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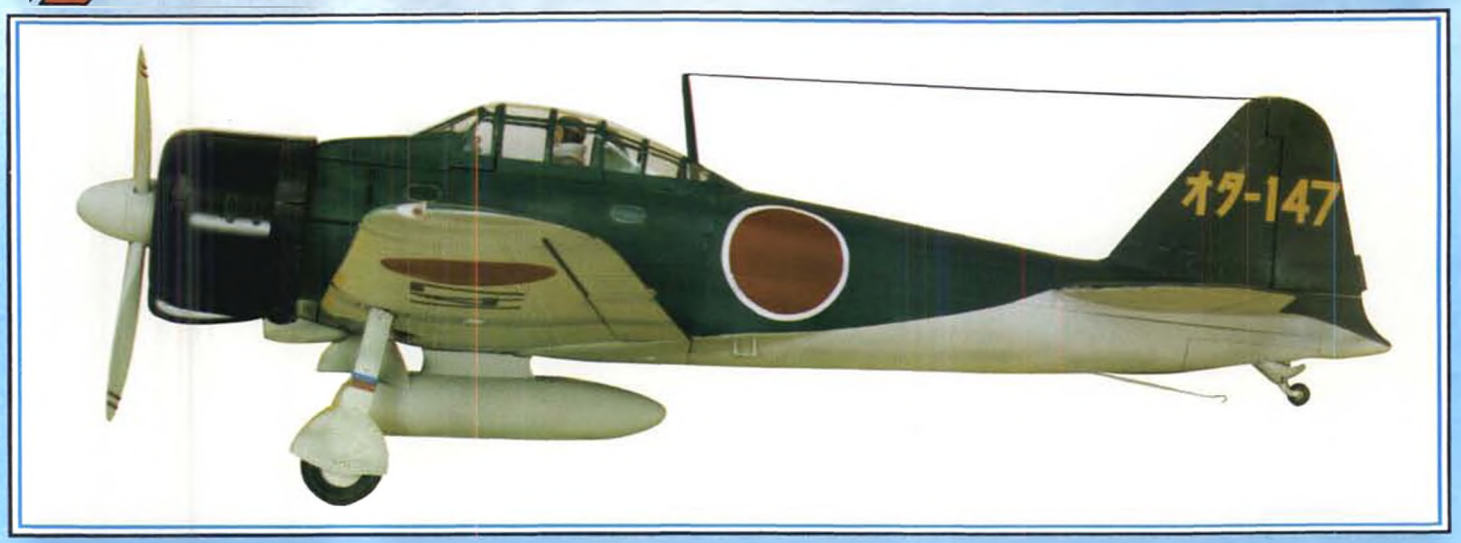
MODEL BUILDER

volume 11, number 119 $2.50 DECEMBER 1981

The R/C A6M2 Zero



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Kit RC-19, P47D THUNDERBOLT
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Kit RC-23, F8F-2 BEARCAT
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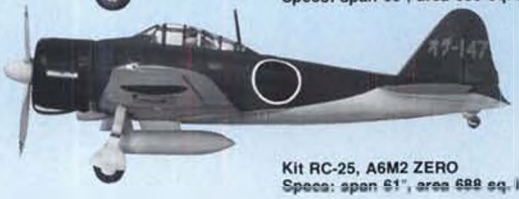

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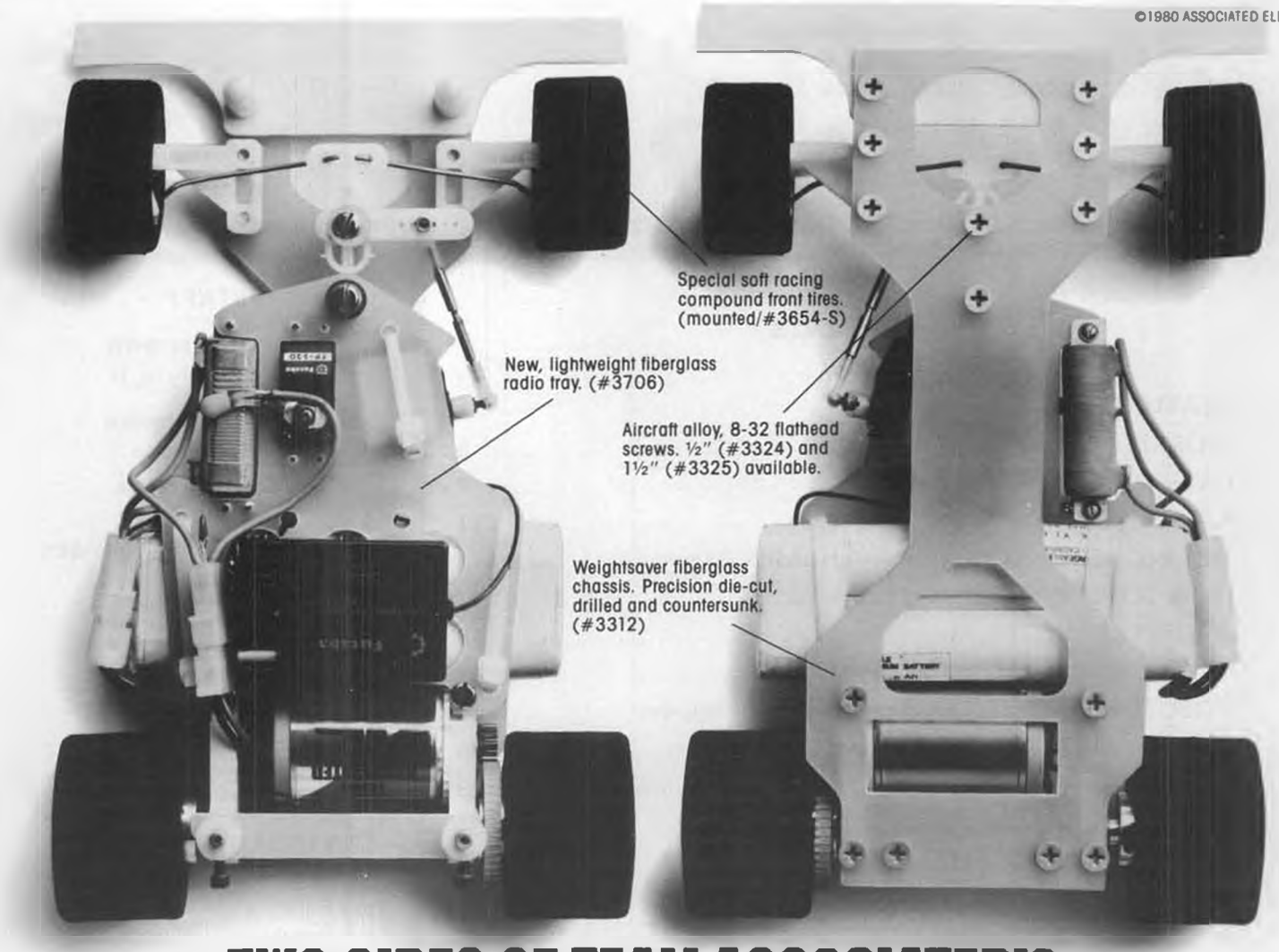

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MODEL BUILDER

DECEMBER

1981

volume 11, number 119

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CONTENTS

FEATURES

CONSTRUCTION

Cover: Ken Stuhr's F3B Class sailplane plays under the clouds of northwest Washington state. Called "Xingu", it is of contemporary design and construction. Plans and how-to-build article begin on page 24. Inset: The top three R/C aerobatic fliers in the world, at the 1981 Championships in Acapulco, Mexico (l to r): Dave Brown (2nd) U.S.A., Hanno Prettner (No. 1) Austria, and Wolfgang Matt (3rd) Liechtenstein. Photo by Bill Northrop.

MODEL BUILDER (ISSN 0194 7079) is published monthly by RCMB INC., 621 West Nineteenth Street, Costa Mesa, California 92627. Phone (714) 645-8830.

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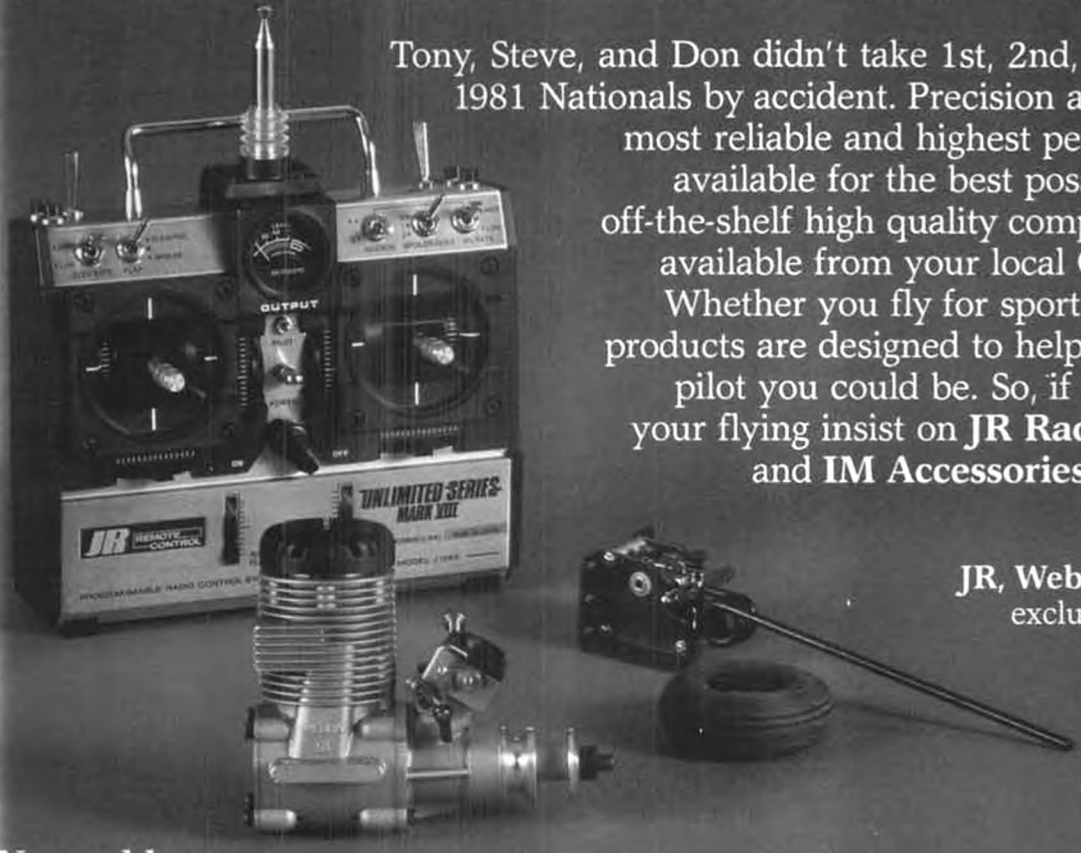
L to R: Tony Bonetti–National Champion, Steve Helms and Donald Weitz, Jr.

THE FINISHING TOUCH



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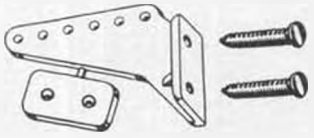

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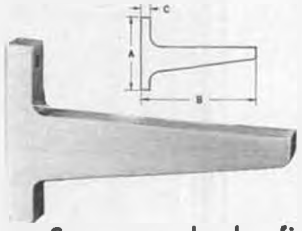

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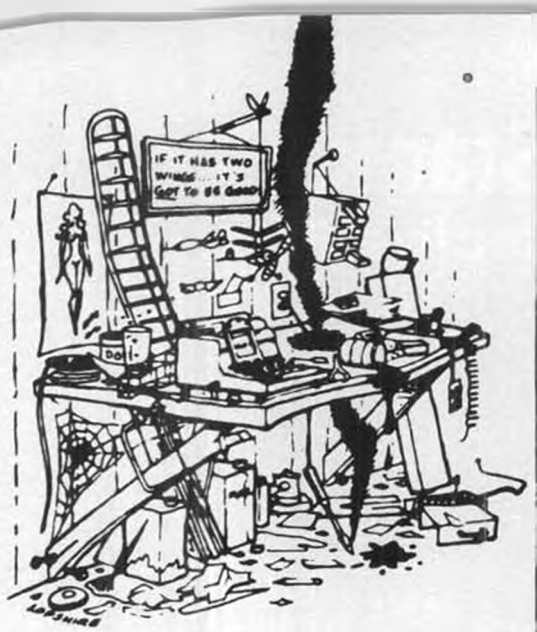


from Bill Northrop's workbench

The winning U.S. R/C Aerobatic Team in Acapulco, Mexico, September 27, 1981 (l to r): Mark Radcliff, Steve Helms, Team Manager Dean Koger, and Dave Brown. Individually, Dave was second, Mark was fifth, and Steve finished eighth. They did their job!

REQUIRED READING

The best piece of writing we've published to date was Dave Thornburg's "Where Are All The Female Modelers?" which appeared on page 13 of our October '81 issue. Although the style is casual, Dave has penetrated right to the core of a subject that every male modeler should try harder to understand. If you haven't read it, do so, even if you have to beg, borrow, or steal (buy?) a copy. And while you're reading it, think about your own personal situation as related to modeling and the female type girl in *your* life.

SPEAKING OF GIRLS...

If it had been on purpose, we couldn't have done it better! The gal who appears on page 9 of our November '81 issue is *not* a Multi-Purpose Work Center, but if the letters and phone calls to Panavise are any indication, Hobby Hideaway has a great new product, no matter what you call it!

This was our month for missing switched photos, as Vito Tomeo's Hawker Tempest and House of Balsa's 2-S sailplane also managed to change places. Ever try to slope soar a 1/6-scale World War II fighter?

IN THIS ISSUE

We're happy to welcome back Eloy Marez, who was a member of **MB's** office staff a couple of years ago. This time, as a regular contributing editor, Eloy will be heading up our new *Electronics Corner*, which, as he explains in his lead-off article, will cover matters electronic as well as electric. Eloy has a fine way of taking the mysteries out of modern circuitry and making it more palatable to the average modeler. As he lives within five minutes of our office, you can direct your questions or comments to him care of **MB's** address.

We hope you've noticed the reopening of **Model Builder's** *Classified*, now being conducted by Jim Moynihan. In case you missed the correction, Jim was really opening modeler's eyes at Toledo earlier this year, showing some interesting new construction materials in his Aerolite booth. As he had obviously done so much research on the subject, and is still doing it, we felt our readers would enjoy the benefit of his work. Those who are building, or are thinking about building, most any kind of "biggie" should carefully consider the increased strength and weight savings possible using modern composite materials.

TRAVELOGUE

It's your fault, you know... Encouraged by the favorable comments you've made on our recent accounts of our travel adventures; cross-country in a rental truck, and R/C glider flying in Hawaii, we'll now try to tell you about our experiences while attending the R/C Aerobatic World Championships in Acapulco, Mexico. We'll report on the contest itself in *R/C World*, just sticking to our personal trials and tribulations in this column.

Perhaps Western Airlines was trying to tell us something on our way to Acapulco ... four out of our five suitcases either didn't leave LAX when we did, or they were lost after arrival in Acapulco, even though it was just a four-hour, non-stop flight. Whatever the reason, we were told that the earliest we could expect them would be on the same flight tomorrow ... manana ... which, incidentally, also means "the indefinite future".

Anyway, as we got off the plane, we were hit by something not felt since the last time we deplaned in Lake Charles, Louisiana ... 90/90 weather ... that's 90 degree temperature and 90 percent humidity, and the plane was our last contact with cool, dry air until we got back on it a week later!

Having determined that our missing luggage would be brought to the hotel if and when it was found, we journeyed on to the airport exit area to get a cab to the hotel (the others in our party had gone ahead in an airport limo ... VW bus) and thus began the first of many price bargaining ceremonies that were to go on for a week! Don't buy anything at face value ... or first price offered ... in Mexico. Starting at about $10 each for the three of us, General Manager Anita finally got us a taxi for $5 each. Tony Dowdeswell, reporting the championships for the British magazine, *RCM&E*, paid $35 for the same service!

Arriving at the hotel (Marriott Paraiso) about 45 minutes later, we unloaded our one bag (mostly Anita's and Belinda's things), got our room assignment and said hello to many old acquaintances from past W/C's. Typical of the big hotels along the beach at Acapulco, the lobbies, bars, dining rooms, and shopping areas are all open. The only air conditioning at the Marriott was in the guest rooms and the super-fancy/expensive dining room on the top floor ... period. Even at that, the cool air was just a dribble from a single grillwork in the guest rooms ... if they were working. Some of our gang had no cool air, while others had about what we did.

Our room was overlooking Acapulco Bay, a pretty sight, but also over the main bar, five stories below, and the very loud

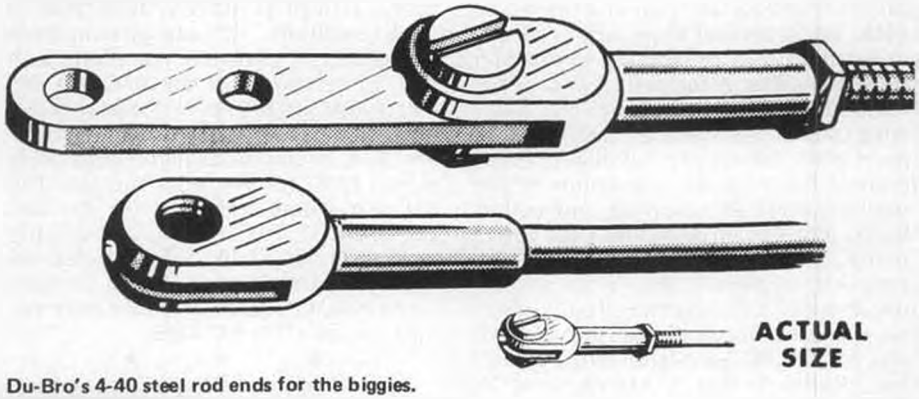
Continued on page 111

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.

At last! The 1/4-scale Sig Cub!

The completely revised Sig Mustang.



Du-Bro's 4-40 steel rod ends for the biggies.

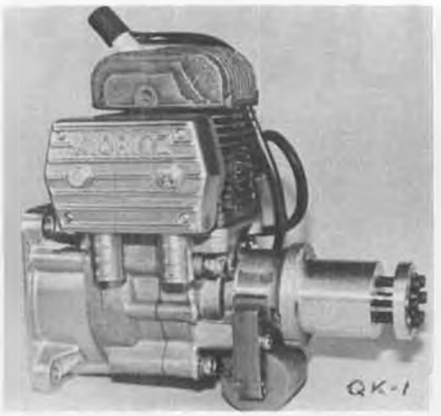
• From MRC, now at last, a full feature, 4 channel R/C Tank bursts on the scene with details and features previously unheard of in a kit! This World War II model of Germany's Panzerkorps behemoth has dual clutch proportional steering, a movable turret incorporating a safety clutch, variable speed control with forward and reverse, and a strobe unit (available separately) mounted in the turret and cannon barrel to simulate cannon fire! The torsion bar suspension, rugged aluminum chassis, ABS plastic upper hull molded in color, scale treads and great detailing, make the assembly and operation of this veteran warrior a joy to behold with more ruggedness than ever before. If you have already built the M4 Sherman tank, now here's your chance to do battle with its famous German adversary! With the King Tiger's hill climbing ability and firepower, you'll have your hands full! See your MRC/Tamiya dealer today. Get your hands on history. If he can't help, contact: Model Rectifier Corp., 2500 Woodbridge Ave., Edison, NJ 08817.

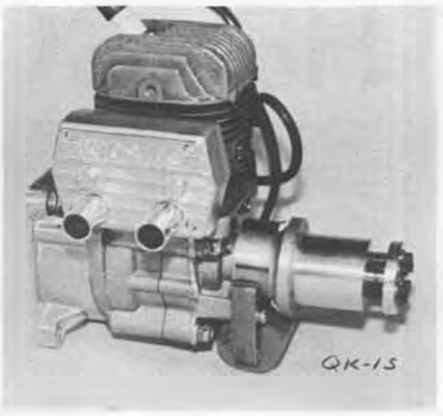
★ ★ ★

Scheduled to be at your dealers about now is the all new revision of the Sig Mustang. The revision has exact scale outlines and tip camber and washout are incorporated to improve flight characteristics. Building instructions include

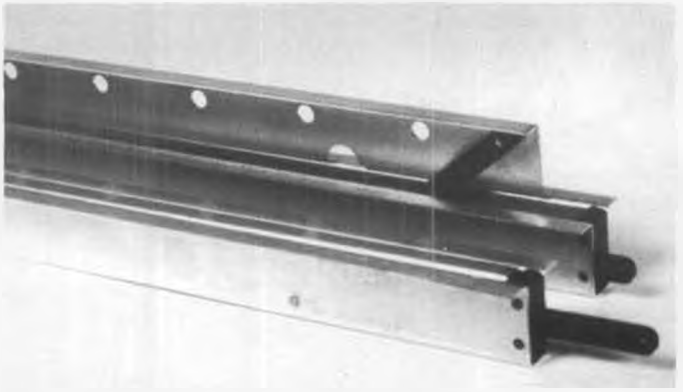
Prospect Park Hobby Shop now kits the Harbor Tug originally featured in MB.

The "Holiday Buggy" off-road electric by MRC.

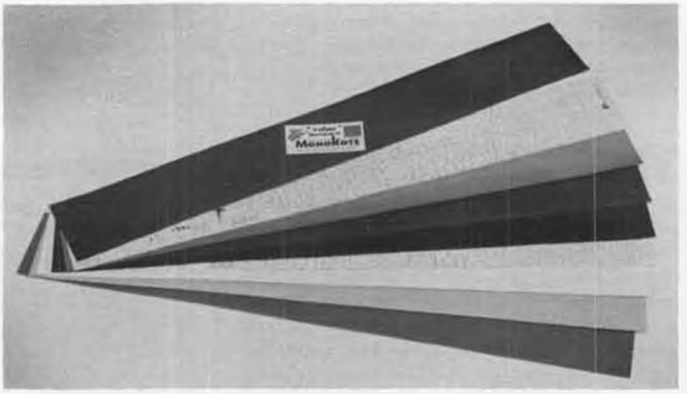




Tatone's newest items for the Kioritz engine; two mufflers and a radial mount.



Ready-to-mount spoilers, from the Sailplane Factory.



Top Flite Monokote trim sheets, shown in new catalog.

photos showing optional flap and retract installation.

The kit features the usual Sig completeness concept, including formed plastic fuselage halves, easily welded together over the solid balsa fuselage profile with butyrate thinner, acetone, or MEK. Sig Supercoat dope, epoxy paints, or enamels, can be applied to the ABS used in Sig kits. A formed clear canopy, molded cowling, precision cut foam wing cores, sheet balsa tail surfaces, 3/16 main gear, die cut ply, Sig quality balsa, control horns, links, aluminum motor mounts, assorted hardware, instruction book, and decals depicting Paul Poberezny's personal P-51 are a part of this new kit. Separate dual trim sheets depicting the 21st fighter group, based on Iwo Jima, are available from Sig. All this for $89.95. Sig Manufacturing Co., Inc., Route 1, Box 1, Montezuma, IA 50171.

★ ★ ★

Associated Electrics, Inc. announces the release of its new "Ball Differential" for the RC 300 car. The new Ball Differential, designed for all out competition, is strong, lightweight, reliable, and easily, as well as quickly, adjustable to track conditions. This new offering from Associated is available complete with rear wheels/tires for the R/C 300 car, Part #2850 for $70, or without wheels/tires, Part #2851 for $56. Rear wheels/tires are, of course, available separately as Part #2852 for $14.50 for the pair. The RH rear wheel, required for the Ball Differential, Part #2854, is available separately for $3.50. Send a SASE to: Associated Electrics Inc., 1928 E. Edinger, Santa Ana, CA 92705 for more information, or call (714) 547-4986.

★ ★ ★

ADC, or Applied Design Corporation, has just released its latest addition of helpful hobby tools, the Mini-T-Bar. Only 4-1/2 inches long and 2 inches wide, this handy sanding tool is perfect for those small surfaces requiring an ultra-flat and super-straight surface. Lightweight and easy to handle, it comes with special die-cut to size, peel-and-stick "Ruff-Stuff" sandpaper. Great for the handyman, perfect for the craftsman and hobbiest. Introductory price of $2.25, including sandpaper, add 75¢ for postage to: Applied Design Corp., 738 Penn St., El Segundo, CA 90245.

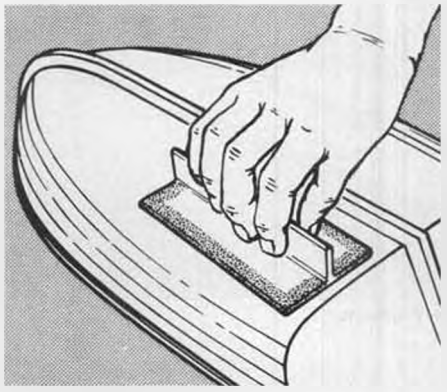
★ ★ ★

Delta Mfg. Inc., has the PICCO .21 racing engine in stock and maintains a large inventory of spare parts as required by all competition racers. This is the engine that was used in Delta's 'Super-J' 1/8 scale race car that won the World Championships. The Picco .21 is ruggedly built and features an ABC piston/sleeve combination and Sch-

Enya .40 four-cycle, from Enya Model Products.

Enya "11CX" for off-road gas cars.

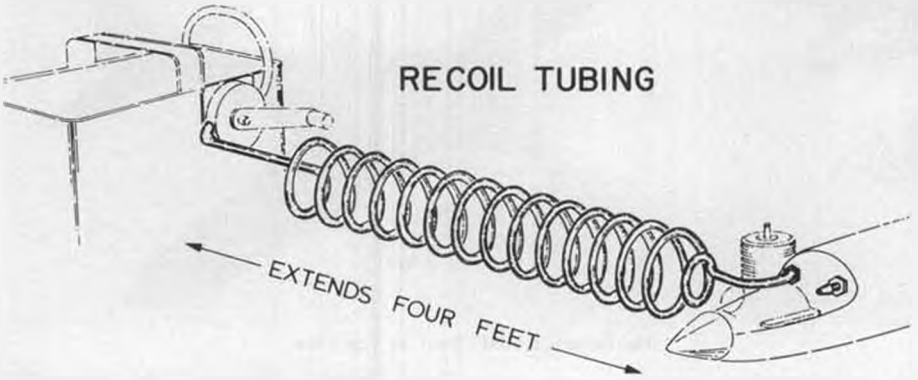
Kioritz Digital tach, from Roush Mfg.



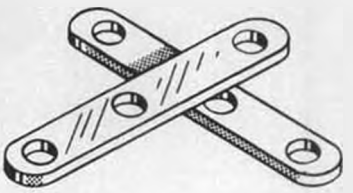
Mini-T-Bar sander from Applied Design.

Delta Mfg. has the Picco .21 car engine.

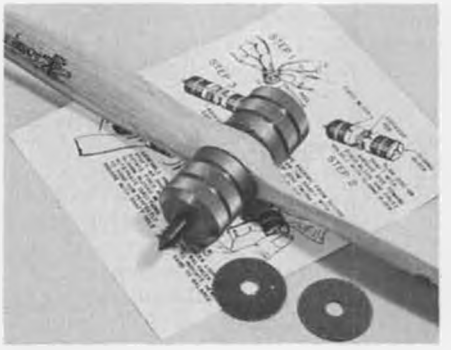
Gee Bee R-1 from Bob Holman Plans.



Recoiling fuel tubing from Fourmost Products.



Du-Bro nickel-plated steel straps.



Rhom's Tru-Prop and Prop Balancer.

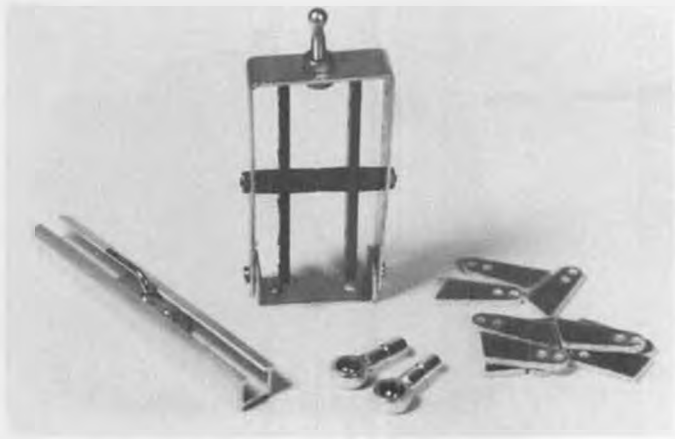
nuerle porting. The engine has also gained quite a following in competition boating circles. Available completely assembled and as a "short block" version. Suggested retail is $135. For more information, contact Delta Mfg. Inc., 27 Racecar Court, Lorimar, IA 50149, or call (515) 763-2220.

★ ★ ★

Prospect Park Hobby Shop has just released a highly prefabricated kit of the 85 foot Harbor Tug featured as a construction article, Plan #12741, in the December 1974 issue of **Model Builder** (and one of the top 40 best sellers since its publication). The kit features keel, bottom, middle, main deck, and all cabin parts band sawn from aircraft quality birch plywood. Parts are notched and slotted for an interlocking fit. Brass handrails, stanchions, portholes, rudder and skeg are supplied as is the stuffing box. Wood parts for ladders, cleats, chocks, bits, stack, doors, and ventilator, are all precut! Detailed sketches and instructions are included. Thirty-seven inches long and with a beam of 10-1/2 inches, the Harbor Tug builds into an impressive model. Prospect Park Hobby Shop, 512 Chester Pike, Norwood, PA 19074.

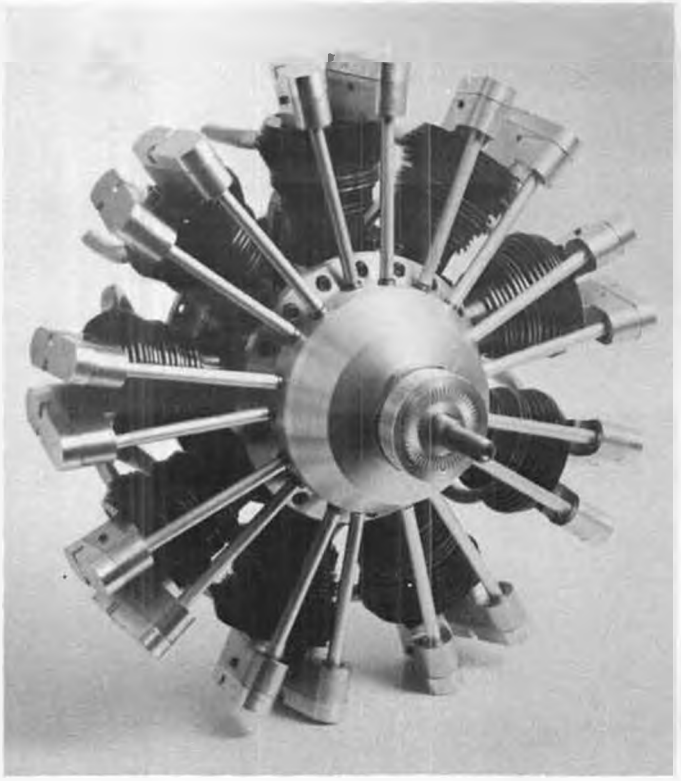
★ ★ ★

MRC has added yet another off-the-road car, the "Holiday Buggy" to its line of fun cars. With a newly designed transmission coupled to the Mabuchi RS 038S electric motor and powered by their standard 6V Ni-Cd battery, up to 20 minutes running time can be expected. Special, semi-pneumatic rubber tires, with the popular ribbed tread pattern for the front and the 'Spike' type for the rear (offering rough, soft, terrain traction and smooth performance on hard surfaces) provides better cornering with less slip at high speeds. Sintered, oilless bronze bearings, two tough brass universal joints, and direct drive to the rear wheels gets the power delivered under all conditions. A variable speed control resistor gives both forward and reverse for precise maneuvering. See your

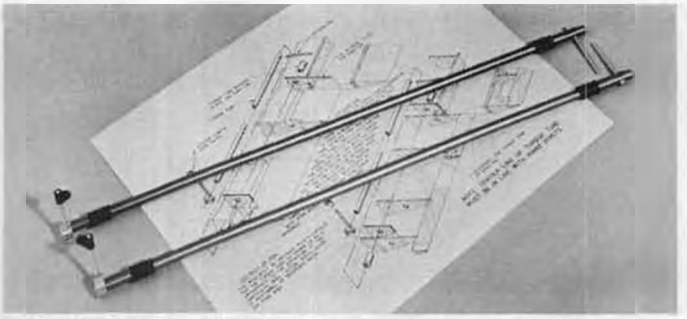


Miscellaneous sailplane hardware from The Sailplane Factory, include mechanical mixer, adjustable tow hook.

Off-road car wheels in anodized colors, by RCH Hobby Marketing.



Technopower's 9-cylinder radial.



Torque Tubes by Rhom Products.

Hal Parenti's A6M2 Zero by Top Flite.

dealer, or if he can't help, contact: Model Rectifier Corp., 2500 Woodbridge Ave., Edison, NJ 08817.

★ ★ ★

Top Flite Models has added the Hal Parenti designed, prize winning A6M2 Zero to its famous line of standoff, or sport scale R/C fighter planes. Designed for .60 to .90 engines, with a wingspan of 61 inches, a wing area of 688 sq. in. and engineered for a flying weight of 7-3/4 to 10 pounds, this authentic replica kit has full size plans, technical illustrations, a proven checkoff booklet, aircraft history and a 8-1/2 x 11 inch scale, five view, to aid the modeler in construction of this new kit. Typical Top Flite kit features include a rugged, injection molded cowl, gun port detail, clear plastic canopy, 3/16 formed landing gear, complete hardware package, nylon fittings, rock hard maple motor mounts, and matte-finish mylar markings for added authenticity. Scheduled for your dealers' shelves by November, according to Top Flite.

New colors added to its line of 5 by 36 inch MonoKote trim sheets are cream, maroon, and crystal red. Trim sheets provide the finishing touch to models and make field repairs quick and easy. Twenty colors, including checkerboard patterns make it easy to add that custom touch!

SparkleKote, a prismatic, rainbow like pressure sensitive trim sheet, available in four colors, can add depth and brilliance to your trim designs. Send $1 for the latest catalog, prop chart, MonoKote and FabriKote samples to: Top Flite Models, Inc., 1901 N. Narragansett Ave., Chicago, IL 60639.

★ ★ ★

Rhom Products, the 'Retract People' mention that the Rhom Air Torque Tubes will eliminate flexing and excessive play found in piano wire and bellcrank installations for ailerons. These strong, lightweight, frictionless, torque tubes are suitable for smaller R/C ships, yet are long enough (20 inches) for use in larger R/C models as well. No more trim changes due to temperature variations and they greatly minimize the possibility of aileron flutter.

Rhom's Tru-Prop and Prop Balancer easily and accurately refaces and trues up prop hubs to assure a perfectly square alignment of the shaft hole and prop hub. Out of "true" and unbalanced props can destroy radio equipment, engines, and of course, air frames. After the simple process of refacing the hub is complete, the Tru-Prop will accurately balance your props! The 'Torque Tubes' and 'Tru-Props' are available at your dealer, or order direct from: Rhom Products Mfg. Corp., 924 65th St., Brooklyn, NY 11219.

★ ★ ★

Continued on page 84

RAMTEC's transmitter case.

Germany's Panzerkorps tank for 4-channel R/C from MRC.

Frank Kelley's about to fly his B-25 as Larry "Jet Hangar" Wolfe and Anita and Belinda N. watch.

Chuck Fuller's beautiful, big, Kawasaki powered PT-17 touches down after another show-stopping flight.

R/C WORLD

Text and photos by BILL NORTHROP

• September was a busy month for this writer. First there was the Crosswinds Scale Contest at Canyon Country, north of Los Angeles, then the magnificent full-scale Unlimited "Thunderboat" races in Mission Bay, San Diego, and finally, the R/C Aerobatic World Championships in Acapulco, Mexico, to finish out the month.

The World Champs are covered elsewhere in this issue, and the Unlimiteds were an exciting "non-working" weekend off for the Northrop family, so that leaves us with a story to do on the Canyon Country contest, which was co-sponsored by Cannon Electronics, Inc.

Actually, as any modeler who was there will agree, the contest could be better named "The John Lockwood Benefit", as our portly friend from Clovis, California walked (flew?) off with a first place prize and trophy for every event held. The prizes included two R/C

Continued on page 108

Pat Sajak, Channel 4 NBC-TV, Los Angeles, interviews Bill Cannon on live Sunday afternoon show, with models flying in background. It came off very well.

Bob Halvorsen, San Fernando Valley flew this beautiful Svenson Jungmeister.

Quadra powered Tiger Moth by Larry Sunderland, Fresno, CA. Full size at Corona.

John Lockwood's Komet jumps from its cradle for another fast, smooth flight.

Quadra powered Bridi Rearwin Speedster in maroon and white, Cirrus radio, by Paul Castle, Santa Maria, Calif.

Larry Jenno describes how he intends to fly his Fleet, while Bill Semler checks the sky for butterflies.

The 1981 WORLD CHAMPIONSHIPS for R/C AEROBATICS

Text and photos by BILL NORTHROP

• Aside from some of the peripheral difficulties and confusions that always go along with international model competition, but seemed to be above average in Acapulco, Mexico, the 1981 R/C Aerobatic World Champs came off quite well. Although it was more distant for many competing countries to attend, there seemed to be more contestants, representing more countries, than in several past championships. There were 62 pilots representing a total of 28 countries. We believe this was the first World Championships in R/C aerobatics for New Guinea, Argentina, Venezuela, Thailand, and South Korea.

If the extreme heat and humidity weren't the direct cause, it certainly was reason enough that only one round a day was flown, with flying finishing soon after the normal siesta time of 1300, or 1 p.m. There were two flight lines, with four judges at each site. Each day, a block of fliers was shifted in time, so that all fliers had the opportunity to fly early morning, mid-morning, and late morning. Judges' sites were shifted after two days. The net result was that each flier performed twice for each set of judges, and the best of the two flights for each judge set was used in determining a flier's two-flight total. This was a good plan, thus preventing the higher scoring judge-set from determining most all of the final positions. All judges had an effect on the results! Incidentally, tabulating was expertly handled, as usual, by the mother and daughter team of Betty and Suzy Stream.

Before going further, the results:

1. Hanno Drettner	2841	5734
2. Dave Brown	2790	5610
3. Wolfgang Matt	2733	5569
4. Bert Lossen	2656	5567
5. Mark Radcliff	2629	5387
6. Gunter Hoppe	2615	5342
7. Ivan Kristensen	2602	
8. Steve Helms	2602	
9. Yoichiro Akiba	2581	
10. Giichi Naruke	2533	

Teams: 1. USA
2. West Germany
3. Japan

Dave Brown was high man after Round One, but then fate stepped in. During his second flight, he suddenly blew out of the rolling portion of the Triangle Loop. Dave is not one to make excuses, and thought he simply "went blank" for a moment. But when he came up for Round 3, the aileron servo became a turkey, and Dave figured maybe he didn't go blank after all. Maneuvers can get sort of automatic after awhile, to the point that it's not easy to be sure. . . His

The big winners (l to r): Wolfgang Matt, Liechtenstein, 3rd; Hanno Prettner, Austria, World Champion; Dave Brown, U.S.A., 2nd. A familiar trio!

Mr. and Mrs. Benito Bertolani, 12th, Italy.

Werner Schweiker, 11th, West Germany.

Jung Bok An, 59th, South Korea.

Judges (l to r): Camile Gerard, Luxembourg; Heinz Freundt, Austria; Arthur Hofer, Switzerland; Geoff Franklin, England.

Judges (l to r): Martin Danker, Mexico; Travis McGinnis, U.S.A.; Tony Aarts, Holland; Werner Groth, West Germany.

Dave Brown and Bert Lossen. Bert surprised everyone (except W. Germany!) with his flying ability. Had highest score in flyoff!

last flight, which was almost the last of the regular competition, proved that everything was working again, as he blasted out the second highest score of the competition. Fortunately, it was for the judges that he did *not* have his only other high score, and he plopped comfortably into second spot.

The most talked about flier at the contest was young (just turned 20) Bertram Lossen, of West Germany. A new star is born! A tall, blonde, good looking kid, he first caught our eye as he came out for his second round flight. We hadn't seen the first one, which put him in about 10th place. What we noticed was his calm, unperturbed manner as he got his engine started and checked controls . . . deliberate, unhurried. He sauntered to his position in front of the judges, and could just as well have been putting in a routine practice flight at home. But wow! Everything in the air

Marcial Davila, 40th, Mexico. We won't tell why that engine didn't start, Marcial. Don't forget the string!

FAA who? Cessna with parachutists aboard takes off over heads of fliers for part of opening ceremonies.

During fly-off, all judges scored. Second row were unofficial judge/fliers, who got a taste of judging the best in the world.

Constantinas Papaspyrou, 61st, Greece.

Ivan Kristensen, 7th, Canada.

Per Andreasen, 46th, Denmark, with Earl Witt as helper/caller/manager.

Peaphon Techavichark, 57th, Thailand.

Jan Van Beek, 24th, Holland.

Alain Kirmann, 43rd, France.

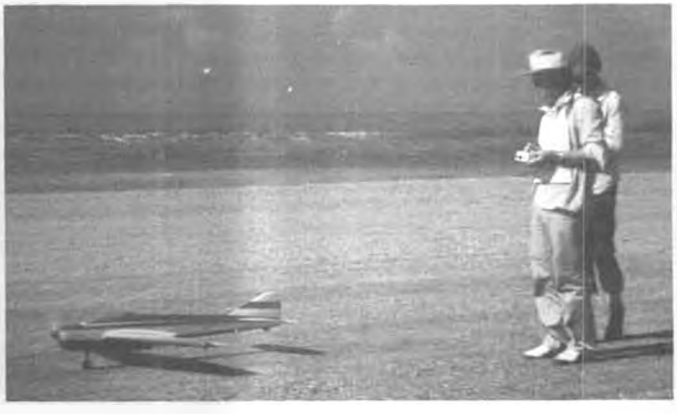
Pascal Ardonceau, 22nd, France.

was as unperturbed and precise as *he* was on the ground. Everyone stopped to watch. This flight was at the busy site in front of the pits, not down in the boonies. It was his best flight at 1348; third best in the round, under Prettner (1388) and Matt (1403). He went into the fly-off 77 points behind Matt for fourth place, and made the highest score of the fly-off . . . *twice* . . . exactly the same, ending up only 2 points behind Matt. You'll be hearing more about Bert Lossen!

Although several fliers were using variable pitch props, Hanno Prettner's flying showed it the most. Taking from his successes at Las Vegas, he used the

Wolfgang Matt, 3rd Liechenstein.

Jim Clarke, 58th, Ireland, with black bowler over the straw hat. Had quite a bit of bad luck.



Emile Giezendanner, 28th, a fellow graduate of 1968 judges school in W. Germany.

Angel Maldonado, 51st, Argentina.

Mike Lynch, 45th, New Zealand.

Dieter and Renate Fritz, 21st, Austria.

Juan Cerdan, Jr., 44th, Spain.

Huub Dekkers, 34th, Holland. Jan Van Vleit, 30th, holds Dekkers' model.

Yoichiro Akiba, 9th, Japan.

variable pitch more to maintain constant speed throughout a maneuver, rather than to merely improve only the vertical climb situations. In the Square Loop, for instance, Hanno would change pitch just prior to climbing up the front leg, then he would change as he came out the top, then again just before coming down the back, and once more as he pulled out at the bottom. Along with each change of pitch, Hanno would adjust the throttle to maintain a constant speed throughout the maneuver. As you listened, it seemed as though he were shifting gears, and the shifting even sounded like "double clutching", particularly for the vertical or 45 degree down legs of maneuvers. The down legs almost seemed slower in flight speed than the up and horizontal legs. Some fliers felt this was too unrealistic, and Hanno himself was concerned, especially when his first round flight was 29 points below Dave Brown's and only 9 above Matt's. We advised him to stay with it for another round before making a decision to change style, as his first flight was before the lower scoring judges (after working with the World Champs judges for the past 12 years, we

Sam Crawford holds on for Gunter Hoppe, 6th, West Germany.

Gerard Werion, 16th, Belgium. Team Manager Ivon Werion holds model while Joe Lopez takes a db reading.

Tom Prosser, 23rd, Australia, with his pair of Fangs. Says they're no relation to Phyllis Diller's husband.

Bruno Giezendanner, 13th, Switzerland.

Daniel Falco, 48th, Argentina, father, Hernan (right), and Team Manager Tito Madonia.

Domenico Bruschi, 54th, San Marino.

Giichi Naruke, 10th, Japan.

Tsugutaka Yoshioka, 14th, Japan. Team Manager Kentaro Iioka.

knew which group would be low before the competition started). Incidentally, low scoring and tough judges are not necessarily the same. A judge is being tough when he scores low for his particular characteristic scoring range. Equal exposure balances out different scoring ranges.

Hanno stayed with the constant speed style throughout the contest and gained the lead permanently in Round 3. It was never as high a margin as in the past, however, and it's difficult to say at this point whether the constant speed style actually helped or hindered his scores.

Steve Helms proved his value as a U.S. team member by jumping into 9th place in the first round, then holding 7th in Rounds 2 and 3. In Round 4, he ended up in a tie with Ivan Kristensen for 7th, but Ivan had the highest single flight score, by one point, dropping Steve to a final of 8th. Mark Radcliff continues to fly better than his scores indicate. Fourth in Round 1, he dropped to 6th, then 8th in Round 3. In Round 4, he really burned the barn with his best flight, the 4th best in the round, to gain the fly-off in 5th place.

Japan's newest team member, Yoichiro Akiba, jumped ahead of his veteran partners Yoshioka and Naruke, to place 9th to Naruke's 10th. Yoshioka, World Champ in 1975, placed 14th to give Japan 3rd place as a team. One thing sure, Akiba gave Tom Prosser a run for his money as the loudest maneuver caller at the contest! Tom "Drill Sergeant" Prosser really belts out the calls, but little Akiba, especially with his Japanese accented English, really got everyone's attention!

Determining how loud an engine can or should be is still a problem, and was certainly proved to be pointless this year. Although pilots were required to peak engines and show their throttle control on the transmitter to be fully advanced while a reading was taken, anyone with a radio controlled mixture

Mark Radcliff, 5th, U.S.A. with Team Manager Dean Koger.

Dave Brown, 2nd, U.S.A., Sally Brown, and Dean Koger, prepping for fly-off flight.

Steve Helms, 8th, U.S.A., with Don Weitz holding.

Pattern Flying

By DICK HANSON . . . Part 18: Reverse Knife Edge and Reverse Point Rolls

• This month's maneuvers take a good deal of practice at a safe altitude before attempting to fly them at the best position for maximum scoring.

The Reverse Point Rolls especially can cause disorientation very easily. Every flier has his own ideas on point roll techniques, but I think the easiest method is to do the unfamiliar points first, then complete the maneuver rolling in the direction which is most comfortable for you. Regardless of the technique used, these maneuvers are much easier if the model requires only the smallest amount of rudder to maintain the knife edge portions of flight.

Let's cover some R.C. aircraft design criteria for good point roll maneuvers. Remember that we can't feel what's happening to our aircraft as is the case when the pilot is inside a full scale craft. We have only our eyes to tell us what corrections are required. That is the reason we need very stable yet very neutral designs. What I'm trying to say is that full scale aerobatic designs are not necessarily the best for our purposes. As a model rolls from level to knife edge, the fuselage assumes the lift duties, and the wings become pure drag. Also, *any dihedral in the wing puts increased drag on the wing pointing down as the nose of the model is pointed up.* Speed drops off as a result. This loss of speed requires an increased nose-high attitude which now starts (typically) to impart some very strong rolling forces caused by dihedral plus other factors.

The location of the rudder and stabilizer is also very important, *but* the real key to correcting the problem is having a model that will fly knife edge with the least amount of fuselage angle. You can get this characteristic in a variety of ways.

1. Shift the side area of the model forward.
2. Sweep the wings back.
3. Reduce the vertical stab area.
4. Improve the "lift" characteristics of the fuselage by adding a chin or an engine fairing, etc.
5. Shift the balance point aft.

A number of pattern designs don't look much like full scale aircraft for the above reasons.

Now that you're ready to fly without jamming the rudder from stop to stop, let's do some warm up maneuvers. Set your roll rate to full (about one full roll per second) and try some high, level upwind passes while rolling from point to point. The usual tendency is to add up elevator during the roll from point to point.

If your plane is properly set up, you can probably get a good point-to-point roll by simply shifting the ailerons quickly from stop to stop and adding a little rudder as the plane reaches the point positions.

It is extremely important that you learn to fly with the trims set for hands-off level flight if you want to avoid heading changes that mysteriously pop up. Down-trim is especially troublesome on these maneuvers.

If you are comfortable with the preliminary point-to-point rolls, try them downwind. They will probably look smoother, but that's only because the errors are spread out more. Sorry. . . The rule book says: "Downgrade if the maneuver takes less than 4 or more than 6 seconds." We now have to establish a roll rate which will give us a smooth roll which when added to a short hesitation on points will come out on approximately 5 seconds. My low roll rate (3 rolls — 5 seconds) works out right for me. The altitude used for this maneuver is up to you, but 50 feet or so is a good height. Play with the entire sequence until it takes 5 seconds from start to finish. Your trusty assistant will tell you when the time frame is correct.

Now work on framing the maneuver. It can easily take the entire frame if you have a fast model.

Don't forget to call the start approximately 1 second prior to starting.

POINT ROLLS

Again we need some altitude to save us if we get disoriented. The maneuver sounds simple enough, but it's very easy to hit the wrong rudder and head straight for the ground.

Everything we said about the reverse knife edge trimming, practicing, etc., holds true here.

The time frame is the same as for the reverse knife edge. This seems quite fast to us and you will have to move smartly to finish in time. You may get more points if you learn toward the 6 second limit.

Our trusty rules committee has already made many corrections or changes covering questionable rules in this year's schedule, and perhaps this maneuver will also receive a little attention. Thanks guys. . . •

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setting and/or variable pitch prop could get by the 105 db maximum. Some also went to three-bladed props, trading a little less thrust for a lot less noise.

Yoshioka's problem also has to be considered. In order to save time, the db readings were taken in the starting box on the flight line, as part of the three-minute starting period. As Yoshioka's engine noise was marginal, his airplane was kept on the ground, running full speed, for too long, resulting in a dry tank in the middle of his last maneuver for that flight. He did not demand a re-fly, but probably could have.

Other than the above mentioned items . . . three-bladed props, and variable pitch, there wasn't really anything new in aircraft or equipment at Acapulco. There were Atlases, Semi-Atlases, Modified Atlases, Curares, Semi-Curares, Modified Curares, etc., etc.

Continued on page 106

The joy of winning! Hanno Prettner, World Champion once again, poses, while a whole bunch of cameras record the scene.

CHOPPER CHATTER

By RAY HOSTETLER PHOTOS BY THE AUTHOR

"Now I lay me down to sleep." The author tells you how to learn something from your helicopter crashes.

• This month I'm shifting gears to examine a subject that we are all quite interested in: why helicopters crash.

Credit for this subject goes to Dick Hausfeld, who has corresponded with me every now and then, sharing his new projects. Also, a much sharper stimulus which reminded me of this subject for this month comes from the fact that my faithful Jet Ranger crashed last weekend, and I'm sitting knee high in bent mainshafts and broken rotor blades.

Fixed-wing airplane pilots reading this, don't laugh. When you make a poor landing, a fresh prop and some new scuff tape on the wing tip will do . . . Tip over a helicopter and it's back to square one. It's well known that when airplanes crash, they go thud and that's it. Helicopters, however, crash, then continue to beat themselves to death with thrashing rotor blades and a screaming engine which is trying to melt the piston to the cylinder liner. Maybe the best example would be to just say that a crashed helicopter reminds me of a dying chicken.

In an effort to figure out why helicopters crash, I'll have to draw from my own experience and list some of my own mishaps and classify them by major failures. They are as follows:

Pilot Error	41%
Mechanical	24%
Radio	18%
Engine	12%
Battery	6%

I should mention at this point that "pilot error" *does not include those mishaps which result from learning how to fly the machine*, but from judgment errors or other "unintentional actions."

Before I sat down and wrote this, I took a wild guess at what percentage of my crashes were pilot error. I said roughly 25%. It turns out that 41% were pilot error, and some of the failures classified as mechanical could be classified as pilot, depending on your definition of pilot error. For instance, let's say that your batteries went dead because you forgot to charge them long enough. This would be pilot error because you would be directly responsible for that blunder. A flat battery failure due to a shorted cell would be classified as battery failure.

Then let's be realistic, allow for some error, and declare that nearly 50% of my crashes were pilot induced. The other 50% were not *directly* my fault, but due to systems failure.

Then I looked at the time of the failures vs. my flying experience. Basically, the mechanical failures came early, the pilot errors came randomly spaced throughout pilot experience, and the other categories came randomly between pilot errors. This is interesting to note, because the mechanical errors suffered early on were due to little hints and experiences that only time can provide . . . I never should have started this thing in the first place because it's turning out that my worst enemy is myself. . .

Nevertheless, the aim of all this embarrassment is to make *you* a better pilot. Hopefully you will be able to learn from my mistakes and avoid repeating history. The best way to do this is to quickly review each crash from present to past, state what happened, and how it could have been avoided (if possible).

Somehow this doesn't look as neat as the original kit! Vibration detuned the receiver.

• Last weekend, my Rossi quit at the top of a full power vertical climb out, just as I was coming back on power and pushing in forward cyclic. Damage: extensive. I classified this as engine failure. The ship was blowing nice white smoke and sounded great. I'm not one to run right on the lean edge of power; with a Rossi I can back off a few clicks into the rich side. Estimated cause of failure, a rather quick, large power reduction which the engine couldn't quite handle. Make your power changes as smoothly as possible when you're at the extremes of the carburetor.

• I was about to fly, and another pilot was practicing hovering on the other side of the baseball diamond. I asked the other pilot what frequency he was on. It was different, so I proceeded to fire up and hover out. Upon going into forward flight the ship went to full power, full forward cyclic, and stayed there. (No, Jet Rangers do not do outside loops.) Damage: totalled. It turned out that the other fellow *was* on my frequency. Fortunately, he was not affected. Classification: pilot error. It is *my* responsibility to see that I am on a clear frequency. I should have walked across the diamond and double checked frequencies. Four minutes and I could have saved a Jet Ranger.

• At a five foot hover, the Rossi died very quickly. Damage: light. Classification: engine failure. The bronze band that is around the Rossi's rear portion of the crankshaft let go. It's theoretical purpose is to "pack" the crankcase with more solid area and less airspace, giving more power. If you are flying a Rossi, I would strongly suggest cutting off that band with a jewelers saw before it comes off by itself at an inopportune time. I have heard of this happening to others, too.

• I flew a beautiful 15-minute flight, went inside to get something, came back out, fired up, and two minutes later, at 150 feet the engine died from fuel exhaustion. Damage: severe. I could

Continued on page 101

Skip Mast's impressive C-130. Finished sixth at the Scale Master's Tournament in Rough River, Kentucky. All photos taken by Bob's daughter Cathy Underwood, except as noted.

1 TO 1 SCALE

PHOTOS BY CATHY UNDERWOOD

By BOB UNDERWOOD

• As you entered the gym there was no denying that it was a gathering of eagles. A row of beautiful mounted brass birds stood waiting for the assembling pilots. On the grassy areas outside the gym some 30 models moved through stages of metamormorphosis from scattered parts to complete beings. They hailed from Texas and Missouri and Michigan and Arizona and Florida and a dozen other states.

The table with its calipers and score sheets awaited the few precision models and the thirty foot circle yawned, ready to gobble up sport scale models, one after the other. Half a dozen gaggles of people moved in patterns about the room. Some were preparing the necessities of the contest and others greeted one another as old friends and new acquaintances. The 1981 Scale Masters had become a reality in Louisville.

The concept of a scale master's tournament bringing together fliers who were qualified by winning at one of eight or so regional contests, was born in California in 1980. The Southern California Scale Squadron gave birth to the notion, receiving help from several quarters. While the program still struggles with some elements of its infancy, it has blossomed and continues to mature gracefully.

This year, the event was hosted by the Southern Indiana R/C Modelers, who are responsible for hosting the well known Mint Julep Scale meet at Rough River. Under the leadership of Dale Arvin, John Guenther, and the club president Bob Jones, working with the Scale Squadron Masters' leader, Harris Lee, everything fell together beautifully. Each contestant received a beautiful mounted brass eagle compliments of Scale R/C Modeler Magazine.

On Friday, all the aircraft were static judged by 3:30 and everyone adjourned to the beautiful site across the street in E.P. (Tom) Sawyer State Park. At 4 p.m., Dale led a spirited pilots' meeting in an effort to bring everyone to a common ground on the flying aspect of the contest. While this is not to be construed as a criticism, it is safe to say that there are regional differences in some contest procedures. After some discussion, it

Leonard McCoy's Dornier heads for another mission. A realistic flyer.

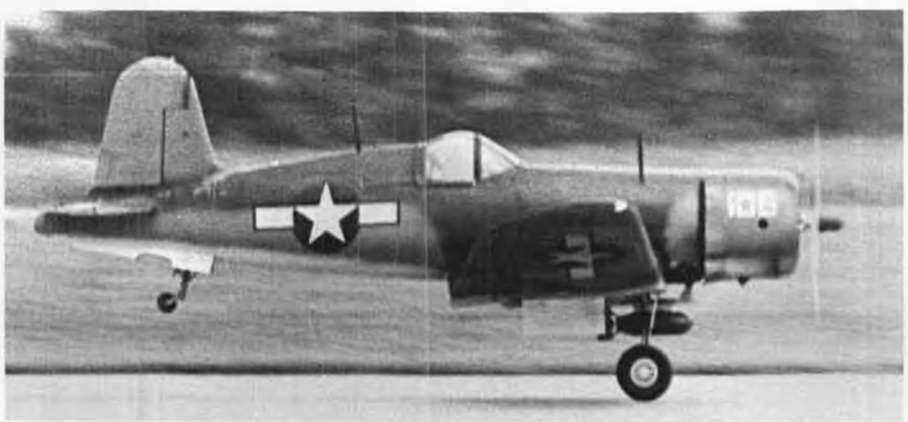
Don Srull's "Schlepp", a Swedish target tug. Looks like designer couldn't decide which end should go first!

Bob Underwood's winning Precision Scale Hiperbipe. Photo by John Preston.

Kent Walters' SBD taxies by. Placed third in Sport Scale.

Charlie Chambers' Jet Hangar Grumman "Cougar".

Ralph White's veteran P-51 has been around for years. Beautiful flier, with pattern capabilities.



Garland Hamilton's Corsair made beautiful takeoffs and landings. Placed 10th.

Cliff Tacie proved you don't have to have a gimmicky scale subject to place well. His Citabria finished fifth.

was determined that an "official" flight occurred when the wheels left the ground and that "attempts" as such did not exist. Once you were on the clock that was it for that round.

Other considerations were spoken to, however, no major problems developed. Clarifications or agreements, such as the official flight idea, "cruise" speed for fly past, etc., seem to be working themselves out quite well. This was true at the Nats as well, this year.

After the pilot's meeting, a goodly number of persons availed themselves of the super weather and put in a few practice flights. It was fun to watch and try to determine whether someone was doing a psych job or really just getting the feel of the site. Garland Hamilton was really practicing in earnest and by the time some of the other 1/8 Air Force members almost clubbed him into submission, had put in eight or nine flights. Everyone was concerned about when a battery pack would give out.

