio by Fred Marks.



Jim Kubo's Ohio Superstar Kraft "Super Fli" halfway down the runway on her first flight, in Hawaii. Kawasaki 2.2 turns a Top Flite 20 x 8 to pull this 25 pounder. Is there pilot in that cockpit, Jim? Photo by Jim Miura, Kapiolani R/C Club.



By AL ALMAN

• The number of airplanes I've been able to keep in one piece these past ten years has noticeably increased. Naturally I've attributed this remarkable feat to my constantly improving ability as a pilot.

Now I find out that this is not necessarily so, which deflates my bubble a whole bunch. Oh, I've improved alright, but according to my wife, Dee, that only accounts for a very small percentage of aircraft staying in flying shape. She insists that well over 90 percent of my birds owe their continuing airworthiness to

having been named.

Sound crazy? Well, you haven't heard anything yet, pardner. First, Dee says, you've got to accept the fact that *all* flying machines are naturally females: some are nice, some are mean, some are workhorses, and some are just plain slinky and sexy . . . but they're all ladies and want to be treated as such. So you can see that your new BIG Bird is off to a very shaky start and faces a dubious future if she's not given a name prior to that crucial maiden flight.

Dee explains it this way: by not bestowing a suitably nice name on your latest creation, you make her feel unloved and unwanted. She then reasons that you didn't name her because you have no faith in her flying ability and are convinced that she has no class. This in turn leads to a very deep depression and massive loss of self-confidence and self-image, which can end in only one way . . . suicide.

Don't laugh! Just think about the vast number of planes, yours and others', that have made unexplained kamikaze attacks during their first flight. Isn't it possible those poor wretched birdies couldn't bear the shame and humiliation of being flown without a name?

I scoffed, too, at first . . . till Dee reminded me that my buildup of birds started at the same time we first met . . . ten years ago . . . which is when she started naming my planes.

So there it is . . . the real truth about BIG Bird longevity. I thought you'd like to know about it since this is the kind of information most people don't have, or for some reason aren't willing to pass on. To insure that you keep more of your planes for much longer periods of time, have your wife or girlfriend (I was going to say, both, but decided not to do that) pick out a really nice name for each and every aircraft in your hangar. And not only will they last longer, but having a name will also get them flying better, which always makes the pilot look good.

Here's your chance to help reduce the carnage at our flying fields. Get a name on your next BIG BIRD and cut the suicide rate.

THE GAPING HOLE SYNDROME

Being a self-confessed, stand-way-off-scale type, you'd think that a pilotless plane wouldn't bother me . . . but it does. And from what I've overheard, it's the first thing that your average run-of-the-mill spectator notices and makes negative comments about, also. That empty cockpit looks more like the Grand Canyon when there's no one (or



Jim Miura bought this "Snapper" for only a hundred bucks. A Quadra with 20 x 8 Zinger flies this 20 pound aerobatic biggie. Jim Miura photo.



Al's Mapp Gas Torch, fully described in the text. Great for those heavy duty landing gear joints.



An 8-foot, Clark-Y airfoiled version of an RCM Trainer with a 1.3 Kawasaki turning a 16 x 6 cut down from 18 x 6.

nothing) at the controls . . . especially in a BIG Bird. Now I know there are those who get violently ill at the thought of a Yogi Bear or Snoopy being commissioned to patrol the wild blue, but it seems to me that even a Big Bird or Cookie Monster would be better than nothing.

And it's a paradox that the majority of these empty cockpits are in extremely well-done scale birds with detailed instrument panels and such, where not having a pilot is an affront to those who've come to pay homage . . . and leaves them wondering why the builder didn't finish what he started. And for all their creative ability in designing, building and finishing (and sometimes even flying), these scale types, when asked why, seem unable to come up with anything new or original, and offer the same old, "I can't find the right pilot."

Hey guys, it's difficult to accept that kind of an answer from someone who is obviously well on his way to becoming a master craftsman . . . because there shouldn't be any excuses. A number of articles about how to make your own pilots have been published over the past few years in many of the model magazines, and include the option of having a look-a-like at the controls.

But even if you're not up to making dolls, or want to protect your image, there's another way to go: large discount department stores and toy stores sell quite a few different dolls that are mighty close to the right size. What's that? You're tired of girl dolls. Okay, then take a look at the macho males that are on the shelves; you may have to do a little surgery here and there, and maybe have your gal make a jacket and helmet, but at least you'll end up with something that looks like a pilot to fill that gawdawful looking gaping hole.

Since I'm not held to absolutes in regards to pilots, I definitely favor and use the blond and brunette ingenues I find in those stores; their size is acceptable, their arms and legs are articulated, they do look very much like people . . . and the price is nice. At somewhere

between a buck and a buck and a half, only females are available; however, that macho male can be had for about a five dollar bill, which is still a decent price for a realistic looking pilot. I've been using Velcro Tape to hold my gals in place, and haven't lost a body yet.

If you're gonna fly an ugly Big Stick, then a pilot sort of ruins that airplane's basic charm; but most other BIG Birds do have cockpits that beg for an occupant (or two). Give a doll a good home and dress up your biggie at the same time.

DON'T GO DOWN IN FLAMES

While an old flying buddy and I were hangar flying and trying to outdo each other with stories about birds we miss the most, he told how his magnificent "Dallaire" burned up due to a backfire.

Vividly describing how that transparent yellow, orange, and blue Monokoted BIG Old Timer disappeared before his very eyes reminded me that although I had never lost an airplane that way (what a trauma that must be), I had charred a number of nose sections over the past 20 years. This recollection, in turn, reminded me how most everyone

jumped on the bandwagon not too long ago, strongly recommending, and in some cases, insisting, that we don't crank up our BIG Bird gasoline engines unless a fire extinguisher was right there on the spot. No one can logically argue that the major consideration in any kind of flying has got to be safety, yet this overwhelming concern for gasoline made it seem that methanol fuel was neither volatile nor anywhere near the safety problem gas was.

Ask most any race car driver how he feels about running with alky, and I do believe you'll get a negative answer. Why? Because the stuff is insidious; just like the Dallaire and countless other birds have been destroyed in seconds, too many race drivers have been severely burned or died because the damned flames are invisible, and all too often you don't know there's a fire till it's too late.

What's my point about all of this? Only to remind you that both types of fuel must be treated with more respect . . . and that you're gonna be in deep trouble if you're not prepared for that inevitable emergency. Good fire extinguishers can be had for about 10 bucks . . . and that's mighty cheap insurance, since we're not only talking about losing an aircraft, but your very own personal butt along with it (and don't forget about innocent bystanders). Better to spend those 10 bucks on an extinguisher you'll cart around and never use, than to be caught without it and go down in flames because you were too lazy to go get one.

THE POOR MAN'S TABLE SAW

If you're like me and most other BIG Bird Drivers, you've probably got a hankerin', and a need, for a table saw. And you've also probably got a circular saw that's been loafing around for a long time, enjoying the good life, and doing little or nothing to earn its keep.

Well, there's no need to fret any longer, because The Hirsh Company has a two-in-one solution for you: it's called the Hirsh Saw Table, and it'll get that lazy



Hirsh Saw Table puts your circular saw to work as a table saw. See text.



PRODUCT\$ IN U\$E

AMERICAN R/C HELICOPTERS' SUPER MANTIS by RAY HOSTETLER

● Review time again. The format for the articles on the Kobe-Kiko Hughes 300 worked out so well that I'm going to stick with it. The current subject is the SuperMantis, a .40 powered collective pitch machine produced by American R/C Helicopters, San Marcos, California. American has been manufacturing a fixed pitch version of this ship too, simply called the Mantis.

The Mantis design (the fixed pitch ship) is aimed primarily at the beginner market, something simple, yet rugged enough to take the blows of a KIWI helicopter pilot. The new SuperMantis gives the progressing beginner through expert a collective pitch helicopter that is more responsive to altitude control (via collective pitch) and also cyclic control (via Bell and Hiller systems in the SuperMantis vs Hiller only in the Mantis).

Everything comes in one conveniently sized box, measuring only 25 x 12 x 5. Most accessories are included in the kit, except the tank. Seems to me they should throw a tank in as only one type fits anyway. American recommends the O.S. .40 FSR engine, but other good,

healthy .40 engines will work fine. The factory used to advertise that "a Schnuerle ported .40 engine not needed". I think too many guys tried to put worn out "sporty forties" in the helicopter and it just didn't work out, so the people at American decided to drop that point and recommend a good Schnuerle engine from the start.

Before starting to assemble anything, I cut out the wood parts, took the aluminum tail boom and skids, and made a trip to the paint room. I wanted a good looking ship without extra effort. Since the side frames are black nylon filled plastic, I left them black. I painted the skids black to match, painted the tail boom red, and trimmed the canopy in red.

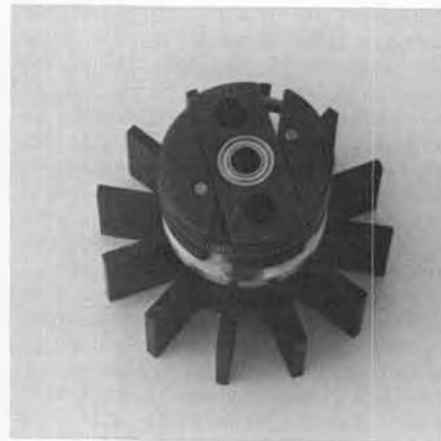
POWERPLANT AND CLUTCH

The engine in the SuperMantis is mounted vertically. Again, this is the best way to mount engines because engine torque can easily be corrected by the yaw axis. The cooling fan slides right against the engine drive washer, and the clutch bolts to the top of the cooling fan. The cooling system is fan and shroud, or "cyclone" cooling, as it is in the Heli-

Boy. Due to this system, engine cooling is excellent.

The clutch has two shoes. Each pivots about a pin, and an outer spring regulates the centrifugal engagement point. The design is simple and everything works well. The clutch fits up into a plastic bell housing which is held in position between the side frames by two ball bearings.

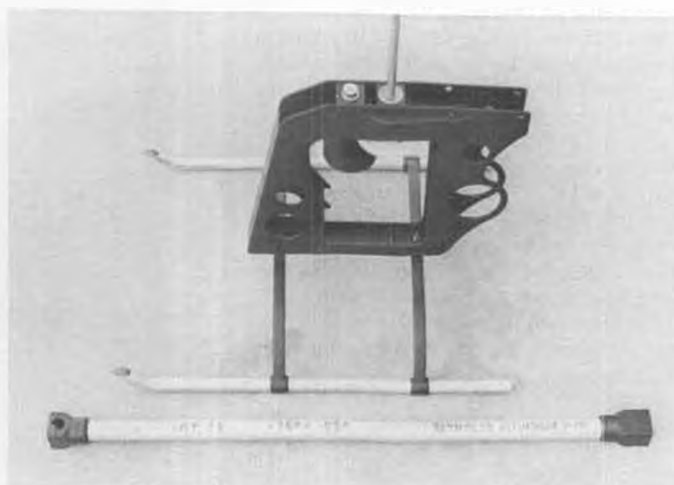
The clutch lining does not come installed; you have to epoxy or Hot Stuff it in place. While this is not a big deal, I thought it should be done at the factory. It is a fairly critical piece, you wouldn't want it to come loose in flight! I used, and would highly suggest that you use, Hobbypoxy Formula Four for the job. Whatever, make sure it is put in to stay.



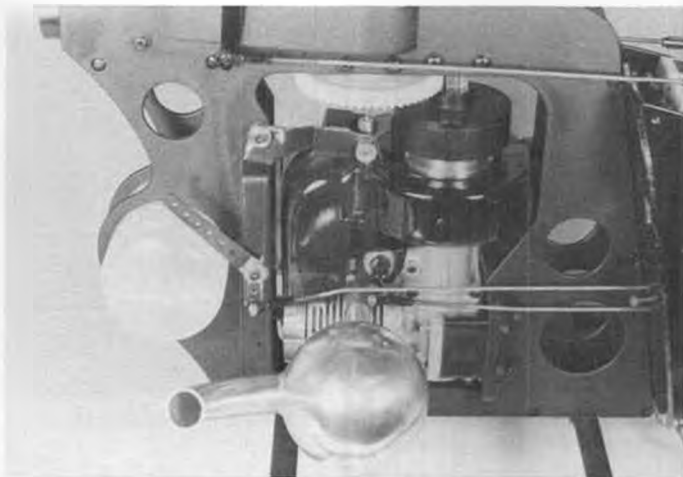
Clutch detail. Two shoes rotate about pins, retained by outer spring.



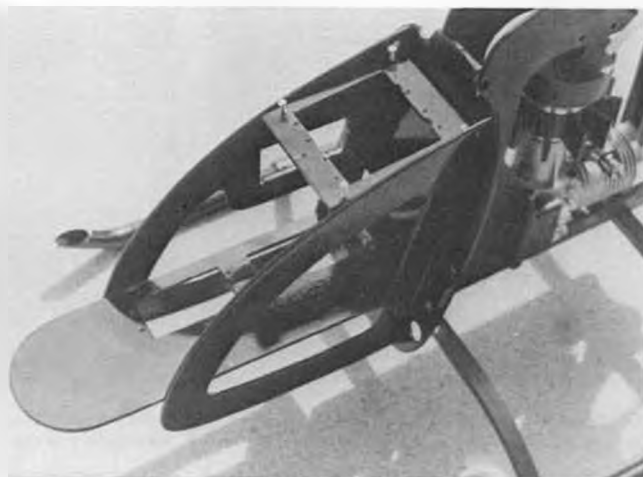
Author couldn't wait for parts-out-of-box picture. Cut out wood pieces, and started assembly of side frames and gears.



Close-up of side frames, landing gear, and tail boom. Clutch bell housing, main shaft, and main gear in place.



Engine and cooling shroud in place, most pushrods hooked up. Mac's Heli-ball muffler works nicely.



Modified servo mounting trays. Removable top tray by four screws on corners. Details next month.



HB 40 PDP mounted in Super Mantis. Rossi-type carb in HB works flawlessly.

I elected to install the new version of HB's .40 PDP. I had flown a Heli-Boy with HB's .60 PDP a while back, and it delivered very good performance; so I was anxious to try the HB .40 PDP with the new style carburetor. Earlier HB's used Perry carbs, but this new style carburetor is fashioned after the Rossi carburetor. In short, the HB carb works flawlessly, producing smooth power

changes and very reliable settings. The overall engine is quite powerful: My SuperMantis lifts off at half throttle with ease.

As per my standard procedure, I run all of my engines for 45 minutes on the bench before I install them in the helicopters. Three runs without the muffler, and the last two with the muffler. During the last run, I finalize high end and mid-range mixture adjustments so I know I'll be very close when I go out for the first flights.

The engine is started by a removeable starter belt, included in the kit. It has little hooks to hold it together in a circle for the starting procedure, then the belt is removed before flight. The hooks should be flattened somewhat, if you leave them fully round they will try to tear up the cooling shroud upon starting. If you flatten them too much they won't disengage when you want them to, so go easy with the pliers.

The fuel tank placement is just behind the engine. The position is very good, but the holes in the side frames are not quite large enough to accept the tank. The instructions say the tank should be a tight fit, but if you don't enlarge the opening somewhat you'll end up with one punctured tank . . .

DRIVE TRAIN

The engine is geared to the main rotor

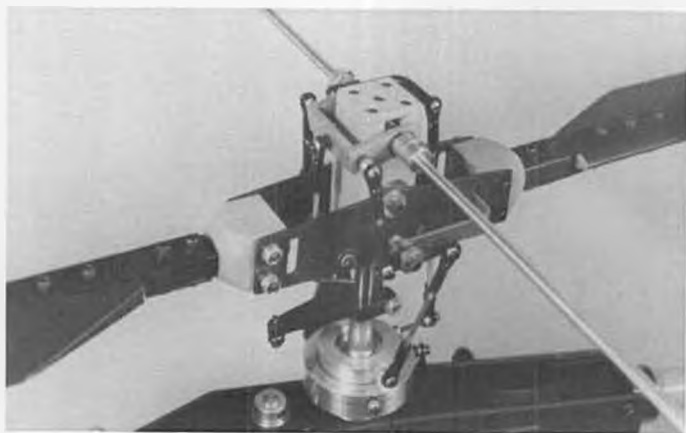
at 5.6 to 1. The tail rotor is belt driven from a pulley on the main rotor shaft. Assuming the engine turns 12,000 rpm, the corresponding blade speed would be 2,143, and tail rotor speed would be 9,644. These gear ratios are very high, i.e., the engine runs relatively slow while the main and tail rotor speed is very fast. What happens in the end is that the blades have very little pitch in them for lift-off. On collective reduction or certain cyclic application, the blades are near zero pitch. This can cause the blades to "hunt", making the cyclic response feel "stiff". I don't want to get into too much detail at this point; and I'll suggest a cure next month.

Anyway, I directly asked John Simone why the gear ratios are set up the way they are. He replied that by running the engine slower it will give a longer life in the helicopter. Quite frankly I question this philosophy because (A) if the engine runs slower it will run hotter, working harder to turn the rotors, and (B) gear ratios should be chosen by proper rotor performance, not by "engine life".

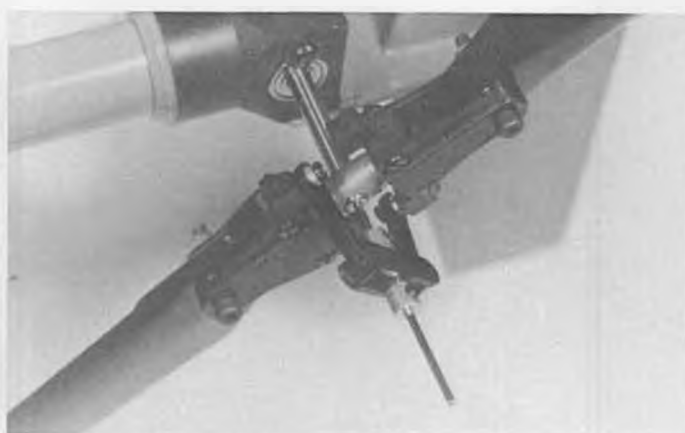
MAIN FRAMES AND LANDING GEAR

The nylon reinforced main frames are a "first" at trying a replacement for conventional aluminum side frames.

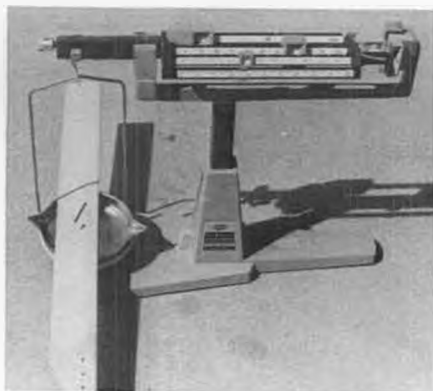
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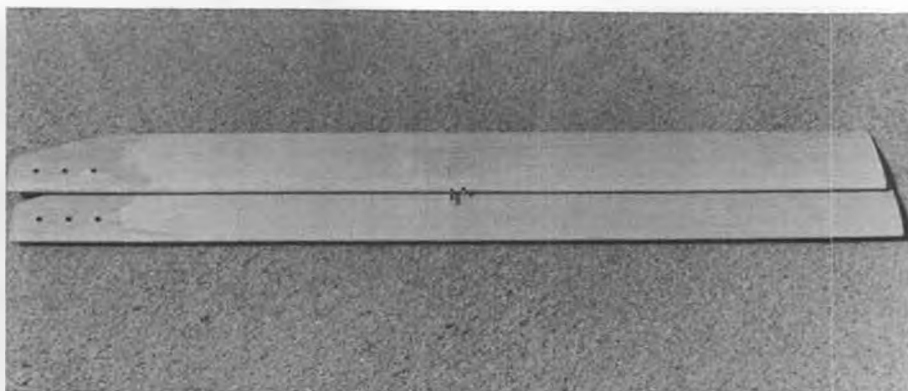
Assembled main rotor head. Collective pitch; Bell and Hiller system via mixer arms.



Tail rotor assembly showing gear box, blade holders, and pitch change links.



Brad weights added to light blade to equal weight of "heavy" blade.



Brad's inserted in leading edge of light blade, then Hot Stuffed. Alternate method calls for wrapping Fas-cal around center of light blade.

CHOPPER CHATTER

By RAY HOSTETLER

PHOTOS BY THE AUTHOR



• Last month I layed down the basics for a rotor head balancing procedure. Hopefully you have digested that information, gathered the balancer, straight main shaft, and an appropriate machined counter-balance. Assuming that you have these items, I'll continue where I left off.

It does not make much difference if you are balancing a new rotor head or one that you have been flying. There is

one point where a head that has been flown can come in handy; but I'll point that out when I come to it.

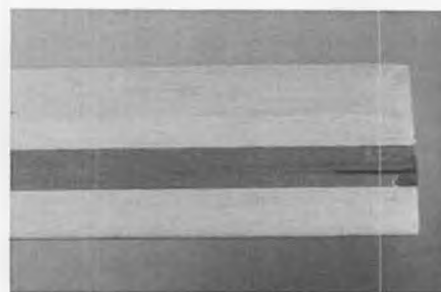
MAIN ROTOR HEAD

First it is necessary to get the blades close to each other in weight. Most of the blades in the kits I've seen have been fairly well matched and balanced. The procedure to follow is not difficult or time consuming, and it give us a good place to start.

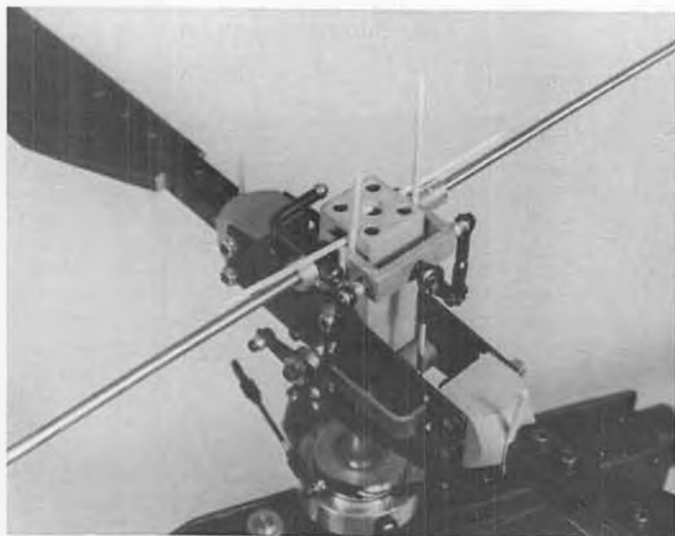
Weigh your rotor blades on a good balance (available at your local high school physics lab), or construct the little teeter-totter that John Gorham described in the Oct. '81 issue of RCM. Take the light blade and cut a strip of Fas-Cal, covering the proper width to make the "light blade" equal to the heavy blade. Wrap this Fas-Cal around the center of the light blade. Another, "cleaner" way to do this is to use a



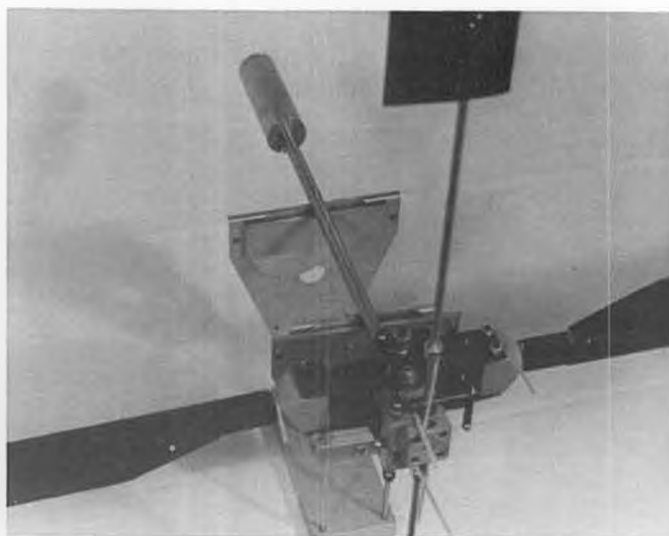
Setting lead lag for fixed-pitch ships.



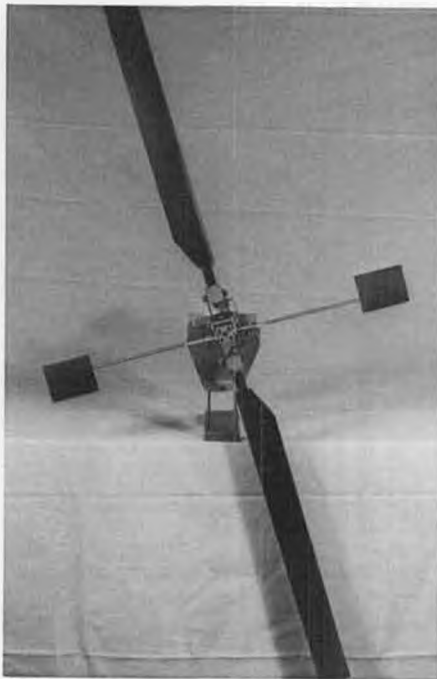
Black mark on tip locates lead lag on collective heads.



Rotor head shown full of toothpicks after "freezing" procedure. Blades are at lift-off pitch.



Frozen rotor head in position on High Point balancer.

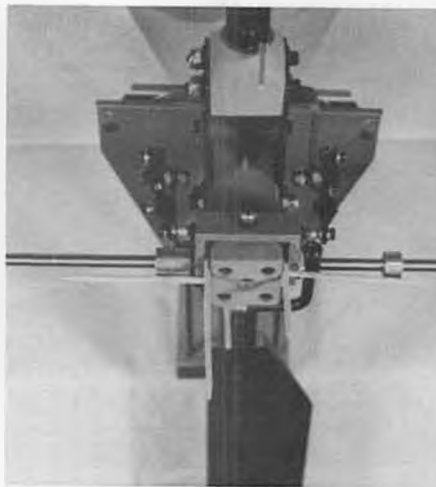


Before balancing, this is where Super Mantis stabilized on balancer.

couple of brads to bring the light blade to the heavy blade's weight. Then drill small pilot holes in the center of the blade at the leading edge. Tap the brads into the holes that you predrilled. Use a drop of Jet to fuel proof the little hole after you're all finished. Now both blades weigh the same and the CG of each blade will be close enough to the other. There is no need to individually check CG's, because we balance the head as a whole unit, like I demonstrated in the examples last month.

CAUTION

If you have to add more than three-grams (six wire brads, 16 gauge by 1-1/4 inches long; or about one-ninth of an ounce) of weight to the light blade, take note of it. If the blades are way out of balance from the start, this suggests that the density of the wood in each blade is different. You can weight the blades successfully to make them statically equal, but this is no guarantee that they will flex (or develop lift) equally in flight. If the blades don't behave equally in flight, this will generate aerodynamic problems. To put it short and sweet; *Some blade pairs are not compatible.* Nothing you do will help the situation. The solution is to get another pair of



Right wheel collar moved out on flybar gives proper chordwise balance.

blades, hopefully closer matched to start with. Let me say again that this is not usually a problem with most kit blades, but be aware.

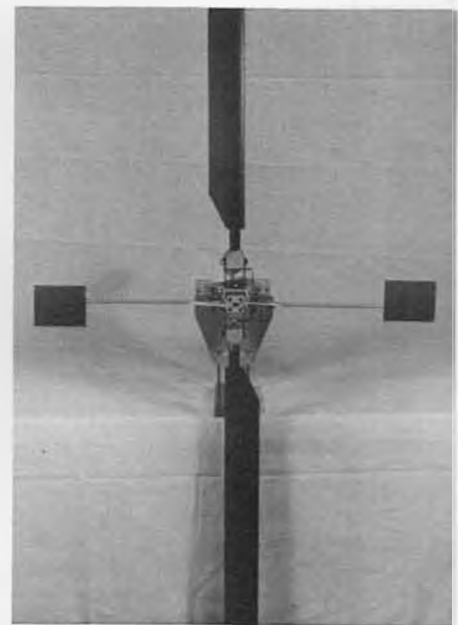
LEAD-LAG, FIXED PITCH

At this point the blades can be attached to the rotor head. If you have a fixed pitch helicopter, align the blade lead-lag by holding a metal yardstick to the seesaw, and adjust the rotor blade parallel to it. Do the same for the other blade, then lay the yardstick over the top of the head to double check that both blades are perfectly in line with one another.

LEAD-LAG, COLLECTIVE PITCH

For collective heads, I have a little different method of setting lead lag. In past issues, I commented a bit on lead-lag and pressure changes along the blade. I stated that improper lead-lag can give some aerodynamic problems that balance cannot correct. So to set lead-lag on a collective helicopter, I pivot the blade along the feathering axis and look at the blade tip.

First make a mark at the tip as shown in the photo. If your blade attachment holes are 17mm back from the leading edge of the blade, this mark should also be 17mm back. Same for 12mm; 12mm, etc. When the lead lag is correct, this mark will remain stationary as the blade is pivoted from extreme positive to extreme negative pitch. Make the blade "flutter", i.e., go from positive to negative to positive pitch (one cycle) at about two cycles per second. If the lead-lag is



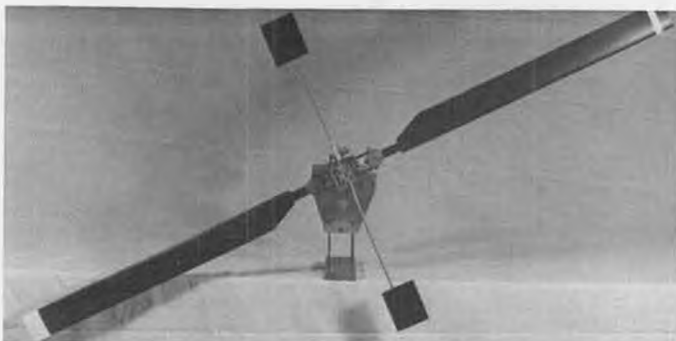
Chordwise balance completed. Next comes spanwise balance.

not correct, the mark will move up and down in an arc, and some other point on the blade will be still. With a little practice you'll be able to see if the pivot point is too far back or too far forward. Make a lead-lag adjustment if necessary and check again until the mark does not move. Repeat on the other blade. Once this is done, tighten up the blade holder screws to lock the blades in place.

Now we are assured that the lead-lag will remain the same throughout all collective pitch settings. Therefore the head will be smooth through the total range of collective pitch.

Those of you who insist on running "loose" blades (free to lead and lag) may have noticed that your helicopter might be smooth at some r.p.m.'s and rough at others. The reason for this is that the blade lead-lag is changing depending upon the rotor rpm. The most likely place that you will notice this is on an approach to hover from forward flight. Fly with your blades tightened down! In fact, this whole balancing procedure will not work with blades that are free to lead and lag. (At least you must have your blades tightened down during the balancing procedure if you want to try it with free blades. However, no guarantees for smooth flight afterwards.)

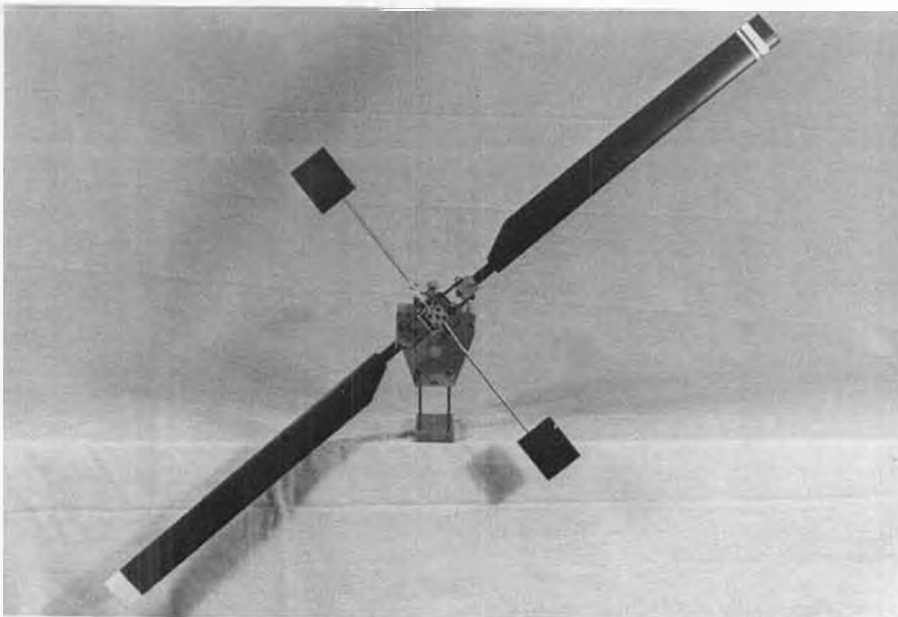
Once this lead-lag adjustment has



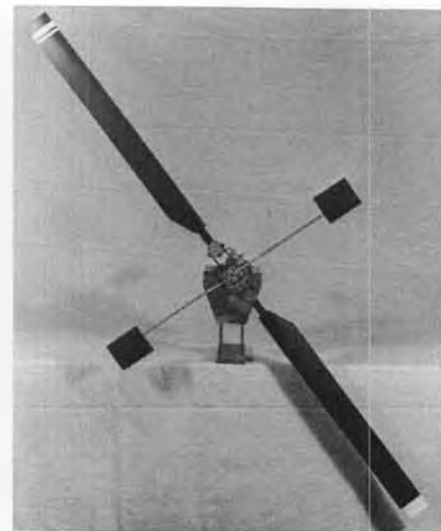
White Fas-cal on left tip for field tracking. A bit more Fas-cal needed on right tip for balance.



This small piece (on right tip) is all it took to give perfect spanwise balance. High-Point Balancer is sure sensitive!



After double-checking chordwise and spanwise balance, the completed rotor 'disk' will hold any position it is put in (above and right). One house fly will throw it off!



bent axle or bent side frames. Double check everything and remedy any problems. Under no circumstances should you alter the lead-lag of any blade if it was set correctly in the first place! The problem is in the head. . .

been set, do not fool with it again until your rotor head has been crashed or bumped around. If the helicopter does get knocked while you are transporting it, simply un-hook the ball links at the head and give each blade a "flutter test".

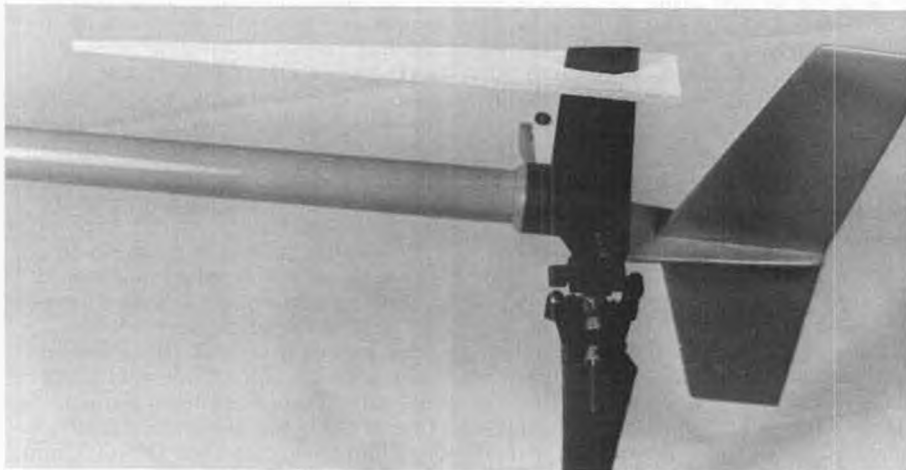
The next step is to check the accuracy of your blade axles and side frames once they are assembled and in the head. First set the pitch in your rotor blades to the number of degrees required to hover the chopper. This is where it is nice to have a ship that has already been flown. You can just set your TX stick at your hover position. If your helicopter has not been flown, position each blade's pitch to the hover position based on the manufacturer's angle or pitch jig. The rotor head must be on the helicopter and the linkages from the swashplate to the head should be installed at this point if you have not already done so. Also set the coning angle of each blade if you have a helicopter where the coning angle is adjustable.

Given that the blades are set at a hover pitch, stretch a string from the mark on the one blade tip to the mark on the other blade tip. This string should pass

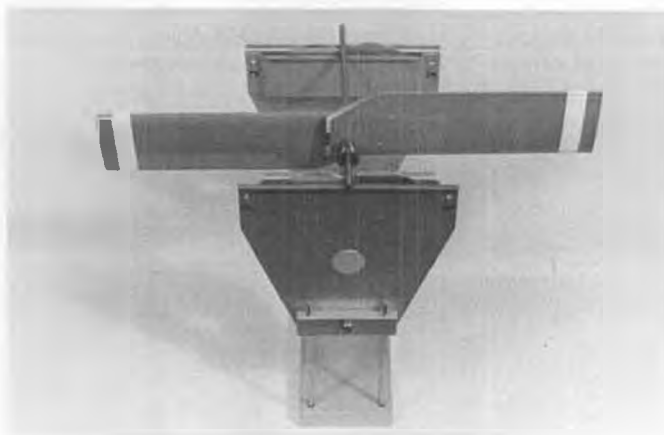
over the center of the rotor head (or main shaft). If it is off center, you possibly have bent or mis-aligned axles or your side frames were tweaked during assembly. In the Jet Ranger, adjust the set screws in the seesaw to properly align the axle that is not set correctly. In the Heli-Boy, it could be a

I have assumed that you installed the flybar with equal lengths on either side of the head, and balanced your paddles so their weight is identical. Before you install the paddles, slide one appropriately sized wheel collar on each side of the

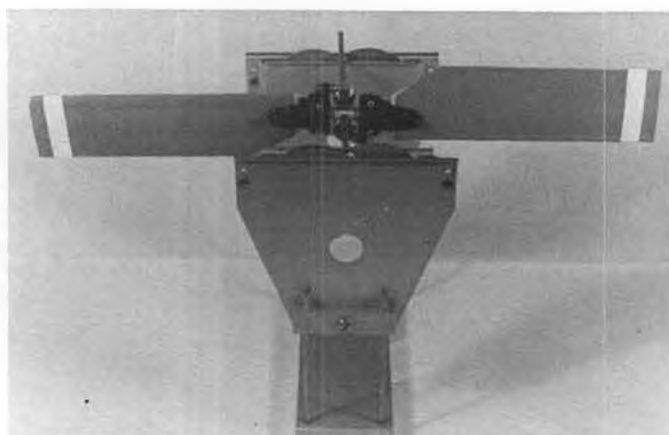
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Sample tail rotor pitch gauge. Takes two minutes to whack one out of scrap balsa. Gives accurate info on tail rotor blade tracking.



"Old" method of balancing tail rotor blades. Still OK for a starting point.



Proper balance using whole tail rotor. Blades set in flight position.



Close-up of Maria fuselage and wing fillet as constructed by Jack Chambers (right). A highly refined design.



Jack Chambers, Laguna Beach, with his two-meter span Maria. Ship has reached speeds estimated at about 150 miles per hour.

R/C SOARING

by Dr. LARRY FOGEL.

• Last night I visited Jack Chambers. I wanted Gerald Lewis, a fellow modeler and friend who is visiting me from London, to meet Jack and see his newest creation . . . a super fast, efficient, thin-winged sailplane. Jack lives in a small cabin in the hills above Laguna Beach, California. While we were talking of airfoils and such, I looked out the open door, and there was a raccoon feeding on some dinner leftovers. Jack assured me that he has a number of such friends, and there are also fox and deer in the local, lush countryside.

We heard about Jack's early days in free flight and how he got into R/C sailplaning in the early '60s after recognizing the significant room for improvement. In recent years he's designed a series of sailplanes of the same basic configuration. His latest Maria is a sleek, T-tailed ship having two-meter polyhedral wings that taper from 6-3/8 inches at the root to 5-1/2 inches at the break, to 3.6 inches at the tip. The forty-two-inch fiberglass fuselage is strengthened by multi-element formers. The wing has graphite spars inset into the shaped 3.3 pounds per cubic foot blue foam core. This is covered with 1.4 ounce per square foot fiberglass on the inboard panels and 0.6 ounce per square foot fiberglass on the outboard panels.

The fiberglass is laid on a 45 degree bias, with alternating layers on the opposite bias. According to Jack, this provides five times greater strength than the same fiberglass laid out spanwise. This coating is then covered with 1/16-inch balsa sanded to match the airfoil templates. The final covering is Monokote. Twelve-inch long tubes anchored in the root rib carry ballast as desired. Obviously, these tubes must be aligned very carefully. In all, Jack has spent over a thousand hours on this particular plane . . . a small investment for a machine of this superb quality.

A key feature is the thin airfoil. Jack generally recommends a rather sharp leading edge on these slightly uncambered sections that range from seven to 8-1/2 percent thick. "That gives you speed and therefore efficiency. You can then outclimb the floater every time, and with all that speed smoothly carry out complex maneuvers. These airfoils also have an exceptionally low speed capability. Obviously, the wings have to be extremely sturdy to prevent flutter and/or total loss in a high speed pullout." Jack's wings have withstood the test of diving to about 150 miles per hour. He claims that his plane has not yet reached terminal velocity. Here's a keen machine that's ready to break the speed



Radio compartment of Maria. Note lightened bulkheads.

record. It should compete successfully with the lead sleds commonly used in pylon racing.

Jack plans to demonstrate his Staker in less than a year. This two-channel fifteen-inch span rig will fly at about twelve ounces. The design incorporates a retractable finger grip to facilitate hand launching. As the plane leaves your



Bill Turner, Laguna Niguel with his Predator, using Jack Chambers' airfoil.



The Predator making high-speed passes at Kite Hill, near Laguna Niguel, California.



