

Three powerful reasons to get your hands on a NEW MRC -Webra Schneurie

From The Maker Of Champions . . . until now MRC-Webra Schneurle power was synonymous with the world and national champion Speed .61. Now we've harnessed this winning horsepower and reliability for three new Schneurle ported, high performance engines. A mammoth .90R/C, a sporty .20 and a sprightly .109. Each with a powerful reason to be.

> Control For The Big Jobs... this .90 (1037R/C) is a behemoth that develops tremendous torque at low engine speeds ... just right for that giant scale bird or big bipe you won't trust to any other power source. Reaching 2.5hp and 13,000rpm it'll take heavy payloads off in a burst of power, allowing you to adjust the fuel mixture by remote control. Marine version available.

Send \$1.00 for MRC Model Aircraft Products catalog.

made in Averila

A New Leader ... this .109 (1008R/C) Schneurle was developed to meet the grass roots clamor we've heard for a new racing class ... somewhere between ½ A and ¼ Midget. Developing .38hp and 19,000rpm this rear exhaust beauty will be the leader in this up and coming category. A Power Plus Silencer

is available to let you milk it for even more rpm — .53hp and 22,000rpm. And the marine version has built-in gear reduction system to put out the useable torque the model boater needs.

Webra's Done It Again ... as you might expect when MRC-Webra makes a .20 Schneurle it's going to be the last word in reliable power. And that's just what this 1019R/C is. Designed with two Schneurle ports and a cross flow port, it supplies the top end power you want for your low wing craft. In addition there's a

1019RCA for competition race cars, complete with cooling clamp head and cooling fins that start at the base and continue up the cylinder head to keep the heat off. Marine version available.

See the trio at your hobby dealer. He'll give you all the reasons to get your hands on these new MRC-Webra Schneurles.

MODEL RECTIFIER CORPORATION / 2500 WOODBRIDGE AVE. / EDISON, N.J. 08817

INTRODUCING

PROTO OF ACTUAL MODEL BUILT FROM KIT Kit N 14, Wing span 45" Wing area 410 sq. in. Engine size .35 Flying wt. 2.2% ibs.

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Your first step to precision aerobatic U-Control flying

Patterned after Top Flite's original NOBLER, the winningest U-Control in history, Top Flite's all new TUTOR is the perfect beginning stunt flyer or the ideal practice ship for full stunt competition. TUTOR continues Top Flite's long tradition of outstanding kit design with many important features.

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Other features of this latest in stunt design are full size plans, precision die cutting, hardware, formed wire landing and tail gear, tank mountings, nylon bellcrank, and adjustable lead-out guide. TUTOR ... one more reason Top Flite continues to be the choice of champions.



Top Flite Models, Inc. 1901 N. Narragansett Avenue Chicago, Illinois 60639

IN THE BEST CIRCLES, **IT'S über skiver**



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See your dealer, or order direct. Dealer inquiries are invited. All direct orders sent postpaid in U.S. California residents add 6% sales tax.



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621 West Nineteenth St., Costa Mesa, California 92627

Newcomer?

If you are new to Radio Control, visit a nearby hobby shop. They can direct you to local R/C clubs and flying fields where you will find friendly people who will be glad to help you in beginning the sport.

Ask them what equipment they use; most fly with Kraft. Write for our free 1978 catalog describing our R/C. systems, and get started!



DUMAS, The Model Boat People Keep an era alive with the New DAUNTLESS COMMUTER

Dumas' new $\frac{3}{2} = 1$ ' scale model of the Sparkmen and Steven's designed 66' commuter boat "Dauntless", is the newest addition to the growing selection of Dumas scale boats.

Commuters were used by their owners as everyday transportation to and from work and for pleasure trips to favorite spots. Capable of speeds in excess of 50 knots, these speedsters of the lakes, rivers and bays are rapidly becoming part of a lost era.

The Dauntless, kit #1211, is constructed from rugged plywood for virtually any gas or electric powered motor 4.2%" long, 14" wide, and complete with deck hardware, the Dauntless will will be an exciting addition to your scale fleet of boats.

See your local hobby dealer to find out more about the New Dauntless kit and the hardware you'll need; whether electric or gas. While you're there, ask about our other popular scale kits.

When you say model boats you're saying Dumas.



COAST GUARD LIFEBOAT S-200 33" kit for exacting modeling includes deck hardware. Balsa construction ... display it, run free, or R/C with Dumas electric power. One of the most popular scale models ever kitted. Kit 1203. Use Running Hardware Kit 2311.





PT 109. 33" Long, 9" Beam

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February 1972

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free flight.

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Indoor Ornithopter.

Calif. Coaster R/C

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by Le Gray.

June 1972

scale racer.



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R/C, by Editor.

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> R/C scale. Travelair 2000 2" scale

Chester Jeep 3-views.

April 1973

JUNE



volume 8, number 77

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COVER: One of the most soul-stirring aircraft of all times, the P-38, since its introduction, has given the "designer's itch" to many a modeler . . . sometimes with success, and sometimes not. In our opinion, Col. Art Johnson, USAF (Ret.), has done the best job of reproducing the sight, the sound, and the flight characteristics of this great World War II fighter. His construction article begins on page 18. Kodachrome transparency by Art Johnson.





Stealing a rare moment, MB's editor checks the fit of his 77 Special ignition engine in the nose of the PB-2 he has been building since last fall. Ah, for the good old days . . .

from Bill Northrop's workbench...

• There has been talk from many sources, including some with fairly high office in AMA, that the Nationals may very soon become a thing of the past. If you have been in modeling for many years and/or have attended the last 10 or more of the Nationals, particularly in an official capacity, such a conjecture should not be too surprising.

The most obvious shortcoming of the Nationals is that it has never really been a "National Championships". There are two reasons. First, the Nats is a "come one, come all" situation. Everyone is welcome to compete; from the raw beginner, right on up to the "pro-experts". In just about any other sport, a national championship is the culmination of many elimination contests; city, county, state, regional, and finally the big one. In modeling, the dud and the pro enter the same arena. If this was allowed to happen in golf, for instance, and assuming TV might still be interested, you could be watching Nicklaus and Weiskoff teamed up with a couple of 26 handicap hackers, and you'd be looking forward to the commercials!

The second reason the AMA Nats is not really a national championships, is partly related to the first. To take nothing away from the ability of the trophy winners in most of the events, you'll find that many of these winners come from within a 300 mile radius of the Nats site. The exception to this is the contestant who is able to travel whatever distance is required in order to attend, as exemplified by the R/C competitors in recent years. Aside from its lack of credibility as a "National Championships", the AMA Nats is suffering from other problems. Again relating to the "everybody's welcome" situation, you have the fact that in recent years, there are more bucks being spent on leisure activities, which include travel and hobbies. Thus, there are many more modelers, in general, and a higher percentage of them who can afford the time and expense to enter the Nats . . . after all, you don't need the skill; just the time, the bucks, and the urge.

The growth of interest in the hobby has also brought about another phenomenon ... it's called "Let's have a new event, and let's add it to the Nationals". Last year, there were 64 events at the Nats, and many of these were broken down into the stilted age classes ("To Hell with skill," or "Keep that kid with the Juniors, I don't want him beating me") and that's just the official events, to say nothing of many special and unofficial contests before, during, and after the regular Nats schedules. Just for comparison, the increase of official events from the 1950 Nats to the 1978 Nats goes like this: Free Flight, from 16 to 27; Control Line from 9 to 25; and R/C, from 1 to 12.

In order to handle all of the events at the Riverside Nats, it was necessary to operate four different sites. Three of them operated simultaneously all week, and we believe Dirty Dan casually mentioned there should have been one more! As a consequence, many contestants saw nothing of the Nats except the action at their own event. And you'd be surprised how many modelers would like to spectate at events in which they are not competing. In spite of the concern of many that the special interest individual championships are pulling modelers away from the parent organization, the split is happening right at the Nats!

So what now? Do we change the Nats to a real championships, and have state and/or regional eliminations, or qualify contestants as is (was) done for the R/C Masters Tournament? Do we pull a complete switch, and have an AMA Convention, with board meetings, seminars, movies, trade show, and demonstrations by leading modelers in the various categories?

One thing we don't do is drop the whole thing and try to go off on our own special interest hooks. Like it or not, the nation's modelers must have a single organization ... to represent us in the FAI; to keep us on good terms with the FAA, whose members could unwittingly regulate us into oblivion; and to provide us with a common ground of relationship no matter where we travel and/or set up housekeepers.

Think on these things, and communicate...

THINGS TO DO

The 4th Annual International Miniature Aerobatic Club (IMAC) Championships are scheduled for June 17 and 18, 1978, at Sig Field, Montezuma, Iowa.

Four events are scheduled: Sportsman Class Biplane, Advanced

Continued on page 144



• Described as "The Aileron Trainer With A Difference", the "Kavalier", from Sig Manufacturing Co., soon to be available, should do much to help the budding pilot through those most important first training flights. This Claude McCullough design uses .20 to .40 engines, spans 56 inches, and will be priced at a modest \$39.95.

The built-up balsa wing has builtin washout, precisely incorporated during the building process, which is done as usual on a flat surface. The resulting elimination of tip stalls result in no tendencies to stall or snap even during those sloweddown landing approaches. This reserve stability is claimed to not reduce maneuverability, making the "Kavalier" an excellent stunter and sport flier.

It uses a tricycle gear for best ground handling, and features full size plans and an illustrated instruction booklet. Included in this kit are die-cut balsa and plywood parts, molded cowling, and formed landing gear.

Do not order just yet, but keep an eye on the Sig ads, and your dealer's shelves, the "Kavalier" is promised to be available in the very near future. From Sig Manufacturing Co., Inc., Montezuma, IA 50171.

Midwest Products Co. has released yet another in its series of 1/2A Goodyear Racing Planes, a Miss San Berdoo, or more correctly,



The aileron trainer with a difference, the "Kavalier", from Sig Manufacturing Co.

Miss San Bernardino. This Russ Sandusky and Jerry Kasmer design can be built to compete in AMA Scale Racer Class I.

The deluxe kit includes die-cut and machine cut Micro-Cut Balsa parts, bellcranks, lead-out wire, wheels, engine mounting screws with T-nuts, formed aluminum gear, and decals. You will need only an engine and paint. Ask for Kit No. 255, \$7.95 at your local dealer. Midwest Products Co., 400 S. Indiana St., Hobart, IN 46342.

Dumas Products, the "Model Boat People", has recently introduced some new products of interest to boaters, both power and sail types. For the former, there is a new, wider, pickle-fork version of the famous "Hot Shot". This version,



Schluter "Heli-Boy" features no-belt starting.



Schluter "Heli-Boy" is a fully aerobatic helicopter.



"Miss San Bernardino" is a new half-A Goodyear racer by Midwest Products Co.



Higley Glue-or-Screw balancing weights.



Higley Half-A Heavy Hub.



Higley Safety-Spinner Hub.



Dumas "Hot Shot" fiberglass outboard.



Dumas "Drag'n Fly" outboard.



Dumas Huson 36 fiberglass R/C sailboat.

also designed for the K&B 3.5 cc outboard, has a length of 21 inches and a beam of 14 inches. It is built of easy-to-handle fiberglass, and production testing has demonstrated great speed and handling characteristics. It is priced at \$67.95. The Dumas "Drag'n Fly", one of the old standbys of R/C boat racing, has been reborn. This model, originally developed from a full size, very successful outboard hydro, has been further developed into a 20 hydro for the 3.5 cc outboard, now known as the Drag'n Fly 20 Mark II. The kit is of plywood construction and comes with complete instructions for pickle-forking the bow. It measures 28 by 14 inches, and is priced at \$39.95.

For the sailboater, there is a new Dumas Huson 36 in fiberglass. It has a length of 36 inches, beam of 10, and is built for the AMYA 36/600 class rules. The kit contains a white hull and deck to be joined by the modeler, and a keel, keel weight, rudder, hatch, wood for the mast, boom and jib club, dacron sails and hardware. The Huson 36 is a realistic model of a typical 28-34 foot full size cruising sailboat, and requires any two-channel R/C system and Dumas Sail Control Unit #3701 (not included) for operation.

For the Star 45 AMYA class, the Dumas fiberglass Star 45 was intro-



Dumas Competition Deep Vee 21.



Dumas Star 45 in fiberglass.

duced in January. It combines the ease of fiberglass construction with the proven sailing performance of its wooden predecessor, which is still available.

This is an excellent R/C sailboat for the beginner, which can also be



R/C Glass offers Excalibur II, Jerry Dunlap's championship outboard.



A 1/12 scale electric R/C Porsche is new from Peerless Corporation.





The "Californian" is a high performance sailplane from Astro Flight.

Master Kit introduces "Peppermint Pattie" for .15 engines.



"Totz-All", a field box kit, or completed, by Master Kit.

very competitive for the serious racer. The kit includes a fiberglass deck and hull, wood for the mast, boom and jib club, rudder, keel, keel weight, hatch, dacron sails, and complete fittings for the standing and running rigging. The critical dimensions are 45 by 11-1/2 inches, with a mast height of 66. It can be controlled with any two-channel radio, a Dumas #3701 sail control unit (not included), and a 6-volt battery. It is priced at \$180, and should be at hobby dealers in May. Dumas has electric drive kits for boats from 12 to 22 inches. Electric Drive Kit #2330 is for 12 to 16 inchers, and contains a 3-volt motor, coupling, shaft, shaft tube, prop, rudder, and sells for \$4.50. It is suitable for boats such as the Dumas 12 inch Harbor Patrol Boat, Cabin Cruiser, and Speedboat kits at \$3.85 each.

Drive Kit #2331 is for 16 to 22 inch models, such as the Dumas 18 inch Cabin Cruiser, Deep Vee 10, and Ske Vee 10. This kit sells for \$10.95 and contains a 4.8-volt motor and the items as listed for #2330, plus a rudder arm. A 4.8 or 6-volt battery (not furnished), is required.

For your .60 powered speedster; there is a new bronze propeller designated as "P-102". It is 2-1/8 inches in diameter and drilled for 3/16 inch shafts. This makes a total of five bronze props available from Dumas, for boats from .049 to .60 power. These, as well as the other Dumas props in white metal, right and left-hand rotation props for electric twins, and a line of plastic props for electrics, are all available through hobby shops. Prices range from 55¢ to \$8.25.

All from Dumas Products Inc., 909 E. 17th St., Tucson, AZ 85719. Tell them you read about it in **MB**.



Fourmost Racing Products has a .40 size Airflo Engine Mount.

The Dumas Competition Deep Vee 21 has been especially designed and developed for the increasingly popular .21 class racing. Created from the successful Deep Vee 40, the new 21 has reduced freeboard,



Quality hardware for .40 and .60 size R/C racing boats, from Metal Concepts, Inc.



Hot Hed is a unique temperature indicator, from Idea Development, Inc.





Bolink's 1/12 electric R/C car.

A '32 Ford Tudor electric R/C car from Bolink Industries.



Robart's Mk 11 Model Incidence Meter has features for more precise readings.

yet maintains a scale appearance. The length is 30, beam is 11, which gives ample room for radio, tanks, and tuned pipe, while still resembling the current full size offshore racers.

The Competition Deep Vee 21 is equally at home on rough water and mirror-like surfaces, with no significant changes in speed. It is available as a plywood construction kit, at \$42.95, as requested by many racing drivers. The Dumas 20 CF, in fiberglass will still be in production.

The long awaited Dieter Schluter

"Heli-Boy" has landed! Preceded by a reputation already established in Europe, this new whirlybird should prove equally popular in this country.

It is designed for .60 power; at a flying weight of 8-1/2 pounds. It features no-belt starting, shaft drive rear rotor, collective pitch, and automatic tail rotor compensation. It is claimed to be fully aerobatic, being able to fly loops, rolls, split-S's, and Cuban-8's; yet has the necessary stability for all hovering maneuvers.

The complete Heli-Boy kit is



Testor's new .049 powered tethered cars.



Evode Sanding Squares have long life.

priced at \$339.95; a Bell 222 fuselage kit is available at \$89.95. Spares are low in price and readily available. It is important and distributed on the East Coast by Miniature Aircraft Supply, Inc., 2563 Diversified Way, Orlando, FL 32804; on the West Coast by Gorham Associates, P.O. Box 1347, Thousand Oaks, CA 91360, and in mid-US by S.C. Modeler, 1999 Larkin Ave., Elgin, IL 60120.

These suppliers are also distributing a new starter adapter especially designed for Heli-Boy type engine installations, though it should prove useful also for use on fixed-wing aircraft and possibly outboard boat engines, and even belt driven installations. The adapter will fit the popular and powerful Sullivan Starter, which is shown in the photos without the original casing and with a different switch. Obviously, other starters with the same diameter shaft can be fitted with this new adapter.

All other Schluter products will be available from these same suppliers; we will bring you news and photos as soon as we receive them. In the meantime, information can be obtained from the addresses above.

How does a \$3 insurance policy to protect your engine against overheat damage sound? If Lloyds of London has already turned you

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"Uncontest" at Mile Square Park, Fountain Valley, California, Feb. 26, 1978. The "old" is an "Albatross D-1", from a Proctor Antic Bipe kit, by Rich Westlake. The "new" is a Mirage V in Israeli camouflage colors, built by Lee Horn from a Jet Hangar Hobbies kit. Photo by Dick Tichenor.

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Most of the 102 scale models that were brought to the Southern California Scale Squadron's "Uncontest", lined up for photos at Mile Square Park, Fountain Valley, California. All scale photos on these pages are by Dick Tichenor.



By BILL NORTHROP & DICK TICHENOR

SCALE SQUADRON "UNCONTEST" The Southern California Scale Squadron came up with a goodie! It was called an "Uncontest". What is an Uncontest? Well, let's see, it wasn't exactly a fly-in, it wasn't a demonstration, or a display, and it was more than a show-and-tell.

It was a turnout of R/C Scale enthusiasts, who brought 102 R/C scale models to Mile Square Park. The theme was to enjoy a sort-of-ascale-contest without the contest pressures. Those who wanted to fly



An interesting mixture of scale subjects, with Bob Olson's Stuka in the foreground.



A gaggle of T-6/SNJ's, with their builders standing by. Most are Bridi kits.

merely picked up the frequency clothespin from the transmitter impound and did their thing, when and how they desired. Throughout the afternoon there were from six to eight models in the air at all times. No prescribed maneuvers, no judges, no points...just FUN! Four T-6's making low passes in formation was exciting.

Four ducted fan models had their share of air time; Larry Wolfe flies his Mirage III as often as he would fly an Ugly Stik, and does a lot of nifty maneuvers with it. Allan Arnold thrilled the spectators with his highspeed, fan powered A4-D built from a Violett kit.

There was no way to keep up with the bunches of P-51's and Corsairs. Bert Baker's P-39, Harry Apoian's banner-towing Waco powered glider, Bob Olson's Stuka, George Killeen's T-6, Col. Bob Thacker's Hughes Racer, and several others seemed to be boring holes in the sky every time you looked up.

About a dozen partially completed models were brought out. These proved very interesting, especially such projects as Bill Bell's Wescraft B-17. Ingenuity is unbounded among these scale modelers, and a preview of an idea in progress is always nice.

We magazine-type people try to keep informed of the latest modeling trends, and when we attend any activity, we automatically analyze what is happening. When it comes to scale, we run into a 1 to 1 situation (like Bob Underwood says), whereas the choice of subject, the fascination of an aviation era, size of a model, and the amount of detail involvement, are all very personal





George Killeen's T-6 at lift-off. Antenna goes slack in the air, from wind pressure on the post.

matters. At this "Uncontest", all the parameters listed above were represented to the extremities of each. Our photos provide only a small representation of the wide variety of model types. Our analysis: each scale enthusiast will do his own thing, and ain't that neat!

So, what is the point of this writeup? Very little effort was required to conduct this event, there was an excellent turnout, and everyone enjoyed a day of R/C Scale. The approach of no judging, no pattern, no scoring, no trophies, no entry fees, the bare minimum of safety

regulations, and no pressure, met with most favorable acceptance. It may be the change of pace that your club needs . . . spread the word and try it! The Scale Squadron plans to do it again soon. (Since it was an "Uncontest", how come nobody served 7-Up? wcn)

K&B 6.5 power.

LEGG LAKE POWERBOAT RACES

Between errands on a mid-March Saturday afternoon, we were able to squeeze in a short visit to Legg Lake, near Whittier Narrows, in Southern California, to take a look at the R/C Powerboat Races.

scheduled points races for the local boat drivers, and we were again impressed with the smooth operation and efficiency in conducting the races. Airplane enthusiasts could learn a lot by visiting a boat race; the boat people have really got it together.

This is not a race report, only a few comments following that brief visit. Our first surprise, when entering the pit area, was a greeting from Al and Terry Prather. Al was tinkering with a K&B 6.5 powered Deep Vee. Al is the driver and Terry calls for him. How about that? After all their



World War I and II, the Classic Era, and a modern jet, all represented in scale.

This was one of the regularly



An EAA member really checking out that Spitfire. The Don Quixote, with EAA on the fin, was built by Mardel Tubbs, from MB plans, as featured in the Dec. '76 issue.



An A4D by Allan Arnold, from a Violett kit, with Scozzi fan and



John Brodbeck and Bill Bennett examine some of the models on display on the lower level, while Walt Schroder listens.



Despite the appearance, Bob Vojslavek is the major domo of Rev Model Products, not Cyt-4. Note "Turkey" decal. Why, Bob?

successful years, with Al calling for Terry in Formula 1, they are now switching positions.

The next surprise was seeing John Perry, producer of the famous carburetors and pumps. John had his fleet of boats ready and is making the racing circuit. Talk about seeing your products in use, John is right in there with them.

Another friend who is racing with his products is John Brodbeck, president of K&B Mfg. John has become very competitive, and so has the K&B equipment. Charlie Pottol, having retired (again) since selling Marine Specialties to K&B, was working as hard as ever to keep his boats out front.

If you have the opportunity to attend a powerboat race, by all means do it! It is always refreshing to see things properly handled, workmanship standards among the boaters are extremely high. High performance equipment is always interesting, and the boat folks display an amazing amount of ingenuity in doing things to make their boats go faster. Most of all, there seems to be a happy atmosphere, where nice people are working together to enjoy a competitive sport. Hearts and flowers —

Motherhood is good, Sin is bad!



George Bussman's Gipsy Moth was 1st in Post WW-I Non-Military category. No indication it was built from our plans, but same size.



Hiperbiper Frank Massa has two new ones coming; the Stinger Bipe for .40's and the 15 powered "Peppermint Pattie".

WRAM SHOW

While Dick Tichenor was visting the slightly warmer modeling sites of Southern California, **MB's** editor packed his "long johns", zipped in the raincoat liner, and headed for White Plains, New York, and the 10th Annual Westchester Radio Aeromodelers' Trade Show.

Considering the kind of winter we've been having this winter all over the country, and especially in the Northeast, one has to assume that Frank Devore and his fellow WRAM henchman had some kind of connection with the Great Weathermaker, as the February 25-26 weekend was cold, but also clear and



Maurice Toltsis and "Hank" Hankinson (standing) explain the high points of Sonic-Tronics' line of accessories.



Betty Boyle discusses Sterling products with a spectator, while Mrs. Ed Manulkin listens in.



Bill Haga (left) and Bob Elliott, of EK-Logictrol. Bob is active flier.



Hazel Sigafoose, girl pilot, and E. Paul Johnsonin the busy-as-usual Sig booth.



Some of the old timers on display at the WRAM Show in New York. Would you believe a Cleveland Stinson Gull-Wing in transparent orange Monokote? All N.Y. photos by Bill Northrop.

beautiful. And being the first decent weekend after months of blizzards, blackouts, fuel shortages, etc., the spectators came out of the woodwork and literally deluged the Westchester County Center. In fact, we'd venture to say the WRAM really need a larger facility to handle the situation. Wall-to-wall people are great for the box office, but really tough on both the exhibitors and the modeler-type spectators who would really like a chance to get together. Of course, we sympathize with the WRAMs on this problem. It's not easy, and sometimes impossible, to locate an exhibition hall that is available at the time and in the location you desire, to put on a trade show of this magnitude.

Many of the "old gang" were there, including Cannon, World Engines, Cass, Top Flite, Coverite, Sullivan, Cox, Sterling, Sig, Craft-Air, Jetco, Dumas, Ek, Kraft, Fox, Royal, Polk's, Gee Bee, Pro Line, MRC, the Midwests, Hobbypoxy, House of Balsa, etc., as well as many fairly new and brand new exhibitors. We can't describe all of the new products, or variations on existing ones, but will mention a few that



Ron Murray, in tie, in the Royal Products booth. P-38 kit is only one available.



Tony Wilford demonstrates the Hydrlock conversion for air retracts, by Idea Development.

stuck in our mind.

Idea Development, P.O. Box 7399, Newark, Delaware 19711, is certainly living up to its company name. Following its first product, the Formicator (Stop that giggling out there! What are you thinking!?), Idea has added Kant-Stik mold release; Hot-Hed, a visual Heat Emergency Detector for engines or whatever; Stik-it, a fuel-proof, reusable adhesive substance; and what we would consider the best so far, Hydralocks, units which convert air driven retracts to hydraulic, improving reliability and adding



Frank Desimone, with some of the ARF (Almost Ready to Float?) boats by Futuraglass, Nashua, New Hampshire.



Dick Sarpolus is right on top of the new AMA rule allowing .40 powered pattern twins, with his Magnum Twin. Placed 3rd in class.



Allan Arnold's A4D on takeoff, just as rotation is beginning. Note that the nose wheel has lifted off.



Ray Baker's Nosen Cessna 310 weighs 30 pounds (!), but flies very realistically on two K&B .61's.



Don Lien's T-6 grabbing altitude after takeoff.

strength to air driven systems.

Master Kit, 6 Fox Rd., Plainville, Connecticut 06062, producer of the popular Hiperbipe kit, has added the .40 powered, fully aerobatic Stinger II Bipe, and the "Peppermint Pattie", a .15 powered sport/ pattern mid-wing.

Aeromobis Design, Box 325, New York, NY 10009 offers a FomeCor® and balsa frame constructed Club Competitor low-wing, trike-geared ship for .29 to .40 engines.



Granger Williams' Gee Bee Z and Curtiss F6C-4 immediately behind Bob Wisniewski's Super Stearman. The Gee Bee flies well, but has ground trouble, especially on smooth surfaces.

Champion Model Aeroplane Co., Inc. P.O. Box 45, Keyport, New Jersey 07735 has a 72 inch Sport Scale model of the Anderson Amphibious Kingfisher. The landing gear retracts for water use.

For those wanting to give a shot at R/C power boating, Futuraglass Design, One Cannon Drive, Nashua, New Hampshire 03104, may be the answer. This company offers a variety of hydros, deep-vees, and outboard tunnels that are almost



Frank Comyns' three biplanes in the foreground. The P-39 belongs to Bert Baker, Scale Squadron Commander. Bipe to far left is a Pitcairn Mailwing.

ready to run, with glass hulls assembled.

Delp's Hobby Products, P.O. Box 82, Perkasie, Pennsylvania 18944, had interesting stainless rolled steel clamps, for holding structures together while gluing. Another interesting clamp was a miniature, springtype hose clamp, for fuel and retract air tubing.

Reading Hobby Supply, Church Lane Rd., RD 3, Box 583AB, Reading, Pennsylvania 19606, is exclusive U.S. supplier of the YS .60SR, from Japan. Designed and manufactured by Shoji Yamada, the YS features integral pump and carburetor system, bolt-on muffler, and Schneurle porting.

Rev Model Products, 430 Kay St., Unit D, Addison, Illinois 60101 (If you've flown control line at the Nats, you know Bob Vojslavek, even if you can't pronounce his name), was showing a Quarter Midget "Ballerina" racer, featuring a lightweight fiberglass fuselage, foam wing cores, separate right cheek cowl, clear butyrate canopy, etc.

We helped judge the model display competition, and as usual, it was a tough job sorting out the first three places in each category. In addition to all the excellent models, it was difficult not to be prejudiced in favor of models built from our and/or MB plans, and prejudiced against models of Precision Scale quality that were entered in the



K&B's John Brodbeck catches up on housekeeping, while Al Prather (right) and Bill Wisniewski decide what he should do next.



You can bet these boats won't have fuel problems . . they belong to John "Carburetor" Perry (left). Art Hammond hides behind cup.



Charlie Pottol literally keeps a hand in the power boat racing hobby.

Sport Scale competition.

To end this brief report on what we think is a funny note... Being an exhibitor at a model trade show can put you in touch with some strange characters. Don Patton had left the booth to get us something to eat, and upon returning, put a large cinnamon-sugar doughnut on a piece of wax paper, in front of us, on our display table. He then took up his position in the booth and had the following conversation with a spectator.

Spectator: "What's that?"



Terry and Al Prather, of Form I and QM Pylon racing fame, have gotten into the boat racing act, only now, Al's doing the piloting!



The old master gets better and faster . . Jim Whitlatch attending to details.

Patton: "It's a modeling knife, an Uber Skiver.

Uber Skiver." Spectator: "What's it for?" Patton: "To cut out balsa parts for models, cutting sticks to length, trimming tissue . . . things like that." Spectator, pointing to the table: "How much is the doughnut?"

End of conversation!



MODEL BUILDER



Gary DeLara holding his "C" Mono, "B" Mono in foreground. **Real beauties!!**



Mrs. Frank (Joyce) Hu, with hubby's winning "A" Mono. Picture doesn't do justice to the finish.



The GREAT P-38

By COL. ART JOHNSON ... The P-38 is a legend in itself, and the author's accurately outlined R/C Sport Scale model of this great fighting machine is just as exciting ... to see and to hear. Why not pilot your own?

• The most beautiful airplane ever built? I thought so when I first saw the sun reflecting from the twin booms of a P-38 high over Southern California. It was early 1941, and Lockheed had not yet started painting the big twin fighter in the dull olive drab common to Air Force planes through most of World War II. First sight of the most different airplane I had ever seen, left me with a hankering to fly it that never stopped. I thought I would get my chance later in the Air Force, but it was not to be. Although I spent thirty years flying almost all of the other Air Force fighters, I never did get up in Lockheed's famous twin.

As the World War II fighters went out in favor of jets, it hit me that if I was ever going to fly a P-38, I would have to build my own. I had been a model builder before flying for the Air Force, and I don't think this activity ever really took second place. However, as you might guess, the idea for the P-38 model was around for a long time before anything happened. A P-38 was just not a project you jumped into back in the reed days. Later, when the right radios came along, there just weren't many designs or kits.

Even today, to my knowledge, there is only one RC kit for a P-38 on the market (Royal). I have seen several models from this kit fly, and some fly very well. However, it also seems that when this size model is equipped with retracts and all scale details, it becomes a real bomb. A full blown P-38 model with the wing area of the kit size has the same scale speed relation to a P-38, as a Formula I model has to a Goodyear racer. And single engine operation with a heavy model of this type is something you would rather not think about.

The problem begins with the highly tapered wing chosen by Lockheed. Great on the full size fighter; not an ideal shape for a model ... particularly without the huge Fowler flaps Lockheed shoved out behind the wing to slow the ship down to a reasonable landing speed (More on this later). That taper really cuts the wing area. For example, the P-38, the P-82 Twin Mustang and the Grumman F7F Tigercat were all within inches of the same wingspan. However, the P-82 had 25% more wing area than the P-38, and the F7F had almost 40% more.

There is one sure way to beat the problem of a lot of aircraft structure and a small wing. Build it big and keep it light. The first is easy . . . the second is not. Any model with twin .40's and retracts will have about 3-1/2 pounds of hardware that you

just cannot sand down to remove weight. With .60's, this runs about five pounds. I chose .60's for the P-38, and a scale of 1.8 inches-tothe-foot, as about the maximum practicable size. Anything larger, and you wind up making your own prop spinners . . . or your wife may leave you when you buy a truck big enough to haul it. At 1.8 inches-tothe-foot, the span comes out to just under eight feet. Shooting for a design estimate of 12.5 pounds, the model actually weighed in at just under thirteen BDT (before drop tanks), ready for the first flight. The drop tanks were added after the first dozen-plus flights, when it turned out that even at thirteen pounds the model was easy to handle.

Flaps would be nice on this model, but the P-38 had four-section Fowlers that moved back behind the wing the full width of the flap as they angled down. My engineering talent was not equal to development of a track system for flaps that would stand up to the full blast of a couple of .60's on a go-around. If any reader comes up with such a system, I would sure like to know about it. The rear wing spar is positioned so that flaps can be added to the model if anyone wants to go all-out.

if anyone wants to go all-out. The "L" version of the P-38 was selected for reproduction for a



Col. Art Johnson's happy smile is well justified. The spectacular performance of his P-38L represents his most capable talents in the engineering and building of a very challenging subject. The ship is a consistent winner and show crowd pleaser.

number of reasons. It was the last and best of the P-38 production models, and was flown in combat by many top aces, including Major Richard Bong, the highest scoring U.S. fighter pilot of all time. It was produced mostly in natural aluminum finish and had the deep cowl which, in the 1.8 inch scale, completely hides any of the .60 size engines. There are also a number of good three-views available for the L version.

(Before Art get's into the construction phase of this article, we felt the following episode, which he reported to us in a recent letter, would probably be of interest to those who might be concerned about the model's single-engine capability. wcn) "I had a chance to check out the single-engine performance on the P-38 at the Tangerine meet on New Year's Day. It



Mr. P-38 himself (Tony LaVier) would have to take a good look at this photo to recognize it as a model. Only the lift-off canopy parting lines give it away. No molded fiberglass parts or foam cores are used in the construction . . just carefully selected ply and balsa, and lots of it!







Bogies at one o'clock!! Those drop tanks tumble on release exactly as the real ones. Addition of tanks, pylons, and release mechanism added only one-half pound to the takeoff weight. Tanks are shaped from foam blocks, on a lathe, then hollowed and finished.

seems the right engine stopped when I lowered the gear on down-wind on my second flight. The only problem was that another model was flying, and I could not hear my engine(s). The P-38 kept flying straight, but drifting slightly to the right. Before I knew it, I had full left alleron and rudder, with the plane going straight and getting farther out. I thought I had lost the radio. By then I decided maybe I should turn right. As soon as I tried, the P-38 snapped around to the right with the nose straight down and not too high, but a long ways out. By then I realized the radio was working, and that an engine must be out. I chopped the throttle and managed to get out of the most unusual position. On part throttle the model was O.K., and I could climb back for a no-sweat landing.

"The lesson is, that the P-38 will fly fine on one engine, but it will not turn into the good engine at full throttle. Cut back the power, and it handles fine on one. It will hold altitude on half throttle on one engine.

²⁷Incidentally, I found out after tearing the engine down, that it had swallowed a hard object that grooved the piston, ring, and liner. It is possible that something flipped out of the nose gear when I put the wheels down, and went back through the engine. A freak deal, after thirty-two consecutive flights with no engine problems.

"The Tangerine had 19 Sport Scale entries this year. The P-38, with only one flight completed, missed first by two-tenths of one point."

Best Regards, Art Johnson Construction involves fairly straightforward, all balsa and ply techniques. The wing should be built first, because you have to hang everything else on it for alignment. Except for the ailerons, the structure will be familiar to anyone who has built a Top Flite P-51. Four-foot balsa will permit full length spars in each panel. Washout at the tips is the same as on the big P-38. Any twist in a wing this size could be disastrous on that first flight. I tack-glue straight 3/8 square balsa strips to each end rib while assembling the rib-spar structure. Sight along the wing, and the strips will give you a check on the washout angle. Use the same technique to make sure each panel lines up when glued together at the center.

Rib centers are cut out as far as W-8, so that retracts hoses and control linkage can be added more



Dick Tichenor has vivid memories from World War II of the P-38L from this angle, to say nothing of the jillions of Phillips-head screws and Dzus fasteners that held it all together!!



How's this for direct size comparison? A key to the ship's realistic performance is its size. Keeps the wing loading within reason.

easily. Vertical strips of balsa on the ribs between spars provide a place to tie down the nylon tubes holding the control linkage, and also strengthen the ribs. Install all of the bellcranks and control linkages before covering the wing with the lightest weight 3/32 sheet you can find. Bellcranks and control horns were Goldberg. The ailerons are built as part of the wing structure, and cut out after the wing is sheeted. Note that the ailerons are hinged at the top, as they were on the real P-38. Du-Bro hinges worked fine on the original model.

Wing dihedral is a scale twelve degrees at the center reference line. This measures more than twelve degrees along the bottom and less on top, due to the radical change in thickness of the tapered wing. Airfoil at the center is scale, but is somewhat thicker than scale at the tips to improve tip-stall characteristics on the model. Wide fiberglass tape reinforces the dihedral joint, particularly around the area that will



One Camloc allows instant access to engine. Note Tatone exhaust header with extension, and cooling duct behind engine head.

later be cut out for servo installations.

The center pod is built upside down on the building board, with 1/4 square balsa stringers tying the bulkheads together. Make sure the nose gear ply mount is drilled before installing. The pod is then stripplanked with 3/32 sheet. This technique will be familiar to all old-time builders. It provides a strong, but very light structure. A modern twist is to use cyanoacrylate type glue... a real time-saver, and no need for



Reinforcing the old adage that one picture is worth a thousand words, this one clarifies many questions about landing gear details. Rubber band tension on bellcrank closes doors as gear is retracted.





pins. Formers and rails for the removable canopy are added to the top of the pod after removing from the board. After making a mold to form my own canopy, I ran across a Sig 15 inch canopy, that when cut down, is a perfect fit. The canopy is held in place by two dowels at the front and a spring-loaded dowel at the rear. Glass the pod, using 3/4 oz. cloth and finishing resin, before cutting out the airfoil section where the pod joins the wing. The 1/4 inch square spruce braces from the nose gear mount to the wing spar are added after the pod is in place on the wing. The nose gear door area is reinforced with extra layers of glass cloth before cutting out the door. Robart hinges are used in all the gear doors.

Build the engine pods by making separate assemblies of the motor mounts and ply bulkheads through FE and the rear formers and stringers, FF through FI. The two assemblies are joined, and the pod is then sheeted to the firewall with 3/32 sheet. The rear of the pod is in straight lines, so fairly large sheet sections can be used. Wet the outside, wrap around after spreading white glue on all points and areas of contact, and tape to hold until dry. Add 1/4 by 1 inch balsa doublers to the section under the wing to provide a saddle. Allow for trimming as the wing is fitted. Note that the wing saddle is different on each side due to the taper and the dihedral. You will also have a right and left pod from here on.

Note the duct from the firewall to the bottom of the pod below the fuel tank. Even though the engine is completely enclosed, cooling has been more than adequate with this system. The duct is sheeted with 3/32 balsa (you need a lot of that stuff for this bird). Resin the inside to fuel-proof. Forward of the firewall, the engine pod and removable cowl is built up by gluing block balsa (1/2 inch) in place. Face all surfaces on the cowl where it mates with the pod with 1/32 ply to provide a tightfitting joint. Do the same on the pod-to-wing joints where the formers meet. The cowl is held in place with 1/8 inch dowel pins and a single Prather Camlock fastener. It can be removed in seconds without disturbing the spinner. This permits refueling and adjustment of the needle valve without any need for external access.

Radiator scoops were built directly onto the pods, using the same former and strip-plank technique as for the center pod. The intercooler scoop is carved from block balsa. The vertical fins and outboard sections of the stabilizer are built as separate units, then glued permanently to the engine pods. The stabilizer and elevator assembly fits onto 1/16 ply keys built into the engine pods. A sheet metal screw into the ply key from under the stab keeps everything in place after assembly.

A truss type structure is used for the stab, elevator, and rudders. When sheeted both sides, this gives an extremely rigid but lightweight component. The assemblies are easily built. Just block the leading edge to the midpoint of the spars and install rib strips that are the same width as the spar. The assembly is carved and sanded to airfoil shape after removing from the board. Make sure the ply key sockets are recessed into the front and rear spars. There will be considerable stress at this point on the stab.

With all the parts boned out, the model should be assembled temporarily and checked for alignment. Trim the pod saddles so the engine is vertical to the ground, not the wing. Looking down, the thrust line should be outward on both pods. Draw a centerline on the engine pods and check that the distance is the same at the front and rear. Next, trim the wing saddles to get the correct thrust line and decalage. For lack of



Varying aluminum color tones on different panels can be detected in this photo. Alclad aluminum color differed slightly between mill runs. Finish is 3/4 oz. glass cloth, two coats of resin, two coats of auto primer (Rustoleum!), followed by Sig silver butyrate, much sanding throughout.



With engines stopped and props feathered, the P-38 does a little thermal soaring ... If you buy that, we can also make you a good offer on the Brooklyn bridge!

a better idea, I used the incidence set-up from the real P-38. Thrust line is zero to the stabilizer with the wing centerline at 2-1/2 degrees positive. This puts the tips at about zero with the thrust and stab. Lockheed must have known what they were doing, as the model proved steady as a rock, with no control surface trim needed.

The engine pods are held onto the wing with four nylon bolts. The two at the rear are readily accessible through the main gear well. The two at the front are installed with a socket wrench guided by a cardboard tube through the fuselage. The fairing and supercharger details are permanently fixed to the wing after the engine pods are fitted.

The entire model is finished with 3/4 oz. glass cloth, two coats of resin, and six dozen sheets of sandpaper (At least it seems that way). This is followed by a couple of coats of auto primer, sanded almost completely off each time. I use Rustoleum auto primer, because it comes in spray cans and is available anywhere, not because I am worried about the airplane rusting here in Florida! After the first coat of Sig silver butyrate dope, you realize that finishing an airplane in natural aluminum is a pain. Every minor mark and dent suddenly shows up and you go back to the primer. When you are more-or-less happy with the first overall coat of silver dope, individual panel shades can be airbrushed on by mixing small amounts of black in the silver base paint. A coat of satin clear dope will help prevent streaks in the silver dope if raw fuel gets on the plane.

O.S. Max .60 Blackhead engines give more than enough power for

this plane, even though the restrictor was retained in the throttle to insure good fuel draw at idle. Pressure is not needed, as the tank lines up perfectly with the spray bar. A Tatone manifold with a piece of aluminum conduit bolted on, provides silencing, and gets the oil and heat out of the cowl. Williams 3-1/2 inch P-40 type spinners are reasonably close to scale, as are the similar CB Associates' spinners. The latter weigh about a quarter of a pound more per pair.

True scale retracts for the P-38 would require a type that rotates considerably more than 90 degrees. Rhom Airs only travel through 90 degrees, so the mounting positions shown are a compromise to come as close as possible to scale appearance. Standard 5/32 Rhom legs are adequate, however, a special nose strut, available from Rhom without the coil, was bent into the correct scale shape for the nose gear. The nose gear was also modified to operate with a pushrod, same as the Goldberg retracts, rather than the two-cable Rhom system. It has worked very well, but then, I have a friend who modifies Goldbergs to work with cables. Take your choice.

Have you ever looked for ideas on how to operate the doors for a retract system? Either I buy the wrong magazines or there are no articles published that fit the P-38 problem. After a number of false starts, the final solution turned out to be too simple to believe. Rubber bands are the answer. The main gear doors are tied to a single bellcrank with quick-links. The bellcrank pulls the doors to a normally closed position via rubber power. The gear leg rides along a small spring wire epoxied to one door, forcing the doors open as the gear drops. The nose gear operates the same way, but no bellcrank is needed on the single door. The weight of the system for all five doors is less than one ounce. It has been foolproof on almost thirty flights.

The P-38 was used a lot in the Pacific theater during WW-II, and drop tanks were a pretty standard item. Scale tanks for this model are more than a foot-and-a-half long. Carving anything this large from balsa seemed like a hard and expensive way to go. Urethane foam shapes easier than cheese, and takes resin and epoxy with no problem, so this material was used for the tanks. Two slabs roughed out with a pocket knife are glued together over a 3/16 dowel, and the dowel chucked in a lathe. A drill would do, as the foam shapes easily with just rough sandpaper. It makes a mess though, so keep the vacuum cleaner handy.

After shaping to a template of the tank, the foam is covered with a couple of layers of 3/4 oz. glass cloth and resin. Cut it in half, remove most of the dowel, and all but a quarterinch wall thickness of the foam. Epoxy the shells back together and add another strip of glass cloth around the joint. Wet-sand, prime and paint. You should now have a drop tank bigger around than the fuselage of a Kaos 40, but weighing only three ounces!

The pylons for these tanks extend quite a way below the wing. This required an indirect release system, with one end of a plywood snackle holding the tank while the other end was held by a Nyrod tube

Continued on page 96



A beautiful quarter-scale 1930 Kinner Fleet Model 2, by Stan Calmy. Powered with a Cox 1.4 cu. in. glow engine, the 84 inch span model weighs 19-3/4 pounds. The prop is a 22 x 8 by Grish, and the fuel Stan uses is Cox Blue Label.

MAMMOTH SCALE

 As promised in the last issue, we'll try to shed some light on problems incurred by large aircraft and give you some facts which will help you put together the right combination of aircraft, engine, and propeller. The horsepower statements made by various engine manufacturers are really only useful if a torque power graph is mated to the horsepower graph. Enclosed are the graphs showing the curves for the Quadra engine. These curves have to be met on factory test runs for the engine to pass inspection, although most production far exceeds these figures. Also enclosed is a fuel consumption chart for those people who wish to do some endurance or long distance work as well as for people who wish to put their 'models' to work. I would also like to invite other manufacturers to submit their graphs to help us design better powered aircraft. By this, I mean certified dynometer test figures. Static prop figures are, at best, a crude form of measurement as there are just too many variables as I'll explain later.

Now let's take a look at the graph curves of the Quadra. Remember that these are full open throttle conditions with the load varying rpm. You can determine fairly accurately, the static load which the prop places on the engine. Fuel consumption reduces as load is reduced. You can readily see from these curves that there is no point in running a Quadra below 7000 or above 9000 rpm if you want to get the best out of the power available. Another powerplant or reduction gear/prop combination may not obtain best results with these figures at all. A simple audio tachometer will tell you what the prop is doing in the air, as far as power output is concerned. Prop efficiency is checked by the rate of climb versus speed and acceleration (Come on, you electronic buffs! How about a good circuit which will do the job economically for the modeler, using easily-obtainable parts?).