That evening, the Scale Squadron hosted a cocktail party for all concerned and everybody milled about drinking "bathtub beer" (that's where Harris cooled it) and other assorted libations. There were war stories galore being told, some which might even have been true. Wives very patiently listened to "There I was at 10,000 feet" stories; Don Srull tried to figure what the heck he had used to mix his drink; and everybody wondered if they got the judges drunk enough whether they'd tell the static scores. Harris said the event broke up "about 1", but several were not certain what time zone he was operating in.

Saturday dawned and planes gathered. Engines coughed and sputtered (as did a few of the party goers) and about 8:30, things began to fly the friendly skies of Louisville. A few little showers punctuated the morning, but nothing that would spell permanent problems. The flying was so-so as everyone got first-round jitters out of the way. The only real spectacular happening was an unfortunate one, when Larry Wolfe, of Jet Hangar, had a slow roll on take off, badly crunching his Kfir ducted fan. A servo problem was probably the cause and a despondent Larry counted the model lost . . . until he saw his static score! Since it was the highest score, there was some immediate reconsideration, and it flew again on Sunday. You should have seen the "debris patrol" we formed to dig little bitsy pieces out of the divot!

Fortunately, Loctite Corp. was present to introduce its complete line of adhesives, etc. to the modelers. They very graciously helped provide the various items needed. One impressive adhesive offered is *Depend*, which can be used even in fuel-soaked situations. With lots of glue joints and time, the Kfir was ready to go on Sunday morning.

The quality of flying was generally good, however, some persons seemed to be eternally having mechanical problems. Probably Dave Platt, with his fifth-scale Macchi, Bill Kinsey with the push-

Ed Couch lost his ducted fan at the Nats, went back a few years in time to his back-up plane, this "Spirit". Saving the left wheel for next year, Ed?

Bill Kinsey starts the rear engine in his Push-Pull Dornier, liquid cooled. Had various mechanical problems, as you might expect.

pull Dornier, and Dan Santich with his Heath Baby Bullet, devoted most energy to assorted problems. All of us in the competitive line have had those days where everything seems to go wrong and often it's never the same thing twice. Bill, Dave, and Dan get my vote for "Determination in the face of Frustration". Dan, with the precision scale Bullet, just needed more time to get all his problems sorted out. Late nights working on it, right to the deadline, I'm sure left him drained. Bill Kinsey had pump problems on the liquid cooled rear engine of the Dornier, and Dave had a variety of problems, starting with a battery pack, before the first round, and continuing through several others. Margaret, his wife, stood patiently by. When Bill and Dave were airborne, their models flew very nicely. The Macchi is a very impressive model in the air.

Saturday's flying ended abruptly with the approach of a thunder boomer, leaving just a couple models yet to fly for the third round. A banquet was held at the headquarters Holiday Inn, and most everyone filled up with great gobs of goodies. The after-dinner comments were handled by Dale Arvin, who thanked a flock of people (all of whom deserved to receive a thank you!) and then he turned the microphone over to Frank Tiano. Frank had written out a beautiful set of zingers (*roasts*, not props) and managed to zap (*stab* not glue) most of the persons attending. I believe he had written them on napkins (I guess because crayons work better on them, as he isn't allowed sharp instruments). Everybody took the jibes in super good humor, although I thought I heard gnashing teeth a time or two. Seriously, it was really great fun to be shot at. I understand he's been asked to do it again next year.

Sunday morning dawned "beautious". A breath of a breeze . . . just right. The flying was beautiful and scores began to show the "practice" from earlier flights. Kent Walters let that old Dauntless drop from way up there, and pulled out in a slow graceful sweep right on the deck. Tom Cook's F-4, with fans a-screaming and exhaust smoke a-pouring, made big wide sweeping turns and rolls on a string. Ted White was working hard at putting the MB-5 through its paces and put in a 93.5 flight to tie with Skip Mast's C-130 for highest flight score through the fourth round. Bob Frey, Hal Parenti, and Garland Hamilton were right in there with 92's, and with two rounds to go, it was almost anybody's ball game. One model that was not being carefully watched by many other than its "daddy" was Cliff "Sleeper" Tacie's Citabria. Cliff had pulled off what many had considered a minor miracle at the Nats by finishing fourth and making the FAI team with a totally non-mechanical option model. Once again he was putting in solid, realistic flights with beautifully placed maneuvers, take-offs and landings. He has convinced this writer

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John Preston catches Bob Underwood's 2nd Place PE-2 on takeoff. Two HP .40's, 12-3/4 lbs., flaps, retracts, dive brakes, bomb drop, stainless steel kitchen sink, etc.

Dave Platt's 1/5-scale Macchi. Had mechanical problems.

Bob Underwood and daughter Cathy wind up Hiperbipe for an official flight. Photo by John Preston.

Front end of the first control line model. Twin Forster 99's turned prop clockwise through auto oil pump gears.

Oba St. Clair, as photographed about 10 years ago.

TRIBUTE TO *Oba St. Clair*

Inspiration and Research by DALE KIRN. Interviews and Text by CHARLES MACKEY . . . (Conclusion)

• In the last issue, we told how Oba St. Clair made his journey in a covered wagon at the age of five, how he was caught up in the excitement of flight in 1927 when Charles Lindbergh made his famous flight, and the thought process he used to successfully design, build, and then fly the world's first control line airplane on July 4, 1937.

This issue will describe Oba's five encounters with Jim Walker, how he met Roy Cox, and the court case, American Junior Aircraft vs. L.M. Cox Manufacturing Co., Inc.

Oba made his first successful control line flight on July 4, 1937. Shortly thereafter, the news was out. On July 15, 1937, the Telephone Register of McMinnville, Oregon ran a large spread with photographs of Oba's control line design, "Miss Shirley." Several articles were printed in model airplane magazines and the science magazines.

Union Oil Company came out and took pictures for a monthly employee magazine in 1939. Oba made a newsreel at Swan Island Airport in Portland, but never saw the film. The photographer wanted him to dive his plane at him and come as closely as possible. Oba obliged and did just that. The only problem they had was controlling the crowd. Would you believe it? The world's first control line airplane and people were walking on the lines!

In the summer of 1936, after he had flown his biplane on a single line, but before his four-line control airplane, Oba saw an ad in *Model Airplane News* advertising the Elf Engine. It was manufactured in Portland, Oregon by Dan Calkin, in his basement. Oba had to make a trip into Portland for supplies anyway, so he thought this would be a good time to see the engines. At that time, Dan was making single, twin, and four-cylinder engines. Dan was kind enough to show Oba his aircraft, which included a twin-engine design similar to the Ford Trimotor without the center engine. This was quite a thrill for Oba, since Dan was the first model builder he had ever met. Oba can still recall that Dan had cut holes in the basement walls about three feet from the ground to exhaust his engine gases.

Dan told Oba to go to the golf course

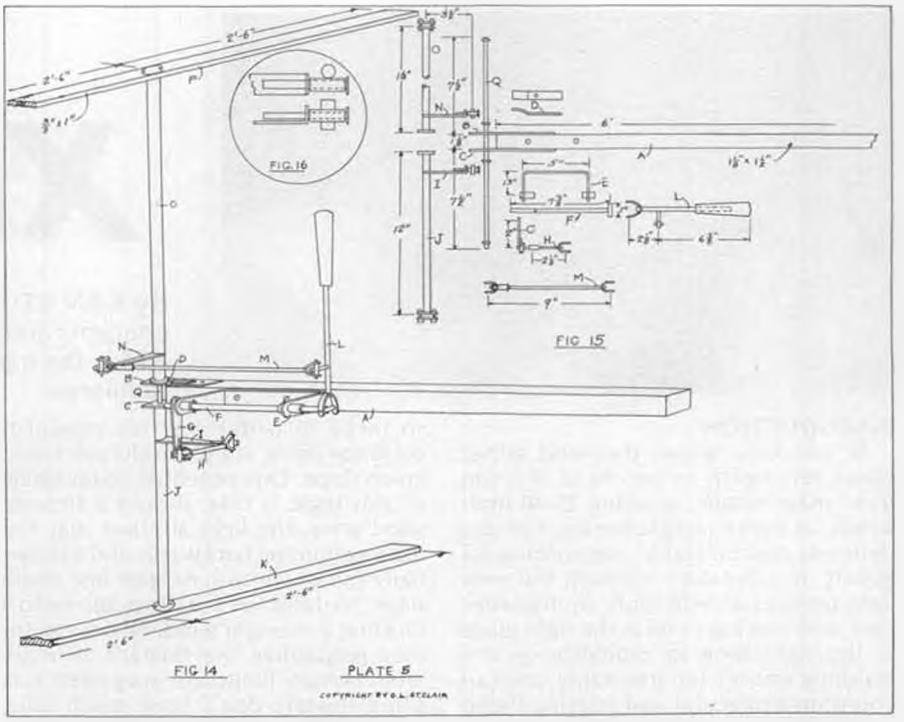
With this modified "U-Reely" handle, Oba can perform flat spins. It automatically takes up line slack.

Oba and his all-metal fuselage P-40. Built in 1949, it's powered by an Atwood 60. Shock gear works.

and he would find Jim Walker flying his gas powered airplanes. Oba rushed to the golf course and was delighted to find him flying a little airplane. It used about an eyedropper of fuel and would fly 15 to 20 seconds in a small circle about 30 feet high. Jim would estimate where the model would come down and snatch it out of the air before it could hit the ground. Oba didn't introduce himself to Jim Walker, he only watched; he had the two-line idea in his head, but hadn't tested it and he feared that if he started talking about it, he might slip and say something that would give away his idea.

Oba built and tested his four-line control plane. He decided to show it to Jim Walker to see if he thought it had any commercial value. It was October, 1937. Oba put his "Miss Shirley" in the back of the pickup, and along with his wife, headed for the Junior American Factory in Portland, Oregon. The people at the factory told Oba he could find Jim at Dan Calkin's. Oba found Jim, introduced himself, and told him he had something he wanted to show him. He showed Jim and Dan the airplane and told them it could be flown on one line, two lines, or four lines with "full house." Jim didn't say much, but did ask a lot of questions. One was, "Do you find your engine speeds up when you're airplane gets in the air? I find these little ones always do." Jim also asked about crashes and slack lines. Oba told Jim that if he had any interest in using the idea, to get in touch with him in McMinnville. That was their second meeting. Oba had planned to fly for Jim, but didn't because it was raining that day.

The following year, 1938, a sawdust hauling contractor wanted Oba to fly his airplane in Portland in a rented stadium, towing a banner with his company name on it. They made plans, but the flight never happened. Approximately two months later, the contractor came back to Oba and said, "Say, I saw a fellow in the school yard flying an airplane a lot smaller than yours and he had just two lines running out." Oba's reply is difficult to put into words.



Drawing made by Oba St. Clair in November 1936, showing the four-line control system he had developed.

Oba went to Portland to pay Mr. Walker a visit. Oba can't remember it it was the fall of 1938 or the spring of 1939. He didn't find Jim at the plant, but was told he could find him at the school yard. Oba got to the school yard just as Jim was finishing a flight with his two-line control airplane. This was their third meeting. Jim asked Oba to carry his airplane back to his starting spot where he had his fuel. When Jim got to the airplane he said, "Hey, I remember you." Oba responded with "Yeah, we talked about my aircraft in '37." Jim fired up his airplane and left the motor running a little rich. He told Oba, "When I get to the handle, you tune it in until I signal." Jim then took off and had a ball flying his little airplane, doing loops and figure eights. Oba recalls the engine to be an Ohlson 23 or something similar. The airplane was similar to a Fireball, but wasn't. Oba can't remember where it differed from the yet-to-come Fireball. After the flight, Jim said, "I've got to get back to the plant," and did. Oba found himself alone and unsatisfied since they didn't talk about the thing Oba had most on his mind. Oba followed Jim back to the plant. When Oba got there he said to Jim, "Well, it kind of looks like you are trying to commercialize on my idea." Jim then put his hands in the air as if swearing to God, and said, "We've got

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Oba flies control line in this clearing he made on his property just for that purpose.

Official court approved photo showing Oba with the four-line control system detailed in above drawing.

XINGU

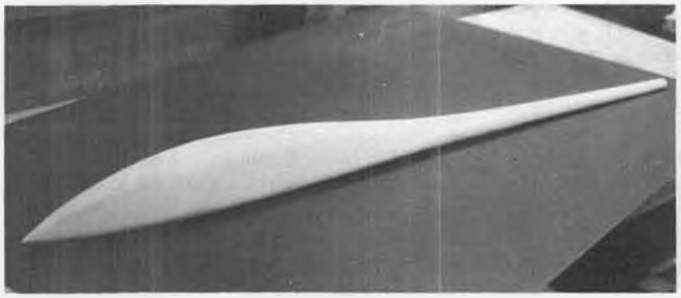
By KEN STUHR . . . A look in depth at the design concepts and possible construction methods required for the high performance F3B and equivalent sailplanes.

INTRODUCTION

At our local slope, the wind either blows very lightly or very hard. A storm front may intrude, pushing 25-40 mph winds, or some conglomeration of undefined, unpredictable meteorological events may produce pleasant but very light breezes of 5-10 mph. In this latter case, one just has to be in the right place at the right time to capitalize on the resulting smooth lift. Inevitably, one can count on a peaceful and relaxing flight, especially so on warm spring evenings.

Typically, a light rudder-elevator airplane derived from a floater-style thermal plane would be used in these conditions. Good light air performance can be achieved by reducing wing loading (floater) to minimize sink rate. This would mean that the vertical velocity component of a slope wind needn't be so large in order for this model to continue flying at a given altitude from a given slope. One potential disadvantage of this logic is that, should a stronger wind arise, the light airplane may find itself swimming backwards and substantially out of control. At least one would have to land and ballast up before tackling a stronger wind. Of course, this may jeopardize the floater's structure after certain limits are surpassed (and some floaters don't have much safety margin). Therefore, in order to tackle the light lift condition with a certain amount of operational flexibility, I was prompted to try a different approach.

Good light air performance can also be achieved strictly by reducing drag. This is, of course, the goal of every sailplane designer/builder/flyer, or should be, since both efficiency (L/D) and sink rate are functions only of drag (in level and nearly level flight, lift always equal weight). Thus, sink rate can arbitrarily be reduced to as little as desired simply (?) by reducing drag. By definition, the efficiency is simulataneously improved. In this context, not much thought is given to wing loading, since a goal in this type of design is the *non-production* of a floater. In Europe, the "Dassel" has used this philosophy to great effect. More and more American thermal pilots are finding that loading particular ships up with ballast really seems to turn them on, and some year we will catch up with the international state of the art. ;However, these ships have to be clean enough to take advantage of their new speed without in turn producing negating amounts of drag. New flying tactics are being developed, too. Area lift is a

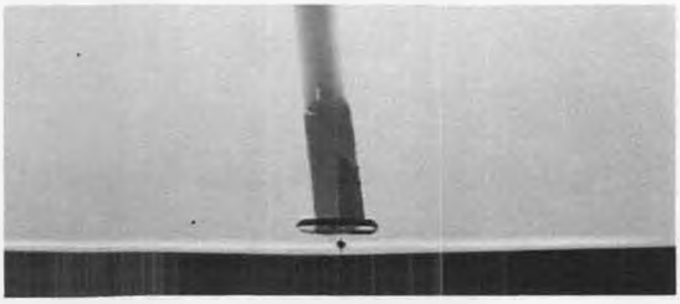


Lost foam fuselage. Epoxy/glass layup over polystyrene form. Primed for final finish, ready for foam removal.

Foam has been removed and hatch cut free. Allow to air out for a day or so.

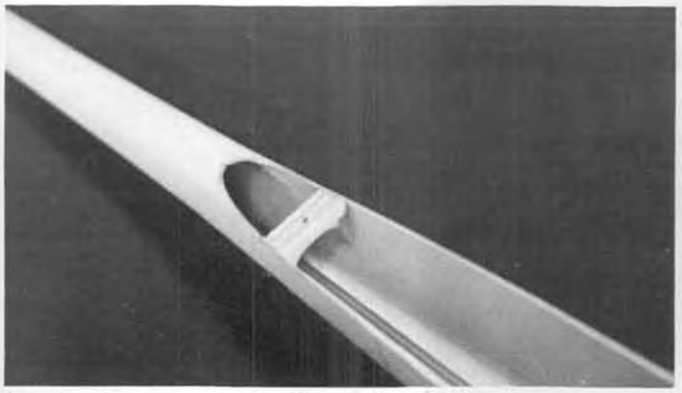
Wing fairing removed. Note internal flange produced by "cast-in-place" method of fitting.

Fit-up of wing fairing using "cast-in-place" technique explained in text.



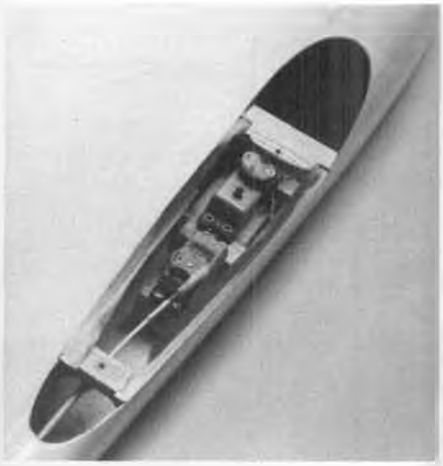
Forward wing mount hole and aileron drive socket.

Aileron bellcrank access. Geometry is different from that shown on drawing.



Aft wing mount in place in unfinished fuselage.

Canopy is painted on in light blue acrylic. Overall finish is lemon yellow acrylic lacquer.



Servo installation. Note Kavan pushrod to elevator servo, aileron coupling ball on servo output disc. Disc stiffened with epoxy circuit board. Old wing mount. Follow plans.

phrase to be heard more and more is it becomes significant to each new "heavy" pilot. These pilots now opt to keep their craft pointed nose level and their speed up, flying at maximum efficiency (max L/D), searching wide areas for lift without even necessarily circling in the occasional thermal. The really flexible craft should be able to circle, of course, without losing everything, should conditions deteriorate.

So the stage was pretty well set for the design of my new light lift slope soarer. "XINGU" was created with all these considerations, plus a few more, like lateral maneuverability and crashworthiness, in mind. Based on my experience so far, XINGU meets the efficiency goal. It can be outflown, in simultaneous flight, by an Aquila or something else as big and light, but XINGU keeps on flying when the 2 to 2.5 meter floaters are forced to land. Specific claims like "flies in a 5 mph wind" make little sense because of the other variables involved (slope geometry, wind direction, lapse rate) so the preceding seems like the best testimonial. Also, XINGU's airspeed is roughly double that of the others, which means it will do well if the wind picks up. Use of ailerons has proved a great asset . . . they're fun to fly and provide fast and precise maneuvering near the ground. Also, the "elephant-ear" dihedral can be eliminated. The few hard landings experienced have resulted in a handful of intact pieces as the result of the successful crash protection system described below.

Recalling my previous comment on the Dassel, and noting the similarities in size, wing loading, and overall cleanliness with XINGU, I can't help but think

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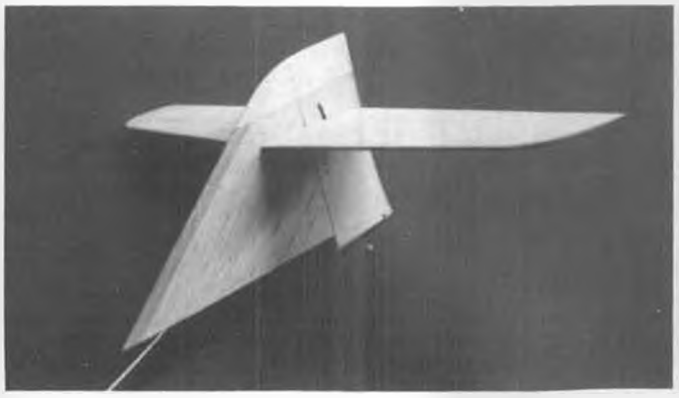
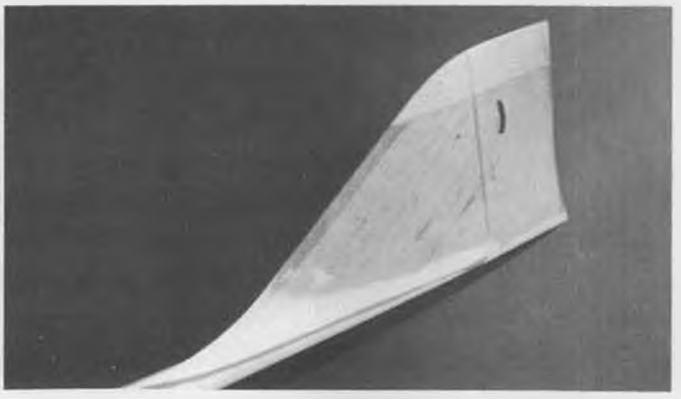
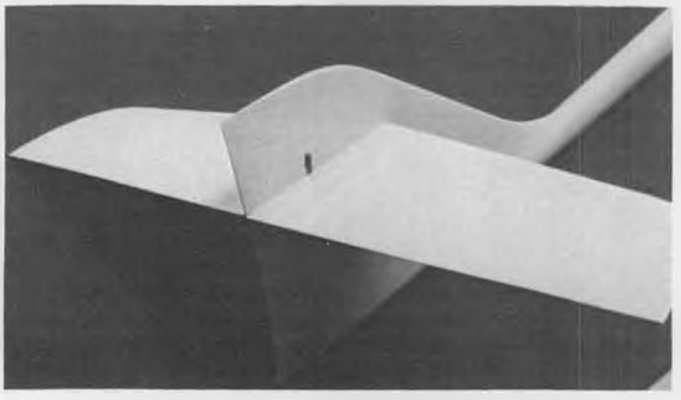


Tail unit. All glassed with 2 oz. (per sq. yard) cloth at this point. Elevator tube protrudes from fin base.

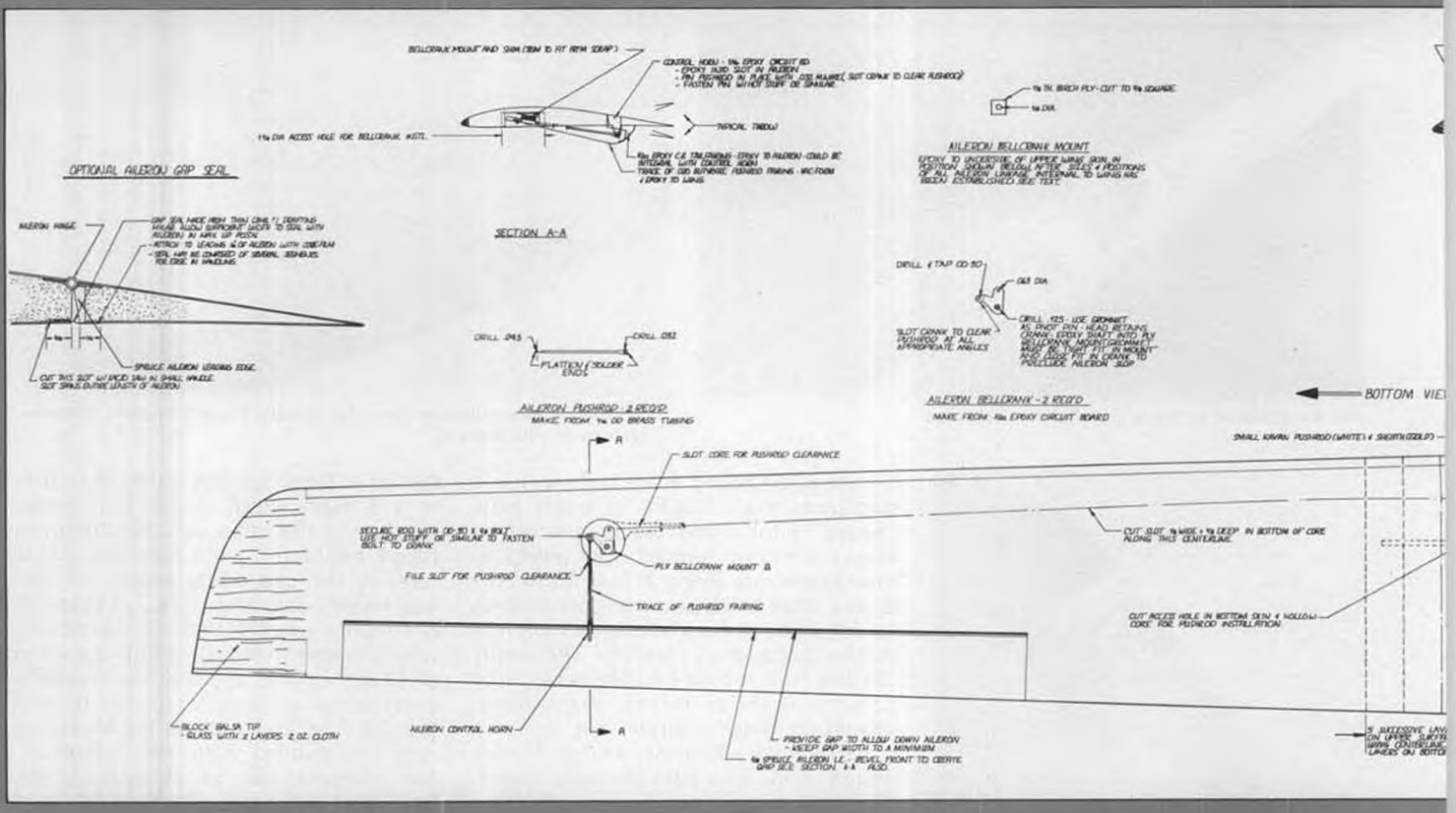


Fin attached and fillet completed. K&B primer used as final contouring aid/filler on fin, fillet, and fuselage.

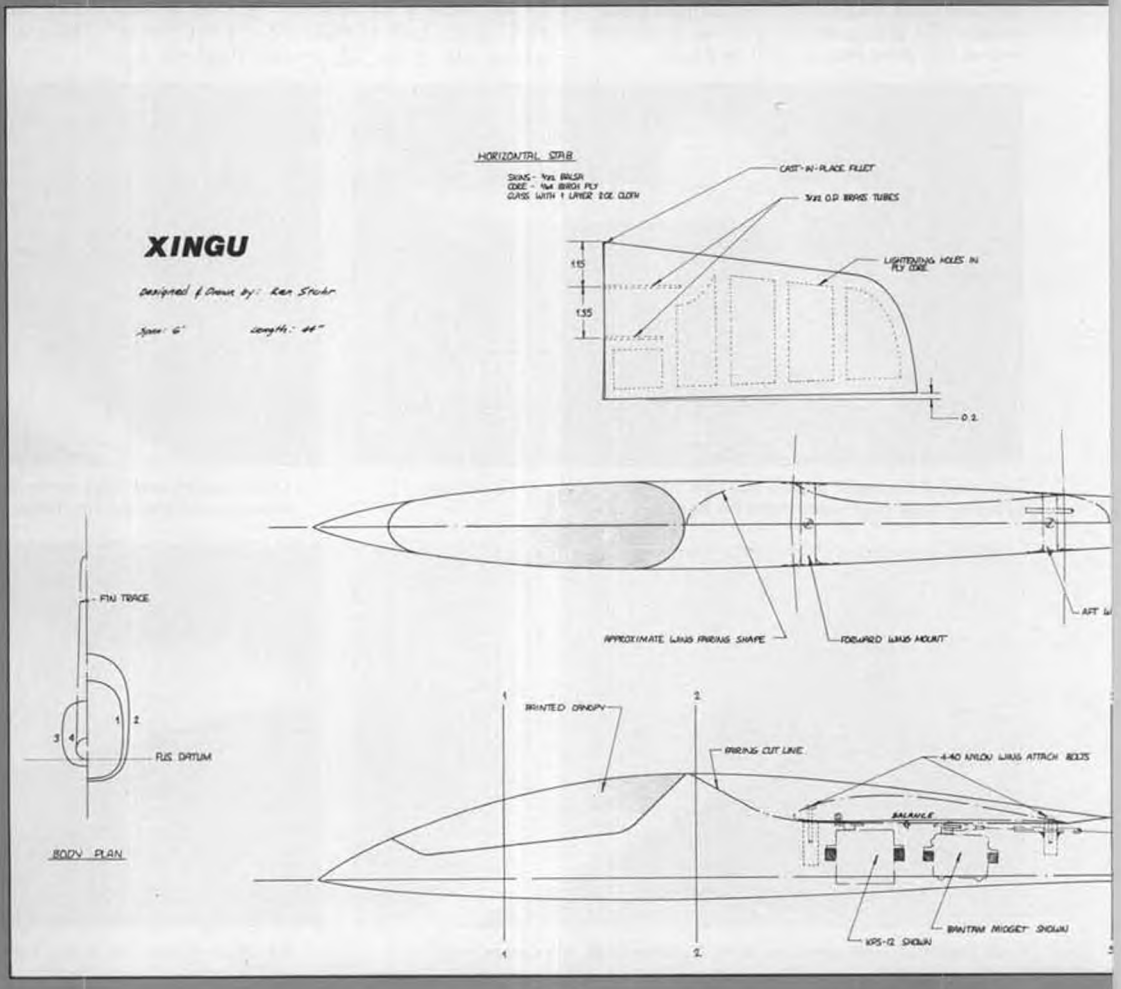
Final finish of fillet gives smooth, flowing lines, minimum drag.

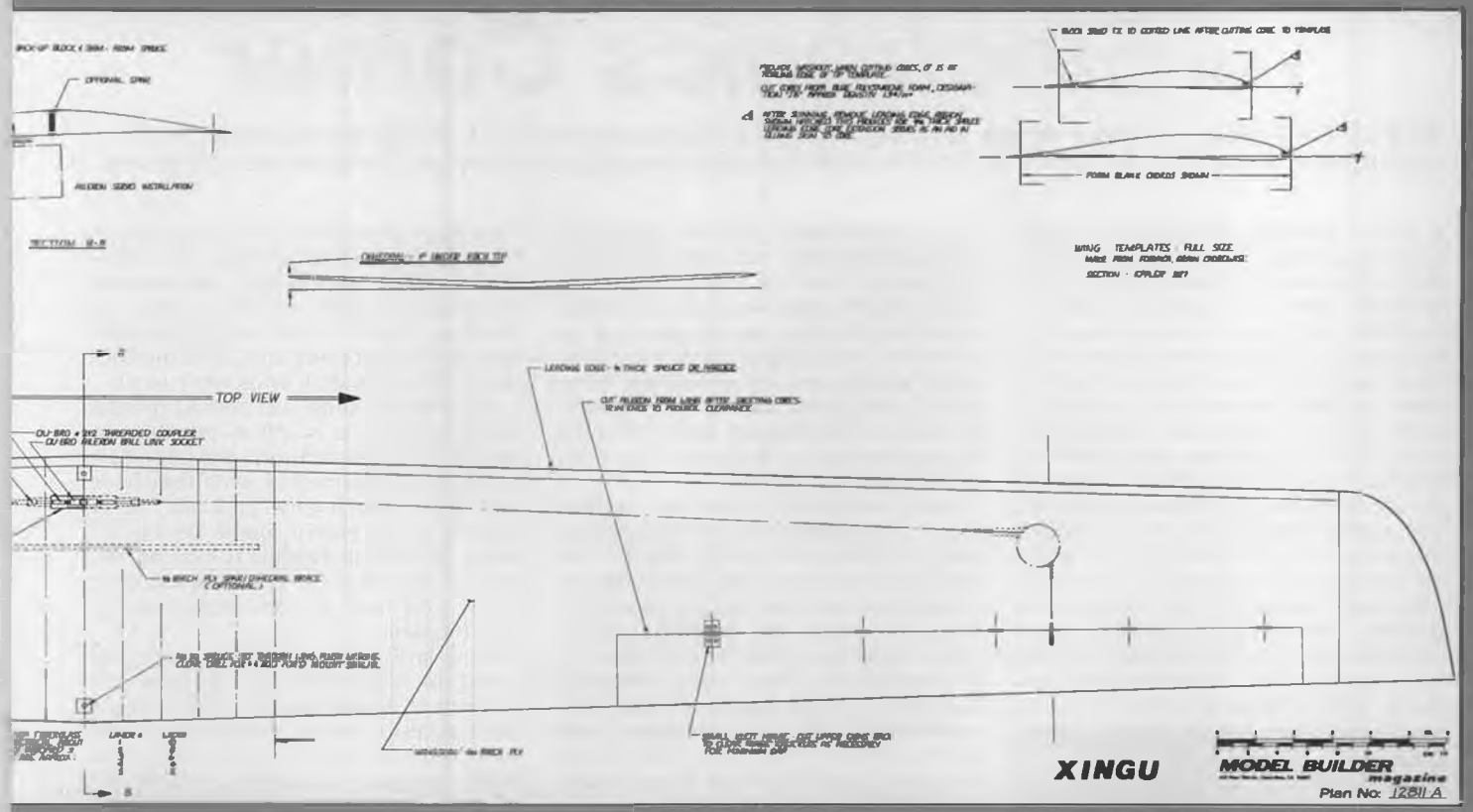


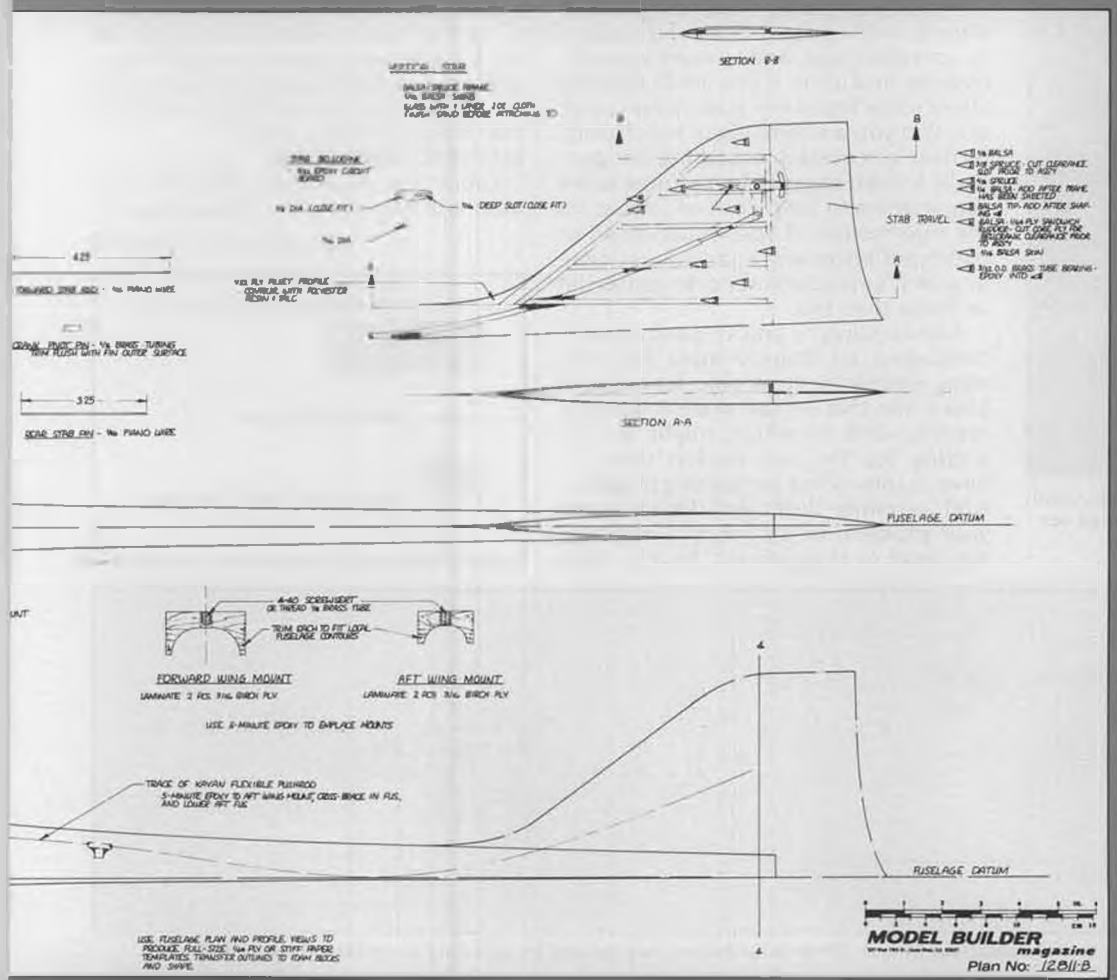
Fit-up of stab to fin is clean and precise. Nice work!



FULL SIZE PLANS AVAILABLE – SEE PAGE 108




TOP VIEW
XINGU
MODEL BUILDER magazine
Plan No: 1281I-A


SECTION B-B
SECTION A-A
STAB TRAVEL
FUSELAGE DATUM
FORWARD WING MOUNT
AFT WING MOUNT
FUSELAGE DATUM
MODEL BUILDER magazine
Plan No: 1281I-B

the Electronics Corner

By ELOY MAREZ . . . Now a regular monthly column, by someone who can translate the mysteries and confusion of electronics *and electrics* into an understandable language for everyone. Send in your questions.

• Model building and flying certainly has many things to recommend it, and those of us who love the hobby have our own very personal reason for doing so. However, we all agree on one thing, it is *exciting*. It is an excitement that never ends, no matter how long the involvement or how experienced you get. It starts way back there when your first uncovered and unpainted attempt is first fitted together into an airplane shape on the garage floor . . . how many hours did you spend mentally flying it through maneuvers that not even Dave Brown on his best days is capable of? It's first take-off, even if made by your friend or instructor was certainly exciting, to be matched only by the first take-off that you yourself made. As experience grows, some of the excitement pales. You no longer experience quite the same thrill from a simple take-off, after all, you are an "expert." But it is definitely exciting to fly that test hop, win that first contest, or to fly one that you designed all on your own. And who can deny the excitement of experiencing an in-flight emergency and getting it back in one piece? Or even simply having some complete stranger come up and say, "I sure did enjoy watching you fly."

Mr. H. Essel, Webra Electronics Engineer, with Webra's Expert 9 radio that so impressed our *Electronics Corner* columnist.

Well, welcome to another exciting first . . . **Model Builder's** new electronics column! OK, we'll admit that it is not quite the same type of excitement we all experience in the air, but our intent is to help you enjoy and possibly prolong your in-flight enjoyment a little more . . . by helping you better understand what is going on inside that black, blue, gold, or whatever color box you happen to be flying with, and the many electric and electronic accessories that grow in number with each passing season.

But throttle back a bit . . . this is not going to be something that those of us here on the shores of Newport Beach consider to be exactly what you need to understand or enjoy your hobby better . . . this is going to be YOUR column. We intend and hope to include the answers to your questions, and to share your discoveries and ideas. If you are in the dark about some feature of your system, or of one that you are thinking of purchasing, or have discovered something not generally known about it, let us know so we can attempt to help you, or to pass on the information. If you've had good or bad experiences with a particular system, or with it's manufacturer or importer, let us know that, too.

And certainly, if you've discovered or developed an improvement for anything electric or electronic, let us know about it so that we can share it with our readers, one of whom might just be waiting for the information that you have to solve some perplexing problem. And certainly don't get the idea that your problem or it's solution might be too small or insignificant. Bear in mind that every weekend, a new generation of modelers is born, those who wandered out by a flying field, got exposed to our great sport, and were bitten by the bug. Those little things that you and I now take for granted are just as mysterious to them as they once were to us.

We'll try to keep you abreast of new developments as much as possible, so we ask our manufacturers and importers to keep us informed of what they have available, both new and old. Your system or accessory might be exactly what one of our readers is looking for, and we can only steer him to you if we know you have it, and know what its features are.

And last but not least, we are not going to claim that we will have the answers to all your questions, but we do have access to many information channels which we can either use or recommend to you. If all else fails, we'll admit to being stumped and ask our readers for help. After all, we all know that modelers as a group are a pretty resourceful bunch. No, we aren't going to make you wait till we get an issue out using your letter before you get an answer. We will answer them all directly as fast as time permits (including an S.A.S.E. with your question would help), and publish those of general interest in the hopes that they will help those who may have a similar problem.

ELECTRIC/ELECTRONIC

Earlier, we mentioned that the column will be devoted to things electric

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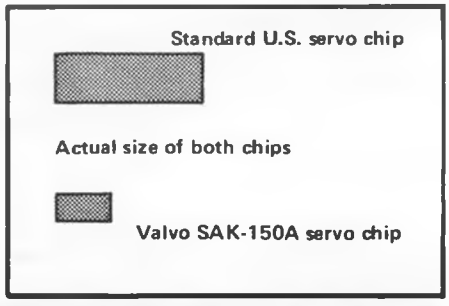
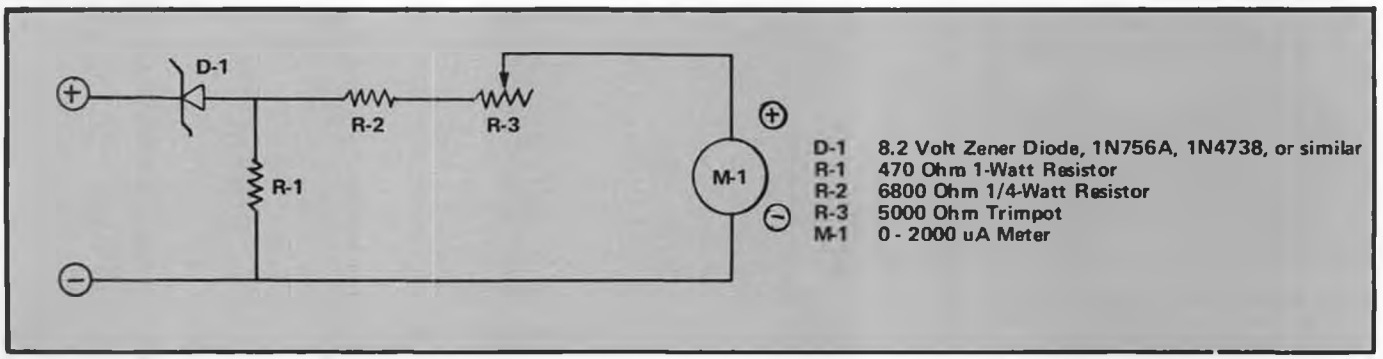




Circuit for installing meter in a transmitter. As described in text. Other value meters may be used by adjusting the value of resistor R-2.

Model Builder's Classroom

COMPOSITE CONSTRUCTION AND ADVANCED MATERIALS

By JIM MOYNIHAN . . . Part 2

One-inch wide laminate strip on a 12-inch wide sheet. Protective scrim cloth is peeled back.

Aerolite laminate. Note the glass pattern.

• Before getting into the good stuff, we would like to acknowledge our source of wood data presented in the previous installment. It was taken from *Wood Handbook: Wood As An Engineering Material.* This book is by the Forest Products Laboratory of the Forest Service, U.S. Department of Agriculture, Handbook No. 72. It can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402 and is Stock No. 0100-03200. Ours is several years old and cost $7.85. So much for that.

Now haul out last month's issue and refer to the materials data table, and let's learn from it. This will be painless but very fruitful. First of all, we listed many materials in order to more vividly illustrate the basic differences of the more prominent products used today. Many don't interest us as modelers and will be ignored at this time. For openers, let us compare balsa and spruce so you get the idea of what the table can be used for. Notice the ratio of tensile strengths; 3.45 to 1. Next, look at the compressive maximums and divide again; 3.6 to 1. The Modulus of Elasticity is next at 2.82 to 1. Weight is always interesting to us and a check here shows a 3.11 to 1 relationship. Isn't it interesting to see that all the parameters are about 3 to 1! Right off the bat we can be sure that spruce is three times stronger than balsa in all departments. But it is also three times heavier. However, if we reduce the cross section AREA of a balsa part by 2/3 we can use spruce to get equal strength at the same weight. Obviously, we pay much less for the spruce.

Not all comparisons of materials are as neat as balsa/spruce, as we shall see. Comparing spruce with T-6 aluminum alloy leaves little doubt why aircraft designers turned to aluminum as soon as it became economically available. At 160 times the tensile strength of spruce, twice the compressive strength and 6-1/2 times as stiff, the increase in weight was a small price to pay. Of course, many others factors are also taken into consideration with real aircraft, such as temperature limitations, creep, fatigue etc. The weight "penalty" really wasn't all that bad, because aluminum made monocoque structure economically feasible too. Someone will surely bring the DeHavilland Mosquito to our attention, so lets dispose of that one right now. The "Wooden Wonder" was proposed by DeHaviland engineering as an answer to an Air Ministry specification. They took umpteen exceptions to the specs, and relying on their suberb engineering ability with wood as evidenced by their Albatross and especially the Comet racer, they proposed the Mosquito. Since the aluminum supply

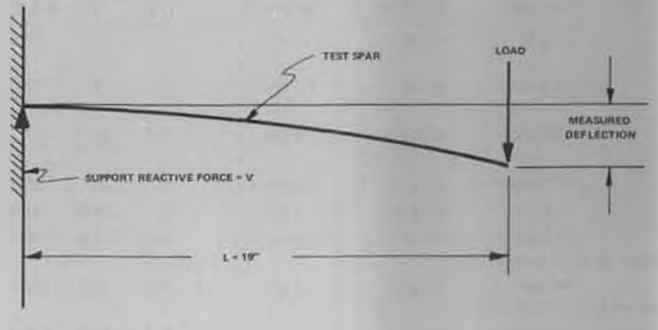


Fig. 1. An elementary diagram showing the procedure for testing all spars.

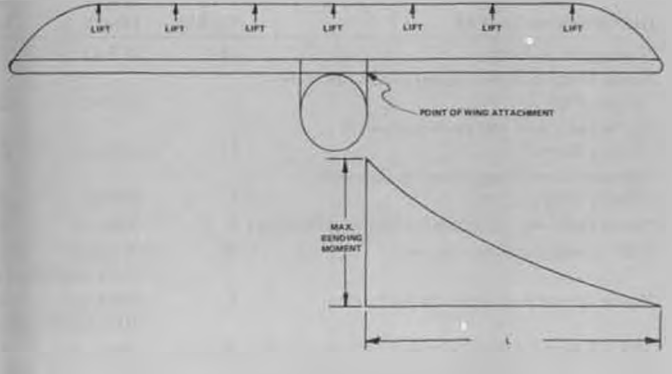


Fig. 3. General lift distribution on rectangular wing, and variation of bending moment with span from point of wing attachment. Note max bending moment is ALWAYS at the wing root.

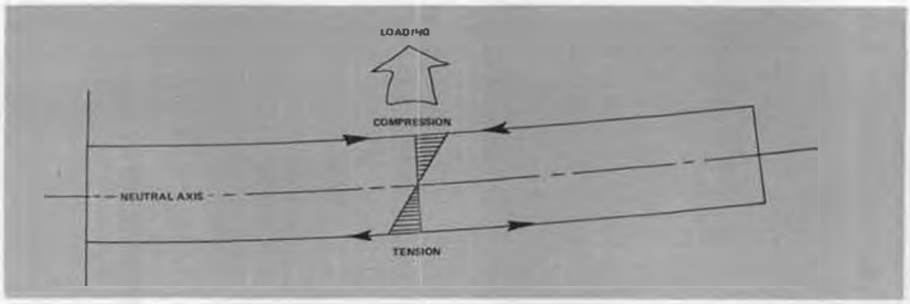


Fig. 2: Cantilever beam fixed at one end, showing location of principal stresses. Shaded area in center depicts the progressively higher stresses applied to fibers as you move from zero stress neutral axis to maximum stress fibers on the extreme surfaces.

was allocated to Spitfires and Lancasters, they got the go-ahead and built the Mosquito. (Personally, I'm glad they did, as I had a ride in one in early 1945 while serving in the 8th Air Force in England during THE War.)

Now back to school. From the previous two comparisons, you get the idea that the table really can tell you something. This is great, but the really important thing is to put it to use. We used balsa and spruce so far because most modelers have a "gut" feeling of what can be done with each. We will be successful here if we can transfer that gut feeling into a thought of "3 to 1" instead. Now look at the really mind boggling characteristics of E-Glass, Kevlar, and Pan Base Carbon Fiber. We picked these three in particular because we can get our hands on these materials now. The rest are in such short supply that a priority is required to be able to buy them, due to defense requirements and aerospace programs. All three exhibit roughly the same high tensile strength . . . almost 10 times aluminum and no contest with spruce. Again comparing aluminum, they are lighter and with almost 4 times the compressive capability. Now the Modulus; Kevlar twice that of E-Glass and carbon fiber almost twice that of Kevlar! Now the really neat thing to appreciate here is that, unlike wood and aluminum, etc., we can inter-mix these three materials in a resin matrix to take advantage of the best or most desireable property of each. As an example, we at AEROLITE PRODUCTS INC. produce a sandwich, or laminate as we call it, of E-Glass and carbon fibers and epoxy. See Figure 5 and photos. This utilizes the high Modulus of carbon fiber with the high tensile and impact resistance of the E-Glass.

This is all very interesting, but what the heck do we do with it? We'll show you

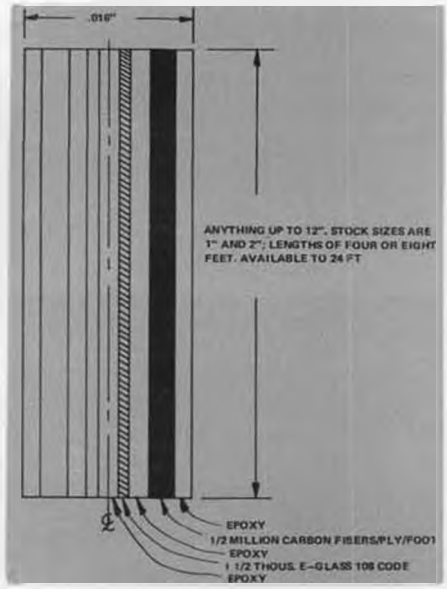
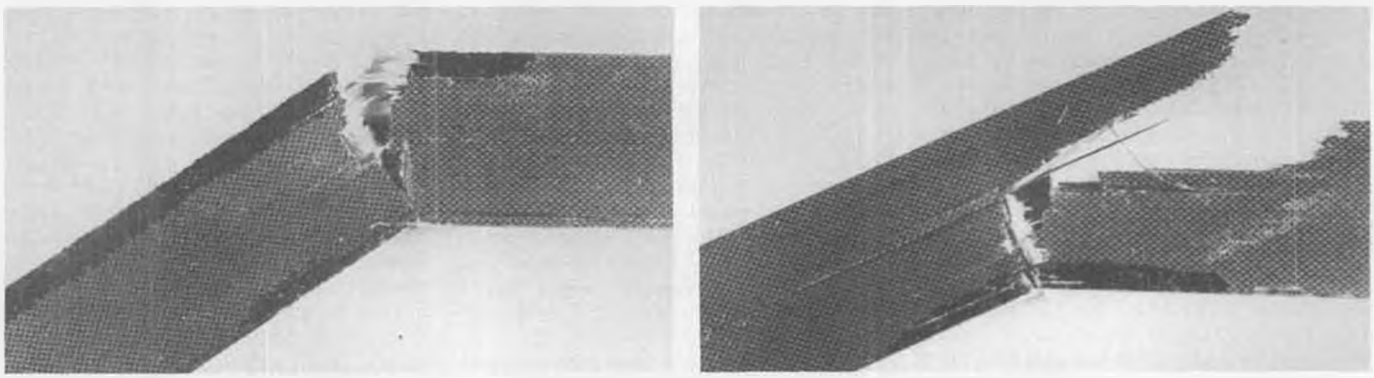


Fig. 5: Greatly enlarged cross section of Aerolite carbon fiber E-glass laminate. Material weighs .375 grams/sq. in. Epoxy used is totally compatible with Hobbypoxy 2 or any viscous C/A glues such as Super Jet.

that next, confining our remarks at this time to carbon fiber applications. Before going any further, look at Figure 2. This is how materials behave when they are loaded. Here we show a simple rectangular beam which could be a wing spar as well. The neutral axis passes through the geometric center of the beam. For the purists, it passes through the centroid of the beam, which, except



Close-up of balsa/laminate spar failure (left) and spruce/laminate failure (right). Similar except that balsa fails straight across (simultaneously) because of low tensile strength of balsa fibers.

TABLE OF SOME DATA FROM AEROLITE TEST SERIES 18, MATERIALS TEST 25519-80, SPARS

Remember, 1 oz. = 28.35 gm.

DESCRIPTION OF SPAR	CURVE	MAX LOAD	MAX DEFLECT	TOTAL WEIGHT	REINFORC. WEIGHT	EPOXY WEIGHT	LOAD CARRIED AT (IN OZ.) DIFFERENT DEFLEC. 1/2"	1"	1-1/2"
*7.6#/cubic ft. balsa	H	11.5 oz.	1.7"	5.5 gm	none	none	5	8	10.5
*Same balsa as above coated both sides with Hobby Poxy 2	I	11.5 oz	2.05"	7.0 gm	none	1.5 gm	4	7	9
*Same balsa with tow both sides with Hobby Poxy 2	G	42.0 oz	2.4"	12.0 gm	4.59 gm	1.9 gm	9.0	18	27
*Same balsa with laminate one side with Hobby Poxy 2	F	50.0 oz	2.75"	12.5 gm	4.5 gm	2.5 gm	10.5	20	29.5
*Same balsa with laminate both sides with epoxy	E	96.0 oz	3.24"	16.5 gm	9.0 gm	2.0 gm	15.0	30.0	44.0
*Nice straight grained spruce	D	107.0 oz (This spar failed prematurely at 93 oz., see text.)	5.20"	22.5 gm	none	none	16.0	31.0	46.0
*Same spruce with laminate both sides	C	138.0 oz (This spar failed prematurely at 114 oz., see text.)	3.95"	34.0 gm	9.0 gm	2.5 gm	24.0	48.0	72.0
.085 x .5 Aerolite pure carbon/epoxy spar stock	B	166.5 oz	2.65"	23.0 gm	none	none	44.0	86.0	118.0
Giant Scale E-Glass .0595 wall epoxy tube spar 10 = .468; 00 = .587	A (24.22#)	387.5 oz	6.20"	71.0 gm	none	none	39.0	80.0	114.0

*All 1/4" x 1/2" x 24" loaded at 19" from support.

for simple geometric shapes, is rarely the geometric center. Oops, we said in the beginning that we would keep this simple. But just so you know, all the fibers of the material below this line are in tension and all those above it are in compression. The fibers along the neutral axis are not loaded in any way. The outermost fibers are at maximum tension and compression, and as you move toward the neutral axis, the fibers are loaded in a ratio of their distance from the neutral axis.

Figure 3 shows a typical lift distribution on a rectangular shaped wing. Below that is a bending moment diagram. New terminology, bending moment: Using our patented simple explanation system, the bending moment is the leverage the load is applying to the wing structure. Lay a stick on the floor. Place your foot on top of it at one end. Holding it down with your foot, pick up the other end and keep heaving. You are applying a bending moment. *(You are also in good shape if you can do it without bending your knees! wcn)* This is simply the sum of the load at any point multiplied by the distance from that point to the wing root. This is a simplification of sorts because it is really a square root function for uniform loads such as wing lift. The point to note is that it is ALWAYS A MAXIMUM AT THE WING ROOT. Since that is true, we need more spar here than anywhere else. But equally important is that we DO NOT need as much anywhere else. More on this later.

To see what's what in the real world, we tested a series of wing spars. Here we present Series 18 of those tested which are 1/4 by 1/2 inch in cross section and 24 inches long. To show a comparison of advanced materials, we also show the performance of an AEROLITE 2-meter glider spar which is only .085 x 1/2, but made of pure carbon fiber and epoxy. We also show an AEROLITE giant scale spar made of E-Glass and epoxy. This is a tubular spar with an OD of .581 inches, ID of .468 inch and is centerless ground to these dimensions. The 1/4 by 1/2 spars are balsa and spruce. The balsa was light stock not normally used as spar material, but it really doesn't matter too much because we were looking for comparisons anyway. The spruce was nice straight grained stock by Midwest and purchased from a local hobby shop as stock material. Both woods were tested as is and with carbon fiber tow and our AEROLITE laminate as we shall see. These were tested as cantilever beams, and load and deflection were measured as shown in Figure 1, until they failed. The point of failure gives us the ability to determine the maximum bending moment as a finite number.

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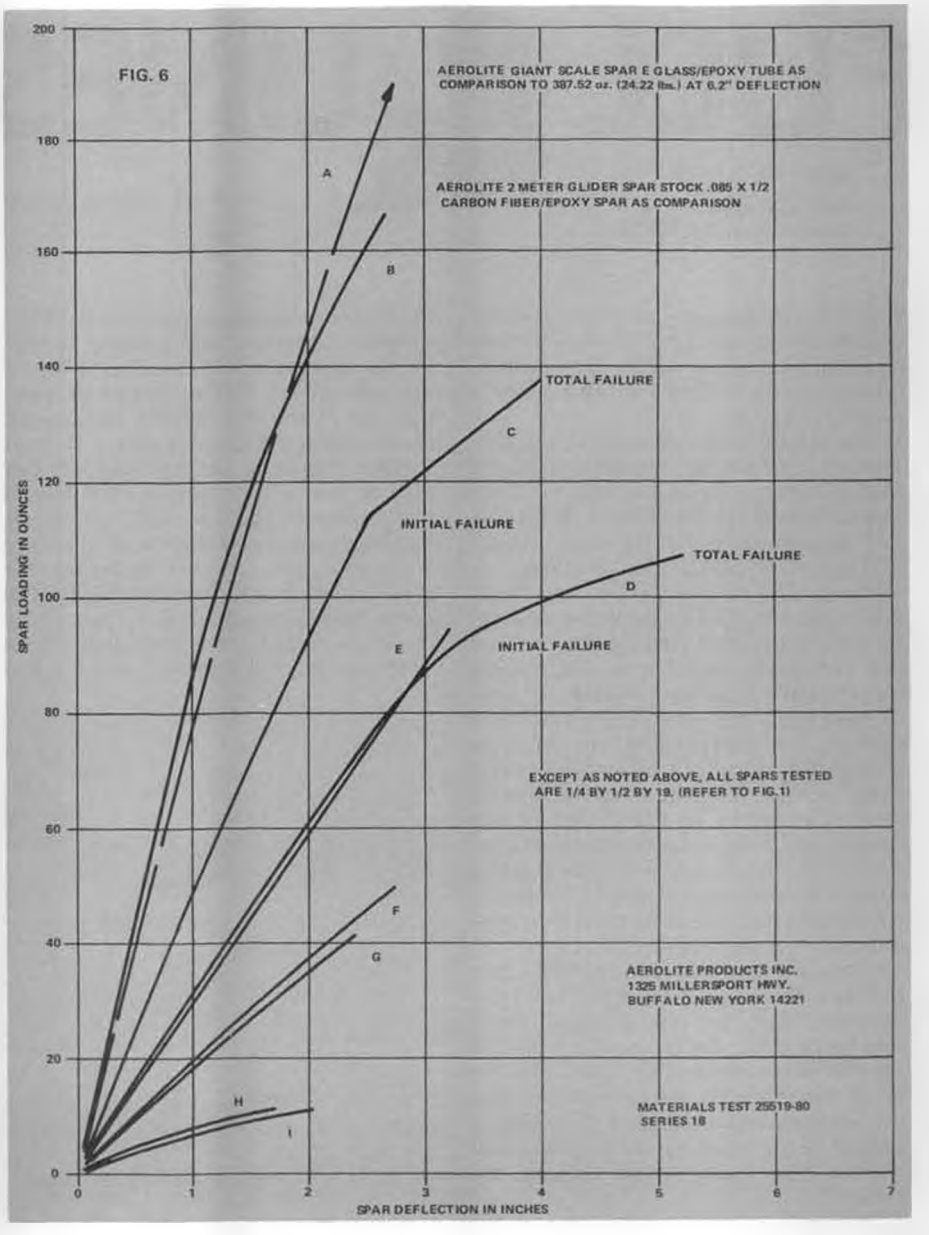
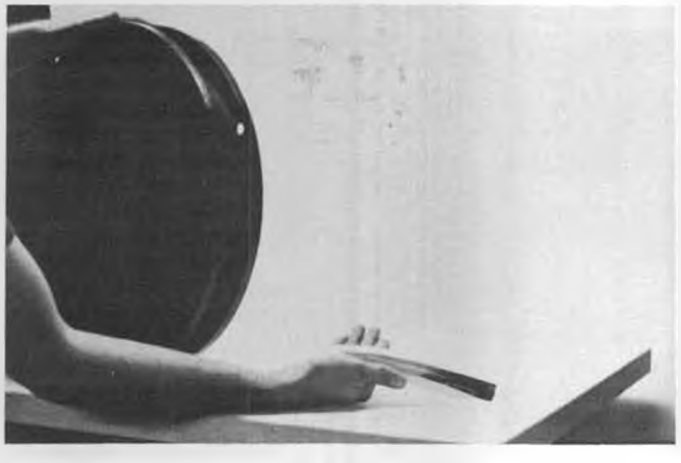
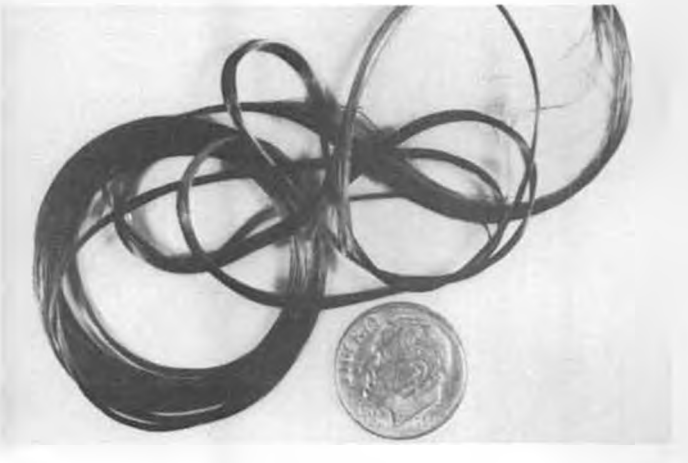


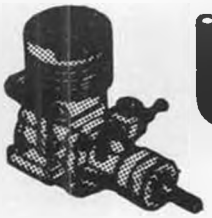


Carbon fiber tow as it comes off the reel.