Rick Schramack, Bonita, California, with FAI version of his Concept I, logically called Concept II.



Concept II, off and flying at Torrey Pines. Modified Eppler 193 for higher speed.

hand, the outstanding bracket snaps back flush to the fuselage.

As indicated in previous articles, other designers are now using Jack's airfoils. Bob Williams' Shreik and Noel Jones' Tiercel both use the Jack Chambers JC-18 airfoil. Both these planes use solid balsa shaped wings. Bill Turner, of Laguna Niguel, has been flying his Predator. Here's another ship based on a Jack Chambers airfoil. This two-meter, polyhedral, short-nosed sailplane flies at thirty ounces. The fuselage is built up and lightly glassed all the way back. The full flying stab is about 12 percent of the wing area. The balanced rudder provides more than enough roll rate. Here the wings are fully sheeted foam covered with fiberglass. I watched this plane fly at Kite Hill in Laguna Niguel. The close-in high speed passes were conducted under complete control. The Predator has now seen many hours of slope and thermal soaring. I asked Bill, "Why the short nose?" His answer was simply, "It looks better that way." What can I say?

Rich Schramack, of Bonita, California, has been practicing for the FAI team selection with his Concept II, a shorter version of his original three-meter Concept I. This plane was specifically designed for the new FAI four-lap speed event. The 88-inch wings conform to a modified Eppler 193 section. The



No canopy on Concept II. Radio gear slides forward into nose on tray, accessible through wing opening. Neat idea. More specs on plane in article.

sharper leading edge is intended to allow greater speed. Rich assured me that this does not induce unnatural sensitivity or violent stalls. The wing covers 780 square inches. The ailerons are 9 percent of the wing area. Without ballast, this plane flies at forty-four ounces, but it can carry up to three pounds of lead. The fiberglass fuselage has no canopy. Instead, a tray, designed to carry the airborne pack, slides into the nose from the open section where the wing is mounted. The blue foam core wings are strengthened with Kevlar spars and carbon fibers, this being covered by 1/64-inch obechi wood. Rich claims this plane can take up to twenty-

two g's (as demonstrated by static loading). His mean time in practice runs of the four lap speed events is thirty seconds. His best time, operating at 16 ounces per square foot, is 26.6 seconds. Let that be a challenge to those who also seek a place on the new FAI team.

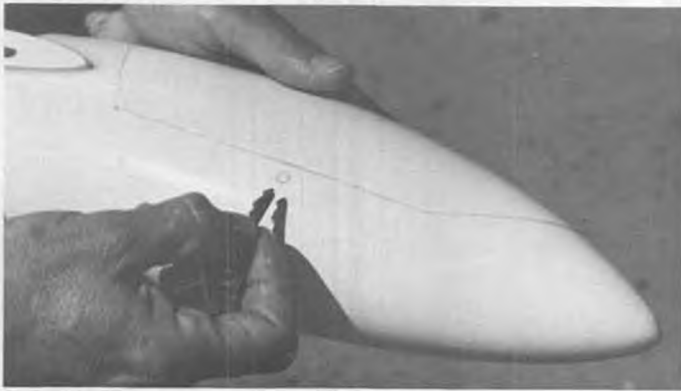
Back at Torrey Pines, I met Mark Rebeck, of San Juan Capistrano. He was holding his Savage, a machine that looks as if it's strictly for aerobatics. The wind was very light. I remarked "I'm sorry you can't fly your plane in view of the light air." Several floaters had just come down for lack of lift. Without hesitation, he threw the Savage off the cliff and flew near the edge while performing intri-



Mark Rebeck, San Juan Capistrano, designed and built this highly aerobatic "Savage", flying over scenic Torrey Pines. Fuselage is built up, kit available, see text.



Mark Rebeck launching Savage. Ship will fly when floaters come down.



Here's a neat canopy or hatch hold-down device, demonstrated on Ralph Loveland's Swift. Pieces of spring steel with short section of dowel affixed near ends. Drill holes, epoxy springs in place, mark dowel locations with canopy/hatch in closed position. Clever!

cate maneuvers. You don't expect to see such a machine stay aloft without considerable lift . . . much less perform consecutive rolls within a few feet of the cliff edge.

After he landed, I got the full facts. This 70-inch slope/thermal machine operates at seven ounces per square foot wing loading. The wing is a very modified Eppler 374 of one pound per cubic foot foam, covered by 1/16-inch balsa sheeting. The fuselage is built up and suitable for carrying up to two pounds of ballast. Although the plane feels very light, Mark usually flies at 32 ounces and somehow creates at least this much lift. Mark has also designed the Prowler for FAI type competition. You can get plans or the entire kit for the Savage by writing to Mark in care of California Slope Designs, 31932 Calle Winona, San Juan Capistrano, California, 92675, phone (714) 493-4051. This kit is rather complete, and requires about twenty-five hours from opening the box to launch. Kits for the Prowler and Hooker are on the way.

And what's wrong with building designs that have long demonstrated their worth? Ralph Loveland is flying his Pteradactyl . . . covered in gold Monokote and properly labeled 24-carat. He's also completed a Swift (designed by Allen Nelson several years ago). Ralph developed an elegant canopy hold-down device consisting of two pieces of spring steel with a small section of dowel affixed near the end, this

snapping into a hole drilled in the fuselage. You simply push in to pop off the canopy. Here's wishing Ralph many happy hours in the air with these fine planes.

To really appreciate what you've accomplished by designing, building and flying radio-controlled sailplanes,



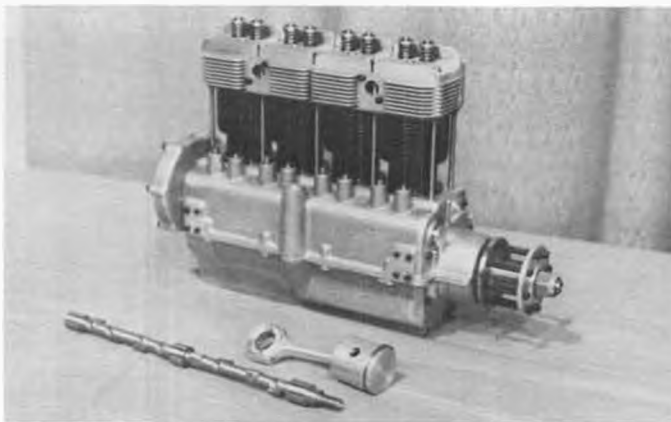
Here's Ralph and his all gold covered Pteradactyl, appropriately named "14K".

consider the remarks of some eminent experts.

Lord Calvin, President of the Royal Society, 1890-1895, stated that "Heavier-than-air flying machines are impossible."

Around 1900, the noted astronomer, Simon Newcomb, attempted to clarify this viewpoint: "The demonstration that no possible combination of known substances, known forms of machinery and known forms of force, can be united in a practical machine by which men shall fly long distances through the air, seems to the writer as complete as it is possible for the demonstration to be." In 1902, he stated that "Flight by machines heavier than air is unpractical and insignificant, if not utterly impossible." And in 1903, he commented, "Aerial flight is one of that class of problems with which man will never be able to cope." (He should have been a weather forecaster! wcn)

Rear Admiral G. Melville, in a paper entitled, "The Engineer and the Problem of Aerial Navigation," published in *North American Review*, December, 1901, stated that, "Outside of the proven impossible, there probably can be found no better example of the speculative tendency carrying man to the verge of the chimerical than in his attempts to imitate the birds, or no field where so much inventive seed has been sown



Exact, 1/4-scale Cirrus engine being built by Merritt Zimmerman, Cleveland, Ohio. Two-inch version has run for several years.



Lindbergh's Lockheed Sirius, beautifully built by Ray DeFrain, Toledo, Ohio. Seen at Toledo show.

1 TO 1 SCALE

By BOB UNDERWOOD

• The yearly trek to Toledo is over and one now chews on what was offered at the great R/C altar for 1982. There were vast multitudes of souls pointing, panting, questioning, and signing up for whatever. The whatever this year did not include any great number of new revelations. There were some very nice new kits, a large percentage of which were a little bigger than little. The kits available leaned toward scale offerings for the most part and they looked quite nice, generally.

Coverings have enjoyed a big year with a great variety becoming available. The "shrinks" are what most of the new ones seem to be and they run the range from very light to heavier materials for the big ones. I enjoy looking at the models on display, as several of them revealed very innovative and attractive approaches in using the plastic film varieties of covering.

Radios continue to incorporate more bells and whistles, but at the same time

are less expensive. With the prospect of 50 frequencies to operate from, one can envision a significant growth in the hobby/sport. The one consideration which I personally would like to see offered would be a servo controller to work through the charging jack to check engines, retracts, etc. without requiring the transmitter.

The models in competition were very nice. The precision scale offerings included, because of Toledo rules concerning raised detail (rivets, panel lines, etc.), a few models that probably would not have gotten along too well in formal precision competition. The offerings ranged from Bob Nelitz's absolutely beautiful big Cub to ducted fan models. One label confused me somewhat, as a Kafir jet was identified as a Mirage. I'm not certain who would be most upset, Israel or France. The sport scale models contained some very nice offerings, both in kit and scratch types. One very well produced model attracted my

attention right away. The little Russian fighter, an I-16 Rata by Joe Spallone, was very nice. Having had some experience with pointy winged aircraft, I would have liked to notice some washout in the tips, however.

The biggest news of the weekend was the weather. The high winds, snow, and assorted whatever make it interesting to say the least. Some persons were unable to attend due to whiteouts, winds, and ice. The Underwoods' trip was filled with tiring driving and interesting CB reports by truckers.

AMA headquarters staff was busy in their usual booth. Dolly Wischer babysat several dozen Teddy Bears she made to promote the AMA Building Fund. Our daughter Cathy wound up with one (actually we got two) and wandered about trying to con others into the \$30 donation that would send one to your home. In addition, we pushed the World Championships supporter package for Reno. By the time this reaches you, it will be too late to apply for the package through AMA. Hopefully, you will be able to join the scale community in Reno from June 13 to 19. A larger number of countries have signed up for this year. With the able leadership of Monty and Patty Groves, this will be a first class event.

Continued on page 95



Ed Izzo, Holliston, Mass., did magnificent job on this Vultee BT-15 "Vibrator", powered by a .90 engine. Toledo.



Handsome quarter-scale Fairchild 22 (C-7E) by A. Lynn Lockrow, Indiana, PA. Seen at Toledo.



1. Nick Nicholau, SAM 30 Contest Director, inspects Speed Hughes' "Yates 10 Ft." for weight. Note mini Dallaire.



2. Close-up of special fiberglass cowl made by Speed Hughes for his Yates model.



PLUG SPARKS

By JOHN POND

• A few months ago this columnist was describing the Team Event annually put on by SAM 30 in the Marysville area. Much to this writer's surprise, SAM 30 reversed its position of holding this event at the end of the year,

preferring to start out with this type competition.

As usual in an attempt to hold down the power, SAM 30 has decreed that only ignition engines of original manufacture and four-cycle glow engines were the only engine types to be used in this special event.

This essentially limited the field to Texaco type models, as most models (including the author) were limited to using the OS 60 four-cycle engine. A few, like Jim Kyncy of SAM 30, anticipated this ruling and produced a Hornet 60 on ignition in a Cumulus.

Photo No. 1 shows that perennial old timer supporter, Nick Nicholau admiring (actually weighing in) another one of his models built for Speed Hughes. As a matter of fact, Nick is so prolific, it can be easily said that 80% of the models entered by SAM 30 modelers were built by Nick. Nick is a tremendous booster of O/T!

To show that he can build models also, Photo No. 2 shows a neat cowl made by Speed Hughes for his Yates model. Most modelers don't care for the inconvenience of making cowls, but the resulting superlative glide is well worth the trouble!

The main point in running this photo is to show the plane this writer has been touting as the successor to the Dallaire



6. Another Bruce Lester pic. Is it a Shereshaw Champion? Anyone know who brought this model to the 1939 Detroit Nats?



3. Loren Schmidt, SAM 30, readies his Comet Clipper for an official. Al Staben holds.



4. A Smith 1941 Mulvihill Stick winner by Phil McCary, SAM 34, Carson City, Nevada.



5. Paul Lewis produced rarely seen "Redwing", designed by Allen Orthof (MB has plans). Powered by Genie engine. Johnson pic.



9. Scientific Ensign by Sandy Chapin, Taft, also Genie powered. Johnson photo.



7. Simply gorgeous Flying Quaker by Randolph Getchell, Willis, Texas. Red with white trim.

Sportster. As it stands now, about the only thing that beats a Dallaire is another Dallaire!

The Yates Ten Footer, as originally uncovered by Louie Levine, of Chicago, in Mel Yates attic, has turned out to be a fantastic performer using the O.S. 60 four-cycle for power. The original model was powered by a Forster 99, as can be seen in a photo appearing in the 1937-38 Forster engine catalog.

Another recipient of this model(s) as built by Nicholau is "Hay Shaker" Loren Schmidt. The writer used to playfully call him "Farmer" but as it turned out, he did no farming on his

ranch preferring to lease the property out to others. Surprisingly, he will answer to the name of "Hay Shaker". That's real fun!

For the benefit of those who do not know, Schmidt runs a partial kit business known as Schmidt Custom Kits. If there is a plan available with rib templates and fuselage formers, he will produce a kit of all parts shown. He actually includes the firewall (plywood) and formed landing gear. Well worth the money!

Photo No. 3 shows Loren Schmidt preparing to crank up his Comet Clipper. Al Staben is giving an assist. This is what is so great about old

timers, most of the manufacturers actually compete themselves! Nothing like being updated every year.

The big draw, the Team Event, proved to be a disappointment, as many modelers failed to make the long drive from the San Francisco Bay Area because of the prolonged rainy season Northern California has been experiencing this year. All time records for rain are being set this year!

Two teams were made up, one representing SAM 21 and the other, SAM 30, the perennial challenger. C.D. Nicholau decided flying would start immediately so as to get the Team Event out of the way for the other four events to be flown. By flying early, the reasoning was that the best flyers would win with little or no lift early in the morning.

The SAM 21 Team of Jack Alten, Don Bekins, and John Pond were among the first to fly, with Alten and Bekins posting 4:16 and 6:37 respectively. About this time, the SAM 30 boys with their Yates models showed superlative gliding abilities, with times of 11:52 and 8:38 for Vincent and Schmidt respectively.

The pressure was on! Pond was anchor man. Unfortunately the engine was set too lean, with a resulting 12-second engine run and total flight of 1:12!! At this time, the flight time for Vincent had not come in, so Jim Kyncy, SAM 30 anchor man, decided to fly his hot Hornet powered Cumulus. Would you believe he was unable to make that Hornet fire? Luckily Vincent was able to pull a long flight that sealed the victory. As the other team members noted, what a good anchor man we had!!

The selection of the teams is always difficult, as generally the hot shots of the club are selected. In many respects this is bad, as many capable and qualified flyers are overlooked. In its place, Jack Alten proposes that the teams be made up of all the respective club members. If SAM 21 has five members on the field with qualified models, all five should fly and the times averaged out.



8. Harvey Parker shows one way to beat the high price of gasoline. Seen at VAMPS Annual.

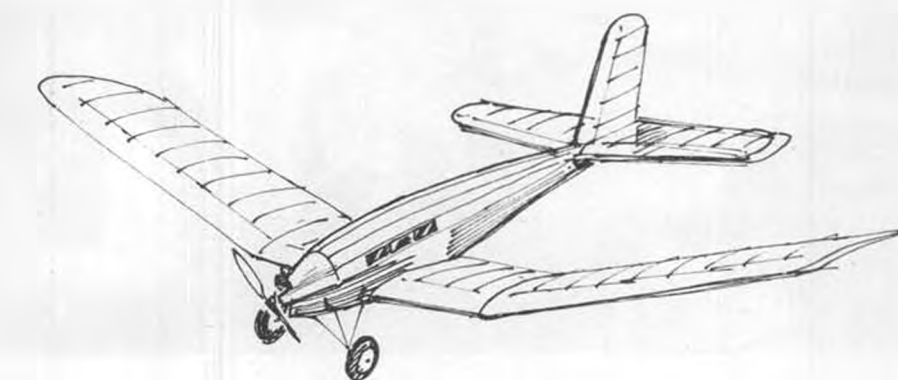


11. Ray Chalker loves those printed silk scarves for wing covering. Johnson pic.

This is a great idea to encourage participation. After all, on any given day, even the best flyer can get beaten by a rank beginner. Let's face facts men, this game is supposed to be fun. Let's make it that way!

Despite the ominous weather reports, the two day contest turned out just gorgeous. Quite a few of the SAM 21 members turned up Sunday as the reports of the meet seeped back to the Bay Area. About the only club that was poorly represented was SAM 27, with most of the officers of that chapter staying home.

As usual, Neva Nicholau and Miriam Schmidt did a bang-up job of running the registration and time keeping desk. Somehow or another Neva found time to put on the luncheon consisting of hamburgers, hot dogs, a special veal



H.A. Thomas sketch of "Kingfish" Sadler's 10 ft. low wing predecessor to his more famous low wing design, the Pacemaker (MB plans available).

contributed by Burleson, salads, chips, etc. Great eating.

About 3:00 P.M. in the afternoon on Saturday, Neva snuck up on this unsuspecting reporter and sprung a birthday cake on him sent up by his wife, Maryann (who was unable to attend). Needless to say, that night was a memorable one for this columnist at the Nicholau house, as most everyone turned out to see what a 65-year old modeler looked like!

Among the field notes garnered, there is no question that the O.S. 60 four-cycle is still king of the motors in the Texaco Event. Some modelers are starting to use ignition, but have had trouble getting the same economy as the four-cycle engines. The 55 second engine run allotted to original ignition engines is a tough one for any glow powered model to beat in Class C.

However, in Class A and B, where the weight penalty for ignition is more obvious, the glow powered entries dominated. That is not to say ignition powered models will not be used in the future. The 55 second motor run is too much of an overkill to overlook. Let's take a look at the results:

CLASS A

1. John Pond (Playboy/Torp. 19) 15:45

2. Loren Schmidt (Pursuitaire) 10:28
3. Bill Bowen (Baby Playboy) 1:37

CLASS B

1. John Pond (Playboy) 16:50
2. Don Bekins (Playboy) 16:14
3. Loren Schmidt (Clipper) 13:24

CLASS C

1. Don Bekins (Playboy) 22:00
2. Jack Alten (Playboy) 21:43
3. John Pond (Playboy) 19:45

ANTIQUE

1. Jack Alten (Dallaire) 30:05
2. Loren Schmidt (Yates) 29:31
3. Jim Kyncy (Cumulus) 28:39

TEXACO

1. Don Bekins (Gas Bird) 57:17
2. Tom Vincent (Dallaire) 53:53
3. Speed Hughes (Yates) 48:52

1/2A TEXACO

1. Tom Vincent (Playboy) 30:00
2. Paul Forrette (Mike) 28:50
3. Jim Kyncy (Playboy) 24:50

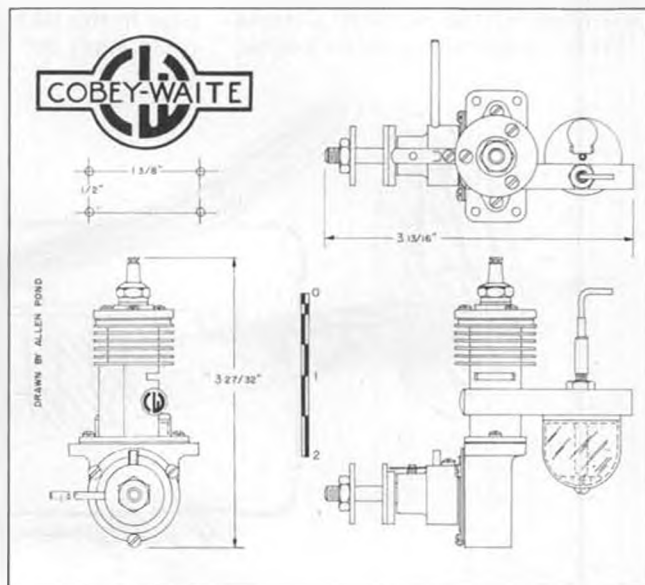
SAM 34 MEMBERSHIP PLUG

As a lead in for the next subject, rubber, and also to help swell the membership of SAM 34, Photo No. 4 is presented of Phil McGary, 3283 Old U.S. 395 North, Carson City, Nevada 89701.

Phil has been sparkplugging this SAM Chapter in the Reno area for anyone interested in old timers, regardless of whether they be free flight, radio, or what have you. Phil can be reached at

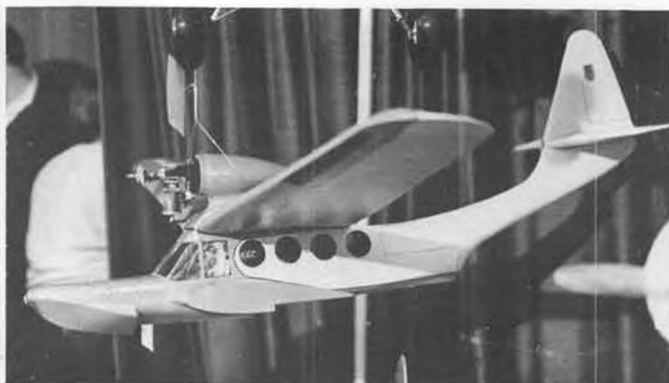


14. Best combination in 1941 was Sailplane and Super Cyclone 64, especially if Frank Cummings was flying it!





10. Hugo Lung, former SCAMPS member, still active in SAM 8 doings. Zipper with converted OS 35.



13. Real early seaplane design by Dr. Fostore called "Mermaid", recreated by Mike Whittard, England.

849-0856 or if no answer, try Manny Gomez, secretary, at 677-1170 for information on how to join the fun.

Phil has also been successful in obtaining the help of Ms. Mary Gojack, a candidate for the U.S. House of Representatives. Her program for the modelers is to initiate legislation to dedicate permanent sites of all disciplines of model flying, race cars, and boats. Now how about that!

ENGINE OF THE MONTH

This month's engine is another one of those look-alike engines as put out by the Cobey-Waite Co., 335 E. Price St., Philadelphia, PA. The 1946 Cobey-Waite "Cobra", as it was called in those days, was a dead ringer for the Madewell 14. This engine is often referred to as the "Post War Madewell".

Regardless of whether Jack Keener (designer of the Madewell) inspired their engine or not, the engine had a very short life on the market. Actually there was a follow-on engine called the Scout, on which we have even less data.

The Cobey-Waite appeared in the "Engine Construction Data" article by Edward G. Ingram (Model Airplane News, April 1947). He reports as follows:

"The latest offering in Class A is the Cobey-Waite, which has a displacement of .147 cu. in., is rated at 1/10 h.p. at 8500 rpm (manufacturers figures), and is stated to weigh 3-1/2 ounces. Bore of this engine is .562 in. with a stroke of .593 in., practically a square engine,



12. What? You mean THE George Aldrich? Yes, he built this nice Megow Korda. How 'bout that!

this type coming into popularity based on the success of the racing engines then dominating the field. A compression ratio of 4.5 to 1 was used."

For those who are interested in the metallurgy, the cylinder was steel honed to a piston of the same material. Grinding accomplished the finish. The cylinder head, connecting rod, and a die cast crankcase were all aluminum alloy.

The brochure put out by the Cobey-Waite people was absolutely top drawer, with three-views and a sectionalized elevation. Instructions for starting and running the engine covered a complete page in this slick paper brochure. One could apply the directions to most any

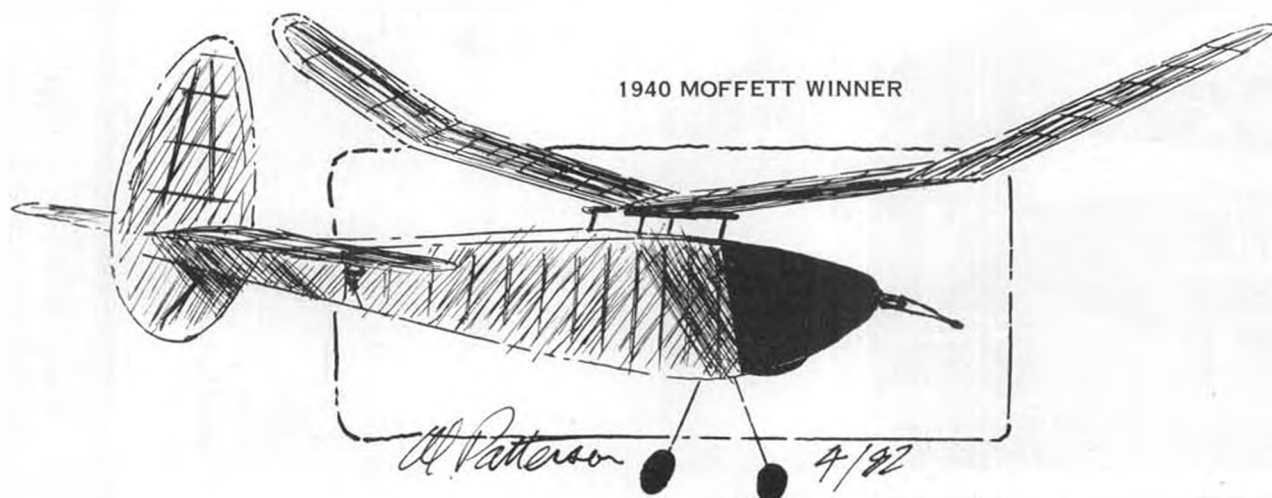
ignition engine of this period.

Careful research among the various model magazines has failed to turn up much information on this little known and short lived engine. Just another engine that succumbed to the pressure of the big manufacturing concerns.

O/T RUBBER CONSIDERATIONS

This columnist has been looking for a slot to put the comments by William L. Baker, 1902 Peter Pan, Norman, Oklahoma, regarding rubber model building and flying. With good rubber again available, interest in rubber models is growing every year. Let's hear

Continued on page 81



39

FUEL LINES



JOE KLAUSE

P.O. Box 2699
Laguna Hills, CA 92653

BASICS

Almost every evening I watch the news on TV. A part and parcel of the program is always the evening weather forecast. Some stations use bucksome blondes who have a knack for writing backwards on plexiglass. Others use stodgy professor-types who always seem to shudder at, and warn of, cut-off low pressure cells. I don't know which is worse. Nonetheless, I have occasionally thought it might be a "wang" to have a short shot on TV weather. You might too. Wouldn't it "grab" the network to be introduced as a special guest forecaster, and solemnly say, "Good evening ladies and gentlemen, I'd like to tell you something about our forthcoming weather . . . (dramatic pause) . . . but frankly, I don't know a damn thing about it . . ." Slow "Emmy" fade from the scene . . .

What's that got to do with engines, fuel, or associated bits and pieces? Probably nothing, but I do have somewhat of a corollary, "I'd like to tell you about a panacea for all engine problems. Unfortunately, there isn't one for all the problems."

So, let's get back to some basics. Remember, even computer geniuses have to know how to add and subtract "ones."

Let me interject that this was all prompted by a couple of basket-case engines I received for service this past week. Look closely at the first photograph . . . an engine morgue shot. This .049 back plate has been kinda eaten away. Like cancer of the colon. The cylinder exhaust kept spewing out black gunk . . . aluminum poisoning. The culprit was overindulgence . . . of an electric starter. Guys, if you persist in grinding away with one of those starters, you're bound to chew the guts of your engine to pieces. In this case, the crankpin ate the backplate, and spread considerable metal contamination throughout the engine. The second photo clearly shows damage to the



1. Overindulgence of electric starter was cause of this badly chewed up backplate.



2. Spread of metal contamination damaged the chamber surface of the glow head.

chamber surface of the glow head. Ultimately, the ball-socket joint and rod failed . . . photos three and four . . . and that really wrecked out everything. The basics of it all? When you use an electric starter, if the engine doesn't start immediately . . . in no more than one second . . . then something's wrong. Essentially, check for a low battery, bad plug, flood, or fuel restriction . . . all

basics. As mentioned, there is no single panacea for engine problems, but correct, or non-abusive use of an electric starter would surely eliminate many of them.

In passing, let me note that a current instruction sheet for a Cox .049 reed engine advises that, "Use of the following equipment can damage your engine and will void your warranty!"

Electric starters.

Diesel conversion kits.

Shaved or extremely high compression heads.

The instructions for Cox Tee Dee .049, .051 and .09 engines states, "Use of the following equipment can damage your engine and will void your warranty!"

Diesel conversion kits.

Shaved or extremely high compression heads.

Fuels containing 100 percent synthetic oil for lubrication."

So much for that bit. (And we better give Bob Davis equal time! wcn)

ANOTHER APPROACH

If you really took meticulous care of an engine, it's likely that you'd have very few problems with it. Think about it this way. If you bought a Rolls Royce, it's highly probable that it would be cared for very well . . . either by you, your chauffeur, or both of you. Conversely, you probably wouldn't expend too much effort on a Moped . . . especially if you also own the Rolls Royce. What's the point? Simply this, and I'll admit it's pretty much of a visceral feeling, those who don't care for their engines aren't really intentionally negligent. They just naturally take them for granted because their value is relatively small compared to perhaps a top-of-the-line R/C set or many patient hours spent constructing a superb model aircraft. On the other hand, I've seen youngsters dote . . . there's no other word for it . . . upon a hand-down cheapie or tired-out engine. Why? Maybe, because it was their most valuable part of modeling. They treasured and cared for it.

Without waxing too philosophical,

Continued on page 70



3 and 4. Ultimately, the ball-socket joint and the rod failed. If an engine doesn't fire immediately, back off the starter . . . Something's wrong, and grinding away doesn't help matters.



THORNBURG AT LARGE

By DAVE THORNBURG . . . A Mail Bag full of clever ideas and enthusiasm from the readers.

• The problem with writing a magazine column is that the best ideas and comments on any given subject arrive too late for publication. They arrive in the form of letters and postcards from readers.

Example: I write a long diatribe on airfoils in April, it hits the newsstands in early June, and by the first of July I've got enough corrections, comments and addenda from North American readers alone to write a much better column. By the summer's end the English and Aussies have chimed in, as well as a handful of American APO's, and I know more about airfoils than I really want to.

But how to get this information into print? It isn't enough material to fill an entire column, yet it wants passing on. Other (and wiser) columnists handle this problem by using an open format, filling each column with tidbits and goodies on a variety of subjects. I tend to write more comfortably in the essay style, focusing on a single subject each month. So, by the time all of the airfoil info from readers has accumulated, I'm busy writing a column on *Why All Birds are Taildraggers*. And the additional airfoil material never gets passed on.

The solution, it seems, is to devote one column a year to the Mail Bag. In it, I can pass along excerpts from the year's best letters. I can play editor, eliminating the cranks (like the guy who claims you don't to have balance a prop if you just shorten your nose gear. The heavy blade will run slightly wide of the track and eventually nick off enough of its tip to balance.)

I can condense five-page letters into single, salient paragraphs. (How can people write long letters? Don't they know that writing is drudgery? Didn't their mother stand over them with a whip, making them scrawl thank-you letters for birthday gifts? Am I the only

person on earth with a two-year backlog of unanswered mail?)

Best of all, I can use the mailbag column to play Dear Abby, handing down godlike and unassailable answers to questions of my choosing. Such as the following one, from a fellow who claims to be Richard Foxenberger, of Utica, NY:

And another thing, Throneberry, how come you say that a glider with a motor in the nose ain't much for soaring, what with the prop hanging out there in the atmosphere and all? If that's the case, how come free flight jobs and RC Old Timers can, and do, go right on out of sight, propellers bedarned? Huh? 'Splain that to me, will ya please, Thumbender? On a general basis just how much does a prop (say a Cox 5x3) hurt a plane's soaring efficiency for sport flying?

Dear Fox

On a general basis, a prop (and cylinder head, and needle valve, and loop of fuel tubing) hurts a plane's soaring efficiency exactly 57 times more than a towhook does. Next question.

. . . Well, Dear Abby answers are lots of fun, but not very informative. Drag is a relative thing. Its importance depends on the size of the model, its airspeed, its mass, even how cleanly it is built otherwise.

For example, a Tee Dee .049 faired into the nose of a well-built Oly II or Windrifter won't cut the plane's average glide performance nearly as much as the same engine in the nose of a Wanderer or Drifter II. Why? The Oly and Windrifter are much bigger planes. The same amount of additional drag is bound to affect a large plane less than a small one, right?

Even more important . . . and this is something not adequately covered by the formulas . . . is that the same percentage of increase in drag is more damaging

to a small model than a large one. In other words, if you up a Drifter II's drag by 10%, you'll hurt its performance much more than you will a Windrifter's by increasing its drag 10%.

A good illustration of this is the dethermalizer I use on my free flight handlaunch gliders. It consists of a one-square-inch flap that opens out at 90° from the side of the fuselage. It completely destroys the glide performance of a 65-70 square inch glider, straightening out its glide turn and bringing it down at a near-45° glide slope. Try putting a 14 square inch flap on a Windrifter (917 square inches) and you'll find that its effect is not nearly so severe.

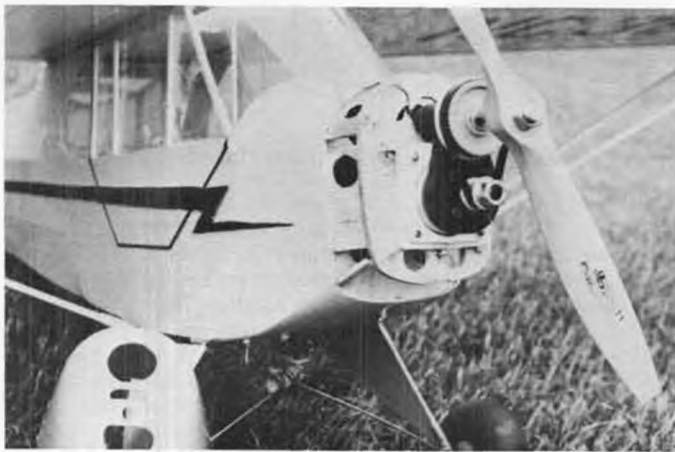
This smaller-the-plane-more-devastating-the-drag rule is why you see so much emphasis on streamlining in the newest generation of two-meter contest ships. But Foxenberger's question didn't pertain to contest planes, just sport models, you say? The answer is still the same. Anything that cuts the performance of a contest plane will cut the performance of a sport plane. A model designed to ride the lightest possible contest lift will stay up longer on the sport field, as well. So, unless you really like swimming with an anchor in your pocket, it behooves you to build your sport models just as clean and drag-free as you would a contest job.

The silk-and-dope article in the April issue struck a resonant chord. Bob DeMond, down in Augusta, Georgia, writes:

. . . I have found a truly excellent way to keep the first coats from sinking through the fabric and here it is: Simply use one of those sponge rubber brushes about one inch wide, available in art supply and paint stores. By taking it easy, you can apply the dope carefully enough so

Continued on page 66





Scratch-built two-inch scale J-3 Cub by Bill Gilchrist, Oskaloosa, Iowa, powered by Astro 15 motor with 3:1 speed reducer, Zinger 13x8 prop. Excellent performance.

ELECTRIC POWER

By MITCH POLING

• These columns, as you most likely already know, are written two months ahead of time, so this one is being written at the start of April for the July issue out in June. This is sort of a sidewise way of leading into explaining why I still don't have flight tests on the flight times that can be expected from digital charging. The weather has been poor, to say the least. Well, maybe next month.

But, bench testing is another matter, and I have had a chance to do a lot of that. Leisure Electronics has a new 05 (as

of last January) that is very well made and an improvement on an already quite impressive system. This motor is made by the Sagami company in Japan, a name that is already familiar to model railroaders for its top quality motors in all the railroad sizes. The motor they make for Leisure has the look of a Mercedes, quality throughout. It is modular, and can be completely disassembled if you wish. The front plate, motor case, and rear plate are machined on a lathe, with ball bearings front and back. The rear (back) plate is especially impressive; it is recessed to accommodate heavy duty, springloaded brushes, in one of the cleanest designs I have seen.

The ventilation in the brush area is very thorough, and together with the ventilation openings in the front plate, provides excellent flow-through cooling. The prop holder will accommodate most props without the necessity for enlarging the prop hole. The only problem that I see with the motor is that it is just slightly larger in diameter than the old 05, so it will not fit into the same mounts. By the time this column is out, hopefully there will be a motor mount available from Leisure. Two bolts are provided in the front plate so the motor can be mounted on a front firewall.

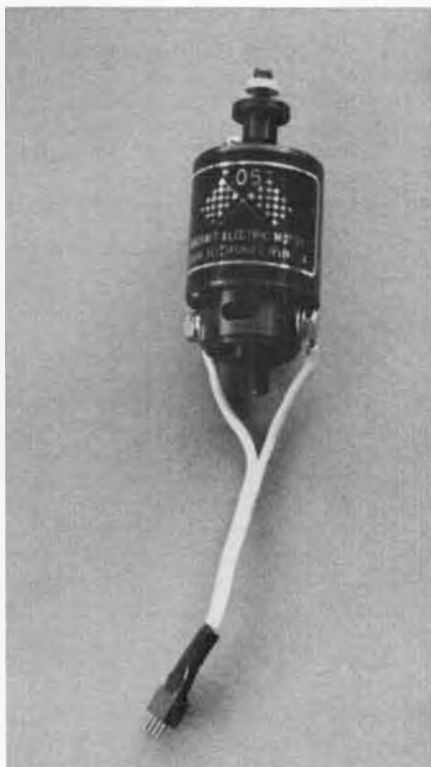
The big advantage in this new design, apart from the fine workmanship, is the heavy duty brush design. This motor can take very high currents, up to 25 amperes without brush failure or brush skipping. In a contest, the motor can be loaded with larger props than it is rated for, and take it. The motor run time goes down, but if the motor run in a contest is limited to 1-1/2 minutes, this is no problem. You can also use higher voltages than the motor is rated for. The motor is nominally rated for six sub-C cells, and a 6x4 or 7x3-1/2 prop. You can use up to an 8x4 prop on six cells for 10,000 at 20

amperes or stay with the 6x4 prop at 13,000 rpm on six Sanyo sub-C cells, at 15 amperes; the same prop at 14,000 rpm on seven Sanyo sub-C cells at 16.5 amperes; and at 15,800 rpm on eight Sanyo cells at 20 amperes. The motor is, in other words, quite versatile. I also ran tests to see how long the motor would run on the bench with both a Cox 6x3 and a Cox 6x4 prop on six Sanyo cells, charged to their peak voltage, on a digital volt meter. These are in Table 1:

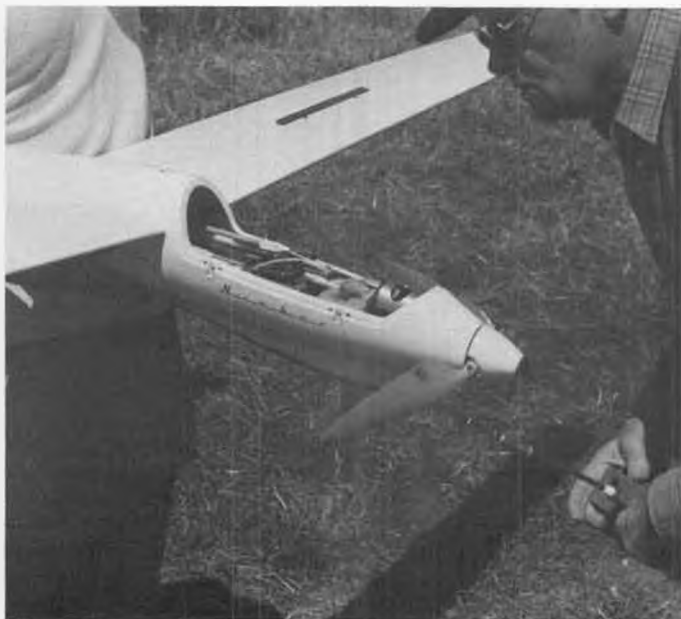
	Table 1	
	6x3 Cox black	6x4 Cox gray
0 minutes	14,500 rpm	13,500
1	12,800	12,500
2	12,500	12,500
3	12,500	12,000
4	12,000	12,000
5	12,000	11,500
6	12,000	8,000
7	11,000	

Flight times would be anywhere from 25% to 50% longer than these, depending on the type of plane and how it is flown. I also ran bench tests on cells charged at four amperes for 15 minutes; this did reduce the bench running time about one minute. Bench tests on six General Electric cells charged both ways gave results from 500 to 1000 rpm lower, but with the same run times. My conclusion is that the Sanyos do indeed give more power; as for the time in the air, only flight testing can say.

Both the G.E. and the Sanyo packs are available from Leisure, at \$35 and \$40 respectively. The motor is available in two winds, and after all this, I forgot to say that all the tests were done on the pattern wind! The other wind is for racing, and gives more rpm, but less flying time. Both are \$45, from Leisure Electronics, 11 Deerspring, Irvine, California, 92714. These motors represent a step upward. Electric power just keeps



The new Leisure Electronics 05, by Sagami, of Japan. Described in text.



Bill Winans, seventy years young, powers his Graupner Mini Nimbus with a Geist samarium cobalt motor, 16 red Sanyo Sub-C cells, and Geist prop. Nine-pound model climbs out almost straight up! Richard Black is his helper.

getting better and better!

Now to some items from readers. . .

Bill Gilchrist, of Oskaloosa, Iowa, sent in some excellent photos of his J-3 Cub, I'll let him describe it in his own words.

