

DECEMBER 1983

\$2.50

volume 13, number 143

Staggerwing Beechcraft

Now Available

in Authentic 1/5 Scale!

SPECIFICATIONS

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Concept" promises top building a model like the Staggerwing will be amazed by the time, labor and money savings made possible by our state-of-the-art fiberglass fuselage and detailed, injection molded wings and control surfaces. All fuselage and wing stringer detailing has been control surfaces. All fuselage and wing stringer detailing has been painstakingly included in our molds to enhance scale realism in all production parts. Even the distinctive concave shape of the fuse belly has been incorporated in our tooling.

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> Actual photo of model trimmed with Metallic Charcoal MonoKote*

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DECEMBER



1983

volume 13, number 143

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TABLE OF CONTENTS

FEATURES

WORKBENCH, Bill Northrop	6
DEAR JAKE	6
OVER THE COUNTER	7
IMAA/IDA GROVE FUN-FLY FESTIVAL, Bill Northrop	10
FAI/US SCALE TEAM SELECTION, Cliff Tacie	
ELECTRIC POWER, Mitch Poling	14
CHOPPER CHATTER, Ray Hosteller	
BIG BIRDS, Al Alman	22
YORK FAI/F3B WORLD CHAMPS, Bill Forrey	24
R/C SOARING, Bill Forrey	
BYRON ORIGINALS CAP 21 IN REVIEW, Dick Moloney	32
ELECTRONICS CORNER, Eloy Marez	
FUEL LINES, Joe Klause	
HOW TO FLY PATTERN, Dick Hanson	
PLUG SPARKS, John Pond	
R/C CARS, Dan Rutherford	
R/C BOATS, Jerry Dunlap	
HANNAN'S HANGAR, Bill Hannan	
FREE FLIGHT SCALE, Fernando Ramos	
FREE FLIGHT, Bob Stalick	54
INDOOR, Ken Johnson	
CONTROL LINE AT THE NATIONALS, Rich von Lopez	

CONSTRUCTION

NIEUPORT 11-C TRIPLANE, Frank Hoffer	16
FAST EDDIE, Bob Sliff	30
KARASU O.T., Danny Sheelds	42
VERVILLE AIR COACH PEANUT, Art Mooney	51

Cover: Steve Neu launches Mark Smith's World Championship F3B backup sailplane, an Eismann *Camaro*, over the side of a beautiful heather and fern covered English slope. Rich Shrameck (U.S. F3B team manager) pilots the model out over an equally beautiful English sheep ranch in the valley below. After a week's worth of tense World Championship competition, this was just what the doctor ordered for soothing the nerves. Cover inset: Mark Smith's primary sailplane was his *Panic*, seen here on a low pass. Those fuzzy white dots are actually sheep. The sheep left evidence that they grazed where the modelers stood while flying R/C gliders... much evidence! For a report on the Fourth R/C Soaring World Championships, see page 24. Kodachrome transparencies by Bill Forrey. STAFF

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LORETTE.

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



from Bill Northrop's workbench

• The Editor's Workbench still suffers from neglect, but less than in past years. In spite of two long trips to Florida that took up most of May, June, and half of July, followed by a two-week trip to take in the Nationals and then a one-week visit to Ida Grove and Montezuma, Iowa, **Model Builder's** editor has managed to put in some shop time.

To get a more direct "connection" with electric power, the old former free flight Comet Clipper, which had been changed over to R/C with a K&B Green-Head Torp .29, was again back-shopped and converted to burn "battery fuel." A belt-reduction Astro Flight 10 motor was installed on maple beams epoxied through the firewall. The very dependable Mathes radio (remember that one?) was installed, with the throttle output arm tripping the lever on a 15-amp micro-switch to turn the motor on and off.

Performance is adequate but not sensational. Probably going to a sevencell pack instead of the present six-cell would make it sprier. But the fun thing is this . . . Last Sunday, Belinda and I took the Clipper and her AMA Cub to the local elementary school athletic field, and though there was a baseball game in progress on the diamond at the far corner, we were able to fly our airplanes without being bothered. A paved area by the school buildings provided a smooth takeoff runway for the Clipper, and within two or three minutes, it was high enough to sniff around for lift (there wasn't any to be found). After each landing, we had 15 minutes of flying with the Cub while the batteries were charging.

Intertwined with electrifying the Clipper, I worked on the pre-constructed version of the Cloud King reviewed by Al Tuttle in the October '83 issue. I'll be doing another, but briefer review on this model shortly. This was my first experience with Solartex, a fabric-type, heat-applied covering material from England, and obtained from Hobby Shack, in Fountain Valley, California. So far, it's very impressive. In fact, I'm impressed enough to commit myself to using it to finish (at last!) the quarterscale Aeronca C-3 started 15 years ago. It sticks well, including to itself. It pulls up reasonably taut. It can be painted. It's a snap to cover compound curves and tricky wingtips, and the grain goes the long way on the roll.

Yes, the Air Knocker is coming along. The drawings are being updated to agree with last-minute changes in construction, the tail surfaces are covered (wings next), and it's getting to be decision time on the engine. Originally, it was to be a Webra 60 vintage 1967, loaded down with a scale size (18-inch) prop. But that was before the four-cycle engines came along. Though it will be a nine-foot span airplane, it's really sort of a powered glider, so not much engine is needed.

It was planned to mount the engine inverted, hide the cylinder head behind scale oil cooling fins, and add dummy opposed cylinders. As it is also planned to add scale Edo floats and fly off water, we may just stay with the Webra for the extra power that may be needed to get unstuck. Also, changing to a four-cycle would probably mean having to revise a 1/4-inch ply firewall that is already firmly epoxied in place. Nothing's easy!

What's next? There's a PB-2 old timer that needs to be finished. This will replace the tired old Powerhouse that served us well for nearly eight years. The front end was so oil-soaked after wearing out three engines that it simply fell apart when we removed the Monokote to attempt some repairs. The only solution would seem to be a whole new front end, spliced on to the original fuselage somewhere along the cabin area. The PB-2 is almost ready for covering; just needs a radio installation and wing saddle. By the way, does anyone know what the 'B' stands for in PB-2? We assume the 'P' is for Thracy Petrides, whose name appeared with this and many other designs of that era, but who is the 'B'?

After that, there's a large scale project we've thought about for many years. Started doing some concentrated research lately. Not easy, because it was a 1933 aircraft, and some details are kinda vague. We're not going for Precision Scale, but sometimes it's difficult to restrain yourself as ideas for obtaining strict scale fidelity starts coming to mind. More on this one later.

OPEN SEATING

It's nice to get letters, even those that criticize, and Bob Benjamin's September '83 cover painting of the PT-17 Stearmans stirred up some correspondence. The criticism concerned his putting the

Continued on page 100



ADVICE FOR THE PROPWORN —By JAKE

Dear Jake,

My baby daughter is teething, and lately she chews up anything she can get her hands on. Right now, our dog has a bandaged tail, and my Sig Contender has tooth marks all over the vertical fin. The amazing thing is, it seems to fly better now. The rudder response is definitely improved. It occurred to me that maybe I was getting the same effect on my tooth-marked fin as they get from putting dimples on a golf ball. To test my idea, I took a ballpeen hammer to an all foam glider and dimpled the entire thing; wings, fuselage, and all. I was sure it would work, but the radio failed "hard over" on the test flight and it crashed. What do you think I can conclude from all of this?

-Experimenter in Edgewater

Dear Experimenter.

I think you can safely conclude that if you beat on an airplane long enough with a ballpeen hammer, the radio won't work when you go to fly it.

* *

—Jake

Continued on page 90

OVER THE COUNTER

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

• Model Rectifier Corporation is in the new products news this month with its announcement of the MRC-Tamiya Subaru Brat 1/10 scale R/C off-road car. The chassis is unlike anything else seen before as it is constructed of rugged ABS plastic resin which provides less weight and allows less chassis twist for more effective suspension operation.

The RS-380 motor inside the Brat drives an enclosed gear box, giving you more running time per battery charge. The power is transmitted to the rear wheels by new hex-type universal joints, which are underneath protective rubber boots. The Subaru Brat uses four-wheel independent suspension, with trailing rear arms that use coil springs, and a double wishbone front suspension featuring a servo saver, constant camber, and adjustable castor for the utmost ease in steering response. The front suspension even has steel radius arms just like the real Brat!

Your two-channel radio equipment and 7.2-volt battery sit in the middle of the chassis for a better center of gravity and for added protection. A three-step forward and reverse speed control



Top Flight Models, Inc. new Antares multi-task, 100-inch R/C glider.



Super Silencer 20 from Midwest Model Supply/Irvine Engines (England).

makes throttle control easy for this Subaru, with plenty of rubber on the semi-pneumatic wide tires on all four wheels giving you fantastic roadability.

A solid steel antenna rod also helps your car bounce back after a rollover. Of course, a great, detailed Subaru Brat body tops off this off-road winner with real style. You'll also find the Brat to be easily modified for hotter running too, using the new RS-540 motors and ball bearings.

((d)) ((d))

What are you waiting for? Join the offroad fun with the MRC-Tamiya Subaru Brat, at a price you'll appreciate! See your dealer. If he can't help, contact



MRC's new Subaru Brat 1/10 scale off-roader.



Pacer Technology & Resources new sizes, packaging.

DECEMBER 1983



Kraft Systems new mini servo, KPS30, has 25 oz-in of torque. MRC at 2500 Woodbridge Avenue,

Edison, NJ 08817.

* * *

Top Flite Models, Inc. has introduced its high-tech, flat-wing, multi-task sailplane . . . the Antares. This radio-controlled aircraft was designed by Scott Christensen and has a wingspan of 99.75 in., a wing area of 867 sq. in., a length of 47.5 in. and a flying weight of 3 to 5-1/2 lbs. (unballasted). The unballasted wing loading is 8.91 ozs./sq. ft. and the kit is designed for most three and fourchannel radio equipment.

Christensen's Antares is easy to build and fly for the Sunday flyer, yet is designed for experienced pilots and allout competitors. The design is Standard Class in span. As a multi-task sailplane, it addresses the challenges presented by club-level competition by excelling in thermal duration, spot landings, closed course speed, and closed course crosscountry. This is a sailplane design that seriously contends with all three competitive tasks.

Aerodynamically, the Top Flite Antares is state of the art. It is a flat-wing configuration that represents a significant departure from traditional polyhedral setups. The airfoil design is a unique marriage of the Eppler 193 and 205 airfoils to provide excellent slowspeed and high-speed characteristics.



New scale drawings from Repla-Tech International.



Hobby Barn's Joe Bridi designed Total Chaos pattern/sport plane.

The Antares can be set up with either separate flaps and ailerons, or with flaperons and flaps to produce the characteristics of several airfoils at will. The Antares also incorporates rudder and stabilator. The use of ailerons and flaps in the design provides the pilot with a precise system for control while launching, thermalling, and in glide path control.

Construction is high-quality balsa, ply, and spruce. Quick-building wings are fully sheeted (top) with completely webbed spruce spars top and bottom. The fuselage is a balsa/ply/spruce composite. All parts are cleanly die-cut for accurate, easy assembly. Each part features Top Flite's printed identification system to aid the builder throughout construction. A generous radio compartment is easily accessible through the canopy/hatch. A complete hardware package is included. Comprehensive, full-size, rolled plans with fully illustrated instructions complete the kit.

For more information and the latest catalog with Monokote color chart, send request with \$1 to: Top Flite Models, Inc., 2635 S. Wabash Ave., Chicago, IL 60616.

Kraft Systems, Inc., P.O. Box 1268,

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Davis Diesel Development's new diesel conversion kits for H.P. 61K and Enya E-19X. Also CO2 conversion for Cox .020 PeeWee/Tee Dee.

MODEL BUILDER



Aircraft Photo Packs 1984 catalog features color photos of over 125 different aircraft.



Power Products four point hydro Marlin kit.

Vista, CA 92083, has announced the release of its latest mini servo. Called the "KPS30," this super light (.79 oz.), super fast servo features ball bearings, no backlash gears, and the following specifications:

Torque 25 oz-in
Speed 0.3 sec
Resolution 0.3 sec for 100°
Current drain5 ma (idle)
Size 1.29 x .63 x 1.45 in.
This servo, with P/N 200-077K connec-

tor adapter, may be used with K-Line systems.

For more details, contact Kraft Systems Inc., or see your local Kraft Dealer.

Irvine Engines of England has released the first of a series of Super Silencers. The Super Silencer 20 fits the Irvine 20 and 25 engines. The Super Silencer 40 fits the Irvine 30 and 40, the OS 40 and 45 FSR, the S.T. G. 40, and the H.P. 40 engines. These Super Silencers are designed to optimize engine performance by minimizing rpm loss and in most applications increasing engine rpm. The Super Silencers are one piece units which require no additional header pipes. Available at your favorite hobby shop. For more information contact Midwest Model Supply Co., Box 518R, Romeoville, IL 60441.

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Meredith Leuken in Hannan's new book: Scrapbook of Scale, 3-views & Nostalgia.



New Zippy Sport kit from I.M.S.

Pacer Technology and Resources, Inc., manufacturers of the famous Zap line of cyanoacrylate adhesives announces that Zap/CA can now be purchased in two-ounce, money saving bottles. Zap/CA is the thin cyanoacrylate adhesive which is so useful in modeling. Zap penetrates and bonds in two to five seconds, making it ideal for quick tacking of components. There are hundreds, even thousands of uses for Zap/CA as modelers everywhere are discovering.

The new two-ounce size joins the

Continued on page 75



Two new Christmas promotional kits from Dremel. Model 3801SP (left) and Model 2501SP (right).



The Christen Eagles and the U.S. Navy's Blue Angels performed during the Festival, providing a terrific aerobatic show, and bringing thousands of spectators to Ida Grove. The Angels couldn't get in a tighter formation than that!

IMAA IDA GROVE EXTRAVAGANZA



A panoramic shot showing half of the flight line and pit area. Tents at the far right background housed the many giant scale models on display. Impound tent is at left foreground.

• Ida Grove, Iowa, August 18, 19, 20 and 21. Some called it the IMAA Fly-In, some called it a four-day Byron Originals Commercial, but most people called it one helluva four-day air show.

The Third Annual IMAA Fun Fly Festival was hosted, for the second year in a row, by Byron Godberson and his model company, Byron Originals. As it was last year, but even more so this time, Byron, his son Bruce, and just about everyone employed by Byron Originals and Midwest Industries (the Godberson-owned company which manufactures heavy farm equipment, as well as a marine division which is the largest U.S. producer of boat trailers and a unique dockside boat hoist), worked hard and for many long hours putting on a miniature and full-size air show that would be hard to beat.

The Christen Eagles; Charlie Hillard, Gene Soucy, and Bob Poberezny, came for the weekend, putting on their thrilling precision show on Friday, Saturday, and Sunday. The U.S. Navy's "Blue Angels", already scheduled for a Satur-



Carroll Cheek, Buffalo, Texas, and his half-scale Pober Pixie. Span is 15 feet, 6 1/2 hp. Hornet engine, 50 pounds.



Dr. Lou Antonacci, Hampshire, Illinois, takes off in his F4U Corsair. His four-point rolls were something to see.



How about a "quarter-scale" Hot Canary? Sorry we didn't get the name of the builder, or any specifications.



An N.A.S. Olathe based Corsair, uses Byron P-51 drive, Quadra, Byron prop. From Ziroli plans, by Kerry Hurt, Lake Jackson, Tx.



Larry Scott's Mosquito. Glass parts will be available. He's designer of Waco Taperwing and Krier G.L.T., both MB plans.

Gincy Math from Bill Northron's MB plans by Dick Parshall

Gipsy Moth from Bill Northrop's MB plans, by Dick Parshall, Holcomb, N.Y. Quadra powered, tows banner.

day/Sunday show in San Diego, still came out to Ida Grove; on Thursday to check out the topography and test a few maneuvers, and on Friday to do their complete show. And this took extra doing, as in order to fly up from San Diego, do the show, and return without landing (no place within range to land and refuel), they had to rendezvous with a tanker plane in order to take on enough "go-juice" to complete their flight back to San Diego's Miramar NAS.

If you haven't heard about it before, Ida Grove is a small (population 2500) farm community almost to the western border of Iowa, about 60 miles south of Sioux Falls. It is almost like any other small Iowa farm town . . . except for one thing . . . it is the home of the Godberson family, of Byron Originals, and Midwest Industries. It has an airport . . . which Byron built. It has a skating rink . . . which Byron built. It has a golf course . . . which Byron built. It has a hospital . . . which Byron built . . . etc. Now if Byron



The 1983 Festival was expanded to four days, with around 55 trade exhibitors occupying over 60 booths under two huge tents. In addition to the "Eagles" and "Angels", there were static and flying displays of homebuilts and WW-11 "Warbirds" (SNJ/AT-6, T-28, Grumman TBM, F4-U Corsair, P-40, Skyraider, etc.).

Thursday was relatively mild, with lots of R/C flying, interrupted for a short period as the Blue Angels came in to "case the joint" and run through a few maneuvers.

On Friday, the stuff really hit the fan, as approximately 15,000 spectators showed up to watch the Eagles and the Angels do their thing! Those Blue Angels can sure draw a crowd. Adding to the fun, the Warbirds and homebuilts did fly-by's. Standing on the highest part of the R/C flying site, one could look off in several directions and spot hundreds and hundreds of cars parked in far off fields, looking like vast country-style junk yards. It was definitely awesome.

Saturday was not as crowded as expected, probably because the Blue Angels were not there. Also there was some threat of those dreaded Iowa thunderstorms. However, the storms held off until 5 p.m., and then hit hard! The exhibitor tents almost went down, and many of the exhibitor booths were badly damaged. Being the third unbearably hot day in a row, many exhibitors had left early to seek out their airconditioned motel rooms in towns as much

Continued on page 84



Byro-drive and prop from P-51 that plowed into corrugated aluminum building. Shaft slightly bent, but otherwise A O.K.





Simple wing disconnect on Byron P-47 (coming soon). Flaps, aileron, and air retract connectors all make up when wing is shoved into place. Two bolts lock it up.

U.S. SCALE TE



• Ah, Louisville! The city of mint juleps and the Kentucky Derby will now be remembered by many for yet another event of significance. Over the weekend of August 12, 13 and 14, some of the top scale modelers in the country gathered in Louisville for the team selection trials for the 1984 United States Scale Team for radio control and control line.

The site of the event was the 750-acre E.P. "Tom" Sawyer State Park on the east side of Louisville. The Kentucky State Parks Department has a history of going out of their way to provide facilities for modelers if at all possible, and this park is the perfect example of how harmonious a relationship between a model club and a park system can be.

The park is the normal flying site for the Lousiville R/C Club, River City R/C Club, and the Tom Sawyer R/C Association, all of whom share the facilities offered by the Park. And what facilities! How about a smoothly paved asphalt runway, about 35 feet wide and several hundred feet long ... about the size of five tennis courts laid end to end ... hmmm? The grass surrounding the runway is fit for a putting green, and the many acres of tree-infested park land are comfortably distant from the flying area. The site has been utilized prior to this for several other major events including the 1981 Scale Masters and the 1981 I.M.A.A. Festival.

In past years, the team selection trials for scale teams has been traditionally held at the Nats. At the Sequin Nats in 1981, there was an additional stipulation that any contestant trying for a spot on the scale team had to compete with a model that met F.A.I. specifications for weight, engine size, etc. It made very



The 1984 US Scale Team, left to right: Bob Wischer, Cliff Tacie, Steve Sauger, Bob Underwood, Skip Mast, Jeff Perez, Mike Gretz, Ron Sears, Ed Rhoades, and Charlie Bauer.



Bus Anno

Ralph Burnstine's scratch-built, C/L, PT-26 Cornell back in action again.

George Rose's P6-E Hawk proved to be a tricky plane to land!



Hal Parenti assists Skip Mast in preparing Skip's C-130 for another winning flight. Powered by four K&B 3.5cc engines.

good sense, and it ensured that all members selected for the team had a legal F.A.I. model *now* and wouldn't be required to build a new model for the World Championships. It's been difficult to hold an F.A.I. team selection event at a Nats, however, along with all the other scale events, and still have it garner the attention and significance it so rightly deserves.

With that thought in mind (and the low turnout of team candidates at Sequin), Bob Underwood, who was then president of the National Association of Scale Aeromodellers, took the bull by the horns and proposed to the NASA membership and the AMA a program of team selection for 1983 which would be separate from the Nats, run solely for the purpose of selecting a team of scale fliers who would represent the United States at the Scale World Championships in Paris in 1984. Through the membership of NASA, and the contestants participating in the 1982 Nats at Lincoln, Bob received what appeared to be solid support, and with this support in evidence, AMA backed and approved the proposal.

As a result of Bob's efforts, it was

AM SELECTION



First place in C/L went to Jeff Perez and his B-17 Knock-Out Dropper.



Ron Sears' Stearman PT-17 and author's Spezio Tuholer. Both are O.S. .60 powered.



Steve Sauger's Stinson Model A trimotor took third (above). Charlie Chambers flew this F9F Cougar (below), Jet Hangar kit.



decided that NASA would organize, develop, and sponsor the team selection event. Louisville was chosen as the location because of its excellent site facilities, and because of the availability of a large group of modelers with the expertise and willingness to run such an event: Contest Director Dale Arvin and the Southern Indiana R/C Club... the same great group of guys who annually treat us to the Mint Julep Scale Meet. Another local group of modelers, the Skyliners Control Line Club, was instrumental in running the control line portion of the trials. The proposed new F.A.I. rules for 1984 were used as these are the rules under which the U.S. team will be competing in Paris. These rules incorporate the new "Standoff" type static scoring, whereby the models are judged for scale accuracy, color and markings from a distance of three meters, after which the judges move in to a distance of one meter from the model to judge fro craftmanship, surface texture, and scale detail. Many scale modelers, myself included, have felt that the elimination of the scale ruler was a downgrading of the event, and that many sport scale models displaying a high degree of craftmanship, but lacking accuracy in scale outline, would receive static scores approaching those of the Precision class. This didn't happen. In fact, I have to admit that with few exceptions, static scores seemed to very accurately reflect the individual models.

The factor which had the greatest impact on the outcome of this event was the F.A.I. system of awarding a complexity bonus for what is considered to be a more complex subject. Under this system, a flier is awarded an additional bonus in the form of a percentage of his total flight scores for items such as extra wings (biplane, triplane, etc.), multiple engines, and retractable landing gear, to name a few. This team selection trial saw the entry of several high complexity bonus models: Skip Mast's C-130 and Jeff Perez's B-17, both 30% for four engines and retracts; and Steve Sauger's Stinson Trimotor, a 25% for three engines and retracts. That meant that each time they flew, an additional 30% or 25% (respectively) was added on top of their raw flight score. As we are about to see, it's an almost unbeatable combination. Tragically, Hal Parenti lost his beautiful Savoia-Marchetti S.M. 79 tri-motor (25%) on it's maiden flight just four days before the trials. If he had been able to compete with that model along with Skip and Steve, it would have been all over except for the shouting.

A total of 23 contestants, 10 for R/C, and an amazing 13 for control line. gathered on Friday at the park gymnasium for processing and static judging. All entrants had been preregistered, and all entrants had paid their \$50 entry fee. an item which ensures that only seriousminded competitors are involved. This certainly could not be considered a regionalized event, as entrants traveled from both coasts of the U.S. to compete: George Rose and Ed Rhoades from New Jersey; Burnis Fields from Florida; and even Earl Thompson from California. It was obvious that everyone was taking this competition seriously, as all the models looked liked winners from the time they were carried into the gym.

The static judging began around 10 a.m., the order of judging having been decided by a draw from a hat. Each model was weighed before judging to verify that it was within the legal FAI weight limit of six kilograms (seven kilograms for multi-engined control line), with only a couple of the larger models being anywhere near the legal weight limit. Two of the fliers had even contemplated using styrofoam wheels if necessary to stay under the weight limit, but it turned out they made it without having to take such extreme measures.

The models were judged by two panels of judges; the control line judges were Burt Dugan, Andy Sheber and Lew McFarland; the R/C judges were John Guenther, Bill DeVerna, Art Arrow, and Dave Abel. In FAI, the same set of judges is used for both static and flying, so the judges had a long, working weekend.

Continued on page 82





Bernard Cawley of the Boeing Hawks, Seattle, Washington, poses with his scaled-up (140%) Showmaster. The model uses Astro 05XL Sport with seven sub-C cells and 11-7.5 prop. The innards of Bernard's Showmaster as seen from the top side. Litco Bantam Midget Servos are at



• Last month I wrote about making your own connectors from wire wrap sockets and wire wrap header pins. These make excellent and very small connectors, but there were two things that were a problem: one was trying to cut the sockets properly (this has to be done carefully!), the other was that the female pins are a little on the fragile side. They did stand up to abuse, even a short circuit I accidentally put them through didn't burn them out, but I did feel that there might be a better way.

There is! There are female sockets that come in strips, just like the male pins, and they are beautiful! The female pins are very sturdy, in fact, they are as good as the Deans pins, which I consider to be the best available. And, best of all, the price is right at 30¢ for a male/female four-pin connector! The strips are very easy to cut apart with a single edge razor blade, in fact, they seem to have been *designed* with that in mind, with notches in between each socket for easy cutting.

The photos show another advantage of the double row sockets, you can either go four pins side by side, or four pins in a square. I like the square arrangement best, it is so compact that the connector is hardly more than a bump in the harness lines.

The Graupner super flexible wire from

Wilshire Model Center is ideal for these connectors, as it comes in red and black. The polarity of the pins becomes automatic, just match the colors. If you do not have color coded wire, put colored vinyl tape or paint on one side of the connectors to keep the polarity straight.

There is only one drawback to these sockets, they are hard to find! They are also hard to describe to the clerks, the magic words seem to be: "Wire wrap sockets with one-tenth-inch centers.' Anyhow, I finally found them at Radar Electric Co. Inc., 168 Western Avenue West, Seattle, WA 98119. They are made by Aptronics, the female pins were part number 929975-01, and the male sockets were 929936-01. They sell for \$3.08 and \$2.29 respectively. The 72-pin and socket strips are enough for 18 connector sets (male/female, four-pin). That comes out to 30¢ a set, not bad. The weight of these pins is almost nothing; the complete male/female set of 72 pins is less than an ounce, so about \$1.50 for shipping and handling should cover it, I think. If you live near Portland, Oregon, or Spokane, Washington, there are Radar stores there too, so you might try them.

These are not gold plated pins, I understand gold plated pins are available, but I have not found a source for them. If anyone knows where to find them, please let me know, and I'll pass it on. I have seen some in single strips (not a dual row) advertised by Sintec Co., Drawer Q, Millford, NJ 08848-990, for \$3.25 for the female sockets (25 pin, gold plated) with shipping charges of \$3. Other places to try might be Jameco Electronics, 1355 Shoreway Road, Belmont, CA 94002 (\$10 minimum order), or Digi-Key Co., Highway 32 South, Thief River Falls, MN 56701 (\$2 handling, includes shipping). Digi-Key does advertise socket connectors that look like the ones I used, but they come with cables and are expensive (part number R307-ND, \$4.65, 50 pins). I think Radar is the best way to go unless you can find a local supplier.

Anyhow, the conclusion to all this is that I think we are due for small, efficient connectors that are reliable and easy to use. I think these are the best I've seen yet, and with all the other improvements in electric power lately, why shouldn't we have connectors that are small enough to put in 05 planes easily, rather than the big bulky plugs we have all been using up till now? I think you'll like them if you try them.

I am not sure if photography qualifies as a hobby for me, as I depend on it so



Radio Shack wire wrap pins and wire wrap sockets on 1/10th inch centers. You can make lots of four-pin connectors from these sockets and pins. Very cheap at 50 cents per set!



Four-pin connectors made from RS parts. Red and black wire marks polarity.



left, a 250 mah receiver pack is forward of 05's power pack, and Jo Mar throttle is in the nose.

much for my column, but as I do a lot of it, I subscribe to *Popular Photography* to keep 'up with what's happening in photography. I like the magazine, it has excellent articles, and it is not quite so "serious" or "arty" as some of the other photography magazines. It also has lots of "how to" material. Somehow, I managed to miss the fact that Larry Sribnick writes a regular column for the magazine, I read the column, but didn't look at the name. How embarrassing! (I wonder if that happens with this column too? It probably does!)

Anyhow, Larry is the chief of SR Batteries, which set the R/C fliers on their ears with their 900 mah batteries that are not much bigger than the 500 mah packs. This is handy for longer motor runs in electric flight, or for longer flight duration capability in the receiver pack. I have not tried them, but from all reports they have exactly what Larry claims: more capacity for practically the same weight.

I knew that Larry flew electrics, but I hadn't realized just how far he had combined his photography with R/C electrics. Then came the August '83 issue of Popular Photography! This issue is



Obvious size/weight advantage of home brew connectors over the commercial variety.



Bottom view of the Showmaster. Bottom of fuselage opens up to reveal seven-cell Sanyo battery pack and 20 amp fuse. Balsa cradle and rubber bands hold battery in place.

MUST for us electric fliers! Larry has an article on page 20, entitled, "Going Up!" which details how Larry built a Kodak Disc camera into the wing of his Olympic 650 powered by an Astro 05. Wow! The article even has color shots (five of them), and details how Larry does it.

He found out that the electronics in the Disc camera caused some radio interference. His answer to the problem was the Airtronics SR-4R radio, which is fairly low cost. Larry says that the total cost of everything, ready to fly, could be less then \$250 if you shop around. Larry used the model 4000 Kodak which is the least expensive model Disc camera.

He initially used a servo to trigger the camera, but that caused a one-second delay, so it was hard to plan the shots. He now uses an electronic trigger, which is much faster. Most of the shots appeared to be between 500 to 800 feet up, and one, I'm sure, was at over 1000 feet. It was an excellent panorama of a marina and a bay.

bay. This is a first for electric power as far as I know, at least at the hobby level. (I'll bet someone in Europe has done it too, but I haven't seen any articles on it.) Congratulations, Larry, how about an article on this in one of the model magazines? The article in *Popular Photography* was excellent, but let's have it on a non-technical level for the public. A "nuts and bolts" article would, I'm sure, inspire a lot of electric fliers to try it too.

The only complaint I have about Larry's setup (and it is a minor one) is that the Disc camera images are not as sharp

Continued on page 62



SERIES/PARALLEL SPEED CONTROL

The O's are the six lugs on a DPDT (center is off) toggle switch of 10 ampere rating. "B" is a toggle for manual off. This switch must be in the off position while charging batteries. "A" is the charging jack. It will charge the No. 1 and No. 2 batteries in series from a higher voltage (usually 24 volts) when the DPDT switch is in the high speed position. It will charge the No. 1 and No. 2 batteries in parallel from a lower voltage (usually 12 volts) when the DPDT switch is in the low speed position. For use with Astro 15 motors.

NIEUPORT 11-C

By FRANK HOFFER ... Here's a neat WW-I era scale subject that not everyone has already done before. As only about five of the full-size aircraft were built, the Nieuport 11-C was a rare bird to begin with. Don't let the three wings deter you ... as only the top one has ailerons!

ABOUT THE AIRCRAFT

The Nieuport 11-C Triplane was an offshoot of the standard Model 17. Dozens of experimental aircraft were built during the war years in a mad scramble to outdo the other side, but most were abandoned after brief testing. This one was no exception. It, too, fell by the wayside because test pilots felt its maneuverability left something to be desired. Also, it landed like a rock.

To the best of my knowledge, only a total of about five of these aircraft were ever built ... all in 1916. They were of three different types, some with other wing configurations. The type I chose to model has been in the back of my modeling mind since the mid 1940s.

My research information came from the following sources:

Aircraft of the 1914-1918 War, Thetford (basic Model 17 three-views and photos).

Air Progress magazine, 1965 (threeviews). Airplanes and Flyers of the First World War, Phelan (color three-views).

The Fighting Triplanes, Hadingham (photos and flight information).

Fighter Aircraft of the 1914-1918 War, Lamberton (photos).

I received technical assistance on airfoils, etc., from Merritt Zimmerman, and flying by "Ace" Harwell. FUSELAGE CONSTRUCTION

Start by making two 3/32 sheet balsa sides (use bottom view of the drawing to get the true fuselage length); taper the rear of the fuselage sheeting per the drawing.

Tape the two sides together. Then, with a fine-line marker pen, lay out all positions for longerons and cross members. Make sure both sides are alike.

For now add the 3/32 x 1/4 framing only up to the point where the fuselage tapers.

Make the firewall and cockpit floor per the drawing. Lay out cross section markings on the rear of the firewall. Cement the fuselage sides to the firewall, making sure everything is in alignment. Let the cement dry; then add the cockpit floor. This will give you a solid start for the balance of the fuselage construction.

At this point, I would recommend making the 1/8 in. ply former, horn assembly and all, and also the rudder post plate.

Cement the former assembly in place now. Using an X-acto saw, cut the fuselage sides halfway through at the point of taper, draw them together at the rear, and add the rudder post plate.

Now you can add the balance of the longerons and all cross bracing.

Make the cabane strut assemblies per the drawing. (Notice the taper where strut meets sheeting.) When completed, cement it to the fuselage. Double-check alignment and the critical dimension for the top wing (4-5/8 in.). Make all the top formers per the drawing and cement them in place.





Tail structure is light and simple. Both rudder and elevator are actuated via scale-like pull-pull cables (above).

Fuselage structure is really very simple (left) as it is basically a box with formers and stringers. Forward platform is where middle wing mounts.



(Notice that only the notches for the main stringer are cut now.)

Add the main stringer and cockpit sheeting.

Make all side formers and sub-formers and cement them in place. Add the hardwood mid and lower wing mounting blocks.

Apply the 1/16 balsa sheeting; 1/8 inch covers the firewall, the rear of the sheeting covers the break in the fuselage sides (at the point of taper).

Make the 1/8 ply cabane braces and install them.

The balance of the stringers are added now. Lay out, notch, and cement them individually. Add all 1/16 x 1/4 hard balsa capping and plywood cockpit combing. I also added a 1/16 sheet balsa doubler to the inside of the cockpit for

additional strength.

Cut the cable entrance slots and sand the fuselage. Make all fuselage fittings and apply

per the drawing. The optional lower access hatch is

recommended.

The author has made arrangements with a plastics manufacturing firm to make cowls for this project. If you wish



The fuselage's side planking is now in place, as is the landing gear and lower wing pod. Note triple-wire LG between the Williams Bros wheels.

> Cabane struts and wires are detailed in the photo at the right. Holes in the side of the fuselage are for the elevator control cables.





The aileron torque tube is 3/32 o.d. brass tubing. It is Hot Stuffed to 1/8 o.d. tubing in aileron. A 3/32 pivot pin is inserted into tip end of 1/8 tubing (pivot is removable). Copper straps and Hot Stuff secure 1/8 tube to aileron. Aluminum horn clamps onto torque rod by set screw.



to order a cowl for your Nieuport Triplane, send \$12.00 (in the U.S., postage is paid, outside the U.S. add \$2.00), check or money order (no C.O.D.s), to Aurora National, 400 W. Bagley Rd., Cleveland, OH 44017. (The owner of Aurora National is a modeler.)

LOWER WING POD AND LANDING GEAR ASSEMBLY

Make two 1/8-inch plywood sides. Cut out wing entrance holes. I suggest making the top of the cutout 1/16 in. higher for ease of assembly, but the bottom of the cutout should be exact as it will give the two degrees positive incidence automatically. Make all hardwood blocks per the

drawing and assemble the basic pod.

The landing gear is made in an unconventional manner, but is much stronger than normal. Form the front and rear pieces. Make brass fittings; slide them on in proper sequence. Add the brass tubing over the butt ends and solder. Set the landing gear in hardwood blocks and hold it in place temporarily with pins or tape. Move the brass spreader bars in place. Add the axel. Tape the assembly together after alignment and solder. Epoxy to the hardwood blocks.

Add 1/16 ply bottom (grain crosswise). The sides of the pod are to be com-



pleted after the wing is aligned and cemented in place.

CENTER WING POD

Make pod base from 1/8 ply. Taper the sides so that the final sheeting will match fuselage contour.

Add Former 1 and Former 3.

The balance is to be completed in alignment.



TAIL SURFACES

The rudder, stabilizer, and elevators are made in a more or less conventional manner.

Make 3/16 ply forms for the laminated outlines. Notice that the stabilizer is made in one continuous piece.

The removeable, optional, tail wheel assembly is recommended for better ground handling. Remove the scale tail



The so-called "business end" of the Nieuport triplane has a dual personality. On the left we see the static display front end with its dummy engine and prop. On the right we see the O.S. "Wankel" rotary engine that makes the Nieuport go as well as the dummy radial engine, prop spinner and tail wheel. The tail wheel replaces the tail skid for flying. **RIGHT**:

Roll control is managed by the aileron system (near photo) which is shown upside down. The serve assembly is removable. At far right is the rudder and elevator system consisting of pushrods, 1800 bellcranks, and control cables for pull-pull actuation.

18



skid when flying

BUILDING THE WINGS (GENERAL) Make a rib template from aluminum sheet at least 1/16 inch thick. Cut the ribs from 3/32 balsa (1/16 ply where noted). Notch the ribs for spars. Saturate each rib in the front spar area with Hot Stuff and set aside.

On the top wing only, and on the plywood ribs only, drill 1/8 in. pilot



holes for the torque rod in advance of assembly.

Make the wing tips prior to starting the rest of the assembly. LOWER WING

Pin the leading and trailing edges, main spar, and lower front spar to the drawing, blocking up as necessary.

Add all ribs, making sure that the ribs which locate strut plates are exact. (This





The aluminum control horn (which resembles a wishbone) is machined from 1/8 in. stock. Outer pivot pin is held on with screws.

applies to all wings.) Double-check the measurement to the center of the wing before cementing in place.

Add the top half of the trailing edges and the top front spar.

Add the wing tips next. Cement the leading edge sheeting, center section sheeting, and the top cap strips in place (except over ply ribs).

Turn the wing over and add the 1/8 in. shear plates, lower caps, and center section sheeting.

At this time, it would be good to make all the aluminum strut plates. Follow outlines carefully.

Add the plates to the lower wing and finish capping per the drawing.

If you prefer, you can sand the wing first, then add the plates and caps. **CENTER WING**

This is built exactly as the lower wing with the following exception: Add the center section solid balsa fill before adding the lower center section sheeting. The cutout is made after sanding, and at the time of assembly to center the pod.

TOP WING

Whereas the bottom and center wing trailing edges had to be spliced in the center, top wings can be made in one piece.

Pin parts in place as before. Add ribs and cement. (Note: ailerons are made later.)

Add the top trailing edge, tips, leading edge and center section sheeting, and capping (all ribs).

Make cutouts for the aileron horns at this time.

Turn the wing over; add the bottom capping except over the ply ribs. Now make the torque rod holes (this is

Continued on page 80

DECEMBER 1983



• This month let's take a look at one of the more subtle areas of flying model helicopters. Or, put another way, what you may lack in flying skills can be made up for by a finely tuned and trimmed ship.

BACK TO BASICS: THE SETUP AND TRIMMING **OF YOUR HELICOPTER**

It all starts before the helicopter ever flys. The basic kit, no matter which brand, must be assembled accurately and precisely in order for the fine tuning to be accomplished successfully when you're flying. My first plea would be for newcomers to obtain assistance during assembly. It's always easier to do things right the first time rather than rebuild a newly completed helicopter.

As it is impractical to list all the points of setup, I want to hit the major components of the helicopter during the final stages of assembly and initial setup. MAIN DRIVE COMPONENTS

Obviously the major components must be right from the start. Improperly aligned drive systems will generate vibration and shed gears, making it difficult to get a baseline reliability level needed to do the fine tuning. Probably the most imporant point I'd stress is to have the engine bench run for 45 minutes to an hour before it is put in the helicopter. Not only will this give you a more reliable engine, it will also give you a chance to get the needle valve settings close and familiarize yourself with the specific characteristics of each engine. Too often the kit is purchased and a brand new engine is stuck in to get the chopper in the air as soon as possible. Try to avoid this, it only leads to trouble later on when the new engine overheats and ruins the fit between the piston and sleeve. When this happens, the available engine power will be lower for the rest of the engine's life. Many times this can be the difference between a crisp performing helicopter and a "dog"

TAIL ROTOR

The bellcrank or slider pin from the gearbox must be free to move back and forth along its entire travel. Binding bellcranks will give sloppy tail control which can get frustrating during initial trimming.

