ICD 08545

R/C MODEL BUILDER

volume 9, number 94 $2.00 NOVEMBER 1979

ISSN 0194 7079

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America's Waterways await you.

The Futaba 6JB makes maximum model boating more than possible, it makes it simple. Using the total performance electronics of the J-Series, the new 6JB gives you the control it takes for total scale realism. Built into our 6 channel system are a dual throttle mode, an exclusive throttle/rudder mixing circuit and heavy duty, watertight S107 servos. And, as with all J-Series systems, you've got Direct Servo Control, modular AM or FM RF boards, sophisticated logic circuitry, built-in servo reversing, adjustable, open-gimbal control sticks, ATV and even programming for rudder and throttle. But don't give our 6JB a twenty-one gun salute, just tell your ship that her radio has finally come in.

Program your next cruise. Adjustable throw rudder and mixing controls are concealed in the back of the T6JB transmitter.

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airplane engines

K&B Engines offer more! . . .

More Quality — K&B is the symbol of quality in the model engine field.

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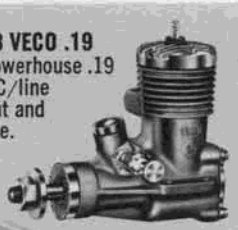
A powerhouse .19 for C/line stunt and scale.



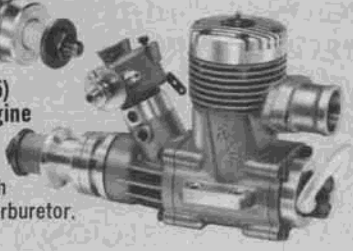
K&B VECO .19 R/C
Equipped with "Squish-band" head . . . for cooler running and increased speed.

K&B 6.5cc (.40) Racing Engine
For R/C Pylon Racing or U/Control. A real powerhouse.

K&B 3.5cc (.21) R/C Engine
A real work horse for its size. Successful as both airplane and car engine.

K&B 3.5cc (.21) Front Rotor F/F or U/C
A record breaking Free Flight and U/Control engine.

K&B 7.5cc (.45) Ducted Fan Engine
"right out of the box" Complete with Perry Pump Carburetor.

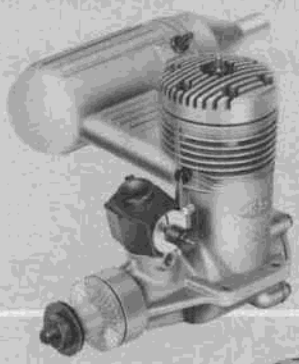


K&B .40 R/C with Perry Pump/Regulator
Also included larger Perry Carburetor . . . gives additional 1000 r.p.m.

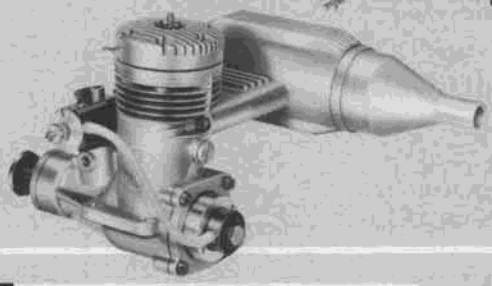
K&B .40 R/C
A front rotor engine for Pattern, Scale and Quickie 500 Pylon Racing.

K&B 6.5cc (.40) Front Rotor
For F/F or Pylon Racing. A real powerhouse.

K&B 6.5cc (.40) R/C Front Rotor
Unbelievable horsepower. For R/C Scale and R/C Pattern.



K&B .61 R/C with Muffler
A top performing Pattern Engine. It competes with the best.

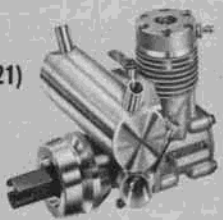


K&B .61 R/C with Perry Pump/Regulator
Features the most advanced step in model engine fuel systems . . . fuel is fed into system.

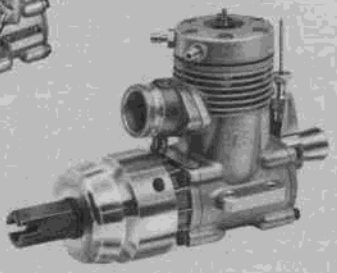
marine engines

K&B Marine engines have proven to be the most powerful "out-of-the-box," record breaking engines available. Outboard or Inboard each is a champion in its class.

K&B 3.5cc (.21) R/C Inboard Engine
For Hydro, Monos and Deep V's.



K&B 7.5cc (.45) R/C Inboard Marine Racing Engine
Superb Power. Dependable all-purpose engine.



K&B 3.5cc (.21) Outboard Engine
The first of its kind . . . setting the pace for others to follow.

Patronize your Local Hobby Shop for the Complete K&B Line

K&B MANUFACTURING
12152 WOODRUFF AVE., DOWNEY, CA. 90241

R/C MODEL BUILDER

NOVEMBER

1979

volume 9, number 94

621 West Nineteenth St., Costa Mesa, California 92627 Phone: (714) 645-8830

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FEATURES

SCALE VIEWS

CONSTRUCTION

COVER: Pam Smith, Simi Valley, California, provides the final touch to a beautiful Malibu Beach background for this Reed Packard photo of Bob Smith's "Sea Breeze," a 100-inch ERF (Entirely Ready-to-Fly) R/C sailplane. All parts of the ship are constructed of molded fiberglass, with foam sandwiched into the flying surfaces for added rigidity. For further information . . . on the aircraft only . . . see page 99.

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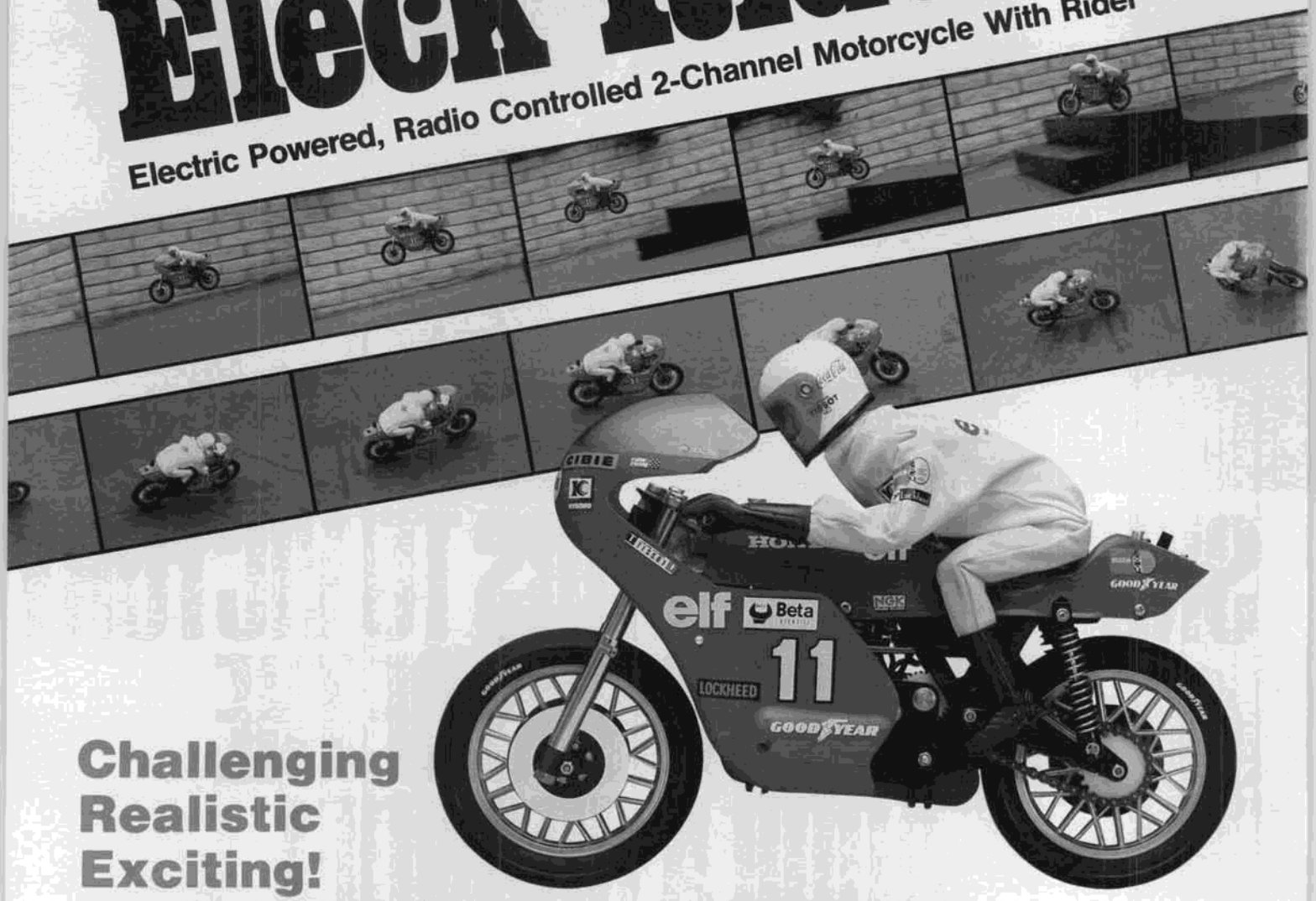
Kraft's Eleck Rider

Electric Powered, Radio Controlled 2-Channel Motorcycle With Rider



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- **Proportional Speed and Brake Controls**
- **Special Chassis Balance Control**
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- **Front Fork Rubber Damper Protects Servos**
- **Genuine Chain Drive**
- **Patented Steering System**
- **13.6" Long, 9.75" High, 3½ Pounds, 25 MPH Maximum Speed**

Kraft's Eleck Rider is the first real innovative change in the sport of radio control in many years. It steers and handles like a real motorcycle with positive control. It is more exciting and satisfying to drive than a radio controlled car, and great fun for beginning or advanced modelers. The average person becomes reasonably accomplished after ½-hour of practice. Whether for oval racing, motocross, road racing, or jumping, this new machine will unquestionably open an entirely new radio control sport. Order P/N 004-014. (Sugg. retail price, $79.95).

Recommended for use with the motorcycle kit is Kraft's KP-2A or KP-2AW 2-channel radio control system. Also required are the rechargeable 6 cell Ni-Cad battery pack (P/N 004-015) $24.95 and the Ni-Cad battery charger (either the Fast Rate Auto Charger P/N 004-005 $24.95, or the Home Wall Charger P/N 004-004, $7.95).

The Eleck Rider is also available as a Ready-to-Run with a 2-channel radio control system installed. A motorcycle rechargeable battery pack (P/N 004-015), and a fast rate charger (P/N 001-005) are included. For Eleck Rider complete, order P/N 004-016. (Sugg. retail price, $229.95.)

See your local hobby dealer for more information on the exciting Eleck Rider, and on Kraft's entire line of quality radio control products.

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Skip Miller of Boulder, Colorado, won first place overall and first in unlimited class, flying an Aquila Grandè with a Cox/Sanwa Medalist radio.

Hoyt Holley of Bethel, Connecticut, won first place overall duration plus first in standard class flying an Aquila.

Tim Renaud of Irvine, California, won first in junior class with an Aquila Grandè and Cox/Sanwa Medalist radio.

The Aquila Grandè is the latest addition to our outstanding line of Airtronics kits. Designed for multi-task, unlimited class competition, the Grandè has already established its championship performance. It can help you to join the winner's circle.

Check out the outstanding features of these great kits and radio systems at your local hobby shop.

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For .09 to .15 Engines
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INCLUDES PRE-BENT SHOCK-ABSORBING GEAR, NYLON GEAR BRACKET AND STEERING ARM.

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COMPACT PERFORMERS
IDEAL FOR SMALL FIELDS

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See your dealer first! To order direct, add $1 postage under $10. Postage free over $10. No C.O.D. Send $2.00 for latest catalog of kits, accessories and supplies by SIG and other major companies.

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"Honey, why don't you concentrate on one or two events?"

from Bill Northrop's workbench

WHAT! SO SOON?

With the last major trade show of 1979 only three months old, it just seems too soon to be talking about 1980 trade shows. However, the Pasadena, California International Modeler Show, the first for the 1980 season, is only three months away.

This third annual affair will again be held in the Pasadena Center, on January 12 and 13, 1980, one week prior to the famed professional football Super Bowl, and two weeks after the equally famed Rose Bowl and Parade, all in Pasadena.

The 1980 show will again feature the Indoor R/C record trials, which were the big hit in 1979. The record attempts, for both heavier and lighter-than-air models, take place during the show, with the models flying over the heads of spectators and exhibitors. With a maximum allowed wing loading of 3 ounces per square foot, the HTA models are light and slow enough to cause only small concern for safety while flying. Pilots, as well as models, must qualify to fly in the exhibit hall by demonstrating their ability on the Thursday evening prior to the show. This year, TV cameras will be on hand to record qualifying activity, for broadcasting on Friday evening, which should assure a record spectator turnout for the weekend affair.

In addition to the R/C indoor models, there will also be a first-ever competition for radio controlled robots. Complete sets of rules for both the R/C robots and indoor flying models are available from either **R/C Model Builder** or from IMS, P.O. Box 127, Costa Mesa, CA 92627. Basically, the robots must not exceed 6 feet in height, 3 feet in width, and 100 pounds in weight. They must at least be able to move forward, left, and right, and will be judged on appearance, originality, functions, etc.

HTA models, in addition to a 3-ounce maximum loading, must not weigh over 24 ounces ready to fly, and must not exceed a span of 8 feet. They will compete for longest time in the air. LTA models will compete by flying as many figure-8 laps as possible in a 30-minute time period. In addition, LTA's will compete for best handling ability by flying through a gymkana course in as short a time as possible.

This is a show you shouldn't miss!

INDUSTRY NOTES

A formal announcement to the industry, issued on August 7, 1979, from Kraft Systems stated that, "Effective September 4, 1979, Phil Kraft will become Chairman and Mr. Arthur Leighton will become President and Chief Executive Officer of Kraft Systems, Inc."

Just as we were going to press, a subsequent announcement came directly from Phil Kraft, dated August 31, 1979, which reads as follows:

"To all my friends and associates in model aviation.

"It is with deep regret that I find my appointment to the position of Chairman of Kraft Systems, Inc., to be psychologically incompatible with my personal objectives and consequently not in the best interests of the company or the radio control hobby. Therefore, I am terminating my employment and relationships with Kraft Systems, effective October 26, 1979.

"I could not have been associated with a finer group of people than my friends and associates at Kraft Systems. I firmly believe that 'a business is people,' therefore, the future of the company is in good hands.

"The new president of Kraft Systems, Inc., Mr. Arthur Leighton, starts Tues-

Continued on page 116

On July 12, 1979, Governor Bob Ray signed a Proclamation declaring July as Model Aviation month in Iowa. On hand for the occasion were Earl Witt, AMA President; Ken Morris, District VII Vice President, with his family; Haxel Sig and Maxey Hester, representing the industry; and various Iowa chartered club representatives, including the Des Moines Modelaires.

Matty Sullivan "doing his thing" at the going away dinner put on by the industry for Walt Schroder during the WRAM Show, White Plains, New York, in February of this year. Inset photos were taken as other speakers addressed the group and Matty was mentally writing the script for his own comments. Whatever Matty had to say was obviously well enjoyed by (l to r) Nat Polk, Susan and Walt Schroder, Matty's delightful wife Marge, and Carrie Axelrod. Matty did not mince words when he talked about his friends, and they loved him for it. Photos and caption by WCN.

Matty Sullivan 1911–1979

Matty Sullivan, 68, founder and chairman of both Sullivan Products and Sullifoam Corp. died on Friday, August 10, 1979. Sullivan Products, a hobby accessories firm, was founded in 1941, and Sullifoam, a plastics manufacturing firm, in 1955.

He was a many time director of the Hobby Industry Association of America, and had received its meritorious award of honor and distinguished service award. He also received the distinguished recognition award of the Delaware Valley Federation of Model Airplane Clubs.

Recently, he had been inducted into the Model Aviation Hall of Fame and was a charter member of the Hobby Industry Association of America, the Hobby Industry Association of Delaware Valley, and the Eight-Ball Association. He was a former national director and Fellow of the Academy of Model Aeronautics and had founded its scholarship fund.

* * *

Still another giant topples, and with it I lose still another good friend and the industry loses one of its all-time leaders!

It's becoming all too frequent, the passing of the giants of our industry, and it's amazing that we manage to keep up, but keep up we will because of the ability of the younger members of the industry pitching in to fill the gap.

Be that as it may, I still have lost a magnificent friend who was always there when needed and many times, according to some, too often we teamed up on mutual efforts to better the state-of-the-art for model building.

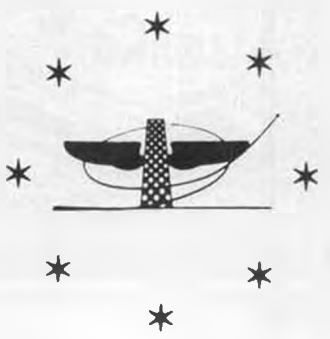
I know of no more innovative man than Matty, his firsts in the hobby are too numerous to recount here, but each did add to the progress of the hobby. His steel lines, his braided steel lines, his Golden Rod, his fuel tanks, his engine starters, all originated with Matty, and even up to the last days he was still in there pitching, so much so that just two days before his passing he was discussing 24-volt electric motors for his starter with son Bob. And Bob told me that he managed final approval for the motor to be used for this new and more powerful electric starter.

He was always on-call for any help at any time, and I well remember the weekend in August of 1946 when he phoned and told me to meet him at La Guardia Airport and be ready to takeoff for Chicago, as he had promised Russ Weber we would both be on hand to help Russ put on a control line show at one of the Chicago stadiums . . . keep in mind, those were the days of DC-3's and seven-hour flights to Chicago. But we made it. And then I remember the time that I called him during or right after World War II to pick up some planes and pilots and drive up to Halloran Hospital on Staten Island, New York, to help me out with a modeling show I had planned for the wounded GI's. Exactly an hour-and-half later Matty, along with Ray O'Neal, arrived with at least five planes and put on a first class flying show for the boys. Keep in mind that Philadelphia and Staten Island are a bit apart, and we didn't have the New Jersey Turnpike at the time. So, to collect the planes, Ray O'Neal, and be there in an hour-and-half was to move it all out and that was the only way Matty could do it . . . all out!

I could go on and on, but it would serve only to be repetitious as Matty was always there when he was needed, and we frequently needed him.

To say I will miss him is to put it lightly, as there was no move or decision on my part that he did not have part of, and the hours spent on the phone when he bounced things off me or vice versa are going to be some of the great gaps in my life. So to Marge, his good right arm and beautiful wife, his daughter Carole and son Bob, plus the grandchildren, goes all my sympathy, and I know all of the modelers throughout the world as well . . . our good friend Matty will be missed by all. Adios old friend.

Walter L. Schroder



OVER THE COUNTER

• First bit of news this month is that MRC is bringing out an updated version of its popular Trainer Hawk all-foam ARF R/C job. (The news release calls it a 1979 version, but since 1979 is almost shot we'll say "updated.") Apparently MRC knows when to leave well enough alone, as the only changes to the airplane were for cosmetic reasons, and consist of red and black pressure-sensitive decals for a sharper appearance. Other than that, it's the same old Trainer Hawk, and flies just as well as ever. The engine is still the reliable Enya .15 TV and comes already installed in the fuselage . . . as does the tank, fuel lines, pushrods, and control horns. Only the radio is missing. Total time to install an R/C system and do the few simple steps to get the airplane in flying shape is only an hour or so.

Eloy Marez did a Products in Use report for us several months ago, and rather than repeat what he had to say we'll refer you to his article in the December '78 issue. Suffice it to say that Eloy was impressed by the Trainer Hawk in all respects and felt that it was an excellent buy. And speaking of buying, the airplane sells for $99.95, which seems especially reasonable when you consider that the engine and muffler sell separately for about $48. Not a bad buy at all.

You're going to need a 3-channel R/C rig for your new Trainer Hawk, and it just so happens that MRC has exactly what you need in its new Guidance System 3000 radio. This unit is a logical extension of the 2-channel system pictured on the back of this month's **R/C MB.** The transmitter features a 2-axis stick on the right and a single-axis stick with ratchet feel and separate trim on the left. What's more, this system can be upgraded to a 4-channel system when the flier is ready.

The new fancied-up Trainer Hawk from MRC.

The Guidance System 3000 is sold with either standard size or miniature servos. You can also buy it for use with dry batteries or with factory-installed ni-cds. In any case, all Guidance 3000 transmitters have a charging jack built into the case so that even if it is bought with dry batteries, it can easily be converted to ni-cds with no factory modifications necessary.

The Guidance System 3000 with two heavy-duty MR-12 servos and provision for dry batteries retails for $149.95. The full ni-cd (transmitter and airborne) version with two MR-12 servos sells for $188.95. Both versions are available now.

The Trainer Hawk and Guidance System 3000 radio are products of Model Rectifier Corp., 2500 Woodbridge Ave., Edison, NJ 08817.

* * *

Sig is introducing a new trainer/sport model for .09 to .15 size engines, to be called the "Scamp." This fairly conventional ship was designed by Mike Gretz, who has designed quite a few of Sig's kits, and features a 45-inch molded foam wing and a sheet balsa fuselage and tail surfaces . . . about as quick and simple as you can get. The small engine size makes a lot of sense too, when you consider the outrageous price of glow fuel these days. What is little more than a prime for

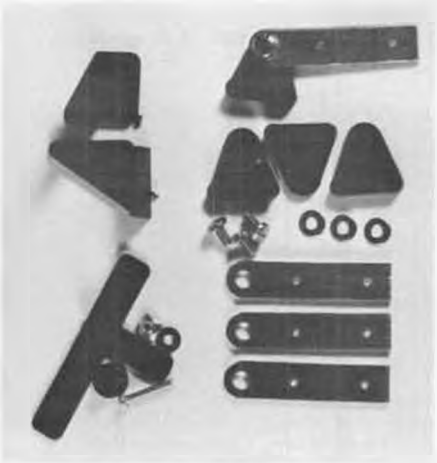

MRC Guidance System 3000, 3-channel R/C outfit.

The Tower Hobbies 1979-1980 R/C Catalog, now available.


New 2 or 3-channel sport model from Sig, called the "Scamp."

"Graphics," pre-cut letters and numbers from Coverite.

Sterling's F6F Hellcat, primarily designed for C/L but easily adapted to R/C.



Heavy-duty hardware for big scale models, from C.B. Associates.

Also from C.B., a real workhorse of a tailwheel assembly for large models.

a .60 is enough to keep an .09 running for several minutes.

Other features of the Scamp kit are die-cut plywood formers and doublers, formed aluminum main gear, aluminum motor mounts, threaded pushrods, and all off the little stuff such as control horns, hinges, screws, blind nuts, clevises, etc., etc. The foam wing is fuelproof as is, but for better appearance and longer life should be finished with either paint (Sig Plastinamel is a good choice) or plastic film coverings (Econokote or Solarfilm).

You can pick up a Scamp kit at your local hobby shop for just $24.50; the kits should be available by the time this issue comes out. From Sig Mfg. Co., Montezuma, IA 50171.

* * *

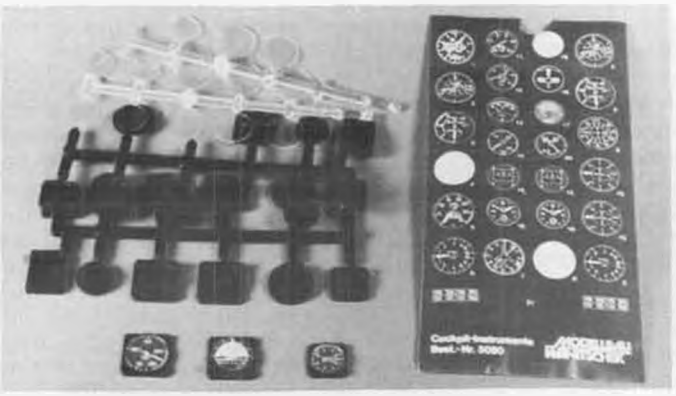
Sterling Models is also bringing out a new kit, this one being a profile version of the F6F Hellcat for C/L Stunt and sport flying. Also, when the kit comes out (it hasn't been released yet), the plans will show how to install an R/C system for some wild aileron/elevator stunt flying. The kit includes die-cut balsa and plywood parts, a vacuum-formed clear plastic canopy, hardware for the C/L version, and a full color decal sheet. The airplane is designed for .19 to .35 size engines and spans 42 inches.

No price has been announced, and the kit is slated to be ready for the fall season. You can find out more from Sterling Models, 3620 "G" St., Philadelphia, PA 19134.

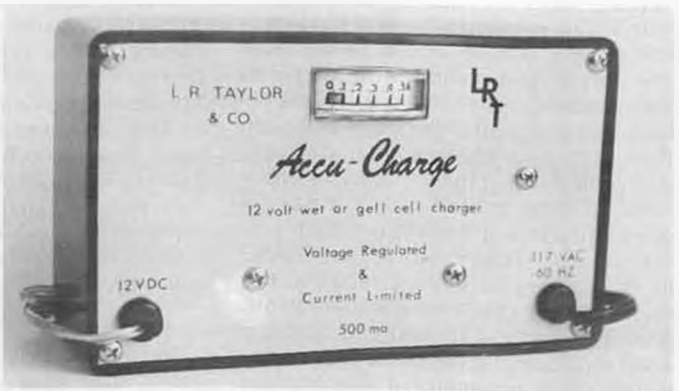
* * *

Jerry Nelson, of Midwest Model Supply, sent us a sample of the 1/4-scale instruments that are being imported from Modellbau Wanitschek, one of the big German manufacturers of large scale R/C sailplanes. The instrument faces are printed in full color on black paper with a pressure sensitive adhesive on the back, and are pre-punched. All that is required is to choose whatever instrument you want, remove it from the sheet, position it over the instrument housing (which is molded from black plastic), and stick it down. For the finishing touch, a clear plastic "glass" cover is snapped in place over the face, resulting in a very professional and realistic dummy instrument.

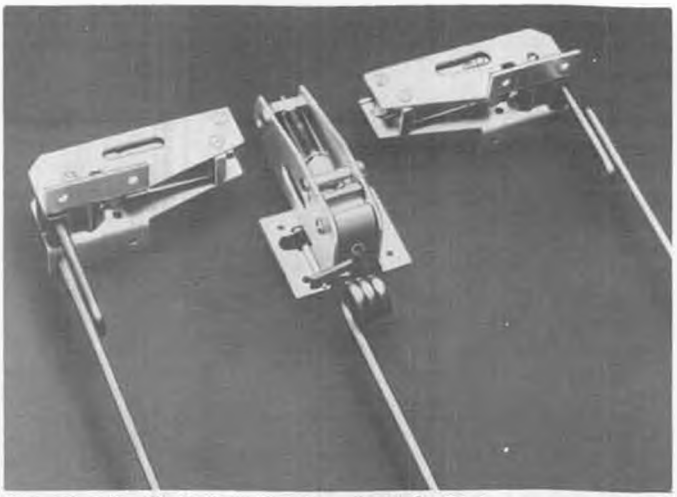
The sheet contains just about any instrument you'll find on a full-size panel, plus some special sailplane instruments . . . even a nav-com radio is included. As far as we know, this is the only set of 1/4-scale instruments available, and certainly seems to be worth the asking price of $9.95. For more information, contact Midwest Model Supply, P.O. Box 518R, Romeoville, IL 60441.



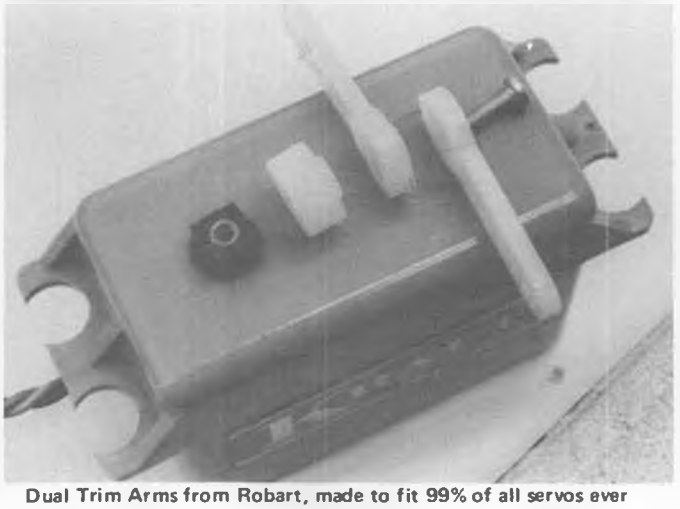
Nicely-made 1/4-scale instruments being imported by Midwest Model Supply.