"The model was scratch built from my own drawings made on poster board so I can build directly from them. It is 2 inch scale. I worked from drawings by James Triggs in American Modeler, October 1958. These are also shown in his little book, 'The Piper Cub Story'. I also had a set of Sig Cub plans to use. Neither of these is all that accurate, but they served the purpose. The model length is 44.75 inches, span 70.4 inches, wing chord 10.5 inches, and wing area 714 sq. in. The model is powered by an Astro 15 motor with a 3:1 Astro speed reducer. A Zinger 13x8 prop seems to do the best. The model was covered in yellow Solarfilm, the letters, numbers, and trim in black regular Monokote. Its performance was beyond anything I had hoped for. The fuselage is small enough that hand launch is no problem. It will take off very nicely from bare ground, but the 3 inch balloon wheels don't like even short grass. In my opinion planes should be designed and built strictly for electric if the results are to be good. Bob Boucher's Porterfield would be an example (I agree also on the Porterfield . . . a fine flyer— MP). The Cub was an extra project that I did just to have something that I could count on to fly when the weather is right. My flying has all been done here on the farm from a mowed strip. When the weather is right, I am quite likely to be out flying instead of some more serious job. I would be glad to supply details on anything I am doing and would correspond with anyone interested in geared electric." Bill mentioned that he is retired; it sounds like retirement is fun! Bill's address is Route #1, Oskaloosa, Iowa, 52577.

Another electric flyer who knows retirement is fun is Bill Winans, who has

chosen the other extreme, high powered sailplanes. Hans Weiss sent some photos, and says that Bill is a very young seventy year old, who could write a book on "For What It's Worth" material. Hans says that his Geist samarium cobalt motor powered Graupner Mini Nimbus is spectacular, straight up and out of sight! The motor is a Geist 40/16, using 16 red Sanyo sub-C cells, and the Geist fiberglass folding prop. This prop, by the way, is said to be one of the very best on the market, and is available from Wilshire Model Center, 3006 Wilshire Blvd., Santa Monica, California, 90403. The flying weight is 9 lbs., a big plane! Bill built a special skid on the Mini Nimbus which is very effective in preventing damage in hard landings. Thanks, Hans, for the information.

I did, despite the weather, fly this weekend at the Evergreen Radio Model-



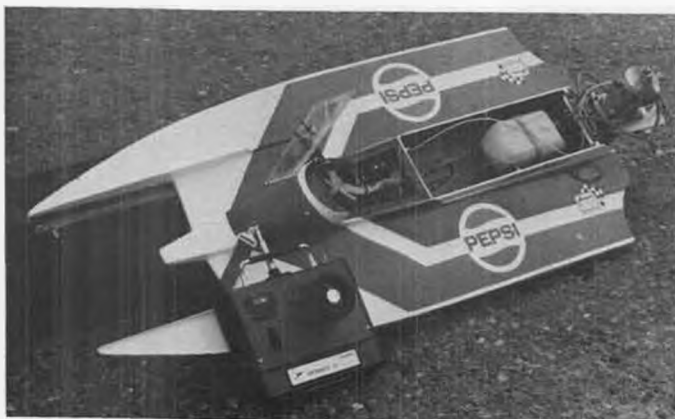
Better view of the interior of Bill Winans' Mini Nimbus. Room to spare, it seems.

ers Association float plane meet at Snohomish, Washington. We all flew in weather that ranged from short bursts of sunshine to freezing rain, and we all had a blast. Those who fly on floats must be a little crazy! Anyhow, I flew my original design, the Aqua Sport, which uses an Astro 15, with 50 inch span and 450 sq. in.

This is the same model that has been pictured in previous columns, so I won't bore you with them here, but I had to pass on something "new". I'm using an Astro 25 pack on the 15, and it works great! The run times are now nearly double, with flight times six minutes or better, and I can use larger props. The Astro 15 uses an 8x4 prop at 12,500 rpm (initial) at 13.5 amperes on the stock pack, for about three minutes run time, on the bench. I can use an 8x6 prop, at 11,000 rpm, and 16.5 amperes, on the 25 battery pack, and I get much better acceleration and takeoff, plus a better climb, at a weight gain of about 12 ounces. The flying weight with the 25 pack is 4 lbs., 10 oz., and the heavier weight doesn't hurt the performance at all, the additional power more than makes up for it. I do recommend good cooling for the motor, it does run hotter this way. I did get a lot of compliments on the way the plane flew (all the other planes were gas), everyone was impressed. How did I place? Well, seventh out of ten wasn't all that bad, considering I hung the plane on a buoy in the slalom. I do that every year, like Charlie Brown and his kite eating tree. But, the touch and goes were terrific, and so were the snap rolls!

Have fun. At last, flying weather is here! ●





The Airtronics Championship Series 9132 Transmitter and Dumas Hotshot 45.



G&M Models seals and rods used for rudder linkage. K&B throttle kit for speed control.

R/C POWER BOATS

By JERRY DUNLAP

LET'S START WITH THE AIRTRONIC RADIO

Last February I had the opportunity to cover the Northwest Model Exposition for **Model Builder**, and it was an enjoyable experience. One of the folks attending the show was Dave Schadel, sales manager for Airtronics. Since I had used an Airtronic radio system in my Prather 3.5 Tunnel, I was interested in what might be new from the Airtronics people. One of the concerns I'd voiced in my review of the first Airtronic system I used was that the servo might be a little underpowered to pull a faster, heavier boat through the turns. I never experienced any trouble turning the tunnel, but turning a .45 or .65 powered hydroplane is another challenge.

Dave proceeded to haul out the new Airtronics Championship Series 9132 and explain the system to me. It all sounded good at the time. But how would it work in a boat? With a little arm twisting (is the cast off yet, Dave?), Dave agreed to make the new system available to try out in my Dumas Hotshot 45. It wasn't too much later that the U.P.S. dark brown delivery truck left a box

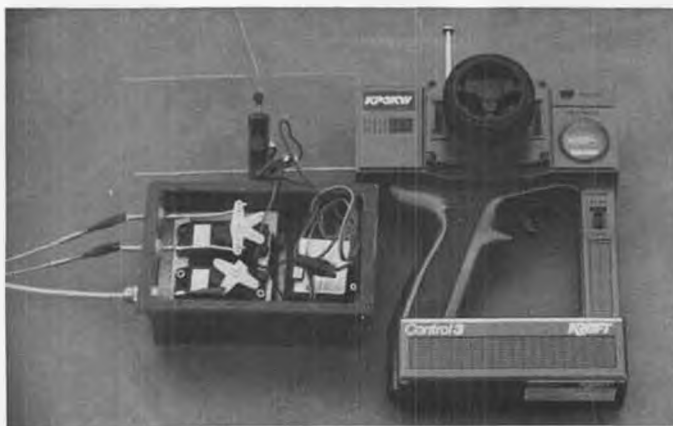
from Airtronics at the Dunlap house. It was time to stuff it in the boat and head for the pond.

"Stuff it in a boat and head for the pond," is a typical way I review a radio. However, I would highly recommend Bob Aberle's review of this radio in the April 1982 Flying Models for anyone who wants a really technical evaluation. When it comes to understanding whys and wherefores of electronics, I'm still working to learn if red is positive and black is negative. If that isn't correct, then it's the other way around. What follows is aimed towards the application of the system rather than the reason the system works.

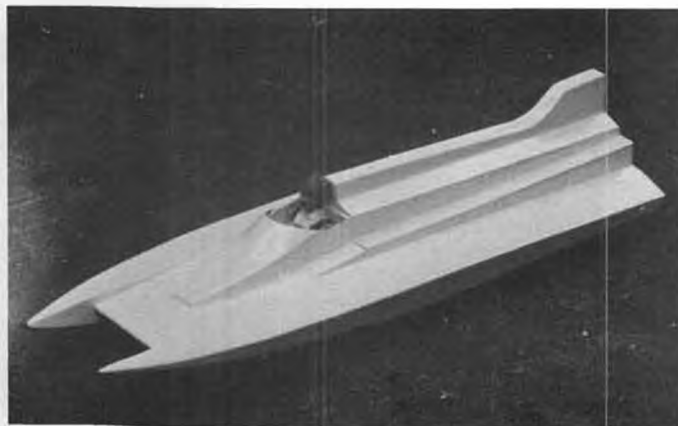
The Championship Series 9132 is a three-channel system that comes with two servos, and rechargeable batteries for the receiver/servos and transmitter. I selected the wheel transmitter. There were two big differences between this Championship Series and the XL Series I used in my 3.5 tunnel. I think the most important change was the larger Airtronics 94509 servos. This servo is one "herky" device. It is obviously intended for boating application. Compared to



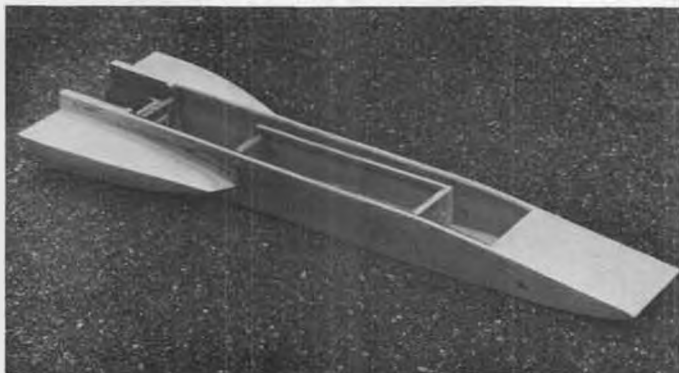
Author's son, Paul, tries the Kraft KP-3KW "pistol grip" transmitter.



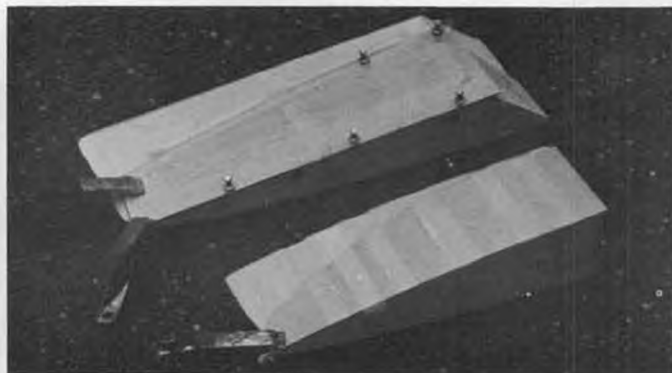
The Kraft KP-3KW radio system installed in G&M radio box. Pistol grip transmitter very functional.



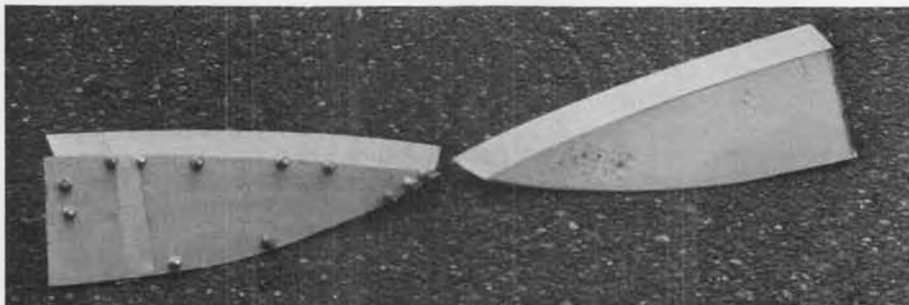
After reviewing the Octura Wildcat Tunnel in the April issue, we finally got it cowed and painted.



Avenger 40 Outboard center hull comes completely built. Rear sponsons have been attached in this photo.



Clamps, tacks, and tape hold sponson sheeting to foam core for gluing.



After top and bottom sheeting, cores are trimmed even with sheeting, then sides are glued in place.

most servos, it has a slower transit time for servo arm movement. I would suspect this is a function of gearing the servo to provide extra torque for turning the bigger and faster boats. The "grab that hummer and try to stall it while the wheel is turned" is probably not the most technical method of testing a servo's strength, but it's probably used by most folks when checking how strong a servo is. The Airtronics 94509 servo is one strong servo, capable of hauling those big hydros through the corners. I didn't find the slower turning rate any problem when running the system in my Dumas Hotshot 45. I could not detect any difference in the way the boat turned with this servo than with a standard servo I had used in the boat prior to installing the Airtronics. There is no question, however, that the Airtronics 94509 had much more strength. The second servo, an Airtronics 94551, is more than adequate for throttle control.

The other noticeable change was the toggle lever on top of the transmitter to

switch from linear to exponential function. On my other transmitter, exponential was controlled by a switch located in a panel on the front of the transmitter. Exponential allows the amount of servo travel to be varied in relationship to the amount of movement of the transmitter control. An example might be helpful. In the linear control mode, turning the steering wheel half way would result in the rudder servo traveling half its amount

of movement from neutral to full turn. In the exponential mode, the same half turn of the steering wheel would result in less than half of the movement of the servo. However, as the wheel is turned to full turn the servo movement increases until full servo movement is achieved.

Is exponential really useful in model boating applications? I have found that for my driving style, linear control works best when I'm heat racing. Remember now, I've only used exponential systems in outboard tunnels. When I go to straightline 1/16 mile speed trials, I use the exponential mode. In straightline speed, you don't want quick rudder movements. The exponential feeds the amount of turn at a lesser rate than the transmitter control movement until you get past the half-way margin. This allows the driver to make directional corrections in a more subtle manner, thus allowing the boat to run smoother. Although I don't use exponential mode

Continued on page 71



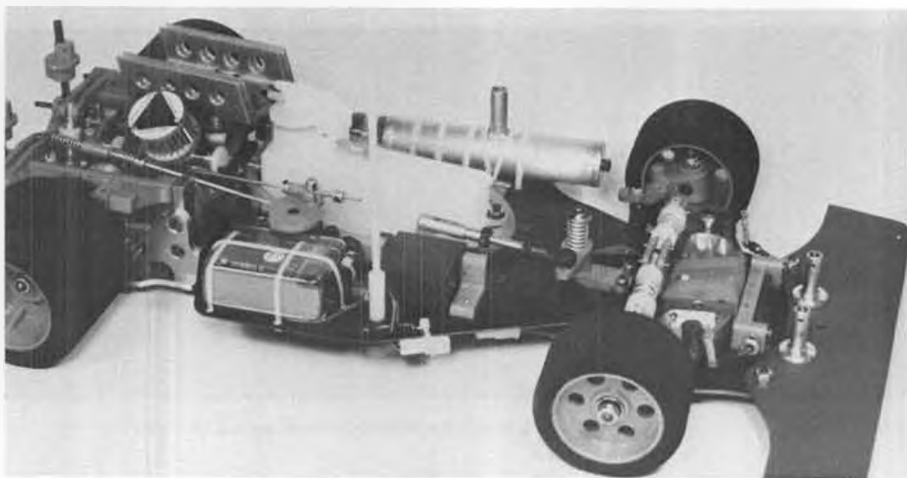
Running shot of the Avenger 40 Outboard. The boat rides very clean on the water.



Removed hatch cover reveals forward placing of fuel tank. G&M radio box, Kraft radio, K&B 7.5 Outboard.



In order to run boat as soon as possible, it was given a quick finish with clear epoxy. Time for painting later.



Right side of new Delta Eagle. Picco .21 for power. Airtronics radio and full-boinger suspension front and rear.

• As a result of recent columns, Chris Chan felt compelled to write his letter which was published last month, and which was published on its own, without comments from me, as it is so easy to let the other guy go first and then cut him up with the last word. In fact, I have even considered not saying something in this month's column, but a few letters that have rolled in prompt me to not just let Chris' letter go unanswered.

First off, how he read into anything I have ever written that I want to get rid of the fast guys is completely beyond me, as is the notion that I have a sour grapes attitude about anything concerning R/C car racing. There are certain situations in racing that I don't particularly care for, and that needs to be noted, but that is hardly sour grapes. As for racing against the fast guys, if I didn't want to, I simply wouldn't race, as in this area we are up against racers like Gary Kyes, Bob Welch and his boy, Jim Welch, just to name three, at most every club race. I'm not a super fast racer, but wouldn't be half as fast as I am now were it not for racing

against these guys, all of whom will tell you that I am willing to race head-to-head with anybody and can have a lot of fun doing it, win or lose.

As Chris notes, and I have mentioned this before myself, to win in R/C car racing takes skill, patience, and practice. No problem there, but there are in fact a few "speed secrets" and "tricks" around. Some of these are passed immediately on to the club racers via this column and factory newsletters, and a few are carefully guarded secrets; it all depends upon who has the secret and their attitude toward racing as to how fast the secrets (a more appropriate name would probably be "new techniques") are passed along. The technique of breaking in electric motors in a water bath was, for a very short time, a factory trick. It was published in this column and now most everybody is aware of it, whether they use it or not.

Chris closes by challenging me to show up or shut up, evidently referring to my not having attended the last couple of ROAR Nationals. At this time, I

R/C AUTO NEWS

By DAN RUTHERFORD

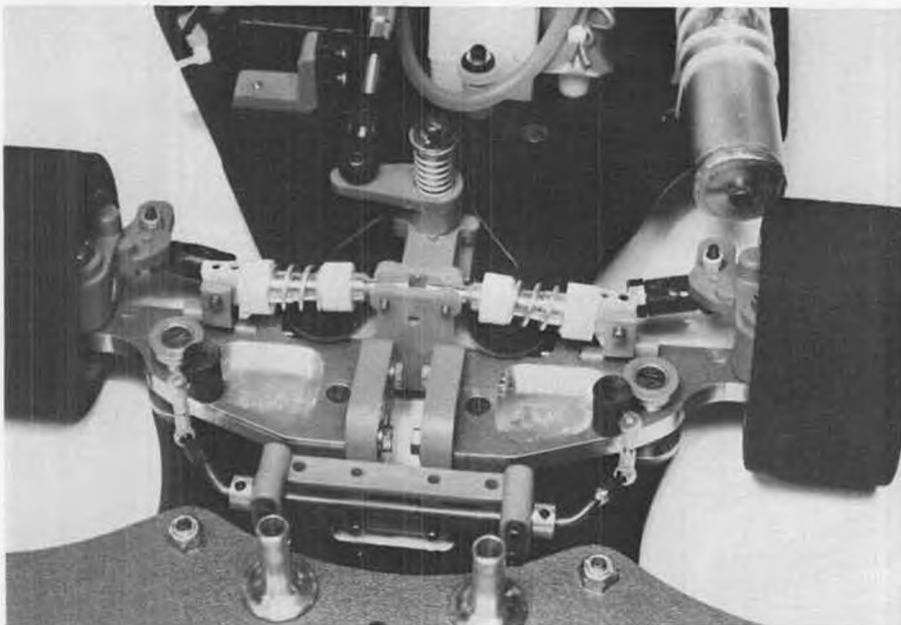
PHOTOS BY AUTHOR

won't be doing either, thank you, as I did go to the Nats in Boston a few years ago and then to the Nats in Columbus, Ohio. So I have been there and know pretty much what it's like. And it comes down to time and what I am going to do with it. I can devote the time and expense in a much better manner by attending local club races, racing heads-up with friends and having a hell of a good time doing it, than I can in taking a week's worth of my family's vacation time to go to the ROAR Nats each year. More simply put, the ROAR Nats simply is not worth it for an average club racer like myself. *It could be.* And I sure wish it was, as I am involved enough to want to go. But until ROAR learns to put on a Nationals race that offers much more to the grass-roots racers out there, it will continue to be a small race stuck over in a corner of a parking lot, just like it was in Ohio. Possibly ROAR needs to look at what the AMA has done over the years with the AMA Nationals.

All the other letters received on this subject tend to back up my suspicions that maybe we ought to be taking a look at what the large sponsored teams are doing. . . Not at the Nationals, I'm not overly concerned about that, as it is traditionally a Factory Shoot-Out and that is unlikely to change. Unfortunately, the best letter to come in, I can't use, the writer having specifically asked that I not do so, as he is only interested in the promotion of car racing in his area as a hobby. . . This area *does* have a *problem* with sponsored racers and he is trying to change that and could be identified just by the letter.

I don't think there is a serious problem today, except for isolated cases, of team members turning a hobby-type activity, that of racing cars, into a win-at-all-costs situation, but still there is indication that it can happen. Solutions? Sorry, don't have any, as these are local situations and there is a different answer for each locality.

So we come back to my feeling that this column should concentrate on items of interest to club racers, but that most of us are involved enough to want



Front end of the Eagle. The coil-over shocks feature valving that really works and all components are mounted very low.



A 1/12 body that is definitely not "bush", the Busch Hogan from MRP.



Make your own R/C transporter, tractor and low-boy trailer, available from Shinsei Corporation.

to know what happens at every level of racing, just like the guys attending SCCA races in full-size cars want to know what is going on in Formula 1.

In fact, that works out to be a fairly good lead-in to asking what you want out of this column. It has appeared for a number of months now and evidently has a pretty good audience out there in Racer-Land. So far, I've done what I want with the column, including getting wcn closer to that ulcer he has worked so long for. (What? ME worry? Anybody wanna buy a magazine? wcn) My address will be at the end of this column, let me know what you think.

But first, I'm going to let you know what I think. I feel that how-to stuff is more important than anything else, in fact this column has had more how-to stuff since its start than has been presented in any other magazine during the same time period. Race reports are a real drag, to me, which is why you haven't seen any, or even race results. Race results are important only to a few and those who really want to know will find out (somehow) within a week of any big race, so to come out with a race report that is anywhere from two to three months dated (good old magazine lead time strikes again) is a little silly. However, if you really want to know, I have friends who can and will do reports on the races they go to, all I have to do is ask them and they attend all major races.

Team Happenings and other things political I happen to enjoy, simply because I am an involved racer and want to know the details on this 'n that. If you don't, fine, just let me know. But some-

times it is necessary, for instance when trying to make the point that you need to buy a race car that fits your needs, as opposed to just buying whatever car won the latest big race.

Another item that I have in the past been pretty successful with, but haven't done much of recently, is full-blown tests of race cars. Right now, a test of the new Delta Eagle is planned, and will appear next month, but nothing else is set up. I have plenty of race cars, so this type of article is just asking for more work on my part, but if that is what you want to see, it can be arranged.

PAINTING THE LITTLE GUY...

I thought I had it all covered last month, what with devoting a whole column to the painting of bodies, but then realized nothing was said about the driver figure.

We generally make sure to get his little helmet painted while doing the body, just so the skid-lid matches the car. Then once the body is all done will paint the driver's suit, seat belts, gloves, etc. on the outside of the body shell. A flat paint is best for this, we just bought a paint kit that Testors sells, it is number 9129 and is labeled "Military Flats". Super cheap brushes work fine, the expensive ones are better, depending upon how picky you are about the finished result.

To start, we paint the interior of the cockpit flat black, as well as anything else that should be that color, and you don't have to be very careful in applying the black. Oh, and here I am talking about bodies that have driver figures molded in, ok? At the upper edges of the

cockpit, the paint is liberally applied, generally spilling over onto the outside of the body. I'm not steady enough to make this line between body and cockpit interior super straight, so don't try, just slop on the paint. When it is partially dry, I will take a clean rag dipped in Testors thinner and wipe along the molded edge of the cockpit. This takes the paint off nicely, leaving a clean line and is very easy to do. The enamel thinner will not hurt the body.

Next the driver's suit is painted, and if you want your guy to be a little grungy, try painting the suit while the flat black is not quite dry and you will end up with slight streaks of black on the suit. Properly done, it looks realistic, if you don't like it, just put another coat of paint on. The face shield can be painted while the other stuff is drying, free-hand seems to work OK, and some shade of blue is usually best.

If you will take a close look at the driver figure, most have wrinkles molded into the driver suit and these can be highlighted with a marking pen or paint applied with a very fine brush. Done very subtly, it looks fine; overdo it and it looks gross. Same with details like zippers, harness buckles, buttons and pockets, too much accenting here spoils the overall effect.

And overall effect of the paint scheme is another thing that I didn't mention last time. I lean to very simple paint schemes with bright colors, not because I can't do it (used to do really trick paint jobs, winning our club's season-long Conours

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Basic booklet available from HIA. Worth just slightly more than its cost ... it's free.



Latest street craze is radically lowered VWs. Do your own with BoLink's VW body. Don't expect it to handle in turns.



Refugees in front of Gene Pape's house, 28 models, tools, fuel, and five people in a Datsun pickup; remember day we went out with all the various types of models... CJ on left, Lenard Ascher and kids, Dave Braun on right.

Control line

• Ripping from the excellent PAMPA newsletter, here is an interesting technique that you may want to try in reviving that old engine...

Knurling is an accepted method of resizing automobile pistons and valve guides, and we have used it with great success to resize new and used O.S. Max 35 pistons for improved compression seal. In effect, the knurling process impresses a groove circumferentially around the piston, in the area between

the top of the piston and the wrist pin hole.

The material displaced from the groove is upset into the adjacent area, increasing the diameter of the piston in this area. The enlarged piston can then be lapped to fit the original sleeve. The remaining grooves serve to retain oil for better lubrication of the piston under the most severe operation.

For the knurling process, we have used an ordinary tubing cutter, making

progressively deeper grooves until the piston will just enter the bottom of the sleeve. Then the piston and sleeve are lapped together with 0.3 micron compound until the piston, with light pressure, will slide up to its highest running position in the sleeve (not until it reaches the top of the sleeve). The sleeve is rotated in a lathe about the stationary piston, but other techniques will work as well.

Two or three grooves is sufficient and



Mike Hazel (left) and John McCollum flying Rat at Merced, on Labor Day. John and Tim Gillot turned 4:50 for easy win.



Mike Hazel giving Gary Crawford a whipping during Rat competition. Gary's consistent model got second with about 5:40.



Ron Columbo doing a little maintenance. Note metal motor mount running full length of model. One was actually seen to break, however.



Bosta and Rushmobile teamed up for four trophies at Merced.

break-in is fast. This technique can restore to usefulness many lapped engines that have been retired due to poor compression seal. Scott Bair, Atlanta, Georgia.

Must admit that I have never tried that idea, but see no reason why it wouldn't work just fine. I am going to go slow when I do it, and will further hedge on the bet by at first using engines I normally wouldn't be flying even if they were in like-new condition. Then we'll see if I can't breathe some more life into a few engines that are fine for sport flying but aren't worth the price of new parts.

If you try this idea, remember that a piston/cylinder set that is worn enough to need knurling should also be checked carefully to see if there is too much wear in the wrist pin holes and the rod and crank need a good look also.

CELEBRATE THE FOURTH OF JULY ... IN ENGLAND?!

Just got a note from Pete Jayes, of London, England, and he invites any and all Combat fliers over for the British

Combat International, to be held at Dytchleys, a country estate only twenty miles from Central London. The facilities are excellent and include full on-site accommodations for competitors and supporters (just 100 meters from the Combat area), three meals a day, car parking, toilets, showers, bar, and limited camping facilities.

It all sounds super. If you are interested, fire off a letter to Pete Jayes, 26. Premier House, Waterloo Terrace, Islington. N1, London, England. And do it tonight, as Pete let me know about this just a month too late to give you much notice at all and they need to schedule rooms, meals, etc. in advance.

LAMINATING FILM FOR COVERING ...

After finishing off last month's column, I went back into the shop and whipped up a balsa version of my "Plastic Nasty" Fast Combat plane, just to give the Seal® film a good try and to see if I could remember how to build an all-wood Combat model. The film worked fine, not as strong as the Fas-Cal I used to use on wood models, but a lot lighter and somewhat easier to apply. And although I only painted the inboard tip of the wing (just to be able to see the thing while flying), can see where a person could get a reasonable finish with just a spray can of dope or lacquer. Lacquer? Yes, as the tip shouldn't be seeing much fuel slopped on it, I used some of that touch-up paint you see for sale in auto parts stores and it is OK for a rush job.

WOOD vs FOAM ...

Not having built an all-wood Combat plane for years, being a true believer in foamie models, it was a real kick to realize how many parts there are in wood models, even today's super simplified designs. But that doesn't really matter too much when building one model at a time, as I was. Still, it is real hard to realize that I used to whack out

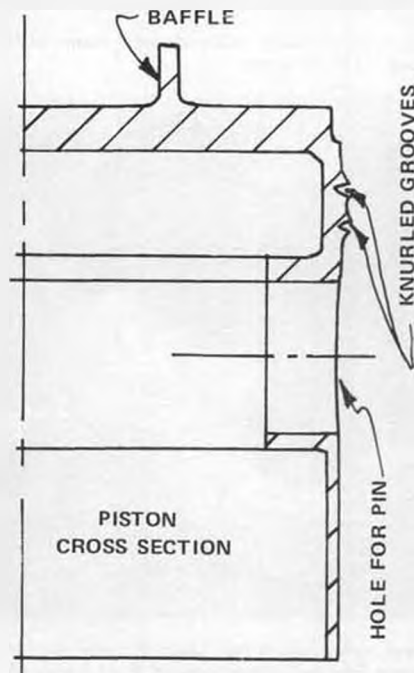
bunches off wood models, all of them regarded today as complicated in design and fabrication. Where in the world did I find the time to do it? And now I can see how valuable the foamie models really are ... Nothing like going back to where you've been to see how far you have come!

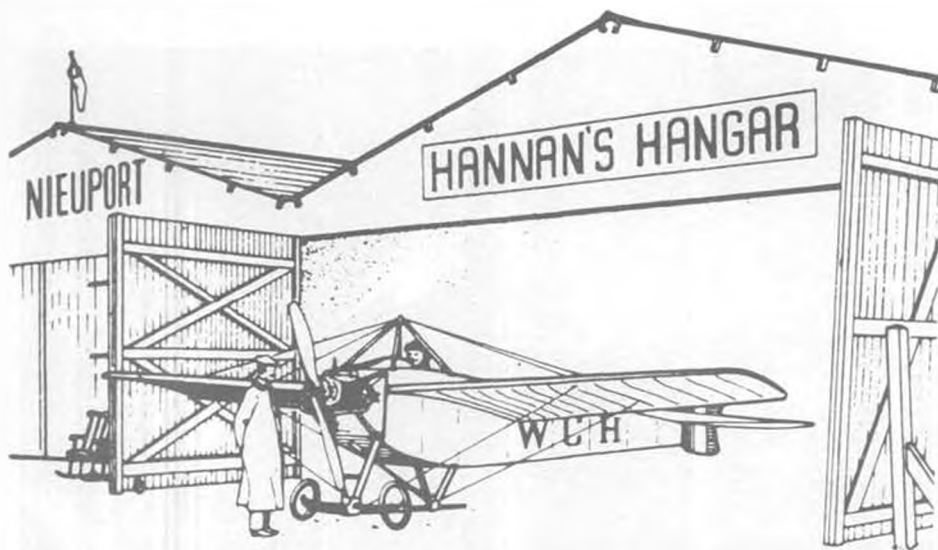
When starting out on the new model, the idea was just to build something, so the proven moments of the PN were used, but as it was a one-off model for sport flying, the wing area was increased some, just to see how a really huge model would fly. So it came out larger than the PN's hanging on the wall, but didn't fly all that much better, as it is also a little heavier than the foamie PN's. Now that surprised me, as we have all assumed that foam models tend to be

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Neal White (left), Rush, and Myles Lawrence with remains of his model. Howard was first in FAI, Myles 2nd, with AAC Fox and Neal third.





"Experience is not what happens to you, but what you do with what happens to you."

• Our lead-in this month is from the pen of Aldous Huxley (1894-1963), and was brought to our attention by Janet and Jim Lueken.

AND SPEAKING OF EXPERIENCE

"The experience (of indoor flyers) was that CO₂ engines gain power as they encounter the warmer air trapped

beneath the ceiling. I would like to suggest something for what it is worth: first, if downthrust is increased so that the model has only a *slight* climb, then it may be possible to reach the desired height just as the engine stops.

"Second, we know that with endurance models, we use a generous amount

of blade area on the propeller to gain height quickly. Also, with distance models, we *reduce* the blade area for a given diameter propeller to limit climb to perhaps 100 feet. In this instance, it would appear that by reducing the blade area while keeping the diameter the same, the climb would be lessened, thereby taking longer to reach the desired altitude by the time the engine stopped.

"Perhaps a combination of the two might prove interesting. One drawback is that you may wind up with a toothpick propeller, but it would be worth trying"; Sincerely, Chester S. Maxwell, Hickory, North Carolina.

READER RESPONSE CONTINUES

We take great satisfaction in the far-reaching knowledge of our audience and their willingness to share it with fellow model builders. Mention of a problem or "missing link" is quite apt to bring helpful information, as witness the following: "Your column in the April *Model Builder* hit me right in the face. Dave Stott's account of the 'White Monoplane' made me feel guilty. I've had these plans for quite some time (referring to the first White monoplane canard homebuilt, which apparently preceded the more conventional White mono featured in *M.B.* as a Walt Mooney Peanut).

"I figure on (building) two models; one to figure out how to make the thing fly... the second for competition and photos. I've made canards fly before, but this one looks crazy. Who ever saw a rudder in front of the C.G.? Imagine sitting in that bird and trying to land it... ought to dig furrows deep enough to plant 'taters.'

"If I can't make it fly, I'll make the plans available... we'll see who can make it fly!" Donald (the "Wiz") Assel, Canton, Ohio.

STICK WITH IT!

Sometimes it seems we are faced with a bewildering array of choices when it comes to glue. We have white glue,

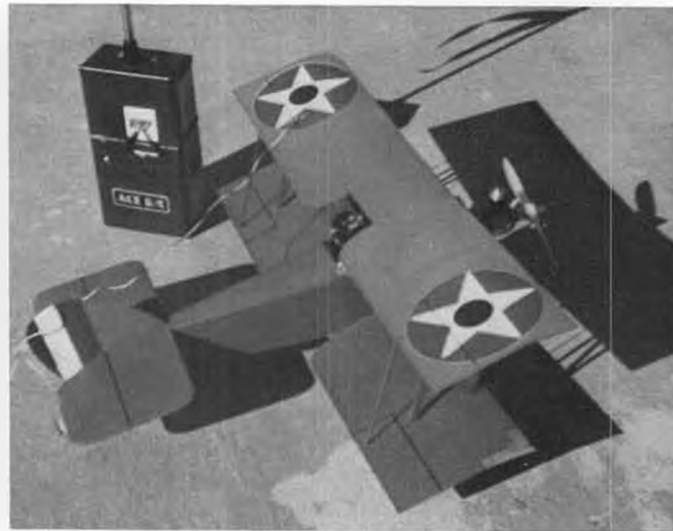
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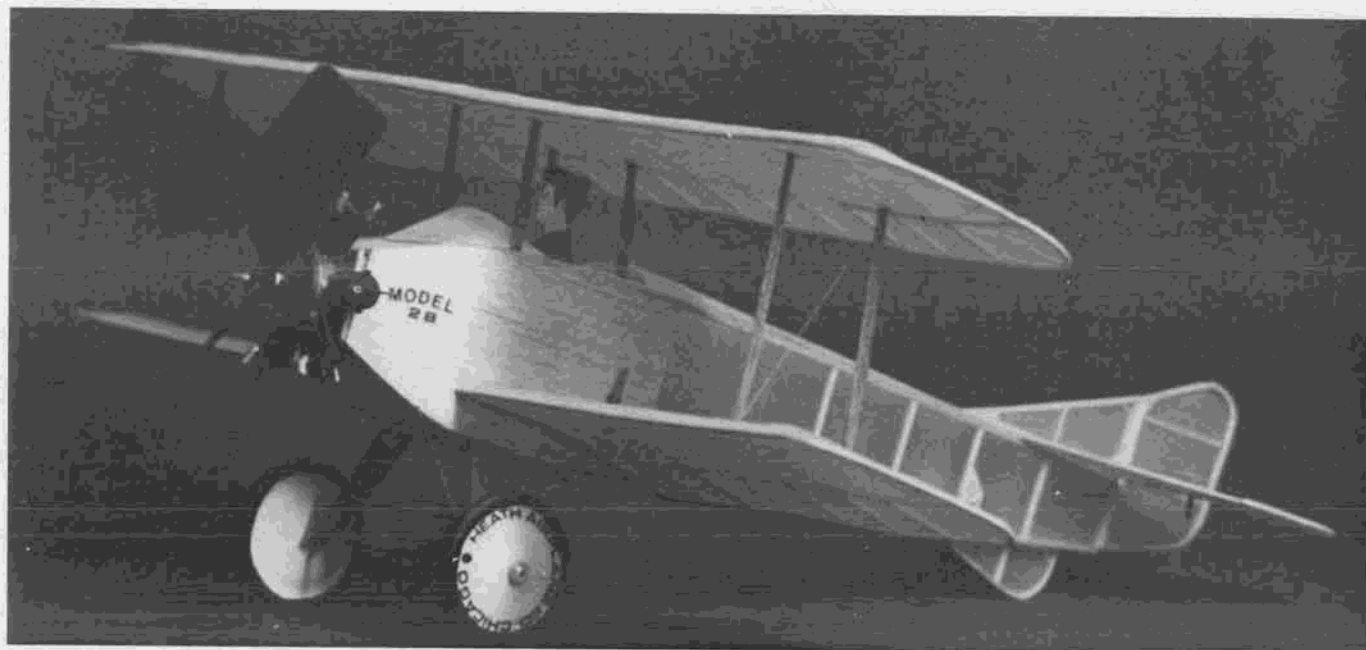
Mitsubishi "Claude" 1/2-inch scale paper (!) flying model by Mike Hetherington, of England. Photo via John Blagg.



Charming Mireille Aime, Salon, France, with condenser paper covered Santos-Dumont canard, Peck Lacey M.10. Roger Aime pic.



Cox .020 powered, 18 inch span R/C Sperry Messenger, by Jack Swaney. More details in article.



HEATH 2B



By HOBY CLAY . . . First of several fine new Peanuts by the author, he has followed Walt Mooney's three-views of Ed Heath's tiny biplane in every structural detail, and it flies well to boot!

When Walt Mooney had his work on this obscure Ed Heath design published, I was completely captivated. The article was well-researched and the bird satisfied all my requirements for a Peanut Scale model. Matter of fact, I'm surprised Walt didn't do it first. The plane is not well-known, has reasonably good moments and scales to over ten-inches long. The documentation (probably the only information ever published) satisfies the needs of all but the most scrupulous scale modeler and the AMA Scale rules.

The wind blows pretty regularly in my part of the Southwest, and I get much more flying time indoors than out. Consequently, my models are built light. This one will easily do forty seconds indoors. Putting in about a quarter-inch dihedral under each wingtip will give

better gust-stability, although it does quite well in stable air.

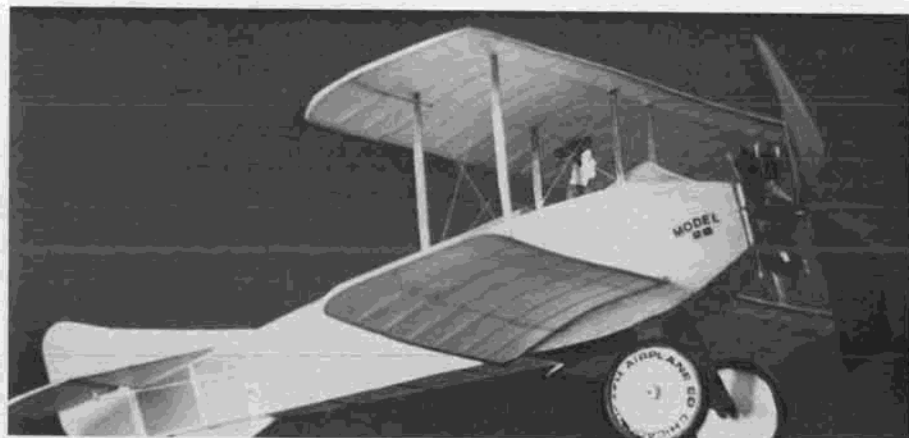
My plans incorporate all the scale structure Walt showed. Separate ailerons and tail surfaces were built to improve the scale appearance of this plain-Jane. These really help in getting her adjusted for flight. Mine came out at a quarter-ounce (7 grams) without the motor, which I consider acceptable for an indoor Peanut with a small amount of detail.

Begin construction by stripping out the sticks for the fuselage longerons and cross-members. I use one of Jim Jones' adjustable balsa strippers for this. It's a precision tool and Jim has made, in my opinion, a real contribution to our hobby by building it and making it available to us. I recommend obtaining

one if you haven't. You'll wonder how you got along without it. Stripping your own wood has a number of advantages. All pieces come out the same width throughout their length. You can select the proper strength and weight wood much better by evaluating a relatively large sheet of wood, and the strips will match in weight, strength, and stiffness, where this is important.