The pitch control plate which anchors the ball links to the tail rotor blade holders must not fit sloppily between the set collars. For conventional plastic plates, there should always be a small washer between the collar and the plate. The best pitch control plate I've worked with is the Circus Hobbies (Kalt) unit which has a little bearing in it. It can be adjusted easily by loosening one nut,



One method of balancing the tail rotor is to stick pins in the inside edge of the rotor blades. Another approach for adjusting slight differences is to add a layer of plastic covering.

sliding the unit to adjust, and then retightening the nut.

Whatever control plate you use, make sure it is oiled before each and every flight.

The ball links out to the tail rotor blade holders must also be a very smooth and free fit. For all new ball links that are a little stiff, snap the link on the ball, then gently work the outside diameter with pliers to loosen the initial snugness and "break in" the link. This is very important, especially up front in the cyclic/ collective system. Several binding ball links can give a control run that will never let the servo accurately center! If you expect to get the most from your new ball bearing servos, make sure they don't have to fight stiffness in the ball links.

The tail rotor blades should be smoothly covered with Fas-Cal or a similar plastic covering. This prevents grass and small gravel from deforming the tips of the leading edge. Thoroughly Hot Stuff the root of the blade, and use some on the tip to seal the blade covering there.

With some blades it may be necessary to bevel the root of the tail rotor blade slightly so it will fit in the blade holder without spreading the holder excessively. A block and sandpaper does this easily. Always bevel the blade root before applying the Hot Stuff so a completely fuel proof blade results.

Set the tail rotor blades in the holders so they can pivot back should a tail strike occur. If they are too tight, they will not be able to set their own lead/lag, which will really shake the tail. If they are too loose, they will flop around and ding the trailing edge as the rotor goes from idle to operating speed.

The whole tail rotor unit should be balanced as per the July '82 "Chopper Chatter." You can use thin strips of Fas-Cal on the tips to balance the unit, or you can stick straight pins in the root end of the light blade. (Photo.) This way the pins are always kept in place by centrifugal force which results in a neat, easily adjusted balance system.

MAIN ROTOR

Just as with the tail rotor blades, the main blades must be covered smoothly with Fas-Cal. Bumps and imperfections in the covering can lead to aerodynamic imbalance later on. Most main rotor blade roots should also be Hot-Stuffed before they are attached to the blade holders.

As the blades are inserted into the blade holders you should look for a nice, friction fit. Sometimes it is necessary to shim the blade roots with brass shims to achieve this. The lead/lag can then be set, the blade holder bolts tightened down, and the joint between the two Hot Stuffed. This gives a solid lead/lag which will still break loose should a tip over occur.

With collective pitch machines (only), each blade holder should feather smoothly. Bumps or definite "notching" in the feathering action can lead to each blade tracking differently at various

pitch settings. This can become annoying from one flight to another, and changes during any particular flight are common. The latest rotor heads with thrust bearings help alleviate this problem considerably, as the centrifugal loads are taken by thrust bearings and not on the feathering bearings. On early style heads, the centrifugal loads are taken by the feathering bearings, which are not designed for pulling loads. Because of this, they wear out faster and soon become "ratty."

The seesaw must be free to flap up and down, as well feather along the flybar for pitch changes. This feathering of the flybar is very critical. You have to realize that the paddles feather every rotor revolution, which means 1400 actions per minute on a modern helicopter. Any binding in the flybar will fight the swashplate, causing vibration in the system. Again, a lot of the newer style helicopters have bearings here too, so you can start to see that the latest ball bearing miracles have a higher price tag and higher performance because of their engineering.

Most kits have pitch gages to help you set lift-off pitch. Use these gages; they are accurate and will certainly get you in the ball park for initial trimming. After the pitch is set on each blade, you can check the coning of each blade by measuring from the tail boom up to the trailing edge of each rotor blade. The measurements of "soft" dampered heads should be within 3/8ths to 1/2 inch at most. On more rigid heads, the coning should be within 1/8th inch. Improper coning will easily give you vibration and tracking problems during initial trimming. Make sure these points are correct before you ever go out to fly. After pitch and coning is set, balance the rotor head as stated in the July '82 "Chopper Chatter" for a smooth flight the first time out.

SWASHPLATE AND PUSHRODS

The swashplate must move freely on its uni-ball. Binding within the swashplate will make the head fight the swashplate with resultant vibration. It's kind of like the stiff flybar we looked at earlier, but with the binding now coming from below instead of above.

Break in all stiff ball links so they pivot freely when snapped on the balls. If you have a kit with poor quality ball links, do not hesitate to replace all links with higher quality ones. For many years I used only Kavan links, lately I have been using the heavy duty Rocket City link with the Hirobo ball as provided by Gorhan Model Products. The heavy duty Rocket City links as they come from the factory need the cheap aluminum ball replaced with higher quality ones, at least for helicopter use. The heavy duty Schluter links are also some of the best on the market.

Pushrods should be run as straight as possible and not touch one another or any surrounding surfaces. (Rubbing pushrods is always a great way to make your radio system go bananas. . .) If the control runs are not silky smooth, you will never get crisp flight, and you will



Larry Jolly demonstrates his hovering technique at a recent MACs show in Long Beach, CA.

feel your trim constantly changing. And if you can't really tell the difference between a smooth and stiff linkage, don't worry about it too much because you probably won't notice any trim changing either. You will notice that the helicopter is extremely difficult to fly....

RADIO INSTALLATION

Install all servos with the rubber grommets supplied. The receiver and battery packs should be wrapped with 1/2-inch Sig foam rubber and lightly rubber banded in place for best vibration protection. I've said it before, do not mount the receiver or battery pack with double sticky servo mounting tape to the plywood floor. Yes, it looks nice and is often used in display helicopters because of its neatness, but vibration will go straight from the airframe to the receiver pots and battery leads! I lost one helicopter years ago from this mistake, and would hate to see you repeat it.

Run the receiver antenna directly out the side of the canopy to keep it away from other wiring. Do initial test flights with the antenna dangling; if this gives glitch free performance, then try it with the antenna strung back to one of the tail fins. When the antenna goes back to the tail, it is out of the way and not nearly



Full-size Jet Ranger control yoke for the main rotor. What a mass of metal!

as susceptible to getting stepped on, but again, it may not be as glitch free at the dangling antenna.

One other thing you will want to try to do is mount the switch on the opposite side of the engine exhaust. This will keep the switch contacts free of oil or dirt blown around by the exhaust.

THEORIES OF SETUP

We all know that a beginner's machine will be set up differently than the expert's, but you may ask. "In what ways?" The answer to that question is fairly simple: rotor rpm. But to understand that, I'll regress a minute and explain.

The fixed pitch helicopter has less lattitude for varying rotor rpm than collective ships. This is due to lift being developed directly from varying the rotor rpm, not the angle of attack of the blades as in collective ships. Most fixed pitch helicopters have only the flybar (Hiller system) for cyclic control inputs too, and this slows down control response automatically. So a basic fixed pitch helicopter is limited in performance by its design, which does make it fairly easy to set up and maintain for the novice.

On the other hand, the collective helicopter will usually have the Bell and Hiller control system in its head. Because lift is produced through the angle of attack (bite) of the blades, rotor rpm is much more flexible. About the only exception to this would be the early style SuperMantis kits with poor gearing from engine to main rotor. These kits must be run at one basic rotor rpm for all setups. The Schluter collective ships, the Gorham Competitor, and Kalt helicopters all have very good flexibility in main rotor rpm while still producing excellent flying characteristics.

Which brings me to one last point before getting back to rotor rpm. If you live in an area where there is no one else around who flys helicopters, you had better stick with a Cricket (or similar



Don Langer built and flew this Nosen Cessna 310 as a demo ship for the Jomar Sync System at Ida Grove. Joe Utasi photographed the 310 on final with one engine dead. Don made a long, gentle approach and landed safely.



TYPES OF R/C PILOTS

It's usually comforting to know exactly where you stand in the scheme of things, and how you compare to others. So here, for your edification, is a peerless list of "Types of R/C Pilots" which has been logically and methodically derived by a hard-working computer. Be aware, however, that your failure to squarely "face the facts" will result in an erroneous self-judgment and incorrect placement on the list. This, of course, will be of little value to you. It is absolutely vital that you evaluate yourself *honestly*... even if it hurts. Then, and only then, will you have true peace of mind by eliminating any nagging doubts as to how you really stack up.

Super Pilot:

- Flies through trees with absolute impunity . . . never crashes. Lifts buildings and walks under them. Kicks locomotives off the track.
- Catches bullets in his teeth and eats them.
- Freezes water with a single glance. Is a god.

Instructor Pilot:

Only crashes student's plane. Leaps tall buildings in a single bound. Is more powerful than a locomotive. Is faster than a speeding bullet. Walks on water.

Gives policy to his god.

Above Average Pilot:

Sometimes crashes own plane. Leaps short buildings in a single bound.

- Is more powerful than a switch engine.
- Is just as fast as a speeding bullet. Walks on water if the sea is calm. Talks with his god.

Average Pilot:

- Often takes off with ailerons reversed. Leaps short buildings with a running start.
- Is almost as powerful as a switch engine.
- Is faster than a speeding BB.
- Walks on water in an indoor swimming pool.
- Talks with his god if special request is approved.

Below Average Pilot:

Very frequently crashes on T/O just because...



Here's another Utasi photo, this time of Bob Campbell's B-29. Model has just pulled out of a "hairy" out-of-control dive at Ida Grove Fly-In. It was totalled only moments after this shot was taken.

Barely clears a quonset hut.

Loses tug of war with a locomotive. Can fire a speeding bullet.

Swims well.

- Is occasionally addressed by his god. Fair Pilot:
 - Hardly ever makes a T/O...continually ground loops.
 - Makes high marks on wall when trying to leap buildings.
 - Is run over by locomotive.
 - Can sometimes handle gun without inflicting self-injury.
 - Dog paddles.
 - Talks to animals.

Poor Pilot:

Never makes a T/O... doesn't know how to put fuel in tank.

- Runs into buildings.
- Recognizes locomotives two out of three times.
- Is not issued ammunition.
 - Can stay afloat with life jacket.
- Talks to walls.

P-Poor Pilot:

- Always falls on airplane when unloading in pit area.
- Trips over doorsteps.
- Says, "Look at the choo-choo."
- Wets himself with a water pistol.



From Texas and the IMAA "Renegades" (Chapter 132) comes this Waco ARE built by Charlie Morgan from Dario Brisighella plans. Model has Kioritz 2.4 engine up front.



Being "natural" Texans, the "Buffalo Renegades" do everything in a BIG way . . . like this 1/2-scale Pober Pixie designed and built by Carroll Cheeks. With a gross weight of 49 pounds, and a wing loading in the lower twenties, the plane really "floats" around.

Plays in mud puddles. Mumbles to himself. SKIS: THE QUICK AND EASY WAY

Flying off of snow, like flying off of water, is tops in the sheer fun and enjoyment category. If you live in snow country but haven't ever flown with skis because you're just plain chicken about the cold, I may not be able to get you motivated... but, if lack of suitable skis has been your only excuse, than I gotcha!

Chuck Spencer, an avid flyer and BIG Bird lover who lives in Lansing, Michigan, rarely lets the winter weather keep him from flying . . . especially on those beautifully balmy 30-35 degree days when the snow's got a firm but powderylike surface. Here's how Chuck and the other Lansing CARDS members get skis on their BIG aircraft F-A-S-T.

"Well, what we have been doing the last few years is going to K-Mart, Sears, Wards, or any discount or sporting goods store and buying skis that children use. I think they're made of polypropylene or some such semi-rigid plastic and cost about four to five bucks a pair. They are 22 inches long and four inches wide. A couple of years ago, our local K-Mart was clearing them out at the end of the season. I bought ten pair for a buck a pair.

"Then, what you do is bring 'em home and cut the strap loops off. Make a pylon from basswood a half-inch thick, and line each side of it with K&S .30 aluminum for strength. Make the pylon about an inch higher than half the diameter of the wheels you are using; drill an axle hole, bush it with brass tubing, and hold it on the axle with wheel collars. This maintains the proper height for prop clearance. The pylon should be mounted two thirds of the way back from the front. The skis have plastic stiffening ribs running their full length. The pylons are screwed to the ski using flathead wood screws which you countersink. They are number six or eight screws (about an inch long). Be sure the slot in the screw parallels the ski to prevent drag. Oh yes, I use No. 2 sheet metal screws to hold the aluminum to the pylon.

"Sink small screw eyes about four inches ahead and behind the pylon; use heavy rubber bands to hold the front of the ski, and make a halyard of nylon cord and Du-Bro metal landing gear clips for the rear. Sear the ends of the nylon with a match to prevent unravelling. After the slant of the ski has been set slightly nose up, I use Comet (or similar) blobs of glue on the halyard so it-won't slip."

Chuck included a drawing to supplement his text, and anyone should be able to duplicate a similar pair of skis for his own BIG Bird. Thanks a bunch, Chuck, for getting this info to me during the summer; it'll give almost everyone a chance to build and fly with skis during the major part of the snow season.

Gotta confess that flying with skis always sets off the same fantasy in my mind... I see myself as an Alaskan bush pilot involved with heroic rescues and other derring-do. Guess my years of cropdusting were just not exciting enough. I, of course, have "other" fantasies ... and one buck, American, will get you my best trilogy in a plain brown wrapper.

SLINGS AND THINGS

It seems like most of us are driving VW vans... and the rest are driving vans of other denominations. At least that's the impression I get from the number of guys who've "checked in" regarding my wing slings. The pic of my van in the May issue got a lot of people to 'fess up as to how they were also lazy ... and that these nylon slings were a good quick and dirty solution to the wing transportation problem.

However, a rather large contingent of BIG Bird types yearned for something better than a curved sling for carrying

Continued on page 95



DECEMBER 1983



• The granddaddy of all R/C soaring competitions is, without a doubt, the biennial F3B World Championship. No other contest on the soaring calendar of any country has as much prestige, receives as much attention, or gathers people from as many points on the globe as this one. I might also add that no other contest costs as much to organize, run, or compete in either! But such is the price of greatness.

This year was the fourth time in the history of R/C soaring that there has been a World Championship. The first three were held in South Africa (1977), Belgium (1979), and the United States (1981). This year it was the United Kingdom's turn. Let me say from the outset, they did a fantastic job! Everyone had nothing but praise and compliments for the organizers. The competition ran like clockwork. It was said that the ratio of organizers and helpers to contestants was 1.5 to 1. I believe this was so, and I believe it was one of the reasons why this year's WC ran so well and will be remembered for a long time to come. The standard by which all future WCs will be judged has been set by Great Britain.

The site of the Fourth R/C Soaring World Championships (as it is officially called) was the York Racecourse in the ancient walled city of York. Also known as the Knavesmire, this horse racing track is vast. The track's infield is about a mile long by about a third of a mile wide. Its surface is almost perfectly flat, and consists of closely cropped grass. You couldn't have picked a better site if you tried.

The weather for the six day event was the topic of a great deal of talk. Wind, rain, hail, sunshine, heat and cold were all represented there. One observant fellow commented, "How nice of you (British) to show us all four of your seasons in one day!" He was referring to the second day of the contest, August 2, when out of a sunny, warm mid-day, a curtain of darkness advanced swiftly across the field, totally obscuring everything it engulfed along the way, basically putting the fear of God in the hearts of the observers. Within a period of about two minutes, a full-blown hailstorm was raging across the expanse of the Knavesmire, burying everything under a twoinch blanket of pea-sized frozen rain. As quickly as it came, it passed on, and out

4th R/C SOARING WORLD CHAMPIONSHIPS



The top F3B soaring team for 1983: Federal Republic of Germany. This team took the lead in the first round and never lost it. Left to right: Liese, Quabeck, Decker, and manager Schroeter.

came the sun again. Roger Roth quickly ran over to the backside of the German team's nylon lean-to and scooped up the ice into a Coke-sized pile... he was heard to say, "It's the only way I know to get a cold Coke in this country!"

For most of the contest, however, the weather was simply beautiful ... for England, that is. The wind never really disappeared for very long, and most of the time it blew 10 to 15 mph. The gray overcast that is so often associated with English "sunshine" usually burned off by noontime. T-shirts with jeans or shorts were the chosen garb, with a wind breaker or jacket for when the warm sun ducked behind a cloud.

As I was unable to be at the contest for the first two days due to work schedules at **Model Builder**. I missed the usual "settling down" of the contestants and aircraft. By this I mean the folded wings on tows, the broken fuselages on nervous landings, etc. I was even told that I had missed all the excitement!

One tale of woe that was described to

me concerned a member of the U.S. team, Don Edberg. Apparently, Don's first flight of the contest was the acid test for a possibly metal-fatigued tow hook. Four launches in a row (and four line retrievals in a row) were prematurely terminated by a pop-off. Larry Jolly was running back and forth with the airplane while Collin Dimaio fetched parachutes. After the fourth attempt, Larry ran to the field box and grabbed another tow hook, then ran back and installed it on the Quantum. Little did anyone know, or even suspect, that on the fourth landing (which must have been a little rough with so little working time left), damage had been done to the elevator system

... not major enough to be discovered by preflight control checks, but major enough to fail under a typical F3B zoom launch. Needless to say, the terminal dive from the top of the launch was heart-rending, and the damage done to the *Quantum*, irreparable. As this tragedy occurred at the beginning of a round, and before Don had made lap



Great Britain was a solid, second place team. Team fliers were (left to right) Stuart Blanchard, David Worrall, and Sean Bannister. Nick Neve was the team manager (second from right, standing).



David Worrall had a unique ballast compartment: the wing tips! See text for explanation.



First place airplane was Ralf Decker's. Seen here is his method of installing the servos (all five of them!). Craft had a removable nose cone.



Molded, one-piece fiberglass wings of Ralf Decker's plane featured C/F spars, molded F/G ballast tubes, neat spoiler setup (push rods visible).

one, he received three zeros. By the F3B rules, a contestant may not fly a backup model, or switch models, in the middle of a round....But that's not the end of Don's misfortune.

The second event of Round 2 was equally disastrous for Don. Part-way up the tow, the backup *Quantum* folded a wing. To Don's credit as a pilot, he managed to minimize damage during the crash, and ended up with a badly damaged, but repairable airplane. Two more zeroes were regretably given to Don.

That night, Don and Brian Chan repaired the fuselage and wings. The airplane was no longer pretty, but it was flyable. A spar was spliced into the broken wing, and an aluminum plate was epoxied to the top and bottom of the wing. The repair lasted the rest of the contest.

I was informed, on the night of my arrival in York, that of the U.S. team, Mark Smith was in the lead, with Alex Bower not far behind. Don, of course, wasn't doing very well. I was also told that the Germans had taken a quick lead, and were in the top three places. I was surprised by this, but even more so when I found out that the expected winch race didn't materialize. I was told that the U.S. team had the most powerful winch on the field and that the Australians, with a Lucas M-50 truck starter motor, had the second strongest. Evidently, with the wind blowing as it was, the strong winches couldn't be used to their fullest advantage because of the risk of line breaks, and the weaker winches were competitive by virtue of the wind and the stretch in the monofilament nylon line.

Of the U.S. team, Alex was launching highest. He was out-launching his nearest competitors by 50 feet in the wind, and 100 feet in the calm (which wasn't very often). The slightly lower performance of the *Tai-Tai* was balanced nicely by his higher launches.

Which reminds me, Alex didn't finish his intended F3B model in time for the

York departure, so he flew the same airplane that he flew in the team selection finals in Joliet, Illinois. As a result, he found himself wishing he had finished it. The *Tai-Tai* just has too much wing area for F3B. If you think that the *Tai-Tai*'s polyhedral wing layout was a handicap, you're only partially right. In the air, the *Tai-Tai* was every bit as competitive as the next guy's plane, with the possible exception of speed where Alex had the fastest time of the U.S. team (21.5), but also the slowest (28.0). Alex's big handicap was not in the air, but on the ground

... the Tai-Tai has no glide path control (spoilers, flaps, dive brakes, etc.). This made Alex lose four out of six landings, or roughly 200 points or more per duration event. That's simply too much to give away to your competition.

Mark Smith, on the other hand, DID finish his airplane in time for the York departure ... just before! For most of the year prior to the contest, Mark was working on a variable geometry F3B ship. The wings were going to be made





Alex Bower (upper left) dodges his Tai-Tai outside LZ. Polyhedral ship had no spoilers or flaps and was often difficult to land. The Australian team (above) finished third in team standings. Fliers were (left to right) Dale, O'Reilly, Smith. Brian Alexander represented New Zealand (No. 24). All flew the *Marjali* design. Mark Smith (lower left) finished highest on US team (7th). He flew the *Panic*...'Wake up Larry, it's time to fly!'' Kare Schanche of Norway (lower right) flew the *KITT 193* design, as did the whole Norwegian team. It featured built-up wings F/G fuselage.







Don Edberg, Larry Jolly, and Roger Roth get ready for the "pork pie drop" event.

of carbon and to telescope in and out for variable wingspan. (All by R/C as the rules insist.) Well, it didn't work out, and Mark was left with two weeks in which to start and finish a competitive, worldclass F3B model, which he did... all except that last bit about "competitive" and "world-class."

The Panic, as Mark calls it, has a molded fiberglass fuselage, and balsacovered, foam core wings. Would you believe that Mark made the plug, the two mold halves, and the fiberglass fuselage from that mold in less than 48 hours? Well, if you said no, you lost the bet! The Panic has a Quabeck-like airfoil that Mark designed himself...he calls it



Andy Keil of South Africa flew his *Skybird* well, but had wing joiner failure and radio problems.

the "Mark Y". It soon became known as the "Mark, why?" as it wasn't very good at all.

If it sounds like 1'm picking on poor Mark's Panic, 1 am. However, Mark did quite a bit of picking at it himself! Just ask him.

It has been said that, "If you gave Mark a toilet seat with wings, he would win with it." Well, it almost happened! Mark *did* have a flying toilet seat, and he finished with a VERY respectable seventh place, the highest of the U.S. team. Mark is a dam-good pilot!

The stars of the show were undoubtedly the Germans.

From the beginning, Ralf Decker



Reinhard Liese (FRG) and his *Milan II*. Model had spoilers and flaperons with TX mixing.

grabbed everyone's attention with his blistering speed run. The German technique for going fast in the four-lap run (4 x 150 meters), is to make the first and second turns a split-S maneuver, and finish off with a pylon turn. Ralf used this technique flawlessly and polished off the fastest speed run of the entire sixday contest ... 18.89 seconds! The troops were impressed.

That round, Ralf's team mates showed their stuff by going 21.0 (Reinhard Liese) and 22.1 (Dr. Helmut Quabeck). In that first round, the German team was: Decker (1st), Liese (2nd), and Quabeck

Continued on page 86

r/c soaring

WHAT'S COOKIN' THIS TIME?

I'm glad you asked. This month you and 1 are going to slog through some very technical stuff. With apologies to Model Builder's typesetter and to anyone who feels that technical things are beyond him, I present to you one man's labor of love ... make that two men's labor of love, as I have had to decipher. and fill in the first man's work a little in order to clarify it! That first man is none other than Michael Seelig of the University of Illinois. His labor of love is aerodynamics, with an emphasis on discovering new airfoil sections for us glider types! In the following column L will translate (as best as I can) Michael's knowledge of computing the approximate L/D of a hypothetical "F3B glider" for the purpose of comparing the performance of different airfoils on this same glider. It's all theoretical, admittedly, but it is valuable for comparing the relative performance of these airfoils.

Before we get into the heart of the matter, I will preface this column with some background information. Michael is an aerodynamics student. He has access to a sophisticated computer with a line plotter and a printer. He also has the Eppler computer program at his By BILL FORREY PHOTOS BY THE AUTHOR

disposal, and a vast wealth of aeronautical data as contained in the university's physics libraries (which I'm sure he has only begun to scratch the surface of!) In his correspondence with me he has included such reference sources as: "Experimental Studies of the Eppler 61 Airfoil at Low Reynolds Numbers" (AIAA-82-0345), by Mueller and Burns, University of Notre Dame, Jan. 11-14, 1982; and "NASA CP 2045, Advanced Technology Airfoil Research, Vol. 1", March 7-9, 1978, a report on low speed airfoil design and analysis by Eppler and Sommers. What all this means (1 think) is that we can trust what Michael has to say on the subject, and gain an insight into the more analytical and predictive side of model design. It may not swallow easily, but chew it over several times and perhaps you will better understand it.

As I have said many times in the caption information of the airfoils that I have published in this column, theoretical lift and drag curves don't necessarily agree with experimental data (i.e. wind tunnel data) at low Reynolds numbers (small chords, low speed air flow, and air of low density all contribute to low Reynolds numbers, and typically decreased airfoil performance). At higher Reynolds numbers, the theoretical and experimental data come closer to agreement. Michael's explanation is as follows:

"I analyzed several airfoils using the Eppler program and compared the predictions with the wind tunnel measurements of Dieter Althaus (author of *Profilpolaren fur den Modellflug*) of the University of Stuttgart, Federal Republic of Germany (a.k.a. West Germany), and



Craig Huntziger, Park Rapids, MN, designed and built this 1374 sq. in. wing area R/C sailplane for 2-channel control. Wing loading: 7.5 oz/ sq ft; aspect ratio: 14.4 to 1.

also with the experimental data of D.F. Volkers at Delft University of Technology in the Netherlands (Holland). The Wortman FX62-K-131/17, the Epplers 61, 193, 201, 203, 385, 387, 392, and the Althaus AH79-100B all exhibit the effects of large laminar separation bubbles (see Figure 5) at very low Reynolds numbers (below 100,000 R). (A laminar separation bubble is a small separation of the smooth flow of air over an airfoil's upper or lower surface. It usually reattaches itself to the surface in the form of turbulated, or rough, airflow. wrf) In each case, the profile drag prediction of the program is in poor agreement with the experimental data. This is because the program cannot contribute the additional drag due to the laminar separation bubbles. On the other hand, agreement is 'reasonably good' for the FX60-126, Clark Y, and Goettingen (Goe) 795 because they do not have large laminar separation bubbles.

"Based on these comparisons. I designed several new airfoils applicable to F3B R/C sailplanes using the Eppler program. The emphasis was on low drag in a lift coefficient range from 0.1 to 0.6 at R approximately 600,000 while maintaining respectable lift/drag ratios at high lift coefficients for R approximately 100,000."

Michael continues with some calculations and formulas. I am going to organize his material only *slightly* differently in an attempt to make it easier to follow. First, let's have some definitions of symbols:

V = velocity in feet per second (ft/sec). W = wing loading of plane in pounds per square foot of wing area (lb/ft¹).



Craig will "kit" you a sailplane from your plans. See text for details.



Bill White shows you what a fun little slope ship looks like. The White's Lightnin' has no fancy airfoil, yet it flies super. Is FAST!



 \overline{C} = mean chord of wing in feet (ft). R = Reynolds number (a product of wing chord, air flow velocity, and for our modeling purposes, a constant factor: 6400)

We find the Reynolds number of a given section of wing by using the following formula: R = 6400 (C) (V). The mean chord (C) is the average chord of the section of wing you are looking at. For a constant taper wing, this would be the tip chord plus the root chord divided by two. For a straight (no taper) wing, the mean chord is the same as the root and tip chord. If you have a combination of both, you're better off figuring each one separately. The velocity (V) is determined by multiplying 29 times the square root of the wing loading divided by the coefficient of lift. Let's see what this looks like:

R	=	6400 (C) V(29 W/CI)
R	=	185600 (C) V(W/Ci)
R		(1.856 x 10 ⁵) (C) V(W/C ₁)

In a real life R/C glider (or full-size, for that matter) what happens when we increase the wing's coefficient of lift by pulling back on the stick? Answer: the glider slows down because of the increase in drag caused by the increased C_L . If you keep pulling back on the stick (slowly), the nose will continue rising, the angle of attack of the wing will The graphs below are theoretical L/D polars for three sections. The standard profile polars are in light lines and the Reynolds number corrected polars are in heavy lines. (See text for explanation.) In the examples below, the line marked "1" represents a glider with a wing loading of 1.125 lb/ft^2 (18 oz/ft²). This represents an F3B glider in a speed run. The line marked "2" represents the same glider in the duration event with a wing loading of 0.50 lb/ft² (8 oz/ft²). Both cases have a mean (avg.) chord of 10 inches.



MODEL BUILDER

100,000 200,000 400.000 EPPLER E-193 600,000 BAME MB-253515 S-1144 L/D polars SEELIG S-1120 From time to time we will be featuring the new Seelig airfoils for you to try. New this month are the S-1144 and S-1120. Send Michael Seelig an SASE for coordinates. He would like to know how they work for you. SEELIG S-1144 continue increasing, the Ci will continue

continue increasing, the Ci will continue to go up . . . until . . . STALL!! The glider goes too slowly, the air flow completely separates from the wing and this causes the wing to stop working. Part of what is happening here is that because the glider is slowing down, the Reynolds numbers are decreasing . . . and we all know what affect that has on performance, don't we? (It gets a lot worse.)

What Michael Seelig has done is plot this deteriorating effect of the lift versus drag due to the dropping Reynolds numbers. This is very typical of gliders where the wing loading and mean chord are constant, and there is no outside motivating force (i.e. motor) other than gravity. In his own words:

"The drag at various values of CL can be computed as a function of the Reynolds number (R). (Refer to above equations.) Now, where W (wing loading) and \overline{C} (mean chord) are constant, the Reynolds numbers can be computed at various CL (lift coefficients). The CD (drag coefficient) can be plotted as a function of CL and R. I have done this for the Eppler 193, the Seelig S1120, and the Mike Bame MB-253515. (See Figures 1, 2, and 3.)

"The next step is to guess the drag

coefficient of the fuselage (CDI) which will be a constant and approximately equal to 0.007. "Next, pick an aspect ratio (AR) and

"Next, pick an aspect ratio (AR) and plot its drag.

"Now, for full-size sailplanes, when the profile drag (C_{Dw}) is equal to the induced drag (C_{Di}) plus the fuselage's drag (C_{Di}) at some C_L , that is the maximum L/D. However, commonly, C_{Dw} is everywhere less than $C_{Di} + C_{Di}$, so it (maximum L/D) has to be plotted. The

Continued on page 73



By BOB SLIFF... It's small, it's light, it's fast, and it comes in three versions: 29-inch span, 33-1/2-inch span, and 38-inch span.

• The Fast Eddie is a fine flying electric model intended for experienced R/C pilots. It is a spectacular performer, especially when configured with the Astro 05 Challenger cobalt motor powered by seven 1.2 ah cells.

Larry Jolly piloted a Fast Eddie to an unofficial FAL world speed record of 92.85 mph in level flight over a two-way course (measured, but not professionally surveyed) using the Astro 05 Challenger. So, it is safe to say that if you want a fast electric model, the Fast Eddie is the model for you.

The Fast Eddie can also be set up for aerobatics. If pattern flying is your thing, then the Fast Eddie with Astro 05 Challenger motor and Taipan 7-6 prop will give you an excellent rate of climb. Aerobatic maneuvers are no sweat for this combination.

Don't count the ferrous magnet motors out just yet! The Astro 05 XL and the Leisure LT-50 have very good performance. While you won't have the spectacular rate of climb or speed of the cobalt motors, the Fast Eddie will do most of the aerobatic maneuvers that an aileron and elevator ship can do.

As you can see by the plan, there are three wing size options: a 29-inch span version (217.5 sq. in. wing area); a 33.5inch span version (261.25 sq. in. wing area); and a 37.8-inch span version (283.6 sq. in. wing area). All three versions have been flown and tested. In each case we were very satisfied with the performance. The fastest is, of course, the smallest wing version, but for pylon racing and aerobatics, the larger versions with their lighter wing loadings work best. The larger wings give smoother maneuvers, and lose less speed in tight turns.

In the following instructions, it is assumed that the modeler has precut all shaped parts such as fuselage sides, ribs, fuselage formers, etc. This prefabricaElectric power is provided by any 05 system with six or seven Ni-Cd cells. This model holds an unofficial speed record, too!

tion speeds assembly considerably.

To minimize confusion, keep your place in the instructions by checking off each step as you complete it, using the "()" symbols provided.

FUSELAGE CONSTRUCTION

() Place the fuselage sides on the building surface with the bottoms toward each other. This is to insure you're building a right and left side.

() Glue the 3/16 sq. longerons and the $3/32 \times 3/8$ wing saddle doublers to the fuselage sides. To the extent possible, match the 3/16 sq. longerons so that they are of equal stiffness. This will allow the fuselage sides to bend evenly when the tail and the nose are pulled together.

() Join the two fuselage sides over the plan top view using F2 and F3. Do this by placing the sides vertically over the plan top view, bottom down, and glue F2 and F3 into place at the positions shown. Check the sides for squareness, both vertically and horizontally, and allow the glue to dry. Then, add the 1/8 sq. uprights behind F3.

() Pull the tail together and glue. Do not bevel the 3/16 sq. longerons, as you want an opening at the tail for the elevator pushrod, for cooling air to exit, and for the receiver antenna. Align over the plan top view and allow the glue to dry. () Make the motor tube out of 1/64 plywood. To do this, the plywood is



Electric power VIP's (I to r) Frank Heacox (S.E.A.M. president), Bob Boucher (Astro Flight, Inc.), Larry Jolly (*Electricus, Whistler*), and *FAST EDDIE* designer, Bob Sliff (Hobby Horn).



formed around the particular motor you are going to use. Begin by placing a piece of waxed paper on the motor where the plywood will overlap and glue. Then wrap the 1/64 ply around the motor allowing about a 1-inch overlap. Glue the lap joint with CA (Cyanoacrylate, such as Zap, Jet, or Hot Stuff) glue.

If you are going to use an Astro 05 Challenger Cobalt motor, then clearance notches for the brush holders must be provided for. They can be cut after the tube has been formed provided you are careful in forming the area that sticks out past the front of the motor. Furthermore, you must enlarge the hole in F2 so that the motor may pass through it for installation and removal.

) Enlarge the hole in F1 for the motor tube to pass through. Then, with the motor still in the tube, insert the tube into F1, and install the tube in the fuselage nose by pulling the two fuselage sides into contact with F1 and the front edge of the motor tube. Be sure to check squareness and alignment over the plan top view. Glue with CA glue and hold in position until hardened.

) Install the top and bottom fuselage sheeting, cross-grain.

() Cut the 1/4 sheet so that you have a

Continued on page 77



Top view of FAST EDDIE shows fuselage mods for Astro Challenger 05 installation.



PRODUCT\$ IN U\$E



Photos by Henry McAllister

By DICK MOLONEY... The words "Byron Originals" suggest custom quality and a personal touch. It is nice to know that this is indeed true of this company. If you are looking for a well thought out kit of the French CAP 21 in quarter-scale, with all the trimmings, this is it!

• When I first received the carton from Byron Originals, I couldn't wait to open it. I was very much impressed by the quality of the CAP 21 kit. After being out of R/C for a period of time, all the fire and enthusiasm came back, and I couldn't wait to get started.

Dollar for dollar, I don't think there is a better deal going when you consider that just about everything you need to build the plane is in the box. With the exception of radio, glue, engine, and



CAP 21 test pilot, Don Brown (left) poses with the author, Dick Moloney, after the first few successful test flights. This 1/4-scale airplane flies a lot like the full-size one. It's FUN!

hardware items, pushrods, hinges, and special items like tools, and even Loc-Tite to prevent vibration from loosening threaded assemblies. If you were to add up the cost of these items separately, it would represent a considerable portion of the price of the kit, not to mention the many trips to the hobby shop to purchase these items (which you seem to realize you need, five minutes after the

finishing materials, included in the kit

are all the things you need like wheels,



Quadra engine has Dario Brisighella flywheel (front) and home brew vibration balancer.

hobby shop closes for the day). CONSTRUCTION NOTES

Construction went very well, the fit of all parts was very good, and using the instruction manual made it very easy to construct the model. Included in the manual are pictures which illustrate the steps that are not easy to describe in words. Packed in the box is a piece of foam rubber which can be put down on the workbench to prevent things like drops of glue, scraps of wood, etc., from making small dents in the foam parts while you are working on them. The further I got into the construction of the Byron CAP 21, the more impressed I was with the fit of the parts. The cockpit and canopy assembly went together so well, that it is obvious Byron Originals has a mold maker who really knows what he is doing. Having made most of the molds



Three-quarter rear view of the Byron CAP 21 shows the markings of the plane flown by Eric Muller and Louis Pena. Note instrument panel.

for the DEE-BEE line of ARF models back in the late 60's, I can appreciate the difficulties in making parts fit properly.

At the time I was putting the canopy together, I could not find a pilot that suited me, too big, too small, too heavy . so I didn't put one in. Now I wish I had because the plane looks great sitting on the ground, but with the large size of this model, it looks strange on a low flyby to see an empty cockpit. Maybe Byron Originals could turn their expert mold maker loose making either a vacuum formed or molded styrofoam pilot. After the model was completed, I found out about a scale pilot made by DGA Designs (135 E. Main St., Phelps, NY 14532). This pilot is available in two-inch scale, 1/4-scale, 1/3-scale, and either military or civilian versions. The civilian version is made complete with suede jacket, visor cap, and sunglasses. The realism of this pilot is spooky!

The fiberglass cowling and wheel pants were very well made and fit perfectly. When I assembled the pants to the aluminum landing gear, I added two 6-32 x 3/8 soft steel screws drilled through the aluminum gear and tapped into the aluminum reinforcement piece inside the pants to prevent the assembly from rotating out of alignment.

RADIO INSTALLATION

For greater peace of mind, I felt that I would like to have two servos each on elevator and aileron. I also added one extra servo for choke and engine shutoff. I added shut-off because this airplane is being used as a test bed for an engine-driven vibration balancer, and I wanted to be able to shut off the engine in mid-air if it became necessary. SIDE PROJECT

I first saw the design of an enginedriven vibration balancer at a DC-R/C symposium back in 1967 and wanted to build one then, but I never quite got to it.

After a four-year layoff from R/C, I became interested in 1/4-scale, and in reading many articles to accumulate information, there seemed to be alot of concern regarding the effects of vibration on airframes and radios. I dug out my copy of the symposium paper and built one to bolt on the rear of a Quadra engine. Being a machinist, and having

my own machine shop, made this possible. The engine with balancer has been run extensively on a test stand and in the Byron CAP 21, the reduction in vibration is dramatic.

You may notice in the photos that the engine is fitted with a Dario Brisighella flywheel which in itself produces a big improvement in vibration and was used so that a comparison could be made.

Continued on page 90



This quartering front view shows the clean, simple lines of the CAP 21. The high quality of Byron's mold work is very evident.



Ace R/C's new Offset Antenna Mount.

CIRRUS SUPER SPORT IV

I received a letter from "over there", from Walmir T. deMorales, who is touring Europe with the U.S. Army. He writes:

"I need help to find a crystal for my R/C receiver, a Cirrus Super Sport IV. Normally, the crystal is no problem to find, but that particular crystal, 73.415, I could not find. The set operates on 72.960, 73.415 for the receiver.

"I sent my set to Hobby Shack, they returned it to me and I was informed that the manufacturer of the radio does not exist anymore. Thanks for your attention and consideration."

Well Walmir, as near as I can determine, your system was maded for Hobby Shack by the now non-existant EK Company. The remaining assets of that company are now part of Full Command Systems, 908 E. Rosewood, Spokane, WA 99207, who is presently advertising: "All service and parts available for past manufactured EK and Logictrol radios including Logictrol manufactured Cirrus, Tower, and Hobby Lobby radios." I was also able to determine that your receiver uses a fifth overtone crystal, which I confirmed is available from Authorized Radio Control Service, 941 N. Main St., Orange, CA 92267. The price is \$11, plus \$2 for postage and handling.

My Ace R/C catalog also lists a 72.960 fifth overtone receiver crystal, No. XT415, at \$9.60, plus \$1 for handling. I would also include 40¢ for postage; it shouldn't cost any more than that for a jiffy-bag to your APO address.

This is as good a time as any to talk briefly about crystals. Inside that neat metal package is a small piece of quartz, which when excited by a electric current, will oscillate at a frequency determined by, amongst other things, its thickness. The thicker the quartz, the lower the frequency. In high vibration environments such as ours, the thicker crystals are preferred and used due to their physical ruggedness, the basic frequency is then multiplied with external circuitry to arrive at the desired operating frequency. The multiplication factor is referred to as "overtones." In Walmir's receiver, the crystal is cut to one fifth the operating frequency, plus, of course, the 455 KHz intermediate frequency.