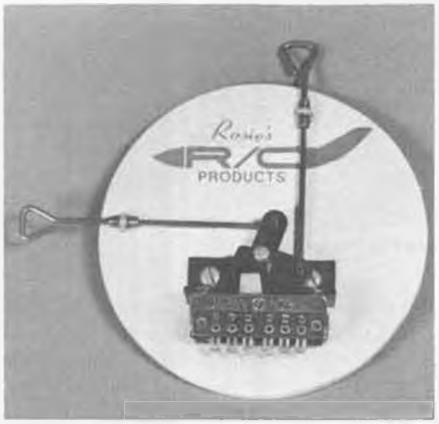
L.R. Taylor's Accu-Charge, charger for 12-volt starter batteries.



Impressive air-operated retracts from Sonic Systems.

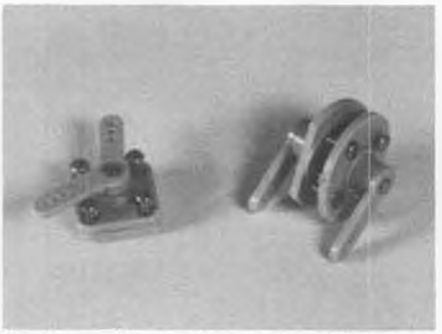


Dual Trim Arms from Robart, made to fit 99% of all servos ever built.

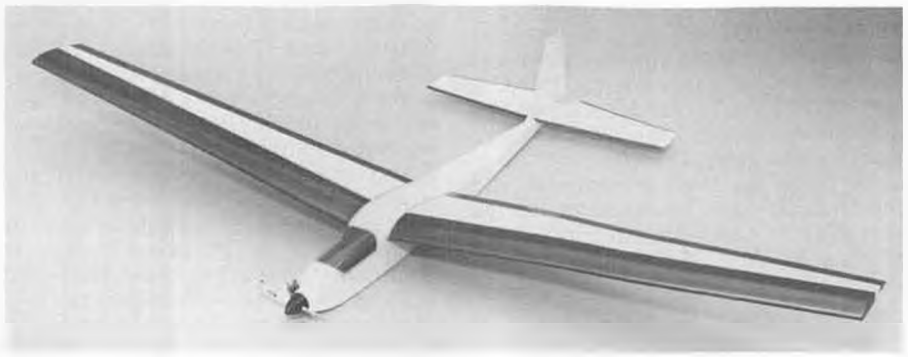


Clever little Bulkhead Switch Mount from Rosie's R/C Products.

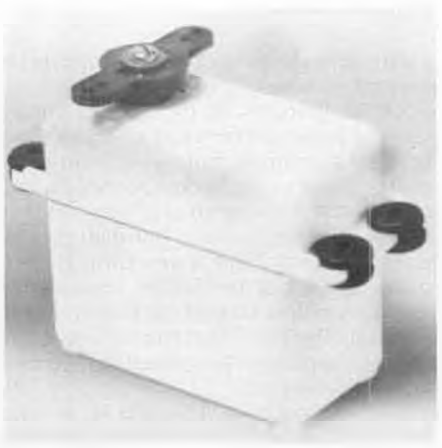
Waterproof seals for R/C boats, by G&M Models.



Also from Robart, a Differential Bellcrank and Feed Thru Bellcrank.



Master Kit's "T.N.T.", powered glider for training or sport flying.



New heavy-duty servo mechanics, the D-8, from Dunham's R&R.

* * *

Tower Hobbies has advised us that its new 1979-1980 Radio Control Catalog is hot off the presses and is better than ever. It's quite a catalog, with 358 pages listing merchandise from over 150 manufacturers at discount prices. In addition, there are two indexes (manufacturer and product) that make it easy to find a needed item quickly. If you have a question about a certain product, you can use the "Tower Action Post Cards" in the catalog to write directly to the manufacturer for more information. Also included is a revised and updated accessory completion guide in an easy-to-use chart arrangement that enables you to determine what accessories you will need to complete the kits listed in the catalog.

It's easy to see that the Tower Hobbies 1979-1980 catalog is more than just a catalog; it is a valuable reference tool that no R/C modeler should be without. The catalog is available by itself for $2.50, or you can get one free of charge with your first merchandise order from Tower. The address is Tower Hobbies, P.O. Box 778, Champaign, IL 61820. The toll-free phone number from Illinois is 1-800/252-3336; from anywhere else, call 1-800/637-7686.

* * *

Decorating your new model is now easier than ever with Coverite's new "Graphics," pre-cut vinyl numbers and letters with a special pressure-sensitive adhesive that doesn't attain maximum adhesion for about 24 hours, letting you lift and reposition the figures if you don't get 'em straight the first time.

Graphics are cut from a very thin cast vinyl that is very pliable, making them just the thing for going over compound curves. The adhesive is claimed to be absolutely impervious to glow fuel and will stick on just about anything. Graphics come in 1, 2, or 3-inch sizes, in gloss red, black, or white, and are paintable if those colors don't suit you (the manufacturer recommends spraying the entire sheet, then remove the figures after the paint is dry). Each package contains two complete sets of numbers (0 through

Continued on page 111

Flight INSTRUCTOR

Conducted by
DAVE BROWN
8534 Huddleston Dr.
Cincinnati, OH 45236

• The subject for this month is one I have avoided until the late fall, as it is more appropriate when the building season is arriving. (I know I'll get some flack from those of you in climates where there is no building season.) A letter from Bob Spigener of Oklahoma City, which I received last spring, provided the inspiration. The Ideal Workshop, of course, depends somewhat on what type of airplanes you build, but the basic considerations are the same. The first consideration is where to put your workshop, and here is one decision that can have a profound effect on your enjoyment of it. The most common possibilities are: the basement or a portion thereof, the garage, a spare room in the house, or an outbuilding separate from the house. Although you may not have all these options, it is a good idea to consider the advantages and disadvantages of each possibility before deciding.

The first possibility mentioned was the basement, and this probably accounts for more workshops than all the other options combined. The advantages that the basement has are that it is usually reasonably warm in winter (or at least easy to add heat ducts) and usually cool in the summer. A basement typically has plenty of electrical service readily available, and most have running hot and cold water. Now, if this all sounds ideal, then perhaps we should consider the disadvantages of the basement workshop. They are typically somewhat damp, and some even flood in the spring, depending on your location. Basement steps are typically steep and narrow, which makes it difficult to carry airplanes in and out, as well as limiting the size of any machinery you may want.

The garage is probably the next most common workshop area, and its advantages are easy accessibility, and they are usually dry. If it is attached to the house, it has the same advantages as the basement, in that it is convenient to sneak out to the workshop even when only a few minutes is available. The disadvantages of the garage workshop are that a garage isn't always heated well, and even if it is, it is usually poorly insulated, making it very hot in summer. With the addition of insulation, heat, and air conditioning, the attached garage can be made into a great workshop, but the detached garage will require more work to make it suitable (electricity is more of a problem, for example). A spare room in the house used as a workshop has the advantage of being already heated, air conditioned, has electricity, etc., and is quite convenient, but its disadvantages are many, such as small size, problems with paint and glue smells (not to mention balsa dust and wives not mixing well), and limited ability to support any large machinery.

The outbuilding has few advantages other than that the paint and glue smell will not bother your family as much, but nearly every other disadvantage mentioned applies. These advantages can be overcome with a lot of effort, and for many this is the only available option.

Now that the place has been selected, the selection of what tools and equipment you'll need will depend on what type of airplanes you intend to build, as well as how much equipment you can afford. Plan your workshop layout to allow for the addition of more equipment and tools at a later date. My own opinion of an ideal tool selection, in order of importance for general building, would be the normal hand tools (knives, saws, pliers, etc.) first, followed by (in order) a Dremel tool, a small jigsaw, an air compressor and spray gun (if you intend to paint your models) or a Monokote iron and gun (if you don't intend to paint), a drill press, a disk or belt sanding machine, a bench grinder, etc. Other machinery and tools will depend greatly on what your needs are and may include a table saw, a metal lathe, a milling machine, or whatever.

Now it is time to start to lay out our dream workshop. I would start out by building a spray booth in one of the rear corners. It should be about 10 feet square for convenience in using it, although 8 feet square would be enough if you are short on room. It must include an explosion-proof exhaust fan and should have fairly high intensity (150W) spot or flood lamps installed in the corners, as well as some smaller bulbs for general lighting. I'd build it using simple 2x2 framing and cover it with replaceable cardboard or possibly even polyethelene sheet, so that it could be cleaned easily or even replaced when it becomes too dusty. It is also important that you install some large furnace filters in the walls or door to keep dust out while allowing good ventilation.

Once the spray booth is built, I feel it is a good idea to set aside an area for the storage of completed airplanes, keeping in mind that they must be charged and taken in and out easily. This area should be partitioned off somehow, if only with a curtain, to keep dust off of the models.

Next comes the installation of any machinery, and I recommend that most of this be mounted along one wall to simplify the electrical hook-ups. Make sure all machinery is easily accessible and not positioned too closely together. The remaining wall should be equipped with two-foot-wide benches and shelving for normal construction, and one assembly bench should be positioned in the center of the room. I find this bench invaluable, as it enables you to walk all around an assembled airplane. All of these benches should be built as straight, strong, and stable as possible. An old bowling alley slab makes a nice, flat, straight workbench, if you can find one. I use a piece of tempered glass about three feet square to wrap cores on, and this seems to work well. To complete the ideal workshop, a Shop-Vac (vacuum cleaner) is absolutely necessary to keep the place clean, and some pegboard would be nice to mount tools and accessories on so you can find them. With a few exceptions, my shop is set up in this manner and it is very convenient to work in, with one small problem: it is usually knee-deep in junk, and the benches are usually a foot deep or more with every conceivable piece of trash. Oh well, I never claimed to be perfect.

It's a short column this month, as I've been preparing for the Nats and for the South Africa trip, and also I haven't received ANY letters lately with questions! Please, guys, just a postcard or a note scribbled on even a piece of toilet paper would help, and they can be mailed in or handed to me if you see me at a contest! Please send them to Dave Brown, 8534 Huddleston, Cincinnati, OH 45236. •

Beautiful 2-inch scale Curtiss Hawk F6-C1 seen at the recent Scale Squadron meet at Mile Square Park, Fountain Valley, California. Built by Eugene Martin, Felton, Calif.,it will be featured as a *complete* construction article, coincident with Pete Westburg Scale Views, in R/CMB.

R/C WORLD

By BILL NORTHROP

PHOTOS BY AUTHOR

WHAT WENT WRONG!?

Back in the January 1977 issue of **Model Builder,** we introduced our concept of Mammoth Scale. The concept came about as the result of a brainstorm session with Le Gray, and our earlier experiences with radio controlled old-time free flight models during a fun-fly sort of thing at Taft, California. At the time, R/C assisted O.T.'s were just becoming popular, and "oversize" R/C scale models only enjoyed scattered interest among isolated enthusiasts.

R/CMB Editor's '72 Corvette becomes an aircraft carrier! Walt Schroder's Byron Pitts wouldn't fit in his Cordoba, so guess who took it from the office to his home. More in text.

The Northrop/Gray concept was based on our "discovery" that large (8 to 9-foot span), lightweight Old Timers flew at what appeared to be that realistic but somewhat elusive rate called "scale speed." This editor was fortunate in that Spirow Nicholau, an excellent O.T. free flight modeler, appeared with his beautifully-built PB-2 (plans in August '77 **MB**) in which he installed an O.S. Gold Head 60, and a Futaba radio on rudder, elevator, and throttle. At the time, Spirow was quite new at radio, so it wasn't long before we were handed the transmitter, as his orientation problems allowed the PB-2 to get higher and farther away.

Within moments we had the PB-2 down to about 25 feet of altitude and buzzing . . . no, putt-putting past us at 2 to 6 feet from the ground. With Spirow nervously wringing his hands nearby, we shot one touch-and-go after another; on both wheels, left wheel only, right wheel only . . . and giggling all the while like a kid with a new toy.

On the return trip from Taft, the brainstorm session got into full swing. If a large 8-foot span O.T. model could be

Doc Keith's Northrop A-17 taxies out at Mile Square. Grandfather of the Douglas SBD, the family lines are very evident.

Flown by John Lockwood, Eugene Martin's F6-C1 is just about to flare at Mile Square. Note up elevator. A very smooth flying plane.

built at under 6 pounds, why couldn't it just as well be a scale model? Then you'd have a *scale* model flying at *scale* speed. Of course, this couldn't be a fully sheeted, fully detailed, fully painted scale model. It would have to be built like the big O.T. models . . . open structure, pre-colored covering material, non-scale rib spacing, etc. . . . simply a blown-up rubber scale ship in the good old stick-and-tissue, sun-through-the-framework tradition.

Actually, this editor had partially experienced the concept some years before, with his 7-1/2-foot span Gipsy Moth. Flown at the 1961, 1965, and 1966 Nats in R/C Scale, it appeared to take more spectacular flying ability than was actually required. In 1961, it barely got off the ground when the ignition system to the Forster .99 failed . . . a probable life-saver for both plane and pilot. At the 1965 Willow Grove Nats, with an old and tired Fox .59, the 15-pound model put in an excellent low-altitude flight and took 3rd. In 1966, it placed 4th, performing an extra touch-and-go when the throttle refused to drop into full low. All of the Gipsy's flights were slow, realistic, and very easy to perform, making an average flier look really good. Ah yes, quarter-scale is not new.

The above reflections were also thrown into the brainstorming session, and the conclusion was that with proper structural design, getting away from scale construction, the Moth could have been built much lighter.

The more we talked about open-structured, rubber-powered type scale models, the more we leaned toward the models of that Golden Era before World War II, and the designs that eminated from those years. The Mammoth Scale concept was thus expanded to include the word "Classic."

Our thoughts on power for these MCS models never wandered beyond .60 because we simply felt it wasn't necessary. Again, if an 8-foot span Texaco-style O.T. model could take the air at 5-1/2 to 6 pounds, why worry?

Well!!! Look what happened. Along came the 2 to 3 cu. in. ignition engines,

John Martin's "First R/C", a Royal Rudderbug, built and flown in 1955. John still living in Joliet, Illinois, where this photo was taken. Wonder what the 'Caddy' model's doing there?

The "Eugene Martin Flying Team". Dennis Griggs cranks on the HB 61 as John Lockwood checks controls on the F6-C1. Builder and team manager Martin wears "supervisor" hat.

and with them came 20, 30, and even 40-pound *small aircraft*. Also, along came the need for full-scale building techniques, heavy-duty this, heavy-duty that, and a great deal of concern about safety, and speculation about "Where do we draw the line on size."

We have to admit that a few kit models, such as the Concept 1/4-scale Fleet, the Byron Originals 1/3-scale Pitts, and the Bridi Rearwin Speedster are really great, but the scratch-built "monster models" that are showing up here and there are getting beyond reason. The building techniques required to make them airworthy are far beyond the capabilities of even above-average

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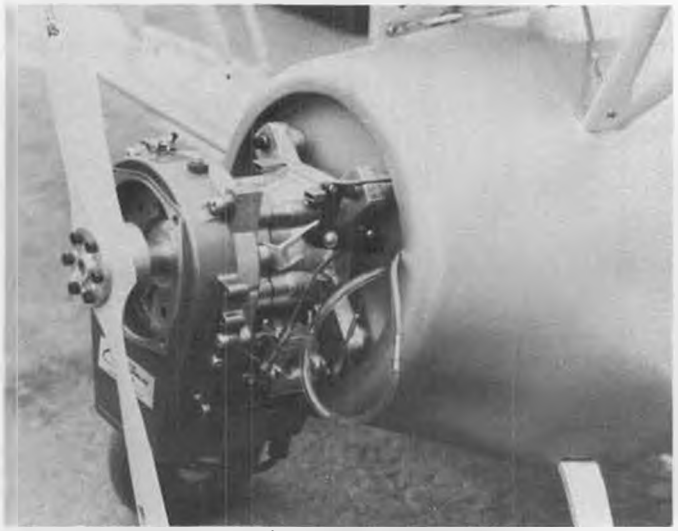


What next?! Bob Seigelkoff (CB Associates) has now installed a Kawasaki engine on his Grumman Ag-Cat (Dec. '78 MB).

Leon Shulman with his Fox 45 powered bent-wing Top Flite Contender 40. Logictrol International Super Pro operates controls.

Ray Stits was right when he touted his Sky Baby as being the "World's Smallest"...wingspan is just under eight feet! Power is an 85 hp Continental. Now in EAA Museum in Wisconsin.

1 TO 1 SCALE

By BOB UNDERWOOD PHOTOS BY AUTHOR

• Some things seem to continue to occur over and over again with little or no change. The sun makes its appearance on schedule and departs with the same predictable regularity. Prices seem to advance with no let-up. The IRS finds whatever way necessary to find ways of "withholding" our future. And each time we have the model aircraft we so lovingly constructed leave the ground, it finds a way to return to the ground, sometimes in unique and surprising attitudes.

The more things *seem* to change, the more they remain the same, and the one thing which seems to continue ad infinitum is the question, "What do I need for documentation?" I realize that we have treated this question in one form or another before, but I feel that it needs constant attention. To ignore the question or most certainly its answer is probably one of the most discouraging aspects of scale modeling.

Just within the last several months at least a half dozen persons right in my immediate St. Louis area have related the sad tale of having completed or started a model, only to find that the information they had afterwards begun to accumulate did not match the model. "What can I do?" they ask. I suspect it's much like jumping from a plane and then asking how the chute works.

Please work diligently at bringing together the various items you need *before* you begin any construction. This should include the three-view, photos, and any other materials available. Read carefully the printed material you have to see if something might be revealed there that will help clarify some confusing items.

Separate your photos so that you can compare various features with the three-view(s) that you might have accumulated. Make notes as to differences that you might see and evaluate carefully your decisions. Let others help you with this task to compensate for the "blindness" we often develop as we study things. Break your study into sessions so you return with a fresh look. It's much like proofreading; mistakes often fade from view as we stare at them for long periods.

Take into consideration the angles that might be present in the photos. So often the camera angle alters the appearance. You'll find this especially in rounded surfaces such as spinners, round fuselages, etc. It might help, if you should become confused as to the actual shape, to visit a local airport and see if you can find a similar type of shape to view.

The most discouraging thing to me is the problem one encounters with three-views. It is not my purpose here to discredit the work of those persons who prepare three-views; however, the deeper I get into scale, the more I realize that *very* often the available material is quite inaccurate. As a result, when you try to reconcile your information, all you do is *prove that what you have is wrong.*

In way of illustration, may I use my long-standing love affair with the Whittman D-12 "Bonzo." At the time I built the last model, the one that went to the Internats in Sweden, I had accumulated three different three-views. Not one of those three was completely accurate. One of them was, shall we say, laughable.

When I made the last of several trips to Hales Corners to photograph, measure, and study the "Bonzo," I asked Mr. Gene Chase about his knowledge of the three-view preparations. He related that he was not aware of anyone who had visited the aircraft and done any measuring, etc.

Now, just recently, another three-view appeared in another model magazine with the name of a well-known artist on it. Since it is not dated, I cannot tell when it was prepared; however, let me point out some very definite inaccuracies present:

1) Rectangular fuselage cross-section shown does not exist anywhere on the aircraft.

2) Struts or flying wires are shown from the stab to the tail skid area of the fuselage. They do not exist.

3) Nice slope on the lower portion of the engine cowl doesn't exist.

4) Canopy shape *most* inaccurate. Shown as a full plastic shape, when in fact it consisted of a combination of triangular shaped rolled sheet and aluminum. Cutouts in side are incorrect.

5) Rudder and elevator shape incorrect.

6) Wing flying wires incorrect.

7) Rib spacing *most* inaccurate. Actual aircraft has 4-inch spacing with some 22 ribs in each wing panel. Three-view in question shows 10.

Ah well, that should give you an idea

Dick Graham's Piper Pawnee makes a low pass for the judges at Mint Julep meet. Talcum powder "dust" makes for sweet-smelling fly-bys! Photo by Dale Arvin.

Harold Krier's full-size aerobatic ships would all make excellent models. Chipmunk in foreground, Great Lakes and Cub in back.

Lots of warbirds at Mint Julep contest. Photo shows just four, two P-51's and two P-39's. Photo by Dale Arvin.

of the inherent problem involved. The above items do not even take into account measurement problems. I did not take the time to go into that aspect of it with the suspect three-view.

Now, where does that leave us? Confused, I suspect, would be a reasonable answer. It is easy to see that in the case of many aircraft, a particular subject aircraft may not completely fit a three-view, since thousands may have been made over a period of many years. Through that period, updating and changes will occur that will greatly alter the aircraft. However, in the case of the Bonzo, we are speaking of a one-of-a-kind ship. Certainly it was changed from 1934 to 1939, however, the changes became most subtle in the later years.

One might argue that such accuracy is not really necessary, and indeed, that could be the case. It would be helpful, however, if one could be reasonably certain that the material he is using is accurate and has been developed by a study of the aircraft whenever possible.

So much for the "sermon of the month." Actually, it does not personally disturb me as much as it may sound. I've learned to discard what I've found to be grossly inaccurate; however, it *does* disturb me to think that newcomers to the scale scene often become frustrated because of the documentation problem.

A SEARCH

What are you seeking for the latest bird?

Chrome parts are a problem. Have you tried a L'eggs "egg" container? The ends make great hubcaps. The "chrome" part is very thin, so exercise caution in working with it. The disposal of the product within the egg requires some thought, especially if you are married.

Trying to duplicate a weld joint with its irregular metal material? Try R/C 56 adhesive. It will stick to metal well and remains flexible. You can make it ripply and it will stay without running smooth. It paints great. We mentioned it earlier for rivets using a mini tip on the container.

SPORT SCALE: OTTOWA '80

In 1980 the U.S. will be sending a Sport Scale team to Ottowa for the Internats. Since the event is not yet an "official" event until the approval of certain factors, the team will not receive financial help from AMA. The scale organization (NASA) will shortly have patches on sale to develop monies to help pay for the teams. AMA will provide funds for transportation, entry fee, and housing for the Precision Scale teams (C/L and R/C) and the team manager. Hopefully, we will be able to generate funds that will take care of the Sport Scale team members as well. Be on the lookout for details on purchasing these patches forthcoming next month.

I know that many Scale people are eagerly awaiting the Scale '80 event and intend to journey north to our Canadian neighbors for the competition. It will be significant to see what level of participation develops for the event. There was a smaller number of persons represented when it was last on this continent, due to the cost of transporting a larger number of teams over the big waters. Now that the currency levels are somewhat different, perhaps a greater number of European countries will be able to afford it.

A second concern will be whether there will be a control line competition. At this date, just two days before the Nats, the number of participants signed for the team selection program is larger in control line than R/C. It would be a shame if the event cannot be official in '80 due to lack of participation from other countries (five are required).

There is doubt at this point that any free flight participation will develop, due primarily to the fact that Scale '80 will be flown at an active airport. There is still a chance that if enough local support could be generated, we might work it out by flying at an alternate site which is available.

RULES

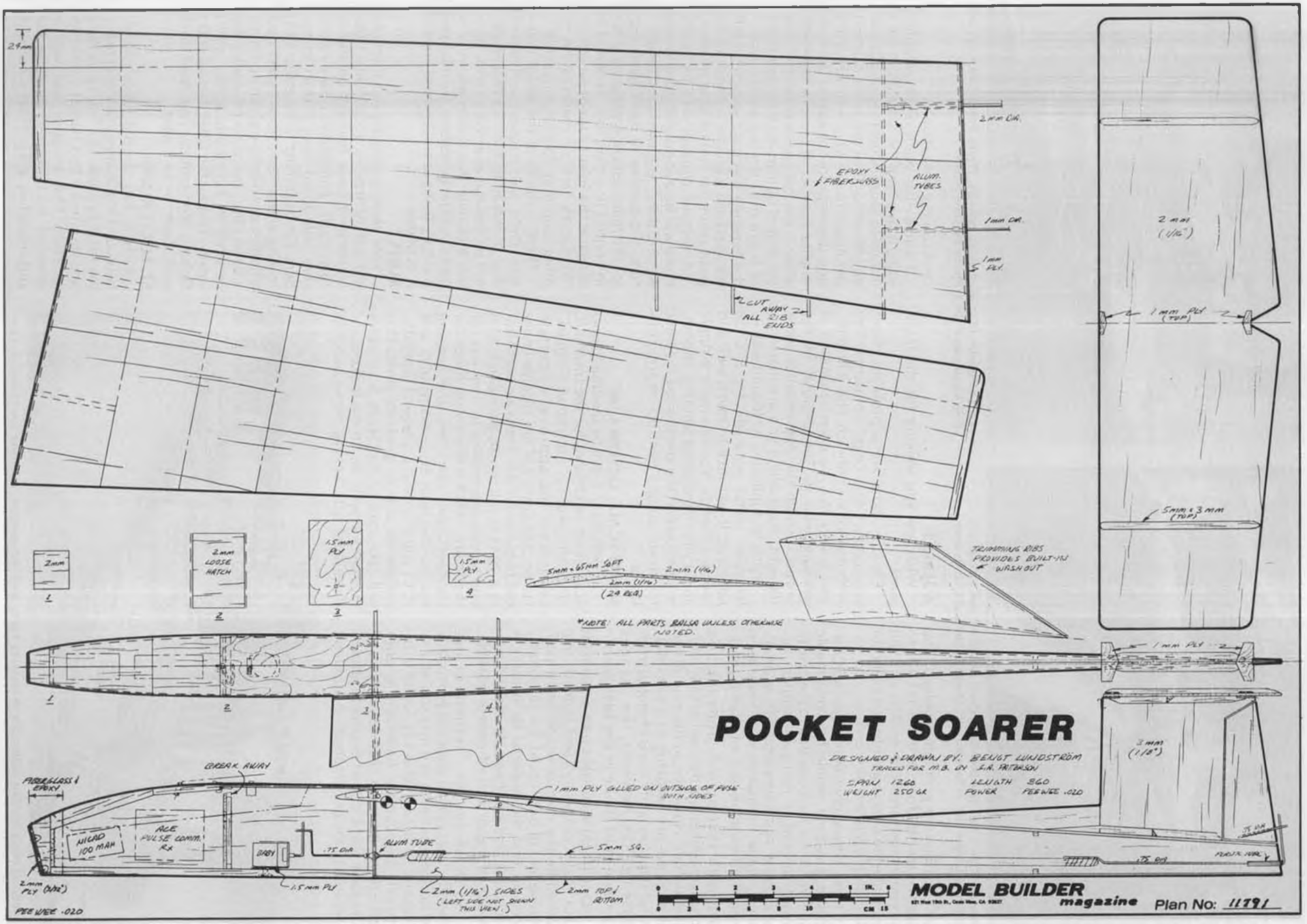
Your time is running out if you have not yet written to your contest board concerning your feelings on the next rules cycle. Personally, I have received *very little* input from District VI members. I'm beginning to have that sinking feeling about now, since I can't decide whether people have given up on me as a basic idiot, based on my earlier votes, or whether everybody agrees with me totally. I prefer the latter, but suspect the former. Remember, you have to live with them for two years.

ST. LOUIS ROBIN

Early in July, an old timer visited St. Louis and made appearances at many of the local airports. The "St. Louis Robin" was sponsored by Chapter 32, the local St. Louis EAA chapter, and was well received by historians, airplane buffs, and modelers alike. (That's not saying

Continued on page 97

Lineup of birds at Mint Julep. Big ships were fairly well represented, note the Aeronca C-3, two Citabrias, and Col. Art Johnson's big P-38 featured in June '78 MB.


2mm
EPOXY & FIBERGLASS
ALUM. TUBES
2mm DIA.
1mm DIA.
1mm PLY
CUT AWAY ALL DIB ENDS
2 mm (1/16")
1mm PLY (TOP)
5mm & 3mm (TOP)
2mm
2mm LOOSE HATCH
1.5mm PLY
1.5mm PLY
5mm x 65mm SOFT
2mm (1/16)
2mm (1/16)
(2 REQ)
TRIMMING RIBS PROVIDES BUILT-IN WASH OUT
*NOTE: ALL PARTS BALSA UNLESS OTHERWISE NOTED.
1mm PLY
3mm (1/8")
POCKET SOARER
DESIGNED & DRAWN BY: BERNT LUNDSTRÖM
TRACED FOR M.B. BY J.R. PATTERSON
SPAN 1260
LENGTH 860
WEIGHT 250 GR
POWER PEE WEE .020
FIBERGLASS & EPOXY
BREAK AWAY
NICAD 100 MAH
ACE PULSE COMM. RX
BABY
.75 DIA
ALUM TUBE
1mm PLY GLUED ON OUTSIDE OF FUSE WITH SIDES
5mm SQ.
.75 DIA
3mm (1/8")
2mm PLY (1/16")
1.5mm PLY
2mm (1/16") SIDES (LEFT SIDE NOT SHOWN THIS VIEW.)
2mm TOP & BOTTOM
PEE WEE .020
MODEL BUILDER magazine
Plan No: 11791

PHOTOS BY AUTHOR

POCKET Soarer

By BENGT LUNDSTROM . . . A nifty powered glider from Sweden, for single-channel R/C and an .020. Simple all-sheet balsa construction.