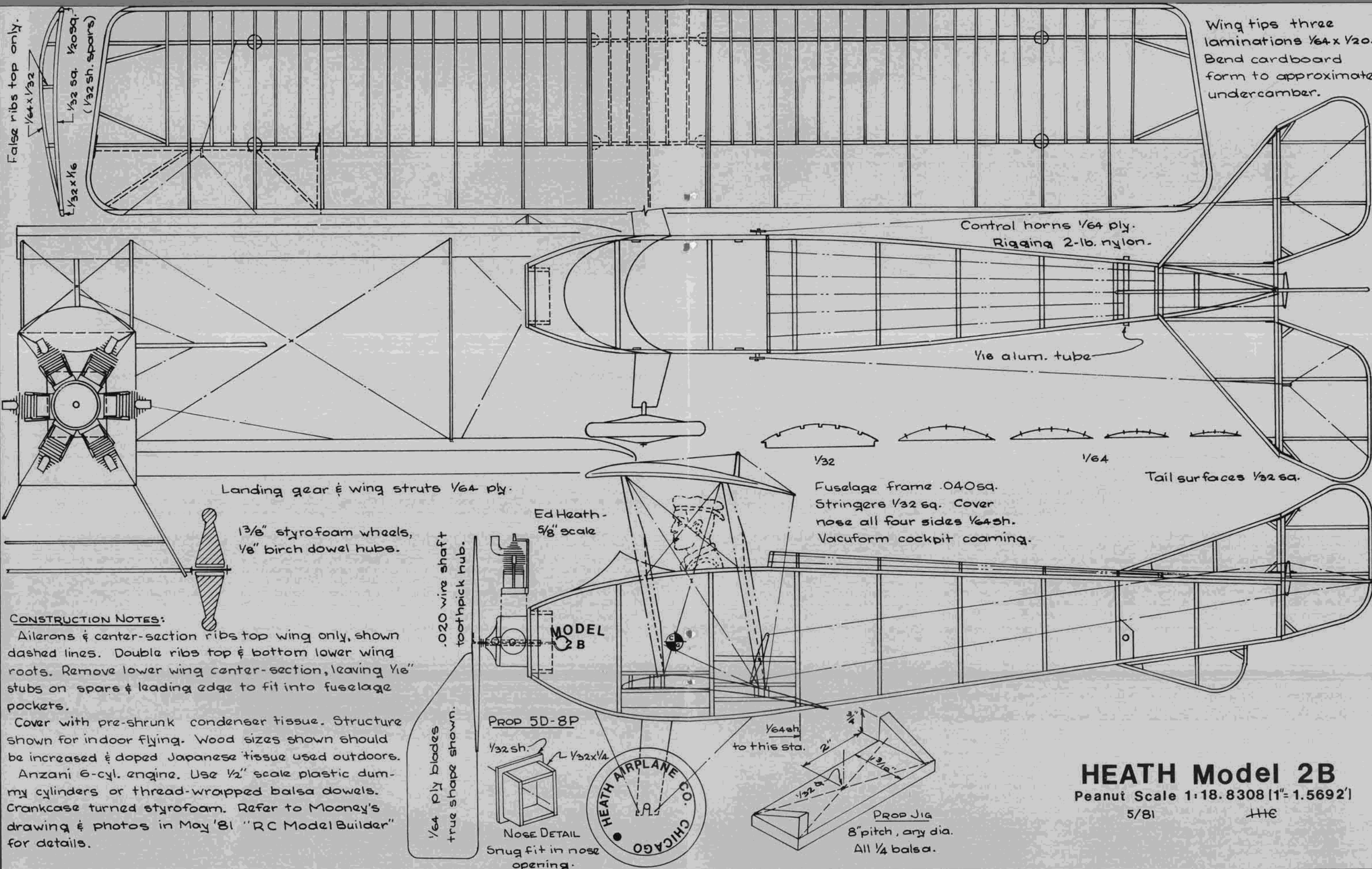
Good quality precision balsa sheets can be obtained from a number of places if you look around. I get most of my lumber from Mike Mulligan, who has taken over Oldtimer Models from Jim Noonan. His sheets are less expensive than the shops which cater to the indoor builders, and are larger. He will select hard, medium, or soft, if you specify. A lot of hobby shop 1/32 sheet is really closer to 0.040 inches thick than the specified 0.031. Careful selection of a light, straight-grained sheet will yield a nearly lifetime supply of longerons for light Peanuts.

The curved parts of the tailplane outlines and the wingtips are laminated from strips of 1/64 balsa soaked in ammonia solution and bent around waxed cardboard forms using diluted white glue adhesive, in the conventional manner. Hinges are made from fine steel wire, obtained by untwisting a length of stranded electric wire. This is light, plenty stiff to hold adjustments, but won't twist the structure out of shape when making them. Install the 1/64 ply control horns after the surfaces are



Puzzle . . . How did Ed Heath get in and out of his little biplane!? Hobby Clay's model is right on the mark. Interesting idea for a prop to fly lightweight Peanuts.

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HEATH Model 2B
Peanut Scale 1:18.8308 (1"=1.5692")
5/81 HHE



Hawker Fury I built from 22-inch plan originally published by Great Lakes Model Engineers, now available from Golden Age Reproductions. Slightly enlarged stab, modified airfoil. Excellent flier. Model and photo by Mark Fineman.

FREE FLIGHT SCALE

By FERNANDO RAMOS

• Once again, I had the opportunity to ride with George James to another Flightmasters R.O.W. fun-fly at Lake Elsinore. As before, I learned something, this time another interesting way of building fuselages. There is no question that all of us have a pet way of constructing fuselages, and that it is very difficult for some of us to try different approaches to the same problem. In my case, even though I build many fuselages using my jig methods, I really do prefer to build a box type of fuselage. Then to this box structure I add formers and stringers. George does his this way with a clever touch added to it. Incidentally, this system is for building from your own plans. Before I go any further, I realize that there are many modelers who can plot the cross-sections of the most complex fuselages, and have everything fair beautifully. Well folks, I for one, can't draw, let alone loft cross-sections!

George's technique is about as simple as can be, and one that will give you excellent results. The first step is to take an enlarged drawing of a three-view and sketch in a basic frame of the fuselage (see illustrations) when you do this, there are a few points you have to take into consideration. For example, is the bottom of the real airplane flat? If so, then the lower longeron can be tangent to the bottom outline of the airplane. Another item to consider is how far forward should this box structure go? Will a thick nose block be used or will the stringers go right to the firewall?

Once you've established these couple of points, draw in the side-view structure. As far as the vertical members are

concerned, they are placed wherever you want a former. I use a single line to show the fuselage side. For one, it saves a lot of time, and after I have the first side constructed, the second one is built on top of the first one.

The next step is to look at the plan view. This is necessary so that you can determine the width that the box structure should be. The only real consideration here is whether the shape of the fuselage is such that you will have to have side formers to give it the round or oval shape. Sometimes all that is required are a few stringers on edge to give the required shape (see illustrations) of the sides. This is easier than gluing bulkheads onto the sides of the fuselage, then adding stringers.

OK. Now that you have the side and top-views laid out on your drawings, you can build the basic fuselage framework. When this is completed, the formers are next. I'm sure you have noticed that I have not mentioned anything about cross sections. This is where George has really simplified the task. (See sketch). At any given cross section, there is a certain height and width from that of the fuselage framework. George measures the width and height at a given station. He then cuts out a rectangular piece of balsa and glues it in place using Super Jet. If a side former and bottom former are needed, rectangular pieces are also cut and glued into place.

When all stations have been done similarly, George takes a pair of scissors and starts trimming each station until it looks pretty uniform. Sanding all around the formers, using the eyeball method, is

next. Then take a stringer and lay it down on each former from the front to the rear of the fuselage. If the stringer doesn't fair just right, do a little more sanding until it does. Do this all around the fuselage. When you are satisfied, each former or bulkhead is notched to receive the stringers. The number of stringers is strictly up to you. If, this doesn't beat lofting I don't know what does!

Personally, I don't like to make notches for stringers. I prefer to under-cut the height and width of each former by the size of the stringer. This way the stringers rest on top rather than in a notch. That is, all formers are undersize except the first and last one. On these, you want the stringers to fall into notches. Also, if the model you're building has an open cockpit, the formers at the front and back of the cockpit (instrument panel and headrest), should also be notched, simplifying the covering of the model.

I think you will agree that this truly simplifies drawing up your own fuselage plans and building a model from them.

While I'm at it, as long as I'm talking a bit about handling cross sections, I will review with you the way that Ken Smith tackles the same problem. You can decide which way is more accommodating to you.

Ken starts out by drawing a datum line on both the side view and the plan view of the fuselage. Like George, he decides where bulkheads should be and these are drawn at the same time on both views (see sketch). He then makes a xerox copy of the side view of the fuselage and rubber cements this to some stiff cardboard (i.e. tagboard or equiva-

lent). By using the two views of the fuselage, he can determine the height and width of the cross section.

Ken then eyeballs a particular cross section and cuts one half of it out of the tagboard and glues this at right angles to the fuselage side view. This is repeated with all other cross sections. He then lays a stringer fore and aft at different locations to see how things fair. If they don't, he removes a bit by sanding, and if a former is undersized, he notes on the former by how much. Once this has been accomplished, each former is removed and transferred onto a piece of folded graph paper. The template is cut out, opened up or unfolded, and there you have it. From here you can use the jig I've talked about many times before.

I've been writing for many years regarding the advantages of Floquil model railroad paint, and its use for model airplanes. I'm very surprised at the number of requests I keep getting to know more about Floquil and its proper use for our needs, and what will mix with it and what will not.

I want to review some of the more familiar techniques I've mentioned in the past plus a few additions I've been working on. What makes Floquil so desirable in model railroading, is that it covers in one single coat, the pigments used being really fine. I'm sure that's one reason why the product is so expensive considering the size of the bottle it comes in.

Floquil will mix with nitrate dope and



"No-Cal" 13-inch span Wittman Bonzo, also built and photoed by Mark Fineman. Profiles build quicker and a lot easier.

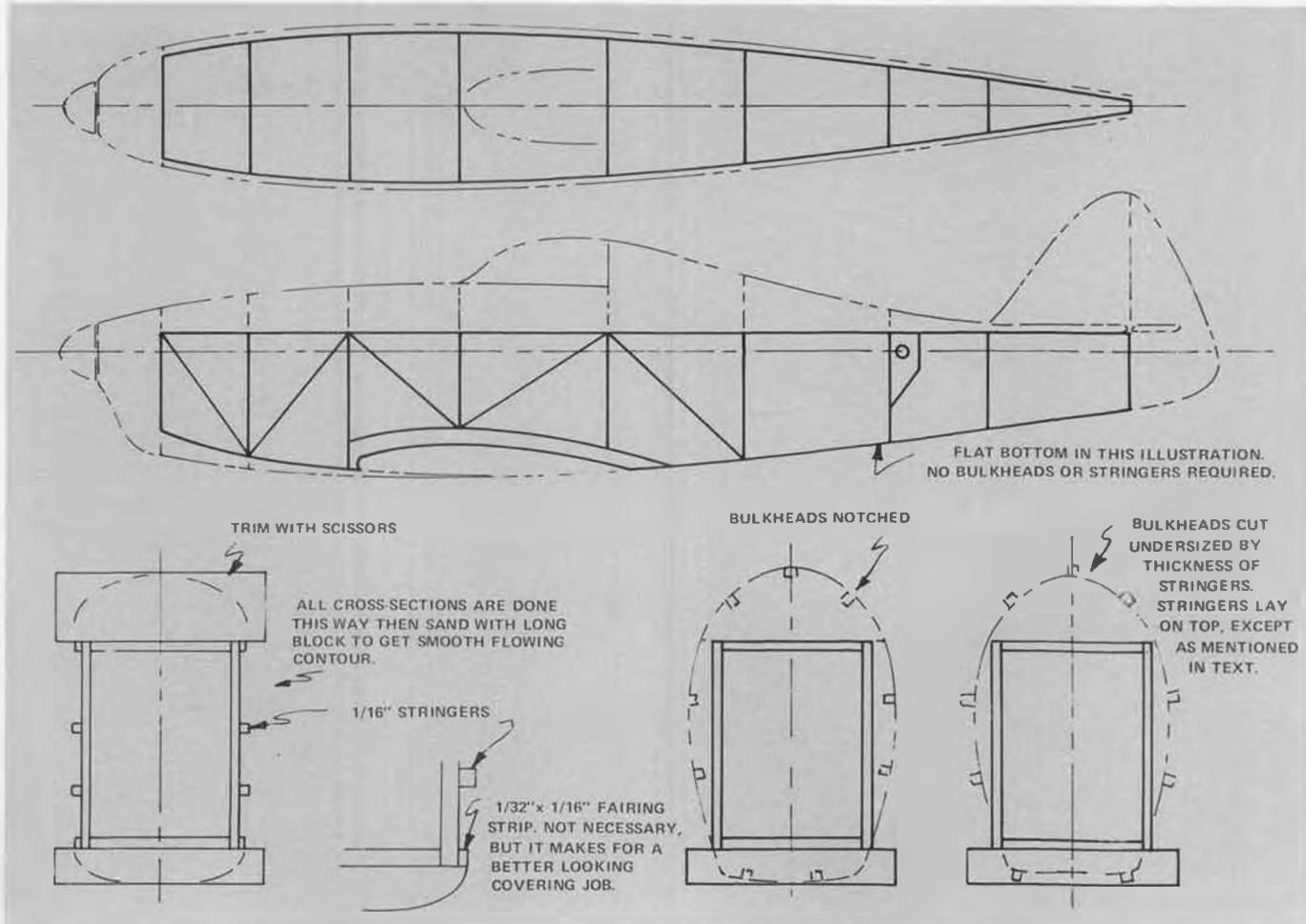
lacquer thinner, but it will not do anything but curdle with butyrate dope, such as Sig's Litecoat.

My simple approach to mixing Floquil is to fill a baby food jar about 1/3 full of raw, non-tautening nitrate dope (dope which has not been thinned out). I then take the color of the Floquil I want, mix it thoroughly, and pour about half of it into the dope. Next (and here is something many of you may not know about), I take Floquil's Crystal Coat and add about 1/3 of that bottle into the baby food jar. The three ingredients are mixed thoroughly, then lacquer thinner is added to top off the jar. The contents are now ready for spraying. The Crystal Coat is used to give the ready finish a sheen, and it also takes away any brittleness created by the paint. Over the years

of using Floquil, I've noticed that the one drawback was that the tissue had very little resistance to tear. Crystal Coat seems to remedy that.

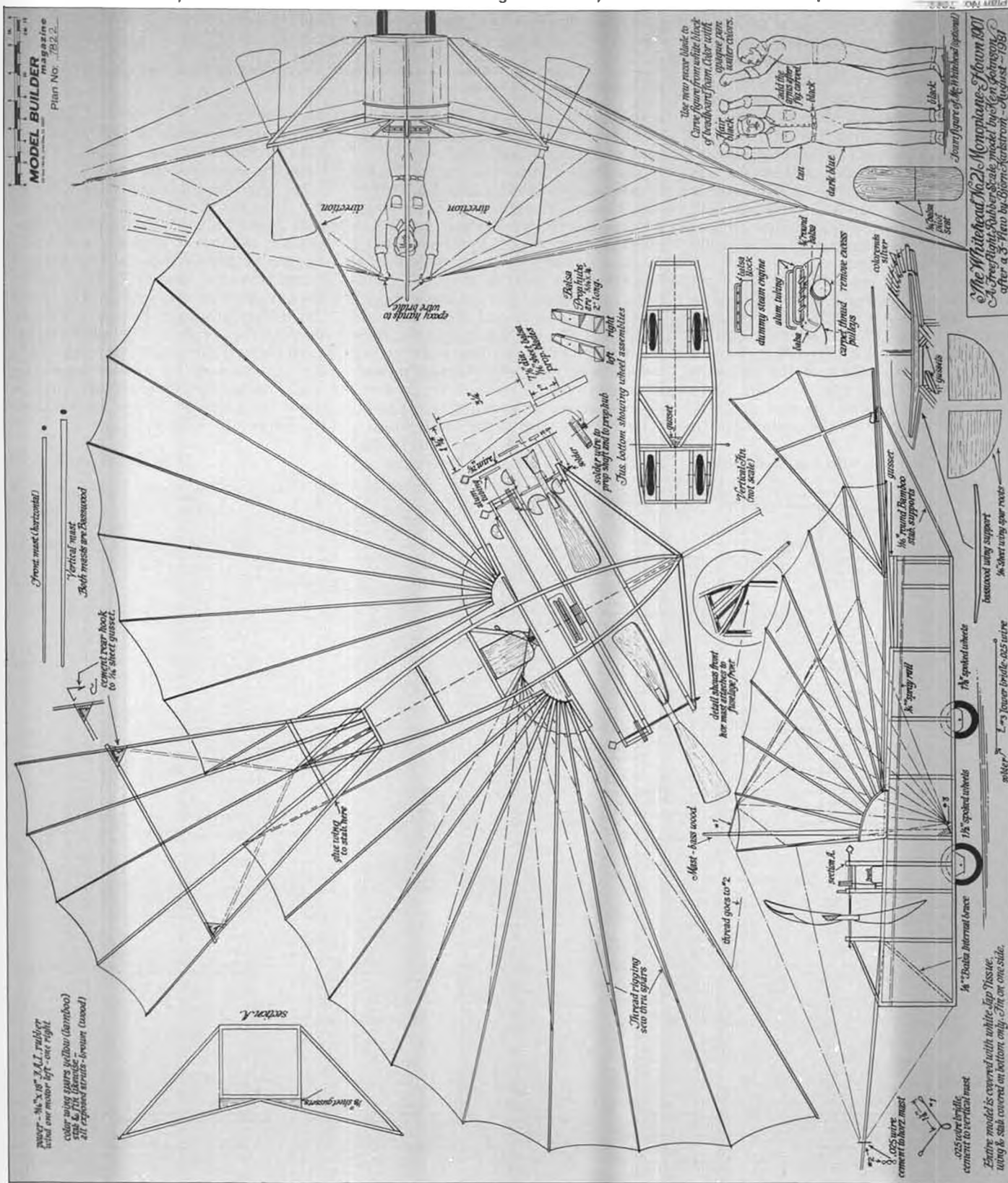
For old time rubber models, I like to use Floquil's Reefer Yellow, trimmed with a light blue. My first attempts were to paint the model so that it was nearly opaque. I always thought this looked great! However, one of the neat things about rubber models is to be able to see the framework, and the sun glistening through the wings . . . Oh, what a sight! Even though the opacity was such that the structure could still be seen, I've finally realized that I do not like the way the models looked, so I've approached the finish a bit differently.

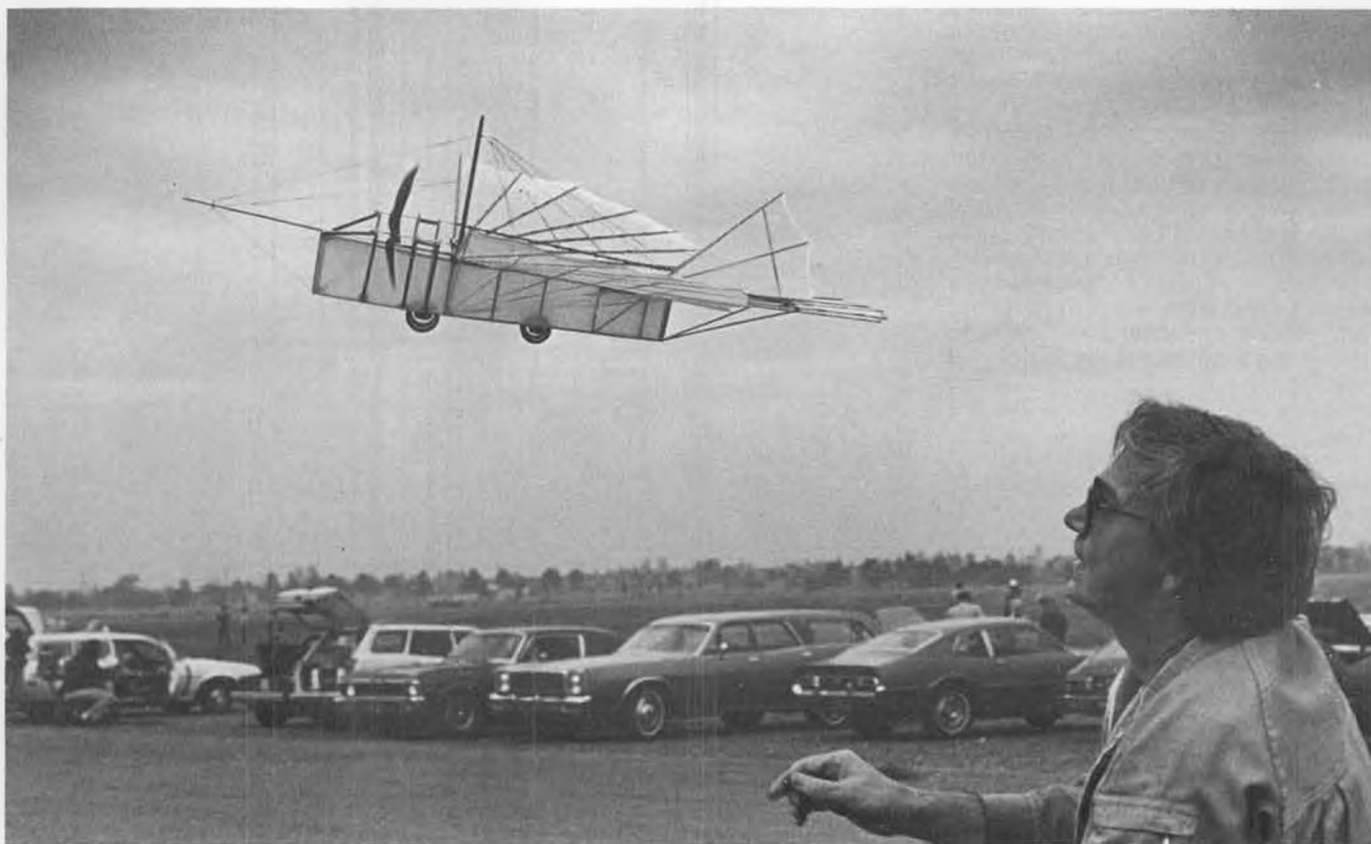
Continued on page 65



Whitehead No. 21 Monoplane

By KEN JOHNSON . . . An interesting scale model, as the original may have flown before the Wright Brother's aircraft. Lesson: If you're ever the first to do something historical, be sure someone takes pictures!





PHOTOS BY BILL NOONAN

• Did Gustave Whitehead and his #21 monoplane truly fly on August 14, 1901? This date was over 2 years before the Wright brothers flew at Kittyhawk.

This question prompted me to read the article on Whitehead in the November 1968 issue of *American Aircraft Modeler* magazine.

According to this AAM write-up, there were numerous eyewitnesses who related seeing Whitehead in #21 fly for up to 1/2 mile in distance.

The Wright's flight was 122 feet in length.

While working in Dayton, Ohio, in 1975, I was a contestant in a paper airplane contest held in the convention center. This building has two marble pillars in the lobby, marking the distance of the Kittyhawk flight. The contestants in the contest stood on a low platform at the one pillar and flew their paper gliders toward the other pillar. The winning flight went past the 122 ft. marker and struck the wall a good 30 ft. behind it.

The reason the Kittyhawk flight was recognized as the first powered flight was that a local photographer snapped that famous picture we all know, with the airplane about 4 ft. off the ground. A helper in black suit and cap is standing near one wingtip.

Unfortunately there were NO photos of the Whitehead aircraft. Just accounts from eight eyewitnesses who saw #21 fly.

A friend of the Whitehead family, Miss Stella Randolph, wrote a book about Mr. Whitehead and his experiments with airplanes and engines. This work is titled "Before the Wrights

Flew," and was published by G. Putnam's & Sons, in 1966. I found the book in my public library. Many photos and accounts of the planes can be found there. A second book by Miss Randolph is titled "The Lost Flights of Gustave Whitehead."

The AAM article contains an excellent three-view drawing of #21 by Bjorn Karlstrom.

Note: There is no intent herein to discredit the achievements of the Wright brothers, but to simply show a comparison with Mr. Whitehead.

This airplane intrigued me personally for several reasons:

- ★ It had folding wings and tail.
- ★ The craft stood on four wheels.
- ★ The pilot was partially enclosed within the fuselage.

★ The two counter-rotating propellers were driven by one steam engine located in the front of the fuselage.

★ #21 could come down on the water, since the body of the plane was boat shaped.

★ To turn the craft, Mr. Whitehead stood up and pulled on the wires which supported the wings. This amounted to wing warping and the resulting drag made the plane turn.

As I studied the three-view, I wondered if it would fly with no vertical fin. #21 had none. And how would I make a rubber powered model of it with one rubber band driving two propellers?

The plan was drawn up to a span of 22 inches and construction began. The rubber motor was enclosed in the fuselage, with a two-pulley arrangement forward of the front hook. The propellers each had a pulley just behind which

connected to the motor hook pulley by a tied length of thin thread. The model was covered with condenser paper.

The wing structure was made of what appears to be tapered bamboo poles connected at the root and fanning out toward the tip of each wing. To simulate this in the model, 1/16 sq. balsa strips were sanded round and tapered smaller toward the tips. This is accomplished by holding a small square of sandpaper (folded over) in one hand and spinning the strip of wood around through the sandpaper and drawing it back and forth simultaneously. The wood poles are coated with yellow marker and the joints marked with a thin brown ring.

Test flights on the completed model revealed that the pulley arrangement was inefficient and much power was lost with this type of drive train. The model flew in a straight line but wandered slightly from side to side. I concluded the reason being the absence of a vertical fin. This first model was set aside and eventually given to a friend when my family moved to California.

The second Whitehead model was built to the 13 inch Peanut size for the Model Builder Peanut Proxy Contest held in Long Beach, Ca. in 1978. The new craft was different in that it used a separate rubber motor for each propeller. Rear hooks were located on the top of the stab on each side. The model was covered with white Japanese tissue, and this time a scale-looking vertical fin was added.

The performance was much improved. The model was proxy flown by Curtis Mooney, using another modeler to help with winding. The Peanut Whitehead

flew for 17 seconds. WOW! Not very high time. But I considered this model a success because it did fly. To my mind, this proved that Gustave Whitehead's airplane would indeed fly through the air, in contradiction to the beliefs of some aeronautical experts who stated that the design was not airworthy.

Now we come to the model featured in this article. While searching for a subject for an upcoming Flightmasters multi-engine contest, I turned again to the #21. The plan were drawn to a wingspan of 40 inches this time. The aircraft was finished the day before the meeting, which is rather typical for me, or so say my friends. No time for test flying.

Next morning, the model was lifted from my car trunk and two motors were made up and slightly lubed. Almost immediately a bearded gentleman appeared and offered his help. "My name is Paul Steel, and I'm a Whitehead #21 fan." Paul realized that winding this airplane was a two-man job and he was willing to spend some time with me to see that the trim was right and that I got my flights in early, before the winds came up.

The writer held both props while Paul Steel wound one motor forward, attached it to its stab hook, then wound the other motor backwards and attached it. After both motors were in place, Paul would come around to the front and hold one prop as I moved around heading the same way the model was heading and underneath it. The launch position was to have the tip of one prop blade in each hand and the #21 over my head and slightly forward. At launch, the prop blades were pushed forward softly and the fingers released quickly so as not to tear off the blades.

With Paul Steel's help I was able to get the time up to 25 seconds from a hand launch. The Whitehead won the meet. One ROG was attempted, but the time was about 15 seconds. And since hand launch was legal, we stuck with it.



Original wings opened and folded like a Japanese fan. Model proves that it very well could have flown . . . and prior to the Wright Brothers at that!

One problem noted during winding was that the the stab would give as the first motor was attached to its rear hook. This warned us that using heavier motors might destroy the tail of the model because of the lateral force exerted in the stab area. I feel that using bamboo support rods under the stab would allow bigger motors and higher, longer flights.

Note: Several months after the above mentioned contest, Mr. Paul Steel was killed in a fall from the balcony of his condominium.

The Whitehead was flown again recently at a meet which offered a Paul Steel Memorial Trophy for the most unusual model to put in a qualifying flight. I was most happy to win this award, since the last time the Whitehead flew, it was with the help of Paul Steel. This trophy means more to me than any

other I own.

This model project is not for everyone. It is only recommended for the adventurous builder. It won't fly the highest, it won't fly the longest, but it sure is a challenge. If you want a museum piece, why not try it?

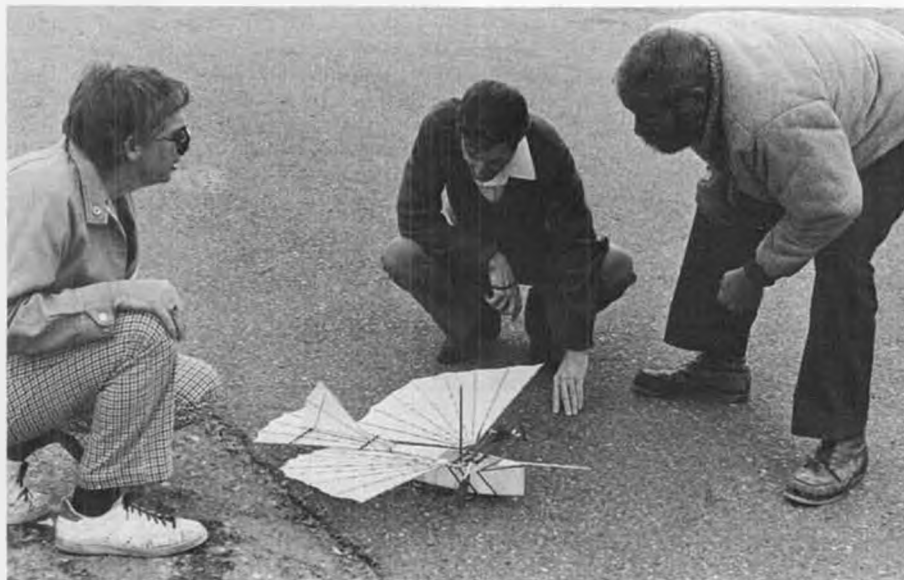
CONSTRUCTION.

Begin with the fuselage. It is built in the standard fashion, using 1/8 sq. medium balsa throughout. Note the construction used on the fuselage bottom. Holes must be left to fit the Hungerford wheels up into the fuselage. These, of course, remain uncovered. Build one fuselage side over the other and cut the cross pieces for the top and bottom. When connecting the fuselage sides together, be careful not to crack the longerons as you pull both front and back together. Wetting the longerons will help them to bend more without breaking. Note the notch at the rear in which to set the stabilizer. The pilot seat may be put in last.

The wing construction is totally different from other models. There are no ribs. No airfoil. The method of sanding the simulated bamboo poles in each wing has been covered earlier in the article. Select medium 1/8 sq. balsa for the "poles." Make sure the strips are straight and have about the same spring to the wood. The rounded root triangle of the wing is 1/16 sheet. Pin this down to the plan.

After coloring the wing poles, pin each one down (x-pinning style) to the plan and cement the root of each pole to the root triangle. Trim each pole so that the tip diameter is the same on each.

Repeat this building technique on the other wing and lift both off the plan after sufficient drying time. Note: The



Author/designer Ken Johnson, Bill Hannan, and the late Paul Steel (l to r) surround the Whitehead. Rudder is non-scale. Original apparently flew without it.

Continued on page 94



Nicky Wyeth launches his Cameron 23 ignition powered Megow "Ranger" from a field at Broad Cove, Cushing, Maine, as his famous artist/painter father, Andrew, looks on. We have an autographed sketch of a Fokker D-VII and German pilot, which ain't for sale!

FREE FLIGHT

By BILL NORTHROP

• If you didn't happen to notice, take another look at this month's byline. Tom Hutchinson was unable to complete his column in time for the deadline. A hospital is not the best atmosphere for creative writing, and Tom has been in and out of several in recent months.

It suddenly dawned on us that if free flighters found a **second** model magazine with its regular free flight column missing, they might all sell their balsa

and dethermalize into the nearest storm sewer! And so, we figured this was a good time to catch up on our Mystery Model winners. When it comes to the more exotic stuff, you'll just have to wait until Tom returns next month.

Response was very low on the Decem-

ber 1981 Mystery Model. Rudy Kluiber, Lakewood, Ohio, was first, however, identifying Paul Palanek's "Driftwood", from January 1954 M.A.N. Bob Higgins, Bremerton, Washington, has over 400

Continued on page 65



Cor Burger's version of the April 1982 Mystery Model "Pushalong" still holds a record in Holland!



Current holders of the Magnificent Mountain Men (Colorado) perpetual trophies are (l to r) Jerry Murphy FIA, Roger Maves FIB, and Ken Phair FIC. Won at July 4th Annual.



Fine looking F8F Bearcat Peanut by Scott Rubke has registered a 51 second indoor flight.



Mike Hetherington, England, built this 15-1/2" span Fokker D-VI. Tissue pre-colored with thin poster paint. Rotating engine, gearbox.

INDOOR

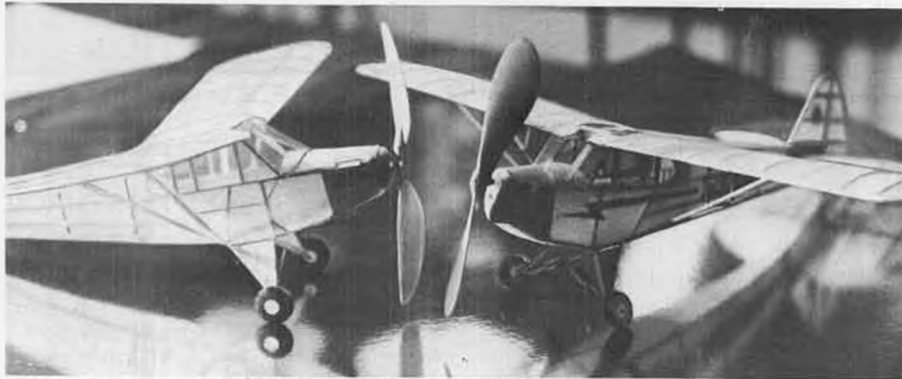
By KEN JOHNSON

BUILDING THE PECK CUB.

Last year about this time, our Flight-masters West club held its first annual Peck Clipped-Wing Cub indoor meet. The contest was well attended and lots of fun. It's time for this event to take

place again, so I thought it would be interesting to discuss the construction and modification of this neat little kit.

The Clipped-Wing Cub is an ideal model for the novice indoor builder as well as the seasoned competitor. It is not



Stock (right) and modified Piper Cubs. Modifications described in text. First clue is wood vs plastic propellor. Johnson pic.

at all difficult to build, and flies quite well. Another important consideration is that the Cub is an easy airplane on which to get documentation.

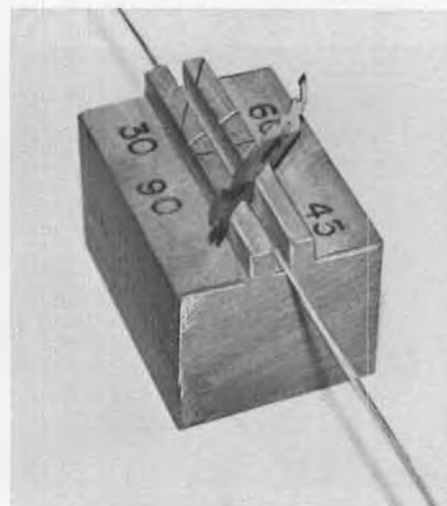
Most small to moderate size airports contain at least one Piper Cub aircraft. Son Chris and I spend many Sunday afternoons haunting every small airfield within 100 miles. We always bring a camera along to shoot reference shots of any plane we intend to model in the future. Last Sunday we photographed a beautiful old Stinson Reliant and a tiny replica of the Corsair fighter. The latter is a fiberglass over foam kit that is powered by what we guess is a Volkswagon engine. Sure hope the pictures turn out on that one. We saw several Cubs on that trip. Photos were taken of the instrument panel, main and tail wheels, engine details, etc. One thing we always check is how much washout the wings contain.

Many magazines also feature articles on the Cub. Most Cubs are painted yellow with a black lightning stripe along each side of the fuselage. Engine detail is rather minimal. The gear consists of triangle struts and big balloon tires. Pretty simple, huh?

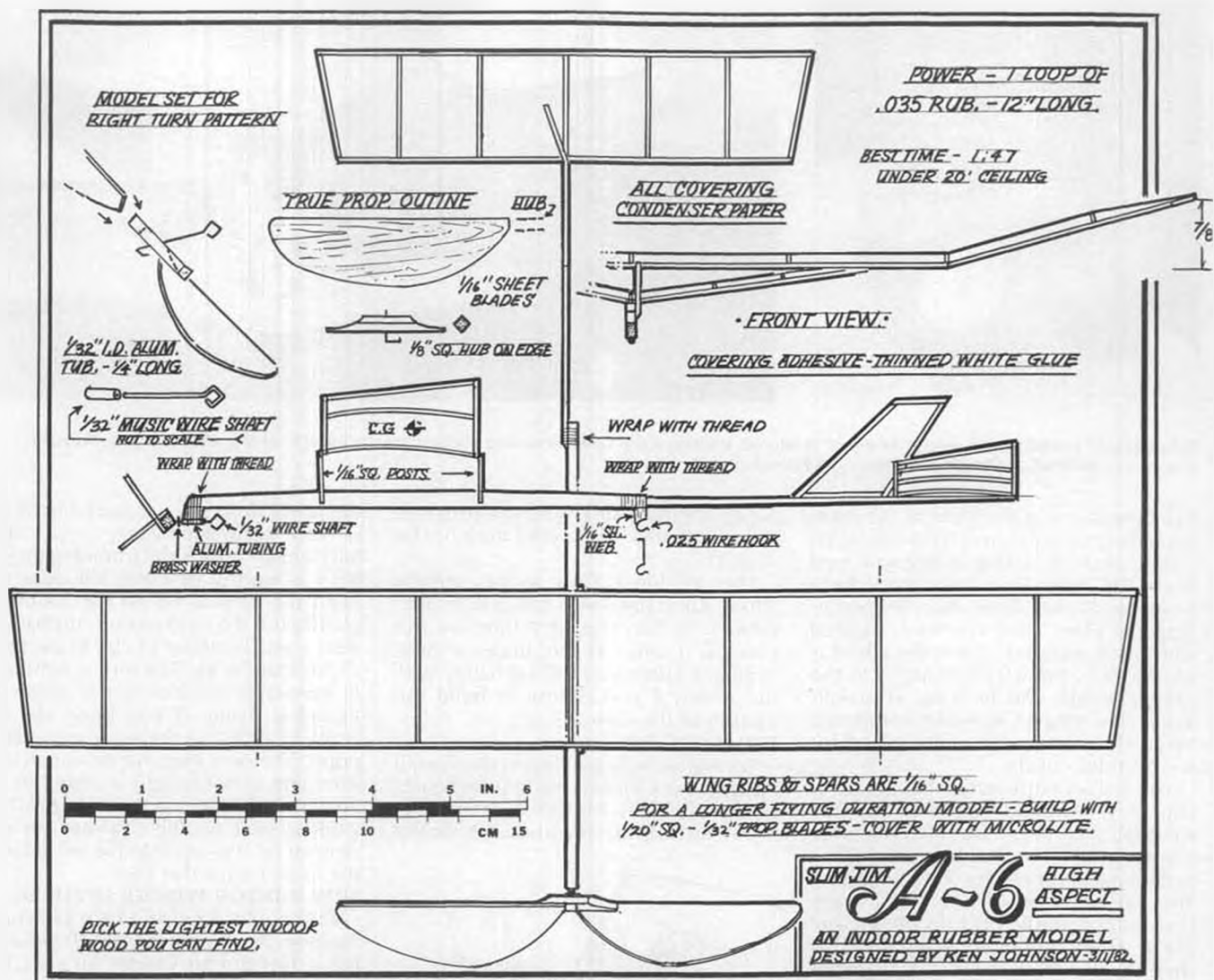
The model in the Peck kit is the version with shortened wings. This makes an ideal Peanut model as the fuselage is slightly longer. The kit contains all the necessary materials. The wood is good quality and light by



Contestants at last year's Peck Clipped Wing Cub meet in Santa Monica, CA. Scaled-up version flown for fun by John Godel. Contest discussed in text. Photo by Warner.



Balsa strip miter box, milled from hardwood by Ron Ganser, Pittsburgh, Johnson photo.



comparison. I recommend building this model with Testor's green lable cement (better to talk to this guy, Bill Hunter! wcn). Use the glue and dope sparingly. The lighter the model the longer it will fly. Cover with the lightest Japanese tissue you can find. The kit tissue is O.K. If you insist on doping the completed Cub, cut the dope in half with thinner. One coat only, of course.

The completed stock kit will weigh about 10 grams. Flying time will be about

25 seconds. Be sure to wash out the wingtips 1/8 inch. You can do this by holding the covered wing about 15 inches high over a pan of boiling water.

Gently twist the desired shape into the wing tip and hold for a minute.

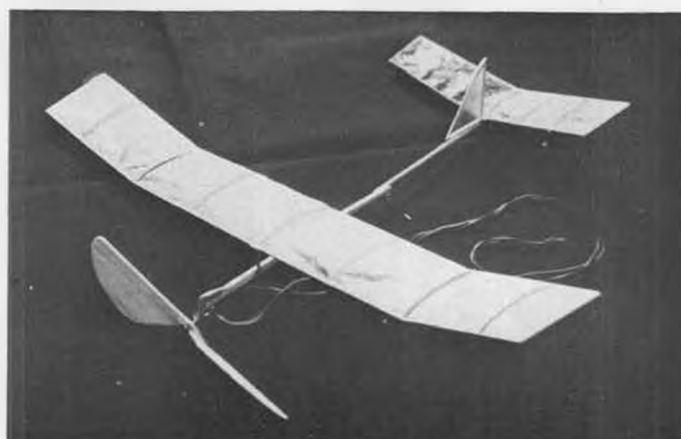
The modified Cub is another story. The fuselage is constructed from 1/20 sq. indoor balsa. The nose is sheeted with .015 sheet. The wing is made with 1/20 sq. leading and trailing edges. The sliced wing ribs are 1/32 sq. indoor stock with a

.015 x 3/16 spar running between the upper and lower ribs. The wing tips are 2 laminations of 1/32 sq. balsa wrapped around a card stock template and baked in the oven. Thinned white glue is used to cement the laminations together.