The latter 455 KHz is added to or subtracted from the multiplied crystal frequency to arrive at the true operating frequency. There is no set rule as to whether it is best to mix under or above, except that in known cases of nearby operation, such as in R/C, it is sometimes best to go in a certain direction to reduce co-channel interference. This possible interference is affected by so



Transmitter and receiver charger for portable use, by McDaniel R/C. Cigarette lighter plug.



Don Gravelle's audible battery checker, designed to provide an audio signal when the receiver battery drops to a preset value. Those preferring a visual warning could replace the buzzer with an LED and current limiting resistor. (Resistors are 1/4-W.)



The Porter and Kraft Systems shielded servo extensions are different in that the former uses two inner conductors with the shield providing the third conductor. The Kraft extension uses three conductors, with the shield connected to the negative lead near the Rx.

Continued on page 68


THE FAST LANE

What does that mean to you? Something? Nothing? To a fair number of people it means some sort of razz-matazz. Here in Southern California, individuals often use the expression, "Life in the fast lane." That can mean a lot of things ... depending upon who's talking. On a freeway it's the far left lane. At a "crazies" get-together it could mean a drug smorgasbord. In a church, it might mean a confessional...

Obviously, there are many possibilities. Some others are making model airplanes, boats, cars, baby carriages, or what have you, go fast! There we go, guys. The fast lane in our vernacular generally means: the best; the winner; a real smoker; a modeler's modeler; or ... that so-and-so who lucked-out and beat me by a whisker.

OK, do you want some tips on how to alienate the other guys by winning? Of course you do. Well, I'm going to tell you how to do it with one simple word: CHEAT! Naturally, if you're caught, you'll be *personna-non-grata* everywhere . . . not just in the ladies' "John." So, let's rule that out on both moral and practical grounds.

What's left? Quite simple, some effort or work. If you want to be competitive, even at casual club contests, here are a few tips.

PROP

Begin by observing what props the other guys are using. That cliche about, "It's what up front that counts," is all too true. Look closely. Chances are that they are not stock. Here now, right here and now, let me caution you. If you modify a manufacturer's prop, you have begun a whole new ball game. Legally, you could be solely responsible for any injuries or damages due to prop failure. Regardless, modelers often modify props especially for major competitions in racing and speed events.

A good prop carver could have a significant advantage. As a counter measure, many clubs have strictly enforced stock prop rules. Some of them have even gone to the point of issuing flyers a propeller just prior to his time to fly! There are pros and cons to stock and modified prop rules, but whatever rule you fly under, you might try this.

Sidle up to the "hot shot." Offer him a cold one. Play the dumb role. Flatter the so-and-so. Sooner or later he'll cut loose with some worthwhile information. Check it with some others... casually of course. There's no sense in plowing new ground if it's really unnecessary. All of

this gamesmanship will get you into the "ball park," so to speak. From there on, your success will probably depend upon your tenacity.

GLOW PLUGS

For no particular reason, I've put these next on the winner's check-off list. The right plug will depend upon your fuel and compression ratio as well as atmospheric conditions. Some observing can help here, but most likely you'll have to experiment on your own. At this point, let me note that not many modelers are inclined to conduct two or three dozen tests on a given afternoon. Frankly, it's somewhat of a pain, but it does provide meaningful information. Simply put, try different combinations of plugs, props, and fuel. Use a very accurate tachometer (one which reads in 100 rpm increments) record your observations.

There is no single glow plug on the market that is best for every engine under all conditions. However, as a very general rule, colder plugs (usually higher voltage range) are better with high nitro contest fuels. A noteable exception is a 1/2A engine which will be discussed later. With that in mind, the data in Table 1 should be helpful in shopping around for a better plug. Note: The voltage data, nitro range, idle information, and quoted comments were provided by the manufacturers. Both are medium heat range . . . about 1.5 volts. Neither one is available with an R/C idle bar. The third 1/2A head is called the Glo Bee 5P sport. It is also in the medium heat range. It is a very high compression head that was intended for use with very low nitro fuels. Some flyers use them with high nitro. If you try one with ample nitro, it might be wise to use three or four copper head gaskets. Otherwise detonation is very probable. **FUEL**

Many of the above comments apply in a similar manner to fuel. At this point, let me note, for example, that all 30% nitro content fuels are not equal. The lubricant does have a significant effect upon performance. In this regard, I am not merely referring to rpm alone. Needling and glow plug life are affected to a considerable degree by the lubricant.

What's best? Again, it depends upon your particular event. However, for racing, Klotz KL 1000 and UCON 625 are two excellent lubricants to try. The local hot rod shop should have both of them. If you don't have time to get involved in extensive mixing and testing, my suggestion is that you stick to name brand fuels. Products from a local home-brew fuel merchant may be good, or they may not. Well-known national brands may cost a little more, but they have withstood the test of many years of satisfactory usage.

Here's some information about the contents of a few well-known fuels:

FUEL	NITRO	LUBRICANT
Cox Glow Power	10%	Approx. 20%
Cox Flight Power	15%	Approx. 20%
Cox Racing	30%	Approx. 20%
Note: Cox uses pure	Baker AA	castor oil as a
lubricant. Cox also reco	ommends	that Cox Glow
Power be used in their o	ars.	
Fox Superfuel	5%	28%
Fox Duke's Fuel	10%	22%
Fox Missile Mist	25%	22%
F 10.10		

I UA IVIIS	111C 141121	6370	44.10	
Fox 40-4	0	40%	20%	
Note:	Fox lubricant	consists of	90%	casto
1.400	-1 -1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	18		1.1

NITRO

RANGE

and 10% synthetic. Missile Mist uses a combination of nitromethane and nitroethane. All Fox fuels also

IDLE

Excellent

TABLE 1

VOLTAGEPLUGRANGEFox Regular, short or long.9 to 1.2Fox R/C, short or long.9 to 1.2Fox 2.0 volt series, short or long1.0 to 2.0Fox 2.0 volt R/C series, short or long1.0 to 2.0

"Fox plugs are designed to be less critical so that they will work well under most conditions."

GloBee Racing GB-1, short or long	1.8 to 2.0	30% to 60%	Fair to poor
GloBee R/C GB-2, short or long	1.25 to 2.0	5% to 30%	Excellent
GloBee Sport, GB-3, short or long	1.25 to 1.5	5% to 30%	Good
GloBee Racing ² , GB-4, short or long	1.8 to 2.0	50% to 80%	Poor
K&B, short or long	1.25 to 2.0		
K&B R/C, short or long	1.0 to 1.5		Excellent

"K&B plugs are equipped with a newly developed platinum alloy wire element, making the coil element superior to the coil being used in any other plug... will withstand the terrific heat of the hottest fuels."

With respect to 1/2A engines, there currently are only three glowheads available. Two are manufactured by Cox: the low compression No. 325 and the high compression No. 1702. The former is supplied with Cox reed valve engines, and the latter with the Tee Dee.

have	propylene	oxide	as -	an	igniter.	
K&B	100				5%	Castor
K&B	100+				5%	X2C synthetic
K&B	500				15%	X2C synthetic
K&B	1000				25%	Castor
K&B	1000+				25%	X2C synthetic

Continued on page 74

oil



 This month we will discuss the flying tests we have done using the new O.S. 1.2 four-cycle engine.

For those of you who are familiar with what we are doing, we have been working on possible model and engine combinations for the new Master Class "Turnaround" Pattern. The O.S. fourcycle engine is the latest engine tested and is the first four-cycle model engine we have owned.

In past (way past) years we played with big four-cycle engines such as "full race" flathead Fords, warmed-up Corvette V8s, supercharged Oldsmobile V8s, TR-3 A and B engines etc., etc. So the four-stroke engine is not a complete mystery to us. It's rather like completing the circle in our engine involvements.

The picture at the top of the page

tuned exhaust system. It weighs 10-1/2 deliver as advertised. lbs. The other model has the O.S. fourcycle engine and weighs 9-1/2 lbs.

For testing purposes we tried three different size propellers. These were all Zinger models because the are widely available and can be purchased in high pitch combinations. The sizes used were 14-8, 15-8, and 15-10. All props were balanced, trimmed, and thinned. Do not try this unless you understand thoroughly the procedures used to keep the prop stiff and strong.

The first tests were simply on-ground rpm checks. The gearbox engine turned the 14-8 at 10,000 and 1.2 four-cycle turned the same prop at 9500. The 15-8 prop and the 15-10 prop ran at very nearly the same rpm on either engine: 8000 with the 15-8 and 7000 (plus) with 15-10. Flying told a different story.

I guess some of you wonder why the gearbox doesn't swing the props tested at much higher speeds than the fourcycle if it has more horsepower. Well, it does swing the smaller props faster, but the horsepower requirements for increasing propeller speeds goes up at a non-linear rate. What I mean is that if an engine must put out one horsepower to turn a propeller 1000 rpm, it will not follow that 10 horsepower turns the propeller 10,000 rpm. Also, the low rpm torque of the four-cycle engine is much better than the two-cycle engine. The net effect is that in the rpm range we were using, the results were similar.

The most significant part of the test was the "human" reaction of other modelers to the models. If the sound of screaming power appealed to someone,



shows the engine mounted inverted. This was done with some skepticism as we felt that possible flooding could result. Actually, we found that we could start and run the engines successfully in this position, but the idle was not dependable, and frankly, starting procedures were awkward at best.

Turning the engine on its side (see photo) with the exhaust stack down is really the best mounting arrangement. The engine will dump any excess fuel out the exhaust valve because it is on the lower side of the head. Also, the carburetor feeds slightly uphill which prevents puddles forming in the intake system. Finally, the glow plug is very accessible which makes quick starting a snap.

The third photo shows both test planes. The C.A.P. in the foreground has the O.S. VF A-1 two-cycle engine and a

The four-cycle engine pulled the larger props more easily in the air. I had been flying the four-cycle with the 15-10 and was pleased with the performance. As we continued comparison tests using first one plane, then flying them together, it became apparent that the 14inch props were producing the best overall results. The most noticable difference was in climbout on takeoff. When we tried comparison speed runs using the 14-8 props, it appeared that the models were fairly evenly matched. The real difference was in vertical performance. The gearbox had the edge, BUT the four-cycle was able to do all the maneuvers. The gearbox simply has more horsepower in reserve. This is not surprising as the VF 60 is very strong and can exceed two horsepower without much trouble. The 1.2 four-cycle is rated at about 1.25 horsepower and seems to



The author used two CAP 21s as test beds for the comparison of the new O.S. 1.2 4-cycle engine and O.S. VF A-1 2-cycle. Above: 1.2 engine mounted inverted. Below: 1.2 engine mounted horizontally.



then the two-cycle gearbox engine was that person's favorite. However, if a more "realistic" sound was preferred, than the modeler invariably showed more interest in the four-cycle engine. I'll let you guess which sound was the most popular.

During the testing, we noted some features of the four-stroker that we liked and a few that we didn't like. On the positive side, we liked the adjustable throttle arm and simple choke setup. On the negative side, we thought that the exhaust pipe and pressure tap chamber could have been engineered better. This is because the exhaust pipe is held in place by tightening a packing nut against the flanged end of the pipe which in turn tightens against a soft aluminum exhaust gasket. The engine's vibrations

Continued on page 92

• Every year that goes by this columnist faithfully covers the SAM Champion-

By JOHN POND

ships. Every year he says, "How can it continue to get better??" With the very professional attitude of each contest manager, this is no problem, a tremendous amount of background is available to each succeeding manager.

This year's contest manager, Jim Thomas, an executive banker, really organized the champs well and showed the boys how to get a town ready to receive the onslaught of 150 contestants plus families plus interested parties. According to the Texas boys, although all motels were long sold out before the meet, the accommodations at the Otero Junior College were nothing short of outstanding.

The town of La Junta in Colorado was well briefed on what to expect from model builders. "Welcome SAM" signs were to be found everywhere. The restaurants went all out to accommodate the week-long requirements of food. In most cases, food was excellent (depending on where you went).

To get things in proper perspective, we might as well start on Monday, August 18, with the Model Engine Collectors Assn. Grand Collectogether at the Otero Junior College. As this has been held in conjunction with the SAM Champs for many years now, these "Grande" meetings have constantly improved, right in keeping with the SAM Champs. Besides trading, selling, and general all-around "bull sessions, there were some interesting tests of engines being run outside of the Otero College dormitory. The best running engine on the blocks was John Morrill's new "Hornet" as developed from the Lindberg Hornet detailed in 1940 Popular Aviation issues. No question about it, this .19 cubic inch motor ran with authority, turning propellers at 10,000 rpm, a decidedly healthy sound!

As usual, prizes were given out for the best display. Perhaps the most interesting exhibit was the McCoy engine series arrangement by Tim Dannels complete with video display. All one had to do was to push the button number corresponding to the particular McCoy, and immediately a complete specification and writeup appeared on the screen. This display showed a lot of imagination and hard work! It's truly a shame this columnist didn't get the names of the winners and their respective exhibits.

This columnist observed a considerable amount of interest at various tables, but thought trading and selling was down. Don't know whether it was a case of "short arms and deep pockets," or if Our intrepid SAM Speaks editor, Jim Adams, triumphed again with his Earl Stahl Fokker D8. Model flies great on diesel power.

PLUG SPARKS

AT THE SAM CHAMPS



Bill Booth represented Fresno, California, at the SAM Champs flying this *So Long*. Model is powered with O.S. 15 that has been converted to ignition.



TOUE MODELS

THE SOCIETY O









Above: Real nostalgia! Winner of the Skelley Oil Co. event, a Jimmy Allen *Bluebird* as faithfully reproduced by Larrie Schaeffer.

Left: John Pond scaled up this Comet *Clipper* to a large, ten-foot span model, same as a *Valkyrie*. It is powered by an O.S. 60 fourcycle engine, and weighs 6-3/4 lbs, total! It's a real floater!

Right: One of the most successful designs by the Scientific Model Airplane Co. was this *Oriole*. Earl Hipp, of North Platte, Nebraska, holds the model.

Below: Every so often someone builds the Maurice Schoenbrun *Gladiator*. This one, powered by an Ohlsson 60, was built and flown by Lawrence Nigh.



the engine cost has gotten to the point where trading is the only way one is going to get one of the high priced engines. The writer does not condemn this as it is strictly a result of "supply and demand." With over 1000 collectors, and in many cases only several hundred of any particular engine manufactured, the demand can easily outstrip the supply!

However, for the flyer who is caught in the middle of the engine shortage, help is in sight! Two more companies have announced the manufacture of engines, the Orwick 64 as marketed by Joe Klause at the recent L.A. Colectogether, and the Super Cyclone (see ad,



this issue) recently shown at the MAC trade show. Here is what the situation looks like now:

INGINE	MANUFACTURER	STATUS
Drwick 64		
Klause a	nd McCollum In p	roduction
Super Cyc	lone	
Super C	yclone Co J	Available an. 1, 1984
Hornet 19		
Morrill	MotorsIn p	roduction
Simplex 2	5	
Morrill	MotorsTempora	rily out of
		stock
Ohlsson C	iold Seal	

Wahl Motors In production

Brown Jr.

Wahi	Motors	. Temporarily	suspended
Hurlem	an engines		
M/abl	Motors	Tomporarily	hobdoor

running of the second sec
Megow 19
Spielmaker Motors Available
Jan. 1, 1984
McCoy 29
S & A Temporarily suspended
Forster 29 & 35
REMCO In production
Forster 99
REMCO Production problems
Deezil A
Burford (Australia) Available
Mechanair Jan. 1, 1984
Post Stringlos Immediate delivery
bert Striegier Immediate delivery



Class A-B size *Cloud Snooper* designed and flown by Ed Konefes. Bob Larsh has plans. Model is powered by an Ohlsson 19.



Larrie Schaeffer tried this Lanzo Puss Moth for the Rubber Powered Flying Scale event at the La Junta SAM Champs.



Woody Bartlet, past SAM president, always makes an appearance at the SAM Champs. Here he is launching a beautiful O&R 33 powered *Zipper*. Asphalt launching pads were provided by the organizers.



As no scaling is allowed in Free Flight O/T, Jim Ramsey flew this standard size *Gas Bird*. Ramsey uses an Arden 19 in this one . . . compare with original using a Dennymite 56!



No SAM Champs would be complete unless Ken Hinton of England showed up. This time he brought with him a Scotty Murray *Topper* powered by a Mills 1.3 diesel.



Fred Emmert, Belmont, California, has had this Forster 99 powered Anderson Pylon for a long time. It flies better every year! Model is lightweight and very clean.

Baby Cyclone

Carlson Replicas Only 50 to be mfd.

In addition, there are numerous companies and/or people involved in the conversion of modern engines from glow to ignition operation, restoration of old engines, and manufacture of parts for old engines. A short list follows:

77 Products (Otto Bernhardt)

Chandler Engineering

Les Payne (associated with REMCO) Roger Mason

Best way to get addresses is to read Model Builder, SAM Speaks, "MECA Swap Sheet," MECA Bulletin, or the Model Engine Collectors Journal. If we have overlooked anyone, it wasn't



E-gads! It's a *Tsetse Fly1* Charles Grant 1938 *M.A.N.* plan built by Art Watkins.

intentional and we would be glad to publish your name as a source.

ANNUAL SAM CHAMPS BEAN FEED

Seems like time flies when you are having fun, and the MECA Collectogether no sooner started to wind down, than the annual SAM "Bean Feed" started up at the Catholic Community House at 6:30 p.m. Contest Manager Jim Thomas did an outstanding job of arranging catered food for 200 people (mostly reserved in advance).





Mitch Post tunes up an Arden 19 powered *Snuffy VI*. Model is a Bob Toft design.



Marion Knight, Houston, Texas, flies a good looking Simmons Gas Champ (Class C glow event) in practically every contest.



A little-known Maurice Schoenbrun design is this *Theo-Radical*, flown by Lawrence Nigh. Model is powered by Madewell 49.

Imagine the surprise when the engine collectors arrived in force and just about doubled the demand for food. Thomas was equal to the situation; stalled a little while additional food was prepared, and most important of all, made sure the huge drums of Coors beer were kept flowing at all times. Turned out to be a real success! (At least the beer portion was from this writer's viewpoint.)

As usual, there was the annual renewal of friendships, the camaraderie around the tables, and the general atmosphere of cordiality everywhere. This is what SAM is all about ... FUN!! Late announcements were made regarding flight limits, motor runs, and other restrictions. Those who did not attend the Bean Feed or hear about the field rules felt that some of the standard SAM flying rules had been usurped on the field. Closer examination of the problem reveals that as early as February, notice was given that some changes were inevitable because of the large amount of entries. Be that as it may, everyone still had fun!

For a change of pace, this column is going to revert to the old system of just publishing pictures with no accompanying text. In the case of the SAM Champs, no introductions are deemed necessary as most of the contestants are wellknown. Besides, there is enough in the text for the reader to familiarize himself.

We are greatly indebted to Harold Johnson of Minneapolis, Minnesota, for the excellent photos taken of the free flight action. Taking pictures is almost a full-time job, and Johnson should be commended for his efforts. Other photos of the R/C Assist portion are by "Bo" Buice of SAM 29 and the columnist. So we have more than plenty for the reader to enjoy.

Weatherwise, it was just plain hot! As Jim Lobb reported in his article in the "Planesman", "Tell you fellow, the SAM Champs at La Junta was one real tough endurance test! The guys who flew and placed under the flying conditions that prevailed during the contest were topnotch! Much will be said and remembered about the temperature, the wind, and the flying field." Couldn't have said



The Texas "Planesmen" did very well in the SAM Champs. Here is the hardware that they took home!

it better myself!

Before we get to talking about the contest proper, this is the time to insert the popular "Engine of the Month" section. I'll bet not too many of you fellows have seen the actual engine presented this month.

ENGINE OF THE MONTH

This month, we are indebted to Karl Spielmaker, known variously as "Bearing Von Spielmaker," "Krazy Karl," etc., for his use of a rather little-known engine produced by Robert Steele directly after World War II.

Model gas competitors first became aware of Steele through the D & S (Delong and Steele) engines that were carefully parceled out to the hot pilots inthe hope that their models would win.



Fun in the Otero Junior College dorm. Jim Lobb lights the cigar for "surgeon" Dick Huang (gotta keep things sanitary!) as he operates on injured *Cumulus* bird. Joe Percy says, "What!"



The SAM 30 boys did rather well, too. Here they pose behind the hardware that they won at the SAM Champs.



How about the most popular rubber powered kit of them all? The Cornet Sparky as built by Ernest Linn. (Lidgard designed model.)



The R/C desk people (all hard workers) give us a big smile in spite of the very hot weather. Left to right: Evelyn Woodman, Dorothy Granieri, and President Mike Granieri.

If you come from Canada, why not fly a Canadian O/T design? Peter Mann shows us the Easybuilt 1936 *Rainbow*. Neat flier!



All the way from Washington, D.C., Jim Coffin came to La Junta, Colorado, to fly this Super Cyke powered, Ray Heit Scram.

The year 1940 was a good one for D & S, but the oncoming war negated any favorable publicity. The War Procuration Board would not authorize the use of metals for the production of model engines during this period.



Don Bekins scaled up this Gas Bird two times the original size and came up with a winning Texaco model. O.S. .60 4-cycle.



The Eagle Wing Model Aircraft company produced this all-molded balsa kit of the *Pacific Coaster* in the late 40s. See text.

DECEMBER 1983

During this time, Delong and Steele were the driving force behind the design of the Cannon engines. The side draft intake was reportedly Steele's idea as he did continue this feature in some of his postwar designs. Of course, we are referring to the early sandcast versions of the Cannon engines. With the war drawing to a close, Joe Delong and Bob Steele went their separate ways.

As most engine collectors are aware, Delong produced an entirely different engine utilizing a rear rotor intake. Steele continued with the proven formula as can be seen in this month's subject, the R "B" Special.

This engine, first advertised in the 1946

Model Craftsman, was a product of Steele Machine Co., 10529 Aspinwall Avenue, Cleveland, Ohio. This ball bearing engine was priced at \$32.50 less coil and condenser, a rather high price for a Class B engine.

With their "exclusive timer" on the back side of the crankcase, the advertisements at that time would brag, "Mr. Dealer, give the boys the best." Another slogan noted in the ads was, "It's always in the money." No question about it, the R.B. engine was a good runner, but as pointed out in previous issues, because the timer was located in the rear of the engine, modelers looked upon this as a

Continued on page 62





"It frew rong befaw the Light Blothuhs!"



attache case for John Wayne.

I had also ordered a duplicate made of the perpetual trophy awarded annually at our SAM Champs and contacted Don Burnham, getting his permission to call it "The Burnham-Sheelds Trophy." That does sound quite British, what? Needless to say, David and his hearty band were delighted. Saturday. August 25, 1979, off we drove to Barkston Heath for the opening of the British Nats.

By now, you're probably wondering what all this narration has to do with an

done vast research on aircraft design from his native land. The model, called "Karasu" (the "Crow"), was first flown in — ARE YOU READY FOR THIS? — 1891. Yes, a Karasu was first successfully flown a distance of 33 feet at the Marugame Parade Grounds, Japan, on April 29, 1891.

The original craft was designed, built, and flown by Chuhachi Ninomiya, who was born in 1866 and died in 1936. Dr. Ono re-designed this ancient craft and flew the model pictured, at Old Warden, Bedfordshire, on July 16, 1978.

Many variations of the KARASU had been flown in Japan previous to the Old Warden Exhibition. Members of the Kyoto Free Flight Club with winning Crows included Mr. Imaru, who did 276

By DANNY SHEELDS . . . So you think you have an old Old Timer, huh? Well, here's one that dates back to 1891 . . . yes, that's 1-8-9-1, my friends!

I was privileged to meet and become friends with a wonderful band of "invaders" from England in 1978 at the SAM CHAMPS in New Jersey ... the Coyle Field Drop Zone to be precise. This scurvy band of knaves, brigands, and pussycats from across the pond endeared themselves to one and all with their warmth and joviality.

One of the events that they seemed to enjoy most was the twin pusher mass launch, which I sponsor. The winner (last one down) receives a plaque to keep and a giant economy-sized perpetual trophy to hold for a year. Two horses rumps decorate the top of the trophy to symbolize "twin pushers." Get it?

Oh well, sometime in early 1979, I received a note from Dave Baker, the self-appointed, but duly-annointed leader of this Rogue's group, stating that SAME (that's SAM of England) would like my permission to stage an "A-frame" mass launch event at their British Nats, I then called Dave on the phone (even with my voice, a phone was needed!) and told him that my permission was not needed to run the event, and that I was delighted by their enthusiasm for this most basic type of antique model airplane. I also offered to send over my Donald Burnham twin pusher to be flown by proxy.

Dave loved it!

After two weeks of musing, persuing, and conjugation, I called Dave again, and he was beginning to think I owned phone company stock. I asked him what he thought of *me bringing* my TP over, instead of sending it. . .? I'll never forget his answer!

"Mahvelous Danny ... just mahvelous! They've never seen anyone like you, here in England!"

I left Dulles Airport in Washington on Wednesday, August 22, 1979, carrying my Burnham twin pusher and a Harry Edsel single pusher stuffed into an ornate, decal-covered box with a brass handle. Large, but thin, it looked like an ancient Japanese model airplane, right? Well, I always start by disgressing, and then lead up to the B.C. — Basic Crux!

On Sunday night, inside one of the huge R.A.F. hangers at Cranwell, while watching Mark Hinton fly his championship indoor Santos Dumont 14 bis, Dave Baker spoke of a friend he'd made. The gentlemen he referred to was a sociology professor from Japan, now teaching in London. The good doctor was a model plane builder and enthusiast, and had seconds in 1977, Mr. Iwamura, who won the prestigious Ninomiya Prize in 1961 with on an O.O.S. flight, and Mr. Hakuno who did an impressive 237 seconds with his version.

Some history, huh?.. and we thought that we started it all ... or was it the Russians???

Well, I was fascinated by Dave's story and said I'd like to see the drawings of

Continued on page 81



"Oh my gosh, it'll never fly!" ... "This is a joke, right?"





Left:Bill Osborne's U-60 Miss Thriftway took Best Boat honors at the 1983 Northwest Model Exposition. The scale detailing on this boat was fantastic: nail holes, rivets, etc. It even had its own scale trailer!



Above: The driver's compartment of the *Miss Thriftway* was also very detailed. It featured a complete instrument panel and scale steering wheel. The engine compartment featured a realistic V-12 engine.

R/C POWER BOATS

"DEAR SANTA,"

It's getting towards that time of year when one might be giving some consideration to appropriate items to request of the rotund fellow in the white beard and red suit. Of course, I believe in Santa Claus, don't you? How could I not believe? After all, I'm the one who has Barbie's friend, Ken, dressed in a life jacket and helmet in the driver's compartment of my 7.5 tunnel. Personally, 1 like to request tools for possible gifts during the holiday season. It's pretty difficult to get the wrong size, color, or pattern when you ask for a tool. Usually you don't have to wait in line the day after Christmas to exchange a tool. Another nice thing about tools is that they can be used on those other gifts that have the following message (or warning) on the package, "Little or no assembly required." I know Christmas is going to be a happy day if none of those packages are unwrapped.

For the serious modeler, tools are

vitally important to the pursuit of building models. There are many tools that I employ during my model boating activities. I'm going to take a little space here and discuss three that I've found to be extremely helpful during the construction of both model boats and model aircraft.

The first major investment I made in a hobby tool was the purchase of a Moto-Shop from Dremel Manufacturing. With all the attachments, this could be all the tools many hobbists will ever need. I do a considerable amount of construction of original design boats employing plywood construction. The Moto-Shop has become indispensible for this type of model boat construction. My Moto-Shop is used exclusively for cutting parts. For cutting, I have found the wide blade to work much better than the thin blade. Both Sears' and J.C. Penney's catalogs have this Moto-Shop with their name on it.

Another tool that I have used for many

years is a hand held, high speed grinder. There are a number of firms that offer this type of tool ... Dremel and Black and Decker to name just a couple. The two bits I use most with my hand grinder are the steel circular saw and the barrel sander. Last Christmas, my wife gave me the J.C. Penney variable speed hand grinder because my old Dremel was getting rather tired. I'll have to confess that I've never even used any speed other than fast for model construction purposes. One of these days I'll have to try cutting or sanding at a slower rate. 1 find that the circular saw on my hand grinder is extremely helpful for a variety of cutting and shaping needs. The hand grinder is definitely a handy tool to have available for model building activities.

The last tool that I'm going to recommend is one that is dual purpose. This tool is "The Finishing Machine" from Black and Decker. It has a grinding wheel on one side, and a six-inch sanding disk on the other side. The sanding



Howard Price's Sport 40 Vernors engine cowl detail. Even the obvious details should be given careful attention.



Howard Price entered this Miss Lynnwood Equipment hydro in the scale competition. Note the excellent detailing on the dummy engine.





Here is a good example of one of the better driver's compartments found on an unidentified R/C Unlimited.

Howard Price entered this beautifully detailed Vernors in Sport 40. Cockpit detailing like this wins points in scale judging.

disk has a platform to assist in holding the material to be sanded. The sanding disk has proven to be more than adequate for all the sanding and shaping needs I've had. The grinding wheel is sufficient for most model boating grinding requirements, but it is not a heavy duty grinder. However, it has proven itself useful for sharpening turnfins, rudders, and struts. If there is a drawback to the disk sander, it's the dust that it creates. However, dust is a problem with most sanding activities.

Well, those are Jerry's recommendations for your Santa's gift list. They are definitely three very useful tools when it comes to building models from wood. Now ... start believing in Santa!

SELECTING A MODEL BOAT FOR SPECIAL LOCATIONS

Captain Barry Schoen of Grand Forks, North Dakota, wrote asking for some guidance in the selection of a model boat. I believe Barry has some valid concerns about a suitable model for his location. I'm going to use a portion of his letter to get us into this discussion.

"North Dakota is a very windy state, which means if you're going to wait for the lake to be glass smooth you may never get your boat wet. I like the looks of tunnel hulls like your Hot Shot, but I'm not sure they can handle rougher water. Would a deep vee hull be a wiser choice? How rough of a water surface can they handle? Your article on the Magic Boats Stingray was most enlight-

Right: Gary Teeter's second place Sport 40 hydro, Circus Circus. Had pics of full-size.



Above: Jerry Dunlap's cockpit detail. That's a Ken doll named "Dunny"... hm-m-m.

DECEMBER 1983

ening. Would a larger boat using K&B's 7.5 outboard be even more stable?"

It is my belief that Barry is doing the right thing in considering the type of hull that would work best under the typical water conditions in his area. Although I dearly love my tunnel boats, I'd be first to admit that they are definitely not the type of boat that one wants to be running on rough water or windy conditions. At a majority of the races that I attended this year, the racing in the tunnel classes was greatly hampered by wind-chopped water conditions. This was certainly the case at the "B.C. '83" N.A.M.B.A. Internationals in Vancouver, Canada. Water conditions were so bad during the running of the 3.5 Tunnel event that some heats had no finishers.

A deep vee design is certainly a much better choice if water conditions tend to get on the rough side. Having run both inboard and outboard vees, it is my opinion that an inboard deep vee has better handling characteristics in rough water conditions than its outboard counterpart. The reason for this has to do with the weight distribution of the two forms of power. The outboard is on the transom of the boat, and of course, the weight is much higher than an inboard installation. Under calm running conditions, this higher weight distribution is not a critical factor in the handling characteristics. However, it has been my experience that outboard deep vees seem to rock with more violence

than inboards do when the water conditions become choppy. I believe that the higher weight distribution of the outboard accentuates the side-toside rolling motion. An inboard vee will roll in rough water, however, the lower engine location of the inboard seems to assist in minimizing this action.

One of the classes that caught my attention at the "B.C. '83" event was the .65 and .90 deep vee boats. The performance of these boats was most impressive. When it comes to ease of starting and reliability, the larger engines are definitely a worthwhile consideration. More than one model boater who runs the big bore .65s or .90s has told me that he breaks far fewer parts in his larger engines compared to his smaller bore engines. Granted, the initial costs involved in setting up a big bore deep vee are greater. However, that initial investment could start looking real good when water conditions dictate that smaller boats he put on the beach because they cannot cope with lumpy water situations.

SPEAKING OF BIG BORE ENGINES

Look for the new K&B .67 to be out by the time this column appears. This will be the inboard edition. I do not know the price, but I would assume that it might be somewhat less than foreign powerplants of the same displacement. This particular engine has been under development for about three years.

Continued on page 92





New body from Associated: the 1/12-scale Mirage. It's clean and fast!

• After a several-months-long bout detailing the setup of a 1/8 club racer known as the Associated RC150, we can now move along to some of the new things that have been backing up around here. Just remember the preceding series of columns when you get ready to race 1/8... or when you have some spot of trouble with your current car. A ton of experience went into those columns; no other magazine has published such a series, nor are they very likely to do so in the future.

TIRE WARS

I am one of those racers who has always been very concerned about tires, as evidenced by the huge rack of tires which the Dirty Racing Team has on hand at all races. You can do anything you want to the chassis . . . massage the motor, pour heavily nitrated pop into the tank, run a body that is super low to the ground, and all of that good stuff... but those tires still have to transmit the power to the ground and fight to keep the car from sliding into the outer barrier. To put it another way, with the chassis, motor, and body working properly, the only way to gain an advantage is with the tires. In fact, the proper choice of tires goes a long way in tuning a chassis to the track.

I first became aware of tire selection fairly early on when I started to race Delta Super Js. Even way back then, Delta was offering three grades of rear tires and four or five sets of front tires. Quite frankly, it was a little confusing! However, with a few practice sessions and several races, things started to make some sense. I did make some serious mistakes in tire selection, and I lost a few heat races because of those mistakes, but there is absolutely no substitute for experience when it comes to racing. Wrong moves can prove just as valuable as right ones in gaining this experience.

About the time that I figured I had it all sorted out, along comes the era of differential cars. While rear rubber selection remained about the same, front tires which worked became softer. Now we are heavy into suspension 1/8 cars (and semi-suspension 1/12 cars) that use nearly the same rubber in the front as in the rear. This is an unbelievable turn of events, assuming you have been around long enough to have seen the change. For example: most R/C car buffs have seen the starter wheel which Associated sells; it is mounted on a Pylon starter motor and spins the flywheel on 1/8 cars. While it is just passable in that application, the wheel is actually what we used to use as front rubber on 1/12 gas cars! Even more outrageous is the fact that they worked guite well in that application, which ought to tell you a lot about how far chassis development in 1/12 cars has come.

With my lesson learned, I have for years used Delta rubber almost exclusively in both 1/8 and 1/12 scales. They were the only ones offering graded tires for the rear, and while others had a selection of front tires, Delta's offerings seemed to make more sense at the track when you wanted to alter the handling only *slightly* one way or the other.

However, the "Tire Wars" have now heated up considerably with both Associated and Delta coming up with new rubber compounds for 1/8 and 1/12 cars. The biggest gain in this battle seems to go to Associated; they have a new rear tire compound that really works, in fact, it's better than anything yet offered. Last month's column had pictures of these new tire/wheel sets and a rather nondescript caption which indicated that they offered more grip, along with faster wear. Well, they do wear faster. However, at that time I didn't realize just how much better bite they gave.

Joshua installed a set of "medium" rears ("Yellow Dots" in Associated jargon) on his RC500, but with the low power level he runs (.161 insert in the carb) almost anything works okay. So, while we could see that the car was "stuck better," we also didn't need to go to stickier fronts for more steering. At the same race, I used a set of mediums on my Delta Eagle, but I made the mistake of using them all day. Without other tires to compare to, I didn't realize the difference.

Now all that has changed, I've tried the usual rear tires (Delta "A" compound) back-to-back with Associated Yellow Dots. My advice is that you had best get yourself on over to Race Car Central and pick up on a couple sets... yellow is most definitely not mellow, these tires work! The best part of these recent developments is that Associated is now grading rear tires, and this new rubber is available in firm (Green Dot) and soft (Red Dot) grades. We haven't tried either, but the impression I get is that the Yellow Dots are almost universally used on suspension cars. On a slick track, I would try the soft grade, while



Prototype rear end setup on an Associated RC500. Production pieces will be much neater.



New front end anti-roll bar installation on the Associated RC500. This further improves the handling of the car.

firm might be required on a really sticky track or for use in a long enduro where you might find yourself having to trade some bite for tire life. In any case, even the firm grade, I am told, offers better grip than Associated's number 2402 rear rubber, although the 2402 is still without a doubt the best wearing.

For the many racers with pan cars, I would like to say that while the firm Green Dots will probably work better for you, the medium Yellow Dots can work well on all but high-traction tracks. The soft Red Dots could easily cause the car to hop in the turns, a problem that can only be cured by using one or more of the following: (1) harder rear tires, (2) driving a wider radius on the tight turns, (3) using less brake, or (4) lowering the car. However, this is just a guess on my part ... experiment!

This Red/Yellow/Green Dot scheme of things also applies in 1/12 scale. Locally, there has been a very quick switch over, with most of the faster racers running on the Yellow Dots and getting a better "bite" because of it. The Greenies might also be a hot tip, especially on the "semi-boinger" cars and/or slicker tracks; all I know is that Yellow is now regarded as the way to go.

In either the 1/12 or 1/8 size tires, you can get them mounted and trued (on Associated wheels, of course) or as rubber donuts. The donuts are ready to glue to wheels, and there is no need to glue rings into donuts, which is real handy. Now that Associated is offering graded rear rubber, many more racers have a choice out back, where before it was pretty much only Delta customers who had this tuning tool available to them.

My first suggestion is to mount up at least one set of each compound, and then try them in a meaningful test session. In other words, "feel" isn't going to tell you much. Lay out a test track, keep it fairly simple (for consistency), and believe only the stopwatch. Be prepared to see some unusual results.

For instance, it would no longer surprise me to switch from, say, Red Dots (soft) to Yellow Dots (medium) and turn faster laps. If it wouldn't surprise you either, then you are already ahead of the story. For the other thousands of racers who assume "max bite" is the best, you have been warned.

Much more important than maximum traction at either end of the car is a balanced amount of traction which sees the car turning well into the corners, coming off the corners under control (read with a little push), and stable down the straights. If, at your track, the Red Dots give a bunch of rear bite, it is doubtful that you will have front tires on hand that will hold the car on line. It will be better to toss some rear grip to eliminate the push than to bang the walls all day. Depending upon the track, the Red Dots might even get so much bite as the car turns into the corner that you will see the car hop sideways, a situation which is very difficult to control. Going to harder rear tires is one solution, and it can easily result in lower lap times.

Be really wary of using more steering throw. If you already have plenty of throw and the car won't turn, what you



New electronic whiz-bang device from Delta is the Precision Discharger. See text for details.

really need is softer front tires, or harder in the back, but cranking in more throw can really mess things up. Don't do it! To have a real "Tire War," there has to be another shot or two fired. We've just discussed Associated's weapons...now it is Delta's turn. While Associated has been arming its flank, Delta has been arming the other end of the car. trying to get more front bite.

There are a couple of reasons for Delta's frontal assault: firstly, they have been very well satisfied with their AA. A, and B grades of rear rubber; secondly, the Eagle needs more tire in the front to turn with the RC500. It's not that Delta couldn't offer sticky front tires, they have been cutting A (medium grade) and B (firm grade) rubber normally used for rear tires into rings sized for front tires ever since the Eagle was released. The problem here is that A and B rubber, when used on the front of the car tends to wear out very quickly ... quickly enough to be considered "qualifiers" only. When you get to the main event, what do you do?

In the past, a compromise tire has been used, originating with Tom Wong, it was simply a ring of AJ's (Twinn-K) number 738 molded on the outside and an A or B ring on the inside. These work okay. I have run many a race on them, but they are a pain to make up, and still don't wear very well, even though they are acceptable.

Which brings us (finally) to the recent release of Delta's 324 series of front tires in (yes, I fully realize that you still haven't sorted out Associated's whatchamacallit "dot" scheme) A, B, C, and D grades. The A grade is the softest; it provides the most steering, and can be expected to wear the fastest. D grade is at the other end of the spectrum, the others are in between ... OK?

With the 324 tire series, Delta has, for the present at least, solved the problem of not enough front bite. I have been using the B compound on my Eagle, and this is great rubber. It has plenty of steering (although I am anxious to try the A compound as well) and all kinds of tire life. They do not wear as well as Associated's molded fronts, but then, hardly anything does. You will not find a front tire that gives this much steering and wears even half as well. If you are racing a suspension car, you have to at least try these tires. You might even slip



"Imagination is the highest kite that can fly."