• The Pocket Soarer is a very small and easy to build motorized sailplane with good performance. The Jedelsky type airfoil works better than the usual Clark Y, and the tapered and swept forward planform gives built-in washout. With a model this size, the weight must be kept low, and the Ace Pulse Commander is recommended as it is still the lightest (and least expensive) radio gear.

Compared to the photos, the drawing has some simplified and improved details in the wing mounting and the fin.

BUILDING THE FUSELAGE

Make the two fuselage sides and the bulkheads. Glue the sides to bulkhead No. 3 and together at the tail. Then put in all the bulkheads and ribs behind bulkhead No 3. Bend the sides together at the front. Put on the bottom sheets. The torque rod from the actuator is installed now.

Glue the two plywood wing fillets to the fuselage and then epoxy the piano wires for the wing to bulkheads 3 and 4. Note the dihedral angle.

Now put on the top fuselage sheeting, the fin, and make the hatch. Bulkhead No. 2 slides in to keep the receiver from interfering with the actuator.

BUILDING THE WING

Make 24 wing ribs, all alike. Pin the ribs to the drawing with the front 5x65mm block glued in place. Choose lightweight balsa for this block! Then put on the rear sheet and cut away the protruding parts of the ribs. Form the upper part of the airfoil. Glue the plywood root ribs in place and add the aluminum tubes for the wing wires.

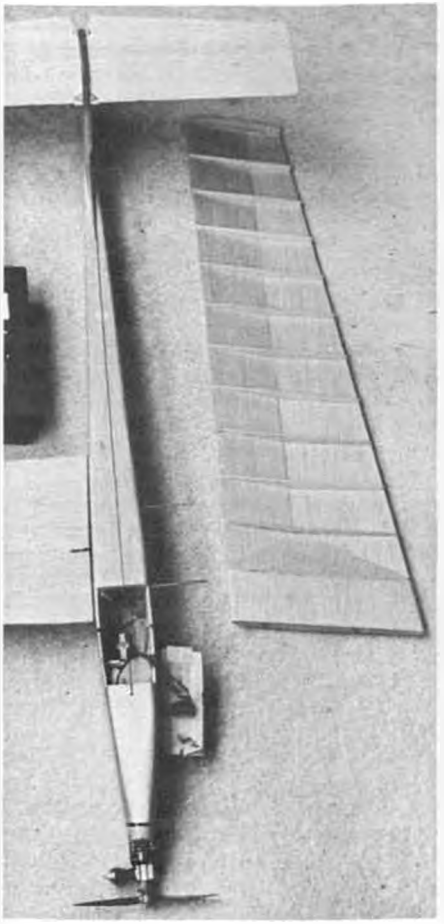
FINISHING

After sanding, give the whole model 2 or 3 coats of light dope. Do not apply heavy paint, particularly at the tail, which must be kept light. Give the fuselage nose a fuel-proof coating.

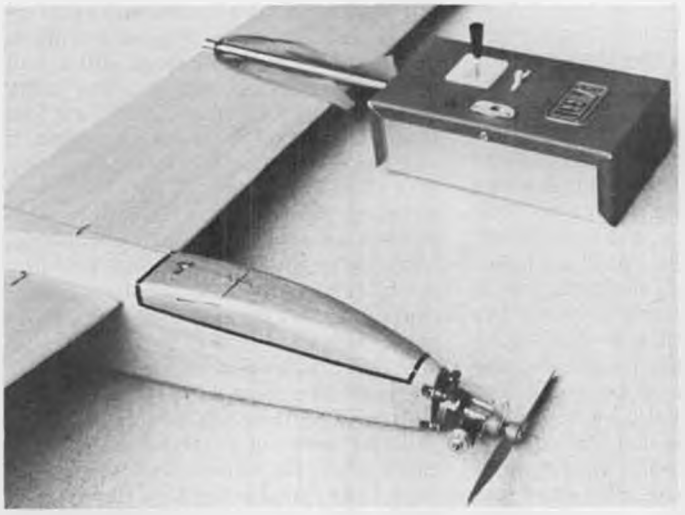
FLYING

If the CG is out of the recommended range, adjust with lead. Make hand glides. If the model stalls, raise the l.e. of the stabilizer with a piece of 3/32 balsa. If it dives or glides too fast, raise the t.e. Then start the engine and fly.

Always keep the plane upwind! A sailplane of this size is hard to see and flies slowly. If you lose it downwind it is very difficult to fly it back to you. Good luck! •



Radio switch is mounted in hatch. First bay at wing root is completely sheeted for strength.



Pee Wee .020 has lots of down thrust to prevent looping. Some builders might want to add an extra tank for longer engine runs.

The author getting ready for a flight. Swept-forward wing and T-tail add a distinctive appearance to the little bird.

FUEL LINES

GEORGE ALDRICH
P.O. Box 817
Edinburg, TX 78539

JOE KLAUSE
P.O. Box 2699
Laguna Hills, CA 92653

OTTO BERNHARDT
17119 S. Harvard
Gardena, CA 90247

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

ALDRICH

• We've been wondering how long it would take someone to ask us about diesels, or compression ignition engines, in view of the increasing cost of glow fuels. Sure enough, we've had a number of people ask us about diesels and gasoline fuels, and now we have our frist letter:

Dear Mr. George Aldrich:

After reading your article in the July **RCMB** *about the increasing shortage of nitromethane, I decided to convert my .049 engine to diesel because the 1/2A fuel is loaded with nitro, and when the price of nitro goes up so does my fuel. So I decided to go diesel with a diesel conversion kit.*

I was wondering if you could give me a few hints on making diesel fuel, such as additives, because this is my first go at a diesel engine. Any comments would be appreciated. Yours truly, Brad Beeson.

Dear Brad:

Smart move! The diesel is the way to go if you're trying to save money. We used to put on demonstrations with a big Flite Streak, powered by an Oliver Tiger .15. The little Oliver pulled the model about like a .29 glow engine and flew seven or eight minutes on a little 2 or 2-1/2 oz. tank.

The only problem with diesels is the fuel. It is available via Davis Diesel Development, but the culprit is the ether used as one of the base ingredients. Ether has such a low flash point that it boils off, or evaporates very easily. A good base diesel fuel is 40% kerosene, 32.5% ether (commercial grade), 20 to 25% aircraft mineral oil, and 2-3% amyl nitrate or nitrite or D.I.I.

Taking each ingredient separately, let's discuss them.

Nothing liberates BTU's like kerosene. Use plain old lamp kerosene, not something exotic like JP-4, etc.

Although it will work, you do not want medical grade ether. Just plain old commercial grade ether does a better job. The only source we know of for small quantities of ether is HUMCO Laboratory, Texarkana, TX 75501.

All of the well-known lubricants such as castor oil, Ucon, etc. will work, but the best we ever used is No. 110 weight aircraft mineral oil. It's available at most any airport. The No. 110 nomenclature, if divided by two, gives the SAE oil weight. Before using this lube all the pistons in my diesel engines varnished easily and became very dirty looking. After just a few flights the pistons cleaned up and remained very nice.

The Ethyl Corp. makes a product called Diesel Ignition Improver, or D.I.I. This is a blend of various igniters, including amyl nitrate. Whether D.I.I. is still available, or available in small quantities, I don't know. The object behind the use of amyl nitrate type igniters is to get better detonation. With 2 or 3% added to the fuel, the compression setting can be backed off so that the engine does not pound as hard, with no loss in power.

Besides the economy (glow engines will run on diesel fuel too, if you want to fight the ether), the big advantage to the diesel is its ability to provide 80% to 90% of its available power, even when badly set. They can be burping and sputtering away and the model will still be flying like gangbusters.

Diesels start and are set very easily once their behavior pattern is understood. And it's great to go out to fly with only your fuel and a spare prop.

Remember that ether is very dangerous. It should always be kept in a FULL metal can. If you buy a quart and use a pint, pour the remaining pint into a pint can. Don't leave it in the quart can. (This applies to all fuels as well.) We also keep ether and diesel fuel in the refrigerator, with the container cap tightened with a pair of pliers. Ether is safer when kept cold and cold diesel fuel stays good longer, as the ether does not evaporate so easily.

Now all you have to do is to convince the little woman that the strange odor coming from the refrigerator is OK. That, or pick up a used, apartment sized little job and put it in the garage.

We have had several requests lately to warn everyone to oil their engines when they get through flying. With a fuel that contains nitromethane, the residue left in the engine contains nitric acid. Actually, when the nitromethane fires it forms nitrous oxide; that's where the power comes from. If you don't want your engine's bearings rusted and the aluminum parts oxidized, put some kind of light oil in your engine when you get through flying for the day. We've been using a couple of Teflon based lubes lately that seem to really do a good job. One is called Tri-Flon and the other Break-Free. Check your local gun shop for either of these or SS-2, as we've mentioned before. They'll do a lot to lengthen your engine's life. •

BERNHARDT

• Many modelers who are considering converting their engines to ignition operation are concerned with the possibility of a power loss when operating on gasoline. Is it true, and if so, how much power will be lost? The answer is yes, compared to glow fuel, you will experience some power loss when switching to gasoline operation *only if you have been using nitro in your glow fuel.* To get an idea of how your motor will perform on gasoline, try running your glow engine on no-nitro fuel, such as FAI fuel. This consists of an alcohol and castor oil mixture of about 4 to 1. Your engine performance on this fuel would be about the same if you were using a gas-and-oil mixture. Of course, if you add nitro to your glow fuel you will boost its potency considerably. This extra power is not without a price. Although glow fuel can be power enriched by the addition of nitro, the amount consumed by the engine will be two to four times greater than when running on gasoline. This means that a fuel tank for glow operation will have to be two to four times greater in volume than a tank for gasoline for the same flight time.

"What about the mixture of oil to gasoline?" This question does not have a fixed answer, as it really depends on the type of engine you have. A lapped piston engine with a sleeve crankshaft bearing will require a richer oil mixture than an engine with rings and a ball bearing crankshaft. Many modern chainsaw engines use a gas-and-oil mixture of 15 or 20:1. Oil tends to foul the spark plug if used excessively; however, not enough oil will cause excessive wear in the moving parts of the engine. It's far easier to change a spark plug than to replace a cylinder and piston, so I recommend that you don't skimp on the oil. If your engine has a lapped piston and a sleeved main bearing and you are using a motor oil (S.A.E. 70) for a lubricant, don't use less than one part oil to four parts gasoline. If you use a castor oil lubricant, don't use less than one part oil to six parts gasoline. If your engine is equipped with piston rings and a ball bearing crankshaft and you are using motor oil for a lubricant, don't use less than one part oil to six parts gasoline. If you use a castor oil lubricant, don't use less than one part oil to nine parts gasoline. Remember, a little more oil is better than not enough. When breaking-in a new engine I recommend doubling the oil content for the first hour of operation to insure a good mating of the moving surfaces.

When breaking-in an ignition engine, the main objective is to produce a good running fit between all moving parts. The greatest wearing of these parts takes place when the engine is started for the first time, so during this period the engine should not be required to do any appreciable amount of work. Putting a

load on an engine during the break-in period would cause excessive wear on critical moving surfaces before they have been properly mated. This in turn will reduce the total running life of the engine. Therefore, when breaking-in a new engine operating on ignition, heed the following advice:

1) Mount your engine on a sturdy stand equipped with fuel tank, batteries, coil, and condenser.

2) Install a medium diameter, low pitch *balanced* prop. A spinner is also advisable for electric starter use.

3) Set the ignition points so that they begin to open when the piston reaches the top of its stroke.

4) Fill the fuel tank with a low or no-nitro content *glow* fuel. If you have it, add a little extra castor oil. The reason for using glow fuel is that it will allow your new engine to run much cooler than gasoline would during the break-in period.

5) Start the engine in the conventional manner by hand or with an electric starter. After starting, open the needle valve so that the engine runs at a rich four-cycle setting. You may also wish to slightly retard the spark to further reduce the speed. It should run so cold that you can hold your fingers across the cylinder fins without burning them.

6) Let the engine run in this fashion for about ten minutes, then shut it off for two or three minutes. Restart the engine and gradually screw in the needle valve until an increase in rpm is noticed. Leave it at this setting for about five minutes. You will notice that the cylinder fin temperature is a little warmer.

7) Now run the engine for periods of about two minutes before shutting it off. Leave it off until the temperature has dropped to the point where you can hold onto the cylinder. Then start and run it for another two minutes, each time screwing in the needle valve slightly. When the engine breaks into a two-cycle mode, start and stop it at least three times, letting it run five minutes each time and cool between runs.

8) Repeat the two-minute run-and-stop cycles. However, each time you restart the engine, slightly advance the spark, which will increase the rpm. Take your time and don't be in a hurry to see how fast the little beast will go. Many are the engines that have been ruined by improper break-in.

9) Eventually the engine will reach its peak rpm with the propeller being used. If the engine holds a steady high speed without slowing down, you may consider the break-in period to be over. Now you can switch fuels to the gasoline and oil mixture. You will find that the needle valve will have to be screwed in considerably when running on gasoline.

10) Although your engine is now broken-in on glow fuel, do not overload it when first switching to gasoline. Gasoline will cause your engine to run much warmer, and it is best to introduce your engine to this gradually.

Incidentally, how many of you readers have heard or used the term "loop scavenged" when describing the cylinder porting of a model engine? I'll bet all of us have at one time or another. It's even in the SAM rules (Sec. III, Para. 6), describing suitable engines for conversion to ignition for O.T. F/F competition. Has a nice solid sound to it when talking to someone else, but the truth is that we have been using the wrong terminology when describing our miniature engines! From the early days of the Brown Jr. to today's non-Schneurle engines, the cylinder porting has always been cross scavenging and not loop scavenging. Cross scavenging is where the raw incoming gas enters the cylinder and is deflected upward by striking a baffle on top of the piston. This baffle prevents the new gas from escaping through the exhaust port located directly opposite. At the same time, the fresh new gas helps expel the spent exhaust gas remaining in the cylinder. This is the basis on which most all miniature non-Schneurle engines operate today.

A somewhat rare Ross Twin belonging to Alberto Ulrich and converted to ignition by Otto Bernhardt. Crankcase and cylinders are anodized black, heads are gold. A very smooth runner.

Loop scavenging is where the exhaust port is located directly above the fuel bypass port (used by the fresh incoming gas to enter the cylinder). The theory here is that the exhaust port is opened first by the piston on its down-stroke. Then the fresh fuel port is opened, allowing the new gas to enter the cylinder, striking the opposite wall, bounding upward across the top and down in the form of a loop, all the while helping to push out the spent exhaust gas. Hence the term "loop scavenged." I think you will all agree that this hardly fits the description of our model engines. •

KLAUSE

• In this era of "Everything is. . .," it's unlikely that anyone would be dismayed at hearing, "Happiness is a hobby." Within this pursuit of happiness, at least as far as model planes are concerned, there's a current craze that says big is beautiful. Now, I'm not knocking quarter scale or mammoth scale. If that's your thing, fine. However, for those of you who are not as yet completely dedicated to any particular size of models, here are some considerations that may lead you to conclude that smaller might be smarter.

It's nice to have a large room that's all your own just for building models. But if you live in a small home or an apartment, you may have some problems. For some unfathomable reason, wives and mothers just don't seem to comprehend the esthetics of a wing resting on a cocktail table, with one tip in the kitchen and the other in the bedroom. If your models are in the four-feet-or-less wingspan category, you'll have a lot more flexibility regarding space for building and storage . . . ironing boards are usually 4-1/2 feet long.

How about those of you who have successfully unloaded your gas guzzling big cars in favor of the many-miles-to-the-gallon compacts? Have you ever tried to transport a really big model in a Honda? With your Great Dane along for company?

What about costs? Modest size models, either kit or scratch built, simply cost less. The engines also have significantly lower price tags. Last but not least, your fuel bill will be a lot less. Let's face it, a .60 tuned-pipe pattern ship usually gets about nine flights per gallon at $15 or more per gallon. That's well over a tank of gas for your Honda, or forty cans of Alpo for the Great Dane . . . eight meals.

Forgetting about all those things, there just might be one other consideration over which you have no control: the availability of an adequate flying site. Your chances of obtaining permission to

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Before and after painting photos of Dave Latsha's Rivets, built from the new D&L kit. Manufacturer had some kit production problems, but should have kits ready to ship by the time you read this. Our Pylon columnist will do a review on this model as soon as possible.

PYLON "GO FAST AND *Turn Left!*"

By JIM GAGER

PHOTOS BY AUTHOR UNLESS NOTED

• Okay, you Turkeys . . . I've been nailed by several of you racers (Northrop too!) about the ever-popular question: "Where's your Pylon column, Gager?" All I can say is that it's awful tough to write an interesting article month after month without any input from you guys to stimulate my creativeness. You all surely have *something* to say, 'cause right at the busiest time of a contest you manage to find something distracting to talk about. Sit down and write me a short note about whatever is bugging you or a subject you'd like to read about, and quit griping that the only contest photos you see in this column are from the Midwest . . . when's the last time you sent some photos of your contest or a neat wreck or whatever? Just remember not to send Polaroids, they just don't make it. They have to be black and white (or B&W's, as we say in the mag business), the larger the better, and don't write on the backs with a ballpoint pen because the chemical residue transfers the ink onto the photo. Instead, use a fine tip felt pen and separate the photos with a scrap of paper. Twenty-dollar bills work nicely.

We received a brief note from Art Arro, who edits the NMPRA Newsletter. Heeeeeerr's Art. . .

"Dear Jim,

"Thanks much for the NMPRA plug in the May **Model Builder.**

"Please see what you can do about having an application form published as done for the LSF, NASA, NPJA, SAM, etc.

"Also, please mention that a Race Procedure Guide is available from AMA HQ at no cost. This Guide gives the Contest Director all of the information required to run a successful pylon race. The safety recommendations included in the Guide were the basis for the NMPRA's response to the AMA Safety Committee. A complete safety guideline listing will be forwarded to you upon AMA approval of our recommendations. We would appreciate the widest dissemination of this information when it is

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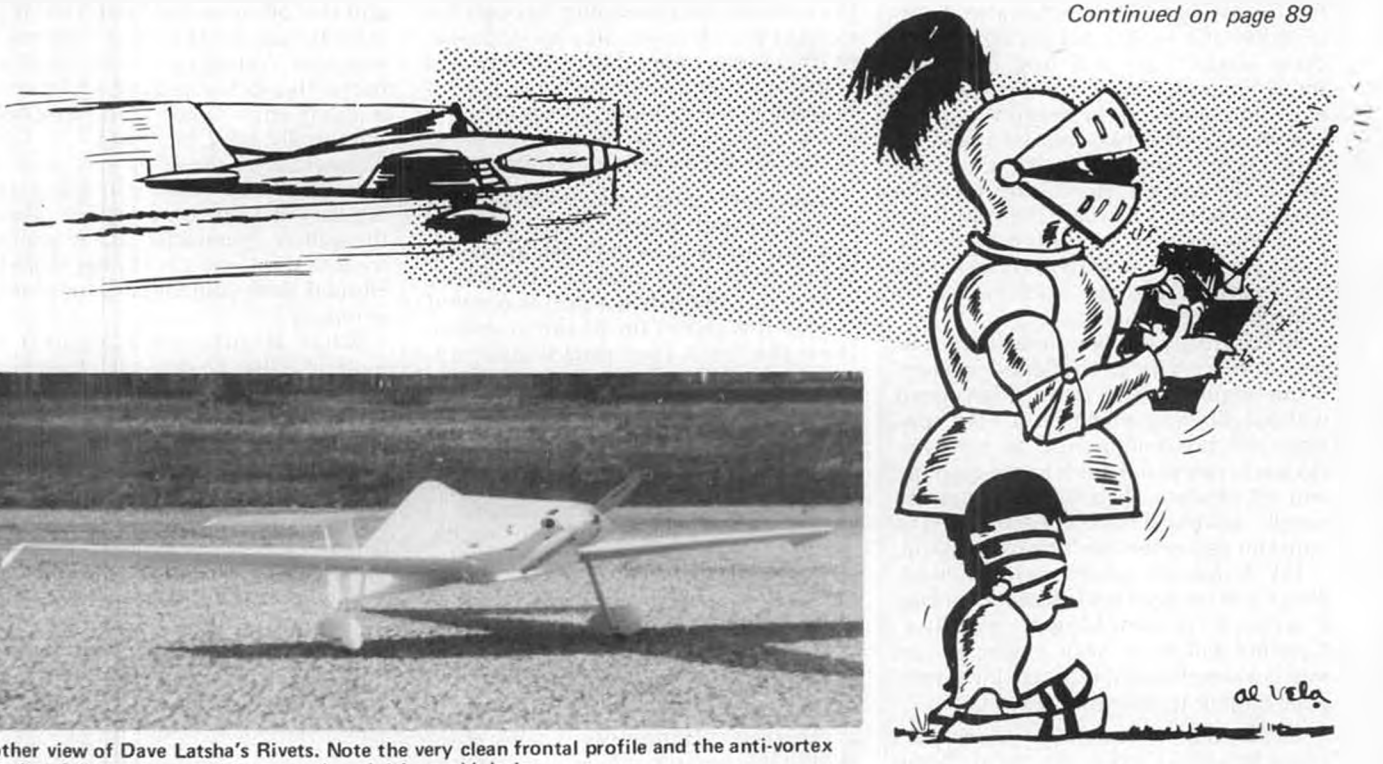
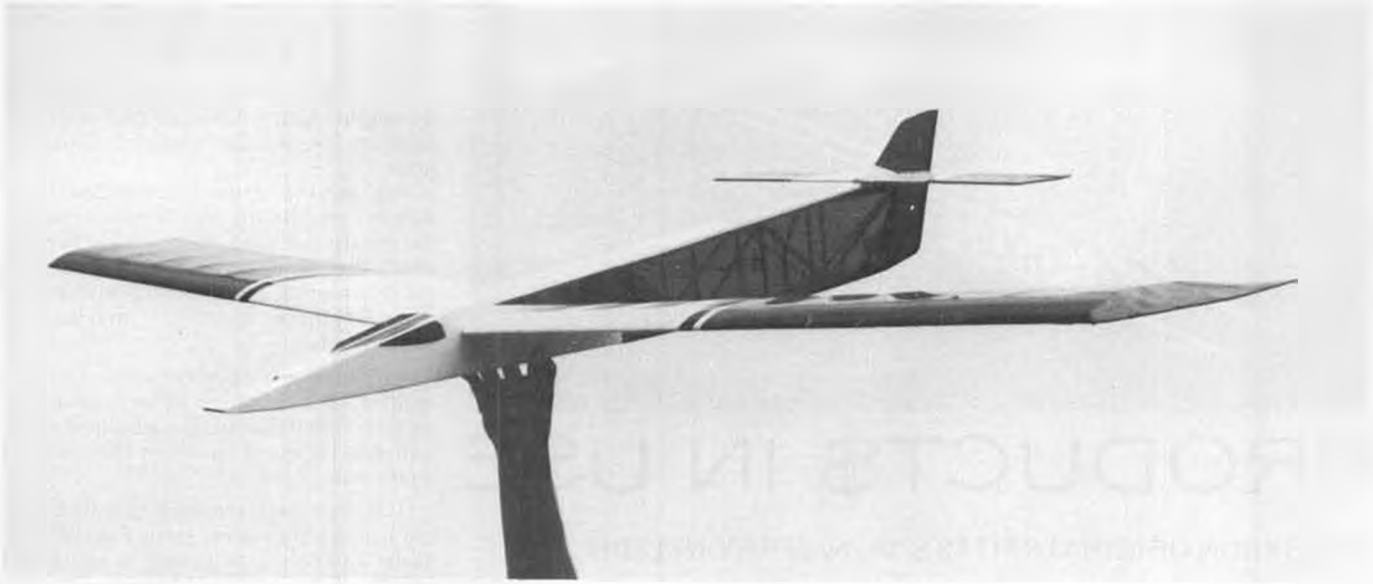


Another view of Dave Latsha's Rivets. Note the very clean frontal profile and the anti-vortex wing tips. Still very competitive even though it's an old design.



PHOTOS BY BILL NORTHROP

PRODUCT$ IN U$E

LEGIONAIR'S SHUTTLE SAILPLANE, by STEVE UPTON

• The Shuttle is a Legionair kit designed for thermal or slope soaring. It has a wingspan of 78 inches and a wing area of 819 square inches. If you're in the market for a fast-building sailplane that combines uniqueness with performance, this plane is definitely the answer. The planform of the fuselage lends itself greatly to exciting color schemes. There are a few other things that are unusual in the construction. An example is the aluminum tube spar, a trademark of Legionair kits. It is an advantage because the wings are practically unfoldable on a winch. We have done all the test flying of this airplane on a slope in fairly heavy winds, and have found it to be a very smooth and easy flier. We will tell more about the flight characteristics of the Shuttle after the construction part of this article.

We found a modification that is necessary in the fuselage. The fuselage construction is all plywood in front of the wing and an open stick framework aft of the wing. Unfortunately, the point where the plywood meets the stick framework is a high stress point. Unless you are an expert at soft landings in 20-knot winds, as I found I was not, some beefing-up is needed behind the last ply former. What we did was to splice in 1/4 by 1/8 plywood doublers to beef up the existing balsa longerons fore and aft of the last ply former.

FUSELAGE

The fuselage was easy and fun to build. You start by building up the sides as usual, doing the needed modification at this time. The disc sander from Stricks Enterprises came in extremely handy for joints and gussets. After the sides are done you simply drop the bulkheads into the notches in the sides, taking care that everything is square over the plans. I used 5-minute epoxy throughout the fuselage, since the strength is needed, especially in the open framework. I used Titebond only for the top and bottom balsa sheeting. After gluing the tail together and gluing the 1/4 by 1/8 top and bottom cross braces in the aft fuselage, bulkheads 1 and 2 up front are added. Now put in the 1/8 ply forward bottom piece. This may be difficult, depending on how stiff this piece is. The front of this plane is very strong, so don't worry about it breaking. Now comes the fun part: gluing in the 3/8-inch diameter aluminum wing joining rod. If the plane is straight, the die-cut holes should be in line. There is a 1/4-inch ply brace that butts up against the aluminum wing rod. The brace and wing rod are now wrapped with copper wire and the whole mess is epoxied to death. Don't worry about the weight, since it's at the C.G.

WINGS

The wings are fairly easy to build, because they almost serve as their own jig. The tube spar first has to be wiped with alcohol, then the ribs are glued on with Elmers glue, since Elmers stands up

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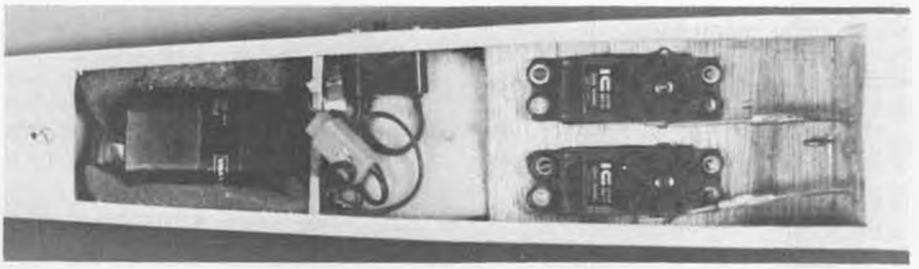
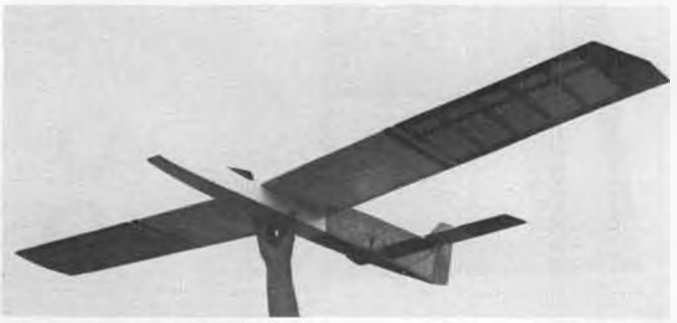


Radio installation in the Shuttle. Cox Sanwa rig fits in with plenty of room to spare. Cables used for controlling tail feathers.

Steve Upton with his Legionair "Shuttle" at Torrey Pines, famed for its fabulous slope site and nude beach below! Photo by Bob Upton.