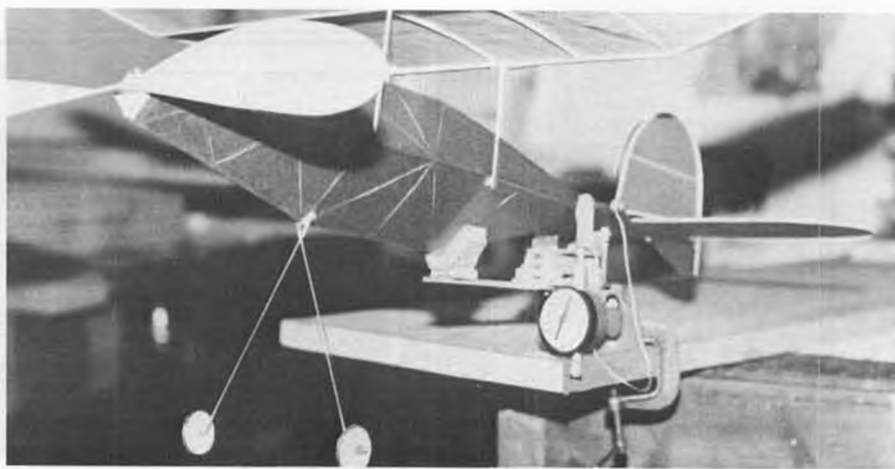
Outlines of the stab and vertical fin are also laminated. The two laminations are 1/32 x .020 balsa and cross pieces are 1/32 sq. The landing gear is also changed. Instead of using wire, the struts are round 1/32 balsa and bamboo. The



Semi-scale, 22" span Taylorcraft CO2 kit by Micro-X. Has done one minute, 34 seconds in highschool gym. Weighs 1-1/8 oz. total.



Slim Jim A-6 from plan above. Specs limit motor stick to 6 inches. Build as A-6, or lighter fun duration model. Johnson photo.



Ron Ganser's exotic torque meter. As motor is wound, holding stand twists, exerting pressure on the plunger of the readout meter. At right, model is in position, ready for winding . . . and measuring.

bamboo part is at the front of the strut. Then the triangular strut is covered with yellow tissue. A small wire axle is formed from .015 wire. Tires are carved from beadboard foam. Paper hubs are white-glued in place after the tire is painted with black india ink. Once the wheel is on the axle, the wire is snipped to the proper length and bent up at a right angle. The engine is made from scrap balsa. Oven liner aluminum is used for the cylinder covers.

The tail wheel is scrap balsa and its strut is 1/32 round bamboo. The side windows on the Cub are Microlite plastic, while the front windshield is cellophane (Tetley Tea box wrapper). The noseplug is carved from foam. Discard the plastic prop in the kit and use a wood propeller. Wrap the 1/32 sheet blades around a 3 inch diameter can (after soaking in warm water) and bake in a 350° oven for 1/2 hour. The prop hub is 1/8 sq. balsa.

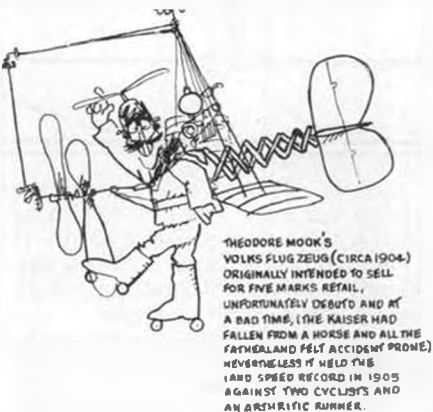
Covering adhesive should be thinned white glue. The Japanese tissue covering can be tightened slightly with water spray. An adjustable spray bottle is fixed to the finest mist and held above and to the side of the covered model. Spray the fine water mist across and above the plane. Only the dust of the spray is allowed to touch the covering. If the

paper is shrunk too tight, the structure will warp badly. The model must *not* be doped!

The modified Cub model weighs about 3.6 grams (with the .040 rubber motor). So far, the best time on this plane is 1 min., 35 sec. under a 20 ft. ceiling. I know you will be happy with the results if you choose to build this version of the Cub.

TRIMMING TIP.

Several years ago, I flew in the Peanut Postal Proxy Contest held at Long Beach, California. This Model Builder meet drew entries from far and near. As one of



the proxy flyers, I was assigned to fly the Farman monoplane entry by our own Bill Hannan. I think this trimming trick of Bill's is worthy of note. Bill does not bend the vertical fin on the model to accomplish the desired turn. Instead, he adds a small amount of clay to the tip of the inboard wing. The turn is tightened or opened to suit the room in which the model is flying. If you bend the fin, wrinkles appear in the tissue at the stress point. The only negative to this style of trimming is that weight is added to the airplane. The wing tip trim method worked well on Bill's Farman, as evidenced by the fact that the model won the Grand Prize that year.

NEW INDOOR WINDER OFFERED.

R.M.S. Tooling of 11370 Eldorado Avenue, San Fernando, CA 91340, now has a 16:1 indoor winder for sale. This model joins the 6:1 winder introduced previously by R.M.S. Most of the 16:1 unit is plastic and is very light. It features a simple turn-to-wind chart etched on the handle side of the winder. A revolving aluminum sleeve on the crank handle eliminates friction where the fingers grip. A very smooth action is evident during the wind. The manufacturer suggests not using over 1/8 rubber on this winder. The price for the R.M.S. winder is \$11.95 Post Paid U.S.A. Your



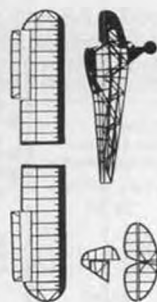
The author holding yet another weirdo flapper. A flying scale Dragonfly insect prototype, one wing goes up as other comes down.



Dick and Shirley Baxter, Costa Mesa, CA. That's first prize in recent "Moon-E" Scale (get it?) Peanut contest. Warner photo.

[illegible]

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INSTRUCTIONS

[illegible][illegible]

Abstract—The purpose of this study was to determine the effect of a 10-week training program on the physical fitness of 10-year-old children. The program consisted of 30 minutes of aerobic and strength training, 3 times a week. The children were divided into two groups: a control group and a training group. The training group showed significant improvements in aerobic capacity, strength, and body composition compared to the control group. The results suggest that a structured training program can improve the physical fitness of 10-year-old children.

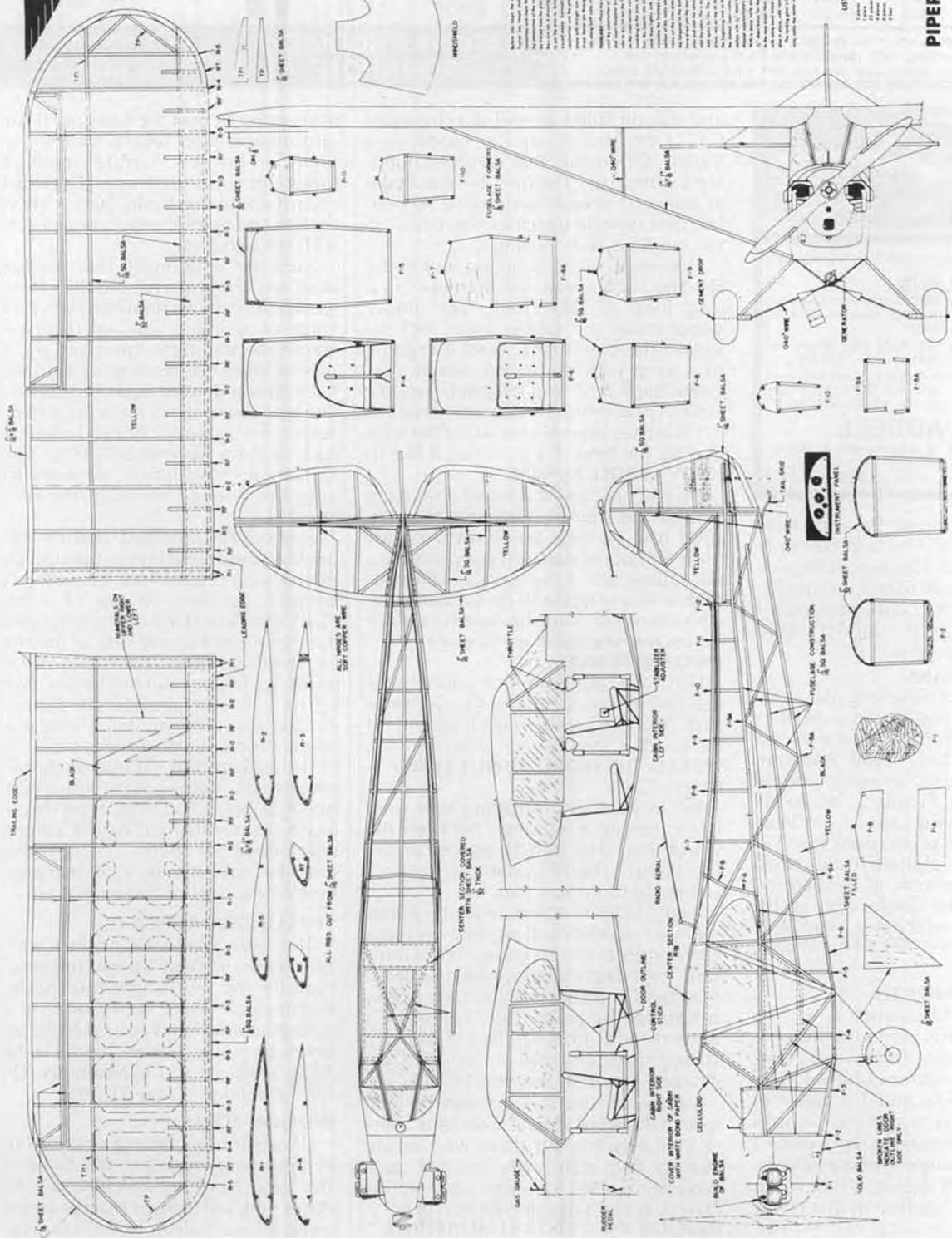
MATERIALS FOR BUILDING MODEL ENTER CUB 2-3 YEARS

Run	Matrix	Filler	Ratio	Temp	Time	Notes
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59	PMMA	PMMA	100/0	150°C	10 min	Control
60	PMMA	PMMA	100/0	150°C	10 min	Control

It is a well-known anecdote that the architect from one world design for city street in

PIPER AIRCRAFT CORPORATION

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Piper's "Wings for Youth" competition, approved by the U. S. Army Air Forces, provided winners with aeronautical scholarships, a year's employment (with pay) at the Piper Aircraft Corp. plant, and 100 hours of flight training in a Piper Cub (Where, oh where are such programs today?). Piper provided these plans at their local dealers all over the country, circa 1942. Span of model is 25 inches, and the original plan is on blueprint. We have reversed it for duplication. This is one set of model plans that you might say are self-documenting! Original set provided through the courtesy of John L. Hanks, Verona, Wisconsin.

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club can get a price break if you purchase five units or more. You will pay only \$7.17 each this way. The purchase price is refundable up to 30 days if you decide you are not satisfied. The only thing I would change about this winder would be to put a handle on it.

ORNITHOPTER PLANS.

Texan Walt Kulzer is selling plans and construction information on a 24 inch ornithopter. Someone sent me a clip from the October, 1980 Popular Mechanics magazine, showing photos of Walt's machine. I wrote a note to his address in Texas and heard from Walt shortly. The packet of info that came was very complete. Detailed instructions and 16 close-up photos of his flapper. Walt has even done smoke tests on his model to check its efficiency. Send \$6.00 to AE Products, Box 18722, Fort Worth, TEX 76118.

MODEL OF THE MONTH.

The plan for this month is an A-6 duration model. Your indoor editor has entered A-6 contests for several years. On the recommendation of Tony Naccarato, I decided to build a different type of A-6. Tony suggested a high aspect airplane. I wanted to try a canard planform. What came out of our talk was a canard with high aspect. Living room tests on the model indicated that it was flying without a vertical tail. At the contest, the model would only spin in. I tried several remedies. Wingtip weight

and stab tilt failed, as well as a change of C.G. I decided to try the model as a tractor. Of course, that involved building a vertical fin. The new A-6 was flown at our next session with more success. The best time on the clock was 1 min., 35 sec. under a 20 ft. ceiling.

This model was as solid as a rock in the air. The rubber size was increased to a long loop of .035 Pirelli. The longer motor made the rubber knots lock up against the motor stick. I feel that going to a prop with more area would slow down the R.P.M. and lengthen the time aloft. A new motor of .030 that measures 1-1/2 inches shorter should do the trick and up the time. Try it... you'll like it!

NIFTY MODEL PUNCH.

Do you have any discarded darts lying around the house? Well, put them to good use, partner. Screw off the brass front end of the dart and sharpen with a file. There you have it; a great metal punch. You can pound on the blunt end with a hammer. Mine has been in service for several years and no damage.

SMALLER PUNCH.

For smaller punch holes, try upholstery needles. These come in a 4 or 5-needle pack. You can break off the loop ends of the needles with pliers if you care to.

SPREAD THE WORD ABOUT FREE FREEFLIGHT.

We in freeflight modeling have long been the silent minority. Let's tell the world that "The Best Things in Life are Freeflight!" The NFFS wants to put on a campaign to do just that.

Your indoor editor was a charter member of NFFS and worked on many early projects for this group. The "Lifting Bird" with legs dangling, the newsletter masthead and Dick Black Coupe trophy design are by yours truly. I received a letter recently from Mr. Jack Woodward stating that Tony Italiano of NFFS has charged him with the new PR task.

I hope to use this column to help spread the word about "Freeflight". Any of you stalwarts out there who would like to help can write to: Mr. Jack Woodward, 7985 Sunridge County, Fair Oaks, CA 95628 or call (916) 961-1829.

INDOOR INCIDENTS REMEMBERED.

Scene: West Baden, Indiana. The date was 1974, and your columnist was

attempting to best the category II Autogiro record. After several morning trim flights on my new "Gyrat" model, the times crept up to 5 minutes. The existing record was about 5 min. 26 sec. My very patient and helpful wife Pat was assisting with the winding.

Someone announced that the lunch hour was about to end and the cafeteria would close in five minutes. I was on the verge of setting a national record so I wanted to stay right there and fly. The official timer was waiting for us to wind. Pat Johnson wanted to go and eat lunch. She was upset, to say the least, when we found the cafeteria doors locked and had to drive several blocks to find a restaurant. After lunch, we went back onto the floor to continue the record quest.

The model climbed steadily for 2 minutes and drifted into an open balcony doorway on the 3rd floor. I could see the autogiro perched on top of a snake plant. After knocking on the appropriate door from the hallway side of the room for several minutes, I was told that the resident had gone out for the day. I went up one floor and onto the balcony directly above the model. A long wood pole was obtained to remove the aircraft from the plant. Alas, the fragile microfilm autogiro was destroyed in the attempt to free it. If only I had kept flying through lunch. If only that girl hadn't gone out and locked her room... Oh, well, no one likes spilled milk. I still had a great time flying at West Baden that year.

PEANUT GRAND PRIX III.

The 1982 World Grand Prix will be held again in West Baden, Indiana, on June 18 and 19. Twenty four hours of Peanut Scale flying are in store. If you cannot attend, send your models to be flown by proxy. For info, write to Mike Arak, 10900 SW 61 Ct., Miami, FL 33156. USA. Deadline is May 31, 1982.

INDOOR BOXES.

Having trouble finding suitable boxes to carry your models to the flying site? The local Newbury's 5&10 and K-Mart stores now sell blanket storage boxes in several sizes. A deep box of corrugated cardboard had woodgrain on the outside, and the separate lid fits down over

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the body of the box. For best results, the lid should be taped, along one of the long sides, to the body of the box. This way the box lid will hinge on one side.

A flatter box is also available. This one is flower colored. It is about 8 inches deep and should be hinged like the larger box.

NEW YORK AREA MODELERS FLY AT COLUMBIA U.

The Low Memorial Library at Columbia University is the scene of indoor model flying these days. The ceiling dome is 105 feet and ideal for fun flying and record trying. Recently, Richard Whitten flew for a time of 14 min., 15 sec. in Penny Plane and Bill Tyler set a new Easy B record of 11 min. 12 sec.

By the by the new Easy B rules are:

- * Must be a PAPER covered monoplane.
- * Max. projected wingspan 18 inches.
- * Max. wing cord 3 inches.
- * Motor stick solid and from a single piece of wood. Tail boom may be separate piece of solid wood.
- * No restrictions model length.
- * No minimum weight.
- * Stab area not over 50% of projected wing area.
- * Only wood bracing.
- * Prop blades entirely wood.

MORE ON THE BROWN A-23 CO-2 ENGINE.

Modelers around the world are trying out this new 1 inch high powerplant. Some are even trying different sizes of

propellers and CO₂ tanks. Apparently the \$50 purchase price is not stopping modelers from buying the engine. Walt Everson, of the MIAMA indoor club in Florida, has tried it in his Waco E and Cougar scale models. The Waco climbed at a steep angle to 70 ft. in the Opa Locka blimp hangar, then did a hammerhead stall and dove to the floor, smashing the engine. The same situation occurred with his Cougar. This time the airplane was destroyed. Walt suspects that the engine changes speed with temperature changes. This would explain the steep climb angle after the engine had been set for a more moderate speed.

Have you had any experiences with the Brown CO₂ that you would like to relate? Write and share them.

Please send your indoor photos and comments to: Ken Johnson, 16502 Tulsa St., Granada Hills, CA 91344.

F/F Scale . . . Continued from page 55

All of my models, scale or otherwise, are covered with white tissue, then floquiled to what ever color is appropriate. My approach to the non-scale models is to place less pigment in the jar in the first place, thin adequately, then spray as many coats, until I get the desired effect. Surprisingly, you can make the finish look exactly like colored tissue. You may ask, if that's the case, why not just use colored tissue in the first place? I don't like the overlap seams

that are unavoidable and leave a darker shade than the tissue; I also don't like to wrap the edges of the wings and tail. It's just easier for me to spray a model. I think that this approach will provide you with just the right amount of color and still maintain the classic look of the rubber model!

F/F Continued from page 59

flights on his Driftwood, which is still alive and well. He was surprised to see a sport F/F model as a mystery subject. Gotta watch that Tom Hutchinson, he's tricky!

If we didn't get many for December, everyone must have been saving up for January! Almost 50 knew it was Australian Alan King's 1954 Wakefield winner. Bill Park, Charlotte, North Carolina, had the earliest corrected postmarked correct answer. Larry Dona took Alan's picture at the Glenview (near Chicago) Nats that year. Don Assel, Canton, Ohio, helped time one of King's flights at the Wakefield competition on Long Island, New York. John Bortnak, Calgary, Alberta, Canada was an active Wakefield flier at the time, making \$135 a month and says, like Alan, "lack of official funds to send any team members" kept him home. Now he's flying my Galloping John (What an admission for a free flighter!). Ron Firth, South Yorkshire, England, and ex-editor of PAM News, recalls that plans for King's

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Wakefield appeared in an issue of RAF Review, an early version of the current UK magazine *Air International*.

Fred Wolfe, meet Ed Turner. Ed, meet Fred. You're both from Fort Worth, Texas, and you both mailed (on the same day) the earliest answers to the February Mystery Model, Sal Taibi's "Zenith". Per his request, Ed Turner's subscription will be used to renew the subscription for his friend in Czechoslovakia, Ivan Horejsi. Arto Viiri, Calgary, Alberta, Canada, says the Zenith was his first successful competition free flight power model. Bill Baker, Norman, Oklahoma, remembers Sal Taibi at the 1950 or 51 Nats in Dallas. Sal was flying a 1/2A and had a one-second overrun. The Navy timer said, "Oh that's OK". But as Sal took off in pursuit of the ship, he turned to the timer and said, "No, that's an attempt because of the overrun." Bill calls Sal a "quality person". We'll go along with that.

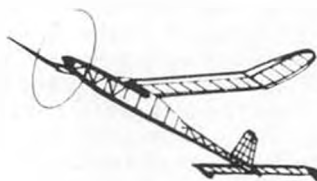
Bob Bissett was our winner for the March Mystery Model, Hal Roth's "Pushalong", however, we also have a special winner, Cor Burger, from Holland. See photo. Cor built his Pushalong in 1955 and still holds the National Dutch record for canards, rubber driven. Time was 164 seconds. Cor is also into Peanuts, and is organizing a contest for them at the KLM jumbo hangar at Schipol Airport, near his home city of Amstelveen.

April's Mystery Model, Joe Bilgri's "The Specialist", from February 1958 Flying Models, also brought heavy response, however, because Joe turned out so many similar designs, we also got some wrong answers. Ed Turner, Fort Worth, Texas, who donated his earlier subscription win to his friend in Czechoslovakia, also won this one. Bill Baker, Norman, Oklahoma, sent two answers the same day, naming Bilgri's "Echo" first, then correcting it to the Specialist. Others name it the "Echo", and "50 gram Wakefield".

We already have a winner for May. John Lenderman, Clatskanie, Oregon, correctly identified John Hannay's "Topscore", originally published in a 1950s Aeromodeller.

By the time this is published, it will be too late to mail in an answer for June, so we'll tell you now that it's Ed Whalley's "Otsega Mk2", originally published in the August 1959 issue of *Flying Models*. Maybe we should give a bonus to anyone who can explain the name!

That's it for this month. Be sure to stay tuned for Tom, who'll be back with you in the August issue.



Thornburg... Continued from page 41

that penetration will be no problem, and if some does seep through, you can simply draw the dope back on top of the silk by carefully going over it again with gradually reduced pressure. Sounds crazy, but it works.

Bob adds that he's been reading about painting the silk with Knox gelatin (dissolved in water) as a way of filling the grain before doping begins. He says, "If it really saves three or four coats, think of the cost savings."

Nice long letter from George A. Wilson, Jr., a frequent contributor to *Model Builder* and *MAN*. George is a seaplane addict, with a list of published designs longer than one of Don McGovern's hulls. Here are George's tips:

I wet cover using nylon, with no real problems... the added weight is offset by strength, low cost, availability.

I use the lightest silkspan (or Japanese tissue) over open areas first... seal it with dope (2:1 dope to thinner) and never have a care about leak-through. This ought to work with dry silk also. I have occasionally had pockets between nylon and silkspan due to unequal shrinkage, but these are barely visible with clear butyrate finish.

Gosh, George, last model I had that was nylon covered was a Royal Rudderbug, a ship so old that the copywriter for *Model Aviation* (May 1982 issue, p. 79) obviously didn't even recognize that the Bug's designer, Walt Good, was standing next to it in the photo. (Which is what you get when you assign a journalism major who isn't a modeler to write your photo captions.)

George is right on about cost and availability: you can buy nylon by the yard in any fabric store. Just ask for sheer (light) nylon with a tight weave.

Surprisingly, the biggest response came from last summer's article on simple handlaunch gliders. I thought there were only eight people in the whole U.S. who flew OHLG, and they were all serious contest freaks. Not so: almost everyone who wrote is a hacker, just like me. They fly in ballparks and athletic fields, mostly evenings and nights, when the thermals and winds have died. They're happy to get 35 seconds, consistently. They do it for the exercise, for the joy of feeling their body move, for the medieval awe of watching things that fly.

And here is the kicker: None of the people who wrote contributed a single left-brain concept ("five degrees of washout in the left tip will give you..."). Everyone responded from their right-brain power base... from their spirit. Am I getting off into psych jargon here? Go see the movie "Chariots of Fire". It's one of the first balanced treatments of the two driving forces of mankind: spirit and intellect. It can teach you a lot about yourself, and whether you should fly in contests or not.

SIG KITS AROUND THE WORLD



Mike Minty (Singapore) sent in this photo of his Citabria, painted in the colors of an Australian aircraft. Both models are very attractive. He's building a Miniplane and a Kougars now.



You may think you are looking at a Cessna scale model but it's actually Faye Stille's (Wilton, CT) Kadet Jr., duded up with an inverted S.T. 25 engine and scale colors. He kept it light, says it will do 3 vertical rolls.



If you've been around the hobby long, you'll recognize Gil Horstman (Deer Park, WA). He built the Smith Miniplane, Howard Breshears the Kougars. Gil flies both. His letter said, "I feel that when the quality of the product and the end results are considered, the price makes your kits the 'best buy' in the hobby."

"No home should be without a Kougars"

Dear Sig,

My modified Kougars was inspired by the new Northrop F-5G Tiger shark and its factory color scheme. Powered by O.S. .50 FSR, 6 lb. 4 oz., 10 x 6 prop. Performs everything in the book of aerobatics. Climbs to 500 ft. straight up (no stall). Knife edge flight is a plus "A" — 360° without drop or rise in the nose. The rockets are 7/16" dowel with plastic fins. It now has 146 flights logged. My compliments to designer Claude McCullough. This is my 7th Kougars over a period of 5 years. My motto — "No home should be without a Kougars."

Don
Barkley

Don Barkley
L/Col. USAF (ret.)
Indian Harbor
Beach, FL



Calvin Ellis (Guthrie, OK) built the Kougars in the rear and a fellow club member turned out the example in the foreground. O.S. 40 powered.

To Sig Mfg.
Your kit speaks for itself! I am a sport RC'er
and private pilot. The Citabria has been a lot of
fun to show off at our NFFC field in Roswell, Ga.

Barry Hall
Marietta, Ga.



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But back to the letters. They don't contain any hot tips to pass on . . . just lots of enthusiasm for the sport:

Well, last Sunday, October 25, the day was clear, calm, and cool, with the temp at 42°. I threw a half-dozen weak warmup throws. The air was light. On my first all-out launch, I hit lift. The air was smooth but the lift was consistent. The glider went high but did not threaten being OOS. It drifted about a 1/4 mile north and then back over the field. After 35 minutes, it landed about 150 yards from where it was launched. The fire is burning again . . . I just thought I would share this experience with you. I fly a lot of indoor and RC gliders as well. I'm 55 and am a little pleased with the summer. The best of all, is that I'm no longer the only flier and modeler in town. Two more "fanatics" started as a result of my flying and are progressing rapidly. On H/L, of course.

John L. Hanks
Verona, Wisconsin

What makes John's experience so special is that in 1967 he was temporarily paralyzed from the waist down; learned to walk again, but half stooped at the waist; took up bicycling when a doc pointed out that he was already in bicycling position; became a cross-country cyclist, and:

... Lo and behold, after two years I was standing straight again. However, I was afraid to throw a handlaunch in deference to the back problem.

Last spring, Hutch printed plans for

the Lagani Papaniu Tavern. It looked good and was my size. I told my back to go to hell and built six. . .

What a success story! And it combines my two favorite sports, cycling and outdoor handlaunch. Thanks, John, for sharing. I never tire of reading flying stories, descriptions of soaring, etc. Here's a nice description of OOS, from old Izaak Walton's *Compleat Angler*: "When they are lost in the sight of man, then they attend upon and converse with the gods." It was said of hawks, but what the hell. Izaak is just the sort of chap who would enjoy our "art and recreation," if he were alive today.

And as long as we're into good quotes, let's honor the photo caption from the old *Flying Models* that featured Ted Strader's "Struts Aircrate" RC biplane. The photo was a launch shot, and the caption (probably written by Ted himself) said: "Off she goes, into the turbulent, signal-jammed, vile-gray yonder." A classic!

But back to the readers' letters. (Now you see why I have to force myself to write in a tight essay form: I have a centrifugal mind.) The "Women in Modeling" article in last October's MB also drew a lot of fire, most of it friendly. Here's Susie Lipp, from Defiance, Ohio: "I'm a woman modeler and I think your article is right on about why more ladies aren't interested in the hobby."

My son is going on 17 now, and I no longer spend as much time serving others. About four years ago I found I had spare time, my family wasn't demanding as much (I would like to think I have become more efficient), so I started building with my husband. After two years of building power I received a sailplane for Mothers' Day 1979 (I have always been drawn to that segment of the hobby.) I have flown from that day on and will NEVER stop.

I'm experiencing the satisfaction of a successful flight, going to contests, and the sorrow of losing a sailplane that I put more than just time into. Also the solitude you spoke of, it's great! The solitude is there only as long as I choose, because when I look around me there are the best friends I've ever experienced, other modelers, a whole different kind of human being, and I don't think you ever really get to know one unless you are one.

I don't think of myself as a woman modeler, just a modeler. . .

And finally, because no roundup of letters would be complete without a contribution from Mr. Ken Cashion, the only person in Picayune, Mississippi who owns a ballpoint pen. . . Ken chides me for talking about thermals without making a clear distinction between wind movement and general airmass movement.

Wind direction alone, as Ken wisely points out, isn't always a reliable guide to the shape and position of a thermal. Wind can be simply local air movement, generated by the convective forces of the thermal. What Ken tries to keep in mind is the direction and speed of the overall air mass, something which is likely to remain more or less constant throughout the day.

For example, you come off the launch at 200 feet and head straight for Tom Trophy's thermal. Tom is at 600 feet and corkscrewing up like mad. There's no wind at the moment, so you center your circle right beneath Tom's and wait for the magic to happen. But you sink like a stone.

Why?

Could be that Tom's thermal is a small bubble that has already broken loose from its ground source, and everything left below it is pure sink.

But it could also be that Tom's thermal is still growing, but it is simply attached to its ground source at a long slant angle, a slant angle determined not by the wind (it's calm, remember) but by the movement of the overall air mass, the movement that I referred to once as "the river of air."

So how do you look for the bottom of Tom's thermal? You start a search pattern "upriver" from where Tom is circling. To know which way "upriver" is, you must be able to recall which direction the thermals have been drifting from all day: this is the direction of general airmass movement, the long-term flow pattern of the "river of air." Over to Ken:

So . . . your adding, subtracting direction changes in wind of course are algebraic variations the vertical movement "inflicts" on the general horizontal airmass movement. Too many fliers try to keep turn diameter constant in your "river" when in reality you ignore diameters and try to keep bank constant and if you were ever in lift, you are going to drift with it.

Now why didn't I think of that . . . the part about keeping a constant bank angle? I've tried to describe to beginners

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for years how you just relax on the sticks and let the model follow the thermal on its own. But when a beginner relaxes on the sticks, the model usually wanders off into the next county. . . Leave it to a NASA engineer (with a ballpoint pen) to describe what's actually happening.

Lots more wise and witty letters, but space is limited. Let's close with a plea from Canada:

... As far as I know I'm the only glider flier in this province (well endowed with cliffs and sand dunes) and it's lonesome sometimes. Here's my idea: a pen pal club for glider fliers all over North America to exchange photos, diaries, theory or just lies. . . I do a lot of goal and return flights along the cliffs here, combining jogging and flying. . . have a nice design for slope soaring on small hills. . . let me know if you know any glider pilots who like to write. Wendell Hughes, R.R. 2, Morell, Prince Edward Island, Canada C0A 150.

Elect. Corner . . Continued from page 21

airplanes. I would recommend that you simply connect the ailerons to the right stick, rudder on the left, when the time comes.

Think of the right stick as your "turn" stick, regardless of what control is moved. Both your three-channel on rudder and your four-channel on ailerons will react in the same manner to its being moved. True, the refinements are there, such as more roll action with the ailerons, and you can do coordinated or cross control maneuvers with the four channels, but basically you are flying with left/right, and up/down.

This has some bearing on what I have discovered to be useful during a person's training period . . . referring to the action rather than the control during flight. We have all heard a student being told to "give it a little more right

rudder", or aileron, as the case may be. This seems to create an extra mental step for the newcomer, who has to first remember what a rudder is, and what stick movement is required to get it to go right. Simply saying "a little right" is sufficient, and less confusing. After all, at this point, even if the trainer aircraft is fully equipped, all that is being used is left/right, we are not yet into maneuvers requiring the use of two roll/yaw controls.

By the same token, I have seen a number of students get in trouble with a three-channel model on which the nose gear is attached to the aileron (right) stick when they later convert to the more conventional nose wheel on the rudder (left) stick. They have gotten so used to ground steering with the right hand that they have to unlearn that before they can begin to learn the conventional method of doing so with the left hand. If the field is adequate for a model without ground steering, I would say it is advantageous to do without it rather than learn an unconventional way.

I don't know who said it first, but it certainly seems to be true that "the human brain is truly remarkable, it starts working at the moment of birth, and stops only when you pick up your first R/C transmitter". Learning to fly will not be the easiest thing you ever tried to do, Bob, but because it isn't exactly easy, it can be one of the most rewarding in terms of personal accomplishment.

And thanks for the suggestions for future column and article material, I've added them to the list.

Ike Kerschner, Kunkletown, Pennsylvania, N31K, asks about the servo tester. I will soon have all the information down on paper. . . remember, it was not meant to appear as an article, though the response has been good. Anyway, all those who wrote will receive enough information to be able to duplicate it.

Ike is also one of a few who looked up my Ham call sign in the "Callbook", the ham directory, and who wrote to the address listed. For the record, I now live in Southern California, just minutes away from MB offices. Regarding my ham activities, except for 6 Meter R/C flying I'm completely QRT (Off the Air), I hung up my S-Line, 4-1000A Amplifier, etc, when I left YS-land (El Salvador) some years ago, none too soon, as it turned out. To further clarify the record, I inherited the W1 (New England) call sign during my USAF career, I am originally a W5, from Corpus Christi, Texas.

We heard from Don Buchanan, Gardena, California, who is looking for information on the Evra engine, and how to convert one to transistorized ignition.

Well Don, the Evra 190 (1.9 cu. in.) is available from Hobby Lobby, P.O. Box 285, Brentwood, TN 37027. I am sure they will gladly furnish you complete information on it. It is an ignition engine. According to the photos, it is magneto equipped, which is a simple and reliable system. That being the case, I am not sure that any conversion would be worthwhile, since it would involve building in a points or pickup system, plus all the other requirements, such as coil, batteries, etc. It would turn out to be heavier than the original.

However, if the stock engine does not meet your requirements, Electronics Corner to the rescue! Our May 1976 issue, page 33, has a roll-your-own transistor ignition by an old-timer flyer named Tom Bristol. Also, RCM ran an interesting Capacitive Discharge ignition article in its December '80 issue, page 65, authored by Floyd Carter. The Bristol article is a bit simpler, in that it uses standard components, using a transistor to carry the heavy currents normally going through the points and which are the cause of their pitting and eventual burning. The Carter design

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requires the winding of a special transformer, but is probably more saving of the available battery power. It also runs low current through the points. After you study both systems and do all the hard work, be sure and tell us about it, so we can in turn pass it along; this seems to be a subject of continuing interest.

If you don't want to build an ignition system, check with 77 Products, a regular advertiser. Otto Bernhardt provides a fine ignition system and also converts all types of engines to ignition.

Had some rather sad news from James Baker, Altus, Oklahoma, whose planes (three to date) are losing the war to motors in "Bantam Midget" servos.

Well James, I can only partially answer or comment on your letter, except to express my regrets at the loss of your planes; we have all been there for one reason or another.

Unfortunately, you did not mention the maker of your "Bantam Midgets", whose mechanics are made, and named, by D & R Products. After that, there are at least six companies that have produced electronics and marketed it under their name. So, don't be down on the "Midget" in general, they are an excellent mechanics, and to point out the opposite of your experience, I have a set of Novak Electronics Bantam Midgets now at least two years old, much flying, original motors.

I suggest you inform the manufacturer. Most of them appreciate such information. After all, their livelihood depends on the reliability and reputation of their products. Don't be reluctant to ask for no-cost replacements, preferably tested and of better quality. After all, you've already paid plenty in wrecked airplanes.

Please write back and tell us whose Bantam's you've had this poor

experience with, and the manufacturer's solution or comments on the problems.

We have another chapter in the saga of Mr. Earl Levin, Sunnyvale, California, and the fast disappearing alkaline batteries:

Dear Eloy,

Thanks so much for your reply to my letter regarding the conversion of a Cox Mod. 8020 transmitter to Ni-Cd's. Since I received it I brought the set in to work to have it check out. Very interesting results:

Drain = 125-130 mA (about the same as my Futaba)

Operating Range = 12.5 down to 8.5 volts (Ni-Cd's are OK)

Guess what? The lower LED gets very dim at about 11.5 volts. Below 11 volts you can't see the glow unless it's quite shaded (you would never see it at the field).

Conclusion: Set is working fine, and my son threw away some alkaline cells that were OK! The resistor for the lower LED needs to be changed to one that will give a proper reading but we didn't have time to experiment. And, if we keep it at all, we will convert to Ni-Cd's. I wonder how many others (I suspect many) have suffered over this same "non-problem".

Thought you might like to know what we found out.

Earl Levin

For those not familiar with the system in question, it has two LED's that are supposed to indicate the condition of the transmitter battery. In this case, the one that is supposed to light up when the voltage gets to a critical low was coming on too early, calling for a premature battery replacement. So if you are suffering from a similar malady, this is the first thing to check. Thanks Earl.

Received some interesting informa-

tion from John Lange, Melrose Park, Illinois, who has circuitry boards, and some of the hard-to-get components for some interference detecting receiver converters. It was all covered in great detail in Feb. 1982 Model Aviation, so I won't go into it here. However, just briefly... a receiving converter is a device that receives a certain range of frequencies, in this case 53 and 72 mhz, and converts them to those accepted by another receiver, in this case our ordinary auto or portable broadcast band receivers. Effectively, you listen to the R/C spots on these types of radios. If you are plagued with unknown interference, you might investigate this method of listening to what's on your transmitter frequency.

Hint of the Month:

One of my favorite test instruments is the Digital Pulse Meter, available from Royal Electronics, as a kit. It is extremely valuable and the most accurate equipment available for the setting up of transmitter and servo centering and throws, as well as dual rate and any servo/transmitter movement.

What I don't like about it as it comes is that you have to cut a window in the plastic case for the digital display, something I can never do with the degree of neatness that I insist on. However, there is a perfectly sized bezel conveniently available which dresses up this ragged hole enough to satisfy even a nit-picker like me. The case shown is also different; Radio Shack or similar.

It is called a EM-140 Bezel, at \$1.80 each, and is available from Ancrona Corp., P.O. Box 2208, Culver City, CA 90230; (213)641-4064.

The catch 22 in this case is that they have a \$10 minimum, so you'll have to buddy up with your friends to dress up your DPM's, or check the Ancrona ads in the electronic magazines for enough other items to make up the balance. They handle a full line of electronic components that will fill many an electronic tinkerer's needs.

Till next month, keep the soldering iron hot! (But don't leave it on your "Workbench"! wcn)

Fuel Lines . . . Continued from page 40

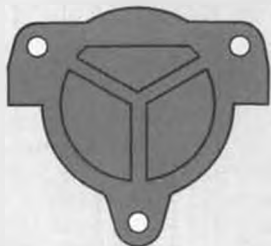
just maybe we could learn something from this. Think about it this way. Although the cost of your engine may not be particularly large, it is quite important. So, its value is considerable. Take care of it.

TIPS

Here are a few repeat tips on engine care. On the last engine run of the day, secure the engine by pinching off the fuel line instead of flooding it out. A flooded engine has a lot of methanol in it, that readily absorbs moisture from the air, which causes corrosion and/or rust . . . especially to ball bearings.

Afterwards, use an engine preservative such as WD-40. Remove the plug, juice down the engine and work it through

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thoroughly. Actually a mild application of an electric starter works very well. By that, I mean that you won't have to bear down hard against the prop nut or spinner. Without the plug installed, very little force will be necessary. Afterwards, at the minimum, wrap a clean dry cloth around the engine to help prevent unwanted contamination.

Guys, it may take some imagination, but try to think of your engine as a Rolls Royce. If that's stretching things a bit, just remember that you can't fly without one. (My apologies to any HLGers and gum banders who may have errantly read this.) •

R/C Boats . . . *Continued from page 45*

when heat racing, I switch over to exponential when my son Paul races my tunnel boats. Paul is just starting to race tunnels after breaking in with deep vees. Anyone who runs both tunnels and deep vees will tell you there is a difference in the way these two types of hulls turn. In racing deep vees, Paul had developed what might be called a "slam-bang" style. When he tried racing the tunnel boats, he was oversteering the boats. By switching over to exponential mode, his driving became noticeably smoother. He still has a way to go before he's as comfortable racing a tunnel as he is his deep vee; but being able to switch him to exponential control has improved his tunnel driving.

Let's see now. So far you've read about the "herky" servo and something called exponential. I guess indirectly it could be inferred that the Airtronics Championship Series 9132 worked well in my 7.5 tunnel. That is certainly the case. I have had the opportunity to use the system under race conditions and I'm very satisfied with the radio. Airtronics' address is: 121600 Woodruff Avenue, Downey, CA 90241. Because of the many features of this system, it is expensive when compared to systems offering less features. However, it certainly rates as one of the top radios available for model boating.

THE AVENGER 40 OUTBOARD RIGGER

What is this? Dunlap building an out-rigger? Well, it is an outboard, so that makes it sorta okay.

A few months back I received a flyer addressed to my local boat club (I'm the secretary/treasurer) telling about a new outrigger hydroplane called the Avenger. The part of the flyer that really caught my eye was a photo of this rather "zoomy" looking rigger with the K&B 7.5 hanging on the transom. The other thing that grabbed my attention was the part that said, "50% Constructed." Half-built and running an outboard, that's worth further investigation. The results of "further investigation" provided me with another visit from the dark brown van. This time the box was from AVENGER BOATS, 2300 Fable Drive, Meraux, LA 70075.

An inspection of the box's contents showed that the 50% completed portion was the hull center section and top cowling. The sponsons were pre-cut pieces of foam to which plywood was glued to make solid sponsons. The most interesting thing to me was the material used for the sides of the main hull and cowling sides. I'd never seen a boat built using 1/2-inch cedar before, at least not a 36 inch outrigger hydroplane. I took the hull over to my wife and told her to smell it because it smelled just like a cedar chest. I've said lots of things about many different boats over the years; but this is the best smelling boat I've ever received. It's too bad the boat had to be painted because that ended the good cedar smell. Let's stop with the smelling and get on with the building.