• This month's lead-in line is from the pen of actress Lauren Bacall, and it's a good reminder to us all. **SCUM**

Going from the sublime to the absurd, Bill Stroman is forming a new scale group to be known as the Southern California Ultimate Modelers club. The idea is to provide a sort of west coast equivalent to the famous Flying Aces. There would be no dues, no newsletter; only homemade trophies, but meets would be held two or three times per year. Bill puts it this way: "All the Flying Aces contests are held back east, as the air is so much heavier there, my models seem to stay on the low side as far as time in the air goes."

Bill figures he may have better luck on home turf with his new organization, and suggests the motto: "We always rise to the top!" Which may seem appropriate for SCUM. Interested modelers may apply with a pre-addressed stamped envelope to: Bill Stroman, 12218 Dune St., Norwalk, CA 90650.

AND SPEAKING OF FLYING ACES...

Their club newsletter, edited by Lin Reichel, continues to excell. The current issue, for example, offers delightful cover art by Bob Rogers, information about improving the performance of Jumbo, rubber-driven models, a comprehensive program for predicting model aircraft duration with the aid of a home computer, aero history by Adrian Comper, of the firm which manufactured such aircraft as the Comper Swift, humor by "W. Summersuit Vaughn", a tongue-in-cheek scale presentation of the "Hawker Humpback", photos, and full-size model construction plans by Mike Fineman, plus an article on the art of weathering, by Mike Midkiff.

At nine bucks per year, this newsletter is a real bargain. Subscriptions are available from: FAC, 3301 Cindy Ln., Erie, PA 16506.

GOOD OLD DAYS PRICES

R.F. "Bo" Watson sent us vivid proof of how model supply prices have risen over the years: He enclosed a pre-WW-II package of Comet "Hy-Grade" tissue; two 20-1/2 by 24-inch sheets, offered in a choice of white, black, red, yellow, khaki, green, orange, light blue, and dark blue. The price? Five cents!

WORDS OF WISDOM

Larry Williams, on the subject of a competition model: "It's gotta be ready at least a year in advance. If it's not ready, don't take it to a contest!" Guess



Lois Goff demonstrates the "Statue of Liberty" Easy B launch technique at West Baden. This is only her second model . . . the first having been a Delta Dart. F. Scott pic.

that eliminates the majority of our entries!

THE COLONEL SEZ

Bob Thacker's thesis of the month: "I know two things: my name, and that a canard will not fly with an aft C.G.!"

For reasons best known to himself, Colonel Bob refers to any sort of paint as "oog". His latest scale canard employs regular latex house paint, which he points out is easily available in ANY color, custom-mixed by the paint store at verv low cost. Also, clean-up is with ordinary H₂O!

COLLECTING MAGAZINES?

R.J. Twohy, of 24246 Crenshaw Blvd., Apt. 103, Torrance, CA 90505, specializes in used aviation magazines. Included are such titles as Aero Digest, Air Pictorial, Air Progress, Popular Aviation, Air Trails, Aeromodeller and Flying Aces. Why not send a pre-addressed, stamped envelope for the list and prices? ZACK WRITES BACK



Fritz Mueller likes rotorcraft! Shown are some of his rubber-driven giros and a helicopter.



The cockpit/fuselage of the 1906 VUIA, a full-size CO₂ powered flying wing at the French Air Museum. Photo by Michel Benichou.



Denis Fairlie, of England, constructed this charming *Amalgam*, loosely based on several US homebuilts of the Golden Age. R/C model has 3-channel radio, O.S. 15 power.

Evidently our readers do respond to these mentions, as reported by author/ artist Zack Mosley, who says that the **Model Builder** mention of his "Lil' Deicer" books brought letters and orders from "all around the USA". He also favored us with a copy of his autobiography, *Brave Coward Zack*, which gives the inside story on the creation of the *Smilin Jack* comic strip and its characters, as well as Zack's own remarkable life as a pilot and celebrity.

First off, as we might have expected, Zack was a model builder during his youth. The surprise to us was that for many years he had a fear of flying. Eventually, he went on to gain his license and to accumulate some 3,000 hours at the controls. He has owned nine aircraft, some of which were employed in patrol roles during WW-II. His circle of friends reads like a "Who's Who in Aviation", and included Jimmy Doolittle, Roscoe Turner, Hap Arnold, Briggs Cunningham, Bill Lear, and William Piper, of Cub fame.

Among his cartoonist cronies were Chester Gould (Dick Tracy), Frank King (Gasoline Alley), Milt Caniff (Terry and the Pirates), Frank Willard (Moon Mullins), Mike Branner (Winnie Winkle), and Bill Holman (Smokey Stover).

During his lengthy career, Zack became involved in show business and even beauty contest judging. (Just doing research for Smilin Jack's Lil' De-icers, he claims!).

The 103-page book is illustrated with photos as well as many examples of Zack's cartoon and aircraft artwork. Copies may be ordered directly from the author for \$9.15 postpaid: Zack Mosley, P.O. Box 375, Stuart, FL 33495.

PAINTING PILOTS

Now that dummy pilots have gained almost total acceptance in model aircraft, many builders are trying to improve their skills at finishing them. Joe Wagner passes on this tip for improving realism: "I found out from a portrait painter friend of mine how to avoid that 'staring eyes' effect seen on so many model pilots. Just don't paint the eyeballs white! Rather, paint them the same color as the flesh areas. When the irises and pupils are added, the eyes will look perfectly natural. I've tried it, and it works."

MORE HANDY HINTS

Ken Hamilton, who models both

aircraft and trains, was recently refurbishing a Pacific Electric car constructed back during 1946. Its plastic windows were hazy and fogged, but were installed in such a way as to make replacement very difficult. Ken's solution? A smoothly brushed-on coat of Krasel Industries Micro Coat Gloss, a product intended for plastic models. This thin, varnish-like liquid flows out evenly leaving the windows shiny new and clear. Ken cautions against brushing back over, or adding a second coat of the liquid, which may disturb the optical qualities. This idea should find equal application to old model aircraft canopies and cabin windows.

Ken's second discovery concerns reference photographs. When one is using photograph prints (not magazine half-tones) for study, the detail is sometimes obscured by deep shadows. Sometimes this information may be better revealed by backlighting the photograph with a fluorescent lamp. With the aid of a magnifying lens, a surprising amount of additional detail may be revealed.

And finally, Ken has encountered another plastic model product which may be equally useful for flying types. It is an extremely thin, polished aluminum foil, employed by model car builders to simulate chrome on grills, hubcaps, etc. Its thinness enables it to be burnished down snugly, revealing the finest details of the surface beneath. Details are available from: Bare-Metal Foil Com-



Mireille Aime, of France, holds her husband Roger's Peanut Scale *Epsilon*. Photo by Roger Aime.



The new Davis Diesel CO₂ conversion for the Cox .020, eliminates glow plug, battery, and glow fuel. Provides one-flip starting.

pany, 19419 Ingram, Livonia, MI 48152. THOUGHT FOR THE DAY

From an unknown source, this most appropriate reflection about model flying: "If you do it right, it's awfully simple — if you do it wrong, it's simply awful!"

ROTOR ROOTER

Richard Howard, well-known scale model builder, took part in the first Los Angeles area air mail delivery flight via helicopter, during 1947. He notes that the price of an air mail stamp at the time was only a nickel! Richard learned to fly rotorcraft at Sheppard Field, Texas, during 1945, and we enjoyed reading the inscription on his diploma:

Kollege of Kopter Knowledge

Be it known by these contents that 1st Lt. Richard A. Howard having remained motionless in space, flown forward, backward, sideward and vertically, without serious consequences, is awarded this certificate for successful completion of the helicopter pilot training course and is duly acknowledged to be a genuine hoverbug.

VINTAGE AIRCRAFT COLORATION

One of the most frustrating tasks facing builders of scale models is obtaining authentic color information, particular for older machines. Recently, Georges Chaulet was fortunate in interviewing Jean Ordonneau, an elder French pilot and restorer, and we were able to abstract the following: "... I've never known white-painted planes. (If) there were some (of the 1907-14 period) they were by exception.

"The aeroplanes of the times were all covered with top quality linen, well pulled. But the builders understood that it had to be tightened even more. They first used some sort of collodion. Then the Dreyfus brothers released the famous Avionine (dope) which was used on planes throughout the world. It was clear (not colored), but sometimes slightly dyed in light yellow. I knew that Caudron had used this dye. Thus, with the approval of Charles Dollfus (former curator of the Musse de l' Air) I recovered two of Vedrine's planes with Avionine slightly colored in yellow. I never had any criticisms, even from old

49





By FERNANDO RAMOS

OSHKOSH

Yep! It's that time again ... another trip to the fantasy land of Oshkosh! Oshkosh is the home of the Experimental Aircraft Association. Every year about 1500 airplanes and 800,000 or more people come to this most incredible gathering.

This trip however, has a preamble, so to speak. Every year, for the last ten years or so, my wife and kids go to Yosemite with a bunch of her friends and their kids, the day after school lets out for summer vacation. They spend a week of blissful relaxation, while dear old dad decides that he would take this time to paint his newly acquired '49 Bellanca Crusair. I figured that by the end of this week, I would have a glistening classic at bay.

Even though I spent twelve hours a day that week preparing for paint by sanding, shooting primer, and more This beautiful replica of a WW-I German Halberstadt was one of many interesting full-size aircraft at this year's EAA meet at Oshkosh. Note unique tail surfaces.



sanding again, it was not ready for final paint. How do you tell your wife after she arrives that the airplane is still not painted? It's kind of like hearing ... "What have you been doing this whole past week?"

As I had planned to take the Bellanca to Oshkosh, it was obvious, at least to me, that I had to get it finished, and soon! I had decided to use Dupont's Dulux which is an automotive paint, figuring that it would last long enough before I brought the Bellanca home to completely restore. I had gone to the paint store to pick out the red I wanted, and after checking a few color charts, I



This Pfalz D-12 model was on display at the EAA museum in Oshkosh . . . as were many more.



Another model in the EAA museum, this one is a red and silver Whitman Bonzo racer.





Left and above: If big radial powered biplanes turn you on, you would have loved this Pitcarin bipe belonging to Steve Pitcarin, of Robbinsville, New Jersey.

Continued on page 90



By WALT MOONEY... The Verville *Air Coach* presented herewith is a two-for-one model... you can build either the Peanut size version (pages 52 and 53) or send \$2.50 to *Model Builder* for the 26-inch, Free Flight Rubber Scale version. Either way, you'll enjoy the *Air Coach*!

• In the January 1979 issue of **Model Builder**, Colonel Hurst Bower had a three-view of the Verville Air Coach published. Because Mr. Alfred Verville was a friend of mine in his later years (we became acquainted during the building of a couple of replicas of the Curtiss A-1 for the celebration of 50 years of naval aviation), this three-view of the Air Coach was put aside to be converted into a model. In early 1980, a drawing was completed for a twice Peanut-size rubber powered scale model of the Air Coach.

Three years later the model structure was completed. About the same time, I met Pete Glor at work at Convair and mentioned the project. A few weeks later, he was sent on a business trip to Washington, D.C. and set himself up to get a short time at the research library in the Aero-Space Museum. While there, he got the project in a little trouble by getting copies of data on the Air Coach. There was good news and bad news. As Bill Hannan would say, "Don't trust photographs either." Nevertheless, Colonel Bower's three-view was proved to be reasonably accurate, but the sideview did not represent the Detroit diesel engine version, but one with another engine. The small three-view reproduced on the drawing is Colonel Bower's modified to more nearly match the photos of the diesel powered version.

Even the articles obtained by Pete, one of which was the original sales brochure, are a little questionable. For instance, it says that the color scheme was black and vermillion with aluminum painted struts. The top of the wing, the fuselage, and the vertical tail are black, the bottom of the wing is vermillion. The photos clearly show that the top of the wing and horizontal tail are *lighter* than black. My suspicion is that the wings and horizontal tail were red, and the body and vertical tail were black. The sponsons are black and the struts are aluminum. The Verville logo is blue and white.

The model is pretty much constructed in the standard fashion for an airplane of this vintage. Laminated wing tips and surface outlines are used because they are strong and lightweight. Except for the root ribs, all the ribs are of sliced construction.

Balsawood wheels obtained from Old Timer models are also used. The engine cylinders are primarily Williams Brothers plastic pieces. The exhaust stack is a bendable plastic soda straw. The instrument panel reproduction of the actual diesel engine Air Coach panel, and was copied directly from the sales brochure as was the vertical tail logo. By the way, that logo was also used on the wheel hubs which stick out on the outside of the wheels just like the soldered washers

Walt Mooney has done it again with another gorgeous F/F scale model of the Verville Air Coach. This one is the 26-inch rubber powered version. It is a terrific flier! You could say that the Air Coach just begs to be built as a lightweight F/F model. holding the wheels on the model.

The fuselage is started by making two fuselage side frames directly over the plan. Use hard, one-sixteenth square balsa sticks for the longerons. This is pretty important because this fuselage is relatively large for this size structure.

While the sides are drying, start the wing structure. Strip several 3/32 width sticks from 1/32 sheet. (Select hard balsa for these sticks.) Build the wing bottom directly over the plan. Pin the leading and trailing edge sticks down over the plan and cut the bottom of the ribs to length and cement them in place between the leading and trailing edges. Slice the forward and rear spars from 1/16th sheet. Note that the top of the spar sticks should be beveled to match the top of the ribs. Cement the spars in place.

By this time, the fuselage side frames will be dry, even if you use Ambroid as I do. Remove them from the plan and with a thin, sharp blade, separate them from each other. Now, assemble the two

Continued on page 72





Walt. VERVILLE

MODEL BUILDER

Peanut Scale



Mooney's **AIR COACH** Rubber Scale

DECEMBER 1983

FULL-SIZE PLANS AVAILABLE - SEE PAGE 98

By BOB STALICK

Josh Chamberlain admires his Simplex A-1 glider. This model, designed by the author, was featured as a 3-view in Model Builder in the December 1982 issue. Josh placed second in the USFFC at Taft, California, with this model. Way to go, Josh!

6 B

• As of the writing of this column (August), the results of the FAI Internats are not known... however, if the results become available before this issue goes to press, they will be printed (hopefully) in the magazine.

Whatever the outcome at the international level, the FAI events appear to be generating some new blood here in the US. A recent list of qualifiers published by the FAI committee shows over 20 new participants in the program. New blood is always a sign of life ... and I think that the program appears to be showing some new life. It's a good sign.

Most encouraging is the improving status of the Wakefield event. Undoubtedly, the availability of competitive rubber strip through F.A.1. Model Supply and the availability of the Champion Models Wakefield kit have helped.

Down a bit over recent year's attendance is the A-2 event. I'm puzzled over this development somewhat, but as no competitive kits are generally available, and circle towhook technology is still less than an open market item, perhaps this explains the downturn. This December F/F column will update one FAI event gadget ... the bunt system ... and feature one of the hottest events on the free flight circuit today: Nostalgia gas. Read on! THREE-VIEW OF THE MONTH: THE FUBAR 36

The FuBar has always been one of my favorite models. I built one from a Midwest kit many years ago and flew it with an old Wasp equipped with an Atwood Timer Tank. The whole thing weighed in at around 5-1/2 ounces. The



Clarence Bull, a member of the Willamette Modelers Club, launches his 1/2A C-Quell at the 1983 Northwest Free Flight Championships. He eventually placed second. This model is a reduced size version of the C-Quell design (MB plan No. 11743, \$5.00) which is also a Stalick plan. Wasp was an ideal engine for a model of this size. Later, as my youngest son, Tom, wanted to get into free flight power, I helped him with his Wasp powered FuBar. The May 1974 issue of "Model Builder Free Flight" shows him, at nine years old, replacing a glow plug. (Now, 9-1/2 year later, Tom is six-foot, seveninches tall, and is a student and a basketball player at the University of Idaho.)

The FuBar trimmed easily and flew well. The only problem with it was that blankety-blank pop-down DT system. The stab was pivoted at the rear and the DT line was strung through the fuselage from a remote fuse just under the center of gravity on my FuBars. The line was attached to the leading edge of the stab. When the DT fuse burned through, the leading edge of the stab popped down, and the ship started on its way down.

The one peculiar characteristic of the FuBar that I recall was that you could hear them dethermalize. As the air pressure under the dethermalized stab built up, the stab would snap back up into the stab platform, and a distinctive "click" could be heard as the rubber bands pulled the stab back down again to the DT position. A dethermalized FuBar literally clicked itself back down to the ground.

For Simon Blake, of Edmonton, Alberta, who recently wrote requesting more three-views of Nostalgia models, here is the FuBar.

Alberta restrains engines in 1/2A



Ross Thompson won Novice Nostalgia with this 1/2A Spacer design powered by a Testors series 8000 1/2A engine. The combination is excellent, and the power is such that Ross would be a good competitor in AMA Gas with this combination.

Nostalgia to sport types. The FuBar is ideal for an old Wen Mac or a Cox 290. I think a Cox 020 might do the trick too. I know that a T.D. 049 has way too much power, as one of our club members found out 10 years ago.

I think that you may even be able to find an old Midwest FuBar kit hidden away in some old hobby shop. It also came in a larger size for A or B engines. John Pond has full-size plans. Drop him a line at 4269 Sakoyo Circle, San Jose, CA



DECEMBER MYSTERY MODEL

95136. Tell him "Model Builder Free Flight" sent you.

DECEMBER MYSTERY MODEL

This nostalgia model is of the same vintage as the FuBar, but as I have never built one, I decided to feature it as the Mystery Model for this month.

Once upon a time, kits were available for this ship. The original was intended to be powered by the Wasp or the Thermal Hopper. It had one of those names that should have made some one's list of oddball models. In fact, I considered building one once, but declined because I didn't want to build a ship that had a name that reminded me of an athletic supporter.

If you know the name, and if you send it to Bill Northrop at Model Builder

magazine, he will send you by return mail a free subscription to this here magazine...you gotta be the first with the right answer, though.

Let's get up to date on past Mystery Model winners.

In March, it was Al Kramer's "Celestian" that was first identified by Pete Young, of Garden Grove, California. A letter came in from the designer (too late to win, Al) that should be of interest.

"This sure looks like my design, the 'Celestian' of 1963. It then held 1/2A, A, and C records in Senior Class, the C record being 54 minutes and 50 seconds, set the last day of the Nats at Los Al. I'm in the real airplane world now, and own and race the "Cobra" racing biplane. Still fly some R/C now and then, and am



Joe Supercool's Bunt System. Photo No. 1. This photo shows the system in the power or launch position. Note stab's trailing edge is raised above the stab platform. Sketch on page 56 shows arm details.



Joe Supercool's Bunt System. Photo No. 2. This photo shows the system in the bunt position. Note the stab's trailing edge is at a lower incidence angle than in the first photo. Model transitions from vertical to horizontal.



Joe Supercool's Bunt System. Photo No. 3. This photo shows the system in the glide position. Note the aluminum arm has moved back to remove the bunt and power arms out of the way. Stab at highest incidence.



Don Zipoy is a well-respected N.W. contest director, but is seldom seen with one of his own models in hand. Here he is caught in the act with his O&R powered Varsity.

a model railroader. Believe it was in American Modeler (yes, July/August 1963). You guys sure know how to make someone feel their age."

Al's note was on San-Val Aircraft Parts letterhead. He says company was named after "San-Valeers", 14 years ago.

Even though he spelled it incorrectly, "Ephurmus" instead of "Ephemeris". Phil Hainer, Jr., of Kent, Washington was the winning identifier of the R. Jess Krieser design in our April issue. Very appropriately, the April model fooled a lot of people ... if only a little. Many called it Carl Goldberg's "Viking". Actually, it was designed by Jess, but with Carl's advice and encouragement, and it uses Carl's G-610B airfoil. It was in the July/August 1964 American Modeler.

Martin Schindler. Vienna, Virginia, was first to identify Armand Vasquez's "Pylon Buster" as the May Mystery Model. He also pointed out that the model appeared in Mechanix Illustrated in the early '40s instead of the early '50s as indicated by Bob Stalick.

For June, Phil Oestricher, of Fort Worth, Texas, and Bill Haught, Cincinnati, Ohio, cost us two subscriptions, as they managed a tie in naming Stan Hill's "Hammerhead", as originally published in September 1956 Flying Models.

In the July issue, it was Ted Enticknap's "Gool", as published in a back issue of Flying Models, that brought lots of correct answers. Tom Cope, Issaquah, Washington, happened to be ahead of the pack.

And guess who was first in identifying Dave Whatsistrums "Auntie Freez" Coupe in the August issue? That's right, none other than Uncle Dave himself!





For September, Bob Stalick kinda slipped up by repeating a previous Mystery Model, Roger Lapp's "Foamee", from the 1958 Air Trails Model Annual. Don't remember who named Foamee the first time around, but for September '83, it was Bill Park, of Charolette, North Carolina.

The October 1983 Mystery Model appeared in the August 1961 issue of American Modeler. Design credit was shared by Howard Timlin and Craig Cusick. Lee Campbell. Campbell's Custom Kits, Lake Worth, Florida, named it correctly and firstly as the "Solar".

All of the above mentioned winners have earned a one-year subscription to Model Builder. Remember, your answers are timed according to the postmark, not the date of arrival. And we also have a handicap system that helps to balance the arrival of your subscription in various parts of the country.

DGA FOR DECEMBER: NACA 6407.5

Previous issues of "Model Builder Free Flight" have featured many of the NACA series of free flight airfoils. Generally, the 6409 has been touted as a good one for AMA power events and occasionally used in FAI power. The 6406 is recommended for rubber models, especially Wakefield. Midway between these two is the 6407.5. It uses the same mean camber line as the other two, but may be better suited for those folks who would like to use a sheeted structure

Continued on page 56









Your Indoor editor built these two early canard subjects. The model on the left is an A.S.L. Valky rie B racer, right is Valky rie Type 1.

Flightmaster Bill Warner entered this Peanut homebuilt *Contestor*. Bill is a respected authority on scale and is a superior craftsman.



INDOOR MODELS AND FINE ART

Have you considered that these little toy airplanes we build and fly could possibly be works of art? I, for one, believe that they are. Some years ago, it came to me that the ornithopters I was turning out were also fine art. These moving machines are "kinetic sculpture."

In 1968, while living in Pittsburgh, Pennsylvania, I entered my "Wingfoot" flapper in a local art competition. Needless to say, its acceptance and prizes in that show elated me greatly. Later, I read that a Manhattan Cabin indoor model was sold while on exhibit in New York City. It was the Yeloise (**MB** plan number 10772) which appeared on the cover of **Model Builder** magazine (October 1977), and it brought a price of over \$700.00 while at the Metropolitan Museum!

More recently, your editor decided to go the art show route again and was given a month-long one man show at Los Angeles Mission College in San Fernando, California. The 25-ornithopter exhibit got several press write-ups and resulted in an offer to show in the



"Sculpture in the Park" show. This 28artist exhibit ran through September 6, 1983.

The microfilm models being flown around the world are surely the most exotic form of art this artist has ever seen. The beauty and grace these airborne snails put forth is without equal.

Have any of you readers taken your models out of the realm of model aircraft and into the world of the arts? Your Indoor editor would like to know the circumstances and print pictures of your masterpieces.

My newest flapping, flying machine (number 138) was built expressly for an art show in Burbank, California. The testing session yesterday proved the sound aeronautical design as well as the merit of the ornithopter as a creative artform. It's really fun to let your



Clarence Mather competes with this Peanut P-39 Cobra 11 Thompson Trophy winner (1946). Flights of 45 seconds are common.

imagination run wild while creating a new machine.

WHAT IS BORON?

Until recently, some of us thought that Boron was a brand of gasoline. Well, now an indoor product has come on the scene which goes by the name of *boron*.

Boron filament is very light, stiff, and strong. It is produced in a continuous process by subjecting a .001 diameter tungsten substrate to vapor-deposition from boron trichloride and hydrogen gas. The resultant product is a .004 filament which is tremendously strong. The weight is very little different than



The judging table at the Flightmasters Indoor Annual. Competition was keen at this outing ... or should that be *in-ing*? Johnson photo.





An Easy B model cruises near the ceiling at an Indoor session in Winnipeg, Canada. Large propellers just chug along . . .

Here's an unusual subject seen at the Flightmasters Indoor Spring Annual built and flown (well) by Bill Warner. Johnson photo.

before.

Boron filament has six and a half times the strength to weight ratio of aluminum and six times the relative stiffness to weight ratio of tool steel. This product has been called the strongest material known. The .004 diameter boron filament is comparable in strength to about .020 diameter music wire. A 1000 foot spool of boron weighs only 0.2076 once. It cements well with all modelling glues.

The uses for this product for indoor model airplanes are atill somewhat unknown. In Indoor Scale and Peanut models it can be used anywhere that additional strength is needed ... capping wing ribs, for instance. Cementing boron along a wing spar will add only about five percent to the weight of the spar while making the spar 10 times stronger.

At a recent indoor flying session at the blimp hanger, I noted that Bob Randolph had even tried it as a fin outline on a microfilm ship. The covering was cemented right to the boron.

Would you like to try some on your models? Write to Model Research Laboratories, 24693 Nympha, Mission Viejo, CA 92691: phone (714) 586-5779. Prices are: \$25.00 for 1000 feet, and 2000 feet for \$40.00.

Carbon fiber is also sold by MRL: 112 ft. (6,000 strand tow) for \$6.00. Microfilm (slack and dry) is only \$6.00 for a four-ounce bottle, \$10.00 for an eightounce bottle and \$19.00 for a 16-ounce bottle. All prices include shipping costs and applicable sales tax.

FLOP/FLOP STABS

While at the previously mentioned Santa Ana blimp hangar session, I approach Clarence Mather of San Diego about the use of unbraced stabs. Most mic models, some years ago, featured nichrome-braced tail planes. A vertical center post ran through the stab and the wire was strung to four tip positions from this point. The result was a very stiff surface in flight. The current thinking is that an unbraced, floppy stab makes the aircraft fly better. It is a strange sight to see the model creeping along while the tailplane is oscillating up and down on its own. It looks as though it would fracture and collapse at any moment, but (alas) this does not happen. **RON WILLIAMS HONORED**

In New York, the Columbia Indoor Miniature Aircraft Society presented a special plaque to Ron Williams this summer. The award reads, "Presented to RON WILLIAMS with our sincere appreciation for your untiring and devoted efforts on behalf of all our members... C.I.M.A.S., June 5, 1983." Ron secured the use of the Columbia University Rotunda flying site and acted as host and even retriever of models from the galleries. Ron wrote the indoor journal entitled, "Building and Flying Indoor Model Airplanes." (Incidentally, Lew Gitlow informs me that this book is no longer in print. So, if you have one, cherish it; if you find one for sale, buy it!)

NEW YORK NEWS

At a recent New York meet, Easy B was won by Pete Andrews with a time of 13:58. Frank Haynes and Joe Nuszer were second and third with 12:04 and 11:30. The new 35 cm mic event was captured by Joe Nuszer with a time of 10:27.

The Long Beach, New York site (a skating rink) may be torn down because



Unidentified flying Canadian releases an Easy B model in gymnasium during wintertime flying session. Perfect pastime for idle R/Cers.



Indoor expert and San Diego scale modelling enthusiast, Clarence Mather, winds his PT-19 at the last California "nationals." Johnson photo.



Canadian modeler, Jim Holland, winds the motor in his indoor Peanut Stinson 125. Jim is also an R/C glider enthusiast.

of the lack of money to maintain, heat, and man the facility. It would be a shame to loose such a fine building as this where more records were set than any other indoor site in the country. We hope they change their minds and save this room. If you are in the area and wish to know the current status, call John Carbone, (516) 271-5548.

LAKEHURST SESSIONS

The hanger at Lakehurst, New Jersey, was scheduled for flying sessions in August and October. For info on future dates call Dan Domina at (608) 488-2840. NEW FROM 1.M.S.

Mr. Lew Gitlow has introduced a new indoor kit. The Zippy Sport (a recreational vehicle) is one of the new "Miniature Scale Aircraft Series" models from Indoor Model Supply. The Zippy Sport retails for \$6.95 at your dealer. It it's not available there, send \$6.95 plus \$1.00 postage and handling to I.M.S.

The new I.M.S. 16-page catalog has lots of instructional information and illustrations. It is available for \$1.50. The Zippy kit with the catalog is available for \$8.00. Bill Hannan's Peanut Power book



is \$8.95, or you can get the book, the kit, and the catalog for \$16.00, postpaid. Write to: Indoor Model Supply, Box C, Garberville, CA 95440. Tell Lew that **Model Builder** sent you!

Lew relates that he recently flew for three days at the Idaho University Kibbie Activity Center. This room has a ceiling height of 144 feet and spans 400 feet from side to side. Lew feels that the building might be available each summer, and could also be a site for indoor team trials and world championships, if West Baden is lost to modelling.

AVAK MINI-'THOPTER

Last column featured pictures of Tony Avak's little two-inch ornithopter, which flew for five seconds. As the photos show, the flapper had to be held with tweezers while winding. Apparently, this model caught the fancy of many readers, as I've received several letters asking for further information and plans. So, I am presenting herewith a full-size plan of the model.

I can tell you that models of this tiny size do not fly as long as larger craft, and

are somewhat more difficult to trim. My four-inch flapper climbs to an eight-foot altitude and makes three five-foot diameter circles. It resembles a gnat by

Continued on page 97





Lew Gitlow, of Indoor Model Supply, is now kitting this Peanut Zippy Sport homebuilt.



Stan Chilton and microfilm FAI model. Stan travelled from Kansas to Texas to fly at the Bedford Boy's Ranch gym.



Control Line at the U.S. Nationals

By RICH VON LOPEZ... Control Line is alive and well at the U.S. Nationals. Combat, Speed, Carrier, Goodyear, Rat Racing, Scale, and Aerobatics were all flown and relatively well attended. Enjoy this mostly pictorial essay of one of the most diverse fields of modelling.

• There is no doubt in my mind that the AMA Nationals is the best all-around competition for model aircraft in the world. There are so many things to do and see that one week is not enough time to take it all in. I have judged Combat at all eight of the Nats I have attended, not full time, however, as I like to enter FAI and Fast Combat. This limits my time to get around and spectate. I did, however, manage to get around the control line circles to get a feel of the action.

The site at Westover Air Force Base in Chicopee, Massachusetts, was great. Combat had plenty of grass turf, while Carrier, Precision Aerobatics, Racing, Scale, and Speed had lots of level runway. There were plenty of food stands and roving beer and ice cream trucks. The Academy of Model Aeronautics headquarters was located at the Quality Inn, a pleasant departure from the normal airbase hangar. That meant that there was a lobby, lounge, pool and conference rooms right at hand.

I stayed at the Elms College dorms. Elms is Catholic school for women. O'Leary Hall was very comfortable and had an air of antiquity about it. The grounds in front of O'Leary Hall were large enough to permit the flying of rubber powered models. Some of the younger modelers flew them well into the night, every night. There were nightly bull sessions on the front steps.

Yes, Sal Taibi did drive his 1956 Chevy all the way from Lakewood, California to this Nats. This is a long-standing tradition with Sal.

There were unofficial gatherings that took place, such as Jed Kusik's birthday party at the Ponderosa steak house. Jed won FAI Team Race.

The Air Force was constantly flying their airplanes over the site, and on Saturday they put on an air show for us. There were paratrooper and cargo drops, low passes by tank-busting aircraft, and maneuvering demos by various aircraft. There were large groups of spectators asking questions. On Wednesday, a troop of kids from a camp invaded the site and never let up their questions and their clicking cameras. They even went through the combat trash cans for souvenirs.

As always, the competition was intense and fun to watch. If you have never been to a Nats before, don't miss Reno in 1984. We talked to John Grigg, and apparently *Philadelphia is out as the* '84 World Championship site. Reno, the week before the AMA Nationals, is a good possibility. That would make a great two-week vacation.







Above: Open Fast Combat winners: Phil Cartier (1st), Don Hollbrook (pitman), and Gill Ready (2nd). Not much left of the models! Left: Open Slow Combat winners Jim Gall (2nd) and Don Cranfill (1st) shake hands. Below left: Nice Avenger Carrier model. Below: These guys are as good as they come, they are: Pete Athans (Illinois), Steve Kott (Michigan), and Dick Tyndall (Virginia).





NAVY NO

Control Line Scale models can be every bit as nice as R/C . . . *Mister Mulligan* is proof!

Would you believe ducted fan for Control Line scale? Why not! Excellent workmanship.



Jim Casales won the Precision Aerobatic event (left). Here he is keeping his Spectrum free from fuel residue while answering questions from a bystander.

Father and son team of Gary Frost and Eric Parker (right) tune up their Combat model.





Left: The winners of Junior Slow Combat (left to right) Mike Wilcox (third), Eric Parker (first), and John Stubblefield (second).

Below: Control Line Scale PT-19.





Electric Continued from page 15

as I would like. They are much better than Polaroids, and on par with Instamatics, but isn't there a 35 mm camera that might work?

In fact, there is, the Canon "Snappy" cameras. they are motor driven, use 35 mm color print film, and are inexpensive and light. The "Snappy 20" is advertised at \$69, the "Snappy 50" at \$89. I see in *Popular Photography* that the Snappy 20 is often discounted to \$59.95, so you can save some money.

Both the 50 and the 20 accept only ASA 100 or 400 film, that is, they are really not set up for slide film. The reason for this is that they have a fixed aperture (like a box camera) so the film has to have quite a lot of latitude, and as a print can be adjusted in the lab, and a slide cannot, print film was the way to go.

The Snappy 50 has adjustable focus, the 20 does not. As all the shots would be focused at infinity anyway, the 20 should do just as well as the 50.

Both cameras weigh 11 ounces, which should be fine even for most 05 motor gliders. It would be nothing at all for an Astro 15 type plane.

There is, by the way, an excellent review of these and other pocket 35 mm cameras in the August '83 issue of Consumer Reports. So, how about some electric aerial photography! Larry has proved that it works well, and the cameras are available. I may try it myself (project number 1001!).

I just happened to think of another plane that would be absolutely ideal for aerial photography, the Leisure Playboy. It flies slowly, climbs quickly, and would be easy to position.

The Boeing Hawks recently had an R/C show for the public, and there were

some electrics featured. Larry Bedford flew his Playboy, there were electric pylon racers, Bernhard Cawley flew his 140% Showmaster, and I flew my Aqua Sport. I landed the Sport on grass (it was equipped with floats), which worked out all right till the last flight, when I goofed it and came in too fast. The floats went one way, the plane another! The grass was dry, if you land on floats in grass, I recommend wet grass!

Bernhard and Leonard flew together, the Showmaster and the Playboy make a good combination. The Playboy climbs faster, but the Showmaster excels at slow speed aerobatics.

Bernhard scaled up the Showmaster (Ken Willard design, plans from RCM) 140%, to get four square feet of wing area, with a 42-ounce all up weight. He uses Bantam Midget servos for elevator and rudder, and a Jomar electronic throttle for speed control. His receiver is the Royal 1/2A receiver using a 250 mah receiver battery.

The plane has been flown on both the Astro 05 XL Sport system (seven-cell) and the Leisure LT 50 pattern wind on seven cells (Sanyo). A Rev-Up 11x7-1/2 gives 4300 rpm with the Astro and 4500 with the Leisure on an Astro belt drive. The climb is better with the Leisure, but both fly the plane quite well. Bernhard can get 20-minute flights if he goes for altitude, but he generally flies lower for aerobatics, which gives 12 to 15 minutes.

The photos show Bernhard's installation, which is very clean and accessible. The Jomar throttle goes in the nose, with an aluminum plate for a heat sink. This is part of the floor of the nose, so outside air flows past it for cooling.

The seven-cell Sanyo pack is mounted very simply in two balsa cradles that are accessible from a hatch in the cabin floor. The batteries are rubber banded in, great for shock mounting and for easy in and out. Note the fuse . . . good man, Bernhard!

I know I've said it before, but I'll say it again, that seven-cell Sanyo pack that comes with the Astro Sport XL makes it the best bargain of the year! The price for the whole outfit is lower than most 05s on the market. It's got to be Astro's way of enticing people into electrics! In fact, the price for the motor, all the wiring, and the battery pack is just about the same as the price for the seven-cell Sanyo pack alone from other sources. Mine delivers more power than any other pack I have.

Anyhow, Bernhard loves his Showmaster, and it is fun to watch him as he flies with a big smile on his face, with a loop here, a stall turn there, a spin; a wonderful way to speed an afternoon or evening!

A few months back, Model Builder had a construction article for the "Pleaser" by Stan Wilson. Among the other fine features of this sport R/C plane, Stan included a wiring diagram for high or low power using an R/C switchable series or parallel circuit for the motor batteries. By a coincidence, I too had been using a series/parallel setup, and had sent in a wiring diagram to Kalmbach for my electric book (which will be out in June of '84... such a long time away!). That diagram showed a few more details than Stan's (his is easy to understand, but did not show the motor and batteries), so I'll include it here.

Those that have tried series/parallel have found that it makes an excellent alternative to a speed control. The parallel gives an excellent "half-throttle" (actually, more like one-third throttle) and long duration. I have used it on both my 05 and 15 seaplanes, and it has been so effective that it has seriously delayed my use of electronic throttles!

There is one drawback, however, and that is it takes more wiring, and you can only use even numbered packs (parallel with a seven-cell pack will not work!). The benefit is that it is very reliable. The low throttle is just enough to keep a powered glider in the air. In my heavily loaded seaplanes it gives a gentle descent, excellent for setting up landings or touch and goes.

If, on the other hand, you prefer electronic throttles, Bernhard is very impressed and pleased with his Jomar throttle, and I have used and currently like the Astro Flight electronic throttle.

Till next time, fly high, and take a few pictures . . . electrically!

Plug Sparks . . Continued from page 41

nuisance due to cowling problems. Many a good engine succumbed to this so-called bugaboo.

This was truly a shame as the preceding D & S engines scored impressive wins at the 1940 Chicago Nationals and the Scripps Howard Races at Akron. Somewhere along the line, the engine was passed up by the Delong, Torpedo, and McCoy. The competition for national recognition was something fierce! The Steele R.B. Special as a .299 cu. in. displacement engine featuring sandcast aluminum parts. This 29 was one of the first engines of that size to feature ball bearings. With an all-up weight of 8.75 ounces, this made for an excellent power to weight ratio.

To spur sales, Steele also produced a Class C version of .362 cu. in. displacement known as the Steele RB-C, still on ignition. With glow plug operation becoming so popular, the last gasp of this company was its production of an RB Special in 1950 without a timer for glow plug running. However, the price and lack of attendant National publicity (so coveted by the other manufacturers), the engine was relegated to the true title of "special" as very few were produced thereafter.

ANNUAL SAM BUSINESS MEETING

The meeting, directed by President Mike Granieri, did not accomplish too much new, but it did provide a lively sounding board for those members wishing to express new ideas or suggestions on running the SAM Champs.

Highlights of the meeting were:

1) The announcement made by the secretary-treasurer indicating that the SAM treasury had better than \$13,000 on hand.

 There was an exhibit of a new computer printout of the membership list developed by Richard Williams for SAM.

3) The announcement made by Woody Woodman that the new R/C Assist rules passed, and would become effective January 1, 1984.

4) The recommendation that the R/C Assist portion of the SAM Champs be extended to four days was approved. Free Flight is to remain as it is.

5) The contest manager/host club of the Champs will be permitted to determine the SAM Champs dates in order to avoid the heat problem noted by Contest Manager Jim Thomas at this year's SAM Champs.

6) A resolution was passed to recognize all modelers who have passed on during the time between SAM Champs. Their names will be read at the SAM banquet and properly toasted.

7) It was approved for the 1984 SAM Champs to be held at Toledo or some other suitable location in the Midwest area.

THE CONTEST

Surely by now you have gotten the idea that it was hot at this meet. Temperatures ran better than 105 degrees Fahrenheit for the first two days with the third day seeing a slight drop to 100 degrees.

With heat like that, thermals were good but spotty, much like the flying at Taft... complete with dust devils. One could expect a lull in the wind, the build-up of temperature, and then the wind with its good thermals.

The contest was expertly run. The free flight portion was an eye opener as all models were weighed and processed at the central tent. In addition, Contest Director Jim Whelan had the assistance of a rules committee comprised of SAM 1 members. They also acted as judges to verify the authenticity of models located in the big army surplus tent serving as the free flight headquarters. This is something that is not always done, and such action should be applauded.