Two-meter wings have 819 sq. in. of area. Aluminum tube wing spar is typical of Legionair kits.

PHOTOS BY AUTHOR & BILL JOHNSON

PRODUCT$ IN U$E

THE BYRON ORIGINALS PITTS S-1A, by JERRY NELSON

• I have followed the development of the product research by the Byron group for several years. Finally, after who knows how many man-hours, their first product, the Pitts Special, was released in late spring. Knowing the image that Byron Originals wanted to make on its first commercial effort, I was overly enthused about being asked to do a product report on the Pitts Special.

Several biplane designs have emerged from my workshop, but I have never had the experience of working with such an excellent product as the Byron Pitts. From the original packaging to the final assembly details, the kit is first class. Every single item required is called out, and anything that is somewhat unusual that you wouldn't find in the local hobby shop is supplied, such as an 8-32 ball end wrench, tensiometer for the belt drive, a 20x8 Zinger prop, 4-1/2 inch wheels, and so on.

The instructions are very complete, with over 175 construction photos and many drawings, plus an additional 21 photos in a manual revision update. Each step is fully explained, not only with the actual procedure, but with helpful hints as required.

Most likely, the average model builder could assemble the entire aircraft in one week of evenings and finish the project with the Econokote process by the end of the weekend. The factory claims that they can put one together, ready for covering, in 8 hours. They are probably right. Of interest are the actual steps that one goes through. Each step is actually a lot of fun; they're not tedious steps, but rather a long series of quick processess . . . perfect for working on the project at a hour or so at a time.

The prop drive (Byro Drive) is as simple as anything can be. Of particular interest is that each unit is designed for a particular engine. The pulley that attaches to the engine is not the same for all engines. Engines that develop maximum power at higher speeds have a smaller diameter unit than those with maximum power performance at lower rpm's. The pulley is attached in a similar manner as the normal prop driver on the engine. The pulley actually takes tha place of the prop driver, thus assuring a positive attachment requiring no maintenance.

Let's examine a few of the engineering features of the kit. The wheel pants (epoxy fiberglass, not ABS) have two aluminum attachment plates molded into the sides of the pants at the axle location. A heavy steel axle/attach unit is attached to the aluminum landing gear with no less than a 5/16-inch nut. When installed, the wheel pant is on permanently.

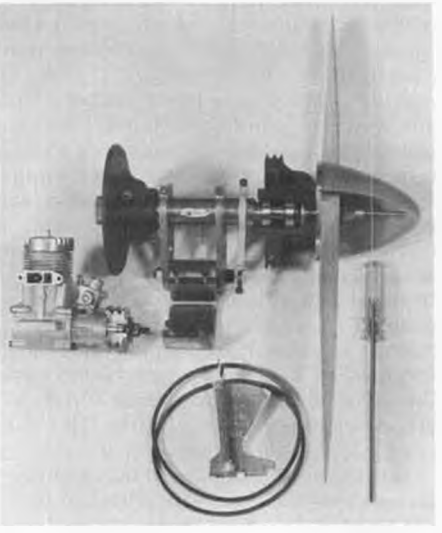
The huge fiberglass cowl is very light in weight. All the full-scale part lines and fastener details are molded into the glass.

The cabane struts are molded from nylon, requiring not a bit of work except for painting. All you have to do is drop the units in place into the fuse (after covering and painting) and attach with 5-minute epoxy . . . maybe a 3 minute job.

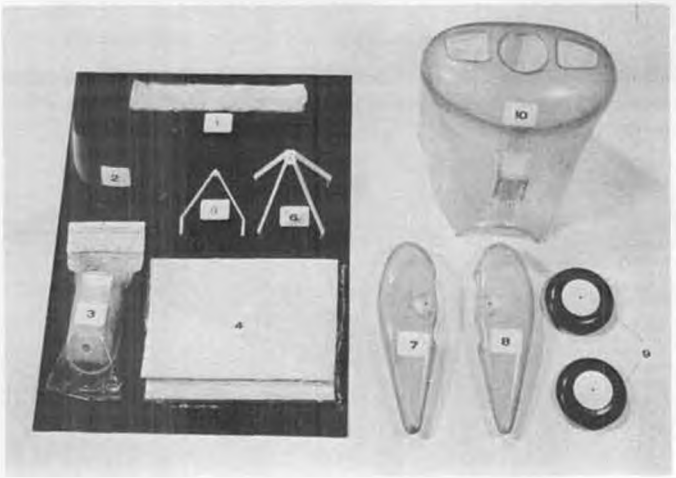
Anywhere a reinforcement is required, such as at the rudder horn attach points, a plywood plate is epoxied into a suitable recessed cavity in the molded foam part.

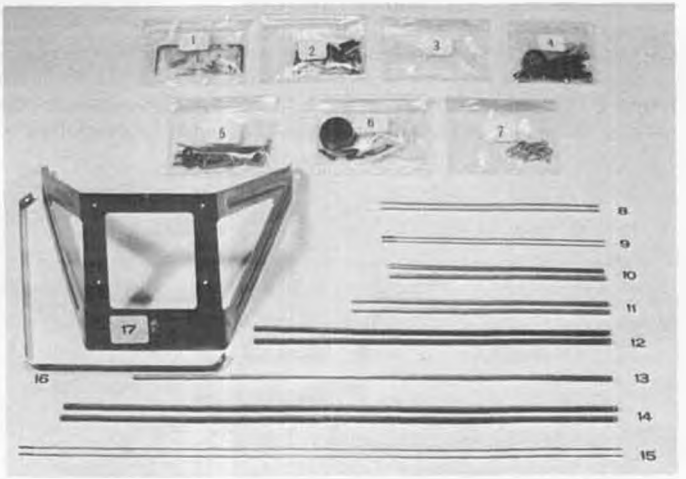
The foam parts are done very well with no noticeable warps. Even the rib locations and fabric wavyness is simulated on the wing surface. When my Pitts was first taken to the local flying field, one observer was positive that the wing was a normal built-up type with ribs and fabric covering!

Of course, there are many other points of interest, but we only have so much space available. I guess everyone has ideas on how to improve someone

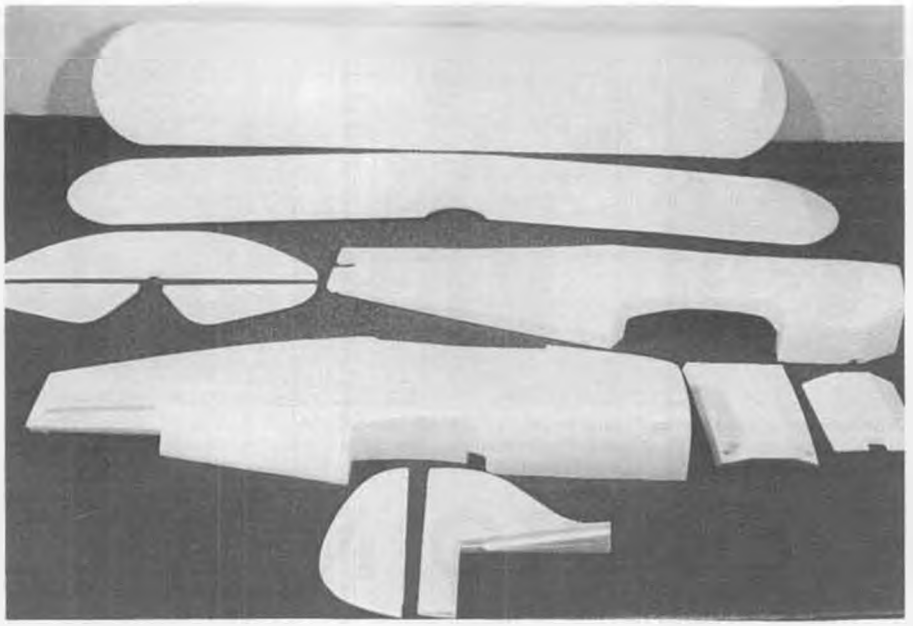


Factory photo of Byro Drive with O.S. .60 SR. Available to fit most popular engines.





Factory photos of some of the parts in the Pitts kit. Note how all of the small hardware is neatly packaged and numbered for easy identification. Total parts count in the Pitts kit, not including the Byro Drive, comes to a staggering 324 parts! All first-class quality, too.



The pre-molded foam parts that make up the bulk of the airplane. Parts can be covered or painted as is, or can be fiberglassed to keep "hangar rash" to a minimum.

Jerry Nelson poses with his massive monster model. Color scheme follows that used by Australian pilot Guido Zuccoli at the 9th World Aerobatic Championships this year.

else's product and this modeler is no exception. The suggestions offered are only to improve an already superior product.

The Pitts is big, and hangar rash (the dents that occur during handling in the workshop, car, etc.) can be a problem. Seems that the wing tips on my Pitts are getting more than their share of dents. The addition of a 1/16 plywood tip outline about 3/8-inch wide epoxied into the tip greatly increases the impact strength of the tip. Simply cut the slot with two back-to-back hacksaw blades. Weight increase is nil. Speaking of dents, they can be filled in with spackling compound, obtainable at the local hardware store.

The wings have 1/8 x 3/8 spruce spars laid flat into recessed slots. The spars seemed to be too tight in the foam. If you run the edge of a spar down the slot so as to widen the cavity somewhat, more room will be provided for the glue and allow you to keep the top of the spar flush with the contour of the wing's airfoil.

The interplane struts are held in place with a long threaded rod and two 1/4-inch nylon bolts threaded into the rod ends. The bolt heads protrude from the wing. I substituted the bolts with 1/4-inch flat-head nylon bolts by Prather Products. Doesn't work any better, but looks better. Of course, one must countersink the holes in the attach points.

The elevator joiner is formed from 5/32 wire, with a nylon steering arm used as a control horn. A flat is already ground into the wire for the set screw to firmly attach the unit to the wire. I was concerned, perhaps needlessly, about vibration loosening the set screw and terminating a flight much sooner than expected. A new brass arm consisting of two pieces of K&S .060 x 1/4 brass strip 1 inch long and spaced 1/16 inch apart were silver soldered to the 5/32 wire. Then a portion of the previous control horn was attached between the two strips and held in place with two No. 2 sheet metal screws. The exposed portion of the nylon arm is then attached to the elevator pushrod clevis.

The aluminum landing gear is supplied with a large cutout for obvious weight reduction purposes. The cutout is to be covered over with Econokote. Didn't like that idea, so I cut out a piece of 1/16 plywood, primed it with K&B finishing resin, and painted it the proper trim color. Then it was attached to the landing gear assembly with Silicon Sealer glue. Looks good and works great.

I elected to cover the Pitts with the

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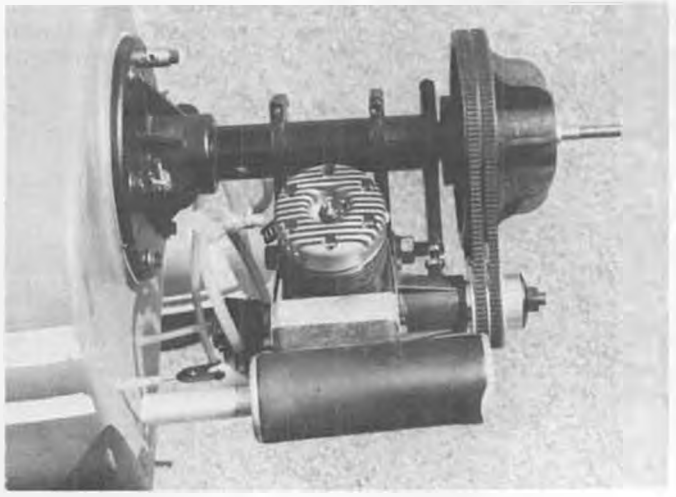


Engine installation. HP .61 R turns a Zinger 20 X 8 at 6,000 to 6,500 rpm with Semco muffler.

Tail assembly details. Stab brace is 1/4-inch aluminum tube. Finish is K&B Superpoxy.

Phil Booth of Great Britain, the new World R/C Car Racing Champion.

Just before the start of the Finale. From l to r: Rick Davis (USA), F. Sasuga (J), Chuck Phelps (USA), Dave Martin (GB) (missing from photo but his car is there), Phil Booth (GB), Curtis Husting (USA), Bill Jianas (USA), Ronnie Ton (NL), Jeff Rold (USA), and N. Ishihara (J).

PHOTOS BY AUTHOR

R/C AUTO NEWS

By CHUCK HALLUM

Start of the Finale. Can you imagine the tremendous pressure on those ten drivers at this point? All the cars look almost identical.

• The 2nd World Championships for R/C cars at Geneva, Switzerland, July 2-8, 1979, concluded with Phil Booth of Great Britain as the new World Champion. However, many (me too) had to wait several minutes after the race to find out who won because all the announcing was done in French. Was Bill Jianas catching and passing the leader? Was Chuck Phelps holding onto third, or second, or the lead? Where was Ishihara, the Japanese superdriver? Was he in second, or third, or where? I was not even able to understand the names of the drivers as announced in French, much less the position or lap count. Too bad that with five Americans and two British drivers in the 45-minute Finale, they did not announce at least their positions and laps at ten minute (or so) intervals in English.

The finishing order and laps in the finals are tabulated below:

FINAL PLACINGS

		No. Laps
1)	Phil Booth (GB)	116
2)	Bill Jianas (USA)	115
3)	Chuck Phelps (USA)	115
4)	F. Sasuga (J)	114
5)	N. Ishihara (J)	109
6)	Rick Davis (USA)	102
7)	Jeff Rold (USA)	91
8)	Ronnie Ton (NL)	81
9)	Dave Martin (GB)	77
10)	Curtis Husting (USA)	38

Toward the end of the race Jianas, Phelps, and Ishihara were turning 21 sec. laps, with Ishihara having the fastest one and Booth a little over 22 sec. But Jianas, Phelps, and Ishihara were all out at various times and Booth seemed to be staying away from trouble (launch disks) on the track. Sasuga was not a dramatic driver and I really didn't watch or time him, so he must have been on the track all the time. The rest of the drivers were in and out of the pits with all sorts of problems and were definitely out of contention.

The weather for all seven days of the race was very good. Usually it was a little overcast in the morning, clearing early and getting to about 70° to 80° each day. The first few days the humidity seemed fairly high, and several days in the late afternoon it was cool and windy.

The race site was the Vernets parking lot, which is the Geneva Sports Arena. The track surface was very smooth and had a considerable amount of gravel showing. During the first two days of practice the traction was very poor. By the third day (another practice session, the result of a schedule change) the traction was getting reasonably good. When initial qualifying started on the fourth day, the traction was good and just seemed to get a little better each day, with very little change during the day, but rather improving overnight. The traction never appeared to decrease.

Site preparation was very good, with good spectator control arrangements, a fantastic driver's stand, good pit area with ten starters, good timing equipment and lots of dedicated personnel.

The Sunday race crowd. Pit side was just as crowded. At 7 Swiss francs ($4.50) a head for the spectators, the race was a financial success. Note the large Fiat disc course markers, just perfect for putting a stray car into orbit!

Dave Preston, Kieth Plested, and Phil Booth in the British pits working on their cars on Sunday.

K. Masuda, N. Tomita, and K. Kondo in the Japanese pits. All Phoenix cars painted alike, same with all Kyosho team cars.

These dedicated people included not only the race director (and assistants), but transmitter control, radio frequency monitoring, lap counting and timing, announcing, starting and race control, and of course the turn marshals. There was just enough pit area for everyone, with some in the shade . . . and it was really hot if you were in the sun. A local Boy Scout troop provided the turn marshals, ticket takers, and parking control attendants. As turn marshals they did pretty good, though at first unfamiliar with what to do. But as the racing proceeded they became very competent and good. I don't know how the same boys lasted the full week.

The first official thing drivers did Sunday afternoon, July 1, when checking in was to get driver and mechanic photos for I.D. cards and pit passes. It was also my first chance to check out the track surface and layout and the driver's stand. There were two small changes to the track layout as originally published: a slight left jog (angle) on the back straight and a little esse on the infield straight. The little esse made you be a little careful, but if you lined up anywhere near correct it was still full throttle. Oh yes, we also picked up our racing numbers for the cars and heat race group and frequency assignments.

One interesting thing done in Europe is that car numbers are 1-8 in all heat races, using large numbers. The job of lap timing and counting is much easier. For the semis and mains, numbers 1-10 are used and there is a little extra confusion, but the numbers are sure easy to read.

The race schedule called for practice on Monday, Tuesday, and Wednesday; three qualifying rounds over Thursday and Friday; then on Saturday, requalifying and eliminations for 65th to 128th to get eight move-ups to Sunday; and finally on Sunday, qualifying with the top four going to the final and the top three of two ten-car semis going to the final. The original schedule was for two days of practice and three days for initial qualifying, but first day problems with 160 competitors caused the change. I don't think any race director/committee could have done any better.

During the first days of practice we learned what those FIAT discs could really do. These discs were about two feet in diameter and about six inches high. Fiat probably popped for them and got the dubious honor of having its name plastered on them. With rather poor traction it was hard to always miss them . . . there were about 45 of them around the course. Hit one of those "truck hubcaps" and you: a) did a half roll and slid 30-50 feet; b) attempted to set an altitude record; or c) attempted to set a flight distance record. And occasionally you: d) did a quarter roll and sat on your side; e) sat on top of the dots; or f) if you went through the discs and didn't come back, you would lose a lap.

The bad thing about a, b, and c was that you never knew how the car would land, and it was very destructive to the cars. Mufflers collapsed, bumpers mangled, wheels broke, radio components popped out, etc. There were quite a few runaway cars and engines the first few days. Finally the organizers were convinced to remove the discs from the inside of the corner entering the back straight. Things were much better then; all we did was blast into boards and probably ricochet into the outside boards. But at least we only hit the front or sides of the car.

After a couple of practice/qualifying days there was "open practice." It was completely uncontrolled and I called it "Kamikazi Practice." Nobody had frequency flags, you just went out and took your chances. At one time there were 24 drivers on the stand, two deep in places, running cars. There was practically always 18 or so. The good guy approach was to turn on the receiver and see if the car was getting commands. If so, switch crystals. If not, go ahead and take your chances. The "black hat" approach (and it was used) was to turn on the transmitter, crash the car that was running, keep giving output commands for a while, and then go out after things had

N. Ishihara of Japan was quick, consistent, and was top qualifier every time he ran.

Pit lane, starter boxes on right. On pit stops, car had to stop inside dotted line in front of your number. A 3-sec. fuel stop cost about 8 secs. total.

U.S. drivers discussing a problem. Jeff Rold (foreground) was top U.S. qualifier on Sunday, but had engine problems.

Driver's side of track and Sunday crowd. Big driver's stand, but imagine 24 drivers up during "Kamikaze" practice (see text).

Mike Reedy, Curt Husting, Debbie Preston, and Rich Lee horsing around in U.S. pits.

Carl Petri, Mike Rowland, and Chuck Phelps working with Roger Curtis looking on. Phelps placed 3rd in Finale.

cleared. There was no way to check who was on what frequency. I don't think this should ever be done again!

Official transmitter control was pretty good. Transmitters were impounded by 9 a.m., at which time you got your numbered "bib" which all drivers had to wear. You only got your transmitter when your heat group was up. Then after the last heat, you could get your radio by turning in your numbered "bib."

The method of lap counting and timing was pretty good, using the same equipment (Longine) used for full-size Grand Prix cars. Basically, there was a caller, a recorder, and an observer, and all timing room comments were recorded on tape. When the caller gave the number of a car crossing the start/finish line the recorder hit the appropriate key and that number along with the time was printed on a paper tape. Counters in both the timing booth and in front of the announcers advanced each time a number key was depressed. So, the paper tape could be used for both lap time interval and overall time. But there still could be problems if there were problems on the track or long pit stops. I believe the equipment used at the ROAR Nats is better, but not as accurate timewise. No way can three or four people keep track of all that is happening with ten cars in case of protests. Lap time interval alone cannot be used to settle protests unless you know what was happening to that car on each lap.

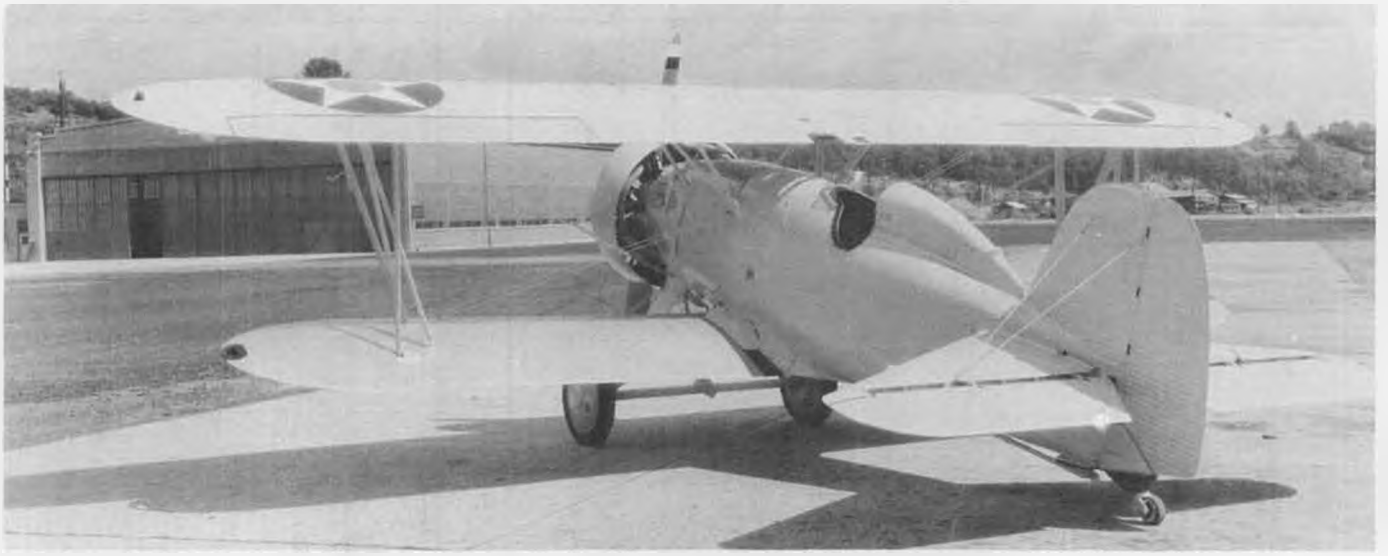
By the end of practice it was clear that several of the Americans were turning in the fastest laps (I had Bill Jianas the fastest) and a few European drivers not far behind. But the Japanese all seemed extremely smooth, and a couple of them were right behind the Americans and ahead of the Europeans.

Initial qualifying started. In the first round several Americans looked good. Bill Jianas was getting some super lap times, but was having some problems and not getting a good overall time. Art Carbonell had problems too. Jeff Rold ran a clean heat and got a good time. Many of the Japanese drivers looked extremely smooth, and Ishihara was the quickest, cutting all the corners almost perfect. Tall gearing, a small carburetor and 50% nitro gave the Japanese cars

Continued on page 72

Bill Jianas (left) and Rich Lee. Jianas was the bridesmaid again, taking 2nd in the Finale. Lee made it to the semis.

The best from Germany, Reiner Dosch and his girlfriend, the top pit cutie. Dosch was in top 8 on Saturday.



First F4B-4 out of the factory has the enlarged headrest for life raft storage, refuting one report that only the last 45 out of 92 were so equipped. Battery box on left wing fillet is clearly visible. Boeing photo via Johnny Burnett.

BOEING ✪ F4B-4

by PETER WESTBURG

PART ONE

• The Curtiss Hawk P-6E must share honors with the Boeing F4B-4 as the classic fighter biplane of the Golden Age. Models of each have been built by the hundreds of thousands since they first appeared.

The late 1920's saw the appearance of the first aluminum airplanes. Thanks to metallurgy, the metal had attained a strength-to-weight ratio that enabled it to fly. At Boeing, the cigar fuselage Monomail and the B-9 bomber were the first examples of the stressed skin, aluminum airplane. During the same period, the Army's P-12 and the Navy's F4B fighters were produced in numbers. Anxious to extend the life of the little fighters, Boeing designed an aluminum monocoque fuselage for the series, the Model 218.

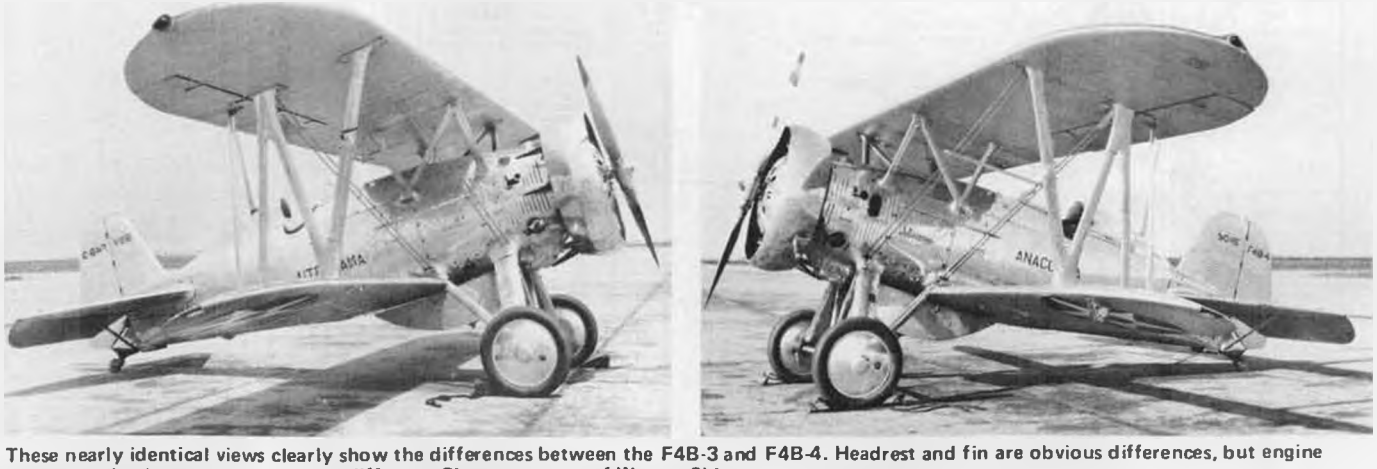
The Navy ordered 75 as the new F4B-3, the Army 135 as the P-12E. Early in the Navy test program, the first F4B-3 showed a serious tendency to skid. The words in the test report are: ". . .recovery from a skid to the right with free rudder is very slow, and the airplane will not recover from a skid to the left." The 22nd airplane was modified with the easily recognizable wide fin and was called the F4B-4.

Thirty-eight additional F4B-4's were ordered, plus one assembled from spare parts, for a total of 92 airplanes. A reliable report states that only the last 45 F4B-4's had the fat headrest, in which a life raft was stowed, but we have not been able to locate a single photo of an F4B-4 with a wide fin and a narrow -3 headrest, though many are available of the earlier numbered F4B-4's. If the early airplanes were retrofitted later, a photo should be in existence.

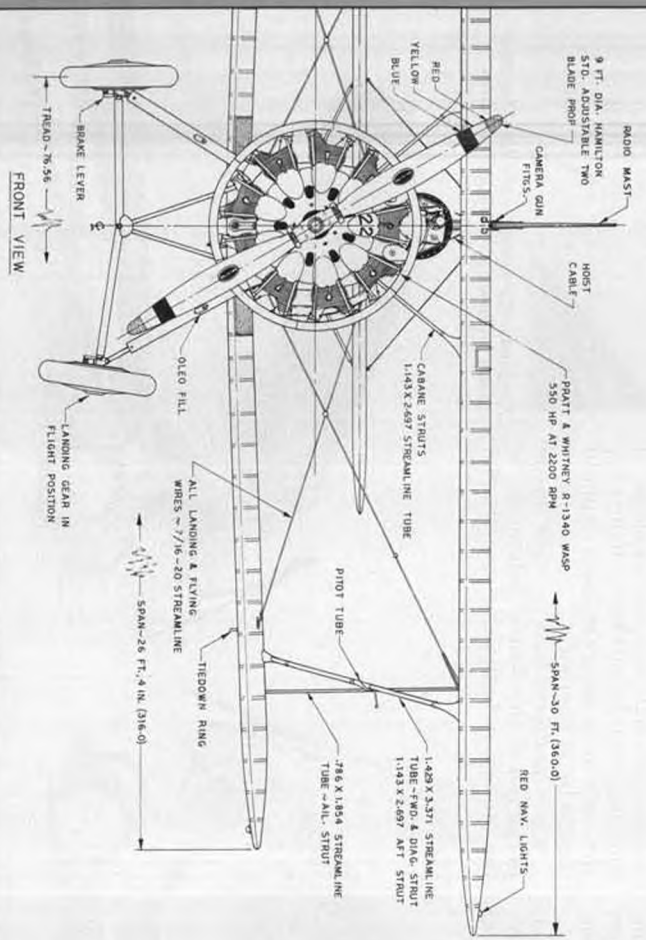
Scale modelers have a right to be perplexed at the visible differences in the models and individual aircraft. Not all F4B-4's were alike. Early airplanes had the F4B-3 engine cowling with two carb air intakes on each side ahead of the cabane struts, while later airplanes had a single intake on the left side below the forward cabane strut, with corresponding changes in the louvers and bead stiffening.