BUILDING THE AVENGER 40 OUTBOARD

The building portion of this boat is devoted mostly to making the sponsons. This was my first experience with sheeted sponsons, and I'll have to admit it's a super quick and easy way to make 'em. The foam front and rear sponson pieces are pre-cut to facilitate the building. Building really doesn't seem like the correct term for this process. I'm not sure if "making" the sponsons is any better. Oh well, it's really rather simple. To build the front sponsons, the blocks of wood into which the sponson booms are fitted are glued to the inside sponson plate. All pieces of sponson sheeting are

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pre-cut. The foam is then cut to accept the boom blocks and the inside sponson plate is glued to the foam. Five-minute epoxy works very well in attaching the sponson sheeting to the foam. After the inside sponson sheeting, the rear sponson cap is affixed, followed by the sponson top sheeting and then the sponson bottom sheeting. With these pieces in place on the foam, a hacksaw blade can be used to cut away the excess foam along the sponson side. Using the sponson top and bottom sheeting as a guide, the side can be cut and then sanded prior to applying the sponson side piece. The rear sponsons are built in a similar manner, except it isn't necessary to notch the foam for the boom blocks.

Attaching the rear sponsons to the hull is simply a matter of marking the proper locations for depths and then sticking the pieces to the back of the hull. Hotstuff Super T was used for this gluing application. Attaching the front sponsons takes a little more time and attention since there are some offsets and sponson dihedral that must be attended to. The directions give all the necessary information on sponson offsets and sponson dihedral. Slow drying epoxy was employed for attaching the sponsons to the aluminum booms. Super T was used to affix the booms to the main hull. The booms go completely through the main hull, through pre-drilled holes.

SYSTEMS INSTALLATION

The Avenger has a radio compartment built into the hull sufficiently large enough to house three or four radio systems. However, I elected to use a removable radio box to avoid tying up a radio system in one boat. With just a bit of trimming of the wooden lip that was part of the built-in radio compartment, the G & M Models radio box slid right down

into the front of the radio box compartment. For rudder control, the push/pull system using two wire lines was employed. This is the same type of rudder control that I've found very functional for all my outboard steering installations. Throttle control is accomplished through the use of a K&B Throttle Kit. The fuel tank is mounted directly in front of the radio compartment, between the sponson booms. I would recommend carrying at least 10 ounces of fuel. In order to do this, it will be necessary to use an oval tank. A rectangular 10 ounce tank will not allow the top hatch to fit in position. I was a little concerned about mounting the tank in the forward section. It seemed like a long way for the fuel to travel without causing fuel draw problems. However, the K&B 7.5 Outboard has a pressure fitting on the lower unit and there was sufficient pressure to allow for efficient fuel draw. A Teague Model Marine Products 7.5 Motor Mount was attached to the transom to allow for adjustments in engine height and angle. The boat will run without a motor mount of this type. I just happen to feel that maximum performance can be obtained much easier through the use of such a device.

To give you an idea of how quickly this boat can be assembled and run, it arrived on a Wednesday, was put together on Saturday, the systems were installed on Sunday, it was painted with clear epoxy on Monday, and test run on Tuesday. It will probably take me more time to put a final finish of paint on the boat than it did to assemble it and install the systems. I was in such a hurry to see how the boat would run that I decided to just slap on the clear and give it a try. **RUNNING THE AVENGER 40 OUTBOARD**

The weatherman really cooperated on

the day the boat was ready for initial running. A very light wind and temperatures in the mid-50's made for a pleasant afternoon at the pond. Not knowing what to expect, the K&B 7.5 Outboard was fired up and the boat given a gentle launch. The Avenger was on step immediately and from the first moment it hit the water, rode clean and level. The photo of the boat running shows this very level, clean running attitude. I did experience some problems when it came to making highspeed turns. The right, or inside sponson, wanted to lift, and the boat spun out a couple of times as I tried hard cornering at top speed. The addition of weight to the right sponson provided some improvement. A phone call to Don Wagner, of Avenger Boats, was made to tell of the cornering problem. I mentioned the rather small turn fin might be a big part of the problem. Seems like Don was just in the process of coming out with a bigger turn fin to use with the boat. The day I began this article the new turn fin arrived and I think it's going to take care of the sponson lift problem. It's about two and a half times bigger than the fin I used on my initial tests.

Just estimating, I would guess the Avenger 40 Outboard was running in the high 40's with a stock K&B 7.5 on 50% nitro fuel. The straightaway record for the 40 outboard hydroplane class is held by Norm Teague, with a speed of 58.21 mph using a modified K&B 7.5. I ran a number of different props and found that the Octura X-447, X-450, and 2.0 props worked very well. The 2.0 prop worked the best for keeping the right sponson down in the corners. This prop has more lift than the X series props, and this would explain why it was a better prop in the corners. However, with the larger turn fin, props with less lift will be okay because the fin will keep the sponson from lifting. There's no doubt in my mind that the Avenger 40 Outboard is capable of handling increased speed very easily. The boat is extremely stable going down the straightaways. My personal plans for the boat are more in the area of oval racing, and I hope to be able to establish a NAMBA record for oval racing with this boat in the near future. Since no one has submitted a record time for the .9 mile oval competition record, whatever time I submit will become the new record.

For the model boater interested in an outboard rigger for the new K&B 7.5 Outboard, the Avenger 40 Outboard has much to offer. The \$120 retail price seems to be very fair for a well built boat featuring top grade material throughout. I think the boat has very appealing lines that set it apart from many rigger type hydros. The fact that there is very little building required to complete the boat should be another positive point for this boat.

THE AVENGER II — TWIN 40/60 KIT

This is a bigger version of the outboard outrigger intended for twin engine installation. Like the boat I received, it is also 50% pre-built. The



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retail price for the Avenger II is \$220. Don Wagner informed me that he has run 80 mph with his Avenger II, and that is flat getting down the creek!

WHAT ABOUT THAT KRAFT KP-3KW RADIO SYSTEM?

This is the unit I used in the Avenger 40 Outboard, and it proved to have all the moxie need to control this boat. Like the Airtronics radio mentioned earlier in this article, the KP-3KW has a number of neat features that allow for fine tuning the handling characteristics to individual preferences. This system also allows for adjustment to steering throw and limits. It seems to me that many of these "trick" features would really be important for the "wall bashers" who race cars. This radio system was designed primarily for cars, but it is certainly most adaptable for us "wet trackers."

I think the most interesting part of the KP-3KW system is the transmitter. It has the appearance of something with which Luke Skywalker might zap enemy forces. This was my first experience with a pistol type transmitter and I'll have to admit it has a very good feel when running a boat. A few of my friends have tried it out and their reactions have been favorable.

I would highly recommend the rechargeable Ni-Cd conversion package that is available for this unit. The Ni-Cd conversion will increase the initial cost of the system, but will eventually pay for itself since the batteries will not have to be discarded like dry batteries. With Ni-

Cds, you always have freshly charged batteries available as close as the nearest electrical outlet.

The two servos, receiver and Ni-Cd pack fit easily into the G & M Models 3 x 5 inch radio box. I took a photo showing the installation of the radio in this watertight box. The need to keep your radio equipment dry cannot be emphasized enough. There are a number of waterproof radio boxes available, I just happen to like the G & M version.

Although the servos provided with this system are powerful, they are not what might be considered a "muscle servo." Dan Lutz, who was representing Kraft Radios at the Northwest Model Exposition, informed me that they are developing a heavy duty servo for those who have such a need. I believe the servos provided to me for use in this article have sufficient power to handle most model boating applications. Unless you're into the "big bore" riggers, a "muscle servo" isn't needed to turn most boats.

Kraft radios have always had a high reputation in our hobby and this new KP-3KW is no exception. It has gained popularity with the R/C car folks and should gain acceptance in model boats. I'm looking forward to using it in competition.

A POSSIBLE PROP FOR YOUR 3.5 TUNNEL

One of the projects I've been working on recently is a 3.5 tunnel that is a downsized version of my 7.5 tunnel. I thought

the 7.5 hull worked pretty well so why not make a 3.5 version. I did and I'm now in the process of sorting it out to see how it's going to perform. One of the things that seems to be proving successful is raising the engine up on the transom and surfacing the propeller. With the introduction of the new lower unit for the K&B 3.5 Outboard, it became possible to raise the engine and still have sufficient skeg in the water to turn the boat. Surfacing the prop allows you to run bigger props and props with more pitch. It also has some negative points, since props begin to cavitate when they are not running as deep in the water.

One evening I was discussing this situation with one of my local racing buddies, Jim Burba, and he asked if I'd tried an Octura X-440-3. That's Octura's designation for a three-bladed prop. I hadn't tried that prop and when Jim offered to let me try his, I accepted his offer. The X-440-3 proved to be an excellent wheel. It provided more push than any of the two-bladed props I'd tried and allowed the boat to float in a fine running attitude. Because the prop has low lift, the boat ran through the corners without wetting up the sponsons. If you haven't guessed by now, I'm rather pleased with the performance of this prop.

However, if you wish to run the X-440-3 on your 3.5 outboard, it will be necessary to remove the existing slotted portion of the prop hub and re-slot the prop for the drive dog. In its stock form,

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the prop is too long to fit on the stub-shaft. A file can be used to remove the slotted portion and then another key can be cut into the prop hub. However, if you have access to a drill press or lathe you can save yourself some time when removing the excess metal. It certainly works well on my tunnel and it just might work on yours.

EVER LOSE YOUR BOAT IN THE FOG?

While practicing before the start of a recent contest, I managed to get my 3.5 tunnel further away from the beach than I realized. It was about 9 a.m. and the pond still had some fog covering it. As I went zipping down the backstretch, my boat just disappeared. I slowed it down and tried to steer it back into view. You

could hear it out on the water, but I couldn't manage to bring it back to me. Finally, I just shut it down and rowed out to find it. It took me about ten minutes. When I returned to the beach I received some well deserved ribbing about installing fog lamps and a fog horn if I planned to run in the stuff. Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498.

Choppers . . . Continued from page 30

flybar. Move the collars toward the rotor head as far as they'll go, and lightly tighten the set screws to hold them temporarily in place.

GET READY, GET SET

Now I want to freeze the head in the "flying position". The swashplate should be neutral, blades at lift-off pitch, flybar paddles neutral and flybar level. Obtain some toothpicks and/or various short balsa wood sticks. Insert these pieces of wood into a position where you can Hot Stuff the head at the above position. See the photos for details of this freezing procedure.

Now un-hook all unnecessary push rods from the head with one exception; leave the pushrod that goes to the paddles (Hiller System) in place. Since this push rod is not opposed by another one like it on the other side of the head, it will influence spanwise balance. It must be in place. Hot Stuff the bottom of this push rod to the seesaw to keep it from flopping around.

Very carefully lift the head from the helicopter, slide your spare mainshaft into the head, place the machined counterbalance on the bottom of the mainshaft, and gently lay the head on the High Point balancer as shown.

CHORDWISE BALANCING

Begin with the rotor blades vertical, flybar horizontal. Let go of the head once you've eyeballed it vertically and see which way it drops off. If the top blade falls off to the left, move the right side wheel collar out a bit on the flybar. Try again. If it still falls left, out a little farther. You want the head to remain vertical when you let go of it.

The standard size wheel collars should

give plenty of adjustment. If you have one collar all of the way out and the other all of the way in you've probably set your lead-lag incorrectly, tried to reuse bent axles, or failed to balance the flybar and/or paddles. Recheck your prior steps for accuracy. Remember, if you want a smooth head don't compromise anywhere.

SPANWISE BALANCING

Once the head will remain with blades vertical, move the rotor blades horizontal to check spanwise balance. Add small strips of fas-cal to the blade that rises up. You'll be surprised to find that it takes very little weight on a blade tip to drastically change the balance! After the blades balance level in the horizontal position recheck the chordwise balance with blades vertical. Make any minor adjustments necessary, and recheck spanwise balance with blades horizontal.

The spanwise balance adjustments should not affect chordwise balance, and vice-versa. If you find that one noticeably affects the other, double check to make sure the flybar is exactly 90 degrees (perpendicular) to the rotor blades. If it is not, correct the situation.

Given that you've done the spanwise and chordwise balance as stated, you'll now be able to set the rotor head at any position "on the clock" and it should remain there. If it drifts ever so slightly this is allowable, since most heads (and blade axle bearings) have some slop in them. The "tighter" your head is the less drift you'll experience. After you've double checked the above procedures, gently remove the head from the balancer and place it back on the helicopter.

ROTOR BLADE TRACKING

The last step for the main rotor is to check blade tracking out in the field. Track both blades the same to start with. If all is smooth, then both blades are quite the same. If you note some vibration, track one blade a bit higher and see if things smooth out. If not, then track the other blade out a bit higher. One of these positions will give you smooth operation.

Due to blade differences I talked about at the start of the article, it is normal if the blades run out of track slightly to generate equal lift. If the head still shakes after this last move, then you should give some thought to the opening premise that some blade sets are not compatible. If both blades were straight, true, and within acceptable weight limits from the start, I can assure you that the problem is NOT in the head or tail rotor balance. Maybe a bent main shaft, a bad bearing, tail rotor drive problems, loose engine mounts or a mis-aligned main drive system, but it is not in the rotors.

TAIL ROTOR BALANCING

Most of the manuals you've read have probably told you to balance tail rotor blades opposite each other, as the first tail rotor photo demonstrates. However, if you've generalized any material from the rotor head process, this first method

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is not good enough. I start by doing this "blade to blade" method, but then I check the spanwise balance of the whole tail rotor assembly (blades, blade holders, and tail rotor hub all in place).

Place the whole tail rotor head on the balancer, shown in the second tail rotor photo. Add very small strips of fas-cal to the light blade. Again, I think you'll be surprised how very little weight makes a large change in balance.

Since the tail rotor blade holder bearings are always sloppy, it is impossible to balance it chordwise. If you had real precise tail rotor hubs, you could use exactly the same method on the tail rotor as I did on the main rotor.

Once you've checked tail rotor balance, make an "x" on one blade and its blade holder. The other half remains "blank". If the tail rotor blades are ever removed, they must be put back on exactly as they came off. This same point also goes for the main rotor blades...

Re-assemble the tail rotor assembly on the tail rotor shaft. Hook up the pitch change linkage, and construct the little "pointer" to fit on the end of the tail rotor blades as shown in the photo. By using a stationary object (not shown) at the end of the pointer, you can very accurately check the pitch of each blade to assure that they will track together. Just as you track main rotors, you must statically track the tail rotor by this method. If one blade is out from the other, shim one of the pitch change arms to bring both blades in track.

Some commercial tail rotor pitch change units are horribly inadequate. This in turn generates tail rotor vibration! One of the better units I've seen is the Rocket City pitch change linkage. It has a nice brass bushing to ride on the pitch change wire, and has proven to be nice and tight at all times. Before you install it, test fit the brass bushing on your particular pitch change wire. If it is too small, replace the bushing with another piece of brass the proper diameter to give a close, smooth fit. Then Hot-Stuff the brass bushing in the plastic hub before you install it on the helicopter.

Well, I've already gone too long for this month, but I felt it was important to include all of this info in one issue. I'll close by stating that I have never had a head shake after I've balanced and tracked it by this procedure. This is not "a" method to balance heads, it is "THE" method. If you take care and follow the steps as given, I'm sure you'll be pleased with the results too. Bye, bye trial and error, vibration, and frustration: Hello smooth helicopters!

Control Line . . . Continued from page 49

porkier than wood models. Maybe that was true a few years ago, in fact I know it was, as I had to keep one step ahead of the other fliers as far as the size of the foam models was concerned, just to stick with them in the turns.



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The universal use of foam models in Combat has been slow in coming, in fact we may never see it, but if you are just starting on a campaign of Combat flying, it would be time very well spent to go back over all your old model magazines, searching out articles on foam cutting techniques (don't overlook the RC articles on the subject), foam structures and so on, then getting yourself set up with the necessary cutting bows and assembly jigs. This time invested will be recovered about the second set of 12 models that you build, from then on you will be cranking out models at least twice as fast as the guys who are still using balsa, plus saving lots of money for materials.

BUSHED LEADOUTS...

As I recall, this technique was ripped from John Kilsdonk, although he probably ripped it from somebody else. No matter who gets credit, there is a simple and effective method of bushing leadouts at the bellcrank. First, cut some 1/16 diameter brass tubing into 1-1/2 inch lengths. Make a bunch and chuck them in a drawer for later use. Drill the holes in the crank to 3/32 and de-burr the holes with a large drill. With the leadouts in hand, thread one end through a piece of the pre-cut brass tubing, leaving a couple inches sticking through. Using snipe-nose pliers, or just a piece of 1/8 piano wire, bend the tubing into a "U" shape and slip this into the bellcrank

holes. To lock the leadouts in place, you can wrap with wire or other favorite technique, but I just slip a piece of 1/8 brass tubing (cut 1/2 inch long) down the leadouts, bend the short end of leadout material back on itself and slip the 1/8 tubing over it. This is done so that the short end of the leadout has a tail about a 1/4 inch long poking out from the 1/8 tubing. This is crimped tightly, in a vise or with lineman's (lineperson's?) pliers, and then the tail is folded over and also crimped. Very simple, easy to do and guaranteed to be strong.

Yes, you can use the bushing of 1/16 brass and then wrap and solder the leadouts. I can't recall ever having soldered leadouts, however. Applying heat to these very important pieces of the control system has always seemed like a bad idea to me.

The above procedure can also be used at the line end of the leadouts for a nice, long-lasting bush where the line connectors attach, although wear at this end is not as much of a problem as it is at the crank.

R/C Auto Continued from page 47

competitions in both 1/12 and 1/8 two or three years in a row), but because it takes too long to do it right and my bodies that were winning in up-close scrutineering didn't look that great out

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on the track while racing. Notice some-
time what the cars look like out racing.
You should see that some of the bodies
with lots of shading, paneling, cobweb-
bing and so on look definitely blah when
far enough away that the details just
blend together. So, while it can be great

fun to do a radical paint job, keep in
mind what it will look like at a distance,
and if that is more important to you than
tossing another Concours trophy on the
shelf or in a drawer, consider simpler
paint schemes.

That's why my cars are invariably
orange, and I use large black-on-clear
manufacturer logos to dress things up a
bit. Looks great at speed and is also very
easy to pick back up when you have to
look away from the car, as we all tend to
do when checking out the competition.
DELTA'S NEW STUFF...

First up has to be the new Delta Eagle,
an independent suspension design that
looks just super. Actually, looks are
about all I have to go on right now, as the
car only has three tanks of fuel through
it, all done here in the cul-de-sac where
it is quite hard to really learn anything
about how it handles on a race track. But
it is smooth, the suspension really does
soak up the bumps, and it is great to
watch the nose of the car rise and fall as
you gas it and then back off.

I suppose that it is best to go over the
complete car in the test, until then there
are a couple of pictures to look at and
notice that we are using the new Air-
tronics radio in the car. The servos are
not only strong, they are quick, so much
so that for the first time ever I am using a
4-cell battery pack in a 1/8 car and still
the servos are plenty fast.

An item that is included with the Eagle
and that will soon see use in a lot of 1/8
cars is a molded polyethylene tank.
Finally somebody has put all the good
features of all the tanks made in the past
few years into one package. The tank is
light, strong, easily mounted, low at the
front and has a huge opening for those
fast pits, with the lid sealing very posi-
tively. The fuel and pressure fittings just
screw into the molded holes in the tank
and are sealed with silicone. Venting is
evidently right, as the tank in the Eagle
and another just like it in my Delta Super
J give very consistent runs from full to
empty, so consistent that there is abso-
lutely no warning. The motor just goes
eeeeeeEEEE-BLAT and dies when the last
drop of fuel goes through.

A couple of neat tricks are the sump,
which is actually a baffle, and an inter-
nally-mounted phosphor bronze fuel
filter/fuel pick up. This is one of those
Du-Bro filters you see for use in airplanes
and is a very efficient piece. But if you
prefer an external filter, Delta makes
them up that way also. The tank is flat-
bottomed, but a ridge in front of the
sump lets fuel run into the sump on
acceleration, while trapping it in the
sump during all maneuvers except
double and triple gainers. On top of all
that, this tank is cheaper than the old
hard tank Delta used to sell, this piece
coming in at \$18.

In fact, the tank is so good other
manufacturers are interested in it (that
kind of thing only rarely happens), with
Associated already having received their
initial shipment of this tank. So if they
are your parts supplier, it is available
from them as well as from Delta and
their dealers.

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Out West Continued from page 16

of turns possible. The stooges were new,
the folding techniques, the rubber
attachment doo dads, the prop locks, all
these were new to me and indicated a
large degree of advancement.

The ole timers were still there, like
Foster, Cole, Bilgri, Andrade, Hines,
Norcross, Lenderman, and Gallbreath,
just to name a few.

The FAI power models are no longer
free flight models; to me they are pre-
programmed models. The programs are
as close to being remote controlled as
one can get without using a radio. In this
event, the same as speed, the engine has
become the primary factor; without a
high revving engine (on alcohol too)
one might just as well give up, the 100

CAMARO F3B

This is EISMANN's newest F3B model. A formidable contender already having taken some First places in European competition. This model uses a Wortmann airfoil which is proving to be very efficient, also has canopy speed brake.

The kit contains an epoxy fuselage, foam wings covered in Obici wood, ailerons are cut out, tail surfaces are cut out shaped and sanded. Includes necessary hardware and detailed plans (Instructions in German).



Span 2750 mm
Fuselage Length 1280 mm
Wing Area 60.10 DM2
Weight 2000 P
Airfoil Wortmann Fx60/100
Price \$295.00

AMPERE F3E

An Electric motor powered high performance Sailplane designed around electric motors of 200-600 watt. GEIST or Keller Motors. The fuselage will hold up to 22 1.2 amp. cells.

The kit contains an epoxy fuselage, canopy speed brake, rear access hatch for servo and receiver. Wings foam covered in Obici wood. Ailerons are cut, shaped and sanded. Kit contains all necessary hardware. Detailed plans. (Instructions in German).



Span 2800 mm
Fuselage Length 1290 mm
Wing Area 56.1 DM2
Weight 1900-3400 G
Motor 200-600 Watt
Airfoil Eppler 387 modified
Price \$299.95

FOCUS F3B

An International favorite in F3B and winner of many contests.

The kit contains Epoxyglass fuselage and canopy. Wings are foam, balsa covered. Ailerons are cut out and utilize torque-tube linkage. Stabilizer and rudder are finished and sanded to shape. Kit includes plans (German instructions), all necessary linkage and hardware and 1,000 grams of ballast.



Span 2550 mm
Length 1360 mm
Wing Area 55.4 DM2
Weight 1900 G
Airfoil Eppler 387
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foot-a-second climb equates out to a nifty 6,000 foot a minute; I don't know what the speed is, but they are really moving. With this 600 foot altitude, a sink of 3-4 feet per second or less will make every time.

R/C gliders, for some reason really intrigued me; why I really don't know; maybe it was a carry over from my 10 foot glider of the late 50's with its Orbit reed receiver and the Bonner servos. There is a huge difference here. The radios are all so much smaller, they are also now proportional instead of the reed bang-bang operation. The servos are really tiny. I was really amazed at Bill Cannon's tiny receiver and servos. Airtronics and Futaba's new transmitters do everything but talk for you. All in all, the radio gear of today will fit into spaces a fraction of that when I was flying, and proportional too.

The model shops are now packed with more gadgets than the proverbial Carter's pills. One does not have to make anything for his model today, everything is pre-manufactured, usually molded in nylon. The kits are, in some cases, simply fantastic. I was very impressed with Airtronics' kits of Lee Renaud's (sons Dennis and Dale have built just about everything that Airtronics has put out in sailplanes). The Pierce Aero kits designed by Ed Slobod and manufactured by Gene Wallcock are also very excellent kits. Friends tell me I missed the best kits, those of Jim Jensen; these, they say, are still the ones used for comparison. I have not had enough contact with other manufacturers' kits to say anything good or bad... maybe later.

One thing that was quite noticeable was that what are now called "Scratch Builders" are really in the minority, supplies for scratch builders are sometimes difficult to find, all the parts you need though are in the kits.

Monokote has sure taken over the

covering material market, though like everything else, it is expensive. Japanese Model tissue "Esaki Type" is scarce as hen's teeth, there is none in the hobby shops, only the old timers have it. The silk available is the same silk I used to use. The Sig contest balsa is of the same high quality as before; Sal Taibisure cuts beautiful wood and to exact dimensions.

The contests were very interesting, the first one after so many years was the Free Flight champs, pretty much the same management as large contests used to be. The Second contest was the F3B world championships in Sacramento, I was very disappointed, as this one appeared to be just too much for the management, or there again it could be that they were just not really prepared, I don't know, but it was embarrassing.

Then over to Hawaii and a small club contest, R/C gliders and three events, I got hooked into running this, it was still work. I made an appearance at the Deep South contest just outside Orlando (distances in Florida must be talked about the same as in Texas). They ran two days; Two-Meter Triathlon Saturday, and open Triathlon on Sunday. I don't mean to pick on a contest, but I saw things happen here which should not be allowed to take place at a model contest. Some times were recorded by the timers much closer to the even minutes than actually flown; one flight of 3:32 was recorded as 3:52, another flight I timed (on the sidelines) was also increased when recorded. I really hate to see this in a contest (Ce la Vie).

Another thing about these glider contests that I am unable to understand is the spot landings. When I think of soaring or sailplanes, I never think of landing as anything but something which takes place when you are done flying, when gravity rears its ugly head and you must stop flying. Some contests are nothing more than landing contests;

not to land smoothly with great precision, but a timed dive into the ground which would seriously injure a pilot or mangle a plane (some do). This makes an ugly spectacle out of a beautiful sport.

Yes Bill, there have been some big changes, this is how it looks to me. Since you asked me to write this, I have even built a model, a factory proto Sagitta 600. It was something really different, but a joy to build. I could have used a lot of instructions (they weren't ready yet), the wood seemed hand picked for the job it had to do, the machine-cut wood really fits slick, the engineering and design excellent, and it flies like a bird, thermals with the big ones, it penetrates and does not seem to have any bad habits (now I'm going to build a 900).

Note: I haven't had a chance to see the big birds, the pattern models, the go-left guys and many others, but I will. Way out West, with Dick Everett

Soaring Continued from page 33

with so little return as in the attempts of man to fly successfully through the air. Never, it would seem, has the human mind so persistently evaded the issue, begged the question and, 'wrangling resolutely with the facts', insisted upon dreams being accepted as actual performance, as when there has been proclaimed time and again the proximate and perfect utility of the balloon or of the flying machine."

He went on to soften his view. "...Should man succeed in building a machine small enough to fly and large enough to carry himself, then in attempting to build a still larger machine he will find himself limited by the strength of his materials in the same manner and for the same reasons that nature has."

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On December 10, 1903, the *New York Times* commented on Samuel Langley's experiments in heavier-than-air flight (just one week before the first successful flight at Kitty Hawk): "...We hope that Professor Langley will not put his substantial greatness as a scientist in further peril by continuing to waste his time, and the money involved, in further airship experiments. Life is short, and he is capable of services to humanity incomparably greater than can be expected to result from trying to fly... For students and investigators of the Langley type there are more useful employments."

In the 1904 March issue of *Popular Science Monthly*, Octave Chanute stated, "...The (flying) machines will eventually be fast; they will be used in sport, but they are not to be thought of as commercial carriers. To say nothing of the danger, the sizes must remain small and the passengers few, because the weight will, for the same design, increase as the cube of the dimensions, while the supporting surfaces will only

increase as the square. It is true that when higher speeds become safe, it will require fewer square feet of surface to carry a man, and that dimensions will actually decrease, but this will not be enough to carry much greater extraneous loads, such as a store of explosives or big guns to shoot them. The power required will always be great, say something like one horse power to every hundred pounds of weight, and hence fuel cannot be carried for long single journeys."

In 1905, T. Baron Russell, a visionary, stated in the book *A Hundred Years Hence*, "As it is not at all likely that any means of suspending the effect of air-resistance can ever be devised, a flying-machine must always be slow and cumbersome... But, as a means of amusement, the idea of aerial travel has great promise. Small one-man flying machines or the aerial counterpart of tandem bicycles, will no doubt be common enough. We shall fly for pleasure."

In 1909, Louis Bleriot flew across the English Channel, and in 1910, William H. Pickering stated, "The popular mind often pictures gigantic flying machines speeding across the Atlantic carrying innumerable passengers in a way analogous to our modern steam-ships... it seems safe to say that such ideas are wholly visionary, and even if a machine could get across with one or two passengers, the expense would be prohibitive to any but the capitalist who could use his own yacht."

And now we fly heavier-than-air even without power, and there probably are people who still say, "It can't be done." See you next month.



Big Birds Continued from page 25

circular saw off its duff and the unemployment list and turn it into a wood-eatin' dynamo. You'll be able to do all those things that are mentioned in so many articles aimed at helping you keep your building costs down... such as rip, cross cut, miter cut, and bevel... all with surprising ease and accuracy, and at a very palatable price, indeed.

This Saw Table usually sells for \$59.95 (which isn't a bad price, at all), although I picked mine up for \$39.95 at a rather large, local do-it-yourself/hardware store called Homer's. Granted, it's not as sophisticated as a \$200 nine-inch saw, but it does the job... and the savings is terrific. And although the 4½-inch Dremel Table Saw was also a consideration, and can be had for something under a hundred bucks, I felt it wouldn't survive any amount of real heavy-duty workloads.

I've been using my saw table for about three months, and laugh every time I think about the paltry sum I plunked down for it. Besides doing a dandy job of cutting a lot of assorted wood for my BIG Birds, it's also been used for some "Honey-Do's" and other work involving heavy lumber... and has done it all without any problems.

The Hirsh people did a good job of designing this saw table: it's rugged and very stable, and I haven't (yet) needed extra weight to keep it from dancing around (the manual recommends putting sandbags over the crossbraces for some type of work); it has a large work surface; a safety shut-off bar up front; an adjustable miter gauge; a sturdy rip fence; a high-impact blade guard; and it folds easily into a very compact unit for storage.

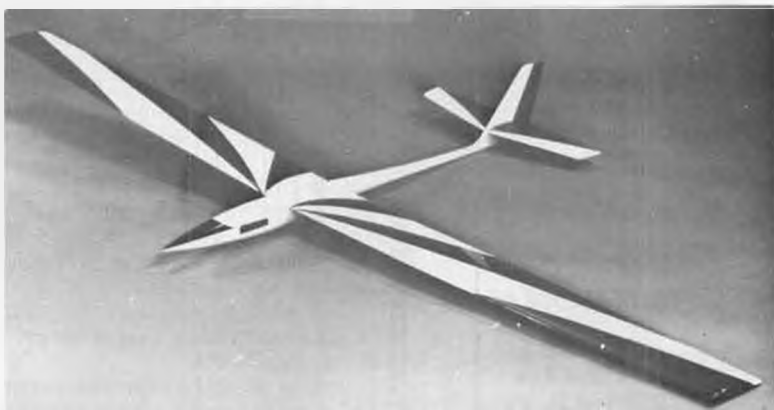
Also, it goes together in jig time, thanks to both the excellent instructions and parts that actually fit as they should.

And it's versatile! Besides setting it up as a table saw, you also have two other options: installing a portable router or a saber saw in place of the circular saw... and being able to change quickly from one to another because that was also designed into this good looking and very functional piece of machinery.

Okay, guys, here's the clincher! As a bonus, this saw table even provides a solution to a third problem: how you're gonna get to go to the IMAA Annual Fly-In up in Ida Grove, Iowa, on August 27, 28 & 29. BIG Bird Lovers, it's simple... unless you're a cabinet maker and/or have an overwhelming compulsion to spend hundreds on a nine-inch table saw, just marry the malingering circular saw of yours to a Hirsh Saw Table... and the money saved will help subsidize three outstanding days of easy going, uncontested flying, and comradeship.

For those of you who don't know, Ida Grove is the home of Byron Originals, and co-hosts Byron Godbersen and our IMAA are going out of their way to

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THE SILVER SOLDER CONNECTION

My silver soldering technique stinks . . . or at least it did until very recently when I started using what seems to be the right piece of equipment for me.

Like everyone else, I've had a Propane Torch for years, but have never been able to do any decent silver soldering with it: either the work was small or too delicate for that Propane burner, or the torch just couldn't handle big jobs . . . not enough heat. And it didn't make any sense to spend a lot of money on an expensive rig that I wouldn't use too much; so over the years I've jacked with most everything from the frustratingly small MicroFlame to the awkward and cumbersome SolidOx . . . with, at best, very limited success.

I could hardly ever seem to get the proper flame size and pattern with these products, or if I screwed up and did happen to get the flame looking "good," I'd always run out of time on the cartridges or pellets. I must have reread the instructions dozens of times, but to no avail; I never had them burning long enough (properly, that is) to really learn how it's done.

Ahhh . . . but now things are different and I'm no longer thwarted or frustrated.

Within the last three weeks I've repaired two fatigued joints on my wife's pastry blender and three loose ends on that many broiler grills . . . and my wife says I'm now ready to start socializing, again. My ego took a boost 'cause all those joints look good enough to fool anyone into thinking that I really knew what I was doing, thanks to my new pressure regulated Mapp Torch.

Sears was where I bought mine, although I'm sure that Mapp Torch Kits are available in other department stores, and probably hardware stores. For \$35 I got two Mapp Gas fuel cylinders, two different size burner assemblies, a pressure regulated torch assembly, five all-purpose brazing rods, a spark igniter, a package of flints, a decent instruction booklet, and a strong, bright yellow case to keep it all in.

The two big differences between Mapp Gas and Propane Gas Torches are: Mapp Gas burns hotter, and you get the two different sized burner assemblies so the heat can be tailored to the work (there are a number of fringe benefits due to this higher temp, such as economy and efficiency). In actual use, the smaller burner assembly would be used for all of our silver soldering needs, as maximum heat output (obtained with the larger assembly) is neither needed nor desired.

Now I'm not about to try and convince you that getting your silver solder to flow is on a par with the excitement of your brand new BIG Bird's first flight . . .

but it does have its gratifying moments, and like the afore-mentioned happenings, certainly helps in the self-confidence department when done with care and finesse.

Yeah, I know about Stay-Brite . . . and have used it. Can't deny that it is stronger than regular solder, but it sure *can't* compare to silver soldered joints for strength and longevity. Stay-Brite is fine for use on small, light models . . . but strut, landing gear, and control system connections and joints in BIG Birds need the strength and peace of mind that Stay-Brite won't give you.

I've already told you about those small silver solder repairs I made on grills and a blender, but forgot to mention how easy it was to braze loose and broken parts back onto my aged and severely abused lawnmower using the larger burner assembly and one of the brazing rods. Quite a handy rig . . .

From a standpoint of economy and efficiency, these Mapp Gas fuel cylinders will last even longer than your Propane cylinders . . . and you know how much mileage they've given you all these years.

And safety-wise, Mapp Gas is actually less of a hazard than Propane due to its very horrible odor; it really *stinks*, so that any leaks can be easily detected.

A final thought: in addition to improving the quality of the work done on your BIG Birds, which means you'll have better built, longer lasting aircraft,



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consider how well you're going to be able to keep the peace by doing such equally great work on all those special "Honey-Do's" that always seem to pop up.

THE LITTLE TRAILER... OMT

It seems as though J.W. Jones has spurred quite a few folks on to finally building a trailer, instead of just yakking about it. I've received a surprising number of letters and phone calls about J.W.'s "small trailer" (MB, April '82), and most of the guys said they were planning on making theirs exactly as Jones did. Some felt they wanted more room and would increase the size of the ply box to suite their needs.

And well over half of them wanted to pass on this recommendation: weather permitting, remove the plane(s) and sleep in the trailer. It's sort of fun for that one or two nights, helps save bucks and, according to a few very knowledgeable informants, also helped them and their spouses to get to know each other... again.

Hey, J.W.... if we have a sudden "baby-boom" among BIG Bird Buffs with trailers, you may be named R/C Godfather of the Year; of course there may be some who'll have another name for you...

ENGINES

I've put more time on my "Diesel-Eagle III," and I'm still very delighted at the way she hauls my C-3 around. I'm learning to lean the engine out a bit more, and in general feel comfortable with this Davis conversion. There are a lot of guys who, after watching my bird fly, still won't believe that a diesel can do such a great job. I'm not sure what they think I have mounted in the nose...

And talking about mounting in the nose, I've finally had the chance to try one of US Quadra's hand-massaged 1982 Quadras in a CAP 20 that previously had a standard, older Quad in it. This BIG Bird's performance backed up the static reading of a full four more pounds of



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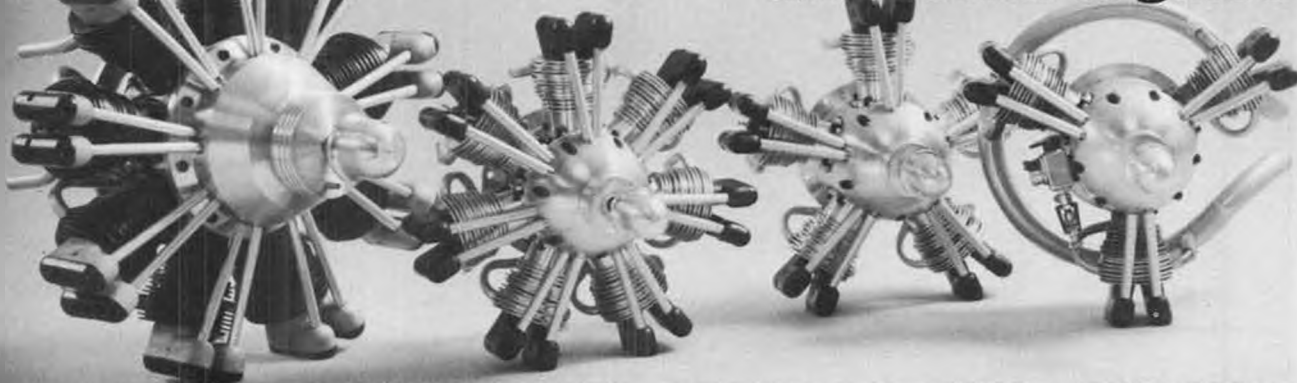


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thrust coming out of the new engine; I read a "conservative" 22 pounds as compared to 18 pounds from the older Quad . . . on an 18x8. This made me; wonder how much the new 3.05cid Quadra will put out if Dario can work the same magic on it. Only one way to find out, that's to ask . . .

REDUNDANT POWER SOURCE

It seems like a good idea, because after all, who can't use a tad more insurance against instant rekitting. Designed by George Steiner and kitted by Ace R/C, Inc., Box 511, Higginsville, MO 64037, this little gem switches over to the good 5-cell battery pack if either one of the two 5-cell packs fails or loses capacity.

I haven't had a chance to test fly it yet, but it does what it's supposed to do on the bench. By the way, a 5-cell pack really gets those servos zipping around, due to the 20 percent boost in power over a standard 4-cell pack. More on this next month . . .

BALANCING ACT

Too many guys aren't getting their BIG Birds balanced right, mainly because it's awkward. Hope to have details on a balancer I'm working on. Stay tuned . . .

TRANSMITTERS NEED LOVE TOO

So why aren't you treating yours with a little more respect and consideration? In case you've forgotten, that transmitter is no less important than the airborne system you seem to be spending all the time on.

When you're driving to and from the flying field, remember to make your transmitter a little more comfortable and safer, instead of just tossing it around and abusing it. A well cared for tranny can easily match a dog in the loyalty and dependability departments.

And just because there's far less muck n'such to clean up on and from a gasoline powered bird, don't think that your transmitting antenna isn't going to still pick up its fair share of dust, dirt,

sweat and oil . . . and then transform all that into a buildup of crud that'll lodge in the crimped area of each telescoping section. This buildup can then limit continuity and effectively shorten the antenna by one or more sections, which translates into very little power actually getting out. You then become the prime recipient of instant cotton-mouth, severe palpitations and bugged eyes that always accompany the weird, but wonderfully traditional "Dance Of The Glitches." Although most of the footwork and gyrations differ from person to person, the transmitter is always thrust way up high in a last-ditch effort to regain control. Obviously this attempt to "tickle the gods fancy" would be futile since you'd be diddling with the tip of an impotent antenna.

Here's how to cut the odds way down: first, when through flying for the day wipe the antenna off, starting from base to tip, with a clean handkerchief (what, you don't carry one?) or a clean rag; then, after you get home, wipe again, only this time using alcohol. You'll be amazed at the amount of crud that's left on your wiper. Remember not to push that antenna in until after you've wiped it off . . .

IMAA FLY-IN FESTIVALS

As you're reading this, you've only got about six weeks to get ready for the 5th Annual Southwestern Jumbo Fly-In held in Ft. Worth on July 17 & 18. This year's Jumbo will be co-hosted by our local IMAA Chapter, and I'll be one of two guys named Al who'll be pulling the IMAA Airworthiness Inspection on all aircraft; we've proved over the past two years that this inspection makes for a safer and happier time for everyone. Lookin' forward to seeing you in a few weeks . . .

And, of course, the BIG Bird event of the year, IMAA's 2nd Annual International Fly-In Festival, will be held in Ida Grove, Iowa, on August 27, 28 & 29. It's

honestly and truly going to be "a gathering of eagles," so don't miss it. Drop me a line and I'll make sure you get a Fly-In Brochure; it's particularly important to pre-register if you're planning on bringing a bird or two along. And if you're not a member yet, don't forget to ask for an IMAA application; you'll be joining the best damn BIG Bird organization in the world, and our outstanding quarterly publication, "High Flight," is dedicated to really helping each and every guy who loves BIG flying machines. HF is chock full of proven ways and means on how to get your biggies flying . . . and how to keep them flying.