You will be surprised that some props show no significant rpm change, static or in flight, while others, even of the same 'pitch' (hate that word and hope to prove it obsolete) and diameter have considerable change. This is due to the rate of stall of the particular blade shape. Whether you run the prop direct or via a speed reducer, you can find out how to get the most out of your powerplant/prop/aircraft combination by these methods. Per-



The big Fleet is realistic to the eyes, as well as the ears.



Stan Calmy with his Fleet. He has just moved from Southern California to 1315 Monterey Dr., Boulder City, Nevada 89005, and would like to hear from his friends.

formance is another variable, as sometimes one prop shape will outperform another, even if the engine is not allowed to put out its best.

Most people don't realize that you can have well over 20 variables in the propeller design (Note: I don't say airscrew') of propellers which have the same numbers stamped on them. What works well for one aircraft, use, and pilot combination may well be the worst choice for someone else. An aircraft that seems to fly a cut above the others is simply a good blending of combinations, and this combination if it hasn't come about by luck, has to have some starting point to build on. If your starting point is a particular aircraft, then the first problem is to match the correct propeller, driven at the correct speed, to suit the aircraft, and what you want to do with it. Then select the powerplant to do the job necessary. All else is compromise, which will reduce that

efficiency for which you are striving. Model builders (let's use "miniature aircraft designers"), like home builders, often start with the engine they have lying around or would like to try, and then design an aircraft around it; but to do a proper job you should look realistically at what this engine can handle. If you are confused by some of the ads, especially regarding speed reducers, I don't blame you. It will become more clear if you remember these facts.

Any reduction gear (there's one coming out for the Quadra as well) will not increase horsepower or turn your engine from a .60 into a 1.20. Horsepower will remain the same at the engine shaft or prop shaft. You can increase torque by sacrificing propeller rpm, and you can also go the other way and increase propeller rpm at the expense of prop shaft torque, as in the marine version of the Quadra. Another fact is that no matter what transmission is used to cheat either way, there is a loss of power in that transmission, and it can be quite high.

Another fact is that a speed reduction gear will not change the sound of that engine. People often mistake propeller noise for engine noise, and propeller noise can be terrific. With a speed reducer, you lower the frequency of the propeller noise, but add the mechanical noise of that unit. Most six-cylinder engines used today in light aircraft are red-lined around 2750 rpm. However, these engines are 4-cycle, so that you get three exhaust notes per revolution. Multiply that by 2750 and you get 8250, which means that your singlecylinder, two-cycle engine would have to turn at 8250 rpm to give the scale sound, or if it was an alternate





The cylinders and pilot in Stan's Fleet are very light. He molded them from urethane foam.



firing twin, at 4125 rpm (opposed or boxer, simultaneous-firing twins also at 8250 rpm). As this is the speed range of the Quadra powered aircraft, they are often mistaken for full-sized aircraft.

Propeller noise is something else. Why does a prop turning at 8250 rpm sound so much like a full-sized prop turning at 2750? Remember, it's the speed of the propeller airfoil passing through the air, its shape, and size (which affects the blades Reynold's number) which creates this noise (music to us!) as well as the forward speed of the aircraft. The combination of airfoil and air speeds in the propeller's working area are nearly equal, due to the increased diameter of the full-sized propeller. If you could find the exact center of a rotating object and make that center's dimension small enough, you would eventually come to the



Nick Ziroli's Mammoth Scale Corsair, mentioned in March/April R/C column, is a real eye-cather. A Du-Bro reduction unit is used, with a Max .60 engine. infinite point where you couldn't measure either the speed at its circumference or its size, whichever you gave up on first! Now what does this mean in layman's language? An 18 x 6 or 20 x 6 propeller at 8200 rpm can sound identical to a 5 or 6 foot propeller turning at a much higher pitch angle, at 2750 rpm. There is no set formula for propeller design. A propeller is not an 'airscrew', that word being a misnomer. Pitch angle does not necessarily increase the top speed of an airplane, even if the same diameter propeller and rpm are used (a lot of WW-II fighters cracked up on takeoff because of a propeller being stuck in coarse pitch and they couldn't obtain air speed). Aircraft speeds have exceeded the theoretical speed of a propeller when the air screw theory is applied; i.e. 7 inch pitch = 7 inch travel per revolution if there is no "slip" (another misnomer). If this theory were correct, we wouldn't have the speed records we have now. In other words, for a pylon racer to do 150 mph, he would have to turn a 100% efficient propeller at 22,628 rpm. No matter which theory you use, air screw or rotating wing (I subscribe to the latter), nothing even approaches 100%.

"True helical pitch" as advertised by some manufacturers, is only of



Still not quite finished, Nick Ziroli's Corsair at the WRAM Show in White Plains, New York. He'll be offering plans, canopy, etc.

value if you subscribe to the air screw theory. In rotating wing/ propeller theory (let's shorten that to RW), you are trying to get the blade to work equally well from tip to hub, realizing that air speeds vary along its length so that blade profile, chord, washout, etc., as well as angle are important to achieve power balance. This often means a helical pitch is not always desirable.

There are points where the theories agree. The larger the diameter of the propeller, the more important are the torque charac-teristics of the powerplant. It takes power to drive a blade through the air, regardless of whether that blade has any pitch, angle of attack, or produces "0" thrust. While it is important to get the blade angle correct at each station for the type of blade you are using, it's even more important to get the other blade/s the same, or they will tend to fight each other, cause blade flutter, vibration and a whole flock of problems. If you chop or shorten a good propeller, you'll change its entire characteristics, possibly for the worse. The more we explore propeller operation, the more we realize there is still a lot to learn.

Don't be satisfied with the propeller you are using on any airplane. *Continued on page 97*





Maurice Robinson, St. Albert, Canada, engineered this biggie, based on Clinton B. DeSoto's 1939 R/C job published in Air Trails.



See text for more details on Maurice Robinson's Mammoth. Do you suppose all that snow had something to do with this big project.





Frank Comyns' 1917 De Havilland WW-I bomber is stable and very realistic in flight. Not as large as it may appear, it is powered by two Taipan .15 engines.



By BOB UNDERWOOD

• There was something special about going to grandmother's house in Plymouth as a youngster. Beyond the quiet grace of the lady; beyond the tranquil spell of warm, scented evenings enjoyed in the gently swaying porch swing, came an experience too vivid to forget these many years later.

Across the street, a scant one hundred yards away, set a small railroad station serving the town. The main New York Central line running from the Empire State to the Windy City passed through that point and in that era the traffic on those rails was heavy.

The locomotives, often in tandem, belched smoke, fire and cinders. Their hissing pipes assailed the senses, and their stark, functional beauty was masterful to behold. Most often, since Plymouth was a small community, these monsters did not stop but pursued their destinations with an eager mile-perminute determination.

It is a certainty that the engineer rarely noticed a small boy on the platform as his charger thundered through the station. But the youngster was there firmly planted on the ground, arms encircling the post that held the platform roof. His eyes were closed and teeth clinched enduring all the noise and thunder that tons of locomotive and a hundred cars at 60 mph could produce.

As the caboose faded into the horizon and the last cinders sprinkled down from their lofty arc, the small figure would move swiftly back to the house across the street, filled with the excitement produced by the wonderfully, frightening experience. Each fiber of his mind tingled with thoughts of what it would be like to be the master of such a marvelous machine and have it answer his every command.

Non-modelers often ask why we, in this hobby/sport, do what we do. We've often been saddled with the image of adults playing with toys. It isn't always easy to convince these people that what we do requires keen skills and is creative, especially when one sees available many models which require little skill or no creativity. Certainly when the casual spectator takes the time to see what can, and does exist in our world, many indeed do marvel at the mastery. Beyond this, however, there is an area that everyone can relate to; the vicarious experience that modeling provides. Some may derive their vicarious experiences from the movie screen or other sources but somehow, somewhere, each person seeks out his "locomotive experiences".

The scale modeler has a unique possibility in that he can combine the developing of skills and creativity with the exhilaration of these experiences. He identifies closely with that which was, is, or yet may be. He can project his experiences into the



Ken Case built two 4-cylinder engines to power his Twin Comanche. Each is .50 cu. in.



Rich Westlake's Albatross D-1 is almost ready to lift off. Model is a modified Proctor Antic Bipe kit.




A Bridi P-51 built by Bill Woolard, has flaps and retracts.

precarious mood of the 1910's; the romance of World War One flight; the daring of the racing thirties; the deadly efficiency of the forties; the Star War future. In any case he can be a vicarious traveler in the world of aviation.

The casual observer might muse that he is caught up only in a world of fantasy; a dreamer who escapes reality. Perhaps this is true; but what of it? There is a need for the creative dreamer whether it be to invent a safety pin or to provide a safety valve for the pressures built up by that real world. We all escape; whether through TV, amusement parks, or just through sleeping our lives away. Why not seek the fulfillment of this need through a creative means?

Dream on modeler; create and feel the exhilaration that comes from your creation. Make it your "locomotive experience". A FILLET'S NOT A STEAK

A common problem shared by many scale modelers develops around the joint where wing and fuselage meet. Looking at full scale aircraft, you often note that the

builder had his problems making it come out right, even though he wasn't faced with the terrible prospect of having it fit right every time the wing was removed and replaced, as we are. As a result, otherwise nice models often have a gap that looks like the San Andreas fault (whoops, make that the Grand Canyon, since this is a California publication)

Featured in the December, 1976 issue. running from leading to trailing

Mardel Tubbs built this Sport Scale Don Quixote from MB plans.

edge. At times the fit may be beautiful in the front only to have the larger, flared area at the trailing edge soar skyward ala Farrah Fawcett Major's hairdo.

A system that has proved successful for me, even on models that have reached advanced age (though



Side view shows the classic lines of Frank Comyns' 1917 De Havilland bomber. All scale photos on these pages by Dick Tichenor, at the So. Cal. Scale Squadron "Uncontest".





By RANDY RANDOLPH . . . All the performance capabilities of the hot .60-sized pattern machines have been wrapped up in this efficient 42-inch span .19 powered bird.

Last year our club, The Dallas R/C Club, instituted a plane-of-themonth and a plane-of-the-year contest, with a substantial prize to the winner at the end of the year. The first winner of this prize was a five foot, .71 powered, standoff scale Gloster Gladiator, a beautiful ship and a deserving winner. I was wit-ness to the test flight of this bird, and it was an interesting experience . . . to me, not the builder. The least exciting part of the flight was the landing; a wheel-landing preceded by a fifty-foot vertical dive. The airplane obviously survived, but my friend suffered from a bad case of intestinal interruption for some weeks after. Although the plane had been balanced to the indicated CG, it did not become flyable until the addition of two pounds of lead to the nose. It did become flyable, very flyable, for my friend also won the Southwestern Championships with it a few months later, against some of the toughest competition ever in this part of the country.

I use this story as an introduction because it contains several elements that will not be found in PASKEY. It is not an award winner, it does not cost an arm and a leg to build, it does not take three months to finish, it does not take a gallon of fuel for an afternoon's flying, it is not beautiful, but most of all, it does not require seven notches on a five-notch pucker string to test fly. On the credit side, it is easy to build, it looks kind of like an airplane, and it is a dream to fly. It will fly anyway you want it to fly; with the clevises in the outer holes, it is a nice and easy learning airplane for Saturday morning; with the clevises moved in for full control movement, it is a rough and tumble fun-fly contestant on Sunday afternoon.

PASKEY is a gentle airplane, and a forgiving airplane; it will snap, but it must be forced to do so, and it will spin very flat, but recover rapidly. Landings are a pleasure, for there is aileron control all the way to the ground, and takeoffs are simply a matter of advancing the throttle and giving a touch of back stick. Don't forget the back stick, for this airplane has got to be flown; it will stay where you leave it, but you do have to leave it somewhere reasonable. In short, it is a stable, groovey aircraft with a wide performance envelope.

The tip plates are responsible for a lot of the performance; they provide low drag tips and help the builtin washout do its job of keeping the ailerons effective well into the stall. The square lines are not only easy to build, but the abrupt fuselage wing joint goes a long way in contributing to the excellent spin recovery. The somewhat ungainly fuselage gives



This, and the lead photo reveal the features that make Paskey a practical and desirable addition to your airforce. Note the anti-tip stall tabs outboard of the ailerons.

excellent knife-edge flight racteristics, and the blunt trailingges of the control surfaces te to dampen response around n_{Tal}. which adds to the basic neral stability of the design.

The original was powered a rather old and well-establisd Webra .20, and it provides plenaf zip for all maneuvers, but this. plane will handle anything frog sick .15 to a hot .23 and be happy .10 with the new lightweight ray gear would make a good trainer a very low initial investment and sm upkeep. With the Webra, a gallon fuel will fly PASKEY for 9 hours an 20 minutes. If you decide to buil PASKEY, and I hope you do, let mi suggest that you start by assembling... THE KIT

Make a template of the rib from ballpoint pen to make a "printed sheet" on two pieces of medium lihedral braces and landing mounts 1/16 x 3 x 36 balsa, moving the template around to find the most ribs that can be cut from each sheet. You will need 24. After the ribs have been cut out and gang-sanded to the same shape and size as the template, take four of them from the stack and cut 1/16 from the top and bottom of each ... these are the center ribs that will receive the sheeting; call them R2. Cut the gear mount notch in four more and call them RL.

The trailing edge sheeting is cut from a single piece of 1/16 x 4 x 36 balsa. Cut the sheet to a length of 22 inches before stripping them, and the rest can be used for the centersection sheeting. The wing spars are stripped from a sheet of 3/16 x 3 x 36 medium hard balsa. Cut 8 strips 3/16 sq. and 4 strips 3/16 x 3/8, the extra 3/16 sq. is for the stabilizer and rudder. The spar webbing is 1-15/16 x 1 inch, sixteen of them are from 1/16 balsa and four are 1/16 plywood. The trailing edge webs are all 1/16 balsa 1/4 inch high. Cut the



thin, stiff cardboard, and use it and a Randy performs an almost knife-edge pass for the camera. Note down elevator and left, or "up" udder. Ship is actually in a left turn. It's capable of all required maneuvers.

om 1/8 plywood, and the landing ear braces, stabilizer spar doublers nd tip plates are from 1/16 plypod. The leading edge is 1/4 sq. lisa.

Gut the fuselage sides from a sgle piece of $3/32 \times 6 \times 36$ balsa. The can be made by edge-gluing tw pieces of 3 inch wide stock to fon the larger sheet. Pin the two side together and gang-sand them to the same shape. Use the finished sideas a template to cut out the two 1/16 plywood fuselage doublers. The abin doublers are 3/32 sheet balsacut as shown and notched to fit OYR the 1/16 ply doubler. Strip the 13 sq. for the longerons and uprights from medium 1/8 sheet balsa, ind strip two extra for the wing tailing edge. Cut the cabin former and the two-piece firewall from 13 plywood, glue the firewall togethe with epoxy, and drill for the engine mount bolts and fuel and throttle ines. The addition of 1/16 sheet for the fuselage top and bottom comletes the kit.

EUSELAGE

Epoxy the 1/16 plywood doublers to the forward part of the fuselage sides, making sure of a left and a right, with the ply to the inside. Add the cabin doublers and the longerons and uprights. When all is dry . . which is now if you use the new glues ... once again pin the two sides together, with the ply to the inside, and sand them to the same shape with square edges, then drill the 1/4 inch holes for the wing holddown dowels.

Place one side over the plan and mark the location of the cabin formers. While it is still flat on the plan, glue the cabin formers in their proper locations using a square or a right triangle to keep them vertical. When the glue has set, glue the other side on top of the formers, use the square to make sure that the two sides are exactly over each other. Place the fuselage over the top-view on the plan, epoxy the firewall into position, bevel and glue the tail together, and check for alignment. Sheet the bottom with 3/32 balsa in



First step in fuselage assembly. Be sure you make a left and a right! Cabin doublers notched to fit over ply nose doubler.



Cabin formers are glued in first. Make sure they are square to the sides. Check with a triangle. No "banana" fuselages, please!



FULL SIZE PLANS AVAILABLE - SEE PAGE 144

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(Top) Sides are joined, ready for installation of the firewall. (Btm) Bottom has been sheeted, crossgrain, and tail surface control Nyrods installed.



Looking toward the nose, showing tank and Nyrod installation.

front of the wing and 1/16 in back of the wing ... this is crossgrain. Cut the exit holes for the outer nyrods in the fuselage sides and install them, using epoxy and micro-balloons where they exit the fuselage ... add the bulkhead in the aft section to steady them. Epoxy the brass tube fuel and overflow lines and the blind nuts for the engine mount to the firewall, and install the inner nyrod for the throttle pushrod. Extend this nyrod well into the cabin area. Install the fuel tank, using foam on



Accurately cut, vertical grain, spar webbs are an aid in obtaining correct rib alignment. Make yourself a "kit" before assembly starts.



Dihedral braces are clamped inplace with clothes pins while glue dries.



Sanding block is used to prepare structure for trailing edge sheeting.



Center section ready for sanding. Note that sheeting is let in between spars, and ailerons are notched to take torque rods.



Stab framework pinned down for drying. Note the 1/32 ply leading edge doubler. Also used on main spar.



Completed tail feathers, ready for covering.



Main landing gear struts retained with metal brackets. No time for screwdriver to slip!

the bottom and sides to wedge the tank in position. Add a 3/16 balsa bulkhead behind it, and attach the fuel and overflow lines. Sheet the top of the fuselage, from the firewall back about two inches, with 3/32 balsa, drill it for the inner nyrod nose-gear steering, and install the nyrod, extending it well back into the cabin area. Use epoxy and micro-balloons where it goes through the sheeting. Sheet the rest of the fuselage top with 3/32 balsa to the top of the cabin, and 1/16 from there aft. Cut all nyrods flush with the sheeting and sand the completed fuselage with 150-grit sand-



Aileron servo installation details.

paper. WING

Cover the plans with the backing from Monokote (or use food-wrapping plastic) to keep the structure from sticking to them, and pin the bottom trailing edge sheeting in place over them. Glue a strip of 1/8 sq. to the back edge of this sheeting, and using a rib as a gauge, pin the bottom main spar to the plans. Glue the first RL rib near the center of the wing in place over the plan, and glue one of the plywood webs to it and the spar on the outboard side, as well as a balsa web at the trailing edge. The webbing makes an excel-



Radio installation, nose to left. Servos are mounted on plywood tray which is epoxied to side rails in fuselage.



Wingtip close-up shows tip plate and anti-tip stall tab. Trailing edge piece is simply reversed.

lent spacer and assures that the ribs are perpendicular to the spar as well. Continue adding ribs and webs out to the tip with the other RL next.

There are no webs between the last few tip ribs. After all the ribs are in place, glue the top main spar to the ribs and the webs, and add the leading edge. At this point, glue the plywood web inboard of the first RL installed, slide on the first R2, and glue it in place. Glue the top front spar in place and bevel the 1/8 sq. at the trailing edge to receive the top trailing edge sheeting . . . glue it in place. Lift the wing panel from the work board and glue in the remaining front spar. The other wing panel is assembled in the same order.

When both wing panels have been assembled, bevel the spars, and leading and trailing edges, where they will be joined to form the dihedral angle. This can be done with a sanding block or a bench or radial-arm saw. After beveling, join the two panels, with the main dihedral braces on either side of the main spars, and the trailing edge brace between the top and bottom sheeting. Place one panel flat on the bench and raise the other wing tip until the dihedral braces are flush with the top and bottom of the main spars at the center joint, and a good fit is had at the trailing edge. Support the wing at this angle and glue in all dihedral braces with aliphatic resin



Kink in throttle pushrod provies override protection for servo. Note small gauge wire used. Adjustment is at servo end.

glue. Clothespins are quite useful to hold the braces in alignment while the glue dries.

Cut the front of the two remaining R2 ribs 1/8 inch in front of the main spar notch, and glue them together and into the center of the dihedral joint between the main spar and the leading edge. Add the 3/16 balsa gusset on each side. The aft part of the R2's are cut 1/8 in back of the main spar notch and glued on either side of the dihedral joint as shown on the plans to form the servo cutout. A piece of scrap 1/16 balsa sheet between them finishes the box, and another piece of scrap from the center of this box to the trailing edge completes the structure for sheeting.

Notice that the center sheeting is BETWEEN all of the spars, and that there is no sheet on the top of the wing between the R2's that form the aileron servo cutout. Glue in the landing gear braces, and the landing gear mounts, and the wing is almost ready for sanding.

Cut the ailerons from 3/16 balsa sheet and sand them to shape with 100 grit sandpaper on a sanding block. Cut 2 inches from the tip of each and glue these pieces to the trailing edge of the wing at the tip, UPSIDE DOWN. This provides the washout for the tips. Epoxy the aileron mounting hardware to the trailing edge center section as shown, the original used 1/16 I.D. brass tube with 1/16 wire bent to form the torgue rod and horn. Relieve the trailing edge, and its backup block, to allow movement of the aileron horns where they exit the tubing. Notch and groove the ailerons to receive the torque rods; they are installed on the wing after covering.

STABILIZER AND RUDDER

The tail group is built in a very

straight forward manner over the plans. The only thing to remember is to add the spar doublers before assembling the stabilizer. The rudder and elevator are cut from 3/16 sheet balsa, and pinned to their respective fixed surface for final sanding. I like to apply Hot Stuff, or Zap, to the bare wood where the control horns are installed to harden the wood at these locations. COMPLETION

All parts should be sanded well with 150 grit sandpaper, round all the edges of the fuselage, the leading edges of the wing and tail as well as the trailing edges of the rudder and elevator. When you think you are finished, sand everything again with 220 paper.

The wing should be balanced at this time. Use a piece of 1/8 music wire for a fulcrum at the center of the wing and use the heaviest aileron on the side of the lightest wing panel, if it still doesn't balance, add weight to the light tip. The main spar can be drilled at the tip to accept the necessary amount of weight.

COVERING

This airplane should be covered



Nose gear steering linkage and fuel line installation shown in this photo. Set-up is simple and trouble-free.

with plastic film. I like Monokote, and use it for hinges as well as covering. Follow the instructions packed with the film. When covering the fuselage, overlap the firewall about 1/16 inch with the film when ironing it on, then paint the firewall with a matching color of epoxy paint, or plain epoxy glue. This will seal the edges of the covering and make the airplane last much, much longer. Black Monokote cut into 1/16 wide strips makes very good striping to separate colors for trim.

When the covering is complete, cut the covering away from the center section of the stabilizer, top and bottom, where it will contact the fuselage, and epoxy it into the cutout at the rear of the fuselage. Cut the covering away from the top of the fuselage where the fin mounts, and epoxy it into place. Do the same for the tip plates, and epoxy them to the wing tips. Hinge and mount the rudder, elevator, and ailerons. Epoxy the wing hold-down dowels into place.

Install the engine mount with 4-40 x 1/2 inch bolts and drill it to accept Continued on page 108



Paskey on a fly-by. You'll catch a similar sight many times, after you complete yours.



MID-WINTER DOLDRUMS ARE HERE

Setting in somewhat later this year than normal, the doldrums are nonetheless here. What with 30 inches (might as well be 30 feet) of snow on the ground, and daytime temperatures reaching a high of only the low teens, it's extremely difficult to keep one's enthusiasm at a fever pitch. However, Toledo is only six weeks away as we're writing this, and that show always acts as a powerful stimulus to get our butts (Empennage, Jim, this is an AIR-PLANE column! wcn) in gear again ... hope we saw you there.

Glancing through the newsletters and the AMA contest schedules leads us to surmise that 1978 is going to be a very good year for racing. It looks as though the number of contests will be at an all-time high, and first indications are that prizes will be upgraded greatly. We've noticed that where merchandise is being given as prizes, it is geared more toward what will be useful to someone in racing. Money prizes are becoming more prevalent, and amounts are increasing. This looks like the year for many contests to be awarding \$100.00 or more for first place finishes. I'm very glad to see things going this way, as the expense of competing gets more astronomical each year, and it's time to provide a real incentive to compete; not that pylon racing in itself isn't exciting, interesting and fun enough to be self-awarding ... but, it sure doesn't hurt to sweeten the pie with cash or realistic prizes.

I just hope that money doesn't bring out the worst in people. While there are very, very few racers that would possibly cheat to win, it is nonetheless a possibility, and the C.D.'s will have to be on guard with even greater vigilance.

The biggest area for possible cheating will be in reworked Q-M engines, and if you engine experts would be kind enough to take a minute (Day? wcn) and put down some guidelines the C.D.'s should use when examining engines, send them to me, and I'll be happy to publish them.

OH, MY ... OH, MY... WHAT SHOULD I FLY?

We just recently broke down the statistics of the 1977 Rough River Championship Races and came up with the following facts:

(There were 51 competing entries as the base line.) Aircraft used:

Toni, 19; LR1A, 7; P-51, 7; Cosmic Wind, 6; Ballerina, 3; Minnow, 2; P-63, 2; Ricky Rat, 1; Miss Dara, 1; Firecracker, 1; Shoestring, 1; Bugatti, 1. Unfortunately, the breakdown by kit manufacturer is unavailable.

Most used engine was the Rossi, with 39 entries, followed by Cox with 12 entries. Rev-Up props were used by 26 competitors, followed by 19 Top Flite, 2 Zinger props, and one fellow used a Kelly fiberglass prop.

The above statistics can be misleading, in that numbers don't explain what really happened. For instance, the first two place finishers, Bill Weesner and Bob Ruether, were both flying their own design airplanes, powered by Rossi and propped by Top Flite. I suspect that familiarity with equipment and knowing how to get the most out of a given combination had as much to do with their success as the equipment itself.

So, there it is. There just may be some good information as to what combinations you may wish to try this year to get to the top of the heap.

Speaking of props leads us to the third part of George Zink's dissertation on the care and feeding of props as written in the MARA Newsletter. Heeerrrrr's George... PITCH DISTRIBUTION

The term pitch, as used in connection with model aircraft propellers refers to the distance in inches that the aircraft should move forward for each full revolution of the propeller. at vela

Imagine the prop blade as being a pile of airfoil shapes, stacked from hub to tip. The problem is how to get the very best performance from each of these airfoil shapes without harming the performance of the rest of them.

The first thing to try is to make each of the airfoil sections travel the same distance forward (pitch) for every revolution. The term for this is called "Helical Pitch". The angle that we set the airfoil section relative to the hub, is determined by the pitch we want and the distance from the hub to the airfoil section. As we go further out towards the tip, the angle (0) decreases. The relation is:



MODEL BUILDER

E THINGS WE DID LAST SUMMER

With pylon racing activity down to about three notches below zilch, there just aren't any current racing photos to be here activity down to about three notches below zilch, there just aren't any current racing photos to be had. Therefore, we just present some typical summer scenes by Paul King. It won't be long ...



While "Helical Pitch" is a good starting point, it is not always the best solution for a racing prop. Racers have found a number of ways to increase prop performance by doing certain things to the prop blade. Washing out the tip has increased rpm and resulted in faster speeds. Washing out the blade near the hub can increase rpm and also improve thrust at lower speeds, such as in a turn. We can plot the pitch for several airfoil sections and tell at a

glance how the prop's pitch is distributed over the whole blade. Once familiar with the distribution we want, we can be extra careful with the props which best meet the distribution and perhaps modify the others to bring them into line.

Pitch Distribution Curves are easily made once you have an accurate pitch gauge and use it properly. We use a Prather Pitch Gauge and find it adequate to read to 1/10 in. pitch, if you get a light behind the knife edge and estimate carefully.

We take readings at all the stations of both blades, writing down the pitch of each station as we go. Next, we get 1/4 inch square graph paper and make a chart. The radius stations are laid out in station numbers of the gauge. We put them along the horizontal axis about 1 inch apart. Pitch is in inches and laid out on the vertical axis. Once the axis has been



The "Seturday/Sunday Gang" at Van Nuys, California, admiring the new Schluter Heli-Boy on display (I to r): George Croker, Dr. Rich Smith, Kevin Flynn, John Gorham, Bill Wise, Dennis DuBois, Neal Pedinoff, Stan Noar, and Curtis Croker.

CHOPPER CHATTER

By JOHN TUCKER



BELL HUEY COBRA REVISITED

The lead photo of the 8-year-old Schluter Cobra, in the March/April 1978 MB, has seemingly touched off a sense of nostalgia among several R/C chopper pilots...this has been evidenced by a number of phone calls asking where the kits may be purchased or can the body-shells be obtained from a U.S. source?

As luck would have it, I received a call from Ted Qualls of T&J Manufacturing, 727 Pleasant Drive, Knoxville, IL 61448, who advised me that he is in production on the Huey-

Cobra shells and can make them available for a very reasonable price. According to Ted, these are exact copies of the original Schluter Cobra and are molded in fine detail in fiberglass and polyester resin. Although weighing only 2 ounces more than the original, they are much stronger!

Needless to say, I have my order in for one, since I have 3 sets of original Schluter mechanics floating around the workshop with no body shell to install them in. Of the thousands of kits that were produced, there are

PHOTOS BY AUTHOR UNLESS NOTED

bound to be a lot of those transmissions, etc. Buried in the spare parts boxes of modelers around the U.S. Incidentally, Ted also advises he provides the tail rotor driveshaft and housing, along with full size plans. Additional shells are planned for the near future. . . In stock now are shells for the Hughes 500, which should be very popular. As soon as I receive the Cobra, I'll give you a rundown on it, along with more details as to price, quality and inclusions.

If your interest is too great to wait,



Gilbert LaForest hovers his tandem-rotor test bed, powered by a Webra Speed .61. Uses heat sink head for cooling rather than fan.



Gilbert installed mechanics and equipment on top of upper structture, most practical location. Photos from poor color prints, sorry.



John Tucker with the new Schluter Bell 222 aerobatic chopper. Everything but body is basic Heli-Boy unit. Watch for detailed product review in forthcoming issue of MB.

pick up the phone and call Ted at (309) 289-2284 and he'll be glad to give you any information he has. (P.S. You might try Lloyd Wheeler at S.C. Modeler Hobby Shop, 1999 Larkin Ave., Elgin, IL 60120; call (312) 697-3737 for possible availability of the original and complete kits . . . if they are available, Lloyd will have them!)

LITTLE ROCK HELI-CONTEST

Bob Wilcox called in the preliminary information on the Second Annual R/C Helicopter Contest to be held June 17th and 18th, at Little Rock Arkansas. The contest is AMA sanctioned and sponsored by the Mid-Arkansas Radio Control Society. The AMA proposed rules will be in effect and several events are planned, such as Expert, Intermediate, Novice and Scale. A special category for beginners will require only a liftoff, hover, and back down to landing ... this should appeal to the many guys who want to get the "feel" of competition (and rewards) but don't want to tangle with the better flyers!

Last year's event drew a very respectable crowd and about 15 entries . . . this year the number of contestants should at least double or triple. The contest will be held at the MARCS Bishop Field, just outside Little Rock. Bob has promised to mail out flyers in time for all to get the information, however, you can write or call him direct for additional data and instructions. Contact Robert Wilcox, 6413 Rolling Hills Drive, North Little Rock, AR 72118 or call (501) 758-8626. Further information will be posted in this column next month.

TWIN ROTOR -

TANDEM HELICOPTER

A very ambitious young man is 26year-old Gilbert Laforest, of 1909 St-Jean-Baptiste, Pointe-Aux-Trembles, P. Quebec Canada H1B 4A6. Gilbert is a programmer for a Montreal newspaper but loves R/C choppers and has dreamed for years of a twintandem chopper. None being available, he set out to design and build his own, this project lasting almost a full year! He said the thing he likes about choppers is flying them, not building. He gave up a complete flying season to build the twin!

The tandem is strong and easy to repair, but remains scale in proportions, with a wide space inside to provide for a camera, small winch or what have you! The mechanics are installed on top of the structure to protect them in case of a crash. No cooling fan or shroud is used in order to simplify the drive-train and to gain additional power from the engine. He advises only a good heat sink is needed on the Webra Speed 61, which is located in the back for easy starting, and to keep the model clean from exhaust residue.

The control system, which is Bell, is used on both rotors for optimum control and stability. Kavan main rotors are utilized front and rear. The weight of the model is 15 *Continued on page 119*



Partially completed tool for adjusting plastic ball links. See text and sketches.





Conducted by

DAVE BROWN

• The column this month is being written as we, in Ohio, are snowbound in the middle of February, and it is due into Bill Northrop by the first of March for the June issue which should reach you around the first of May! I think I have just figured out why all magazine people are usually walking around in a confused stupor. (You're getting the idea! wcn)

The first of May is the time of year most modelers look to as the start of the flying season and a chance to get out those airplanes, old and new, and start limbering up the thumbs. The first flying session of a new season can often set the trend for the whole season of flying, so it is important that it be as successful as possible. Plenty of preparation in the shop, prior to the first flying session, is in order, to assure this success.

The radio system should be thoroughly checked for proper operation and exercised for a short time to loosen up those servo gears and to remove the corrosion build-up on the armatures of the servo motors. If the servos act jumpy and erratic after this exercising, or won't center properly, the pots are probably dirty and should be cleaned. If you do not know how to do this, get a competent radio man to clean them, and perhaps he will show you how to do it yourself the next time.

Next is the battery pack. Battery failures probably account for more crashes than any other single part of the radio system. They are prone to going "belly-up" after being unused for long time periods. If you have a battery cycler, charge them and check the capacity on the cycler two or three times. A normal 500 MAH pack should run a typical cycler (Flite-Life, Super Cycle, etc.) from 90 to 120 minutes. If you don't have access to one of those devices, you can get a good idea if the batteries have sufficient capacity by running the system with all servos moving continuously. Most systems should run this way for a minimum of one hour with most running oneand-a-half to two hours. I realize that this is a long, tiring test, but the airplane you save will be yours.

Once you have determined that the battery has proper capacity, there is one more very important test to perform on the pack. With the battery charged and plugged into the radio system, turn the system on (including the transmitter) and tap the battery on all sides, reasonably hard, with a screwdriver handle. If the servos jump when you hit the battery, then replace the pack or it will almost surely cost you an airplane. An intermittent or noisy battery pack is suitable only for fuelpump use and not for an airplane. The final test on the radio system should be to range test it. Refer to your radio instruction manual for proper range approximation.

Next on the agenda is the engine and fuel system. Check all engine screws for tightness. Check the carburetor barrel for free movement. Remove the needle valve and force some fuel through the carburetor to flush it out. Now, flush some fuel through the engine and check the compression. If the compression is very low, it may be a stuck ring, which should be checked out by someone competent to work on your engine. Again, if you can watch him repair it, perhaps you can do it yourself the next time.

Remove the fuel tank and check it for leaks or spots nearly worn through from chafing. I prefer to replace all fuel lines at this point, including the pick-up line in the tank. The brass tubing may be corroded and, if this is the case, should be replaced. Reinstall the tank and hook up all fuel lines. Put some fuel in the tank and make sure the engine will draw fuel when choked and turned over.

Now that we have the power system and radio systems checked



out, it is time to inspect the airframe. Start by inspecting it to make sure that the servo mounts are secure and that the wing hold-down blocks or dowels are securely fastened to the fuselage. Now check all hinged surfaces by pulling on them to assure they are not going to pull out. Check all screws and collars, that hold control horns, wheels, etc., for tightness. Check all kwik-links and keepers to be sure they are snapped properly. Caution: If you use swingin or snap-on keepers, make sure the servo output arms do not unsnap them when full throw is applied. BE SURE ALL SERVO OUTPUT ARM SCREWS ARE IN PLACE! Loss of an output arm has caused many an airplane to crash, and the experts are no less prone to this than the beginners.

Once the airplane and its systems have all been inspected, it is time to pack your toolbox. Make sure that you have a "hot" starting battery with a good plug connector and that your electric starter battery is fully charged. Your toolbox should include screwdrivers, pliers, plug wrench, and allen wrenches to fit everything on your airplane. ((Wife-typist note: "I hope he follows his own directions!") Spares should include props, plugs, wheel collars, fuel line, and at least one spare prop nut. A few extra kwik-links and clevises might also come in handy. Check your fuel pump and be sure it is fully charged if electric and make sure your fuel can is full, and that the fuel is fresh.

If you have been very careful in checking out all of your systems, the spare parts won't be needed, but can come in handy if you should need them. Be sure you charge your radio batteries the night before flying. Finally, you might consider cooling off a six-pack for that first flight of spring.



Hal De Bolt

• This column is being written before our first column appears in print which makes things a bit awkward. As explained last month, the concept of this column is to assist our readers with the use of their radio systems. We plan to answer questions submitted by our readers, with a goal of providing information that modelers need, want, and is useful to them. The sooner we receive your questions, the faster we can get this show on the road.

Many R/Cers tell me that they don't give a damn, or else have little interest in how our R/C systems work. Apparently, their only interest is in the models, or, in many cases, just the flying. With R/C, as a whole, being as complex as it is, this is understandable. When R/C is a hobby, hobby-time is necessarily limited. No one modeler can possibly find enough hobby-time to get really involved with the intricacies of the model, the operations of the radio system, and the gaining of flying experience. So, an average modeler picks one of these fields as a favorite, and works to develop more expertise in that field; good common sense. In the past, this was not possible, you had to have knowledge of all 3 areas. Perhaps, that is why it took some of us so long to get the message!

Today, I like to think that the sport has grown up; you can be a "specialist", because we do have manufacturers building reliable equipment and people to serve them for you. The point I am making is that being a "specialist" is fine, but to prove your modeling ideas and to improve your flying you MUST USE the R/C system. You must also be aware of its capabilities and when you may have a potential failure. For instance, if you experience any abnormal performance from your R/C system, have it checked out. You generally have a warning before it completely stops working and you lose a model. An ounce of prevention is worth a thousand cures, right? Better yet, prevention can save a precious model and prolong your flying.

In line with this, there is a problem

How to get the most in performance and reliability from your Radio Control System.

Mail in your questions or concerns.

in the field which was created for all R/C manufcturers a few years ago. The problem was caused by a component producer and the results were not apparent until the equipment had considerable usage. However, this can be a problem to the R/Cer who is using a system produced during that period, a problem which may just now be coming to the surface. It can be serious in that it can cause the loss of a model, however, it does not mean that the equipment is useless. The faulty parts can be replaced at a reasonable cost and the operation of the system will be equal to any other system of its type. The point is for you to be aware of the potential danger and to do something about it when the symptoms show up. Like any malady, they will not go away until a cure has been provided!

The problem is that for a period of time, about 2 to 3 years ago, servos were produced using some feedback pots with a surface that was unusually abrasive. This caused the wipers to wear drastically enough to create a malfunction and eventual failure.

The symptom would, of course, be a servo failure, probably several servos at the same time. Preceding this, you might see a condition where one or more servos have had a neutral change. With all controls in neutral on the transmitter, the servo or servos will have shifted from what had been their normal position. NORMAL is the important word here; it is possible that the servos would not normally have been CENTERED. The centering of the servos depends on the attention given to it by the cat who originally aligned and set up the system. Another important symptom would be the so-called "nervous" or jittery servos, an abnormal tendency to not want to maintain a position that was commanded. Otherwise, watch for any sort of servo action to which you are not accustomed. A servo simply does not change its mode of action unless there is a cause for it.

The so-called faulty pot elements are simply so abrasive that they wear the wiper drastically. When we first developed this type of servo, a particular brand and type of pot element was found to be adaptable from the electronics industry. Things of this sort are extremely expensive to develop from scratch, hence the R/C industry leans heavily on other electronic developments for components. The original pot proved to be extremely reliable and thousands of systems were produced using them. In doing this, the servos were designed and tooled around this particular pot by all of our R/C manufacturers. This, also, is very expensive, as can well be imagined.

The result was that for years the servo pots were so reliable that we practically ignored them. The problem was created when, for some reason, the pot manufacturer decided to change the type of ceramic used for the element. Normally, a pot is not rotated as continuously as we rotate it in a servo, so the change to a more abrasive element probably would not be noticed in other applications. Being only one pea in the pod (and a small one at that!) our R/C people had very little to say about it at the time. Also, apparently no one anticipated that the change would create a problem. As soon as this change got into continuous usage, the problem turned up. Many efforts were made to alleviate it. Other types of elements were tried, along with sophisticated wipers and the use of lubricants. None proved really successful. Recently, the pot manufacturer returned to the use of the original ceramic, and happily, the problem has ceased. However, it still leaves many people with excellent systems which can suffer this malady. Hopefully, they will discover it before something serious occurs. Usually it will be corrected during your R/C systems' annual cleaning, before any problem occurs.

I hope that this discourse will be of some help. Naturally, that is the intention. Some may want to check their servos to see what pots they have. IF YOU HAVE THE ABILITY to remove the bottom cover of a servo you can peek inside. As you look in, high up in the top on the same base as the motor, you will see the ceramic pot element. It will have 3 wires leading to it with soldered connections. The proper pot will be TAN in color. If the color is white, be very suspicious, any other color would be grounds for further in-vestigation. PLEASE, if you do not have the experience and ability, do nothing more. Instead, take the



DALE KIRN

Send in your questions, relative to glow or ignition engines, and these experts will give you the correct answers.

GEORGE ALDRICH

• Last month's column, my first with **M.B.'s** new look, was a fairly rushed affair, as that month (January) had both the Southwest Modelers Show in Dallas and the H.I.A. Show in Houston. It was so rushed, in fact, that we forgot to write any sort of lead in for the beginning of the column.

Anyway, from the outset we want it known that this will be a straight info column with no hedging, much as Dirty Dan has so ably handled the C.L. column. For those of you who write in and want an immediate reply, list your questions (1, 2, 3, etc.), and enclose a self-addressed, stamped envelope. In this way I will answer your questions as I read them and your answers will be on their way the same day.

This month, let's get into a discussion on a couple of related subjects we're always getting letters about... namely, fuel nitro content vs. head compression or head clearance, and the effect on glow plugs ... and a bit on fuels in general.

First, why a cool and standard heat range plug? Basically, it works on this axiom: cold fuel/warmer plug, hot fuel/cold plug. Unfortunately it is not always this simple. Under extremely hot and humid conditions, the smart flyer must be willing to make a compromise. After all, what good does it do to have the fastest model, engine, etc., yet "flame out" on the next to last lap? The time is still a big fat "0".

What makes a plug hot? Warm? Cold? Primarily it's the amount of tungsten in the element base composition, which is mostly platinum. More tungsten means colder plug. A cool plug will not tach as fast as a hot or warmer plug. Under hot and humid conditions, if a flyer will sacrifice 200 or even 400 rpm by running a cool or standard heat range plug, and if he presets or position sets the needle valve, he stands a much better chance of not only finishing the race, but winning it.

Tungsten has another characteristic that offers some advantages ... an affinity for vaporizing under high level conditions, i.e., when you have a lean run. The obvious advantage here is that if you do get a lean run, it's better to have the element vaporize and go out of the exhaust, instead of bailing up and getting caught between the piston and cylinder wall.

While on the subject of elements, here's another little gem to think about. Platinum, our element base, HATES aluminum!! Touch a glowing platinum coil with aluminum wire ... instant burnout! With our engines containing so much aluminum, it's not hard to see why a lean run is hard on your plug. Obviously, some aluminum gets rubbed off pistons, rods, etc., and is carried via the fuel charge right to the plug. Just to add fuel to the fire (no pun intended), think about that plain bearing engine that has its shaft floating back and forth. You hit it with the electric starter, and the shaft goes back against the backplate. Now you have a crank-pin and rod galling against the backplate. Ugh! Aluminum mud, right to the plug.

The most common error committed in racing is made on the starting line. Most flyers start their engine, bring it to peak rpm, and then back off 500 or more rpm, to allow for the engine to "unload" in the air. This is the way to set an engine, but not the place or time. When the engine is peaked on the line, 90% of the time the plug is blown at that point and the chances of the engine running the full ten laps are slim. In the old days, before the pipe, it was not such a problem to keep a plug for the full race. NO MORE!!!! If the flyer will do his needle valve setting in the pits, he has a far greater chance of finishing the race. The needle valve should be pre-set 500 rpm or more rich, after peaking, in the pits. Then when called to fly, a new plug is installed, the engine is started, and the model is launched without touching the needle valve. Using this method, the model leaves the ground with a 'cool" engine and the glow plug intact.

Compression ratio and head

clearance were never more important nor critical than with racing events. Many times a switch from 50% to 65% nitro in an engine will accomplish no more than burning the plug out sooner. When there is no rpm gain, usually an increase can be realized by raising the head with one or two .004 head shims. Another approach would be to leave the head setting alone and run less nitromethane. When the nitro content is increased, the compression ratio is effectively increased also. No matter how well one can fly, a winner must finish the race.

Control Line Rat Race and Scale Racing are other examples of compromise events. The head clearance must be adjusted so as not to blow the plug, or less nitromethane must be used in the fuel.

Perhaps the most significant example of over-compression via nitro content is that of the tuned pipe/muffler .60's so prevalent this past year at the big pattern meets. The engines being used were just not set up to run on more than 5% nitro AND the pipe. . . We have seen and heard of many parts failures in these engines, and mostly it was due to just too much nitro in the fuel. The easiest way to tell, with these engines, is your glow plug life. If you're not getting 8-10 flights per plug, the head needs to be raised, or the nitro dropped, until you do.

Any engine that is run on an alcohol base fuel will have some moisture left inside after flying. Alcohol, by its nature, attracts water. Any engine that does not have a few drops of machine oil, WD-40, SS-1, etc., put in the exhaust and venturi after a flying session, can have rust form on its bearings, crankshaft, etc. The above treatment, and turning the engine over a few times, will virtually eliminate any rusting or oxidation problem.

Every precaution should be taken to keep extraneous moisture from getting into any alcohol based fuel. Just leaving the cap off of your fuel container can allow the alcohol in your fuel to attract extra moisture. In the same light, when a drum of fuel is opened, it should be poured into clean, dry containers immediately. Another solution is to get a small tank of nitrogen and connect it to the drum. As fuel is removed, nitrogen gas is pressured into the air space to keep it dry. Five to seven pounds of pressure is plenty.

While we no longer take in engines for customizing, and plans are to do a book on the subject, if your queries do not involve too lengthy an answer, we will try to answer any and all questions.