Carbon fiber yarn. Only 12,000 filaments. Care to count them?

FUEL LINES



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PHOTOS BY AUTHOR

• By far, the majority of the *Fuel Lines* columns have been explanatory or tips, techniques and so forth. This month, however, we'll deviate, and offer a product review.

The subject is the new M&H Variable Venturi Carburetor, manufactured by Martin Enterprises of San Marcos, California. When we first heard about this R/C carburetor, our initial reaction was, "All throttle type carburetors have variable venturis of one form or another." When we received a sample for testing, we were pleasantly surprised to find that the venturi is varied quite differently from any other carburetor we have seen. In essence, this one has a standard venturi, but the area of the throat is changed by inserting or withdrawing a cone. Further, the fuel spray hole is located vertically in the center of the throat, and fuel is metered simultaneously with insertion or withdrawal of the cone. It's a surprisingly simple design for controlling the fuel/air mixture throughout the throttle range.

When the throttle is in the full open position, the cone is retracted from the venturi, and the fuel spray hole is unobstructed. Only the high speed needle valve meters the fuel. As the throttle is retarded, the cone moves into the venturi, and the tip of it begins to slide over the spray bar outlet. Thus, fuel and air are both simultaneously decreased.

This will become clearer as you examine the photographs and drawings of the carburetor. The first photo shows the carburetor installed on a K&B .61. It's a fairly conventional looking set-up, *except there's no big hole in the top of the carburetor.* The air enters through the slot in the side of the carburetor. Now, look at the two cut-away and cross section drawings. At first glance they may appear a bit complex, but after a few moments you'll realize how simple but ingenious the design is. In the third illustration, you can see that the throttle arm, which is attached to the throttle cone, rides in a curved slot. Thus as the throttle is opened, the cone is raised out of the throat of the venturi, and the fuel hole in the spray bar is unmasked. In the second photo, you can see that the top of the cone is at the top of the air slot . . . full throttle position. The third photograph shows the cone in the idle position.

So much for how it works. The important part is how *well* it works. Obviously, comments about the performance of a carburetor could be quite subjective. So, to gain a bit more objectivity, we conducted a series of engine runs, first with the Perry carburetor that came with the engine, and then with the M&H carburetor. Before going any further, let's reiterate a phenomenon about modelers and R/C carburetors: It seems they either swear by or swear at particular brands. That's why we're trying to be a bit more objective.

All of the test runs were conducted with 15 percent nitro fuel, and a Rev-Up 11 x 7-1/4 prop. The glow plug that came with the engine appeared to be a Cox long, idle bar plug. Although we personally feel that this is too much prop for a

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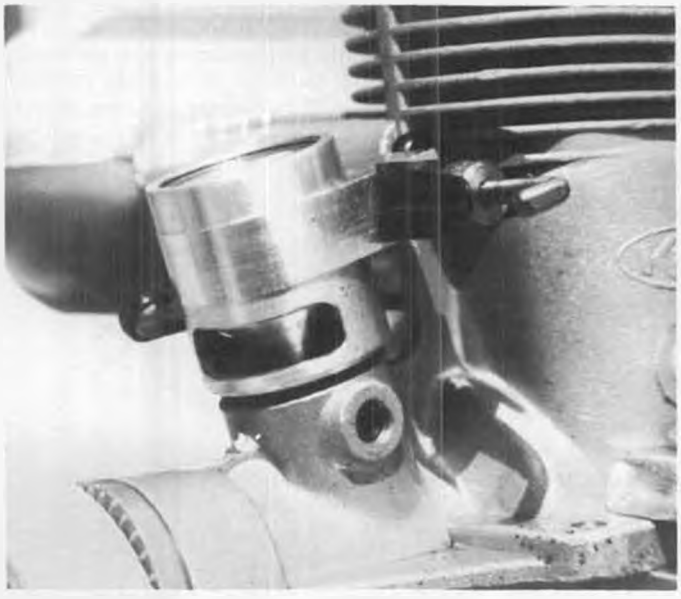
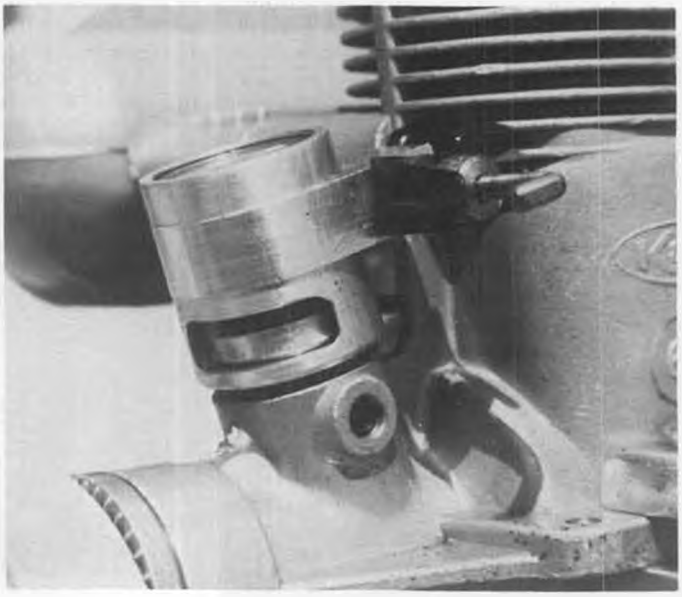
The M&H Variable Venturi Carburetor installed on MB's K&B 61 for testing purposes. Note: no hole in the top of the carb!

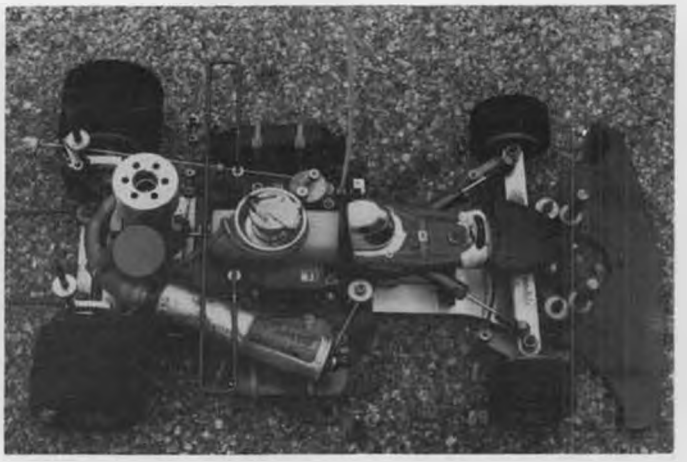


With the cone raised, the carburetor is in the full throttle position. Air enters through slot in side of carb.



As cone lowers and reduces air intake, fuel is metered simultaneously as cone tip slides over spray bar outlet.

Kondo's top qualifying Kyosho car. All Japanese cars used body similar to this Mooncraft Special with low wing.



Kondo had O.S. power with Perry pumper carb. Shocks damp chassis oscillation, battery and muffler to right side.

R/C CAR WORLD CHAMPS

By CHUCK HALLUM . . . An analysis of the various cars that raced in the 3rd World Championships at Indianapolis on July 5, 1981.

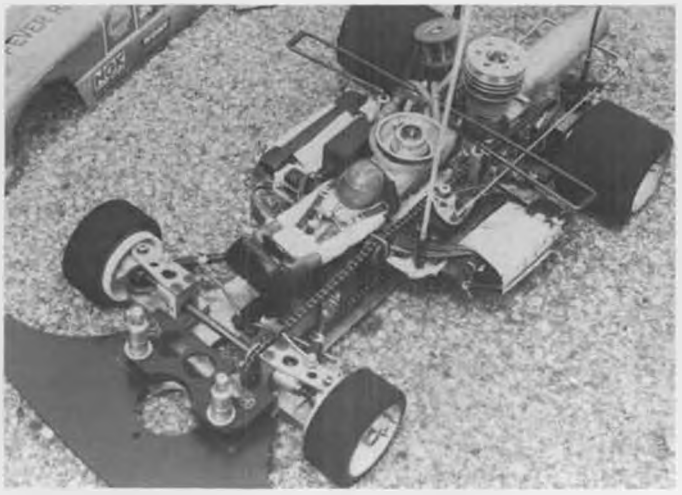
• This month we are going to look at the cars of the 3rd World Championship held in Indianapolis on July 5, 1981. There were quite a few cars that had new innovations and performed well. The great majority of these were European built, plus a couple of Japanese cars. I got to thinking and discovered that of all the car pictures I took, not a single one was of a car built here in the U.S. . . . and I took well over a hundred photographs. There were only minor changes made to U.S. cars, just to make them perform a little better or to improve reliability. Why change winning car designs? Well . . . all that will probably change over the next couple of years.

It's too bad that model car racing seems to be going the way of the full-size cars. What I mean here is, that new technology seems to be coming from overseas. And besides that, one U.S. company is having prototype development being done in England. Shades of March and Chaparral. Too bad that the U.S., who started it all, can't stay in the forefront. I guess it really all boils down to the fact that racing in other countries (European, at least) is more serious and receives much more public and private support. Enough of this. . .

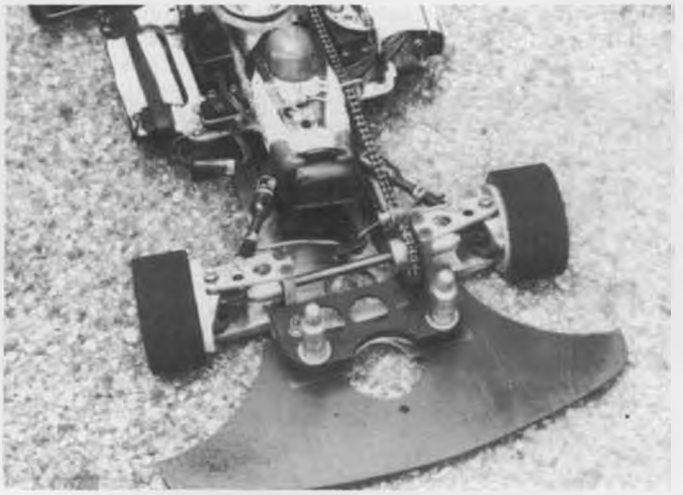
When I first arrived at the track, some friends said, "Quick, watch the cars running. There's a four wheel drive (4wd) car out there." So I hustled over to the track and watched. I was very impressed. The traction was not great, but the 4wd car hardly had any tendency to power oversteer. The car could take the corners practically anywhere. I hate to jump ahead, but the fact the car too corners well from any line caused it to turn in poor times, because the driver, Taki, had become used to taking corners extremely conservative. Too bad there weren't several of these cars there, so we could really see what the car could do.

There are several pictures of Taki's 4wd car, which is a prototype Kyosho car. Actually, it is quite simple. Just a new front end and chain-drive components. The sprockets are on the left side of the car and the chain runs the full length of the car, with about three chain idler supports on the return side. The front wheels are driven by a single pin running through a slotted hub with the pin center-line located at the kingpin axis. I think the front wheels are under-driven a little, and there is a one-way clutch driving each front wheel. Only the inside wheel will be driven in a corner (normally) and probably the front wheels only drive when the rears slip a little. Look at the picture and let me know what you think.

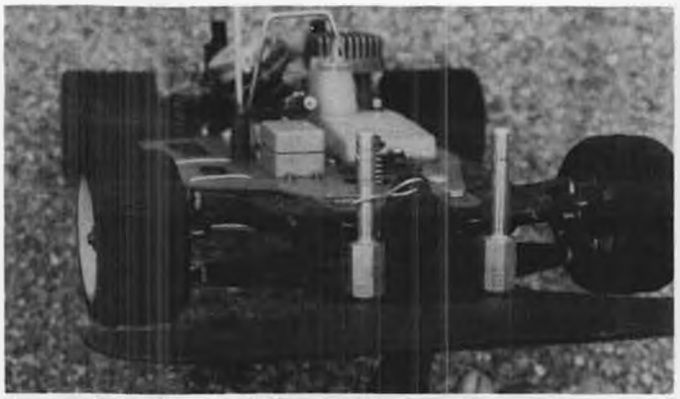
The next car I looked over was the P.B. independent suspension car. I was



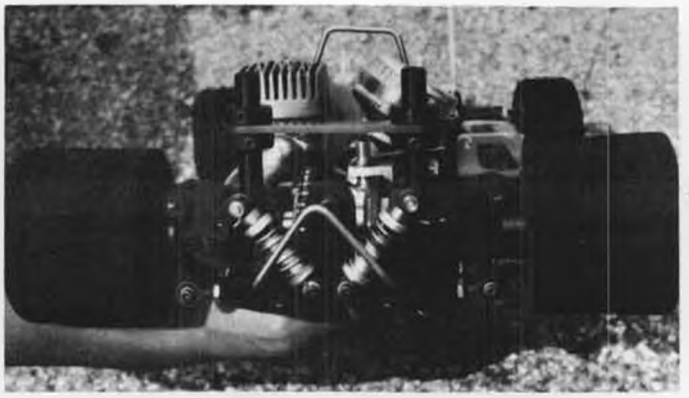
The 4 wd Kyosho prototype car. Same component layout as Kondo except muffler. Note three chain idlers.



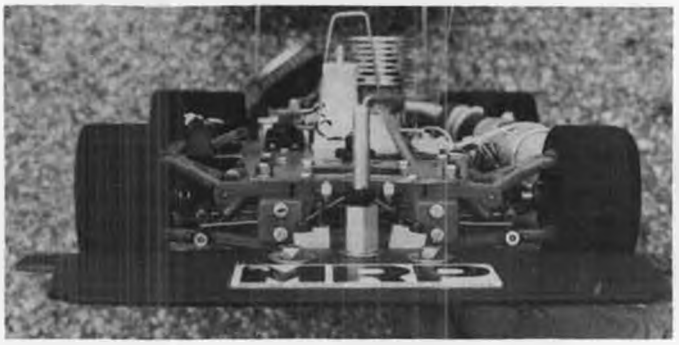
Taki added new front end and chain drive components from Kyosho off-road car. Aluminum cylinders are one-way clutches.



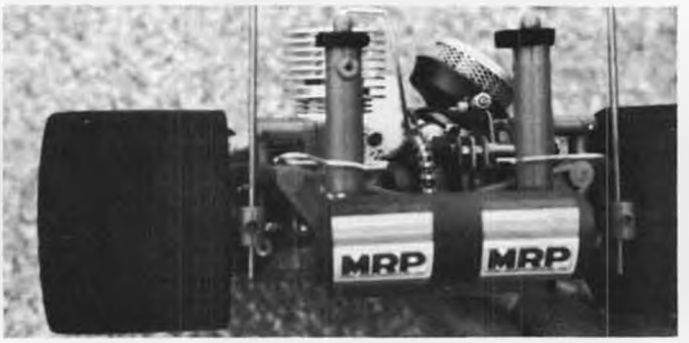
Front end geometry of BP/A car. Machined aluminum parts and 'O' ring springs, with high rate change.



Inboard rear hub pivots not good, but lower 'A' arm pivots are down (good). Coil springs probably unload.



Front view of P.B. suspension car. Steep angle of upper 'A' arm gives drastic camber change with deflection.



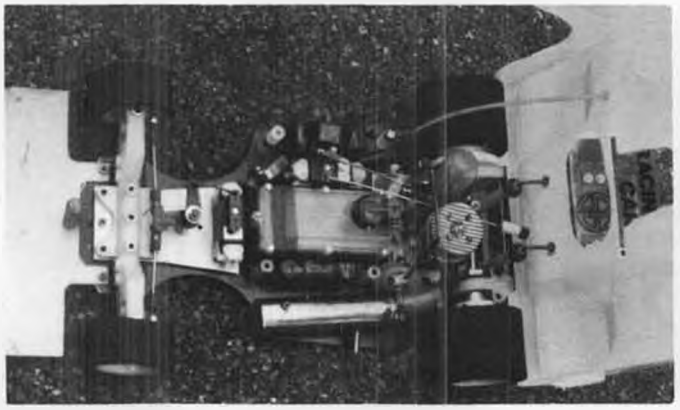
P.B. rear suspension geometry good in free position, poor in deflected position (see text).

impressed by all the little parts that seemed to always stay together (much better than the old Dynamic car that it reminded me of). The P.B. cars of Errington and Culver really looked good during early practice. And all the MRP team were running the P.B. cars, and just learning what to do. There are now a zillion adjustments that can be made. The P.B. team has had lots of time to work these things out and their car showed it. Tire wear on them looked pretty drastic, with the outside of the fronts wearing a lot and the insides of the rears wearing. If you look at the pictures of the P.B. chassis, you can see why. The only reason the P.B.'s did well was that they have been out awhile, so that people could learn how to set them up. (There were only one Serpent and two Booth-Preston Associated prototypes.) But I was still impressed by how well they ran.

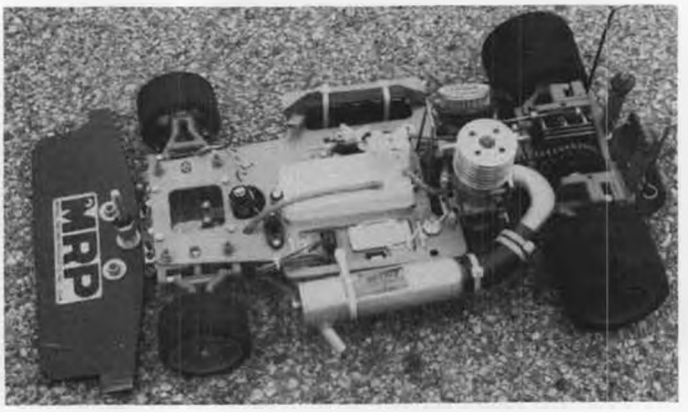
Looking at the pictures of the P.B. car, you can see that the front suspension is held between an upper and a lower chassis plate back to the engine, and then a rather sturdy lower engine power pod plate only. The two forward plates make the chassis very stiff. The front view shows the relative pivot points of the upper and lower front 'A' arms. The short upper one at the steep angle causes the front wheels to go through a drastic camber change during vertical motion . . . which is bad. The same thing applies to the rear, when the car is at its best running height. If I were running one of these cars, I would try putting a spacer between the lower chassis plate and the suspension components to lower the engine, servos, fuel tank and batteries with respect to the suspension . . . probably at least 1/8 to 1/4-inch. Suspension geometry would be much better and stiffer springs might be required . . . but I think the cars would run much better.

The factory P.B. cars were modified so that the front end caster could be changed. The upper 'A' arm was shifted back about 3/16-inch to give more caster. When traction was high, the front end of the factory cars couldn't have been much more than 3/16-inch off the track. And the so-called front roll bar is tied down solid in the middle and is really just a ride height adjuster. As usual, the P.B. team was running mucho nitro . . . 45% . . . and their huge carbs. This combination may have been the reason that the suspension cars had problems on the damp track in the final.

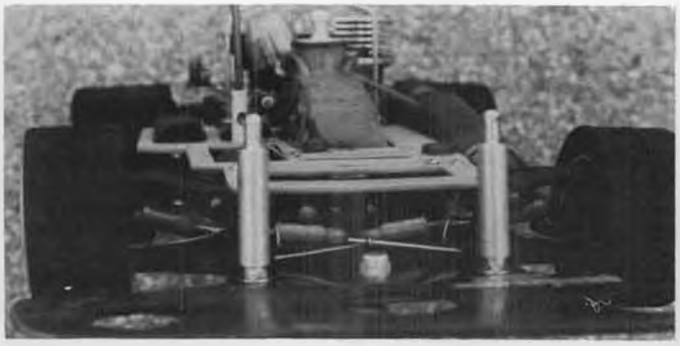
The next car that I really looked at critically was the Kyosho car of Kondo. Throughout qualifying, Kondo had his car on top or only a position or two back. I saw nothing really tricky about the car. Notably, the car had a solid rear axle . . . no differential. The O.S. Max engine breathed through a Perry pumper (61) carb, using K&B 1000 and Special fuel



Bortolamasi's S.G. car with Super Tigre power. Thin alloy aluminum chassis, front roll plate, quick change servo mounts.

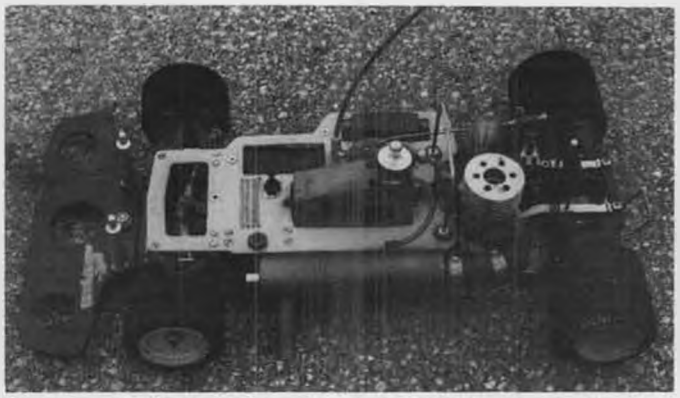


P.B. car as run by MRP. British team used Picco power rather than K&B. Dual chassis plates make unit very stiff.

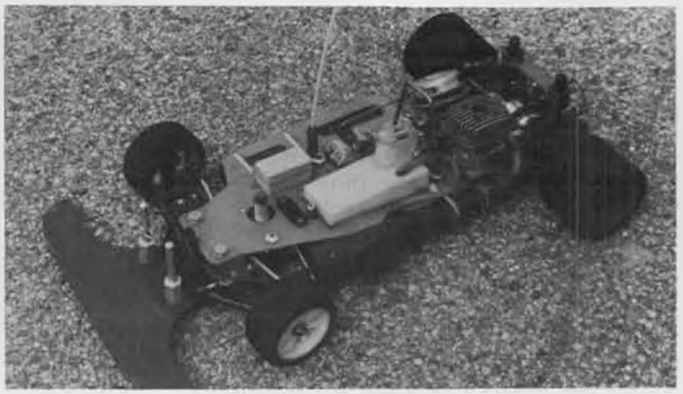


Serpent front suspension geometry pretty good, but top 'A' arm too steep. Front wires (with loop) are roll bar.

Rear hub pivots on Serpent OK, but if car lowered with suspension deflected, geometry would be better.



Serpent car of Bervoets. Rear end support layout is good. Bervoets switched to plate chassis car to make final.



The Booth-Preston prototype car for Associated. Front end parts ahead of kingpin axis for more room.

1:1. As with many Japanese cars, two shock absorbers mounted fairly high are used to control front end vibration, both vertical and in roll, to some extent. The kingpins on the front hubs are really inboard, which means that the servos had better be strong. But the general understeer effect of the inboard kingpins is probably offset by the oversteer characteristics of straight axle and big carb. The chassis was aluminum, as were all foreign flat-plate chassis cars. I personally feel the flex characteristics of an aluminum chassis are much better than the U.S. glass-epoxy plates. Aluminum doesn't have the 'flat' flex spot that the epoxy boards do. The aluminum is a little weaker, but for competition like this, every little bit of performance counts. Many U.S. drivers were changing plates because of problems like this.

One of the biggest things going for this Kyosho car was the driver, Kondo. Kondo was quick, consistent and took good lines through all corners. It was really something to watch him flicking those two sticks. When you watched the car, it didn't look like there was any problem with power oversteer, but that had to be Kondo showing his ability. The weight of all Japanese cars was rumored to be about 4 lb., but I lifted this one and was told it weighed 5 lb., 4 oz. . . . and I believe it. A plastic fuel bottle with bolt-in Gits flip-top cap is lighter than ours.

Next, I had to find an interpreter so I could find out about the Italian cars. Now these cars were light, 4 lb. 7 oz., and were the lightest cars there. I looked at Bortolamasi's car, which was the quickest S.G. qualifier, and Tadiello's was identi-

Continued on page 80

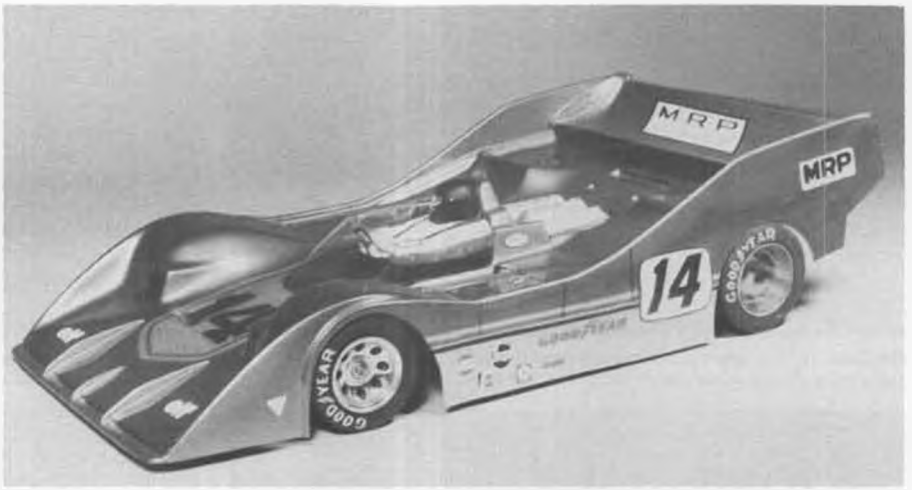
3rd WORLD CHAMPIONSHIP FINAL EVENT CARS

PLACE	NAME	CHASSIS	ENGINE	RADIO	BODY	CARB.	FUEL	WT.	DIFF.	GEAR RATIO
1	CARBONELL (USA)	Delta Super J Graphite Plate	Picco	Delta & KO rec. & servos	Budweiser Spyder (MRP)	Delta Slide	Delta 40& nitro	5#, 1 oz.	Yes (ball) (qual. no)	5.8:1 small tires
2	TADIELLO (ITALY)	S.G. Al. chassis plate, front rockers	Super Tigre '81	Sanwa	Lola 310 (parma)	Super Tigre	S.G. 20% nitro 15% castor	4#, 7 oz.	No	5.0:1 small tires
3	KONDO (JAPAN)	Kyosho Fantom 20 Al. plate	OS Max 21 FSR	MRC Astro Racing	Moon Craft Special	Perry (pumper)	K&B 1000+ spd. 1:1	5#, 4 oz.	No	5.36:1
4	ISHIHARA (JAPAN)	Delta Super J Graphite plate	OPS	KO EX-1	Sorbello (parma)	Delta Slide	Lion 30% nitro	5#, 4 oz.	Yes (ball)	5.45:1 small tires
5	CULVER (ENGLAND)	P.B. Alpha Ind. Suspension	Picco	JR - Futaba	Lola 310 (PB)	P.B. Slide	P.B. 45% nitro	5#, 9 oz.	Yes (gear)	5.75:1
6	BORTOLAMASI (ITALY)	S.G. Al. plate front rocker	Super Tigre '81	Sanwa	Lola 310 (parma)	Super Tigre	S.G. 20% nitro 15% castor	4#, 7 oz.	No	5.0:1 small tires
7	WHITE (ENGLAND)	P.B. Alpha Ind. Suspension	Picco	JR - Futaba	Lola 310 (PB)	P.B. Slide	P.B. 45% nitro	5#, 9 oz.	Yes (gear)	5.75:1
8	LECAT (FRANCE)	P.B. Alpha Ind. Suspension	Picco (OS max. qual.)	Multiplex Europa	Lola 310 (PB)	P.B. Slide	Power Plus	5#, 9 oz.	Yes	5.41:1
9	BERVOETS (HOLLAND)	Serpent MK3 Al. plate	O.S. Max	Robbe-Futaba	Sorbello (parma)	Pipalla (Italian)	40% nitro 12% oil	4#, 13 oz.	Yes, but with center clutch	5.55:1
10	BURCH (USA)	Associated RC-300 Epoxy plate	K&B	Futaba	Porsche 30 KL (assoc.)	OPS	Lion 30% nitro	5#, 4 oz.	Yes (ball)	5.55:1

R/C AUTO NEWS

By DAN RUTHERFORD

PHOTOS BY AUTHOR



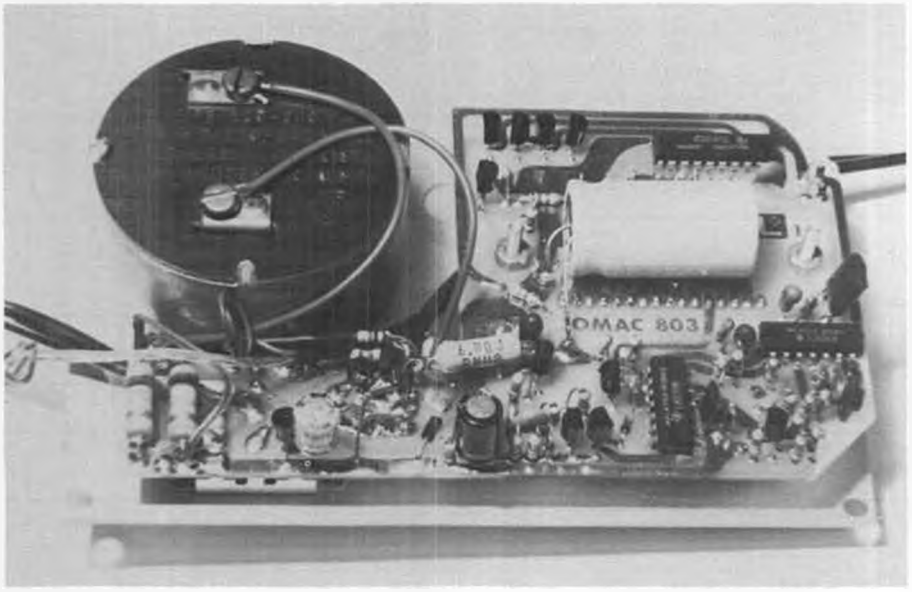
A nicely turned out Lola; the Can-Am body is in 1/8-scale and available from MRP.

• Seems to be about time to wrap up, more or less, the series of articles dealing with set up of a 1/12-scale race car, in this particular case the Associated RC12E. Hopefully you were around when we went over the building of the car plus getting tweak out of it and, in general, just detailing the little sucker out with what is basically only proper mechanical fits. Now we will probably go off on a couple of tangents, talking about support equipment, batteries and so on. . .

A real Big Deal, when racing electric-powered cars anyway, is a battery charger. You gotta have one, no way around it. And it has to be the *very best* charger you can afford, no way around that fact, either. Even though price doesn't always mean something is better, in this case it does. A $100.00 charger is quite expensive, I know that. But if you are serious about racing, you will sooner or later end up paying that much, quite possibly more, and your decision to do so will probably be prompted by having had a "good enough" charger overcharge a couple of packs, in between losing a few races, because the same charger couldn't be trusted to put a 100% full charge into your batteries before that all-important main event. Let's add up the cost of buying that "good enough" charger. The unit itself was around $35.00. Those over-charged battery packs aren't cheap; before learning your lesson you have blown up two of them . . . at right around $40.00 a throw. The losses in racing can't be reduced to dollars and cents, but your whole investment in car, radio system, support equipment, entry fees, transportation to the races and so on seems rather pointless when you can't even make that last couple of laps and everybody else can.

So it's easy to get to the point where that first charger isn't cutting it and is worth little to you now, plus it has cost $80.00 or so in batteries, as well as the truly aggravating lack of running finishes in racing. That adds up to over $115.00, money much better spent on a top-of-the-line charger in the first place. *(You ever been a used car salesman, Dan? wcn)*

As for specifics, I don't know of any bad chargers on the market but do prefer and use the JoMac digital output charger, I am reasonably sure the part number is 803A, and it presently sells for $100.00. As it happens, I also have several other chargers laying about and they see some use, mainly in slow-charging various packs, but when it comes time to do some racing in 1/12 scale, the only charger that I can trust all of the time, to give a full charge everytime, is the JoMac unit. In a pervious column I went over all of the features, in fact in a relatively rare blunder, did it twice in back-to-back columns, so most certainly won't go over it yet again. For now, I can recommend it without reservation, the only caution being that, as with any charger, you *read* and *fully understand* the instructions for use.



A peek inside the JoMac 803A charger. Now you can see why they're kind of expensive.

On the horizon are some interesting chargers; MRP has a couple that promise excellent performance, one of them will push the state-of-the-art even higher but production units have been delayed for lack of a component or two. Delta has working prototypes of a set-it-and-forget-it charger that will sense that voltage peak we watch for, only the charger itself will automatically shut off. All interesting stuff, but for now you should take a good look at what JoMac offers in chargers.

Short of a really good charger, you must at least have a digital output voltmeter patched into the charger leads someplace, preferably as close to the batteries as possible. Associated has a charger that offers this option, as it is already wired for it, all you need add is the voltmeter. Still, a decent voltmeter sells for around $70.00 or so, seems to make more sense to get it all in one package.

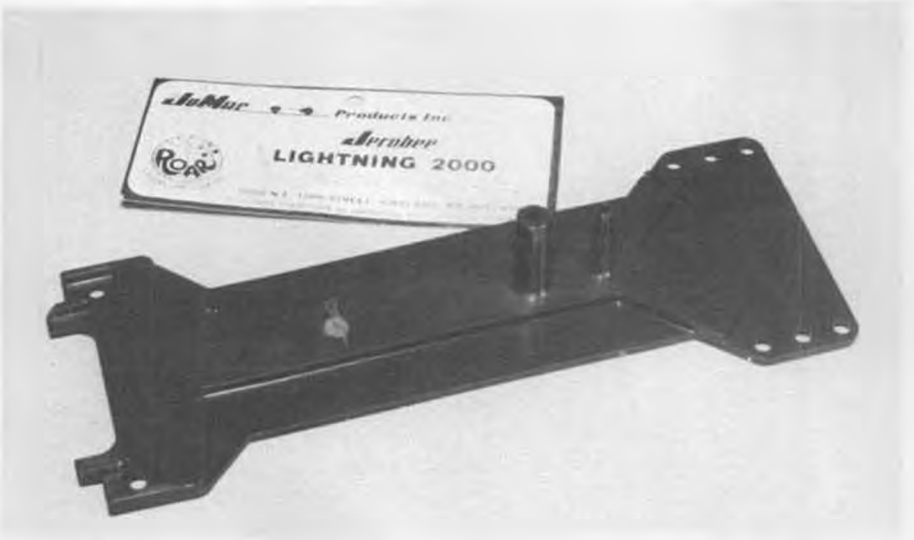
I'll say it again, as it is important. *Get the best charger you can afford.*

The batteries your charger feeds are also important and now there is a choice, where in the early days of electric we all used GE cells. And it is also an area, one of many in car racing, where what the factory-sponsored racers are using and winning with the precious little to do with your successes, or lack

thereof. To be real blunt about it, the top racers are using, almost exclusively, the Sanyo batteries and, yes, they do seem to be better, at least as far as on-track performance is concerned. However, it has also been my experience that they are more trouble, can be over-charged much easier than GE cells, in fact you have to charge them slower because of this. Competition at the top level is very close indeed, so these racers can much more easily devote the extra time to proper charging, and a ruined pack is no big deal to them as their sponsor will just come up with more batteries.

This means that you will have to look to your own needs before choosing sides. If you are already a pretty fair driver, have the car sorted out, plus have an efficient pit area and are losing races by a few feet, you probably ought to have Sanyo packs and just learn to deal with the slower, more critical charging procedures. If instead, you are still crashing more than you should, spend a lot of time between heat races repairing the car or just trying to get it set up properly, and have a working area that gives additional meaning to the phrase "the pits", it would probably be best to stick with the GE cells, cleaning up your act in the other areas first. Finally, if you are still over-charging GE cells once in awhile, flip back to the section on chargers and realize that if you can't get GE cells to work *very reliably*, you are not ready for Sanyo's . . . Simple as that.

With that, an interesting observation for you to consider. The club I race with, Seattle Area Radio Control Auto racers (SARCAR), has always shunned the ROAR-suggested eight-minutes-plus-one-lap race procedure for 1/12 cars. Prior to the '81 season, we just ran 15-lap heats and 25-lap main events. This year, after some discussion, we settled on a graduated system where the A main is 7 minutes long, plus that extra lap, the B main is 6 minutes, C main is 5 minutes, with further mains also being 5 minutes.



New chassis pan from JoMac for the Lightning 2000, molded in Lexan. Very strong and more resistant to "tweaking" than 'glass pans.

The philosophy here is that it is simply too difficult for many club racers to always have a pack that will reliably go that 8 minutes. Yes, it can be done, racers are doing it every weekend. But there are also those who fail to finish that worked-for main event, just because their pack wouldn't go the distance. I don't know about you, but I can handle (fairly) easily another racer simply out-driving me, doing a better job setting up his car or even stumbling across better luck than I. But to drive a decent race and then to have a pack dump on me a lap or two from the finish is just too much. It seems to reduce the racing to a battery-charging contest and I personally wouldn't even turn around to watch such an uninteresting operation.

The other side of it is that the club has a certain amount of responsibility toward the racers in providing good racing and to avoid forcing the racers to spend any more money than they have to. Don't ever forget that the last 30 seconds of an 8-minute race are the most expensive. You have to have good batteries, possibly even an extra pack that is used only for the main events, an expensive charger to push in a maximum charge each time, and car setup gets more critical.

Our method has, I think, worked very well. We have racers that come out with one set of batteries, charge them with a simple charger and still finish their races. If required to race 8-minute heats and mains, these same racers would have buy that $100.00 charger, plus another pack or two. Would it be worth it? So far, the club thinks it would not be, and it is something that at least needs to be discussed within your club.

For the actual power source at the races, most just use the 12-volt battery in their full-size car and that is OK. I do a lot of 1/8 scale racing, plus like the convenience of having a 12-volt battery in the workshop, so lug around a heavy-duty number that I got at Sears. Junk yards are a good source for cheap

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Update kits from Delta, to add adjustable steering rate to existing transmitters. An easy installation.

Another update kit by Delta, converts most any charger to a variable output unit, making them more versatile.

The latest insanity at Torrey Pines is jumping off the cliff with a directional parachute. No helmet or other protective gear, naturally.

R/C SOARING

by Dr. LARRY FOGEL

PHOTOS BY THE AUTHOR

• In 1965, Congress created the National Foundation on the Arts and Humanities. Part of that foundation, the National Endowment for the Arts, aims to "preserve the historic birthright of future generations of Americans by supporting the survival of the best of all art forms which reflect the American heritage in its full range of culture and ethnic diversity". For the Folk Arts, it aims to honor "music, dance, song, poetry, tales, crafts, games, pastimes, visual representations, oratory, and rituals at their core."

If you design, build, or fly R/C sailplanes, you are very much part of our Folk Art and deserve to be so honored. No, the present list of grants does not include any devoted to R/C soaring, but maybe it should. After all, here is a unique means of "visual representation". "Flying a sailplane is certainly a performing art", and what could be more "folksie" than spending long hours at your work bench, getting together with other pilots at your soaring site, then telling tall tales about your performance on that last flight?

Our art form involves people of all ages, ethnic groups, and walks of life. It's really a great equalizer. With your hand on the controls, it doesn't matter who you are or what you've done, but merely what you do now. And there's always good fellowship . . . friends who eagerly share their knowledge and tradition. The helping hand is there whenever you want it. A hearty welcome greets every interested newcomer. To prove all this, let me share some hints and kinks offered by your fellow sailplaners.

Alex Mladeneo of the Torrey Pines Gulls solved the problem of the new small C/A glue bottles tipping and spilling inside your tool box. "Why not attach the lid of a spray can to the side of the box (permanently or with velcro)? The bottle is held within the inner ring of the lid. It remains upright in transport and is at your service whenever needed."

Mike Charles, of Anaheim, California,

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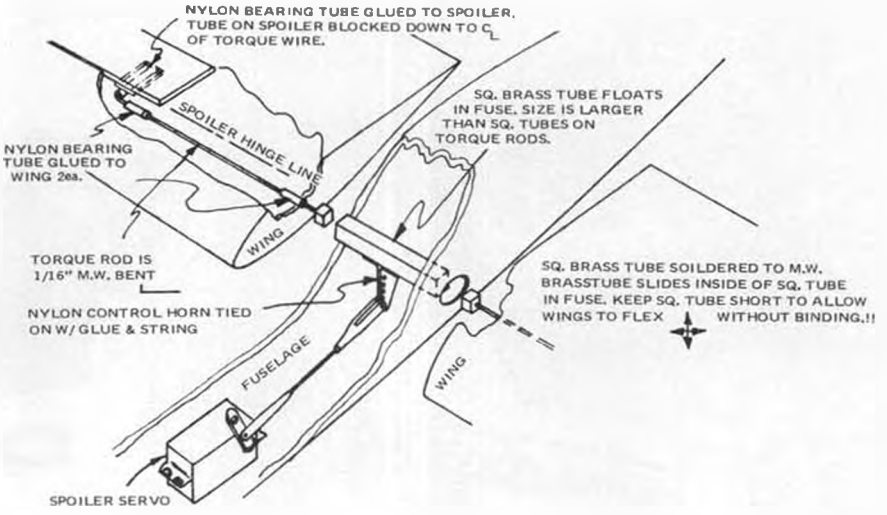
Alex Mladeneo shows off his field box Hot Stuff holder.



Ray Cooper, Northwest Soaring Society, uses this method for linking up spoilers to the servo.

1. Shereshaw "Cumulus" very popular with SAM 29 Ft. Worth gang. Marion Knight at Brooks AFB, San Antonio, Texas.

2. "That injine do not sound right," says John Pond, as Dick Huang, Jr. holds on to the screamin' beast, a Playboy, of course.

PLUG SPARKS

By JOHN POND

• There is a sign appearing in front of a Reno, Nevada gambling casino that says, "The Fun Goes On 24 Hours A Day". This could easily be applied to the Old Timer Events held in conjunction with the AMA Nationals. This columnist has yet to run into a gripe about the good times with old timer flying.

Held consecutively since 1965 in Philadelphia at Willow Grove NAS, the Old Timer events were for awhile, the only national game in town. After the first SAM Champs were organized by Bud McNorgan, Tim Dannels, and Harley Elmore, this columnist continued to run the O/T Nats Events.

This was not intended as competition or to detract from the SAM Champs (which has been a success from the onset), but to provide some fun and competition for those fellows who were unable to attend the SAM Champs but yet went to the closer AMA Nationals.

Of course, at the very start, the events were strictly free flight, with only two or three events being offered. The demand for events as staged at the Stockton Original Old Timer Annual produced events for both glow and ignition powered models. This proved to be quite popular as neither type of powered model competed against each other. In addition, the rubber event was added which eventually split off into Cabin R.O.G. and H.L. Stick events.

These events were run under the rules as first promulgated by John Pond for the Stockton Annual. As the new SAM Rules came into use at the SAM Champs, at the suggestion of Bruce Chandler, the columnist adopted these rules for the Nats O/T Events.

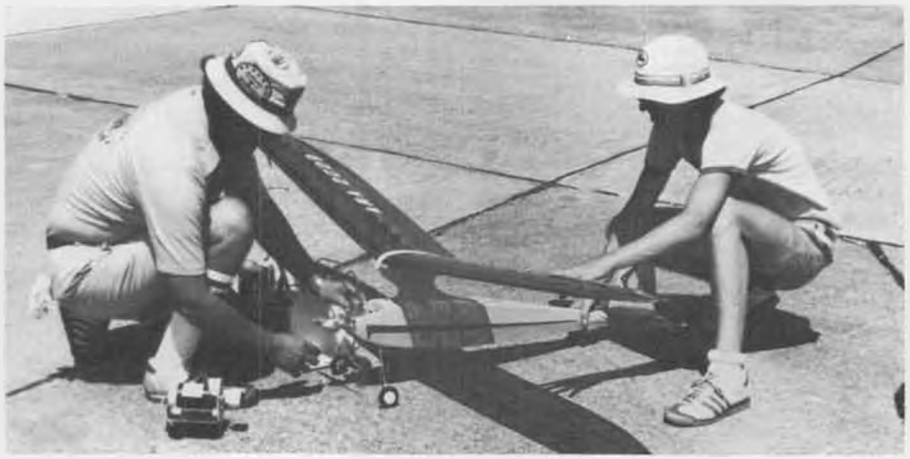
Much to this writer's chagrin, the rules were changed quite radically, eliminating all glow powered models. This was a tough rule to follow as many modelers attending the Nationals had only these type power models. Nevertheless, SAM rules were followed despite some drop in attendance.

In the early seventies, the Old Time Eagles introduced R/C Assist O/T Free Flight models. These made a sensational debut at Bong AFB albeit being flow unofficially and only for demonstration.

It was 1974 that saw the first R/C O/T Events at the Nationals, run by the perennial R/C O/T Contest Director, Everett "Woody" Woodman. In spite of the low amount of publicity and the out-of-the-way site at Oshkosh, Wisconsin, this event drew remarkably well. In fact, this columnist made the trip particularly to fly his New Ruler at that time.

Of course, with such enthusiasm, these was nothing left to do but to start holding R/C O/T F/F Assist events at the Nationals. This meant moving the Old Timer Annual Reunion Banquet from Tuesday to Friday, to act as a Victory Banquet and awarding of trophies.

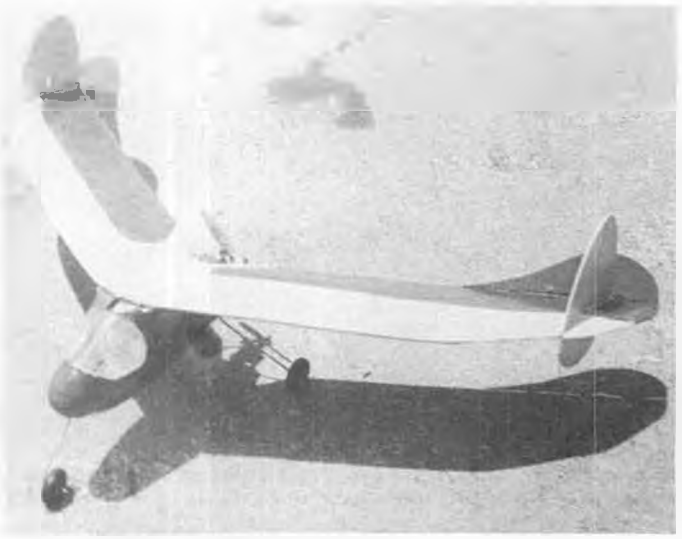
Wednesday was selected as the day for staging R/C O/T Assist events, as Thursday evening was generally set aside for processing the host of O/T free flight models to be flown on the following



3. Nice father and son team. Dick Huang Sr. and Jr. tune engine in Playboy Sr.

4. A rare Miss Empire State scaled to half size, by Ray Santee.

5. Another SAM 29 Planesman O.T. enthusiast, Richard Millet, with Fox 36 powered Taibi Powerhouse.



6. One of the best flying tailless models seen by columnist. A Halleck Bobtail built by John Dana.

7. George Aldrich won Ignition Stunt with Orwick 64 powered Go Devil Sr. at Nats.

8. Don Still is "still" competitive with original "Victory" powered by Atwood Champ.

9. Aldrich reminisces with Pond's Nobler at Seguin AFB.

day, Friday.

Like all other styles of flying, R/C Assist O/T F/F started to proliferate from the Limited Engine Run Event to the Antique Event to the new Texaco Event introduced by the columnist. The latter event has proven to be extremely popular on the West Coast.

The next two Nationals were held at Lake Charles, LA, and it was at the second Nationals that the author got interested in the possibility of staging O/T Controline Events. John Miske, Jr., of the Garden City Circle Burners, was responsible for this line of thinking as he was demonstrating his old Ringmaster using the 1950 AMA Stunt pattern. He also produced a short list of models that were eligible to fly as old timers.

After some consideration, the columnist decided to expand old timer activities to three days with R/C on Wednesday, control line on Thursday, and of course, the big one, free flight, on Friday; all this with a Victory Banquet on Friday. Darn near too much to chew but it did work out.

The Nationals at Riverside saw the first O/T Controline events. Here, too columnist went a step further in establishing stunt events for both ignition and glow powered models. Again, poor publicity accounted for a low turnout but a surprisingly large crowd of spectators. As a matter of fact, George Aldrich got so excited, he promptly donated a flock of merchandise prizes to induce everyone to enter the C/L events.

From then on the O/T events have been held over a three-day period at Lincoln, Wright-Patterson AFB, and Lake Charles. The latest fun we are reporting

10. A Yates Dragon, with Madewell 49 power, seen at Ignition Stunt event.

11. C/L Stunt judges Arlie Pressler (left) and Andy Harissiadis worked hard.

12. Ralph Joubert with Class A Interceptor, with "Old Whiskers" Terry Rimmert.

13. Curt Sanford with snappy looking So Long. Ohlsson 19 engine. Seguin AFB.

14. Sal Taibi shows how DT should have worked on his Swoose. Could have saved the long hike!

16. Some of the hard working timers at Seguin. They make it all work.

15. Twin pusher flyoff between Jim O'reilly and Bill Baker (right). Last plane down is the winner.

on is the series of days at the San Antonio, Texas AMA Nationals.

WEDNESDAY, AUGUST 5:
OLD TIME FREE FLIGHT R/C ASSIST

Leading off the activities with radio control old time free flight models has always posed a problem with a site sufficiently removed from the Nationals to avoid radio frequency conflict. This year, through efforts to George Aldrich, who acted as Contact Man, the use of Brooks AFB was obtained (a good 30 miles from Sequin AFB).

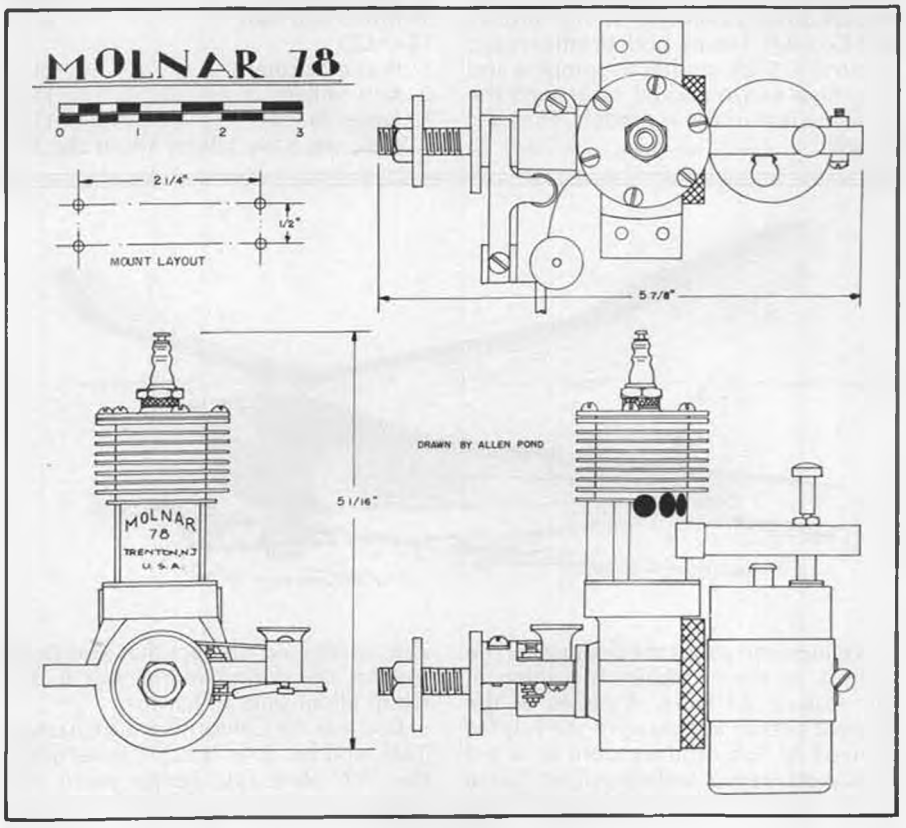
The events staged were Limited Engine Run, Antique, and Texaco. Quite a bunch of flying for anyone on one day! Although the day was sunny and warm (it was 98° every day at the Nats), the wind was rather high and did discourage some of the newcomers to the game.

Photo No. 1 (as taken by Dr. James Buice) shows one of the SAM 29 Planesmen, Marion Knight, starting up his Super Tigre powered Cumulus. Ever since Bruce Norman knocked the boys for a loop at the West Coast SAM Champs at Sacramento with his 10% scale Cumulus, all the SAM 29 boys have built this model; all very successful.

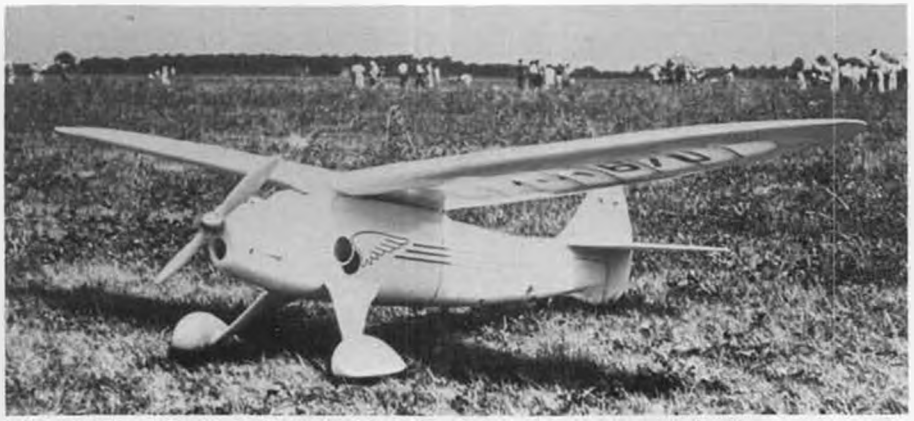
Photo No. 2 shows how to lose a contest. As pictured, Pond is listening to the engine, not exactly sure if the setting is too lean. As it turned out, this was the flight that cost first place. Moral: if in doubt, stop the engine, re-gas, and start again. Incicentally, the Playboy Senior shown is what is left of the original prototype used for advertising photos. Parts have been rebuilt so many times it is hard to say what is original and what is not.

Also worth mentioning is the new covering on the Playboy wing, the new Fabrikote as put out by Top Flite. Several guesses have been made that the rough fabric on the topside has improved the already superlative glide. Latest idea now is to use standard Monokote (the slick plastic) on the bottom side.

Photo No. 3 is another shot taken at Brooks AFB on Wednesday, where the O/T R/C Assist Events were held. Pic-



18. "Berkeley Bill" Effinger receives NFFS Hall of Fame award from Tony Italiano at NFFS Symposium, San Marco, Texas.



17. The original "Snow White" as built by Joe Raspante, at the 1937 Nationals.

tured here is a fine father-son team of Dick and Rich Huang, starting up the Playboy for an official flight. Dick Sr., who will be serving on the new O/T R/C Assist Rules Committee, can be reached for comment at 4032 Deep Valley Drive, Dallas, TX 75234, or if you are in a hurry, call him at (214) 247-1016. We can use all the input on rules we can get!!

Photo No. 4 shows a really rare model, a Miss Empire State, a design originally produced by Heathe Model Co. In this case, the model has been reduced for the 1/2A Texaco Event by Ray Santee. We may not have the right guy here (you know columnists and their memory!), but Ray is extremely interested in starting a SAM Chapter in the San Antonio area. If you are at all interested, drop Ray a line at 1514 Mardell, San Antonio, TX 78201, or better yet, before you forget it, call him at (512) 732-7832.

Photo No. 5 shows one of the Millett brothers, Ray, with his good performing Powerhouse. However, at the Brooks AFB O/T R/C Events, both brothers used Lanzo R/C Stick models to compete and win. Chet Lanzo should have seen the performance of these models. They did fly well!

While wandering around the field, the columnist ran unto John Dana, with about the finest flying O/T R/C model he has seen. As can be seen in Photo No. 6, the model, called the Halleck Bobtail, is quite similar to the free flight Bobtail Contender as designed by Ted Kulich and featured in a 1940 issue of *Air Trails*. Flight demonstrations proved the model was quite competitive, with a fast and very flat guide. Hopefully, plans for this unique model will be available just as soon as approved as an old timer.

Getting around to the result of the O/T R/C Assist Events, maybe we should call this the "Ft. Worth Benefit", as so many places were taken by the SAM 29 boys.

CLASS ABC COMBINED

1. Ken Millett	18:45
2. Bruce Norman	18:30
3. John Pond	17:40

ANTIQUE

1. Dick Huang	30:00
2. James Buice	29:53
3. Bruce Norman	27:11

TEXACO

1. Bruce Norman	21:01
2. Ken Millett	15:25
3. James Buice	11:41

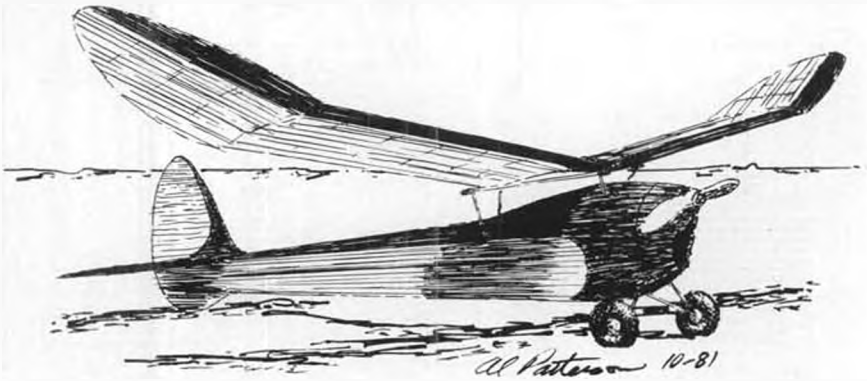
Well, we have talked about the first day of the old timer activities at the San Antonio AMA Nationals; let's take a break to read the engine of the month review. The author would like to mention again, all engines are drawn directly from the original. In the past, it has been found that factory, or other published plans, can be, and in many cases, are in error. To keep errors to a minimum, this columnist has adopted this method to ensure the readers they are getting the most accurate drawings based on the engine itself.