TIP OF THE MONTH

NEVER, EVER, under any circumstances, for any reason whatsoever, regardless of the emergency, go directly to the bathroom after getting Hot Stuff on your fingers!!!!!!

BIG Birds Fly Better! Al Alman, 2609 Burningtreet Court, Arlington, TX 76014. •

Plug Sparks . . . Continued from page 38

what Bill has to say:

"Mostly what I have to say is aimed at informing less experienced modelers about SAM rubber competition. Rules being what they are, let's live with what we have and observe what can be done to overcome some deficiencies.

1. Design Consideration: Korda and Lanzo designs seem to dominate the contest field, but this need not be the case, as there are many excellent designs available. As an example, my new cabin ship is a George Reich Nationals Cabin Winner. There must be a few more contests that Korda or Lanzo didn't win! The Wakefield designs of that time are now what we call O/T cabin, as are the Stout Trophy models. For those wishing to fly old timer designs, it is important to

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realize not all are eligible for modern O/T competition rules!

SAM Rules specify minimum and maximum fuselage cross-sections. Some enclosed motor stick models cannot be flown in the cabin event regardless of their cross-section. With this in mind, look for the following features:

(1) Be sure the design has a lifting stabilizer. If it does not, you may not be able to apply much power to it due to the pitch trim change under power.

(2) Check the design for the adaptability of a dethermalizer. SAM Rules allow for some structural modification and strengthening to accommodate pop-up tails. Rules definitely state you cannot move the stabilizer in relation to the wing (maintain same moment arm). This can cause a problem for the pop-up tail installation.

(3) Propeller: Rules state it must conform to the original type, pitch, and shape. Most of the early designs featured free wheeling propellers, but if you like to be a steady winner, folding propeller designs outglide all others.

This is not to say free wheelers won't fly excellently, as the wing loading is low and most models are boxy and square. The drag penalty isn't that high!

II. Modifications: I do use aluminum tubes in place of a wood dowel, bamboo rear peg, or some sort of rear hook with a rather dubious safety. Hence, I use the modern hollow tubing that allows me to use a winding stooge.

Models last longer nowadays mostly due to the limit imposed on the length of flights (a maximum limit flight commonly called a "max"). In the old days, the longest flight won, and were they ever long flights!! Korda is an excellent example of winning flights of 39, 43, and 54 minutes! So with this in mind, models should be strengthened at handling points; the nose and tail areas should be lightly sheeted, while dihedral joints are reinforced and landing gears made more sturdily.

Many an old timer will decry my comment that I don't like bamboo wood tips, much preferring to make the tips out of balsa wood. Better yet, I like laminating basswood of 1/16 x 1/32, making three layers around a waxed form. I use "Titebond" glue (Fernando Ramos gave these details in his column). I also use balsa strips which are lighter, generally 4 to 6 layers of 1/8 x 1/16. This appears to be more warp free than all other tip designs.

III. Propellers: Special care, here! This is what makes or breaks the performance of your model! I use the propellers as specified on the drawing, taking care to sand carefully to shape. I did change the pitch on the Hi-Ho design, as it had short and violent climbs (this is a no-no under SAM rules). Increasing pitch to 22 and diameter to 18 did wonders to tame the beast (Ed. note: This short but terrific climb has always been a feature of Ed Lidgard's models).

I have often thought that some optimization on propellers should be allowed. This is not to say to use modern design props, as I think these would look terrible on an old timer. Actually, in the case of Korda and Lanzo designs, prop optimization has already been done by the designers. Those boys did their homework!

Soldering tubes to brass to form the folding hinge is a difficult way to go when you can purchase aluminum hinges from FAI Supply. Mounting is such a cinch with thread and epoxy.

IV. Center of Gravity: Most old time fuselages are short compared to modern designs, hence the c.g. location will be at 50 to 60% of the chord and no further back. You are asking for trouble if you fly with the c.g. at 75 to 80% like a modern ship.

You must remember the reason for short fuselages was the minimum cross-section rule which was directly dependent on the length. So to keep the cross-section within reason, fuselages were made short. Even with a large lifting stabilizer, c.g. was still only at the 50 to 60% aft point. Either that, or you run out of longitudinal stability!

V. Rubber: Rubber has changed dramatically over the years, so be careful in using the recommended amount on the original model. It may turn out to be too much!

A lot of the old designs were built very lightly, using the rubber motor to bring them up to weight. It was no great trick to have the rubber motor better than fifty percent of the total weight! These light models live spectacular but very short lives. If we expect to put in a series of "max" flights instead of the one big long one, models must be more dependable, sturdy, and consistent.

My recommendation is to use all the rubber you need, but don't go to extremes like a 40 inch long loop in a 24 inch fuselage! Use shorter motors. It is practically impossible to maintain the glide trim even with modern techniques like braiding, tensioning, etc. Avoid that big knot in the rear of the fuselage!

Since we have no weight rules for the rubber events, the best idea is to keep the weight low, but adding rubber to gain weight. Better thermalling!

VI. Trim: Fly in right circles under power. I fly to the left in the glide. Stabilizer tilt is ineffective on short tail moments and is even less noticeable in the glide. You have to adjust the rudder! Use thrust adjustments for power to the right. I also use as much as 1/8 inch downthrust to prevent power stalls (this assumes the glide is in trim).

Some numbers might be helpful. Your model won't be the same but the figures will demonstrate the kind and magnitude to be applied.

Hi-Ho: 3/32 down, 3/32 rt. thrust. Small rudder deflection, about 1/8 x 3/4 x 1 on the fin.

Korda: 3/32 down, 1/8 right thrust, 1/8 wing incidence. No rudder tab, but skew tail 1/32 to left.

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Lanzo Stick: 3/32 incidence under T.E. 5/32 downthrust and 1/16 RT. Rudder Wedge 1/4 x 1-1/2 x 3/4.

Center of gravity on all cabin models is 50%, while stick models seem to check out at 60%. Make sure all models are in a constant turn under power, otherwise they will stall and hang on the propeller. For a spectacular climb, I use 14 to 16 strands of 1/4 FAI Rubber."

Well, now that Bill has given you all the secrets, you can go out and kill them in rubber!! (Starting with his month's OT of the Month! wcn)

40 YEARS AGO ...

Slight change in the standard heading, as the readers of this column have been getting after this writer for saying "30 Years Ago" when writing about the late thirties and forties.

The picture of J.L. Sadler's large low wing provoked such interest that this columnist contacted Henry A. Thomas, at 6201 Ridgecrest Drive, Little Rock, AR 72205, about a possible drawing of this large model. In requesting information, photos, etc., that would be of some help, the following letter came that should be of interest to all old timer fans.

"I found the photo of the "Pacemaker" on page 38 of the January issue, Model Builder. This was John Sadler's last and best low wing. I drew the original

plans which were published in Air Trails when Bill Winter was Editor. I note that Model Builder is now selling plans to this design.

"The preceding Sadler low wing was a ten footer. This is the one you are referring to in your letter. Unfortunately, only two of these models were built; the original by John Sadler powered by a Brown Jr., and a duplicate built by Ted Kleuser with a Forster 99 for power. No complete plans were ever drawn of this ship, and it is a shame because it was a great old time flyer that made graceful, unassisted takeoffs. The model was most impressive in the air.

"I remember a few details; wing was 10 ft., with a 14 inch chord. The airfoil was typical of the time, a Clark Ytop with RAF 32 underside. (Many old rubber designs featured this combination.) The model had huge rubber tires which were actually ashtrays novelties. Sadler removed the glass center receptacle and turned pine wheels to fit. Turned out heavy as the dickens but they rolled fine. (Columnist Note: Actually Jack was correct in using heavy wheels, as most of the California boys found they needed a low c.g. in their low wing contests.) They were actually miniature Sieberling tires.

"John designed a rugged landing gear with front and back recoil slots, with the landing gear working against rubber bands. The ship had a huge, tall rudder. Sadler later discovered the ill effects of a big rudder and the following Pacemaker

had an almost ridiculously small rudder. But, it did fly very well! The ten footer had a faired fuselage with stringers along upper half, silk covered, an aluminum cowl. Wingtips were made from 1/8 inch diameter aluminum welding rod.

"For the record, John Sadler passed away about a year ago at age 85. He was middle aged when he discovered modeling. I met him when I was about 18. John was a truly great pioneer modeler with ideas of his own. He exerted a great influence on many young model builders now prominent in aviation, the space program, and in the professional groups.

"I have included a few sketches which hopefully will help you recreate this model." (Columnist note: Hopefully, Editor Northrop will see fit to run them.) (See fit indeed! It's an honor to reproduce the work of one of modeling's most famous artists and designers. wcn)

FLORIDA SAM CHAPTER

In spite of all the old timer activity in Florida, as reported by Terry Rimert, there is actually no S.A.M. Chapter in that state.

Bob Nolan, of 57 Douglas Ave., Dunedin, FL 33528, writes to say he is organizing a chapter there. He has about ten guys interested and hopes this little squib in the magazine will help attract additional members.

Bob also points out he has a good field in Crystal River, which is about 80 miles



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north of Dunedin. The field is five square miles of grass and sand. Bob figures the field is good for 15 second engine runs (using ignition). Now how about that?

CAL POLY ANNUAL

Formerly known as the John Pond Commemorative Old Timer Annual, Monti Farrell announces this meet will be held on Sept. 25 and 26 at the Cal Poly University Airport, San Luis Obispo, CA.

The two day meet will feature Limited Engine Run and Antique Events on Saturday, with the Texaco and 1/2A Texaco Events on Sunday.

Best idea is to write Monti Farrell, P.O. Box 1261, San Luis Obispo, CA 93406, to get his latest rule changes. If you don't, you are liable to find your model and/or engine ineligible to fly!

PHOTOS

As Confucius say, "A picture is worth a thousand words" and believe me, we have had a 1000 words! Actually, the columnist would like to take a break and print some photos that are of interest to all.

Photo No. 5, taken by that unofficial SAM photographer, Harold Johnson, of Minneapolis, shows Paul Lewis with a little seen model called the Red Wing as designed by Allan Orthof. This model was published in the 1939 Fawcett publication, "Model Airplane Manual". No reports on how it flew but outside of a horrendous landing gear, it isn't a bad looking design. (Also published in Feb. '78, MB plans available. wcn)

ANOTHER BRUCE LESTER JEWEL!

As is our wont, another old time shot as taken by Bruce Lester and his trusty Brownie camera at the 1939 Detroit Nationals is pictured in Photo No. 6.

As commented in the caption, the model looks like a Shereshaw Champion with that high dihedral. However, this columnist could be all wet, as there is a definite lack of sheeting on the wings, a Shereshaw trademark. Can anyone out there help identify the model and the builder?

Photo No. 7 is one of the kind this columnist loves to get. I am referring, of course, to the beautiful construction job that Randolph Getchell, of 3036 West Shore Drive, Willis, TX 77378, did on a Megow Flying Quaker.

Finished in transparent red, white trim, with red and black pin stripping, this model would do well in any beauty event. Note by emphasizing the size of the rear landing gear strut, one can get away from that terrible looking landing gear. Then, too, a steerable tail wheel always helps. Gives the model that scale effect!

SAM CHAPTER CHATTER

SAM 49. Jim Adams (SAM Speaks Editor) is responsible for using Photo No. 8, showing Harvey Parker on a motorcycle towing his models in a trailer.

In a telephone conversation with Jim, he mentioned that Harvey and his girl friend were going to motor clear across the country to Chicopee, Massachusetts to attend the SAM Championships at Westover AFB. Whadya do when it rains? Yeah, I know, you let it rain!

SAM 3. Among their more active modelers, the Southern California Ignition Fliers (SCIFS) can brag about Sandy Chapin's activities on the contest field.

Photo No. 9 shows Sandy with her good flying Scientific Ensign, that was good enough to get her a fifth in Class B in the Taft SAM Championships against all the big boys! Also thanks to Harold Johnson for this photo. He do take good pics!

SAM 8. Although we have been unable to use much of the newsletter, this columnist has to be impressed the way "Fritz" Schaefer turns in a contest report. The first SAM O/T Annual came

off exceptionally well with the weather and, in particular, with the Army who really cooperated well.

Schaefer comments this was their first attempt to incorporate R/C Assist in the free flight Annual. Ed Lamb and his son, Ed Jr., were responsible for making this event a possibility. Looks like this may catch on!

One of the winners is shown in Photo No. 10, Hugo Lung copping Class B with his Zipper. Hugo will be remembered by his former flying buddies, the SCAMPS, in Southern California. Note he still carries Gene Wallock's company name on his wing: "P&W Models". Great to be remembered!

While talking of SAM 8 members who helped contribute to the success of the Annual, we would like to run Photo No. 11, Ray Chalker, the winner of Class C Pylon, with his scarf covered Sailplane. For the benefit of the uninitiated, those silk scarves sold at the stores make excellent covering, and what wild color schemes!

SAM 41. George Wagner, SAM 41 newsletter editor, writes to say the first SAM 41 Annual was a success in every respect, weather, competitors, and field. The SAM 41 boys are so pleased with the Perris Field, they are going to make this contest a regular feature. George wanted us to print the winners so that the SAM 41 faithful will know they haven't been forgotten. Results look like this meet should have been called the SAM 49 Benefit. Oh well, gettun next year!

ANTIQUE

1. Ross Thomas	1778
2. Jack Albrecht	1620
3. C. Patterson	1576

CLASS C

1. Jack Albrecht	1260
2. R. Sliff	1164
3. J. Doyle	1055

CLASS A-B

1. R. Sliff	1148
2. R. Thomas	1134
3. G. Wagner	420

1/2A TEXACO

1. R. VandeWalker	1382
2. C. Thompson	1158
3. Don Hoyle	1053

RUBBER

1. Bob Diehl	407
2. C. Patterson	311

.020 REPLICA

1. B. Oslan	506
2. Sal Taibi	488
3. Jim Adams	415

SAM 1836. Where the heck did that number come from? Wa-al, you ain't no Texan if you don't know that 1836 was the year of the Alamo, said church is still located in San Antonio, the site of the newest SAM Chapter.

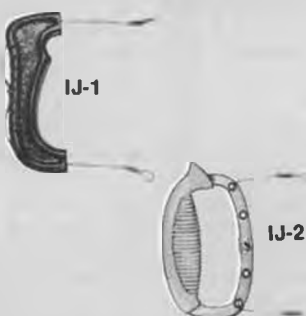
George Aldrich enthusiastically says they go over 20 members the first month. Great stuff! To show the versatility of this club, George sent in Photo No. 12, showing his latest creation, a Korda Wakefield rubber job! As usual, George does his impeccable work. No reports on how it flies. Spring is coming

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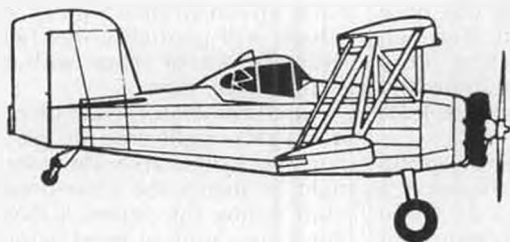
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CD: FRED BROWNS, 8037 CYCLAMEN WAY, BUENA PARK, CA. TEL. 714-522-1931
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FRANK CUMMINGS, MASTER MODELER

This writer doesn't know how many of you Southern Californians remember Frank Cummings, but Photo No. 14 may restore your memory. Frank is shown with one of his favorite free flight models, a Comet Sailplane powered by a red hot Super Cyke.

It is ironic to note the clever folding prop to reduce air drag and then see a flat firewall that could have been cowed. Some sacrifices have to be made for convenience in starting the engine.

Cummings is best remembered for his outstanding indoor models that were always a threat to win. It was bad enough to have him win the outdoor gas events without taking the indoor events. Do we have anyone out there who knows the whereabouts of Frank?

REVENGE IS SWEET

For the wrap-up, just received the latest newsletter from Tom Brennan, the new newsletter editor for SAM 27. No question about it, when the Marin A.C. joined SAM 27, things started popping. However, one is led to think this happened as a result for a counter-challenge meet called the "Hangar Rat Contest" (SAM's Revenge). Here is what Tom has to report.

"On January 22, SAM 27 challenged us to defend our honor and fly for the "Merd Hopper Award". (As Tom says, accepting the challenge was the only right thing they did all night.) After three hours of flying, MAC was obligated to accept custody of the Merd Hopper Award. How revolting! Not one of the SAM 27 Hangar Rat models was nose heavy and they all flew left. Ron Keil really rubbed it in by posting three official flights all over one minute and establishing a new Rat record a 1:11! How humiliating!"

It should be noted that Pierre Flapbon (nee Tom Brennan) has scheduled a secret strategy meeting to do some chewing and plan a MAC response to this dastardly situation. More darn fun!



Peanut Continued from page 51

covered.

Make a rib template from thin aluminum sheet and slice a batch of top and bottom rib strips. Select a reject top and bottom strip and glue together as shown on the plan rib section. Check the required spar depths before cutting them. Every template will vary slightly and this procedure helps assure a good spar fit without building in stress in the rib parts. Fit small sheet gussets at all strut-mount points on the bottom of the upper wing and the top of the lower wing. Make up the ailerons by adding the extra pieces to the structure after it is all assembled and before it has been removed from the building board.

A frame of about one-half inch thick pine such as is used for garden trellises or similar material should be made in a rectangular shape just large enough to take a sheet (or half sheet) of the covering material you are using, if you don't have one. Gusset the corners well and fasten it together with Titebond and small nails. If made well, it will last for years and will be used to pre-shrink tissue and to spray on dyes and tints when you can't find tissue in the colors needed. This is really a must when using condenser tissue and a good idea for any tissue used to cover light model structures. Carefully dope the tissue around the edges of the frame to attach, mist with water. When dry and shrunk, you have an un-wrinkled piece of tissue which will probably not twist your structure out of shape with humidity changes over time.

I used condenser tissue on my Heath. It is light-weight and the plane has a bunch of surface area. The color is about right to match the clear-doped linen used during the period it flew. If you don't pre-shrink or need to touch-up a few tissue sags with a light alcohol mist, be sure to pin down the surfaces and cure well.

The struts are cut from the ply, stained and sealed. The axle is 0.015 wire slipped through a piece of plastic insulation from telephone wire. Ed Heath didn't use a windshield, but did mount a small cowl to help deflect the airstream. I shaped the appendage on my antique Mattel Vacuform. If you're not into vacuforming, it can be carved from foam or soft balsa. To get it light, hollow it out as thin as you can and get the aft edge especially thin to simulate the sheet metal. Paint with bright aluminum enamel before mounting.

Cut open the spar and leading edge pockets for the lower wing on the fuselage sides and mount the wing. Hopefully you have left stubs on the inner ends of these members when the wing was cut apart. This method assures accurate wing location and incidence. Block up the assembly and measure for none or the desired dihedral. Set the top

pretty soon!

England, SAM 35. Photo No. 13 was sent in by Keith Harris, who was one of the pioneers in the O/T movement in England. The model shown is a real old design called the Mermaid, designed by Dr. Fostore in conjunction with Col. C.E. Bowden, with whom he was flying at the time.

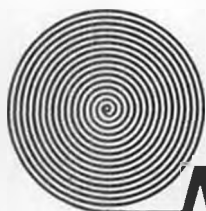
Mike Whittard was able to get a set of plans to construct this oldie. Surprisingly, it is a good stable flier that rises off the water with no problem. Incidentally, that engine is a Kiel K6 motor. Don't see many of those!

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wing on the centersection struts. When the cement has partially set, eyeball from several angles and adjust the wing to get the best possible alignment.

The pre-moulded engine cylinders look the most realistic, but they are packaged in groups of five. This twin-row, three-cylinder beast used six. Thread-wrapped balsa dowels or the flexible section of a plastic drinking straw will both be lighter weight. Turn the crankcase from styrofoam and paint flat metallic gray. Walt's drawing and the photos give all the engine details.

I turn my wheels from foam, using a piece of 1/8-inch birch dowel for a spindle, which just fits my Mototool chuck. Drilled 1/32 before cutting-off gives a good axle bearing. Styrofoam chips easily. The best shaping tool I've found is an emery board and light pressure. Prime with several coats of thinned white glue, sanding between coats. This strengthens the wheel, sets the small fuzz created in shaping, fills small depressions, and protects the foam from attack by the solvents in most paints. Discs are off-white to match the tissue, and tires are flat black, or better, Grimy Black Floquil.

No Heath airplane is complete without the trademark wheel-disc lettering. Cut out rings of the proper diameter and width from some of Bob Peck's clear mylar material. It has a peel-off adhesive backing. Letters are Chartpack Helvetica Medium 10 Point/100CL available at artist or drafting supply stores. After the letters are rubbed onto the mylar, cut the ring once across to allow it to conform to the disc cone, remove the backing, and press into place. The adhesive will allow a couple of tries if you need them. The cowl lettering is done similarly. The word "MODEL" will look more nearly scale if done with 12-point letters.

The nylon monofilament makes good rigging material, except you have to look closely to spot it. Waxed fine gray silk thread looks more realistic, but the nylon can be tightened with a judicious application of heat from a cigarette or soldering pencil placed near the strand. Don't forget to punch or drill small holes at all the right places at the strut ends and control horns before assembly, if you plan to rig.

The toughest and lightest Peanut prop I've found is the one shown. Cut out the blades and drop them into a small bottle of water laced heavily with household ammonia. Let soak overnight. Stack them together and strap on a small can or bottle about two-inches in diameter, at 15° forward skew to get some twist, with cotton strips. Bake in a 200° oven a couple of hours. Drill the toothpick hub and spot-glue an 0.020 wire shaft at right angles. Slip the shaft in your jig and lightly fasten the blades with model cement. When the assembly has set-up, remove from the jig and run a narrow epoxy fillet along each side of the blade-hub joints. Also smear a little on the shaft where it contacts the hub. When this has

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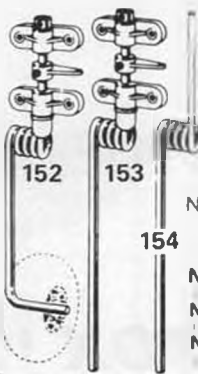
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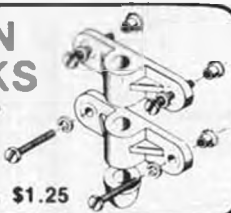
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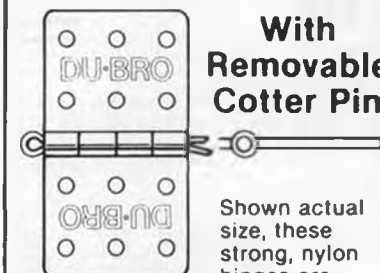


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Bore: 1.00 Stroke: 1.00 Displ: .785
R.P.M.: 12,500 on 12-6 Prop
Fuel Consumption: 1 1/4 oz. minute

#27800 FOX .78-RC	\$125.00
#90264 Tilt-Down Muffler	19.95
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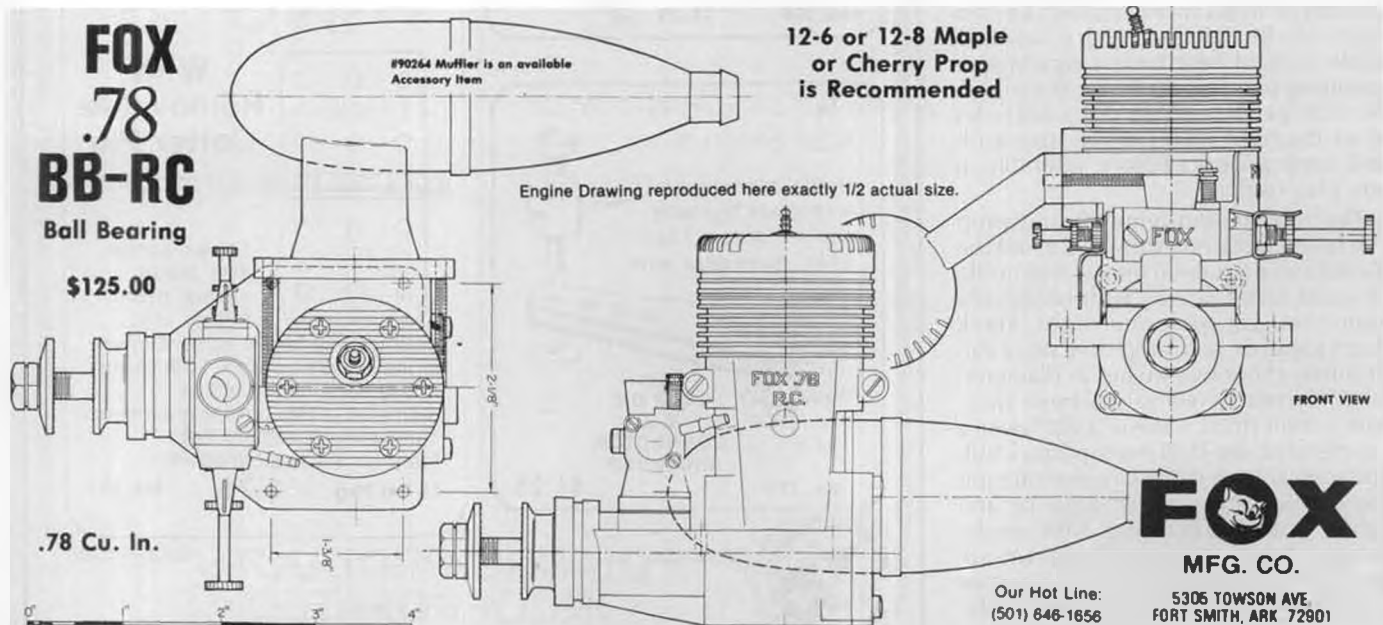


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Bore: .907 Stroke: .937 Displ .61
R.P.M.: 13,000 plus with 11-7 Prop
Weight: 17 oz.
Fuel Consumption: 1 1/4 oz. minute

#26500 FOX .60 EAGLE III Side Exh.	\$125.00
#90262 Tilt-Down Muffler	19.95
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cured, the joint and hub can be shaped with an emery board to clean it up. Blend the parts together and balance the prop.

I have used 0.085 Pirelli and 3/32 Peck rubber on this model with about equal success. Loops should be 15 to 18 inches in length. Balance after the power loop is installed. Flight adjustments are made by tweaking the movable surfaces a little bit at a time. Go easy on the rudder. The surfaces are set-up to give a couple of degrees resultant downthrust. My biplanes do best flying in as wide right circles, against torque, as the site will allow.

Sources for Peanut Scale materials and inspiration:

1. Indoor Model Supply, Box C, Garberville, CA 95440. Catalog \$1.00. All kinds of indoor supplies and kits.

2. Jim Jones, 366311 Ledgerstone, Mt. Clemens, MI 48043. Balsa and rubber strippers, etc.

3. Micro-X Products, Inc., Box 1063, Lorain, OH 44055. Catalog \$1.50. Indoor supplies, kits, and plans.

4. Oldtimer Models, P.O. Box 913, Westminster, CA 92683. Catalog \$1.00. Rubber model supplies and plans.

5. Peck Polymers, Box 2498-MB, La Mesa, CA 92041. Catalog \$1.00. Rubber model, especially Peanut kits, plans, and supplies. ●

Hannan Continued from page 50

aliphatic resins, cellulose cements, epoxies, contact cements and cyanoacrylates, with various types and brands of each to add to the confusion. And yet, there seems still not to be a truly universal, viceless adhesive. How does this one sound: Fumeless (non-toxic), water thinable (yet waterproof when dry), flexible yet sandable, and receptive to all forms of paint when dry. And oh yes, there is a simple way to dissolve it in case of need. Although not yet ready for marketing, this amazing product is presently undergoing practical tests, and shows signs of being a most versatile addition to the model builder's bag of tricks. Watch for further announcements.

WHAT'S IN A NAME?

According to a story in *TV Guide*, actress Swoosie Kurtz, co-star of the series *Love, Sidney*, was named after her father's WW II Boeing B-17D, "The Swoose", which in turn was named for a half-swan half-goose mythical bird.

PEANUT GRAN PRIX

Deadline for entry in the 3rd Annual World Gran Prix for Peanuts is May 31, 1982. (Too late when you see this.wcn) Whether you plan to attend in person or participate by proxy, the time to prepare is NOW. Actual contest dates are June 18 and 19th. Full details are available by sending a stamped return envelope to: Mike Arak, 10900 SW 61 Ct., Miami, FL 33156.

HINTS FROM FRANK SCOTT'S MODEL LABORATORY

1. It is wasteful to machine wire from bar stock.

2. Always employ the sharp end of the drill on the work. Not only will this reduce breakage, but the work will proceed much more efficiently.

3. The practice of using micrometers for C-clamps should be discouraged.

NEW PRODUCTS DEPARTMENT

Mike Mulligan favored us with a copy of his 1982 *Oldtimer Models* catalogue. Featured are hundreds of plans ranging from Peanuts through twin pushers, and rubber powered flying scale types. Also offered are highly detailed scale drawings by Joe Nieto, as well as other three-views.

Mike also stocks a diverse variety of building supplies, including balsa, hinoki strip wood from Japan, plywood and bamboo. By way of covering material, how about this selection: plastic film, condenser tissue, Japanese tissue, bamboo paper, silkspan, and silk. And for the final finish, high quality nitrate dope is listed.

Flying supplies and accessories include FAI and Pirelli rubber, rubber lube, winders, and much more. Why not drop a couple of unused 20 cent stamps to Mike and obtain a copy? Oldtimer Models, P.O. Box 913, Westminster, CA 92683.

Jack Little has also ventured into the cottage industry, and is marketing reprints of the three-view and engine drawings from the old 1929 *Aircraft Yearbook*. Volume I consists of some 38 three-views; Volume II another 38, while the third volume contains outline drawings for some 31 aircraft engines (and a life raft!). A small sampling of the aircraft depicted includes gems such as the Sport Waco biplane, the Mercury Kitten, the Eaglerock Bullet, the Buhl Airedale, Curtiss Robin, General Aristocrat, Ireland Amphibian, Ryan Brougham, and the Stinson Detroiter.

Among the engines are such well-known examples as the Wright Whirlwind, Pratt & Whitney Wasp and the Curtiss Conqueror, as well as more obscure powerplants like the Hess Warrior, the Bliss Jupiter, and the Packard 24-cylinder "X" engine.

Priced at \$4 per volume, or all three for \$10 plus 10% postage, the cost works out to less than a dime per drawing. Order from: Jack Little, Littlecraft, 1414-B Brewster Ave., Redwood City, CA 94062. Please tell these merchants that *Model Builder* sent you!

PAUL MACCREADY ON THEORY

The SOLAR CHALLENGER sun-powered aircraft was recently displayed in the San Diego Aero-Space Museum, and explained by charming test pilot Janice Brown and designer Paul MacCready. One of the most unusual aspects of the machine is the airfoil configuration, which is flat on top and curved underneath, for both the wing and horizontal tail, to accommodate the 16,128 photovoltaic cells utilized.

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Especially disturbed by this seemingly "inverted" airfoil were the conventional aircraft pilots in the audience, who obviously had difficulty accepting any possible aerodynamic efficiency from such an arrangement. We particularly enjoyed model builder Paul Mac-Cready's succinct answer to their scepticism: "If an airfoil is rounded on the front edge and pointed on the back edge and set at the proper angle, it will generate lift."

TINY R/C UNITS, ANYONE?

Some time ago, we bemoaned the lack of TRULY small R/C guidance units, suitable for steering indoor models of, say, 24 inch span or less. Two interesting letters of response were received, from which we have abstracted the following: "This summer I was seeking answers for which you came up with a question: 'Why not tiny R/C systems?'"

"Starting with a full house, I proceeded working downwards with three and two-channel digitals, followed by proportional pulse systems, and now I even have one of those escapement relics made by Ace in the dark ages of

R/C.

"It seems that miniaturization, without giving up a great deal of perfection, just about reached its limits. Not that it can't be done, but who is going to pay for it?"

"So I decided to give up perfection and made a pulsed actuator, lighter than the smallest (commercially available) servo. Ace's Tom Runge likes what he saw: 'Two bad there isn't a super small market still active . . .'" (which comes first, the product or the market? w.c.h.)

The writer of this letter is Fritz Mueller, a dedicated experimenter who would seem to have several possible solutions to a low-weight relatively simple control system. But the question remains: Is there enough interest in micro-miniature guidance units to justify their manufacturer? (*As outdoor flying sites diminish, the justification increases! wcn*)

Jack P. Swaney, of Las Vegas, has been experimenting with tiny R/C models which utilize existing equipment, and has this to say: "To say that I succumbed to the mystic of the micro R/C model would be an understatement at best. I won't bore you with detail, but see the snapshot of my Sperry biplane, inspired, by, along with at least twenty-five similar types in the intervening years, biplanes, none exceeding 22 inch span, mostly scale or at least 'semi', Cox .020 powered, Ace rudder controlled and mostly sheet or mixed construction. The Sperry has an 18-inch wing span with a 3-3/4 inch chord."

"Models of this type are truly in a class by themselves. They never quite know if they're a free flight or full house R/C. Like a free flight scale ship, they have to have that enlarged stabilizer, while at the same time overcoming the need for excessive dihedral by virtue of their merrily pulsing rudder."

"One problem is engine thrust. The

Sperry bores it's way through the air by the good graces of a Cox front rotary TEE DEE and at least 6° side thrust required, with an equal amount of down. And you'd better keep her throttled back with a rich mixture, for unless the structure is absolutely warp-free, a full bore engine run can result in a pretty wild ride. (Ah, alas, that lifelong quest for the legendary model without a warp!)

"In closing, I'd like to note that I don't bother with a free flighter's test glide. I hand-launch 'em 'cold Turkey' over hard-top, and it usually turns out alright. If a model flies at all, it will generally have some kind of a manageable glide, and besides, who ever heard of 'tall grass' in Nevada?"

SIMPLICITY, MOST RARE IN OUR AGE

The above quote from Ovid, circa 2 B.C., serves as a splendid introduction to this extract from "The Airborne Engineer", B. Winch's column in the Australian model magazine, *Airborne*:

"Modellers love to talk, but when it comes to good ideas, they suddenly clam up. Ask some flier how he was able to get such a great finish on his plane and the laconic reply will be 'Stixon house paint!'. If you can speak 'Modelese' you will translate this to mean, 'I sanded and filled the balsa forty-seven times using talc, dope and thinner, shrunk on one layer of Mongolian sacred rice paper, fifteen coats of primer, sanded well with glycerine and soap, etch primed, florescer undercoat, bleed seal, then nineteen coats (reducing density) of a mixture of two drops of Stixon house paint to four litres of acrylic laquer thinner, plasticisers, butylisers, stabilizers, under-arm deodoriser, and four hundred and twenty-nine grams of pigment made by an Ethiopian celibate monk from powdered, dissicated yak saliva. It was then sprayed with twelve coats of marine copal varnish and two coats of stabilized epoxy resin. If it flies well, I will put it back in the workshop and give it a good paint job."

"I don't believe in spending too much time finishing them off until I know they are going to fly."

Silver 7 Continued from page 23

the rudder knob as some transmitters do.

A comment on cross-trim . . . Traditionally, trim levers are found next to and operating in, the same plane as the stick; the trim lever mechanically rotating the pot body to a different position for small control movements. An adjustment of the trim lever necessitates removing the fingers or hand from the stick, as the same hand must be used to adjust the trim levers. Soon after the introduction of electronic trims, cross-trims came along. This places a trim function on the opposite side of the transmitter from the stick function being trimmed, thus the model can be flown normally with the fingers on the stick, and trim changes made with the other

hand. This is extremely handy when flying a new, badly-out-of-trim airplane, and in competition when minor trim adjustments must be made without deviating from a planned flight path. The uninitiated generally claim cross-trims to be confusing, however, once the initial inertia is overcome, most flyers agree as to their superiority.

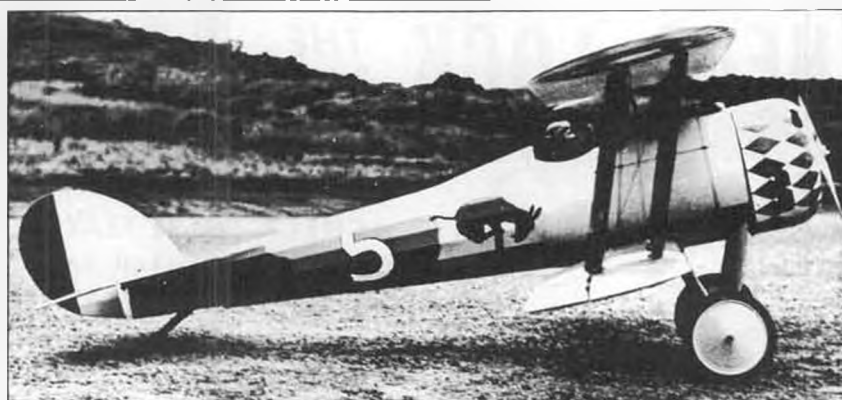
Except for these mechanical differences, all Silver Seven transmitters are electronically alike; they share the same encoder and RF boards. There have not been any real significant changes in R/C transmitter RF sections in quite a while, the legal requirements having remained unchanged in all respects. However, the encoder is completely new, being, as already mentioned, the first commercial design to make use of the Signetics NE-5044 chip. It, and its companion NE-5045 decoder IC have made life considerably easier for R/C designers and manufacturers. They include, in one small neat package, a lot of the required circuitry that previously had to be made up of individual components, or using general purpose IC's that required compromises.

The NE-5044 further simplifies life for the R/C'er who has purchased or is considering the purchase of a kit transmitter such as the Silver Seven. It reduces the component count, thus reducing the possibility of building in a problem because of component misidentification, and it greatly simplifies the adjustment of the encoder, so that you wind up with all servos operating exactly as they should.

We will now discuss the features and options of this most interesting kit. There will not be a part-by-part discussion of the Silver Seven circuitry, or a repeat of the instructions. Both are done in the Ace R/C instructions in such an excellent manner that I don't feel they can be improved upon. Nothing has been left out, and I could not find a single point which I felt required clarification or further explanation. Even at the risk of repeating myself, I'd like to state the instructions leave nothing to be desired. Other than the ability to understand and follow them, all you need to successfully complete a working Silver Seven transmitter is a certain amount of patience.

FEATURES AND OPTIONS: The basic Silver Seven comes to you in a pretty common arrangement; four channels on the two gimbals in the dual stick, or three channels on a 3-axis gimbal, plus lever operated throttle on the single stick; plus one switch operated retract gear channel and two lever operated additional auxiliary channels. The latter two can be fully proportional, or, via built-in detents on the lever assembly, can be operated in increments. For example, you can get "click" stop operation of landing flaps at 1/4, 1/2, 3/4, or full down position.

The flight control channels feature switch-operated servo reversing, and independent control of servo throw.



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The throttle channel can also be switch reversed, and also features both centering and throw adjustments, making it possible to easily and accurately adjust the servo throw for optimum throttle operation at both ends.

The retract channel is adjustable both in travel and centering; it is possible to adjust the servo movement exactly as required for optimum operation of servo operated retracts, or perfect triggering of amplifier controlled electronics.

Switchable dual rates on aileron, rudder, and elevator are standard features. The exact percentage of control surface movement at low rate can be individually preset for each control.

Another interesting and very important feature is the programmability of servo trim excursion; a little or a lot, depending on your likes and needs. For example, you might like a lot of trim capability when test hopping a new one that might just require a lot of adjustment initially. However, once it is mechanically trimmed out, the amount of trim available from the transmitter can be reduced, making the machine effectively less sensitive to trim in the air.

Important also is the standard battery condition meter, an expanded scale voltmeter that serves not only as an "ON" indicator, but which actually gives you a true reading of the state of charge of the internal Ni-Cd battery, and which will tell you when you are getting close to the critical point just before it rolls over and dies.

Everything up to now has been standard features of the Silver Seven, included in your initial purchase. Now we will go into the options, available as additions. Most of us will appreciate the fact that these are not included in the basic kit, and thus not in the price. Since we don't all need elevon mixers, it seems



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only right that we shouldn't have to pay for them!

EXPONENTIAL RATE: Those desiring exponential control of the three basic flight controls have only to unplug the dual rate module on the encoder board, plug in an exponential module, and they are in business. There is something of a controversy existing between the exponents of dual rate vs exponential, as to which has more merit. I will only say that you should consider both possibilities, fly them both if possible, and decide which best suits your requirements.

For the uninitiated, a short review. Dual rate, on the primary flight controls, provides a switchable reduction of control surface movement in relation to stick movement, i.e., say half of the normal elevator movement (adjustable in the Silver Seven) on "low" rate. Effectively, this gives you a vernier effect at the stick end, more movement of the stick is required for a given aircraft response, resulting in less over controlling and a general smoothing out of maneuvers once you have mastered

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the system. The disadvantage can come when one forgets and keeps the system in low rate, then attempts a maneuver during which full control movement is required.

Exponential rate control permits non-linear servo travel in relation to the stick; there is less servo travel around center, giving the system a softer feel, and some of the same effect available from dual rate in "low" position, but only around stick center. The ratio of stick to servo movement increases as the stick is moved further off center, until at the end of the stick movement it is back to 1:1... full control movement is always available. The Silver Seven provides you with varying degrees of non-linearity

around center, one should experiment and match the available curves to his needs.