OTTO BERNHARDT

• My telephone rings. "Hello," says a voice. "My name is Schmidt, and I'm calling from up North. I understand you convert model glow engines to ignition operation and I've got a couple of questions I'm hoping you can answer for me. You see, I've got one of these new SUPER EX-CALIBUR .92 R/C engines which is mounted in my 1/4-scale Fokker Triplane. We fun fly out here nearly every weekend, and my problem is that this monster of mine sops up glow fuel like it was a dry sponge. I'm going broke keeping this thing in the air. What I would like to know is what is involved in getting an engine like mine converted to run on ignition so it will use regular gasoline and oil like an outboard motor. Also, how much power loss should I expect, and what problems will I have with my radio?

Without question, these are the most common questions asked of me by those contemplating an ignition set-up in their model. The rising cost of glow fuel, together with the amount used by some of the large modern glow engines, presents an ever increasing deadly attack on the modeler's wallet. It's not uncommon to consume over one gallon of glow fuel during a single day of sport flying. No small wonder that so many modelers are looking for ways of reducing their flying costs, which may average \$1.00 per flight. In writing this column, it is not my intention to laud ignition operation over glow. Glow operation is by far the simplest method of getting your model airborne and requires less preparation than ignition operation. It is my desire to be of some help to those who are thinking of converting their model engines to ignition operation, and to help those who have already done so, but are experiencing problems of one sort or another. In discussing this subject, I have to assume that I am addressing modelers who have had previous experience with glow engines and their characteristics. Ignition is not for the beginner! This pertains to free flight as well as radio control, and I strongly recommend that the beginner start out using a conventional glow engine to acquire a background of flying experience before experimenting with ignition operation.

But now, you have made up your mind that you are going to convert your model to ignition operation, so let's get it on! First off, are there any other advantages in choosing ignition and also, what are the disadvantages? Well, let's discuss the disadvantages first. Gasoline and oil mixtures, without certain power

Glow engines using more than 5% nitro will definitely outperform an ignition engine using gasoline and oil. Another disadvantage is the additional weight of the ignition package that is not present in the glow set-up. (In larger models, this is overcome, as you will later see.) Also, the space that is taken up by the ignition system sometimes presents a problem, especially in the small R/C model. Lastly, anytime something new is added to a model, that something is going to have to receive periodic attention and maintenance, adding to the complexity of the whole flying system (as if you don't have enough problems already!).

By this time you are probably asking yourself, "Why am I even considering going to this ignition stuff when all I can expect is more misery and headaches? I think maybe I should chuck the whole idea and stick with my guzzling glow fuel set-up." Take heart, old friend, for now we will discuss the advantages of going over to the ignition camp.

Gasoline and oil used in ignition operation does not affect the finish of your model, therefore, fuelproofing is not required. If your model is silk or paper covered, a nitrate dope finish is perfectly acceptable. Plastic windshields are not affected. Fact is, you can finish your model with just about any kind of dope, lacquer, epoxy, or even enamel, if you wish. Gasoline has no effect on any of them.

Fuel tanks for gasoline can be considerably smaller than those used for glow fuel. Four ounces of gasoline will give you as much flying time as nine or ten ounces of glow fuel. This savings in the weight of fuel may be the equalizer in compensating for the additional weight of the ignition components, especially in models that require large fuel capacities.

Now, how about all that space that is required to contain a completely transistorized ignition system? Well, first of all, it is necessary to know what these components consist of, their size and weight, and exactly what does it do to eliminate the interference with your R/C receiver. In the conventional ignitionpowered model, such as used in oldtimer free flight, there is a terrific amount of RF signal emitted, mainly from the arcing of the breaker points and the spark plug high tension lead. It has been conclusively proven that if all ignition components were completely covered with a thin metallic material, such as brass or aluminum, and this covering grounded to the engine itself, there would be no RF emissions that would interfere with the R/C gear. I have been flying my LANZO RECORD BREAKER in this fashion for over two years, using a five-channel HEATHKIT R/C package, with absolutely no problems of any sort. However, almost all ignition engines used in model aircraft today have the breaker points exposed to some degree. The solution is to stop or reduce the arcing across these points to such a degree that the emitted RF signal will be tolerated by the nearby radio gear. This is the prime function of the transistorized circuit. It reduces the current flow across the breaker points to an extremely small amount, and the arcing is almost nonexistent. The balance of the ignition system is then covered with a thin, lightweight metallic material, such as aluminum or aluminum foil, and all wires are covered with braided metallic sleeving. All metallic coverings and braided sleeving must be grounded to the engine mounting bolts. Properly engineered, an RF shielding over the ignition components will add a negligible amount of weight to the complete system. More on this subject later.

Back to the amount of space this system will consume. Various types of transistorized systems are available today with complete packages measuring as little as 2 x 2 x 4 inches. On other systems, where larger batteries are desired, the space required would be slightly more. Complete package weights might range from 6 ounces to 13 ounces, depending upon the size of the battery. The larger the battery, the longer the flight time between charging. Battery sizes and their characteristics will be discussed in detail in future issues. Until next month...

DALE KIRN

• This issue will be devoted to fuel tank systems, and some of their problem areas. All of the currently produced 1/2A engines are designed to operate on suction type fuel draw. Several Cox engines and the Testors .049 (Series 800) come equipped with a tank/needle valve assembly.

When these engines are new, you should have no problems getting good needle valve settings and



PRODUCT\$ IN U\$E

PHOTOS BY AUTHOR

WORLD ENGINES' PIPER J-3 CUB, by Nick Ziroli, Jr.

• The Piper J-3 Cub is likely to be the most famous light plane in America. The Cub was originally manufactured in 1931 as an E-2. As time went on, it went through other versions. The J-3 Cub was introduced in 1938, with a 65 hp engine.

The Cub has been very useful in the past; as a crop duster, for observation, flying ambulance, and especially a trainer, since it is so easy to fly.

A few months ago, I went up in a J-3 Cub and tried to fly it. I didn't have much trouble, since it's so similar to RC flying.

The World Engines J-3 Cub is also very easy to fly and easy to build.

The fuselage is 1/8 inch die-cut plywood. Every little piece punches

right out without any splintering at all. Almost the entire airplane is plywood, with the exception of a few pieces, including the wing ribs and tail surfaces. The sides are cut to make it look like a framework, and also to lighten it up.

A fuselage like this is very easy to assemble, and very strong. The two center frames are glued to one of the sides, making sure they are straight.

The other fuselage side is then placed on top, again being sure everything lines up straight. I recommend using epoxy, and building on a flat surface.

The fuselage sides are notched on the top and bottom so the frames fit right in. Also, you don't have to trace lines off the plans to know where the formers go.

When the formers are dry, pull the tail together and line everything up. A balsa wedge is put in between the sides when they are joined at the tail. When everything is dry the rest of the formers are put in.

Now the landing gear block is put in, flush with the bottom, so when the bottom is put on, it goes right over the block.

The maple wood mounts are epoxied to the firewall and fuselage sides.

I used a 6-oz. round fuel tank. The plans call for a 4-oz., but the 6-oz. fit nicely. The neck of the fuel tank sticks through the firewall for easy service. This is not shown on the plan.

I put a silicone seal all around the tank, so it wouldn't move. Also, a 1/4 inch balsa square was added on top of the tank so the balsa sheeting had something to glue to. The sheeting is in two pieces, to make it easier to put around the windows. This takes



Here is all the good stuff that comes in the kit box.



The die-cut ply parts are cleanly cut, and easily pop apart.



With Pappa Nick keeping his hands in his pockets so he won't steal the transmitter, Nick, Jr. prepares for takeoff on the first test-hop. It went without a hitch.

some cutting and fitting, and is the most difficult part of the model.

The balsa chin block is now glued to the bottom, and sanded round after the glue dries. Now glue on the plywood bottom, making sure it's down all over. It is recommended to tape it until it dries.

The spruce stringer is now glued into the notches on the top of the rear formers, leaving it extend over the last former about one inch.

Before I hinged the rudder, I added a 3/16 x 3/8 strip to the front of it. This gives a more scale outline. Also, I cut the tip off the rudder and shaped it to a better scale outline.

The stabilizer is in two pieces. It is easy to build if you use Hot Stuff or other instant glue. Now a spruce dowel is epoxied in between the elevators. After you sand all the surfaces, slide the stabilizer in and tack the rudder to it. The balsa fairing blocks are glued on the fuselage, along side the fin. When they are dry, remove the fin and stabilizer and sand the fairing block to shape.

The wings are built one at a time over the plans, only the second wing is reversed, so you don't get two of the same wing panel. This is an easy mistake to make, so don't goof! The trailing edge is pinned down, along with the spruce spar. The spar gets shimmed off the board 3 mm. Because the bottom of the wing isn't flat, it must be shimmed to get the ribs to meet the bottom of the trailing edge.

The ribs are all glued to the spar and trailing edge, and all should be vertical except the center one, which is slanted toward the tip 5 degrees to allow for dihedral. If you want, you can make a gauge out of scrap balsa. I recommend that before you glue the ribs in, add a slot for another 1/8 sq. spar. The first spar is too far away from the leading edge, which would allow the covering to sag between the ribs. Make the slot halfway between the leading edge and first spar.

The plywood wing tip is glued on,



Low fly-by. Very realistic, and a Cub for sure. Nick, Jr. made a few mods to improve image.

making sure it isn't drooping or up in the air. Glue the spars in the top of the wing. They have to be cut to size; then the extra piece slants down onto the wing tip. This is done for the top and bottom. The balsa leading edge cap is glued to the front of the hard wood leading edge. Clamp it tightly so there are no gaps. The strut braces are glued in between two ribs. The ribs are slotted and the braces drop right in. Now the same is done for the other wing panel.

The two inner ribs are slotted in between the top and bottom center spars, so you can slide the plywood wing joiner in. You have to do the same for the other side, except glue the two ribs together tight. Balsa rib braces are glued on both sides of the wing brace, then just the front of the next five ribs. This makes a very strong wing. Now the balsa sheeting is cut to fit in between each spar on top and bottom of the center of the wing.



The sturdy but simple structure, ready for covering. Note webbing between main spars in wing, and additional small spars, noted in text.



Hobby Capitol tail wheel assembly was substituted for scale appearance. Better close that clevis!!



Assembling this part of a car is the fun part, you can see progress.

R/C AUTO NEWS By CHUCK HALLUM

 Numerous requests continue to come in about putting a car to-gether. There seems to be a renewed growth of interest in R/C cars, with new people coming into the sport. So the time may be right for a how-to article on putting an R/C car together. I usually assume that the majority of readers of this column are car enthusiasts . . . and already have cars. But with all the new people coming into the sport and numerous beginners who are still learning, a good construction article will probably be very helpful.

This article will not be a specifically detailed construction article, but rather, an article which points out things to watch for, and problem areas for most beginners. Even after building cars for about seven years, I still have some trouble with certain areas.

When you first get into the sport of R/C car racing, I recommend that you select a kit car and build it as specified by the manufacturer. Only after you learn the basics of car

PHOTOS BY AUTHOR

driving should you depart, or deviate, from a standard car. Which car do you buy? Go to an R/C car track a few times and look over the ones in use. Also send for brochures from the various car manufacturers. Think about it for a while and then decide which car will be best for you. If you're really interested in the sport. get a car which has the features that are important to you and you believe will satisfy your needs for the longer run. If you get a strippeddown version, you may have to get a completely new car . . . sooner than you think. Used cars and obsolete cars, no longer manufactured, are okay if the price is right.

Now you have your car kit. Spread out the parts and look them over. Read the instructions and identify the parts as you read. After going through the instructions complete-ly, you will have some familiarity with the parts, and you can check against the parts list to be sure they are all present and accounted for. Before starting any assembly, 1



A roller on the Z-bar, in the Associated and HRE steering overrides, provides smoother operation.

recommend removing all burrs and making sure all mating surfaces mate ... straightening and filing smooth as required.

Back to instruction number one and you can start the assembly. Usually the basic chassis parts; chassis plate(s), front end and rear end, go together easily. However, take time to be sure the front end is square to the chassis centerline and parallel to the chassis surface. Before attaching the rear bearing blocks to the chassis, make sure the mating surface is flat and the tapped holes have no raised edges ... I usually run a file over the mating surface to be sure it is flat. When mounting the rear bearing blocks, have the bearings installed and loosely mount the blocks. Slip the rear axle through one side so it almost reaches the other bearing. Viewing from above, position the block so the axle lines up with the bore of the opposite bearing then tighten the screws holding the block with the axle through it. Now do the same thing on the other side. This procedure assures that the bearing bores are aligned properly and will result in the lowest friction and wear.

One critical item is the clutch.



The gear mesh, shown here, is adjusted as described in the text.



Fuel tank installation, showing GITS cap filler.





Throttle control installation, using Du-Bro override.

Radio installation in Hallum's car, with servos forward of the fuel tank.

Make sure the shoes pivot properly and freely, and the springs are square and true. If the manufacturer describes adjustments to get more clutch slip, and if you are a beginner, make those adjustments or modifications. Usually it is recommended to lighten the shoes and/or increase the spring tension. On the steel shoes for the small diameter clutches (0.9 in. I.D.), take off about one-third the width of the shoe on the flywheel side, except in the pivot location. Try to make both shoes and spring tensions idential. Out-ofbalance shoes (springs to a much lesser extent) can cause clutch bearing problems.

On cars where the clutch and pinion are part of the engine assembly, take your time to get the proper gear (pinion/spur) mesh. If too tight, there will be clutch bearing/shaft problems, and if too loose, there will be spur gear (plastic) wear and stripping problems. Mount the engine so that the pinion has a little (just noticeable) free play when the spur gear is held stationary. Now rotate the rear axle slowly to see if there is any gear drag at other positions. Some manufacturers have gears that are out-of-round and the gear mesh (free play) must be set at

the fullest engagement point. Also be sure that the full width of the pinion, or gear, whichever is thinner, is engaged. Move the gear or engine so that there is full-width gear engagement.

On cars where the engine and centrifugal portion of the clutch is separate from the bell and pinion, good alignment is also important. Good alignment is required for the clutch to operate properly. Offset will cause extra wear and uneven loads on the bearings. Take the time to get the clutch shoes centered in the bell.

When you're setting up the front end, be sure that each (wheel) steering block is free and rotates easily. The steering cross-arm length should be made, or adjusted, so that the front wheels have slight toe-in. By slight, I mean 2° to 5°, or a frontto-rear wheel spacing difference of 1/16 in. to 1/8 in. And also be sure that when the cross-arm is installed, the front wheels turn right and left full lock with no drag or hang-ups. Finally, install the steering bellcrank or override. Again be sure the steering goes full lock-to-lock freely.

For the time being, put on the front and rear body mounts, but *Continued on page 111*



Castor angle on front end improves straight line stability.



Friction reducing roller in steering override is 3/16 O.D. steel, with brass inserts.



Butch Kroells installs servos on each side of fuel tank. This is a popular arrangement.



Art Carbonell's 1976 equipment layout. A little different, with both servos to right of fuel tank.



Early Model 90 was powered by a Lambert R-266, of 90 hp. Fin is early configuration with a straight leading edge. Cylinder below engine is a filter for the air stove or carburetor air heater.

by PETER WESTBURG

PART ONE

• Seventeen different models of Monocoupes were manufactured from the 1927 Model 1 through the 90AL of 1950, not including the Monoprep, three Monocoach models, three Monosports, five Folkert racers, and thirteen Luscombes, all related, and the products of the genius of Don Luscombe and Clayton Folkerts.

Late in 1926, a group of airminded men in Davenport, Iowa, formed the Central States Aero Co., based in Bettendorf, a suburb, to design and build a small, two-seat, fully enclosed private airplane referred to as the "flying coupe" for want of a better name. You have to be old enough to remember the difference between an automobile roadster and coupe to understand why "coupe". Roadsters were convertibles and coupes were hardtops to a younger generation, but the words meant the same kind of car. In the 1920's, if you owned an enclosed automobile, a coupe or a sedan, you were more affluent than those who had to ride in a roadster or touring car, with isinglass curtains, to protect them from inclement weather.

Don Luscombe had learned to fly in a cumbersome, drafty Jenny, and he didn't like to dress up in helmet and goggles, leather coat, and breeches and boots to go flying.

Continued on page 105

MONOCOUPE 90A



A lot of Monocoupes were sold in Canada and England. The time period of this Model 90A can be determined by the automobiles shown.



This Model 110S was manufactured in Orlando, Florida, in 1941, and was powered by a 185 hp Warner. Flown by Woody Edmonson to win the 1948 International Aerobatic Championship.







The Ace Radio Control "Guppy" can get you into R/C flying at a total cost of around \$100.00, for radio, engine, and kit. Simple to build, and easy to fly. Ace R/C is one of the oldest radio control suppliers in the country.

The 1/2-A SCENE

By LARRY RENGER

 Just a guickie follow-up to last month's column with a mention of Cox's old throttle/muffler add-on system. I set up a Tee Dee .09 with the unit and tested it. Results were interesting. High end was at 16,000 and low around 4000 on my standard, a Cox 7 x 3-1/2 gray prop. Fuel was only 15% nitro; this engine would be significantly better on 30%. The engine tended to run a bit rich in the low mode, but the tank placement was too low, so the needle was a bit more open than in a model installation. The muffling in high speed was not terrifically effective, but with the engine at less than peak it was quite quiet. Most interesting is the fact that this is an engine which is 1-1/2 ounces lighter than the Max .10 FSR and 2-1/2 ounces lighter than the Fuji .099 (all equipped with throttle and muffler). Moving on to things you can

actually still buy, I have photos of a current .09 and a .06 diesel. The diesel is a "M.E. Heron", it weighs 2.4 ounces and will turn a 7 x 6 prop at 10,000 RPM. That should generate a lot of thrust. It is characteristic of British diesels to use relatively high pitch props at low RPM to generate power. You make the propeller's airfoil work at a higher angle of attack at lower Reynolds numbers, but you also have lower skin friction drag losses. Efficiency may actually be better than a glow engine at low model speeds. Diesels are designed to handle more heat and higher stress levels; glow engines are built to deliver power by turning higher RPM on low pitch props.

In the air, this means that a diesel can fly a plane relatively slow, while still having the ability to make it climb at a steep angle. A glow engine with the same displacement typically will fly that plane faster on the straight and level, but won't climb as steeply. It is like having different gear ratios in a car. Anyway, diesels are very interesting. The Heron and several other makes of diesels of various sizes are imported by Hobby Hideaway, RR 2, Box 19, Delavan, IL 61734.

Next engine is the Cipollo .09. This is imported by Indy R/C, 10620 N. College Ave., Indianapolis, IN 46280. The Cipollo is a high performance engine and on 15% nitro, turned that same 7 x 3-1/2 at 15,500 RPM. Cost of this engine is about half of other engines with similar power output. Construction is an interesting blend of screw machine and cast parts. Finish is good, and the engine is quite light.

Final engine for the month is another "oldie-but-goodie", the Cox "Space Hopper". This engine was the improved, but simplified, reed valve engine which replaced the "Thermal Hopper". While not as powerful as the later Tee Dee engine, the Space Hopper still is a powerful engine, hotter by far than the more modern Black Widow. Neat features of the Space Hopper



The Space Hopper was an early generation Cox engine, nearly as powerful as a Tee Dee.



Hobby Hideaway imports this M.E. Heron .059 diesel from England.

were the very light weight and the beam mounting. The needle valve could be oriented anyway you choose. This particular engine was retro-fitted with a Tee Dee piston and cylinder, so it turns a 6 x 3 Cox gray prop at 17,000 RPM, only about 1000 below a stock Tee Dee.

By the way, I am interested in running photos of other old-time small engines. If any of you collectors out there will send in the pictures I'm sure the more recent readers would be interested in seeing a Spitzy, O.K. Cub, K&B Infant, Fury, Atwood Wasp and Shriek, Holland Hornet, WenMac, McCoy, O&R, Fox, or even an Albon Bambi .008!

Let's hit the Beginners Workbench section before taking a look at some airplanes. This month we move into basic radio systems as an overview. I am not going to dig into the electronics, just the factors you need to know in selecting a system type. There are only two types of basic radio systems still in use today. They are Pulse Proportional and Digital Proportional. If someone offers you a good deal on an escapement system or an Analog Proportional, or even a Reed Multi system, be sure to trade them the Brooklyn Bridge for it. Try to get some cash in the deal too so you can pay for the crashed airplanes.

Getting into radio can be expensive, of that there is little doubt. There is a way to minimize the initial expense, however. The least expensive radio systems are the pulse proportional type. They use a simple single channel pulsed wave which kicks a coil and magnet actuator. The rudder flaps back-and-forth continuously, but the airplane flies smoothly. The actual radio transmission and reception are identical to digital systems, but the coding and actuating portions are far less complex. The few drawbacks to this type of system are due to its simplicity. First, you only get one channel, unless you go through a peculiar mechanical linkage and a somewhat more complex electronic coding system. Stick to the single channel, believe me! Second drawback is that the trim location is not fixed, small adjustments are usually necessary from flight to flight. Third is that the control surface must be hinged extremely freely. These are very minor annoyances; the system works well.

Two really significant advantages to pulse radio are the very lightweight possible with the system, and the low cost. they go as low as 2.1 ounces in airborne weight. Even the largest system, capable of handling a .15 powered model, only weighs in at 3.5 ounces. System cost, complete



A scratch-built twin by William Kuhnle is aerobatic, even on one engine. Uses two Medallion .049's for power.

with charger is only \$75.

The other type of radio system worth having is the Digital Proportional radio. A complex coding and decoding system is used along with a feedback servo-mechanism actuator. What that means, is that the system compares where the controls are set to what was commanded, and if there is a difference, the servo moves to eliminate it. When the setting is correct, battery drain is very low. Accuracy and repeatability are very good. Systems are available from one to seven channels, and cost from about \$100 to as high as \$1000 for the top custom units. Most 1/2A flying is done with 2 channel units ranging from about \$120 to \$250, depending on the manufacturer and the weight of the airborne unit. Systems are available as separate components, or as "Brick" units containing the receiver and servos in a single package.

Digital proportional servos are very powerful compared to pulse actuators; this means that you can accept somewhat stiffer linkages and hinges without loss of control. The digital servo moves smoothly and then stops at the commanded location rather than using the "aero-



Capillo .09 imported by Indy R/C, beautifully made.

dynamic averaging" of the pulse system. A drawback is the comparatively high cost of lightweight equipment; the lighter, the more expensive.

In selecting a system, if you want pulse proportional, there is only one place to go: ACE R/C, Inc., Box 511, Higginsville, MO 64037. They make



The Model Factory has this 42 inch span sport scale EOS/001. Molded foam fuselage and balsa covered foam wing construction.



Sandy Edward's Pee Vee at Torrey Pines.

A closer look at Sandy Edwards' original slope soaring Pee Vee, It is a speedy machine.

R/C SOARING

by Dr. LARRY FOGEL.

PHOTOS BY AUTHOR

• I won't forget my introduction to the Wanderer. One Sunday morning, Mark Smith turned up at our Escondido flying site with his new creation. I asked, "Why?" He went on to describe the need for a trainer that will perform efficiently and still fly "hands off". I interrupted, "You mean, a plane that's very stable?" "No," he said, "I mean, 'hands off" ... watch". He placed his transmitter on the grass, hooked the histart tow line to the Wanderer, and walked back to the point of proper tension. I was tempted to remind him of the transmitter back there on the ground, but, "Surely Mark knows what he's doing ... anyhow,



Bill Floyd with his experimental flying wing glider.

it's his plane!"

Well, by golly, he threw it, and up she went straight and true, off the tow line at full altitude and into a long cruise. That was quite a demonstration of faith. And the Wanderer is not only stable, but rugged and inexpensive as well ... a winning combination.

Now Mark is coming up with an expanded version of the Wanderer. If 78 inch span is good, then 99 inch span should be better. The new oversized Wanderer also promises to be "hands off", rugged, and inexpensive. It has a two-piece wing of 840 square inch area. It is 48 inches long and weighs in at 36 ozs. when ready to fly. By this summer, that plane should be a familiar sight at every flying field.

The 1977 National Soaring Society Excellence Award Program in now history, and we're already a long way into the 1978 program. Here's your chance to compare your skill with that of your fellow fliers all around the country, even without



Stability tests may lead to a full size hang glider.

leaving your own local scene. Any member of the NSS can participate. You offer your score in up to six qualifying contests. The best four of these is normalized, taking into account the performance of all other fliers in those contests. Frank Deis, member at large, devised this program and has served as Scorekeeper and, as such, authorized sculptor Charles Hayes to create an original statue representing our soaring flight; this to form the theme of the trophies for this event. First Place for 1977 goes to Fred Weaver of the San Francisco Bay area. Second Place goes to Skip Miller, who already holds so many top honors. All the winners can be proud of their award. It's the kind that can't be bought . . . only earned.

What's up at Torrey Pines? ... Sandy Edwards has come up with a "Pee Vee" that really perks along. It's scratch-built all the way. He's also flying the Ace kitted Mach None (without the engine). It's as aerobatic as intended.



Radio equipment simulates Bill's weight.



Chet Herbert's over-size aileron experiment.

Chet Herbert is experimenting with oversize tip ailerons, hoping to gain aerobatic capability without losing efficiency. Bill Floyd is now deeply into hang gliding. He wants to come up with a better design. A way to do this is to create and test a scale model in our open wind tunnel (Torrey Pines) ... thus the twochannel flying wing that may become a scale model before long. Let's wish him well.

Hi-Flight Model Products (43225 Whittier Ave., Hemet, CA 92343) has just introduced a really new winch. The Hi-Flight 12 is powered by a conventional 12-volt automotive battery, and it's unique in that a single foot control allows the pilot to choose slow, medium, or high winch speed. In fact, the speed may be varied continuously through the launch as dictated by glider size and wind conditions. An isolation switch is provided to prevent high speed if the flier so desires for safety's sake. The price is \$179 (without battery). It also comes in kit form. Every club should have such a winch, as should all those individuals who take RC soaring seriously.

I receive quite a bit of mail. Ordinarily, this correspondence remains



Fuselage of Chet's slope soarer is made of plywood. It has a compartment for lots of ballast. Fast indeed!

private. But let me share Bill Bartlett's query. This proves that RC soaring now reaches the hinterland (including Central America). 'Dear Dr. Fogel,

"There are a group of us down here, working and living at a fairly isolated gold mine, who have decided to take up RC soaring. We have two Wanderers flying and an Olympic II almost completed. None of us have any RC experience, although two of us have over 200 hours in full scale sailplanes.

"We have no local hobby shop and customs can be capricious, so mail orders are risky and we depend on our annual leave and traveling salesmen to bring things down for us. So a purchasing error or pilot error can represent a considerable setback for us.

"We're now to the point where we only make a major repair every 20 flights (we used to make a major repair every three flights). In part, this is because it's hard to break the Wanderer. Right now both Wanderers are down for repair because we were flying in too good a thermal (without spoilers) and were coming down in a fairly high speed spiral and hit a rotor caused by the wind hitting the ridge. I cracked a wing spar and the bottom Monokote. The plane hit the ground coming straight down from about 200 feet. The nose cone pulled off when we pulled the fuselage out of the ground. There were two shattered bulkheads and the receiver wouldn't work.

"Our houses are on a ridge about 900 feet above the savannah floor (there is no road to get down there). We haven't tried ridge soaring yet because our yards are small and full of obstacles and we can't control the aircraft well enough to guarantee a landing in a 60 meter circle. Again spoilers would help.

"I write you all this in the hope that you help us find a knowledgeable pen pal (hopefully with electronic background as well)... one who is willing to correspond and help less knowledgeable people to do things and understand why things are the way they are. For instance, why don't gliders have ailerons? Can a Kraft KP5CS be wired to an EK or World Engines transmitter for training? If so, how? Is there a complete catalog of RC accessories? How can I get the Torrey Pines club magazine? Can I join the National Soaring Society and receive its magazine?



Mark Smith's latest, Wanderer 99. See text for description.



Structure for Mark's Wanderer 99. Note wide spar cap and turbulator spars on inboard panels.



The 1977 NSS Excellence Award Trophy is an original sculpture by Charles Hayes. Fred Weaver is recipient.

Are there any advanced books on RC soaring? We need a sketch of a spoiler system that can be compatible with the Wanderer (we're standardizing on the Wanderer because it is inexpensive, strong, and we don't know about other suitable gliders).

"I want to build a 100 inch straight tapered wing for the Wanderer (without polyhedral) in hopes of getting better light air endurance. What airfoil should I use? ... and again, why no ailerons?

"Thank you for all your help. "Sincerely, Bill Bartlett, c/o Rosario Dominicana, apto. 944, Santa Domingo, Dominican Republic."

'Dear Bill,

"I hope that a number of our readers will be in correspondence with you. I'm sending along a complimentary issue of the RC Soaring Handbook for the San Diego area and application forms for joining the Torrey Pines Gulls and the National Soaring Society. Both groups provide interesting reading on a monthly basis. With respect to your specific questions: many gliders do have ailerons. Usually these are to provide an aerobatic capability. They look and fly similar to



The Hi-Flight 12 winch has many desirable features. Available complete or as a kit. See text.

pattern power models, but use ridge lift. Thermal aircraft are configured to bank when the rudder causes a yaw which increases the airspeed of one wing relative to the other (and to some extent masks the slower wing by the fuselage). The difference in lift produces roll. A properly designed sailplane of this type should smoothly roll into a coordinated turn and roll out to level flight just as easily.

"On the other hand, aerobatic aircraft are configured quite differently. Here, there is much less dihedral. A rudder command then causes yaw without roll (and increases the drag). The ailerons cause roll (and are most effective with minimum dihedral). I suggest that aerobatic sailplanes of this type are great sport, especially if dependable ridge lift is available, but they require considerable skill because of their greater speed and less stability. For safety's sake you need a landing strip of at least two hundred feet.

"A rather complete catalog of RC accessories is available. It's called, *RC Buyers Guide*, published by Boynton and Associates, Clifton House, Clifton, Virginia 22024 (\$4.25). There's also the catalog published by Sig Manufacturing Co., Inc., 401 S. Front Street, Montezuma, Iowa 50171. The newest edition, number 37, includes the complete Sig line and practically all other lines now available (\$1.50). Both items will require additional postage to the Dominican Republic.

"There are a number of good books on RC soaring. In particular, may I call your attention to Model Glider Design by Frank Zaic, and Model Aeronautics Made Painless by R.J. Hoffman. Both these books are reprints, currently available through the Academy of Model Aeronautics. They're classics and well worth reading. May I also recommend Radio Controlled Soaring, compiled and edited by Dave Hughes, from Radio Control Publishing Co., Ltd., 1974. This presents an up-to-date view, but primarily from the British vantage point.

"Spoilers are indeed a distinct asset for larger aircraft, but are unwarranted in an aircraft like the Wanderer. I agree, this is a fine training ship, but there are other good trainers as well. For example, the Pierce Aero is about the same size, easy to build, light in weight, and fine in light air. The Super Questor is a bit more of a challenge, and yet easy to build.

"Mark Smith will soon produce a new 99 inch wingspan Wanderer. I expect this will be of particular interest to you. I'm sure it will

 I am continually bombarded with inquiries for reference materials on R/C Model Yachting. Except for the assembly manuals which accompany the typical yacht kit and a couple of paperbacks, the lack of information is complete. I am pleased to report that my good friend Rich Matt has made a major contribution to filling the gap. He has just turned the rights of his book over to the AMYA. Titled, "BUILDING A COMPETI-TIVE, YET ECONOMICAL SANTA BARBARA ONE-DESIGN R/C YACHT," Rich takes the reader from a bare hull to the completion of a well outfitted, competition-ready boat. Much of the content is directly applicable to any class of yacht. I feel that the sections on hatch making and deck attachment will be deemed the most valuable. The book can be obtained through the AMYA Secretary, 2709 S. Federal Highway, Delray Beach, FL 33444. The price for AMYA members is \$5.00, non-members will be charged \$7.50. Why not pay half of your annual dues of five bucks by joining and buying the book for a single investment of \$10.00. At any rate, if you order, tell them that you learned about the book in the pages of Model Builder.

A recent change in the allowable roach on an EC/12 mainsail has caused me to spend a good deal of time recutting sails that have been sent in by some of the skippers. What I've learned from viewing these sails may be of value to you as you try to make your investment last as long as possible.

The most obvious problem seems to stem from spreaders that have sharp edges. When running downwind, the sail is pressed up against the shrouds and rubs on these sharp edges. Some of the sails I've received have had holes all the way through. Spend some time smoothing the ends of your spreaders. I put a drop of polyester resin on mine and use very fine sandpaper to shine them up.

The next problem, in frequency, is hard creases put in the sail by mistreatment. This is simply the result of not exercising care in the handling of the sails when they are off the boat. Surface smoothness has a direct effect on how much power you can get from your sails. Any creases upset this smoothness and encourage the air to break away from the sail, or turn into turbulent flow. Either are deadly to an efficient sail plan.

Stretched leeches are often observed. About 25% of the 1-year-old sails show this, while 65% to 70% of the two-year-old sails do. This stretching is caused more by the



The author, aboard "Intrepid", which is on a starboard tack, defends against a port tack Soling.



breaking down of the resin in the leech area of the mains'l than by something like too much vang and/or sheet tension. The two latter are usually balanced by wind pressure, and if assisted by a tabled leech or hem, the leech will still be in fairly good shape at the end of its second year.

Grease and dirt are more of an esthetic problem than one of power or efficiency. Yet, a dirty sail just seems slower than a shiny clean one. Kind of like the feeling that your car seems to run better after you have given it a bath. I use that wonderful spot remover K2R on sails and it seems to handle all but the most stubborn stains. Rust stains can often be removed by using soap and water. A skipper who looks after his equipment is going to be more likely to do well than one who ignores it. When I go to a regatta, I worry much less about a boat that looks like it just came out from under the bed without being dusted off. Chances are that the skipper has a goodly number of cobwebs between his ears and will not be a major threat out on the course.

Regular checking of battens is a must. The common problem I found was the substitution of battens that were too stiff, especially in the uppermost pocket. The batten should be long enough to support the sail's roach easily. It then must function to allow a smooth continuation of the sail shape all the way out to the leach. If the whole roach looks like a flap on an airplane, then thin your battens down until they let the sail curve all the way aft.

SAIL HANDLING

Excerpted from the instructions included with all Carr Sails GENERAL MAINTENANCE

Your new sails have been constructed with the care and experience necessary for successful competition. They are your powerplant and must be treated with care and respect. When not sailing, your sails should be left attached to the spars with all tensions relaxed along luff, foot and leach. If left with a strain on them, the sailcloth will creep somewhat and eventually distort. This may culminate in a sail which will measure too large for the appropriate class rule that you sail under, and you may not be allowed to race. We carefully check all dimensions of the finished sail, and generally make the sails 2%-3% undersized to avoid just such an unpleasant possibility. If the sails become soiled, they may be washed in a mild detergent by laying them out flat, washing and rinsing well. Avoid putting creases in the sail and let them dry completely to avoid unsightly mildew. If you sail Continued on page 136





Steve Muck's Lil Lightning is popular in the midwest.

A different approach to boating competition; Sol Rubino's models of the Monitor and Merrimac.

R/C POWER

PHOTOS BY AUTHOR

By BOB PREUSSE

• We wish to thank all of the modelers who have written to **Model Builder's** Boating Clinic. All letters have been answered personally by the author, and we hope you have found the responses informative and helpful. We don't profess to have all the magic answers and speed secrets; however, we do proclaim to be helpful and interested in your boating projects.

Over the past two years I have written monthly how-to construction articles and occasionally a contest report or R/C hobby show review. This month I will openly discuss several major concerns of the boating sector. Some of the comments reflect personal opinions but, I must say that your comments and letters are the basis for this article. I am by no means force feeding these views upon you, so please form your own opinions and send your comments into the magazine so that we can share your ideas with our readers.

The success and popularity of R/C boating has, of course, been good for the hobby however, the rapid growth has caused a few problem side effects. When was the last time you went to a one-day contest that was open to all the standard mono and hydro classes, including scale hydro, .09 outboard and deep-vee, and you competed in more than two heats per class? If you have been in boating for more than five years, you will remember the good old days when each class was run three, or even four times at a one-day meet. The boater who could afford to compete with only one class really got more enjoyment racing four times in one day. Today, with the abundance of boats and several new, growing classes, in both

NAMBA and the IMPBA, the internats will have to run a format of one class per day or else racing would have to be stretched out over four or five days. The latter idea is bad because it will cause added time and expense for out-of-town boaters, and yet, they would not effectively race in a greater number of heats. Let's face it, with an overabundance of entries a club can only schedule approximately 75 to 100 heats per day.

BOATS

To try to solve this problem, we must first state the real problem. It seems to me, and other boaters who I have talked to, the real problem is the poor distribution of radio frequencies in each class. How many times do we endure through two and three-boat heats because of numerous conflicting frequencies? This wastes valuable minutes and even hours over the average con-



Bill Pistello and Gary Preusse duel with Deep Vee's.



How about those sturdy fittings on the real thing? Photo was taken in the pits at Detroit races.



David Preusse points out the trouble on his dad's outboard.



John Ackerman helps IMPBA Pres. Len Skwiera with his OPS powered Crap Shooter, at Indianapolis.

test. We should be able to handle all the added entries if we run seven and eight-boat heats. The Indy R/C Boat Club does it at the Indy Unlimited each year. This race is controlled by pre-registration and the club only allows twelve to fifteen entries per frequency. They schedule so many heats each day and that's it.

That system may work for the unlimited type race, but what about the regular heat racing? If possible, boaters should be able to run alternate frequencies in each radio. With the new plug-in module concept by Kraft Systems, it is very easy to change frequencies at the pond. The host club can then request alternate frequencies when one class has a poor spread. We should support the radio manufacturers who promote design with the boaters' interest in mind!

Secondly, your club should keep records of its contest registrations to determine which frequencies are congested. Then, when new boaters join your club or a current member starts racing a different class, he or she can be given a preferred frequency. Remember, let's be cooperative now, so we don't need any more rules!

Thirdly, we need more frequencies. The FCC will take the boating sector more seriously if we band together and flood them with letters. Jot down your thoughts on the need for more frequencies and remember to stress R/C boating as a family hobby. Send your letters to the FCC, Washington, D.C.

Another major concern expressed in your letters and discussions seems to be dissatisfaction over the current trend of frequent rule changes (mainly in the IMPBA, 1 believe) over the past year. I would like to express a few general words of thought on this subject. First of all, let's not destroy the enjoyment of boating by overburdening the hobby with needless rules or rule changes. Next, when you have an idea for improving a rule, first talk it over with your club members and also the other clubs in your area. Decide if the idea has real merit that will benefit boating. Remember that proposals that give advantages to individual interests and disagree with the fundamentals of good, competitive, open boating, should never become rules. Next, when you are sure your idea would make a good rule, stop and think it through again! Boating has grown because of its enjoyment and relaxation. Let's keep that in mind.

The race schedule seems to present problems in some areas of the country. In the Midwest, there is a lot of activity in June and September (every weekend) and only one or two races in July, not counting those in the East and West, which are definitely too far for weekend travel. We need more planning of racing schedules, not only at the club and district levels, but how about a joint effort between NAMBA and IMPBA in districts where both organizations have representation.

We need to do more for the beginners to our hobby. Has your club held any club races? These are much needed to help the beginners develop good driving skills and ease them into competitive racing. In fact, why not consider club racing as spring training for the race circuit? Many seasonal boaters (West Coast boaters are lucky) could use a club race early in the boating season to get back in the groove prior to the regular schedule. If you support club racing and more participation for beginners, bring up your ideas at the next club meeting.





The new Kraft plug-in module concept is a valuable aid in relieving frequency conflicts at boat races.



The author checks controls before releasing "Mara" for a shakedown cruise. Being a true auxiliary, there's no need to worry if the wind dies. PHOTOS BY THE AUTHOR

R/C KETCH "MARA" PART 1

By WALT MUSCIANO ... One of modeling's best and most prolific designers presents a semi-scale R/C cruising ketch that can be returned to the dock if the wind dies, using its electric powered auxiliary motor.



"Mara" is a convenient size model; small enough to transport easily, large enough for realistic performance, and spacious enough for control equipment.

• "MARA" is beautiful, stable, agreeable, swift, dependable and smooth. Truly, it is impossible not to fall in love with our Mara once you know her. Mara is a development of two previous double-ended ketch designs built by the author, and is the epitome of the scale model sailboat. The double-ended, twomasted ketch design features a wide beam, with lines that provide superb stability coupled with moderate speed; in most cases faster than powered scale models.

Mara is radio controlled, however, the craft can be made free sailing if desired. Our model can be operated on two or three channels; one for steering, the second to haul in or play out the sheet lines so as to arrange the sail angle to obtain the maximum results from the wind, and a third channel, as we used, to start an electric motor to bring the craft to shore in the event that the breeze stops and the model is becalmed in the middle of the pond.

The sails can be lowered manually and the model operated on motor power alone when desired. Mara is a scale model patterned after the very popular wide-beam, double-ended ketch designs, many of which have sailed across oceans. Not only does the wide hull give Mara stable



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"Mara" under way, sails well filled with wind. She receives compliments from anyone viewing her graceful appearance and performance.

operation, but also provides plenty of room in the interior for equipment. Although we installed the proportional Aristo-Craft Micro-Prop equipment with the Dumas-Probar sail control with success, any other dependable units can be used. CONSTRUCTION

Keel pieces are traced and cut from 1/8 inch plywood and assembled along the splice lines, using plenty of cement. Two entire keels must be fabricated and then firmly cemented to each other. Before they are joined, a groove for the propeller shaft tubing must be cut into the inner surface of each keel half. Trial fit the brass tubing into the grooves by pressing the keel halves together around it. When the fit is good, roughen the outside of the brass tube with medium sandpaper and cement the tube in one groove, using plenty of the adhesive. Now, apply plenty of cement to the keel halves and cement together. Let dry for several hours under weights. When dry, add cement to the ends of the tube installation. Be certain that the notches for the bulkheads are accurately cut after assembly.

Bulkheads, supports, and mounts are now traced and cut to shape from 1/8 inch plywood with a coping saw or jig saw. Cut the notches for the keel and chine accurately. The supports and mounts for batteries, masts and electric motor should be inserted into the bulkhead slots, but not cemented, before the bulkheads are fitted to the keel. After the bulkheads have been cemented in place and are dry, the platforms can be moved into final position and cemented to the bulkheads. Using plenty of cement, fit the bulkheads into the keel notches, egg-crate fashion. Check the bulkhead alignment as the cement dries. The deck is cut from 1/8 inch



Forward hatch holds receiver switch and receiver batteries. (1) Switch. (2) Hatch cover (removed). (3) Decal name of your favorite female. (4) Receiver batteries.

sheet balsa. The grain should run athwartships (from side-to-side instead of from bow to stern). Butt join the pieces together, using generous quantities of cement. Check the deck outline with the plans and be sure that the three openings in the deck are cut accurately. Also cut small holes for the masts in the deck. Slots must be cut along the deck edge for the bulkhead extensions that act as bulwark braces. Fit the completed deck atop the bulkheads and be certain the deck outline meets the edge of the bulkheads. When all fits well, cement the deck atop the bulkheads, using pins to hold it in place until the cement dries. Add more cement to the bulkhead/deck joints from the bottom.

Planking strips are 1/8 x 1/4 medium balsa. All strips must be well cemented to the bulkheads and to the adjoining strips. The installation of the strips should alternate from one side of the hull to the other. Never add more than two planking strips to one side at a time without then applying two strips to the other side. Planking begins midway between the deck and keel. Use plenty of cement and hold in place with pins until cement is dry. When one strip is in place on each side, a planking strip is cemented to each side of the original strip on each side of the hull. Continue in this manner until the hull is complete. As planking progresses, it will be necessary to bevel the sides and taper the ends of each strip in order to insure a good fit. As the strips approach the deck, they should be continued above the deck until the proper height is attained. Those strips that are above the deck must extend from keel-to-keel, fore-andaft, to form a bulwark. After the cement is thoroughly dry, the planking seams and planking joints with the bulkheads should be reinforced with additional applications of cement, using a long strip of scrap balsa to reach the inside of the hull. Trim the bulwark to the proper height.

Hull end blocks are laminated from one inch balsa, then roughly cut to shape, slightly oversized, and cemented to each side of the keel, the deck, bulwark, and fore-and-aft end bulkheads. Let dry overnight. Gently carve the blocks to shape, using the bulwark, planking on bulkheads, and keel, as the guide.

Sandpaper hull thoroughly with fine and extra-fine sandpaper until smooth. Wipe cement into any cracks between planking strips, and sand again. All remaining cracks are filled with Plastic Balsa, pressed into





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Scene: Moffet NAS, 1937. Edwin "Foo Foo" Elliott, Salinas, Calif., launches his Brown Jr. powered original gassie. Vern Aliver, S.F. Gas Club president was timing. Vivell photo.



• This month's lead-in, is primarily concerned with the Old Timer **Events in the All Electric Annual held** at Mile Square on January 29. Not enough credit can be given to Bob Boucher, of Astro Flight, who con-ceived, pioneered, and acted as Contest Director for all meets to date. Of course, Bob runs the radio controlled events, while his trusty Lieutenant, Bill Stroman, presides over the free flight activities.

However, fate dealt a cruel blow to Bob Boucher, as the night before the contest, some no-good broke into his car (parked in front of his shop!) and rifled the contents,



making off with models, transmitters, chargers, and field boxes. The columnist also has discovered another way to lose a contest. In staying over at one of the local modeler's homes, he put everything on charge that night. Little did he know that in some of the old homes. the electrical baseboard outlets and the overhead lights are on the same circuit! On the field, the transmitter was scrutinized for every fault, and concluded the batteries were shot.

All of this effectively cut down the already small entry in the O/T R/C event. Boucher's Buccaneer and Pond's Turner Special were the ones to beat, based on their performances at the Las Vegas SAM Champs. This is not to detract from the winner, Mitch Poling's fine flying Brigadier, which won first, nor to disparage Bruce McAvinew's Ehling Contest Winner. After all, they flew and did a good job of it!

Over on the free flight end of things, competition was real heavy, with an .020 electric powered Strato





Nicely constructed framework of a Playboy Senior, by Ted Katsanis.

Dave Brodsky actually flies his GHQ Robotaire powered by GHQ. (How about prop rotation?)



Joe Elgin, designer of the Playboy, with Ted Katsanis' model.