ENGINE OF THE MONTH

Some engines came on with a very large fanfare, with heavy advertising in hopes of boosting immediate sales. Other engines, like our engine of the month, the Molnar 78, appeared very unobtrusively with only one advertisement. After that, the Molnar people were content to allow the Polk Bros. to act as distributors.

In some respects, this did prolong the life of the motor, as Irwin Polk was able to find ways to publicize the motor at little or no expense. The publication, "The Model Airplane Annual, 1941-42", written by Graham and Cleveland, published by McBride, featured a photo

Continued on page 108



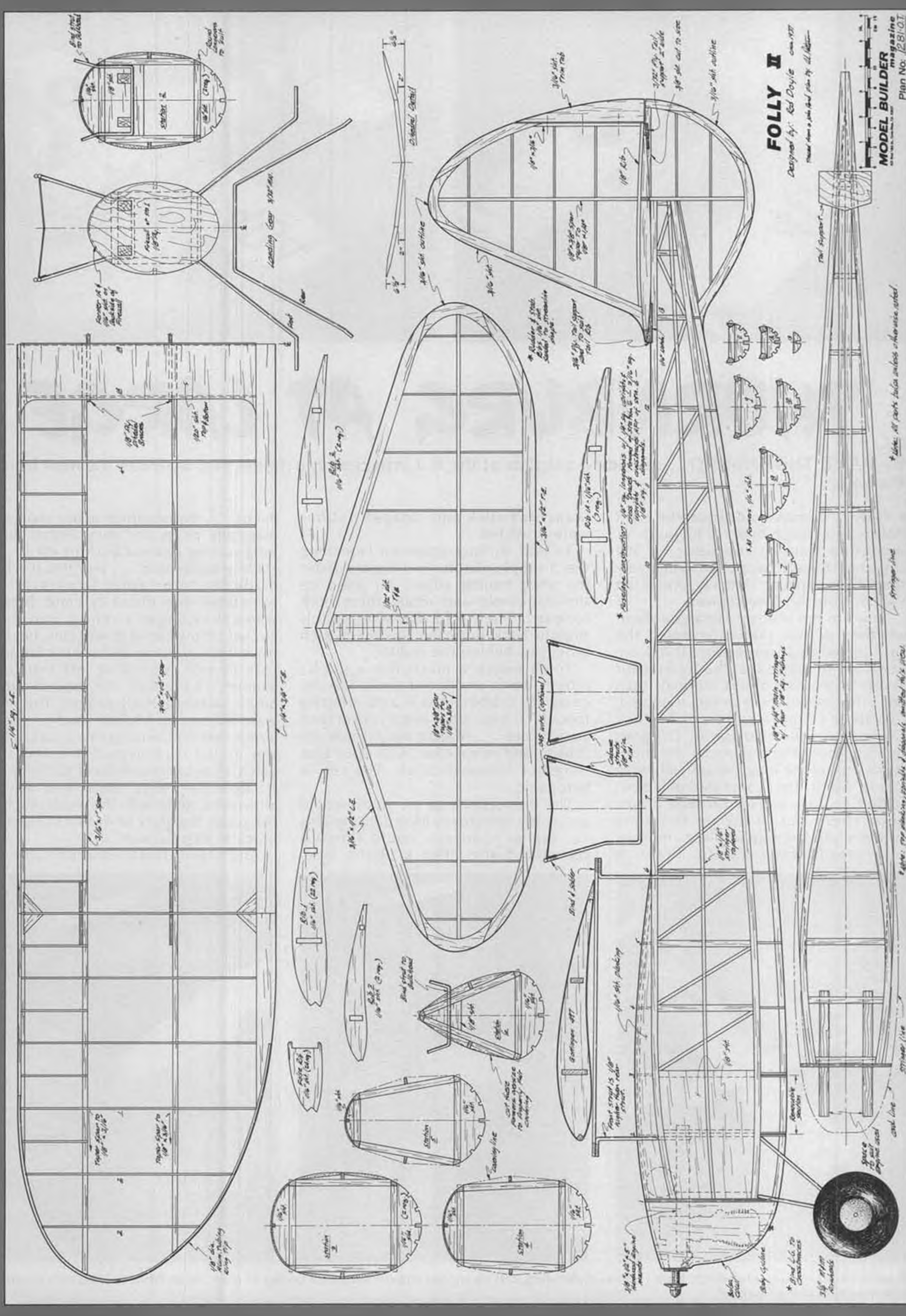
FOLLY II

OLD TIMER Model of the Month

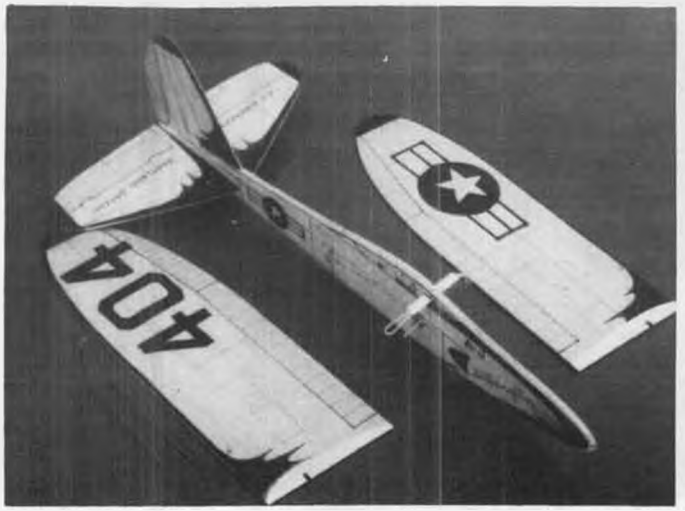
Designed by: Rod Doyle
Drawn by: Al Patterson
Text by: Bill Northrop

We inquired about the designer of the Folly II, in the *Workbench* column of our August '81 issue. A photo of the original aircraft appeared in the July '40 issue of *M.A.N.*, and we were attracted by its pretty layout and clean lines. Sad to relate, letters from John Pond and Frank Zaic confirmed the fact that Rod Doyle lost his life during World War II, as a troop glider pilot in Europe.

Rod was the California State Champ in 1936, and his Folly II came in second at the 1937 State Fair, Senior event. In a year when flying boxcars still dominated the scene, Folly II was a standout. In our opinion, it's still one of the prettier designs, both esthetically and functionally. In keeping with the latest trend, it should be a real performer if enlarged to 9 foot span. Ought to give the Lanzos a real run for the money. Plans were published in the Zaic Yearbook.



FULL SIZE PLANS AVAILABLE — SEE PAGE 108



THORNBURG AT LARGE

By DAVE THORNBURG . . . Building a replica of the A-J Interceptor, a model that separates the men from the boys.

• Only a madman would squander eight dollars and eleven hours of his precious modeling time to reproduce a 50¢ airplane. Unless it happened to be a very special 50¢ airplane. Like, say, one of Jim Walker's old A-J Interceptors.

Now I'm not prepared to argue about whether or not Walker invented the folding-wing Interceptor. But I am prepared to argue that the Interceptor taught more kids about thermals than any other model ariplane ever designed.

Walker's American Junior Aircraft Company, up in Portland, Oregon, pumped out Interceptors by the thousands during the long decade following World War II. They came assembled but folded up in a narrow cardboard box. Slide them out, hook up the wing rubbers, slip the stab in place and your Interceptor was ready for flight. A launching stick and catapult rubber were provided.

To fold an Interceptor for launching was a simple matter. Two fingers under the wing trailing edges; lift them up simultaneously and rotate them both forward. Then fold the wing panels straight back until the tips meet each other just behind the rudder.

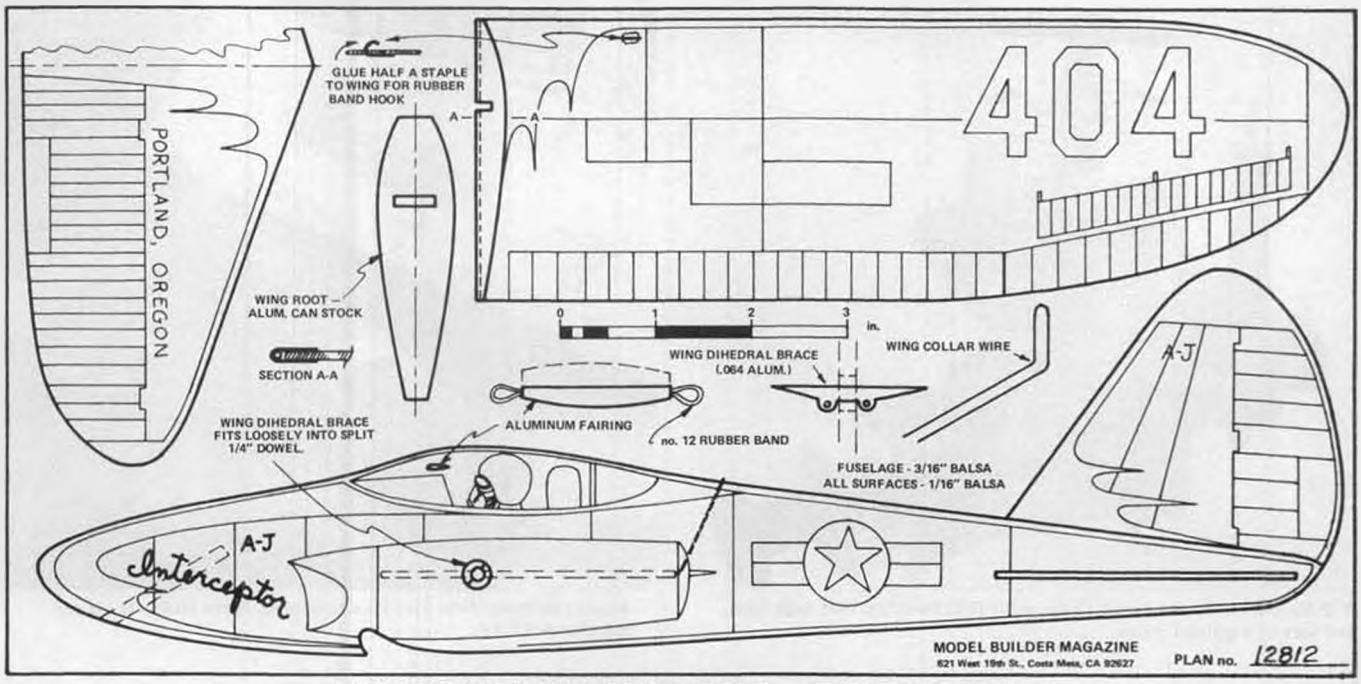
You'll notice a notch like a shark's mouth down under the nose. Slip the catapult rubber into it and aim the model . . . now more like a rocket than an airplane . . . straight up. Stretch the rubber and release her with your best slingshot follow-through. The rest is automatic.

The Interceptors of my youth would arc swiftly upwards to incredible heights . . . higher than you could throw a corncob, higher than a phone pole, even! . . . before their wings snapped magically open and they began their long soaring descent back to earth.

Only sometimes . . . and this is what made the Interceptor so special . . . sometimes they didn't descend. Sometimes they began circling, and they circled UP instead of down! Hey, hey! In my mind's eye I can still see my first lost Interceptor, spiralling off into the summer sky above the now-defunct South Dakota (Ohio) Airport. The year was 1952, and up till then I had only read about thermals in magazines. Long after the model disappeared, I could still catch an occasional flash of sunlight off its aluminum wing roots. Two weeks' allowance, gone with the wind! Ah, but the price, the glory of it; first kid on the block to thermal out!

And it seems that my story isn't unique.

Steps in launching the Interceptor. Hold fuselage under wing. Lift up trailing edge of wing with fingers of other hand. While holding wire support, fold wing back along fuselage.



FULL SIZE PLANS AVAILABLE – SEE PAGE 108

Whenever I take the Interceptor . . . to club meetings, to the hobby shop, to the flying field . . . I hear variations on the same theme. Tales that begin or end with "Wish I had a hundred dollars for every one of then things I've lost . . ." The A-J Interceptor was arguably the best flying ready-to-fly ever to hit the market.

The inspiration for the model shown in the drawings came from a four-color ad on the back cover of a May, 1956 *Model Airplane News*. Let me make it clear that this is only an eyeball reproduction. I doubt that any of the originals still exist. *(That'll get us some mail! wcn)* It's been nearly a quarter-century since production stopped, and at that time the Interceptor sold for a whopping 23¢, wholesale. Model planes, like books. follow the rule that says *the more there were, the fewer there are*. And the Interceptor was once available in practically every drugstore and five- and-dime in America.

But enough prattle. Either you're crazy enough to want to build one of these things, or you're not. If you qualify, read on.

Walker used soft balsa throughout on the Interceptor, to keep the weight down (there are quite a few aluminum parts, remember). If you intend your model for flight and not merely for display, you should do the same.

Note that there's no scale on the drawings. My model spans slightly larger then the original, but the plane flies well, and the proportions are at least close enough to fool almost everyone who sees it.

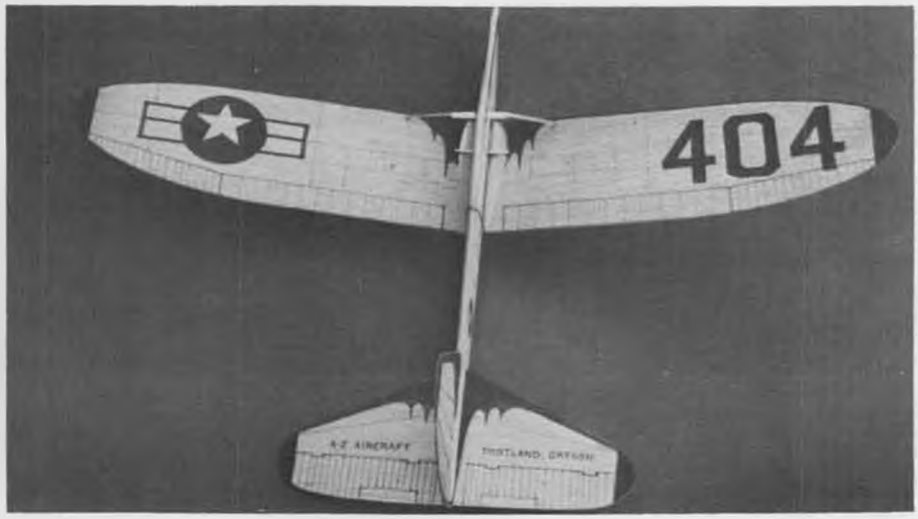
To scale up the drawings, try locating a Xerox Model 2080 copier . . . lots of blueprint houses use them. Just keep enlarging the drawing until you get close to the 13 inch fuselage length. Or shoot the page with a 35mmcamera using slide film, and scale up the drawings on your wall. A third alternative is to use an opaque projector, also known as an overhead projector. School teachers often have access to them. If you have access to a school teacher, you have it made. *(Forget it! This one was too good to pass up as a full-scale plan. Wow! Two full-size plans in the same issue. wcn)*

Personally, I'd just tackle the job freehand. That's how the drawings in the magazine were done, afterall. And, come to think of it, that's how the original Interceptor was done, too. So how can you go wrong?

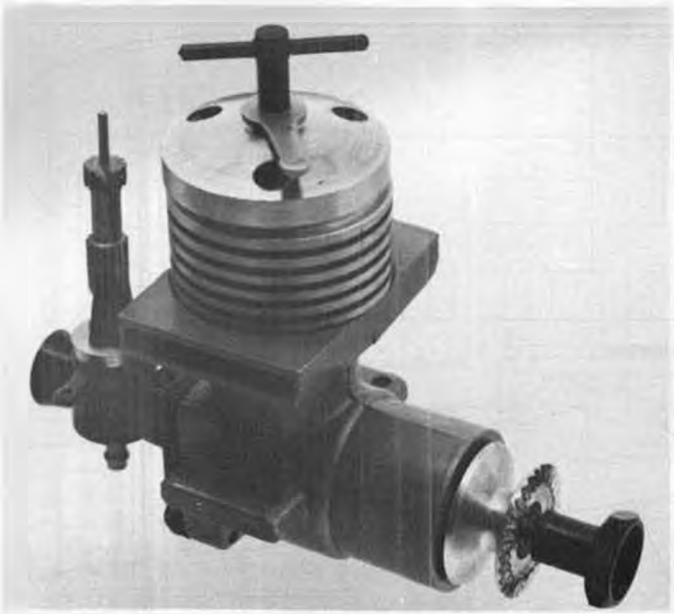
In case you don't have a copy of *MAN* for May of '56 in your back pocket, I've tried to provide enough photos to allow you to duplicate most of the Interceptor's markings. The originals were

Continued on page 72

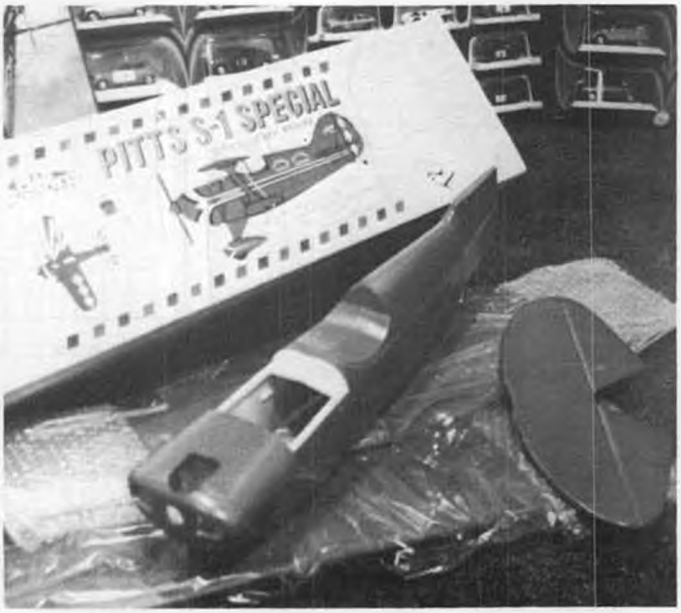
Steve (F3B) Work demonstrates proper launch technique. Two No. 64 bands do the trick.



Red and blue marking pens put on the finishing touches. It'll fool anyone who remembers the original gliders.



A 2.46cc E.D. Racer diesel, fitted with R/C throttle. Not high rpm, but lots of lugging torque.



Imported foam Pitts for .10 size engine, from Polks. It's a pre-painted ARF kit.

Sport SCENE

By LARRY RENGER

• In the mail, the other day, came an inquiry from Garry Sutton, of Ashby, Nebraska. He writes:

"Dear Larry,

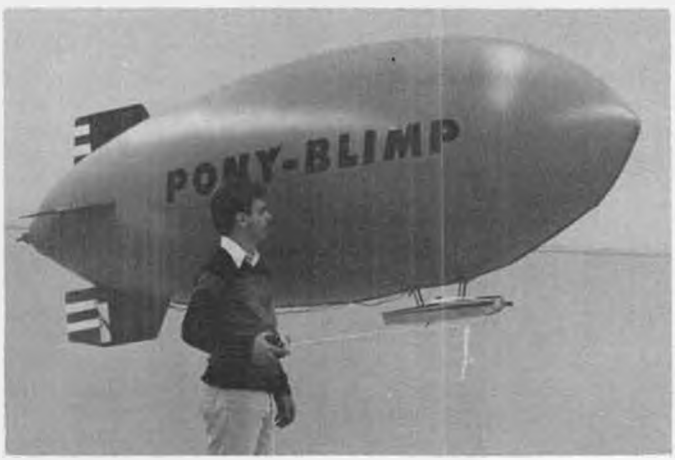
I enjoy reading your articles in **MB**. *I am trying to catch up on modeling, as I haven't done much since the early '60's. Back then, while in high school, I flew only C/L .049 planes. I've started back with R/C now, am pretty good with a Sig Kadet, so I built an Ace Pacer so that I might be able to use some of the shoe box full of Cox .049 engines I have. I can fly the Pacer if I can get some altitude for a dive to gain some speed. These reed valve engines just don't put out much power. I've reamed the venturi to .090, tried teflon reeds, different props and fuels as much as 50%. What I would like to ask you is what is a respectable RPM reading for these engines? I can only get 11 and 12,000 on a 6-3 prop and about 12,500 with 5-4 with 25% fuel, here at 4000 ft. altitude. Incidentally, I've kept the weight of the Pacer down too, to 20-1/2 ounces. From some of the articles I have read, it sounds like the small engines should run close to 20,000 RPM.*

Secondly, things that modelers need is more information to be printed in the catalogs concerning major items. I have to buy almost all my supplies and kits from mail order, as the nearest hobby shop is 125 miles and it doesn't stock that much stuff. I would like to know the shape of the airfoil on the wings of kits, wing area and weight. Some manufacturers do have this info, but more need to include it. Few manufacturers list the weight of their engines or mufflers. These are out where balance is affected, but sometimes I just like to know what things weigh. Servo weight is usually mentioned, but not always the complete flight pack or the other components, especially batteries.

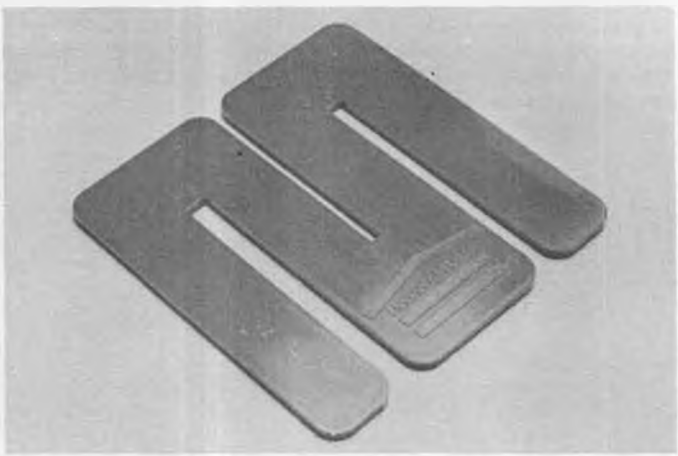
Well, I am sure you get the point by now, and you have probably heard this before anyway. I have also been testing the effects of droop wing tips on some of my models and they work well for landing and take-off. The Sig Scamp would snap-roll on take-off and the tips really help here. It would be nice to have these available in fiberglass, as it takes about 3 hours to make a pair.

Keep up the good work for **MB**. *Sincerely, Garry Sutton"*

Well, Gary, I have spent a bit of time in Colorado at about one mile altitude myself, and can appreciate both the lack of power in your engines and the problem of travel to get your supplies. Specific to your problem, the Pacer was designed to be flown with the Tee Dee shaft rotary valved series of engines at sea level. There is no way I know of to get enough power out of the reed valve engines to



The Pony-Blimp by Peck-Polymers. Length 11 feet, diameter 4 feet, uses three to five-channel radios.



"Stick 'em Up" tool from House of Balsa is handy gadget for true construction.

do an adequate job of flying this model. At your altitude, with a Tee Dee .049 and a light radio and, perhaps 60% nitro fuel, you will have good performance. The problem is, that the engine's oxygen intake and the absolute pressure are both reduced, the "bite" of the propeller, and the lifting power of the wings all go to pot at once. The cumulative effect is disasterous. My recommendation would be to switch to a mild, or even hot .09 engine, such as the Medallion or Enya for mild, or the Max .10 FSR or Cox Tee .09 for high power.

At high altitude, it is necessary to both increase the fuel's nitro content and engine compression ratio while running a slightly smaller-than-normal prop to get top performance. For example, I used to run 30% Nitro, and a Tee Dee (1702) head on my Babe Bee and Golden Bee engines to drive a 5x3 prop. They still tended to shellac-up unless I put some Hoppe's #9 gun cleaner in the fuel. (Beware! That stuff is poison to breathe or get on your skin. So is Nitro).

Regarding the problem of information, I have found that if you provide a self-addressed, stamped envelope (SASE as it is known in the business), manufacturers are generally happy to answer any specific questions you may have. I know it would be nice to have all the specifications in advertisements, but as a graduate marketeer I can assure you that most people only want to know about the "sizzle", not the weight of the "Steak". I once made up an ad for Bob Novak which eliminated all the great data he had been providing. The reader inquiries went way up. The ad told what the people who used his servos were doing, not what the servos could do! Anyway, that doesn't solve your problem. It seems that one of the competitive magazines puts out a book which shows the plans of most available kits. That might be helpful to you. Also, spring the couple of bucks each for the catalogs of each of the established hobby suppliers, such as ACE and SIG. I get much of the specific data I need from such places. Tower Hobbies may be the most general source of data.

As long as you, the modeler, are willing to speak, I am happy to pass along your comments and questions. I received another letter, this one with answers rather than questions. John Riese of Granada Hills, California writes:

"Dear Larry,

I have been reading with interest your remarks in **MODEL BUILDER** *for a number of years and have found them most entertaining and informative. Recently you have been bemoaning the lack of a small high performance biplane. Ignoring Mr. Northrop's parenthetical asides regarding his design, which would of course be a most welcome airplane to see in print, I believe I have found the airplane for you. The most recent (August-September) "Sports Flyer" mailer from Hobby Shack has in it an ad for a .10 sized Pitts S-2A. I have enclosed the ad for your inspection. This has not been advertised before, however, I purchased the kit at the Encino store this spring. At the time, I remarked to the boys in the store that I would have it flying in a couple of days. Alas, this is not one of the "Quick Built" series, the ad copy notwithstanding. It is a nice looking design, with lots of scale details, bolt-on wings, formed plastic cowl etc. Using the time-honored method of putting all the parts, radio, wheels, engine, covering material in a box, weighing them, then subtracting the weight of the box, I estimated the final weight to be around 40 ounces, too heavy for relaxed flying. The plans say 33-38 ounces, but that would be with a very light ratio. I had doubts that my old O.S. 10 would fly it fast enough to stay upright, and I could not afford a small radio, so I gave up on it after I had the fuselage finished.*

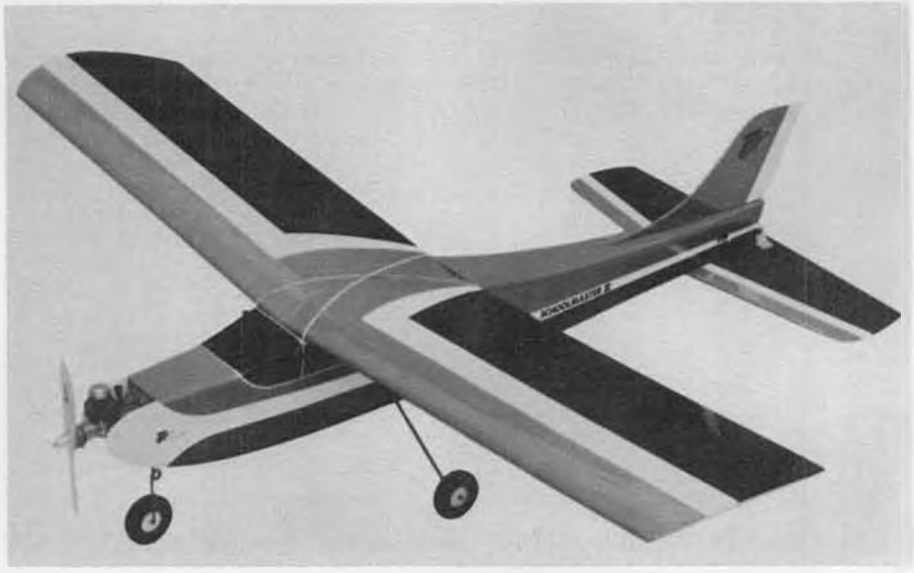
Hobby Shack Pitts is Japanese Pilot kit, for .10 to .15 engines.

A recent purchase of an O.S.10FSR, nagging by my flying buddies and wife, and your words in the magazine, have caused me to go ahead and finish the project. I will give you a report on how it flies, or better yet, come up to our field and fly it yourself. Should be just your cup of tea with four ailerons, an almost symmetrical 12-percent (max thickness a little over 5/8 inch) airfoil and short coupling. Typical Pilot completeness (even a cute 3-ounce gas tank) and quality and construction, just smaller than their usual. The designer mentioned on the plans is the ubiquitous Y. Matsumato; I believe this is the title of the design department, as I have never seen any other name on any Pilot kit. Rather pricey at 43 dollars, but all 250 plus parts fit.

To comment on another topic you have written about, I have some of the double-edged razor blades from Jim Jones, ordered in 1977 with his excellent balsa stripper. As you say, they are just the thing for trimming covering. I am using them on my silkspan covered Brewster Buffalo.

This brings up another topic that you as an exponent of small airplanes should be aware of. The bottom of plastic soft drink bottles in the 2 liter size are perfect for cowlings on radial engined scale models. They are 4 inches in diameter, nicely curved on the bottom, which becomes the front of course, and the price is right. (Pardon our "parenthetical aside" once more, but regular readers of **MB** would have seen this hint, with photo, in Bill Hannan's column quite a

Continued on page 79


Revitalized Top Flite kit for Schoolmaster II. One of several being updated to bring them current with modern radios.

The I.M. Products F-15, marketed by Circus Hobbies. In the air, and with prop turning, the non-jet power is not that obvious.

PRODUCT$ IN U$E

The CIRCUS HOBBIES/I.M. PRODUCTS F-15, by LARRY RENGER

PHOTOS BY THE AUTHOR

• There is a bit of Walter Mitty in all modelers, I suppose. I really get a kick out of horsing a fighter model around the sky. The IM Products F-15 fighter aircraft captures the excitement of flying a jet aircraft without the additional work and expense of a ducted fan model. For the purist, perhaps a prop on the nose of a "jet" is unacceptable. I can't see the propeller when the model is in the air, and for me, that's where an airplane should be spending its time.

Since the F-15 is prop driven, it has good ground acceleration and climb performance at moderate speeds with a sport engine like the HB .25. You needn't worry about high nitro fuel, precision balancing of fans, tuned pipes, high fuel consumption, or long, smooth runways. This is just an enjoyable airplane for we sport fliers to FLY.

The F-15 is available from Circus Hobbies. Unlike most other hobby businesses which start out small and grow steadily, Circus has enetered our field with a broad line of interesting imported goodies. The IM Products F-15 is one of the more spectacular items it handles.

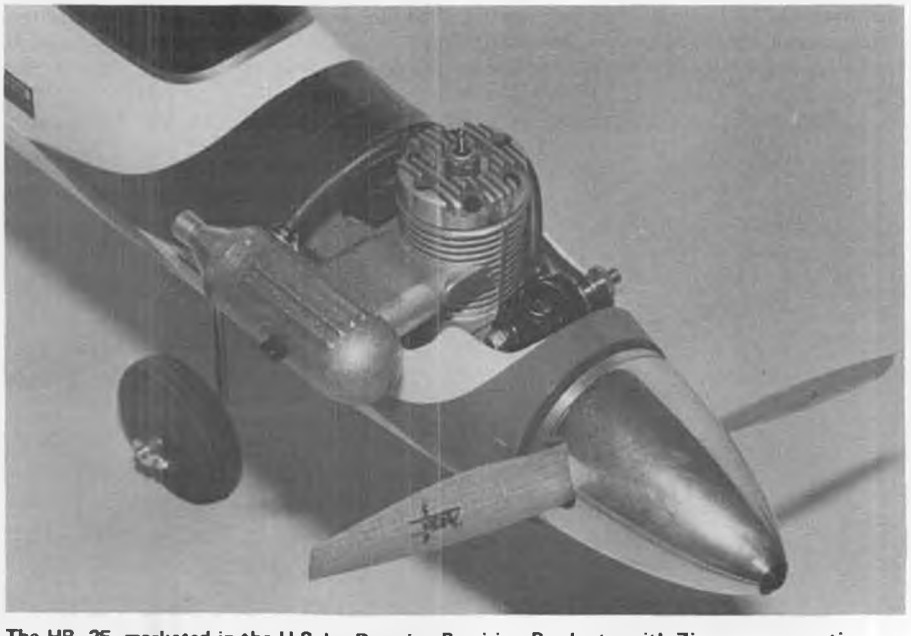
THE KIT

Basic construction of this aircraft uses Polystyrene bead foam (Popcorn plastic) to produce an attractive aircraft with many of the basic assembly and finish tasks completed for the modeler. The kit is remarkably complete: it includes tank, landing gear, screws, wheels, all hinges, rods and clevices, horns, and even the spinner. You only need: epoxy, an engine, a radio, and replacements for all the screws to finish out the bill of materials.

That's the good news. The bad news is that the model can't quite qualify as an ARF. There are a lot of bits and pieces to assemble, and R/C installation has all the charm of building a ship in a bottle while blindfolded. I usually build very slowly, but even I would expect to complete a foam model in way under the thirty hours this one took me.

The few major construction steps include epoxy bonding the wing halves and joining the two fuselage parts. From there it's a case of following all the minor assembly steps until the model is complete. All the parts fit accurately and assembly of the basic model is quite straightforward. I recommend that you add the cowl a little later than specified in the instructions. Also, throw away the self-tapping screws you get with the kit, as they have hopelessly inadequate Phillips slots of the wrong angle for any screwdriver you buy this side of the orient. *(Either that or get yourself a Japanese "cross-head" screwdriver. wcn)*

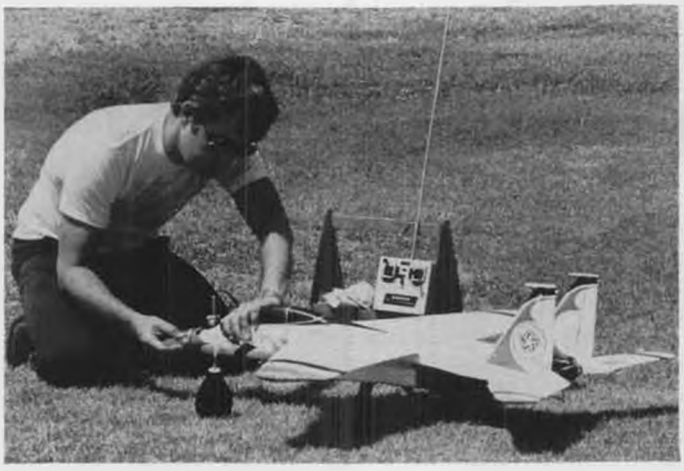
When you get to mounting the three servos and their linkages inside the tail of the fuselage, it becomes very frustrating. The practical solution is to cut a large hole in the top of the fuselage and epoxy the resulting panel back in after



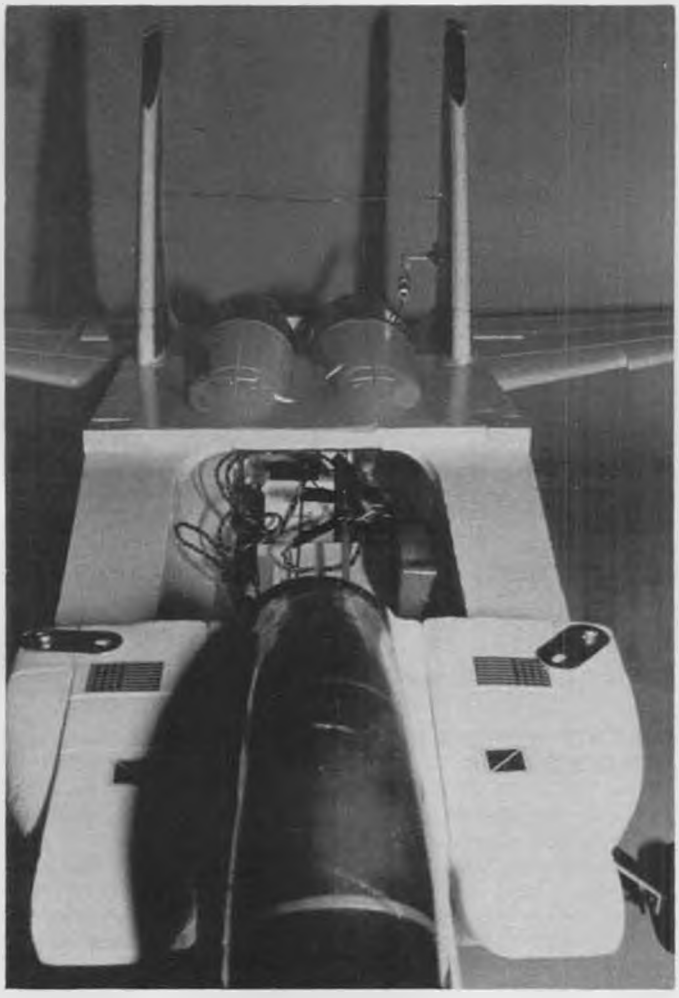
The HB .25, marketed in the U.S. by Bavarian Precision Products, with Zinger prop, motivates the F-15. Ball bearings, Perry carburetor, Fox spinner.

F-15 on approach for landing at local school playground.

Generous tailplane areas assure smooth, responsive sport flying. Horizontal tail is full-flying stabilator.



Author likes the simple things; squeeze bulb fueler and hand starting. F-15 R.O.G.s despite long grass.



Most difficult part of this project is getting the servos and linkages inside the tail section. Use ship-in-bottle technique.

R/C gear installation is complete. It is possible, but very awkward to get all the mounts and linkages done according to the instructions. I did assemble mine the hard way to see if it could be done. It can, but why bother if you own a sharp knife and epoxy?

IM has already spray painted the F-15 for you, so all you need do for decor is add the stickers they provide. I did find that some touch-up with microballoon/epoxy filler and various colors of Aero-Gloss "Formula-U" paints made the model neater in a few areas. The end result is a model which looks good on the ground and terrific in the air!

RADIO

Inside the F-15, as you might expect, goes a radio. I selected Novak airborne components because they are the very best I know of. The servos are exceedingly fast, but still track well and put out sufficient torque for any aircraft I'll ever build. The large, full-flying elevator in the F-15 was a severe test, but the Novak Bantam Midget performed perfectly.

The receiver is very light and compact. It, too, worked perfectly. I have had this airborne system for about three years now. I've used it in several different aircraft, and it has always performed well. Of all my systems, the Novak has so far been my favorite and most trusted.

I am, by the way, using the transmitter from a Cannon "Super-Micro" system to "talk" to the Novak airborne. I like the very small case that Bill Cannon uses, because it is easy to grasp the sticks with thumb and forefinger while holding the case in my hands. A large transmitter with an European style tray would allow the same freedom and stability.

ENGINE

For the powerplant in this review, I took IM Products at their word (Power required: .20 to .30 cu. in. engine), and put a good, strong, conventional .25 on the nose. I selected the HB .25 which features Perry Carburetor and ball bearings. The engine is easy to start by hand and a willing performer. My only difficulty with the HB is that there is no compression for hot, hand propped restarts. At most flying sites, where you share the air, this should be no problem. Note, however, that the engine hot restarts instantly if you use an electric starter.

The other peculiarity of the HB .25 is that the crankshaft front end is very short. The IM spinner from the kit would not fit, nor would most others without leaving off the washer under the prop nut (very unsafe!). I did find one spinner which works, it was the Fox, which includes a special recessed nut and washer system. Now, Duke makes great spinners, and he is a nice guy, but you really have *some* options, especially with a top line engine such as the HB.

Duke Fox provided one other important bit of hardware: I added a Fox pressure tap to the HB's muffler. The running settings both at full rpm and idle had to be leaned out from previous running positions after the tap was added. That, I feel, is positive proof of the muffler pressure's effectiveness. Idle was smooth and solid whether the nose of the airplane was elevated or depressed. No noticeable leaning-out occurred through the tank run.

Flight performance of the HB .25 was excellent, even though the engine had only 30 minutes of bench running before flying. It pulled the F-15 in a respectable manner. With more power the performance could have been more exciting, but the model weighed at least a full pound more than it should for a hot performance on a standard ported .25 engine. I suspect that the HB .25 will become one of my favorite engines when I put it in lighter aircraft.

I would suggest that more experienced fliers use at least a Schneurle ported .25 or a Sporty .40 for power. With the combination tested here, the F-15 had a moderate but solid climb rate

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Racing action in the 1981 Dist. 8 Miniature Gold Cup, August 23. David Jensen's "Natural Light" on the inside of Bud White's "Notre Dame".

R/C POWER BOATS

By JERRY DUNLAP

MISS BUDWEISERS (Big and Small) WIN GOLD CUPS

The 1981 edition of the Gold Cup for full-scale unlimited hydroplanes was contested on the waters of Seattle's Lake Washington on August 9. Not unexpectedly, the "Miss Budweiser" driven by Dean Chenoweth, and owned by Bernie Little, captured this premier event for unlimited hydroplanes. The "Miss Budweiser's" romp in the Gold Cup marked its fourth victory of the season and assured the boat's second consecutive year as national highpoint champion in the unlimited class.

(Dean and "Miss Budweiser" did it again in San Diego, on Sept. 20, as MB's editor watched his first unlimited race. Bill Muncey, in the Atlas Van Lines boat, would have been the only close competition, but the prop and shaft, not necessarily in that order (according to Bill) went out early in the Main. wcn)

Two weeks later, August 23, "Miss Budweiser" won another Gold Cup. This "Miss Budweiser," however was the 42-inch version belonging to Roger Newton. If anything, the 1981 District 8 Miniature Gold Cup was much more fiercely disputed than the full scale version. Originally scheduled for the Kent Lagoon, the mini competition was moved to Tacoma's Lake Waughop, site of the 1980 NAMBA Nationals, when weeds growing in the water rendered the Kent site unraceable.

The Miniature Gold Cup was sponsored and conducted by the board of directors of R/C Unlimited of District 8. Heading up this year's event was board president, Gary Jensen, and secretary, Morrie Lemke. The event is intended to be the highlight of the model unlimited season in District 8. A unique feature of this race is the qualification requirement. Only twenty-one positions are available for those with Miniature Gold Cup aspirations. Qualifying for this year's race began the day prior with thirty boats vying for the qualification slots. Boats failing to qualify for the Gold Cup or unable to attend the qualifying session, would be eligible to compete in the Queen's Race.

Qualifying entailed running two con-

Bob Brackett, Kennewick, Wa., drove his "Miss U.S." to second place in the Mini Gold Cup. Bob designed the boat.

NAMBA's R/C Unlimited Director, Roger Newton, won the 1981 Dist. 8 Mini Gold Cup. Shown with his "Miss Budweiser". Has plans for boats in this class. See text.

Larry Knudson, Portland, Or., won Gold Cup Consolation with his "Olympia Beer". He's dressed right for the warm weather.

Top qualifier "Coral Reef", built and owned by Harold Shew (right), and driven by Ed Fisher.

Jack Haugen leads in 1981 Driver's Championship. Qualified final and jumped the start.

Washington State patrolman Curt Weston, Arlington, Wa., won Queen's Race with his "Olympia Beer".

secutively timed laps on a four-lap course for a total distance of .9 mile. During the first qualifying round, it became apparent that the "Coral Reef," owned by Harold Shew and driven by Ed Fisher, would be difficult to bump as the top qualifier. Deeply involved in the endeavors of the full size "Miss Circus Circus" unlimited hydroplane, Ed has found it necessary to greatly curtail his model racing activities. The Coral Reef's 36.11 timing for two laps proved sufficiently fast to capture the top qualifier award. Well known R/C unlimited designer and competitor, Roger Newton, qualified his "Miss Budweiser" in the second position with a 38.51 timing. Posting a 39.54, thirteen year old David Jensen pushed the "Natural Light" to a third position on the qualification list. Rounding out the top five qualifiers were Butch Melewski turning in a 41.31 with his "Miss Bardahl", and Jerry King guided "Smythe the Smoother Mover" to a 41.51 good for fifth. The twenty-first qualifier posted a 54.21 timing in making the qualification list.

The race format for the Miniature Gold Cup required each boat to participate in four preliminary heats. Points accumulated in the preliminaries would determine entry into the seven boat, winner-take-all final heat. There was a Gold Cup consolation heat for boats finishing eighth through thirteenth in the Gold Cup prelims. The Queen's Race drew a field of eighteen boats that were not eligible for Gold Cup competition. Queen's Race participants would race three preliminary heats with the top six boats advancing to the winner-take-all final heat.

As racing action progressed through the preliminary rounds, a couple of scenarios began to unfold. Top qualifier, Ed Fisher, found the pressure of competition somewhat greater than single boat qualifying. Attempting to pass in two of the heats, Ed ended up eating roostertails and dead in the water. In another heat, a buoy acted like a ski jump to spill the boat. The three DNFs put Ed and the "Coral Reef" on the beach when the final heats were called. Showing why he won the 1980 District 8 R/C Unlimited Driver's Championship and headed for

Continued on page 87

1981 District 8 Miniature Gold Cup Summary

TOP QUALIFIERS	BOAT	TIME (2 laps, .45 mile)
1. Ed Fisher	"Coarl Reef"	36.11
2. Roger Newton	"Miss Budweiser"	38.51
3. David Jensen	"Natural Light"	39.54
4. Butch Melewski	"Miss Bardahl"	41.31
5. Jerry King	"Smythe the Smoother Mover"	41.51

QUEEN'S RACE	BOAT	TIME (4 laps, .9 mile)
1. Curt Weston	"Olympia Beer Temp."	1:36
2. Kurt Gober	"Old Ox"	1:48
Jim Johnson	"$ Bill"	DNF
Rick Barnes	"Miss Escide"	DNF
John Earnest	"Gale V"	DNF

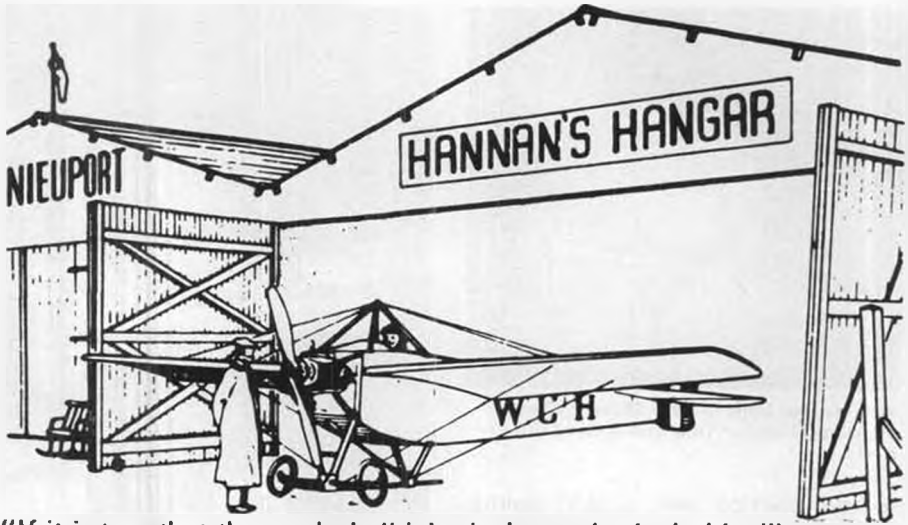
MINIATURE GOLD CUP CONSOLATION RACE		
1. Larry Knudson	"Olympia Beer"	1:45.23
2. Bill Smiley	"Miss Supertest"	1:54.65
3. Jolene Fridell	"Squire Shop"	2:02.07
Jerry King	"Smythe the Smoother Mover"	DNF
Ron Daum	"Wildroot Charlie"	DNF
Mike Hamilton	"Miss U.S."	DNF
Doug Tumilson	"Miss San Diego"	DNF

MINIATURE GOLD CUP		
1. Roger Newton	"Miss Budweiser"	1:43.44
2. Bob Brackett	"Miss U.S."	1:49.82
3. David Jensen	"Natural Light"	2:04.60
4. Butch Melewski	"Miss Bardahl"	2:07.50
Jack Haugen	"Thriftway, Too"	DNF
Les Ruggles	"Miss Thriftway"	DNF
Bud White	"Notre Dame"	DNF

Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498.

Butch Melewski was 4th in the Mini Gold Cup and 4th fastest qualifier.

Dave Jensen's "Natural Light" was 3rd in Mini Gold Cup and 3rd fastest qualifier. David is only 13, but gives adults a tussle.



"If it is true that the meek shall inherit the earth, the bold will inherit the sky."

• This month's quotation is from Janice Brown, perky test-pilot of the solar-powered Gossamer Penguin and Solar Challenger. We had the pleasure of attending her slide/movie presentation during the opening of a new section of the San Diego Aero-Space Museum devoted to women in aviation. Ms. Brown arrived with one leg in a cast, leading to speculation of an aero accident, but nope . . . it seems she had been kicked by a horse!

Tiny (95 pounds) Janice proved to be a charming and entertaining speaker with remarkable technical knowledge, expounding upon aerodynamics and photovoltaic theory with ease and assurance. Model builders could readily identify with her weight reduction concerns. In addition to dieting, she even resorted to wearing ballet slippers as being the lightest practical footgear.

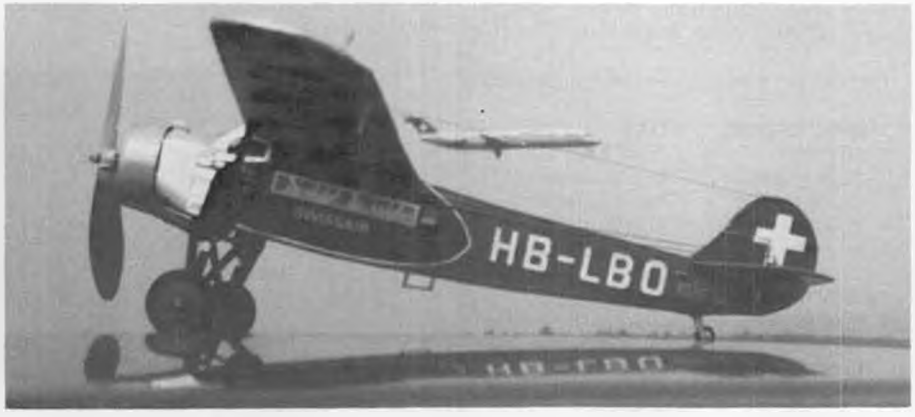
In describing her sun-powered flying experiences, she said that gaining the first 100 feet of altitude was the toughest part, unless lucky enough to be favored with thermal assistance. After that, things were much easier, and once at altitude, the Solar Challenger is a pretty fair soarer, yielding about a 13 to 1 glide ratio.

When regarding the bravery aspects of piloting such a frail appearing machine, Janice recalled one time when she said to herself: "Fool, what are you doing flying around in this plastic toy . . . it took you a long time to get this old!" But such fleeting doubts were apparently rare, and she radiated confidence in the Challenger designers and constructors. Summing up the success of the MacCready team ventures, she de-

Continued on page 94

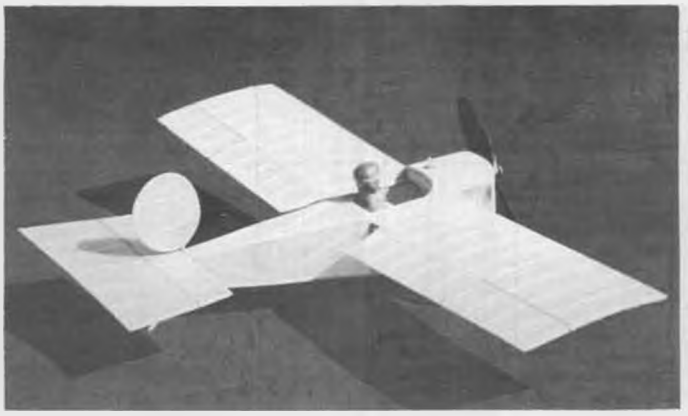
Butch Hadland, famed British Peanut nut, poses with his Morane-Saulnier. Photo by Frank Scott.

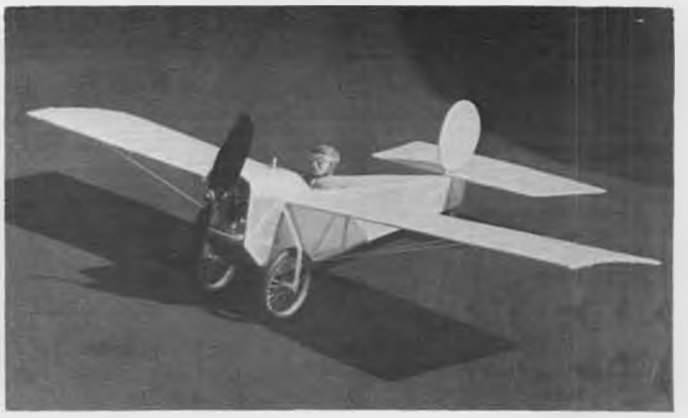
Peck's Pony-Blimp in the Santa Ana blimp hangar. Lottsa room!



Alfred Genther's Swissair Fokker F VIIa Peanut with Swissair jetliner in background. Model was proxy-flown at U.S. West Baden contest.

Ebbe Jensen, Sweden, built these CO_2 powered models . . . Miles Satyr, Avro 558, and Avro 554 Baby.





PEANUT SCALE

WHITE MONOPLANE

By WALT MOONEY . . . Our Perennial Peanut Professor is back with another rare one. With its short nose moment, it's a perfect match for the Peanut size Brown CO_2, and it's a good flier to boot.

• This is an obscure airplane that was designed around the end of World War I and for which plans were marketed by the George D. White Company of 107 East 49th Street, Los Angeles, California, in 1919. A very early forerunner of the homebuilt movement, the configuration is generally suitable for a Peanut model.

Its major fault as a Peanut design is its very short nose. This is not a real problem if it is to be powered with the new Peanut size CO-2 engine being manufactured by Bill Brown.

The model illustrated here has the Brown engine installed exactly as shown on the plans and balances at the CG point indicated. It weighs 14-1/2 grams complete, of which the engine installation is 5-1/2 grams including the 2 cc tank. Model structure is all balsa wood with the exceptions of struts, tailskid, rudder outline, firewall, and of course the wheels and engine installation. The model is covered with lightweight Japanese tissue and has three coats of thin nitrate dope.

I am indebted for the inspiration to build this little Peanut model to Joseph Shultz of 1752 Pleasantview Rd., Pottstown, Pennsylvania who sent me a copy of the original full size plans. These are on four sheets of 11 by 17 paper and have all the data George D. White thought was necessary to build the real airplane. Intentional deviations from exact scale include larger tail surfaces, and probably dihedral. (The model has 3/8 inch at each wing tip and the full size plans omit any mention or indication, so the airplane probably had none.)

The structure of the model is very simple and does not require a lot of explanation beyond what is on the plan. The engine installation is probably worth a short description because it takes a little force to fill the tank and the model needs to be reinforced to take these loads.

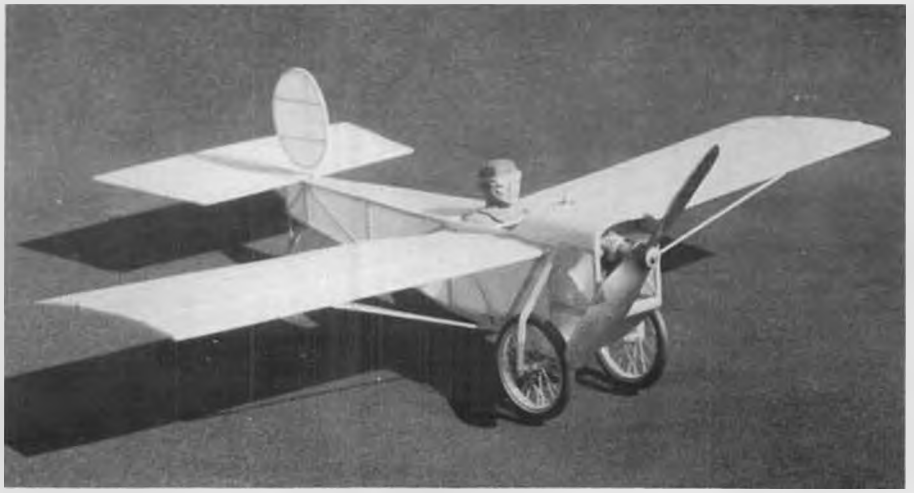
Build the conventional fuselage structure by making the two side frames directly over the plan and then add the cross braces as shown in the top view.

Start the engine installation before adding the cowl. Very carefully, bend the engine tubing to the shape shown in the side view so that the engine, filler, and tank will be in the proper place in the fuselage. Bend the several loops required over a round dowel or piece of 3/16 dia. tubing to keep from kinking the tubes at the bends. Make the solid balsa filler block and slide it over the filler. The top of the filler will have to be removed, (don't lose any parts) to keep the hole as snug as possible, or you can make the block in two parts. Cement the filler in the block securely. (I used Hot Stuff and baking soda to fill the gap between the hole and the filler, being very careful not to get any in the engine.) Replace the filler top.

Next, cut out the firewall from 1/16th thick plywood. The front view shows the shape of the firewall. There is a cutout at the bottom to allow air to blow past the engine cylinder and then past the tank. It also allows the tubing to pass back into the cockpit area. Mount the engine on the firewall. (I used bank pins, which are thicker than ordinary straight pins and cemented them in place with baking soda and Hot Stuff on the back of the firewall. They were then cut off about 1/8th inch aft of the firewall.)

Now remove the forward top cross piece from your fuselage box and carefully cement the firewall in place. Then position the filler block on top of the fuselage and cement it in place. Add the engine mount gussets at the longerons forward of the firewall, and the two 1/16th thick filler braces from the landing gear cross brace to the filler block. These braces should be hard balsa because you'll be holding the model at the axle and pushing down on the filler during your refueling operations.

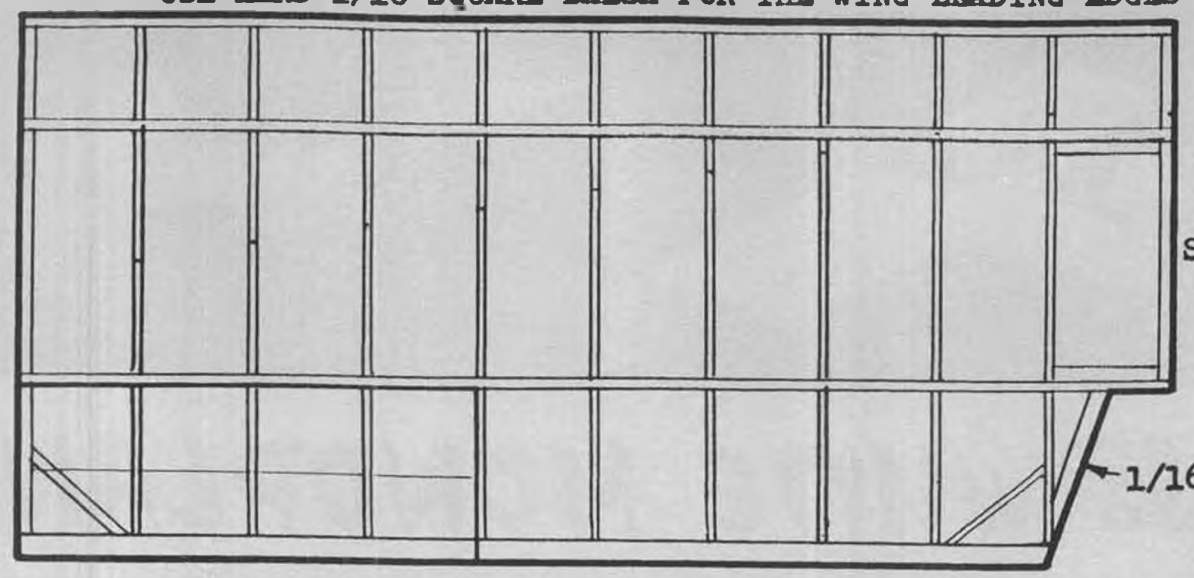
Fix the tank location by installing the floor made out of 1/32nd balsa. Now finish the model. Fill in the bottom for-



Looking like something Papa built for Junior to pedal around in the back yard, the White Monoplane is a surprisingly good flier, just perfect for the Brown Peanut CO_2.