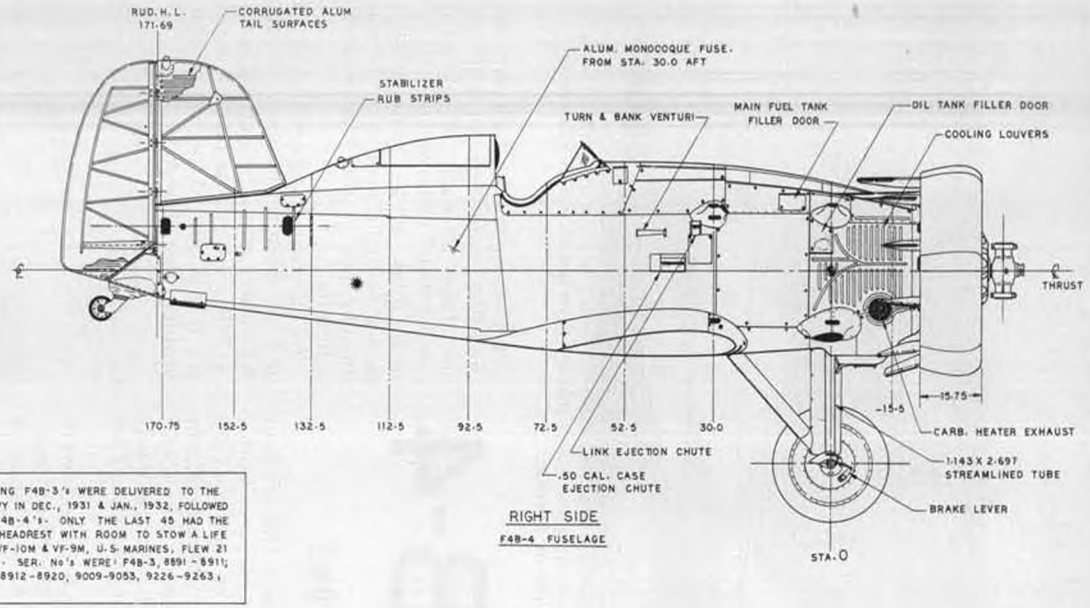
All surviving tube-and-fabric F4B-1's and -2's were retrofitted with the wide fin, rudder, and anti-drag ring. Strangely, no F4B-3's were fitted with the wide fin, yet it was the -3 on which the skid problem first appeared. •

Original, intermediate, and final fin areas. Small fin made airplane skid in turns.



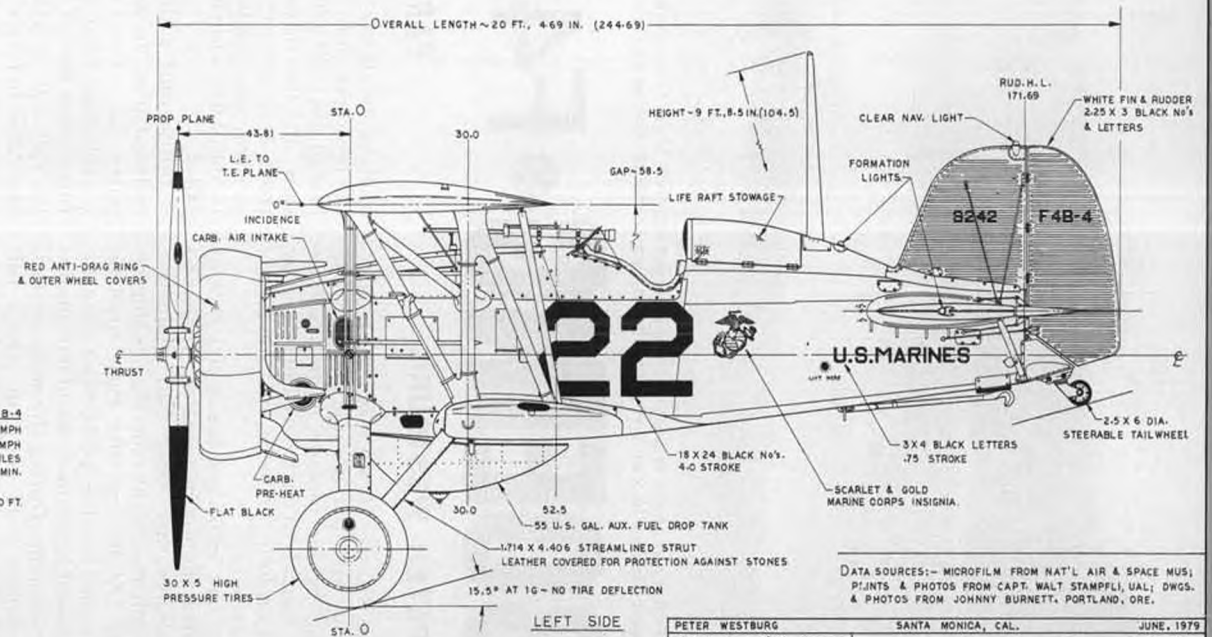
These nearly identical views clearly show the differences between the F4B-3 and F4B-4. Headrest and fin are obvious differences, but engine cowling and exhaust system are also different. Photo courtesy of Warren Shipp.





RIGHT SIDE
F4B-4 FUSELAGE

21 BOEING F4B-3's WERE DELIVERED TO THE U.S. NAVY IN DEC., 1931 & JAN., 1932, FOLLOWED BY 92 F4B-4's. ONLY THE LAST 45 HAD THE LARGE HEADREST WITH ROOM TO STOW A LIFE RAFT. VF-10M & VF-9M, U.S. MARINES, FLEW 21 F4B-4's. SER. No's WERE: F4B-3, 8891 - 8911; F4B 4, 8912 - 8920, 9009 - 9053, 9226 - 9263; 9719.



LEFT SIDE

CHARACTERISTICS:-

OVERALL LENGTH	20 FT., 4 IN.	
UPPER WING SPAN	30 FT., 0 IN.	
LOWER WING SPAN	26 FT., 4 IN.	
AIRFOIL	BAC 106	
UPPER WING AREA (INCL. AIL.)	141.4 SQ. FT.	
" " DIHEDRAL	0°	
" " INCIDENCE	0°	
LOWER WING AREA (INCL. FUS.)	96.6 SQ. FT.	
" " DIHEDRAL	2°	
" " INCIDENCE	0°	
FIN AREA	F4B-3 ~ 4.05 SQ. FT.	F4B-4 ~ 6.27 SQ. FT.
RUDDER AREA	7.5 SQ. FT.	
STABILIZER AREA	15.88 SQ. FT.	
ELEV. AREA	18.0 SQ. FT.	
HEIGHT TO WING	8 FT., 7 IN.	
WEIGHT EMPTY	F4B-3 ~ 2192 LBS	F4B-4 ~ 2354 LBS
MAX GROSS WEIGHT	F4B-3 ~ 3419 LBS	F4B-4 ~ 3611 LBS

PERFORMANCE:-

	F4B-3	F4B-4
MAX. SPEED	187 MPH	188 MPH
MIN. SPEED	61 MPH	62.5 MPH
RANGE, MAX.	829 MILES	734 MILES
TIME TO CLIMB TO 5000 FT.		2.7 MIN.
" " " " 6000 FT.	3.6 MIN	
SERVICE CEILING	27,500 FT.	26,900 FT.

DATA SOURCES:- MICROFILM FROM NAT'L AIR & SPACE MUS; PRINTS & PHOTOS FROM CAPT. WALT STAMPFLI, UAL; DWGS. & PHOTOS FROM JOHNNY BURNETT, PORTLAND, ORE.

PETER WESTBURG — SANTA MONICA, CAL. — JUNE, 1979

SCALE ~ 1/12 SIZE

.0833 = 1 IN. — // — 1 IN. = 1 FT.

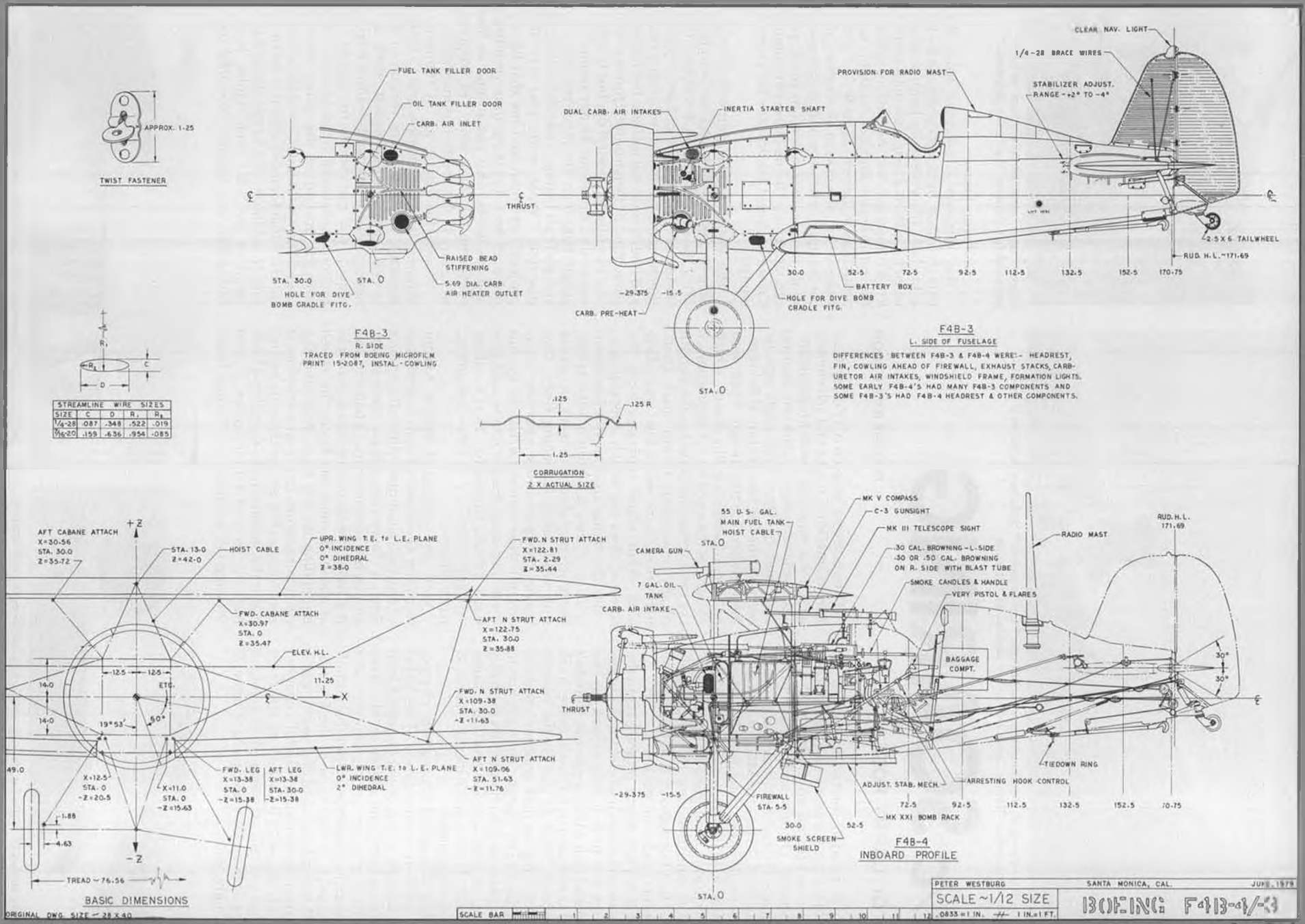
BOEING F4B-4/-3

SCALE BAR 1 2 3 4 5 6 7 8 9 10 11 12

ORIGINAL DWG. SIZE ~ 28 X 40

FULL SIZE PRINTS MAY BE PURCHASED FROM R. W. WESTBURG, 834 7th ST., No. 6, SANTA MONICA, CAL., 90403. $11.00 MAILED 1st CLASS, FOLDED.

SHEET 1 OF 4


APPROX. 1.25
TWIST FASTENER
FUEL TANK FILLER DOOR
OIL TANK FILLER DOOR
CARB. AIR INLET
RAISED BEAD STIFFENING
5.69 DIA. CARB AIR HEATER OUTLET
STA. 30.0
STA. 0
HOLE FOR DIVE BOMB CRADLE FITG.
THRUST
F4B-3
R. SIDE
TRACED FROM BOEING MICROFILM PRINT 15-2087, INSTAL.-COWLING
CLEAR NAV. LIGHT
1/4-28 BRACE WIRES
PROVISION FOR RADIO MAST
STABILIZER ADJUST. RANGE -+2° TO -4°
DUAL CARB. AIR INTAKES
INERTIA STARTER SHAFT
2.5 X 6 TAILWHEEL
RUD. H.L.-171.69
30.0
52.5
72.5
92.5
112.5
132.5
152.5
170.75
BATTERY BOX
HOLE FOR DIVE BOMB CRADLE FITG.
-29.375
-15.5
CARB. PRE-HEAT
STA. 0
F4B-3
L. SIDE OF FUSELAGE
DIFFERENCES BETWEEN F4B-3 & F4B-4 WERE:- HEADREST, FIN, COWLING AHEAD OF FIREWALL, EXHAUST STACKS, CARBURETOR AIR INTAKES, WINDSHIELD FRAME, FORMATION LIGHTS. SOME EARLY F4B-4'S HAD MANY F4B-3 COMPONENTS AND SOME F4B-3'S HAD F4B-4 HEADREST & OTHER COMPONENTS.
R1
R2
C
D
STREAMLINE WIRE SIZES
SIZE | C | D | R1 | R2
1/4-28 | .087 | .348 | .522 | .019
5/16-20 | .159 | .636 | .954 | .085
.125
.125 R
1.25
CORRUGATION
2 X ACTUAL SIZE
AFT CABANE ATTACH X=30.56 STA. 30.0 Z=35.72
STA. 13.0 Z=42.0
HOIST CABLE
UPR. WING T.E. to L.E. PLANE 0° INCIDENCE 0° DIHEDRAL Z=38.0
FWD. N STRUT ATTACH X=122.81 STA. 2.29 Z=35.44
FWD. CABANE ATTACH X=30.97 STA. 0 Z=35.47
AFT N STRUT ATTACH X=122.75 STA. 30.0 Z=35.88
ELEV. H.L.
12.5
12.5
ETC.
11.25
14.0
14.0
19°53'
50°
FWD. N STRUT ATTACH X=109.38 STA. 30.0 -Z=11.63
AFT N STRUT ATTACH X=109.06 STA. 51.63 -Z=11.76
49.0
X=12.5 STA. 0 -Z=20.5
X=11.0 STA. 0 -Z=15.63
FWD. LEG X=13.38 STA. 0 -Z=15.38
AFT LEG X=13.38 STA. 30.0 -Z=15.38
LWR. WING T.E. to L.E. PLANE 0° INCIDENCE 2° DIHEDRAL
1.88
4.63
+Z
-Z
TREAD ~ 76.56
BASIC DIMENSIONS
MK V COMPASS
C-3 GUNSIGHT
MK III TELESCOPE SIGHT
55 U.S. GAL. MAIN FUEL TANK HOIST CABLE
CAMERA GUN
.30 CAL. BROWNING - L. SIDE .30 OR .50 CAL. BROWNING ON R. SIDE WITH BLAST TUBE
SMOKE CANDLES & HANDLE
VERY PISTOL & FLARES
7 GAL. OIL TANK
CARB. AIR INTAKE
RADIO MAST
RUD. H.L. 171.69
BAGGAGE COMPT.
30°
30°
THRUST
TIEDOWN RING
ADJUST. STAB. MECH.
ARRESTING HOOK CONTROL
FIREWALL STA. 5.5
MK XXI BOMB RACK
SMOKE SCREEN SHIELD
F4B-4
INBOARD PROFILE
PETER WESTBURG
SANTA MONICA, CAL.
JUNE, 1979
SCALE ~1/12 SIZE
.0833 = 1 IN. = 1 IN. = 1 FT.
BOEING F4B-4 1/-3
SCALE BAR
ORIGINAL DWG. SIZE ~ 28 X 40
SHEET 2 OF 4

Woody Blanchard Jr. displays his original design "Les Joindres." Sailplane features a variable camber wing and a "flapler" over the center section of the wing.

Woody has a rather surprised look as he launches his 2-meter "La Petite Joindres."

R/C SOARING

by Dr. LARRY FOGEL

PHOTOS BY AUTHOR

• I was headed for the East Coast on business and a weekend away from home, so I tossed my Olympic 650, the transmitter, charger, and hi-start into my baggage. (I described that neat package in the April '79 issue of **MB**.) Once there, to be fully prepared for the DCRC contest at Manassas, Virginia, on Saturday morning, I plugged in the charger, only to find that one of the charging bulbs had burned out. Can't fly with an uncertain airborne pack!

I made a few frantic phone calls to the local model shops and electronic supply houses just before they closed for the weekend, but without success. Couldn't find a miniature bayonet base bulb anywhere. What to do? Fly the contest anyway? Try to find another modeler who has a Kraft charger, then ask him to let me borrow the charger he's probably using to prepare for the very same contest? At best that's inconvenient; at worst, impossible!

Then it dawned on me. My charger has built-in redundancy. The bulbs (transmitter and receiver required load charging lights) are identical. All I have to do is charge my transmitter and receiver in sequence (rather than simultaneously). A few turns of the Phillips-head screwdriver and the switch game was over. By morning I was fully charged in both regards. I'll not take you through the gory details as to why I didn't win the contest, but I do want to share some of the high points.

This contest was co-CD'd by Gus Burgin and Don Goughner. Each electric winch was equipped with an automatic line retrieval system . . . the one devised and built by Don. Two years ago he received the LSF Best Technical Achievement Award for this design. Since then he's been perfecting this device, which eliminates the need for "shagging lines." Let me explain this term for the benefit of any newcomers to our sport. Ordinarily the electric winch tows your plane aloft. Your plane separates from the towline, then the winch operator activates the motor to draw the line down before it can be blown into trees, become entangled with itself, or, worse still, with other launching lines. That leaves the parachute near the turnaround. Now someone has to go out there and drag the parachute and line back across the field. That's called "shagging line" . . . a time-consuming, nasty chore.

Well, the 45-pound Winch Master Retriever eliminates all that. It consists of a large cast-aluminum Mitchell Spinning Reel, a clever cam release mechanism, an electric starter motor, a battery, and the base. The launching line is drawn in at about 18 miles per hour, the speed depending on the load. Watching the parachute return to the winch before it ever touches the ground is really a sight. Naturally, automatically dragging it back over the ground is a bit slower . . . and through tall wet grass . . . or loose rocks . . . well, you know.

This retriever is separate from the launch winch. In fact, it can be used with a hi-start. It's especially helpful when launching from a long thin field and/or in a strong crosswind. According to Don, the retrieve line imposes no significant reduction in launch altitude . . . and I believe that. It works in all weather and can be operated by the pilot if necessary. With this retrieve device in place you can launch up to one plane per minute. Contests need no longer be launch limited.

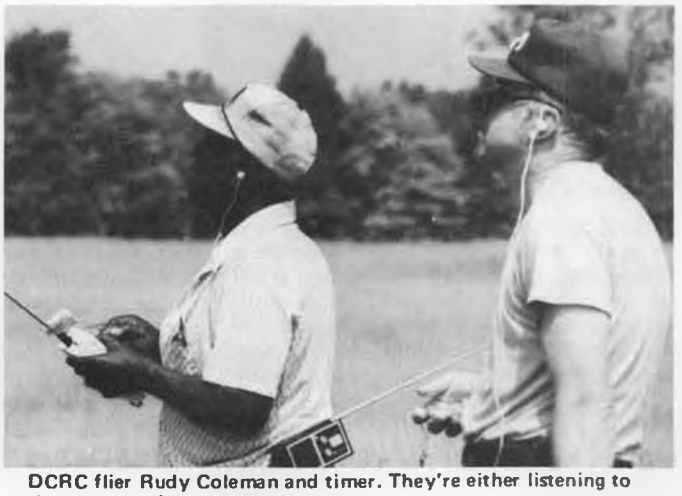
The Winch Master Retriever is available for about $180 from Don Goughner (Rt. 2, Box 112, Red Lion, PA 17356). This includes the spinner, cam release mechanism, the motor, mounting base, and line. It does not include the battery, parachute, or turnaround. Don says that you can buy 100-pound dry test braided nylon line for about $9 per pound . . . about 1600 feet. He recommends a 6-volt golf cart battery. I asked the obvious question, "What made you start this project?" He then told me that he fell some 20 feet, breaking four vertebrae and his wrists. That put an end to line retrieving for some time. Yes, Virginia, necessity IS the mother of invention.

Woody Blanchard, Jr., of Hampton, Virginia, flew Les Joindres and La Petite Joindres (the two meter version of the larger craft) at the contest. Both are equipped with droopable leading edges; that is, you can modify the Eppler 205 section by changing the incidence of the forward portion of the wing. Woody uses 5° down for launch and about two-thirds of that for more effective thermaling. In addition, the larger plane has a two-foot by 1-1/2 inch flapler (combined flap and spoiler) mounted over

Woody shows how the l.e. droops on his Les Joindres for thermalling. Airfoil is semi-symmetrical with l.e. up.

Airfoil is even thinner on the La Petite Joindres than on its bigger brother. Gap apparently doesn't hurt performance.

Don Goughner demonstrates his Winch Master Retriever, automatic towline bringer backer. Text tells how to get one.



DCRC flier Rudy Coleman and timer. They're either listening to thermals or a football game.

Don Clark looks silly in that hat, but it keeps him cool. Text tells where to get one.

the trailing edge of the center section of the wing . . . 3° up for speed, 3° down for thermaling, 20° down for launch, and 80° down when you really need a speed brake. According to Woody, this allows you to dive straight down from 1,000 feet without fear of overstressing the airframe.

Les Joindres is built around the Wizard fuselage designed by Dick Belt. I couldn't wait to ask, "What does Les Joindres mean?" Woody explained that it simply means "the joints" . . . clearly appropriate. Using the French gives it "a bit of class." I for one appreciate such experimenting. Dreams are only worthwhile if tested against reality. Here's wishing Woody continued success.

Rudy Coleman represented the Long Island Silent Flyers. He flew his 170-inch span "Plainsman." Its D-tube built-up wing has a Wortmann Fx-167K airfoil of 12-inch chord. The plane operates at 8.4 oz./ft.^{2}, carrying at least 6-1/2 pounds (without ballast). It's a beautiful sight as it graces the sky.

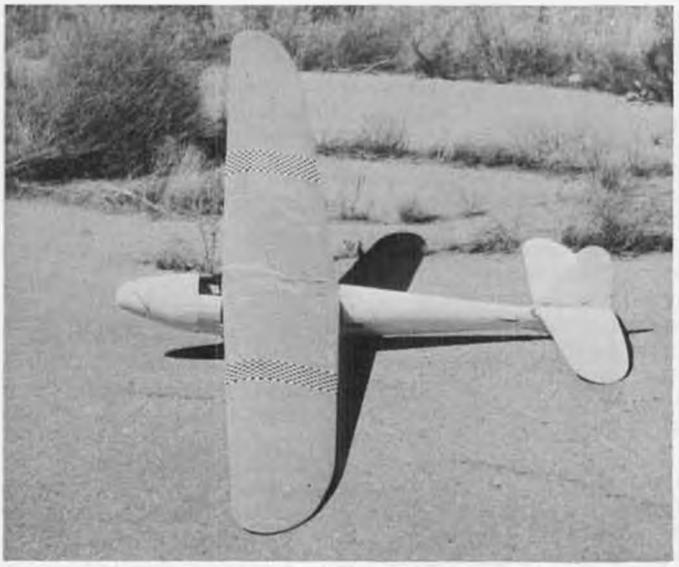
Don Clark participated and, in addition, provided an "Open House" for all "contestants, workers, wives, etc." You can easily spot Don at a contest. He usually wears a parasol hat that provides an effective sunshade while allowing full ventilation of the scalp. I couldn't help but wonder how much lift that hat would provide on a windy day. For those interested, the hat is officially called the "Brocca Brella." It's made in Taiwan and is available from LuWan Enterprises, Inc., St. Louis, MO 63043.

By the way, if you find yourself with sailplane in hand anywhere near the Shenandoah Valley in Virginia, by all means take the Skyline Drive. [It's wise to call ahead for reservations at Big Meadow Lodge (703) 999-2221.] Set up your hi-start on the open fields at Big Meadows. If the wind is out of the west you'll be in fantastic lift when you slip off the hook. If not, you'll find lots of thermals anyway.

Gordon Codding, of Kingman, Arizona, writes "Dear Larry, I've enjoyed your column for quite a long time . . . keep it up!! I enclose two photos that might be of interest to your readers. Here is my nine-foot span 1938 Cavalier gas model converted to an R/C soaring configuration. I altered the controls and moved the wing back one fuselage section for better balance. A camera goes in the nose, with a separate nose section replacing the streamlined one shown. The former engine mounts are used to attach the camera. A four-channel MRC radio provides all three controls. I've added ailerons since these pictures were taken. The former throttle control is now used to operate the camera (an old Kodak Brownie movie camera).

"The Cavalier was always noted for its fine glide. It just seemed natural to float.

Continued on page 92



Old Timer enthusiasts should recognize this one. It's an old 1938 Berkeley Cavalier, converted to an R/C glider by Gordon Codding. Span is 9 feet, and a Kodak Brownie movie camera can be fastened to the engine mounts for in-flight movies.

SLOPE SOARING

By DAVE THORNBURG . . . Now that you've found yourself a place to fly, as Dave explained last month, all that's left is to take your bird out and have at it. Here are the basic principles of slope soaring.

• Last month's article covered the two most important criteria for choosing a slope site: a favorable prevailing wind direction and the absence of upwind obstructions. For good soaring on *any* hill (ridge, dam, embankment, roadcut or whatever) the wind must strike the face as nearly perpendicular as possible. And the approach to the site must be free of trees, buildings, other hills . . . anything that might deflect or turbulate the wind before it gets to the face. For this reason, beach cliffs and lakeshore dunes are nearly perfect soaring sites: the water offers no obstructions to the oncoming air, lets it flatten out wind-tunnel-smooth before striking the slope.

But the big point made last month was this: you shouldn't write off slope soaring merely because you don't live near Torrey Pines. Most Californians who fly slope do so from inland hills, hills that may not feel a sea breeze for weeks at a time, hills where the wind direction and velocity vary with every passing thermal; in short, hills that are no different from the hills in Ohio or Kansas or Alabama or wherever you happen to live.

Why would a Californian deliberately pass up the smooth air of a Pacific beach in favor of an inland site? I've asked this question a lot, and for people not particularly noted for their sanity, they give me some surprisingly logical answers. The coastal slopes here in Tomorrowland, it seems, are all too often a) crowded, b) foggy, c) chilly, and d) barren of grass and trees. Add to these arguments the fact that most public beaches charge entry fees whether the wind is blowing or not, and you begin to get the picture: that little grassy knoll out in Aunt Martha's pasture starts looking more and more like the Wasserkuppe.

So you've decided to give sloping a try. Good. And you've found one or two sites within driving distance that look as though they might generate lift. Double good. The next question is: what's the best slope airplane for getting started? Should I build one of those low-wing fiberglass missiles you see in the mags? How big should it be? How tough? Should it have ailerons *and* rudder, or just. . .

Hold it, friend! I've got an answer here you're gonna love, especially if you're a lazy builder like me: *you probably already own an excellent slope soarer right now!* Almost every thermal sailplane on the market today will fly well on the slope, particularly in the hands of someone who hasn't had too much sloping experience. You don't need (in fact, you don't even want) symmetrical airfoils and ailerons on your first couple of slope birds. What you want is a relatively light, stable, tight-turning thermal ship with plenty of room for ballast near the center of gravity, so you can adjust the wing loading to the wind speed when necessary.

If you must build a plane just for the slope, there are only two criteria: make it simple and make it tough. The plain fact is, slope airplanes just don't last as long as thermal ships do, so you don't want to put too many hours of love into their construction . . . at least until you become proficient. A two-meter ship like the "Wanderer 72" or the "Soar Birdi" or "Drifter II" is perfect. Such kits are inexpensive, relatively quick to build, and easy to repair. All three are designed on the theory that light ships smite the earth more gently than heavy ships do, and hence do less damage to themselves. It's a good theory.