Credit should be given to Jim Thomas and Jim Whelan for the precontest decision of three-minute max flights. There was a lake located about a mile and a half downwind that would only require a five-minute flight for the F/F models to drift over its wet welcome. The wind did shift on the last day to its normal direction which made the models much easier to retrieve.

Those fellows expecting to chase models on their motor bikes received a rude awakening as the buffalo grass grew only in clumps. These clumps spaced out in random fashion made for an extremely bumpy ride. For this reason, retrieving was accomplished mostly on foot, and on the last day, by automobile.

The R/C Assist boys also received a rude awakening when trying to land their models in this rough terrain. Many a bent landing gear or broken firewall resulted from these unfortunate collisions. However, Thomas & Co. had the foresight to have paved areas laid down to assist the models of both types to takeoff. The runways originally promised were unfortunately not available as the airport operators exercised their prerogative to open the runways at anytime. This was a bad situation for the free flighters.

This writer thought the SAM 1 boys did an excellent job of providing a dirt access road (which was periodically watered) and areas for plenty of tents. even the barbed wire fence was modified with gates for the modelers to pass through for those errant models which responded to the shifting winds.

R/C Assist Contest Director Woody Woodman put on an excellent meet assisted by his wife, Evelyn, and the Granieris, Dorothy and Mike. SAM 1 also provided assistance at the impound area and the weigh in tables. Things ran really smoothly at this table!

In spite of oppressive weather and other drawbacks, Jim Lobb of SAM 29 had the right idea...enjoy yourself! His writeup in the "Planesman" entitled, "Memorable Moments," was most hilarious, hence, we cannot resist lifting the major portion of his report:

"There were many good times!! I loved the evening that Bruce Norman, Joe Percy, Jack Swain, and I accompanied "Bo" Buice to Huang Headquarters (room) for resurrection surgery. Doctor Huang was in, so the patient (Cumulus) was placed on the cleanly scrubbed table. At this point Doctor Huang tried for a coroner's cop-out pronouncing the subject D.O.A. Despite this, the Planesman persisted, and insisted on their 'Resuscitative Insistance'. 'Doctor' Huang capitulated (caved-in).

"Prognosis showed the La Junta prairie had amputated the landing gear in a wrenching fashion which left a large



ugly gash in the fuselage. 'Bo' had only one request, fix it up for one more flight in the Texaco event.

"Most of us had been to the room of Bill and Dick Huang previously, and observed that they had transported almost all of the equipment and tools from Dick's well-stocked home workshop. To our amazement, none of the fifty or so boxes contained the required 'damage control equipment' needed for repairs. After several scrounging missions by the attending Planesmen which produced Monokote, sealing iron, balsa, epoxy, and a vagrant free flight consultant named Sal Taibi, 'Doctor' Huang was able to proceed.

"The experience of witnessing the witty and brilliant rapid-fire suggestions (bordering on the chaotic?) by the Planesmen in attendance was more than Taibi could endure. He took leave before his reservoir of knowledge could be tapped.

"Eventually, the operation was a success. The 'Doctor' had the Cumulus looking like an aged shark who had just taken a bite out of a whirling lawn mower blade. The wound had received



a hastily applied cellophane band-aid to tide the model over. In that respect, Joe Percy is a master at cosmetic surgery.

"Most of the consultants present felt that 'Doctor' Huang could have done a more professional job if Jack Swain had not been rolling on the floor suffering from violent attacks of laughter. Diagnosis: orange Gater-Ade aftereffects.

"The next day, 'Bo' Buice was back in the hunt, snaggle tooth Cumulus and all. Sounds crazy? Well it really happened at the SAM Champs!"

Jim Lobb goes on to report (in his Texan commentary) the following highlights:

'Loss of three planes by Joe Percy. Joe still hung in there and brought home three trophies.

"Loss of Jim Lobb's Class A glow, Class B/C Playboys, plus two radio failures.

"Bruce Norman's comment to Swain and Lobb as the rear doors of Lobb's van were opened to unload the models (13) at the dormitory. 'Now I know what the inside of a whale looks like.

"Hearing the thundering crash caused by the wind picking up Joe Percy's trailer top (weighing over 100 lbs, with four by ten-foot measurement) and depositing it over the hood of his car and into his windshield.

"The luxury of sharing the shade provided by Dick and Ken Millet.

'Sal Taibi's account of his trek through the La Junta prairie and vain search for the one that got away.

'The simply super help given to all SAM 29 modelers by Nancy Buice and Leslie Norman. Also, to Clarence Percy (Joe's brother) for the many assists and encouragements.

"Tom Dennard's appearance at our tent moaning about how hot it was while wearing a fleece lined jacket in 100 degree weather.

'The narrow point spread in total points between Dick Huang and Don Bekins.

'The many hand launches by Bill Huang for all of us. (Hand launching was allowed here.)

"The monstrous Comet Clipper flown

by John Pond. "The pleasure of meeting so many celebrated flyers, but most notably Chet Lanzo and Sal Taibi.

"Watching those free flight models ROG and then buzz the flight lines . really exciting to watch so many people scramble!

"Swearing off models and then making a pact with Jack Swain to not build any more planes for the next year. On the way home, planning like mad for the best kind for next year!!

"Scrounging all over town for Gator-Ade only to find that Percy had bought it all up.

"The excitement on the flight pad when the wind got under Dick Huang's scale Cumulus, and when it was being wrestled by Bill Huang who was forced to back up under the beast's attack. Dick vanked the stabilizer off trying to help Bill stave off the monster.

Being a part of one of the largest SAM Champs and looking forward to next year. The Planesmen will again give a good account of themselves.

Columnist note: Thanks to Jim Lobb and the Planesmen for sharing some of those "Memorable Moments" with the rest of us.

To show you how tough it was to win against such an excellent caliber of competition, a special fly-off had to be conducted for the R/C Texaco event with five fellows all making the 30minute max allowed. Of course, in a pressure packed situation like this, Don Bekins is at his best, and won quite handily. It was this win, incidentally, that helped him win overall sweepstakes.

Before forgetting all the action, the Twin Pusher event (where everyone launches his model at the same time) saw at least a dozen planes fly off at 8:00 a.m. It was rather fitting that SAM 1 member Larrie Schaeffer should win ... he won with the best climbing twin pusher on the field!

Another special feature, the Compressed Air event as sponsored by Tim Banaszak, saw a newcomer to the event. Tom McCoy, win. Tom used a model resembling in many ways, a semi-scale Curtiss Robin. Good to see a realistic model win!

In reviewing the results, there was more than a good amount of excellent flying and close competition. The Grand Champion for Free Flight trophy had to be decided by mutual agreement of Sal Taibi and Bruno Markiewicz who tied with eleven points each. Bruno finally said, "Sal, you take the trophy.

Wouldn't you know it, the Grand Champion for R/C Assist trophy had Don Bekins and Dick Huang in a dead heat for points. This was finally resolved by reviewing the events to see how many were entered in each event and resummarizing the points based on the number of entries. Don Bekins was awarded the big trophy.

It might be wise at this point to note that points can only be garnered from the "basic events" as outlined in the SAM rule book. Unofficial events such as Gas Scale, Towline Glider, Twin Pusher, etc., do not add to the overall point total. So plan accordingly next year, fellows!

The piece d'resistance of this whole affair is the annual SAM Champs Banquet. This is the vehicle whereby we recognize all those people who have made this contest possible, the awarding of the trophies, special awards, and plaques for the unselfish efforts of all the SAM officials.

The banquet was excellent, a tribute to the planning of Jim Thomas. This contest manager missed no bets as he had the entire staff of the mayor of La Junta at the head table and introduced them accordingly. Jim proved to be more than effective as a master of ceremonies keeping things rolling. Despite the fact that Mike Granieri had a sore throat (hollering for the contestants again, Mike?), the president was able to award plaques commemorating the work of the unselfish people of SAM. These included awards to all of the elected SAM officials, plus awards to R/C Assist Rules Chairmen Bekins and Huang, plus one for Jim Adams, "SAM Speaks newsletter editor, and finally to Jim Thomas and his boys.

While on the subject of awards, Mitch Post pulled a fast one on this writer by presenting the Free Flight Hall of Fame Award to him for work done on behalf of free flight and old timer activity.

Probably the most hilarious thing that occurred at the trophy presentations was the awarding of the Texas Trophy to Don Bekins by Chet Lanzo. Upon calling Don Bekins to the floor, he then announced there was a special cash awartd for anyone winning the Texaco event with a Lanzo design.

Upon asking Don what kind of model he had won with, the audience enjoyed a good laugh, well-knowing that Don had won with a Carl Goldberg design. After hearing this pronouncement, Chet Lanzo then said, "Well, better luck next time. Here's a buck for your trouble.' This brought the house down.

What else can you say, these were only the sketchy highlights of the fun that went on for four days. The only advice this writer has for the reader who didn't attend is don't miss next year's champs!

Well, you have been waiting long enough for the results, here they are: **R/C ASSIST RESULTS EVERETT WOODMAN, CD**

CLASS C IGNITION

1.	Ross Thomas
_	Sunduster/McCoy 601188
2.	Joe Percy Theoradical/Ohlsson 601165
3.	Jack Swain Playboy/Orwick 641110
4.	Chet Lanzo Lanzo Bomber/O&R 601106
5.	Jim Kyncy Anderson Pylon/Hornet 1082
CL	ASS A GLOW
1.	Richard Huang Playboy Sr./K&B 3.251017
2.	Bruce Norman Challenger/K&B 3.25616
3.	Robert Millet Lanzo Stick/K&B 3.25
4.	Loren Schmidt Ranger/K&B 15 581
5.	Ross Thomas
CI	
1.	J. Reynolds
2.	Playboy Sr./S.T. 35
_	M-G/K&B 40903
3.	Richard Huang Playboy Sr./K&B 3.8824
4.	Roger LaPrelle Buzzard Bombshell/ST 35745
5.	Buzz Averill Playboy Cabin/ST 35710
A	NTIQUÉ GLOW
1.	Bruce Norman
2.	J. Reynolds
3.	Turner Special/K&B 6.51639 Robert Millet
4.	Lanzo Stick/OS 601635 Richard Huang
5.	Cumulus/OS 611373 Jim Kyncy
	Dallaire/Rossi 601210
1	Otto Bernhardt
	Lanzo Rec. Brkr./McCoy 601480
2.	Tom McCoy Lanzo Bomber/Super Cyke 1190
3.	Bob Angel Dallaire/McCoy 601107
4.	Don Bekins Valkyrie/Hornet1092
5.	Ross Thomas Lanzo Bomber/O&R 601039
CI 1.	ASS B IGNITION Bruce Norman
2	Kerswap/Torp 29
2.	Playboy/Torp 29
J.	Miss Philly/O&R 23
4.	Jack Swain Playboy/O&R 29765
5.	C. Brannon Playboy/K&B 29711
CI	ASS B GLOW
1.	Richard Huang Playboy/KB 4.9915
2.	Bo Buice Playboy/KB 4 9 859
3.	Don Bekins Playboy Cabin/KB 29 705
4.	Roger Barton
c	Playboy/KB 4.9
э.	Clipper, Mk I/ST 29

CLASS A IGNITION 1. Joe Percy Kerswap/McCoy 19 1029 2. Don Bekins Alert/Bantam667 3. Jack Swain Kerswap/McCoy 19659 4. J. Lange 5. Richard Huang Playboy/McCoy 19......191 1/2A TEXACO 1. Jim Kyncy Interceptor1292 2. Bill Barton Challenger1290 3. Roger Barton 4. Tad Sato Mike 5. Bob Angus Eastern States1121 TEXACO (all times plus 30 minutes) **FIVE-MAN FLYOFF** 1. Don Bekins Gas Bird/OS604C621 2. Rich Williams Flamingo/OS604C481 3. Jim Kyncy Anderson Pylon/OS604C400 4. G. Martin Dallaire/SuperCyke351 5. Joe Percy Dallaire/OS604C187 FLECTRIC 1. Don Bekins Playboy Sr. 2. Dick Huang Playboy 3. Bill Burleson Playboy 4. Ross Thomas Playboy Cabin 5. Loren Schmidt Playboy **SWEEPSTAKES R/C ASSIST TROPHY** Awarded to Don Bekins over Dick Huang (tie). **FREE FLIGHT** JIM WHELAN, CD **30 SECOND ANTIQUE** 1. Mitch Post Anderson/Spitfire540 2. Tom Alden Flying Midget/OR 19407 3. Fred Emmert Anderson/Forster 99403 4. Al Hellman 5. Ted Bieber Clipper/Madwell 49......334 **CLASS A CABIN**

١.	Jim Walston
	Cabruler/Arden 19540
2.	Bill Hale
	So Long/OR 19535
3.	Bob Edelstein
	So Long/Arden 19402
١.	Larry Clark
	Westwind/OR 19
5.	Les Payne
	Cabruler/Arden 19370
H/	AND LAUNCHED GLIDER
I.	John Bortnak
	Zoomer
2.	Peter Mann
	Hervat
3.	Blake Oliver
	Huguelet
١.	Meredith Chamberlain



placement. For two-meter sailplanes, or sport scale aircraft.



KELLER 25

0.25 cu. in. equivalent glow engine displacement. Flies any .19 to .25 powered plane. For 100-inch sailplanes, and sport scale aircraft. Manufactured for Leisure by Keller Motoren of West Germany



KELLER 50/24

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020 ELECTRIC

1.	Bill Baker											
	Powerhouse		,								,	 434
2.	Joe Beshar											
	Playboy	,						-		,		363
3.	Bob Edelstein											
	Strato-Streak										,	220

SWEEPSTAKES TROPHY

Sal Taibi & Bruno Markiewicz (Tie, Taibi to retain trophy)

SAM PERPETUAL TROPHY AWARDS

Ernie Shailor Trophy

(Class B Pylon F/F).....Mitch Post Pond Fuel Allotment Trophy . Sal Taibi Marquadt Trophy

(30 Sec. Antique) Mitch Post Compressed Air Trophy... Tom McCoy Richard White Memorial

(Cl C Cabin) Sal Taibi Twin Pusher Perpetual

Robert R/C Texaco Trophy

Feather Merchant Award

..... Gerald Martin

READERS WRITE

The following letter was received by the publisher of **Model Builder** from Harry N. Fosbury. It is self-explanatory and needs no further introduction. Dear Mr. Northrop:

This letter is in reference to John Pond's "Plug Sparks" in the August '83 issue of **Model Builder** concerning the Pacific Coaster model and the kit. A letter to Mr. Pond from Mr. H.T. (Tip) Smiley about the kit and what it was composed of is only about 75% correct. In the April '83 issue, Mr. Pond credits Jim Walker as the producer of the Pacific Coaster kit. This is not true. I produced the kit under the trade name of Eagle Wing Model Aircraft. I will explain the kit, what it contained, and how it was produced, etc.

Joe Weathers is an old friend going back to the middle thirties. All his creations are old friends to me. When I heard about the Pacific Coaster design, I asked Joe to keep me posted on same. Joe then told me that the plans for the Coaster would soon appear in Model Airplane News. It was the summer of 1946, if my memory is correct. After the plans appeared in M.A.N., I wrote to Joe that the design was a natural for molded shell construction. Joe then sent me the original plans from which I generated the molds to make the kit. The molds still exist.

Four molded 1/8th x 6 x 48-inch balsa sheets made up the fuselage. The finrudder and stabilizer were attached to a special molded tail section which finished off the fuselage contour. This section was removable, not glued down as Mr. Smiley wrote. Like many of the old time gas jobs, the tail section was made removeable for ease of transportation. This section was keyed to the main fuselage so that alignment was always positive each time it was assembled for flight.

Fuselage shells consisted of four shells: right and left bottom, and right





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and left top. These shells were assembled on a crutch which was preassembled and furnished. Half-formers were then installed in the bottom shells. Landing gear formers consisted of four matched sets of 3/8 thick alder grooved to accept the 1/8th prebent wire gear.

The cabin top was formed to curve up to match leading edge of wing, and was not carved from thick balsa blocks per Mr. Smiley. The cabin top was bandsawed to shape, ending up 1/2-inch thick throughout.

The stabilizer was molded to airfoil contour (of one of the NACA streamlined sections), and no spar was used. The stabilizer consisted of two 1/16th molded balsa sheets nine inches wide, not 3/32 per Mr. Smiley. The fin was also 1/16th sheet balsa with a solid balsa trim tab as a rudder, adjustable and lockable to any setting desired, usually slightly to the right.

The wing consisted of eight, 1/16th balsa sheets six inches plus wide. A fulldepth spar notched halfway to receive the 1/8th thick ribs ran the full length. joined at the center section with 1/16th birch ply on both sides of the spar. The end result was a very strong all-balsa wing. The wing's center section was reinforced with either crinoline or parachute silk to prevent caving in when attached to the fuselage with rubber bands. Parachute silk was readily available at surplus stores back in '46, the same was also used around the landing gear fairings.

The cowl was made of four shaped blocks of balsa. It was this area that the builder had to do some carving and hollowing out. A fiberglass cowl was in the works, but never saw production.

All told, there were 73 kits produced. Most of these kits went throughout the Northwest, the rest were scattered throughout the country. The kit was never really accepted by the general modeling public. Its biggest problems were its radical departure from standard model construction, and the lack of funds for advertising. To produce the same kit today would be out of the question... the cost would be prohibitive, not to mention the lack of balsa in the six and nine-inch widths.

That just about covers the kit of the Pacific Coaster in a general sense, and I hope has put to rest all the rumors about same. — Harry N. Fosbury **THE WRAPUP**

We always try to conclude the column with good news, an anecdote, or some such interesting item, but the latest news on the 1984 SAM Champs is not all that great.

In a telephone call with Don Belote, it now appears that the Old Toledo Municipal Airport, Metcalf Field, will not be available. From reports, it now appears that one runway must be kept open for any itinerant flyer. This is an untenable situation for free flight when the wind blows at 90 degrees to the two runways. Tough one to lose! Contest Manager Karl Spielmaker must now choose between his Mini-Champs site in Michigan or Bong Field at Racine, Wisconsin. At this point, we don't hold much hope for Wright-Patterson AFB. We'll keep you informed!

Electronics . . Continued from page 34

many variables that it often becomes a matter of opinion what is best, some manufacturers will subtract the 455 KHz on a certain frequency while others will add it. A receiver will work with the 455 being added or subtracted, subject of course to proper tuning.

Physically, most crystals found in R/C equipment look the same, with the exceptions of the leads. The one with the solid, heavy pins, needed for any installation in a socket, is called an HC-25/U type. The same size crystals, with thin, solder-in leads, is an HC-18/U. Your receiver, Walmir, I believe uses the HC-18 type. An HC-25 may be used, however, the holes in the printed circuit board will have to be enlarged, using the smallest drill bit possible that will permit insertion of the crystal pin. Use care, drill from the foil side, and be sure that continuation of the foil land is not broken, and that no solder bridges are made. Clean the solder connections with some alcohol, and in this case, as in all such cases involving crystal changes on older systems with lower tolerances, retuning is necessary for best operation.

This month's mail brought a letter from Don Gravelle, way up there in Kingston, Ontario, saying:

'I am new to R/C flying, so I have a couple of questions about airborne battery packs. First of all, I own a Futaba FP-4L system, with Ni-Cd batteries. When the system has been freshly charged, the airborne pack measures 5.4 volts. As the system is used, the voltage will decrease. My question is what is the lowest value of voltage that the airborne system can be safely operated at. Futaba has an Audible Flight Checker, the FP-FC1, and the alarm goes off when the airborne pack reaches 4.3 volts. Is this correct? You see, I am an electronics student, and I've designed an audible flight checker, only I wasn't sure what the critical voltage was. If you could answer this question, I would greatly appreciate it. The resistors at the output of the voltage regulator are correct for 4.3 volts. If it is something else, then the divider chain may need readjustment. The 5K trimpot is adjusted to whatever the critical voltage is.

"My second question concerns another form of testing of the airborne battery pack. I wish to place a resistive load on the battery simulating worst case conditions, i.e., maximum current out, and monitor voltage versus time. I will then get an idea of the amount of flying time available per battery charge. Unfortunately, I have no idea how much current the airborne system will draw, therefore I don't know what resistor

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value to choose. If you could shed some light on this topic, I would greatly appreciate it. Again thanks heaps for any information you could give me. Blue Skies!"

First things first Don; take a look at the enclosed graph, which tells what one of the popular battery manufacturers claims for his batteries. Most are very similar; there is a very gradual drop in voltage for about 90% of the capacity, then a sharp dive down. Generally, 1.1 volts per cell is considered the end value, so the 4.3 volts for a four-cell pack is a useful figure, though I personally would use something slightly higher as 1 prefer to know that a battery is close to discharge, rather than to know that one has died. Most of the battery capacitance testers are set for a 300 mil load, with a 4.4 volt cutoff, and it works in practice, I would use that figure. Your circuit is interesting, and should require only readjustment of the 5K pot for it to work at this only slightly higher value. We've

had other correspondence recently about similar circuits, you might check back for items of interest.



Voltage curve of normal Ni-Cd cell at various discharge rates.

Your other question is a bit more difficult to answer ... in fact, impossible, just as you ask it. However, don't despair, there is another way of arriving at the information you are looking for. You see, a well designed modern system



draws a small amount current, as low as 50 ma, at rest. This value increases rapidly each time a servo is caused to move, the actual value being dependent on air loads on the controls, and made worse by tight clevis pins, rubbing pushrods, glued hinges, bottomed throttles and nosewheels, and any friction producing or movement limiting feature the individual can build in. Then too, your habits in the air affect this. If your model is out of trim, and requires constant correction, if you fly something small that flits around your head with constant heading and altitude changes, or if you are just plain nervous on the sticks, you'll use more current than will the properly trimmed graceful model which spends longer periods between control inputs. I'm sure you get the picture, it is just too difficult to say that a certain system will use a certain amount of current under normal or worst case conditions and come anywhere near to a true figure.

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Thus, we do it backwards. We charge the airborne battery, and measure its capacity, either with one of the commercial units such as the Ace Digi-Pace, or, as you have suggested, by a current versus time discharge down to 4.4 volts. Then, we recharge, and fly a carefully calculated amount of time, then without recharging, discharge the rest of the way in the same manner as done previously. This gives us the amount of current we used during whatever time we flew, and will give us a true figure of available flight time for that particular airplane under those flight conditions. Said figure will be different for a larger model with heavier control surface loads, or for a lighter, floater type.

Don, you appear to be taking this battery capacity thing rather seriously, more so than the average beginner, so there are a couple of other hints that I would pass on. One is to monitor the servo current, either with a simple meter in the power leads through a plug-in adapter between the receiver and servo, or with a meter equipped servo tester. What you really see is the motor current, of deterioration in the performance of the motor, or a possible damaged gear. Higher drain servos should be used in low use channels, such as throttle and rudder.

The other hint has to do with batteries . . write for a brochure for SR Batteries, Box 287, Bellport, NY 11713... you'll be very pleasantly surprised at the increased capacity available from its batteries compared to many others of the same size and weight. The figures are not just claims, I have confirmed them many times, and most of my equipment is now SR battery equipped.

My last advice to check your supply of long underwear, as winter is just around the corner!

LONG SERVO LEADS, AGAIN

I received an invitation to "COMEFLY WITH PORTER'S HOBBIES," 1127 Mitchell, Waterloo, IA 50702. From there, Jim Porter writes, concerning the subject above as mentioned in the September issue:

'Per your request in the last column for information on how to cope with long servo leads, lenclose the following: (1) This installation is used in a Sagitta XC with aileron servos 48 inches out in the wing (Kraft mechanics, Ace Electronics servos, Kraft FM receiver on 53.5 MHz). (2) It is also used in my Clipped Wing Cub with aileron servos 20 inches out in the wing (same servos, Ace Silver Seven receiver on 53.2, Gemini Twin Power). (3) I recommend using foil shielded cable with the external grounding wire used as the negative battery lead, the red internal wire used as the positive battery lead, and the black internal wire used as the signal wire ... Belden 8541 FR-1 4. (4) I use a Kraft charge receptacle (#120069) at each end of the cable run in the wing. (5) You should shorten the servo lead to the minimum length possible, Kraft No. 123012. (6) My sagitta

even has a Thermal Sniffler transmitting on 50.090 MHz! (7) Range is out of sight with Sagitta XC!"

Well, two things are immediately obvious, Porter's Hobbies is not operated by a hangar flyer, and Jim has certainly solved the problems as they might affect his particular combination of equipment. Since writing the September column, I have also flown the model which I mentioned was in the last stages, with great success. I am using twin Kraft KPR-8FD receivers, also mentioned in the same column, everything standard throughout, without the slightest problem. This seems to indicate that FM is less susceptible to the long lead problems, which time should tell us more about.

To confirm that Jim's system does work, Kraft Systems now has a "Shielded Servo Cable Extension Kit'' , which consists of a four-foot length of No. 22 three conductor shielded cable and the necessary connectors. After determining the exact length of extension needed, you add the connectors according to the furnished instructions, and go fly, hopefully glitch-free.

There is a fringe benefit to such extensions. The small wire normally used for all R/C interconnections gets to be unacceptable in the long lengths now being used, and for the amount of current that the high power servos demand, the resistance is so great that the servo actually operates at less voltage and with less efficiency than is otherwise possible. The heavier wire used in the Kraft extensions, and as described by Jim, eliminates this voltage loss and lets your servos develop their full rated power. As stated, I don't have any ill effects from the long leads, but I am changing to the shielded leads to eliminate the voltage drop.

There is one small difference in the Porter and Kraft methods. Jim uses two conductor cable, with the shield becoming the negative lead, and requiring connections at both ends of the extension. The Kraft method uses three conductor cable, plus the shield, which is connected only at the receiver end, and being left floating at the servo end. Any advantage that one might have over the other is going to be determined by one of the many other variables, such as different equipment design and length. If your equipment is Kraft, then it is obviously best to get Kraft's kit with all the necessary hardware in one package. If your equipment is something else, then you'll have to obtain the pieces individually, in which case give Jim's method a try. If the particular Belden cable is not available to you, any twowire shielded cable with the internal conductors being stranded, at least 24 gauge and preferably 22, is worth a try.

Thanks to Jim Porter up in Iowa, let's hope we hear from others who have tried either method and will share their experience with us.

PRECISION RESISTORS

Last year, in connection with some particular circuit that was discussed


here, I mentioned that precision resistors are rather difficult to obtain in small quantities from mail order suppliers. I am happy to report that I have located such a supplier, who catalogs a wide range of 1/8th and 1/4-watt metal film resistors in 1% tolerance. They are milspec RN-55C and RN-60C types, and are priced at 25¢ in single quantities, with the price going down attractively in larger quantities. Precision resistors are not the only things this company sells, you can also order all your needs in carbon film 5% resistors, as well as capacitors, ICs, transistors, electronic hardware, etc.

The company is International Electronics Unlimited, or simply, IEU, Inc., 435 First St., Solvang, CA 93463, (805) 688-2747. Its catalog is free . . . tell them who sent you . . . and should be a useful addition to your information file.

INTERMODULATION INTERFERENCE GLITCHES

Back in the September column, page 62, I was talking about the above subject, and got exactly that, glitched either by the typesetting, or the typesetter's word processor. It happed in the second paragraph, in which I listed a number of old and new frequencies which could conceiveably mix to produce problems on other 72 MHz frequencies. It reads: "72.080 & Channel 38 may affect 72.550 72.160 & Channel 42 may affect 72.630" ...and three other such combinations.

Sharp-eyed reader Hal Jackson, who is listed further in the same heading as AMA's District X Frequency Coordinator was the first amongst others to point out that Channel 38 is 72.550, and so on down the line. He is right, of course, and the mystery was solved in checking between my original copy and what you finally received. I can only assume that our typesetter was still programmed with the "may affect" which is present and correct in the similar listing in the preceding paragraph, and automatically added the words in the second listing. (Not quite true . . . the proofreader was the one with the faulty program. —The proofreader)

Anyway, read the second frequency listing without the "may affect", it'll make more sense.

SAFETY NOTE

I know ... you get tired of people telling you to be careful of this and to be careful of that ... but let's face it, accidents do happen, and hazards should be mentioned from time to time, especially for those newcomers who might not really be aware of their existence. I'm not going to tell you again to keep your fingers out of the prop; this is more electronically inclined and has to do with those component leads that you sometimes hear landing across the room as you clip them off.

Transistor leads are especially bad about this, as they seem to be made of harder material than most resistor and capacitor leads, and being smaller in diameter, they could be more damaging. In fact, it is not uncommon in the electronic industry for those persons involved in assembly work requiring manual lead clipping to be seen wearing safety glasses, and that is what this subject is about: these small leads fly off with enough force to penetrate the skin and would certainly imbed themselves in your eyeball if you were unlucky enough to be in their flight path. For minor work such as the average hobbyist does, I wouldn't go so far as to recommend safety glasses everytime you solder a transistor into a board, but it would certainly be a good idea to make it a habit to hold each lead as you cut, or at least to aim it in a direction that won't have it fly, or ricochet, into your eyes. 'Nuff said!

ACE R/C OFFSET ANTENNA MOUNT

Ace R/C's Silver Seven transmitter now comes with an offset antenna mount, which places the antenna with approximately a 15 degree upwards angle, for a better transmitter antenna to



model relationship. This will result in a stronger signal at the receiver antenna, and will sometimes save you from those glitches that occur at long distances or on those ground-dragging, long and low approaches.

Though designed for the Silver Seven, the slanted antenna mount will work equally well with any transmitter using a 11/32 in. antenna, and having just 5/16 in. clearance under the antenna post. Though intended for use with 3.5 mm hardware as used with the Silver Seven antenna, slight redrilling will permit use of any of the commonly used antenna base screws. A longer than normal center screw at least one inch long is necessary.

This is a good item, especially for you antenna-draggers. Ace R/C No. PLA390, at \$1.00, without hardware. A 3.5 x 25 mm bolt, required to retrofit older Silver Sevens, Part No. HWO10C, is available for 20¢.

McDANIEL R/C DC SYSTEM CHARGER

Only slightly larger than the cigarette lighter plug with which it comes equipped, McDaniel R/C Service's DC system charger is proof once more that good things do indeed come in small packages. Designed to provide charging



current for the normal four and eightcell Ni-Cd batteries normally seen in R/C service, this charger can be powered directly from your automobile's cigarette lighter socket, or from any properly charged 12-volt battery. The McDaniel charger is rated at 250 milliamps for a four-cell, and 140 to 150 milliamps for an eight-cell pack. This is certainly a good way to get some amps back into those batteries on the way to the field if you forget to charge the night before, or to extend the available flight time once you do get there.

Two cautions must be mentioned: (one) all batteries do no accept these higher charge rates, and some systems. for example. Futaba transmitters, have internal fuses that will blow and protect



the batteries if they are connected to any but overnight rate charges; and (two) this type of system continues to charge at this rate for as long as it is connected, and overcharging is readily possible. the instructions furnished must be followed

The Model 05 System Charger is only \$19.95, less plugs, though a quote will be sent you for a charger equipped with plugs of your choice, upon request. A \$1.50 handling and shipping fee also applies. Direct your questions and requests for further information to McDaniel R/C Service, 13506 Glendundee Dr., Herndon, VA 22071.

LETTERS

September letter writer Dick Henderson, from Phoenix, was heard from once again, he is still enjoying life, R/C, and R/C electronics. I'll have to pass on one of his hints, which involves a timer for fast charging Ni-Cd batteries. Dick uses an inexpensive household timer, the type with the internal spring which you set to the desired time with a knob, which in turn moves backwards toward zero to indicate the time remaining. He puts an extension on the knob, and mounts a micro-switch in position so that the extension arm actuates it as the zero is reached. Obviously, the connections to the switch should be insulated with tape or heat shrink. Sure is an inexpensive way to save an expensive battery pack.

Dick also writes about how he is enjoying delving into the mysteries of that elusive electron. I must remind you that it doesn't take an engineer to do many of the small jobs required to keep you flying safely and reliably, and it can be a great pleasure to have fixed or built something useful, which after all is the whole idea behind the hobby, personal satisfaction.

Another recent letter attests to that. It starts off with:

"Success! Everything worked the first time with no smoke yet." This letter is from Rodney Taylor, of Van Nuys, California, who is talking about a 72 to 53 MHz conversion he just made which was based on my previous mention in the column and further information that I furnished. You might find it hard to believe, but really guys, it can be as exciting to turn something on, with "no as Rodney says, as that first smoke' takeoff. Well, almost!

And please share with us, either to me at Model Builder, or directly to my home at 231 Cottage Place, Costa Mesa, CA 92627. Bye for now, it is beach time in California!

Peanut Continued from page 51 side frames into the basic fuselage box frame by adding the cross-pieces between the longerons at each of the uprights. Note that the aft end of the fuselage structure is as wide as the rudder fairing. The top formers are triangular in shape with a notch for the centerline stringer. The two other top stingers are simply cemented to the formers. There are two stringers on each side. One is at the bottom of the windows and the other about half way to the bottom longeron. Add the block balsa nose pieces at the forward end of the fuselage box.

Make a pattern to the shape of the top of the wing ribs. Use it to cut out two root ribs and to slice from hard 1/32 sheet all the rib tops. Notch the root ribs from the bottom and cement them in place. Then, install all the rib tops. Also install the wing tips, blocking them up to the position shown in the front-view.

Build the horizontal and vertical tail from sticks directly over the plan. These structures will be 3/32 thick and flat without an airfoil section ... that will have to be added by cementing soft 1/16 square sticks from the leading edges to the trailing edges of the tail surfaces on both sides. When dry, the surfaces are carefully sanded to the desired airfoil, and temporarily set aside.

Cut the wing just outboard of the root ribs, raise each tip .9 inches, and cement it back together for the correct dihedral angle. Allow glue to harden.

Make a nose black for the very front of the fuselage. It consists of a forward part which creates the outside contour, and an innner plug which fits snugly into the forward end of the fuselage box. Now, carve and sand the nose of the fuselage to the desired contours. I note that my drawing shows the forward, top, and side contour blocks as being hollowed out. I did not do this, and do not really think it is necessary . . . unless you want a really lightweight model. It doesn't make sense if you are going to have to add ballast to the nose to fix a tail-heavy



MODEL BUILDER

model. The model in the photos balances 3/4 of an inch behind the front strut.

Shape the wing's leading and trailing edges to the airfoil contour. Now, fit the wing onto the top of the fuselage. The top fuselage stringers should be trimmed to just contact the cross-piece that fits between the root ribs about an inch behind the top of the windshield. A small former will be needed just on top of the rear spar to support the stringers. Do not cement the wing in place at this time, it should be covered first.

Cement a piece of 1/16 balsa sheet between the bottom stringers at the aft end of the fuselage to support the tail wheel.

Add balsa fill-ins on the fuselage to: (A) bring out the structure to the covering surface between the stringers at the rubber motor rear peg support; (B) between the bottom side stringers and the bottom longeron at the landing gear sponsons to make a solid structure for the shock absorbers and the front struts; and (C) between the top side stringer and the top longerons at all the window uprights to preserve the contour of the fuselage. Sand these balsa fill-ins to the correct contour (see the front-view).

Bend the landing gear axle wire to match the front-view. This has the two shock absorber movable struts soldered to it. The assembly is then cemented into the fuselage with the support of a 3/8 by 3/32 cross-piece between the sponson fill-ins.

All the strutting for the model is carved to a streamlined cross-section from medium to hard balsa. The upper part of the landing gear shock struts contain a piece of aluminum tubing which must be a free-sliding fit over the wire.

Carve the sponsons from balsa blocks. Put all the surfaces in place on the model using pins and masking tape to hold all the structure in position. Fit all the struts and the sponsons into place as accurately as possible lightly cementing them in place when you are satisfied. Then, carefully disassemble the struts and major components for final sanding and covering.

Carefully locate where each cylinder of the engine is located and make a hole to accommodate the bottom of the Williams Brothers cylinders. A sharpened piece of brass tubing works better than a twist drill for making holes in balsa blocks. The cylinder blanks required are the ones that are approximately seven-tenths of an inch long and have about a three-tenths base diameter. They need to be shortened by having their top three cooling fins removed. Also, now is the time for making a hole to accommodate the exhaust stack.

Cover all the model components separately except the center section of the wing and the top of the fuselage over the wing. This part must be covered after the wing is finally installed on the body.

Note that there are soft balsa fairing blocks on the bottom of the rudder to finish off the aft body shape.



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Tissue shrinking and final doping follow standard practice. The numbers shown are correct for one of the two diesel powered Air Coaches that were built.

Use a commercially available plastic propeller, or carve one of your own. The one in the photos is a molded plywood propeller that came with a Jim Walker ceiling walker years ago. (I guess that dates me), and I would not except too many people to have them available.

The Verville Packard diesel powered Air Coach was the latest state-of-the-art design when it was built. It had a luxurious interior and safety glass all around. Its sales brochure claims that it could fly from Chicago to New York on four dollars worth of fuel.

Well, a rubber powered model of the Air Coach won't fly from Chicago to New York, but it will fly well enough to provide a lot of pleasure. Enjoy a model of Alfred Verville's design genius ... I cherish the memory of a real gentleman and a great airplane designer.

Soaring Continued from page 29

sum of $C_{D4} + C_{D4} + C_{Dw}$ is plotted in blue (see Figure 4). Only now can we figure out best L/D (best glide ratio) for a sailplane ... but remember, we picked several constants: W, C, AR. If you change any one of these, L/D max will



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change. So what is L/D max for this case? "L/D = $C_L/(C_{D1} + C_{D1} + C_{DM})$ and is at a maximum value at the tangent point marked with a blue asterisk in Figure 4. L/D max = 0.68/0.0375 (the values of C_L and C_D taken from the graph, Figure 4). This is 18.13/1 ... well, boy, isn't that familiar.

"On to something else. At what Ci does a model glider fly at during a speed task?

"V = 29 W/C₁. Pick a wing loading. W = 1,25 lb/ft² (20 oz/ft²). Now, for a four-lap speed run of 21 seconds, the velocity is approximately equal to 65 mph or 95.3 ft/sec. Plug in the values to the equation and solve for C₁. C₁ = 0.11.





Increase the weight and the Ci goes up slightly. So what's the point!?

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¹¹1) For the F3B class of airfoils, the best L/D is around $C_1 = 0.6$. As the fuselage is cleaned up, the C_1 decreases, as the wing loading decreases, the C_1 is decreased. Therefore, the best L/D is at $C_1 = 0.6$ or less in most cases.

"2) In the speed task, the Ci is approximately 0.1 plus.

"CONCLUSION: It is desirable to have a wide, flat drag bucket that extends from C_1 =0.1 to C_1 =0.6 (approx.). To me, the S1120 looks good, as well as the S1140 series."

WHEW!! If we didn't lose you along the way, congratulations! For your enjoyment and benefit, I will be including some additional Seelig airfoils in the future. If you would like to give one a try, please write to Michael Seelig for the coordinates, his address is: 715 S. Randolph, Apt. 21, Champaign, IL 61820. Please include an SASE for Michael's sake!

A subsequent letter from Michael indicates his success with one of his airfoils on a model glider: "I have completed a set of wings utilizing my S1144 airfoil and adapted them to my Sagitta. Simply stated, the performance is good, and better than the 'E-205' on the Sagitta in my opinion and others who have seen the flight comparison."

Michael has since designed even more airfoils and "better" airfoils. As you will see in the coming months, they do look like potentially superior sections. So stay tuned, guy!

SCRATCH BUILDING FROM PLANS Of special interest to anyone wishing

to build a model from **Model Builder** plans (or anyone else's), Craig Huntziger, Rt. 2, Box 326. Park Rapids, MN 56470, (218) 732-9216, is willing to make life easier for you by making a custom kit for those plans. All you would have to do is build the model as if you had purchased a kit.

Craig enclosed two photos of his Atmostherm original design. As you can see, its structure is quite intricate, almost like an antique F/F model with its "stick and tissue" like fuselage. Oh yes, one of those pictures has Craig in it too! Every indication from these photos is that Craig is an excellent builder.

If lack of building time is keeping you from building that model which you have the plans for, give Craig a try, and send him that plan for an estimate. Tell him **Model Builder** sent you.