Exponential on the Silver Seven is available on the three primary flight controls, and can be controlled through the dual rate switches if desired, or it can be wired so as to always be in operation.

As mentioned, this is a plug-in, that replaces another plug-in, which sounds like it might be a limiting factor, but is really indicative of the type of thinking that has gone into the Silver Seven. None of the plug-ins are of the type which you need more than one in at the same time; i.e., you would not want both dual and exponential rates at the same time. There are also some dual function boards available, to be described later, for those extra special applications.

ELECTRONIC MIXER: Gone is the need for sliding servo trays and those mechanical monstrosities that easily wind up losing precision between the stick and control surface. The magic of electronics puts it all in the transmitter, where it belongs.

The Silver Seven plug-in mixer module can be configured in either of two ways, which Ace R/C refers to as "Uni-Directional" and "Bi-Directional". Uni-directional mixing is where one channel, which we will call "B", is mixed together with another one, which we will call "A", and yet allows "A" to remain independent. An example is where aileron control would also affect rudder for coordinated turns, yet rudder can be operated independently for ground handling, etc. Flaps/elevators, and throttle/tail rotor pitch in a helicopter are other examples in which this type of mixing might be used to an advantage.

Bi-directional mixing is when both "B" is mixed into "A", and "A" is mixed back into "B", giving mutual interaction of both controls. This application is common on V-tail gliders, or elevons on a delta. Other uses are limited only to your imagination, remembering that any changes required are made all at the transmitter, eliminating cumbersome space consuming and weight adding devices on board the model.

PROGRAMMABLE PUSH BUTTONS:

This is the feature that started it all, the pro's and con's of push button radios; push a button and your airplane does a perfect slow roll, spin, snap, etc. Well, it is not quite that easy, the airplane still has to be capable, and you still have to trim it, and to enter the maneuver at the right altitude and speed. What you are gaining is consistency.

The Silver Seven push buttons are available in two configurations (all those decisions!), one that will affect just one channel, and the other which will affect two channels, each of which can be independently programmed.

Additionally, each of these configurations can be wired in one of two ways, as best suited for the particular maneuver. In one mode, the button completely overrides the stick, so that its position will not affect the programming. The other way, the programming can be modified by moving the stick.

As mentioned, these buttons are not the complete answer to ten-point maneuvers, there is a lot to do and learn before they can be used to their best advantage, but once the initial requirements are met, the button makes it easier for the competition flyer to obtain the necessary maneuver repeatability.

EXPONENTIAL RATE/MIXER: This one is a combination of two of the options previously discussed, obviously exponential and control mixing. It too is a plug-in, designed for those specific applications during which mixing is desirable, without the loss of the extra smoothness obtained with exponential. However, due to the limitations of the integrated circuit used, and the space available on the board, only two channels can be equipped with exponential; whichever two you require. Again, this sounds somewhat limiting, until you stop and think about the actual applications you might put something like this to; it will do everything you could possibly ask from it in the air.

HOLLEY MIXER, as used by Dwight Holley on his "Gobbler" to capture the World Soaring Championship in 1981, it provides coupled ailerons and rudder, plus differential ailerons, with end point adjustments. Another version, slightly less in cost, has the same features minus the end point adjustments. This one too, while it has seen it's greatest competition success in a sailplane, has all kinds of possibilities, limited only by your application and knowledge of your bird and its capabilities.

So, if you have ever felt that the transmitter designers were not coming through with exactly what you need, if you are interested in saving a few dollars, or if you simply like to build things, the Silver Seven transmitter is for you. Prices start at \$159.95, the options run from \$9 to \$18. For those who may wish to start even farther back, or to modernize an older transmitter, there is an Experimeter's Special Kit, 11G247, at only \$125, which includes an unpunched case, batteries, electronics,

and those super Ace R/C instructions; everything except the control mechanisms.

The way it has been progressing, the chances are that there will be another option or two available by the time you read this; find out about it, and complete system details from Ace R/C Inc., Box 511, Higginsville, MO 64037. ●

Am Heli Continued from page 27

American should receive complements for their progressive work in this area. After working with them I've concluded that I like the way they work. They are strong, easy to work with, and they aren't too hard (brittle) or too soft (flexible). They look nice without paint but they won't chafe as aluminum does.

American R/C has designed recesses in the main frames for the screw heads and nuts, too. This makes assembly very easy because you don't have to use a wrench on every nut. Just pop the nut in the recess and tighten the screw.

The landing gear bows are also made of this nylon reinforced plastic. The bows fit into slots on the bottom of the main frames, and the landing skids snap into the ends of the bows. This is much cleaner than clamping the skids to the ends of the bows. The bows are not arched very much, so the helicopter CG stays close to the ground. This is exactly what a beginner needs. (It doesn't hurt the experts either . . .) Add a couple of wooden dowel rods with whiffle balls for extra lateral support, and that takes care of the training gear.

MAIN ROTOR SHAFT

The main rotor shaft is 5/16 inch in diameter, and is supported by upper and lower ball bearings. The shaft is hollow in the center for the collective pitch wire, which exits the shaft just above the swash plate. If you crash and bend the main shaft, you have to loosen the top of the side frames to make room to pull out the tail rotor drive pulley. This loosens up the tail boom so you have to be careful not to twist the belt the wrong way. Then you must loosen and remove the collective pitch wire, after which you can pull the shaft. Moral: Don't bend the main shaft.

TAIL ROTOR DRIVE SYSTEM

The tail rotor drive system uses a stretchable green drive belt. This is the same system that was employed on the Heli-Baby years ago. It is fairly simple in design, but it is not as drag free as the gear-driven tail rotor systems. The belt drive system has never really been a favorite of mine. I also asked John why he chose this method of tail rotor drive, and he said that for the beginner there are fewer parts to replace, no gears to strip, and in general it is simpler and cheaper to operate than the gear drive system.

I can't argue with these points; they are invalid. I guess that I'm spoiled with gear drive systems, and the SuperMantis has great potential . . . It is worthy of the



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gear drive system. In fact, John commented that American has tried the SuperMantis with gear drive, and if demand warranted, it would be made available as an optional extra.

The only real problem I see with the current belt system is the front pulley. This piece can cause more problems than it solves. To start with, it is not very round, and the flanges on both sides of it are relatively small. If the tail boom is not set just right, the belt loves to climb up on these flanges and derail itself. If these flanges were made larger and with some bevel, they would serve as a guide for the belt to the pulley, instead of providing a means for the belt to jump up on the pulley. Aside from my personal bias, if you are careful to line up the tail boom 90 degrees to the main shaft the belt tail rotor drive system will be quite trouble free for you. About the only maintenance you'll have to do is periodically check the belt tension to make sure the belt is not slipping. If it gets loose, you must loosen the four tail boom attachment screws, and pull the tail boom out a little farther to retension the belt.

TAIL ROTOR, MAIN ROTOR HEAD

The tail rotor unit as a whole is strong and absolutely trouble free. The tail rotor shaft is supported by two ball bearings which sandwich the rear aluminum pulley. The bearings are a push fit into the moulded plastic tail rotor "belt box", and are retained by an overlapping screw and washer.

The tail rotor pitch change system utilizes a 90 degree bellcrank with the pitch change wire running through the tail rotor shaft. The tail rotor sensitivity can be easily adjusted to your taste, anywhere from soft to erratic.

The flat bottom tail rotor blades are manufactured from moulded plastic. I was pleased when I weighed them on my Ohaus balance, because they were

within 1/20 of a gram of each other. I trimmed a little flashing from one and they weighed the same. The tail rotor blade holders are sloppy, just like all the rest of the commercially available holders, but they are cleanly moulded and very strong.

The fin assembly is cut from 1/8 inch plywood, and extends down far enough that a tail boom skid is not really needed. It is held to the tail rotor "belt box" by a single 4-40 screw and washer.


The main rotor head is similar to the design and operation of the Heli-Boy head. It is a Bell-Hiller system with mixers on the pitch arms. The blade axle holders, as well as the hub block, are moulded out of grey plastic. Early pieces were moulded from black plastic and the quality was rather poor. American sent me the grey replacements soon after I received my kit. If you have a SuperMantis with black plastic, obtain the new grey pieces.

The head does incorporate adjustable pins. This means that you can adjust the lag time from control input to fuselage action. With the damper in the outer positions, the head will be extremely slow on response and very weak on power. With the pins in the inner positions the control will be quicker and more powerful. For beginners and intermediate pilots, I suggest that you set the pins at the inner position and use relatively little control throw. This will give you a responsive helicopter but not overly powerful action. As you advance in skills, gradually increase swashplate throw for more powerful control. My personal opinion about setting the damper pins in the outer locations is that the control is so delayed and sloppy that it will hinder you more than it will help you. Set the pins in the inner position but keep the control throw down.

I was not impressed with the head's

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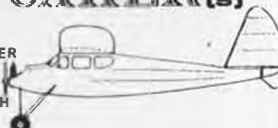


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side frames or the length of the damper pins. The frames are made of very soft metal, and they are slightly bent as I received them in the kit: probably from the stamping process. After you put the side frames together the damper pins do not quite reach across between the side frames. If you tighten the damper pins without adding some thin brass washers, you can pull the side frames out of whack. Check this on your ship before you tighten down the damper pin screws.

The main rotor blades are fully symmetrical, totally hardwood pieces, no balsa trailing edge as is customary. The overall airfoil section and aspect ratio is excellent; refer to the October '81 **Model Builder** for further details on blades. Black Fas-Cal is provided for covering after Hot-Stuffing the roots for strength.

Next month I'll detail the radio installation, set-up, and flying, plus a few other tips, and my overall evaluation critique. See you then. •

Whitehead . . . Continued from page 58

length the wing poles overlap the root triangle (cemented area) is painted silver to simulate metal tubing strengtheners around the poles. A metal pin or bolt passed through the tubing, the pole and

the root triangle on the full size #21 to allow the wings to fold back against the fuselage of the craft. The stabilizer also folded back.

The wings are covered on the bottom side only with white Japanese tissue.

The stabilizer is designed to be slightly wider than on the full size version. The reason for this is to allow a straight thrust line on each rubber motor from the prop shaft at the front to the rear hook at the tip of the rear lateral cross-brace on the stab. This rear hook on each side of the stab is bent from .035 music wire.

The stab also uses the tapered pole construction and is built over the plan, using x-pinning so as not to pierce the balsa poles. The three lateral cross-braces are 1/8 x 3/16 balsa. These are cemented on top of the poles. The stab is covered on the bottom only. The vertical fin follows the same type of construction and cements on top of the two rear stab cross braces.

After the fuselage is sanded and covered with tissue, the 1/16 sq. pre-colored spray rail is cemented along the length, near the top.

The tissue is removed on the top where the pilot and engine are to be located. Likewise on the bottom where the four Hungerford wire wheels set up into the fuselage. The wheel axle supports are cut from 3/32 sheet balsa, then sanded and doped brown after the

straight pin axles are inserted (with points trimmed off flush to the supports). The front wheels are 1-1/2 inch diameter, while the rear set are 1-3/8 inch.

Next the propeller mount supports are fashioned of 1/8 sq. medium hard balsa, colored and assembled on the fuselage sides and top. Note that the mounts are tilted up at an angle when viewed from the front.

The vertical mast is basswood, measuring 1/8 x 1/4 at the base and tapering to 1/16 x 1/8 at the top. The corners are sanded round and the mast is painted brown. Small gussets are added to the back edge of the 5th bulkhead, where the mast is cemented in place. A yoke is bent from .025 wire (with an 1/8 inch loop at each end) and glued around the mast 1 inch from the top.

The horizontal front bracing post is also basswood, but tapers from 1/8 sq. at the fuselage end to 3/32 round at the front end. This also has a wire yoke (with loops) located 1-1/4 inches back from the front end. The wire loops are on the top and bottom. This post sets at a slight angle when viewed from the side.

The stab and vertical fin are now cemented onto the fuselage. The rear of the stab is elevated a 1/2 inch, and two diagonal 1/16 round bamboo braces are cemented from the bottom rear of the fuselage to the stab cross brace just under the rear motor hooks.

The propeller blades are 1/16 medium balsa sheet taped around a can and baked in the oven to achieve a slight undercambered airfoil. The blades are cemented to the notched 3/16 x 1/4 x 2 inch prop hub. A hole is drilled in the hub center to accommodate the 1/32 music wire shaft. Note: the prop to the right of the pilot is a conventional righthand prop. The other is a lefthand prop. Bend the hooks on each prop shaft as shown on the plan. After the hook is formed, the prop shaft should measure 3-3/4 inches long.

Place 1/32 I.D. aluminum tubing over the shaftwire fore and aft of the props (as a spacer and strengthener). A larger diameter length (1/16 i.d.) of tubing is placed over the shaft connected by the two rear shaft supports at the back of the prop shaft. This tubing does not turn with the props. A short length of .020 wire must be soldered to the prop shaft just ahead of the prop, then bent to a right angle, embedded in the prop hub and cemented. This assures the props turning as the shaft turns.

A small glass bead is placed over the shaftwire just ahead of the front propeller mount support on each side. A small brass washer is then soldered on to the shaft just ahead of the bead. The two propeller assemblies are now complete and ready for spin testing. Push the model back and forth to make sure the propellers are both spinning equally free, and of course, in opposite directions.

Fashion the dummy steam engine from a balsa block and aluminum tub-

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ing. A 1/2 inch double pulley wheel is cemented to the front of the engine. Carpet thread pulleys connect this wheel to similar pulley wheels on each prop shaft. These wheels are only scale detail and do not turn.

The wings are now ready to be mated to the fuselage. A 1/8 x 1/16 basswood wing support is cemented to the top of the fuselage just ahead of the vertical mast. The wing root triangles cement to the underside of this support and to the side of the top longerons. Add 2-1/4 inches dihedral under each wing tip.

Another wire bridle with loops is cemented at the bottom of the fuselage (behind bulkhead #5) and gusseted with 1/8 sheet.

Now the model is ready to be braced with thread. The type I used is Gudebrop's Black grade C finishing thread (from fly-tying shop). Begin by threading a thin beading needle with about 12 feet of thread. Loop one end of the thread through the right side of the top bridle and tie a square knot in this end. Pierce the *leading edge pole* with the needle and thread at a point 5-1/4 inches in from the tip. Carefully push the needle exactly through the middle of the wood and draw all the thread through until it is taut. Run the thread through the bridle loop at the bottom of the fuselage and pull taut. Run the needle up and through the next pole and pull the thread through and taut. Then loop through the bridle at the top of the mast. Then down through the next pole, and so on.

String the thread on one side, top and bottom, with the one length of thread. Tie that off at the bridle loop and begin on the other side of the wing with a new length of thread. When both are complete, check the wings for evenness and glue the thread to wood over and under each pole. Do not brace the two poles nearest the fuselage. The stab is not braced with wire.

Run the thread from the bracing point on the leading edge pole to the bridle loop at the front of the horizontal bracing post, then across to the same point on the leading edge of the other wing. The last length of thread starts at the center of the vertical post and connects to the front boom and then down to the bottom front of the fuselage. At this point, the thread is sewn through the wood of the fuselage and tied in a square knot. The contact points are cemented here, also.

The standing figure of Gustave Whitehead was added after the model was first flown, but I believe it adds great realism to this craft. The figure was carved from one block of beadboard foam using new sharp razor blades and my Uber Skiver hobby knife. The arms are carved from smaller blocks and epoxied on later. Black finishing sandpaper was used to smooth the surface before painting with opaque pan water colors. The figure is 7-1/4 inches to the top of the head, with the arms extending over the head. The feet are cemented to the 1/16 sheet

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balsa seat bottom with 5 minute epoxy. The hands are glued to the vertical mast bridle in like manner.

FLYING THE WHITEHEAD. Test glide the #21 model only with the rubber motors on the airplane! It will be very noseheavy without the motors. It was necessary to add some clay to the front boom on my model. Note the winding and launching procedure covered earlier in this article. Good luck building and flying your Whitehead #21. I hope it flies well and lasts for a long time. ●

Scale Continued from page 34

SOMETHING BLUE

A couple of months ago, I mentioned a problem with static electricity and gap filling instant glue. Fine threads were pulled off from the main body of glue and deposited across the canopy. A letter from Bob Hunter of Satellite City offered help with this problem.

Dear Bob:

Thanks for the mention of "Hot Stuff" and "gap filling variety" (@Super T) as per your closing mention in column above. Here's a tip that will solve two problems at the same time, and still allow the fast bond, high strength you expect from Hot Stuff and Super T.

When you are ready to install canopies or windscreens, place a few drops of "3-in One" oil or light sewing machine/gun oil on some cotton or a cloth and wipe the inside of the plastic. Use a bit of alcohol on a cloth and wipe the edges to be bonded. Install the canopy or windscreen in the normal instant Hot Stuff way. Not only will there be no possibility of static but the sometimes whitish curing fumes that show up on the plastic will not occur. In addition, should one have a model with the whitish cure fumes on the plastic, these marks come off immediately and permanently when wiped with a drop of light oil.

Bill and I enjoy your articles, Bob. Best regards, Bob Hunter.

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Also enclosed from Satellite City was a flyer telling about available VHS cassettes which deal with construction

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sessions, building tips, and demonstrations. They can be reserved for 60 days to be used by clubs, shops, etc. Information can be obtained from Satellite City, Box 836, Simi, CA 93062. A \$30 refundable deposit is required.

SOMETHING NEW

The mail brought an ad for a new electric servo listed as a "Jackscrew Linear Operating Electric Servo." Those of you who have been around for a few years will recall the Wing Manufacturing servo from the early retract days. This new unit from Janaco, 2316 Brown Bark Drive in Beavercreek, Ohio, 45431, per-

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forms the same type of operation as the jackscrew unit in the Wing. It is 4-1/4 inches long, height 1 inch, and width 2 inches. Weight is 4 ounces. The jackscrew travel is a maximum of 1-3/4 inches, and will deliver 7 lbs. of thrust when operated at 9 volts. There are many types of applications possible for this unit, with the obvious being retract use. In addition, it would work well for Fowler flaps, canopy, bomb drops, smoke valves, camera cocking, etc. I have not actually seen the unit other than the pictures in the ad.

It struck my fancy as I need some type of unit like this for my precision project. Perhaps at a later date I can give you

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more info. The price is listed at \$79.95 per unit.

From Fliteglas, you may want to check out some very nice torque rod aileron or flap setups. The shafts make a very rigid means of transmitting the servo movement to the surface. They come with machined blocks that clamp around the shaft. There are very long threaded rods and attachment pieces to accommodate the servo pushrods. There are two long bearing surfaces to mount in the wing for each shaft.

Ralph White, Mr. Fliteglas, also intends to provide the Liquid Mask material in several different size containers. If you have never used this product, check into it. One use that works very well is to cover a canopy or windshield during painting and later construction stages. The liquid can be dabbed on with a piece of cotton after outlining an area around the canopy with masking tape. When the mask is dry, cut around the canopy edge with a sharp knife and pull off the tape and excess edge of the mask. Just leave the liquid mask on until the model is complete. You will protect the canopy from glue, nicks, etc. It can then just be peeled off. It is absolutely inert and will not harm the plastic even over long periods of time.

A MOUNTING PROBLEM

Scale models have the nasty habit of running out of space every now and then. Little things like cockpits, etc., get in the way. Hiding servos and battery packs become a problem. Very often the need to hide an air operated valve for retracts can not easily be overcome. One method I've used that eliminates the need for permanent mounts and allows nooks and crannies to be employed is as follows: Using the smallest servo available in a side mount servo tray (aileron variety), I mount it on a piece of light plywood with the valve right next to the servo. The whole unit is very compact, no more than 1 x 1-1/2 x 3 inches. I have then placed it in many different locations. This includes taping it with masking tape to the receiver foam pad, wrapped separately and placed in the fuselage cavity behind the wing, etc. Because the valve and servo are

mounted together, there is no need for them to be securely attached to the model's airframe. Now, figure out where to put the tank! When you find the place, it's simple to attach as well. Just put a little dab of silicone rubber adhesive on each end and stick it down. It will come up easily later when you want to remove it, and the rubber makes a nice shock absorbing arrangement.

AMA-FAI RULES AND ALL THAT

For a number of years I have heard people state that upgrading of rules is necessary. The biggest complaint seems to be that Europe and the FAI in general maintain excessively low weight and engine limits considering the present state of the art. The interesting thing is that when you suggest that proposals to be taken to Paris in December need to be put in writing and agreed to here in the U.S., the response usually is that maybe someone else will do that!

In an effort to get off dead center, I have submitted to NASA members the following items for consideration for presentation to the FAI Scale Subcommittee:

1. Increase single engine size from 10 cc. to 15 cc. (.90 cu. in.).
2. Increase multi-engine size from 15 cc. for twins to 20 cc. (1.20 cu. in.) total regardless of number.
3. Increase total weight (dry) from 6 kg. (13.2 lbs.) to 7 kg. (15.4 lbs.) for single engines and 8 kg. (17.6 lbs.) for multi's.
4. Eliminate wing loading requirements.
5. Eliminate present flight bonus for certain aircraft types and mechanical considerations.

The rationale for most of these is obvious to us here in the U.S. Some critics of the present FAI rules set-up may suggest that these proposals are not yet generous enough. I feel, however, that very large jumps will never be bought and smaller pieces swallow much easier. The last two items concerning wing loading and bonuses would be the most controversial. In respect to wing loading, I personally feel that the rule becomes self-governing. That is to say if a modeler gets carried away and comes up with an excessive wing loading, the model either self destructs before it gets to the competition or it is so marginal from a performance standpoint, that it is not competitive. Some persons have suggested that such a rule limiting the loading to 100 grams/square decimeter (32 oz./sq. ft.) was for safety purposes. I find such a concern highly suspect when at the World Championship competitions, we have been required to fly over areas peopled by spectators, tents, cars, etc. In England in 1978, the flight path was altered to require that we fly directly over the spectator area with the landing approach directly over the PA announcer's truck.

In respect to the bonus percentages for such things as multi-engines, retracts, etc., so far it has not produced the desired results of creating more complicated aircraft. At least in part, this is due

to the low weight allowances. It is difficult to develop a multi that will fall within 6 kg. and be of any useful size. Perhaps if the weight and engine allowances are made more generous, you will see improvement in offerings.

A last thought concerns the combination of the scale classes. Personally, I don't care for it. I have found, however, that no matter what the rules are, I can live with them. If a person likes to compete and enjoys the camaraderie and thrill of it all as I do, then the rules are just incidental things that govern what I'm going to do. I guess my need to submit these proposals stems from the griping I hear from others who feel so strongly about them. For the life of me I don't know why the people who are the most displeased couldn't take the time to write out suggested changes, but they don't. So-o-o! (A pat on the back to you, my boy! Them's my sentiments too. wcn)

I would like to hear from you concerning the above suggestions. In addition, as a member of the AMA, I am submitting the following rules proposal for the next go 'round: In Sport Scale, eliminate the 30 foot circle and replace it with two lines, 15 feet apart. The judges will be placed behind one line and the model behind the other so that no part intrudes into the 15 ft. "no man's land". Either the modeler or an appointed steward will move the model to positions for viewing. The rationale for this proposal is that no matter what size model is being judged, 1/2A or Giant, the same distance between the judges and model is maintained. While it is true that some details on a giant may make them somewhat easier to see, there will not be the great advantage presently involved.

In addition, I am suggesting to NASA that it recommend to AMA that the 1983 team selections for FAI World Championships be held at the Nats and that these two events, Stand Off and Precision, utilize the FAI rules applicable at that time. Since Stand Off will be an official event at that point, I feel that it is imperative that it be offered along with the F4C (which has replaced our old AMA scale event). We then can be certain that the models meet the necessary criteria for competition and that the modelers are versed in the competitive rules. The segregating of the models within the competition will require no additional personnel and little or no additional time. The only thing needed will be some different forms.

'Enuf' soap box for now! One to one, Bob.

Counter Continued from page 9

separately. Send a SASE to: Astro Flight, Inc., 13311 Beach Ave., Venice, CA 90291, for information on the Astro Flight Systems.

Nick Zirol Models has released the first in a series of Giant Scale Kits, the first being the famous AT-6 Texan in 1/5

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scale. The compete kit contains a glass fuselage with 1/2 inch plywood firewall installed, glass cowl, die cut balsa ribs, hand cut plywood parts, canopy, spars, sheet balsa covering, formed 1/4 inch diameter wire landing gear, hardware, and full size plans. Wing span is 101 inches, and the overall length is 70 inches. The kit price is \$275 plus \$10 for shipping in the U.S., any excess will be refunded. Full size plans showing a built-up fuselage are available for \$27 postpaid in the U.S. New York residents add 7 1/4% tax. Send SASE for the complete list of kits, plans, and accessories to: Nick Zirol Models, 29 Edgar Dr., Smithtown, NY 11787.

Dynamic Model Products has ready for immediately delivery, its 'Reverse Coupling Assembly,' long awaited by R/C Scale Model Boaters. Adaptable to all engines with a 1/4-28 thread, each assembly is complete with fly wheel grooved for a starting belt, extra long mounting plates, and a flexible coupling.

The Reverse Coupling Assembly provides for forward, reverse, and neutral. Forward direction is via direct transmission through the centrifugal clutch. Reverse is obtained by the reduction of RPM to unload the clutch and actuating the reverse gear band. A built-in safety through the clutch prevents overspeed in the reverse position. Price of the complete unit is \$149.95. For Dynamics new 56-page catalog (sent via first class mail) describing over 250 large scale fittings, hulls, and accessories, send \$3, refundable with your first order, to: Dynamic Model Products, Inc., Drawer "C" Port Jefferson Station, NY 11776.

Flite-Rite Models, a new company devoted to quality rubber powered models, hand launched gliders and in the future, one-inch scale rubber powered models, has introduced its first kit, the CR-1 'Fun Bird 30,' a P-30 class model, retailing for \$13.95. The kit features, as an example, wing ribs fine line printed on 'C' grain balsa, nice plastic prop, all hardware, rubber, plus beautiful plans, tissue, and other materials to complete the model. Dealer and

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Lehmberg Enterprises is introducing the 'Feather Merchant' Old-Timer kit in three different sizes, each available as a partial or a full kit. The partial kits contain very detailed plans, plus ribs and wing/empennage tips, while the full kit contains, in addition to the above, all strip wood, sheet wood, wire and plywood to complete the model. No cement, covering materials or wheels are supplied. Since the wing ribs and tips are already cut out, the few remaining parts are enjoyable to lay out and cut. Wing spans range from 46 inches for the

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class A/B version to 80 inches for the R/C assist model. Prices range from \$11.95 for the 46 inch partial kit to \$36.95 for the 80 inch full kit. For more information, send a SASE to: Lehmberg Enterprises, 2646 Bolker Dr. Port Hueneme, CA 93041. California modelers add 6% sales tax.

The latest issue of "The Model Builders Wishbook," from Sig is hot off the presses. Containing hundreds of items, from pins to 'Sig' balsa, to kits and most any other modeling item you can name, Sig has it in stock. Send \$2 for catalog #44 to: Sig Manufacturing Co., Montezuma, IA 50171.

The Pierce Aero Company proudly announces two new sailplane kits to be available by June 1, 1982. The "PARAMOUNT," with a 13 foot span, 1,700 square inches of wing area, and holder of the AMA free distance record of 66 miles, features main panel flaps, precision cut parts (no die-cutting), 1/8 aircraft plywood in forward fuselage structure, canopy, and full sized rolled plans. Having a wide speed range, the PARAMOUNT is suitable for sport, open class contests and cross-country flying. The very complete kit retails for \$199.95.

The GEMINI MTS (multi-task sailplane) kit also features precision cut parts, canopy, complete hardware and rolled plans. Strong enough for zoom launch on a 12-volt winch, the GEMINI has flown a F3B speed run of 10.4 seconds while carrying 3-1/2 pounds of ballast! This very complete kit, with a span of 100 inches and a MB 253515 wing section, retails for \$99.95. California modelers add 6% tax, as usual . . . Send a SASE for a brochure on these two kits to: The Pierce Aero Co., 9626 Jellico Ave., Northridge, CA 91325.

For the Canard/Pusher design advocate, O.V. Engineering has developed the "CP-1 Maverick!" This design features spoilers for roll control rather than ailerons to minimize adverse yaw due to aileron 'down' drag. The pusher engine configuration eliminates propeller disturbance over the airfoils and places the engine "down hill" from the fuel supply in high 'G' maneuvers. Full size plans for the Maverick, including templates, are shipped rolled in mailing tubes. Plans are \$25 for the set, California residents add 6% sales tax. O.V. Engineering, P.O. Box 427, Palmdale, CA 93550.

Now available from Leisure Electronics is its new LT50 Modular Electric Motor. Available in several 'winds,' the pattern wind will swing a 6/4 prop at 13,000 for 8 to 10 minutes, while the competition wind will swing the 6/4 at 13,300 for 5 to 7 minutes. Suitable for R/C sailplanes, pattern and pylon aircraft, boats, buggys and cars, the LT50 features a heavy duty machined magnet housing, machined alloy end and brush caps, precision brush tubes and shunted brushes. Maintenance, as well as adjustable brush timing, is easily performed. For more information on this and other fine Leisure products, send a SASE to: Leisure Electronics, 11 Deerspring, Irvine, CA 92714.

TEJA Engineering Co. has announced that it will be importing the British made 'R.V.E.' 10cc (.60 cu. in.) 4 stroke. A unique Disc Rotary Valve with all moving parts enclosed are featured. Recommended prop sizes are 12 x 6 and 14 x 4 and it's designed to run on low nitro fuel. All-up weight is 25 ounces, engines are to be available after the 15th of May, 1982, prices to be announced. Send a SASE to TEJA Engineering Co., 16201 Brimhall Rd., Bakersfield, CA 93309. for

more information on the 'R.V.E. 4 stroke.'

Workbench. . . . Continued from page 6

however, the news was very positive.

It seems that a cemetery near the town of Fairfield, California, was invaded by an estimated 180,000 starlings. Roosting in trees averaging 50 feet in height, they inflicted obvious damage on everything below them, dumping an estimated 5,000 pounds of droppings on grave sites and nearby patios and swimming pools.

After local and state agencies failed to get rid of the birds, the Vaca Valley Radio Controllers of Fairfield offered their services. They flew their R/C aircraft at dusk, low and near the trees, interfering with the roosting habits of the starlings, and for once, the neighbors didn't complain! Local newspapers pointed out that the R/C models were the single most effective weapon used to drive the birds away. Five or six aircraft were lost in the battle, but against 180,000 birds, that's pretty good odds. Members of the VVRC whose names appeared in the newspapers as heroes of the battle included Lowell Gamble (who sent us the information), club president Rick Keefer, Howard Deal, Phil Clay, and Earl Rummell. The experience was even newsworthy enough to make national television! Congratulations to the VVRC club for a well-done public relations job. (Bet it was kinda fun, too!)

STRUCK'S CABIN

Thanks to Art Phillips, Bloomingdale, New Jersey, who wrote in to verify my suspicion that an earlier version of Hank Struck's "Contest Winner", featured as the Old Timer of the Month in the May issue, had been published. It appeared in the July 1936 issue of *Model Aircraft Builder*, and was headlined as a "Contest Cabin Model", though 'Cabin' seemed to be a misnomer.

Incidentally, Hank has shown us photos of a never-published Wakefield ship that was built along the same lines. When you come up with a good design, stick with it!

VIDEO ADVERTISING

Two manufacturers in our hobby have put together VHS tapes about their products and are circulating them to model clubs all over the country. It's a great idea for displaying products practically first hand, and it also provides clubs with much needed special entertainment that brings members to the meetings.

Gorham Model Products and Satellite City both have excellent tape shows that are available free, requiring only a deposit that is refunded upon return of the tape. Gorham's, quite obviously, shows model helicopters in flight, as well as an excellent presentation of the manufacturing and kitting facilities at the GMP factory. In the Satellite City tape, Bill and Bob Hunter take you into their workshop and actually go through the construction of a model, using Hot Stuff regular and Super-T. Also included

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WANTED: Unbuilt kits by Carter Craft, of Norfolk, Virginia, produced during 1950's. Need Sopwith Camel, SE-5, and Fokker Triplane. Also want Monogram "Speedee Bilt" Spad. James Labriola, 1430B Beech Dr., Grand Forks AFB, ND 58205.

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THINGS TO DO

This announcement is made at the request of Tom Hutchinson, who was unable to submit his regular *Free Flight* column this month due to illness. It's the East Coast Free Flight Championships, June 25 and 26, in Galeville, New York.

By the way . . . There is a *Free Flight* column this month, of sorts, even though Tom wasn't able to get one to us. That's one column that will **not** disappear from the pages of **Model Builder**.

The IFMAR (International Federation of Model Auto Racing) Electric Car World Championships will take place August 13 through 21, 1982. Site is the parking lot of the Grand Hotel directly across the street (Harbor Boulevard) from Disneyland, in Anaheim, California. The hotel will be used as race headquarters and the banquet will be held in the starlight room, on top of the Grand.

Main sponsor of the event is Sanyo, who is donating over \$10,000. Sanyo is the leading manufacturer of Sub-C batteries used in race cars which are dominating most every major race in the U.S.

Kraft Systems has joined the list of major sponsors. Kraft has donated a substantial sum to a local high school band which is on a fund raising campaign to buy new uniforms. In return, band members will act as official corner marshalls for the entire event. They will practice their duties at local races for two months prior to the championships.

According to Bob Rule, PR Chairman for the IFMAR Internats, there will be two events run at this first ever Electric Car Championships. . . Stock and Modified. Only 120 drivers will be invited to

this World Class race: Europe has 40 spots; the Pacific Block, which includes Japan, has 40 spots; and the U.S., Canadian, Mexican, and South American block has the remaining 40 spots.

This is the first Electric Car World Championships for 1/12 scale, and will begin an every-other-year schedule, alternating with 1/8 gas cars . . . 1/12 on the even years, 1/8 on the odd years. Race locations will alternate among the three blocks.

For further information, contact Bob Rule, at 420 Hosea Rd., Lawrenceville, GA 30245-4695, (404) 963-0252, or Internats Chairman, Mike Reedy, 1661 East McFadden, Apt. #63, Tustin, CA 92680.

The annual QSAA (Quarter Scale Association of America) "Fly-In", number six by count, is scheduled to take place in Las Vegas on October 28 through 31. The flying site has been moved back to the El Dorado Dry Lake Bed, winter overnight camping is permitted, though no electric or water hook-ups are available. Headquarters will be the Showboat Hotel, located on Boulder Highway. For detailed information, send a long, stamped, self-addressed envelope to: Pat Bunker, Q.S.A.A. Sec., 6532 Bourbon Way, Las Vegas, NV 89107; (702) 870-6076.

MOTOR vs ENGINE

When is an engine not an engine? When it's a motor? Well, who knows, and old man Webster is no help. "Motor: a small compact engine." OK, but how small does an engine have to be to become a motor? Steve Allen would say, "When it's smaller than a bread-box."

Aha . . . Webster also says a rotating machine that transforms electrical energy into mechanical energy is a motor. Indeed . . . Did you ever hear anyone say "Electric Engine"? Yes, Junior, I know your model railroad has an electric powered steam engine. . .

Good Lord, Park Abbott, Santa Rosa, California, why did you have to write in about John Pond's use of "engine" and "motor" in one sentence, even if it was with tongue in cheek? As proof reader of all the material that goes into **MB**, it's my final responsibility as to what shows up on the printed page. Used individually, I prefer "engine" with reference to an "infernal" combustion machine, and "motor" when it comes to an electric machine. However, you say ". . . any real old-timer worth his salt knows that these are engines." For your information, Bill Brown, builder of the Brown Jr., called his company Brown Junior Motors, and he was and still is worth his salt.

To sum it all up, it appears that our glow and ignition engines can rightly be called motors or engines, depending on the situation. In Pond's case, he had to say one or the other four times in one sentence, and believe he justifiably chose to switch back and forth to avoid monotony.

As for me, I'm going to wind up the rubber engine in my R.O.G. and fly it around the office! ●

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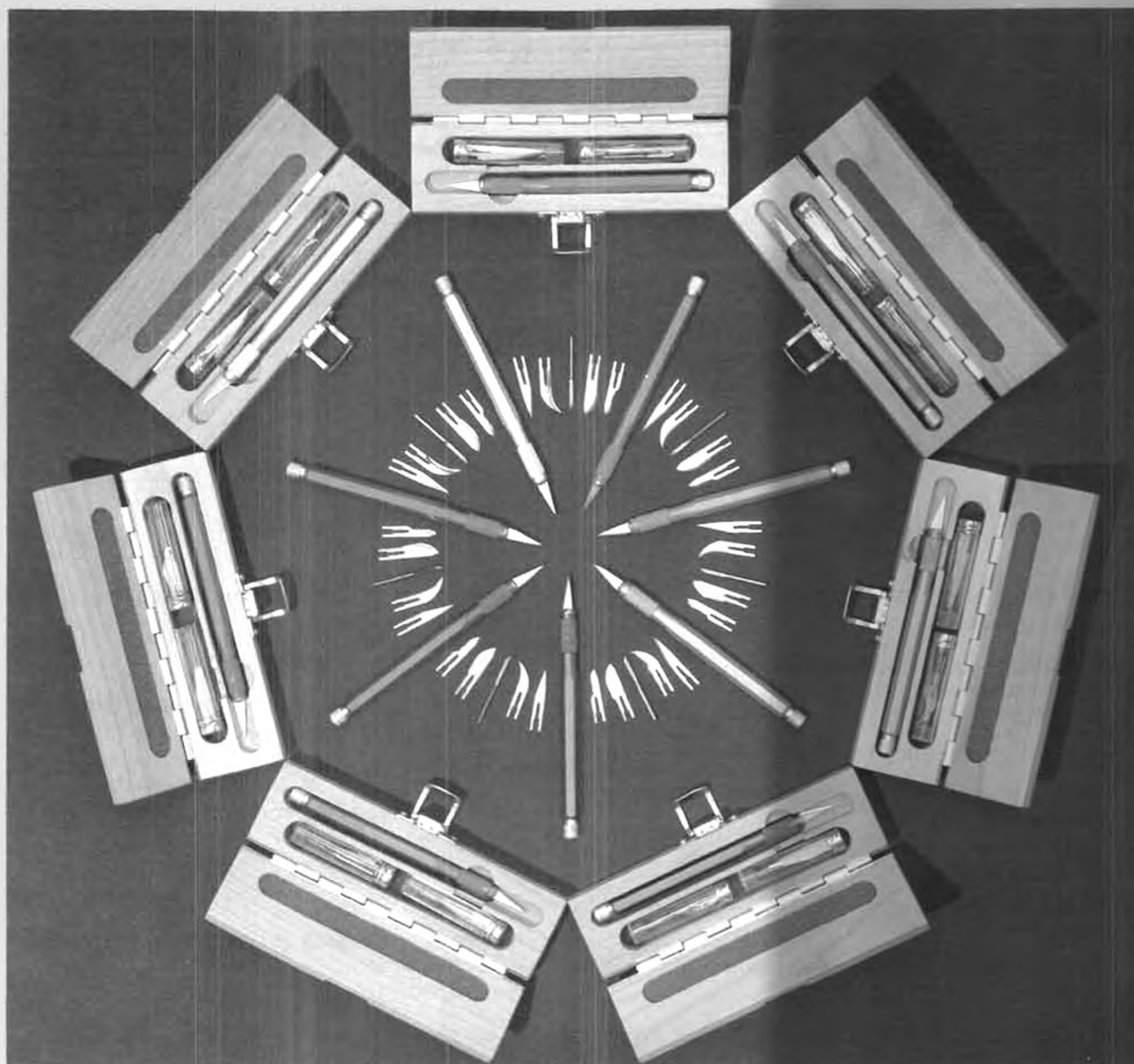
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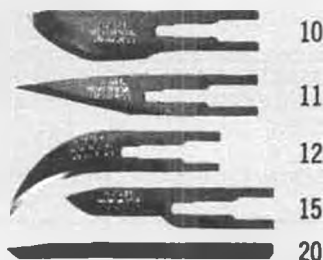
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15
20

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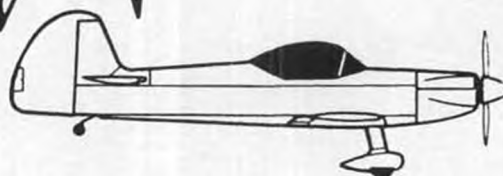


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U.S. Scale Masters



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**Powered by the Patented
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SPECIFICATIONS:
Wing Span 45"
Wing Area 762 sq. in.
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Length 68"
Ready-to-fly weight 9 1/2 lbs.
(with retracts 10 1/2 lbs.)
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Kit includes extensive decal
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Send \$2.00 for complete
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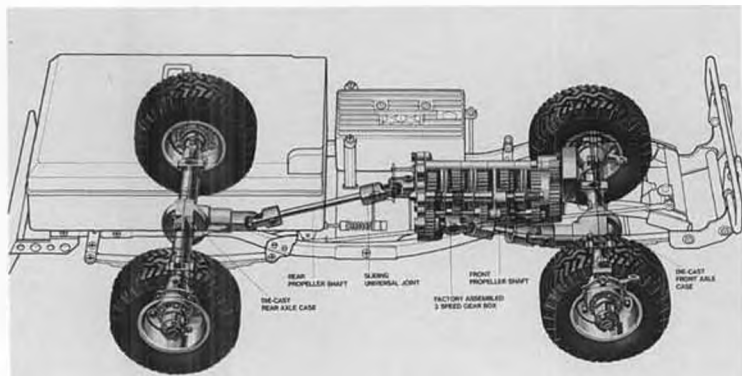
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