If this type of plane seems too fragile for the slope, keep in mind that you aren't going to begin your sloping career in 42 mph winds. It may be true that sloping is "what you do on days too windy to fly," but these are not the days for beginners. For your first experiences, pick days when the wind is light to moderate; about eight to twelve mph is ideal. Any slope that won't generate light lift in light winds isn't likely to improve much as the velocity goes up. Increasing velocity almost always brings increasing turbulence, particularly in the area just downwind of the lip of the hill. And unless your hill is fairly high (100 feet or more), you may find that winds beyond a certain velocity actually generate *less* lift than milder winds, at least in terms of how high you can soar above the hill. I call this condition "blowing the top off the wave": when the wind is too strong, it simply flattens out the crest of the wave of air that's breaking over your hill, just as a strong seabreeze flattens and scatters the crests of ocean waves.

So pick a light to moderate day for your initial slope experience. Remember that you'll be doing two important things on your first few times out: learning how your ship behaves in slope lift conditions, and mapping the peculiarities of your lift site. And your slope will have its peculiarities, rest assured. No two hills are exactly the same to fly, and every hill changes with wind direction and velocity. These are the things which make slope flying interesting; if the lift was always the same, you might just as well have a motor up front, instead.

Now let's run through a typical slope flight and see how it goes.

Say you've located a 300-foot-long roadcut that faces a big, open valley. The place isn't ideal; it's only about 30 or 40 feet high, and the trees on top begin at the right-of-way fence, maybe 35 feet behind the lip of the hill. But the wind is blowing squarely into the face of the cut, and the traffic on the road below is light. It's the best you can do without driving way out into the country somewhere.

The first trick is to park your car down the road a ways. Parked cars draw attention, and the last thing you want is a swarm of day-trippers stopping to picnic on your hill and watch you fly. It's tough enough to negotiate a safe landing on the top of a windy, turbulent hill when the area is clear; when it's covered with sharp-shinned spectators standing about like zombies, it's nearly impossible.

Study your hill carefully. It has two obvious drawbacks: the road at the bottom and the trees at the top. You cannot, you *must* not land on that road. Ever. If you do, you can be sure that an eighteen-wheeler will get to your airplane before you do, and deal unkindly with it. Or else a retired mugger in a Corvair will wreck his car in an unsuccessful attempt to avoid hitting it, and then sue you for your transmitter as well.

The trees at the top are hazards of a less public nature. They have waited patiently for you for years; see how tall they are. They are certain to gobble your plane eventually, so you might as well check them out now. Do they have enough low branches for easy climbing? Do they have enough poison oak? Still, the site could be worse: the area behind the hill could be full of water instead of trees. Dams and high lakeshores make good to excellent soaring sites, provided that 1) the wind is blowing FROM the water and not towards it, and 2) you're already an experienced slope pilot.

Anyone who tries to learn slope soaring on a dam face, regardless of whether the water is up- or downwind, is going to go swimming at least once. I still have vivid memories of waiting on the bank of a reservoir for the wind to blow my waterlogged Junior Falcon ashore. . .

Now let's look at the probable lift pattern of the slope. It's about a football field in length, easily big enough to make nice long passes up and down the face; I've had good flying on slopes half that length. But notice the shape of the far end. Instead of tapering away gradually, it forms an abrupt corner for the wind to blow around. That's a danger zone. Remember how the wind blew around corners when you were a nasty little pinch-faced kid back in Brooklyn? It formed vicious whirlpools that attacked ladies' skirts (hooray!) and ripped all the newspapers out of your grimy hand (boo!). These little twisters were no relation to thermals . . . they had no heat energy feeding them. They were

Continued on page 100

The victorious South African team (standing, l to r): Frikkie Roos, Roy Spavins, and Nord Gerneke. In foreground are Noel Drew and Jack Abbot, Team Manager.

Individual World Champion is Anton Wackerle, of Austria. Model is the extremely efficient Ame-Dassel D-75l.

WORLD SOARING CHAMPIONSHIPS

PHOTOS BY AUTHOR

By JACK HUMPHREYS . . . The 1979 World R/C Soaring Championships saw some outstanding performances by the world's best R/C pilots. The author gives a fascinating look at the men and machines present.

• The story of the 1979 World Champs in R/C gliders is five guys from South Africa. Roy Spavins, Frikkie Roos, Nord Gerneke, Jack Abbot, and Noel Drew refused to be intimidated by the awesome Dassel "machine" and provided the thermal challenge to the speed fliers. With speed flights in the order of 12-13 sec. and extremely consistent thermal flying (three missed maxes out of 24 duration flights), they overcame the 10-11 sec. speed flying of the Austrians who missed 7 of their 24 possible maxes.

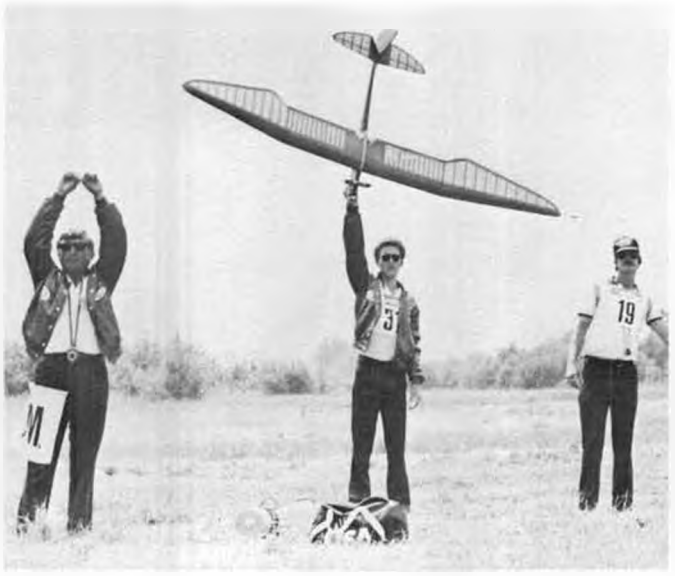
The speed fliers were not to be denied the individual honors. First place went to Anton Wackerle, of Austria, with what is probably the best airplane in the world: the Ame-Dassel. Second place went to Ralf Decker, of Germany, who is probably the best R/C sailplane pilot in the world. His airplane is less stable than most (extremely small tailplane) and could probably only have been flown competitively by someone of Decker's skill.

The origin of the success of the South Africans was threefold: weather which favored thermal soarers; intense practice before the meet, allowing precise reading of the thermal signs (particularly the friendly swallows); and most important, teamwork! When asked, they attributed their success to their winch, and refused to allow team photographs without it. I would say that the teamwork required to operate what is undoubtedly a cumbersome piece of equipment under competition conditions was their outstanding achievement. Remember,

Friedheim Schiborr, Germany, was 5th. Ship spans 2.8 m, best speed time was 11.4 sec.

Nord Gerneke, South Africa, with his Iron Butterfly. Nord injured his hand in a winch accident on last day.

Alex Reinhardt put in the best performance for Canada, was also the youngest competitor at 17. Here he catches his Viking to make a relaunch in duration task.



Dan Pruss (Team Manager), Steve Work, and Skip Miller of the U.S. team. Steve was 19th, flew a Bird of Time.

Terry Koplan and Steve Work, both of the U.S. team. Terry flew a Craft-Air Viking, placed 23rd overall. U.S. was 4th in team standings.

unlike domestic contests, in this event the competitors must set up and dismantle the winch for *each* flight and within a strict time limit. The South Africans never winched their own airplanes; another member of the team operated the winch. In these conditions one must have complete confidence in the other members of the team. I recall watching one of their launches that had a real potential for disaster. Spavins was up for the second last distance flight but released prematurely about 20 meters high. The team reacted immediately so that the launching equipment was all prepared for a second try by the time Spavins got the airplane down. With an elapsed time of 1:15 of the 4 min. usable working time, he relaunched. Another premature release! Now the pressure was really on, but the team reacted quickly and efficiently to set up the second relaunch, which after adjustments to the hook was off with barely 30 seconds to spare. It was while watching these two launches that we realized that under this extreme pressure no voices were raised and no one appeared excited, and we knew that Jack Abbot and the boys had a first-class act underway. Oh yes, Spavins maxed the flight!

The Austrians put on such a massive display of technical prowess and machine-like teamwork that for a time,

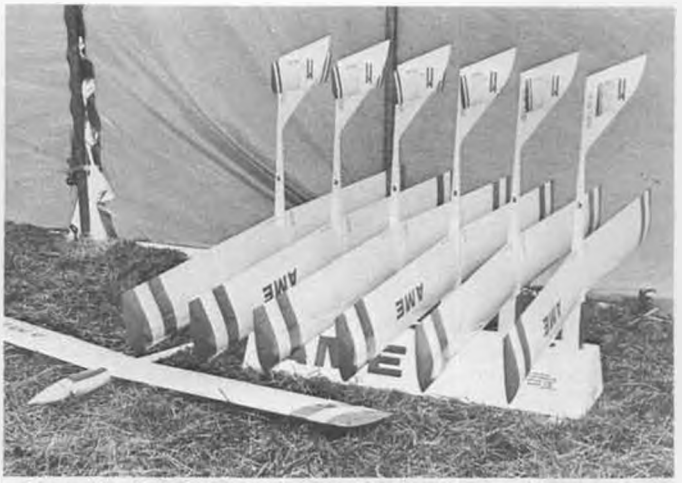
Ralf Decker, Germany, flew this scale-like ship to 2nd place overall, missed 1st place by a mere 2 points in over 14,000!

The Japanese team, l to r: Hasegawa, Kawamura, and Tsuji. Ships on ground have extreme dihedral, others are Aquila Grandes.

The 6th place British team, l to r: Dave Worral (7th); Nick Neue, Team Manager; Neville Mattingly, Hand Tower; and Neil Webb (35th). Fully sheeted surfaces on all models.

Roy Spavins, South Africa, placed 3rd with his "Yellow Bird." Best speed time 12.4 sec.

Members of Gruppe Dassel, l to r: H. Sitar, H. Eckman, A. Wackerle, W. Sitar, and H. Klotz. Austrian team was 2nd.

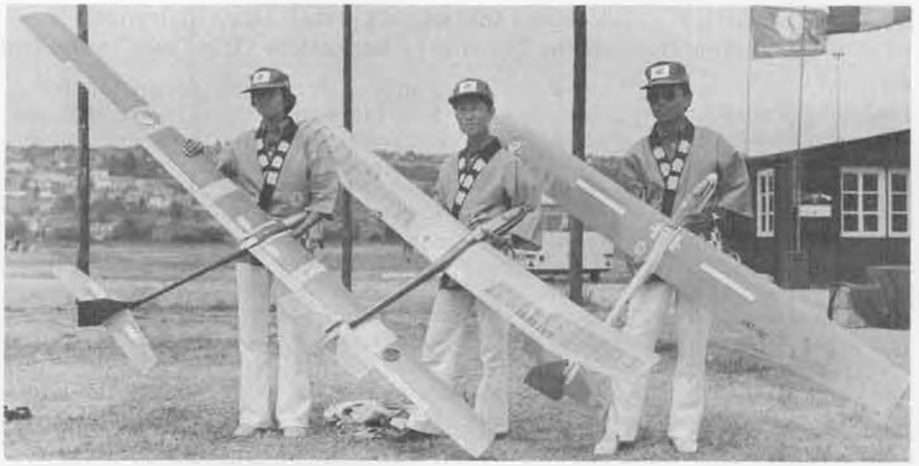


Seven identical Ame-Dassels, flown by the Austrians. Uses composite construction throughout. Note ultra-slick finish.

the greatest concern was that the day of the individual modeler was past in F3B. Flying identical airplanes in an identical way, dressed in identical red track suits, Gruppe Dassel was indeed intimidating. It is fortunate for the future of F3B that they did not run away with the contest, showing that individual effort at the building board, combined with teamwork at the contest, is still competitive.

The most impressive airplane was the Ame-Dassel D-751. Looking more like a slope pylon racer than a thermal glider, this machine posted a 9.5-sec. speed flight but was able to thermal on very light air. The low aspect ratio wings (10:1) barely over 2 meters in span (2.115) are made with an epoxy-glass skin over blue foam. The wings are formed in a female epoxy mold and come out at 220 gr. each, with a magnificent finish. No spars are used, and ballast is carried in tubes in the wings. The tail is all-flying and the fuselage is an epoxy fiberglass molding. The rudder and ailerons are coupled for thermal flying and uncoupled for towing and course flying (competition transmitters in Europe normally have this mixing and coupling/uncoupling capability built-in). Overall weight is about 1 kg, unloaded, with a maximum ballast capability of 700 gr. The wing loading is given as 28-34 gr/dm². The wing airfoil section is an Eppler 193, and the canopy is used as an air brake.

The Austrians' method of flying the speed course deserves mention. They come off the line in front of base A, do a 180° turn at altitude, establish their line for the course while coming back, roll inverted and begin a dive while coming back upside down. They exit the course at about 60° inverted, dive vertically to a height of 50 feet, pull out and enter the course level at incredible speed. They fly the course almost level, slowing down all the way so that when watching the finish, one is almost persuaded that this is a slow run. Then the time is announced: 10.3!



The 14th place Japanese team of Shuji Kawamura, Masami Tsuji, and Masaru Hasegawa. Ship on left appears to have flaperons and fully sheeted wings.

Amay has explained to me why the Europeans like these rules. This is much more exciting flying than we Americans are used to. Their airplanes derive less from directed free-flights than from full-size sailplanes. The challenge is there . . . are we willing to take it up? •

Fredi Schenk (left), Switzerland, and Rolf Girsberger, Team Manager. For roll control, each wing panel pivots at the root; there are no ailerons. Makes for an ultra-clean wing.

Teamwork! Nord Gerneke launches, Frikkie Roos operates the winch, Noel Drew calls the flight, and Jack Abbot manages the whole operation. Roy Spavins is at the turnaround.

PHOTOS BY AUTHOR

"Best of Show" winner was this beautiful Smith Miniplane by J.A. South, of Middleton, Ohio. Model looks pretty big, and seeing as the full-size Miniplane is fairly small, we'd say the model is larger than 1/4-scale. Looks almost as big as the Bud Nosen Gere Sport in the background.

1st ANNUAL EASTERN REGIONAL QSAA

QUARTER SCALE ASSOCIATION of AMERICA FLY-IN

* * * * * * * * * *

By DOUG EARLY . . . A report on the successful 3-day Mammoth Scale fly-in held in Kentucky, the first of what is to be an annual affair. Some very impressive "Big Ones" were present.

• Held at Tom Sawyer State Park in Louisville, Kentucky, on July 6-8, the Louisville area R/C clubs, the Kentucky Parks Department, and QSAA, along with its sponsors and donors, held the 1st Annual Eastern Regional Fun Fly-In.

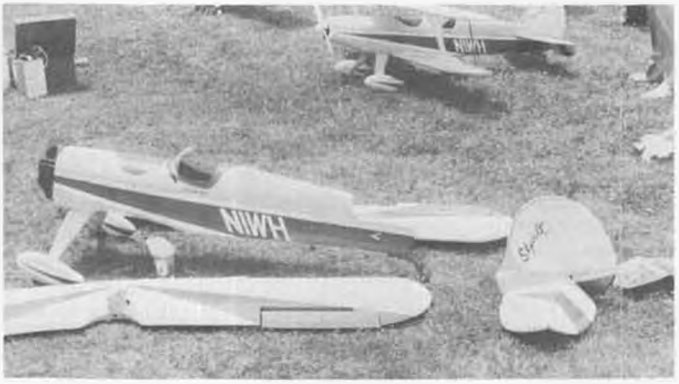
For a very exciting and thrilling weekend, you'll have to attend one of these quarter-scale get-togethers! If you have never seen one of these "big ones" fly, you are in for a treat. Watching one of these big birds take off, climb into the blue, and do a slow roll (and I do mean s-l-o-w!) is absolutely fantastic! No hundred-mile-an-hour flights, just good slow scale-like speeds where you can watch every maneuver easily, and for us folks of the older generation with failing eyes, you can still see these birds at quite a distance.

Another nice thing about these fly-ins is that everything is so casual. No rushing, no pressure, just plain relaxed fun. The pilots seemed to enjoy every minute, and so did the crowd of spectators. You could feel the excitement in the crowd as they watched the pilots perform various maneuvers at random. Applause was readily given! The pilots felt all their labor was worth every moment.

The demonstration flights performed by Dean Copeland for Byron Originals were something to behold. Watching Dean perform with the production models of the Pitts S-1A, the P-51 Mustang, and the ducted fan Mig-15 is breathtaking!

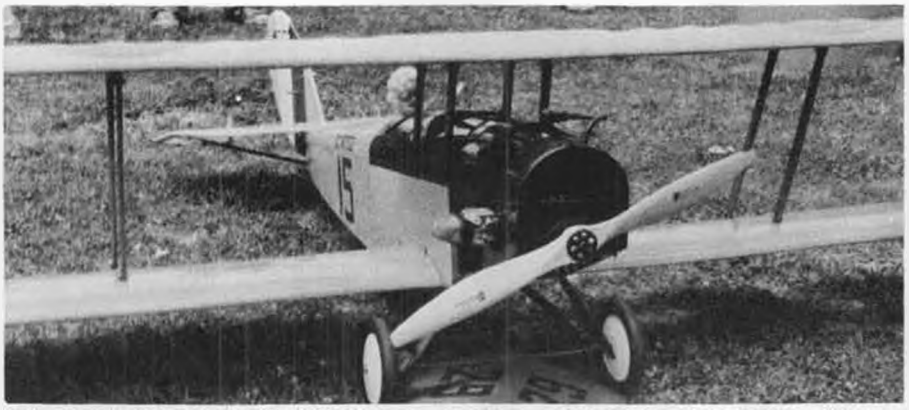
If you haven't considered building a quarter-scale model as yet, after watching the demonstrations of what these aircraft can do, you'll be convinced that this is no fad, but a whole new aspect of modeling. Ed Morgan and the QSAA (Quarter Scale Association of America) boys are to be commended for their work in promoting this type of endeavor. It seems to work out just great and is just

Ray Hostetler, known for his excellent finishes, discusses fittings on his scratch-built Skybolt.



The two Skybolts belonging to Ray and Wendell Hostetler. Wendell's received the award for Best Biplane.

Dean Copeland thrilled everyone with his exciting demonstration flights of the Byron Originals Pitts (see review on p. 22, this issue), P-51 Mustang, and Mig-15. In addition, Dean received the Best of Scale award with his Pitts. Note electric starter with extension shaft for the Mig.



Awards for Best Finish and Best WW-1 were won by Sonny Abrams with this Jenny, scratch built from Bud Nosen kit plans. Uses a chainsaw-type engine (maybe a Roper 1.90?).

Merlyn Graves won the Best Scratch-built Pre-1940 award for this Super Stearman. Similar ship in background belonging to Joe somebody...can't make out all of his last name. Sorry!

the thing we need right now.

There were many new and exciting things to see and talk about. New building techniques, new engines, coverings, and new innovations (I saw a door stop used for choking the engine outside the cowl). It was interesting to be able to walk around talking with various fliers about their aircraft. Most competition flying events have a time element and much pressure involved, in which the flier doesn't have time to converse with anyone easily. Not so at the 1/4-scale fly-ins. Here they are relaxed and willing to spend time showing off their craftmanship on these "Big and Beautiful" models.

With the exception of a little drizzle on Sunday morning (the Ohio Valley is unpredictable even in July), the fly-in had beautiful weather the entire weekend. This made for lots of great flying.

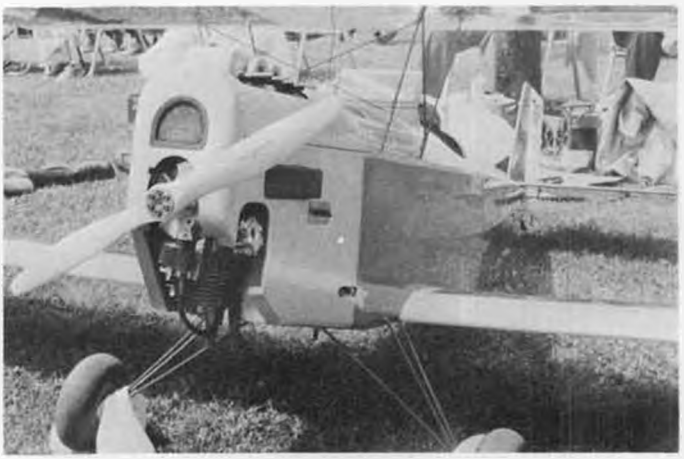
There was a powered hang glider demonstration and even free hot-air balloon rides! These fellows thought of everything! They even raffled off the beautiful fully-built Byron Originals Pitts S-1A along with other goodies at the end of the activities Sunday.

Much praise has to go to all the workers of the Louisville area R/C clubs, C.D. John Sullivan, QSAA, and the sponsors and donors of the fly-in for putting on such a thrilling show. It was a super weekend for everyone. As for myself . . . well, I can't wait to get started on my first quarter-scaler. Yep, I've been bitten! Like I said before, if you haven't attended one of these gatherings, plan to do so. You're in for a real treat!

WINNERS

BEST OF SHOW & PERPETUAL TROPHY
Jim South, Middleton, OH
"Smith Miniplane" scratchbuilt
BEST OF SCALE
Dean Copeland, Omaha, NE
"Pitts S-1A" Byron Originals
BEST MULTI-ENGINE
Bill True, Louisville, KY
"Cessna 310" Nosen kit
BEST BIPLANE
Wendell Hostetler, Orville, OH
"Skybolt" scratchbuilt
BEST WW-I
Sonny Abrams, Louisville, KY
"Jenny JN-4" scratchbuilt Nosen plans
BEST FINISH
Sonny Abrams, Louisville, KY
"Jenny JN-4" scratchbuilt Nosen plans
BEST MILITARY
Dave Platt, Plantation, FL
"Bucker Jungmeister" own kit
BEST MECHANICAL ACHIEVEMENT
Vince Mariani, Findlay, OH
"Fleet Bipe" Concept Models kit
BEST SCRATCHBUILT PRE-1940
Merlyn Graves, Downers Grove, IL
"Super Stearman" scratchbuilt
BEST SCRATCHBUILT POST-1940
Gordon Vold, Louisville, KY
"Stinson Voyager" scratchbuilt
BEST STAND-OFF SCALE
Tom Kuhlman, Findlay, OH
"Pitts S-1A" Byron Originals kit
BEST JUNIOR ACHIEVEMENT
BEST POWDER PUFF
No entries
MINT JULEP BEST STAND-OFF SCALE AWARD
Dave Platt, Plantation, FL
"Bucker Jungmeister" own kit

Powerplant details on the Byron P-51 flown by Dean Copeland. Uses a hot .60 mounted on a Byro Drive speed reducer.



Bill Britcliffe brought this Nosen Gere Sport from Houston, Texas. Powered with Quadra engine and EWH prop.

F/F Grand Champion at the '79 SAM Champs was Bruce Norman (again!). His wife Leslie was not far behind, either!

Don Bekins was the overall R/C Grand Champion, shown here holding two sizes of scaled-up Gas Birds.

PLUG SPARKS

PHOTOS BY AUTHOR

By JOHN POND

• For the first time in the history of SAM Championships held in the Rocky Mountain area, the "Lucky 13th" was staged at Salt Lake City, Utah, July 24 through 27. In many respects, the weather resembled Denver (the usual site) in that if you didn't like the weather, wait fifteen minutes. As Mark Fechner pointed out, one can expect the wind from all directions during the course of the day.

Hosts for this important meet in the annals of the Society of Antique Modelers was the SLAM club (Salt Lake Antique Modelers), with Lin Haslam taking on the dual job of Contest Manager and Contest Director . . . no mean feat! Lin was sharp enough to realize he couldn't handle the R/C end of things, so Doug Gorton was drafted. Doug, incidentally, did a complaint-free job in running his first O.T. R/C meet.

As Lin pointed out at the Annual SAM Victory Banquet, he would have been lost without the able assistance of Jack Defond. Defond, of Cheyenne, Wyoming, where he suffered the loss of his home in a tornado, offered to act as official recorder for three days when he found the wind had left no models in flyable condition! That's what is called dedication!!

In a write-up such as this, probably the best way to describe the activities is to do them individually. Hence, if some things seem a little disjointed or out of order chronologically, it is because we would like to take the time to properly inform the reader what transpired.

MECA GRAND COLLECTOGETHER

Probably one of the best things to hit the SAM Championships was the restoration, after an absence of two years, of the MECA Grand Collectogether on Monday, July 23. Most SAM members belong to MECA and vice-versa, so when Mark Fechner announced the formation of a Grand Collectogether at Salt Lake, this was hailed by one and all. It certainly did simplify things with all activities being held at the Ramada Inn.

Monday morning, July 23, featured the start of the Collectogether, with Vicki Fechner holding down the admittance table. Despite the seemingly low pre-entries, the room rapidly filled with exhibitors and visitors alike. By twelve o'clock, it was hard to find a space for a display table.

Noted this time was a considerable amount of sales, as compared to swaps. Dave Brodsky, of San Jose, reported he had many sales of engines from broken collections he had acquired. This was no doubt due to SAM members looking for good "runners" to use in their airplanes. Also to be noted were many displays of engine manufacturers, such as Herb Wahl (Brown Jr. Motors), Bruce Chandler showing his Black Knight engines, John Morrill (Simplex Motors . . . a new one!), Karl Carlson with Vivell .35 engines, Bob Bowen's introduction of the long-awaited Shereshaw Bantam Twin, and Mark Fechner with his "Slag" engines (Thor .29 engines). Even Pond was there with his plan collection! This made for a varied and interesting exhibition for the people who were not particularly interested in swapping or procuring an engine.

The wrap-up, staged by Dick Dwyer (one of the MECA Collectogether organizers), featured the awarding of prizes for best exhibitions to Carter Watts (1st), Tim Dannels (2nd), and Mark Fechner (3rd). Following that, many prizes were given out to the lucky ones.

SAM BEAN FEED

In line with keeping the activity going, the SAM Annual "Bean Feed" was held at 6:30, following the close of the Grand Collectogether.

As originated by the Denver boys, the

Mitch Post and his Anderson Pylon, just before putting up the winning flight in Fuel Allotment Antique.

Ray VandeWalker brought this neat Brown Jr. powered Scientific Streamliner. Harry Gould was indispensable helper.

Nick Nicholau, of SAM 30, flew this Privateer in the R/C events. Nick's models keep getting prettier all the time.

Robert Schmidt's R/C Kloud King sports a very suitable decal on the side, wouldn't you say?

Annual Bean Feed has previously been an outdoor affair, generally staged on the flying site. This year, the feed was held in the Ramada Inn, on the second floor . . . indoors! This has occurred once or twice before, so no one really complained about the indoor site. The only drawback, of course, was the lack of room; as a result, attendance had to be restricted. Truly a shame for those who enjoy the camaraderie and were unable to attend.

As usual, the Bean Feed also was the vehicle for late announcements regarding rule changes, special events, starting times, and in general, good advice on how to get to and find the parking areas on the field. In short, anything to ensure a good time.

ANNUAL SAM BUSINESS MEETING

The only SAM business meeting held once a year occurs at the SAM Championships. This year, at Salt Lake City, was no different. Held on Wednesday evening, July 25, a considerable amount of business was transacted.

Among the first was the raising of the annual SAM dues. This was brought about by the mounting costs of the SAM newsletter, "SAM Speaks." The President stated he had suggested to new SAM Speaks Editor, George Armstead, that the publication be put on a quarterly basis instead of a bi-monthly rate. As approved by the membership, the new dues will be $10 per year. Life memberships were to be raised from $75 to $100.

The members also voted to make the increase effective July 1, 1980, with the provision that a member could pre-pay as many years as he wanted at the $5 rate prior to the end of this year. The life membership rate of $75 was also to remain in effect until July 1, 1980. Treasurer Banaszak later reported he had received applications for six new life members.

Lin Haslam then proposed changes to the existing system of rules. After considerable discussion and amendments to amendments, the final motion as approved looked something like this:

1) All rule change proposals must be received by the Contest Rules Coordinators (Free Flight and Radio Control) no later than July 31 of the calendar year to be voted on for the following year's regulations.

2) All rule changes were to be published in the September issue (or third

One of the more unusual "slag" engines, a Buzz .60, by Karl Spielmaker. Flown in a Buccaneer C Special.

Herb Wahl launches his favorite model, a Comet Clipper, powered by one of his Hurleman engines.