OKLAHOMA SLOPE SOARING

I recently received a letter from John Dyal of Midwest City, Oklahoma. This is the second or third letter in about a year and a half, actually, and I'm always glad to hear from John and glider guiders like him from other parts of the U.S. and the world. I am concerned about this column becoming too "Californicated" as a clever Oregon bumper sticker proclaims, and input from readers is always welcome. Anyway, on with what John has to say:

"I'm still enjoying your column in Model Builder.

'Enclosed is a photo of Bill White with his White's Lightnin'. This may be the ultimate utility slope machine: small, simple construction, and cheap. It won't win any beauty prizes, but it will outfly any other slope flier except Turkey Buzzards (the kind with feathers). At 16 ounces, it will fly on a whisper, and at 18 ounces, it will penetrate 70 mph crest winds, easily. It'll turn so short, it'll take your breath away. Aileron rolls are beautiful. It won't fly inverted very far, and it won't fly knife-edge (no rudder). Any size loops are the pilot's choice giant 150-foot diameter loops, down to so small it looks like it'll stick its nose in its own tailfeathers.

"Its 'go power' comes from the Jedelsky wing (like on Honker). If you haven't tried, this wing on the slope ... you haven't lived yet!

"Bill uses an Ace Silver Seven transmitter, a Kraft receiver, and Kraft KPS-12 servos.

Go fly, (signed) John Dyal."

Thanks for sharing with us Bill's White's Lightnin', John. Although I personally haven't tried the Jedelsky wing approach. I know many who have and have liked it. For those who may not be familiar with the Jedelsky section, it is formed by two sheets of balsa, one about two or three times as thick as the other, and triangular ribs. Before shaping, the wing looks something like this:



After shaping, it looks something like this:



A very similar approach to the Jedelsky wing is being successfully used by Dick Vader and Terry Troxel of Costa Mesa, California. They are using airfoils developed by a guy named Jack Chambers that are high camber, thin sections made of solid balsa. These sections and airplanes will be further described next month. Stay tuned for more, again!

That wraps it up for this month, and I hope to hear from you soon with any news or models you would like to share with a lot of other glider guiders through this column. Write to me at **Model Builder**, P.O. Box 10335, Costa Mesa, CA 92627.

Fuel Lines... Continued from page 20

(&B Super Speed	50''	X2C synthetic
(&B FA1	0%	20% Castor
Note: K&B nitro percenta	ges ar	e close approxi-
nations.		
IG Champion CL Stunt	5%	25%
IG Champion R/C Fuel	10%	25%
IG Champion 15	15%	25%

SIG Champion Racing 35% 25%. Note: All SIG fuels contain a combination of Klotz synthetic and castor oils, as the lubricant, as well as two percent propylene oxide (ignifer) and two percent Lubricin. The latter is an additive designed to increase the lubricating qualities of castor oil.

OTHER ADVICE

In addition to the above information, there are many very competent modelers who are more than willing to help you achieve better performance. They are usually well-known and liked in a club or area. If you don't know them on a personal basis, a polite self-introduction and a question or two are quite appropriate. However, be sure not to make a pest of yourself.

In this general vein, some clubs invite expert guests to their meetings. Usually the individual will make a short presentation and then answer questions. It's a fine way to foster our hobby. If you're with a newly formed group and don't know who to ask as a guest, simply

MODEL BUILDER



contact your AMA district vice president, and ask him to help you arrange for a suitable speaker.

Guys, that's it for this month. Hang in there. In the fast lane that is.

Counter Continued from page 9

already popular one-ounce, half-ounce, and quarter-ounce sizes ... all with Pacer's patented break-away tip closure. Zap/CA has a guaranteed shelf life of 12 months, and is available at fine hobby stores throughout the U.S.

Also, new releases from Pacer include the chemically treated Z-ends, troublefree tips for all Zap adhesives. What makes these tips different is the very small opening (.020 in.) which makes them the most controllable applicators on the market. Because of the chemical treatment, the small opening is virtually non-clogging, and any hardened Zap/CA on the outside of the tip is flicked away with your fingernails.

Next, Pacer wants you to know that the amazing Z-foam Primer is now available in a new, smaller, field box sized "ZFP Mini Blaster." The Mini Blaster is a 1/2-ounce glass bottle with a handy plastic pump sprayer. It's the perfect answer to field repairs on polystyrene foam core wings when used with Zap-A-Gap thick adhesive ... no more risk of melted polystyrene foam.

If you are into safety, then you'll want to have some Zap-Lock Medium Strength adhesive on hand in the workshop and in the field box. What this product will do for you is keep any nuts, screws, or other threaded fasteners from backing out and *unfastening* themselves. This is a must where engine vibration is present.

One last announcement gets us all caught up with the latest products and accessories from Pacer, and that is that the entire line of Pacer hobby adhesives (including the new Plasti-Zap and Zap-Lock) are now displayed in attractive, four-color, blister cards. The front side identifies the product and describes its uses, while the back side features handy Z-hints which describe some techniques for applying the product.

For further information, contact Pacer Technology at: 1600 Dell Avenue, Campbell, CA 95008.

*

* *

Repla-Tech International, 48500 McKenzie Hwy., Vida, OR 97489, announces the recent reintroduction of the famous Koku-Fan scale drawings from Japan. Printed in the USA by Scale Model Research, this series of drawings is now available to the discerning scale modeler who wishes to fill out his scale documentation file. Send SASE for list of Koku-Fan drawings with prices.

Wait! That's not all! Repla-Tech announces two new scale documentation "exclusives." If you need documentation for a Bellanca "Citabria" or a Weeks "Solution," then Repla-Tech is the one to order it from. Four-view drawings approved by Kermit Weeks and eight color photos of the Hilton sponsored Weeks "Solution" are available at a special price of \$8.50 postpaid. Five-view drawings (detailed!), along with a very complete color photo package of the Bellanca "Citabria" (37 pictures) is available for a special combination price of \$26.46 postpaid.

Give Repla-Tech a try, and tell 'em Model Builder sent you.

The Zippy Sport . . . a full-size recreation vehicle ... is one of the new "Miniature Scale Aircraft Series" by Indoor Model Supply. The regular price is \$6.95 at your local dealer, but if it's not available there, send \$6.95 lus \$1 postage directly to IMS. The new, 16-page, illustrated IMS catalog (with lots of instructions) is \$1.50, or ask for the Zippy Special and receive the kit, and catalog, postpaid, for \$8. Bill Hannan's 80-page book, Peanut Power, is \$8.95, but you can receive the book, kit, and catalog for \$16, postpaid. A great deal and a perfect gift! Indoor Model Supply, Box C, Garberville, CA 95440.

Davis Diesel Development, Box 141, Milford, CT 06460, announces a new and unique CO₂ conversion kit for either the Cox .020 Pee Wee or Tee Dee engines. What can it do for you? It will replace all forms of combustion ... no batteries, glow plugs, or messy fuel ... and it's lighter than electric. The CO₂ system recharges in seconds and runs amazingly well with very little noise. Look at

+

DECEMBER 1983

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these amazing facts:

It's quiet . . . but still sounds like an engine.

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 Simple speed adjustment on the head.

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• Swings an 8-4 prop at 6000+ r.p.m. or a 10-8 at 2000 r.p.m.

Priced at \$39.95 plus \$3.00 postage and handling, this includes adjustable valve head assembly, on board 10 c.c. refillable tank, and receiver valve (completely assembled for easy installation), as pictured (engine not included). This is the answer to treu "School Yard Seale."

Two new David Diesel Development diesel conversion heads are now available at either retail outlets or factory direct ... they are the E-19X and the HP-61K.

The E-19X is intended for use on Enya .19X glow engine. After diesel conversion, the Enya .19X becomes the perfect choice for .25 to .35-size planes. It will



will idle reliably down to 2,000 rpm. One ounce of fuel will run the converted Enya for six minutes. If you want to power a biplane, the converted Enya will safely swing up to a 10-5 prop.

This E-19X conversion head may be used on the Enya 21X if an extra head gasket (obtainable from Enya) is used.

The DDD conversion kit number HP-61K is intended for use with either the H.P. .61 Goldeup engine (a very popular helicopter engine) or the Silver Star .61. These engines, operated as diesel engines, have greatly increased torque and broadened power range. Diesel engines won't sag and change power under varying loads. It will make your chopper more stable to varying control input demands, and be easier to fly. Diesels don't use glow plugs, so they can't flame out ... plus many other advantages.

Write to David Diesel for more information regarding their lineup of excellent diesel or CO2 conversion kits.

* * *

Scrapbook of Scale, Three-Views & Nostalgia, by Bill Hannan, is a new book on the market these days, and it's one you won't want to be without if you are into aviation history, research, philosophy, or whimsey.

This new book contains a selection of articles culled from the work of Bill Hannan, dating from 1964 through 1983. Much of it originally appeared in the following publications: American Modeler, Model Builder, Sig Air-Modeler, Model Retailer, R/C Sportsman, Model Helicopter News, Flying Models, Popular Rotorcraft Flying, Sport Flying, Aeromodeller (England), Scale Models (England), World War 1 Aeroplane, the Cross & Cockade Journal, and le fanatique de L'AVIATION (France).

Included are a dozen 3-view drawings of fascinating aircraft suitable for scale modeling, including obscure pioneer monoplanes, a Golden Age racer, a biplane, a triplane, two canards, an Autogiro, a Gyroptere, and three different Farman Mosquitoes. Countries of origin represented are: England, France, Germany, Spain and the United States of America.

Added attractions are ready-to-use

construction drawings for a simple catapult glider, a rubber-powered profile, and a Peanut Scale model.

So, whether your modeling interests relate to pioneer flying machines, Golden Age aircraft or bizzare designs, you should find something of interest in this unique volume! Send \$8.95, plus \$1.00 postage and handling (California residents add 6% sales tax), for your copy, to: W.C. Hannan, Graphics, P.O. Box A, Escondido, CA 92025. Foreign orders add \$1.25 for surface mail or \$4.00 for air mail (south Pacific country residents add \$6.50 for air mail).

+ * * Ken P. Kalynuk, proprietor of Aircraft Photo Packs, 369 Moorgate St., Winnipeg, Manitoba, Canada R3J 2L6, introduces his 1984 catalog of aircraft photos. Color photos for over 125 different aircraft are available to assist the modeller in color schemes and scale documentation. Canadian and United States military aircraft, civilian, and airshow aircraft are available in different size packs for the Standoff and museum scale modeller. Catalogs are 50¢. \mathbf{t}

*

Power Products, 766 Broadway, Seaside, CA 93955, has released their outrigger racing hydroplane kit. The Marlin is a four point hydro designed specifically for use in oval heat racing. It may be powered by any 7.5cc to 11cc racing engine. Its low weight (7 pounds with a 7.5cc engine or 8 pounds with an 11cc engine) guarantees excellent turning performance, rapid acceleration and excellent speed. If built according to the instructions, the Marlin has excellent controllability and can hold the inside lane around the turns. Its large size insures stability when crossing the wakes of other boats and in rough water racing conditions. Its light weight enables you to "out drag" your competitors at the start of the race and when you accelerate out of the turns. When properly set up the Marlin corners smoothly and tightly with almost no apparent speed loss as if it were on a tether around the bouys.

The Marlin has a unique air cushion sponson design which reduces drag by trapping air between wedge shaped running surfaces. It uses the latest techniques in aerodynamics to keep the hull stable even at very high speeds. Its design incorporates inverted forward mounted airfoils that reduce drag and supply downforce that increases with speed to keep the boat on the water at any speed. The fuselage and cowl design also reduce lift usually developed by these components. The major boat components are designed for complete adjustability. As a result, boat trim may be changed at the lake without rebuilding the boat.

The Marlin is constructed of aircraft grade plywood with foam core sponsons. All parts are pre-cut and precision sanded to shape. The kit includes all necessary wood and foam parts, aluminum sponson support extrusions, motor mount, and a fiberglass cowl. A complete hardware kit will be available

soon after the kit release date. The boat is designed to use a flex cable drive system which is engineered so that you will not loose your favorite prop even if the cable breaks. The kit contains fullsize building plans and a comprehensive instruction book that covers construction and running adjustment information to insure a fine performing hull.

The Marlin is available from Power Products direct only at the present time. It sells for ninety dollars less the running hardware.

No modeler's workshop would be complete without Dremel tools, especially the versatile Moto-Tool. Now, as a special Christmas promotional, you can buy for your favorite modeler a choice of two combination Dremel tool packages. One package (Model 3801SP) features a FREE Dremel Model 1500 Woodburning Kit with a Model 497 Soldering Tip (\$23.70 value) when you purchase a Variable Speed Moto-Tool Kit (Model 3801SP).

The other Christmas special features a FREE Dremel Guide to Compact Power Tools book (\$7.95 value) when you purchase a Constant Speed Moto-Tool kit (Model 2501SP).

For more information regarding ythis special Christmas promotion offer, write to Dremel, Division of Emerson Electric Company, 4915 Twenty First Street, Racine, WI 53406.

The Hobby Barn is proud to announce the release of its new, low cost Pattern/ Sport airplane, the "Total Chaos." Mr. Joe Bridi was commissioned to design this fine ship which uses the same airfoil as the world-renowned "Curare" Pattern ship. This deluxe kit is all balsa and plywood, and includes a very complete hardware package, with an excellent set of plans. Wingspan is 65-1/2 in. with a wing area of 699 sq. in. for a .60-size engine. These specifications in combination with the Curare airfoil give the Total Kaos excellent low speed handling characteristics, and make this airplane one that both Sport and Pattern fliers alike will enjoy

The special introductory price is \$56.99 (plus \$4.60 postage and handling). Add \$2.00 for C.O.D. orders. The Total Chaos is available only from Hobby Barn, P.O. Box 17856, Tucson, AZ 85713, phone (602) 747-3633.

Fast Eddie . . . Continued from page 30

piece for the top front fuselage and a piece for the hatch.

() Glue the top front fuselage sheet in position. Then, tack glue the hatch piece into position.

() Sand the entire fuselage structure by rounding the corners and shaping the nose. (Use scrap balsa to fill the gaps in the fuselage nose before and while sanding to shape. Your aim is to achieve a nose shape that fairs into the spinner you plan to use.)

() Cut or break the hatch free, and, after the wing has been completed, sand to fit over the wing leading edge.



() Make an air scoop. Mark its position on the hatch, glue the scoop to the hatch, then cut away the hatch material as needed to allow for air passage.

() Finally, install the 1/32 ply hatch hook on the hatch, the 1/8 ply hatch hold-down hard point in the front compartment, and the 1/8 ply wing hold-down hard point at the rear of the main fuselage compartment.

() Set aside while the other components are completed.

WING CONSTRUCTION

() After you decide which size wing you wish to make, cover the wing plan with waxed paper or plastic wrap. (Waxed paper should be used in construction is to be done with CA glues.) () Mark the 1/4 x 5/16 trailing edge/ hinge line (5/16 is the vertical dimension) for rib notches, and cut the notches 1/8 deep with a Zona saw. (Glue a strip of wood to the blade using CA glue to control the depth of the cut.)

() Place a piece of scrap 1/8 stock under the waxed paper and over the drawing where the $1/4 \times 5/16$ TE/hinge line is shown. (This is to shim up the hinge line piece.)

() Now, pin the notched $1/4 \times 5/16$ piece on top of the 1/8 shim with the waxed paper separating the two.

() True one edge of the 1/16 sheet LE material (using a straight edge and a sharp blade), and place it in position over the plan (with the trued edge over the main spar location).

() Then, place the lower 3/16 sq. main spar in position on the 1/16 sheet. Use "T" pins with pin clamps (Rocket City's) to hold the spar in position. Do not pin through the spar!

() Place the ribs in position over the spar and into the TE notches. (Note: the center ribs differ in size in their after sections, and require shimming up an extra 1/16 to compensate for the center section sheeting.)



() Place the upper main spar in the upper rib spar notches, but do not glue yet.

() Place a full-length shim (1/16 to 3/32) on top of the 1/16 LE sheet at the location of the leading edge. Then place a piece of waxed paper over this shim so that it will not be glued to the 1/4 sq. LE.

() Now, using a small square, straighten and align all of the ribs, and glue them into the notches of the TE by dripping CA glue into the notch.

() Glue in the upper spar and carefully tack glue the ribs to the lower spar. (Do not allow glue to seep down to the 1/16 sheet that is under the spar.)

() Place the 1/4 sq. LE on top of the shim (waxed paper between the two) against the front surface of the ribs. (Check the vertical alignment of the LE with the ribs and correct if needed.) Now glue the LE to the ribs.

() When all the glue has dried (or hardened), bevel the LE with a razor plane so that it conforms to the upper contour of the ribs. The leading edge sheet must glue fully to it after being bent over the

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ribs.

() Now take the second piece of 1/16 sheet and true one edge (if you have not already done so) with a straight edge and knife.

() Glue this sheet, trued edge to the rear, to the upper spar.

() When dry, start at the center, bend the sheet over the ribs and press against the LE. Pull the sheet tight, make a pin hole through the sheet into the LE, and, while holding the sheet in place, put a drop of CA glue into the hole and hold until cured. Work toward the tips until the sheet is attached fully to the LE.

() When complete, remove the wing panel from the plan surface, turn over, and (from the bottom) glue the top sheet securely to the ribs, spar, and LE. () Trim off the excess 1/16 sheet, and with the TE shim increased to 3/16 in., lay the wing on the plan, bottom up, and pin the TE in position over the shim.

() Bevel the LE with a razor plane as you did with the top side.

() Glue the other 1/16 LE sheet (the one that you've been building over) to the spar, bend the sheet over the ribs, and bond to the LE.

() Remove the wing from the building surface. By using finger pressure and applying CA glue through the gap between the spars, bond the sheet to the ribs. Also, run a line of CA glue on the LE-1/16 sheet joint from the inside.

() If you prefer to use shear webbing, it should be installed now. We did not find

it necessary on the prototypes, but if you think you might need it, pin the structure over the plan on the building surface to keep things perfectly straight. Then glue the webbing (1/32 sheet, grain must be vertical) against the back side of the spars the entire length of the wing.

() Now, you may remove the wing from the building surface, and with the framed-up fuselage, place the wing in position and mark and drill for the 3/16 dowel wing pin.

() Install the pin and epoxy into position. Before the epoxy hardens, place the wing on the fuselage with the pin inserted through the hole in F2, and hold in position until the epoxy hardens.

() Next, install the 1/16 sheet wing center section on top and bottom.

() Cut the $1/4 \times 1$ tapered TE stock to the sizes required for the tip TE, the center TE, and the two ailerons.

() Using the building surface, align the tip TE pieces, and glue into position at the tips.

() Glue the wing tip blocks into position and carve/sand to the airfoil shape and the desired tip shape.

() Take the 1/16 music wire and cut to length for two ailerons. Remember, the horns are offset in the wing... one will be longer than the other. Install the plastic tubing bearings on the wire, and bend the wire to shape. (Note: a slight rearward sweep of the horn will give some positive aileron differential.) The wire at the horn end should be 3/8-inch long from the bend point.

() Now, solder the 3/32 O.D. x 7/8inch brass tubes to the center end of the aileron horns, then flatten the part that extends above the horn wire. Drill the flattened tube for the aileron clevis pin with a 1/16 bit (check plan).

() Cut the center tapered TE piece as needed to clear the horn wire and bearings. (How you cut here will depend on what type of aileron hinge you chose.)

() Install the horn wires and the center tapered TE piece, making sure the horns move freely.

) Shape the ailerons for hinging:



Monokote hinge



Note: for a Monokote hinge, the horn wire must be placed near the upper surface of the aileron, and will need to be able to slide in and out of the hole in the aileron. The regular hinge, with the hinge at the center, requires that the horn wire be centered — these hinges are glued in only at final assembly.

() Add the 1/32 plywood wing bolt support.

() Once again fit the wing to the wing saddle of the fuselage. When you are satisfied that it is correctly aligned (adjust the saddle as needed), drill through the wing bolt support, wing TE, and ply wing bolt hard point. Drill with a 3/16 bit. Remove the wing and open up the hole in the wing so that the 1/4-20 nylon bolt will pass through. Then, tap the ply wing bolt hard point for the 1/4-20 nylon bolt.

() At the location indicated on the plan, cut a hole for the aileron servo on the bottom side of the wing.

() Finish sand the wing and set it aside for covering and final assembly. **EMPENAGE**

() Glue rudder parts together and

sand to shape.

() Sand the stabilizer and elevator to shape. See fuselage side view for elevator hinge line shape for Monokote hinge. If you wish to use a standard hinge, then shape the elevator hinge line thus:



FINISHING AND FINAL ASSEMBLY

() Finish sand all parts in preparation for covering and/or hinging.

() For a Monokote hinge, I prefer to use strips of Monokote. When attaching the top strips (first), I use a 1/16 spruce or balsa spacer. Then, I bend the elevator/ ailerons up sufficiently to iron on the bottom strip so that the bottom strip sticks (through the gap) to the top strip, and is then ironed down fully.

() For conventional hinges, for now, slot the stab/elevator and the wing/ ailerons, and test fit the hinges. Do not glue the hinges into the slots at this time. The hinges are glued into place after the surfaces have been covered. Then, the hinges are epoxied (for pinned hinges) or CA glued (for solid type hinges) into place.

() Now, cover the entire model with your favorite covering material. As Fast Eddie is well stressed already, the extra rigidity of Super Monokote is not a requirement. Still, we recommend the use of Super Monokote. As an alternative, you might consider the use of Coverite's Mica Film, as it is a very light material, and can save a little weight.

() Next, assemble the stab and elevator to the fuselage. (Hinge them first.) Be sure that the stab is accurately aligned in all dimensions. Mark and cut away the covering where it will glue to the fuselage. Again, check alignment and glue to the fuselage.

() Carefully align the rudder, and mark and cut away the covering where the rudder will contact the stab. Align and square with the stab and fuselage and



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glue in position.

() Install the hatch hold-down screw. () Make provisions for a landing skid if you fly over a hard surface. Over soft grass, I have not found a need for a skid, but otherwise, something like an Ace R/C Glider Skid (two strips) should work OK.

RADIO AND POWER INSTALLATION () Small servos were used in all prototypes, and are probably a requirement. We have used both Ace R/C Micro servos and Futaba S-20 servos with great success.

() Install the 1/8 x 1/4 spruce aileron servo blocks, and mount the aileron servo. Add the aileron pushrods and clevises.

() Position the motor battery on the fuselage floor behind F2.

() Cut two $1/8 \times 1/2$ balsa pieces so that they fit crosswise in the fuselage on top of the motor battery pack.

() Cut two 3/16 sq. balsa strips to the length shown, and with the two $1/8 \times 1/2$ pieces below them, glue them to the fuselage sides. (The $1/8 \times 1/2$ pieces are rotated to allow battery pack removal.)

() Add the 3/16 x 1 balsa piece behind the motor battery. This prevents the pack from moving rearward. Your own pack will determine the exact position. (Note: for seven-cell packs, we have placed the seventh cell above the motor pack in the front right corner just behind F2. Some foam packing can help hold it in position when the wing is installed.) () Next, check-fit the elevator servo and the receiver.

() The elevator servo is installed against the right fuselage side, behind the motor battery pack.

() The receiver is placed beside and to the rear of the elevator servo. To do this, F3 must be cut away to clear the receiver so that the receiver can pass through it. The receiver will then lay just above the fuselage floor, part way through F3. (Use seating tape and mounting tape to position and hold the receiver ... it must remain clear of the aileron horns and the elevator pushrod.)

() Make the elevator pushrod from threaded rod (with mini-clevis), 3/16 sq. spruce, and 1/16 soft wire.

() Install the elevator horn and the elevator servo. (Use mounting tape and/or silicone glue to hold the servo to the fuselage side and bottom. With mounting tape, spread a light coat of epoxy glue on the surface where the mounting tape is to make contact.) Install the pushrod and shape as needed for the run.

() Fit the flight pack battery, and make provisions for it to be held in position when the wing is fastened down to the fuselage. (I used an Astro 250 mah square pack ... Ace R/C offers a similar pack ... and the wing held the pack in position.)

() Install the on-off servo/micro switch unit in a convenient place. I simply placed it in the space between the motor's rear and F3. The micro switch was attached to the side of the servo with mounting tape. A long arm activates the switch leaf. Then, the unit was simply placed, not mounted, in the area. Of course, if you have a small on-off motor controller. a second location is the area above the motor battery and beside the aileron servo. (Note: a dynamic prop brake is a good idea, for a free wheeling prop can catch on landing, possibly causing damage to the prop and model.) () Mount the motor on-off toggle safety switch on the right fuselage side, near F2, or to the rear of the seventh cell in seven-cell installations. Insulate it from the cell in seven-cell arrangements with strips of seating tape.

() Mount the radio on-off switch on the right fuselage, just forward of the elevator servo.

FINAL PREPARATIONS

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() With all components installed and ready, check for correct balance. I have found that a safe balance point is at the wing spar. Slightly forward of that is a safer balance point, but beware of a reward balance point, as with a rearward center of gravity, you could find that the model is unstable in pitch as well as having a tendency to snap roll at slow speeds.

() Check for any warps in the wing and tail. Remove any that you discover by twisting and reshrinking the covering material.

() Set the control throws: Set the elevator for 3/8 in. up and down to start with. Set the ailerons for 1/4 in. up and down to start for the "stock" power systems, and 3/16 up and down for the

79



Eddie can be slowed up rather appreciably. Still, it is best to keep the speed up until you are sure just how much you can safely slow it up. Also, be advised that Fast Eddie, being rather clean, will float quite a bit before touchdown. So, be careful of over-shooting on landing. Still, try to keep your landing as gentle as possible.

Nieuport 11-C Continued from page 18 not as difficult as it looks). Take a 3/16 in.

drill, grind the shank down to fit into a piece of 3/16 O.D. nylon tubing (the same tubing as used for the torque rod bearing surface), and Hot Stuff it to the tubing. (Note: Use the nylon tubing from a Nyrod pack or Du Bro Kwik Rod kit.) This, along with a fine rattail file with 3/16 in. maximum diameter will do the job. Carefully make the holes from each end toward the center of the wing.

> Make sure the front of the hole is right up against the rear spar. After this is done, the balance of the horn area can be completed.

Add the slip fittings per the drawing. Add the nylon tubing (three pieces),

and cabane fittings.

Now add the bottom center section sheeting. Complete the cutout for the horns.

Sand the wing, add the outer strut fittings, add the remaining cap strips, and finish sanding.

AILERONS

Pin the leading and trailing edges to the plan. Add the lower cap strips now. Make the ribs per the drawing and cement in place. Add the upper trailing edge and top. Add the upper capping. Sand to fit wing.

Groove the leading edge per the detail on drawing. Cut the torque rods to length. Make straps from thin copper shim stock. Hot Stuff the 1/8 in. rod in groove. Put the straps in place. Solder to the tubing and at the rear overlap. Add the inner rod (3/32 in.), leaving room on the outer end for the hinge. Hot Stuff each end.

AILERON HORNS

Make the aileron horns from 1/8 in. aluminum per the drawing. The horns are made so that the ailerons can be removed at anytime.

When assembling the ailerons to the wing, slip the horn in place by gently opening up the split end and pushing it over the spar.

Slide the aileron rod through wing, slip the clamp in place, set the horn in place over the clamp, align the aileron, and tighten the lock screw. Screw the outer hinge in place. (Remove in reverse order.)

ASSEMBLY AND ALIGNMENT

 I'll not get into the alignment method which I used in very much detail because I haven't yet seen a good builder who didn't have his own personal method of achieving this.

Slide the lower wing into the pod assembly. Make sure the wing is centered properly. Tack cement the wing only enough to hold it in place. If the pod was made correctly, incidence will be two degrees. The space around top of the wing can be filled in later.

Bolt the assembly in place on fuselage. Check for horizontal alignment first, then sit the fuselage up on end on its firewall. Check for the proper 90-degree wing leading edge to fuselage center line alignment.

Tack cement the center pod to the fuselage (or tape it in place).

Set the center wing in place (make leading edge cutout at this time).

Block up the leading edge to achieve the two-degree incidence. Tack cement in place. Align with the lower wing.

Set the upper wing in place. If the cabane struts were made per the drawing, the incidence should be close to correct. Double-check for the correct incidence.

Drill a mounting bolt hole (one strut only). Assemble with a bolt and nut.

Set the fuselage on its firewall. Block up to clear center wing and make a final check. Clamp or tape the upper wing to hold it in place, and drill a hole in the other strut. Add the bolt and nut.

The outer struts should *not* be made in advance. Instead, make mock-up struts from 1/8 balsa. Make one part at a time (left and right together) and fit until correct. Then drill and bolt in place. It is not necessary to slot; just bolt to the inside of the strut plates for now.

After each piece is in place, cement or clamp the mock-ups together so that when they are removed, you will have a perfect pattern for making the final strut assemblies.

ALIGNMENT AND STRUT ASSEMBLY

Make the final strut assemblies now. Slot them just deeply enough to clear fittings, but don't drill holes yet. Set the struts in place on the inside of the mounting plates. Clamp them in place. Now drill the holes. Check for final fit and bolt.

After making sure the holes are in the correct place, you can now add cable fittings. Make cables per the drawing. All cabane and landing gear bracing is made from .025 music wire. All flying

cobalt 05 version. Adjust per actual flight performance from this point.

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() Charge your motor battery pack to peak. I like to monitor peak voltage with a digital volt meter ... Radio Shack offers three models, and the Astro chargers have jacks for the meter leads. Leisure makes a charger with a digital readout. (Note: A new pack, or one that has not been used for a time, will not give full power for the first one or two flights ... having something to do with "formation" of the cells ... so don't be overly concerned if the first couple of flights are not up to par on power. Just be ready for a little less power.) **FLYING**

Pleased be advised that Fast Eddie is offered for the experienced R/C pilot. It is much too quick and touchy for the novice.

All-up weight of the prototypes varied from 28 oz. to 40 oz. ... this variation is mainly a result of the differing weights of power systems. The eight-cell Astro 05 came out at just under 30 ounces. Leisure LT-50 and Astro XL systems (six cells) were in the mid-30s, while the Astro cobalt 05 (seven cells) came in at 40 ounces.

The launch is quite important, and more so with the "stock" systems. You need a hard, straight-out heave. So, find someone who is good at this... a poor launch can crash you real quick.

After launch, go for altitude, but stay off excessive up elevator until good speed is gained and maintained. Once



and landing cables are made from 30pound test steel leader, plastic covered. All control cables are 15-pound test. **FINISHING**

After final sanding, the model was given two coats of Balsarite and sanded again. The covering used is Super Coverite. Use dope or epoxy paint of your choice.

The color scheme on the French aircraft was: upper surface and sides, dark green; underside, natural or beige.

The color scheme on the English aircraft was all silver.

My roundels, etc., were sprayed on, one color at a time, using patterns cut from contact shelf paper. (Works great!) FLYING

I wish to ease the minds of potential builders. Unlike the prototype, the model flies great, is fully maneuverable, and doesn't land any harder than many other models I've seen around.

The complete model weighed 6 lbs., plus 4 oz. for the brass spinner which brought the model into correct balance.

It flew right off the board, so to speak. The only problem we had (on about the third flight) was a broken torque rod. Luckily, I had a real expert at the stick (Dee Harwell), and he landed it with very minor damage. Since I charged the torque rods from aluminum to brass, everything is just fine.

This aircraft is a real beauty in the air and on the ground. In all my 55 years as a builder, I haven't seen any model more realistic in the air. It is a project well worth the time and effort. So what's holding you back?!

Karasu Continued from page 42

the ship.

"Half a mo Daniel," said Dave, and disappeared through the hanger door into the night. Two or three "Half a mos" later, he reappeared with two strange looking black and red tissue-covered creations. Two identical models of the "Karasu" that had been constructed by Professor Ono and given to Dave.

"Good Lord, Dave, they can't fly!!!"

"Wrong Danny boy," corrected Dave, as he hand-cranked winds into the fourbladed pusher prop.

"Dave, I'm telling you, that damned thing couldn't possibly fly!"

With enough winds now stored into the "Crow" to Baker's satisfaction, he launched it with reckless dash and elan. It grabbed air in that big hangar and flew rock-solidly. Funny, but while it cut through the night air in a gentle climb, it looked even *less* capable of flight than when it was just resting.

There must have been close to 300 people inside the hangar watching in utter disbelief . . . but there it was; I saw it operate, and I have to believe it, because I don't drink.

"Dave, I've got to get those plans. I've got to build one. My buddies back home will go crazy over this thing. Loan me the plans." Dave informed me that the Doctor had the plans and was on vacation in Japan. Upon his return, I was assured of receiving the plans.

A few days later, while preparing for my return to the States, Dave offered me one of his "Crow" models to take with me. It wasn't possible. I had left too much money at Harrod's Department Store in London for gifts to carry back home (you might say I was many pounds lighter. Haw-w-w!) Carrying the Karasu was not possible. As a matter of fact, I couldn't even carry my Burnham Twin Pusher and its lovely case, which was left in Dave's temporary (I thought) custody.

From then until February 21, 1981, I had been writing and phoning Dave, trying to get the plans and drawings of the Karasu. No luck.

Always something to deny me. It got to be a *thing*, a veritable fixation. My whole meaning in life had begun to hinge on whether I'd get those drawings or not!

In a conversation with Joe Beshar, I learned that he'd be in Europe in December 1980, representing this country in the FAI meeting in Paris.

Now, if you are an old timer and go to Europe, you dast not do so without at least a one day stop-over in London with Hilda and Dave Baker! They'll throw you a blast in their quaint little home, and pack in 150 friends. It's like 50 pounds of mush in a 10 pound crock!

When Joe assured me of his plans to also visit the folks on Muswell Hill, I

DECEMBER 1983

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81



proceeded to whimper and beg and lick his hand with great fervor.

"Please Joe, I beg you. Please bring back the plans of the Japanese model. Please bring back my Twin Pusher in the John Wayne attache case. Please Joe, please!"

He was moved.

As he brushed aside a tear, he promised. I think he also mumbled an ancient Royal Armenian Air Force curse under his breath. He is the commander, you know. When you are a real trueblue, died-in-the-wool SAM Old Timer modeler, even the curses are antique!

True to his word. Joe stopped at the Baker's domicile after the Paris meetings And true to their style, Hilda and Dave Baker dragged him into their home, along with over 100 U.K. Old Timers... drawn in as if by a huge magnet, or an Electrolux! What a "Bundle of Britains" ... and for just one, old (really young!), grey-headed traveler from New Joisey!

As the time to leave for Gatwick Airport (and then home to Kennedy) approached. Dave presented a weirdlooking vinyl box with magenta carrying handles to Joe. This custom case contained the two dismantled Karasu's, which Dave asked Joe to carry across the Atlantic, stating that one was for me and the other was for him. He also asked Joseph if he might possibly grow another hand rapidly, so as to be able to carry back my pushers in their case. Commander Beshar then came up with one of the few good ideas in his life, when he



faced Dave and said, "As United Kingdom spokesman for Sheelds, 1 hereby bequeath Danny's pushers to you. 1 know that Danny will be thrilled to know they are safely in your hands to stay. Also to show his appreciation for the 'Crow."

Dave was non-plused, and quite moved by Joe's generosity with my stuff.

Beshar related the whole incident to me upon his return to the States and now everyone is happy. I've got a model of a truly unique antique, Dave Baker has the best flying Twin Pusher in the world, and Joe Beshar has his own "Old Crow", (Karasu, that is).

I have decided to share this ancient find with anyone interested via this magazine. For a set of plans of the Karasu, just write to **Model Builder**. See the full-size plans ad in this issue.

If you do build it, please let us know how it flies, comments, pictures, etc. If enough folks build "Crows", we could even have a contest. The winner would get a bowl of Teriyaki, a bottle of Saki, a Samurai Sword, and a picture of Sesue Hyakowa kissing Shirley Yamaguchi!!!

Now if you'll excuse me, I'm going out and fry my Clow!

Danny Sheelds, 3 Cinnamon Cir., Apt. 1C, Randallstown, MD 21133.

Scale Team ... Continued from page 13

Bob Wischer and Dick Byron drew the dubious honor of having theirs be the first models judged. At the end of the day, they were afforded the opportunity for rejudging if they so desired, but both declined, willing to accept whatever unknown score had been awarded to their aircraft. Static scores were not to be posted until after the model's first official flight.

Saturday morning bloomed bright and beautiful, with sunny skies and the promise of warm temperatures. A light, direct crosswind on the R/C runway made takeoffs and landings a real challenge. By luck of the draw (at least that's how they said they did it!), I was given what, as I said before, is a dubious distinction ... I was to make the first flight in the R/C competition. Over at the control line circle, which waslocated in the middle of the spacious gym parking lot, Jeff Perez was also faced with being first up. Jeff had a little problem on his flight: the ball turret on the bottom of that big B-17 fell off in the middle of what was a good flight, and everything from that point on was a big, fat zero. My flight, on the other hand, was reasonably good (that means I got back on the ground in one piece!) and the contest was now underway. And what a contest it became!

Bob Underwood took the lead during the first round with his colorful Hiperbipe. Close on his heels was Earl Thompson's ME-163, followed by Bob Wischer and his Piel Beryl.

The ME-163 was the focus of some controversy as to complexity bonus as it took off on a jettisoned dolly, and landed on a retractable main skid and tail wheel. An interesting point was made as to what kind of taxi the aircraft should perform, as the prototype was reportedly towed, not taxied, into takeoff position. We let the judges handle it, and I believe they considered it a five percent (retractable monowheel) model and allowed a straightforward taxi.

Steve Sauger provided a little excitement for the crowd on his first flight by trying to retract his landing gear on the Stinson Trimotor before it was airborne. It didn't work! No major damage was done ... it just skidded along on the grass, and Steve called an attempt. The beautiful Trimotor features differential throttles, that is, the center engine comes up to full throttle before the outboard engines. It's an interesting concept, and is designed to prevent a poor responding outboard engine from affecting acceleration during takeoff, plus allowing Steve to throttle back the outboard engines in cruise while maintaining moderate power on the center engine.

At the end of the first round of R/C, with all the static scores posted, it looked like anyone's ball game as most of the statics were closely grouped. The lower static scores were attributable to either the model being genuinely "Standoff", or poor documentation, as there were no dogs in this array of models. Craftsmanship was tops throughout.

While we were fiddling with our control sticks at the R/C site, Mike Gretz was establishing a first round lead over at the control line circle with his venerable Zlin Akrobat, a plane Mike has campaigned for many years. Mike took a lot of kidding from his competitors about taking it out of mothballs for this contest, but he ended up with the last laugh. He combined his high static score and a smooth first flight to jump out ahead quickly.

A full second round was flown on Saturday, and the team was pretty much decided for control line by the end of the day. Jeff Perez put it all together with the B-17, and Ron Sears came through with what he described as "the best flight he's ever made" with his Stearman PT-17. Mike Gretz wowed the crowd once again with his Zlin, and once those three were ahead, no one was able to



seriously threaten them. The man with the best chance for a challenge was Steve Ashby, a member of the 1982 Scale Team, whose MU-2, which seems to be getting better looking every time I see it, earned second highest static points. Being a 20 percent model with twin engines and retracts, all he had to do was put in one decent flight, but it was not to be ... Steve was plagued with retract and flap problems.

The highlight of the second round had to be young Julie Abel and her Sig Clip Wing Cub. On this flight, Julie's Cub took off towing a banner which read "Hello Dolly" in recognition of Dolly Wischer's birthday! Apparently the judges as well as the crowd enjoyed it, as Julie scored an impressive 1595 flight!

For the third and final round of flying on Sunday, the flight order was reversed, reasoning that as the top of the list supposedly received the calmest air for flying on Saturday, the fliers on the bottom of the list would now have an equal opportunity at the best flying conditions.

Steve Sauger and his Stinson Trimotor was first up in the still air of the morning, and it was soon obvious that Steve had performed his best flight on Saturday afternoon. The Trimotor is an excellent flying machine, and once Steve gets a few more flights on it, I'm sure he'll acquire consistency. One flight is all you need in FAI, however, and as Steve had a very good second flight on Saturday, it appeared certain that he had locked up a spot on the team. On this third flight, the Trimotor suddenly became oddly quiet, and Steve begin making an angled, short approach toward the runway. Turns out, he not only lost an engine . . . he lost two engines during the flight, and the big Trimotor was respectfully winging home on only the starboard engine! Steve made it to the grass at the side of the runway, and flared it in to everyone's applause. It may not have been his best flight, but it was one I'm sure he'll remember!