Dave Bruner, SAM 21 Veep, readying his R/C Scram at SAM 27 Year Opener.



Nick Sanford's 47 minute flight with his Ehling "4-Hour" model showed the boys how to do it.

Streak showing a remarkable climb. With two "max" flights to its credit, Jim McDermoth was an easy winner over runner-up (last year's winner) Gene Wallock.

Also noted on the field, were Tony and Addie Naccarato, with Addie pulling a third using a Zipper A. Tony was unable to do much in any of the events, so some first class kidding was going on in that car on the way home!

It now appears that this Electric Contest will be a steady feature every year at Mile Square. So don't say you weren't warned!

1978 SAM CHAMPS

In several long distance calls to Woody Woodman, this year's SAM Champs Manager, Woody wants to make it clear there will be a flying scale gas powered event. This event has been held ever since the SAM Champs got started and for some reason got overlooked when the Rubber Flying Scale Event was listed.

Rest assured, both events will be held at Coyle Field, New Jersey. Incidentally, before we forget it, the Rubber O/T Scale will be held on the first day (Tuesday), July 25.

Rules for the Rubber event will be the same as the Gas O/T Scale event,



Jerry Sandford launching his Powerhouse. Too bad that's such a crowded site!!

with the ruling on internal combustion engines being eliminated. There will be no restrictions as to the amount of rubber you care to use.

Also, if we didn't announce it before, Bob Boucher, of Astro Flight, will again be sponsoring two electric O/T events at the Champs. These will be the same as at the Las Vegas SAM Champs; O/T R/C Electric, and .020 Replica Electric. Trophies will be given to third place. Unless otherwise noted, John Pond will run these events. Time and date of each event will be announced at the Monday night Bean Feed. Contest Manager Woodman also sent us an aerial photo of Coyle Field. It is approximately 1-1/4 miles square with 2,000 ft. long runways. The photo makes the field look better than it actually is. Woody recommends you bring some sort of cover, as the soil is packed sand. Get some of that stuff in your ignition jewel and you will really have something to scream about.

Takeoff boards will be provided, if necessary, but if winds are normal, then boards will not be necessary and the drift is 1-1/4 miles downwind. Neat, huh? Woodman sug-



Winners at SAM 49'ers Texaco event (I to r): Karl Tulp, Bob Von Konsky, and Don Bekins. Otto Bernhardt's Lanzo.



SAM 27 member, Bill Hooks, flies his Quaker with a glow engine, and has nothing but fun.



Larry Vance, O.T. decal maker, with his Bleriot 11 at the 1978 VAMPS Annual.



Jim Adams' Clipper can be quite aerobatic when the DT kicks in just as the plane is launched!!



Bob Chambers, Las Vegas, and his Class B Skyrocket.



Reporter Bill Stroman's Albatros B-11.



Frank Szucs and his Zipper.



Bill Cohen with Ranger X.

gests that all contestants carry a compass if you are going into the surrounding areas around the field, known as the Jersey Pines Barrens. This is desolate area and one can get lost for quite some time. So don't say you weren't told!

Inasmuch as this time of year, when the SAM Champs are scheduled, is the height of the tourist season at Jersey shores, motel reservations should be made early. Therefore, get your requests in for a contest packet, to Woody Woodman, 389 Floral Lane, SaddleBrook,



Larry Schwartz, coffee cup, and Brooklyn Dodger.



Bob Oslan thinks it's a Strato Streak.



Karen Fitzsimmons, Larry Sargent, and his .020 Replica Brooklyn Dodger.
NJ 07662.

A list of motels will be included for your choice. Toms River is the largest town close to Coyle Field, with most of the major motels. Woody also points out it is not inconceivable to stay at Atlantic City (the eastern Las Vegas) which is only 45 miles away. The tollway does allow one to traverse the distance quickly.

In closing out this field report, motorcycles should provide no problem in retrieving models. The field is large and open and is still used by the Forestry Service. The only thing requested is that you don't indulge in big "dig-outs", and scatter gravel and sand all over the contest site.

(If we remember correctly, it would also be a good idea to bring along some mosquito repellant. The big ones out there can sometimes be confused with .020 replicas! wcn) ENGINE OF THE MONTH

In the autumn months of 1937, a group of Oakland (that town across the bay from San Francisco) modelers who had been flying 5- and 6foot designs, such as Folly, Skeeter, etc., got together to discuss the possibility of improving the Baby Cyclone engine. This motor, although indisputably the economy king, left a little to be desired for power in the limited-engine-run events. These events were proving to be quite popular and appeared to set the trend for the future.

It was then that the Brown Motor Gas Engine Company was formed, located at 1933 Ashby Avenue, Berkeley, CA. Forming a "Technical Advisory Committee" were Dick Schumacher, Rod Doyle, Joe Culver, Mel Avery, and W.B. Curtiss. C. Curtis was in charge of sales.

Starting with the basic size of the Baby Cyclone (to which the Little Dynamite owes its ancestry despite all other claims) it wasn't long before Jim Brown, the machinist, and the boys, came up with an engine that ran much better. Best of all, the number of parts and gaskets had been reduced, and all parts greatly strengthened. It took quite a crash to damage this engine.

Jim Brown then started producing engines mostly on demand, as the engine was little known except locally. Dick Schumacher probably did more to popularize this engine than anyone else, as he won innumerable contests with his "Ethy" design powered by a Little Dynamite. It wasn't long before every prominent California model builder had a Little Dynamite in his stable.

In an early letter (March 6, 1938), Jim Brown wrote to Earl Vivell (a hobby dealer and distributor) on the



Coyle Field, near Lakehurst, New Jersey, 1978 SAM Champs site. The light areas are sandy, the dark areas outside the rectangle are pine forests. Bring your compass!!



Hugo Lung tunes Zipper built from P&W kit, as Cliff Silva and Nan Taibi watch. Taft, Calif.





Nick Nicolau gets ready to crank up his Super Buc at SAM 49'er Texaco contest. Loren Schmidt holds on. Loren makes up custom kits on most any O.T.



Phil Bernhardt takes a fun flight with his dad's Lanzo. Ship has been around a long time. Was featured on the cover of our July 1973. Full size plans also available from MB. Drawn by Phil.

various discounts available, ranging from 33 to 40 percent. At that time, the motor was priced at \$14.95, complete with coil and condenser, and \$11.50 if you preferred it bare.

Shortly thereafter, Offenbach's Hobby Craft Supply (the largest Northern California distributor at that time) negotiated an exclusive distributorship with Jim Brown for the sale of Little Dynamite engines. In September, 1939, the initial announcement advertisement appeared in Model Airplane News. This proved to be only a "one-shot" deal. The glowing pictures painted by the distributor failed to materialize. Although many Little Dynamite motors were sold, the actual net profit was not much more than when he was selling direct to dealers. For this reason (one of the many), Jim eventually dropped production of the Little Dynamite in favor of his downdraft carburetor version known as the "Thermite".

Little Dynamite motors, when they first hit the market, were sensational. Here was an engine the same size as the Baby Cyclone, but what a difference in performance! Class C models featuring Little Dynamite motors quickly dominated the West Coast competitions. Only one model, Foote's Westerner, was the exception to the case, using Super Cyclone, Ohlsson, and other size 60



"Und you vill enjoy!" CD Otto Bernhardt conducts pilot's meeting at SAM 49'ers Texaco meet. He's columnist for our "Fuel Lines".

motors.

Little Dynamites were a bit mean to start, particularly if you flooded one. Once one got the hang of operating the engine, they were extremely reliable. Probably the biggest bugaboo facing the modeler was the careful removal of a broken propeller. If you pulled the cam off with the prop, you had to be extremely careful to note its exact position. There were eight different



OLD TIMER Model of the Month

| Designed by: | Steve Kowalik |
|--------------|---------------|
| Drawn by: | AI Patterson |
| Text by: | Bill Northrop |

• Back in May of 1936, Steve Kowalik won the (Brown) Junior Motors Trophy for Consistency in Flight at Linden, New Jersey, with this model, "Miss Delaware." At this IGMAA contest, Steve averaged six minutes for each of three flights, using 5/16 oz. of gas. The same design also placed 5th, 6th, 7th, and 9th.

We assume the above is all true, however, the information appeared in an Ideal Aeroplane & Supply Co. advertisement which also implied that the kit they were selling, the "Air Chief", designed by Steve Kowalik, was a duplicate of the prize winning model. That the "Air Chief" had the same basic configuration and shape as "Miss Delaware", was more or less true, but that's where it ended. Miss Delaware spanned 7 feet and was 56 inches long, whereas Air Chief spanned 61 inches and was 39 inches long. Incidentally, the complete kit, which, if you could believe the ad, was as complete as a Proctor Antic, sold for \$6.00 . . . postpaid!

Steve also designed "Mis Arpiem", which was a feature construction project in our April, 1977 issue, and which turned out to be one of our most popular full-size plans attractions. In that article, we expounded at some length on Steve's influence in our early modeling days, so won't go into it here. However, we would like to contact him, and understand he's still in the Wilmington, Delaware area, though possibly unlisted. Can anyone help?

.....

locations for the cam! Once you lost track of the position, one could spend a considerable amount of time finding the correct cam orientation.

Interestingly, when Offenbach took over the distributorship of the Little Dynamite, the price was raised to \$16.50. In all fairness, it must be pointed out that Smith coils and Champion Spark Plugs were included, making it a first class com-

JUNE Proversit with the Chart work make winds Anthe Litz" Let. -----100 NAME AND ADDRESS OF THE OWNER OWNE ALCONT PLAT ARTST MINIO MARKEL Springer ERAT UNIT 111-114" (MIS SAMAS 2123 A65M 1245 70 738 144520 73 54476 ERALTER BRETROM ane -Mai Associat Call-TE 1 ML OF WIZ" CULSENSAD LE. ave have appear. ASSY: MICH SHOULD GRAAKE AT (7) MCARE AT (7) MCARE AT (7) MCARE AT (7) MCARE AND A MCARE A with some start wa's some upe MEGEITED SHEER -ANNO IS APPROVED UN 2 PORTO ANNOS UNA UNDE CUT PEOPO OLD IUNICE FREE NALA CALL MARKE CAT ALLAS AMEL'S 000 SUMPE RELAKE FURT con same in the STRENTER IS APPEAD IN THE BIRKS BED IN "WHE CAP HEAT DO ANDE THE -ALEST SE SE GOOR SE ALEST MEAN BOOK SE SET OF MEAN FROM SE ESTER TEATING ALL & MELETS L. 104" \$ 112" HIT SHAR THE RIDGER 512.4 SHO T THE LEVED 200.1 28.2 100.0 HLCCA LIT MISS DELAWARE ST PORT STS MEREL ATL FORMER DATES CONDITION INVITE OF MUNICAL ANTAL CARL TRIPPY DESTORATED BY STEPPY KOUPUR LE TE A MIL OVELANC And the sugar WITERN 1111 1000 EMPLECTED PRINT DIMETER CHARTER REAL PRODUCT BARDS 3.12" == (2.448) = Times in TOTAL ALL MATE BALLS PALATE PRACE LARK ADDED THERE I ALLER AT CO. 1/2 the maint 2 CN0 17-7 - Internet 11 1. . MODEL BUILDER Magazine Plan No. 27 Presenting ...

STERLING MODELS' BIG BEAUTIFUL "Mk_ II" **Puddle Jumper**

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COAST GUARD

19

** STINGER

R/C Air Boat/Amphibian for .15-.35's

Kit B·27 Length 30" Beam 11"

\$39.95

For Sport

Coast Guard Version

Run it on land Or in the water

or



Frame Photo Reveals Simple-Rugged Construction

About The Kit:

Designed for 2 channel R/C or tether control and 15 to .35 engines. Maintaining top quality and simple construction. All Balsa and Plywood parts are accurately die-cut, with precision vacuum formed Plastic hull and cabin. Hardware package including R/C hardware. Full sized Plans, plus Decals for Sport model or Coast Guard version.

- STERLING MODELS 3620 G ST PHILA PA 19134 If no dealer available direct orders accepted with 10⁴ additional charge for handling and shipping (604 minimum in U.S. 5125 minimum outside U.S.) Catalog of entire line of airplane control line model bits A C scale and Trainer kits bost model bits, accessories, etc. 504 enclosed Secrets of Model Airplane Building Including design, construction covering Linishing, liying, adjusting, control systems etc. 255 enclosed

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City.

Name

Address_

Zin

State_



No mixer is required, "V" tail is controlled like a normal elevator.



Simple but effective scale detailing enhances the model with little extra effort.

This kit, like our others, have complete detailed instructions with over 100 construction photos, including finishing and radio installation.







Karl Tulp tunes his OS 4-cycle for long limited fuel run at SAM 49'ers Texaco meet. He won. Start of winning flight for Karl Tulp. Ship is the Dallaire Sportster, a popular fuel-allotment competition aircraft. Skip Ruff, designer of our popular twin-rotor autogiro, just releasing ship.

R/C TEXACO, IGNITION •• GLOW?

By KARL TULP and DON BEKINS . . . Interesting discussions on special glow fuel mixtures for fuel-allotment events and ignition/radio compatibilityby a couple of consistent winners in R/C O.T. contests.

KARL TULP ...

• Texaco fuel was an absolute puzzle to me when I first saw Don Bekins use some of his own home brew in an Anderson Spitfire.

Long before I could spell "ignition", Don had come to the conclusion that 3:1 or 4:1 mixtures were passe'. By the time I had my Dallaire ready with ignition, he had already experimented with Blendzall and Allproof Synthetic Oil, mixed with unleaded gasoline. Don was then using an 8:1 mixture ... 8 parts gasoline, 1 part of 50-50 Blendzall and Allproof.

Blendzall is a devarnished racing castor oil. Allproof is a pure synthetic 2-cycle oil, the latter used in motorcycles 60:1.

The local cycle shop was very encouraging and helpful. By the time I received my O.S. 4-cycle from Otto Bernhardt, converted for ignition, I tried 6:1 Coleman fuel and Allproof, running the engine in for about half-an-hour on a rich slow mixture. The 6:1 mixture was okay, but nothing spectacular!

I tried 10:1, then 12:1, and performance actually improved. At the S.A.M. Champs in Las Vegas, I used 20:1 Coleman-Allproof in 110° F. ambient, and on 7/8 oz., the engine ran 8 minutes, and there was a 1/4 oz. left over, as the engine quit in mid-air. I guess it ran too hot!

I have used Coleman-Allproof as thin as 40:1, and it works in both my O.S. 4-cycle as well as the O.S. 60 2-cycle. Remember, however, that it uses large propellers (16 x 6 in Las Vegas; now 18 x 6, at about 3800 rpm).

My ignition pack is a Carman solid-state with a homemade brass

box around it. It weighs close to 14 oz. with three pen cells in it. This bothered me. Don and I felt there should be a better and lighter way.

I finally read the O.S. 4-cycle instructions as supplied, for use with Glo-fuel. They mention an O.S. "F" Plug. Don called World Engines... "Not available, use a Hot Plug instead". What is that? Don found them ... made by Fireball. All it does, I guess, is glow longer between firings in the 4-cycle. We mixed a brew of 50% K&B 500 and 50% unleaded gas and it worked on glow in the 4-cycle.

Now we became serious. I mixed everything; even tried Coleman fuel, but it did not mix with K&B 500. For simplicity, look at this tabulation. A. Fuel — 1 Quart

40% K&B 500 40% gas



Equipment distribution in a Super Cyclone powered Playboy, with no shield. (a) Radio system. (b) Coil. (c) Ignition components.



Other side of Super Cyke/Playboy. (a) Ignition switch and charge socket. (b) Radio switch and charge socket.



Equipment distribution in Scientific Mecury, Super Cyke power. (a) Receiver under servos. (b) Bellcrank. (c) Micro-switch. (d) Coil. (e) Shielded lead and cap over plug.

- 20% Methanol 1-1/2 oz. Nitromethane 1 teaspoon Lubricin B. Fuel — 1 Quart 33% K&B 500 33% unleaded 33% Methanol 1-1/2 oz. Nitromethane 1-1/2 teaspoon Lubricin C. 94% Methanol
- 6% Blendzall



Playboy installation. (a) Rudder servo, ignition cut-off servo under. (b) KPR-7D and pack. (c) (c) Elevator servo. (d) Coil and ignition equip.



Another view of layout at left. (a) Nyrod leading to Perry carb. (b) Ignition coil. (c) Ignition micro-switch. (d) Nyrod from throttle servo. (e) Servos and KPR-6A receiver. (f) Antenna.

- 1 oz. Nitromethane 1 teaspoon Lubricin
- D. Fuel 1 Quart
 - 55% K&B 500
 - 45% unleaded

Each fuel was tested in the O.S. 4cycle as follows: 3600 rpm, 18 x 6 prop, 7/8 oz. of fuel, and Fireball Hot Plug. Times came out like this: A = 9-1/4 min., B = 11 min., C = 8 min., and D = 9 min. Incidentally, straight K&B 500 produced a run of 4-1/2 min., with everything else the same.

This was in a 4-cycle O.S. Tried the same in a new Merco 61, 2-cycle and lost about 20% running time. (All these times are on the test stand). Actual flying loses about 15% of the test stand times.

Prior to flying in a contest situation, have a tachometer handy. Experience has shown that 3800 rpm will fly 6-1/2 to 7 pound .60 powered model at its optimum climb and fuel consumption rates. Make sure your throttle and needle valve are set to achieve this rpm with a 17-6 or 18-6 prop. These parameters are true whether you fly glow or ignition. Run your engine as lean as possible. One or two clicks on the needle valve mean minutes in engine running time.

I am sure that there are much better brews to be invented or prop/rpm formulas to be thought out.

The reason we share all of this information is two-fold.

1. We hope that others will share with us some of their secrets. In the S.A.M. group, we are not out to set records and, although it is fun to win, what we (Don and I) are doing is outmaneuvering the competition ... taking chances with engines. We

have done it and we are successful.

2. This is not S.A.M. flying at its best, in my opinion. If we could all still buy Ohlssons, and Andersons, and OK's, and goodness knows what else, we could outlaw O.S. 4-cycles, Merco's O.S. 2-cycles, etc., etc. As a newcomer, I am glad to be able to

buy an "Otto Bernhardt" conversion for ignition of a modern engine. I think we are making a mistake allowing "Exotic" modern fuels or mixtures. Would not a Texaco meet be better and more competitive if we all had to use a standard mixture ala 1934 . . . say 8:1 gasoline and SAE 70, dispensed by the C.D. from his fuel supply, rather than everybody mixing his own concoc-tions? This would be more in keeping with what the old-time boys did, and would make competition more enjovable. How can a true-blue Old-Timer be competitive with his Ohlsson, or O.S., or Merco, with 6:1 mixtures, against 40:1 fuels?

In the case of Glo-fuel, we could do the same. Everybody gets K&B 500 out of the C.D.'s can.

Think about it!

The 4-cycle O.S. 60 would all of a sudden be just another engine, because its economy would be mostly offset by its extra weight. We would then be back to competing on flying skill and not on engineering and laboratory expertise. I hope to see a contest flown by these rules some day soon, just to try it out.

(We thoroughly agree with your item 2, Karl, Texaco should be won



Ignition cut-off. (a) Coil. (b) Micro-switch. (c) Bellcrank (d) Nyrod from servo.



Installation of OS 60 4-cycle engine, converted to ignition, in Don Bekins' Lanzo Record Brkr.

on flying skill, not on chemical and engineering research. However, let's allow a modeler to use any engine and fuel, and thus stay out of the CD's can! It's simple. Allow a 5-minute maximum engine run. This is enough time to climb practically out of sight, yet is a small percentage of the average winning Texaco flight time. Can't hear the engine and don't know if it stopped? Have the flier put on full throttle 10 seconds after he "chopped" it. If the engine picks up, the flight's disqualified still can't hear it? Watch for the exhaust, when the engine blows out its load, or ask for slow application of full up elevator! wcn)

SAE 70 weight oil is scarce. However, I found gallons of it in a Harley-Davidson cycle shop in San Rafael. It appears that the Harley-Davidson uses this heavy oil in summertime. It's made by Torco, and costs \$1.40 per quart.

In talking with some of the fellows who ran their 1932-1938 engines on 3:1 mixtures, I get the impression that even the purest purist will certainly concede that the oils of today are superior to those of yesterday. Even they feel a 6:1 or 8:1 mixture today would be okay. The heat generated is the trade-off in the leaner mixtures. A 40:1 mixture will work and be very economical, but some engines may burn up, particularly at higher rpm. Therefore, we feel that mixtures of 15:1 and under will provide lower temperatures with the economy that is desired.

DON BEKINS ...

While alchemist Karl Tulp was mixing his golden brews, I was experimenting with shielded and unshielded ignition systems. My ignition problems really started at the SAM Champs in Las Vegas. I had two fully shielded, transistorized systems going well until the time to fly. Then the 120° plus heat must have gotten to the components, for both refused to operate, so I shifted to my Futaba receiver with a 77 Products shielded hi-tension lead. this had been used successfully (with an occasional glitch) in my limited-engine-run Playboy. In 20 seconds, not too much can go wrong, but in Texaco, with its 5minute engine run and 2,000 foot altitude problems, I was not so sure. But that was my only alternative. After a bad glitch on takeoff, only occasional control surface movement occurred, even to high altitude . . . enough to garner 2nd place in the Texaco event.

So, I got to thinking of the simplicity and weight-saving aspects of a straight ignition system. Correspondence with the various radio manufacturers lead to many claims of interference-free operation; most unsubstantiated and some no answers. However, Jack Albrecht, Production Manager, at Kraft Systems responded with enthusiasm. It seems Jack is an active SAM member, Formula 500 contest flyer, and old-timer buff. He had been working on the same problem. "Try our KPR-7D, Dual-Conversion Receiver", was the answer to my inquiry.

After replacing a braided wire pushrod to the throttle with a plastic nyrod, the dual-conversion receiver worked perfectly. I placed the coil, condenser and batteries in the cowl of my Lanzo Record Breaker, along with an ignition cutoff switch. The high-tension was totally unshielded. The components, weighed 4 ounces less than the transistorized system.

The freedom from interference can be attributed to the normal increase in rejection by a dualconversion receiver of extraneous sources of noise. Tests have shown that dual-conversion in both the 53 and 72 Mkz bands have flown with equal success.

Usually, the standard singleconversion receivers that are used with today's amplitude modulated transmitters do not reject strong ignition interference very well. How well they do reject these noise pulses is normally subject to the type of automatic gain control that is present in the receiver. The fact that a receiver will not reject ignition noise interference does not make it a bad receiver for normal use with our glow plug engines. Some receivers just have the capability to reject ignition noise better than others, and price may not be the consideration.

Jack offered an explanation of the interference problem. "When we take a look at the ignition noise problem, we see that the interfering noise spikes appear like amplitude modulation (AM) of the waveform present in our receivers. If there was some way to get rid of these AM spikes, we might solve the problem. However, most fixes to eliminate the noise spikes will reduce the control intelligence that we are trying to convey. Actually, there is a better way! We recently test flew a new prototype frequency-modulated Kraft KP-6A sport system in our test Scientific Mercury aircraft, powered by an unshielded ignition Anderson Spitfire engine. No interference of any type was noted, even with the transmitter antenna collapsed to one section with the aircraft at about 500 feet altitude. This appears to be the ideal way to go. The limiters present in the receiver remove all of the AM noise spikes and only the transmitter control frequency modulation information remains to be decoded.



Maybe this is the answer. Bob Boucher's Buccaneer (minus some dihedral) is a real veteran electric powered O.T. R/C model. Ya oughtta see the extension cord!!

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FREE FLIGHT AND CONTROL LINE

Mike Midkiff, Erie, Pa., built this 40 inch span Douglass O-38 from Aero Modeller plans. Uses 24 strands of 3mm Pirelli and averages 45 to 50 secs. in calm air. Won Jumbo Scale at Cleveland F/F Society meet a couple of years ago. Seen here at F.A.C. meet in Connecticut. Chris Clemens photo.



..... from the ashes, the Phoenix WILL arise.

SAN DIEGO AEROSPACE MUSEUM

It is with personal sadness that we report the loss of the Aerospace Museum, which burned to the ground on February 22nd. Long an attraction to visitors from many parts of the world, as well as a Mecca to Californian aviation enthusiasts, the collection was the third largest in the United States. Ironically, the collection, which had been housed in a 63-year-old building, had been scheduled for transfer to another location, later this year.

Among the important aircraft lost

were a "Spirit of St. Louis" reproduction, a Curtiss JN-4D (only recently restored after years of painstaking volunteer effort), a Curtiss A-1 reproduction, a Ryan ST-A, Ryan SC-W, Ryan "Fireball", Mitsubishi A6M5, Ryan M-1, Consolidated PT-3, Fleet 7, Bowlus Baby Albatross, Grumman F9F-5, Luscombe Phantom, Wright Flyer reproduction, three of Waldo Waterman's aircraft and many more.

Additionally, the comprehensive technical library which had served researchers for many years with its



The most accurate reproduction ever made of Lindbergh's "Spirit of St. Louis", consumed in the disasterous San Diego Aero-Space Museum fire. Photo by Warren Shipp.

books, magazines, photographs, and drawings was consumed. Literally hundreds of models, including static display, free flight, control line and R/C types and dioramas, were lost.

Happily, no one was injured, and the staff fully intends to start anew. Several aircraft including a Convair "Sea Dart", and a Grumman F6F will form the nucleus. It is also anticipated that aircraft will be loaned by other museums. For example, the Smithsonian Institution has a Waterman "Aerobile" in storage, which would certainly find a welcome home in San Diego, its birthplace.

Contributions in the form of funds and aero memorabilia are being solicited, in case anyone in our audience might care to participate in this worthy undertaking. Welcomed would be books, magazines, quality scale models, showcases, file cabinets, photographs, negatives, plans and any items of aviation history suitable for exhibition. Donors will receive credit for their contributions, and of course any applicable tax deductions.

Why not check through your closets for any items of possible interest? Contributions should be directed to: Aerospace Museum Emergency Fund, Room 203, Casa del Prado, Balboa Park, San Diego, CA 92112. Please be patient if correspondence is involved, since the small staff is currently working long hours in an effort to salvage any possible remains from the fire. Thank you!

AND SPEAKING OF MUSEUMS

We understand that a tiny new one, dedicated to the late Florence "Pancho" Barnes, is expected to open during the summer. Housed in a railway car, the exhibit will be located in the Mojave Desert town of Cantil, California, near Highway 14. Featured will be photographs and mementos of Mrs. Barnes' many years in aviation. Among her achievements were many wins dur-



Immaculate Sopwith Triplane reproduction was also a victim of the S.D. Museum fire. Photo by J.D. Gillies.



This Armstrong Whitworth Quadraplane was one of hundreds of scale models that went up in smoke in museum fire.







Robin Mooney (Walt's brother) launches his Siemens Schuckert E-1.

The Siemens Schuckert E-1 met the Mooney "Holiday Requirements" of being quick-and-easy to build and having good flight characteristics.

PEAMUSCALE SIEMENS-SCHUCKERT E1

By WALT MOONEY ... Taking advantage of an easy Peanut that really needs no building instructions, Walt discusses an interesting new rule suggestion that could make many more designs highly competitive.

• This is a simple, all-balsa (almost) sheet model. As is the tradition around the Mooney household, since the beginning of the Las Vegas New Year's Peanut contests about six years ago, this year all the Mooney kids wanted to have a new model to enter. It was going to have to be built between Christmas and New Years, and it was going to have to be simple, because model building had to compete with all the other holiday activities. The model had better be a good flyer too, or else the OOOLLD designer would lose his reputation around home. Thus was born the all-sheet Schuckert (with a floy, floy).

It is simple ... Mooney's brother showed up and built one too ... the third model he had ever made, and his first Peanut. His best time at the contest was 27 seconds. The old man's best time with his was only 47 seconds. All of them flew. Since the model is quite simple, there will be no instructions for building in this article. Good luck! Make sure the center of gravity (CG) is at the location shown for flight.

Now for the piece de resistance. We'll start with a question. Are you, as a Peanut builder, a little discouraged by the Fikes and Laceys... to say nothing of that crummy obscure Hergt Monoplane of Walt Mooney's ///??? Don't feel all alone, you aren't.

What do you want to do about it? Rule out Fikes and Laceys? Tell people that they can't build and fly the model of their choice? This can certainly be done, and such suggestions have been heard. This seems to be a decrease in the freedom we all love, however, so maybe there is a better way.

Enter Doc Martin, of the Miami (MIAMA) Club, with what looks like a very good suggestion for a Peanut scale rule change. We would appreciate hearing what you think of the idea. Basically, the rules would be changed to read as follows: A PEA-NUT SCALE MODEL SHALL BE RUB-BER POWERED AND CAN BE BUILT TO ONE OF TWO SCALES: MAXI-MUM WINGSPAN OF 13 INCHES, OR MAXIMUM LENGTH OF 9 INCHES, EXCLUDING THE PROP.

This will make it practical for the modeler to build either a low aspect ratio airplane, or a high aspect ratio airplane. Some of the airplane designs that are completely ruled out



Next month's Peanut is the 1917 Thulin K-Jagarin. Very similar layout to the E-1.



All-sheet construction of E-1 makes it a quickie to build. Hole in bottom of fuselage is for easy access to the rubber peg.







David Carroll, Raliegh, North Carolina, built this 1-inch scale Bristol F-2b Fighter. He developed his own plans from Wylam drawings. The free flight model is powered by a Cox .020 reed engine. Flies beautifully; left under power, right in the glide. Photo by nephew John Paul Jones (!).

FREE FLIGHT SCALE

 The scale World Champs are going to be held in England this year, and as you well know, this is for C/L and R/C scale only. It has been my hope that F/F Scale become part of this international competition. Bill Hannan and I have been doing some letter writing to scale modelers in England with the hope they will agree to run F/F Scale unofficially. The ones we have written to have favored the idea. It is interesting to note that in England, F/F Scale enjoys more popularity than C/L Stunt or team race, R/C Pylon, and even aerobatics. This is one of the reasons that we wanted to initiate our event while the Championships are being hosted in a country where there are many modelers sympathetic to our cause. The F.A.I. permits proxy flying, so this would be a good time for many scale modelers to send their models over there to show that we support the whole idea. Of course, this will depend on whether we can pull this whole thing off or not.

It is interesting to note that there have been F.A.I. scale rules in the book for quite some time, but not too many scale modelers were aware of this until the fact was published in a recent article in Model Aviation. Then it was pointed out that they were officially dropped due to lack of interest (Embarrassing, isn't it? wcn). It wasn't only our country that stirred some action. Let me quote a paragraph from the April Aero-modeller. "FREE FLIGHT SCALE enthusiasts in the USA are indignant that the CIAM has dropped its provisional rules for the class. They are concerned that although the popularity is evident in many countries, no one has done anything to establish free flight scale as an international or even W/Champs event. Suggestions are being made that the SMAE should include an unofficial supporting event at the Woodvale '78 Champs in August. F/F scale flyers are not noted for being 'contest-minded'... nor have they concerned themselves much



Jack McCracken's rubber powered Ryan PT-22 floats on the surface of Lake Elsinore, California.

By FERNANDO RAMOS

over the FAI rules... until they have been wiped out. C'mon, let's really know what the score is. Do write your views if interested."

The wheels are in motion, and by next issue, we should know just exactly where we stand. There are many details to be worked out, but this could be the start of something which will become beneficial to all F/F scale modelers. New knowledge, techniques, etc., will emerge, should our event become a reality. Hang on ... we'll keep you posted!

One of the problems for a "budding" scale modeler is having sufficient reference material for 3-views, photographs, proof-of-color, etc. Going to your local library usually doesn't help, and buying every magazine or book on the subject can put a healthy dent into one's allocated hobby money. I would like to recommend a few publications which I feel can give you a great deal of help in picking a model, or for reinforcing data for one for which you already have some documentation. My favorite, non-modeling, magazine is called Aeroplane Monthly. This is an outstanding English publication which has many interesting airplanes featured each month. In particular, they have a sensational 3-view with the sideview in a larger scale than either the plan or front view, but in color. Many vintage aircraft are featured, along with several photographs and a brief history of the airplane featured. In addition, there is a feature written by Arthur-Ord-Hume on British Pre-War Ultralights. There are many outstanding photographs, some showing cockpits, which you seldom ever see, great text on the aircraft, and an appropriate 3-view. Just these two features alone are



Don Srull's pilotless Pietenpol putts past the camera at indoor rubber contest a couple of years ago at Andrews AFB, Maryland.

worth the cost of the magazine. The magazine also has modern type aircraft with quite a bit of WW-I and WW-II aircraft. The magazine is not cheap at \$2.00 a copy, but a goodly portion of this is postage from England. The subscription rate is \$20.80 per year available through IPC Transport Press Ltd., Dorset House, Stamford Street, London, SE1 9LU, England.

Challenge Publications has a multitude of magazines that come out each month which need your perusal. Many titles deal with WW-II subjects only, but often include great photos and 3-views of seldom modeled WW-I subjects. Air Classics and Air Classics Quarterly, along with Air Trails, have numerous articles and 3-views on aircraft that would make ideal scale models. To subscribe to all of Challenge's magazines would leave even the "healthiest" of modelers with little hobby money. I feel that it is much better to look over each copy and pick only those that have something of interest for you.

One other magazine that is worth looking into is Ian Allens' Aircraft Illustrated. This is another English publication, so it is abundant with British aircraft. However, for my taste, there are too many jet aircraft featured, both civil and military.

As far as books are concerned, there are just too many to list, but there are a few I want to point out to you that many of you might not be aware of. I realize that several modelers live in remote areas where almost all supplies have to be purchased by mail, so they do not have an easy access like those of us who are in populated areas. One book or tome of books I feel you will find an asset to your modeling library, is Air Enthusiast. There are presently twelve volumes, and I'm not certain that the earlier numbers are still available. Air Enthusiast is actually a monthly publication, but I prefer to wait until a year is compiled into a



Hurst Bower's Bellanca, built from old Comet plans. All photos on this page were taken by John Preston.



Don Srull's Siemens Schuckert on an official flight at indoor contest put on jointly by Metropolitan Area Scale Society (MASS) and D.C. Maxecuters. Compare this with Moonay's Peanut.

book. There is a good cross-section on a variety of aircraft, particularly military aircraft of both WW-I and WW-II. There are numerous photographs, with many of them in full color. Each month there is a cutaway drawing on a particular aircraft, which gives a wealth of detail. There are many pictures of cockpits and many color plates giving you color schemes you wouldn't believe. Included in each volume are so many 3-views that you will become frustrated as to which model to make next. Again, you may prefer to buy only after checking each month's copy, but I find that every time I research something in the bound volumes, I run across more subjects I want to build. Air Enthusiast is another fine English publication.

Still even more excellent English aircraft books are the Putnam series, such as: Avro Aircraft Since 1908, Miles Aircraft Since 1925, DeHavilland Aircraft, Bristol, Gloster, Vickers, Hawker, Handley Page, Polish,



There's always one that has to be different! Mass launch for a Thompson Trophy heat is always an exciting moment. No information on hand as to origin of photo.



Dave Haught's Misery Meet entry was this unusual P-30. Not competitive . . . short motor run.



Earle "Foggy" Moorhead and his Blue Ridge kit Square Eagle P-30. Placed third in Misery Meet.

FREE FLIGHT BY BOB STALICK

• Why is it that time flies when you're having fun? Here I am, late for the June issue of **Model Builder**, and I'm sitting here trying to complete this column so that the latest in free flight news can be shared with the multitudes out there in model land. Dirty Dan tells me that he writes his columns whenever he feels like it and is usually a month or two ahead of time (you would be too, if you just sent blank paper, a pencil, and a note to "write it yourself" wcn). Why can't I be like him ... on second thought, that's a terrible suggestion.

Hey, the weather must be getting better by now, if this is June. You are out flying up a storm? (*No, IN a storm? wcn*) Right? Why not? Well, at least pause and read the latest from the typewriter in this issue of **Model Builder**. Here goes... JUNE MYSTERY MODEL

This is a clinker. Although I'm sure a number of folks out there have built this one, its deceptively simple good looks must have drawn a few builders. The ship is a Nordic, but with a special twist. It came with instructions on how to convert it to (ready, one, two, three: pffftt') R.C. (Radio Control, to the uninitiated). Anyhoo, if you know what it is or was, drop good old Bill N. (editor) a line, quick like a spring bunny, and he'll send you a goodie, like a free subscription to **Model Builder** ... provided your postmark is first in line. Do it now. DARNED GOOD AIRFOIL...

Ritz 9-50-7.5GS

Way back in the early 1960's, Gerry Ritz had an excellent series of articles on airfoils. In fact, a number of the DGA's have come from this series. This month, I have pirated another of Gerry's airfoils. This one is from his 1959 Nordic winner, and is the stab section he used. His information on stab sections bears repeating again, "However, more



Gene's Machine, by Gene Bartel, a Satellite 450 with high thrust layout. Deceptive appearance, the Cox Conquest .15 has no downthrust.

extensive analysis of stabilizer functions with determination of just what actions we want from the stabilizer under varying conditions has brought out the fact that here we have a whole new field of study and research. Varying stabilizer sections can be used to get different combinations of control, and we find that definite combinations of wing and stab airfoils are necessary to achieve specific results for varying conditions."

Gerry then quotes the various proponents of the day, and goes on to describe the featured airfoil, "With a somewhat different purpose, I used a stab section on my 1959 Nordic winner that had the identical undercamber as the wing section, but had a much higher top camber (9.5% on the wing and 12% on the stab). The reasoning here was, that the wing was of tremendously high aspect ratio with the chord nearing the critical Reynolds number region, and I did not want to add the extra drag of artificial turbulation, so I had to get an extra strong guarantee of recovery action.

Well, my own feeling about this stab section is that you could use it on an A/2 glider where you wanted the stab area to be at the minimum percentage (let's say around 60 sq. inches), but didn't want to sacrifice stability and/or stall recovery. A stab with this shape would give you the necessary power to give this result with small areas. In fact, the featured section would be a reasonable one for either Wakefield or A/2 wings. Why not?

WAYNE DRAKE'S SUPER SIMPLE CIRCLE TOWHOOK

This month's 3-view is of a super simple towhook, as designed and built by Wayne Drake and Rick Arland. Wayne was giving me the business about how simple the hook was to make . . . saying things like, "I can turn one out in about a 1/2hour, etc." I said something like, "Sure, and I can swim the Columbia River."

Well, quicker than you can say, "Steve Helmick," he says, "I bet you can." So, I took some parts home and in a matter of an hour or so, I did construct one. So can you. What you need, are a few odd parts. The major part is the hook body, which is a piece of brass water pipe 13/32 x 1.4 inches long with an I.D. of 5/16. Drill a 1/8 hole across the top of one end. File a 1/4 inch slot in one side, just below the 1/8 hole. The slot should be wide enough to accept a 4-40 bolt. Tap the bottom of the tube with a 5/16 x 24 NF tap and set aside.

Next, get a bit of brass tube 5/16 O.D. with 3/16 I.D. Thread this one with a $5/16 \times 24$ NF tap. Cut it off so that it's about 1/4 inch long, or so. Slot one end. Set aside.

Get a piece of 1/8 dia. M.W. and bend it according to the sketch. Heat it to get a good bend. Drill a .030 hole in the end as per sketch. Set aside.

Bend a piece of 1/16 strip brass as shown. Drill the three holes. Tap the one indicated. Solder this onto the body where shown.

Bend a retainer spring from .030 M.W. Fasten this to the brass stop bar with a 2-56 screw.

Go to your favorite hardware store and buy a compression spring. Go to your favorite hobby store and buy a package of 4 Du-Bro Wheel Retainers with the 1/8 hole in the center. Put this on your drill and reduce the outer diameter to just under 5/16.

Now, we're ready for assembly. Hold the towhook in one hand. Slide the spring keeper (slot side down) onto the wire, slide on the spring, then install the Du-Bro retainer. Slide the whole thing into the body. Line up the wheel retainer so the 4-40 bolt can be inserted into the 1/4 inch slot in the body and screwed down against the towhook. Screw the spring keeper into the

JUNE'S MYSTERY MODEL

bottom of the body. Wallah!!!! Instant towhook. Fiddle with it so that the unlatch force is around 7 lbs., and the retainer spring disengages when the hook is extended at 7 lbs. Mount in your ready-built fuselage, 1/2 inch behind the C.G. Run a rudder line from the 4-40 bolt through the 1/16 holes in the brass rear stop bar. The rearward travel of the towhook is controlled by a screw-stop installed in the fuselage ... this also determines the amount of circle tow adjustment. The front travel of the towhook (for straight tow) is controlled by a stop-screw mounted in front of the towhook in the fuselage (see sketch).

Now, it takes as long to describe the construction and installation as it does to make one of these critters. Just go out and buy some of the parts and construct a few; maybe you can make them as fast as Wayne. NORTHWEST A/2 AND WAKEFIELD SYMPOSIUM, PART II

Last month, I spent some column space on the A/2 portion of the Northwest Symposium. This month, I will wrap things up with some pungent comments from the Wakerield fliers.

Bill Gaiser kicked off the presentations by describing how he makes his propellers. He carves his from blocks in the traditional style, using FAI Model Supplies Aluminum Prop hubs. After his blades are finished (no undercamber) he rubs the blades with Hobbypoxy II, then sands and balances and finishes with Hobbypoxy Clear. Bill strives for a prop run of 26 to 29 seconds.

Bill then turned his comments to rubber and contest preparation. He pre-stretches his rubber 5 times, rests and stretches 7 times. He uses a stranding board (covered in an earlier **M.B.** F.F. Column) to make up all of his motors. He stated that rubber gives off heat when unwinding, and takes up heat when winding, which is why most motors fail when winding.

He uses the Lenderman style reverse "S" hook, made from 2 mm wire, to hold his motors. The use of a winding tube is a must to protect the model. He uses decorative 1 inch diameter aluminum tubing, available from hardware stores. When winding, Bill recommends stretching the motor about 4 times and winding about 1/2 of the total winds before starting to come in. Close in fast when nearly finished. In order to reduce heat when winding, Bill recommends winding slower on cold days, keeping rubber out of the sun, and winding in the shade.

Ron Davis followed Bill, with a description on carving prop blades from thin sheet and using a prop

DARNED GOOD AIRFOIL - RITZ 9-50-7.5GS



MODEL BUILDER







DRILL 1/16" DIA.











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REAR VIEW



.030 HOLE

COMPRESSION SPRING

.9" .

1"x 3/16" O.D.

1/32" WIRE HARDWARE ITEM

TOWHOOK-1/8" M.W.

1.7"



SCREW STOP

SCREW STOP

LINE TO AUTO RUDDER -

WAYNE DRAKE'S SUPER SIMPLE TOWHOOK

COMPONENTS-FULL SIZE

DUBRO 1/8" I.D. WHEEL RETAINER-REDUCE DIA.

1/2" LONG 4-40 BOLT 1/4" LONG 2-56 BOLT 1/2" BEHIND C.G.



Wayne Drake's towhook, featured this month.

pitch gauge to set the props in the hub. This presentation was somewhat complicated, featuring a series of computer printouts to determine exact prop pitch. A future issue of Model Builder Free Flight will deal with Ron's presentation. Stan Fink followed Ron Davis, and

his presentation dealt with the choices of rubber power strip available today. Stan's information has been presented before in this column, and will not be repeated at this time.

Gene Jensen concluded the presentations for the Symposium by discussing tactics and airfoils. The gist of Gene's comments were: The object of free flight is to get into a thermal and max out. In order to do so, a modeler should be prepared with several systems. They are: (1) Models and equipment systems, (2) Thermal picking systems, and (3) retrieval systems.

On model systems, Gene advocated the following: All equipment is based on correcting past errors. Build models which are dependable, and that you know will perform in the same way time after time. Gene uses a double d.t. svstem, with a timer, and a fuse for back up

For thermal detecting systems, Gene mentioned cigarette smoke, mylar streamers, and the Getzlaff flag, as usable systems. The best is another model in a thermal. He recommends flying at the first of the round, so that, in case something happens, it can be corrected in time to put in the official flight. On the subject of different rounds flying, for example, the upcoming FAI Finals has a 4 minute round early in the A.M.; at this time, maybe a still air ship would be a good choice.

Still air airfoils are not as important, according to Gene, as moving the C.G. back and decreasing the incidence. He believes the Gard airfoil is excellent for still air.

For retrieval a motorcycle is a must. Some good helpers downwind are helpful, as are binoculars. Having a helper who does more than launch but who is willing and able to assist with line tangles, thermal selection, carry on a conversation, etc. is invaluable. When all else fails, standing beside one's competitors and saying things like, "It sure feels good now!" is helpful.

There was much more that took place at the Symposium, which is difficult to report in detail here, but hopefully, the essence of the information will prove valuable to any current and future Wakefield and A/2 fliers. Another thought; such get togethers can be staged anywhere there is a small concentration of FAI fliers (or free flighters of any sort), and it is an excellent opportunity to learn from your peers. I

recommend it as a worthwhile activity.

HUMOR SECTION...

From the CIA Informer

"What Did You Do In The War, Daddy?"

Vince Ferrarese writes that after a long absence from modeling activities he recently sprouted aspirations to begin his comeback via the outdoor rubber competition categories. After first completing a home study course in Zaic Yearbooks, he thought he would shortcut his investigation by seeking firsthand advice from some of his local gum band notables. This decision led him to Joe Macay, Lee Campbell, and



Gene Borchers launching his Cox .049 powered Sig Witch Doctor at a recent Kent Field flving session.



A nicely built Republic P-47 "Jug", by Barry James, an excellent flying machine.



Peter Hatherall had engine problems in his well-finished Chipmunk.

By JOHN POND ... Our "Plug Sparks" columnist took a fast plane to Australia and came back with an interesting article about the similarities and differences in Nats activities.

• The most noticeable thing about the 31st Australian Nationals was the grins to be found on the various contestant's faces. And for good reason!

Imagine being invited by the Mayor of Camperdown, Jim Murname, to be his guests for the Nationals. All Civic Center buildings, facilities, and fields were placed at the disposal of the Model Airplane Association of Australia (M.A.A.A.).

To top it off, Jim was president of the local Model Airplane Club. The piece de resistance was finding out that Murname was also the Chief of Police!