Carl Cogar Sr. winds his Lanzo Stick in the shade to protect the rubber. Carl won Rubber Cabin, Rubber Stick, and Rubber Scale!

Larry Clark, hiding under hat, flew a Miss Delaware in the Antique event. Powered by an Ohlsson .60.

Bill Cohen shows how he cranks the Forster .99 in his Anderson Pylon from his wheelchair. Bill hails from So. Cal.

Not too many Clippers with inverted engines. This one, with a Madewell .49, won 5th in 30 sec. Antique for Walt Johnson.

quarter issue) for vote. Vote to be tabulated and results published in the December or fourth quarter issue of SAM Speaks.

The Engine Review Committee headed up by Mark Fechner then announced that the Simplex 25 engine, as produced by John Morrill, met all requirements of an original ignition engine. Henceforth, the Simplex 25 will be regarded as an acceptable Old Timer ignition engine.

In response to a query by the President, Tim Banaszak, acting on behalf of Midwest Vice President, Woody Bartelt, announced that the 1980 SAM Champs were tentatively scheduled for either Wright-Patterson AFB, Dayton, Ohio, or Chanute AFB at Rantoul, Illinois.

At this point, President Pond announced that Bob Larsh, of the Central Indiana Association, was circulating a petition to restore glow engine usage to the free flight rules and would appear in SAM Speaks for vote. Pond stated this would also be a motivating factor in getting the COFFC to manage the SAM Champs at Wright-Patterson AFB. This argument was rebutted by Joe Beshar, past President, who felt ignition engines should be the only motive power for Old Timer gas jobs. In any respect, the matter will be resolved by membership mail vote.

At the close of the meeting, Irwin G. Ohlsson then showed his 1936-38 films of the early days of engine manufacture. Featured were assembly sequences of the Ohlsson Miniature, plus flight action using these engines. Ohlsson himself kept up a running commentary on the various phases of engine manufacture. Among the early films were pictures of Irwin as a slim young man. Looks like middle-age spread has gotten most of us!!

MECA BUSINESS MEETING

Although not an official part of the SAM Champs activities (MECA is a separate organization), the Model Engine Collectors Association held its annual business meeting at the Ramada Inn on Tuesday, July 24. The meeting was headed up by Dick Dwyer, who was acting on behalf of Hank Hilscher, National Coordinator. SAM President Pond gave a short welcoming speech indicating the pleasure of having the MECA Grand Collectogether in connection with the SAM Champs.

Dwyer announced that the election of officers would be held via the next MECA Bulletion to be issued to all members. Dick announced he had a slate of those willing to serve in each district. During the discussion, it was brought out that additional nominations could be proposed by members through their District Directors.

An animated discussion followed on the status of the MECA Constitution, which appears to be in limbo at present. Dwyer stated that the proposed constitution would be printed in an upcoming issue of the MECA Bulletin for vote by the membership. Meanwhile, discussion centered on how business was to be conducted; i.e., by precedence, agreements, etc.

Although other business was brought up, the foregoing represented the majority of business transacted. At the close of this meeting, the writer ex-

Karl Tulp likes them big. His latest is a 1-1/2 size (12 feet) Lanzo Record Breaker. A real fair weather model, it failed to place in the top 5 in R/C Texaco.

See, sez Mark Fechner, Thor .29's do run. Dick Dwyer hangs on incredulously to Zipper fuselage.

Karl Tulp fine tunes the dwarfed Merco .60 in the 12-ft. Lanzo while son Frank holds on. That sure is a lot of Monokote...

"Happy Times" Loren Schmidt shows off his latest project, a Lanzo Stick. Plans in September '79 R/C MB.

Joe Beshar and Ed Rangus take a break after an hour of trouble-shooting ignition problems in Ed's beautiful Yates "Herky."

pressed the hope that the next MECA Grand Collectogether would be held in the general area of the SAM Champs scheduled for the Midwest District, either at Wright-Patterson AFB or Chanute AFB.

THE CONTEST

The SAM Champs, spread over three days, featured the most bewildering assortment of weather. Things didn't start off too promising, with a heavy downpour on Sunday and Monday, making the salt ground somewhat boggy in areas.

Noted was the early morning wind (east) that drifted the models toward the Great Salt Lake. On Thursday, five flying scale models were lost in the lake and were not recovered. Phil McCary reported he had seen his model floating in the lake (how could a model ever sink in all that salt?) and had to make plans to hire a boat.

In the R/C Texaco event, with models climbing to 2,000 feet altitude, 180 degree differences in wind direction were noted between this and the ground wind. The trick in getting lift was to fly when there was a change in the wind direction.

On Thursday, the strong wind had the modelers grounded for two hours. The strong west wind finally changed to north. This was the signal for those fellows flying in Unlimited Antique to get in their flights. Sal Taibi, who invariably flies early in the morning, was beat out in the afternoon by Mitch Post.

Of all the tough breaks to suffer, Ed Rangus had two good flights with his good looking Mel Yates "Herky," and then simply couldn't get the Orwick running for the third flight. Despite a complete teardown and replacement of the ignition system, the team of helpers never did resolve the problem. Tough!

Noted were a considerable number of fellows only rinsing their motorcycles down. The warning from Contest Manager Lin Haslam was to scrub cycles down thoroughly, otherwise the corrosive action of the salt would set in immediately. Even the writer noted the buildup on the wheels of his models. Immediate lubrication was the order of the day.

Jack Jella and Joe Beshar successfully flew both free flight and radio control. Jack scored firsts in R/C .020 and Class A F/F Pylon events, while Beshar registered two seconds, one on each side of the fence. This trend appears to be gathering more and more momentum as both styles of flying are being offered at contests.

The much-feared Anderson Pylon (an early 1937/38 design) failed to dominate the field. Only Mitch Post was able to score with one. In talks with Sal Taibi, who also has one, it was his opinion that the model was highly overrated and felt his Powerhouse design was equally competitive. (Columnist note: Sal is telling us this after the tremendous string of wins run up by the Powerhouse!)

One facet of the contest was rather disappointing to this columnist, in that it seems the same old designs seem to win all the time. Very few "new" designs

Continued on page 105

Miss PHILADELPHIA

OLD TIMER Model of the Month

Designed by: Maxwell Bassett

Drawn by: Al Patterson

Text by: Bill Northrop

Very nice Miss Philly by Bob Dittmer, a local So. Cal. modeler. First flew as F/F, now sports Kraft radio and O.S. .40.

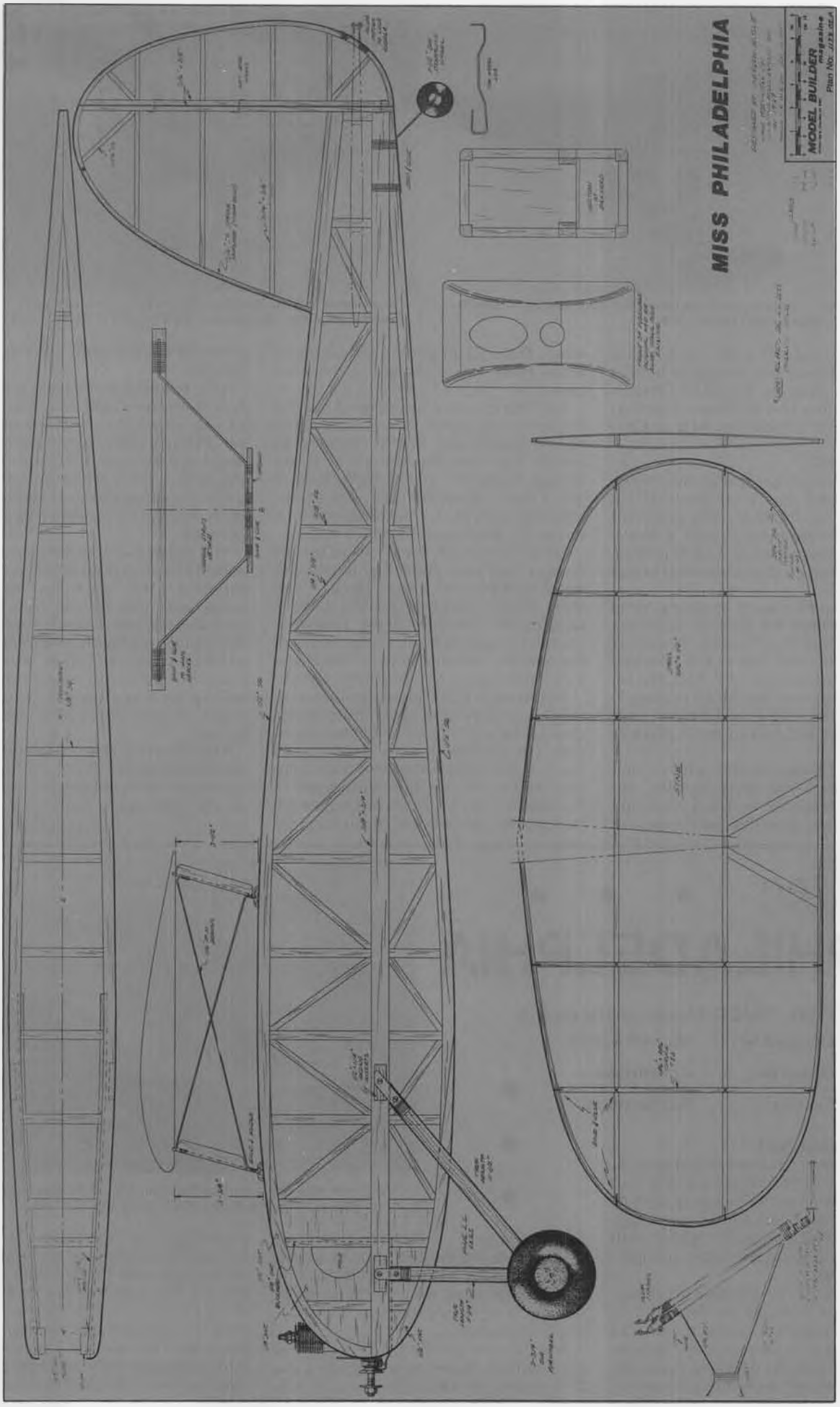
MISS PHILADELPHIA

Wow! Subtract 37 from 79 and what do you get? It's 42 years since we first read an ad in the May 1937 issue of *M.A.N.* about Scientific's kit for Maxwell Bassett's "Miss Philadelphia" . . . $9.95 with wheels, bamboo paper, dope, and ignition hardware.

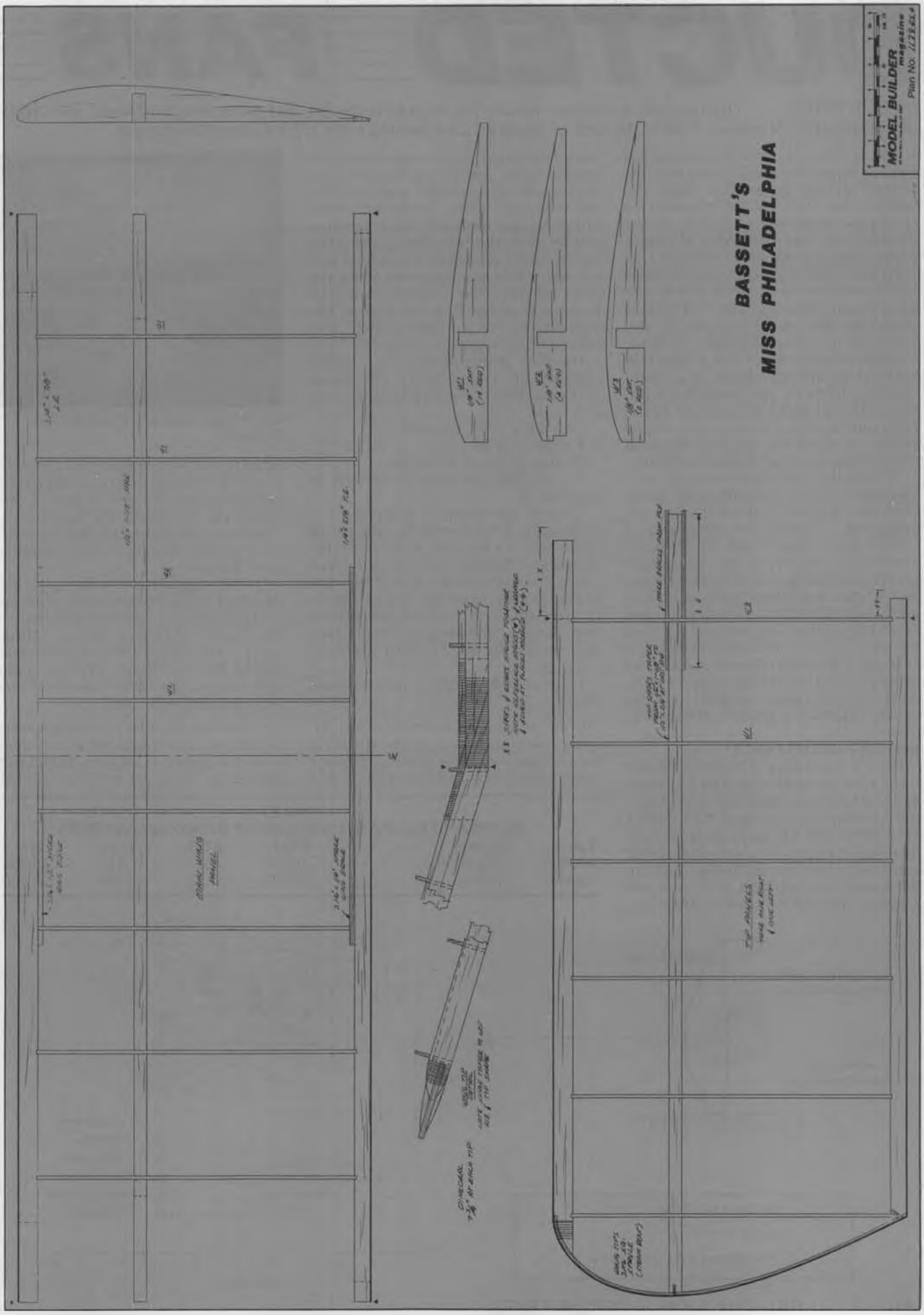
As mentioned on previous occasions, this was our first gas model, built in 1937-38, and quite a switch from small stick-and-tissue rubber models. Lacking a large, flat area on which to build the fuselage sides, we received our parent's permission to use the hardwood floor under our bed . . . and this was done without moving the bed! Taking advantage of the shaped and notched leading and trailing edges, we built the wing "in the air," and managed to do it without acquiring warps.

Toughest part of the construction was the stabilizer. Steaming and bending the 3/16 square spruce outline was a monumental task to a young, lone modeler in a small farm/college town. The stab had to be built into the fuselage, and then we were faced with the problem of covering the stab and fuselage without anything to glue to where the two surfaces met! As we recall, the fuselage was left uncovered in that area. Today we would add some sheeting to solve the problem. Another hint would be to use three

Continued on page 105



FULL SIZE PLANS AVAILABLE – SEE PAGE 116



FULL SIZE PLANS AVAILABLE – SEE PAGE 116

DUCTED FANS

By BOB KRESS . . . Ducted fans are rather demanding of precise design, but when properly done, are capable of amazing performance. This is the first of three articles dealing with 1/2A ducted fan designs.

• This article is another in a seemingly endless series which reflects my learning process in the ducted fan field. The subject this time relates primarily to curing performance problems of the production Midwest A4D Skyhawk powered by the RK-049 AXIFLO fan.

To start with, the prototype Skyhawk built and flown by Nick Ziroli and powered by the author's RK-049 AXIFLO prototype flew quite well nearly two years ago at a takeoff weight of 30 oz. Needless to say, when the production Skyhawk would not take off at a weight of 27 oz., Midwest was somewhat bothered. Thus began a chain of tests, calculations, and changes which finally yielded a gratifying success, although not without aggravation and confusion.

When a ducted fan jet model does not take off, one quite naturally, and usually correctly, suspects that the thrust is not adequate. I previously emphasized correct inlet design, and the Skyhawk inlet system shown in Fig. 1 was supposed to be the epitome of correctness. As we shall see later, the inlet looked great, but had one major defect. At any rate, the initial feeling was that the inlet was near perfect and we should look first at fan performance. Thus began a series of thrust stand bench tests of RK-049 fans with various rotors and inlets from which I learned a great deal that is of interest.

ROTOR PERFORMANCE

Fig. 2 is a summary of all of the RK-049 rotor tests conducted to date . . . some 42 in all! All test data points on Fig. 2 were carried out on one of Nick Ziroli's 1/2A Heinkel 162 jet pods using the ball-bearing-wheeled cart, rail and spring scale test rig shown in the Fig. 3 photo. RPM was by a Pro-Tach. Fuel used was Cox Racing Fuel containing 30% nitro. Fig. 2 contains all points tested with near perfect inlets, either a bellmouth or a short, open cowl, which is available from my company, Kress Technology, Inc. Other less perfect inlets were tested as will be discussed later, but at this point we are only concerned about how well various rotors performed holding the inlet constant. The tailpipe on the jet pod was 4 inches long and had an exit diameter of 2.84 in., close to the "zero contraction" tailpipe diameter of 2.77 in.

The data points of Fig. 2 are superimposed on a basic thrust coefficient (C_T) grid. Thrust coefficient is defined as:

$C_T = 2.074\ T/\rho\ ^2D^4 \times 10^4$

T = thrust in lb.

D = fan diameter in inches

ρ = .002378, sea level air density in slugs/cu. ft.

η = revs. per second = RPM/60

Basically, for a ducted fan, the thrust coefficient is a function of the rotor/fan design and remains constant as the rpm varies. In other words, as you vary the brake horsepower fed into a fan, it changes thrust as a square function of rpm along a constant C_T curve. In fact, one can rewrite Eq. 1 to state just that:

(Eq. 2)

$T = C_T \rho D^4 \eta\ ^2/2.074 \times 10^4 = \text{constant} \times \eta\ ^2$

If the engine brake horsepower vs. rpm curve is known, as for the TD .049 in Fig. 2, one can superimpose constant rotor efficiency and constant blade

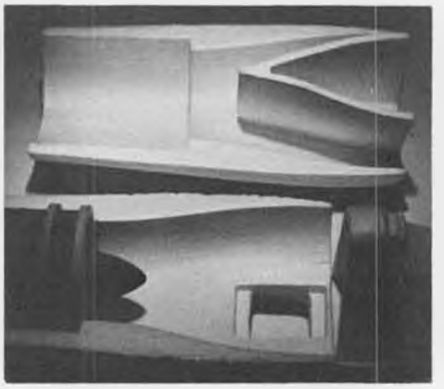


FIG. 1. Air inlet details on the Midwest Skyhawk.

mean section lift coefficient (C_L) lines on the chart. The explanation of this work is somewhat beyond the scope of this article, but the results are shown.

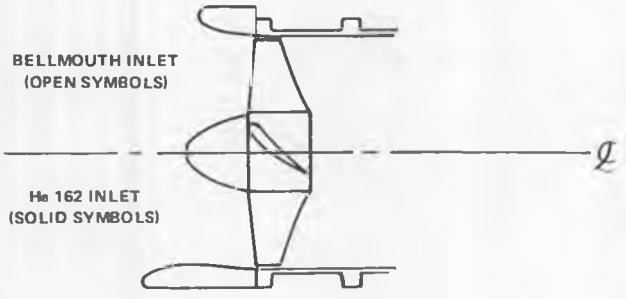
Turning now to the data, the following observations and conclusions resulted from the testing:

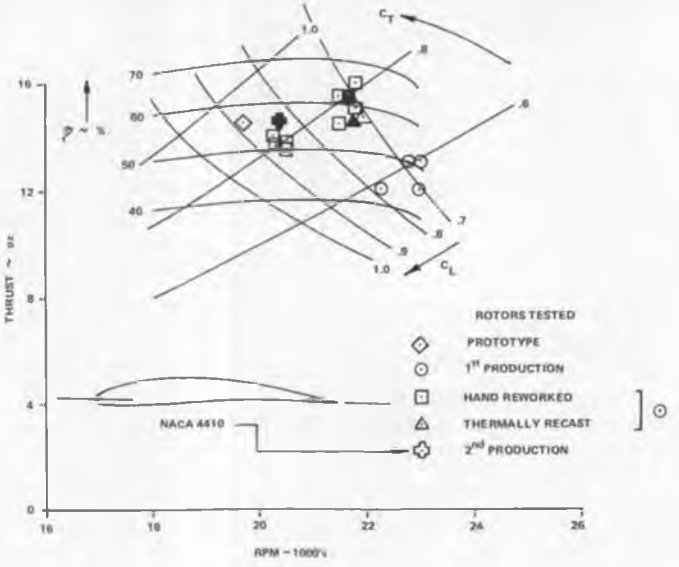
1) The original hand-made epoxy and glass RK-049 rotor (diamond symbol) ran at 19,700 rpm at an efficiency of roughly 56%, with a thrust of 14.5 oz. Thrust coefficient was .92 and blade mean section lift coefficient .89, both quite high values. This rotor flew the 30 oz. A4D Skyhawk quite well.

2) Tests of the first production rotor (circle symbols) revealed what amounted to an overspeed condition, 23,000 rpm with thrust dropping to 12-13 oz. This

TABLE I
RK-049 AND RK-40 AXIFLO ROTOR TIP REYNOLDS' NUMBERS

Fan	Engine	RPM	Rtin.	Ctin.	Rn
RK-049	Cox TD .051	20,000	1.5	.625	66,700
RK-40	K&B 6.5cc	18,000	2.55	1.100	233,000





RK–049 AXIFLO FAN

He 162 JET POD

COX RACING FUEL (30% NITRO)

FIG. 2 – RK – 049 AXIFLO ROTOR TESTS

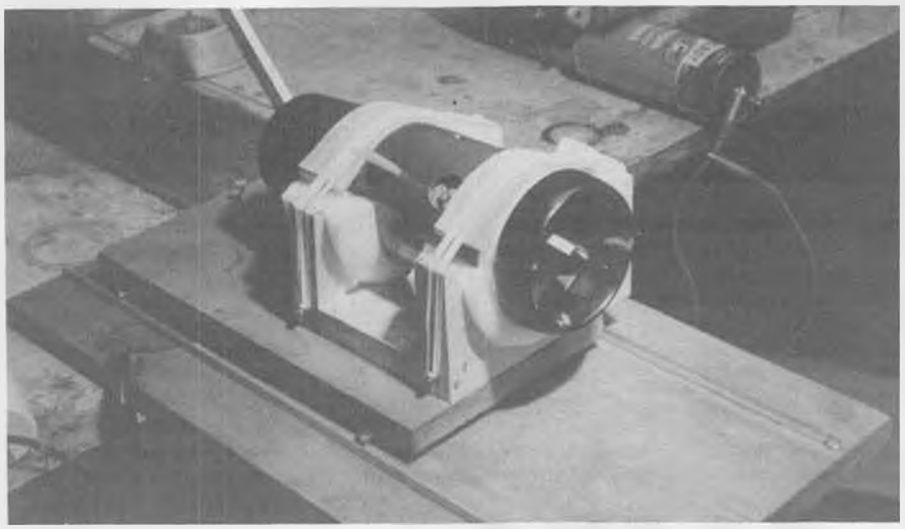


FIG. 3. The author's thrust test stand, accurate to about 1/2 oz.

makes the point dramatically that rpm can fool you; it doesn't necessarily equate to thrust. As a matter of fact, one can generate extraordinary rpm's with a flywheel with no thrust at all! This rotor was particularly bad in flight, since the engine, already "over the top" of the peak of the horsepower/rpm curve statically, would overspeed even more at forward speed.

Close examination plus some calculations revealed a very embarrassing state of affairs (and costly, since 2,000 rotors were scrapped). My rotor drawings called for a tip section blade angle of 21 degrees, which, due to a calculation error (discovered during one of the post-test "what the heck happened" periods) should have been 25 degrees. The prototype RK-049 rotor had a tip angle of 29 degrees, but the production rotor had a tip angle of only 18 degrees. In other words, the production rotor had been built 3 degrees below my drawings in pitch and 7 degrees below what it should have been, which explained the overspeed.

This sent me scurrying to my production RK-40 rotors, which fortunately were built at 24 degrees, 3 degrees higher than my drawing and only 1 degree off what they should have been.

The first production rotor had one further defect: its airfoil sections were not properly cambered and shaped.

3) While awaiting delivery of the second production rotors, I experimented quite successfully with hand remolding of rotors and recasting. The square symbols on the chart were for one single hand-reworked rotor where I thermally repitched and recambered the blades with a heat iron. They were also slightly built-up in section with balsa, which adheres to the nylon very well using cyanoacrylate cement.

The recast rotor points were for rotors thermally reset in an aluminum thermal die made from plaster cast masters of one blade of the hand-reworked rotor. Eighteen of these were produced for flight test purposes.

Data for these rotor tests (squares and triangles) fell into two distinct bunches, along a constant CT line. This suggested that the engine in the lower bunch was not putting out full power. This turned out to be the case, due to vibration, as will be explained later. Rework of the engine produced the higher bunch of points clustered at a thrust of 15 oz. at 21,800 rpm. These rotors were flown and performed well, but were still running too high in rpm to suit me. Although the tip blade angles of these rotors were 27-28 degrees, the tip camber and thickness were too low. What I wanted to see was a good thrust level in the vicinity of 20,000 rpm, just short of the peak of the TD horsepower/rpm curve at 21,000, so that the rotor would ride up onto the peak at forward speed. Just like the prototype rotor.

4) The second production rotor (Maltese cross) turned out to be right on at 14-1/2 oz. at 20,300 rpm. Tip angle was 27° and airfoils were, as specified, very nice renditions of the NACA 4410, for which the shape is shown in Fig. 2. I suspect that the TD .049 may have been varnished up a bit in this test and could have done better. Also, my thrust stand accuracy is about ± 1/2 oz. At any rate, the die was cast, so to speak, and I quit rotor testing while I was still ahead.

My choice of the NACA 4410 airfoil was based on the fact that I had available excellent low Reynold's number lift and drag data for the NACA 4409, essentially the same airfoil except 1% thinner. I knew the NACA 4409 to be well behaved at RK-049 tip and mean section speeds.

A short digression into blade tip Reynold's number effects on ducted fan performance is probably in order at this point. As we have all been taught, Reynold's number effects can cause dramatic disasters in glider stall characteristics. We are used to this happening with 6-inch wing chords at 10-15 mph speeds. What is not always obvious to the modeler is that such effects can occur at speeds of hundreds of feet per second if the wing chord is small enough. The equation for calculating Reynold's number is given below:

(Eq. 3) RN = $\frac{V\ell}{\nu}$ where

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FIG. 4 AIRFOIL LIFT AND DRAG vs REYNOLD'S NUMBER

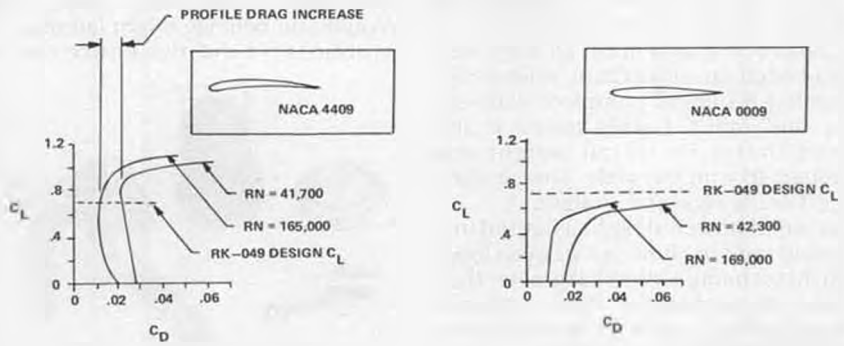
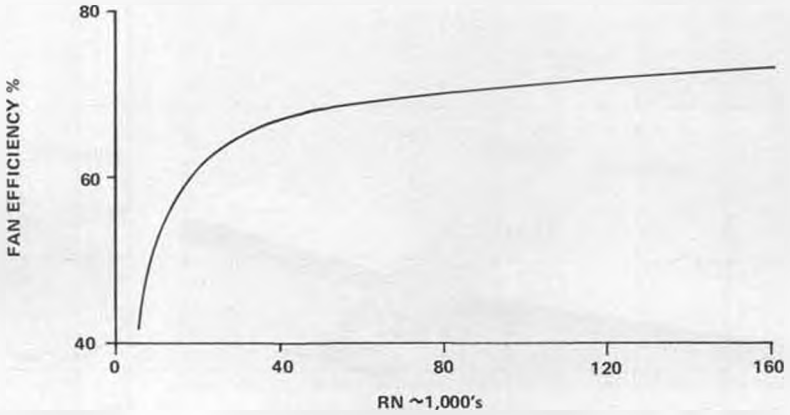
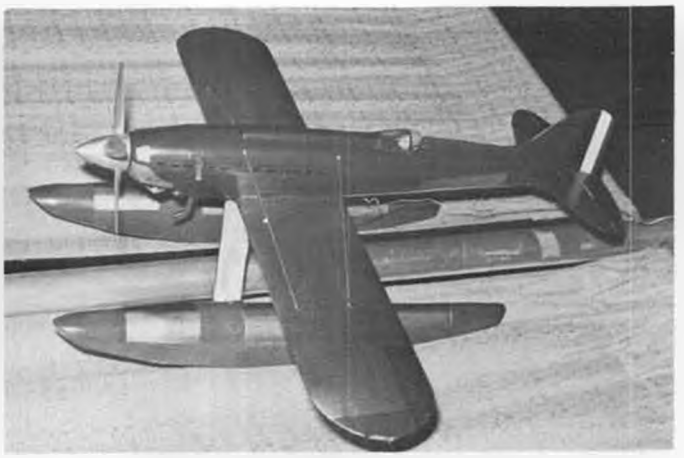


FIG. 5 FAN ROTOR EFFICIENCY vs REYNOLD'S NUMBER



R/C MB's Debbee Holobaugh shows off Larry Renger's newest, the "Cheap Shot." Alas, it had problems. Fascinating tale of woe in text.