George Rose tried to challenge in the third round with his P6E Curtiss Hawk, but once again was frustrated by a tank drop that didn't function properly. The third round was Bob Underwood's round to shine. He guided his Hiperbipe to an incredible 2464 flight (with only a 10 percent bonus!) to jump ahead of Steve Sauger into what would be second place. This set the scene for Skip Mast and his C-130.

Skip had already pretty much wrapped up first place in the second round with a flight score of 2780.05, and it seemed impossible that he could do much better, but better he did! He turned in an outstanding flight score of 2893.8! Consider the closest score (utilizing a 10 percent bonus) was Underwood's 2464, more than 400 points behind! It's almost impossible to beat that kind of a flight score, and Skip deserves all the credit he receives for being so consistent in flying multi-engined models. It's a rare moment when you see Skip Mast coming in with an engine out.

However, it wasn't over yet. If Charlie Chambers could get a complete flight out of his F9F-8 Cougar, everyone was certain he would be assured a spot on the team considering his high static score of 2458. Charlie had scored much lower static points at the Nats just two weeks earlier, and by taking the advice of the judges there, made numerous changes in outline and markings over the two weeks. It paid off in those elusive extra static points that are so hard to obtain on the upper end of the scale. Unfortunately, Charlie once again had the fan problems he's been plagued with since he went to a bigger engine, and it resulted in his not being able to complete a flight. (Go back to the 7.5 Charlie!)

Because of the reverse flight order, I was now the last person to fly in the trials. The pressure was on, and I needed a flight of 2495 (with a five percent airplane . . . the Spezio) to knock Sauger out of third place. It seemed like an improbable task, and it proved to be just that. A heavy crosswind came up just as I was taking off, catching a wingtip and lowering the precision of my takeoff (get out the crying towels!), however, the rest of the flight was great, and we waited with bated breath for the statisticians to compile and post my flight score. Turns out I didn't get high enough for third, but my 2401 flight score did



move me up to the first alternate spot in fourth place.

At the control line circle, the third round was rather uneventful, with Perez further cementing his grasp on first place with a 2231 flight. Charlie Bauer, piloting his Mitsubishi Zero from the Top Flite kit, finally had everything work right for him, and his fine flight of 1698 moved him up into fifth place, the second alternate spot. Charlie's Zero featured a unique electronic system utilizing seven servos in the aircraft. He uses four servos for retracting gear and gear doors, two servos for flaps and the last servo for a fuel tank drop.

Along the same lines (no pun intended) of utilizing electronic controls in a control line model, Clancy Arnold flew a P-38 Lightning featuring his own design "U/Tronics" system. Clancy's servos in the airplane operated individual throttles, brakes, retracts, flaps, and landing lights!

Ed Rhoades, flying the same AD-7 Douglas Skyraider that he competed with at the Westover Nats two weeks earlier, held on to the fourth place position, first alternate, which he attained with his first round flight of 1636.

As the dust settled after the third round, everyone gathered over the R/C site for the awards ceremony. We were joined by the manager of E.P. Sawyer Park, Rita Stosberg, a lady whose warm personality and professionalism are





exceeded only by her attractive smile. Rita has been checking with us periodically all weekend long, helping to ensure our stay was a pleasant one, and she was gracious enough to speak at the awards ceremony.

By this time everyone knew the outcome. In control line, the team members were to be Jeff Perez, first, Mike Gretz, second, and Ron Sears, third, with Ed Rhoades as first alternate, and Charlie Bauer, as second alternate. In R/C, the team members were to be Skip Mast, first, and Bob Underwood, second, and Steve Sauger, third, with Cliff Tacie as first alternate, and Bob Wischer as second alternate.

One of the stipulations from AMA when the team trial proposal was approved was that a team manager be appointed at the event. With this in mind, prior to the event, Bob Underwood passed out forms for all contestants to complete, part of which was a question as to whether the individual contestant would accept the job of team manager. In addition to those present who indicated a desire for the position, the names of several other individuals qualified for the job by their involvement in FAI scale activities over the years were placed on the list of prospective candidates.

After the awards ceremony, a meeting of the team, R/C and control line, was held, and the team members and alternates voted for their team manager. I

feel highly honored to be able to say that I was elected to that position. In the event that one of the three R/C team members cannot make the trip, and I move onto the team from the alternate position, Dolly Wischer has graciously agreed to take over the team manager position.

Now that the trials are over, it will take a while for it to "sink in" to some of the members that they really are on the team, and that they are now shouldered with the responsibility of representing the United States in the 1984 Scale World Championships in Paris. I'm certain they will carry the responsibility well. We could have one of our best team yet. From the standpoint of being competitive, our guys are tops. The R/C team will have 30 percent, 25 percent, and 20 percent aircraft (Bob Underwood is near completion on his latest project). The control line team has a 30 percent aircraft (Perez), Ron Sears is near completion on a 20 percent aircraft, and Mike Gretz is talking seriously about a four engine aircraft with retracts (30 percent). If our team does travel to Paris with high complexity bonus models, we stand an excellent chance of bringing home a world championship win to the U.S.

Once again, a heartfelt thanks from all the participants to the Kentucky State Parks and all the clubs previously mentioned who combined to make this Scale Team Selection Trial probably one of the most purposeful ever held. An additional thank you is owed to those companies who were generous enough to sponsor the beautiful walnut finished plaques which were awarded through fifth place: Ace R/C. Byron Originals, Dave Brown Products, Kittyhawk Models, **Model Builder**, Robart Manufacturing, Sig Manufacturing, and Top Flite Models.

Best of luck to all the members of the team. Paris . . . here we come!

Ida Grove Continued from page 11

as 50 miles away. We were lucky, staying in Ida Grove's only motel, just 300 yards off the end of the R/C field, but the airconditioning didn't work that well in our room. Sunday, we spent all morning at the Midwest Industries end of the airport. Again we missed our ride in the superclean TBM "Avenger", as the pilots decided to take off, do their fly-by of the R/C field, and then head for their respective home bases, without landing again at Ida Grove. Curses!

On these last fly-by passes, it was a pity that scale flight judges could not have been present to watch the very "scalelike" four-point rolls performed by Rudy Frasca, of Champagne, Illinois in his P-40, which starred in the movie "1941", and by Dr. Lou Antonacci in his F4-U Corsair. Each pilot pulled the nose of his ship up to about 20 to 25 degrees above horizontal before rolling to knife edge. The inverted "point" was at the curving top of the arch, point "three' was knife edge at a 15 to 20 degree downward angle, and "four" was accompanied by a gentle pull on the stick to level flight. A really thrilling sight to seel

Well ... what about the models and the modelers? The nearest estimates, based on pre-registration, and adjusted to account for last-minute cancellations, no-shows, late-comers, etc., put the total number of fliers at around 325, and the aircraft at a little over 400. Our own surveyal of the aircraft was limited somewhat by the amount of time spent in our exhibit booth and trying to find a place that was cool ... there was none!

The majority of the aircraft came from kits or plan services, with just enough original designs to keep you looking. Super-big-to-the-point-of-monster aircraft were at a minimum, the only really noticeable ones being Bob Campbell's C-133 and B-29, and Carroll Cheek's 15foot span (half-size!) Pober Pixie. But I gotta tell ya, in spite of my strong feelings about the legal aspect of big, nonman carrying aircraft vs. models, that Pixie really grabbed me! As I walked over and reached out (not down out!) to touch a wingtip of this 6-1/2 H.P. Hornet powered model weighing 50 pounds, I was really impressed. And the realistic flight characteristics of this aircraft from Buffalo, Texas, just have to be seen, as it would take someone with Hemingway's writing capability to describe it in writing.

Another Texan, Kerry Hurt, flew a beautiful 32-pdound F4-U Corsair in Olathe NAS markings. From Ziroli plans, with Aero Marine retracts (yeah, Gary actually delivers some once in a while!), the "Bent-wing Bird" is powered by a Byron P-51 drive unit, with Quadra engine and Byron propeller.

Incidentally, a Byron P-51 being flown by someone (sorry, missed the name) who was hot-dogging too close to the ground, completed the fourth point of a four-point roll into the corrugated aluminum side of a building housing Byron's ultra-lights. When the debris was brought back from the ground below the large gash in the building's side, the Byron-Drive unit was still intact and spinning freely, being wind-driven by the completely undamaged fourbladed Byron propeller! The aircraft itself was somewhat less intact...

Naturally, we had to stop and chat with Dick Parshall, of Holcomb, New York, who brought a Quadra powered Gipsy Moth built from our plans. The Gipsy towed a banner, and occasionally, Snoopy would bail out of the rear cockpit and parachute to a safe landing.

Larry Scott brought his Waco Taperwing as featured in **Model Builder** back in November 1981. It's still going strong. He also brought his nearly completed D.H. Mosquito. Primarily constructed of molded fiberglass, it will be offered in partial kits by Larry once it's been checked out. We'll keep you posted.

There was a Davis DW-1 that caught our eye. Searching around for the owner/builder brought a pleasant surprise. It was Don Neill, Lincoln, Nebraska, who competed at the Nats in the early days of R/C scale. Any old timers remember his Boeing B-9 bomber at the 1962 Chicago Nats?

Another interesting model was the "Razorback" P-47D Thunderbolt, the "Golden Gopher". This is a prototype for the latest Byron Originals kit, being developed by Ken Bundt, and due to be out before the end of the year. For direct-drive Quadra or equivalent power, the "Jug" is a surprisingly easy model to fly, as demonstrated by Ken Bryant. Its best mechanical feature is quickly demountable wing panels, which separate at the root after backing off two bolts. The aileron and flap linkage, plus the air connection for the retract gear, all separate in unison when the wing is removed, and reconnect as the wing is plugged back on ... as quickly as we describe it here. Makes for easy transportation without the necessity of investing in a van or trailer. A later model "bubble-top" version is not far downstream.

Of course, both of these are to be preceded by the beautiful Beach Staggerwing Model G, which is featured in this month's Byron ad. The Staggerwing biplane production was delayed this summer by an RPV project, but as visitors to the plant during the Fun Fly could see, it's in full production now, and as of early September (as this is written) needs only the retract gear parts and instruction manual to complete the package. This was pretty much Ken Bryant's project from beginning to end. Yes the retract gear will be a part of the kit. You do not fly a Model G Staggerwing with fixed gear!

As of this date, no plans have been made for next year's IMAA Fun-Fly. As mentioned at the outset of this article, there were mixed opinions by IMAA officials. Some want to limit future Fun-Flies to just that . . . fun-flying, with no full-size show, trade exhibits, etc. Others felt the outstanding, though nonmodeling attractions provided by the Byron Originals organization brought tremendous exposure to the IMAA, but not the right kind. Byron Godberson, for that matter, has certain reservations about continuing the combined effort.



The bucks he contributed to the festival, to say nothing of the time, the planning, the facilities, the financial risks, are not the types of things that can go on forever.

It could be we will see two, smaller, totally model-oriented affairs next year ... one in Ida Grove and one ... well, who knows where.

R/C Autos... Continued from page 47

them on a pan car . . . further details in a few paragraphs.

Hey, you don't have to believe me about these new tires from Associated and Delta! A recent "trumor" passing through the Dirty Phone says that Delta has bought a bunch of rear rubber from Associated. And another "trumor" says that Associated will soon offer a new front tire "very similar" to what Delta has in the 324 series. These two companies are in competition with each other (that is obvious) and have completely different philosophies in most areas...but what works is all that counts when it comes right down to it.

For those not paying attention, the release of accurately graded front tires that do the job and still wear acceptably is great news for us tire freaks. If the track looks a little slick, slip on the stickiest rear tires you've got and maybe a set of 324Cs in the front. If after a few

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laps the car is pushing too much but the back end seems OK, simply go to 324Bs in front. With experience, you can actually watch other cars practice and know just what combination to put on your car. All you need is a selection of tires like that offered by both Associated and Delta... and a lot of experience!

OH THOSE PAN CARS!

I just came back from MRP a few hours ago, and Gary Kyes was last seen heading to the "Thrash Room" with several pair of Delta's 324B fronts in hand, fresh off the UPS truck. Gary, as well as several other racers here in Seattle, have been pushing the MRP Pro-180 to new levels of performance, thanks to these new tires and adoption of current thinking in 1/12 scale chassis.

Gary is presently using a five-degree "reverse" shim under the front cross bar which reduces caster from the stock 12 degrees to 7 degrees. As with the newer 1/12 cars, reduced caster helps the car turn in better. Then to keep the car on line coming off the corners, Gary is using Delta 324B or C front tires. This is a combination that really works on the diff-equipped Pro-180. At the '83 ROAR Nationals, Gary had everybody covered like you wouldn't believe in the Pan class ... winning going away and really smoking while doing so. As far as our local club races ... don't ask, please!

For rear tires, Gary is softening standard MRP D rears (here we go with yet another rubber grading system) in a homebrew mix of turpentine and oil of wintergreen. Associated's Yellow Dots would be the hot tip, Gary just doesn't have any on hand. Jeff Belcher, another hot Pro-180 racer locally is using two of the shims, cutting his caster to only two degrees. I would suspect that the same tactic might work on other pan cars if equipped with a differential rear end. **DELTA'S B.S. DETECTOR**

The meaning of *that* lead-in will soon become apparent ... Delta has a new electronic gizmo that the more serious racer of electrics will like. It is called the Delta DIS-831 Precision Discharger. With this magic tool, you can apply a constant and very accurate load to your battery packs, which (among other things) allows you to actually predict how long your race car can be expected to run on a full charge. You can also use it to quickly pick out a cell which has gone bad or to show how well (or poorly) matched all the cells in your packs are.

This is where the B.S. detection comes in. You see, Delta sells packs made up of matched cells; they test and grade each and every cell they sell. Buy a six-cell pack, and you can be sure that all the cells are very closely matched. Other companies sell just cells, and don't make any claims for having them matched. Still others sell what they claim are matched cells, when at-track use says otherwise.

How are you going to be able to tell who is selling you truly matched cells? They generally cost more, after all, so wouldn't it be nice to get what you pay for? No problem, you just whip out the ol' Delta P.D. unit and it tells you in no uncertain terms! This thing is better than a lie detector!

Lately, I have used this unit on some older battery packs that I own. I was able to break them down into rated cells, reassembling them into new packs that are much more closely matched . . . in addition to locating a bad cell or two. If you're serious, and you race electrics, this little "black box" is for you.

BETTER RACING

THROUGH CHEMISTRY

Delta has a couple of bottle products you may be interested in. The first is something they call Motor Dip and we call "sheep dip." What it does to sheep is not entirely clear at this time, however, it does nothing but good things to electric motors. Actually, I am not at all clear on what it does to the motors, let alone the sheep, but I have used this mysterious solution on stock class motors as well as tired rewinds, and all gradually or immediately (depending upon the motor) went faster. Hey, this stuff works ... try it.

The other product explains most of the funny smell in my shop. It is Delta's version of a tire dressing ... the same stuff Art used in winning his World Championship in 1/12 Modified. You simply aply it to the tires with a brush, toss the tire/wheel assemblies into a plastic bag, and wait until race day. About 30 minutes before the first race, brush on some more, wipe off the excess just prior to the start ... and go for it. The instructions on the can say to

The instructions on the can say to make the initial application 24 hours before race day, I have also heard of racers doing this 72 hours before the race. Enclosure in a plastic bag cuts down on evaporation... and the smell! The effect is to soften the tires an easily noticeable amount which on the race track gives more traction. Rear tires only get this treatment, you are asking for trouble if you use this stuff on front tires.

That's it for this month . . . more goodies next month!

F3B Champs.. Continued from page 26

(4th). Dave Worrall of the UK was in third. Dave's speed time, by the way, was 22.2 seconds.

Lest I give you the impression that the Germans were always the top three or four scoring pilots in each round, I must tell you that they weren't. A round-byround scrutiny of their scores tells the story: Ralf Decker finished 1st, 1st, 7th, 4th, 9th, and 5th for a 1st place overall; Dr. Quabeck finished 4th, 7th. 1st, 12th, 3rd, and 21st for a 2nd place overall; Reinhard Liese finished 2nd, 2nd, 11th, 2nd, 15th, and 9th for a 4th place overall. Each contestant was allowed a throwaway round. These scores may not look very consistent, but believe me, they are compared to most of the better pilots.

So, Bill, what were they flying? Glad you asked. By now you've looked at all the pretty pictures in this article so you must surely have some idea already. What I'm going to do now is fill you in on a few more details.

The winner, as I said, was Ralf Decker ... so I'll start with his airplane.

Ralf's airplane has no name. Pity. Ralf's plane was a work of art. It had more features both physically and electronically than any other plane on the field. (Quabeck's and Liese's were close, however.) It also had more man-hours (I think) invested in mold making than any other. I'll begin with a description of the fuselage and save the juicy wings for last.

Ralf uses a removable nose cone instead of a canopy. This, however, wasn't unique to his glider as the Australians all used this method with their *Marjalis*, and Andy Keil and Nord Gerneke of South Africa used it on their

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aircraft. (There may have been others.) Ralf has a vertical, fiberglass sandwich backbone inside the nose cone which gives it its support and doubles as a servo tray for all five servos in the aircraft.

When the nose cone was securely screwed on, it was under preloaded compression against the fuselage and touching the backbone . . . a very strong combination. It appeared that Ralf's fuselage was perfectly circular in cross section. I would guess that either the nose cone was part of the original fuselage and was cut off, or that it was molded separately (a la Marjali). If it was cut off, then the fiberglass flange or bulkhead that held the backbone in position was molded separately and epoxied into place afterwards. If the nose cone was molded separately, then the bulkhead/flange was molded as part of the main fuselage.

As I said, all five servos are located through the fiberglass backbone which serves as a servo tray. The pushrods pass through holes in the molded bulkhead. One pushrod from the spoiler servo operates two bellcranks and two short connecting rods to the spoiler surfaces through the wing. If you look carefully at the photo of this setup, you will see the connecting rods and the holes in the wing's lower surface. As nearly as I can tell, the spoiler servo also released the tow hook which was actually the ball and socket variety. One servo actuated the rudder, one actuated the elevator, and two servos actuated the two flaperons (one per).

The tail feathers were all molded fiberglass...you shouldn't be surprised. The stab halves were molded separately (right and left) and mounted in T-tail fashion. The rudder was likewise molded and had a knuckle hinge joint.

Now for the wings . . . In spite of the fact that Decker's plane's wingspan was 2.8 meters (110 inches), it was molded in one piece! By that I mean the span was unbroken, as the wing was molded in two halves, top and bottom. Because it was molded, the wing doesn't need a foam core to hold its shape. The wingskins are a sandwich of fiberglass, Rohacell foam, and fiberglass. When the skins are cured, they retain the shape of the mold indefinitely.

The spars in Ralf's plane were very interesting. I can't tell you exactly how they were made, but I can tell you what they looked like, and that they too were molded. The spar caps were totally carbon fiber. By my eyeball measurement, the caps were 1/8 in. by 3/8 in. The shear webs were a composite of the white, open-cell, Rohacell foam wrapped in what looked like two layers of two-ounce fiberglass cloth. The F/G did not wrap around the spar caps as you would think it should. It is my opinion that these wings were strong enough to stand up to the U.S. team's winch, in spite of its "thin" 8% section. The spoilers were simply cut out of the wing skin with a very sharp knife. They were hinged with 1/2-inch wide, mylar adhesive tape and one Robart hinge point at the driven end.

Roll control was accomplished by full span flaperons. The flaperons also handled the job of changing the wing's camber for the different tasks. The flaperons were a constant width (49 mm) all the way to the tip. With the wing chord tapering from 250 mm to 210 mm, it was necessary to increase the airfoil thickness at the tip so that the aluminum arrow shaft knuckle hinge could remain a constant depth. The airfoils used were Quabeck sections: HW 2.5-9 (tip, 2.5% camber, 9% thick), and HQ 2.5-8 (root). According to the three-view I have, the sections were modified. The flaperons were driven at the root end by a metal control horn which protruded into the fuselage. No flutter was observed as the flaperons were mass-balanced inside the fuselage.

Electronically, Decker's model was very sophisticated. Ralf used the Simpprop Acapulco system. With this radio, Ralf was able to mix the flap and aileron function into one surface (flaperon). He was able to adjust the differential throw of the flaperon to eliminate adverse yaw. When Ralf used the flaperons as camber changing flaps, the radio automatically corrected for the pitch change by adjusting the elevator. In speed runs, he was able to flip a switch on the end of his control stick and get flap coupling to the

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elevator (in opposite directions) so that a pull back on the elevator control dropped the flaps and brought instant split-S turns. At anytime, Ralf could disengage the flap mixer or coupler.

When the spoilers were deployed, the radio automatically corrected for the pitch change here. Aileron/rudder coupling was also used and could be switched on or off. The Simprop also featured one programmable function. I don't know what Ralf used this for, but it was probably for the split-S turn as it requires split-second timing to do successfully... the plane is in and out of the turn in 0.8 to 0.9 seconds!

The number two finisher at York was Dr. Helmut Quabeck. His airplane was set up a little differently than Decker's was. First of all, it was noticeably bigger at 3.2 meters (126 in.). Dr. Quabeck's model (called Dohle '83) had a standard, low-fin positioned, all-moving stab. It also had separate flaps and flaperons. The Dohle '83 uses the Quabeck 1.5-8 and 1.5-9 sections. (You were expecting an Eppler, perhaps?!!) Helmut relied on his trimmable trailing edge (or camber changing flaps/flaperons) for different conditions and tasks.

The Dohle '83 has a more conventional structure. It is foam core and wood veneer sheeted, with a light fiberglass cloth over the veneer. It has spars and wing joiner rods. The hinge is aluminum arrow shaft material, knuckle style. The flaps and flaperons are driven by servos buried in the wings (one per surface). A short connecting pushrod attaches to a control horn on each surface and the servo output arm which sticks out of the wing's lower surface. These four rods are not faired at all, they are fully exposed.

The fuselage is a molded fiberglass front section mated to a tapered fiberglass fishing rod blank of about 3.5 cm (1-1/2 in) diameter at the front. The fin is molded fiberglass and is mated to the fuselage tail boom. The rudder appears to be veneered foam core. The stabs are probably veneered foam also... at least they looked that way.

Helmut's radio mixed the flap function into the ailerons, coupled the flap function to the elevator to compensate for pitch changes, and probably more, I'm sure. The Dohle '83 has no spoilers.

The third place finisher, Dave Worrall, also flew a more-or-less conventional F3B model which he calls Plus Task '83. Its structure was blue foam core with carbon fiber reinforcement over the foam, and wood veneer over the foam and C/F. Dave also had a fiberglass skinned version. On this version it was possible to actually see the carbon fiber through the semi-translucent fiberglass skin. When I asked Dave if there was a spar in his wing, he replied that there wasn't. At that point, I noticed the dark, tapered areas which I assumed (correctly) was the carbon. It was about 2-1/2 inches wide at the root and tapered to a narrow point about two-thirds of the way out to the tip. Because the Plus Task has a one-piece wing, joiner tubes, wing rods, etc., aren't needed.

The Plus Task has a wing that has 116 inches of span, 850 square inches of wing area, 15.5 to 1 aspect ratio, an empty weight of 60 ounces, and a wing loading of 10.2 oz/ft.² As far as I know, Dave used the Eppler 193 airfoil section (as did the two other UK competitors, Bannister and Blanchard). Anyone who thinks the E-193 is outdated had better look closely at the facts. Dave had the second fastest speed time of the six-day event at 19.7 seconds (his other times were: 22.2, 28.1, 21.8, and 25.5). Consistency is a product of handling and pilot skill, so what these times tell me is that the E-193 can be competitive in speed, even if Dave didn't fly his best in all speed runs.

Part of Dave's success in speed with a sparless, one-piece wing may have been attributable to his ballast system. Dave loaded some ballast in the fuselage, but most was located in the wing tips. The reason behind this goes against the common practice of keeping the wing tips as light as possible to keep the plane responsive to roll control. Dave's reasoning was that the farthest away from the center of the wing was the best place to put ballast which could possibly overload the strength of the wing's sparless structure in a high G maneuver. His defense of the slow roll argument was that at the speeds that the plane flies, this just wasn't a factor. In fact, it actually helped him fly more smoothly. It makes sense to me. In the photo, Dave is seen loading ballast into the wing tip tubes of the Plus Task.

The fourth place winner of this year's World Championships was Reinhard Liese, Reinhard's plane, the Milan II, was another F3B model which was not outrageously high-tech. Like Decker's model, Reinhard's used flaperons and spoilers. Unlike Decker's model, Reinhard's flaperons were driven by one servo inside each wing located at about 1/3 of the half-span. Also, Reinhard's spoilers were quite a bit larger than Ralf's in length, and they were mounted in the bottom surface of the wing very near the leading edge. This proved to be a very effective method of slowing down a large, fast, heavy model.

The spoilers were driven by very short torque rods which protrude from the fuselage. A small, metal control horn received the rod and had a set screw for making the connection secure. Like Ralf's airplane, Reinhard's plane had its ballast compartment accessible only through the spoiler bay. Lead-filled brass tubes were inserted into the fiberglass ballast tubes buried inside the wing as rifle cartridges are loaded into the side of the old western style Winchester saddle carbines. It is a very simple arrangement which is very convenient for last minute ballast changes . . . no more disassembling the wings or messing with lead shot, simply pop the spoilers and insert lead!

The structure of the Milan II's wing is blue foam and fiberglass skins. There is a spar inside the wing, but I don't know of which kind it might be. Because of the close proximity of the servo well and the spoiler bay to the most logical position of the spar, I would have to assume that the spar is very narrow, not more than 3/8 of an inch wide. The wing skins were laid up on a glass surface (as in window glass) and allowed to cure before applying to the foam core. The flaperon hinges were the arrow shaft, knuckle hinge type, very clean aerodynamically, and very tight and friction-free mechanically. Here again, no flutter was present in the huge flaperon surface at high speed.

If you look closely at the photo of Reinhard holding up the bottom surface of the Milan II wing, you will see the spoilers at full deflection, the ballast slots in each wing in the spoiler bay, the fiberglass fairing over the flaperon pushrods, and the two servos buried in each wing. Note the bulge in the wing skin where the servos are. Evidently, the servos are wider than the airfoil thickness and they stick out about an eighth of an inch. In spite of this aerodynamic "flaw," the plane did have the fastest speed run of the fifth round (20.3 sec.). 1 seriously doubt that this bulge affected the plane's performance in any noticeable way.

The rudder of Reinhard's plane was ingenious in its simplicity and function. It was molded fiberglass with a foam core. The fiberglass skins were fairly thin, but the foam gave them a great deal of rigidity. As the fin and rudder were molded in one piece, it was very easy to hinge the rudder. Reinhard used the tail's skin as the hinge material. A Vshaped notch was cut vertically on one side all the way through the tail to the fiberglass skin on the far side. This skin was left untouched. The resultant hinge was literally invisible on the left side when the rudder wasn't deflected. The right side of the rudder had a radius added on to it so that it almost wiped the fin's trailing edge surface as it was deflected. Very clean.

The T-tail stab mount was also very simple and clean. The stab was also a fiberglass skinned, foam core, onepiece molded surface. Embedded in the bottom of the stab, and secured by a flathead machine screw and two locator pins through the upper surface, was a machined aluminum pivot block. This block extended down inside the fin and had a flathead machine screw "pivot pin" pass through it. I would imagine that both the sides of the fin at the pivot point and the skin of the stab over the pivot block were heavily reinforced with extra layers of fiberglass and epoxy. A pushrod came up through the fin and attached to the pivot block. This was actuated by a bellcrank at the base of the fin which in turn was actuated by a pushrod from the elevator servo.

Reinhard also had a pitch compensating elevator coupled with the flaperon which could be reverse coupled to give down flap when pulled up in a speed run.

I thought that Reinhard Liese's Milan II was one of the better flying planes at the contest. Certainly his fourth place showing in York and the fact that Reinhard is the current German national champion with this model indicates that it flies well enough!

Andy Keil of South Africa had a very nice flying F3B model which he calls *Skybird*. It features a molded fiberglass and blue foam skinned, hollow wing with carbon fiber spars and an Eppler 211 profile. The stabs were also molded, but with Kevlar skins over a blue foam core. I've included one or two photos of this model with this report. (Whether or not both are run with this report, is a different matter!)

Andy was a member of the 1981 South African team which placed third. He flew an identical model that year (at least in appearance) to a very nice sixth place.

Andy's plane performed very well in all tasks. His speed run in the second round was the fastest of that round at 21.7 seconds. If it hadn't been for a bad crash of his primary model in the first round, followed by a zero in duration in the second round, and radio problems late in the contest... that's alot of *ifs*... I'm sure Andy would have been right up there with the top finishers.

In the third round, Andy was the second best flier behind Helmut Quabeck, and he only missed first place in that round by 4.8 points. His speed runs were quite respectable: 21.7, 22.3, 21.6, and 23.7. It's a pity that we didn't get to see this model's full potential.

Andy's primary plane featured flaps and flaperons, spoilers, and CG shift as

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well as the obvious rudder and elevator. Like the Germans, Andy used electronic mixing and coupling. Whenever the flaps/flaperons were deployed, the transmitter adjusted the elevator trim to compensate. The same can be said of the spoilers, and the CG shift as well. Also, Andy could reverse couple the flap/ flaperon to the elevator in speed.

As you can see from the photo(s) of the Skybird, the tail volume is quite large. This is necessary for pitch stability reasons with the E-211 section. The wing is fairly low aspect ratio compared to most (13:1) and has a span of three meters (118 in). I liked the looks of the Skybird, it was unique, especially with those "gas tank" wing tips!

In my opinion, the Norwegian team had the prettiest F3B model of all. It is called the K.I.T.T. 193, after its four designers initials, three of whom were team members, and after its Eppler 193 section. What made the Kitt 193 different from most, besides its good looks, is the fact that two of the three Kitts had built-up balsa and spruce wings. I didn't hear of any other models that were so constructed.

The Kitt has a wingspan of 2.87 meters (113 in), a wing area of 58.8 dm² (911 in²), a 14:1 aspect ratio, a tailplane area 11.4% of the wing area, and an empty weight of 1.9 Kgms (67 oz) for a wing loading of 29 gm/dm² or 10.5 oz/ft². To me, these dimensions looked "just right."

So what happened to the Norwegian team? They suffered an almost 100% winch line failure rate in practice. During the competition, they didn't use a winch . . . they hand towed. Unfortunately, they were unable to launch to competitive heights.

The Kitt 193 featured what I like to call "spoilerons." Spoilerons are a combination aileron and trailing edge spoiler or dive brake. In use, they function normally as ailerons, plus they have the ability to deflect upwards to about a 45 degree angle during landing approach for glide path control. The spoilerons worked well. Best of all, the spoileron system is simple, and with the modern radios with mixers (or an on-board Christy Mixer from Ace R/C) the system is very easy to install.

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I believe that given a good launch, the *Kitt* 193 is a competitive model, and it certainly is within the building capabilities of most modelers. The *Kitt* 193 would also make an excellent AMA thermal airplane.

Well, I could go on and on about this contest and the airplanes that flew in it, but I've already said much too much, and I'm afraid that if I write any more I'm likely to get edited to pieces. So I'll leave you with the above, and if there is enough interest (please write in if you want to see more photos, etc.), I'll include more coverage as a small part of my monthly column. I hope that the above will profit you in your next design, whether it be an F3B machine or just an improved thermal flier.

Write to Bill Forrey, c/o Model Builder, Box 10335, Costa Mesa, CA 92627.



DECEMBER 1983 WHEN CONTAC



Cap 21..... Continued from page 33

The balancer in its present form is a little heavier and bulkier than it really needs to be. The main reason is that it was designed to be easy to disassemble so that experiments could be made quickly. For instance, I can run the engine without the balancer, take vibration readings, add the balancer, and take readings again within five minutes. **FLYING THE CAP 21**

For the first test flight, I enlisted the aid of Don Brown, as he has been flying a CAP 20 for the past three years. The first flight went extremely well, except for the glue joint between the brass tubing and the delrin connector which failed. Don noticed that the aileron neutral kept drifting, so the first flight was a short one. On landing we found that both ailerons were loose at the glue joint. Since then I have pinned the adapters to the brass tubing with 1/16inch roll pins.

To date, I have flown the Byron CAP 21 many times, and I like it more each time I fly it. As the last airplane I flew was a Banshee, and as I have not flown in four years, I am learning a completely different type of flying... I love it! Flying a 1/4-scale airplane is much more fun; I have found out that they exhibit a lot of the characteristics of a full-size airplane. I think the CAP 21 is the best looking airplane I have ever flown.

When I started R/C modelling many years ago, like alot of people, I would usually build just one of a given design ... then the next one would be something different. At one point I noticed that the fliers who were proficient were sticking with one design. So I built and flew four Senior Falcons, and I found that doing that made more sense, because what you learn through trial and error can be applied directly to the next airplane and consequently it usually flies great right off the bench. This is what I am going to do with the Byron CAP 21. What I would like to do is use the fiberglass method of finishing, but first I want to get this one flying as well as I can, then ballast it with an equivalent weight of the fiberglass method and see how it

affects the flight characteristics of the plane.

One of the biggest mistakes made by modelers is to just put an airplane together, take it out and fly it, and if it doesn't fly as if Hanno Prettner was on the transmitter, they say that the design is no good. Take, for example, the Banshee that I flew. Most of one summer was spent experimenting with CG location, control surface throw, decalage, and props. You would be surprised at the difference very subtle changes can make in the way an airplane flies. Once this experimenting was done, I flew the same plane for eight years, and it flew the same way every time.

The Byron CAP 21 flies very well already, and I expect that by the end of the summer it will be flying even better, then I can get started on the next one. This one will have built right into it, all the things I learned from the first one, plus more scale details.

Dear Jake Continued from page 6

Dear Jake:

I think you're the greatest thing to hit the model magazines in the last twenty years. Please accept the enclosed gift. —Enthusiast in Encino

Dear Enthusiast:

Thank you for the thought, but I really can't accept your generous gift. I am returning your wife under separate cover.

—Jake

Dear Jake:

I've written to all the modelling advice columns with the same question, and nobody has given me a satisfactory answer. Maybe you can finally set me straight. How come the hot shot Masters R/C fliers stand stone still while they go through a flight, and all of us novices twitch and squirm and jump around and try to but body English on every maneuver we do?

-Animated in Anaheim

Dear Animated:

The Masters fliers have learned to visit the Porta-John *before* they fly.

—Jake

* *

Dear Jake:

I've got a problem. I was flying my Class B speed ship the other day when I got a case of the hiccups. Everytime I hiccupped, the airplane did, too. As the hiccups got worse, the flight path of my ship got more erratic. The last hiccup was a beauty, and caused a crash that left only the aluminum pan from my airplane recognizable. This has happened to me before. In fact, you might say my condition is chronic. I've tried holding my breath and scare tactics, but they didn't work. Help!

—Hiccups in Hartford Dear Hiccups:

It sounds like you're hyperventilating. Try flying with a brown paper bag over your head.

—Jake

Dear Jake: Your answer to Hiccups in Hartford is ridiculous. How's he going to see what he's doing with a brown paper bag over his head? Boy, are you dumb!

-Fed Up in Frankfort

Dear Fed Up:

Dear Jake:

I stand corrected. Better make that a clear plastic bag.

-Jake

* *

I don't believe it! Your second answer is even dumber than the first one. Don't you know how many people suffocate from plastic bags every year. Morons like you have no business giving advice to anybody.

-Even More Fed Up

Dear Even More Fed Up:

You're right again. Hiccups in Hartford should see a doctor about his problem, and you should see a septic tank service about yours.

-Jake

F/F Scale Continued from page 55

found a beautiful red. It was a Corvette red called Spectre Red. The fellow behind the counter asked me if I was certain that this was indeed the color of my choice. His next remark I wasn't quite prepared to accept. This red was a mere \$80 a gallon! Needless to say, I went back to the color charts.

By the end of the second week, I was finally ready to paint. Painting an airplane in one piece is a whole lot different than painting individual components. I had rented a paint booth at the airport, and it was equipped with fluorescent lights. (You know what affect these lights have on colors.) After spending many hours of toil and sweat painting, the color I had chosen looked awful. I cleaned up and left, figuring that the next day it would look better after I got it out in the sunlight.

The next morning I got to the airport early to see if the color looked any better. Sadly, it did not. It was not a true red but a muddy looking one. It was a color that looked like it had been prepared by using scraps! I couldn't leave it like this. The whole airplane was water sanded again, and another red was chosen. This time the airplane looked pretty good. After the fifth week, the Bellanca was finally completely detailed and prepared for the long trip east. Thank God for a fantastic, and most understanding wife!! There is no doubt that I have all of the qualifications necessary to be an airport BUM!!

Jack McCracken and another friend of mine were to go with me, but Jack's boss had a serious accident that prevented Jack from leaving work. There were five airplanes and nine people who were planning on leaving the Corona airport together. There was a Piper Clipper, a Piper Super Cruiser, two Piper Cherokees, and my Crusair. On July 26th, the Clipper and Super Cruiser departed for our first scheduled fuel stop, Cedar City, Utah. A half hour later, the rest of us took off and headed north. I might add at this point that the northern route is much more scenic, with better weather, than going through Arizona and New Mexico.

We eventually caught and passed the two older Pipers, and waited for them at Cedar City. At this point, the amp meter on my plane was way above normal, indicating too much charging. I mentioned this problem to my pilot friends, and one suggested that I turn off the master switch after we got airborne to rest the battery. This sounded good to me. So, after taking off and getting the gear up, I switched off the master switch. What happened in the next few moments was enough to shake up my partner quite a bit! We experienced a loud noise followed by dense smoke appearing from behind the instrument panel! Instinctively, I turned the master switch back on. More smoke followed. Naturally, I set the bright red bird back down on the tarmac. We looked things over pretty good, and found the following had happened: an electric oil temperature gauge had shorted out when the master switch was turned off. When I turned it back on, my radio took it in the shorts because of the extra voltage the battery had from the excessive charging. In retrospect, I should have had my radio off so that this would not have happened.

Secure after checking all systems, we took off again. By this time our buddies were a bit concerned as we were too busy to let them know what was going on. Once airborne, we were able to explain what had happened using my second radio. The plan had been to meet in Rock Springs, Wyoming, and to spend the night there. Rock Springs is not an airport you want to take off from in the afternoon. It has an elevation of 6700 feet with temperatures in the high eighties and low nineties, which is not conducive for quick or safe take-offs. We were picked up at the airport and driven to a nice motel where the nine of us had an enjoyable dinner and bull session.

The next morning we departed with little difficulty, and we all headed for our next fuel stop, Sidney, Nebraska. Enroute, I noticed that the left cylinder head temperature gauge was reading too cool. Now what?

Wyoming is relatively flat on the route we were taking. but it is quite high above sea level. Laramie, for example, is around 7,000 feet. Cheyenne is around 5,000 feet, even Sidney is about 4,000 feet. We landed, fueled, and received the greatest hospitality imaginable!

Located on the Sidney field was a flight service station where we were able to get the latest weather enroute to Sioux City, which was our next overnight. The weather was not great, but it



wasn't so bad that we had to change direction. However, Oshkosh wasn't looking good at all, and it looked as though we should try to continue right on rather than spend the night in lowa. This latter decision would not be made until we reached Sioux City.

As before, the two older Pipers took off first, followed by the Cherokees. I was doing my mag check when the left mag indicated that it was completely dead. I had to taxi back to the flight line. The Cherokees saw that I wasn't taking off, so they came back. My buddies in the two Pipers headed on as planned.

Obviously, I was going to spend a few hours in Sidney trying to solve this latest glitch! Fortunately, there was a young mechanic available who was able to help me out with this dilemma. Of course, he was younger than my plane was old . . . this gave me pause for thought. Bellancas with Franklin engines aren't seen that often by the more modern mechanic.

After several hours, he was unable to pinpoint the actual cause of the demise of the left mag. After much checking and head scratching, he called a friend of his to give an assist.

As it turned out, of all places, Sidney has a technical school where they rebuilt all kinds of airplanes and engines! So, this friend of his, I suspect, was one of his former teachers from this school.

Finally, they isolated the problem. It turned out to be a bad coil.

It wasn't until 10:30 a.m. in the next morning that we were able to take off once again. The weather in Sioux City was not good at all, so we had to divert to Lincoln for our next scheduled stop. We did see numerous lightning strikes, but fortunately they were way off in the distance!

Waterloo, Iowa, was our last fuel stop before going on to Oshkosh. Soon after taking off, we were all talking back-andforth, when out of the blue comes the voice of one of my friends in the Super Cruiser. How could this be? They should have been in Oshkosh by now.