There was a story running around about the liberality of the town as far as modelers' zany antics went. In Australia, driving regulations and fines were pretty stiff, including one for not fastening your seat belts.

With such a great air of friendliness, the Nationals could not help but be a success. Even the race track was thrown open for the radio control activities. Made an excellent site incidentally.

The Australian Nationals have



Richard Bloor flew his Gruneau Baby glider in Sport Scale.

quite a few features the American counterparts would do well to copy. During the nine days of Nats competition, there was something of interest for the modeler every night, ranging from movies to an auction.

The initial wrinkle is the briefing meeting held for all contestants, in the Civic Auditorium. Similar to a pilot's meeting only on a larger scale, this meeting lasts about three hours, with the problems of free flight, control line, and radio control events being taken up in this order. This effectively kept the crowd from getting too large, as each segment was leaving and/or arriving.

Like all Nationals, the Australian events are held during the summer, which means being held over the New Years holidays. Starting right after Christmas, on 28th of December, the night schedule looked something like this:



Barry Lee and his O.T. Southerner.

Wednesday: Processing, Get Acquainted, and Raffle Night.

Thursday: Badge Collectors Night. Friday: Movies; The Great Waldo Pepper.

Saturday: New Years Social Event, including outdoor barbecue and F/F Night Scramble.

Sunday: Static Scale Display.

Monday: Indoor Peanut Scale and H.L. Glider in the Civic Center Sports Stadium.

Tuesday: Annual Auction and Rules Conference.

Wednesday: Awards Banquet

In reviewing the schedule, a most interesting group has sprung up in Australia known as the Badge Collectors Association. This has been brought about by the custom at each Nationals to issue a commemorative pin and in some cases, an additional shoulder patch. Over a period of years, these pins have acquired a value based on the demand for a complete collection. As noted, a special night has been set up for the collectors to swap and display their items.

By far, the best and most exciting



Brian Potter with 7-year old FAI ship that is still going strong. Eucalyptus in background.



Ivor F. (beard) Stowe's free flight group was most enthusiastic on field.



A tad windy on pylon racing day, but the show went on.



Frank Curzon's Sopwith Pup, retired from FAI competition to enter Sport Scale.

night is Auction Night. With Ivor F. (Stowe) as auctioneer, a thoroughly good time is had by all. It was only by the greatest restraint that the columnist refused to bid. After all, how was I going to get the stuff home when having to leave the models shipped from USA? Point here was that it was over \$200.00 one way to ship a box to Australia.

One highlight of the auction was the sale of a useless item to the highest bidder. The proceeds to go to charitable organization picked out by the Mayor of Camperdown.

Another interesting item that might be worthwhile for AMA to adopt in their pre-registration is that during processing and registration, a contestant is allowed to not only add events, but swap events for which he was unable to complete models. Sounds like a lot of work, but in reality it was quite simple, as



Jeff Henning and his Spitfire with Aussie markings. He's from Adelaide.

all processing is conducted in one day and event entries are firmed up then.

Another gimmick by the Australian officials was the issuance of a "Daily Blurb". Of course, AMA has its Nats paper edited by Les Hard, but the feature this writer liked was the binding of all issues at the end and selling them as a complete Nats volume. At \$2.00 apiece, this helped swell the M.A.A.A. treasury. The Australian organization is no different than any other; they are always short of money.

The indoor events, glider and peanut scale, were heavily attended because of the site selection. With a balcony and seats around the perimeter of the gymnasium (sports center), each contestant performed individually before the crowd. In every case, no matter how poor the flight, each contestant received a



Noted pattern flier, and all 'round modeler, Tom Prosser, and winning Sport Scale Tipsy.

round of applause commensurate with the model's performance.

R/C Glider is popular in Australia as evidenced by two separate types of flying on spread-out dates. Thermal soaring type of flying and speed events were held early in the meet. Pylon racing was held on the last day of the meet. This proved to be a popular spectator event.

Surprisingly, scale gliders are allowed in the Flying Scale events. Gliders are towed up to a specified maximum altitude and then judged on their maneuvers as long as the glider has altitude. Surprisingly, several of the gliders were able to perform eight mandatory maneuvers.

One noticeable feature about the free flight events was the dispatch with which they were held. This was due mainly to the use of the round



Dr. Bob Allen, MAAA President (left) and Sec./Treas. Gordon Burford discuss a point.



Frank Curzon's Bleriot won FAI Scale. Judges supposedly counted spokes in wire wheels!



Monty Tyrell's Bellanca Skyrocket drops Mc-Donald's Hamburger leaflets on its off days!!



Building and flying indoor rubber powered aircraft is a whole different experience in modeling. Try it with one that can make you win.

• The Busy B came about as a result of a long winter of low-ceiling indoor flying, and 6 airplanes, each an improvement over the other. The end product was a light yet strong airplane that will do over 10 minutes in a 35 foot ceiling, and recover with minimum altitude loss due to rafter banging. The airplane has never been flown over 37 feet, but its highceiling potential looks good. It can be built by beginner or advanced modeler in a few evenings, but I don't recommend that the beginner attempts to build it too light. The final model weighed less than 1 gram without rubber.

Let's start with the wing building jig. Use the wing outline on the plans and make a standard indoor template of thin cardboard, cutting small triangles out at the rib stations. I use the black colored cardboard sold at any art supply store or fiveand-dime. Cement the template to a sheet of 1/8 x 4 balsa, leaving an equal amount of extra space at the



leading and trailing edges and at the tips. Now slice the sheet at the tip dihedral breaks and sand to a bevel to give you 1-3/4 inches of tip dihedral. Cement the tips to the center section. You will now have a building jig that looks like a H.L. glider wing. Now drill a 1/8 hole at



Thrust bearing detail. Prevents wobble and controls offset.

each rib station, including the tips, at the leading and trailing edges. This is to prevent the spar from being glued to the jig when you install the ribs. Now using some scrap from your balsa box build up a simple stand for the jig approximately 3 inches high. This is to allow for the installation of the wing posts. the jig is complete. Now let's build the wing.

The wing on any EZ-B must be strong, yet light, as there is no bracing, and the selection of wood is most important. I purchase most of my wood from Micro-X Products, P.O. Box 1063, Lorain, Ohio 44055 (see ad). They have a fine selection of indoor supplies for any project.

The front and rear spars are stripped from a piece of .032 sheet B-grain stock 5-1/2 lb. wt., and cut to .060., using some scrap 3/32 sq., pin the center spars in place on the jig against the template. For the tip spars, use .026 x .060, 4 lb. stock, B-



Simple jig is used to build wing. See text for full explanation.



Busy B, resting in its foam clamp.



JUNE 1978



Walt Bellmer using the behind-the-pole handle.



Charlie Lieber with his FAI Speed plane.



Johnny Smith with TR, way back when.



• One of the problems associated with doing a monthly column, even one dealing with the widely varied world of C/L flying, is in coming up with fresh material every 30 days or so (Columnist speak with forked tongue. See Bob Stalick's article this month! wcn). More than one magazine columnist has given up doing this type of thing by either burning himself out while telling every thing he knows and then not being able to come up with more material, or by simply getting tired of gathering material, occasionally blaming the lack of readily available material on the readers themselves.

Al Rabe found himself in the latter (and/or former) position back when he used to do the Stunt column for the old American Aircraft Modeler, and went out of the writing business blaming his reading audience for his problems concerning lack of input. A very strange approach, indeed.

The problem seems to be that the material comes in peaks and valleys ... highs and lows. In my case, I might have material like you can't believe for six months. And for another six months or so it seems as if nothing is happening in the C/L world. At these times, I even consider filling the blank pages in front of me with contest reports, something I have only very rarely done and which seems to me to make very boring reading anyway.

All of this is leading up to saying that, at this point in time, I nave enough material here in front of me to last for several months and a lot of it is really good stuff. But a few months down the road I might need some good material, so I'm sitting on it and this month's column will contain the usual garbage you have come to know and dislike.

WAVE YOUR PINKIE GOOD-BYE

After several years of putting out a newsletter every two weeks, P&B (Patty and Ben Sasnett) have found that there really are other things in life besides cranking out n/l's (after all, they were recently married) and have decided to throw in the Pink Towel. P&B will continue, however, to publish the MACA n/l once a month, so their typer stays warm. SOMETHING NEW FROM THE CORE HOUSE

It is finally legal to fly OPA's (Other People's Airplanes) in all of the AMA Combat events. In most of the toy airplane events, I personally don't go for the "Buy'n Fly" routine, but in Combat, it makes a lot of sense to allow it, as the outcome of the matches is based on flying skill, not on who built the model. A really good flier can beat just about anybody, and do it with a VooDoo, while a poor flier can't beat his sister, even if he is flying the latest in ultra-zoot equipment.

If you are in the market for some ARF Combat planes, write to: The Core House, Box 300A, R.D. #2, Palmyra, PA 17078. TCH is none other than Phil Cartier, his wife Mary, and Gil Reedy. The newest designs available from them are the "Gotcha" and the "Axe". I have not flown either design, but Phil knows what is necessary to make a competitive piece of equipment, plus having years of experience in working with foam Combat equipment, so I don't hesitate in recommending whichever plane looks the best to you. The Gotcha, as you can see from the pic, is tapered in both planform and in airfoil thickness. It is of 45 inch wingspan, packs 400 inches of area, and weighs 9 ounces, less engine.

The Axe has a span of 42 inches, 415 square inches of wing area, and comes in at 10 ounces, less engine. I find it interesting to note that in general layout the Axe resembles my own Plastic Nasty, the PN being a bit larger at 494 squares. Guess I'm going to have to quit telling it all in those tapes that Phil and I exchange on a regular basis!

Both planes can be made ready to fly in about one hour. All you have to do is glue on the motor pod, boom, and stab, then solder up the pushrod and finish off the leadouts. Everything else is already done for you, including installation of bellcrank and covering of the wing with a strong, clear, heat-shrink film. The motor pods are drilled for either Fox (the best choice for power) or Supertigre. Also, all necessary hardware for getting the planes ready to fly is included.

In all, it sounds like a pretty good deal to me, with the Axe selling for \$22.00 and the Gotcha for \$26.00. I know that at first thought the prices may seem high, but just figure up what your time is worth to you, how much time you spend building for each season, and I'll bet that the price quoted comes right into line as a pretty good buy. If not, reflect on the fact that in this area we have a top-notch flier who regularly pays \$50.00 for each Nemesis or Rotation Station he can get his hands on ... and has never been seen to wince





"The Axe" comes as an ARF or as a kit, from The Core House.

"The Gotcha", tapered wing combat machine from The Core House.

upon plugging one in. This particular fellow's time is worth an awful lot of money, and even at \$50.00 a pop, he is way ahead. (Only thing we see wrong is the daddy-supported junior who shows up to compete against the do-it-yourself kid. The former has an unlimited supply of weapons, while the latter could be winning but is out of ammunition early in the game. wcn)

In my experience with designing and building foam Combat planes, I have found that the major hang-up is in simply learning how to work effectively with the foam and in cutting really accurate cores. Just getting all the foam cutting equipment designed and working right takes a lot of time, and has sent plenty of Combat fliers back to built-up, balsa Combat planes. So if you still prefer to roll your own, but want to get into foamies, the Core House can still help. They will do Custom Core Cutting for you, all you have to do is supply the templates. Be sure to specify spar slots and leadout locations. Initial set-up charge is \$10.00 (one-time fee) and from then on out, it costs \$1.00 per square foot for solid cores, and \$1.75 per square foot for hollow cores.

The Core House offers other services, including custom building

of your own design, and other kits. Write to Phil and he'll give you all the Coring Details.

JOE KLAUSE GOES SOFT

Joe, owner of Kustom Kraftsmanship, has changed the formula for the wheels he markets. They are now a bit softer, something we could probably care less about, but the important thing is that with the change of compound the wheels last a whole lot longer than the original versions. Yes, the first ones did wear out pretty quickly, didn't they? No problem, these latest last a long time. Check 'em out at your local hobby. If they don't have them, Joe advertises regularly here in MB. Contact him directly. FROM FUSITE

Evidently somebody at Fusite reads this column, because ever since the February '78 issue of **MB** hit, I've been almost swamped with letters from them, all of which proclaim that the 1/2A GloBee Glo Buttons will be released. This is surely good news for those involved with the 1/2A sized engines, and the Glo Buttons ought to be available by the time this issue is out. Give them a try. I think you'll like them just fine, as they do give more power and the element is long-lived. Even though superior to O.E.M. plugs, they are a bit cheaper, so the modelers once again come out ahead in all ways. UNITED STATES CONTROL LINE MODEL AIRPLANE CHAMPIONSHIPS

What a long title for a contest, especially when in the past it has been known as the Winston-Salem meet. Long title or not, this annual affair has been granted a AAAA sanction for the June 17-18 happening. The schedule of events appears to have almost every single AMA C/L event listed, plus some unofficial events that several of the special interest groups plan on running.

I have talked with several people who have competed at past W-S meets and they all say that this particular site, the competition present and the management of the meet, are nothing but the best, so if you are looking for a biggie contest to attend this year, and Lake Charles send shivers up your spine (More like hot flashes! wcn), here is the place to be.

For full information, write to: Bill Pardue, 1201 Surry Drive, Greensboro, NC 27408. Be courteous enough to include a SASE with your request and Bill will set you up with everything needed.



Cartier's unnamed FAI Combat plane. May become and ARF kit.



Fusite's new Glo Buttons. Upper plug is for racing, lower for sport.





Round and round she goes, and WHEN she stops, nobody knows!

Dick Weber tachs engine while Ward Maitre holds plane. Careful attention to details contributed to the successful undertaking.

10 HOURS on the MERRY-GO-ROUND! PHOTOS SUPPLIED BY THE AUTHOR

By DICK WEBER ... Should FAI endurance records test the physical capabilities of the pilot as well as the design and preparation of the aircraft? Fascinating report on one such experience.

• In late 1975, the first version of my model, Echo, increased the AMA control line endurance record from 3 hours, 40 minutes, 37 seconds to 5 hours, 9 minutes, 48 seconds, using a hybrid .29 cu. in. diesel that had been designed for FAI R/C records. Rules for C/L endurance require a .19 to .36 engine, and the introduction of the K&B 3.5 cc (.21) engine shortly after my five-hour flight led to preparations for another C/L endurance attempt.

Echo was heavy, allowing only 15 fl. oz. of fuel within the four-pound weight limit. My goal was to double the fuel capacity by using a lighter engine and fuselage. In addition to having more fuel, the diesel-converted K&B 3.5 would be set up to sip it more slowly than did the .29 diesel. Echo Too uses the wing and tail from the old model, and the new fuselage holds a 32 fl. oz. uniflow tank under the wing. Needle valve adjustments can be made in flight with a servo motor operated by a switch at the control handle. Test flights on November 20, 1976 showed that a Top Flite 10-6 produced the highest airspeed.

Plans to try for a C/L record in 1977 never materialized. Work which resulted in new FAI R/C distance and duration records for seaplanes filled the time. In December, I asked Ward Maitre if there might be a large hangar available at the Patuxent River Naval Air Station, where he works. There are many precedents for flying control line indoors, and AMA verified in writing that a record could be established indoors, thereby avoiding both the winter cold and wind. Ron McNally, chairman of the C/L contest board, was also contacted, and he had no objections to an indoor attempt. Soon after I contacted him, Ward called to report that an empty 160 x 240 foot hangar would be available for the next weekend. Arrangements were completed quickly; witnesses lined up, AMA sanction obtained, diesel fuel brewed, and batteries for the mixture control charged.

On Saturday morning, January 7, 1978, we gathered at the hangar for the record attempt. Our crew consisted of CD Luther Jackson, Ward Maitre, Ken Greenhouse, and Bill Anderson, president of the Patuxent Aeromodelers. Echo Too was readied, and with the engine hum-



C.D. Luther Jackson checks weight (3.98 pounds) as Dick Weber watches. Strict compliance to FAI rules was enforced. At least U.S. record claims are well documented!



Relieved Weber at the end of record flight. Man! Did it ever feel good to sit down!



The K&B 3.5 cc mill, converted to diesel operation. Used 20 ounces of fuel during 10 hour flight.



son, Ken Greenhouse, and Ian Haliscak.

ming, a takeoff roll of 125 feet started the long flight.

In the air the needle valve was set as lean as possible. Occasionally, the engine would falter a little, and I would play with the mixture control. A couple of hours into the flight, not having changed the mixture for some time, I worried about remembering which direction to throw the toggle switch for rich or lean. Long discussions, and sketchy notes made just before the flight, led to the conclusion that I remembered it backwards. An hour later, the engine sounded dangerously lean, so I set it richer . . . I thought. But after 3 hours, 21 minutes of flying, the engine died. An immediate postmortem showed that the mixture control worked as I had originally believed, not as decided during the flight. Consequently, when the engine needed more fuel, I had given it less. Exhausted and disappointed as we were, the crew urged another try for the following day.

That night I stayed with Ward and Holly Maitre, to avoid a ninety minute drive home and to permit an earlier start in the morning. Ward was my flight instructor when I was learning to fly R/C several years back.

On a rainy January 8, preparations went faster than before. The flight circle was moved to the exact center of the hangar, to get farther from some large water pipes near the ceiling which had intimidated me the day before. A five foot radius circle was marked on the floor, as per the AMA rules, and a small rug put inside to soothe the feet. The same witnesses were on hand, with the later addition of Ian Haliscak. Echo Too was filled with 26.5 fl. oz. of fuel, checked, and weighed in at 3.98 pounds. An 81 second test flight showed how lean the mixture could go, and confirmed that the compression was properly adjusted. Takeoff for the big flight was at 10:24:15 a.m.

The empty hangar had a reverberation time of more than five seconds for a brief loud noise, consequently when Echo Too was flying, it really sounded like a B-17! The witnesses at the side of the circle could not even hear when the plane went past.

They had to watch in order to count laps. Low rpms kept the noise intensity at an acceptable level. Ear protectors were on hand, but little used. The continuous echoing made



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it difficult to notice abrupt changes in engine speed.

During the first four hours, the mixture needed occasional adjustment, always a perilous procedure. Thereafter, the mixture was not changed for the rest of the flight. Lap times on 53.69 foot lines ranged from 8.7 sec to 10.1 sec. Most laps were near 9.75 sec, for an average speed of 23.6 mph. Line tension was comfortable, but inadequate for eyes-off flying. Exhaust fumes were barely noticeable because of the slow rate of fuel consumption and the numerous leaks in the large building.

Some physical discomforts appeared during the flight. Legs and back got stiff, demanding frequent vigorous exercise. I ran in place, danced, walked forward ala team race, did knee bends and back bends, stood still for nearly a full lap at a time, and even turned while kneeling or sitting on the rug, all to change the pace. Mostly I just rotated on my left hip. My hands turned a strange dark color, caused by restricted circulation past the bent elbow. A long safety thong allowed use of either hand, and both hands stayed discolored, but they were not numb. About six hours into the flight my hips began to ache from the rotation. This never got very bad, and actually subsided later. I was not dizzy or tired, until I stopped.

Except for the times in the first hours when the mixture needed attention, there was little to occupy my thoughts. Flying was easy and my mind wandered. "If flying is so great, why do I wish this were over?" Sometimes I was mesmerized by the repetition of the scenery flashing before my eyes; flying was often automatic. Frequent discussions with the crew, and a hope to empty the tank, kept me going.

We had just passed ten hours ... into double figures. I began waving to the crew to indicate the time on my watch. Two seconds later when I looked back at the plane, it had climbed too high and the lines were slack! It flew level across the center of the circle and out toward the other side. I prepared to regain control when the lines got tight, but could not cushion the shock adequately. It flew back in. Frantically (you know how this goes), I ran to take up the slack, but in another half lap it landed hard, breaking the nose and prop. I was not too unhappy that it was over. The tank had not been emptied, but it was, nevertheless, a very successful day.

Flight duration at the moment I

stepped outside the circle was 10 hours, 3 minutes, 25 seconds. Total distance flown was 237 miles. Enough fuel remained for another three hours. The engine had burned 20 fl. oz. in ten hours, and should get an EPA rating of 1500 mpg! It was as clean and tight as before the weekend flights. Echo Too is far from the ultimate endurance design: the airframe is too heavy. Clearly, the record could be raised to 15-20 hours, even flying outdoors.

An unnecessarily important aspect of this event is pilot endurance. The AMA C/L contest board recently rejected a rules change proposal to allow relief pilots, because a few board members believe that pilot endurance should be a major factor in this event. Flying control line for many hours nonstop proves nothing important about an individual's flying skill. With no physical conditioning for the flight, I certainly could have lasted fifteen hours. Most experienced pilots could do so, given enough determination. Still, I believe that this event should be for the best airplanes, not the best legs or the best electric swivel chairs.

Special thanks are owed to the witnesses, who encouraged me to try again. Thanks also to Bill Anderson for his efforts to schedule the hangar, and to Dean Smith and Tom Plummer for their help with the hardware.

P-38L Continued from page 27

attached to a servo. The nylon tank hook (made from a bellcrank) and shackle are similar to those used on actual bomb racks. Design is such that when the shackle is released, an arm on the shackle pushes against the top of the hook, forcing the tank away. A rubber band is the spring force. The only problem with this set-up is that it takes both hands and your feet to install the two tanks and work the transmitter by yourself.

Although an eight foot P-38 may not fly exactly like a real one, I think I was more concerned about the first flight than I would have been checking out in the original. Was the C.G. where it should be? What happens if an engine quits? Etc. etc. Our local flying field is sort of rough grass, actually mowed weeds. Could I get the big bird off of this stuff? No problem? At full throttle, the P-38 jumped into the air long before I expected and climbed out rock steady. The model was so stable I thought I was flying a C-47, rather than a P-38. The retracts and doors worked, and after a few passes, I thought I would see how it landed. First discovery! I overshot the turn to final even though the bank

looked pretty steep. Then I remembered. This is a big airplane. It takes a lot more room to turn and it is really moving faster than it looks. Next try, I allowed for this, and it settled down and gently floated past the point of intended touchdown. Shades of the Ugly Stick! Could this by a P-38? On the ground, with both engines running, I looked at the transmitter. All the trims were still in neutral. What happened to Murphy's Law?

After the first flight, the elevator and aileron clevises were moved in a couple of holes so I could wrack the plane around a little tighter. That is the only change made since the first flight. The bird is not sensitive to trim and still flies with the original settings. The C.G. actually moves back when the gear is retracted, but you cannot detect the change in the air. The first three flights off the grass were the only test flights made before a series of contests and airshows. So the first and only (Before the Tangerine!) single-engine experience came on the fourth flight at the first contest. An engine quit on downwind after takeoff. This was not the time or place to experiment, so I eased the throttle back, turned into the dead engine and landed. No sweat.

The model was almost a year old when the drop tanks were added. I made one test before the '77 Nats to find out if they would hit the stabilizer when released. I need not have worried. They come off and tumble down exactly as did the originals. The tanks and pylons add over a half-pound for takeoff, but I can't detect any difference in flight, with or without them.

So if you are looking for a Sport Scale model to get away from the run of P-51s and Corsairs, try a P-38 with drop tanks. Now with a little napalm in the tanks ... if you can find that judge that gave you a five...

Mammoth Continued from page 31

When you discover the right combination for you, your aircraft, and the engine, you'll find the difference like night and day. If you look back into the history of aviation, you'll find literally hundreds of blade shapes: scimitar, equal taper, square tips, swept forward, cuffed hubs, slow speed high rpm designs, and vice versa, etc. The biggest advance in propeller-driven aviation came with the controllable pitch prop, because aircraft designers had for years realized that no matter how much you try with a fixed pitch propeller, it's only a compromise. You can put on a cruise propeller or climb (shorter



takeoff) propeller, but to get one good feature you have to sacrifice another. You have to have a tremendous change in horsepower to gain much improvement in a model, but only a small change in the propeller can mean a big difference.

When we started work on the Quadra, we were looking for something to drive a 16 to 20 inch propeller, as 18 inches is 1/4-scale and 20 inches is 1/3-scale to a lot of propellers in use on full-sized aircraft. We wanted the aerobatic type aircraft to look and sound realistic, which meant settling for an 8000 rpm figure to best use the available power. We found that 6 inches of pitch was about right to utilize full power, but this meant that the aircraft would be theoretically, limited to a terminal speed of far less than 45 miles an hour *if* the air screw theory were applied. In actual practice, 45 mph is far exceeded! Because of these different theories, various prop manufacturers measure different angles when determining pitch, and some use "effective" pitch equivalents so you might choose the right load for the engine.

There have been tremendous advances in prop design and theory in the last few years, but because of the excitement of jets, these have generally not been noticed by the

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K&B 1000 for 1/2 A Engines

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average public. It could be argued that "fan jets" are really propeller driven aircraft with supplementary exhaust thrust! Ask any good fan jet man what percentage of actual thrust comes from the fan intake and from the combustion exhaust as in a pure jet.

Now let's look at the new big transports using turbine engines, where the prop varies pitch but not rpm. If you're using "rotating wing" propeller theory, you realize any airfoil on a wing or prop has its best air speed where it develops its best lift-versus-drag (with a prop, trans-late this to pull or thrust). Run it slower and it loses efficiency and eventually stalls. Run it faster than its best air speed and drag goes up dramatically without much change in thrust.

"Hey", you say, "I want to fly my airplane, not talk it into the air". Well, I do too, but without that prop up front, your engine is only capable of making noise and heat! If you look at the accompanying drawings, showing, in possibly over-simplified terms, how RW prop theory works and how it will explain some of the things we take for granted, we can either lessen or increase the effects as we need them. Keep the following in mind . . . the larger the wing or propeller airfoil the more important the shape.

Question: Why does it take nearly twice the power to get a few hundred additional rpm out of the same prop? Think wing! A 'Clark Y' section runs well at low speeds. If you fly it faster than its best speed envelope, drag goes up sharply, but lift doesn't seem to improve much. Drag is translated into power requirement. This is why that new "Super Duper .60" of yours won't turn your old prop that much faster than your "Whatchamacallit", even if it has 2 and 3 times the advertised hp. Engine torque available isn't the only factor. If you were to change the blade shape or airfoil, you would be better able to use that power, as like a good pylon or slope glider wing airfoil, it develops its efficiency at a higher air speed, with less drag at that increased speed.

Question: Why are some models able to fly fairly well with only an inch or so of the propeller sticking out past the cowl? Think wing! On some airfoils, 80% of the lift is developed on the upper surface by creating a low pressure region there. The remaining lift of 20% is created by a high pressure area below. We can vary this percentage mix on a propeller, like a wing, by blade or airfoil shape. Therefore if you use a propeller shape that has a good percentage of its lift or pull developed on its upper or front surface, you can perform this trick and get away with it. A larger diameter propeller on the same engine may lose more than it gains by not utilizing engine power properly.

Question: Are pusher propellers different? They can be. The example we gave previously was good for a propeller with the 'proper mix' for a restricted air flow behind the propeller. If the pusher air frame design severely upsets the air flow at the front face of the propeller (Example: a Sea Bee type of amphibian model with the propeller spaced incorrectly from the fuselage) that same propeller, which was used so successfully on the large cowl problem, would be a dog on this installation, and vice versa. The distinctive noise you hear from full-sized pusher aircraft (and the Sea Bee was a perfect example) is not only the exhaust noise being chopped by the propeller, but also the propeller changing load as it passes these obstructions to air flow. This might explain why three-blade propellers are often used on the more modern versions of a similar design. The effect on each blade is reduced as it passes these obstructions (2/3 of the total blade area could be in the clear rather than 1/2). By the way, we have available for the Quadra, a rear prop

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spool which allows a standard propeller to be used as a pusher. See the dealer where you purchased your engine, as an improved version is available now. Don't limit your imagination to tractor design!

Question: Why do some propellers have square tips and others have tapered ones, and which is better? The tip of a propeller, like a wing, doesn't develop much lift or thrust. Each propeller design has a working area, which generates the pull, and this area can be moved out or in on the blade area to make the best use of the power characteristics of the engine; i.e. low speed torque versus high rpm-developed hp. The propeller designer must choose one of two evils ... does he increase the the efficiency of the propeller by smoothing out the tip vortices at the expense of the less effective total area, or, does he clip off the tips and move the working area out further, and thereby cutting down the necessary diameter? So the answer really is that each propeller shape has its job. If the propeller was properly designed, clipping a tip will not improve the propeller's efficiency. It may allow the engine to better utilize its power characteristics, but it won't help the propeller.

Question: Which is more efficient ... a single-blade or multi-blade propeller? Neither! It depends on the use. Single-blade propellers are generally ruled out because we have to counterbalance the blade weight and we develop an unequal thrust or side load. In theory, the singleblade should be more effective at *low speeds*, because it can work in cleaner air and blade fight is elimi-

 nated, as no blade matching is required. Generally, multi-blade propellers are designed to gain more efficiency on the back of the blade. The higher pressure area of the preceding blade hasn't fully dissipated before the next blade adds its pressure to the already partially compressed air. An extreme example of this is the fan jet which uses multi-propellers stacked in series to generate a very high pressure over a much smaller area.

What is important to us with respect to large models is that we are generally operating in the lower speed ranges, where the larger diameter propellers are more efficient, but only up to a point. Using a speed reducer on conventional model engines will allow you to fly these giants where they would be limited to a fast taxi if run direct, but there is a limit to which you can go before the air speed is diminished too far. The profile of a propeller turning at 4000 to 5000 rpm should be decidedly different from one of the same diameter at 8000 rpm. Remember that a given propeller airfoil will develop its best lift versus drag at a given air speed (rpm generated). In full-sized aviation, this problem is taken care of via the use of "constant speed" propellers. They have long realized that a major factor in efficiency is to run each propeller airfoil at its most efficient air speed. Speed is adjusted by pitch angle and power settings. There is a point on any aircraft, large or small, where drag increases so rapidly that any further advancement in pitch on a given propeller will not increase speed. For each mph you increase air speed via pitch, from optimum setting, there is a tremendous loss in efficiency. Translate that into hp required and fuel economy.

Question: If a propeller is an airfoiled rotating wing, why does it have such a high angle of attack in relation to a fixed wing?

Note Figures 1A, 1B, and 1C.

You can see from this that the air flow that the propeller airfoil sees is an angle somewhere between the plane of rotation and the flight path and/or the air flow generated by the propeller itself. If we leave rpm constant and increase forward speed in flight, the effective angle of attack of the propeller decreases to the point (depending on airfoil) where the drag of the airplane equals the lift that the propeller can develop at that angle of attack. When that happens, you can go no faster. Now supposing you switch propellers in mid-air substituting one with larger blade area, but one which has the same "pitch angle". Keeping the rpm constant, will you go faster? The answer is yes. Even though the efficiency of both propellers is reduced, the larger propeller still has surplus lift and it will step up the speed until the increased forward vector effectively reduces the angle of attach even further, to the point where you again reach a stalemate. We can change the whole ball game by changing pitch in flight, and I hope that this possibility is not in the too distant future. Helicopters are doing that now.

The question I have not yet answered is, "Why the squat airfoil shape of a propeller, especially near the hub?" Look at Figures A2 and B2 and you will see that the air flow does not cross the airfoil in a straight line. If you cut the propeller section at this angle you get an entirely different picture. Using the RW theory, things like "P" effect and increased snap rolling tendencies on takeoff, which are due to propeller design, become understandable.

I hope you can read and absorb this. If you put all the information to use, it will help you to select a better From the Golden Age of Aviation

The Velie Monocoupe

America's most popular trainer from the golden age of aviation, the Velie powered monocoupe is said to have accounted for nearly 90% of all light planes produced and sold in this country during its heyday in 1928. This just released kit contains all hardware, premium balsa, and spruce necessary to build the most popular variants Models 70 and 113. Structured like its namesake, the model brings together the perfect combination of lightweight for sparkling flying performance and rugged strength to shrug off a beginner's errors. The spritely Short field performance of the original is virtually duplicated in our Half A beauty whether you opt for glow or electric power.



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propeller for aircraft of all types, and this becomes more important as the size of the aircraft increases. Start thinking "wing" when thinking about propellers, and you will realize why there are so many shapes and arguments supporting the advantages of each. Just because a propeller looks queer to you is no reason for not trying it. "Pretty is as pretty does".

If your dealer is looking for some different propellers, might I suggest he contact Polaris Products Inc., 2514 Highway 97N, Kelowna, B.C., Canada V1X 4J4. Polaris has four types of propellers for the Quadra engine, as well as several blade patterns in regular sizes including, 11 x 7-1/2 pushers (a matched tractor version is also available for use in twins). The company also has the Taipan cuffed hub fiberglass propellers. If you want to get top efficiency with these particular propellers, don't cover the cuff with a huge spinner but use a spinner nut.

This month's photo acknowledgements go to Maurice Robinson, 75 Springfield Crescent, St. Albert, Canada for his 12 foot, 5 inch Quadra powered "Mammoth Scale" ... 23 square feet of wing area! Maurice's letter contains so much useful information I'd like to share it with you.



"Now, anybody who knows me, will tell you I build a little on the heavy side. I've managed to build a 10-1/2 pound, 60 inch Vindicator, which flies great! It will be 5 years old in a month's time. Also, I've an 11-1/2 pound, 77 inch J3 Cub on floats, which also flies great ... about 4 years old. I even managed to build improvements into my Proctor Antic, it's 9-1/2 pounds and flies okay too. So what the heck, a bit of weight stops my ships blowing away in our Canadian breezes!

"So I thought, gee, with 23 square feet of wing area, I can really go to town. I modified the side view of the fuselage a bit, modified the nose

and plan view of the fuselage, bigger tail (love Tiger Moth tails), bigger fin and rudder, neatly modified the undercarriage ... now a 3-1/2 pound machinist's delight, fully sprung ... and Sullivan gear for a sprung tail wheel. Got some castings made and machined the wheels . . . 10 inch tail wheel inner tubes for tires. Final weight of body and tail is a touch under 18 pounds, of course, that may increase a little with covering, radio, cowl, etc., but what the heck, I really cut down the wings... from 13 feet to 12 feet, 5 inches, and the chord down from 25 to 22-1/2 inches. Who needed them that big?

"Construction has been great fun, and is almost finished now. A little more work on the wings and 30,000 little odd details here and there, and it will be ready for covering. It has several innovations. I had Kraft Systems make me 45 inch extension servo leads and Y-connectors, so now the servos, 2 for the flaps, 2 for the ailerons, and 2 for the elevator, etc., will be linked direct to each control surface with short, 14-gauge pushrods. With 8 servos, I guess I'll have to use a 1000MA flight pack. The tail bolts on, so trim change will be easy.

"By far the biggest innovation is cost ... about \$25 so far, and just think . . . no fuel-proofing, and fuel



"Well, this all started in an innomahogany ply, and I was off.

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B. Fill tank to the top

C. Tube goes up into air bubble

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at about a dollar a gallon! I'm sure looking forward to bolting it together on the field and seeing it trundle off into the blue . . . I hope! I'll drop a movie camera in the cabin so should get some interesting first flight pictures. and with its 26 by 6 inch flaps, 30 pounds of weight and all that drag, I should get at least some real scale flying speeds."

Of real use to others are Maurice's "tires". These aircraft tail wheel tubes are 3/32 thick rubber, inflate round, and easily support the present 26 pounds of weight, not flattening out even when added weight is sufficient to collapse the sturdily sprung landing gear. Cost for the pair was \$6 in Canada. Sorry, Maurice is unable to produce these wheels for anyone else at this time.

Photo acknowledgements for the "Gute Fahrt" go out to Jack Whitehouse, 5 Koidern, Whitehorse, Yukon Territories Y1A 3N7. (Unfortunately, the photos of this Ugly Stikish model are dark, color prints which will not reproduce well enough to publish. Sorry. wcn) This model has a 9-1/2 foot wingspan, and a dry weight of 18 pounds. Flight endurance is up to 4 hours, and aerobatic endurance up to 1 hour. Total flight time up to 1978 was 24 hours. Construction is mahogany ply and white spruce, finished with Solarfilm and natural stained wood. This is a Phil Rashley and Jack Whitehouse design. Jack says, "This is a very easy plane to build out of lumber yard supplies. If a kit manufacturer wants to kit this, plans can be drawn up, and it would be very cheap to produce. Floats have also been built for the Gute Fahrt. Antic owners, eat your heart out!" Jack said the area they flew from was very rough and short, with acid settling ponds all around, making for some real STOL work, and the Gute Fahrt handled it very well, while smaller planes did not.

This has been a long article, but it is important to cover each topic fully. Next month we'll give you some construction info on a 'new' material, which to my knowledge, is not now being used in aircraft modeling. It can replace all the sheeted structure materials and will do some jobs that balsa and aircraft ply cannot do. It is readily available at a cost of less than 25¢ per square foot in sheets 4 by 8 feet. It will take all glues, paints, and iron-on coverings with ease, and requires no filling. We are presently building drones for our Canadian government and the entire aircraft is sheeted with this material. So far, it has passed every test we have thrown at it. "G" tests have been far surpassed. What is it? What is it? As I'll never be mean enough to be a

continued-next-month writer, I'll tell you. It is 20 thousandths thick arborite backing material. Next month I'll tell you how to use it, along with some scrap foam, to build your new creation (that is, if you haven't already flown it by then!)

(Note: So far, we have not been able to discover a U.S. equivalent for this material, which Ron described over the phone as a backing for formica, as used on kitchen counter surfaces. One individual was familiar with the product, and said, "That's available in Canada." Great! Hopefully, by the time Ron's next article appears, we'll have more information on this material. wcn)

1 to 1 Continued from page 33

those are few in my case), involves the following techniques.

1. The completed wing is fitted to the fuselage, complete with dowels, nylon bolts, the like. Of course, careful consideration has already been given to the proper alignment and incidence ... of course!

2. The curved fuselage portion is carefully cut out or sanded slightly oversize (Somewhere around 1/16 inch).

3. The base for the fillet is cut from 1/32 plywood with the grain of major portion of the layers running



spanwise in relationship to the wing. This makes the final product far more resistant to warping.

4. The wing is put in place with a sheet of wax paper or plastic wrap between the wing and the fuselage wing saddle.

5. The 1/32 plywood fillet is slipped into place and glued to the fuselage. While it is in place cut sections of soft balsa triangular stock of the appropriate size and glue into the joint. Use shorter sections on the sharper curve near the leading edge and longer pieces near the trailing edge. Use a sandable glue or finishing resin to hold the triangular stock in place.

6. When dry, it can be rough sanded or filed to its proper curve. Use caution so you do not gouge the wing or fuselage.

7. Finish off with micro-balloons in resin and rough sand while the resin is still somewhat rubbery. Final finish and sanding is done when the rest of the fuselage is finished. One additional step which really

One additional step which really helps to dress up the whole project is not difficult to accomplish. In order to eliminate the edge which is easily seen, 1 use the following process. Placing the wing back in its saddle with plastic once again between the wing and the fillet I then fold the wrap upward away from the wing. Then soft 1/16 sheet balsa is fitted to the fillet edge, in sections about six inches long, reaching toward the wingtip. Again, run the grain spanwise. These sheets are glued to the original wing sheeting with a sandable adhesive and then carefully sanded so as to feather the 1/16 sheet into the wing sheeting. By curling the sheet around the leading edge and providing the proper feathering, it is virtually undectable after the final finishing. It makes a beautiful joint, which also helps to align the wing and will withstand a small amount of curling of the fillet without leaving an unsightly edge. THE SCALE CONTEST SCENE June 10-11:

5th Annual Scale Championships at Abilene, Texas

F/F... Gas, Rubber, Peanut

C/L . . . Sport Scale

R/C . . . Sport Scale, Jumbo, 1/2A

Fun Fly events on Saturday Jerry Farr, 2802 Robertson Dr.,

Abilene, TX 79606.

July 2:

Midwest All Scale Fly-In at St. Louis, Missouri F/F ... Rubber, Peanut

- C/L ... Sport Scale
- R/C ... Sport Scale (two classes) Novice and Advanced
- Static display with best of show and demos.
- Bob Underwood, 4109 Concord Oaks Dr., St. Louis, MO 63128.
- August 19-20: Annual R.C.F.C.B.C. Western R/C
 - Scale Championships Boundary Bay Flying Site

FAI and Standoff

Bert (Gabby) Hayes, 4619 Gothard St., Vancouver, B.C. Canada

V59 3K8.

August 19-20:

Annual Scale Squadron Contest, Mile Square, Fountain Valley, California

- R/C Sport Scale (two classes)
- Harris Lee; phone (714) 531-1312. September 2-4:
 - Kelowna Ogopogo R/C Fun Fly and Standoff Scale Contest, Kelowna, B.C.
 - (Includes float planes)
 - John Kristensen, RR #1, Pritchard Dr., Westbank, B.C., Canada V0H 2A0.

Readers may not be aware that reciprocal agreements exist, making it possible for AMA and MAAC members to participate in each others sanctioned events.

NASA NOTES

Momentum is increasing each day within the National Association of Scale Aeromodelers. As communication picks up, we find that there are many things to be done and said. Very shortly some proposed Constitutional and By-Law considerations will be sent to the members. In addition, there are several concerns being considered in the area of rules proposals.

There appears to be a tendency to attempt to re-emphasize the word Sport in the term Sport Scale. Three basic types of proposals have been heard at this time. First, there are those who wish to limit the model by not allowing certain types of details, such as rivets, panel lines, etc. to appear on the model. (The intent of this thinking is okay, but it is narrowminded. It's like burning the whole barn to roast the pig. This is a matter for the method of judging to control. At 50 feet, a distance successfully tried at the formidable World War II Scramble, in Morgan Hill, California, such details as rivets, panel-lines, instruments, etc. become unimportant, allowing the builder to experiment with detailing as much as he pleases, without affecting his static score one way or the other.

Let's judge Sport Scale aircraft. For outline, color, and markings, and get on with their flying. This was the

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original intent of the event. "Workmanship" belongs to the close scrutiny of Precision Scale, and should never have been allowed in Sport

Scale. wcn) A second area of thought revolves around the concept of limiting the modeler; or rather by classifying the modeler, as is done in other events, such as pattern. In this case, two or more classes could be created such as Novice and Advanced, with some form of procedure for advancement by wins or point accumulation.

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Thirdly, consideration for enlarging the effective judging distance, either by making it an "honest" ten feet by using a set of two lines and not allowing any portion of the model to violate the ten foot space, or by enlarging the circle itself to some greater distance.

Since we are approaching the deadline for submitting rules proposals for the next cycle, an exchange of information is vital. Your membership and participation within the organization can be an important link in the decision making process.

Patches made available by the organization to provide support for the Scale Team going to England in August can still be purchased. For \$1.50 each or 3 for \$4.00 you will

receive a natty, multi-colored cloth patch which will really spiff up your jacket. Contact Bob Underwood, 4109 Concord Oaks Dr., St. Louis, MO 63128, or Model Builder.

For membership in the organization contact Noel Allison, 4174 W. 120th St., Apt. C, Hawthorne, CA 90250. The dues for this year are \$5.00.

AN EDITORIAL CONCERN

It has been interesting to note the trends over the last several years as R/C models have moved toward opposite poles in regard to size. Some have become a mere handful with wingspans that would barely reach across a TV tube. Others have actually moved beyond the size of some full scale aircraft.

The possibility for this movement is a tribute to the reliability and ingenuity of the equipment manufacturers as well as the innovators found among the modeling fraternity. It has provided additional motivation and challenge for many people. But as these trends continue to develop may I ask you to consider what may well be some real concerns.

In the case of the smaller models, one can find many benefits. Reduced costs for materials and equipment are very noticeable and wel-

come. In addition, the smaller size often may make it possible to operate the model in much more limited areas. While this may be a virtue, it may well be a negative factor as well, if we promote the concept of "fly almost anywhere". We have noted the term "schoolyard" used to indicate this facility of the smaller model. For those of us who operate established model fields in large metropolitan areas, fields that perhaps were hard to come by and are hard to keep ... the thought of a multitude of schoolyard being used is not encouraging. Indeed, it is not just the concept of possibly having someone suddenly appearing close at hand, but the fact that neighbors nearby to a school often take a dim view of such activity, and immediately associate that modeler with all modelers.

The problem here is not so much a matter of size, but rather our need to promote the use of established sites where we can more readily control our own activities.

On the opposite end of the size spectrum, we find the large models. No one can argue the thrill of seeing the more realistic flight that they provide. It also seems most definitely true that as the model reaches toward and beyond guarter-scale, it is easier to fly. But size is what provides the concern here. How big is too big?

As an R/C modeler, a very common statement I hear from the lay public when models are on display is, "Oh, they are larger than I thought they were." This is a natural reaction, since the general public views the hobby/sport as far less sophisticated than it actually is. But can this member of the public look upon the model with a 15 foot wingspan as a "model" or will he see it as an unpiloted aircraft? (Shades of 1937 in Connecticut, where gas models were momentarily banned! wcn)

It is a very valid statement to defend large models by stating that a smaller model traveling at a higher rate of speed would be just as destructive, should it go out of control, but is it not also necessary for us to keep in mind the psy-chological "impact" of a very large model.

These thoughts crossed my mind on two separate occasions when at a trade show I saw a 25 pound, 20 foot span sailplane with a .46 engine for motive power. A second trigger was provided upon reading in another model magazine a report dealing with a B-29 reported to have the following specifications; wingspan 15 feet-3 inches, length 10 feet-8 inches, weight 48 kilograms (105.6

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lbs.), wing area 2,950 sq. in., wing loading 5 lbs./sq. in., powered by four spark ignition engines, each with a displacement of 2.56 cu. in., and driving four-bladed. 18 inch props. The article mentioned that this was not a one-of-a-kind model, but was intended for kit production!

An extreme case? I certainly hope so. But I think that it would be well for us to carefully consider whether there are, or should be, limiting factors within which we should operate. I am aware that these thoughts may tend to negate the ideas that I expressed in the first of this month's offering. However, as we seek greater realism and enjoyment from the hobby/sport we must be mindful of the impact (no pun intended) that we make when viewed by those about us. What do you think?

SHORT SHOTS

Do you have information and photographs that you can share with others through this column? I'd dearly love to have them! (Black and white photos, please, and include descriptive info. wcn)

Have you visited Hales Corners, Wisconsin and spent some time at the Experimental Aircraft Association Museum? If not, shame on you! A beautifully clean, attractive display of aircraft, engines, etc. awaits your visit. You'll also find a rack full of their publications and others that can provide very useful information, especially in the home built area. Besides, no where else can you see that most beautiful of all airplanes, the Wittman D-12 "Bonzo"!