Continued on page 79

USE HARD 1/16 SQUARE BALSA FOR THE WING LEADING EDGES



USE FIRM 1/16 BY 1/8 BALSA FOR WING TRAILING EDGES

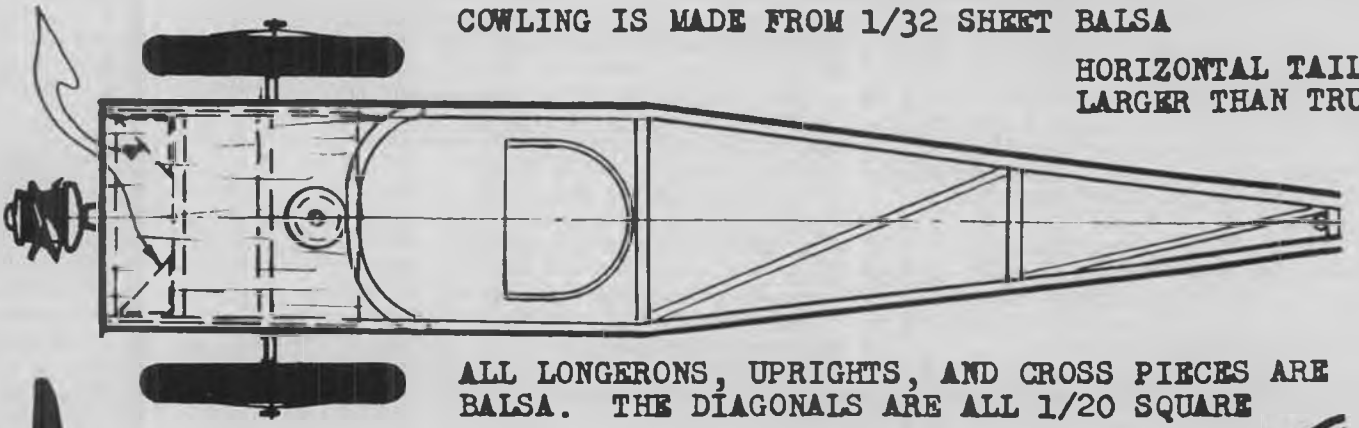
USE 1/64 BY

USE 1/20 SQUARE BALSA FOR

ENGINE MOUNT GUSSETS 4 PLACES

COWLING IS MADE FROM 1/32 SHEET BALSA

HORIZONTAL TAIL
LARGER THAN TRUE



ALL LONGERONS, UPRIGHTS, AND CROSS PIECES ARE BALSA. THE DIAGONALS ARE ALL 1/20 SQUARE

THE SMALL BROWN CO-2 ENGINE IS MOUNTED ON A 1/16 PLYWOOD FIREWALL ---SEE FRONT VIEW FOR PATTERN

A SOLID BALSA FILLER BLOCK UNDER THE SHEET COWLING SUPPORTS THE CO-2 FILLER FITTING

FILLER BLOCK BRACE

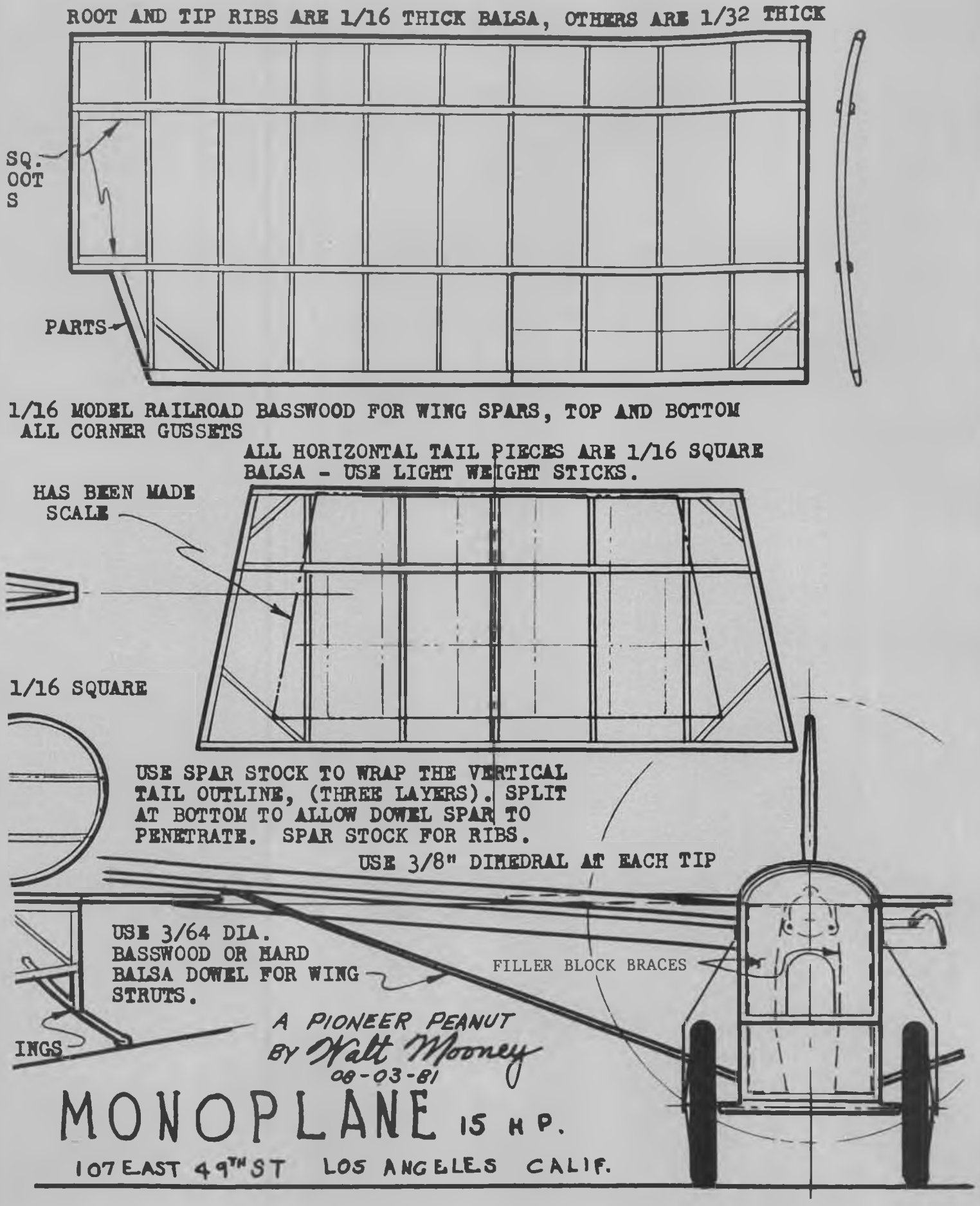
HARDWOOD TAILSKID FITT

HUNGERFORD WHEELS ARE GREAT

(1919)

WHITE

GEO. D. WHITE CO.


ROOT AND TIP RIBS ARE 1/16 THICK BALSA, OTHERS ARE 1/32 THICK
SQ.
OOT
S
PARTS
1/16 MODEL RAILROAD BASSWOOD FOR WING SPARS, TOP AND BOTTOM
ALL CORNER GUSSETS
ALL HORIZONTAL TAIL PIECES ARE 1/16 SQUARE
BALSA - USE LIGHT WEIGHT STICKS.
HAS BEEN MADE
SCALE
1/16 SQUARE
USE SPAR STOCK TO WRAP THE VERTICAL
TAIL OUTLINE, (THREE LAYERS). SPLIT
AT BOTTOM TO ALLOW DOWEL SPAR TO
PENETRATE. SPAR STOCK FOR RIBS.
USE 3/8" DIHEDRAL AT EACH TIP
USE 3/64 DIA.
BASSWOOD OR HARD
BALSA DOWEL FOR WING
STRUTS.
FILLER BLOCK BRACES
INGS
A PIONEER PEANUT
BY Walt Mooney
08-03-81
MONOPLANE 15 H P.
107 EAST 49TH ST LOS ANGELES CALIF.

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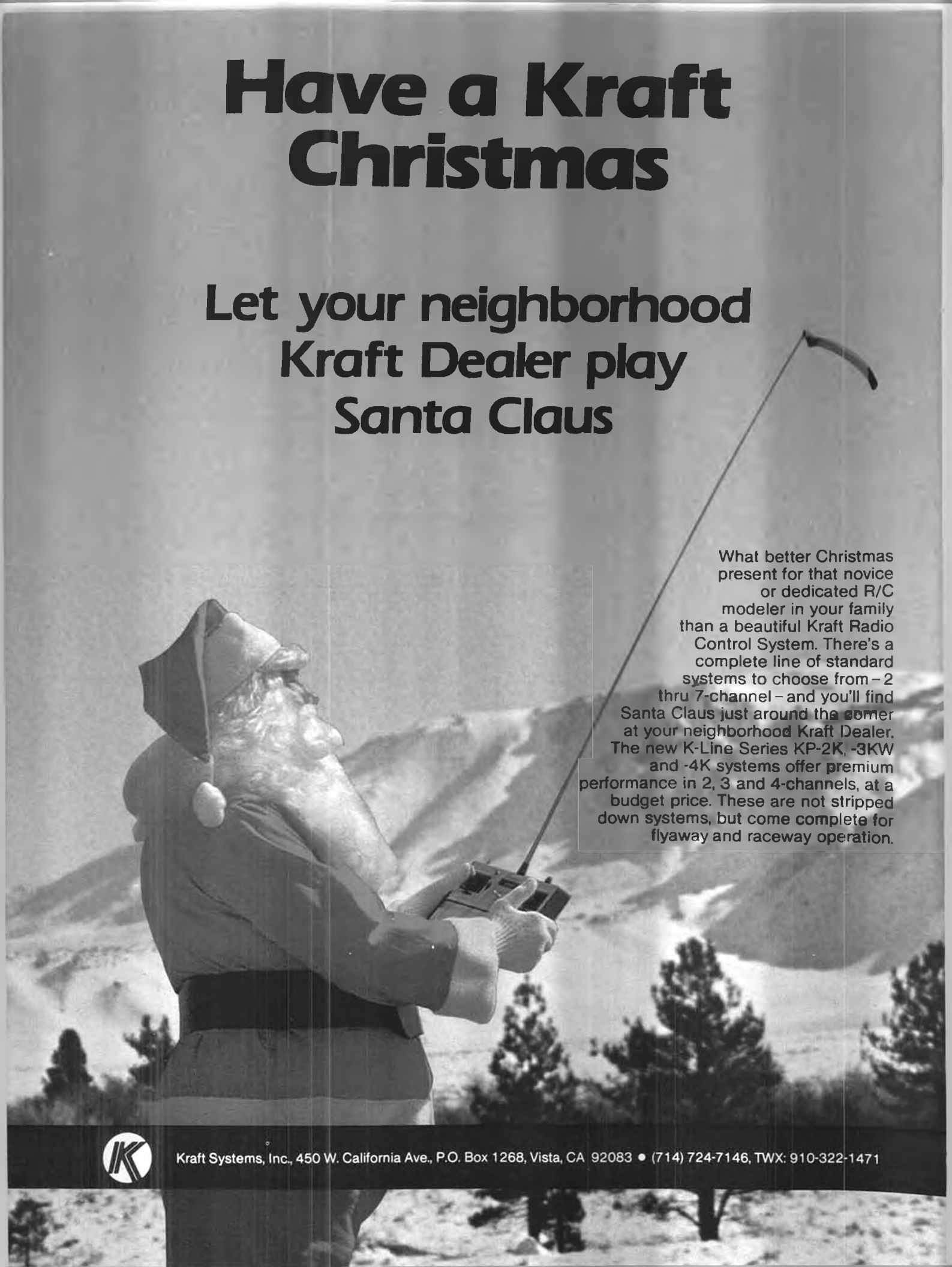

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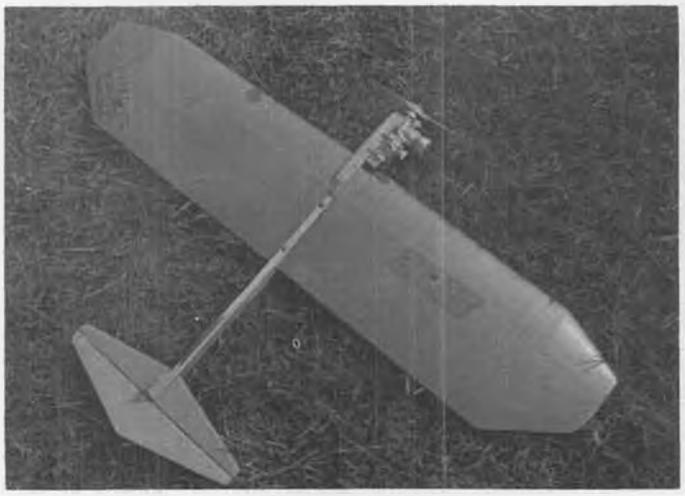
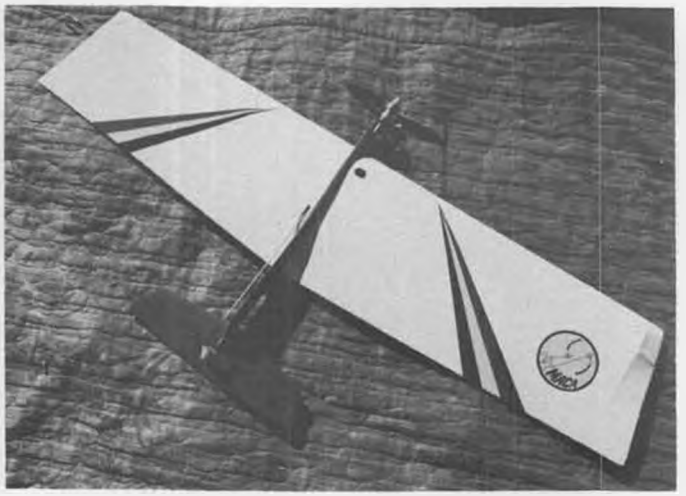


Paul Smith's Super Star foam Slow Combat. Bolt-on fuselage from motor mounts back. Fox 36, chicken hopper tank.



TD powered mini Challenger, by Gordon Delaney, Salt Lake City.

Control line

By "DIRTY DAN" RUTHERFORD

PHOTOS BY CHARLIE JOHNSON

JORDAN SEGAL AND MACA CHECK IN

Just got a note from Jordan Segal and he asks that I pass along the news that MACA (Miniature Aircraft Combat Association) membership is now $9 per year, $15 for overseas. The money gets you membership in MACA, of course. Probably of more importance is the fact that it also nets you 12 issues of the MACA newsletter. And a voice in how things are going and will be going with Combat.

GRANDERSON FINALLY WINS IT

Phil Granderson tried for six years to win the famous Bladder Grabber Combat meet and each time, as I recall, found his luck in early rounds to be consistently very bad.

But this year he lasted through every round of the triple-elimination contest, packing off hundreds of dollars worth of Carver Corporation stereo components. At last report, most of the windows in Phil's house were broken but the stereo sounds real good. . .

AND ANOTHER NOTE

Dear Dirty,

I listen to your show all the time. Please play a request for me and my fellow RAMS (Roanoke Aeromodelers Society) members who are getting into 1/2A Combat. We need a surefire, magic, one-flip starting procedure for Cox TD 049's, just like the big boys do.

I have spent some time trying to work out a method for myself, but it's not very reliable. So far, I've had the best luck with two drops of fuel in the venturi, turn the prop a few times, one drop through the exhaust and laid on the piston, one more turn of the prop, apply the heat and hit the prop sharply with a section of automobile heater hose. This procedure works better on my Medal-

They fly on kinda short lines in Buckeye. Pat Wilcox tries some stunts with Gordon Delaney's model.

Dick Stubblefield changes engines during lull in action. Called "Mr. Lee's Pilot" after setting various racing records.

lion 049, which I use on my favorite sport model; it always starts quickly. However, my TD's are often persnickety. When I miss the start on the first stroke or two, I alternate hitting the prop forward and backward. If this doesn't get it in a few tries, something else is wrong . . . usually it's flooded. My procedure may tend to load up the crankcase with fuel, but it has worked better for me using two drops of fuel in the venturi, rather than one.

I'm sure you have a better method, and with the increased interest in 1/2A Combat (around here, anyway) a lot of beginners like me could use some help getting the little honkers going.

Thanks, Raymond LeFrancois.

I decided to use Ray's letter, as he might have a good way of starting those wee little Combat motors and you should probably give it a try.

Before I tell you how I start TD 049's, a note of caution. In all the hours and hours I have spent flying Small-Bore Combat, I can't at this moment recall ever having flown SBC in a contest. Oh, maybe once or twice a few years ago . . . but then, maybe not! All my flying in this category has been of the grudge-match variety where a bunch of us would just fly for grins and ego-fulfillment. In this type of flying, first guy up definitely gets a match and everybody else races to be second in the air, but if that camel doesn't start it's not like losing a contest match to air-time, so we never did develop super starting techniques.

However, even when out just playing, you can't play unless the engine hums along in time, so here is how I start the little rascals. Ha, knew it wouldn't be that simple, right? Of course not! Before the first flip of the prop, you must be certain that the engine has a good piston/cylinder fit. The engines are already hard enough to get started, even when in perfect condition; one that is over the hill by a few miles can be impossible. It always seemed to me that when a TD 049 started to really snort it was good for maybe three or four more evenings of serious flying and from then on the motor would still put out with plenty of power but would also get real hard to start. This might seem like a short life for a top end setup, and is, but we also ran the engines very hard, used short, flat-pitched props, and I in particular, was known for tipping the nitro can pretty heavily.

The other things to check for are pretty obvious, but can be overlooked. The glow head has to be on tight and it is worthwhile checking for leaks. This important piece also has to light up very brightly for good starts, in our group it was common practice to use a 2-volt wet-cell battery. Most everybody used common bell cord for the leads, which were about four feet long, and so cut the voltage down a little. In addition, some kind of adjustable resistance was used in the leads, a simple wire-wound resistor is fine, wrap .055 piano wire around a dowel, make it about three inches long, windings fairly close together and you've got it. For a low voltage requirement you can clip the battery end of one of the leads to the very end of the resistor, moving down the windings, closer to the battery to which the resistor is attached, to get more juice to the plug. Still, most of the time I just used the voltage "straight", no resistance, other than that in the leads and don't think I ever burned out a plug doing this.

Craig and Terri Cervo surround Bob Beardon. Terri gave Pat Wilcox a real battle in Slow Combat, costing him three broken props and two cuts. Way to go!

Even though 2 volts sounds like too much power to the plug, it's not, and the usual 1-1/2 volt dry cell is next to worthless in starting a TD 049. Very important, enough to be worth repeating; the plug has to glow very brightly for good starts.

Now, assuming the motor is in decent shape and you are wearing sunglasses to protect your eyes from that bright plug, we are ready to make noise. Fill the bladder, be sure to keep it pinched off so the motor isn't loaded with fuel.

Get the model positioned so you can hit the prop hard and fast, hook up the leads to the glow head and rotate the prop so the piston closes the exhaust ports. With whatever is handy lay fuel on the piston and immediately turn the prop through one revolution, allowing the fuel to get pushed off the piston and down into the cylinder. I would caution you to hold tightly to the prop while doing this, as there is the possibility of it firing first flip . . . don't hold your breath, though. This gets the cylinder primed and releasing the bladder line for an instant will prime the venturi, with experience telling you how long an "instant" is. Finally, the prop can be smacked, and with a TD 049, there is no such thing as flipping the prop too fast. Ray's use of the heater hose is good, gives a little more leverage, although I was never able to get comfortable using one, plus kept losing the things. So I personally just flip my hand, after learning exactly where to set the prop . . . even quit using gloves and such.

If, after following all of the above suggestions, that hummer still won't fire, all you can do is practice. With more experience you can "hear", literally, these little motors talking to you, telling you when they are dry and needing a prime, flooded to the gills, or just plain worn out.

ONE MORE NOTE

Dan,

I was just reading Linstrum's FF column in M.A.N. *and it inspired me to write you another "fan" letter. (I wrote you one a couple of years ago after reading my first honest product review.) Huh? What's that? Briefly, Dan, it's because you aren't one of* them. *Linstrum is one of* them. *Northrop is one of* them. *Bill Winter is one of* them. *Bill Hannan has recently become one of* them. *And damn near every other model airplane columnist seems to be becoming one of* them.

"Them" refers to people who are somehow unable to think of themselves as being only one person. Like corporations, and like the Pope, they use the word "we" in place of the apparently obsolete word "I". For example: "When we built our first plane. . ." etc. . . .

So . . . Hang in there old buddy and rest assured that you have my warmest thanks for remaining one of the few singular columnists. I don't know how you feel about this trend, but we for one are getting tired of it!

Sincerely, Ed Hopkins.

Interesting point, Ed, one that has made me wonder about writers that *(incidentally, no matter how good or bad a writer may be, he or she is still a "who" not a "that"! wcn)* constantly use the editorial "we". I always assumed they

Continued on page 98

Dave Wineland won Class A at 1981 Nats with this Pearl-like design.

Tony Blizzard, Phoenix, displayed very hot climb at 1981 Nats with this modified Satellite 450.

Highest-climbing B ship at 1981 Nats belonged to Mark Heller, Illinois. Anderson-modified K&B 3.5cc.

FREE FLIGHT

by TOM HUTCHINSON

PHOTOS BY AUTHOR

Tom Hutchinson's new address:
20518 S.W. Leeds Ct.
Aloha, OR 97005

NATS IMPRESSIONS

I went to this year's Nats, after a 4-year absence, and came away impressed . . . with the flying site, the weather, the quality of competition and the partial return of the old "Nats" feeling.

The field at Seguin was, without a doubt, the finest free flight site yet offered at an AMA Nats. It was huge, and the only difficulties occurred when the drift was toward the control-line and RC areas. It's an honest 3-minute site under nearly all flyable weather conditions (Mulvihill was even flown to 5-minute maxes this year, with models staying on the field if flown early in the day). The long runways and short grass between them made it a pleasurable site to fly from; no clouds of dust (as at Riverside) or jungle undergrowth (you name the site) to hamper flying or chasing.

Seguin must also rank as the best-hidden Nats site I've been to. AMA never did publish a detailed map prior to the contest showing the location, even in the entry blank. Only contestants who had pre-entered received the information. We had to wait until I found AMA HQ and got my press credentials to get directions to the site. Even then, it wasn't easy . . . the sign at the field entrance looked like an ad for a grocery store nearby. It was frustrating to see the field and the activity, but not be able to find the only entrance gate . . . a far cry from Navy Nats days! But once you found it, you wondered how such an immense field could be hidden. Perhaps this is the much-rumored "central" site that would be ideal for an FAI Final Team Selection contest. I certainly can't see any drawbacks, except for the possible lack of a local club to run a Finals there. It would certainly be a field more representative of typical US conditions than the freaky, fickle specialized ones found at Taft.

The weather seemed very reasonable for the 3 days I was there, and those who were there all week said it had been that way all the time. Winds were light (less than 10 mph), so maxes were contained within the field boundaries. The weather was warm, in the middle 90s. Humidity was a bit higher than West Coast conditions, causing problems for lightly doped models. But it's hard to find much cooler temperatures anywhere in the U.S. in August where the topography is flat enough to fly models on, that is . . . even Portland, Oregon was over 100 degrees during this period!

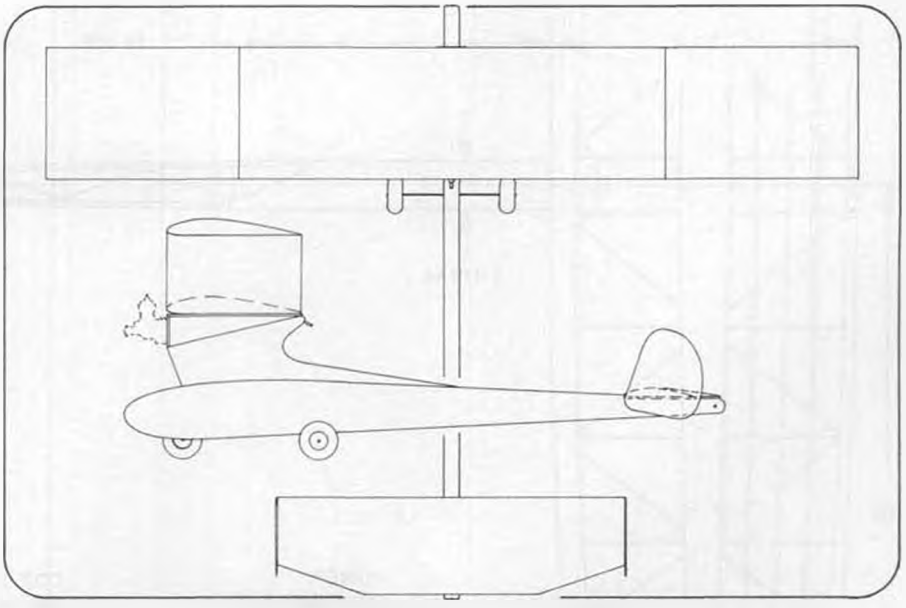
Larry Sargent twists the plane while George Perryman holds the prop (wanna bet?) It's the famed "Great Speckled Bird."

Another impression I carried back was of the extremely high quality of flying displayed at this year's Nats, particularly in the gas events. Flyers from the mid-west have really succeeded in producing extremely high climbing gas ships for the reduced engine runs now flown in most parts of the country. And these hot ships were being flown very stably, too . . . I could count the number of crashes I saw in 3 days on the fingers of one hand. Toby Blizzard and Randy Archer (Phoenix) had some of the hottest-climbing modified *Satellites* I've ever seen, with flawless 1/4-turn straight up power patterns that flipped right out on top in a smooth transition. Gil Morris' *Toothpicks* design climbed equally well, living up to its reputation. On B day, Mark Heller (Illinois) unleashed an original design that, in my opinion, was the highest climber of them all. Even with 660 sq. in. of wing area, the Anderson-modified K & B .21 hauled Mark's ship to super altitudes. The trend in Class B now seems to be towards a combination .19/.21 model rather than the .29/.35 size ship, probably caused by the high performance of the current crop of Schneurle motors of this size.

On the quieter side of the field, the results could be summed up in 2 words: BOB WHITE. The foxy Godfather of the Max Men managed to capture 1st place in every official rubber event except his specialty, Wakefield. His wins in Coupe, P-30 and Mulvihill, along with his 2nd place in Wakefield, is probably the most complete domination of the rubber events since Maxwell Bassett won them all (with a gas motor).

On the power side, Gil Morris took top honors by winning 1/2A and B, along with a 3rd place in Class C. This was nothing unexpected, since he's won 1/2A and B for the last 4 Nats in a row . . . some real good consistent flying, under a variety of conditions. He shared some of his design secrets at the well-attended (but well-hidden, like the flying site) NFFS Symposium.

The only negative factor about this year's Nats is that so few competed . . . the quality of flying was way up over previous Nats, but the quantity was down. If you weren't there, you missed a good one! Next year, it may not be the same . . . the talk was that the free-flight events would be held separately (at Wright-Patterson, in Dayton), while RC, Control-line, and Indoor would happen at Lakehurst.



DECEMBER MYSTERY MODEL

WORLD CHAMPS TIDBITS

No, I didn't make it to Spain for the World Champs, but I did get some secondhand impressions from talking to Charlie Martin and John Lenderman (who were there) as well as to Bob White and Bob Isaacson, who had plugged into the Southern California grapevine. So here's what I found out. . .

Nordic was held in winds approaching (and probably exceeding) the FAI limit of 27 mph. Under such conditions, it's not unusual that nobody maxed out. However, the winner, Vidonsek of Yugoslavia, dropped only seven seconds in the last round.

Lost models were common on the rather small flying field. Lepp, of the USSR, was runner-up for the second consecutive World Champs, but lost two models and had to finish up with his calm-air AL 33 model featured a few issues back. Paul Lagan, of New Zealand, finished third, after having maxes the first six rounds, but losing all three models. One model was returned before the last round, but had spent some time in a river, and lost trim.

Organization of the contest was a bit loose, according to my sources. The first round of Nordic started 2 hours late, because none of the contest officials could be found on a Sunday morning!

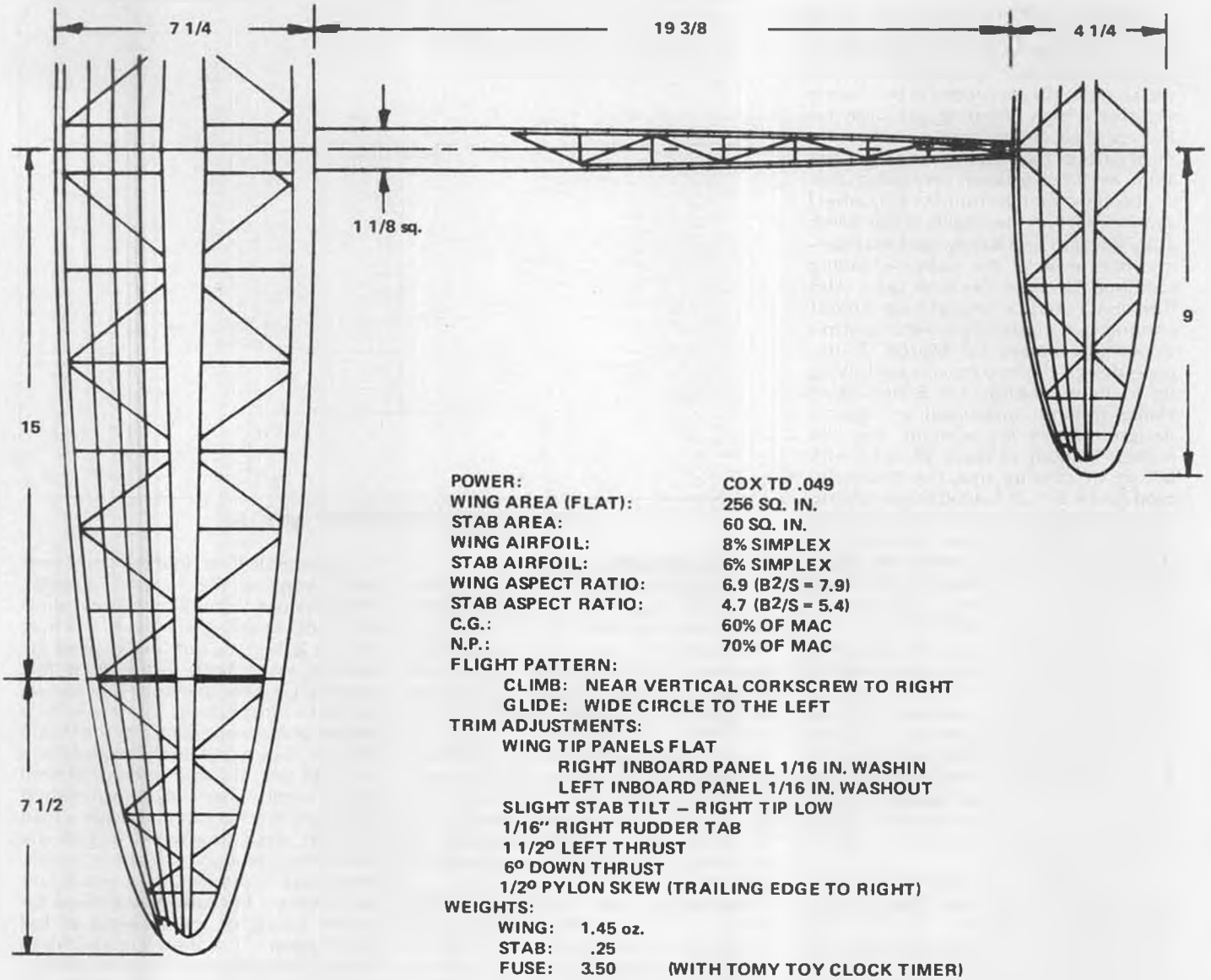
The victorious USSR team used some interesting tow techniques in the windy conditions. All of their models featured a "compensator" to hold the circle tow-hook firmly in the forward position, which in normal conditions would allow the model to swing in front of the flyer until he jerked the line and allowed the hook to swing back to the circle tow position. (The compensator mechanism could be something as simple as a friction or magnetic latch.) At the World Champs, they relied on this to give them a straight tow, kiting into the wind until lift was found. Then they activated their circle tow mechanism and made a mad 75 meter dash downwind to pull the model into position for a zoom launch. Conjecture is that this risky procedure was necesary because of the need for proper timing of the lock-out of full glide rudder . . . if they released when lift was first encountered, they might stall off the top until full rudder was attained.

Wakefield was flown in slightly better conditions, resulting in a three-man fly-off won by Doring of West Germany, who beat out Landeau and Pierre-Bes (both of France). Defending champ Ben-Itzhak of Israel finished respectably, in seventh place, between the top two US flyers — Walt Chio (fifth) and Joe Foster (eighth).

Wakefield winner Doring had to accept his trophy on crutches because of a severe beating by Spanish security guards the night before. He was with a group of Danes and assorted other

DARNED GOOD AIRFOIL – EPPLER 61

STATION	0	1.25	2.5	5	7.5	10	15	20	30	40	50	60	70	80	90	95	100
UPPER	1	2.7	3.4	4.7	5.8	6.5	7.6	8.4	9.3	9.95	9.8	8.8	7.7	6	3.7	2.15	0
LOWER	1	0	0.15	0.5	0.95	1.1	2	2.3	3.15	4	4.2	4.3	4	3.1	2	1	0



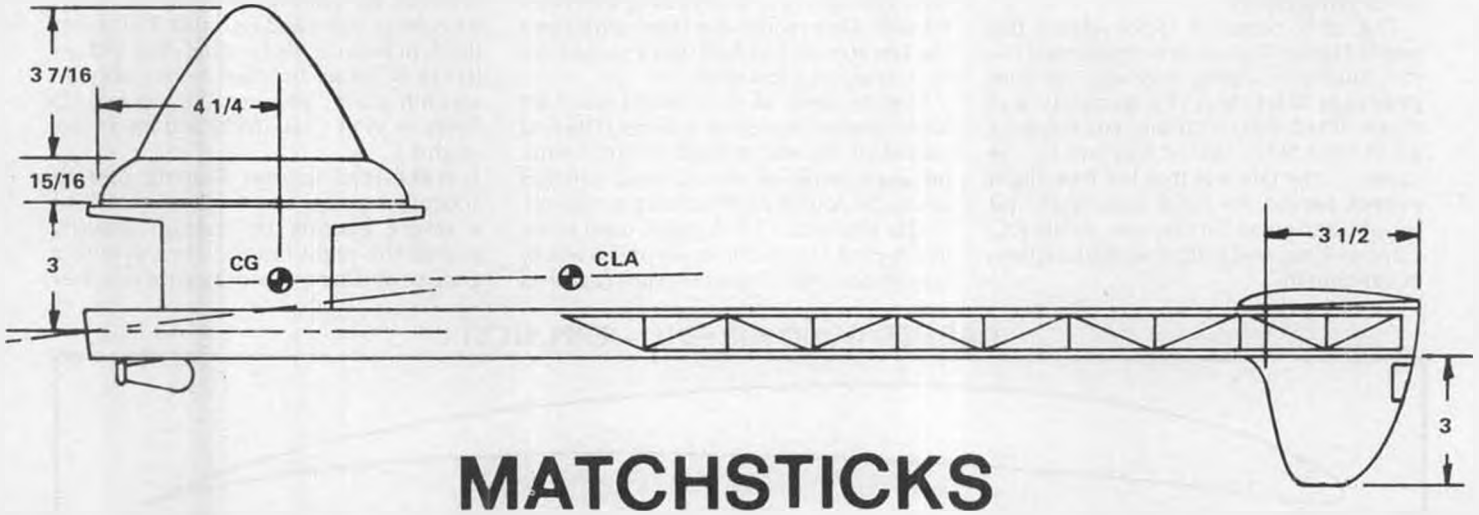
POWER:	COX TD .049
WING AREA (FLAT):	256 SQ. IN.
STAB AREA:	60 SQ. IN.
WING AIRFOIL:	8% SIMPLEX
STAB AIRFOIL:	6% SIMPLEX
WING ASPECT RATIO:	6.9 ($B^2/S = 7.9$)
STAB ASPECT RATIO:	4.7 ($B^2/S = 5.4$)
C.G.:	60% OF MAC
N.P.:	70% OF MAC

FLIGHT PATTERN:
- CLIMB: NEAR VERTICAL CORKSCREW TO RIGHT
- GLIDE: WIDE CIRCLE TO THE LEFT

TRIM ADJUSTMENTS:
- WING TIP PANELS FLAT
  - RIGHT INBOARD PANEL 1/16 IN. WASHIN
  - LEFT INBOARD PANEL 1/16 IN. WASHOUT
- SLIGHT STAB TILT – RIGHT TIP LOW
- 1/16" RIGHT RUDDER TAB
- 1 1/2° LEFT THRUST
- 6° DOWN THRUST
- 1/2° PYLON SKEW (TRAILING EDGE TO RIGHT)

WEIGHTS:

WING:	1.45 oz.	
STAB:	.25	
FUSE:	3.50	(WITH TOMY TOY CLOCK TIMER)
TOTAL:	5.20 oz.	(ALL-UP)



MATCHSTICKS

Dave Benepe and son Greg prepare to fire up a Class D Satellite at '81 Nats.

Gil Morris with Nats-winning B ship. Also won 1/2A, 3rd in C. Wire extending from wing is antenna for FM "beeper" transmitter.

nationalities who attempted to continue their post-contest celebration at one of the official lodging places (where the Danes were registered), but were stopped by security types. An altercation ensued, resulting in Doring's mugging . . . cameras were confiscated and/or broken, and a real melee was getting underway when police stopped the action by brandishing sub-machine guns. There was talk of a boycott of the victory ceremonies, but the team managers convened and decided to carry on as scheduled. (It'll probably be a long time, if ever, before the World Champs is held in Spain again!)

The Chinese team must have learned something quickly from their visit to Taft in 1979. China placed second in both the Wakefield and Power Team standings. Interestingly enough, the North Koreans were not among the 27 countries represented at the World Champs this year.

Power provided the only strong showing for the US team, as we won the team event without placing one flyer in the flyoff. There was a 12-man flyoff, which soon reduced to two veteran power flyers trying for the final max and the world championship that had so narrowly eluded them for so many years. Andreas Meczner of Hungary (on his 10th consecutive power team) came out the winner over Russian stalwart Eugene Verbitski. The final flyoff was rather anticlimactic, since Verbitski had lost his number one ship and was flying a greatly inferior reserve model which went off-pattern, ending up in a nose-down attitude before the outside loop recovery mechanism came in, resulting in a 9 second flight/crash.

NEW PRODUCTS FOR FREE FLIGHT

While at the Nats, I heard of a few new items that might be of interest to free flighters. For instance, Bob White is now custom-making thermistor thermal detectors of the type he's been using for many years. Price will be $50 . . . order from B & T Instruments, 1030 Norumbega, Monrovia, CA 91016.

I also ran into Ronnie Young, who says that K & B will undertake a production run of the Cox Conquest .15 design, probably out sometime about the first of the year. No price has been set yet, but look for it to be considerably less than (half?) the price of the new Rossi or Nelson. (Speaking of the new Rossi, George Aldrich has looked at them and claims that the porting is really radical . . . timed for about 30,000 rpm, he says. Maybe a 6/3 will be the new standard F1C prop size?)

DARNED GOOD AIRFOIL . . . Eppler 61

At last, we have a DGA which can be recommended on the basis of actual low-speed/low-turbulence wind tunnel tests, rather than on the old "eyeball" system. Dr. Bruce Carmichael has summarized and compared the results from three such tunnel tests in the 1981 NFFS Symposium, and concludes that the Eppler 61 is the highest-performing airfoil of the batch tested, particularly at the low Reynolds numbers corresponding to Wakefields and Nordics (40,000-60,000). He also compared tests of the E-61 at three different wind tunnels and found the results to vary greatly, for no apparent reason, so this is sort of a cautious recommendation.

The Lift Drag polar plot for this type is one in which there is a noticeable drag increase in the medium lift range, indicating that for best performance the model should be flown close to the stall. Some tests showed that a wire turbulator in front of the leading edge removes this drag increase. No test results are available for a surface turbulator on the E-61.

So, it looks like the scientific evidence indicates that this is the latest hot-setup airfoil to try. It certainly seems to look reasonable to try on a Wake or Nordic.

MODEL OF THE MONTH

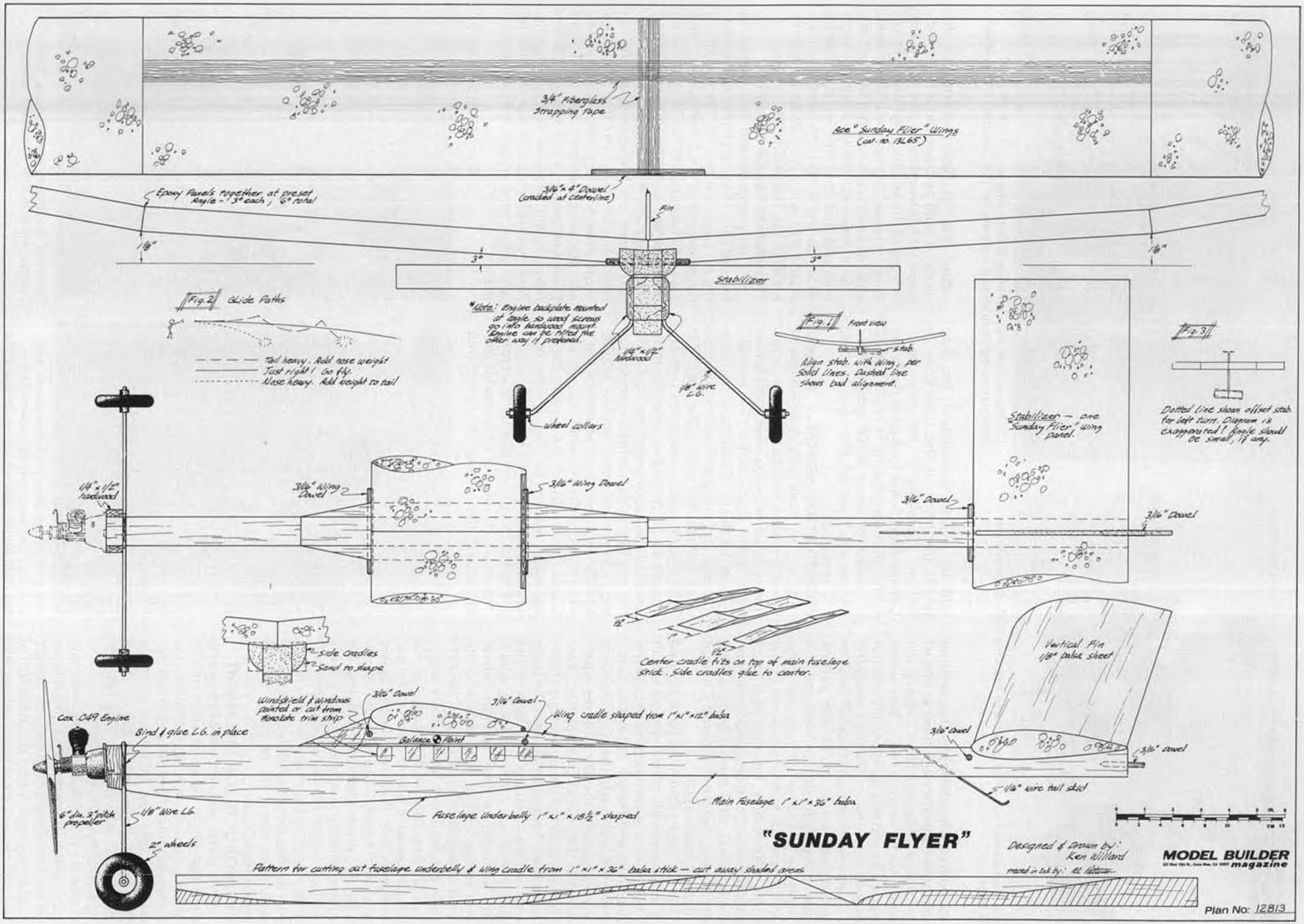
"Matchsticks" by Gil Morris

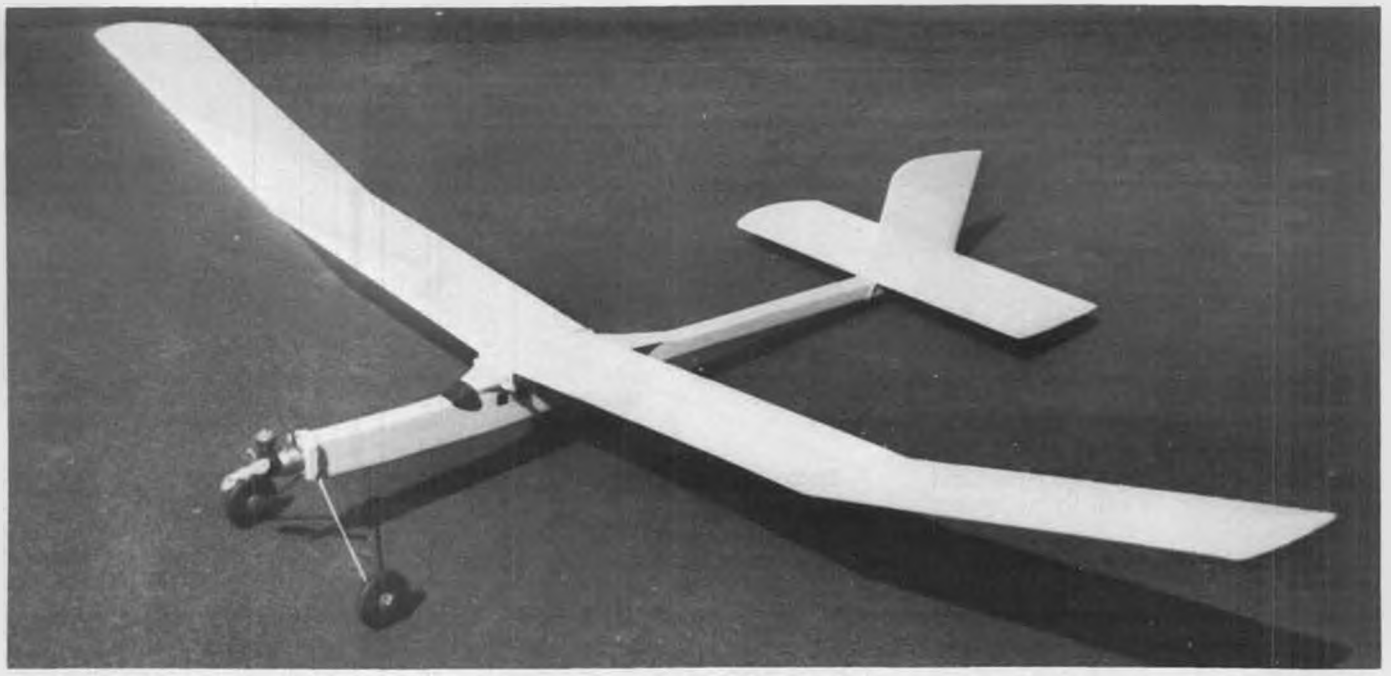
It's only appropriate this month to feature Gil's 1/2A Nats winner, considering his past Nats record. The model is a development of his "Toothpicks", and Gil's article in the 1981 NFFS Symposium discloses some of the thinking behind the design. He believes in a light tail end, to reduce pitch moment of inertia, which has the side benefit of allowing a short nose to aid power stability. The elliptical wing planform was put in to aid glide endurance, even though Gil believes it will decrease stability slightly. And, naturally, the aim was to come up with a low total weight for best performance.

Continued on page 97

Bob White dominated rubber events at Nats, winning every event but Wakefield. This is Mulvihill winner, lost on 6-minute max flight.

Junior of the Month, Mike Watson, Cedar Rapids, winds P-30 at Nats, Dad assists.


3/4" Fiberglass Strapping Tape
Ace "Sunday Flier" Wings (cat. no. 12L65)
Epoxy Panels together at preset Angle - 3° each, 6° total
3/16" x 4" Dowel (cocked at centerline)
Fin
1/8"
3°
3°
1/8"
Stabilizer
Fig. 2 Glide Paths
Tail heavy. Add nose weight
Just right! Go fly.
Nose heavy. Add weight to tail
*Note: Engine backplate mounted at angle, so wood screws go into hardwood mount. Engine can be fitted the other way if preferred.
1/8" x 1/2" hardwood
1/8" wire L.G.
wheel collars
Fig. 1 Front view
stab.
Align stab. with wing, per Solid lines. Dashed line shows bad alignment.
Fig. 3
Dotted line shows offset stab. for left turn. Diagram is exaggerated! Angle should be small, if any.
Stabilizer — one "Sunday Flier" wing panel.
1/4" x 1/2" hardwood
3/16" Wing Dowel
3/16" Wing Dowel
3/16" Dowel
3/16" Dowel
side cradles
Sand to shape
12"
1"
1/2"
Center cradle fits on top of main fuselage stick. Side cradles glue to center.
Vertical Fin 1/8" balsa sheet
Cox .049 Engine
Bind & glue L.G. in place
Windshield & windows painted or cut from Monokote trim strip
3/16" Dowel
3/16" Dowel
Wing cradle shaped from 1" x 1" x 12" balsa
Balance Point
3/16" Dowel
3/16" Dowel
6" dia. 3" pitch propeller
1/8" Wire L.G.
2" wheels
Fuselage Underbelly 1" x 1" x 18 1/2" shaped
Main Fuselage 1" x 1" x 36" balsa
1/16" wire tail skid
"SUNDAY FLYER"
Designed & Drawn by: Ken Willard
MODEL BUILDER magazine
Pattern for cutting out fuselage underbelly & wing cradle from 1" x 1" x 36" balsa stick — cut away shaded areas
Plan No: 12813



SUNDAY FLYER

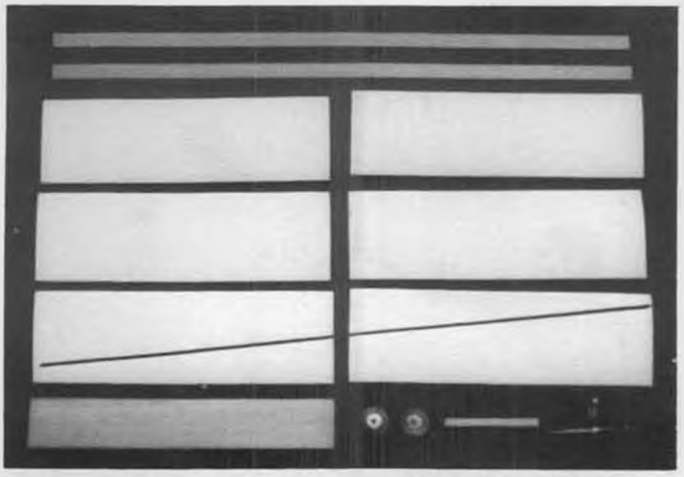
By KEN WILLARD . . . Here's the ideal project to kindle a flame from that spark of interest shown by the youngster in your life. One evening or weekend isn't much time to devote to its construction, and who knows . . . *you* might learn something!

• In the past ten years, literally hundreds of thousands of 1/2A engines have been made and used by hobbyists as power for their boats, airplanes and cars. Most of the boats, airplanes and cars have long since been wrecked, but the engines are still lying around, unused, but still usable. The hobbyist has lost interest. Most of them, to be sure, are youngsters who would like to do something with their engine, but they don't have a lot of money to buy radios and suitable kits. So what can be done with all those engines?

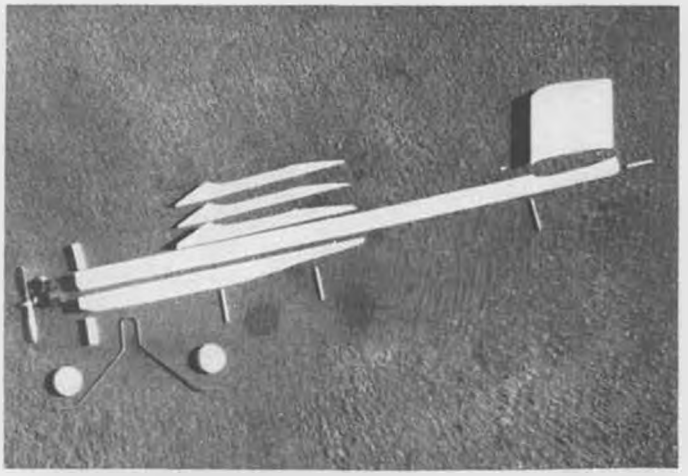
How about putting them into a simple sport free flight model? One that will need a minimum of building time, practically no adjustments, yet will give good flights and teach the owner quite a bit about flying simple powered models. With that in mind, the design of the "Sunday Flyer" was developed.

The secret of a good flying model is the trueness of the alignment of the structure. The most critical, in that regard, is the wing. Very few newcomers to airplane modeling can construct a wing which doesn't have any warps. With that in mind, the "Sunday Flyer" uses ready-built foam wings. That feature, combined with the solid balsa fuselge, insures an accurately built model, just what you want for your first try in building a flying model.

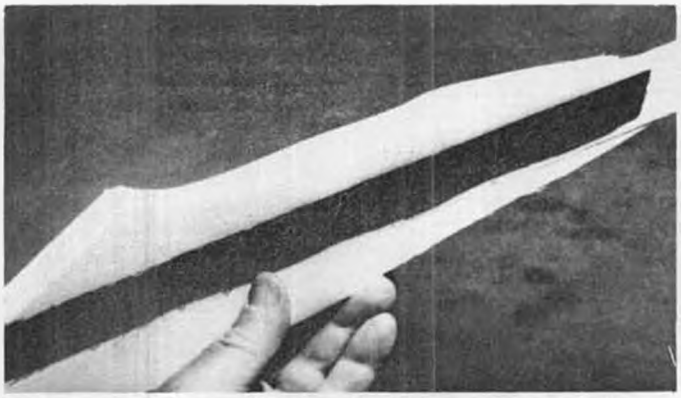
The foam wings used on the "Sunday Flyer" are produced and sold by Ace R/C, Inc., Box 511D, Higginsville, MO 64037. These particular wings have the tips of the panels precut at a precise angle of three degrees (3°) so that you don't have to sand them before putting them together. They are called "Sunday Flier" wings, and the catalog number is 13L65. Yes, I know that the spelling is not the same as the name of the airplane. Don't let it bother you. Somehow, the modeling people have never agreed on whether you're a "flyer" or a "flier" so



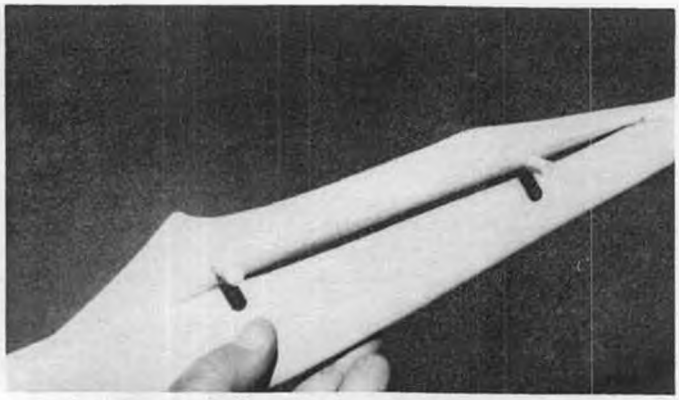
Masic materials; foam wings, balsa sticks, 1/8 wire (on lower wing set in photo), wheels, 1/2A engine, some 1/8 balsa, and scrap wood.



Assembly parts for fuselage, engine mount and fin. Easy for mass production, club training project.



Dark shadow of unfinished wing mount cradle on fuselage almost looks like carbon fiber overlay.



Now it looks better! Wing saddle has been carved and sanded, wing hold-down dowels added.

don't worry about it. Just go ahead and build the model. It will fly no matter what you call it.

What materials will you need? To make it easy for you, they are all listed in the "Bill of Materials" shown in the accompanying box. Look it over, and lay in the supply. You are now ready to start building. You'll be surprised how fast it goes together.

MATERIALS

1. Two balsa sticks, 1" x 1" x 36"
2. Two sets of Ace "Sunday Wings" (Catalog No. 13L65)
3. Some scrap pieces of balsa wood and hard wood.
4. One foot of 3/16" dowel.
5. Two 1/2" wood screws
6. Seven feet of strapping tape
7. Epoxy or "Super T" Hot Stuff instant glue.
8. "Aerofoam" paint, Pactra Formula "U"
9. Rubber bands (No. 64)
10. Wheels (2" or 2-1/2" diameter — not critical) + wheel collars - 1/8"
11. Landing gear wire, 1/8" steel, and tail skid, 1/16" x 4" wire

FUSELAGE

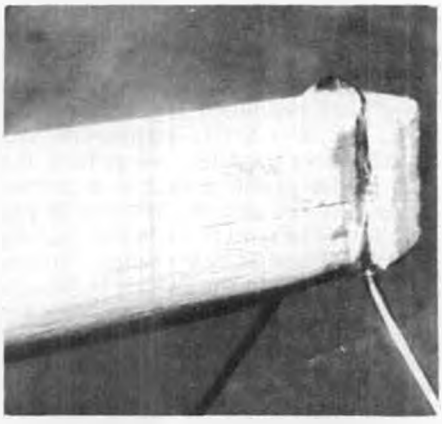
Study the drawing the the photos before putting anything together. It will make the job a lot easier. Note that the fuselage is made up from two pieces of balsa, each of which is 1 x 1 x 36 inches long, plus two little pieces of hardwood for mounting the motor, and some 3/16 dowels to mount the wing and tail surfaces.

One of the 1-inch square balsa sticks serves as the base structure for the fuselage. The only cut on it is the cradle at the rear which is cut to fit the shape of the lower surface of the horizontal stab. To do this, put one end of one of the wing panels in position on the tail of the balsa stick, making sure that the center line of the airfoil section is parallel to the top line of the stick. See plans. Now mark the curve on the balsa with a pencil.

Cut out the cradle. Be sure the cut is straight across.

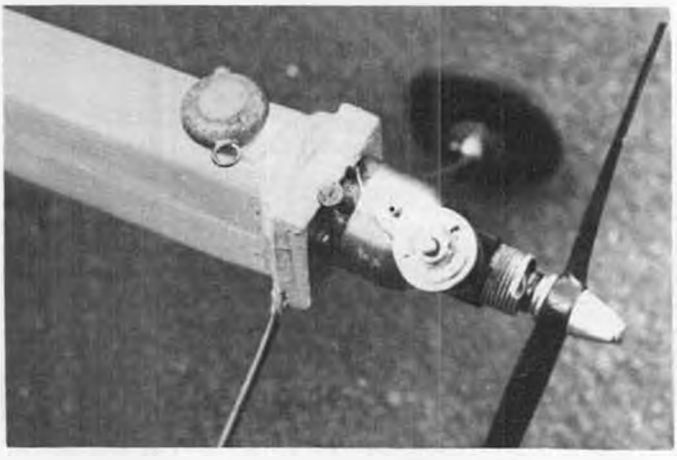
Next cut out the "underbelly" piece which fits from the nose back to about 19 inches. I say "about" because it is not critical. Don't make it any longer, and

Continued on page 98



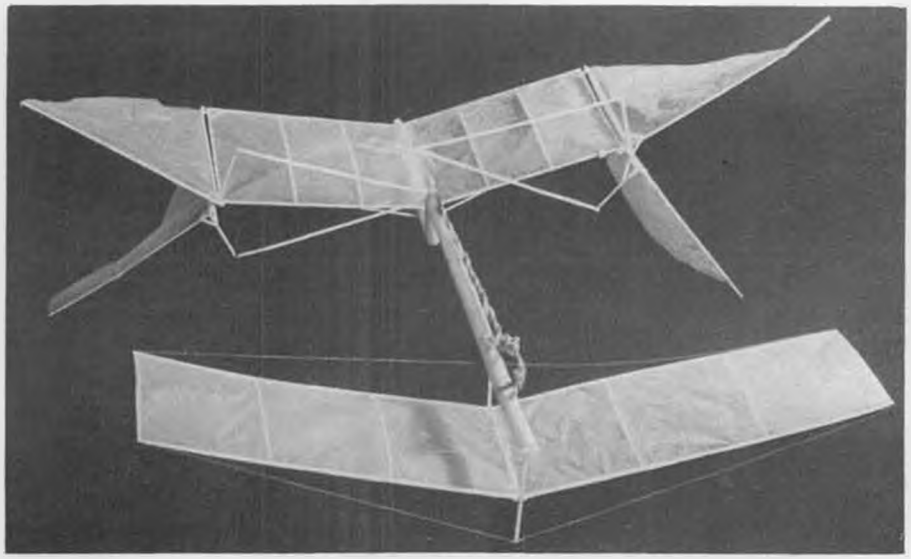
Bound and epoxied landing gear tucks in behind engine mount blocks.