Well, as it turned out, the weather had deteriorated so much that they were not able to depart Sioux City until late the next day. Surprisingly, we all arrived at Oshkosh about the same time!

This year, for the first time, four of us go stayed in a private home instead of in



staying at the dorms. I had written to the dorms long ago, but they had been filled up. We had other choice except to stay in a private home... even the motels in town had been filled! We were given the second floor of this home, and we had the run of the house just as if it was our own. The lady who owned it was superb and quite a hostess. Even Bill Stroman and a friend of his joined us Saturday evening on. Needless to day, we had many sessions in the wee hours, talking about our favorite subject.

The next five days after our arrival were absolutely heavenly! Five full days and nights of airplane mania! There were airplanes, airplanes, airplanes... all sizes, shapes, ages, some very fast, others very slow, and many in between. Civilian aircraft of all kinds were displayed as were the beautiful war birds! Surprisingly, there were about 300 less registered planes than last year, but attendance was up again, somewhere around 825,000 people attended this most incredible week at Whitman Field.

There was no question that variety in both the experimentals and the antiques was lacking. The lower powered airplanes were much in evidence like Luscombs, Aeroncas, Cessna 120s and 140s, et al, with few of those lovely radial powered oldies. Regardless, it is a magnificent experience.

I talked to so many people about Bellancas and Franklin engines. One gentleman from South Africa was restoring a '46 Crusair from a basket case.

WHEN CONTACTING ADVERTISERS, THE 'EM MODEL BUILDER SENT YOU!



Believe me, his problems are numerous! In his country, he does not have as much latitude to do many of the things we take for granted here in our country.

Each afternoon there is quite an airshow, and this is an opportunity to see the war birds really perform. The sights and sounds of these machines are so impressive that one longs to experience the thrill these pilots must get from flying them. It is difficult to say which sound better, a powerful radial in a P-47 or the Merlins? I love them both.

Usually, after the war birds flew, we would take that time to visit the buildings where there were many vendors selling airplane paraphernalia. It is mind boggling . . . the amount and variety of stuff that we airplane nuts would buy if money was no object!

Beside the vendors inside the buildings, there is what is simply called, the Fly Market. This is similar to the most familiar swap meets which are so common these days. There are bargains, and there are bargains. It's one good deal after another for those in the market for all the necessities required for building or restoring airplanes. What a guy couldn't do with a bankroll and a truck to load up all of the acquisitions!!

Interestingly, among the forum tents were displayed the latest general aviation airplanes from Mooney, Beech, Piper, and Cessna. To be honest with you, these are great planes for those who like this type of machine. I just don't happen to get heart palpitations when I get around these airplanes. A friend of mine went over to a Bonanza which probably had everything you can hang on such a plane ... including air conditioning. The cost was a scant \$246,000!!! 1 couldn't believe it!

If I had the money to buy one of these luxury toys, I would rather have a Staggerwing Beech. a Cabin Waco, Bellanca, T-6, umm . . . what else? You would still have money left over to build a hangar to house all of the airplanes in. Oh well, it's fun to imagine. With prices like these, it isn't too hard to figure out why there is so much interest in homebuilding and in the ultralights.

One afternoon I was headed toward the Classic area, when in the distance I saw what appeared to be a giant model airplane being unloaded from this covered trailer. The closer 1 got, the more 1 was convinced that this was a model airplane. I could see through the fabric, and see the model-like structure. As it turned out, it was an ultralight of a Piper Cub. It was powered by a Cayuna engine, and had room for a single pilot.

I commented to the owner/builder how much it resembled a model. He replied that he had taken the Balsa U.S.A. quarter-scale drawings of the Cub and scaled every dimension three times. It worked! I wouldn't be surprised to see it sometime in the quarter-scale meet in Las Vegas.

There were many other incidences that made our five days seem like five hours! The new museum was very impressive, and is located handily on the field. This was another highlight, but space doesn't permit going into that.

We had planned to depart on Wednesday morning, but like all other previous trips, the weather decided differently. It wasn't untilabout 1:30 p.m. that we were finally able to depart Oshkosh. Fortunately, the trip home was uneventful and very pleasant. We finally arrived at Corona on Friday afternoon a bit weary, but with the best of memories!

How would I compare this trip in the Bellanca to the ones in the Charger? For one thing, it was 10 hours quicker one way than in the bipe. The Charger definitely provided more excitement, and I'm glad that I had the experience of flying a biplane that far. However, I do not plan to fly the Charger to Oshkosh again . . . that is, until I have three other Chargers go along to keep me company. You see, I have three friends who are presently building them!

Pattern Continued from page 36

plus the weight of the "muffler" caused the pipe to loosen and beat the aluminum washer to pieces. We also had to replace the set screws in the muffler. Our "fix" was to shorten the stainless steel exhaust pipe and replace the aluminum gasket with a copper gasket. This setup seems OK for now.

As maintenance is a necessary part of running an engine, we looked for an easy way to really flush the crankcase. So far, we have found that using a pressurized can WD-40, or similar product, and spraying it into the crankcase vent will work well *providing* you loosed the screws on the cam shaft cover to eliminate pressure buildup in the crankcase. Be careful in tightening these small screws!

What's needed is another breather (vent) so that you can flush the entire crankshaft area. Any convenient place should work.

That nasty old nitro and alky will draw moisture like honey draws flies, and the only way to prevent rust is to use a water displacing lubricant faithfully each time you use the engine. This problem is not peculiar to a four-cycle engines of course!

Adjusting the valves is easy, and the

only problem that I can foresee is some darned fool trying to set them with the engine running.

Will I buy another four-cycle? You bet! I understand there are a couple of other high power, low weight .90 and 1.20 types coming onto the market. I will probably have to sell the kid's dog to get the money to buy another engine but that's the price of progress!

R/C Boats . . . Continued from page 51

Prototype versions of the engine (pushing outriggers) have set straightaway records of just over 90 mph. The introduction of the K&B .67 will mark the first time in many years that an American manufacturer has attempted to produce a .60-size marine racing engine. I'm not an expert on the history of American made model racing engines, but it might be that the last American made .60-size racing engine was the McCoy 60 series. Maybe one of you model engine fanciers can set me straight on my facts. It will be interesting to see how the new K&B .67 fares during the 1984 competition season.

There is no release date even set for the proposed K&B .67 Outboard. The prototype of this engine was first run in mid-1983, and also demonstrated in an exhibition run at the "B.C. '83" contest. The .67 power head can be adapted to fit on the 7.5 outboard's lower end. Jack Garcia ran the prototype on a Prather 35inch Tunnel using dual servos on the rudder control. The engine was swinging an Octura X-455 without any problems. If there is a problem with this conversion, it would appear to be the area of noise level. The .67 outboard that Jack was running was hitting 100 dbs on the meter. This is higher than the N.A.M.B.A. noise limit of 95 dbs. It may take some reworking of the lower end exhaust to bring down the noise level to acceptable limits.

HOW ARE YOU DOING ON YOUR "PBs"

My PBs? What's Dunlap referring to, my powerboat?

Anyone who might be into running knows that PBs has nothing to do with a type of boat and everything to do with "personal best." Most of us involved in model racing tend to think in terms of how well we did when competing against others. Our measurement of success at contests is based on how well we performed compared with the performance of other participants in the event. You win races by beating the other contestants. There's no argument about that.

However, maybe you need to begin thinking about another type of winning. This type of winning has to do with beating yourself. No, I'm not talking about self-abuse here. I'm referring to your PBs or personal bests. Think about this for a moment ... Very few model boaters will ever set national records, but every model boater establishes a personal record when he, or she, races on a standard, measured course. How many of you racers know your best times for each of the classes you race? I'm talking heat racing times, not straightaway, as more heat races are run than straightaway events. I was surprised when I posed this question to some of the members of the local boating club. Most of them never even thought of keeping track of their times in a race.

I know each of my personal bests because it is a measure of my progress or regression. At the last contest I entered, I turned in a 1:44 clocking with my 7.5 tunnel. That this time was eight seconds off the record is not as important to me as the fact that it was four seconds faster than I'd ever completed a heat with this boat. On this particular day, I lowered my personal best twice in the 7.5 Tunnel class. I was more excited about doing that than I was about winning first place in the class.

The 1984 racing season will soon be here. I would encourage you to begin thinking in terms of your own PBs. A very realistic measurement of achievement in this hobby is how you are doing with your PBs. Each heat presents you with the opportunity to set a new personal best. There are many races when, by the time I get to my last heat, about the only thing I can win is a race against myself. This can turn a basically meaingless heat into a new challenge. Go for it. Whadaya got to lose?

IT'S SHOW TIME

The lead sounds like an endorsement for a cable television network. Actually, it has to do with something that many of us have an opportunity to participate in during the winter, and that is R/C shows. Many of us enjoy displaying our handiwork at model shows. It gives us an opportunity to compare our building skills with other modelers. Let me state right now that I'm not a real gifted modeler when it comes to winning awards at R/C shows. I did, however, manage to win a third place award in one of the boat divisions at the Northwest Model Exposition a couple of years back. That there were only three boats in the class will give you some indication as to why and how I won that award.

At the 1982 Northwest Model Exposition, I took photos of boats I felt looked good. Most of them won awards in their divisions. Getting ready to compete in an R/C show can be much more time consuming than getting ready to enter a race. The winning boats had some common qualities. Those enterting their models for judging should consider these items.

The winning models paid attention to detail. I have included some photos of cockpits and engine compartments which give an indication of the intricate work that can be done on model race boats. This type of attention to detail gains points on the scoring sheets used by the judges. Attempts to replicate reality always attract attention. A person entering an R/C show for the first time needs to be cautioned that there is a



difference between detailing a model and decorating.

Although items like photos of the original, information about the original and the model, boat trailers, and attempts of make a pleasing display are not supposed to be consided when judging the model, such efforts certainly enhance the appearance of the model. There is no doubt that it takes a certain amount of skill and talent to create the interesting displays that help set off the model. Knowing that you have done your best to make your model ready for a show can be very rewarding in and of itself. If you happen to win an award for your efforts, all the hetter

SPEAKING OF R/C SHOWS...

The Third Annual Northwest Model Exposition is scheduled for the Western Washington Fairgrounds in Puyallup. Washington on February 4th and 5th. The event is now recognized as one of the "biggies" in national R/C shows. Actually, it is more than just an R/C show. Trains, control line, free flight. and plastic models are included along with all R/C aspects of the hobby spectrum. The event is sponsored by the Mt. Rainier R/C Society. Admission is free to those entering models and only \$2.00 for adults wishing to view: "A fantastic display of all types of models from Peanut Scale to Giant Scale." That quote, incidently, was from the NME promotional flyer.

Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498.

Hannan..... Continued from page 49

G3 or G4 pilots.

"I point out nevertheless an exception; REP (Robert Esnault-Pelterie), whose planes were covered with red cloth. The REP monoplanes were well-



known by their color. I met with REP at Cannes, in the home of painter Foujita, and he told me he painted his planes with transparent dope. Thus, the cloth itself was red.

"The planes of these times, Farman, Santos-Dumont, and Bleriot were uncolored. Their color was the one of the linen; that is neutral, becoming somewhat white by going old. This is all I know about this 'heroic' period. I hope my modest knowing will help..."

It certainly does, Jean, and we thank you on behalf of model builders everywhere.

THE GOOD OLD DAYS?

Jack P. Swaney, of Las Vegas, Nevada, feels that vintage model kits have been remembered with rose-colored glasses:

"The thing that always turned me on were the radial engines, instrument panels, and insignia simply printed on the plan with the legendary caption, 'Cut from plan and glue in place.'

"Golden Age? Not really. Those old kits were scale and engineering monstrosities, little more than caricatures of the real craft. I once tried to build a 12-

93





inch SPAD that was physically impossible to assemble. The top wing drawing didn't jibe with the rest of the layout. I still have the original plan after 45 years. Many suspected in those days that some manufacturers never actually built a sample model from their own kits ... THEY WERE RIGHT!" Rebuttals, anyone? **THE CO2 SCENE**

Bob Davis, working in conjunction with Bill Brown has developed a CO2 conversion kit for the Cox .020. The concept is to adapt these easily available engines to the quiet, clean, and easy starting characteristics of CO2. Capable of turning an eight-inch diameter propeller at about 6,000 rpm, the conversions open up new possibilities for School-yard Scale. Offered as accessories are an assortment of items including various size on-board CO2 tanks, filling devices, multi-tank manifolds, and charging cylinders. These are available in both disposable and refillable varieties. A stamped, pre-addressed envelope will bring you complete descriptive literature: Davis Diesel Development Inc., Box 141, Milford, CT 06460.

When responding to mentions in Model Builder, please tell them where you saw it, we can always use additional advertising! FULL-SIZE CO2!

One of the the lesser-known aviation

experimenting in France during the early 1900s. In 1960, he succeeded in making several short flights with a flying wing of his own design. This remarkable craft featured variable incidence for control, and a four-wheel undercarriage. However, its most unusual feature may have been its powerplant, a converted Serpollet steam engine, adapted for use with CO₂ Although running duration was short, perhaps three to five minutes, output was about 20 horsepower, enabling a large diameter propeller to be turned. Although Vuia's flights were brief (the best distance covered being 24 meters), they preceded those of the Santos-Dumont 14-bis canard, and were made in full view of other experiments, thus doubtless served to inspire them to greater efforts.

The Vuia is still in existance in the collection of the Musee de l'Air near Paris, and thanks to Michel Benicou, editor of *le fanatique de L'AVIATION*, we have a fine photograph of its "cockpit". Note the tubular steel construction, wicker seat, and steering wheel type control.

PARTING SHOT

Robert T. Smith, former Air Force pilot and author, has recently published a book entitled, *Building & Flying Rubber Band-Powered Airplanes*, and we particularly enjoyed this gem from it: "Aerodynamic laws were made by Mother Nature and discovered by man — not the other way around, as some engineers believe!"

Choppers Continued from page 45

fixed pitch ship) to learn on. Their simpler nature will allow better training with little initial experience. Conversely, if you live in an area with some competent pilots whom you trust, go with a collective pitch machine and have them set it up as I'll describe. This will give more flexibility in the long run as you'll be able to use one helicopter to progress through several different learning stages. OK, back to rotor rpm theory.

Let's say you have a Heli-Boy. It will fly fine at a main rotor rpm of 1200, 1400, or 1600. These are the three basic rotor speeds of the novice, intermediate, and expert levels. The more you look at it, the more sense it will make. Just looking at rotor rpm, a helicopter running 1200 will have 3/4 of the rotor speed of a ship at 1600, and it's fairly safe to say that the overall response time will be that much slower too. After all, the speed of response time is directly proportional to the control inputs, and a rotor spinning at a faster rpm will have more inputs (hence quicker response) in a given period of time. Notice that the control authority will still be there in each helicopter. The one with the lower rotor rpm will be slower and smoother in response time, yet still have control authority, just what the beginner is looking for.

To give you a few examples of how this works, I'll draw from my own experience. In the fall of '74 dad and I learned how to fly on the Kavan Jet Ranger. We did this indoors in a local gymnasium where blowing wind and cold temperatures would not be a problem. The initial setup of the Jet Ranger was with a main rotor speed of under 1,000, or a tail rotor speed of 4,600 to 4,800. Any of you familiar with the Jet Ranger will realize that this is slow. However; this gave us more time to follow the ship's movements and correct without overcontrolling too much. We had a good cure for altitude control too. We set the throttle so only 3/4 to 7/8ths of the throttle barrel would be open at full stick. Essentially this gave us enough power to hover in ground effect. Anything over four to five feet was impossible, it wouldn't go any higher! So we both learned how to fly inside with this setup.

After we were competent with hovering, takeoffs, and landings, we progressed to the outdoors on calm mornings and evenings. We quickly learned what worked very nicely indoors didn't have the control response for outdoors, so rotor rpm was increased and we brought in all of the throttle barrel's movement at full stick. This gave quicker control response to fight the wind gusts with cyclic as well as collective. But I'm getting ahead of the story, back to the rotor speed examples....

To get more specific, here are the three basic setups, assuming that the helicopter will hover at 3-1/2 to 4-1/2 degrees of pitch and top out at approximately seven degrees of pitch. Novice:

Rotor rpm: 1200.

- Swashplate travel: Roughly half of total throw.
- Collective pitch range: 0 to +6 degrees.
- Tail rotor: Sensitivity as desired, although usually the novice will want
- a fairly soft response at first. Intermediate:

Rotor rpm: 1400.

- Swashplate travel: Half to threequarters total throw.
- Collective pitch range: -1 to +7 degrees.

Tail rotor: Sensitivity as desired. **Expert:**

Rotor rpm: 1400 to 1600.

Swashplate travel: Half to threequarters throw on low rate, full throw on high rate.

Collective pitch range: -2 to +7 degrees.

Tail rotor: Sensitivity as desired.

You can see that the slower rotor rpm of the novice will not quite get him in the main power curve of the engine, so he has to run slightly less total collective throw to compensate, which gives him a softer collective feel. With intermediates and experts, the rotor rpm is smack in the middle of the engine's power curve, so they can run seven degrees of pitch at the top end.

If any of you read the "Chopper Chatter" (March '81) on collective pitch, you'll understand that the low end of collective pitch will determine overall crispness in flight, and that the expert's setup will be the quickest and maintain the most constant rotor rpm. For those of you who haven't seen that issue, it's highly suggested reading.

I just thought of another important aspect of setup. Most of you out there won't have a tachometer to check blade speed, but there's a fairly easy guide to get in the general area. The novice blade speed will sound "slow", engine will run at a fat two-cycle and four-cycle once in a while with the engine blowing lots of smoke. The intermediate blade speed will sound "just right", the engine will run at a fat two-cycle all the time, and will blow noticeable white smoke. The expert blade speed will sound "high" or "wound up", it will give you a slightly scared feeling, the engine will be running at a noticeably higher rpm, and it will be blowing fairly light smoke. I know you have to have some exposure to running helicopters to get the general idea, but it doesn't take long to get it.

SETUP OF MAIN ROTOR

Obviously, the degrees of main rotor pitch you run will influence the blade speed. An average setup for a Heli-Boy or Competitor at near sea level would be 4-1/2 degrees for novice, 4 degrees for intermediate, and 3-1/2 to 4 degrees for expert. These pitch settings are only relative guidelines as many other variables influence where the helicopter will hover and at what blade speed. Some variables are: The helicopter's weight; relative humidity; feet above sea level; high or low pressure in the airmass where you are flying; and the condition of your main rotor blades.

CYCLIC SETUP

Initial cyclic setup should be with the swashplate at 0-0. Then, if you are flying a clockwise rotor, tilt the swashplate a degree or two to the right, and vice versa for counterclockwise rotors. This will help compensate for translating tendency. For novices, using "half of swashplate throw" will work nicely, you can always increase or decrease throw a little if you want to. Some manuals will give swashplate throw in degrees, but it's

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tricky to measure. I've never measured swashplates in degrees, I just set it up by relative travel and eyeballing it. **SETUP OF TAIL ROTOR**

As various main rotor speeds and collective settings vary torque, the tail rotor will have to run more pitch to compensate for torque at slower rotor speeds, and less pitch at higher rotor speeds. After a while you can easily eyeball tail rotor pitch and get very close the first time. On a clockwise main rotor, if the nose goes left, increase tail rotor pitch, if nose goes right, decrease tail rotor pitch. On counterclockwise main rotor systems, if the nose goes left, decrease tail rotor pitch, for nose right, increase tail rotor pitch. It's important that you know which way to make trim changes before you go out and fly. In the heat of making adjustments the first couple of times out, it's very easy to tweak tail rotors the wrong way. In fact, it's easy to do it backwards most anytime....

RADIO SETUP

All trims should be neutral and swashplate actions should be double checked for correct reaction and proper throw. As collective pitch is increased, blade pitch should increase and the throttle must open up. If you are running mechanical mixing, the tail rotor pitch should increase as you add throttle. For clockwise rotor systems, left tail rotor will decrease pitch and right tail will increase pitch.

On the special helicopter radios that

include electronic mixing, make extra sure that everything works together. It's so easy to have the throttle and collective working properly with the tail rotor mixing backwards!

Some of you will be running gyros on the tail. If so, a 1,000 mah battery pack is highly recommended. A gyro running on a 500 mah pack along with the radio will run down a fresh pack in as little as three or four flights.

Well, it looks like I'm out of space for this month. Next month I'll pick up at this point and describe the trimming process and a little bit more of the philosophy of learning how to adjust your helicopter to keep up with your progression. Hope to see you then.

BIG Birds Continued from page 23

relatively flat wings ... and Rudy Arns, of St. John, Newfoundland, was one of the many to offer a better way ... a flat support.

Rudy says, "I have a Chevy van, and instead of using wing slings, I made two hardwood laths with flat aluminum ends screwed on as shown in the sketch. I covered the hardwood laths with a piece of carpet, and the aluminum ends fit down inside the structure of my van. Wings slide in and out with no worry, and the laths can be put in and taken out at will. I've carried two Citabria wings

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(112 in.) and a Nosen P-51 wing at the same time. Fuselages, of course, are stowed on the floor of the van."

Gotta tell you, gang, that at first I wasn't sure what Rudy meant by a "lath." His sketch seemed to indicate either something like a one-inch dowel or a one-by-two Douglas fir strip. Of course, my ubiquitous American Heritage Dictionary once again saved the day, letting me know that a lath could be a narrow. thin strip of wood or metal used to make a supporting structure. Voila! I just learned something new!

Anyhoooo, there were quite a few sketches sent in, and all were pretty similar. Some used large diameter dowels, while others, like Rudy, used something like fir strips (anything too thin would tend to bow, and possibly break). However, everyone had one idea in common ... to use foam or carpet remnants to cushion the wood with. Rudy didn't specify what thickness aluminum, but I'd imagine that something about 3/32 or 1/8 in. would be needed to support the weight of a number of wings. I like the flat support idea; it is an improvement over the nylon sling, so I'll probably switch over shortly.

BUFFÁLO RENEGADES

From Buffalo, Texas, come the "Renegades" (also known as IMAA Chapter 132 amongst the more genteel folks), a somewhat surly but redoubtable bunch of native Texans (all four of them), who are hot to trot. Led by "Grisly" Randy Getchell, who holds the record for clubdefecting, these "natural" Texans were initially thought to be a tad on the vainglorious side . . . but they have proven that they don't just run off at the mouth by successfully flying Carroll Cheek's half-scale Pober Pixie on the very same day that the IMAA granted them chapter status. "Grisly" Getchell, who's a medically retired airline pilot and has made "Renegade" synonymous with "Robin Hood," gave this purely objective eyeball account of the happening.

"We have completed the initial maiden (flight) of Carroll Cheek's 1/2scale Pober Pixie. The bird spans 15 feet and weighs 49 pounds "wet" (Carroll missed the estimated gross by one pound). The flight was FANTASTIC! Talk about scale flying! Wow!

She's powered by an American Seventy, and we used a Grish 24-10 which performed great. On static runups, Carroll was measuring 37 pounds of thrust. The entire airframe is built of paneling material, spruce, redwood, etc., with the cabanes and gear welded up with chrome-moly steel tubing ... and the gear is fully articulated and functioning. It works just great! The covering is Worldtex which has been painted orange and white with acrylic lacquer.

"I still can't get over what a sight it was. I've got to say that this has to be the most realistic model in the air that I have ever seen; it even surpassed that BIG P-47 we saw up at Cunningham's Fly-In when I met you there. There's just something about a great, big, graceful model lightplane easing around the sky! The landing was absolutely uuuuuumph! That bigger gliding in at about 20 knots and lightly touching down on the grass on all three points was the icing on the cake. Emotionally, it was too much to handle ... but no one was embarrassed because we all followed your sage advice and wore dark pants.

Getchell's photo shows how big this Pixie really is . . . and as you guys know by now, I've come down kinda hard on these BIGger ones 'cause all too often their wing loadings are disgracefully high. Why is it that the guys who get the hots to turn out behemoths are the same people who seem to have no understanding or respect for wing loading? In this case, the Pixie's 49 pounds is, to say

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l c an	ertily that the statements made by d complete Anita North	/ the above a	are correct

the least, a delightful gross weight. No wonder Randy was overcome by the way this BIG Bird lightly touched down on all three points; with a wing loading in the low twenties, she couldn't have been anything else but light and nimble on her feet. In fact, a BIG Bird with this kind of wing loading should be able to thermal very well. . . and might encounter problems getting down out of one of those all-too-frequent Texas "hatsuckers." So, anyone planning to build a really BIG BIGGIE should follow Carroll Cheek's example and keep the wing loading L-O-W.

We've seen too many "lead sleds" turned out by guys who were supposed to have had the savvy and the craftsmanship. The fact that their creations pushed hard on 100 ounces per square foot told me they should have stuck to building display models and hangar queens. A BIG airplane does not have to be a heavy airplane . . . and, in fact, shouldn't be a heavy airplane. If any of you guys want to know how Carroll managed to achieve such a dandy power-to-weight ratio, write in and I'll pass your letters on to

him; 1 know he'll be happy to answer any questions you might have. A lightlyloaded airplane is always a joy to fly! ZENOAH QUARTZ 2.28 CID

The UPS lady just brought one of Ernie Pritchard's (E&L Manufacturing, 8631 East Laredo Lane, Scottsdale, Arizona 85253; (602) 941-0633) reworked Zenoah 2.28 engines to my door. Ernie, who's done some nice things to the Evra, is balancing the standard Quartz, advancing the timing to 30 degrees for optimum running, and increasing the compression ratio. Also, he's replacing the Champion RCJ-8 (or NGK BMR 6A) with a Champion RBL-8 ... which he says makes the engine run better, and which I've discovered is fairly easy to get from better auto supply stores.

According to Mr. Pritchard, this Zenoah has got the Quadra beat all the way around: it's built better; has bigger and better bearings; a double-balanced crank; sports an electric ignition; and outperforms the Quad by a good 200 rpm. We'll see! Gonna try to have something definitive to say about it next month.

TIP OF THE MONTH

Everything east of the San Andreas Fault will eventually plunge into the ocean!

Al Alman, 605 168th Street, East, Box 95, Spanaway, WA 98387. Keep up the correspondence, gang ... and don't forget to let me know about any fly-ins or such so I can pass the word on to everybody else.

FLY SAFELY!

Indoor Continued from page 59

its sound and size.

One of the biggest hangups is finding rubber small enough to power these machines. Mine flew on .015 Pirelli, while Tony's flew on a length of round, grey rubber taken from a man's sock (or elastic thread).

If you intend to build Mr. Avak's flapper, I suggest that you build it twice the size of the plan, and *then* build it to the original size . . . if you dare!

FRENCH INDOOR PROXY CONTEST

Recently received word of an indoor proxy meet to be held in Flemalle. France. (Flemalle is near Paris, and is situated on the left bank of the river Meuse.) The classes were Peanut, FAI/ F1D, FAI/F1D for beginners, Easy B, and Pennyplane. The ceiling height was 36 feet. The organizers of the contest were soliciting both proxy entries and inperson entries from everywhere. The information sheets even listed camping sites, hotel accommodations, and meal locations with prices. I hope that I can get the information in time next year to make it known to my readers who may wish to plan vacations there or send models to be proxy flown. The dates for the meet were August 19, 20, and 21, 1983.

INDOOR FLYING IN CANADA Word from Jim Holland of Manitoba,



Canada, is that indoor flying is alive and well. The site is the local high school gym with a ceiling height of 18 feet. Most indoor activity is through the winter months (freeflight and R/C glider takes up the summer), and so the flight times are somewhat low. Flight times average: 10 minutes in Easy B, 31 seconds in handlaunch. 1:05 in Bostonian, and 1:30 in indoor scale. How do these times compare with those in your area?

If you wish to correspond to Jim, write to: Jim Holland, 7 Norham Rd., Winnipeg, Manitoba, Canada R3C 2E4.

NEW HANNAN PUBLICATION

Our own Bill Hannan has done it again! It wasn't enough that he wrote that great Peanut Power book several years ago, now he has come out with a new volume for scale buffs. My copy of Scrapbook of Scale, Three-Views and Nostalgia arrived the other day, and 1 immediately began to pore over its contents. This 56 page book contains 13 three-views of such aircraft as the Bleriot 25 (I'm building a 30-inch model of this one for our big scale meet), Farman 451 Moustique, and the Cierva C.4 Autogiro. Construction plans include: Blackburn "All-Steel" monoplane, and the Pilatus Turbo-Porter Peanut, plus more. An article on the Backward Gee Bee and the Barnwell Monoplane are only two of the 17 included. The attention to detail is very evident in each article.

I dare say that almost everyone who is involved in scale modeling and full-size aircraft and who scans the model magazines, knows of the vast knowledge which Mr. Hannan possesses. Only someone who dearly loves flying machines and anything pertaining to them could command the respect and admiration that Bill Hannan does. It is always a pleasure to read anything Bill puts his typewriter to, and an even greater pleasure to know himpersonally. You cannot go wrong in the purchase of this volume. I personally intend to collect any books Bill sees fit to write, and I hope you do the same. Great effort, Bill!

This 8-1/2 by 11-inch, 56 page book is now selling for \$8.95 directly from the author. The postage and handling charge is \$1.00. Send to: W.C. Hannan Graphics, P.O. Box A. Escondido, CA 92025, USA.

with an undercambered airfoil on their FAI power ships.

I like this whole series of sections because they combine good power control with a really outstanding glide. This section could be used with either D-box construction or fully sheeted construction ... in which case it would be useful for Rubber and Glider as well as Power. It should not be overlooked as a good, all-around utility airfoil.

BAMBOO THE BEAUTIFUL

Many new and exciting model building materials are coming on the scene every day. Now that we have 1/64 plywood, boron filament, beadboard foam, etc., we may tend to forget about one of the most useful and versatile modelling materials. It has been around since mud was new, and I find more uses for it every day. Of course, I'm referring to the wood known as BAMBOO.

Way back in the '20s and '30s, it was widely used for rounded wingtips and landing gear struts. Today, I use it for splints on broken longerons, for rear rubber pins, and for connecting rods on my ornithopters. Now, I've found that it works great for flapper spars, also.

Bamboo has much greater strength than balsa, and even more than most modelling hardwoods. Sometimes a length of basswood is substituted for balsa, and later on it cracks due to angular or weak grain. Did you ever see bamboo with bad grain or cross grain? Well, neither have 1. It is harder to sand and strip, but that superior strength makes up for its faults.

I taper the strip from 1/16 round to 1/64 round (for flapper spars) by scraping it lengthwise with a razor blade or Uber Skiver knife. The wood is rotated as it is scraped. It can even be soaked in hot water and baked around a cardboard form in a 300-degree oven to get curved outlines.

Where can you get bamboo for model building these days? How about your local super market. In the oriental foods section, you will find chopsticks large and small. In the picnic section, look for

All Full Size plans purchased from M Magazine include a reprint of the cons building instructions were part of the a SEND TO: MODEL BUILDER P BOX 10335, COSTA MESA, CALIFOR	NEW O Price includes First Class in seas Airmail (of total order or U.S. fund APO and FPO Include card of Add 5% to cree CALIFOR	RDERING INSTRUCTIONS a 3rd or 4th Class mail. For Airmail on U.S., add 25% of total order. For Over- includes Canada and Mexico), add 50% c. Remit by International Money Orders s on Overseas orders. Postage paid for orders. Master Card or VISA accepted number, expiration date, and signature edit card orders. Minimum order, \$5.00 NIA RESIDENTS ADD 6% SALES TAX
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barbecue skewers. In our neighbor- hood, a package of 100 sells for 99¢. Such a bargain! Occasionally, you will find a	son, 16052 Tulsa St., Granada Hills, CA 91344.	so the bunt serves to decreat incidence momentarily until the mo- has completed it transition.
camboo birdcage at a garage sale or hrift shop for a couple of dollars. This will net you enough bamboo for two or	Free Flight Continued from page 56	Now, from the pages of the "B Sheet" comes this version from Austra Note: Bill Gieskieng, also mentioned

BUNT UPDATE: JOE SUPERCOOL'S F1C "BUNDT CAKE"

Some months ago, I featured in this column a brief bit about power model bunt systems. The notion behind such systems is that as most power models are pointed straight up when the engine cuts, some manner of bringing the nose down before the glide would be helpful

after engine flood. There are three MODEL BUILDER

these pages recently, says that he be-

lieves the bunt system is not effective, or

at least not reliable for use on standard

The bunt and the rudder operate simul-

taneously about one-half second before

engine flood. This is different from the

norm, where rudder usually operates

Anyhow, here's how this one works.

F1C models.

98

three years of building. Try it. You'll like

it. Oh, yes! It's still good for wing,

rudder, and stab outlines (very thin

As soon as I finish this, I'm gonna start

pouring some of that new microfilm

solution obtained from Erv Rademsky at

the Taft Free Flight Champs. Write

comments and questions to Ken John-

lengths, of course) for some models.

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INDEX TO ADVERTISERS

Kimbrough Products	92
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Kraft Systems	31
Kustom Kraftsmanship	58
Lehmberg Enterprises 8	33
Leisure Electronics	35
Midway Model Co	78
Midwest Model Supply 8	30
Walt Mooney	94
Sid Morgan Vintage Plans	32
Novak Electronics	33
Nowlen Aero 7	77
Octura Models 7	73
Pacer Technology &	
Resources, Inc)1
Peck Polymers 7	8
John Pond O/T Plans95.9	37
Proctor Enterprises	30
Prop Shop, The	14
RLF Products	39
Robbe Model Sport	3

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levers, instead of the usual one or two, at the tail end. (Two are shown in the sketch.) The third is the glide stop lever and is normal in all respects. There is a tab added to the power lever at the rear, and the bunt lever is mounted on this tab. Another layer of aluminum sheet is attached to the power lever in order to provide a stop. If the sketch throws you, compare it with the pictures that show the system in its three stages. **NFFS PLANS**

For those of you who are not members of the National Free Flight Society, you may not know that the NFFS has a large collection of free flight plans, including most of the Top Ten Models of the Year. These are available at a reasonable price from Fred Terzian, 4858 Moorpark Ave., San Jose, CA 95129.

In addition to the Top Ten plans, NFFS has a good stock of other notable F/F designs as well. Fred recently wrote to say that the NFFS is searching for plans of other successful free flight designs to add to their list. If you want to be famous, and want to have your favorite design available to the world, drop Fred a line. He needs a clear three-view, or better yet, a set of full-sized drawings. No pay, but plenty of prestige awaits you for your efforts.

NFFS ADOPTS NOSTALGIA

NFFS President Tony Italiano has announced that beginning with the 1984 season, the Society will adopt the Nostalgia Gas movement. I guess that this means that the NFFS will sponsor it at the Nats and other major meets.

One of the major tasks facing Nostalgia is agreement on which rules to use. The two major hotbeds of Nostalgia action are in Southern California and in Indiana. Although the rules are similar, differences do exist.

Ralph Prey of the San Valeers (California) and Harry Murphy of the CIA (Indiana) have been appointed as the official drafters of the Nostalgia rules.

Here are a few of the differences to be ironed out:

1) West coast modelers (read: California fliers) permit the use of T.D. 049 engines, whereas the Indiana boys do not.

2) West Coasters fly a six-minute max, whereas the Indianans have a shorter max and less engine run.

3) West Coasters have a more liberal definition of eligible designs than do the folks from Indiana.

Other differences undoubtedly exist, but I'm sure that Ralph and Harry can work them out. Incidentally, we in the Northwest fly Nostalgia with threeminute maxes, 12-second motor runs for HL, and 15-second motor runs for VTO/ ROG. No T.D. or Schnuerle engines are allowed.

If you are interested in getting your two-cents-worth on the ground floor of this emerging national event, send the thoughts you have to Ralph Prey. 4859 W. 79th St., Inglewood, CA 90301, or Harry Murphy, 3824 Oakwood Blvd., Anderson, IN 46011. If you are just interested in flying the event, some great kits are available for the 1/2A Spacer, the A-B Spacer, and the 1/2A Zeek from Campbell's Custom Kits at P.O. Box 5996, Lake Worth, FL 34461. Lee Campbell has also recently purchased the R.M. Products line and will be out with Tom Hutchinson's designs in the future.

So, if you have been wondering where to get a kit for the Dragmaster, the Maverick 1/2A, or the Zingo FAI Power model, let Lee know of your interest. QUOTE FOR THE MONTH

"Nostalgia ain't what it used to be!"

I guess that's it for another month. Keep those cards and letters coming, keep building and flying, keep thermalling, and have a good Christmas and New Year. I'll be back in 1984... with more.

Workbench Continued from page 6

single student pilots in the front cockpits of the classic military trainers. Regulations stipulated soloing from the rear cockpit. Of course, it could be kind of arbitrary when you think about the old story concerning the commanding officer and his desk sergeant. "I don't care if it is pouring rain, go out and water the flowers. It's in the regulations!" For an airplane of the Stearman's gross weight and generous stability, it seems highly

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 - Use to remove acrylic, enamel, and epoxy paint overspray/use to "weather and highlight" paints.





unlikely that it could make much difference!

Anyway, we asked Bob for his comments.

"The harder you try, the harder you fall. My research was in the wrong place. Although I do fly classic tail-dragger aircraft, I haven't had a chance to fly a Stearman. My aircraft mechanic friend, Ron Rowland, owner of the J-3 Cub, subject of my January 1983 cover painting, says his experience with Stearmans has been rear seat solo, and I won't dispute the word from the Air Corps guys, that cadets soloed PT-13/17/18's from the back seat.

"I do have in my files several magazine photos from a mid-60's publication showing Stearmans being flown front seat solo, and these are what I worked from. Ron agrees that the aircraft is not so C.G. sensitive that it cannot be done, but the rear seat custom seems to prevail.

"How many of you full-scale pilots have ever trustingly followed the guys ahead of you in the pattern, gone through a let-down and landing, then discovered after a long roll-out, that you just landed downwind? It's the same kind of feeling."

PIXIE FOUND

In the August issue, we requested help on finding plans for the "Pixie" R/C biplane from an early American Modeler. Tom Ailes, of Valparaiso, Indiana was trying to locate them. The other day we came to work and found several cuttings from magazines, carefully encased in clear plastic folders, and slipped through the mail slot in our front door. Lo and behold, one contained the complete Pixie article from the February 1961 issue of *American Modeler!* A complete print of the plan, in reduced size appeared in the article. We're sending the clippings to Tom, and suggest that his local graphics repro shop should be able to blow the plan up, using the oneinch scale provided.

The kind helper in this case turned out to be Chuck Thompson, of San Clemente, California. He telephoned just today and admitted to being the one who came by over the weekend and deposited the goodies. Tom thanks you and I thank you, Chuck!

BOOK REVIÉW

Remember when you had to do those in school . . . book reviews? Used to hate 'em. Wonder if they still do it.

Anyway, I just finished perusing a book that I wouldn't have minded reviewing in school, but I'm not sure the teacher would have tolerated it... Just like the time I tried to give a review on a monthly episode of "G-8 And His Battle Aces", a pulp magazine of WW-I aviation adventure stories with some pretty wild plots. If you remember those at all, you're about ready for retirement!

Anyway, the book we're talking about is nothing like G-8. It's an enjoyable venture into the fun and foibles of scale modeling, as written, compiled, prepared and published by our "Hangarman", Bill Hannan, Box A, Escondido, CA92025. Under the title, Scrapbook of Scale 3-Views & Nostalgia, Bill has gathered new and previously published material of his creation, and arranged it into a delightful rambling of subjects on scale modeling. You'll find stories, reminiscings, construction articles with full size plans, a serious study on the art of researching, scale views and photos of interesting and somewhat obscure aircraft, a revealing article about the Cierva autogiros, and other miscellaneous items. It is clearly printed on non glareproducing paper and is profusely illustrated with Bill's drawings and many fascinating photos. You'll enjoy all 56 pages, whatever the price. Write to him for your copy. You'll be glad you did, no matter in what model category your scale interest lies.

STANDING ORDER

Whenever we publish a construction article that calls for molded fiberglass parts, such as the nose cone and wheel pants on last month's Quarter Scale Hawker Fury, we send off an advance copy of the plans to Tom Keeling, of T&D Fiberglass Specialties, 30925 Block, Garden City, MI 48135, phone 313-421-6358. This means that by the time you're ready to order plans and start building, Tom will probably have epoxy glass parts ready for you. Send \$1 for his ever expanding list of cowls, wheel pants, and ready-formed and welded wire landing gears and cabane strut assemblies.

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