Do you have a friend in the printing business? The aluminum plates that are used in the printing process come in a variety of thicknesses and are great for providing details such as inspection plates, etc. They are etched and take paint very nicely. Most important, they generally are discarded for scrap after use.

Have you run into Idea Development Inc.? This is a new manufacturer on the scene, which presently has an inexpensive plastic molding duplicator on the market, called "Formicator", that can be used to make canopies and a jillion other things. It holds an 8-1/2 x 17 inch sheet of heat forming plastic, and can form over molds in excess of three inches high.

The company also has an interesting item to install in gas or air operated retract systems that provides more power and can also reliably slow down the retract travel for more realistic operation. It's called "Hydralock", and it utilizes a hydraulic principle for operation.

Idea Development Inc., Box 7399, Newark, Delaware 19711.



Have you seen Eastcraft's selfstarter? A completely self-contained unit makes it possible to set your model on the runway, back off behind the judges, and start up. If you flame out in the air, it is possible to restart (assuming that you didn't forget to fill the tank or something like that). The unit consists of an electric motor, batteries, belt-drive, clutch and various other items. Eastcraft Specialty Products, Box 25, Irwin, Pennsylvania 15642.

A closing thought for this month, to those who compete ... remember, you've lived with that scale model for a year; the judges only get a few minutes. One to One, Bob. •

Peanut Continued from page 79

by the present rules might be interesting under the new rules. For instance, a 9 inch Tupolev ANT 25 would have a span of about 24 inches, and a similarly designed Vickers Wellesley would have about an 18 inch span. They might then be more competitive with the Fike. The increase in aspect ratio would make them more efficient, but their motor length would be limited. This kind of a rules change would also allow the designer to make a choice where the variables are less drastic.

Real peanuts come in a variety of

sizes, and they all taste good. Do you think a rule change like Doc Martin's might enhance Peanut Scale? Would you like to see plans for a model of a high aspect ratio airplane to the 9-inch long rule?

Monocoupe . . . Continued from page 52

No dependable source of small engines existed at the time. The OX-5 put out 90 hp, but it weighed 400 lbs. and was out of the question. The first engine chosen was the Detroit Air-Cat, a 75 hp, 5-cylinder, air-cooled radial made by a company headed by Eddie Rickenbacker. The engine was unreliable, and the company eventually went into receivership. The Velie Motors Corporation, of Moline, Illinois, just across the Mississippi, took over the Central States Aero Co., and redesigned the Air-Cat into a more reliable 55 hp engine. The elder Velie passed away after some 300 airplanes powered by the M-5 had been sold, and Velie Motors Corp. was liquidated, the engine and airplane becoming the property of a new holding company named Allied Aviation.

Though men may not have been born to fly, he thought that if they did, they should do it in comfort. A flying coupe was the answer. He



coined the term "Monocoupe" from "mono-" as in "Mono-kite", a toy glider sold by one of the founders of the Central States Aero Co., and from the flying coupe.

The Monocoupe was designed as a side-by-side two-seater, because Luscombe wanted to concentrate everything close to the center of gravity. The flying coupe was short coupled, compact, small and light, and a great improvement over open cockpit airplanes, and with horsepower around 55 to 100, it could outperform most of them.

Pylon Continued from page 41

laid out and labeled, we plot the pitch for each station of one blade and connect them with a French curve, then do the same for the other blade. The closer the lines, the more aerodynamically balanced the blade will be at rest. Of course there are other factors which determine the aerodynamic balance while the engine is running, but having the pitch distribution equal for both blades at rest is a big step in the right direction.



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At last, simulate panel lines and hatches simply and easily with this new tape, from the makers of the famed "Zinger" props. No messy ink, masking or tissue strips ever again. The ideal final touch on any scale model. Saves hours of tedious work, and looks authentic, tool

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P R WASHOUT AT TIP P R PITCH DECREASING TO TIP

IN THE ABOVE DIAGRAMS, THE HUB IS TO THE LEFT.

And now, for a short, unpaid commercial message. We happen to know that George is marketing a fixture to true the backside of the prop hub area. As you may or may not be aware, the back of a prop is machined while being clamped in a fixture from the front. In most cases, this machining process does not leave the front hub and back of the hub parallel, and this throws off the pitch distribution. Using George's fixture will allow you to equalize pitch distribution by sanding the back of the hub and not having to sand the back of the blades. The fixture George is selling will also allow you to check the blade tip radius, as measured from the hub, and the tip runout to check the tracking of the blades.

These fixtures are being offered on a limited production run basis for \$17.50 each, plus postage, direct only, from: George Zink, 80-28 222nd Street, Jamaica, NY 11427. CLEARING OUT 1977!!

We're going to finish out all the old racing reports from 1977 with

this column. If your race hasn't appeared in these pages it's because I couldn't personally attend your race and nobody in your organization was interested enough to bother to send me pictures and results. A new year is starting, so why don't you C.D.'s or Chief Race Organizers assign someone to that task, just as you would a starter or lap counter. Make it just another job as part of the race and send the information along to us. We'll see that your race gets recognized. You contestants might mention it to the C.D., just in case (Heaven forbid!) he doesn't know about the wonderful service this column can do in alerting the racing community to what's going on. Besides, if you win, you can take the magazine to work with you and show all the other guys what a hotshot racer you are, and ask them what they do in THEIR spare time. Show it to the neighbors and they'll know why the "Nut's" lights are on at all hours of the night and why there's always weird smells seeping through the basement window.

The Flying Circuits, of Fort Wayne, Indiana, hold a large, well run, and profitable contest each year. It's profitable to contestants and the club alike. Drawing 59 entrants for two days of Q-M and F1 racing, the top five finishers shared in \$500.00 cash prizes and over \$500.00 in merchandise prizes. Each year for the past 4 or 5 annual contests the Flying Circuits have tied their races in with the City of Fort Wayne's Annual Three Rivers Festival, which is a celebration of the historical significance of the Army fort con-structed by Gen. "Mad" Anthony Wayne (hence the city's name) back in the days when the western fron-





Span 40 in. Power 15 cu. in. Weight 3-1/2 lbs.

ALL BALSA KIT with complete instructions

\$32.95

MARK'S MODELS, P.P. Box 2134, Escondido, Calif. 92025

tier was here in the Midwest. Being aligned with an event such as this, gives the Flying Circuits access to almost unlimited (free) advertising by newspaper and TV, which has allowed them to draw a larger spectator crowd each year.

And spectators mean money. A donation type parking charge goes over real well, especially since the Flying Circuits were handing out free copies of the R/C Sportsman Magazine, kindly donated by Jim Sunday, of the same. Lots of hot dogs, ham sandwiches, popcorn and pop were sold over the two days of racing, all contributing to making the awarding of cash prizes painless, and there was still enough profit left to make the hard work and long hours a happy investment for the hosting club members. A Saturday night banquet, with free flowing beer, provided the flyers and contest workers a chance to share some mutual feelings as seen from different vantage points. I might add that this race is put on almost solely in the interest of club spirit, as only about 3 or 4 of the members are racers, the rest with interests in other areas of the sport.

Typical of the summer climate here in the Midwest, the two days of racing were quite warm, with just enough light wind to make things comfortable and aid in takeoffs and landings.

Q-M racing was uneventful until after the fifth round when a tie for first place led to a fly-off between Crazy Bill Weesner and Dan Kane, the lad from Chicago. For nine laps the two planes see-sawed the lead between them, with Weesner being slightly ahead down the front straight on the way to lap ten. Kane, in a last ditch effort to catch Weesner, pulled too soon at Pylon One and lost the flyoff. Bill Weesner walked away with first place and \$150.00; Dan Kane, in second place by only a hair, walked away with the \$100.00 second place prize; Mike Lasker was third and winner of a Prather Q-M Toni; donated by Prather Products; Russ DeWitt wound up in 4th with a new Cox 15 donated by Cox Hobbies; and 5th place was taken by yours truly, with an LR1A kit contributed by Big Art's Models.

Formula I racing was a C.D.'s dream, as the frequencies broke down into a manageable matrix that had a full complement of racers in each heat, and good flying and good luck allowed the entire five rounds to be flown with each race an interesting one.

The highlight of the races for me had to be when I blew my Prather X40 Tigre (not exciting in itself) and Bill Hager was kind enough to disassemble one of his spare engines and rebuild mine so I could make my next heat. Unfortunately for Bill, he was in my next heat and I proceeded to blow his doors off when he got off with a slightly bad needle setting.

Final results were: yours truly in first and winner of \$150.00 cash; bill Preis in second with \$100.00 cash; Bill Hager and Dave Sears tied for third, and by virtue of a faster time it went to Hager, along with a Super Tigre X40 donated by World Engines, and Dave won a K&B SRII 40 donated by K&B; fifth place was won by Wayne Yeager, who won a F1 LR1A kit donated by Big Art's Models.

Magazine subscriptions to Model **Builder** for fast times were won by Mike Lasker in Q-M and Bill Hager of Formula I. Bass Airbrushes (also courtesy of MB mag.) were awarded as prizes for best finishes in both events. Q-M winner was Allen Booth and his nicely rendered Weesner Toni, and Formula I best finish belonged to Wayne Yeager, with a nicely done Prather Toni. A WORD OF THANKS

We appreciate the newsletters and information that many of you send our way. A tremendous amount of useful information is published and circulated through newsletters, and having just taken on that responsibility in our club this year, I can really appreciate what you editors go through. I would like to ask that you put me on your mailing lists, as it helps generate ideas for this column and also keeps me informed of what you racers want. It also impresses my mailman. Where we use any newsletter material we will be happy to credit the author and give you the wider recognition you deserve. Any mailings can be sent directly to me at: 3727 Shepherd Lane, Fort Wayne, IN 46815. If you lose this address, send it to me, care of Model Builder. SEE YOU AT THE RACES!!

Instructor Continued from page 89

Dear Dave: I can't seem to make my airplane do a stall turn consistently. It seems to want to simply stall and flop as often as it turns. How can I improve my average? L.D.P.

Dear LDP: The Stall turn is a maneuver which seems deceptively simple. My first advise is to always stall turn the airplane into the wind if there is a crosswind. Example: If the wind is blowing in your face, apply rudder to turn the airplane away from you. Another trick is to



chop back to about half throttle when climbing at the entry rather than completely throttling back. This will maintain some slipstream over the rudder at the point of stall and enables you to kick the tail out from under your bird with the rudder. Some airplanes may have a tendency to twist or roll while executing the stall turn and this can be corrected by applying a small amount of aileron in the opposite direction of the rudder.

Dear Dave: I'm confused by some of the advertising I've seen. I know what a single stick is but what is Mode I, II, and I've even seen Mode III listed in some contest results. Which is the best to learn on? C.L.B.

Dear CLB: The designation Mode I, II, III, etc. are confusing to many. Mode I has the ailerons and throttle on the right stick and the rudder and elevator on the left. This mode is very popular on the West Coast and is used to a lesser extent elsewhere. Mode II has the ailerons and elevator on the right stick and the rudder and throttle on the left stick. It is generally the most popular mode throughout this country.

Mode III has the rudder and the elevator on the right stick and the ailerons and throttle on the left stick. It is the least popular in this country but is very popular in Europe. (Actually Mode II and III are electronically and physically the same ... it's just a matter of which direction — servo, rudder or aileron, you plug into which receiver direction output. Most rudder-elevator type airplanes, ones without ailerons, have the rudder plugged in for right stick operation on a two-stick Mode II transmitter. This makes it sort of a Mode III . . . would you like to call it Mode 2-1/2?

Many full-size light aircraft used to be called "rudder" airplanes by their pilots. The Aeronca C-3 is an example. This means the rudder is the primary turning surface, and in coordinated turns, the rudder plays the most important role. The same applies to a scale model of the craft. Since the rudder is the primary turning surface, it makes good sense to plug the rudder servo into the receiver so that it is operated by the right stick.

On the other hand, pattern type models very seldom, if ever, use the rudder in basic turn maneuvers. Of course, the rudder is very essential in performing many of the precision maneuvers in the pattern schedule, but basically, the aileron is the primary turning surface. Consequently, it is controlled by the right stick, in both modes.

To sum up, put your primary turning control on the right stick ... unless you're left-handed, in which case ... back to you, Dave! wcn)

As to which is best, it's a toss-up. Each has its advantages and its disadvantages. I feel that the single stick is the easiest for learning to fly, but is more difficult later on when you try to coordinate rudder. Mode II is more common and it will probably be easier to find an instructor who flies this Mode. Mode I has many advantages later on but, typically, is more difficult to learn to fly. Mode III is about the same situation as Mode I insofar as learning goes. Basically my advice is to find a competent instructor and learn to fly whatever Mode he flies.

That should do it for this month but I need some questions from our readers to help in writing this column. Send them to me: Dave Brown, 8534 Huddleston Dr., Cincinnati, Ohio 45236 and include an SASE if you need a personal reply. Gear down and locked, Dave Brown.

Paskey Continued from page 39 your engine. A 1/8 hole should be drilled down through the back part of the mount for the nose gear, as shown. The main gear is bent from 3/32 music wire to the shape shown on the plans, and installed on the plywood landing gear mounts with landing gear mounting strips and small screws. The strips are formed over the wire, or already formed strips can be purchased. Use epoxy in the stop hole and the screw holes when making final assembly.

The nose gear is bent from 1/8 music wire and a wheel collar is installed just above the coil to bear on the bottom of the engine mount. It is best to solder it to the gear. Another wheel collar at the top secures the gear. The steering arm is mounted above the top collar to engage a piece of .040 wire from the rudder servo through the Nyrod at the top left of the fuselage. Mount all wheels, and bend and epoxy the tail skid in the location shown. Mount the engine.

I like to mount all the servos in my

The FIRST TRUE

Rigid Rotor System[™]

for R/C HELICOPTERS!...

No Stabilizer Rod (or flybar) Required.





airplanes in 1/8 inch plywood trays with small wood screws through the grommets. The tray can then be moved back and forth to locate the CG, and then glued in place. The aileron servo is mounted on plywood pads glued to 3/16 x 3/4 balsa risers which are glued to the front and back of the servo mounting cutout in the top of the wing. The servo should fit as far as possible down into the cutout.

Hook up the ailerons with commercial hardware. Check that they move in the correct direction, with the bottom of the ailerons flat with the bottom of the wing when in a neutral servo position. Install the elevator and rudder inner Nyrods, and hardware, with these surfaces neutral. The throttle hookup is florist wire from the servo to the engine throttle arm. Bend a kink in it for override protection.

for override protection. Connect the nose gear steering rod to the opposite side of the rudder servo arm from the rudder pushrod and check that the steering is in the correct direction. Apply wing saddle tape to the wing mount. Connect the aileron servo, and strap the wing into position with rubber bands. And now, let's go to the flying field. FLYING Range check the equipment. Watch all control surfaces for proper movement. Make a final check on the C.G. location. Now, fire it up and taxi into the wind...

You can expect PASKEY to track straight, even in some crosswind, and you will have to apply back pressure on the stick to rotate. With the clevises in the outside holes of the elevator and rudder, response will be smooth but by no means slow. Do not expect to make rudder turns, as the rudder will not cause the ship to bank. The turn will be very flat, and wide, with the wings level. Knife edge flight will require little or no aileron, after it is established, and not much rudder to hold the nose up. Loops are round, and any diameter you want, and tracking is excellent.

Snaps and spins require full aileron, and full rudder, as well as full elevator. Recovery is the neutralization of all controls. Outside maneuvers are just as easy as inside, requiring only slight down trim for inverted flight.

The tail skid on the airplane is necessary, as the landings are slow and at such a high angle of attack that the tail drags almost every time. The ailerons are effective all the way to the ground. The name of this bird came from the fact that it looks a little like a Pazmany, and a little like a Cherokee, and a whole lot like a model airplane; that makes it a "passkey" to much good flying.

BILL OF MATERIALS

4 sheets 1/16 x 3 x 36 medium balsa for wing ribs and sheeting.

2 sheets 3/32 x 3 x 36 medium balsa for fuselage sides and sheeting.

2 sheets 3/16 x 3 x 36 for spars and movable surfaces.

8 pieces 1/8 sq. x 36 balsa for longerons and uprights and trailing edge.

2 pieces 1/4 sq. x 36 balsa for wing leading edges.

1 piece 1/8 x 6 x 12 plywood for firewall, formers, braces and mounts.

1 piece 1/16 x 12 x 12 plywood for fuselage doublers, braces and tip plates.

1 piece 1/4 x 12 hardwood dowel for wing hold-downs.

Kraft engine mount

Kraft tank, 4 oz.

1/8 x 3/32 music wire for landing gear.

Strip aileron mounting hardware, 2 control horns and 4 clevises.

Two 36 inch lengths of inner and outer Nyrod.

Landing mounting brackets, two sets.

Nose gear steering arm

Wheel collars for 1/8 and 3/32 wire

Four 4-40 x 1/2 inch bolts Four 4-40 blind-nuts

1/8 O.D. brass tube, about 2 inches for fuel and overflow lines

Epoxy for firewall and Nyrods Aliphatic resin for dihedral braces

and landing gear mounts

Hot Stuff, or Zap, for everything else

One roll of Monokote and one One roll of wing saddle tape

Soaring Continued from page 58

perform exceptionally well. I question the value of eliminating the polyhedral for additional lift. The wing area is designed for a particular wing loading with the loss due to polyhedral taken into account. On the other hand, the polyhedral makes rolling that much easier, thus helping you stay aloft through turns.

"I would encourage your experimenting with the 99 inch Wanderer, then with more sophisticated aircraft which benefit from spoilers. The Olympic II is a step in that direction. Beyond that, there's the 100 inch Legionair, or the larger Legionair 140. In general, spoilers are hinged at the high point of the wing. You'll want to use some 30° to 45° of spoiler in the final approach, reserving the 80° to 90° spoiler for breaking out of strong lift. Of course

a lot depends on the width and length of the spoilers. I suggest one inch width is sufficient. The length should be about nine inches for a considerable effect.

"I hope this note finds you back in the air and enjoying our mutual interest to the full. Sincerely, Larry Fogel."

Say, could you be that "pen pal"?

By the way, you should enter the South Bay Soaring Society Second Annual Sport Scale Soaring Contest, to be held June 10 and 11, at Curtis Jr. High, Santa Clara, California. The events will be static and flight, including three rounds of five minute duration. The contest manager is John Lowe, 2423 South Drive, Santa Clara, CA 95051, (408) 247-2946. This promises to be the largest R/C sport scale contest in the nation. See you there.

R/C Forum . . . Continued from page 45

servo to an experienced R/C Technician for further disassembly; it can be much cheaper in the long run. Also, if you find a faulty pot in one servo, the odds are great that all in the set will have the problem, as usually, the servos in a system all come from the same production batch.

We are waiting to hear how we can help you, or what you may have to offer concerning R/C. Write to me direct. YOU WILL get an answer! Hal deBolt, 49 Colden Court, Buffalo, NY 14225. Or, if you wish, address your correspondence to **Model Builder**, R/C Forum.

R/C Auto Continued from page 51

leave the front ones loose. The front mount height will have to be adjusted to fit the selected body. The car is finally taking shape and looking like something is being accomplished. But the next two jobs are rather time-consuming. These two jobs are the fuel tank fabrication and radio installation, including the throttle and brake linkage.

Selection of the fuel tank shape depends on the radio layout selected. The two common radio layouts presently used have: 1) a central tore-and-aft fuel tank, with vertically positioned servos on each side, and battery to the right side (for sports cars) and receiver to the left; and 2) a central side-to-side fuel tank just ahead of the engine, with both servos in front of the tank and battery to the right and receiver to the left. All of these items are mounted on a plastic "shaker" plate, which is in turn mounted to the chassis, as shown in the photographs. The plastic "shaker" plate is

ATTENTION SUNDAY FLYERS! HERE ARE FOUR NEW MOTORS CREATED ESPECIALLY FOR YOU.



Easy starting, good idle, non critical handling characteristics with easy installation were the primary considerations in the design of the Fox 15 BBRC The side exhaust configuration fits the sirplanes you now have. Power output does not suffer. The Fox 15BB is by far the most powerful side exhaust 15RC on the market and with suitable carouretor changes it will give the most expensive rear exhaust 15s a real run for their money. Install one of these new beauties in your 15 model — it's cooperative attitude will amaze and delight you.



The Fox 19 defies explanation. It has neither ball bearings or schneurle porting yet in Club 20 Racing it has so consistantly outrun all comers that 1977 Club 20 rules handicap Foxes to 6 mm exhaust outlet. Webras, Tigres, Taipans, OSs & Vecos are permitted to run stock. For 1977 the Fox 19 has been given a beauty treatment, an improved carburetor and the crankshaft and rod have been beefed up a bit. We invite you to fit one of these remarkable motors in your model



really a vibration absorber, which helps isolate the radio equipment from the higher frequency engine vibrations. Radio problems have reduced significantly since "shaker" plates were introduced.

Anyhow... back to the fuel tank. Select the proper fuel tank shape for the radio layout you're going to use (chassis manufacturer's recommendation). The basic fuel tank will be about 3-1/2 oz. capacity, because the filler and sump are going to add about a 1/2 oz. to get to the 4 oz. R.O.A.R. legal fuel tank limit. Fuel tanks used are normally made by Sullivan, Pylon or Perfect. The filler caps most often used at the present time are large diameter (about 3/4 in.), spring-loaded, pressure-sealed, cap designs for rapid filling, such as the Gits Cap (GM Part No. 1-2296781). Our photos show what these caps and finished tanks look like.

Take the basic 3-1/2 oz. tank and cut a hole in the top (on the centerline), toward the rear, for the filler cap. Make the hole a little smaller than the cap so it will not fall inside the tank when soldering. Cut a hole in the bottom, at the rear, for the sump (a brass door pull or a quart fuel can cap). Sit the fuel tank right side up and place the filler cap over the filler hole. Before soldering, place a piece of brass sheet stock



(about .025 thick) between the cap and filler neck so the rubber seal will not get overheated, or remove the cap if it is removable. Get your soldering iron hot and tack the cap in position at one spot. If it's positioned correctly, start on the op-posite side and solder around the neck at the neck/tank joint. Inspect, re-solder as required and then cool. Now turn the tank over and solder on the sump. The tank vent and fuel pickup are 1/8 O.D. brass tubes ... use annealed tubing, because it can be bent easily to point in the proper direction. I usually place the vent through the upper left side of the tank and run the end (inside) to the bottom of the tank (near the center) so that the fuel tank operates like a "chicken hopper". Leave the inside end of the vent tube at the top of the tank, if you don't want a "chicken hopper" type tank. The fuel pickup tube ends at the bottom of the sump, along the sump centerline. Once you've decided where the tubes go into the tank, mark the location and pierce the wall with a tapered scribe. Using this method instead of drilling, no metal chips are made, and there is lots of surface area for the solder, to provide a strong joint. Put the vent and pickup tubes in and solder them. Before accepting the tank as finished, check for leaks by putting a length of fuel tubing on one of the outlets and submerging the fuel tank in water while pressurizing (with your mouth) and sealing the other outlet with a finger.

Position the fuel tank and radio equipment on/in the shaker plate, put on tank mounts and/or servo

trays as required, then mount the tank and servos. Now, locate and mount the throttle bellcrank (to change fore-aft motion of the servo to side-to-side motion to operate the throttle) as specified by the manufacturer. Cars using engines with a slide valve carb will not need this bellcrank. Fabricate and bend the bellcrank-to-throttle linkage as required and install the linkage and throttle override. Pictures show what typical throttle overrides look like, and how they are installed. A great number of cars and racers use the standard DuBro servo override (#DU-OR120). However, several car manufacturers have their own brand.

The brake linkage can now be fabricated and installed ... usually just a piece of piano wire from the throttle servo arm to the brake arm. Some spring action on the brake linkage (behind the arm) is required to prevent stalling the throttle/brake servo. The throttle and brake linkages should be set so that when the throttle is at idle, the brake is on lightly. As the servo travels farther (low setting for single motion throt-tle, or full brake if you use a midposition idle), the throttle override allows more brake to be applied without moving the throttle. When the throttle is advanced from idle, make sure the brake is fully released when the throttle is about 1/3 open. Adjust lever arm lengths until the brake is fully released at about 1/3 throttle. When the throttle servo is at the full throttle position, check to see that the carburetor is at the full open position. Don't have extra motion on the full open carb position, because there will be less motion available to get the brake to release properly.

The linkage from the steering servo to the steering servo saver is the last mechanical hookup to make. Lots of racers use a two-piece steering linkage, one from the servo going almost to the servo saver, and a second piece coming from the servo saver toward the servo. The two linkages are slipped through two set-screw collars which are positioned near the ends of the double linkage parts. With the steering servo centered and the wheels pointed straight ahead, the setscrews are tightened. For beginners, full transmitter lock, right or left, should turn the car in about a six foot diameter, and the servo saver can be sort of soft (releasing at a couple of pounds force). As you become a better driver, the turning circle diameter can be reduced to about three or four feet . . . and the steering servo saver set up much stiffer, about 4 lbs. to 5 lbs. The stiffer steering servo-saver is required to overcome the higher steering forces when the car is going faster and generating down force. Another thing to do when your driving gets better is to use full 6-volt battery packs (if that's what your radio is designed for). Four dry cells at 1.5V in series gives a 6V pack, but it takes five nickel-cadmium batteries at 1.2V each to make a 6V pack. On high performance cars, the turning ability is greatly improved when a $6\overline{V}$ pack is used, rather than a 4.8V, four-cell pack.

Okay, now trim and mount the body, and paint and detail it as described last month. With the body off, and also when mounted, check to see that the front wheels have the same amount of force on them. Shim between the front axle beam and chassis to square up the chassis, if required. Then mount the body and adjust the body mounts so that the front wheels exert equal force on the ground.

Charge up those batteries now, get your fuel and starter, and get out and see how that new car runs.

Here are some of the 1/8 scale car manufacturers. Write to them for catalogs or more information about their cars or components (Tell them **Model Builder**/Chuck Hallum sent you).

Associated (1,2,3,4), 1928 E. Edinger Ave., Santa Ana, CA 92705.

Delta (1,2,3), 27 Race Car Ct., Lorimor, IA 50149.

HRE (1,2,5), P.O. Box 4658, Irvine, CA 92716.

Marker (1,2), 127 Midway Lane, Vernon Hills, IL 60061.

MRP (1,2,3,4), 12702 N.E. 124th St.,





Ultimara (2), 8670 Chardon Rd., Kirtland, OH 44094.

Key to materials available from the above manufacturers:

- (1) Chassis kits
- (2) Chassis components and/or tires
- (3) Fuel tanks and/or tank components
- (4) Bodies
- (5) R/C car tech articles

Well that's it for now. Previous articles have described what sequence to use for track testing an R/C car, and adjustments to use to get them to perform properly. If you want reprints of these articles, send a first class stamp (13¢) and your request, to Chuck Hallum, P.O. Box 4658, Irvine, CA 92716. Good racing!

Texaco Continued from page 76

Unfortunately, FM is not yet legal in the U.S.A. for use on our Citizen Radio Control frequencies. The AMA plans to include this requirement in their future submission for new R/C frequencies to the F.C.C. We, the modelers, must get behind this action."



The accompanying photographs show various installations of Kraft Systems radios in old-timer aircraft. Note that the Playboy Senior and Comet Clipper Mark I use unshielded Super Cyclone engines and the KPR-7D. The receiver, servos, and battery pack were in close proximity to the coil and ignition components. No ignition noise interference was experienced. If you purchase a KPR-7D receiver, it must be tuned to your individual transmitter TX module. The KPR-7D will work with all Kraft Systems radios from series 72 to the present, except for the current Kraft Sport Series.

Jack did some trials with singleconversion receivers, i.e. the Kraft KP-4A, KPR-6A Sport Series and Tower Hobbies 6. I had previous experience with the Futaba 6-channel receiver. Our experiments showed these systems will work if proper precautions are taken:

1. Separate the equipment; ignition components as near to engine as possible; receiver, servos, Rx pack, and switch harness 6 to 8 inches away.

2. Place coil at right angles, or across the aircraft.

3. Use a fully shielded high-tension lead; i.e., 77 Products spark plug lead. (Some receivers will not require the shielded lead.)

4. Use plastic pushrod to throttle and ignition cutoff.

5. Route receiver antenna away from any wires, servos, metal and ignition components.

Finally, for those who want a fully shielded, transistorized ignition system, Otto Bernhardt at 77 Products is now putting the final touches on one that works well and is reliable (*It's available now. wcn*). The major advantages to his system are a hot spark, low current draw, and an automatic switching system that turns off the current should the points be closed when the engine stops.

I hope these comments by Karl Tulp, Jack Albrecht, and I, will help the many Texaco event enthusiasts to have more success in this modeling year. If there are other specific questions on fuels or ignition systems, please contact me at: 85 Bellevue Avenue, Belvedere, CA 94920.

F/F Continued from page 87

Chuck Wiese. These selections were based upon three important requirements: (1) They impressed him with their skill and knowledge, (2) They gave generously of their time to educate him, and (3) he could remember their names.

Thereby armed with a notebook and his trusty Eversharp, he collected the following "Excerpts of Expertise".

JOE MACAY, Dean of the Midwest Rubber Fliers: "You must go for the MAX. The name of the game is Unlimited. You cannot take it easy and expect to win. You have to punish the rubber. Get a cast iron winding tube, as you will break a lot of motors, and aluminum or plastic may not hold up. In fact, you should expect to blow a couple of motors at every contest just to show who is boss. If you let a motor lay around for a couple of weeks, it will get lazy and let you down. Discipline is the key to rubber performance!"

LEE CAMPBELL, NFFS Most Photographed Modeler of the 50th Nats: Never, never abuse your rubber. Take it easy. When you get a good flight, don't change the motor. If you wind a few turns less on each subsequent flight, a good motor should last you all season, maybe even longer. Why fool around with proven performance? If you wind a good motor too tight, it might break, and who knows how long it might take to find another motor that will give you another max? Also, if you don't break motors, you can recycle them for Embryo next year. Consistency is the key to rubber performance!"

CHUCK WIESE, CdH Sr. Record Holder: "Whatever you do, don't get hung up worrying about the rubber. Just so it is the right weight for the rules. Put some rubber in, wind it, hook the prop on. If you use a locking hub, you can do this the night before the contest. Then you can exert all your concentration into picking air. Some fellas do not care for a Montreal hub because they might forget to release it and launch with the prop locked. Well, so what? If the air is okay, and you have a good arm, you can get close to a hundred feet on the launch anyway. Then you don't have to worry about a sloppy fold ruining your glide. Good air and a strong arm are the keys to rubber performance!

Now that he is blessed with all this valuable information from the experts, Vince advises that two things still bother him: Why don't his models fly very well and lastly, why do Ed Vargo and Earl Schick keep beating these guys?

Editor's note: Vince was last seen fondling cellophane-wrapped boxes of plastic models in the Monroe, Michigan, K-Mart.

One thing about those Indiana guys, they have a good time. Thanks to Harry (Dirty Harry) Murphy for the above whimsey.

See you all next month.

C/L Continued from page 91 SPEED AND RACING STUFF

Dave Sears, of Midwest Model Supply, called a few nights ago and let me in on what Midwest is trying to do for the Go-Fast guys.

First off, they will be stocking some speed kits, with the Twister in A, B, and C sizes. Some Darp pans are available, and for those involved in Rat, Formula 40, or B Proto, Midwest is now stocking the Harter pan used in these events.

The fine line of Kelly props are also stocked. These are the green fiberglass air-beaters seen on most of the nation's fastest racing planes.

The HP 40 Stunt mentioned a few months ago in this column is in good supply right now, and look for this engine to make its mark in the PA circles. Dick (Fast Richard) Mathis is using one, and of course, Bill Werwage placed at the last World Championships for Stunt using an HP 40 in his model.

One of several advantages to using a 40 in Stunt is that you are allowed to fly on .015 lines, as opposed to the .018's required for any model powered by an engine larger than a 40.

Back to S&R, Dave wanted me to let you know that the latest runs of HP 40's feature a chrome liner and dykes ring. In addition to this, the



level of quality control has been bumped up some by HP, with new machines and some new people whose only job is to be sure that each engine is of the best quality.

Local Hobby probably deals with Midwest, one of the leading wholesalers in the country, so have them pick up some of the above for you, if they haven't already.

MORE S&R STUFF

George, of Hubschmidt's Hobby Center, writes to let me know that they now have back in stock Don's Racing wheels, in 1-1/4, 1-1/2 and 1-3/4 inch sizes. They also have the elusive Don's Fast Fill plugs in stock. The wheels sell for \$1.65 per pair and the fast fills go for 75¢ each. George asked that I spread the word and I just did. Write to: Hubschmidt's Hobby Center, R.D. 1, Box 318, Ewan-Aura Road, Glassboro, NJ 08028. (Also, see the Classified Ads. wcn)

STUNT STUFF

A couple of kits are coming out from Top Flite in which RSF's (Rookie Stunt Fliers) and SSF's (Serious Stunt Fliers) will be interested. For the RSF's, the Tutor looks pretty good. It's an all-balsa profile stunt trainer that shares a lot of the dimensions of the famous Nobler



for \$20.50, postpaid in the US. Canada and Mexico add 30 cents per binder. Overseas add 50 cents per binder. *California residents add 6% sales tax.* NOTE: One binder holds 1971 and 1972. Use one binder per year for 1973 to present.

(For UPS delivery, add \$1.00 per binder)



(designed by George Aldrich). For .35 power, of course, this might just be the kit you've been looking for. The kit will sell for \$24.95, and is scheduled for April release.

The Gieske Nobler is a very wellknown design in SSF circles, and that is the other Stunt kit from Top Flite. Billed as a "reproduction of Bob Gieske's current winning Nobler", this kit will offer what is regarded as a very refined Nobler to anybody with about \$35.00 to invest in a new kit.

It is highly doubtful that the upper echelon of SSF's will go all giggly over this kit, as part of the trip for many of these guys is in flying their own design. But for that broad band of average Stunt fliers like myself, the Gieske Nobler will have a lot to offer in that it has been proven to fly really well, is available now in kit form, and is a 35-size model, which is much easier to store and transport than the huge 46-powered models.

My personal stock of Stunt planes has now been reduced to one profile model, via the stupid-mistake/ linkage-failure (one of each) route. When it comes time to build another full-bodied Stunt model, I'll be taking a real serious look at the Top Flite Gieske Nobler and you probably should too. They are supposed to be out in early June.



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TWEIVE

CLASSIC DESIGNS



AND MORE SS

Ah, yes, another of those wellknown "form" letters to those of us in the model press. Naturally, it comes from Keith (Form) Trostle, PAMPA president.

Seems that for the 5th consecutive year, Cox Hobbies will be sponsoring the unofficial 1/2A Stunt event at the 1978 NATS. Trophies will go to all three age categories, Junior, Senior and Open. Scheduling for this is not firm, but will probably be Tuesday and/or Wednesday, August 1, 2.

Rules will be the same as used for the last several years; max. engine size .051, no B.O.M. requirement, no appearance points, one entry per pilot, one pilot per model (a backup model, per AMA rules, is okay), lines can be .008 in diameter, and the pull test is a no-sweat 5 pounds. The Pattern, number of attempts, and model identification are all as outlined in the AMA rulebook, with the exception that 1/2 inch high numbers are allowed.

Look for 1/2A Stunt to be a pretty big thing in the '78 NATS scene. Interest in this event has been growing, as the models are neat. Every body seems to be going their own way with model design, trying a few things they wouldn't consider

with a larger stunt model, and just participating in Nats 1/2A Stunt seems to be a let-your-hair-down type of thing. Gives those ODing on Rolaids a chance to let their system

Aussie Nats ... Continued from page 89

get back to normal, you know.

system, wherein each modeler was required to get a flight in by a designated time. Generally speaking, most free flight events were over by noon (having started at 7:00 a.m.), which gave the contestants and spectators alike time to visit or enter other control line or radio control events.

This business of running free flight events for nine hours a day (in the case of A.M.A.) is a terrific drain on manpower and time. Sandbagging wouldn't be completely eliminated, but you would probably see some different faces in the winner's circle for a change.

One bad feature of the Australian Nats was the way they ran the R/C Flying Scale Events. There were two sets of judges and two groups of contestants. Every round of flying was judged by alternate judges. However, instead of moving the judges, the contestants were required to move their models and gear back-and-forth to each site.

Of course, the impounded radio transmitters had to be moved by the officials as well as the frequency control. It was only a matter of time until the system broke down and found a contestant in each site flying on the same frequency. This cost John Tidy a very lovely looking V-K Sopwith Camel. The other model, a glider, was stable enough to be saved from crashing.

The Australian Nationals were rather "decentralized", in that there were separate fields and/or sites for each type of flying. Free Flight enjoyed a large area made up of three fields: radio control was held at the large race track; control line was staged at the cattlemen's corral (a large cement paved area); the R/C Soaring at the Volcanic Lake hills (fly from any direction!); and the Indoor at the Civic Center. Add to this, test fields for all main categories, and you had quite a spread of modelers.

Weatherwise, the Victoria climate (Camperdown is 140 miles west of Melbourne) could be briefly described as windy, windier, and windiest, with the wind gaining in velocity each day. Truly a shame for such a long period of time.

The wrap-up of the Australian Nationals is quite different from the U.S. Nationals, where everyone seems to be in a hurry to go home. In Australia, the emphasis is upon attending the Victory Banquet whether you won or not. This attitude is most praiseworthy, and something the "hot dogs" over here could well take to heart.

The Awards Banquet is really a vehicle to show the visiting dignitaries that model airplanes are not toys but a sport that should be recognized like golf. To this end, the Australians have been successful in promoting their hobby as a sport as evidenced by the head table at the Victory Banquet.

Besides the Mayor of Camperdown, and all the executive members of the M.A.A.A., the Victoria Ministry of Tourism was represented by the Minister, who participated in the awards of trophies. A total of 40 other political people were invited to this banquet to be made aware of this Model Airplane Sport.

The banguet itself was excellent, with wine being provided for toasts to the Queen and other special dignitaries. The crowd was handled very effectively by a smorgasbord style of service. This did cut down the time in serving and cleaning up so that the business of the awards and speeches could go forward rapidly.

WHEN CONTACTING ADVERTISERS, TELL 'EM MODEL BUILDER SENT YOU!

MODEL BUILDER

In summary, when asked how the Australian Nationals were, the columnist can only reply all Nationals bear a remarkable resemblance, as officials, contestants, and spectators all seem to respond the same way. In short, this is such a great hobby, it seems only the best qualities are brought out in each entrant. Those fellows generally regarded as "scrounges" quickly fade away. This is what makes the sport of model airplane flying so good . . . the universal appeal of good-will competition.

Busy B Continued from page

grain, and taper the tips from .060 to .032 at the ends. Cut a bevel at the dihedral break point so you will have a good fit and pin these in place same as the center spars. Now cut the tip ribs from the same sheet used above, to .032 sq., and install these. Now cement the entire wing outline together with indoor ce-ment and an indoor glue gun. Minute drops of glue are important, as they save weight. Cut the rib template from a piece of medium thick plastic or aluminum and slice the ribs from 4 lb. C-grain stock, .016 thick by .026 wide. You can go to .032 wide at the compression points if you wish. Those are the center rib and the rib at each dihedral break. Glue the ribs in place and let dry thoroughly.

The covering is condenser paper, and it is wise to pre-shrink it first. Take a full sheet of condenser paper and scotch tape it to 2 pieces of 1/4 sq. top and bottom and pin it to the corner of a wall so the paper does not touch. Spray a fine mist of waxer on the paper and let it dry. It will shrink. When dry cut it off the wood and put it between two pieces of newspaper and press it flat with an iron set on permanent press. You now have a nice sheet with no wrinkles. Draw the outline of the wing on the paper and cut out a sheet so you have about a 1/4 inch overlap on the leading and training edges, and about 1/8 overlap on the ribs at the dihedral break points, as the wing is covered in three parts.

I have found that the best glue for condenser paper is white glue thinned to almost water thickness. Using a fine-pointed brush, cement the paper to the center section, making sure that no glue runs off or drips between the spars and the jig. This takes care and patience and you will see why when you remove the wing from the jig. Do not pull the paper too tightly, but just enough to conform to the airfoil. When this is dry, trim the excess off the outer center panel ribs and cover the tips in the same manner. When all is dry,



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trim all excess paper off, and if you're real careful, sandpaper any small burrs with 600 grit paper glued to a small piece of wood to control the pressure.

Now take 2 pieces of 1/20 sq. cut to length as shown on the plans and sand to a taper for wing posts. Glue these in position as shown, offset from the center. Make sure that the wing posts are straight when dry. The wing is now complete and can be removed from the jig, if you wish.

The stab is made the same as the wing. Cut the template using the stab plan outline. Cement to a sheet of balsa, same as the wing. Using 4 lb., B-grain stock for the stab, slice the leading and trailing edges from a piece of .026 sheet to a thickness of .026, so the spars will be .026 sq. Wet the leading edge spar and pin in place same as the wing, using pieces of 3/32 sq. Pin the trailing edge in place and when the wet spar has dried, cement the outline together. Make a stab rib template same as the wing, and slice the ribs from .016 4 lb., C-grain stock to .026 thick. Glue in place and let dry. Cover the stab at this time and trim excess.

The rudder template is made by using 1/8 sheet balsa. Strip a piece from 4 lb., A-grain stock .016 x .020, wet, and bend around the rudder template and let dry. Hold this aside for now.





The tail boom is made from a piece of .060 sq. 5 lb., B-grain, tapered to a point at the tail.

The motor stick is made from a piece of 5 lb. stock $3/16 \times 1/8$, and sanded to shape as shown on the plans. A micrometer is a good tool to use here. It will enable you to keep even tapers on all parts of the airplane. Add the rear hook as shown.

The thrust bearing is made in two pieces. The front is made by wrapping a piece of .010 music wire around another piece of the same size. Two wraps is enough. This will form a small wire tube, or a 2-loop tight spring. After the loop is formed, cut to shape and glue to the nose of the motor stick. The rear, or dual portion, is a corkscrew type to keep the shaft from wobbling. This works better than the pre-made thrust bearing because there is no prop shaft end-play, due to a much closer fit. These are made by using a piece of .010 music wire wrapped around a straight pin in the form of a tight spring and then pulled out straight until the prop shaft wire fits with no end play, but yet not tight enough to bind. When completed, cut and shape and glue to the motor stick, using a piece of prop shaft



wire as a guide to keep it straight. You will see how well this works when you fly the airplane.

Now remove the rudder out line from the form and glue it to the tail boom. Add the support rib and cover the rudder in the same manner as the wing and stab. When dry, glue the tail boom to the motor stick with the incidence and left turn settings as shown on the plans ... 1/4 inch lift rudder and 1/4 inch negative incidence. Now cement the stabilizer to the tail boom with 3/4 of an inch of stab tilt for left turn (left side high when viewed from rear).

Now the heart of the airplane... the prop. Carve the form from the block size shown on the plans. When completed, sand and dope the form until smooth.

Cut 2 spars from 5 lb. stock B-grain to a size of .080 x .050 and taper to a point at the tip. Make 2 and splice in the center as shown. Make the prop shaft from .010 music wire and cement this to the spar. Wrap a small piece of tissue around this for strength. Now cut a groove in the prop block in the center as shown on the plan so that the prop spar will just stick up enough to glue the blades.

The blades are made of .010 4 lb. C-grain sheet lightly sanded. Make a cardboard template for the blades so you can cut them both exactly the same size and shape. When completed and the blades are smooth wet both blades and lay one on the prop block, then a strip of tissue, and then the other blade on top of the tissue, and then another piece of tissue on top of it. Make sure that the blades are centered on the form, using the spar groove as a guide. Lay a piece of 1/4 inch foam rubber on the top of the blade and wrap this with 3/4 inch elastic band from the local fabric store. Wrap this tightly and bake in a low oven for at least 30 minutes. When completed, separate the blades, secure the spar to the block, and glue the blades to the spar on the form. Glue one side at a time, making sure that one side is completely dry before doing the opposite side. When completed, balance the prop with some 5minute epoxy as needed. The prop is installed on the thrust bearing by screwing it into the corkscrew portion of the thrust bearing.

Make the tissue wing sockets by wrapping a strip of tissue around a piece of .045 music wire and gluing the tissue to itself. Make sure the glue does not touch the wire. When complete, cut two sockets, each 3/16 inch long. Fit the sockets to the wing posts and sand the ends of the wing post so as to get a snug fit. Set aside for now.

Locating the C.G. is easy. Install the prop. Tie a loop of rubber and install it between the prop shaft hook and the rear hook, making sure it fits with a slight tension. Now find the balance point and mark it with a pen. Now locate and cement the wing post sockets so that the C.G. is at 55%, approximately 1.65 inches aft of the leading edge of the wing.

The airplane is now ready to fly. Install the wing, using 0 incidence. Test glide the airplane, and adjust the wing so you get a glide with the prop turning and no rubber installed, with a very slight nosedown attitude. Now tie a loop of rubber .037 x 11 inches long. Install 2 small O-rings. You can cut these from nylon tubing... the same stuff used for R.C. pushrods....030 thick is a good size. If you are winding with a torque meter, these O-rings are a must. Break in the motor in the normal way, wind to maximum turns, and if you're in a room lower than 40 ft., back off to .80 tenths of an inch oz. If the model was built light, you should have approximately a 3-minute climb to about 35 ft. Add wash-in and wash-out to the wing and stab as needed to prevent power stalls and insure correct flight trim. Normal indoor flying and winding techniques apply at this point. The airplane has flown over 10 minutes below 37 ft., and I'm sure you'll enjoy building and flying the Busy B.

F/F Scale Continued from page 83

just to name a few. These books are loaded with photographs and 3views of about any airplane you would ever want to build. A.J. Jackson is the author of several of these titles. Mr. Jackson is well noted for his aircraft writings. British Civil Aircraft, Volume I, II, and III, is another fine compendium of well and lesser known British aircraft. These are also published by Putnam.