The "Sunday Flier" admires his "Sunday Flyer".



Note canted engine, reversed prop for early test flights, one-oz. weight for balancing model (use double-stick tape).

Launching model for test flight. Note that it is in a level attitude.



Canard flapper by the columnist. Three models built, but with various linkages. Double scissors on this one. Best time was 58 seconds. Bill Warner photo.

Susan Weisenback Johnson; private pilot, aerospace engineer, indoor modeler.

INDOOR

By KEN JOHNSON

WOMEN IN INDOOR MODELING — THE FIRST OF 3 PROFILES

Why are there so few ladies attracted to indoor models? I've wondered about this many times.

Over my last 20 years of indoor flying, only a few gals have appeared on the scene. Certainly, there are those who come out with their husbands or boy friends, to help with winding or timing. Occasionally, one of these will even build a model. After one session of flying it, the novelty has worn off and they are back to being a helper for someone else. A bonafide lady indoor builder and competitor is a rare find and a joy to all of us.

Three such special ladies will be profiled in this column.

The first is from the Cleveland, Ohio area. She is the daughter of Warren and Marge Weisenbach.

First, a look at mom and pop. Warren is a long-time free flight builder. Until his recent retirement, he was a policeman in Cleveland. Marge has for many years, been the AMA District 3 contest coordinator. When the Weisenbach daughters, Susan and Cheryl, were about 5 years old, they began competing with mom and dad, helping wind, time, and chase.

It soon became apparent that Susan was to be the flier and the others would assist. The four Weisenbachs would be there at every contest, outdoor and indoor. At the outdoor meets, they could be distinguished by their red pith helmets. Susan was the competitor; Warren the mechanic. Marge and Cheryl would drive down wind. Warren would radio the chase team as the model went up. The gals were there to retrieve as the airplane came down. What a family unit. Sue never had to chase her models!

When indoor season rolled around, there were the Weisenbachs; flying and helping. Both girls enjoyed indoor flying. They ran the gamut from microfilm to hand-launch glider.

By the early 1960's, Susan was flying almost all the outdoor and indoor events and designing her own airplanes. At the '65 Nats, she placed 3rd in A/1 towline glider and was first the following year, all the while excelling at indoor modeling. The whole family enjoyed the friendships and good times available only at the Nats. One of her Nats prizes was a trip to Pensacola and a cruise on the carrier Lexington.

In 1970, Sue won an AMA college scholarship, and an additional scholarship from the Cleveland Women's Chapter of the National Aeronautic Assn. Two days before she was awarded the AMA scholarship at the 1970 Nats, Sue was injured when a Super Tiger .15 pulled out of her airplane and tore into her knee. After 4 hours in surgery, Miss Weisenbach was back at the Nats, putting in the rest of her flights. The next day, she won the Coupe d'Hiver Nats event.

After graduating from Kent State University, with a degree in Aerospace Engineering, Susan went on to obtain a Masters Degree in Mechanical Engineering. Susan is now married to computer programmer Eric Johnson (no kin to Ken) and is employed by NASA in Cleveland as a research and project engineer, working on jet engine combustors. Still modeling and still winning, Sue is president of the Northern Ohio Free Flight Club.

Warren was this year, the Canadian National Champion in gas powered free flight scale. A full-size Pietenpol airplane was built by Warren to seek out lost models and look for new flying sites. Both Susan and her dad hold private pilot's licenses. Susan Weisenbach Johnson says, "I think building and flying models truly brought all of us together as a unique and unified family."

Next time we will meet Miss Lynn Buben; Aeronautical Engineer, pilot, and indoor model builder.

PLAN DRAWING TIPS

One of the problems encountered in

Don Srull's peanut Eastborne. Has won several contests.

Young Dan Brotz with beautifully built canard rubber model. He's noted for unusual models. Tony Naccarato photo.

Ready for mass launch of Easy-B and Pennyplanes for TV taping of new children's show. Luther Burbank High, Burbank, Ca. Photo by Tony Naccarato.

drawing up your own model plans is getting both sides of the wing and stab the same size and shape. Here is the easy way to draw a plan.

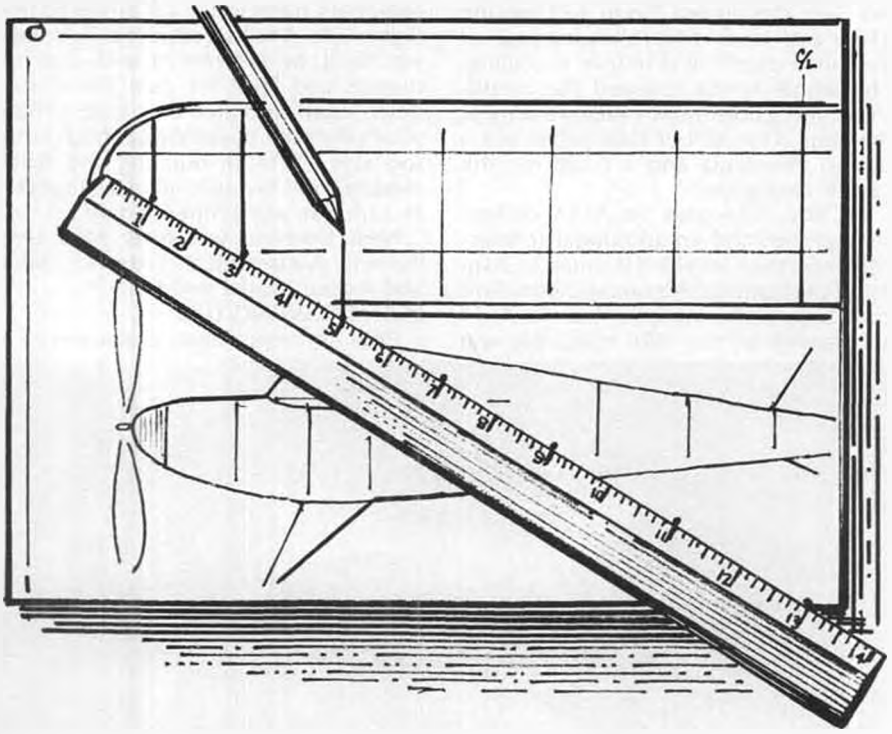
Draw half the top view only. First, draw a straight line down the center of the fuselage. Then draw the left side of the fuselage, wing and stab. The important thing is to draw the plan on artist's thin tracing paper. This paper is sold in various size pads at art supply stores. The sizes I buy are 14 x 17 and 19 x 24. The small size sells for about $5.00 to $6.00 per pad.

After half the drawing is made, seek out a Xerox machine. Put the drawing face down on the machine and place a sheet of plain white paper on top. Make your copy. Then flop the tissue drawing upside down. Again put the same white paper on top, and make your copy.

What you should have now is a left plan side and a right plan side. The only thing left to do is to make a straight cut along both center lines and tape the two halves together. Both sides are exactly the same.

Another problem is spacing out the correct number of ribs in the wing and stab. Instead of counting the number of ribs in the wing, count the number of spaces between the ribs. Then take a ruler that's longer than the span of the wing section and angle the ruler as shown in drawing A.

Count the correct number of increments (say 1 inch or 1-1/2 inch per unit). By angling the ruler to this number, you arrive at the proper spacing between each rib. Mark each increment with a dot along the top of the ruler. Then draw a vertical line through each dot. These lines mark the correct rib positions. Once you get the hang of it, it's easy.



Method of angling ruler to space off ribs. Procedure is explained in text.

CEMENTING MOTOR STICK SEAMS

Here's a tip from Ron Ganser, of Pittsburgh, Pennsylvania. Indoor duration models use a tube motor stick. The blank is wrapped around a form, taped and baked in the oven to achieve the tube shape. After the blank is removed from the form, the open seam must be closed. Cementing the seam, inch by inch, is sometimes difficult. Here's Ron's solution.

Ron uses plumber's teflon tape (from the hardware store). It comes in rolls 1/2-inch wide. Lay a strip of the tape lengthwise along the form. Then slide the rolled wood tube over the form and the tape. Run a bead of cement along the edge of the wood. Now wrap the wood tube (diagonally) with the teflon tape. Secure both ends of the tape with scotch tape and allow the cement to dry. Then carefully unwrap all the tape and slide the wood tube off the form. The cement will not stick to the teflon. Sounds good, Ron.

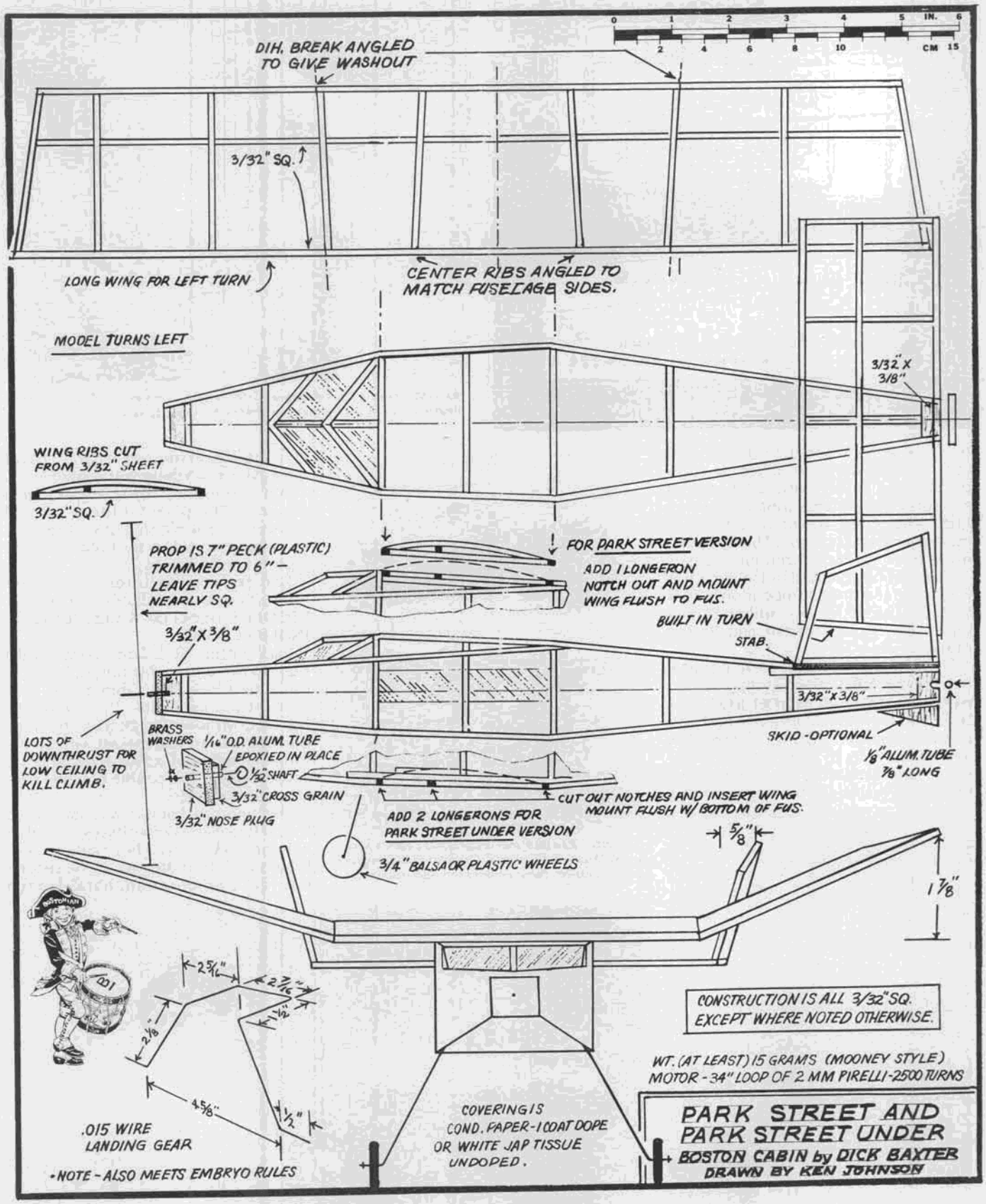
INDOOR BALSAWOOD STRIPPER

Are you stripping your own balsa? You should be.

Long-flying, winning models are doubtless constructed with custom stripped wood. This way you can control the thickness and weight of each piece. Many times a plan will call for 1/16 sq. balsa longerons, when 1/20 sq. will do as well, and the model will come out weighing less. The result is longer flights.

Maybe you have shied away from stripping your own wood because you thought it was too hard or too much trouble. It isn't. It is easy.

Have you tried making your own? Wood block strippers are O.K., but the blade is usually cemented in place. When it becomes necessary to replace

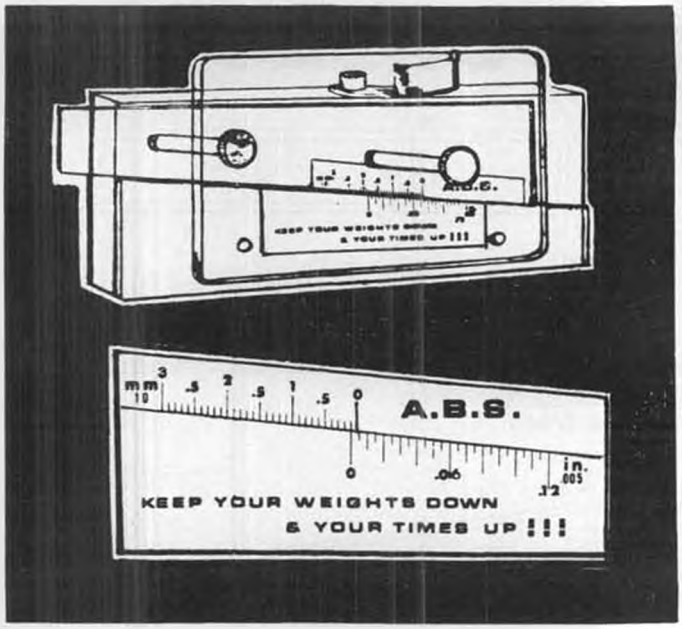


Park Street and Park Street Under Boston Cabin designs by Dick Baxter, drawn by Ken Johnson. One slight mistake, though. Long wing is shown as being on right in front view. It should be the left, as shown on wing plan at top.

this blade, it's a hassle. You must also have a different block for each wood size. The other problem is that you don't have a scale of sizes on the stripper.

Solution: The adjustable balsa stripper made and sold by JIM JONES, 36631 Ledgestone, Mt. Clemens, MI 48043.

This stripper has a micrometer readout that's adjustable from 0 to 1/8 strips. Each division is .005 in. and .01 mm. It automatically adjusts to stock thicknesses from 1/64 to 1/8. The stripper is



MIAMA club's Dick Kelso with 9" length rule Peanut. Maubousin lightplane has 20" wingspan. Photo by Dave Linstrum.

held in one hand and the wood stock is fed through with the other. It strips parallel and square, strip after strip. It measures 6-1/4 inches long by 3 inches high. The cutter is half of a standard double-edge razor blade. The stripper is made from hardwood and plexiglass.

This unit can be used by the novice as well as the seasoned competition indoor builder. Use it for microfilm, Pennyplane, Easy-B Manahattan and Boston cabin.

The price, $15.50, plus $1.50 postage. Ask for the A.B.S. wood stripper.

HOW-TO INDOOR MODEL BOOK

Have you seen Ron Williams' new book on indoor model airplanes? It took Ron over three years to write, draw illustrations, and assemble photos for this beauty. It you haven't seen it yet, you are in for a pleasant surprise. It has 271 pages filled with everything you should know about building and flying indoor model airplanes. The price for this 8-1/2 x 11 soft-cover book is only $12.95. The book features a forward by indoor world champ Erv Rodemsky.

Ron, my congratulations on a super effort. You deserve all our thanks.

RECOLLECTIONS OF A CLEVELAND INDOOR EVENT

Back in the '60's, Ron Ganser and I used to drive from Pittsburgh, Pennsylvania to Cleveland, Ohio twice each year for indoor meets. The biggie was held at downtown Public Hall. This huge building has an auditorium with an 80-foot ceiling, removable seats and no vertical posts. The sizable balcony runs around three sides.

The two-day contest was sponsored by the Cleveland Press (through aviation writer Chuck Tracy). The first day was all record trials for Category 2. The second day featured duration, hand-launch

Stinson 125 and Piper Vagabond Peanut kits from Micro-X Products. Original kits designed by columnist. Now redesigned and updated.

Jolyn Andrews, 12, of Tujunga, CA, flew three different ornithopters at recent Burbank session. This is Indoor Model Supply kit bird. Has flown for 57 seconds. Naccarato pic.

Mik Mikkelson fishing broken motor from his Manhatten cabin ship. Mik is flawless scale and old timer builder as well as noted illustrator on west coast. Warner pic.

glider and the big event; PRE-FAB. What is PRE-FAB?

This term referred to any of the four Carl Goldberg sheet prefabricated rubber kits; the Spirit of St. Louis, the Cessna 180, the Shoestring Racer, and the most popular, the Ranger 21.

At first the event was flown with stock kits. No modifications. Then some of the entrants began making changes in the kits. You were allowed to sand the sheet wood on the back side as long as the printing still showed on the front side. It was necessary to add ribs under the wing to hold the airfoil shape. The landing gear wire was dropped down to make room for a larger wood prop. The props were mostly single bladers with a metal counterbalance. The bulkhead holes in the fuselage were enlarged to accommodate bigger motors. The hardwood wheels were sanded and drilled out for lightness. The rubber motors in these beauties were usually 3/16 to 1/4 flat, with one loop 36 inches long. And they flew fairly slow.

One point to remember on rubber motors. You will get the most turns in the fewest number of strands. In other words, you will get more turns in 2 strands of 1/4 rubber than in 4 strands of 1/8 rubber.

The result was a half-weight Ranger 21 capable of very long flights. The winning flights were over 1 minute. Pretty good time for an all sheet model.

We sure looked forward to that event. Say! Are any of you clubs still flying Ranger 21 models indoors? I would like to hear about it.

Doc Martin writes that the VII NART (the big bash in West Baden, Indiana) is scheduled for June 23-25, 1982. The 26th Peanut Gran Prix.

Write comments and questions to Ken Johnson, 16052 Tulsa St., Granada Hills, CA 91344. •

Fuel Lines . . . *Continued from page 32*

.61 sport engine, we used it because it is so widely used by modelers. Thus the RPM figures will be more meaningful to readers. Other pertinent data are: temperature 85 degrees, dew point 63 degrees, barometric pressure 29.95 inches, and elevation approximately 400 feet.

After engine break-in, with the Perry carburetor installed, and using crankcase pressure, and no muffler, full throttle RPM's were 12,400. Reliable idle RPM's were 4200. Throttle response was not very linear. (This is typical of R/C carburetors.) After prolonged idle, when the throttle was rapidly advanced to full open, there was a monetary sag before full steady power was reached. No amount of adjusting would overcome this.

Next, the muffler was installed and muffler pressure was used. Full throttle RPM's were 11,900, reliable idle 4100, and the hesitant throttle response, after prolonged idle, diminished somewhat. The non-linearity remained unchanged.

When the M&H carburetor was installed, although throttle response was not a particular problem, only two test runs were made on crankcase pressure before switching to muffler pressure. There was no significant difference in performance at full throttle or idle on crankcase pressure and without muffler. It was obvious that the higher crankcase pressure was contributing to some sagging when the throttle was rapidly opened after prolonged idle. In fact, this could be seen quite plainly. With crankcase pressure, at full throttle, the Sullivan plastic tank would bulge noticeably. At idle it would return to normal shape because of the reduced pressure. When full throttle was applied, it took a moment to reach full tank pressure to prokvide an adequate amount of fuel through the high speed needle setting. That moment naturally coincided with the hesitation or slight sag. It also could be confirmed by carefully watching the fuel flow through the fuel line. For many years we've known that the lower muffler pressure, and consequent smaller pressure differential between idle and full throttle, provided a smoother throttle response. It was all quite logical, however, this was the first time we've seen such a dramatic visual example. If we hadn't used metal tanks so much in the past, maybe we would have seen such a striking example sooner.

Well, with muffler pressure, the M&H carburetor provided 11,800 RPM's at full throttle. It would idle at 3500 RPM's, but

ELECTRIC POWER

By MITCH POLING, in July '81 MODEL BUILDER magazine.

How would you like to have an 05 size motor that delivers super performance and flies for 8 to 10 minutes? I would, and when I was admiring the digital charger at the Leisure Electronics booth at the IMS show, Roland Boucher showed me a motor that he said could do just that. When Roland says something works well, I listen, because Roland and his brother Bob are the pioneers of electric flight in the U.S., and they really know electric flight from start to finish. The motor is the black label Leisure Electronics Aircraft motor, available in pattern or racing wind, with ball bearings on both ends, balanced armature, and trued commutators (retail price $45.).

Roland suggested trying the motor on an 05 plane using six sub-C NiCds and a 6x4 prop. I did. And it was a revelation! In my Astro Stunt plane (my own design) it flew like a pylon plane, and could do spins, loops, and rolls on two channels with ease. In fact, the Astro Stunt flies better with this motor than any other, and it flies well with most of them. I could hardly believe the level of performance, and on 6 cells, 2 less than usual! Roland was right about duration, too. I'm getting consistent 8-10 minute flights with stunting throughout the flight, not just from going over maximum altitude. I've had several fliers say that this was the first electric that they had been impressed with (they all flew gas), and one thought I was catching a lot of thermals to stay up that long! No thermals are necessary, just good engineering by Leisure Electronics!

I did some ground testing, and the specs are; 12,000 rpm on a 6x4 prop, at 14 amperes draw, all-up weight of the system with the batteries and prop equals 17.5 oz., two ounces more than the Astro 05. Even so, the Astro Stunt weighs only 30 oz. with a Cannon receiver, Bantam midget servos, and a 250 mah receiver pack (two channel). The Astro Stunt is a 42 inch span, 290 sq. in. plane with a 10% flat bottom airfoil. The Astro Stunt kitted by Astro Flight is very similar and would be ideal for this motor.

it seemed to be more comfortable when the idle was set at 3800 RPM's. Throttle response was clean and steady. The response was not linear, but it was noticeably closer to linear than the Perry carburetor. Further, it's a pleasure to note that idle adjustment was not critical.

By way of criticism, some modelers may not like the fact that there is no idle stop adjusting screw as found on other carburetors. The idle must be set by servo and linkage adjustment. We don't feel that's a problem, although some others might disagree.

At present, the carburetor is only available for .60 size engines. If you'd like to try one for yourself, Martin Enterprises has an introductory offer that's hard to refuse. To order your M&H carburetor, send $10.00 and your shipping address to Martin Enterprises, 170 Navajo, San Marcos, CA 92069. Be sure to include the engine make and model. Oh yes, there is a catch to their offer. They expect you to try it, and then complete and mail them a form with your comments. Sounds reasonable enough, especially since they unconditionally guarantee it!

In summary, for many years, Perry has produced good but not perfect carburetors. The M&H is not a perfect carburetor, but it definitely is a very good one. At least we had no reason to swear at it. •

Thornburg . . . *Continued from page 45*

silk-screened onto the balsa, but this can be reproduced with surprising accuracy using just a ruler and a selection of felt pens. (The eight dollars estimated cost includes over two dollars in pens!) The rudder is done in red; all other markings are blue.

Sticklers for accuracy will notice that I omitted from the wing markings the dive brakes, the wing cannons, and the folding instructions printed back on the trailing edge. (They said something like "Fold up, then back," with appropriate arrows . . . if memory serves.)

Use K & S sheet aluminum for the wing dihedral brace, or cut it from an old dural landing gear scrap. Aluminum beer can stock will make the wing roots. The hardwood bearing for the dihedral brace comes from the same 1/4-inch dowel that provides the catapult handle. Walker used a slightly soft wire for the wing collar, so it could be bent fore and aft along the sloping turtledeck to change the wing incidence. I substituted piano wire, of about paper-clip diameter. The small clips out on the wings, to which the wing-folding rubbers attach, are made from half a staple, superglued in place. How Walker ever built even one of these complex little rascals . . . much less mass produced them . . . before the invention of cyanoacrilates!

Study the side view of the folding mechanism with care, and stick close to the dimensions shown . . . they were arrived at painfully! On my first Interceptor replica, I got the parts layout right after only two tries, but I made the mistake of gluing the aluminum fairing in place around a #14 rubber band. Too long! It worked OK on the bench, but I had to add a second band to make the wings open under air loads. A good stout #12 is just right for the dimensions shown.

Save the bending of the collar wire until your entire plane is complete. Where you put those 90° bends will determine the angles of attack of your wing, all-important if you want your model to fly. I don't mean to make this bending operation sound tricky: I just laid the fuselage on its side, eyeballed the stab angle, then set the wing a few degrees positive in relation to the stab. This "few degrees" amounts to between 1/16 and 3/32 of incidence at the wing leading edge.

Noseweight on the original Interceptor consisted of a piece of 1/8-steel rod embedded in a slanting hole in the fuselage. Mine took more steel (cut with Dremel tool from the shaft of a 20-penny nail) than seemed appropriate, even to give a 40-45% CG. Maybe it was the light coat of Aero Gloss clear spray dope I gave all the parts, to seal the markings against moisture. Or maybe my nose is a bit short . . . the *MAN* ad does make it

look awfully long!

That's about it for building hints, sports fans. If you're old enough to want a replica Interceptor, you probably remember as much about how they went together as I do. Good luck with your new toy. Take it with you to the next gathering of modelers if you want to see grown men near tears. It's one model that really separates the men from the boys, cutting right through all those facelifts and dye jobs and boyish grins, letting you know right away who's forty and who ain't! •

Materials . . . . *Continued from page 31*

Equating this number to the bending moment relationship of a uniformly loaded beam, such as a wing structure, let's calculate the wing loading the given spar will tolerate at a very PREDICTABLE deflection. More on this later, but it gets juicy doesn't it?

All the balsa spars were identical stock cut from the same sheet. The spruce was also identical stock cut from a six-foot piece. At least 12 points of load and deflection were taken and plotted for each spar to generate the curves in Figure 6. A great amount of observation took place as well, together with some high speed photography.

Now look at Figure 6 and Figure 7. Figure 7 is a tabulation of some results of the tests and describes the spars tested and what the hybrid reinforcement consisted of. Wherever tow or laminate is indicated, it was applied only to the 1/2-inch side of the spar. The 1/4-inch "edge" or narrow dimension was never reinforced in any test in this series.

The reinforcement process is simple, but it should be explained here to kill off the old wives tales we've heard about the difficulty of working with this material. We produce the laminate using high temperature and pressure equipment, in sheets one foot wide and 24 feet long. We then cut it to four and eight-foot lengths and slit it to one and two-inch widths. It has what is called a "scrim" cloth facing which easily peels off. The cloth is applied to help protect the surface in shipment. The laminate utilizes an epoxy resin system that is totally compatible with Hobby Poxy 2 so that you can use it easily. Any of the viscous C/A (cyanoacrylates) work equally well, but we like the time element afforded by epoxy for laminating. Any C/A can be used really. A light sanding of the laminate to clean it is good practice, but nothing more. How simple can you get?

The tow is applied in much the same way. Since it is harder to handle, we put the epoxy on the fibers as they lie on the paper they are packed in. Now wet the wood with epoxy (very light coat) and place the wetted fiber tow on the wet wood surface. Peel off the paper and lay a sheet of Saran wrap on top of the wet fibers and weight with a flat board or bar until cured. No sweat! The whole secret to imparting stiffness to parts with carbon fiber is to keep the fibers straight and running the length of the part. This is called unidirectional fiber orientation. *(Good grief! Another meaning for UFO! wcn)* Much can be done by variations of orientation in terms of predictable flexure, and we do this with our carbon fiber pushrods. The laminate is also unidirectional as we produce it with all the fibers running the length of it. We have tested hundreds of laminated spars and other parts which have been reinforced as described and have yet to experience a single failure of the tow or laminate bond to the parent material. 'Nuff said on that.

Back to Figure 7. Note how the simple addition of either tow or one side of laminate doubled the load carrying capability of the balsa. Laminate on both sides of the balsa allowed four times the load to be applied. Spruce all by itself is not too shabby either, being comparable to balsa with both sides laminated. But the weights tell us that the balsa with laminate is 72% LIGHTER! The laminate allowed all spars to carry much more load at the same deflection, or controversy, deflect much less at the same load. This was expected, but to what degree we were not sure. Note too that the primary failure was in compression in every case. The spruce failed and took a permanent set. Then, with further loading, it failed in shear with total delamination of the wood fibers. But notice too from the photos that our theory of the neutral axis has been dramatically proven. This mode of failure was also true of the balsa spars, but happened very quickly and was not possible to plot.

Now look at pure composite material, the .085 x 1/2 AEROLITE carbon spar. With only 34% of the cross section area of the other spars and the same weight as spruce alone, it will carry 2.75 times as much as spruce, almost 9 times as much

as balsa alone, and almost 3 times as much as reinforced balsa. Look the curves over and come to a lot of your own conclusions. We are trying to present a lot of useful data from which you may draw your own conclusions and use your own judgement to apply this knowledge to the solution of your own problems. You will notice the tabular data listed loads at only three deflections. Our reason for this is that any wing that begins to bend even this much is failing internally somewhere, whether the spar is still in one piece or not. We'll delve into some more of that next time. In the meantime, if you have any questions, write care of *Model Builder* or to me at AEROLITE PRODUCTS, INC., 1325 Millersport Hwy., Buffalo, NY 14221. •

Xingu . . . . . *Continued from page 25*

that, using a wing section of greater efficiency than that of the Dassel, XINGU would probably make a potent FAI ship as well as slope soarer. XINGU uses the Eppler 387 wing section, which is more efficient, by a few percent, than the infamous E193. Use of foam/epoxy, plywood wing construction makes the near faithful reproduction of the E387 possible and attainable by the common man. The E387 was also chosen because its camber matches well with XINGU's intended flying condition, namely, heavily-loaded cruising at max L/D. Basic (unballasted) loading of XINGU turned out to be 15 ounces per sq. ft. with a wing weight of 14.5 ounces unfinished. Further, experience with the E387's sharp leading edge has proved to me the value of this feature in reducing the viciousness of low-Reynolds number stalling.

Aileron size was dictated by the low drag requirement coupled with one for *adequate* roll authority. By placing the ailerons far out on the wing, minimizing their span and relatively increasing their chord, lower drag due to (reduced) control deflection was hoped for. Sealing the bottom gap, coupled with the insignificant top gap, ensures a very low drag installation.

The fuselage was designed around a long moment arm. This increases boom skin friction drag but decreases drag due to tail download and control deflection. Also, a smaller horizontal tail can be used, thus amliorating the boom area increase. Though this is always a tradeoff, it's usually beneficial in sailplanes. The long arm also increases pitch inertia and damping, making the glider less susceptible to unwanted oscillations.

Thus, the efficiency that seems apparent in XINGU results from a variety of sources that might well apply to all sailplanes. A quick inspection reveals no substantial control gaps or holes, no external pushrods, clevises, or horns, no blunt or thick trailing edges, no sagging film covering, but the most important element is one that only you as builder will be able to control. XINGU is as much a builder's airplane as it is a flyer's. Simply, your care and attention are required to produce the maximum efficiency. Lack of it can just as easily negate all of the beneficial design features. Your emphasis should focus on a nicely rounded and contoured body, thin, sharp, and straight trailing edges on smooth, flowing, wave-free wing and tail surfaces, and tight fitups between wing and fuselage and tail and fuselage. As one might suspect, aesthetics has contributed to XINGU's design as much as objective engineering principles, but, in this case, attention to eye-appeal has not compromised performance.

DESIGN FEATURES

XINGU embodies several features not commonly seen on sailplanes. A new technique for aileron hinging allows for quick construction and minimum drag by virtually eliminating the gap. Standard small hinges (like Klett) are used, as are usual building materials. It's an easy technique, and details are given in the construction description. Also, both wing mounting and the aileron drive system, though basically simple, employ all new techniques.

XINGU's wing is attached to the body with nylon bolts. This is something I've been doing for a while, but seems to have escaped the soaring community. Using the bolts as an internal means of wing fastening reduces drag compared to the rubber band technique and allows for wing release (see discussion below). The drawing shows 2x4-40 bolts, as used in the prototype XINGU. These *are* adequate for normal flight loads. The tensile strength of these bolts is very much greater than their shear strength, so do not substitute larger sizes, since this would defeat the wing release feature incorporated in XINGU. In fact, many airplane models use much-over-strength nylon bolts, and, in a crash, incur more structural damage because these bolts do not break, than for any other reason.

By way of explanation, understand that the occasional hard landing is synonymous with slope soaring. XINGU employs a wing release feature intended to free the wing from the body in such an event. Realizing that the wing and body have very great inertias as separate pieces, it suddenly seems very dangerous

to have them constrained together during group impact. Impact with the ground is often pretty innocuous, but a wing can cause total destruction to a fuselage during the ensuing cart-wheel style landing. The best solution to this problem is to allow the wing to escape from the body, and a common sense design consideration would ensure that breakaway require less force than needed to break any other part of the sailplane. So we come to the 4-40 nylon bolts shown on the drawing. While these have more than enough tensile strength to stand flight loads, their shear strength is low enough to avoid landing damage. One might have to replace 2 bolts per landing at 10¢ apiece, but it's cheaper than the labor involved in a repair. The fuselage is beveled to anticipate the wing swinging clear during a release, so don't cheat on those angles. Use tape or an internal attachment to hold the fairing on the wing or fuselage. Also, the wing mounts are designed to put the bolts in tension during flight and shear during adverse landing loads, so do not deviate from the drawing. All things considered, it's worth the little effort involved, and it works.

Another unusual technique is the fitting of a plastic fairing around the aileron external pushrod. This cuts a few points of drag, and every bit counts for an otherwise clean sailplane. The fairing is vacuum-formed from .015 butyrate over a plywood triangular fin pattern and trimmed to shape with scissors and sandpaper. Small hardware and home built parts have been used to reduce drag. The 1/16 brass tube aileron pushrod uses a pin at the aileron horn to keep the joint small (no big clevis) and allow the fairing to be fitted. Epoxy circuit board bellcranks and horns are used so that slop in the control circuit can be controlled and minimized. These cranks just do not flex, and the holes drilled in them for their shafts can be held to close tolerances. This all adds up to no slop, no flutter, and precise control.

The lost foam process is used to make the body. This has been explained in other articles (see Spine-Tailed Swift, July '81 MB), but basically involves shaping a blue (polystyrene) foam plug, coating with fiberglass and epoxy resin, finish sanding, and finally dissolving the foam with a solvent. The process simplifies the production of a rounded, curvy fuselage like XINGU's.

WING CONSTRUCTION

The wing is a foam-cored, 1/64 birch ply covered structure. Construction principles are similar to other models in the pylon racer or pattern ship vein, but a few details should be mentioned. In the prototype, the wingskins were epoxied to the foam core. For reasonable finished weight, a roller was used to apply epoxy to the wing skins prior to the layup. Obtain a stiff-napped 3-inch paint roller and a length of drafting mylar or heavy paper. Tape the paper or mylar sheet to your table and pour out a small quantity of resin. Now, use the roller to spread the resin around the sheet. Strive for uniform coating of the roller with resin, neither too wet nor dry. When this has been achieved, move to the appropriate skin and begin rolling on resin. Aim to cover the skin with stipples or small blobs of resin. Do not wet the skin such that the grain becomes filled. When satisfied, place the skin in position on the core and press down. Lift to verify resin transfer, but be careful, because even an adequate amount of transfer is hard to see. Dyeing the resin black might be a useful trick. Remove skin and roll on a heavy coat along the very leading and trailing edges for extra strength; replace the core and position the outer core negative block as usual with this technique.

Before the opposing skin goes fully into position, brush extra resin on the core in the trailing edge region. Press the skin down and position its negative block. Evenly weight the core/skin/negative sandwiches on a flat surface and leave to cure.

Spruce is used for the leading edge. The large X-ACTO #226 blade is nice to carve the spruce tangent with the birch ply at the skin leading edge. This greatly reduces sanding, but be sure to use a block when you do get to the sanding stage.

Be certain to install the aileron pushrod sleeve tubes before skinning the cores. Use only the KAVAN flexible pushrod, the white plastic inner (.072

dia.) and the gold sheath. These have minimal clearance and thus minimal slop. A Dremel 1/8 router bit and the router attachment are hand-guided along the extended pushrod path to slot each core. Alternatively, 1/8-inch thick spruce with sandpaper on one edge can be used to make the slots. Epoxy from wing skin bonding will hold the sheaths in place.

Ailerons are marked and cut free from the wing after sheeting the cores and finish sanding the completed tips and leading edges. Mark top and bottom identically, cut through each skin *only* at first, using a new Uber Skiver #11 blade, and then make a final cut through the foam to free the aileron. The lower aileron skin and foam, 1/8-inch back from its leading edge, are cut free and replaced with a slotted 1/8-inch thick spruce leading edge. Be sure to leave the upper skin intact. Before epoxying the leading edge in place, slot with a flat file to receive hinges (use small Kletts or similar). The vertical face is beveled slightly to allow downward aileron deflection, but remember that much differential is intended for these surfaces, so down movement is small. Differential does double-duty here, keeping the lower gap small, and reducing adverse yaw tendencies. Do not permanently attach the ailerons until painting is complete. Allow hinge pins to project into aileron gap to allow later removal.

An optional 1/8 ply dihedral brace or tongue is used when joining the wing halves. If you plan to hi-start or winch XINGU, install this brace. The slot for this can be made after skinning the cores by using a 1/8-inch aircraft drill, some flat files and a long, 1/8-inch thick spruce sanding board. If you get the hole too big, the gaps can be filled with epoxy at the time of joining. This is all assembled at once, so use 1/2-hour epoxy. The center area is fiberglassed externally, as shown on the drawing, after joining the halves and removal of any excess surface glue. Weight of the unfinished wing at this stage was about 14.5 ounces.

The aileron bellcrank access hole is cut after skinning the cores and joining, glassing, and finish sanding. All related hardware is then installed. A ply skin disc can be glued back in place and recontoured to hide the hole, or a circle of drafting film, frosted side up, can be contact cemented in place to cover the hole. Fairings for aileron pushrods are vacuum formed thin butyrate (.015) and contact cemented or epoxied in place.

The aileron bellcranks and control horns are cut from epoxy circuit board, available from electronics houses. Five-minute epoxy will attach the horns to the aileron skin. The external aileron pushrod is 1/16 brass tubing, flattened, soldered and drilled on each end as shown on the drawing. Slots are cut in both the bellcrank and horn to receive the flattened ends. A brass 00-90 bolt is used to secure the rod at the bellcrank, while an epoxied-in-place music-wire pin is used at the control horn. Installation of the internal aileron pushrod is discussed below.

FUSELAGE & TAIL

Lost foam fuselage construction has been described in various construction articles, but a few pointers might help with this particular body shape. Use a blue polystyrene foam, and try to find HD 300, a dense Dow product that is quite rigid and workable. Despite its stiffness, I made my foam body blank from two halves, epoxied together, with the tip end of a fiberglass fishing rod blank trapped in between. This tip piece was about 20 inches long, and at the largest end, 1/4-inch diameter, and

served to stiffen the tail boom during shaping. It was removed when the foam was dissolved. A file and coarse sandpaper glued to the fishing rod blank can be used to rough out accommodation grooves in each foam blank half prior to gluing. Afterwards, a wire hook can be epoxied into the tail end of the rod blank, allowing the whole body to be hung for convenience during the glassing operation. Once this has all been accomplished, shape the blank to the sections given on the drawing.

Epoxy resin must be used with the blue foam, but try to find a type that does not soponify or cure with a soapy film on the surface. Such a film greatly hinders handworking by clogging sandpaper. A resin of this type is called out at the end of this article. During the glassing process, it is a good idea to follow the dry layup philosophy, which usually eliminates cloth floating due to excess resin and the accompanying elbow-deep mess, not to mention a lot of extra sanding. To do this, use toilet paper to absorb excess resin from glass cloth after both have been applied to the foam plug. Use a lot of toilet paper, since it's cheap and the results are significant. The prototype XINGU used 3 layers of 4 oz. plain weave cloth overall, with a 4th layer forward of the body fairing trailing edge. Use one piece of cloth for each layer. Alternate seams from top centerline to bottom centerline, and slit if necessary to conform to the severe nose contours. Block sand any rough spots smooth, especially along the seams, between layers. After the final layer of glass, continue adding resin and lightly sanding between coats to fill the cloth weave. Stay with the toilet paper routine since, even though some resin is wasted, sanding time is reduced. When the weave becomes filled, finish block sand and re-resin if necessary. Work down to at least 220 grit.

At this point, use acetone or lacquer thinner to dissolve the foam. This takes some time, but does work. Bare weight was just under 7 ounces. Then, the wing-body fairing can be cut and all the other fuselage installations begun.

Build up the vertical fin as shown on the drawing. Glass and finish sand before installing. All of the interal workings can and should be installed through the rear spar of the vertical after finish sanding. Use 3/32 O.D. brass tubing for the stab rod bearings. The bellcrank pin ends flush with the fin surface and does not extend into the stab. Note that the bellcrank, made from 1/8-inch epoxy circuit board, has a 1/16 slot for the aft stab rod, not a hole. Also, install the pushrod sheath at this stage. Use 5-minute epoxy as shown on the drawing, and leave enough sheath to project the required length forward into the body. Drill a hole for the pushrod sheath and insert as the fin goes into position. Use 5-minute epoxy to butt glue in place on the body. After scuffing up the exposed epoxy resin, a polyester resin-micro-balloon putty is used to make the vertical fillet around a 1/32 ply dorsal fin.

Wet a finger with saliva or water and use as a contouring tool.

The rudder was not operational on XINGU. Construct as a balsa/ply sandwich as shown. Cut a clearance piece from the core prior to laminating to allow for later hollowing of rudder; since the bellcrank projects back into the rudder, this hollowing is necessary. Tack glue in position on the fin/fuselage assembly and carve and sand to shape before glassing, finish sanding, and permanently epoxying.

Balsa/ply sandwich was also used on the horizontal stabs, but lightening holes were cut in the ply cores. The 1/16 music-wire attachment rods are used to ensure ample "compliance" of the stabs during hard landings. A simple but elegant fillet is used on the stabs, and the technique can also be used to fit up the wing. Find a release agent that will release epoxy glue and resin from the epoxy resin used on all the previous structure. Test it to be sure. A particular type is called out at the end of this article. Then coat the fin sides where the stabs will butt up and allow to dry. Rough shape the stab root end to fit the fin. Prepare a 5-minute epoxy/talcum powder paste and, working quickly, apply to *one* stab root end, avoiding stuffing it into the rod holes. Then assemble the stabs onto the vertical, using the 1/16 rods. Ensure that the position is as it will be with controls neutral, and that the paste entirely fills the gap between fin and stab, removing excess. Allow to cure for at least one hour. Pop apart and carefully block sand

excess paste from top and bottom of stab fillet, clean up vertical, and there you have it! A perfect fit! Repeat for other stab. The stabilizers are fiberglassed with the same epoxy used on the fuselage and 2-ounce cloth.

INCIDENTALS

Wing mounts are pretty self-explanatory. Use 5-minute epoxy to attach, but thoroughly scuff up the body where the glue joints will occur.

Wing body fit-up is more involved. If you're lucky, the edges produced by cutting free the wing/body fairing will locate the wing without lateral tilt. If not, adjust by sanding until this is achieved. Once the wing mounts are installed, the gap between the upper fuselage edge and the lower wing surface can be filled using the same technique as used on the stab roots. Screw the wing into position while the epoxy paste fillet cures, then remove and block sand and fillet flush with fuselage contour. With the wing back in place, the fairing piece can be custom fitted to the wing upper surface and body using the same technique.

CONTROL INSTALLATION

The fuselage-mounted aileron servo can only be fitted after the wing pushrod is installed. White KAVAN inner pushrod (about .072 dia.) is used inside the already installed sheatning. DU-BRO KWIK-LINKS are used to couple the rod to each aileron bellcrank because of their small size. Threaded couplers, as called out on the drawing, are used on the outboard ends of the pushrods to attach the KWIK-LINKS. At the wing centerline, a DU-BRO ball socket aileron (two-ended) coupler joins the two pushrod halves (one from each wing). Adjustment of the aileron trim is difficult because of the close quarters, but because the pushrods don't vary much with temperature, there should be little need of this.

The actual installation of the pushrods is the unusual part. Assemble two oversized lengths of pushrod with KWIK-LINKS and threaded couplers on the intended outboard ends. Position the links midway on the coupler threads to allow for later adjustment, if necessary. Slide each rod into its sheath from the aileron bellcrank access hole, pushing in until the KWIK-LINKS can be attached to the bellcranks. Drill each end of a DU-BRO aileron socket to fit the white pushrod. The scheme here is to use the socket to join both pushrods to form a single continuous length. Mark and cut the overlength pushrod so that, with the ailerons and bellcranks at neutral, each inboard pushrod end projects completely into its respective aileron socket hole, but no further. Roughen the pushrod ends with #220 sandpaper and 5-minute epoxy each into the aileron socket. This will necessitate uncoupling and quickly recoupling the outboard links from bellcranks for clearance and alignment. At this point, providing all moves freely, the aileron servo can be mounted in the body, noting that the required neutral position of the servo can be accurately achieved by shimming. Strive to reduce slop in the total installation and you will be rewarded with smooth, precise control response.

The elevator pushrod sheath is epoxied in several places along its length as indicated on the drawing. It's best to connect the pushrod to the servo first, since this will give the proper direction and shape to the sheath prior to being "frozen." Don't omit this fastening, or the flying stab will gallop. Flex cables are not really a good way of actuating something like this, being unsupported all along their length, but the gluing shown will provide adequate stiffness.

Both battery pack and receiver were foam wrapped and stuffed into the prototype XINGU's nose, battery first. There's plenty of room for any modern gear.

FINISHING

An epoxy-glass fuselage like XINGU's can be very easily finished. Pinholes should be filled with a resin/talcum power mix using the same resin used to build the body. After dressing the surface with 360 or 400 grit sandpaper, you're ready to paint. An epoxy primer and paint are best, but a lacquer combination could be used. I used acrylic lacquer on the prototype, but my landings are done in grass, so the hard surface characteristic of an epoxy finish was not really needed. Costs for either approach work out about the same.

The stabilizer, being fiberglassed, should be finished with the same method used on the fuselage.

Birch ply covered wings can be filmed, resined, or glassed. Film coverings can be used, but they are not satisfying to me. Full fiberglassing is not recommened. Rather, one or two coats of thin epoxy resin, as used for the fuselage, should be used to fill the wood grain and seal the surface. Sand between coats and keep the coats *thin*. A final sanding with 400 grit paper preps the wing for primer. Again, either epoxy or lacquer might be used, depending on your particular flying style and site.

ASSEMBLY

When attaching the wing, eyeball the aileron socket into place while lowering the wing, and then install and tighten the 4-40 bolts. The fairing is fixed in position with tape or could use some internal rubber band of your own concoction.

FLYING

Balance as shown. Perform a few test glides just for security. When flying, adhere to the high L/D philosophy . . . Keep the nose down, the speed up, search over large areas for lift, and don't circle too tightly. I am still of the opinion that XINGU would do well in FAI and would love to hear from any who try. For that matter, your enquiries are welcome for whatever reason, though Model Builder Magazine or at the address shown below.

SUPPLIES

Molded epoxy fuselages and a special

molded epoxy wing with integral, gapless ailerons are available to those wishing to build and fly XINGU with a bit less effort.

The following hard-to-find (especially in small quantities) items are also available:

- Low viscosity, sandable, structural epoxy resin
- Light glass and Kevlar cloth (1.4, 1.8, 2.0, 2.1, 4 oz/yd²)
- 1-inch wide uni-directional carbon fiber tape (reinforcement)
- Kavan pushrod
- HD 300 polystyrene foam (fuselage plug)
- IB polystyrene foam (wing cores)
- Release agent for epoxy and polyester resins (non-fail!)
- 4-40 and 6-32 nylon bolts.

For details on any or all of the above, contact: Slope Associates, 2317 N. 63rd, Seattle, WA 98103. •

Peanut . . . . . *Continued from page 53*

ward bay of the fuselage with balsa or plywood sheet for extra strength.

The wing and tail gussets were added to the plan after the model was built and while not absolutely essential may help prevent covering wrinkles from appearing.

The model, as built and balanced as shown on the plan, flies quite nicely with a motor run of 30 to 40 seconds maximum. It has 1/8th inch of washout at each wing tip (my most favorite adjustment) and required about a sixteenth inch of up elevator relative to what is shown on the plan. The powered flight is rather flat and the glide is fairly steep, so some more up elevator may be in order.

Oh yes, while I've read some of the controversial comments in some of the model magazines about "dolls" in model cockpits, I think that a "pilot" enhances the looks of a model such as this. . . . Mine was carved out of styrofoam and painted with plastic model paints. •

Sport Scene . . *Continued from page 47*

few months ago. wcn) *I don't know how fuel proof or paintable they are yet. The Seven-Up one is green, weighs 23.4 grams, and has a wall thickness of a little less than a sixteenth of an inch. By doing a bit of stretching, I was able to come up with a "stand way off with your glasses off and squint scale" model of a Brewster Buffalo using one of the plastic cowls. It is all sheet construction, as in some of Hal DeBolt's and Nick Ziroli's planes. The new slow drying super glues help a lot in the planked construction technique, but are costly. I'll send you some black and whites of the Brewster and the Pitts when they are done.*

Thanks for letting me bend your ear a bit, and for the many enjoyable words in my favorite magazine. If you are ever up this way stop by and fly the Pitts for me at the Valencia Valley Headwinds field. As you are probably aware, Sepulveda Basin is not exactly the place to be. I have

heard of people losing quarter-scale planes in the corn.

Keep writing for Uncle Bill, John Riese"

John sent clippings of the advertisement for the Hobby Shack Pitts, but fortunately, I also happened to see the model kit at the MAC Show. The model is reputed to fly best with about a .15 rather than the advertised .10, but with that extra power, it is supposed to be an outstanding little model. We can all eagerly await John's report on flight performance!

At the MAC Show, there was, believe it or not, a SECOND .10 size Pitts! This one is imported by Polk's and is a pre-painted Foam ARF version. The price seemed high at $115, but it turns out to be in line with the other recent offerings in the foam area, especially when you consider that you get an extra wing. *(Hmm . . . top or bottom? wcn)* I don't have any information on flight performance on this one, but it seemed pretty light. Anyone who may have flown or seen one in action, let me know and I'll pass on the info here.

I remember the corn at the Sepulveda Dam Basin, it ate my best free-flight ever and a really hot Holland Hornet. Of course that was in 1958, so I suppose I can stop waiting for someone to call me up 'cause they found it. . .

That photo of the Plastic "M" needs some talking about. A long time ago, I discovered that in modeling it is the small convenience items which make all the difference in how well and easily your models come out. A few sanding blocks with different grits of paper glued on, extra knife blades, little drawers to keep all those small parts and tools sorted and separate, etc., all make life worthwhile. I can (and do) live without a lathe, mill, band and table saw, big drill press, etc., but don't try to take away my sharpening stone, Monokote iron and Heat Gun, razor saw and mitre box, or vice. A new and really handy gadget that won't wear out is the "Stick 'em Up" from House of Balsa. This one piece (in electronics, I guess it would be "solid state" or perhaps "monolithic" construction) widget is the answer to getting ribs to stand up perfectly straight while you apply glue and pins or one of the Cyanoacrylate adhesives. There are three slots for 1/16, 3/32, or 1/8 inch wide ribs. Any other sizes can be leaned against an outside edge as you would with a normal triangle.

Next photo certainly isn't of a competition model, so it must fit in this column. Peck Polymers has just come out with its new Blimp, the "Pony". The Pony will lift 28 ounces, and will fly with two small electric motors. Bob Peck is threatening to try one out with either .049 or .09 gas engines to see how it will go (outdoors). The blimp disassembles quickly for storage. Length 11 ft., diameter 4 ft., volume 80 cu. ft. The blimp requires a 3-channel radio for basic controls of turn elevation, forward, off, and reverse. A 4 or 5-channel radio is suggested so that you can also control water ballast and helium release. It can be flown outdoors in calm weather.

Two more photos, the first is that lovely diesel engine. It is a 2.46 cc E.D. Racer fitted with an R/C throttle. Take a look at this beast, it has twin ball bearings and a rear rotary intake system. It will swing anything from an 11x5 (6500 rpm) to an 8x4 (12,000 rpm). Like most diesels, the peak rpm is not impressive, but the static pulling power with large props is amazing.

And finally, the latest kit from Top Flite. TF has been going through its old kits and revising them in light of the latest ideas in construction and the much improved radio equipment and engines (Plans showing the latest in escapement installations don't do the modern modeler much good). It was time to take a fresh look. Anyway, the Schoolmaster II sports a 292 square inch wing with 39-inch wingspan, while the weight has been cut down somewhat. Radio can be single-channel, but two or three would be more like it now. Looks to me like an ideal model to get started in R/C flying.

Until next month, then, consider this: How come the average citizen thinks they are "Remote control", not "Radio Control" models? And, does it matter?●

Auto Champs *Continued from page 35*

cal. You could tell these cars were light because they 'squirreled' around unless there was good traction. On the damp track in the final, the light cars were about the worst handling until the track really dried out. Because of the light weight, these cars used the lowest nitro fuel; 20%, and the tallest gears; 5.0:1.

The chassis plate was a very thin, high-strength aluminum alloy. The front axle is mounted on a rocker plate. The fuel tank is all plastic, saving about 2 oz., compared to our tanks. The muffler also looks like it's made out of extremely thin material. One of the real neat little things I liked was the quick-change servo mounts (Ralph Burch could have used one of these). The servos sit in a plastic mount with two plastic snaps. The S.G. cars also had quick-change wheels. These must have been special cars, because I think EFRA has a minimum weight limit near 5 lbs. I think not specifying a weight was an oversight of the race committee, and the Italians were able to take advantage of it. Again, I have to mention that I think these aluminum chassis plates are better than the typical U.S. glas epoxy board chassis.

I didn't get any detail pictures of Carbonell's Delta J Car, 'cause it looked like any typical Delta car of the last 6-9 months. I think Art had his ball differential out for the last couple of qualifying heats when the traction was so good and when he got his quickest time. For the final race, Carbonell put the diff back in because of all the rain the night before, and probable rain on the day of the final. A good decision.

Art's Delta car was probably the

lightest U.S. car there at 5 lb. 1 oz. Both Carbonell's car and Ishihara's J car (they qualified 3rd and 4th respectively) had graphite epoxy chassis. Now graphite eopxy is very stiff and has a high modulus and does not exhibit that 'flat', or floppy, spring characteristic about the center position, but then again, I wouldn't mind having two of the best drivers in the world driving my cars in the final.

By the way, all the details of all the cars that made the main event are summarized in a table. The order is the way the cars finished in the final.

Another car I didn't get pictures of was Ralph Burch's Associated RC-300 car. Now this one is very stock looking . . . especially since Ralph Sr. has only been building 1/8-gas cars for about 9 months. And Gene Husting described to Ralph Sr. how to put the car together by letter and over the phone prior to seeing it in February at the Winternats. Ralph had a ball diff in his car, tightened up a reasonable amount. The only deviation from stock that I could see was that the radio tray was extra long and went up to the steering servo bolt. Apparently the long tray helped take out some more of the lengthwise chassis flex. This is used on some lightweight 1/12-scale chassis to control bounce. Oh yes, the chassis was epoxy board.

The real force behind this Associated car was little Ralphie Burch's driving. Ralphie was super quick with his reactions, to take advantage of openings when they developed. His driving style sort of reminded me of Carbonell's. Ralphie didn't try to pass when he first came up on a car unless he had room. He was content to wait a corner or two for a hole to develop, and then he was through. I've never seen anyone quite so quick. Too bad the radio had to go out in the Final.

The only car that made it to the Final that I haven't described yet is the Serpent car of Pieter Bervoets. And I can't do a great job of that because he switched cars on me and ran a solid plate chassis (aluminum) car, rather than his suspension car. Bervoets and Ronny Ton both ran O.S. Max engines that really seemed to put out the power. Pieter said the engines were built well and lasted longer than other engines. Bervoets had a gear diff in his car, but there were centrifugal clutches to lock it up at high RPM's. (My diff is like this, but it still has a tendency not to put enough power down in slow corners.) Pieter just barely made the main and was never really a contender.

The Serpent car that I really looked at was the independent suspension prototype. The geometry of this car looked quite good and the ball joints and method of retaining them were the best of the suspension cars that I looked at. I didn't see any shocks, but the friction of the pivots may have been enough. If you look at the front end picture you'll see that there is probably a lot of bump steer . . . not good. The servo needs to be raised quite a bit to help this, and possibly the links repositioned. Most of the suspension cars used hex dog bones (like spherical hex drivers on both ends) to drive the rear wheels.

Phil Booth and Dave Preston (BP) designed and ran the Associated prototype suspension car. It looks similar to the Serpent car. The BP car is a fairly neat package and the prototype used machined aluminum front end parts with some planned changes to use spherical bearings and retain them with snap rings (a la Serpent). The main thing I didn't like about the prototype was the springs . . . either front or back. The front 'O' ring springs looked like they would have a wild rate change with deflection, and the rear springs can become completely unloaded if the car raises enough. The front end geometry looks pretty good, but the rear hub pivots are too far away from the wheels.

The BP-Associated prototype ran pretty well considering that Booth and Preston were still sorting the car out. Booth officially finished 26th, but in the last half-round of qualifying that was dropped because of rain, he had a respectable time that may have placed him as high as twelfth. And again, with only two cars out of 139, it's hard to really see the full potential of a car.

The only other suspension car in the competition was the AMPS car. The AMPS car was the first production suspension car in Europe that I heard about. It appears quite heavy and has an odd component layout to get around the in-line engine. The car must have showed enough potential to have spurred on the other car manufacturers. The rear end geometry looked good, but not the front. At the '81 World Champs the car didn't perform well, probably because of the excess weight, smooth track surface, and the stop-and-go layout.

Well, that's a quick look at the new, and/or, main event cars of the 3rd R/C Car World Championships. As you can see, the U.S. has fallen behind in the technology of R/C cars. The foreign suspension cars did extremely well considering this was their first World Championship. However, I feel that the solid plate chassis car is far from being obsolete. In fact, at big races with good racing surfaces, the solid plate chassis will be hard to beat. Unless, of course, all the big guns of racing go to the suspension cars. The biggest problem I see is that the suspension car may do better at the club and local race level, where tracks aren't so good.

The suspension cars are possibly an overkill, with much more suspension travel than would normally be necessary (unless it's for off-road). Suspension geometry of all the cars I saw could use some improvement. Another alternative that really impressed me was the prototype 4wd Kyosho car. It seemed much simpler than the suspension cars and may be a good compromise. In any case, we have now seen that there are numerous ways to go to attain great performance in R/C cars. I truly hope that the U.S. will make a comeback and again be a leader in R/C car technology. •

R/C Scale . . . . *Continued from page 21*

(and himself) that if you fly well and really work at it, the model doesn't *have* to be a WW-II fighter to win. When we get to the end of this article, check Cliff's placing!