Closer to home we have U.S. Civil Aircraft Volumes 1 through 6, written by Joseph Juptner. These are referred to as ATC (Approved Type Certificate) books. These fine books cover all U.S. civil aircraft that the government assigned ATC's. There are extensive photographs of lost but not forgotten antique and vintage aircraft. It is unfortunate that there is not one three-view on any of these most desirable aircraft. Yet, they are a valuable source of information for the scale modeler.

One last book that I feel should be considered is, Color Profiles of World War I Combat Planes. There

are 479 illustrations of which 323 are in full color. Many colored fourviews (the fourth view is the bottom of the aircraft). This text was originally done in Italian, but fortunately has been translated into English.

These books and magazines are but a few a scale modeler should examine to see if they fit into his library. Where are they available? Many of the hobby shops which cater to the plastic model fraternity carry a vast inventory of books and magazines. Since the majority of plastic models for aircraft are military, so are the bulk of books and magazines. However, the owner's know where these others can be obtained, and I'm sure that they would be happy to order them for you. If you find that the Putnam books are not available through your local plastic shop, you will find an advertisement in Aeroplane Monthly. There are many book stores in England that handle these books, and that is how I was able to get a hold of all the ones I presently have. In future columns, I'll mention other books or magazines which I think you should take a good, careful look.

I have a word of caution for you scalers out there who already know about Aeroplane Monthly and its terrific 3-views. After receiving the issue with the Avro 534, I decided that this was the airplane I wanted to build for Jumbo rubber scale. My method for enlargement is to use an opaque projector and to scale it up to whatever size or scale I want the model to be. The 3-view I used is the one with an enlarged colored profile and the smaller plan and front view. I first figured out what the scale would be (1.2" = 1') so I projected the plan view to give me a 30 inch span. I then drew the plan view, followed by the front view. I relocated the projector for the side view so that I would have the exact proper length for the scale I had chosen. Everything looked just great, and I could hardly wait to cut my first piece of balsa.

I built the fuselage first, as is my usual practice, followed by the tail. I save the worse for last, and it isn't too hard to figure out what that is. If the fuselage turns out like I expect, then building the wings isn't too bad. I would hate to build the wings first only to find out the fuselage was a real flop! At any rate, everything looked satisfactory, until it came time to place the wings on the fuselage. What had happened is, that with both sets of wings on, the stagger was so severe, that the Avro looked like the Pou de Ciel (Flying Flea)! I'm exaggerating some, but the difference was just unbeliev-



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quality.

able, and it looked terrible.

When I started checking to see where I had goofed, I found that the chord of the wing shown on the profile was much larger than what I had drawn from the plan view. I just assumed that all three views would project correctly. In fact, any time you are planning to enlarge a 3-view, it is a good idea to check the plan view against the profile view. This way you can be assured that lengths and widths of the two views are the same, etc. When you project like I do, these differences don't show until it's too late. I guess I was so enthralled with the overall project and the clarity of the 3-view, that I did not expect to run into any difficulties. But alas . . . Murphy waits to strike! At any rate, someday I'll build a new set of wings when the mood hits again.

In closing this month, I want to thank all of you who have taken the time to write. I really plan to answer all of you, but you just have to give me additional time. Seems as though there is so little time to do the things we want.

Choppers . . . Continued on page 43

pounds, and it can lift 10 pounds in ground effect. Gilbert said that on some of the initial tests, the model was tied down to a 21 pound sheet of plywood and it was dragging it all over the field! The rotors themselves are contra-rotating to eliminate the torque produced ... two major problems appeared during early tests; severe vibrations and radio interference at low rpm.

The fuselage length is 4 feet, and was deliberately chosen in order to fit the twin in his car without having to disassemble anything. He began the project in January, 1977 and took 3 months in the design stage alone. The next 2 months were spent in construction, and another month for radio installation. Mid-year tests required a few modifications, however, he was able to demonstrate flight at the Greenville NRCHA Nationals before a large crowd of spectators.

Of particular interest is Gilbert's transmitter, custom-built by Tony Manes of Can-Air Hobbies, in Montreal. The radio has seven channels, six of which appear to be used in flight. He does say that the twin could be flown by a standard 4channel rig. If you can visualize two "single-stick" controls sitting sideby-side (3 controls on each stick).

You have the basic picture. Left stick: Fore and aft controls, collective on both rotors. Left and right gives controls forward and backward. The knob controls throttle

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and/or lifting the chopper. *Right* stick: Fore and aft, left and right controls are cyclic in the conventional manner, while the knob controls direction of flight. Also included are 6 trims, and 3 dual rates on right hand stick. None of the controls are mixed or coupled on the chopper. I'll bet that Gilbert is never bothered by other chopper pilots wanting to "fly" his radio gear! I wonder what this set-up would be called? Mode 4 or Mode 5? Hal

Gilbert claims he can fly forward or backward with the fuselage inclined or perfectly horizontal. Also, there is no weathervaning effect,

regardless of the wind. He can also liftoff and touchdown with either front or rear skids remaining on the ground. He plans to attend the next Greenville Nationals with a Chinook CH-47 (fiberglass fuselage) to demonstrate the weird maneuvers possible with his set-up. Before leaving this subject, credit must be given to Gilbert's flying buddy, Jean-Luc Bolduc, who translated the above text from French into English! Jean-Luc is also an accomplished chopper pilot who regularly flies his Schluter Bell 222 and reports that it is a very fine machine indeed. Gilbert also has a Schluter Bell 222, weighing 9 lbs. with body and fuel, ready to fly. Both pilots claim the rocket-like vertical acceleration and maneuverability make the 222 superior in every way to any other chopper on the market today! (Fortunately, this Schluter Bell 222 is now being made available in the U.S.A. by the time you read this article...see **MB**, Feb. '78 article on Heli-Boy.) Many thanks for the details on your twin, Gilbert ...we hope to hear more from you in the future.

FINAL APPROACH

A great number of R/C modelers have their toolboxes filled with special tools and gadgets which they find useful in their hobby, and I'm no exception! As a "tail-end" item, I'll try to sketch details of the tools I find most beneficial for building and adjusting R/C choppers, and will include those details in future issues.

We'll start the ball rolling with a very simple, but desirable gadget, for adjusting the plastic ball-links on the end of the pushrods. These little plastic ball-links usually grip the pushrod so tightly that it's very hard to install them initially, let alone adjust them in the field without ruining your fingers! This tool slips over the pushrod and is then lifted up and around the ball-link to provide a firm grip for adjusting same.

Although most any hard material may be used, I chose a piece of 1/4 inch aluminum plate because of its easy workability. First cut out a disc, about the size of a quarter. If you have a lathe available, you can knurl the edges to give your fingers a nonslip grip. Next, drill a small "pilot" hole in the exact center of the disc, using a #53 drill. This pilot hole will later be enlarged to the exact size of the shank, or body, of your particular brand of ball-link. The next step is to drill 2 additional holes, with the #53 drill, one on each side of the "pilot" hole so that they will eventually engage the ridges on your ball-links in a vise-like action. All 3 holes should be centered on a line and about 2.5 mm apart, centerto-center.

Now, at right angles to the centerline of the three holes, drill 2 more holes with a #46 drill, each about 3 mm from, and on each side of the "pilot" hole (center to center). When this is accomplished, you can now enlarge the center pilot hole with a #23 drill. Be careful, when drilling, that the drill doesn't drift into the other holes and spoil them.

The last step is to file-out the remaining metal between the holes, and saw a small slot from the edge of the disc to one of the #46 holes, large enough to slip over your pushrods. It sounds harder than it really is...it shouldn't take more than a halfhour to do the whole job, and it will save hours in making those installations! The drawing should explain it more adequately than the words. Next month, I'll show you a simple pin-clamp to hold the pushrod solid while you adjust the ball-link. Until then, BCNU.

Plug Sparks.. Continued from page 70 bination package.

For the technically minded, Little Dynamite motors were square; i.e., .781 inch bore and .781 inch stroke; giving a cubic inch displacement of .374 (same as the Baby Cyclone). Weight bare was 6-1/2 ounces, attesting to the ruggedness of the motor. The motor was rated at 1/5 horsepower at 6000 rpm, although the boys were able to get these engines to run much better than that.

The original timer on the Little Dynamite was a vertical exposed type, somewhat like the early Bunch engines. However, this was quickly replaced by the enclosed type which used automobile type points. These points made the engine very reliable in starting, as it would take a considerable amount of oil and grime to keep the points from operating effectively.

Overall height (including spark plug) was 4 inches, and length, from prop nut to crankcase cover, was 3-1/8 inches. Main bearings were large, being made from Johnson bronze. The needle valve was a carefully ground steel rod that was quite susceptible to dirt. Although the fine needle adjustment gave excellent performance, it also had its faults in that one could "needle" the engine a little too lean for flight.

With the advent of the war, production on all engines stopped in the Brown factory. After the war, a few engines were put out, but the parade had passed Jim by. Before he could develop a competitive engine, his untimely demise signaled the end to the line of Jim Brown engines.

WESTERN OLD TIMER

F/F R/C ASSN.

As noted in a previous article, seeing that no one has suggested a better name for the group of O/T R/C Clubs on the coast, this will have to do until a better name is produced.

In line with the dates assigned during the October meeting at the Holiday Hotel in Santa Maria, SAM 27 led off the year's festivities with the Year Opening Contest at Kimes, California. In spite of all the rain that has deluged the West Coast, this Sunday was alternately sunny and cloudy with some pretty terrific thermals in the afternoon. In its eagerness to provide the best takeoff area, the SAM 27 members mowed a fifty-foot circle in the grass. The tenant farmer, on discovering this, immediately claimed a \$200.00 damage to his grass area. It appeared from this columnist's standpoint, that the farmer was attempting to obtain one year's free leasing fee. Actually, one, or at most, two bales of hay would more than have made up for the "loss" of the grass.

Anyway, with things at an impasse with the farmer, Lloyd Gomez did some fast talking with Rancher Kimes and was able to secure an adjoining field by ten o'clock that morning. Led by Don Bekins, the cows were herded off to one side of the pasture and flying started in earnest.

Seems like the rich get richer and the poor, poorer, as Don Bekins was really the only one ready for this contest. He promptly won first in all three events. Whew! What dedication! As usual, the Texaco Event was the hardest fought, with results looking something like this:

1. Don Bekins (Lanzo) 57:47

- 2. Nick Sanford (Ehling 4-1/2 hr) 47:10
- 3. Karl Tulp (Dallaire) 29:53
- 4. Loren Schmidt (Dallaire) 28:33

LTD. ENGINE RUN

- 1. Don Bekins (Playboy) 12:00
- 2. Dave Brodsky (Playboy) 10:32
- 3. Nick Nicholau (Miss America) 8:00
- 4. Ted Samuelson (Westerner) 6:21

.020 REPLICA

- 1. Don Bekins (Playboy) 5:56
- 2. Nick Sanford (Challenger) 2:36

With a good contest for a start, the season looks simply great, particularly with the schedule appearing in the heavy California R/C Schedule (consisting of ten sheets). It's gonna be a great year, so don't miss the fun!

WEST COAST O/T R/C CHAMPS

With Russ James doing a great job as Contest Manager, it appears the West Coast R/C O/T Champs will be a reality. As sponsored by the five SAM Chapters, it appears this could be THE MEET of the year.

The Holiday Inn in Fresno has been, set up as the contest headquarters. The field at Clovis Lake is within 15 minutes driving time from the Holiday Inn parking lot. The area meets all AMA requirements, i.e., three-mile radius of FAA controlled fields, plus the advantage of having available a small store, beer garden, lakes, horseback trips, etc. In short, something for all the family.

Of course (like Mile Square Park at Fountain Valley, California), there is an admission fee to the field, which will consist of \$1.00 for adults and 75¢ for children age 7 to 15. Camping sites will be \$5.50 per day,



Higher viscosity for filleting

slight misfits.



1550 Dell Ave., Campbell, CA 95008 / (408) 379-9701

with no overnight charge for day admission. Full hookups, which are not in the flight area, run \$7.50 per day.

The rates above apply only to the contestants and their immediate families. Proof of SAM membership must be provided. The best idea is to put a SAM decal on your vehicle windshield to simplify things. All other spectators will pay regular admission prices; i.e., adults \$2.00 and children \$1.00.

Actually (before anyone starts screaming about the cost), this is the way to go, as the city of Clovis is working with James on suitable publicity via the news media. This



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will also be disseminated to the papers where the various SAM Chapters are located.

A special area has been graded especially for the takeoff areas. Cooperation with the field operators appears to be great, as this writer understands that the city people are soliciting local merchants for prizes.

Dates, as confirmed for this firstof-a-kind O/T R/C Memorial Day Annual, will be May 27, 28, and 29. Make your plans to attend this "biggie".

Almost forgot to mention, with

the Holiday Inn being selected as the Contest headquarters, a hospitality room has been assigned to this group (at no charge) and the main banquet room reserved for May 28 for a "Victory" banquet and general get-together.

PLAYBOY SENIOR TRIVIA

Received a nice letter from Ted Katsanes, of Middleburg Heights, Ohio, wherein he submitted a series of photos showing a well-built Playboy Senior. One of the photos shows Joe Elgin, the original designer, with Ted's completed model.

Ted goes on to say that Joe designed the model, and Packard (of Cleveland) kitted the design before it was ever flown. Ted has also talked to Bill Schwab, who built the first Playboy from the kit, and Bill did very well with the model, as numerous Cleveland Model Supply Co. advertisements could attest.

We'll get some more information later on from Joe Elgin (via Ted Katsanes), so don't miss the next exciting episode! DAWN TO DUSK

For a considerable amount of time, the Salt Lake Antique Modelers (SLAM) has been holding night contests at the Saltair Model Airport. In August, an evening Fun-Fly was scheduled, with Lin Haslin being run off by threatening weather which never materialized at the Modelport, although it was a gully-washer everywhere else. This session lasted to 2 a.m. before the boys gave up.

Later on in 1977, after the Utah State Aeromodellers weenie roast, a group consisting of Mark Fechner, Jerry Sanford, Bob Sudgen, Clarence Bull (Oregon) and Lin Haslin tried again (Jerry ended up missing, probably discovered girls).

With probably the best weather they have ever enjoyed, most flights landed within several hundred feet of takeoff. In Utah's clean air, lights were easily seen. Clarence Bull's model (actually his son's), climbed upstairs with a full tank. All that could be seen was one little light hanging up there for a half-hour. It landed only a quarter-mile away!

The action stopped around 1:00 a.m., and again, the flying all night idea went glimmering. Maybe next year?

HAGGART-BOWDEN PRECISION CONTEST

The Haggart-Bowden contest (so named because of John Haggart's efforts to renew the Bowden Event) again continues to grow in popularity. Latest count, according to Jim Dean's SCAMP Newsletter, "Hot Leads", shows eleven entries.

Surprisingly, the victim of thermals last year, Al Heinrich, was able to win the event with only 27 second deviation in three two-minute target time flights. Actually, Hugo Lung, second placer, was off only three seconds after two flights, but then decided to give the model a little power. Natch, a three minute max.

Results looked something like this:

| | Deviation from | six minutes |
|----|---------------------------|-------------|
| 1. | Al Heinrich | 0:27 |
| 2. | Hugo Lung | 1:06 |
| 3. | Larry Clark | 1:21 |
| 4. | Bill Cohen | 1:28 |
| 5. | F.L. Swaney | 1:41 |
| 6. | Jim Adams | 1:58 |
| 7. | Gene Wallock | 2:17 |
| 8. | Bud McNorgan | 2:55 |
| 9. | Sal Taibi | 3:01 |
| 0. | Tom Rice | 3:18 |
| 1. | Jerry Vernon | 4:04 |
| | (two four-minute flights) | |

POST-WAR OLD TIMERS

In his latest issue of the CIA (Central Indiana Aeromodellers) "Informer", Editor Harry Murphy is again plumping for a post-war event in the old-timers. His claim is that many of the fellows now in the O/T game, never were able to fly the socalled real old-timers before the war. Hence, most have fond memories of models like the Vagabond, Korda Powerhouse, Yogi, and the numerous Scientific Cabin designs; i.e., Good News, Honey Bee, etc.

Several attempts have been made, particularly on the coast, to start interest in this phase (as Harry calls it, SAM Part II). The post-war event, run twice at the early SAM Champs, proved to be a poor draw. This was eventually abandoned. The SCAMPS tried a so-called "Old Ruler" contest, wherein you could design your own old-timer that resembled the models of old. This event also proved a flop, with only Jim Adams and Bob Oslan building special ships. The rest of the modelers took advantage of a loophole in the rules and entered modified Clippers, flatsided sailplanes, etc. This event is still being carried by the Las Vegas VAMPS Club, but has failed to catch on.

In his column, Harry points out that there were four classes of free flight in 1946, with Class D starting at 40 cu. in. displacement and ending up at .65. Harry feels that perhaps, if this event were introduced specifically for O/T models of post-war vintage, this might lead to the use of many of the large ignition engines which seem to grace only the engine collector's shelf.

Harry has a point in claiming that the ignition engine era has been cut in half by the 1942 cutoff date. However, the question is how to rouse interest, as it appears that most of the good designs were already in use before December 1942. This columnist would be most interested in hearing from various modelers as to the feasibility of again creating a post-war event, hopefully to be used in the 1979 SAM Champs at Salt Lake City. If we don't hear from you, we can only conclude there still isn't enough interest in post-war models. Write! SAM 49 SALLIES

SAM 49, the new O/T R/C club in the Los Angeles area founded by Otto Bernhardt and Al Hellman, is attracting members like crazy. As Ken Sykora, SCIF "Flightplug" newsletter editor, points out, "R/C club ... is long overdue because of the interest in the R/C activity in L.A." Bob Sliff is the Secretary-Editor while Otto runs things with able help from Bob Oslan. Looks like a very strong club to start off.

Sliff reports that after their very successful Texaco meet in December, the club is looking very hard at new ideas and events to stage at fun meets. A quick rundown on events they are considering are as follows:

they are considering are as follows: (1) Vintage R/C Touch-and-Go Balloon Bust. Object here is to break as many balloons as you can (say up to 8) while making touch-and-go landings. This would be limited to a five-minute period. As Sliff slyly notes, this is one way to get rid of all the balloons that Otto had left over from the initial SAM 49 Open Invitation and Fun Get-together last year.

Anyway, getting back to the event, basic rules would call for eight balloons to be attacked in a line spaced at one foot intervals. Three feet in front of the balloons, a touch limit line is established so that no model may continue on the ground and score a break. You are only allowed to break one balloon at a time, so you can see, you can't fool around too long. (2) Vintage R/C Pylon (something

(2) Vintage R/C Pylon (something that was started by the New Jersey boys in their first O/T Free Flight radio assist contest). The first run around the pylon for five laps is your



basic time. The idea then is to try to match your flight time in subsequent flights, without the benefit of a countdown. Sounds wild.

Bob also sez other events under consideration are things like "Vintage R/C Two-Minute Precision Loop and Land", "Vintage R/C Two-Minute Precision", "Vintage R/C Streamer Attack", and a modified version of the present .020 Replica Event. Anyway you look at it, this is going to be the club to have some real fun. After all, that's the name of the game!

ELECTRIC POWER SCOOP

Now that Bob Boucher (Astro

Flight) is a member of SAM 49 (that intamous Los Angeles group that stole the nickname of Forty-Niners), he has come up with another event in addition to the Electric Duration Event he will be sponsoring at the Memorial Day O/T R/C meet at Fresno.

The old-timer R/C Electric Scale Event as proposed by Boucher goes something like this:

(1) The original plane must have been built before 1937 and look like an old-timer. No Messerschmitts, Spitfires, or that type.

(2) Original airplane must have been fabric covered. The model shall be a built-up, stick framework,

New! Ready-to-Fly

PRE-ASSEMBLED AND READY TO FLY QRC muffled .049 engine installed • Beautifully finished scale model with 2 piece wing • Uses Cox/Sanwa 8020 radio (not included)

with silk covering. Monokote will be permitted.

(3) Static judging, using same rules as the All Electric Annual.

(4) Flying maneuvers to consist of eight in number, not requiring aileron control. No rolls or Immelmans.

(5) Trophies to third place. Bruce McAvinew will bring cold beer for the losers.

Now how about that? This new 3day Annual looks better all the time! AMPS NOTICES

The Antique Model Plane Society of Northern California informs this columnist that all O/T activity (free flight, that is) will be held in conjunction with the Fresno Gas Model Association's monthly contests. This means old-timer events will be held on March 12, April 30, May 14, June 25, July 30, August 27, October 29, November 26, and December 17. Whew! What a schedule of O/T flying!

Another date to paste in your hat is the 18th Annual Stockton Old Timer Contest scheduled for September 23 and 24 at Fresno. Also worth remembering for a pack of fun is the North-South Challenge Meet to be held over two days on June 24 and 25. Will the North finally emerge the victor?

Another activity scheduled for

this year, according to Jim Persson, Newsletter editor, is the AMPS Bowl (3rd Annual!) to be staged at Cliff Silva's ranch house in Livermore. The model to be flown this year will be the Comet Phantom Flash. Plans are included in their latest newsletter. Persson claims actual building time is 47 minutes. So get yours ready!!

REGION 2 MECA

COLLECTOGETHER

Among the many notices this column is bringing to your attention, one of the better activities is the Annual Region 2 Collectogether. This is by far the best this columnist has attended, and in many cases, has outrivaled the National Collectogether. They come from all over for this particular MECA function.

Dick Dwyer, Region 2 Coordinator, Director, Vice President, or what-have-you, announces May 27, Saturday, will be the date of the Annual Spring Collectogether of Region 2. Dick is hoping to make this meet the biggest ever, as he is working in conjunction with Region I (Southern California) Director Bob James to hold a joint affair.

This collectogether will be held in conjunction with the Western O/T R/C SAM Champs at Fresno over the Memorial Day holiday at the Holiday Inn. This sounds just great, as the new Western SAM O/T Champs now embrace two-thirds of the activities of a normal SAM Championships. If this goes over big, there is no telling what will happen next year!

SAM 49 TEXACO

We have been taken to task for overlooking the first contest staged by Otto Bernhardt's new club, SAM 49. The Texaco contest, ably run by Otto and his family, was cursed by low fog which caused several models to get lost, notably Bob Dittmer's Miss Philly VI and Bob Sliff's Ehling Contest Winner (later recovered in pieces).

The big SAM 21 guns garnered all three first places, Karl Tulp, Don Bekins, and Bob VonKonsky, in that order. With a 1/4 ounce of fuel per pound of model weight, flight times were spectacular, with fifth place (Paul Hatzl) at 22:42. Tulp, using his O.S. 60 4-cycle engine in a Dallaire, again showed the way, with an excellent flight of 43:24, despite light lift conditions.

For those who have been screaming about the gas and oil boys running up some ridiculously long motor runs, this time Tulp and Bekins operated glow engines using 25% gas in their low-percent "mentholated" fuels, and got better than six or seven minute runs. The col-

WHEN CONTACTING ADVERTISERS, TELL 'EM MODEL BUILDER SENT YOU!

MODEL BUILDER

124



Another breakthrough from the leader.

Who else but Cox could introduce the first ready-built powered sailplane in R/C? After all, we are the world leaders in ready-built flying!

And in the sleek new Sportavia, we've assembled just about everything in one package. Which means your fun starts right away.

Even the Cox QRC .049 is already installed. And only two R/C planes have that. (The other is our own Cessna Centurion.)

Sportavia has a giant 70-inch wingspan as well. It flies long. It flies high. And it flies easy on 2-channel radio.

Cox/Sanwa Radios.

Check out the brand-new Sportavia. We build it, you fly it. Fair enough?

rtronic Kits, Cox Engines.

Cox Hobbies, Inc./A subsidiary of Leisure Dynamics, Inc. 1505 East Warner Avenue, Santa Ana, CA 92702

umnist tried it and got six minutes! So don't give up hope men, there's still a chance for the glow-powered Texaco versions (See article on page 74).

ANNOUNCEMENTS,

ANNOUNCEMENTS. .

Been paying attention? If not, you have only yourself to blame. Latest news from the SLAM group in Salt Lake City indicates they are going to follow up on their bid for the 1979 SAM Champs. With Denver (and Tim Dannels) pretty dormant of late, it appears to be a lead pipe cinch for the SLAM boys to host the 1979 Champs.

This year, the Intermountain Old Timer Championships will be held at the Saltair Modelport on Saturday and Sunday, July 22 and 23. Events to be staged are AB Pylon, AB Cabin, C Pylon, C Cabin, .020 Replica Cabin, .020 Replica Pylon, Gas Allotment Antique, combined rubber, handlaunched glider, and two special events: Ohlsson 23 power only and Brown Jr. power only events. With such a terrific schedule, anyone within driving distance should be ashamed of themselves for not attending. It's gonna be a great show!

Haslin also reports that flying off snow with skis on his Super Buccaneer was real fun until the snow started to get slushy. The fourth flight was pretty hairy, but the fifth almost ground looped into his new bride. Time to quit then! SPECIAL NOTICE

WSBEN

202

It's no fun to display your engines at a collectogether, private showing, or otherwise expose them, when you discover a day or so later that several are missing. This columnist, along with the rest of the modelers, have loudly claimed that most of the collectors are hoarders and keep the engines from the light of day. Well, small wonder, when 1 receive a request to publish a list of engines that are missing and to request anyone seeing same to report the matter to this columnist:

May Rocket #13248 O&R 33 Ign. #041534 Pacemaker #1539 Forster 99, no serial number, a mix of new rear crankcase cover and old style engine Cannon 358 #C-013174 (This model has the circular head)

The "lucky" guys who are looking for these engines are Mark Fechner (the first four) and Allen Shively (the Cannon). If you're trading, buying, or selling motors, keep your eyes open!

FLORIDA FLASHES According to the latest FMA News

(Florida Modelers Assn.), Rex Henson is stepping down as Editor of this excellent newsletter. Accorinding to Rex, he had to make some glue money (work, to you). However, the good guys will still survive, as Harry Grogan has agreed to carry on. If his first articles in the latest issue are any indication, the Florida boys are in good hands.

The columnist's favorite Floridian, Terry Rimert, wrote a letter poking fun at the Californians, stating that the Rebel Rally scheduled for Labor Day would not conflict with any of the western meets. Terry goes on to say they had so many contests in 1977, everyone was moaning they couldn't build and/or repair models fast enough.

By comparison, 1978 looks like a desert, as only four are presently scheduled: the Rebel Rally; a proposed meet in Atlanta, Georgia, that is stumbling over bureaucratic tape; a Pensacola meet in June; and then later in the year, the Jim Kloth Memorial and Turkey Flyers Annual in Pensacola. Terry sez he will see most of his buddies at the Lake Charles Nats.

C.I.A. FIRST OLD TIMER F/F ANNUAL

As pointed out in a previous issue, the C.I.A. (Indiana boys) are really



getting with it these days, now that the Wright Patterson Air Force Base is available for model contests.

Bob Larsh writes to plug the first C.I.A. Annual, scheduled for June 25 at Dayton, Ohio. Contest Director will be no less than Meredith (El Goofy) Chamberland (That's gonna be fun!). Events will be Class A, Class B, and Class C gas events, with pylon and cabin types combined. An oldtimer hand launched glider event will be a feature of this meet.

Another interesting facet of this contest will be the allowance of glow engines. Motor runs will be as follows: original ignition (100% of 25 seconds), converted ignition (75%), and glow engines (60%). Otherwise, all SAM rules will apply.

Trophies will be given to third place, with special awards for high point Junior and Senior flyers. Larsh sez this is the first trial meet to be put on by the C.I.A. Your support is solicited! That's the only way the old-timer movement is going to grow. Be there!

KING ORANGE INTERNATIONALS Just received the latest Florida Model News in time to make this column. The KOI (24th, by the way) was held at Whitehouse Field, near Jacksonville. The radio control interests have split off from the KOI, but retain the name Tangerine, which was originally applied to KOI.

Couldn't complain about weather for December 30, 31, and January 1, 1978. It was terrific, with temperatures in the 60 and 70 degree range. Contestants came from all over, most notably Gary Myers and wife, Patty. They flew in from Corona, California. Others who showed were Bill Hale, Ohio, and the gang from Toronto, Canada. Andy De-Mello did not show. Rumor has it he discovered girls.

In the old-timer events, Bill Hale proved he didn't make the trip for nothing, in winning old-timer ignition and third in .020 Replica (Tom McLaughlan won that event). Bryton Barron, fresh from the hospital, was third in O/T ignition. Doesn't that guy ever wear out?

Just to show he was still in shape, Barron promptly proceeded to win the old-timer glow power event. Jim McNeill surprised everyone when he topped George Perryman in the O/T rubber event. George has had a "lock" on that event for so long, everyone is generally competing for second place. Take a look at these times:

O/T RUBBER

| Jim McNeill George Perryman Joe Hurdle | 1016 (!) 991 629 |
|---|-----------------------------------|
| O/T GLOW 1. Bryton Barron 2. Tom McLaughlan 3. Bill Hale 4. Jim McNeill | 352 344 290 (close!) 289 |
| O/T IGNITION 1. Bill Hale 2. J. Houtebrink 3. Bryton Barron | 341 318 165 |
| .020 REPLICA 1. Tom McLaughlan 2. Russ Snyder 3. Bill Hale | 360 310 263 |

Harry Grogan promises next year will be better, as this meet was put together in a hurry. Better publicity for 1978!

THE LAST WORD

Probably the best comment this writer has heard, came from Bob Ellington, of Bakersfield, when he was out flying models with Bob McCormick. Mac was commenting on the availability of so much equipment nowadays and how the modeler has it made. He concluded by saying, "In those days I didn't know what I was doing. Nowadays, I know that I don't know what I am doing." Amen, brother!

VAMPS CONTEST REPORT By Bill Stroman

• To those who aren't familiar with the VAMPS, it stands for the Vegas Antique Model Plane Society. Now, what is a free flight scale nut like me doing at an antique model meet? Well, last year, I entered the scale event and had a ball! The people are friendly, eager to help, and their models look like real aircraft. As this seemed to parallel my interests, I vowed to return the next year. This time I entered scale and 02 replica. Who knows, next year I may just get an ignition engine and build something as big and beautiful as I saw this year.

The contest was held at El Dorado dry lake, near the town of Henderson, Nevada. This lake bed is nine miles long, and about two miles across. No tall grass for testing, but boy, what a runway! The cracks look deep in the photos, but cause no problem with the wheels of the models. Even my 28 inch span Albatross B11 rolled and took off with ease.

Bob Haight was the C.D. for the meet, and did a fine job. There was always a timer available when one wanted a flight. Each round was clearly announced at its beginning and at its close. There was even an official clock on the table for contestants to check.

Bob Haight had entered a Bellanca "Columbia" in the scale event. Just to make things lively, his first flight was over six minutes! I flew next, and made 30 seconds. Larry Vance flew his Bleriot 11, but had engine trouble and smashed his landing gear on impact. Ever try to repair a Bleriot landing gear in the field?

Bob Chambers had built a Fokker D-VIII that looked fantastic. He and Bob Haight had fully tested the model the week before, and were getting eight minute flights each time. However, on the contest day, the gremlins seem to be after him. For some reason the model had lost its lateral stability. Don't feel bad Bob, we've all been there! Had there been scale judging, I think Bob would have placed very high. As it was, the S.A.M. rules use only duration (not objecting, just observing).

Now, for some random observations from an outsider. The quality of workmanship is very high, better than many scale models I have judged. The models seemed, on the most part, to be well trimmed prior to the contest date (mine were not, four weeks of rain in Los Angeles had seen to that). The contest seemed to be low-keyed for the most part. The Round System was tried for the first time by this club, and it would have worked well if the winds had not been blowing so hard on Saturday morning. There was some discussion to change this next year. These models R.O.G. so well it makes me sit back in wonder! The climb is good, not straight up as in modern models, and the glide is fantastic. One model went 22 miles to land in Lake Mead! Needless to say, one should always check his D.T. fuse before launching.

Jim Adams is always an obliging flier. When I asked him if I could photograph an R.O.G. of one of his planes, and jokingly said how about a low pass while you're at it, he just grinned. While he was setting the timer, a gust of wind blew the D.T. fuse against the restraining rubber band. Just as Jim let loose, the stab popped up. Well, I shot the takeoff, and about two of the six or seven very low loops that followed. When it did hit, it was surprising how little damage resulted. A tribute to Jim's building skill!

There is an event called "The Rock". This is a trophy made by Jim Dean and Bud McNorgan, in the form of a black rock set on a wooden base with a drawer in it. Here's how one flies "The Rock". First insert \$5.00 in the drawer, then, fly one flight. This is recorded on a list next to the trophy. The longest flight wins; Bud McNorgan won the event this time.

There were many more things that happened that I have missed, but flying two events, and taking photo-



2. Bill Holt

4. Lee Rose

1. Bob Haight

2. Bill Stroman

3. Larry Vance

B, C, D, AMA

2. Paul Hatzl

3. Don Wietz

1. Frank Szucs

4. Bob Chambers

SCALE

3. Fred Caballero

was written down. Hope the pictures tell the rest. Here are the results of the contest.

Clipper

Clipper

Duster

Texas

Duster

Satellite

Playboy

Playboy

Zoomby

Sailplane

Playboy

Clipper

Buzzard

Playboy

Ranger

Zipper

Arrow

Powerhouse

Powerhouse

Mini-Pearl

Powerhouse

- 2. Bill Cohen 3. Paul Hatzl
- .30 SEC. ANTIQUE
- 1. Jim Adams
- 2. Bill Holt
- 3. Larry Schwarz
- 1/2A, A, AMA
- 1. Bob Sweet
- 2. Lee Rose
- 3. Larry Schwartz
- 4. Paul Hatzl
- 5. Craig Rose
- C PYLON
- 1. Don Weitz
- 2. Mark Fechner 3. Bill Holt
- 4. L. Nadolsky
- 5. Jerry Sandford
- C CABIN
- 1. Jim Adams
- 2. Bill Holt
- 3. Bruce Gaines
- 4. Mark Fechner
- A-B PYLON 1. Mark Fechner
- 2. Clarence Bull American Ace
- 3. Bill Cohen 4. Frank Szucs
- 5. Jim Adams
- A-B CABIN
- 1. Fred Caballero

Bob Long Cabin

| So Long 54 So Long 50 Answer |
|--|
| Skyrocket Skyrocket Skyrocket Skyrocket |
| Bellanca |

Albatross B11 **Bleriot 11** Fokker D-VIII

> Satellite Duster Playboy

Half-A Continued from page 55 the only units available. Digital systems are harder to select. You should talk to the guys who fly in your area and look at magazine ads and your bank balance to make the best choice. I currently have ACE and Cox Sanwa radio systems, plus an extra airborne unit made up of a **Dorffler receiver (Royal Electronics)** and a pair of Ace Micro servos for an ultra lightweight system. This airborne is tuned to my Cox/Sanwa Transmitter.

Moving away from radios, let's look at some airplanes! First is a



Jerobee ready-to-roll R/C cars less radio

If you already have proportional radio gear, here's your chance to ease into R/C car racing at minimum cost! Precision engineered Jerobee 1/12 scale cars, complete with engine and *pull starter*, will take any receiver servo set that fits a 2" x 64" area. Just add your radio and linkages, find the nearest paved surface ... and you're in the R/C racing game ... at over 240 scale mph! See your hobby dealer or write

JOMAC Products Inc. 12702 N.E. 124th Street, Kirkland, Wash. 98003

Membee Radio Control Racing Cars

remarkable new airplane from a new company. The model is a sport scale of the "EOS/001", a prototype designed by Airmotive Engineers, of Pontiac, Michigan. The styling is unique and I find it very attractive. Even more interesting is the model's construction. The fuselage is two urethane foam halves cast with a slick outer finish. Spaces in the halves are hollowed out to custom fit your equipment and then the halves are bonded together. Wings are conventionally cut styrene foam cores with balsa sheeting (supplied).

Wingspan is 42 inches for 227 sq. in. area. Weight runs between 20 and 25 ounces, depending on finish and equipment. Canopy, steerable nose gear, motor mount, main landing gear, and other hardware are included. Kit price is \$28.95. Manufacturer is: The Model Factory, 1307 E. Main St., Alhambra, CA 91801.

Next airplane is an interesting twin engine model designed and built by William Kuhnle, 1319 Belaire Dr., Richardson, TX 75080. Wingspan is 45 inches, weight is 31 ounces, power is a pair of Medallion .049s. Bill says that the airplane will loop, roll, and turn sharply in either direction with either engine out. He can force it into a spin, but it comes out by itself. In the last part of his letter, Bill said that of the 120 members of the Richardson Radio Control Club, only a half dozen fly 1/2A.

He started in 1963 in this size, and never let it drop.

Final model for the month is the ACE "Guppy". This little powered glider uses (what else?) ACE foam wings to speed the construction. It

was specifically intended for only the lightest pulse radio gear. Complete flying weight is 8 ounces. This should be an excellent beginner's model choice as the construction is rugged and simple, the engine is high up so it won't get dirty in a hard landing, and total cost is very low. Flight characteristics are said to be extremely docile.

Piper J-3 Cub. Continued from page 49

The spruce wing struts make the plane look good in the air. Although they are made to be a structural part of the plane, it can be flown without them. A completed V-strut should be built a 1/4 inch wider apart at the open end than shown on the plans. This is so the strut won't back out of the holes on the wing after being sprung into place. The kit comes with 6 strut anchors; 4 on the wing, and 2 on the fuselage. On the inner part of a strut, a threaded rod is epoxied on and wrapped with string. Then a nylon clevis is used to attach it to the fuselage. On the outer end of the strut, wire with a 90-degree bend is inserted so you can squeeze the strut together and it will spring into the two holes. When you have the struts all lined up, the anchors are removed until after the plane is covered.

There are a lot of different types of covering that could be used. I chose yellow Permagloss Coverite. For a model like this it's the best choice. It's easy, quickly applied, and gives a scale appearance.

The cowl is supposed to be dyed, but I painted it with K&B Superpoxy, along with the struts and aluminum landing gear. The black stripe on the side is also painted with Superpoxy.

An OS Max 25 was used, seems to give plenty of power, and runs very well. I ran the engine on muffler pressure, but it is not necessary.

When you build a plane like this, the fuselage is narrow. Therefore, 1 installed the Heathkit sub-miniature servos sideways instead of the usual fore and aft direction. The battery pack fit up under the fuel tank and the receiver, wrapped in foam, went in front of the servos.

The kit comes with pre-cut windows, but I found that Hot Stuff, or anything else, won't stick to it. Instead, I cut windows out of other plastic that I knew would work. The plywood wing saddle doubler is put over the plastic about 1/8 inch using plenty of epoxy. Now the wing leading edge filler is put in and sanded so the wing fits. Make sure the windshield fits all around, then Hot Stuff it around the edges. If you do use Hot Stuff, make sure you don't get any on the windshield, then touch it. If you do, it will show.

Instead of a regular tail wheel, I used a scale tail wheel assembly by Hobby Capitol. It makes the plane look nice without a lot of work. I had to cut the springs a little so they would fit better.

The main wheels are 2-1/4 inch Banner wheels and axles. They look a lot like Cub wheels.

Just to add a little detail, I added dummy engine cylinders cut out of balsa and painted flat black. The numbers on the wing and lower rudder are cut from black trim Monokote. It was the quickest and easiest way to do it. The aileron outline and door are done with black trim tape. I found that after you put the tape on, applying a few drops of Hot Stuff will seal the tape better. This is only necessary around the engine exhaust.

The Cub flew very nicely. However, I do not recommend it for a beginner's first airplane. The Cub is easy to build and rugged, but it is a little heavy. Because of its weight, this plane does take some experience. I like certain planes a little heavy because they are easy to land, as there is less floating tendency. This is especially true on a windy day. I found that once you set up for a landing, you can put it right where you want it, without a lot of floating. To make it even better, I adjusted the wing strut by lengthening the rear one to obtain some washout. This makes it possible to fly the plane slower and with more stability, with less tip stalling tendency.

The Heathkit radio and Max 25 both performed well in the Cub. The Max 25, I feel, is a good choice of power.

I found that the World Engines Cub is a nice model that doesn't take a lot of skill to build. I've had a lot of fun with mine, as the Cub is a good semi-scale sport plane that goes together easily. I've enjoyed building and flying the World Engines Cub.

Hannan Continued from page 78

ing air racing's "Golden Age", and stunt flying in such movies as "The Lost Squadron" and "Hell's Angels." She also established a women's speed mark of 245 m.p.h. in her Travelair "Mystery Ship" during 1930.

We had the pleasure of seeing Pancho repurchase her recordsetting machine some years ago at the Tallmantz aircraft auction. At the time, she and her son Bill Barnes (!) had hoped to restore the machine to airworthy condition. Perhaps with the wings removed, it could be added to the new museum display? SCALE

That's what the license plates of Fernando Ramos' new car say... particularly appropriate since his election as the free flight scale representative to the NASA, National Scale Modeling Association. HANG TEN?

According to the Experimental Aircraft Association Chapter 14 newsletter, via Warren Shipp, the world's first airplane/surfboard accident has occurred. It seems that a Baby Great Lakes was flying close to the surface of the water near Oahu, Hawaii. A surfer saw it approaching and dove off his board just as the biplane roared over. The surfboard popped into the air denting the aircraft's lower wing, but causing no serious damage. Both the pilot and surfer called the FAA and demanded that the other pay for his damaged vehicle. The agency is investigating the affair. MESSERSCHMITT

AIRCRAFT DESIGNER

A recently published book with the above title, authored by Armand Van Ishoven, provides a comprehensive insight into the activities of this most famous German engineer. We were intrigued to note that he was building rubber-powered flying models at the age of twelve. Later, Messerschmitt became involved in the construction of man-carrying gliders. As an example of his ingenuity, he sometimes employed a cow to tow the craft back up the launching hill . . . utterly ridiculous! From gliders, he branched into ultralights (some would make delightful models), sportplanes, transports, and eventually the fighters, with which he is usually identified.



Thoughtfully examined in the book are the philosophical, political, and financial factors which helped to determine the course of Messerschmitt's career.

Our thanks to Russ Barrera, who provided the review copy.

FABULOUS FOLKERTS

Kurt Enkenhus' article about his Proxy Peanut winning model in the January, 1978 Model Builder, has created quite a stir, even among R/C enthusiasts, who were amazed at the amount of theory and engineering involved. "THE HANGAR PILOT" (Florida club newsletter) was impressed enough to suggest retaining the story as reference for future project designing. And Dave Gibson had this reaction: "The Folkerts article has everyone agog. It put me right back in pure NOVICEHOOD, and isn't that a great thing about this hobby; there is no end to the learning curve. But for a man to determine in advance of building that 981 turns on 4 strands of .040 rubber in this 6 or so gram plane will produce a flight time of 1 minute and 59 seconds . . . staggers me. But there is hope, because there are more of us who determine in advance of building, "If I can build this plane, and if I ever get it done . . . I wonder if it will fly?"



PROOF-OF-FIKE

In response to the shortage of scale information for the Fike, Tom Houle reports that Bill Fike, designer of the full-size homebuilt aircraft that has become so infamous in Peanut circles by virtue of its winning ways, has the answer. He has a package which includes a rather sketchy 3-view, three color prints, and a sheet of detailed photos suitable for model builders. The price is \$5.00 from: William J. Fike, P.O. Box 683, Anchorage, Alaska 99510.

THE ACCENT IS ON FUN

We are pleased to see that the "seriousness" associated with many flying scale model contests is being replaced by a more relaxed attitude. Locally, the California Scale Squadron sponsored a sort of non-contest, wherein participants were invited to fly, talk, show unfinished models or whatever. Similarly, the forthcoming Texas Annual Scale Championships promises: "This is a low pressure, no hassle (sic!), fun contest. You may enter more than one plane in an event. You may enter the same plane in more than one event. . "

The Texans are out to accommodate all forms of flying scale models, including free flight rubber, Peanut, and gas, control line sport scale, R/C 1/2A sport scale, R/C

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sport scale, and R/C Jumbo.

Meanwhile, Johnsville, Pennsylvania, the First National Flying Aces Club contest is taking shape. Included will be ten events for free flight models, with nine of them scale-oriented. The FAC has long been supportive of the FUN approach to scale modeling, and this forthcoming affair should represent the zenith of their efforts. Scheduled for July 15th and 16th, the meet is expected to attract the largest quantity of flying scale models ever assembled. (Leave yer' unassembled models at home?) Details may be obtained from: Lin Reichel, 3301 Cindy Lane, Erie, PA 16506. Oh yes, equal time to the Texas contingent: Flying Scale Championships, 1410 Portland St., Abilene, TX 79605. FREE FLIGHT SCALE INTERNATS?

During the FAI committee meeting held in Paris last December, U.S. Representative Bob Wischer brought up the subject of an International Free Flight Scale event. He was told that provisional rules had been in existence since 1971, but were about to be dropped for lack of interest! Needless to say, this was news to many of us. Additionally, it was implied that only a few modelers in the United States had any interest in such models, and that no other countries showed any concern for the class.

Obviously, we take issue with any such conclusion, and bet that builders in at least half a dozen other countries would agree! At any rate, the situation CAN be salvaged, if enough interest can be shown. It is hoped that an unofficial F/F scale event can be conducted during the 1978 Internats, to be held during August in England. Since FAI rules information and instructions for everyone. 21 big sections on subjects such as Mixing Paint, Model Camou flage and Painting on Velvet. Over 140 color photographs of step-bystep techniques for spraying models of all kinds, ceramics, mutals and many other hobby and craft projects.

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permit proxy-flying, the possibility of sending entries presents itself. No firm commitments have been made yet, although Russ Barrera, John Pond and LeRoy Weber have volunteered to assist at the site.

Interestingly, FAI F/F rules allow "Extensible Motors" (gum bands!) as well as "Piston Motors", so it would appear that even Peanuts would be eligible to compete. Such a model might easily "stowaway" in the corner of a transportation box used by R/C and C/L Scale team members. Although not definite as yet, F/F scalers should keep their thinking flexible and their models prepared!

NEW CATALOGUE

The latest (Number 20) Peck-Polymers catalog features a bumper crop of goodies to appeal to small model enthusiasts. In addition to a wide range of kits from Peanuts through a tiny R/C reproduction of the cross-country "Liberty Bell", the Pecks offer building materials, such as balsa, bass, bamboo, Japanese tissue, plastic props, thrust bearings and more. Brand new to the line are flying scale model plans by Alan Callaghan, who conducts the "Scale Matters" column in the English "Aeromodeller" magazine. \$1.25 will bring you a catalog from: Peck-Polymers, P.O. Box 2498, La Mesa, CA 92041.