A mixed bag of models put on a little impromptu WW-II scramble about noon and thrilled the large crowd. Phil Sibille with a Spitfire, Garland Hamilton (Corsair), Ted White with his MB-5, and Tom Czikk with a FW-190, did some really neat free style and formation flying. The presentation was marred, however, when Garland lost his Corsair. With all the confusion of flyers and photographers, he lost sight of it for just a moment as he was climbing out from an inverted pass.

The fifth and six rounds saw some of the upper portions moving about. The score board saw some counters going in during the last round. As the smoke cleared, the results were as follows:

1.	Tom Cook, F-4	189.25
2.	Bob Underwood, PE-2	187.25
3.	Kent Walters, SBD	185.5
4.	Bob Frey, Spitfire	184.5
5.	Cliff Tacie, Citabria	183.5
6.	Skip Mast, C-130	182.75
7.	Hal Parenti, Bearcat	182.25
8.	Larry Wolfe, Kfir	182.25
9.	Len McCoy, Dornier	180.25
10.	G. Hamilton, Corsair	180

In Precision Scale the results were:

1.	Bob Underwood, Hiperbipe	786.5
2.	B.F. Fields, Sopwith Camel	486
3.	Dan Santich, Baby Bullet	351.5

A side note on the Camel occurred Sunday when it made a beautiful "landing" in a Camel-eating tree. It was low enough that with your weighty writer hanging from the branch, Pat Potega was able to reach up and pluck it down. Aside from a cracked prop, there was no damage and it flew in later rounds. Charlie Brown take note for future kite adventures.

To recount the events of an entire weekend is impossible. For me personally, and for my wife Rae and Super Pit Crew daughter Cathy, it was probbly one of the most relaxed and rewarding weekends we've ever had competitively. I'm not saying this because of the places I was lucky enough to finish in, but rather because of the atmosphere and rapport which developed between everyone involved. While the competition was serious and intent, it was still possible to kid one another and to share in triumphs and problems alike. I'm certain each person there would recount how much movement there was between tents and shelters and how little gaggles of modelers shifted in the composition of members. If someone had a problem, parts, pieces, and help instantly emerged from the group. That, my friends, is what competition *really* is! Those of you who haven't yet tasted competition, and met with a contest that developed as the Scale Masters did in Louisville, have missed a truly rewarding experience. My sincere thanks to the Scale Masters Committee, the Southern Indiana R/C Modelers, and Scale R/C Modeler for a magnificent contest. I was fortunate to bring home some goodies, including two *huge* trophies (5 ft.), one sponsored by Sig Manufacturing and the other by All Phase Art. In addition, first place Tom Cook garnered a deluxe Futaba radio and I received a Max .60 four-cycle donated by World Engines and a Jet Hangar kit and Turbax fan unit donated by Larry Wolfe's Jet Hangar Hobbies.

And now some parting shots on the contest:

Who was that member of Dale Arvin's club who provided an airplane shaped paddle to allow the competitors to commemorate Dale's birthday?

Who *was* it that said they'd send Ralph White the article from another model magazine about *blue* P-51's?

Who *was* it that said I was trying to bomb Dan Parsons and Ted White when they were retrieving a model in the grass? (Anyway, I missed!)

There is *no* truth to the rumor that Harris Lee took a bath in the beer left in his bathtub after the Friday party.

There is *no* truth to the rumor that Pat Potega does not have film in his camera but just likes to listen to the motor drive.

There is *no* truth to the rumor that Bob Frey has earphones in his helmet and receives flying instructions from Col. Pratt, the 1/8 Air Force boss.

A brief word of concern in that a number of the Underwood pictures went to the great camera heaven in the sky. One camera malfunctioned because of battery problems and Cathy's dopey dad shot a whole roll of flash at something other than the right shutter speed, resulting in 1/3 exposed negatives. Therefore, many people and planes got short changed. Sorry about that!

Happy second Scale Masters Scale Squadron! On to three!

PRODUCT NOTES

Loctite Corp. provided a display and samples at the Scale Masters. Many of you are familiar with some of its products since it has been around for years. There are newer products you'll want to check out. The liquid lock washer material ranges from "it will hold tight but can be loosened" to "ain't gonna ever come off". There's a gap-filling cyanoacrylate, five-minute epoxy that comes in little one-serving packages (great for field reparis), silicone sealer, and a very interesting adhesive called "Depend", that is two-part but goes on in a little different way. It is claimed to bond acrylics, aluminum, brass, ceramics, concrete, on and on. Try your local hobby or hardware store.

Dale Willoughby has a new listing of Scale Model Research photos. The list is growing by leaps and bounds. Well over 200 aircraft are listed, with a description of the aircraft and the types of photos included. An example of a listing: "Mig 15 . . . Russian single seat all metal jet

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Send $1.00 to Scale Model Research, P.O. Box 675, Orange, CA 92666.

A THANK YOU

Cathy and I want to thank the many Nats contestants who took the time to write to us stating how much they enjoyed the competition. Whatever success we had this year was a product of the hard work of many persons. Whether the individual manned transmitter impounds, pull tested at the C/L area, clicked a stopwatch for the F/F, or whatever, each person was a crucial part of the program. To each of them, please let me extend your thanks. If we have a chance to do it again be assured we will strive to make the events better.

IN MEMORY . . . SID AXELROD

One of the most difficult burdens man has to bear in his life is the knowledge that as he ages, family and friends will pass from the mortal scene. We are truly saddened to mark the passing of Top Flite's Sid Axelrod. We counted him as a friend.

We would like his gentle wife, Carrie, to know that we will treasure the many fond memories shared with Sid in the all too brief decade we knew him. We recall the 1977 Pattern World Championships when the new trainer, the "Freshman", made its debut during the informal noon airshows. When he turned it over to us to demonstrate using a borrowed Kraft *Signature* series for a buddy box, it was fun to watch the tender loving care he lavished on the model between each flight.

To watch him stand for hours in a Toledo booth and demonstrate Monokote or Fabrikote, so patiently let the more than casual observer know that Sid was *not* just a manufacturer, but wished to serve the modeler in whatever way he could.

To be present when he and Carrie became AMA life members, and to evidence the joy he revealed was truly touching. Modeling in general and we, personally, have lost a good friend.

A donation in Sid's memory has been made to the AMA building fund by NASA. ●

Counter . . . . *Continued from page 9*

Technopower II Inc.'s latest edition to its line of radial engines is a 3.6 cu. in., 9 cyl. radial intended for the larger models. With a 9 inch overall diameter, weighing less than five pounds and developing 3 hp, it's capable of turning a 24 x 6 prop in excess of 7,000 rpm. With its realistic sound, it should add a new dimension to the big scale models. Like its smaller 5 and 7 cylinder kin, the "Nine" is machined from solid, is 4 cycle design with overhead valves and glow ignition. It has been in the development stage for sometime. The initial production run of 100 engines will be available direct only, starting about Christmas time, 1981. Orders are now being accepted. Its price will be $1,595, but if you are serious about your scale airplanes, it is well worth it. For more information, contact Wally Warner, c/o Technopower II Inc., 16650 S. 104th Ave., Orland Park, IL 60462, or call (312) 349-1998.

★ ★ ★

The Sailplane Factory, specialists in radio controlled soaring, sends word that its new illustrated catalog should be available by now. Kenn Rolin, President, has formed the 'Sailplane Factory' to offer personal and specialized service to the R/C soaring enthusiasts, whether his interest is sport or competition.

Specializing in imported as well as some domestic kits, from aerobatic slope ships to high performance, open class sailplanes, featuring epoxy glass fuselages and even some with fully sheeted and completed wings; all types, including scale, are stocked. The most complete selection of model sailplane hardware, spoilers, etc., gathered from around the world, are also being stocked. For example, from KDH, tow hooks, Sizzor type spoilers; from WIK, wing retainers (joiners, blades), to Giezendanner scale electric retracts, are just a few of the items on hand. Kenn suggests a phone call for expert assistance, availability of items, shipping, etc. Send a SASE to the Sailplane Factory, P.O. Box 341, Red Lion, PA 17356, or call (717) 244-4508.

★ ★ ★

FAI Model Supply of Torrance, California, has announced that they have acquired the rights of J&R Models, of Phoenix, Arizona. They will continue to produce the line and will be introducing some new projects that were in the works when the owner, Russ Oliver, passed away. For more information, contact FAI Model Supply, P.O. Box 3957, Torrance, CA 90510.

★ ★ ★

RCH Hobby Marketing, of Costa Mesa, California, has come on the scene as "The Pit Stop" for R/C off-road racing parts and accessories. Among the many items produced and stocked by RCH are aluminum wheels for front and rear use in Sand Scorcher or Rough Rider style, and available in red, blue, gold, or natural polished finish. Aluminum skid pans, rear dual shock mount brackets, ball bearings and bearing packers, different weights of shock oil, and torsion bar kits are some of the items available, developed "by racers for racers." Dealer and distributor inquiries are invited! RCH Hobby Marketing, 653 W. 19th St., Costa Mesa, CA 92627, or call (714) 631-1555.

★ ★ ★

Du-Bro Products continues to expand its line of 1/4 scale items and accessories with the addition of 4-40 Steel Rod Ends. Each card, or package, contains two complete sets, which includes four machined ends, four drilled steel retaining straps, two 12 inch 4-40 rods, and all

necessary nuts and bolts. Perfect for biplane aileron connectors, tail fin/stab supports, strut attachments and other applications.

Available separately, packed four per package, are the nickle plated steel straps from the "steel rod ends" package. One-sixteenth thick, 1/4 wide and 1-5/8 inches long, they can be bent, shortened, reworked, and soldered, if required for use as strut attachments, stab supports, etc. See your dealer for these and other goodies. Du-Bro Products Inc., 480 Bonner Rd., Wauconda, IL 60084.

★ ★ ★

Tatone Products is keeping abreast of the requirements of the 1/4 scalers with the addition of two types of mufflers for the Kioritz and Kawasaki engines. The QK-1 is for upright or inverted use, while the QK-1S can be utilized for upright, inverted, or side mount. Both are of two piece design and can easily accommodate coiled tubing for smoke systems. Neoprene tubing for extension is included; $22.50 for either muffler.

A one piece engine mount of cast aluminum, precision machined, and bright polished is now available for the Kioritz engine, too, for $19.95. Three hardened steel engine mounting screws are included. See your dealer, or write: Tatone Products Corp., 1209 Geneva Ave., San Francisco, CA 94112.

★ ★ ★

Finally, Sig has released its long awaited 1/4 scale Cub kit! The clipped wing model of Hazel Sigs own clipped wing bird is now available with the full span version to follow soon. With over two years in development, the kit reflects the usual Sig penchant for completeness. Starting with the usual top quality Sig balsa and plywood, precision die cut parts, molded plastic engine cowl, scale engine, bungee covers, chin air scoop; scale leaf-spring steerable tail wheel, strong formed main gear and adjustable tail brace wires, the kit also includes colorful authentic decals, four full size sheets of plans, and a photo-illustrated instruction book. A hardware package chock full of nylon hinges, R/C links and rods, nylon control horns and wing bolts, blind nuts and other small hardware completes this new offering. Sig Mfg. Co., Montezuma, IA 50171.

★ ★ ★

Top Flite has a new catalog featuring its complete product line, from R/C and U-Control kits, Super MonoKote, EconoKote, FabriKote, trim sheets, decals, finishing tools, a full line of props from 1/2A to 1/4 scale size, the new A6M2 Zero just released and a new Two Meter sailplane to be released in February 1982! Send $1 to: Top Flite Models, Inc., Attn. New Catalog, 2635 S. Wabash Ave., Chicago, IL 60616.

★ ★ ★

Enya Model Products has added the 40-4C engine to its line. This is a new, .40 sized, four cycle motor, ringed for quick and easy break-in and offers high torque and low noise level for those medium sized scale ships. Good fuel economy, too!

For the 1/10 and 1/12 scale gas car crowd, Enya's new "11CX" offers more guts and power for the off-road gas cars. With a die cast deep-finned heat sink head, G-type carb, the Enya AAC piston/cylinder combo, *and* two ball bearings on the crankshaft, this 0.4 bhp, 27,000 rpm bomb should really get you going. For more information on these two new ones from Enya, contact: Enya Model Products, P.O. Box 286, Fords, NJ 08863.

★ ★ ★

According to Fourmost Products, its new "recoil tubing" allows you to place your flight box/fuel supply up to four feet away from your aircraft, boat, or R/C car for refueling purposes. Priced at $3.95 and made from super tough fuel-proof urethane, preformed into a four inch coil, it will retract into its original space-saving form after use. See your dealer for this handy ground support item. Fourmost Products, 4040 24th Ave., Forest Grove, OR 97116.

★ ★ ★

Roush Manufacturing now offers the Kioritz Digital Tachometer. Simply point it at the spark plug of any two or four cycle ignition engine from about six inches away and read rpm from 100 to 19,000. It comes with a soft leather case and fits in your shirt pocket. Very reasonably priced at $59.95, and is available direct from Roush Mfg., P.O. Box 251, Sandyville, OH 44671.

★ ★ ★

RAMTEC offers a practical transmitter case for storing and transporting your transmitter to and from the flying field, pond, or track. Offered in two sizes, #1 for Futaba FP6N types and smaller, while #2 fits larger TX's, such as the Kraft KP-7. Available in red, brown, or black vinyl with a pale yellow plush pile interior lining. Antenna storage area is provided, as is convenient carrying straps. Specify transmitter type, model number, and color desired. Introductory offer is $19.95 plus 50¢ for shipping/handling. Personalized names in gold foil may be had for $2.50 extra! Also, special custom orders are welcomed.

A transmitter Muff is also offered, made from waterproof material, featuring ribbed cuffs for cool or cold weather flying. Helps keep your tranny warm, too! Costs $11.95, plus $1.50 shipping/handling. Dealer inquiries are invited. RAMTEC, P.O. Box 3203, Lynwood, WA 98036.

★ ★ ★

Bob Holman Plans, "Best In Scale," for over 20 years, now has the Gee Bee R-1 available as an SMI kit, which includes an epoxy glass fuselage by 'Palmer', molded belly pan, glass cowl, wheel pants, molded canopy, foam wing cores, and decals by the Williams Bros.

B.H.P. has the various MAP plans handbooks, covering U-control, free flight, rubber, and listings of MAP's scale 3-views for $2.50 each, postpaid. Plans by Brian Taylor, Dennis Bryant, C.A.P., and M.A.P., are all carried by Holman Plans. Send a SASE for current newsletter, or better yet, send $2 for the complete "Best In Scale" catalog, listing all the above plans and more! Bob Holman Plans, P.O. Box 741-MB, San Bernardino, CA 92402, or after 6 p.m. Pacific time, call (714) 885-3959. •

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

batteries, but the best type seems to be a battery designed for marine use as they don't mind deep discharge as much as automotive types.

For a work area, you're on your own, it should be as large as possible and easy to use. I generally work out of the back of our van and have a table, supported by collapsible saw horses, that sees a lot of use, primarily for 1/8 racing. One of the neatest solutions to the problem is to build a folding table that attaches to the front of your car, trunk, whatever. These look like a tray used in drive-in restaurants, only bigger. Hooks attach anyplace handy when the hood is open, a strut or two extends to the bumper and you have instant pit area, right next to that much-needed 12-volt battery.

Getting back to the race car, tires are very important and it seems impossible to have enough of them of a wide enough choice in selection of compounds. For the 12E, Associated's stock rear rubber is fine and the 3651-S (soft) front tires will work on a wide range of track conditions. Still, this isn't enough selection, and Associated is now doing something about it; offering a compound front tire (hard rubber ring on outside softer ring on the inside), as well as what is actually rear rubber cut for front wheels.

Still, this isn't the full solution, especially for somebody like myself, spending a lot of time working to get that perfect balance between front and rear traction, which is a much different proposition than simply getting maximum traction at either end of the car. So I use, almost exclusively, the rubber compounds from Delta, as they are the only source for rubber that has actually been graded, not a whole sheet at a time, but each ring individually, and they offer a wide range of compounds. For rear tires they have the number TR1240 compound, available in B, A and AA, with AA being the most traction, A a little less and B a step less traction. Same story with front tires; they are just cut a little smaller, but the real trick is that there are also some hard rings (numbers TR1222 and TR1216) that I like to use as outer rings in compound tires, backed up on the inside with AA, A or B rubber, even though they can also be used full-width for front tires, mainly on slick tracks.

I will admit that on occasion I have made the wrong selection on tires; having that many choices will do that to you once in awhile, but for every time I have been wrong there are many times I was also right. And experience with tire selection tends to reduce the number of mistakes made.

In actual racing, I will generally start the day with AA's in back and either 3651-S's or TR1222/TR1240B combinations in front. Sometimes this setup works throughout the day, more often the car will develop a little bounce in the corners as the traction gets better and a switch to TR1240A's will cure that, plus giving a little more steering. And if the traction goes way up, the B's go on the car, although I have to be getting more bounce in the car before switching to that hard a compound out back. More commonly, the A's work fine at the rear and I will go to softer front tires, still with a combination make up, to get the amount of steering needed. Even though I have sets with me at the races, I have yet

to need softer front tires than the B's, run full-width, no hard outer ring.

The thought of so many different combinations of front and rear tires sounds confusing, but it very rarely is. As I said, the Delta tires are graded so there is no mystery involved in choosing another set, you just have to decide which way to go, and after some practice you will know the effects of harder or softer tires at either end of the car. As an example, one you will have to trust me on; by the time the main event comes up I can put on new rubber, stuff that has yet to touch the track, and tell you exactly how the car will handle, the Delta rubber is graded that accurately and consistently.

To close this month's column and having just talked about tires it seems appropriate to further underline the hint a few lines back, and that is that getting a lot of bite at both ends of the car is fine, *only* if the amount of traction at the front is in proper balance with that in the rear. Too much rear traction has messed you up more times than you realize, nearly as often as having too much front tire and assuming you race on surfaces that are relatively clean. . .•

R/C Boats . . . *Continued from page 51*

another Driver's Championship this year, Jack Haugen had his "Thriftway, Too" performing superbly in the preliminaries. There was no doubt that this boat would be on the water when the final heat arrived. Top qualifiers, Roger Newton, Butch Melewski, and David Jensen showed in the prelims that those qualifying marks were valid. Veteran District 8 R/C unlimited racer, Les Ruggles, had his "Miss Thriftway" on track and headed for that final heat. Bob Brackett managed to keep the "Miss U.S." in contention, and rookie driver, Bud White's two heat wins with the "Miss Notre Dame" gathered sufficent points to make the final.

While those involved in pursuing the Gold Cup were sorting things out, the Queen's Race was also being contested. Curt Weston displayed excellent driving skills, as he managed to place two boats in the Queen's Race final. Curt's decision to go with his "Olympia Beer Temporary" in the final proved a good one, as he was able to best Kurt Gobel's "Old Ox" to win the Queen's Race. It bears mentioning that besides both of the top finishers in this race sharing the same first name, the two hulls were the same. Curt Weston's version is from the year 1976 when the full size boat ran a couple of races as the "Olympia Beer Temporary." The following year the boat ran under a couple of other names, one of them being "Old Ox." Some of the unlimited hydroplanes have been renamed and repainted an unbelievable number of times.

With the completion of the Queen's Race, the Miniature Gold Cup consolation race was ready for settlement. An exciting duel between Larry Knudson's "Olympia Beer" and Bill Smiley's "Miss

Supertest" spiced this race. The "Olympia Beer" managed to brew up a lead to win this consolation heat with the "Miss Supertest" finishing second. Jolene Fridel, who along with Marti Newton comprised the women drivers for this event, piloted her "Squire Shop" to a steady third place finish.

The watery stage was now set for the race of the day. It was time for the "biggie." After watching all the preliminary action, this writer predicted a win for Jack Haugen and the "Thriftway, Too." However, any of the seven finalists were potential race winners and predictions don't always become facts. As is often the case in this type of racing, the start of the race becomes extremely important. For this particular race, it made the difference between winning and placing somewhere down on the final standing's list. All seven boats were on the water as the clock ticked off the final seconds to the start. The jockeying and jostling was fierce as the boats approached the starting line. The "Thriftway, Too" led the pack to the line, followed by the "Natural Light" and the "Miss Bardahl." Unfortunately, in their pursuit of that elusive racer's edge, these three fine boats jumped the start. That left the "Miss Budweiser," "Notre Dame," "Miss Thriftway," and the "Miss U.S." as the legal starters. The race quickly developed into two struggling packs as the three boats that jumped tried desperately to catch the legal starters. A severe case of the flips struck both the "Thriftway" boats as they kited and dumped. An uncooperative engine caused the demise of the "Notre Dame", leaving the "Miss Budweiser" and "Miss U.S." running uncontested in the first and second positions. Both boats were able to maintain these positions to the finish line. A heated battle was being waged behind the two lead boats as the "Natural Light" and "Miss Bardahl" battled for third and fourth place finishes. At the finish, light beer prevailed over oil additive for the third place trophy. A well timed start coupled with good, skillful driving proved to be the winning combination for Roger Newton's "Miss Budweiser." Bob Brackett's second place finish with the "Miss U.S." marked a personal best in R/C unlimited competition.

An overall examination of the 1981 District 8 Miniature Gold Cup provides some interesting information. This was a day when beer labeled boats prevailed in all three final heats. A model of an unlimited that raced in 1958 set the pace in qualifying. Of the seven boats that made it into the final of the Miniature Gold Cup, the two "Thriftway" boats were models of unlimiteds that ran in the mid-50s. The "Miss Bardahl" and "Notre Dame" are models of boats that ran in the late 60s. I think it is important to note that the older unlimited designs are very competitive in R/C unlimited racing. Possibly one of the biggest complaints about this particular racing class is its limiting of the boats that are allowed to race. Each district only allows one boat of a particular name and year to race in its events. Someone interested in getting into this phase of model boating might not be able to race the boat of their choice. Most newcomers want an "Atlas Van Lines," or a "Miss Budweiser", and find that those boats are already spoken for. However, it is important to note that a particular boat is not necessarily going to be the guarantee of victory.

THIS CLASS LOOKS INTERESTING, HOW CAN I GET MORE INFORMATION?

There's no denying that the R/C unlimited class is very appealing to many people. One thing that needs to be pointed out immediately is that this is the most expensive form of model powerboat racing in this country. It is also one of the most tightly regulated. Although I don't personally recommend this for beginners, a majority of those people racing the class in District 8 never built any other R/C boat prior to getting into the R/C unlimited class. Although there are a few fiberglass boats available (Steve Muck's R/C Model Boats has a fiberglass R/C unlimited), most of the boats are built from plans.

Roger Newton, 14518 167th Pl. S.E., Renton, WA 98056, probably has the world's largest selection of plans for model unlimiteds. A self-addressed, stamped envelope to Roger will bring you his latest catalog. For anyone interested in finding out more about this class, the R.C Unlimiteds Program would

be worth the $2.50 for cost and mailing. This fifty page program is full of photos and articles about the R/C unlimiteds.•

Electronics . . . *Continued from page 28*

and electronic. Is there a difference, and if so, what is it? Well, turning to our electronics dictionary, we find the following definitions:

Electric . . . containing, producing, arising from, actuated by, or carrying electricity or designed to carry electricity and capable of doing so. Examples: electric eel, energy, motor, vehicle, wave.

Electronic . . . the definition of electronic is somewhat longer and more descriptive; pertaining to that branch of science which deals with the motion, emission, and behavior of currents of free electrons, especially in vacuum, gas, or photo tubes, and special conductors and semiconductors. This is contrasted to electric, which pertains to the flow of large currents in metal conductors; of or pertaining to devices, circuits, or systems using the principles of electron flow through a conductor, for example, *electronic* control, equipment, instrument, circuit.

Frankly, finding the reference to the electric eel in this dictionary was something of a surprise, but to back up the statement that we intend to cover all related subjects, we'll have to talk about it briefly . . . after all, it is a digital device, since it emits it's electric power in pulses of 1/500 of a second. It gets its power from layers of electricity producing tissues similar to the plates of a battery, and on the average, a full grown eel's electric potential is about 200 to 300 volts. However, they have been known to generate as much as 800 volts, which is enough to stun a grown person, and would kill you if sustained long enough.

So much for this month's fish story; just please don't take it as an indication of things to come. Dissecting the above definitions, we can see that there isn't a positive sharp dividing line between what is electric and what is electronic, unless we accept as gospel the statement in the second definition which says that electric pertains to the *flow* of large currents. If so, we can say roughly that *electric* is a means for getting it there, while *electronic* pertains to what it does upon arrival.

In practice, most of us have developed the habit of thinking of electric as those things which are common home and shop items used to convert electrical energy into some other form of useful energy, i.e., to light, mechanical or heat energy, as in a bulb, motor, or heater. We tend to think as electronic, items such as TV, radios, garage door openers, etc. Actually, many of the things we use daily, such as refrigerators, mixers, your variable speed Dremel moto-tool, and

this typewriter, are a combination; an electric motor being controlled by an electronic device.

What is the connection to R/C modeling? Well, we have recently seen the start and on-going growth and development of electric power for model propulsion. Whatever the dividing line between the terms, we intend to deal with this subject in future issues. Not with its application, which is more than adequately covered by my friend Mitch Poling, but with its control and it's marriage to the electronic control system. I started to say *purely* electronic, but that is not true, if we are to believe our dictionary. The R/C system is also a hybrid; we use electronics to ultimately control an electric device, the servo motor.

Anyway, let us know of your interests, successes, and/or failures in the fascinating sport of radio control. As with all other subjects which we hope to cover, the intent is to learn from each other.

CATALOGS

Homebrewers, technicians, tinkerers and such in matters electronic always face a common problem; where do we obtain the bits and pieces that go into the servicing or building of our systems and accessories. Within our hobby industry, we are fortunate to have two companies that can and will supply us with R/C electronic components in reasonable quantities of one. Some of these items are so inexpensive, i.e., resistors cost from 2 to 6 cents, that most electronic suppliers only sell them in bags of 100, which most of us don't need. These two companies are: Ace R/C, PO Box 511, Higginsville, MO 64037 (816) 584-7121, and Royal Electronics Corp., 3535 S. Irving St., Englewood, CO 80110 (303) 761-5962. They both carry everything from resistors and transistors to stick assemblies and printed circuit boards, all R/C oriented. And they both have catalogs; Ace's is $2.00 and you'll have to inquire from Royal about its catalog.

Outside the R/C industry, the following are some mail order suppliers who I have used recently with good success, both in price, and quality of product, and in the time in which the order was shipped: All Electronics Corp., 905 S. Vermont Ave., PO Box 20406, Los Angeles, CA (213) 380-8000; Jameco Electronics, 1355 Shorway Rd., Belmont, CA 94002 (415) 592-8097; Solid State Sales, PO Box 74, Somerville, MA 02134 (617) 547-7053 and (800) 343-5230. They all have free catalogs, yours for the asking.

NEW FROM EUROPE

Earlier in the year, I had the pleasure of spending a few weeks in Europe. In addition to seeing the cathedrals and wineries, I also took the time to visit a number of the leading model manufacturers, including Webra, which is spread out over two cities in Germany and one in Austria, and whose high quality engines, now imported by Reno's Circus Hobbies, we are all familiar with. What most of us in this country don't know is that they also produce R/C systems, including one which was the most impressive model article I saw "over there". It is know as the Webra Expert T9 FMSI (Frequency Modulation with Symmetrical *Impulsetelegramm* (pulsetrain). It is a marvelous system, with all of the programmers and mixers seen on the competition systems we are familiar with here in the US, plus some features I haven't seen anywhere else. Its interference rejection is the best I have ever seen demonstrated . . . but enough of that, since it is not a system presently available here in the US. What I do want to tell you about is, their use of a new servo amplifier IC, much, much smaller than anything previously seen.

The new amplifier is also European made, by a company named "Valvo", and designated as its SAK-150A. According to Mr. H. Essel, Webra's engineer in charge of the T9 project, they tested all available servo chips during the development stages of the system, including the American chip that has become a standard in the US industry, which was, quote, "not good enough" by their standards. His opinion is that the SAK-150A is far ahead of anything else presently available, though admittedly more expensive, which to me is perfectly understandable. I did not get a chance to test the servos using this amplifier in other than a cursory manner. All I can say is that they seemed to meet all the claims made for them, pertaining to precision, deadband, and power.

I won't bore you with all the technical specs of the SAK-150A, except that it has a current capability of 1/2 amp, and it is *small*. In fact, it is so wee that if you take your eye off it, you've lost it. Notice from our sketch, that it is far smaller than the chip now in common use. Looks to me like one more step in the right direction for those of you who like small airplanes and need small servos.

For you technical types, I have spec sheets for the SAK-150A, in German, which I will be glad to send upon receipt of your SASE.

LETTERS

Jordan Flakser, of Silverton, Oregon,

gets *twice* the excitement this month. Not only does he get to read a brand new comumn, but his letter is the first one used in a brand new column. . .

He asks for a circuit for an ESV (Expanded Scale Voltmeter) for his Ace Silver Seven transmitter, using an existing 200 *squiggle*-A meter. The squiggle means that I can't tell from his letter if he wrote mA for milli-amp or uA for micro-amp. Since the meter he has is supposed to be used in a foreign transmitter, I am going to assume that it is a 200 micro-amp unit, as a milli-amp meter in this range is not sensitive enough for any of the measurement circuits used in R/C transmitters.

The schematic shown is one that I have found to work well, and with this meter, should read from 8 to 11 volts, depending on the setting of the pot.

The glitch in this particular flight plan is the calibration, which requires the use of a variable voltage supply and an accurate, preferably a digital voltmeter, to establish the setting of the pot, and a relationship between the input voltage and the needle position. Look for some nearby ham or electronics hobbyist; the items mentioned and their use are not uncommon in their world.

FINAL APPROACH

To answer some recent flying field queries: to R.T., yes, I feel that a good post-flight of your aiplane and it's radio equipment is as important as a pre-flight. Listen to the individual servos for strange gear noises, run them all at the same time to compare speeds, and check everything for mechanical integrity, such as missing mounting and arm-holding screws that might have become loose and/or lost due to vibration. And look for fuel seepage into the !#%6&* servo tapes that you insist in using, as fuel will cause the adhesive to loosen and let go.

To B.B.B.B., yes, the post-flight of the pilot is equally important. To relieve the stresses and pressures of modern highly demanding R/C flying, I recommend equal portions of "Presidente" brandy, cola, and club soda, over two ice cubes, taken orally, preferably to the strains of Frank Sinatra singing "Come Fly With Me".

Remember guys . . . and gals . . . we are going to do this one together. I'll try to keep the electrons traveling through the proper conductor, and you can have the fun of doing the flying. •

Soaring . . . . . *Continued from page 38*

writing in the *Pacific Breeze*, suggests that you mix your epoxy on the plastic lid of a coffee can. "After the remaining epoxy has cured, flexing the lid will pop it right off. Next best, use a piece of glass or tile. But then don't try to flex off the epoxy. Use of a chisel blade is an easy out."

Howard Doering, writing in the same newsletter, addresses the problem of creating a smooth wing joint. "Here's a sneaky way to make an unusually smooth reinforced wing joint. Apply fifteen minute epoxy (for hot weather use thirty-minute epoxy) to the bottom of the joint. Press the glass tape in place. Add more epoxy as required to fill the cloth. Place Saran Wrap on the epoxy and work out the bubbles and/or wrinkles. Stretch the Saran Wrap and hold it in place with some tape.

"Now here comes the sneaky part. Partially inflate a large party balloon and press it against the joint until the epoxy goes off. Then remove the balloon. Wait a couple hours before removing the Saran Wrap. Repeat the process for the top of the joint. Very smooth joints result because of the even pressure exerted by the balloon on every square inch of the glassed area."

He goes on to consider trailing edge reinforcement. "Carefully cut up an aluminum can and flatten it by rerolling it around another can or wooden dowel. Sand with 240 or coarser sandpaper on the printed side. Scribe the required shape with a sharp knife or razor blade (about 1-1/2 inch square). Then bend the metal 'til it breaks off. Clean the sanded area with Acetone. Bend it twice over a metal straight edge (1/16 inch thick). Trial fit, then epoxy in place. The same aluminum sheet makes great rib templates. Scribe and break as above, then make pin pricks at strategic intervals at both sides to keep the template from

sliding around on the balsa being cut. Label the shape with a permanent marker."

Bob Nelson, writing in the *Portland Area Sailplane Society Newsletter* recommends some valuable radio control system home servicing. "If you've been using regular dry cells, throw them away and replace them by the best alkaline-type cells you can buy. Better still, replace them with rechargeable NiCd's. Your plane is really worth that kind of investment. Begin with a 24-hour slow charge, then exercise the radio once in a while for at least a two-hour period. Repeat this charge-recharge cycle for a few days, and don't forget to fully charge your batteries the night before you expect to fly. You can help your transmitter by cleaning the case with any good household cleaner or furniture polish. Extend the antenna and spray it with WD-40. Collapse and extend the antenna several times to work this into the sectional joints, then wipe off the residue with a clean rag. You may be surprised at the amount of grit you've collected.

"Why not use WD-40 to clean your servos once a year? To do this, open the case. This may involve removing screws. If so, put them where you can find them later. Very gently pull down the bottom of the case. The wires will stay with the upper portion. Now look at the electronics. There's a small printed circuit board filled with components. The motor and the potentiometer with the three wires connecting to it run into the gear box. The 'pot' is typically in line with the output shaft to the servo arm.

"We're now going to clean the pot, but before this, first scribe a line with a knife across the pot to the plastic rim. This will serve as a reference so we can line it up when we put it back together. Remove the pot by loosening the screws, holding it to the upper case. The part of the pot remaining with the case will be the wipers. Using a knife or screw driver, very carefully lift up the wipers 1/32 of an inch. These wipers are delicate, so be gentle. Next, take a Q-tip lightly soaked in alcohol and run it around in the pot, removing any debris that may be there. Now reassemble the pot aligning the scribe marks made earlier.

"The gear train won't need any inspection unless the servo has been making grinding noises or was in a crash. If noisy, replace any damaged gears and reassemble the servo in the reverse order from the disassembly. Any extra parts? I hope not. Connect the servo to the receiver and try it out. It should run better. Now, go back and do all that to each of the servos."

Ray Colville, writing in the newsletter of the New Zealand Soaring Society, faced the problem of correcting a bad warp in the wing of an aerobatic ship . . . developed after a repair. "The usual techniques didn't work. Heat and steam were tried as well as a heat gun, but without success. The final solution came through the use of a couple of bath-towels. Two large towels were wrapped around each panel, leaving a two to three-inch grip area at the tip. A potful of boiling water was then poured over the towels to wet them thoroughly, and a corrective twist was applied to correct the error. After two minutes, a friend helped to remove the towels while holding the twist in until the wing cooled. A few seconds later, presto! The warp was corrected. As it happened, there was an overcorrection, and so the process was repeated, but in the reverse direction. It seems that the twist applied in this way becomes locked in, and there is no need to compensate for its creeping back."

Stan Watson, of Hazel Crest, Illinois, writes "How To Build Better Sailplanes" for Soaring Flight. He points out the value of saving the parts that remain after planes have been crashed. The tiny pieces are valuable in the repair process, and the larger sections can decorate the shelf. "Hey, why not put these larger pieces together to make an even better plane than the original design? No kidding; it works." For a few years I enjoyed a Dandy/Amigo II . . . the Graupner Dandy fuse and tail, lifted by the Graupner Amigo's polyhedral wings. "A little more originality is required to extend the wings and/or reconfigure other components. You might even use a two-meter fuselage for 100-inch wings or stretch a standard class plane into open class, but longer wings may require greater dihedral to make up for

the shorter relative tail moment.

"With success thus far, you might try your own wing design." Stan suggests that you avoid sharp leading edges and very thin wings. "All you'll get is a headache, sharp stalls, tip stalls, knife edge performance and parts left over that you will never want to use again (but may be able to sell to someone who has not learned yet!)" Stan recommends using a nine percent thick symmetrical stab and fin/rudder and a strong enough fin post to withstand a flip on landing. Greater wing chord may help gain some height on launch, but this may reduce the effective tail moment and cost you in glide slope efficiency.

"Turbulator strips are the nearest thing to getting something for nothing that you will find in the glider game. Try adding a one-eighth to 3/32-inch wide strip of trim tape about twenty to twenty-five percent aft of the leading edge of the wing. This may help to avoid laminar separation and the resulting stall. Here's a way to improve handling quality and extend the speed range at very low cost in terms of drag. It doesn't always work out this way, but it's certainly worth an experiment or two. One way is to fly successive trials with and without the turbulator strips in place. Another way is to turbulate only one wing and note any change in trim. The plane should turn away from the more efficient wing.

"Don't seek to improve the lightly built-up 'floater' wings. They already have 'turbulator spars' in the top front surface. These models, patterned after the free flight types, are designed for a narrow speed range and are best suited for duration flights under light wind conditions. Their drag rises rapidly with speed. They're not the best best for modern competition or even serious sport flying. Of course, if you *only* operate at high speed, you probably don't need any wind tripping devices because of the high Reynolds Number.

"Now that you're really into sailplane design, you need to review the literature . . . that is, read all the old magazines and at least one or two modern texts on low speed aerodynamics. You're bound to come across the Clark-Y airfoil 'cause it's a fine choice in the critical region in which we fly (Reynolds Numbers from 50,000 to 150,000). It may be a bit higher in drag than the Eppler 205 or 193 sections, but greater thickness (11.7%) provides extra lift and strength. The Clark-Y is much better than these Eppler airfoils in the range from 40,000 to 80,000 (about where an Olympic II flies in dead air). Most models said to have this airfoil really don't . . . the lower 'upcurve' or 'Phillips Entry' is usually omitted for ease of building. Too bad, because that's the secret of making this airfoil operate over a wide speed range.

"Learn how to draw airfoils from the coordinates. This requires only a sharp pencil and a few moments of thought. Start thinking about dihedral and polyhedral in terms of degrees rather than inches." Stan recommends three degrees V-dihedral for FAI competition aircraft and four degrees at the center and seven degrees on the tips for AMA competition.

"Calculate the wing area in square feet and determine the wing loading. Contemporary practice is headed for nine ounces per square foot without ballast . . . a far cry from the floaters we used to use. (With a load of lead added to make them penetrate.) Build in strength continuous and forget ballast. Try the Eppler 193 or 205 airfoils. Calculate the area of your stabilizer as a percentage of the wing area. Modern ships use a bit longer rear fuselage and are going to horizontal stabilizer area of 11 percent or less. Ten percent is common in conventional configurations and nine percent isn't too small for a long tailed bird. The vertical lateral area should be about six percent."

If you're tired of strings breaking when you activate spoilers . . . or rubber band spoiler returns stalling servos . . . or spoilers popping up during launch . . . or maybe you should consider torque wires for positively control of your spoilers. Ray Cooper, of the Northwest Soaring Society arranged his Camano and used this method (see the sketch).

From Adelaide Australia and New Zealand comes comments on slope landing. "Different techniques are required, depending on the actual slope you're using. If there's a large, clear, relatively flat area behind the ridge, that's obviously the best place to land. In winds under ten mph, the landing is no more difficult than in flat land flying. However, in stronger winds, you have a whole new ball game!

"The first rule then is to keep flying the model on to the ridge until you walk back to the landing area. If the wind is really strong, it's best to let the model drift backward, keeping the nose into the wind the whole time . . . until the model is about fifty feet downwind of the landing spot. Then push the nose down enough to achieve zero or a slight amount of forward ground speed. If this is enough to start the model sinking, fine. If not, allow it to drift still further downward and then make a steeper approach. Keep your model headed directly into the wind and concentrate on leveling the wings whenever the model is disturbed. Remember that the air is likely to be turbulent and that the model will drop into relatively still air when it gets within twenty feet of the ground. When this happens, the model will plunge forward and down. Don't panic, and on no account be suckered

on to pulling on up. Simply relax the down elevator, and the model will not zoom up into a stall (as it would if you used up elevator with the speed so high). The rest of the landing procedure should be uneventful, but stay alert until the model is down and stopped.

"On shallower slopes (45° or less), it is usual to land on the slope below the ridge level. Start by flying out off the slope, gently diving to twenty feet or so below the ridge level, and this at the downwind end of the ridge, that is, heading more or less toward yourself. As the model nears the ridge, smoothly start to bank into an upwind pass, but instead of continuing the turn, ease the elevator to neutral so that the model touches down with the wings still banked more or less parallel to the ridge and some way down from the top.

"Another method (trickier and dangerous if you goof) is the uphill flare landing. Simply fly straight on toward the hill. And, at exactly the right moment, begin a smooth flare to touchdown going up hill. Too little speed or too early in the flare and it's . . . zonk! . . . you stall right into the slope. Too much speed or too late with the flare and . . . bonk! . . . you fly straight into the slope. Either way is hard on models, radio gear, and hard-won reputation! So this method is best reserved for emergencies when there's not enough time to set up the more desirable approach."

And some words of caution from a recent issue of *Soaring Flight*. "Yellow and white (72.96 mHz) may soon become unusable in the western Chicago suburbs and other places. A hospital paging system will soon be on the air in that vicinity. Brown and white (72.08 mHz) is being splattered by another paging system located in Wisconsin, and a third in Indiana." Clearly we need more frequencies for the exclusive use of model aviation.

Coulter Watt writes from the Clay Cliffs of Gay Head, Massachusetts (near Cape Cod). "The Vineyard is a great place to fly. No matter which way the wind blows there's a good cliff to fly on. I just installed a servo actuated strobe light system for evening flights of my Sagitta. It's great! Even reflects off the chrome Monokote wings." Here's wishing Coulter many more fine flights.

And, at the local slope, Torrey Pines, there's a new activity to report . . . parachute jumping from 340 feet altitude to the beach . . . a very exciting, unauthorized sport.

See you next month. •

Hannan . . . . . *Continued from page 52*

scribed the secret ingredients as "lots of talent and lots of love."

AND SPEAKING OF THE CHALLENGER

We have received reports of three different scale models, including one electric powered and two Peanuts. Anyone contemplating such a project should certainly obtain a copy of the June, 1981 English Aeromodeller magazine, which contains detailed 3-view drawings by A.A.P. Lloyd, many photos, and a fine descriptive article by Martyn Cowley.

INTERNATIONAL PEANUTS

Butch Hadland, well-known for his model designs, hopes to gain official FAI recognition for Peanut Scale. Several Peanut contests, including some of the *Model Builder* proxy affairs and the West Baden Gran Prixs have attracted more than the minimum five country representation required by the FAI. And since there are more Peanuts in existence than any other type of flying scale models, it seems only logical for them to gain World Class status.

Hadland's rules proposals attempt to retain the flavor and simplicity of the original Flying Aces Club concept, yet minimize the present inequities. In brief, Hadland outlines the following parameters: Emphasis is to be placed upon realism of the model when viewed from a distance of 5 feet. This distance would enable judges to gain a "general impression" of outline accuracy, moments, dihedral, landing gear length, etc., and to assess the finish, color and markings.

The workmanship, by contrast, would be scrutinized while "hand-held" to assure accuracy in judgment.

"Complexity," or subject difficulty would determine bonus points, i.e.: a 3-engined octagonal-fuselage flying boat with separate ailerons would get more complexity points than a high-wing, slab-sided monoplane with drawn-on control surfaces.

Penalties would be imposed for *gross* deviations from scale, i.e. wrong color, no pilot, increased moments, *gross* increase of dihedral or tailplane outlines, etc.

The FLYING section would consist of as many flights as required in the time allotted, with the average of the two best to count. The average flight score added to the scale score would determine the winner. The flight score average could not exceed points accrued for scale. (Therefore, the model's scale score would decide maximum average duration.) All flights would be R.O.G.

Hadland's proposed score sheet assigns:

0 to 25 points for general impression.

0 to 25 points for finish, color and markings.

0 to 10 points for model complexity.

0 to 20 points for workmanship.

0 to 15 *minus* points for gross scale deviations.

Biplanes and triplanes would have their average flight time multiplied by a factor of 1.1. Low-wing and mid-wing modesl would have their average flight time multiplied by a factor of 1.2.

In the event of a tie, the highest scale score would win. If still a tie, judges would re-assess winning models plus one flight to determine placing.

Butch concludes with these thoughts: "I hope this proposal generates thought and constructive criticism from active Peanut participants worldwide, so that we (the modelers) can fly to a universal

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At Your Favorite Model Shop:

Pint	2.75
Quart	4.50
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"GOLD STAR"

55 Gallon Drum . . . $160.00

Ideal for Clubs & Active Flyers (Available only Direct from Fox Mfg. Co.)

For the past 30 years, nitromethane has been a relatively cheap power additive and ignition accelerator. While it is a necessary ingredient in engines designed for it, most imported engines and many of our newer engines operate well on a basic alcohol fuel. FOX "Gold Star" Fuel contains a detergent and an igniter which makes it run a bit cleaner and start and idle a bit better than the basic 22% castor oil, 78% methanol mix. Try it, your engine and your wallet will both like it.

FOX .40 BB-RC

Bore: .800 Stroke: .790 Displ: .40
R.P.M.: 14,250 with 10-6 Prop
Weight: 12 oz.
Fuel Consumption: .8 oz. minute

The FOX .40-BB is the most rugged .40 on the market and possibly the most powerful. In eight years of refinement it has developed into a highly desirable R/C powerplant. It starts easily by hand, idles beautifully and flies all models designed for .40's and many designed for a .60. Construction features Fox patent crankcase design, button head, nitrided cylinder, cast aluminum piston, bar stock conn rod bushed, two ball bearings, a 590 shaft size and Mark X carburetor. This engine runs beautifully on our "Gold Star" Fuel. Fuel cost for 10 minutes flying time is approximately 18¢ based on drum prices.

#24100 FOX .40 BB-RC	$94.95
#90252 FOX .40 Muffler	12.95
#50404 Engine Mount	9.00

These American-Made Fox Engines are now set up to Run on "No-Nitro" Fuel:

FOX .78 BB-RC

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

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

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

FOX "EAGLE III" .60 BB-RC

The FOX EAGLE III has many improvements over the EAGLE II, resulting in considerably more power, longer life, and a less cranky nature. Also, the EAGLE III runs best on our lowest cost fuel. Physical improvements are a re-designed piston, shorter conn rod, improved cylinder porting, new head contour, heavier duty rear main ball bearing, improved taper lock and thrust washer. Muffler is available with Tilt-Up or Tilt-Down flange. Select the one best suited to your installation. Fuel cost for 10 minutes flying approximately 25¢ based on drum prices.

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

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

FOX .45 BB-RC

Bore: .850 Stroke: .790 Displ: .45
R.P.M.: 15,000 with 10-6 Prop
Weight: 12 oz.
Fuel Consumption: .9 oz. minute

The FOX .45 BB-RC has been further refined and modified to meet today's flying needs and to operate on economy fuels. Now features improved head button, nitrided steel cylinder, conn rod bushed both ends, crankshaft has larger throw and more counterweight. Cast aluminum piston is fitted with a freely rotating high tension ring. The carburetor is the highly acclaimed Mark X B size. The beefier than average crankcase resists minor crashes extremely well. Fuel cost for 10 minutes flying approximately 20¢ based on drum prices.

#24600 FOX .45 BB-RC	$94.95
#90252 FOX .45 Muffler	12.95
#50404 Engine Mount	9.00

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We really try to take care of our customers. If you crash and need parts that are not in stock at your Dealer, call us at (501) 646-1656 and we will try to get parts on the way, usually within 24 hours. We offer a complete re-build with the assurance your repair costs will never exceed 60% of new motor price.

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THE FOX .19 BB-RC

★ We think you'll find some unusual features.

Bore: .650 Stroke: .600 Displ: .199
R.P.M.: 14,250 with 10-6 Prop
Fuel Consumption: .4 oz. minute

#22000 FOX .19 BB-RC	$89.95
#90266 Tilt-Down Muffler	19.95
#90267 Tilt-Up Muffler	19.95
#50203 Engine Mount	8.00

Our new FOX .19-BB about to be released is a brand new engine from FOX incorporating the latest in technology. Schnuerle porting of course, and rugged parts. Lots of power, a good idle. The special design feature is that the upper cylinder casting can be turned with exhaust to either side, back, or even facing forward for marine boat use. A Muffler is being made available too with tilt-up or tilt-down flange. It runs great on our FOX "Gold Star" Fuel. The fuel cost for 10 minutes flying time is approximately 10¢ based on our fuel drum prices.

set of rules and really enjoy ourselves in our unique past-time.

"Please get general views of your compatriot flyers on these proposals so that scale committees everywhere, throughout the world, can formulate a proposal to the F.A.I. to get Peanut flying accepted and ratified quickly!

"One thing is certain; whatever set of rules we utilize, someone, somewhere, will find an aeroplane that outscores end outflies its rivals!"

WORLD'S SMALLEST PROOF-OF-SCALE DOCUMENTATION?

The 1973 San Marino 90 Lire postage stamp features a 3-view drawing of the "Spirit of St. Louis"!

FREE FLIGHT PRODUCTS

John Morrill offers a range of merchandise which demonstrates conclusively that fine craftsmanship is still very much alive. Among the first-rate items presently offered are hand-crafted spark ignition engines, heavy-duty winders, Wakefield model front-end assemblies, and stainless-steel propeller shafting. A pre-addressed, stamped envelope will bring complete details from: John Morrill, 143 Richmond St., El Segundo, CA 90245.

STRIP TEASE

Richard Jordan, of Gainsville, Texas, says that a "Strpt Eze" device, available from leather craft shops, also does a good job on balsa wood.

SCALE SCALE

Gerald Myers, of Redway, California, tells us of the simple but accurate CBG weighing scale, well suited to model work. Having a capacity of 4 grams (60 grains) it has a sensitivity of 1/20 gram or 1 grain. With an extra-cost option, the useful working range can be extended to 30 grams. Quite compact (1½" x 7½" square), the scale sells for $17.95, and the optional range increaser is $5.95. Available from the Balancing Act Corporation, Box 26820, Tempe, AZ 85282. Please tell 'em *Model Builder* sent you!

AMERICAN HALL OF AVIATION HISTORY

According to R.J. Mikkelson; one of aviation's staunchest historians, David D. Hatfield, founder of Northrop University's American Hall of Aviation History, passed away during June. A long-time model builder, Hatfield worked for many years with authors, magazines and motion picture companies, and amassed one of the world's largest collections of aircraft literature and photographs. Additionally, he had compiled a number of aviation history publications, and at the time of his death was nearing completion of a video tape chronicle of flight.

Scale modeler Loren Williams reports that the collection remains in the Northrop University Alumni Library, and that access may be available to serious researchers on an advance appointment basis. He stresses the importance of consideration in the use of these facilities, which is indeed a privilege. It is anticipated that Xerox copies of research material will be available for a nominal fee. Volunteer help to assist in sorting and classifying portions of the collection is also urgently needed. Additional information may be obtained from Ms. Roe Pinto, 5800 Arbor Vitae, Inglewood, CA 90301. Phone: (213) 776-5466.

FIZZY BOSTONIANS

Walt Mooney's latest innovation is an event for CO_2 powered Bostonian models, and the idea was given a practical test during August by the San Diego Scale Staffel club. Seven entries appeared, six of them powered by Brown Junior A-23 engines. other non-Bostonian CO_2 powered models were also flown, including Keith Scwemmer's magnificent Armstrong Whitworth quadruplane. Although three of the models were converted from rubber power, four were specially constructed for the meet, and most arrived at the indoor flying site with little or no advance testing. Ray Crowell, of the Aero-Space Museum staff, decided to try his Bostonian outside the building, and nearly had it fly away! Newsletter Editor Lee Tipps, Jr. divided his time between trimming a Bostonian and a scaled-down CO_2 powered FAI competition F/F design. Complete with dethermalizer, the little machine did its best to escape the confines of the gymnasium!

Mooney's Boston Found turned a most impressive one minute and three seconds duration, only to be bested by Frank Allen's "Bug Lips" design, which exceeded two minutes. Bob Greenaway's unique T-tailed, condenser paper covered entry showed promise but exhibited trim problem. Dick Baxter, who made a navigational error en route from Los Angeles, arrived late and chose not to fly his novel Brown twin powered pusher canard.

The main lesson learned from the experience was that CO_2 engines gain power as they encounter the warm air trapped beneath the ceiling, and keeping the aircraft out of the rafters can be quite a challenge! Suggestions, anyone?

BOSTONIAN POSTSCRIPTS

Recent articles in *Model Builder* regarding Bostonians prompted some responses. Event originator, Ed Whitten, of New York, had this reaction to the variety of rules being tried: "I would prefer all areas to run the event the way they want . . . who cares how someone else likes it, just so everyone is happy!"

(Captain Frank Courtney, of England, who has a long history of participation in full-size aircraft testing on both U.S. coasts, once remarked that for all practical purposes, New York and California were two different *countries.)*

Ed continued: "Here in New York City we are, of course, entirely indoor oriented (although some, naturally, also fly outdoors, but not all, by a long shot). So seven grams (the New York Bostonian minimum weight) is *not* a lightweight model (to us). We also do seem to be competition, if not WIN, minded. . . . We've had modelers from Pennsylvania and Massachusetts, but mostly they come from a 50-mile radius. Everyone flies what he, she or it wants . . . with the heavies having to look out for the lightweights . . . or maybe it's the other way around. (Recently) I flew a microfilm covered biplane canard pusher in the 35cm event . . . so not all of us are without a sense of humor. Really, we do fly to enjoy ourselves. But we also *do* measure art and enjoyment by performance . . . so there is a great deal of stress on duration in just about all events. And that requires light weight." Ed's reaction to California rules without appearance points: "Judging Bostonians for Charisma is not a long process, and I *do* think it should be part of the event."

AND FROM OHIO

Dave Gibson says: "Bostonian rules are quite loose. Loose enough to encompass a Mooney *Boston Found* as well as Wrisley's *Great Expectations.* Stated another way, the rules are loose enough to appeal to scale-minded people as well as duration-minded people. Possibly the scale people could be pitted against the duration people in the Team concept, with one team going against the other (Team Mooney vs. Team (Bob) White, for example).

Dave also envisions Bostonian postal contests, with Team Captains doing the flying of the top model from any given geographical area or state. He sees it as a means of promoting the idea and generating interest in the hobby. This is a bit different from developing a contest for the contest's sake, according to Dave.

Dave also says, with tongue firmly in cheek, that since it is rumored that Bill Northrop has never ever built a Peanut, he should have the chance to redeem himself by constructing a Bostonian! Hmmmm. *(When I built Peanuts, they were called "Megow ten-centers." wcn)*

Dave also says that some folks think that Bostonians are unable to pronounce the letter "ah," which appears in the alphabet between the letters "q" and "s": "For the most part this is true, but a Bostonian can pronounce a hard 'R' when the word he is saying usually ends in a vowel. For example, idear. Idear is a thought that pops into a person's head. It is spelled I D E A. The 'R' is invisible.●

F/F . . . . . *Continued from page 62*

The original version of this design used the same wing, but had a thicker stab airfoil, shorter fuselage and pylon, and a smaller rudder. It had a tendency to go into a shallow dive or race horizontally, even with upthrust, so he finally settled on a thinner stab airfoil to cure the problem. It also had trouble obtaining a stable power pattern, with a tendency to fall off to the right, despite all trim techniques. A longer fuselage and higher pylon were tried, but the eventual cure was to increase the rudder area. (Which duplicates my experience with models having too little rudder area.)

NFFS SYMPO 1981

As you can tell from this month's column, the latest NFFS Sympo has some very interesting stuff in it. The past few issues have turned away a bit from the strictly theoretical, highly mathematical treatises contained in the first volumes, and are much more suited to the general free flighter. (But the plowing up of new theoretical fields was a necessary first step to advance the state of the art!) The current volume, in addition to the airfoil test summary by Carmichael and Gil Morris's design philosophy, contains a report on structureless foam composite construction by Ron St. Jean, an account by Bob Hatschek of 10 years at the book works, as well as a special section on contest flying techniques, and the 1981 Top Ten Models. There is also a complete listing of all previous Nats and World Champ winners, along with previous Models of the Year and an index of previous Symposia.

All in all, it's a worthwhile addition to your library, priced at $9 with shipping inside the US. Order from Fred Terzian, 4858 Moorpark Ave., San Jose, CA 95129.

MYSTERY MODEL

This month's MM is one of the earliest published high-thrust designs that I know of. (Funny, but this breed of free

flight was almost non-existent at the Nats this year.) If you've got a good memory or a good file of model mags from the 50's, you might be able to label this one. Identification points include the lavish use of wheels (three of them!), as well as the twin rudders,d and tip dihedral in the wing. If you think you can identify the beast, send your guess to the Model Builder office (621 W. 19th St., Costa Mesa, CA 92627) to see if you win the free subscription.

A CLOSING NOTE
(From the Norwesters newsletter, Ted Rogers, editor.)

A while back, **Model Builder** *printed a series of letter from readers debating the world shaking question, "Who are the real modelers?" The RC guys said, "That's us". The free flighters said, "No way, Jose, if it doesn't fly by itself, it doesn't fly." And the control-liners said, "Hey, we're the ones," etc., etc., ad nauseum. As I was re-reading those comments last week, it dawned on me they ALL missed the point completely. You're a real modeler, no matter what you build, if:*

You have a drawer full of plans that are in terrible shape, not from building . . . but from folding and unfolding.

You have at least three unbuilt kits ordered Air Mail, Special Delivery, prior to 1970, because you had to get building right away.

You have just purchased a gallon of dope because you only have 2 gallons left . . . and you haven't used a quart in the last 5 years.

Your model/accessory/balsa supply is worth more than your car.

And you're a real expert modeler, if the above supplies are worth more than your house! ●

F-15 . . . . . *Continued from page 49*

and would do smooth maneuvers. It could be pulled straight up from level flight and do one creditable vertical victory roll before running out of steam. If necessary, it can pull tight turns at low speed without undue tendency to snap roll. Pitch response is smooth and positive, but be sure to balance the airplane as specified in the instructions. My example required nearly 5 ounces of lead in the tail to balance correctly. Receiver and battery pack were mounted aft of the wing, too.

The F-15 was flown with props ranging from 8x5 to 9x6. The prop which seemed to give the most satisfying performance was a 9x4.

All in all, I can recommend all the items tested in this review. Just be sure to consider the performance level you want before selecting the aircraft/ engine combination you will use. The completeness of the F-15 kit, coupled with its dynamite appearance in my judgement override the negative factors mentioned above. It does fly well, too! ●

C/L . . . . . *Continued from page 59*

had gone to some hoity-toity writing school and wanted all of us to know that or had never in their lives been able to accomplish something on their own, always needing help, in which case the "we" would be properly used.

As for myself, never even got close to the HTWS, only made it through basic English classes by faking it, some say we default, although I did learn the difference between "we" and "I".

And you will notice that since my product preview article I haven't done any more!? Message there someplace, I suppose. . . .

(The "trend" Mr. Hopkins mentioned was going on long before he was old enough to . . . er, write. According to the dictionary, a book which is available for viewing in many places other than hoity-toity writing schools, "we" is used by editors and writers to avoid any appearance of egotism from repeated use of "I". As for **Model Builder's** *contributing editors, we are not prejudiced about their use of "I" or "we" just as long as they continue doing a good job. wcn)* ●

Sunday . . . . *Continued from page 66*

cut it to the shape shown, because the upper "cradle" for the wing is cut from the remainder, and the slant cut at the rear of the underbelly allows you to cut the full upper structure out of the same piece.

Cut two cradle pieces for the wing. Note that the centerline of the airfoil, in this case, is not parallel to the main body stick, but the forward end is higher. This gives the right angle for the wing to set relative to the fuselage and the tail surface. It's called the "angle of incidence."