Tell 'em Model Builder sent you! THNIRT

This almost unpronounceable acronym advertises the Third National Indoor Record Trials, to be conducted in West Baden, Indiana. Previous events have drawn rave notices from the silent fliers, and the forthcoming meet promises to be the best yet. Featured on June 23rd will be the "featherweight" categories, while the heavier (by comparison) stuff, such as indoor glider, Manhattan Formula, Pennyplane and Flying Scale will take to the air on the 24th. Early Sunday, the 25th, will be devoted to Peanut Scale, using the MIAMA rules. Low-cost housing and meals are available. For complete info, send a stamped, addressed envelope to: Dr. John Martin, 3227 Darwin St., Miami, FL 33133. NASH NOT NOISY

No truth to the rumor that the new American Motors CONCORD cars are being kept out of New York City!

Fuel Lines Continued from page 44

using up all the fuel during the flight. But after a few crashes, their reliability can start to fall off.

Let's take a close look inside the Cox Babe Bee .049 tank assembly. It consists of an aluminum shell with the reed valve held in place with a snap-in retaining spring. At the end of the venturi is a thin neoprene gasket. When the tank back is fastened to the tank shell, this gasket seals the "other end" of the venturi. If this gasket is left out, the engine WILL NOT RUN. After long useage, it should be replaced when the engine is disassembled for periodic cleaning.

A piece of fuel line (fuel pick-up tube) is attached to the tank backplate near the top. The end of this tubing is then placed near the right hand bottom of the tank (when tank viewed from the back) so it will pick up all the fuel in flight for counterclockwise control line flying. This piece of tubing can shift its pick-up location in a crash, and will soon let you know by only allowing your engine to run a short time when it gets airborne.

If you intend to use this engine for free flight or R/C flying, the fuel pick-up tube will have to be relocated so the end of it is positioned at the bottom of the tank. The spring inside the tubing not only keeps it from kinking, but also prevents the end of the tubing from sealing itself against the tank shell. It is a good idea to replace this plastic tubing after extended useage, as it tends to harden and can cause the seal to be lost where it attaches onto the backplate.

You will soon notice that when the engine is first fired up, it will siphon some raw fuel out of the tank vents. This can be a nuisance, especially if the fuselage doesn't have enough fuelproof dope on it. It doesn't take long for balsa or plywood to soak up the fuel and possibly weaken the engine firewall

area. However, there is a solution to this problem. Remove the needle valve and spring and file BOTH tank vents at a 45 degree angle (side view). This modification also helps to increase the flight duration.

There are still a couple of other problems that can happen to the tank backplate. Both have to do with the needle valve assembly. After many flights, the needle valve and needle valve insert threads wear (from vibration) and reach a point where air will suck in around the threads and make a good needle valve setting impossible. Only solution is to replace the entire backplate and needle valve. The best way of prolonging this condition is to run a balanced propeller, as vibration hastens the wearing out of threads.

The other problem that can arise is in the tank back casting. Sometimes very fine cracks can develop when the needle valve insert is pressed into the casting. When the tank is full of fuel, the engine will start and adjust fine. But once the fuel level gets below these cracks, the needle valve adjustment will go lean and die. These cracks allow air to enter the area where the fuel is metered into the venturi. The only way you can see these cracks is with a magnifying glass.

Dirt is a real troublemaker when it comes to reed valve type engines. One grain of dirt under the reed will prevent it from sealing against the reed seat, and the engine WILL NOT START. Here again, a magnifying glass is helpful in spotting the trouble.

When reassembling the tank, be sure no dirt gets into the "V" groove at the back edge of the tank shell. If it does, you will soon notice its effect. Fuel will seep out where the tank joins the backplate, and drip down onto the engine firewall.

All of the above problems apply to the Golden Bee, Black Widow and the QRC .049 engines. The tank shell on these engines is larger and has the vents pressed into the shell. It still has a little of the siphon problem, so we would still suggest filing both the vent tops at a 45 degree angle.

The fuel pick-up tube location on the Golden Bee and Black Widow is positioned for control line counterclockwise flight. The QRC .049 has the pick-up tube positioned at the bottom of the tank.

The only other engine with a selfcontained tank/needle valve assembly is the Testors .049, Series 800. The tank parts are plastic and are permanently sealed together. There should be no problem with leakage here. Dirt will still be a problem



getting in under the plastic reed valve though. Other than dirt, this tank design should be relatively trouble free.

The Medallion .049, Tee Dee .049 and .051 engines are designed to operate on suction type tanks. Cox makes a plastic tank mount which works fine for control line and free flight. It can be used for R/C flying, but the flight duration is relatively short.

Many other fuel tanks (metal and plastic bottle type) are available at your local hobby shop. Caution must be used in mounting the tank in the plane. Mount it as close as possible to the engine. For free flight and R/C flying, the top of the tank should not be higher than the needle valve . . . unless you are using a tank with the fuel pick-up tube located in the middle (side view). With this fuel pick-up position, locate centerline (side view) of tank on same level as needle valve.

Any leaks in the fuel line, needle valve threads or plastic carburetor housing, will cause inconsistent needle valve settings in flight. Replace the fuel line to the engine quite often as a precaution. The needle valve thread wear problem on the Tee Dee .049 and .051 can be Greatest Book of FULL-SIZE RUBBER SCALE PLANS, plus building, trimming, and flying instructions ever published!

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resolved in two manners. When wear is evident, remove the needle valve, push a short length of neoprene tubing (approx. 3/16 inch long) over the threads and reinstall. This usually solves the problem. The other solution is to replace the Cox needle valve assembly with one made by Kustom Kraftsmanship. In this assembly, the needle valve threads are sealed with a nylon cap which is pressed onto the needle valve insert. Needle valve has 128 threads-per-inch, which allows for a finer adjustment.

The venturi MUST seal against the needle valve body and the top of the plastic carburetor housing. Be careful not to get dirt in these areas when reinstalling these parts. The plastic housing has a tendency to swell with certain fuels, and allows air to seep down the threads under the retaining ring. This also causes the adjustment to be quite critical. To check for this potential problem, loosen the retaining nut and see if you can easily pull the housing forward or rock it from side-to-side. If either condition exists, the carburetor housing should be replaced.

Pressurized fuel systems offer better engine performance IF they are properly installed. Two types have been used with equal success. One is a bladder tank, and the other consists of a fuel tank that is pressurized from the engine.

The easiest method is the bladder type. A length of thin walled (1/32)surgical tubing is the tank. When it is inflated with fuel, it can be metered to the engine without regard to its location in the plane. Also, the hole in the venturi can be enlarged to increase the power output of the engine. This type of fuel system assures a constant engine run. However, it does have a couple of disadvantages. First, is the starting technique required. If the needle valve is opened too fast, the engine will be flooded instantly. And if an electric starter is being used, there is danger of bending the connecting rod or breaking the crankpin due to excess fuel during the compression stroke.

The solution to this problem is to make a provision for pinching the fuel line off between the tank and the needle valve. To start, fill the tank and pinch off the fuel line. Now open the needle valve about 1/8th turn from the last running position. Prime in exhaust and venturi, and flip prop. As soon as it starts, release pressure from the fuel line.

The other problem this system can give you is its ability to burst the bladder and fill the fuselage with raw fuel. Extreme care must be taken to provide an absolutely smooth surface for the inflated tank to rest on. A thin foam lining in the fuselage works great.

A pressurized hard tank (either metal or plastic bottle) will provide the same engine performance as the bladder type tank, and there is no danger of the tank breaking. The tank construction, pressure fitting on engine, and fuel line connections, MUST BE AIRTIGHT or you'll have problems you wouldn't believe!! Observe both types of tanks in action before you decide which way you want to go. Neither type is recommended for the novice.

"MARA" Continued from page 64

place with a finger in a wiping motion. Sandpaper when dry and repeat again as necessary.

Steering cockpit is made by cutting sheet balsa pieces to form the sides and cementing them to the edge of the deck opening and the cockpit floor or platform, as well as to each other. Sand the edges flush with the deck when cement is dry.

Keel ballast is a bar of plumber's solder that is available at most good hardware stores. Drill holes and countersink for the wood screws. Mark the location of the holes on the keel and drill pilot holes in the keel. Apply cement to the keel and screw the ballast in place. Add a bead of cement all around the keel/ballast joint. When thoroughly dry, apply several layers of Plastic Balsa to the keel/ballast joint to fair the ballast into the hull. Trim the ballast to fair into the shape of the bow. Sandpaper well.

Sealing the wood is very important on all operating ship models, because the slightest crack will admit water, which swells the wood and raises havoc with the structure, as well as the finish. Apply at least one dozen coats of Balsa Filler Coat to the entire hull. Sandpaper with fine sandpaper between each coat. Then add about ten percent thinner to the Filler Coat and apply five more coats. By this time the hull should be smooth and free from grain. If not, add more Filler Coat and sand with very fine sandpaper after each coat is dry.

The propeller shaft is now cut to length. Force-fit the propeller to the shaft and hold in place with 5minute epoxy glue wiped around the front and rear of the propeller. It is important that a flat surface be filed on the forward end of the shaft to meet the universal joint set screw and prevent possible slippage in operation due to the round shaft. Now, wipe the shaft with vaseline and slip it into the tube. Attach the

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universal joint to the shaft. We used an Aristo-Craft spring type universal.

The rudder is traced and cut to shape from 1/8 inch plywood. Round off the corners to attain a somewhat streamline shape and seal well with Balsa Filler Coat. Add the Williams, Sig or similar nylon hinges and control horn. Install the rudder on the keel and be certain that the hinges work freely and are firmly installed. Be sure that the pintels or pins of two hinges face each other so the rudder cannot be removed.

Cabin opening coaming pieces are cut to shape and cemented to the inner edge of the deck opening and to each other. Seal well and sand. The coaming is very important because it not only holds the cabin in place, but prevents water from entering the hull if the deck is awash. Note the depth of the coaming that extends below the deck level.

Bulwark rail pieces are cut to shape and trial fitted on the bulwark. Trim as required and then seal and sand and cement in place atop the bulwark and bulwark braces.

The cabin is constructed at this time. The cabin is made with 1/8 inch balsa sides and 1/2 inch balsa ends and roof. The cabin must fit the coaming snugly so it will not be

disturbed in rough water. After the assembly is dry, gently carve the roof and ends to a rounded or streamline shape. Openings are now carefully cut for the portholes. Sandpaper the cabin and apply several coats of Balsa Filler Coat inside and outside.

The steering cockpit enclosure is made by cementing the front and sides to the deck and to each other after holes have been made for the portholes. Round off the corners. Now, cut out the roof. Cement a balsa plug to the underside of the roof so the roof fits very snugly between the enclosure sides and front. Round off the corners of the roof while it is in place so it fairs into the sides and front. Seal the inside and outside of the steering cockpit enclosure and sand smooth.

Painting is next. We used model airplane dope. Our hull is white with a medium blue deck. The area below the waterline is dark red. The entire hull should be painted white: deck, bottom, sides, etc. At least six coats should be applied. When dry, apply clean masking tape along the waterline and paint the bottom of the hull dark red. (A coat of clear dope along the tape edge will prevent any bleeding of the dark red under the tape. wcn) Three coats should cover well. Now, mask the deck and apply three or four coats of medium blue dope. The hull interior should receive several coats of dope as protection against water damage. The steering cockpit and enclosure are white, as is the main cabin. Cockpit floor is blue. If coverage leaves something to be desired, then don't hesitate to apply a couple more coats of dope. Thin out the last few coats with about ten percent thinner. If a fine lustre is desired, the hull should be rubbed with rubbing compound on a soft flannel cloth. If desired, a black band can be painted along the waterline, separating the white and red colors as on the prototype model.

Rigging line tubing is installed now. This should be heavy-wall copper tubing so it doesn't kink when it is bent into small radius curves. Tubing is the best way to guide the sheet lines from inside the hull to the booms. Bend and fit constantly until the necessary curve is achieved. Be certain that the inner edges of the tubing are smooth in order not to injure the rigging line; in fact, a slight flare at the tubing openings is good to have. Install carefully, using plenty of cement in the hull interior and brace with balsa as required. When cement is dry, touch up the paint on the deck.

The forward hatch cover is cut out and assembled. Seal and paint blue. The hatch plug must fit tightly in the opening to hold the hatch securely in place. Hatch cover is 1/8 sheet balsa, and the plug is two layers of 1/8 sheet balsa cemented to each other and to the cover.

The bowsprit is cut from straight grain dowel or a strip of hardwood, such as pine. Taper as shown. The bowsprit has a circular cross-section except for that portion aft of the bulwark which is square in crosssection. Sand, seal and paint tan. Carefully cut a hole in the bulwark for the bowsprit and cement the bowsprit securely to the deck, using plenty of cement. When thoroughly dry, add the chain to the bowsprit by fastening one end to the bowsprit by means of a band of soft fine wire passed through the last link and wrapped around the tip of the bowsprit. Twist the two ends of the wire with pliers to form a tight band and snip off all but about 1/8 inch of the twisted portion. Press the wire against the bowsprit and add a layer of cement. The other end of the chain is held to the keel by means of a straight pin pressed into the keel with pliers after the pin has been passed through the end link of the chain. Be certain the chain is taut and add a droplet of cement to the pin attachment.

Scale details, such as cabin hatch, life ring and cabin and cockpit enclosure air ports are added now. Life ring is orange, cabin hatch is blue. Air ports should be of the sealed type, with clear plastic inserts to keep spray out of the cabin.

The electric motor should now be attached to the universal fitting and held to the plywood base with round head wood screws and aluminum straps.

Battery holders are held in place with wood screws and then the necessary wiring is soldered to the motor and holder terminals as shown on the diagram. Allow plenty



of slack in the wiring and provide plenty of extra wire at the two open ends that will connect to the servo switch.

The steering servo is installed in the steering cockpit and connected to the rudder horn by means of a Williams, Sig or similar clevis assembly, or a length of .045 music wire, bent to shape as shown. The servo is screwed to a balsa and plywood mount.

The motor servo is mounted in a 1/8 inch plywood and 1/2 inch balsa structure that includes a pushbutton spring-loaded micro-switch. Install the switch firmly, and in such a manner that the button is within 1/8 inch of the servo arm. Trim the 1/2 inch balsa to fit the hull bottom shape and cement in place. Connect the battery and motor wiring to the switch and test the circuit by depressing the switch with a balsa strip. If the propeller turns in the wrong direction reverse the batteries in the holders.

The sail control mechanism consists of the Dumas Probar unit, which includes switch, motor, gears and control arms. The switch is mounted on a common 1/8 inch plywood structure with the sail control servo. A short length of music wire connects the servo to the Probar toggle switch. We used an electrical wiring circular terminal soldered to the wire. This should be the correct size to fit on the switch lever without excessive play. The sail control mechanism is bolted to two transverse mounts cut from 1/8 inch plywood. Apply cement around the nuts or use blind nuts that will adhere to the wood when the bolt has been removed. Cement the ends of the mounts firmly to the underside of the coaming and, when dry, remove the Probar assembly and apply more cement all around the mount attachment to the coaming. Let dry overnight. Cut

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the Probar arm to length, drill holes as required, and bolt the arm to the Probar mechanism. Bolt the Probar assembly to the mounts. Solder the switch wires to the correct battery wires as shown on the wiring diagram.

The receiver shelf is cut to shape, assembled and cemented securely to the coaming.

The switch is mounted on plywood and wiring is soldered to the terminals. Cement the plywood to the deck and bulkheads in the forward hatch.

The receiver battery compartment can be lined with 1/8 inch balsa if desired to keep the battery from shifting. The battery assembly should fit snug but not tight. We stuffed sponge rubber on each side of the battery to keep it from shifting, instead of the balsa lining.

The antenna wire can be spotcemented around the cabin coaming and under the bulwark rail.

Connect servo wiring to the receiver and check the operation of the equipment and we are then ready for the rigging and sailing. The receiver battery wiring to the receiver will require a wiring extension in order to reach the receiver.

PART TWO of the "Mara" will be presented next month, and will

conclude the construction and cover the operation of our model ketch.

LIST OF MATERIAL

(all material is medium balsa unless noted otherwise)

- (20) 1/8 x 1/4 x 36 for hull planking
 (1) 1 x 2 x 36 for bow and stern blocks (laminated)
- (2) 1/8 x 3 x 36 for deck, cabin and cockpit sides, coaming, and hatch

(1) 1/2 x 2 x 36 for cabin and cockpit enclosure ends and roof, and servo foundations

(6) 1/8 x 6 x 12 birch plywood for keel, bulkheads, rudder and servo mounts

- (1) 1/2 inch sq. x 9 inch hardwood for bowsprit
- (1) 1/4 inch dia. dowel for main and mizzen booms
- (1) 3/16 inch dia. dowel for foresails boom
- (1) 1/2 inch dia. dowel for main mast
- (1) 3/8 inch dia. dowel for mizzen

(1) 1/8 inside dia. x 12 inch brass tube for propeller shaft tube

(1) 16 oz. bar plumber's lead for ballast

(1) 1/8 inch dia. x 12 inch brass rod for propeller shaft

16 ounces Pactra Balsa Filler Coat 8 ounces Pactra Swift White Dope

4 ounces Pactra Stearman Red Dope

4 ounces Pactra Curtiss Blue Dope

- 2 ounces Pactra Jet Black Dope 4 ounces Pactra dope thinner
- (3) A.J. Fisher No. 218 brass cleats
- (12) A.J. Fisher No. 567 brass tangs
- 12 inches of A.J. Fisher No. 440 black brass chain 11 links per inch
- 30 feet of 20 lb. test fabric fish line
 (4) A.J. Fisher No. 105 brass working blocks
- (1) A.J. Fisher style F-530 gooseneck (open end)
- (2) A.J. Fisher style D-531 gooseneck (open end)
- (12) A.J. Fisher No. 225 brass air ports 3/8 inch with lights (clear plastic lens)
- (3) Williams Bros. Nylon Hinges No. 106
- Aristo-Craft RC-360G-3265 electric motor
- .032 x 1/2 inch aluminum strip to hold motor against motor mount
- Aristo-Craft M-232-15 spring type universal joint
- Dumas P-49 Nylon propeller

1 foot of 1/4 inch copper tubing

- Black carpet thread
- Coarse, medium, fine and extra-fine sandpaper
- 1 x 2 x 3 inch sandpaper block
- Large tube of Ambroid cement
- Assorted brass wood screws and straight pins
- 045 brass wire
- Sig Nylon control horn for rudder tiller

A.J. Fisher M-29 cast metal bow light Lafayette No. 99-62184 push-button micro-switch.

Sailing Continued from page 59

on saltwater, it is good practice to rinse your sails to stop salt buildup on the sail.

SETTING CARR SAILS

Your sails have been designed with plenty of flow for use in light airs with the luff wrinkles just pulled out by halyard and downhaul tension, while bent upon an absolutely STRAIGHT mast. No matter what kind of a fancy curve you think is the right thing for your mast, no sail will set properly upon it unless it is die straight, or unless you have provided a table of deflection measurements to the sailmaker.

As the wind increases, bend the upper mast by increased backstay tension and maintain a straight lower mast using lower shroud tension. Increase luff tension to prevent draft from being blown too far aft in the sail, and increase foot tension to suit. Now the bottom two-thirds of the sail is producing all the drive and the head has been flattened to reduce heeling. With further increases in wind, slack the lower shrouds to allow the lower part of the mast to bow forward, reduce jenny stay tension to further flatten the upper part of the sail.

For heavy air, the rig should be stepped forward to reduce weather helm and balance the vessel. Slack the mainsheet and shorten the jibsheet to produce backwinding of the main. You will now be sailing under operationally reduced sail area, but can reset for full power should wind lighten.

To monitor mast shape, either sight down the mast while the boat rests on its side, or use a pocket mirror at the base of the mast to sight up it.

BATTENS

These important parts of your sail are used to stiffen and support the extra cloth built into your sail that lies outside a straight line between the head and clew. Your battens should be carefully worked over to allow the sail to take on a smooth curve as one proceeds aft from the luff. Since sail shape is different from skipper to skipper, we have provided you with heavy, non-tapered battens in order that you be able to shape them to fit the curve that you like in your sails. We generally find that the battens should bend most up front and get stiffer in the after regions. The top batten usually is the most flexible of them all, while the bottom ones tend to be the stiffest. Rather than provide you with a compromise, we hope that you'll make the effort to match your battens to your sail shape. And don't forget to carry some spare ones in your toolbox.

NUMERALS

Put the numerals on the sail and let it lie in a sunny window for a couple of days. The heat and UV light will set the adhesive. DO NOT just go out in freezing weather and wonder why your hastily attached numbers shake off, give them a chance!!!

SAIL LIFETIMES

Since I started making model yacht sails in 1969, I have been continually concerned about the lifetime to be expected from sails. By keeping a careful record of a number of suits in different classes, and by maintaining a log of how and when these sails were used, I can now make some general statements about longevity.

CRUISING SAILS

If your sails were made for sport sailing and have been used on an occasional basis, their lifetime is in excess of 4 years. This is especially true of sails made from the 3.0 oz. stabilized Dacron which comes in colors as well as white. Deterioration for these suits is in the eventual breakdown of the resin which impregnates the cloth. The cloth loses its stiffness and its ability to hold



shape. By this time, it is the leeches which have gotten the worst of it, as they flogged in the wind while tacking, or by heavy air working on them when slacked to keep the boat on her feet.

RACING SAILS

These lose their spirit in less apparent, but damaging ways to a vessel's performance. I will center the discussion on EC/12-size sails (What is important is the length of the edges of the sails). If you sail a high aspect 50/800, your sails will age 20% to 30% faster, while if you are skippering a short 36/600 they may last half again as long. formance is in the mains'l leach. It is usually the result of the loads imposed on the unsupported afterside of the main which eventually stretches a bit and loses its springiness. The loose leach which results reduces weather helm, and also reduces drive as it no longer plays its role of forcing the wind to exhaust parallel to the boat's centerline. This will be seen as early as 1 year of hard competition sailing, especially if a good deal is in heavy air. The new tabled leaches help a little, but the cloth immediately forward of the tabling will stretch, giving you a cupped leach which promotes drag at an alarming rate. By the end of the

The first sign of reduced per-

JUNE 1978



second year of use, the typical racing main is ready to be retired.

The next problem is in the jib leach. While it is not stressed as much as the main, and usually has the opportunity to lift the jib club in the puffs, the trend is not to table the leach, or to put battens in it, so the cloth stretches, and suffers a resin breakdown, allowing it to fall away. The shape and airflow in the slot goes to pot. The boat gets sluggish and starts developing weather helm in puffs that she never used to have. By the end of the second year, a jib is well on the way to needing replacement. STORMSAILS

Many skippers ask if worn outsails can be cut down into storm suits. The answer is yes, but the cost is usually more than the cost of a new suit of storms'ls. In addition, they are being made of a tired cloth that is not likely to hold its shape. If you are going to sail in heavy air, it is essential that the sails do their job of extracting power that the hull can handle from the wind. My recommendation is for new storms'ls out of 3 oz. cloth. These should be cut flat and short to eliminate heel, yet keep the hull at hull speed, and carry the extra opportunity for surfing and planing on the reaches and runs that can put you into first place.

NEW SAILS

My recommendation is to invest in the most efficient powerplant you can, whether you race or sail for sport. We are firmly in favor of the California Cut jib used in conjunction with a tabled main leech. You then have a jib with shape built in, but shape that can be altered unlike the fully paneled kinds. The tabling on the main leech adds life, and it adds camber aloft where mains usually flatten out. Sails of this variety have two STAR 45 Class ACCR wins in a row to their credit, and have been carried on every challenger in the EC/12 MINI-AMERIČA's CUP matches. They should be custom designed to fit your boat, and to match with your prevailing wind conditions.

Questions are answered if you'll send a self-addressed, stamped envelope to the author in care of Model Builder, or direct: Rod Carr, 7608 Gresham St., Springfield, VA 22151.

Counter Continued from page 10

down, try Idea Development's new product called "Hot Hed", which will bring this protection to every engine you own for that small amount of money.

"Hot Hed" is a liquid, visual heat warning indicator that is applied in

MODEL BUILDER



dots to the upper fins and top of an engine. It is normally olive green in color, which turns a light brown when the proper operating temperature is reached. It will further turn to a deep red brown at temperatures of 490 degrees, at which continued operation will cause engine damage. The visual warning is gradual; coming in time to avoid serious damage, and is a sure sign of too lean mixtures or inadequate ventilation.

With complete instructions, at \$3 per half-ounce container.

Another handy-dandy for those of you who mold your own models and parts from epoxies or resins, is "Kant Stik", Idea Development's answer to the sticky mold problem. It comes as a dry compound, which is mixed with water to form a superior Polyvinyl Alcohol, considered by many to be the only mold release.

In the dry form, the shelf life is indefinite, and it will last for one year after mixing. With complete instructions, at \$4 per package or 2 for \$7.

These items are available directly, postpaid, from Idea Development, Inc., P.O. Box 7399, Newark, DE 19711.

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Quarter Midget flyers will probably be the happiest group to see the "Peppermint Pattie" come along; as most of us have a large number of non-competitive, but still good .15 engines around. This sleek, high-performance and fast sport flyer should be lots of fun to fly, and it has pleasing looks to go with it.

with it. The "Peppermint Pattie" is a "Nick" Damuck, Jr. design, and is further endorsed by Pete Reed, of national pylon fame. The kit features matched balsa fuselage sides, selected wing sheeting, precision diecutting, plans, photos, and a hardware package.

Check your dealer's stock first; if unavailable, direct orders are accepted.

Since we feel strongly that it is best to lose a quick sale than a beginning modeler, we applaud the manufacturer's statement that this kit is not recommended for the inexperienced pilot or beginner.

For beginners and expert alike, from the same company, there is a new field box kit, called the "Totz-All". It is a clever combination of a general parts and equipment carrier, with a removable "power box" that holds only the flight line essentials. The power box can be customized to fit any accessories, battery, power panel, or starter of your choice.

The kit includes all pre-cut 1/2 inch birch and 1/2 inch solid core plywood, hardware, and instructions. The kit is priced at \$39.95 plus shipping, available also assembled and polyurethane finished at \$59.95, plus shipping charges.

Where? Why, from Master Kit, 6 Fox Road, Plainville, CT 06062. Tell them **MB** sent you.

Most of us have come to think of Astro Flight Inc. as "Mr. Electric", possibly because it has pioneered electric powered flight. However, we should not forget that the company has a lot of experience, and produces other products, including sailplanes.

The latest offering in that field is the "Californian", a high-performance soarer for two or three channels. It features a completely finished, rugged, plastic fuselage, and a 113 inch span, wing with an area of 850 square inches. The total surface area is 1000 squares, at an all-up weight of 40 ounces.

The polyhedral wing gives positive spiral stability, quick roll response, and a floating glide. Spoilers are used to provide pilot control of descent rate and approach glide



angle. The large elliptical stab gives hands-off pitch stability and powerful pitch control. The Californian is equally at home in the hands of a novice or expert.

The "Californian" should now be in your local shop, if not, write Astro Flight Inc., 13377 Beach Ave., Venice, CA 90291.

It is always a pleasant surprise to us to discover that a company has improved something that is already in widespread use, and has already established a good reputation for itself. In this case, we are referring to Carl Goldberg Models' retracts, in use in large quantities at every flying field we have been to in recent years.

In this case, the gear mechanism remains the same; the change is from a three-turn coil to a one turncoil in the strut. The many expert flyers using these retracts have found that one coil is ample, and increases the firmness of the struts during downwing turns on the ground. Better control for takeoffs and landing is also claimed.

The complete system using the new struts and replacement struts only are available. Carl Goldberg Models, Inc., 4734 W. Chicago Ave., Chicago, IL 60651.



Is your field box a rat's nest of wires, starter, glow plug, fuel pump, etc., and their assorted batteries? Not only is this inherently dangerous, what with a volatile fuel can always nearby, but it can slow you down at the contest and is certainly lacking in class. What you need is a Sonic-Tronics Solid-State "Glow-Plug" Ignition Power Panel. Everything you need to power is conveniently connected to a single 12 volt battery.

The Power Panel is designed for flush installation on the face of your field box. It provides the proper voltage and controls for your fuel pump, starter, and glow plug, plus High Intensity test lamps to indicate "Test" and "ON" for the glow plug. A special solid-state circuit is used to provide "square wave A.C. power" to ignite the plug, resulting in a claimed savings of over two amps from other power panel systems.

The Power Panel is complete with all hardware and cords, requiring only a battery. It is priced at \$29.95, available at most hobby stores. For more information, write Sonic-Tronics, Inc., 518 Ryers Ave., Cheltenham, PA 19012.

* *

Most things being relative, I guess most of us have our own idea of what being rich would be. Mine is to have enough money so as not to have to clean out spray guns, a chore I hate as much as installing hinges and, until I got a little better at it, covering with plastic films.

As I am still a spray gun cleaner, I read with care Section 20, of a recently released publication entitled "Hobby and Craft Guide to Air-Brushing". This 32-page, colorillustrated booklet is available from Badger Air-Brush Co., and its many dealers. The 21 sections cover such important points as how to select the proper equipment, mixing paints, model camouflage, weathering techniques, air-brush aging sails, candy spraying model autos, and on and on.

Though there is no mention of large model planes of any sort, the techniques shown are basic, and in most cases will apply whether you are painting your latest mammoth scale effort or a redhead's T-shirt, as shown in the illustrations. We found many answers to "I wonder how they do that?" type of questions, and suggest you drop by the nearest Badger dealer and have a look at this \$4.95 book yourself. It is also available direct; include 75¢ for postage and handling. Badger Air-Brush Co., Dept. HCG-2, 9128 W. Belmont Ave., Franklin Park, IL 60131.

The innovative Harry Higley... or maybe it is his sons, has just announced some heavy items, all intended to help you correct some of those airplane designs or building errors.

First, is a Half-A Heavy Hub, similar to the one previously available for larger engines. This one is made from nickel-plated brass stock, with the front end rounded for safety and appearance. It is provided with a steel stud of the proper diameter and length to fit the Cox engines, and will add a 1/2 ounce of nose weight right up there where it will do the most good. A standard prop wrench can be used to tighten this hub. The price is 99¢ each.

Second, a 1-ounce lead casting to be installed in the proper location. It can be secured with a wood screw, nut and bolt, or with epoxy. The back is serrated for best glue adhesion, and the tapered shape acts as a wedge under the glue. Properly installed, this weight should stay exactly where it's put for the life of the model. Price is 3 for 89¢.

Last but not least, we have a Safety-Spinner Nut, in the same size and shape as Harry's Heavy Hub, only much lighter. This handpolished aluminum prop nut meets AMA rules for events that require this safety item, and adds a scale-like look to the model's front end. It is available in 1/4-28, 7 mm (Enya), or 5/16-24 threads, at \$2.39 each.

Look for all these fine new products at your local shop, or check with Harry at 433 Arquilla Dr., Glenwood, 1L 60425.

Fourmost Racing Products, 4040 24th Ave., Forest Grove, OR 97116, has announced its .40 size Airflo Engine Mount, similar to the .049 mount previously available (O/C March 1977). Both models result in improved aerodynamic efficiency


SEND 50¢ FOR CATALOG AND PRICE LIST

7351 N. Hamlin Ave. OCTURA MODELS INC. Skokie, III. 60076

through reduced drag around the engine.

This design, molded in rigid glassfilled nylon compound, results in the strongest, vibration-free, molded airplane front end available.

The .40 Engine Mount is ideal for Quickie racers, as the firewall face is 2-1/2 inches square. It is recommended the 6-32 socket head screws and blind nuts be used to attach the mount to the firewall, and either sheet metal screws or machine screws into tapped holes should be used to secure the engine.

The Airflo .40 Engine Mount is priced at \$5.25, and should now be at your dealers.

The perpetual problem of drilling engine mounts precisely has been alleviated with the introduction of a new Engine Mounting Kit, from The LAX Company. This kit includes all the tools needed to mark, drill and tap holes of the proper size, plus the socket-head cap screws, and even a hex key wrench with which to tighten them.

Two kits are available: one that includes a #38 drill, 5-40 tap, a nickel-plated tap wrench, transfer punch, tapping fixture, four 5-40 cap screws, and hex wrench. The other set includes all the proper size items for 3-48 bolts, to be used with 1/2A engines.

Each kit is \$6.69; extra bolts are available in sets of eight of either size for 98¢. A shipping charge of \$1.00 should be included for each order; a catalogue is available for \$1.00 also.

Inquire further at The LAX Co., P.O. Box 202, Chicago Ridge, IL 60415.

Are you looking for a present for some youngster in your life? Take a look at some of the new goodies from the Testor Corporation on your next trip down to the hobby shop. There is a wide assortment to pick from, including some neat looking .049 engine powered model



cars for tethered running. They include No. 3812, a "Bug"; No. 3811, a Pick-up; and No. 3810 Van. All of them measure over 10 by 5 inches, and feature brightly colored flip up bodies, mag wheels, wide rear slicks, chrome accessories and detailed seats. They also carry supergraphic decals to simulate the custom paint jobs often seen on these cars. They are complete with line, tetherpost, and require only the Testor .049 Engine Starting Kit which contains fuel, battery, wrench and filling spout, for operation. Included with these cars is an

exclusive and interesting first from Testors ... a five-minute recording that "talks" the beginner through the steps required to start the engine in an easily-understood, step-by-step manner. This recording covers all critical points and should give the newcomer the confidence needed to insure reliable starts every time.

For more info, look first at your favorite shop, or write to The Testor Corporation, 620 Buckeye St., Rockford, IL 61101.

Peerless Corporation recently introduced a new line of R/C electric race cars, three in 1:12 scale, and three in 1:20 scale.

The 1:12 cars are models of the Lamborghini Countach LP500, the

Lancia Stratos, and the Porsche RSR Torbo. They feature a 6-volt motor, differential gearing, rheostat type speed control, spring suspension, nylon wheels with sponge tires, and a 6-volt 1200 MAH nickel-cadmium battery pack. Price, \$100.

Plus! New NAMBA Oval Record

of 1 min., 13.4 sec.

The 1:20 models include the BMW 3.5 CSL, Porsche 935 Turbo, and the De Tomaso Pantera GR-5. Some of their features are a 6-volt motor, ball joint tie-rod adjustments, nylon wheels and sponge tires, and an electronic proportional speed control. The price is \$70.

Rechargeable batteries available are a 6-volt 1200 MAH pack at \$27, and a 6-volt 250 MAH at \$20. A home charger is priced at \$12; a 12-volt quick charge model, built to plug into an automobile cigarette lighter receptacle, is \$23.

A complete illustrated catalog is available for \$1 from Peerless Corp., 3919 'M' St., Philadelphia, PA 19124.

R/C Glass, 1628 Corona, Medford, OR 97501, is offering a fiberglass version of Jerry Dunlap's 1977 NAMBA National Outboard Champion, the Excalibur II, which was also District 8 High Point Champion, established an oval competition record, and was the first outboard to be officially timed at over 40 mph.

The Excalibur II is a 25-1/2 inch picklefork tunnel, incorporating a

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special tunnel section developed by Dave Knowlen. It comes completely assembled with a removable cowling, in either white gel coat or metal flake finishes. Plywood reinforcements for the transom and turn fin are glassed into the hull. Plywood and plexiglass for a radio box are also included. K&B's new Auto Trim engine adjustment kit can be easily installed. bottom version is \$75, and the all metal flake boat is \$80. Shipping and handling are an additional 5%; dealers inquiries are welcome.

High quality hardware for .40 and .60 size R/C racing boats is available from Metal Concepts, Inc., P.O. Box 25596, Seattle, WA 98125. The line includes a heat-treated stainless rudder and shaft; an aluminum and

stainless strut with mounting that

The gel coated Excalibur II costs \$70. A metal flake top, white gel coat

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features needle bearings; a stainless skid fin and bracket, tuned pipe mufflers, and exhaust couplers for the OPS .40 and .60, and for the K&B .40.

Quotes on special items of your design will be made if a sketch is submitted. A full money-back guarantee covers all products. A full list of available items and prices will be sent upon request. Tell them **MB** suggested it.

We have learned of an unusual clamp which should find many uses in the modeling workshop, and would like to share it with you. Though it is obviously designed for assembling picture frames, the inventive modeler will find more uses for it than the manufacturers ever intended, as it will hold two pieces of material securely and at perfect right angles with up to 20 inch/ ounces of torque.

It is known as a "Dual 90 Clamp", and comes in sets of four, though unfortunately, we do not have the price. Please direct your inquiries to: Dual 90 Clamp, P.O. Box 266, Burbank, CA 91503.

You probably wouldn't recognize it as such the first time you saw it, but the C.P. Clamps from Delp's Hobby Products have got to have the proverbial 101 uses.

The C.P. stands for Constant Pressure, and models are available that exerts 1; 1-3/4; 2-1/2, or 4 pounds. They span from 0 to 10 inches, and are formed from stainless steel which should last much longer than any airplane any of us will ever build using them.

Priced at 2 for \$1.98, in the size of your choice. From Delp's Hobby Products, Inc., P.O. Box 82, Perkasie, PA 18944.

Robart's Model Incidence Meter is now available in a new and improved model. While maintaining all the features of the original that provided you with true and accurate thrust, and wing and stabilizer incidences, the latest model includes a steel counterweight and a precision pointer and dial scale. Results: more precision.

With complete instructions and suggested uses, at \$15.95. Look for the Model Incidence Meter and other Robart products at your favorite hobby store, or inquire from Robert, P.O. Box 122, Wheaton, IL 60187.

A sandpaper that lasts 20 times longer than flint paper? That is one of the claimed features of a hand sanding abrasive named "Evode

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AERO HOBBIES — Rubber and CO₂ specialists, kits, accessories for Peck, R/N, Vintage Aero, SIG, etc INTRODUCTORY SPECIAL — FREE Vintage Aero Profile Pientenpol and catalog with purchase of Shark or Telco CO₂ engine — \$19.95 plus \$1 00 postage Catalog 35¢ Send to Aero Hobbies, Box 115, East Glastonbury, CT 06025

OLDTIMER MODELS, 1978 catalog now ready. Rubber, balsa, bamboo, plans, dope, tissue, wheels, props, kits, etc. Three 13¢ stamps or 4 dimes. Oldtimer Models, Box 18002, Milwaukee, WI 53218

CASH & WILL TRADE, new R/C engines for old engines and built-up R/C model airplanes — any type Hobby Capital R/C. 46 North Oak Street, P.O. Box 2002, Ventura, CA 93003, Ph (805) 643-7616

F4U-1 "CORSAIR" SCALE PLANS PRE-PARED FROM FACTORY DRAWINGS — 4 sheets 24" x 36" — scale 3/4"=1' — ALL DETAIL \$7.00 from SUPERSCALE, BOX 201, ARLINGTON, TX 76010 Send \$1.00 for catalog.

WANTED — K&B Infant .020 Engines, must be operative. State price and condition in your first letter Burr Stanton, Box 22151, Lyndon, KY 40222.

PLASTIC AIRCRAFT MODELS, a superb 32page magazine from England packed with indepth kit reviews, detailed modeling articles, accurate drawings, and clear sharp photos. Send \$1.50 for sample or \$9.00 for six-issue subscription (checks payable to "J.J. Daileda") to USA/Canada PAMAG Agent, 4314 West 238th St., Torrance, CA 90505.

WANTED: Sept./October 1971-Vol 1 No. 1, and September 1972-Vol. 2 No. 11 issues Model Builder. Send price to Bill Howard, 624 16th Terr Cir N.W., Birmingham, AL 35215.

Sanding Squares", now available from Evode, Inc., 401 Kennedy Blvd., Somerdale, NJ 08083.

These 3-1/2 x 4-3/8 inch squares are made by a lamination of abrasive sheets back-to-back by means of an interleaved fabric. This makes them flexible, and enables more of the grit to come in contact with the work surface. They are offered in dry and wet types, in three grits for each type. Each type is identified by color, and is packaged three to a pack. Evode Squares are non-filling and clog resistant, and, in the case of the wet type, does not curl when immersed in water.

For additional information, and availability, write Evode, and don't neglect to mention **MB**.

* * *

It's better than green stamps! The radio features proportional

WANTED FOR CASH. Old spark-ignition engines, parts and plane kits Russell Stokes, Rt. 1, Box 73J, Keller, Texas 76248

.020 Replica Kits: PLAYBOY SR., STRATO-STREAK, BROOKLYN DODGER, SO-LONG. FREE PRICE LIST, J & R Models; 5021 W. Sheridan St., Phoenix, AZ 85035.

SELLING MODEL AVIATION LIBRARY, MAN. Aeromodeller, Air Trails, books Write for list Ray Hansen, 3033 Rutgers Avenue, Long Beach, CA 90808

We allow used radio trade-in on new ProLine Systems. Check our prices! Also, we have the fastest building Formula 500 airplane kit on the market, \$24.95 HB40 PDP is winning in Quickee Racing, only \$48.50. Giezendanner Pot Wipers. now only \$2.50. The Great Western Aeroplane Factory. P.O. Box 8885. Boise, ID 83707, (208) 376-0624

6 PEANUT PLANS, Ascender, Kean Ace, Bellanca Aircruiser, Douglas Y10-43, Aeronca LB, and Howard DGA-9 \$5.00 P.P. Also parts kit for Scientific Flagship 78" from Superior Balsa \$20.00 plus \$1.50 postage + handling. Printwood Hobbies, P.O. Box 88, Brigantine, NJ 08203.

COMBAT FLYERS — Get in the air fast with a CORE HOUSE plane Almost-Ready-to-Fly Gotcha — \$26, Axe — \$22. Send S.A.S.E for complete info and details. The CORE HOUSE, Box 300A, R.D. #2, Palmyra, PA 17078.

CUSTOM BUILT Radio Controlled airplanes, boats, cars, and gliders. Hobby Capitol Dist., 46 N Oak St., P.O. Box 2002, Ventura, CA 93001 Phone (805) 643-7616.

MODEL AVIATION BOOKS Out-of-print. Big list 50¢ JOHN ROBY, 3703MT Nassau, San Diego, California 92115.

Send \$1.00 to Bolink Industries and they will give you \$2.00 in return . . . plus a catalog from which you can deduct the \$2.00 on your first \$10.00 order.

To the R/C car fan, Bolink needs no further introduction, but possibly some of its new products do. First, we've got a '32 Ford Tudor in 1/12th scale, made of Tuffak and available clear or painted. An interior is also available. And if pickups are your thing, a '77 Ford pickup body might be what you are looking for.

Bolink's new electric car, legal for ROAR Class D racing, features Jo-Mac's electronic speed control and radio. The car is built on a Lexan chassis with Tuffak body, .05 motor and wide racing slicks. Proportional speeds up to 30 mph are possible.

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JUNE 1978

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Workbench . . . Continued from page 6

Class Biplane, Sportsman Class Monoplane, and Advanced Class Monoplane. The 120 degree aerobatic zone rule will be in effect, and the 10% Scale Bonus will apply for the Biplane events. Monoplanes must be Sport or Precision Scale models of aircraft designed for and flown in full-size aerobatic "box" competition. Send an S.A.S.E. for a copy of the rules that will be used at the contest. No entry fee. Write to Maxey Hester, CD, Box 368, Montezuma, Iowa 50171. Phone (515) 623-5154, 5157, or 2194. (That's all the phones in Montezuma!)

- span) cabin monoplane. By Bill Noonan.
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No. 11771 LI'L GEM III \$3.00 Competitive 1/4 Midget R/C pylon racer. All wood construction, Austin Leftwich,

The Monmouth (New Jersey) MAC's Soaring Meet is scheduled for July 16, 1978. Of special interest is the fact that this is the 10th anniversary of the meet, making it about the longest-running R/C soaring contest. Dick Sarpolus, CD, for the past nine years, will again officiate. For contest particulars, write to him at 32 Alameda Ct., Shrewsbury, New Jersey 07701. HOW ABOUT THAT!?

Old-timers in radio control (well, at least back to the 1950's) should get a kick out of this. In the January 1978 issue of "Gold Coast Flyer", newsletter for the Gold Coast Radio Controllers in the Delray and West Palm Beach area of Florida, edited by Charlotte and Art "P-38" Johnson, it is mentioned that Vern MacNabb showed up at the club field with a new plane which flew well.

For those of you who are not so

No. 11772 WEICK W-1A \$2.50

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MODEL BUILDER PLANS SERVICE 621 WEST NINETEENTH ST. COSTA MESA, CALIFORNIA 92627

old Old Timers, Vern was the founder of Citizen-Ship Radio Corp., about the first company to supply radio control equipment on the then newly established examination-free Citizens Band. Wonder whose system he's flying?

And speaking of R/C pioneers, we see that Walt Good, the human subject of our first "Famous R/C Aircraft" series, is planning to move from the Washington, D.C. area after many, many years, and relocate near Clearwater, Florida. According to a report in the March 1978 issue of the DCRC Newsletter, this move was in Walt's schedule for about three years hence, but this bad winter and a holidays trip to the Tangerine Meet accelerated things, and he and Joyce will be moving around June or July.



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NEW 8022

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All systems include transmitter, receiver, two microservos, dry battery box and switch, plus frequency flag and accessories. 12 AA alkaline energizer batteries required. Optional rechargeable transmitter pack available. Be sure to get your FCC Citizen Band License.



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You won't find those on other two channel radios. Nor are you likely to see a combination of receiver features which include lead out wires for easy installation, double tuned RF front end and IC circuit decoder. In short, we didn't skimp on the 772, it's better all the way 'round. So whether you sail, fly, glide or take a spin, don't trust your pride to just any two channel. Buy the better one so you don't compromise control. Ask your dealer to show you the 772 with open gimbals.

MODEL RECTIFIER CORPORATION/2500 WOODBRIDGE AVE., EDISON, N.J. 08817 In Canada: Borgfeldt Toys LTD., 3440 Pharmacy, Scarborough, Ontario M1W2P8 772 comes complete with 2 servos, receiver, battery holder, switch harness. (At a small additional charge, select the servos best suited to your application).

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