Next, cut one of the cradle pieces lengthwise so you have two pieces, each 1/2-inch thick.

Now glue the underbelly to the main fuselage stick, with the forward ends in line.

The one-inch wing cradle piece is now glued to the top of the main stick. Be sure to locate it at the right position as shown on the plan.

Next glue the one-half inch wide cradle piece on either side of the center piece, but raise the bottom line of the side pieces about one eighth of an inch higher than the top of the main stick. This is so you can cut it to the center at a slight angle to fit the center of the wing. See detail in plan.

The 1/4 x 1/2 inch hardwood engine mounting pieces can now be glued to the sides of the forward end of the fuselage. Take note that they slant down slightly.

This provides the required "downthrust" for the engine.

The fuselage is now complete, except

for wing mounting dowels and final shaping. We'll come back to that under "Assembly."

WING

Putting the wing together is a snap. The dihedral angle for the panels is precut by the manufacturer. All you have to do is make sure the ends line up with each other. With this method, you get the "polyhedral" effect on the wing which makes it so stable in flight.

Note that the center panels are wrapped completely around at the point of maximum thickness with fiberglass strapping tape. This adds a lot of strength which is needed in the center area. Do this wrapping before attaching the outer panels.

Put the panels together with "Five minute epoxy." First do the center sections, then strap them around with the strapping tape, and then attach the outer panels. You can brace the panels up until dry, but if you're the patient type, you can hold them until the epoxy sets. Also, this way, you can keep an eye on them and make sure they don't slip out of alignment. It's the best way.

After the panels are firmly dried together, make a 3/16 inch cut, 4 inches long on the trailing edge at the center joining line, extending 2 inches out on both sides. Epoxy a piece of 3/16 dowel in the cutout. Partially cut through the dowel, then crack it in the center so it will angle up and fit the trailing edges of the two center panels where they join. Mix enough epoxy to not only secure the dowel, but also smear the epoxy along the center joint forward to and around the leading edge both on top and bottom, extending out about one inch on either side of the center line.

Before the epoxy sets, wrap a piece of strapping tape around the center joint to reinforces the center.

The wing is now finished except for some final sanding and painting.

TAIL SURFACES

The stabilizer is simply one panel from the "Sunday Flier" wing set. Only final sanding, and, if desires, painting, is required.

The vertical fin is made of 1/8 balsa sheet. Cut it out, using a very sharp knife (Uber Skiver or single-edge razor), to the shape shown on the plans. Make sure the bottom curve is cut straight across so the fin will set vertically on the stabilizer. Also cut the bottom curve as carefully as you can so that it will be flush with the top surface of the stab. The closer it fits, the better and stronger the joint will be.

Sand the forward edge and the trailing edge of the fin to a "streamline" shape. Also, while sanding the fin, sand the top curve into a pleasing rounded shape when viewed from the front.

Draw a center line on the stab with a pencil, then epoxy the vertical fin to the stab in line with and on the center-line of the stab. Sight along the center-line from the front, and make sure that the fin is vertical to the stab.

ENGINE MOUNTING

The two hardwood pieces that have been epoxied to the sides of the forward end of the fuselage serve as the engine mount. The slight downward angle gives the "downthrust" angle needed for powered flight. This angle causes the "slipstream" (air pushed back by the propeller) to flow back in such a way that the nose of the model doesn't raise so high when the engine is running and cause a stall to occur.

Mounting of the engine is simply screwing the backplate into the hardwood pieces, using two 1/2-inch wood screws. The backplate is mounted at a slight angle so the two screws go into the hardwood side mounting pieces. The angle can be either way, and if the holes get stripped in a bad landing, you can remount the engine at the other angle. See plans.

LANDING GEAR

This may be the toughest part of the construction sequence, since the 1/8 steel wire is very hard to bend. A vise is almost a must for the job.

Put the wire in the vise with the bend point flush with the top of the vise, then pull the wire and bend it by hitting it just above the bend point with a hammer. Yes, this will tend to take the "temper" out of the steel wire, but it will still be more than strong enough.

After you have bent the wire to the shape shown on the plans, check the alignment by sighting along the left axle line. It should line up with the right axle. Small corrections can be made by hand bending the wire.

Slip the wire over the fuselage, just aft of the hardwood engine mount pieces. If you have bent it carefully, it should wedge itself against the sides.

Epoxy the wire in place, simultaneously wrapping it around with thread or fishing line. Go around the fuselage with the binding, crossing over the wire several times. This helps to prevent the wire from breaking loose on hard landings. Yes, there probably will be some hard landings.

The size of the wheels isn't critical. Two-inch wheels are shown on the plans. They seem to be about the right weight to help balance the model. Hold

the wheels in place with wheel collars, or alternatively, you can use tubing which will slip over the wire snugly, then hold it on with a drop of "instant glue" such as Hot Stuff. Wheel collars do have the advantage of allowing you to change wheels more easily.

The tail skid is made from 1/16 wire, 4 inches long. Force the wire through the center of the fuselage stick at the angle shown on the plans. Bend the top 1 inch flush with the top of the fuselage and glue in place. Make a slight bend at the bottom end to skid along on the ground.

PAINTING

If you want to paint your model, be sure to use a polyurethane base paint, such as Pactra Formula "U" or a similar type. Other types of paint will more than likely dissolve the foam wing material.

You can use one of the plastic mylar coverings in lieu of painting, but be sure it is one which needs only mild heat, such as Top Flite Models' "Ekonokote." Otherwise you will melt the foam on the wings.

Although the wings do not have to be painted or covered, since the styrofoam is fuel resistant, the fuselage must be protected. It can take any type of paint, since it is wood. Just be sure the paint is fuel proof. Epoxy resins or butyrate dope meet that requirement.

ASSEMBLY

Drill 3/16 holes in the fuselage at the points shown on the plans and insert the lengths of dowel. Glue them in.

Attach the wing with rubber bands. Check the cradle to be sure the wing fits it. Sand any high spots off until the wing is resting securely on the cradle without wobbling.

Attach the tail assembly with rubber bands going from the front dowel back over the stab and looping the dowel which sticks out the rear. Be sure the vertical fin is lined up with the fuselage. Also, sight down the fuselage from the front and check the alignment of the stab with the wing. See Fig. 1.

FLYING

The Sunday Flyer is not a "hot rock" performer. It isn't intended to be. It flies in a steady, gentle turn at a fairly slow speed. However, when properly adjusted, it will climb several hundred feet, and, if there is a wind blowing, it will fly with the wind and you'll have a long chase. So, my advice to you is, "Don't fly the Sunday Flyer if the wind is over five miles an hour. Even then, limit the engine run to about a half-a-minute."

Before flying, check for balance by holding the model up at the balance point. The model should hang horizontally. If it hangs with the nose down, add small weights to the tail until the model is level, then tape or glue the weights in place. Similarly, if the tail hangs down, add weights to the nose. This is the most common condition.

Now test glide the model. Launch the model straight ahead . . . not up . . . at about the same speed as you would toss a softball to a friend some twenty feet away.

The model should go straight ahead and gradually nose down into a gentle glide. If it noses up, then drops sharply to the ground, add more weight to the nose until the nosing up tendency disappears. If, on the other hand, the model leaves your hand and makes a shallow dive towards the ground, remove some weight from the nose until the model glides gently forward. See Fig. 2.

When the model seems to be gliding properly, it's time for the first powered flight. There are two ways to keep the power down for the first test flights. One is to run the engine "rich." The other is to reverse the propeller on the prop shaft so the curved face faces aft instead of the normal mounting. This allows the

prop to run faster but it doesn't make as much wind, or thrust, because the blades are inefficient when running backwards.

Limit the fuel to about twenty seconds of running time. And, be smart. Wait for a quiet day.

Launch the model just as you did in the glide tests. It should move out in a gentle circle to the left, climbing very slowly, then when the engine stops, it should glide either straight ahead or maybe in a gentle turn either to right or left. That part isn't critical; actually, a slight turn is best, so it won't glide too far away.

If, when you launch the model, it goes into a swooping type of flight, winding up in a mild crash to the ground, then go get it, and if it isn't damaged, realign it the way that you had it, and then carefully shift the stab in the cradle, moving the left side of the stab forward, and the right side aft, and snug it down at the new setting. Not too much. See Fig. 3. Note the setting.

Shifting the stab will change the setting of the vertical fin to give a slight left rudder action.

Launch the model again at low power. This time it should leave your hand and climb gently to the left as it is supposed to.

If you have shifted the stab too much, the model will circle to the left and spiral back to the ground. If it does that, retrieve it, and reset the stab at about half the offset you had in the spiral. The third time should be the charm, as they say.

You are now ready for full power. Limit the engine run to fifteen seconds for the first few flights. After you have observed the rate of climb, you can make longer flights, but watch out! If the model should get too high, it might enter a rising current of air, known as a thermal, and you'll have a long chase. Oh yes; don't forget to put your name and address on the model, just in case it should fly away. It could, you know. It loves to fly.

REPAIRS

One of the features of the Sunday Flyer is that it is easy to repair. The wood parts can be glued back to their original shape using epoxy or, if you are careful, the instant glue types.

If any of the foam surfaces break, they can be carefully joined back to fit as they did before breaking, then separate them, smear epoxy in the break put back together, and let it dry. You can also strengthen the repair by laying a piece of cloth over the break before the epoxy dries, and smear the cloth with epoxy. It may not look as good as it did, but it will be strong.

SUMMARY

The Sunday Flyer is easy to build, easy to fly, and easy to repair. Yes, you probably will have some crashes, but you'll get a lot of good flights, and you'll learn a lot about adjusting for best performance. You'll learn a lot, while having a lot of fun.

ENJOY! •

Choppers . . . . *Continued from page 18*

barely believe that the tank was empty; I was *sure* that I had fueled up before I went inside. Please be sure to check for a full tank every time before flight, particularly in a full-bodied ship where the tank is partially hidden from view.

• The clutch shaft broke just above the bell housing in the Jet Ranger. Fortunately I was at a two-foot hover and the chopper settled slowly to the ground. Damage: untouched. I have never heard of this happening to anyone else. Evidently it just fatigued from vibration and torque. This particular Jet Ranger had hundreds of flights, and was not out of the box.

• During the flight I felt a few glitches, but continued to fly. Several minutes later the radio froze and the ship went straight in at full power. Damage: totaled. Classification: pilot error. I had foolishly mounted the receiver to the cabin with double-sided tape. High frequency vibration slowly detuned the receiver until it's range fell to zero. This was confirmed by a factory checkout of the radio. Mount receivers in soft loose foam even if they stick out in the cabin! *(And listen to your radio when it's trying to tell you something! wcn)*

• Pilot error; tried a loop too low. If I would have had two more feet it would have made it. Damage: light. Don't get too fancy with aerobatics before you know the whole range of your helicopter.

• While hovering, the helicopter suddenly went awry and backed tail first into the ground. Damage: light. Classification: radio failure. Although it is possible a push rod could have failed, I think the radio got temporary interference, or the pitch servo glitched. All worked find afterwards. Cleaned all servo pots and checked everything else out. No further problems at later dates.

• It was one of those evenings where the air was so smooth and the ship felt so good. I was making some fast low passes and got going so fast that the helicopter

fell off to the right in a shallow dive. Damage: moderate. Cause: pilot error. Essentially I exceeded the rotor system's control capability. No retreating blade stall, the servos and paddles just couldn't handle the aerodynamic loads imposed on them. Don't fly *that* fast.

The next one has been taken out of sequence and saved for last. . .

• Dad and I were flying out on the street in front of the house. At a two-foot hover, the helicopter rolled in to the right with no warning. Cause: Radio interference on 53.3. Damage: light. Later we found a lead tip weight two feet from the front door at head height, impacted in the press board siding! We changed our tip weight attachment procedures.

• Battery failure at a two-foot hover. Chopper slowly drifted to the left and tipped over. Damage: light. A cell went dead in the flight pack. I checked the pack before flight with an ESV with load. Even these pre-flight checks cannot guarantee against completing that particular flight, but it's a step in the right direction. The ESV's have saved at least three of my ships at one time or another. For the money they are a mandatory investment to purchase and *use*.

• During a winter session, the weather had temporarily warmed up then cooled off, leaving a one-eighth inch crust of ice on four inches of snow. I was flying slowly along at four feet above the snow/ice surface. With my left hand (throttle hand) I reached to make a trim change. At that moment the ship went through a down draft and started descending. Before I could get my hand back on the throttle the skids punched through the ice cover and immediately flipped the 'copter over. Aft cyclic was not enough to pull the skids up out of the snow. Damage: severe. I moved to California to avoid the threat of ice-covered snow!

• In the middle of a hot Ohio summer I was practicing for an upcoming contest, and asked a bit too much out of the Webra Speed .61 I was running at the time. It overheated and seized at 100 feet. Damage: severe. As helicopter pilots, we must be careful with mixture settings and run on the rich side at all times. If the particular engine we're using is not quite enough to adequately do the job, we should consider either a lighter helicopter or a stronger engine.

That same summer I lost a pressure line from the muffler to the tank. The engine leaned out and siezed. Check pressure lines as well as fuel lines often. Do not be afraid to replace these items every three months or so. Also be sure that these lines are not chaffing on surrounding wood or metal. If you suspect a pinhole somewhere, replace *all* lines and be safe.

• At 100 feet (notice that all of these in-flight failures happened at 100 feet?) my Jet Ranger threw a home-made expert blade before the expert blades were commercially availabled through Kavan. Needless to say the ship was in 100 different pieces before it ever hit the ground. Post crash thought recalled that the blade had been bumped before fire-up, and the metal tongue that holds the lead-lag had partially split the root of the blade. Rotor rpm and G-forces did the rest. When handling a helicopter with tongued blades, be careful about bumps and knocks, check the root carefully for hairline fractures if this occurs.

• Here is the one I saved from earlier on . . . I was flying with Don Chapman at his home, with Al Irwin's Tach-Tron installed in the Jet Ranger. Before I lifted off Don told me, "Whatever you do, don't crash!" I hovered for a few minutes and then executed a vertical ascent out of his driveway over the surrounding trees. After making one circle I saw an object directly in front of the Ranger's path. I quickly pulled full aft cyclic and added full power. The top of the telephone pole passed *between* the skids and caught the tail rotor, causing it to throw a blade. After that the tail cone went over cooling fan. . . When you can clearly see the cooling hole of a Jet Ranger from 200 feet away you can kiss it goodbye. Damage: Totalled, but my father rebuilt it anyway. Cause: Pilot error. I didn't open up the throttle all the way after bringing the rotor up to speed. This is a definite must with any governor system. In the full-size Jet Ranger, the throttle must be rolled full on to allow the engine to give as much power as the governor asks for. Same thing applies to the Tach-Tron. When I pushed full throttle to avoid the pole I got pitch but not the throttle to keep the rotor speed. And I wondered why the vertical takeoff felt sluggish. That was why. To top this one off, Don got the "hole" sequence on super-eight film. (That's why he told me not to crash in the first place.) We played it, and played it again, then played it backwards. To see it on film it appears hilarious at first, but then it gets less funny as time passes and the consequences come to mind.

Go ahead, Don, pull out that film and take another look for both of us. . .

See you next month. •

St. Clair . . . . . *Continued from page 23*

proof that we have been working on this system for years before you showed me that 'thing' of yours." Oba was insulted because Jim called his airplane a 'thing'. He thought that perhaps Jim had really been working on line control for years, but didn't understand why Jim had been flying free flight airplanes on all their previous meetings.

Jim invited Oba into the back room to see his experimental aircraft. Oba recalls that there were about two dozen airplanes, all the approximate size of the Fireball and all had obviously been crashed and repaired, some many times. Jim was quite knowledgeable about the airplanes and explained to Oba how and why each change was made and how it worked. Jim obviously enjoyed explaining to Oba the design principles. But, in the back of his mind, Oba was wondering if Jim and his workers had had time in the year and half since they saw his four-line control to build and test that many airplanes. He concluded they did indeed have enough time. Oba also reasoned that he still had time to patent his system since Jim had not patented "U" control yet, but a long law suit would surely follow. Oba had no money for that. Oba and Jim parted company in a friendly manner.

Oba saw Jim Walker for the fourth time at Mayland Sweed in Oregon, in 1948. Jim was scheduled to fly an R/C airplane at a free flight contest but didn't, due to a radio problem his crew couldn't solve.

Oba didn't approach Jim that day. He had concluded that, "He's not my friend now."

The fifth and final time Oba St. Clair saw Jim Walker was in Portland. Oba went to make a deposition for the court case. Jim Walker's Junior American Aircraft Company was suing Roy Cox's company, L.M. Cox Manufacturing Co., Inc., for patent infringements on two counts; one covered the bellcrank system used to control the elevator, the other was the control handle, with attached reel. Jim felt that the Skylon Reel produced by Roy was a copy of his patented U-Reely.

The first Oba heard of the court battle was in 1952, when Roy called Oba and told him Jim Walker was mad at him and would sue if he continued to produce his ready-to-fly airplanes without a license. He asked Oba to furnish him with a list of all the evidence he could find that proved he was using a line control system to fly his airplanes prior to Jim's patent. The list Roy received must have been a pleasant surprise, because Oba had many dated photographs, newspaper articles, company publications, sets of plans, and still had the original plane!

Roy Cox made his decision to produce his airplane and fight the impending law suit. Roy felt that the items were not legally patentable and that he could prove that Oba flew his airplane prior to Walker's patent. He was also aware that Oba had showed Jim Walker his control line plane prior to the patent date of "U" control.

It took three years from the time Oba received that call from Roy Cox to the start of the trial in 1955. Oba, his wife, father, and brother went to Portland to make their depositions for the court. Jim Walker, his attorney, and a clerk were also present. No conversation transpired between Oba and Jim, but Jim's attorney asked Oba if he saw Jim Walker in the room. Oba pointed out Jim. Jim's attorney turned to Jim and said, "Don't you suppose he could have seen you at one of your demonstrations?" This statement led Oba to speculate on the idea that Jim hadn't told his attorney about their prior meetings. They broke for lunch, the plaintiff and the defendants each going to separate restaurants. Roy's attorney told Oba that it was obvious that, "We have the case sewn up," and they fully expected Jim to drop the case. To continue in the face of overwhelming evidence would surely put his patent in jeopardy. Much speculation has been suggested on why Jim continued with the case, but one point should be considered if you want to speculate yourself. Jim had won a similar judgment by consent against an R.W. Pickney, Case No. 47C458, in the United States District

Court of the District of Illinois, Eastern Division. The court had ruled Jim's "U" control Patent No. 2292416 was good and valid and was infringed upon by the defendant. It would seem logical to assume this must have given Jim confidence in the present case against Roy Cox. The case lasted four days.

THE TRIAL

On September 24, 1953, Jim Walker filed his case against L.M. Cox Manufacturing Co., Inc., charging them with patent infringements on two counts; the Bellcrank System and the Control Handle/Reel. Jim also charged that the trademark "U" control had been indirectly used by Roy Cox and that constituted unfair competition. Jim offered as evidence:

Copies of his patents and trademarks.

Several magazine articles and books.

Drawing of his control system and Roy Cox's TD-1 airplanes.

A model of the framework of Oba St. Clair's airplane.

A Fireball and parts.

A "Handy Reel", "Skylon Reel" and "U"-Reely".

A letter from W. Elmer Ramsey (one of Jim's attornies) to Roy Cox.

Several airplanes, a TD-1, Firebaby, Zing, Monogram Piper Cub kit, Testor wooden model and a Testor's Sophomore "9" kit.

The patent infringements were charged by Jim because Roy had been selling his TD-1 airplanes that used a bellcrank without a license. He also charged the Skylon Reel was a copy of his U-Reely and also made without a license. He charged that when Roy had his TD-3 airplane boxes printed with the words, "All You Do Is Control It," he was obviously cashing in on the trademark "U" control and taking unfair advantage.

Jim's statement to the court said that 90% of all model airplanes flown at that time in the United States used "U" control and that it had grown to a multi-million dollar business by his hard work, substantial investment, time, and ability.

Roy Cox's statement to the court said that the L.M. Cox Manufacturing Co., Inc., was aware that the patent had been issued to Jim Walker, but they had been illegally issued because the original inventor named was not the original inventor, that the ideas were known and used by others prior to the patent issue.

Roy challenged the claim that the trademark "U" Control was owned by Jim Walker. Roy Cox listed fourteen patents that preceded Jim's two patents and listed the following publications:

Popular Science, April, 1939, page 107.

The Telephone Register, McMinnville, Oregon, July 15, 1937

Model Airplane News, November, 1937

Model Airplane News, January, 1938

Roy's evidence included all of the above mentioned, plus his star exhibit, Oba St. Clair's original "Miss Shirley" airplane, three TD-3 airplanes, two molded from clear plastic to show bellcrank action. Altogether, Roy introduced over fifty exhibits of evidence.

On February 11, 1955, a flying exhibition was put on by Jim Walker and Roy Cox for the court. Jim flew his three Fireballs at once. This may have done Jim's case more harm than good. When he flew his Firebaby with Roy Cox's designed Skylon Reel to illustrate that it performed the same function as the "U-Reely" (lengthening and shortening of the flying lines during flight), the court did indeed conclude Jim was such an expert that he did not prove that the average flyer could do the same thing and Jim lost that point.

Roy Cox flew is TD-3 and believes he did everything Jim did except fly three at once. Roy had one airplane control system set up as Oba's airplane and one set up as manufactured. The flying went well for all. I am sure each flyer returned to the courtroom thinking he had proved his points, but the victory for Jim was to be short lived on that day; he lost his first two points. The court ruled the defendant had not infringed on the trademark "U Control" and had not engaged in unfair competition.

Roy's attorney asked for a judgment in favor of L.M. Cox Manufacturing Co., Inc., at that time, but didn't get it.

The case to follow was equally interesting. Roy produced a list of fifteen people who could testify to prior use of the control system invention in question. They had all seen Oba fly his airplane more than a year prior to the issue of

Jim's patent.

Roy or his attorney somehow had found an ad in a January, 1938 issue of *Model Airplane News* listing for sale, construction plans and specifications for building a "Miss Shirley" control line airplane. They came up with a modeler named Wilbur Hahn, who purchased a set of drawings and built and flew the "Miss Shirley" in 1938. There was little doubt as to how the case would come out, only a question of whether or not Jim would win any points. He did win two points; the trade name "U-Control" was declared his, plus the court referred to him as "Super Expert."

The court ruled that the control patent was void and invalid. The court also ruled that Jim Walker had seen Oba St. Clair's airplane in the spring of 1937, although Jim testified he didn't remember. The court ruled that the control handle patent was valid only on the points that related to reeling the control lines out and in during flight.

The decision was all in Cox's favor. It must have been hard for Jim to take, but the worst was yet to come. The judge began to lecture Jim . . . scolding him for not keeping records of his testing, comparing him unfavorably to Oba, who was a millworker and had complete documentation and proof of everything. The judge sent a letter to Oba St. Clair (Oba only testified by deposition, he didn't go to the trial) naming Oba as the "father of control line flying".

There are no villains in this story — only heroes. Jim Walker is certainly a hero in my eyes and I am sure most control line enthusiasts feel the same.

I can recall Jim Walker putting on his exhibition at the annual Fort Benjamin Harrison Contest in Indianapolis and again at the East-West Meet held in Sportsman's (Baseball) Park in St. Louis. Jim would fly his three Ohlsson 23 powered Fireballs all at the same time, while his pants fell down around his ankles. You got the idea it was a gag when you saw "Eat at Joes" on the back of his shorts. He used another gimmick to please the audience. While his assistant bent over pretending to start an engine, Jim would taxi his two-speed ignition point Fireball in a manner that would indicate he was having trouble; when he got it lined up, the full speed would kick in and the airplane flew into the rear of his assistant. The crowd would scream, and then change to laughter when they realized it was an act. After the show, I asked his assistant if he used padding. He said he didn't as it didn't hurt much. Those Oregon people are tough!

Jim always had time for inquiries and would answer all the questions. The late Dean Hawkes, a friend of mine, would get tears in his eyes when he told the story of when he was a small boy, he asked Mr. Walker how he got such a nice finish on his airplanes. Jim put his hand on Dean's shoulder and said, "Son, the only difference between a good finish and a bad one is a little piece of sandpaper." Bernard Ash has written about seeing Jim Walker at the Kentucky State Fair and how "Jim always took time to give a helping hand when it was needed." I am sure that we three Jim Walker fans are but a few of the thousands out there. Whether Jim did or didn't use Oba St. Clair's idea for line control really is not that important. The good things Jim did for the hobby, the design and developmental work, the salesmanship, showmanship, and promotion, make Jim Walker a hero.

Roy Cox is also a hero in this story. If Roy hadn't had the courage to follow his beliefs and fight the lawsuit, he would have gone into another business and we wouldn't have the benefit of the millions of control line airplanes Roy shipped around the world. Roy and Jim had one brief meeting after the trial. They briefly discussed the trial, shook hands and parted without any hard feelings.

Prior to the lawsuit, Roy was told by four other model airplane manufacturers that if he would fight the case they would share the expenses; they obviously had much to gain if he won the judgment. The cost to Roy Cox was around $7000. At that time, his company was new and the sum put the company on a much tighter financial restraint than they preferred. One of the four companies sent Roy a check for $50, which he never cashed. He never heard from any of the other companies until a few years after the trial. One of them needed engines. Roy said he would build their engines if they would pay their share of the court cost. They left to consider the offer, but he never heard from them again. Roy is now retired, with his wife, Mary Bell. They spends their winters in Palm Springs and the rest of the year in a beachfront home in Corona del Mar. Roy still has much respect for Jim Walker, and considers him as the man who did the most to promote control line modeling. Roy is too modest to mention the millions of good airplanes he gave to the world.

Oba St. Clair is alive and well, living in Eugene, Oregon. If you see a black Vega wagon with model airplane paraphernalia in the back, you'd better get out of the way. That's Oba and he drives like Art Scholl flies. Oba lives alone, next to his flying field, and over his workshop where he has designed and built his own machinery to produce "stooges" (they hold and release your control line airplane).

Oba has invented a control handle that allows him to do spins . . . yes, you read it right . . . he does flat spins with a control line airplane. The handle is a converted "U-Reely" that automatically winds in when line tension of the airplane decreases. If the wind were to blow the airplane towards the pilot, the handle would pull the lines in without any movement required by the pilot. The way Oba does spins is to loop the

airplane until it stalls overhead. He holds 'up' control as the reel automatically winds in the line and the airplane does a flat spin. When the airplane gets close to the ground, Oba gives a little down control, the airplane levels off and picks up speed. Oba designed the handle in 1949. He claims it has saved him at least 1000 crashes.

Oba doesn't fly much competition, but when he does, he never places higher than second if the kids are flying. He has designed and built a flight stimulator (see photos) that is used to train prospective pilots at the local contests.

When the Prop Spinners of Eugene, Oregon set their world record of 64 hours, 33 minutes of sustained flight on September 3, 1957, Oba was club technical advisor and one of the thirteen pilots.

Oba has all the gas airplanes he ever built except for his single-line biplane he gave away for lack of space. Most seem to be ignition, with his own designed and built magnetos. A few glow plug designs are around. All were original airplane designs. The P-40 in the photograph was built in 1949 and is powered by an Atwood 60. The fuselage and fin are aluminum and the shock gear works.

When Oba was asked how he feels when he looks back on what happened, if he has any regrets. He replies that he does regret not having money to patent his system, because he always recognized the potential of control line flying. He said he recognized Jim Walker as a great promoter of control line flying and has great respect for his coordination and dexterity. His only regret is that Jim didn't cooperate with him. Wouldn't they have made a helluva team! We asked Oba what was the biggest loss; the lack of financial gain or the lack of recognition. They reply was financial; he didn't need recognition. The money was the true loss. The money would have given Oba the time to do more inventing, and this was his life.

This story was made possible by Dale Kirn's interest in a mystery airplane. Dale was employed by Roy Cox and saw an airplane in the model shop being repaired. (Oba's . . . it suffered damage during shipping and court procedings.) He couldn't get anyone to tell him about the airplane, so he copied the address from the shipping crate before it was sent back to Oba St. Clair after the trial. Dale called Oba and Oba told him the story. Next, Dale did some research in the court records and obtained more information. His next step was to write the Smithsonian Institute, in September, 1969, outline Oba's story, and suggest they consider putting the "Miss Shirley" airplane in the museum. The Assistant Director of Aeronautics, Louis S. Casey, checked with the A.M.A., who verified Kirn's story, and they accepted the airplane in a letter to Kirn dated October 1, 1970.

The airplane is still in Oba's workshop, hanging on the wall. Oba never sent the airplane because the engine cowl, wheel pants, and engine drive connectors were stolen from his garage.

If any individual or a club, similar to the Eugene Prop Spinners, are looking for a good cause to champion, contact Oba St. Clair at 5053 Larkwood, Eugene, Oregon and tell him you want to help put the airplane in the Smithsonian where it rightfully belongs. He might accept help to get it back to the original condition. If you're not that ambitious, send a card saying, "thanks, Oba" and he will understand. •

Auto Champs . *Continued from page 17*

Radios were very closely guarded by the contestants. . . Logically. . . No bumped switches or trims in the impound. Most were locked in briefcases or wooden boxes with handles. Fliers carried keys to the flight line and unlocked the cases, screwed in sticks, extended antennas, flew, then reversed the procedure, locking the cases before they were picked up and returned to the impound.

Brief random thoughts. . .

- Score flash cards were not displayed. Actually, there was little use for them, as after the "novelty" wore off the first day, the contest became a private affair, with the only spectators being fellow fliers, helpers, officials, and a few press members.
- Speaking of press, there were only a few direct representatives; ourselves, Tony Dowdeswell for RCM&E, von Sandor for Flug Modell, and Susumu Tsubota for R/C Technique in Japan. Ed Keck was reporting for *Model Aviation*, and Sally Brown was to write a story for *M.A.N.* If there were others, we didn't know about them.
- U.S. modelers acted as Team Managers for some of the lone entrants. Ed Izzo managed for Mike Lynch, of New Zealand, and Earl Witt managed for Per Andreasen, of Denmark. Isao Matsui, a former Japanese team member and

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ATOM, ARDEN, Dooling to Wasp model engines, race cars, spark plugs wanted. D.L. Wehrly, 4325 Winding Way Dr., Fort Wayne, IN 46815.

SCALE DOCUMENTATION: Photo-copied 3-view, specs — $1.00; all info available — $2.00. Refund if nothing available. A. Daugherty, 3407 Leon, #1510, Bryan, TX 77801.

FOR SALE: Rossi .15, Anderson rework for megaphone pipe. Serious only. Robert Krome, 1705 E. 238 St., Euclid, OH 44117.

ENGINES — New and used. Original Atom castings, Vivell parts, balsa kits. List 30¢. T. Crouss, 100 Smyrna St., West Springfield, MA 01089.

SEVEN full pages of ready-built models and used equipment bargains in the last issue of "Hobby Swap News." Hundreds of items of all descriptions. 35 word ad only $4. BUY-Sell-Trade, your first ad free with subscription. $10/yr. (10 issues), $19/2 yr., $27/3 yr. Add $3/yr. for first class postage. Canada and Mexico must use 1st class rates. MC & Visa accepted. Hobby Swap News, Dept. FLC-31, Box 834, Santa Maria, CA 93456.

R/C PILOT LOGBOOK and FLIGHT RECORD — Here for the first time is the logbook designed for the R/C pilot. No more guesswork. Valuable tool for expert, sport, or novice fliers. Durable black hardbound cover with gold stamped lettering. $6.90 each postpaid. (Ohio residents add $.31 sales tax.) Champion Hobies, 3715 Reemelin Rd., Cincinnati, OH 45211.

020 REPLICA Old Time Kits. Free list. Write J&R Models, 5021 W. Sheridan St., Phoenix, AZ 85035.

KITS FOR SALE: Planes, boats. Ambroid, Amcraft, Berkeley, Cleveland, C. Goldberg, Comet, Consolidated, Fox, Enterprise, Guillows, Jasco, "Japanise", Kenhi, Midwest, Model Craft, Playtron, Shure Flite, "German" Sterling, "Hobby Shack." Send a legal size envelope with a S.A.S.E. E.T. Frank, 12469 Walsh Ave., Los Angeles, CA 90066.

ROPER 1.9 cubic inch 2 HP engines at super sale prices. New factory assembled $45.00. Ready to assemble kits $39.00. Prop. adaptors $13.95. Prices include shipping and handling. Will ship C.O.D. Dealers inquiries invited. Everett H. Yost, Dept. MB, R.R. #1 Box #37, Sauk City, WI 53583.

President of I.M. Products, was Team Manager for Jung Bok An, of South Korea.

• Earl Witt had an unexpected dip in the Pacific Ocean during the contest. He was the lone volunteer to go after Irish team member Jim Clarke's airplane when he lost control and it landed in the surf (couldn't say the contest wasn't held at sea level!). Earl figured his boots wouldn't be harmed if he just waded in and picked up Jim's plane as the next wave brought it closer. Unfortunately, the bad undertow had created a depression on the bottom, and as Earl reached for the plane, he tripped and fell in just as the wave broke. Actually the unexpected dip felt good in the extreme heat, and it didn't take long to dry off!

• Canada's young Greg Marsden, sticking to his flight pattern, caused an illegally overpassing helicopter to take evasive action, received a refly. Placing 15th in his first World Champs, he's another flier to watch.

• Veteran campaigner Benito Bertolani blew a plug when starting one flight, got off with only seconds to spare, and did a roll as soon as he had enough altitude to clear the wing tips. Show off? Maybe . . . but it also relieved the tension built up in those moments and relaxed everyone, including himself. He finished 12th.

• Not so lucky again was Irishman Jim Clarke. After the fly-into-the-surf incident, Jim came up for his last flight, black derby in place over his eye-shading straw hat, with a back-up airplane. Somehow, the servo leads had gotten switched, and for three frantic minutes, he, his helper, and Team Manager Shay Murphy (is that an Irish name!) switched connectors; getting retracts on elevator, rudder on throttle, elevator on aileron, etc., but never quite the right combination.

Japan unofficially announced its desire to host the 1983 World Champs. While many Europeans would have preferred one closer to home for '83 and postponing Japan until 1985, there were no offers made to date, so it may end up that way. Unfortunately, Japan is an expensive country to visit, but organizers are already researching the problem, with the idea of getting support from industries in and out of the modeling industry. It's an adventure we would certainly look forward to, and in the meantime, we'll have to expand our knowledge of the language. "Thank you" and "Good morning" won't get us too far! •

R/C World . . . *Continued from page 12*

kits, two Cannon radio systems, and a completely built, covered, and skillfully painted Bridi "Miss Los Angeles" Brown Racer!

The overall quality of flying was excellent, and the facility was very deluxe, featuring paved runways with a rich grass area separating the strip and the roofed-over pits. Adding to the fun on Sunday, the Los Angeles NBC-TV affiliate, Channel 4, held its weekly Sunday afternoon interview show at the field, going on the air shortly after the competition was concluded. The TV's well-known weather personality, Pat Sajak, interviewed Bill Cannon, who managed to get in a little pitch for R/C modeling in general and Cannon radios in particular!

In our estimation, the most outstanding performance was put on by Chuck Fuller, whose big quarter-scale, Kawasaki powered Stearman PT-17 flew and sounded like the real thing. Slow, low inverted passes showed Chuck's capabilities at the controls and his trust in the consistency of the big Kawasaki. He could shove on full power and half-outside loop to recover from the inverted pass!

This is definitely an affair to attend in the future, and perhaps, if we're lucky, we can all keep the contest date a secret from John Lockwood! •

Plug Sparks . . *Continued from page 42*

and three-view drawings of the Molnar 78. The book sold quite well and was responsible for many dealers stocking the unpublicized motor.

Designed and manufactured by the Molnar Model Motors Mfg. Co., 118-120 Albermarle St., Trenton, NJ, the Molnar 78, a reduced version of the Molnar 98, was aimed at the modeler who liked big models and also to the then budding would-be radio controllers looking for something else besides a Forster 99 to power their heavily loaded models.

As indicated in previous articles, all engines are drawn from actual examples. This month we are indebted to David Brodsky, 5542 Lauren Dr., San Jose, CA 95124, for the use of his fine specimen. At first glance, this Molnar appears to be rather crude, but on close inspection, the modeler finds the work has been put inside where performance depends on good fits.

The Molnar people advertised their ringless piston was made from solid Chrome Moly bar stock, heat treated, ground, and lapped within one ten-thousandth of an inch. Based on this fine fit, a claim was made for 12,000 rpm using 15 or 16-inch propellers. The engine came guaranteed to perform as advertised.

For the technically minded, the Molnar engines feature cylinders turned from solid chrome molybdenum. This material was also used for the head and piston, as noted above. Wrist pin was tool steel with two keys to prevent sliding and scoring of the cylinder walls.

High speed bronze was used for bearings in the connecting rod, held in place by a split washer. The crankcase, made of aluminum alloy, featured Oilite bearings pressed into place. A balanced crankshaft was machined from Chrome Moly, heat treated, and then fitted with a cam on the outer end of the tapered crankshaft to help promote good compression and vacuum in the crankcase. Aluminum alloy was used for most of the miscellaneous parts, such as the timer arm, air intake, etc.

The Molnar engine was square (one-inch bore and stroke) with a displacement of .7854 cu. in. Actual bare weight was 16 oz., with advertised flying weight of 18 oz. Strangely enough, no horsepower claims were made, but on the other hand it was stated the engine would handle nine-pound models easily.

Like so many of the post war engines, the Molnar was no exception and ended a victim of the new glow plug craze. Another interesting engine passed into limbo.

THURSDAY, AUGUST 6:
O/T CONTROLINE

Here is the newest series of old timer events that appear to be catching on, with attendance improving every year. This year's attendance in Ignition powered Stunt models was most heartening, as the boys are starting to get after the columnist for his "easy" wins.

Photo No. 7 shows the real stunt man of all stunt men, George Aldrich, with an Orwick 64 powered version of the Go-Devil, Senior. This design, by Palmer, is the first one to break the string of Yates wins with a flapped wing. As you can see, the years have been very kind to George, as about the only thing different about George is his girth from eating too many of those Texas steaks with all the trimmings.

George, who originally resided in San Antonio at Shady Springs Ave., then moved to Edinburg down by the Rio Grande, has again relocated to San Antonio. George can now be reached at 12822 Tarrytown, San Antonio, TX 78233. Welcome back to San Antonio!

Photo No. 8 shows Don Still, Box 1202, Beaumont, TX 77704, with his original design called Victory, still powered with an Atwood Champion Glo-Devil.

In the early days, there was many a battle between Still and Aldrich for top honors in the Stunt Event. When George hit on the idea of flying a large model slowly through the maneuvers with his design, the "Nobler", Aldrich completely changed the whole idea of pattern flying. Up to then, if you couldn't do 100 miles an hour, most fellows figured you couldn't get through the

R/C MODEL BUILDER's 40 BEST SELLERS !

SEE PAGE 100 FOR ORDERING INSTRUCTIONS. COMPLETE PLANS LIST SENT WITH EACH ORDER.

No. 6781 LOCKHEED P-38L $12.00
R/C Sport Scale, balsa and ply const., a trophy winner, big, 8' span. Art Johnson.

No. 3771 WACO UPF-7 $5.00
Stand-off R/C scale (1.8"=1') of one of the prettiest Waco biplanes. Span 54". R. Steely.

No. 12711 CURTISS-WRIGHT JR. $4.50
Two inch scale model of famous pusher light plane. R/C By Ralph Fidance

No. 6771 GIPSY MOTH $12.00
Exact quarter-scale (7-1/2 ft. span) R/C of famous D.H. bipe. By Bill Northrop.

No. 1722 PUSS MOTH $4.00
Chet Lanzo's famous rubber F/F scale Puss Moth returns! By Hal Cover

No. 680-C.P. GRUMMAN F3F-1 $4.00
Reprint of Miniature Aircraft Corp. plans plus ribs and bulkheads from printwood.

NO. 4742 CESSNA AW $3.50
Jumbo scale rubber powered model of a 1928 classic. Span 48". By Jim Adams.

No. 1731 SPROOSE GOOSE $5.00
EAA type R/C sport biplane, mostly spruce, for 60 engines. By Bill Northrop

No. 11781 TRAVEL AIR D4D $8.00
Accurate 2-inch R/C scale model of famous Golden Era biplane. By Bill Seidler.

No. 11731 BIG JOHN the FIRST $7.50
Modified prototype of editor's notorious monster R/C biplane. By Bill Northrop.

No. 1080-C.P. STINSON RELIANT $4.00
A 3/4" scale model from 1934 Ideal kit. Excellent plans for F/F rubber, R/C, etc.

No. 1723 WHITE TRASH $4.00
A proven, trophy winning R/C sailplane with 7 and 10 ft. span. By Rick Walters

No. 7801 APPRENTICE $5.00
Continually popular genuine R/C trainer for .19-.35 eng., 72" span. Bill Northrop.

No. 175-O.T. FLYING QUAKER $5.00
First gas model kit by Megow, 1937. Span 7 ft. Redrawn by Phil Bernhardt.

No. 9783 R/C STEAM LAUNCH $6.00
Natural finish mahogany planked 40" OA "African Queen" type. Kilburn Adams.

No. 2761 DRAGONFLY $4.50
R/C funship, looks like giant rubber stick model. Superb trainer. By Tex Newman.

No. 8741 WOODY PUSHER $4.00
Easy to build & fly semi-scale R/C home-built, like C.W. Jr, .09-.15. Chris Moes.

No. 9781 GREAT LAKES TRAINER $4.00
Sport scale biplane for 3-4 channels and .19 engines, 40" span. By Bill Northrop.

No. 4801 BRUSHFIRE $6.00
Contemporary design being used by several top pattern fliers. By Ken Bonnema.

No. 2801 TIPORARE $6.50
Top pattern ship in 1979. Flown by Dave Brown at World Champs. Dick Hanson.

No. 4751 R/C AUTOGYRO $4.00
Semi-scale twin rotor R/C autogyro for .35 engines. Very stable. By Skip Ruff.

No. 9792 CRICKET $3.00
Balsa profile fuse, Ace foam wing 1/2A quickie for 1 or 2-ch. radio. J. Headley.

No. 1174-O.T. LANZO STICK $3.50
Rubber stick winner, '40 Nats. Span 4½'. Still good in Unlim. By Phil Bernhardt.

No. 574-O.T. The T-D COUPE $5.00
Classic high wing 1936 'C' cabin gas job. Span 64". Redrawn by Phil Bernhardt.

No. 773-OT LANZO 8' GAS MODEL $6.00
Chet Lanzo's famous "Record Breaker." Two large plan sheets. By Phil Bernhardt.

No. 874-O.T. POWERHOUSE $5.00
Taibi's famous design for Forster 99 ign. Great for R/C O. T. By Phil Bernhardt.

No. 174-OT EHLING '37 GAS JOB $5.00
Frank Ehling's 8 ft. span 1937 gas model. Still winning! Drawn by Phil Bernhardt.

No. 477-O.T. CLOUD CHASER $1.50
This 30" span stick job from 1938 MAN is OT, FF trainer, Unlim. Bruno Marchi.

No. 12792 EXCALIBER II $5.00
R/C tunnel-hull outboard constructed of plywood, for K&B .21. By Jerry Dunlap.

No. 12741 85' HARBOR TUG $8.00
Complete plans (3 sheets) for R/C tug. All wood, 37" LOA. By Francis Smith.

No. 7724 TRAVELAIR '2000' $5.00
Two inch full scale Classic R/C biplane. Proven flier, 60 power. By Bill Northrop

No. 7721 FAIRCHILD 51 $3.50
One inch scale Classic for R/C, also F/F gas or rubber. By Hurst Bowers

No. 879-C.P. CURTISS F-11C-4 $4.00
Reprint of Miniature Aircraft Corp. plans plus ribs and bulkheads from printwood.

No. 8723 TAYLORCRAFT, F/F $1.50
Rubber powered, 24-inch scale seaplane. An excellent flyer. By Walt Mooney

No. 579-O.T. TAYLORCRAFT $12.00
Quarter-scale in 1941! Famous 9-foot design kitted by Miniature Aircraft Corp.

No. 10753 SUPER PUP $3.00
Profile C/L stunt ship for .29 to .36 power, 42" span. Easy-built. Mike Parenteau.

No. 8781 R/C VELIE MONOCOUPE $9.50
Light-weight 1/4-scale for belt reduction electric power, 90" span. Bob Boucher.

No. 4733 PEA POD $4.50
A 36" long R/C sailboat easily made of 1/8" Luan mahogany. Clever sail control. Full size patterns. By Tom Protheroe.

No. 5761 ALBATROS $5.50
R/C sport scale post-war German lightplane. Span 74", .36 eng. By Jeff Breece.

No. 176-O.T. KORDA WAKEFIELD $2.50
The classic of all rubber powered competition free flights. By Phil Bernhardt.

maneuvers.

In line with that, Photo No. 9 shows George living it up with an old Nobler brought to this meet by the columnist for the express purpose of having Aldrich enter and compete in the Glow Stunt Event. Although George didn't win, we could find lots of reasons why he didn't, but the most important one was that he had to fly a model set up for counter-clockwise flight in a clockwise direction with the handle inverted. Try that one some time!

Talk about nostalgia! George attracted a goodly crowd when he flew the Nobler for the first time in about 20 years (the Nobler was designed 30 years ago). All things considered, George put on a real show for the boys.

Photo No. 10 is one of those frustrating things that led to the popularity of glow engines. The builder, a local hobby dealer whose name escapes the writer, had nothing but coil problems on the field. Built on the same lines as the writer's model, this Dragon was powered by a Madewell 49, a real fine performing engine that earned the title of "A 49 engine that runs like a 60".

In the wrapup of the photos of the controline activities, we must acknowledge the tireless efforts of the judges who sat for hours without complaint. Arlie Pressler, who judged last year at Wilmington AFB, is again shown in Photo No. 11 along with a young fellow, Andy Harissiadis, who has earned an enviable reputation at his tender age around the controline circles. We couldn't have done it without you, fellows!

Let's take a look at the results for O/T Controline:

STUNT, GLOW

1. Jim Casale	319
2. Don Still	256
3. George Aldrich	244

STUNT, IGNITION

1. George Aldrich	145
2. John Pond	55

FRIDAY, AUGUST 7: FREE FLIGHT

When Friday finally came around, so did the best weather at the Sequin AFB Nats. Little did the other officials know that this columnist had put in his reservation for good weather for this day six months ago! Think we're kidding? Go look it up in the Farmers Almanac!

Photo No. 12 shows Ralph Joubert of 6108 Irving, Metairie, LA, with a Comet Interceptor powered by an Ohlsson 19 engine. Timer and assistant is Terry Rimmert, from Florida, who has served as the Unofficial Free Flight Events Coordinator for the last six or seven years. Somewhere along the line, Terry has grown a bushy beard reminiscent of the early 49er prospectors, and has kept it ever since. Terry sez he is gonna keep his trademark indefinitely.

Photo No. 13 shows another modeler whose name we're not sure of. Our best guess is Curt Sanford, who entered in the late stages of the day to fly his snappy looking So Long. He will have better luck next year!

How could we write a column without having a picture of Sal Taibi, who seems to pop up at all the big meets. Photo No. 14 shows Sal with a Jack Roesen design called the Swoose. This Chicago design has proven to be quite popular in O/T circles.

Sal was extremely lucky when his timer and L/T stuck, resulting in a practically out-of-sight flight overhead. Fortunately, as the model started to drift off in the distance, it struck a cross current and came back a considerable distance, enabling Taibi to recover the model on foot. Ya gotta be lucky to win sometimes!

On the other hand, Sal Taibi's Brooklyn Dodger was performing excellently, with the Ohlsson front rotor 29 practically hauling the model vertically. Needless to say, he also placed high in Class B. Sal was so fagged after the third flight, that after finding a fourth flight would be necessary to win, he simply said, "I'll be glad to take second with these burnt out feet of mine."

Photo No. 15 is not the best in the world from a photographic standpoint but it does serve as a lead-in for the new Twin Pusher event this year, sponsored by Bill Baker, 1902 Peter Pan St., Norman, OK 73069. Bill is so pepped over this event (especially after his win at the Wright-Patterson AFB SAM Champs in 1980) that he felt everyone should enjoy the fun.

Bill flew the same model again and again, and won! Bill hopes to see more next year. In that same line of thought, George Perryman, who has been sponsoring the Junior O/T Rubber Event longer than most fellows have been competing, suffered a bit of disappointment when the trophies went begging for lack of entries. This is truly a shame fellows; we must encourage the younger set, or pretty soon we are going to be sitting in our wheel chairs wondering what happened to the O/T events.

We acknowledged the help we got on Thursday; therefore, it is incumbent we recognize the efforts of the free flight timers. We didn't get them all in Photo No. 16 (and we don't have all the names), but it's about time the unsung heroes of the contests got their picture in the magazine. Hope you enjoy seeing yourself as we remember and appreciate your efforts.

Talking about unsung men, Bob Lane, of Lake Jackson, Texas, is one of those ardent modelers who enter all phases of modeling for the sheer fun. Bob says he just likes associating with the fellows, as most of his models are not that competitive, as seen by his Saddler Pacemaker for R/C and Veco Papoose with McCoy 09 for R/C. Forgot what his free flight stuff was. The whole point is that these people are what make up the bulk of the SAM membership. All good guys!

I know you have been waiting to see your name in the winners circle, so here are the free flight results:

ANTIQUE

1. Leslie Norman (Clipper
2. Dave Sweeney (Miss America)

CLASS 020 REPLICA
1. Merle Shammo
2. Sal Taibi (Playboy)
3. Leslie Norman (Stratostreak)
CLASS A
1. Ralph Joubert (Interceptor)
2. Bruce Norman (Ranger)
3. Leslie Norman (Ranger)
CLASS B
1. Sal Taibi (Dodger)
2. Bruce Norman (Ranger)
3. Leslie Norman (Ranger)
CLASS C
1. Bruce Norman (Clipper)
2. Sal Taibi (Swoose)
3. Greg Benepe (Bombshell)
RUBBER CABIN
1. George Perryman
2. Jim O'Reilly
3. J. Wernicke
RUBBER STICK
1. George Perryman
2. Jim Quinn
3. William Baker
TWIN PUSHER
1. Bill Baker
2. Jim O'Reilly

THE WRAP-UP

Writing a conclusion to this article is going to be a little long winded this time. We missed having that section, "Thirty Years Ago, I Was. . ." simply because we ran out of space. This extremely popular section we will continue as long as you, the reader, are willing to tell the others of your early experiences.

Also missed putting in one of Bruce Lester's old photos but we did get a tremendous break from Bill Effinger when he submitted Photo No. 17, showing Joe Raspante's "Snow White" at the 1937 Nationals.

This gorgeous plane has been the object of much admiration from generations of modelers. If this columnist had a dollar for every time he has been asked for the plans to the "Snow White", he could have retired 10 years earlier.

Now, the good news! Bill Effinger, who has started up again under the company name of W.E. Technical Services, P.O. Box 76884, Atlanta, GA 30328, has informed this writer the Snow White plans will finally be available in late January 1982. Write for Plan Set RCFF-7, including $14.95 to cover costs.

For those who want to fly it on radio control, Effinger will provide the option for three or four channel operation. Those who are not familiar with the Snow White, the wingspan is 68 inches with 700 sq. in. of wing area. Weight generally comes out around 4-1/2 lbs., making it a beautiful sport model.

After all that introduction, we should include Photo No. 18, showing Bill Effinger receiving the National Free Flight Society Hall of Fame Award at the NFFS Symposium at San Marcos, Texas. For those Johnny-come-Latelies, William Effinger was practically a household name when it came to model kits. Starting back in 1934 at Berkeley Place (now you know where the name Berkeley Models came from!), Bill started out by offering kits of the Buccaneer and Cavalier.

Once things got rolling, Bill was putting out kit models like crazy. After World War II, his output was one new flying scale a month. This represented a tremendous amount of drive and organization. It still amazes this writer that Berkeley Models finally folded.

In short, a better man could not have been picked for a NFFS Hall of Fame Award. We're proud to have you Bill!●

Workbench . . *Continued from page 6*

musical group in the bar played every night from 9 until 3 in the morning! If only the repertoire were larger, it might have helped. If we hear "New York, New York" one more time . . . it's a shame . . . use ta love that tune. . . It was also tough on judges and fliers who had to be on the line at 7 o'clock in the morning during the competition. Hanno and Hans Prettner were smart. They took a room on the street side of the hotel.

Next morning we went out to purchase a few items to tide us over until (we hoped) the missing luggage showed up. First purchase was a pair of leather sandals, from a peddler, about 20 feet from the front entrance of the hotel. The price started at 250 pesos (about $10) and wound up at 100 (about $4), including a plastic bag to carry our heavy shoes and sweaty socks.

The main boulevard of Acapulco, along "hotel row", is completely torn up at this time, and pedestrian traffic really travels at its own risk. We stepped around completely unguarded holes in the sidewalks from two to three feet across and 10 to 15 feet deep. At the curbs, there were ditches one or two feet wide by six feet deep which you either jumped over or navigated across weathered 2x8 planks.

Back to the hotel for shower number two and grab a bus to the R/C airport for the opening ceremonies. The "airport" was, we were told, built in the early 1940's by the U.S., one of many emergency strips located along the Pacific Coast in the event of possible invasion from the sea. We'd estimate it to be about 100 feet wide by 2,000 feet long. The lone carcas of a Navy SBD fuselage indicated that at least once, it was used by our forces. It was parallel to, and 150 yards (about a five-iron shot) from the ocean, and ran roughly east-west. Pilots and judges faced south, and the steaming, hot sun didn't cause a problem until possibly around 4 o'clock, long after flying stopped each day . . . except Sunday.

The buses, which ran more or less hourly from the hotel to the airport, must have dated back to the '40s. Though thoroughly beat up and decrepid on the outside and inside, they were fairly clean to ride in, and it was amazing how the drivers could handle them in spite of the amazingly loose steering. We didn't even want to think about the air[illegible]draulic brake line integrity, and [illegible]of the engines and drive trains pretty much limited conver-

sation to an occasional "Yeow!" as the rigid suspension jumped from one huge pothole to another.

The governor of the province appeared for the opening ceremonies, which included three parachutists, a goose-stepping color guard, and a brass band... Have you ever seen one of those British comedy movies featuring either Peter Ustinov or Peter Sellers, where there's a little band to greet the arrival of an official party, and nobody seems to be playing the same tune? Well folks, we've seen and heard one. They *do* exist!

Luck was with us! Back at the hotel and after a luke-cool beer or two at the bar, we arrived at our room just moments before the desk called to say they were sending up our missing luggage. It was delivered without explanation . . . but delivered!

We celebrated by taking shower number three for the day, put on familiar clothes, and headed for dinner.

Next day, after returning from the flying field, we headed for the beach and got some more surprises. The full significance of the federally owned beach property became evident. As you lie there in the sun, acting like a rich tourist, there is a constant flow of peddlers and beggars going from person to person attempting to sell bracelets, necklaces, clothing, blankets, coconuts, peanuts, dishes of fruit, etc., or simply begging for money. If you haven't noticed it during the bus rides, it was graphic here... Mexicans are very poor or very rich, and there aren't many in between. Acapulco is like those fake western towns you've seen in the movies. A whole bunch of store fronts facing the street, and nothing but props on the other side. Here, however, the store fronts are the fancy hotels along the beach front, and about one block back from there are the props . . . real Acapulco; acre after square acre for miles in any direction of squalor and poverty, hundreds of dirty streets, thousands of poorly dressed people of all ages, tiny little stands set up along the sidewalks where poor people try to sell some little food or clothing items to other poor people... Unless you can ignore this, there's no way you can really enjoy the supposed splendor of Acapulco. It's very depressing . . . and we couldn't ignore it! Now we realized why there were armed guards patroling the fence along the airport strip. It wasn't to protect the airport from us, it was to protect us from the peddlers and beggars who surely would have been there otherwise!

We do not feel that all of Mexico is like Acapulco. In fact, some of our Mexican modeler friends who attended the World Champs were quite concerned that we would feel that way, and pointed out that Acapulco is primarily a tourist oriented city, and does not represent many of the finer cities in Mexico. We believe them and apologize if our comments offend in any way. Incidentally, because Anita can speak the language, we chatted with quite a few of the peddlers, especially the youngsters, and found them to be very polite and having a great sense of humor. They would drive a hard bargain when trying to sell something, but were very patient and trusting, sometimes leaving their wares with us while going to get other samples.

The rest of our story has to do with the World Championships itself, which is really a separate chapter, as contests like this go on all over the world, almost totally ignoring the immediate surroundings. We would, however, like to make one suggestion to Acapulco's equivalent of our Chamber of Commerce . . . if there is such a thing. The words are "Last Impression". It needs improvement.

When you go to the commercial airport at Acapulco to leave Mexico by air, there is one line to check in, whether you already have a ticket or not. While you wait for endless time as some of those in front of you buy tickets with cash, cards, or traveler's checks, your plane could be long gone . . . and there's usually only one a day. Then, before you can get to your plane, you have to pay an "airport fee". Right now it's worth about $4 per ticket. In exchange for this expense, you are allowed to go sit in a waiting area by your gate, where the temperature and humidity are about 10/10 above the 90/90 we mentioned earlier. About the time you are thoroughly cooked, you are finally led to nice warm buses which will not move until all standing room space has been occupied, and then driven to the plane, which is only about one city block away. After you climb the long stairs and enter the plane, you look to the left and nod to the flight crew, who smile back knowingly as that first blast of ice-cold dry air begins to turn you back into a human being once more. They must turn it on full bore on purpose, just to rub it in, but it sure feels good!

Anyway, remember that story about the quiz show, where first prize is a week in Philadelphia, and second prize is two weeks in Philadelphia? From now on, when we tell that story, we're changing the name to Acapulco... •

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Jim Gupton

Jim Gupton
Charlotte, NC

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ORIGINAL **PENETRATING** FORMULA
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MRC'S YOUNG STAR GLIDER IT'S COMPLETE SIMPLE AND IT PERFORMS ...BEAUTIFULLY

A "COMPLETE" DIFFERENCE...

This Young Star is the most complete and versatile glider kit you can buy...and at a remarkable price. Sure it's maneuverable and easy to fly, but what makes it different is that unlike so many others, this one is totally complete and actually easy to assemble. You won't start building only to find yourself running down to the hobby shop to buy some missing hardware. It's all here in the box. Hinges, control horns, push rods, tire, canopy, and decals. And that's not all. We also include a power pod as well as a built-in tow hook.

Unlike conventional glider kits, the Young Star comes with .049 size engine pod. Pod also available separately.

A VERSATILITY THAT GETS YOU OFF TO A FLYING START...

Mount an .049 engine to the pod for power launch or ready it for tow takeoff. Assembly is a snap. Our step-by-step instructions will take you through the procedure right through installation of your radio. It couldn't be simpler.

EASY PIECES...

For instance, the Young Star's fuselage (a big 31 inches) comes in one impeccably finished piece. This not only saves time, but gives your finished model a crisp, smooth, professional look. At the same time, the wing goes together with just two precisely molded pieces. The whole kit is almost as much fun to build as to fly.

Comes complete with tow hook for high start launch.

Take it up and you'll find our low density foam design makes for long soaring sessions and excellent flight characteristics.

Whether you're a novice looking to get some fun and excitement out of a two channel system, or you're already an established glider pilot or Sunday sport looking to test your skills hunting up the thermals, MRC's Almost-Ready-To-Fly Young Star is just the ticket.

Flies with 2-channel radio for rudder and elevator control.

All the hardware is here, easy to assemble and complete.

Model shown here has been finished in color for photographic purposes.

See it at your hobby dealer... and by the way, check out the economical price, that's the most fun of all.

Engine not included

Model Rectifier Corporation, 2500 Woodbridge Avenue, Edison, New Jersey 08817