Macchi MC 72 seaplane by Tony Naccarato for 1/2 A C/L Schneider Cup racing. Does 80 mph from a standing start!

The 1/2-A SCENE

By LARRY RENGER

PHOTOS BY AUTHOR

• Gee, folks, I used to think that I was a really hot shot model airplane designer. Unfortunately, the last airplane I designed and built was genuinely unflyable. I did, however, learn a valuable lesson, so I'll tell you about it.

I wanted to do a high performance single-channel .020 model using my Ace Baby-Twin pulse proportional radio system. The engine was a Tee Dee .020 and the wings would be Ace tapered foam panels. Since it would be quick to build, fast flying, and very inexpensive, I called the design the "Cheap Shot."

Construction and finish all went well and I ended up with a clean, solid model weighing 8 ounces complete with engine and radio. I glide tested it and found that a bit of tail weight was required to trim the glide. The airplane glided really nice and straight.

So, on to powered flight. I figured that it would tend to climb fast or even loop, with thrust being somewhat greater than weight, but what the heck, you can always roll and circle or do horizontal eights to get out of trouble.

The radio was range checked and the engine run a full tank to clear it out after long disuse. All checked out A-OK. Here we go, fuel it up and light its fire, get ready . . . LAUNCH! Up it goes, yup, looks like it'll do power loops, better turn it. . . Hmmm, no response, may be a trim problem, so it wants to roll the other way. Over on its back now, stick hard over in either direction; no response. Down it comes, and SPLAT!

Well, after rechecking the radio, increasing the rudder throw, and application of epoxy and toothpick splints to multiple compound fractures, it is ready to go again. Sure enough, same scene. Would you believe, bright lad that I am (stubborn), I did the entire routine thrice?

Post-mortem analysis finally revealed unto me a great truth. I had designed an unflyable airplane. The culprit in this mystery is the wingtip configuration. I inadvertently stumbled upon a tip design which completely negates rudder function, a somewhat less-than-desirable feature on this particular model. The tips prevent the model from yawing, but they simultaneously reduce the effective dihedral. Hey, gang, guess what makes a single-channel model controllable? The rudder yaws the model and the dihedral reacts to the skewed airstream like ailerons to roll the model. Surprise!

Well, that was the bad news. The good news is that those same effects can be put to good use on other models. This wingtip design ought to give your 2-channel *aileron* and elevator model beautiful axial roll performance. Might

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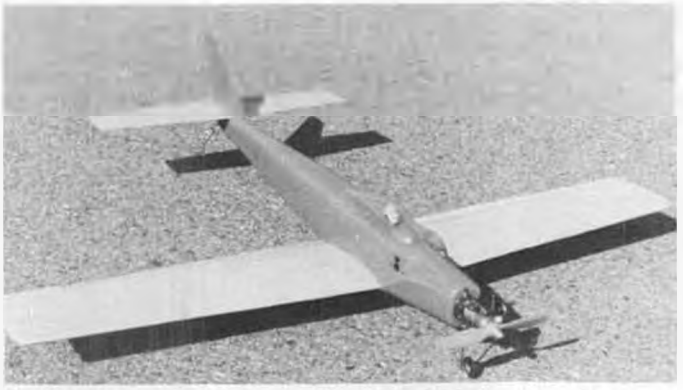
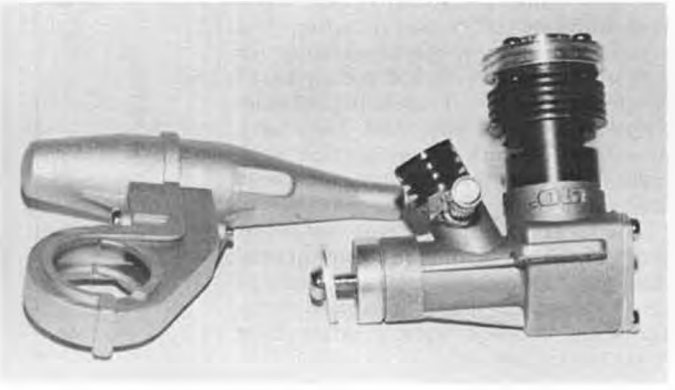
Innards of Tee Dee and Medallion .049's. Tee Dee on left has clear throat carb, big crankshaft port, twin ports in cylinder. Adds 3000 rpm, but drinks more fuel, too.



Darryl Stevens built this 2-channel hot rod with balsa sheeted foam wings. Pacifier tank and 5X3 prop make it very fast.



The standard (unthrottled) version of the G-Mark .06 being imported by Cannon Electronics. Very nicely built.

Hydroplane winners at District 8 Champs (kneeling, l to r): John Moss, 2nd in .21 Hydro; Randy Seiser, 1st .21 Hydro; Gary Jensen, 3rd in .40 Hydro; Ron Erickson (standing), 1st in .40 and .60 Hydro.

Monoplane and Deep Vee winners (kneeling, l to r): Ron Erickson, 1st in .40 Mono; Jerry Dunlap, 1st in .21 Mono. Standing, l to r: Vic Roberts, 1st in .40 Deep Vee; Bill Hornell, 2nd in .40 Deep Vee.

PHOTOS BY AUTHOR

R/C POWER BOATS

By JERRY DUNLAP

SOMEONE ACTUALLY BUILT ONE OF THE BOATS REVIEWED IN R/C MB

While attending the NAMBA District 8 Championships in Kent, Washington, held July 21 and 22, I had a rather unique experience. A gentleman and his son approached me and asked if I was the same Jerry Dunlap who wrote the review of the Dumas SkeVee 10 that had appeared in **Model Builder.** I pleaded guilty to their inquiry and asked why they were interested in that information. As it turned out, they had built the very same boat and installed an O.S. Max .10 after they had read my review. The young lad (I'd guess his age about eleven or twelve), really thought the boat was lots of fun to run. He asked me a whole batch of questions about the boat I'd reviewed and was also very interested in my .21 vee. The boy's father said they had a good time building the boat and he was most pleased with the results. It was pure neglect on my part not to get their names because I'd love to have include them in this article.

Knowing that someone had built a boat because they read about it in an article I wrote and were having a good time with it made me feel real good. Unfortunately, I don't receive much feedback from the articles I write and sometimes begin to wonder if anyone ever does try some of the things I've written about. It really provided me with a satisfying feeling to talk with this young lad and his father and hear about their experiences with the SkeVee 10. I'd like to hear from others who have built boats after reading reviews in the magazine.

BILL HORNELL SETS UNOFFICIAL STOCK OUTBOARD TUNNEL COMPETITION RECORD

When is a record not a record? For those of you who actively race in the stock outboard tunnel class, the following report might be of interest. On July 4, at the Longview Firecracker Classic, Bill Hornell, Renton, Washington, ran his Dumas fiberglass Hotshot 21 at 1:52.3 on the NAMBA .9 mile competition oval. This is the fastest time ever posted for a stock .21 powered outboard tunnel. Hopefully, the NAMBA Board of Directors will approve the new outboard racing rules submitted by this writer at their meeting during the NAMBA Nats in Seaside, California. Even though Bill's efforts will not gain official recognition, they nonetheless do deserve special mention, since it was three seconds faster than the record set last year by Ed Fisher and his hybrid tunnel/hydro.

Bill has done an extensive amount of work on the bottom of the sponson runners to get his Hotshot to turn smoothly and run cleanly down the straights. The sponson bottoms were carefully trued and all low spots filled and block sanded. Running rails were

For the second year in a row, David Jensen, a 6th grader from Seattle, won Top Junior Boater award in NAMBA District 8. His dad, Gary, serves as pitperson.

Bill Hornell lowered his own record in Scale Hydro to 1:23.3 at Dist. 8 Champs. Boat uses twin K&B 7.5's for power.

Frank Ward left his Deep Vees at home and entered an original outrigger canard with a Rossi .60.

Randy Seiser's Gator 60 was 2nd in .60 Hydro class. Uses an OPS .65, really scoots.

Bill Hornell, on the outside, duels with Jack Peters in the .40 Deep Vee class. Bill placed 2nd in class.

placed along the inside edge of the tunnel and along the outside chine. Spray rails were added along the sides of the sponsons. A most interesting feature Bill added is the air deflectors placed in front of the picklefork. Bill inset the engine 1-1/2 inches and the engine is mounted so that the prop is surfacing. The engine turns a reworked J.G. G-22 that has had some of the trailing edge removed from the hub. Trim tabs like those used on deep-vees have been affixed to the back of the sponsons.

Dubbed "Wom Wom, Too," Bill's Hotshot is a good example of what hours of experimenting and making small changes can do to make a kit boat perform. Bill used lots of ideas that worked on his deep-vees in adding the strakes to the sponson bottom and sides. The boat is in complete compliance with the new rules proposed for the NAMBA stock outboard class. Bill did more than just set an unofficial record at Longview on the Fourth of July. He also won the heat racing portion of the day's activities with four first place finishes. Bill then backed up this fine performance by winning the Outboard Tunnel Class at the Olympic District 8 race on July 14. Congratulations to Bill Hornell for this outstanding effort in the .21 stock outboard tunnel class. Hopefully, we'll have an official class for him to set a record in very shortly.

Bill Hornell holds his unofficial record holder for the Stock Outboard Tunnel class. It's a Dumas fiberglass Hotshot .21.

Rear view of Bill's Hotshot, showing the ride plates on the back of the sponsons.

NUMBER ONE SON ENTERS FIRST MODEL BOAT RACE

I suppose I could be accused of getting short of material when I have to start writing about my son entering his first model boat race. But I'm really rather proud of this because Paul, age seven, has been going out to the lakes and ponds with me since he was just a baby. I think he was about three when he first drove a model boat, and this last year he has been doing some of the driving while I took photos of boats I was reviewing.

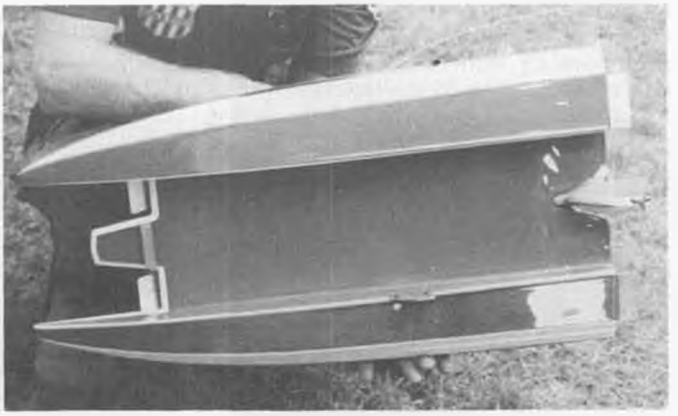
During the winter building season, I put together a modified Dumas wood Deep-Vee 40. The hull was modified by cutting the sides down and then redesigning the deck. The boat came out with a length of 30 inches and had lots of beam. A K&B .21 inboard was installed and the boat proved to be fairly quick and extremely stable. I told Paul the boat was his and that he could race it whenever he felt he was ready. Paul allowed me to race the boat the first couple of races and I even placed second in a sixteen-boat field of Open Deep-Vee at the Longview Firecracker Classic. During breaks in these first races, Paul would practice running the boat.

It was at the NAMBA District 8 race in Olympia, Washington on July 15 that Paul decided he was ready to enter his first race. I think I was more nervous than he was. He did a fine job in each of the heats he raced and managed to place third out of a four-boat field. In his last heat he even forced Ron Erickson, the NAMBA record holder in the class, to cut some buoys in one turn. But since Ron was in the process of lapping Paul for about the second time it didn't make any difference. Ron still won the class. Paul had a good time. Dad was relieved and we're looking forward to more races.

SEATTLE MODEL YACHT CLUB HOSTS NAMBA DISTRICT 8 CHAMPIONSHIPS

The 1979 NAMBA District 8 Championships were conducted July 21 and 22 at the Kent Lagoon, Kent, Washington.

Front shot of Bill's Dumas Hotshot shows the use of air deflectors. Boat was timed at 1:52.3 for .9 mile oval.



The bottom of Bill's Hotshot has been block sanded and ride strakes have been added.

Youngest boater in District 8, 7-year-old Paul Dunlap, and Ron Erickson hold their boats after racing together in .21 Mono class.

Dennis Caines (left) won .21 Outboard Tunnel at Dist. 8 Champs, Mike Wight was 2nd. Boat is the wooden Excalibur II.

This year's double points event was hosted by the Seattle Model Yacht Club, and Howard Nelson was the Contest Director. The two-day event was blessed with excellent racing conditions and a good turnout of boats in the seven classes raced. The racing was divided into monoplane and deep-vees on Saturday and outboard tunnel and hydroplanes on Sunday.

Saturday's first class was .21 monoplane/deep-vee heat racing. Since there wasn't even one flatbottom entered in the monoplane heat racing, it should probably be called deep-vee heat racing. This was the smallest class of the event, as only a half dozen registered for the five-lap races. A good frequency mix allowed all six boats to race at one time, and this made for some excellent heats.

The first two heat wins went to the national record holder in the class, Ron Erickson. However, Ron became involved in a pile-up in the third heat and flipped, and then cut a buoy in the fourth heat. This allowed your friendly race reporter to slip into first place overall by placing second in three heats and third in the final. Dave Austin, of Longview, Washington, moved into second place overall and Ron Erickson had to settle for third. I ran a modified Dumas wood Deep-Vee 40, Dave used a JVS Vee, and Ron ran his Schoeff Vee. All three boats used K&B .21's for power.

Ron apparently got all the mistakes out of the way in the .21 class, because he ran his OPS .40 powered Wardcraft to first place overall in the .40 monoplane class. Vic Roberts, another Longview boater, used a cut-down EKIM Deep-Vee to place second behind Ron. A K&B 7.5 powered Vic's boat. Bill Hornell used his Wardcraft with a K&B 6.5 to place third. The final results in the .40 Deep-Vee 5-Minute Enduros showed the same names as heat racing, only with some changes in positions. Vic ran four very steady heats to take first. Bill ran very fast, but flipped a couple of times and had to settle for second. Ron missed almost four minutes of racing in one heat when he broke an engine. This event features two left turns and made for some exciting corners.

Sunday's competition started off with .21 Outboard Tunnel, and the sixteen entries marked the largest class of the contest. There was some very close racing and the final results showed Dennis Caines beating Mike Wight by one second when both tied with 1,300 points. Both Dennis and Mike ran wooden Excaliber II's. Bill McCay, a former New Jersey model boater now living in Federal Way, Washington, used a Hughey Tunnel to place third.

The hydroplanes took to the water following the tunnels and thirteen .21 hydros made this class the largest it has been in many years in this area. NAMBA record holder, Randy Seiser, Spokane, Washington, put together four wins with his K&B .21 powered Gator to take first place. Another Gator driven by John Moss, Puyallup, Washington, placed second and wrapped up the class high point award. Bob Hartsock, a member of the U.S. Navy, took third place honors with his Hughey 21. This contest marked Bob's last race in our area, as he will be transferring soon to another assignment. We have enjoyed having Bob compete with us during his two-year tour at Widbey Island Naval Air Station and wish him good luck at his next assignment.

The .40 and .60 hydroplane classes belonged to Ron Erickson, as Ron used

Continued on page 92

Three .40 Deep Vees round the right turn during racing action at Dist. 8 Champs.

Ron Erickson's Wardcraft Vee, OPS .40, won .40 Monoplane class, 3rd in Deep Vee.

Ron Erickson's fine running Gator 40 with K&B 7.5 won .40 Hydro class at Dist. 8 Champs.

Another of Ron Erickson's super-fast boats, a Wing Ding 60 with OPS .65. Took top honors in 60 Hydro class.

Two photos of Tim Leary's 58-inch model of the Cal 33. Sail area is a whopping 2180 sq. in., 36 lbs. displacement. Photos taken in 1973.

STRICTLY SAIL

By ROD CARR

TECHNOLOGY AND CLASS STABILITY

In model yacht racing, as in every other competitive sport, the participants seek to gain a performance advantage. This can be through careful fairing and finishing of the hull underbody and its appendages. It can also be through intensive efforts in sail cut, set, and trim, or lengthy practice sessions to hone tactical skills and boat handling. But deep down in every skipper's heart there lies the belief that somewhere there is a gadget or a super-something he can buy which will give him that edge over the fleet. Often, developments in model yachts are reflections of present trends in the big boats we read about. These developments are taking more and more modern materials and transferring them into the model yachting arena. In this column I intend to explore the resulting pressure that such technology can put on existing class stability and briefly touch upon ways that class rules can respond.

The AMYRA presently provides for 2 varieties of classes: formula and one-design. The former are the well-known international classes of A, M, and 10-R designations with the addition of the American 36/600 class. In all these cases, general size, shape, and maximum allowable sail area are controlled by either formulae (as in the A's and 10-R's) or by maximum dimensions (as in the 36/600 and M classes) The only prohibition on materials is a general one in which AMYA outlawed mercury and uranium. These were banned due to the possibility of environmental or health damage which might result from their release to the environment. These two metals were the only ones mentioned. During the ensuing 5 years common practice has been to avoid them, but use anything else that was not explicitly banned.

The one-design classes share the organization wide prohibition against mercury and uranium. In some cases only specific materials are allowed, such as wood or aluminum for EC/12 spars. In the main, however, general dimensional tolerances are coupled with "approved" hull molds to control vessel size and shape. Should some new material be put aboard a boat, and should it be blamed for the boat's winning ways, the result will be a hasty motion and subsequent prohibition of the offending chunk of gear by a vote of the indignant class members. In the one-designs, decreasing the weight of components means that a larger percentage of the total weight ends up in the keel ballast. The result is a stiffer boat which presents more sail to the wind and should extract more power.

The development of one-design class specifications needs to take on a more positive tone. By this I mean that the class secretary and his technical staff should endeavor to follow the lead of the full-sized Etchells 22 class. This class spells out precisely what is allowed on the boat, piece by piece. The philosophy is "If it ain't in the specs you can't have it." Some regulations in the EC/12 class have this tone. The one which prescribes how many and which functions the radio may control is a good example. Many have chafed at only 3 R/C functions, yet this allows 2-channel skippers to be very competitive. I'm not aware of an ACCR being won yet by a third channel in this class.

The longer I stay in the game the more polarized I find my view. There is no such thing as a partially controlled class. Either everything is controlled and the boats are all essentially alike, or one sets the size and sail area, then stands back while the chips, lead, and dacron fly. The two common arguments or complaints then can be resolved with some simple prescriptions. If you don't want to build a new 50/800 every year to keep up, then get into a one-design. If you don't have enough chance to experiment with your Newport 12 or Soling, get into a formula class and either experiment or finish dead last. One simply cannot have it both ways.

What prompted this article was a list of "modern technology" that has been applied to our sport. They seem to fall into a materials category and an operations category. The former must be dealt with on a class level, while the latter may stretch the general AMYA definitions of what is a radio controlled model yacht.

MATERIALS

CARBON FIBER: Now available as a tapered round spar 8 feet long. Also used as unidirectional stiffeners in hull layups to produce functional hulls at 1 lb. and less.

TITANIUM: A metal being used for jib clubs and main booms. Light and strong, which makes it a candidate for masthead fittings and chain plates.

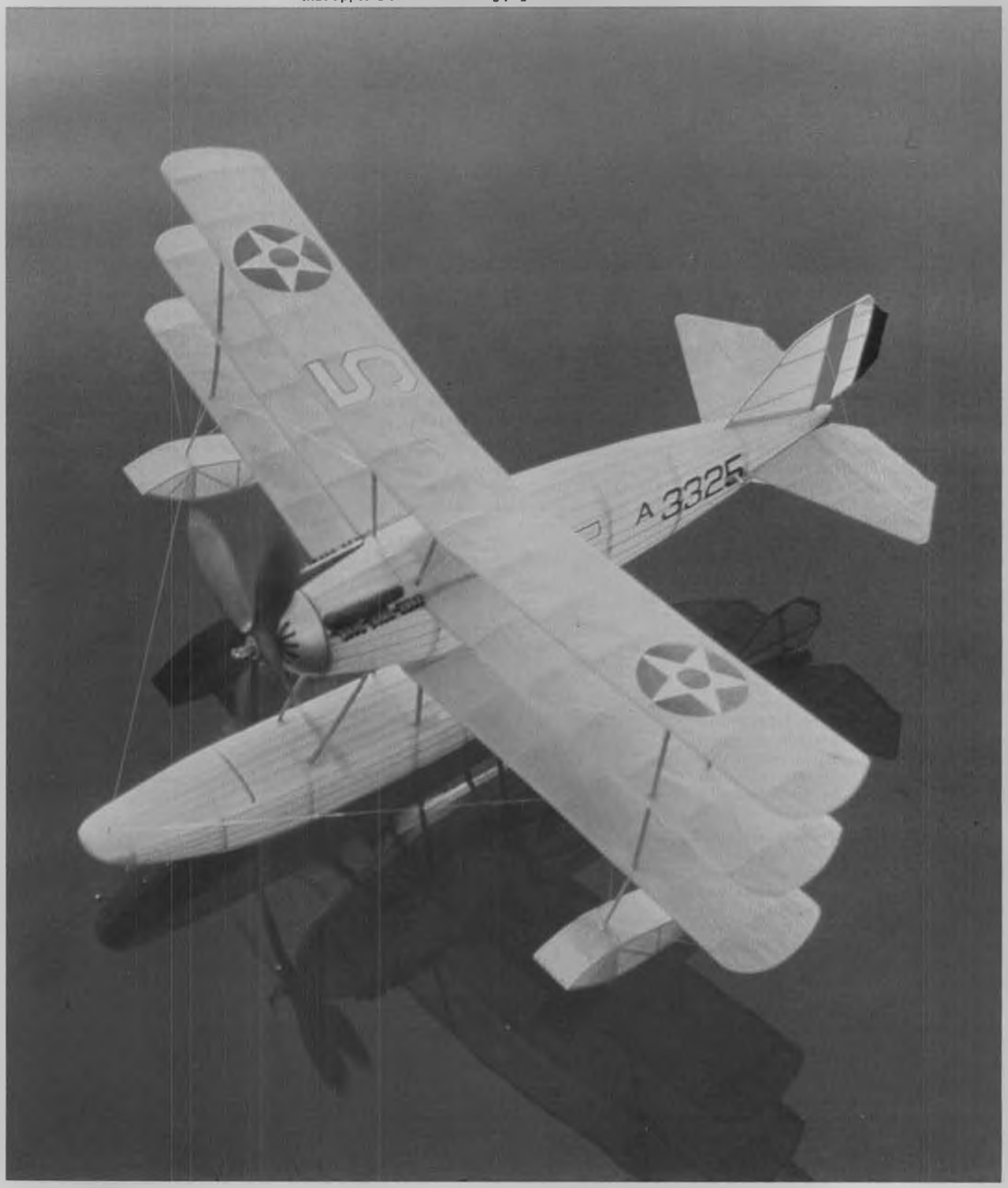
COMPOSITES: These are innumerable. I've seen 3-layer materials which, in a 1/2 x 1/4 x 24-inch strip, will be stiffer than heavy fiberglass arrowshafts and have 1/3 the weight.

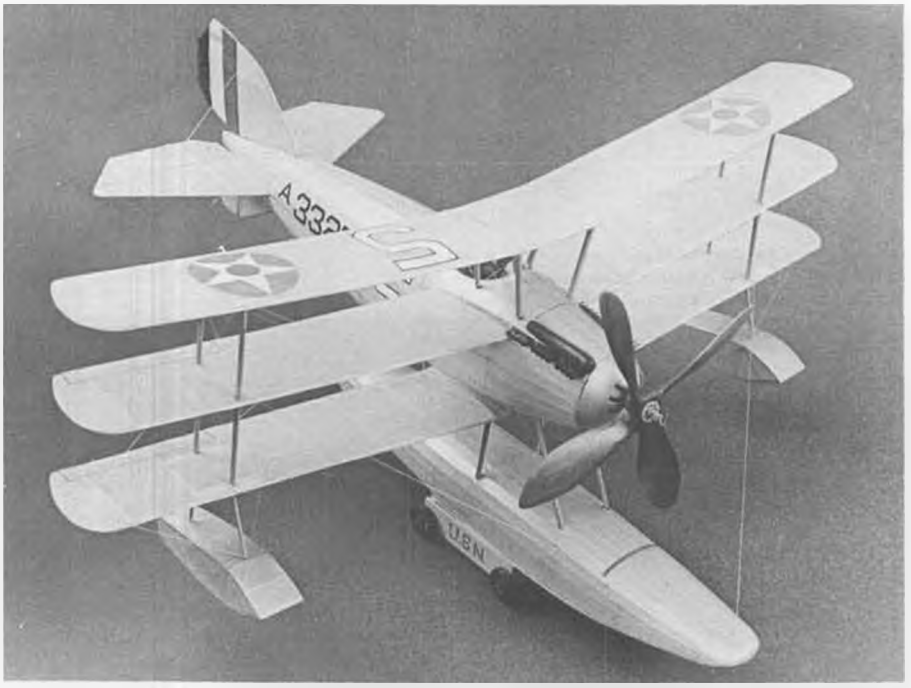
TUNGSTEN: Has appeared in keel bulbs. This metal weighs 19.3 grams/cc vs. 11.4 g/cc for lead. This means the same weight bulb will only occupy 59% of the volume of the lead one. The bulb will have a smaller frontal area and wetted surface, but will exert the same

Continued on page 104

FREE FLIGHT AND CONTROL LINE

Bill Noonan's Curtiss 18-T-1 afloat on a mirror-like water surface. This rubber powered model is featured in a construction article that appears on the following pages. A rare bird indeed!





PHOTOS BY AUTHOR

CURTISS 18-T-1

"WASP"

By BILL NOONAN . . . An obscure three-winger from days gone by . . . and on floats, yet! Don't be fooled though, it's a fine flying model.

• Imagine the ghost of Glenn Curtiss standing in The Big Hangar in the Sky. He is looking out on a phantom aerial parade of famous planes bearing his distinguished name; the Jenny, all the Hawks, the Falcons, the NC-4, the P-40 series . . . the procession seems endless. Suddenly, the expression on the apparition's face becomes a faint smile with the noisy approach of an unmuffled engine, heralding the misty version of an aggressive and precocious craft elbowing its way through.

Curtiss' smile is one of a tolerant parent, making allowances for callow youth. The corpulent fuselage and extravaganza of wings and wires coupled with its brash demeanor give undeniable charm to the plane. It darts in and out of the heavenly cavalcade. Soon they are all gone from view.

This little scenario serves to establish the character of the Curtiss 18-T-1 triplane, one of many interesting and unorthodox aircraft which never achieved fame of any consequence, but which quietly took their place in aeronautical history, only occasionally revealed through probing inquiry of historians.

The Curtiss Model 18, sometimes called the Curtiss-Kirkham "Wasp" Triplane, was designed by Charles Kirkham in 1917 for his powerful K-12 engine. Its limited claim to fame is that it was considered to be the world's fastest "battle plane" in 1918, with an unofficial speed of 163 mph.

After the war, the Model 18 went through a series of modifications by Curtiss. Two of the 18-T-1 types were built for racing, numbered 3325 and 3326. Ours is good old 3325, which came to its ignominious end on a Detroit coal pile in 1922, capping a less-than-illustrious career.

While three-winged hydro-aeroplanes may not be high on your list of favorite designs, you will have to admit it's an endearing little bugger. Try it, you'll like it!

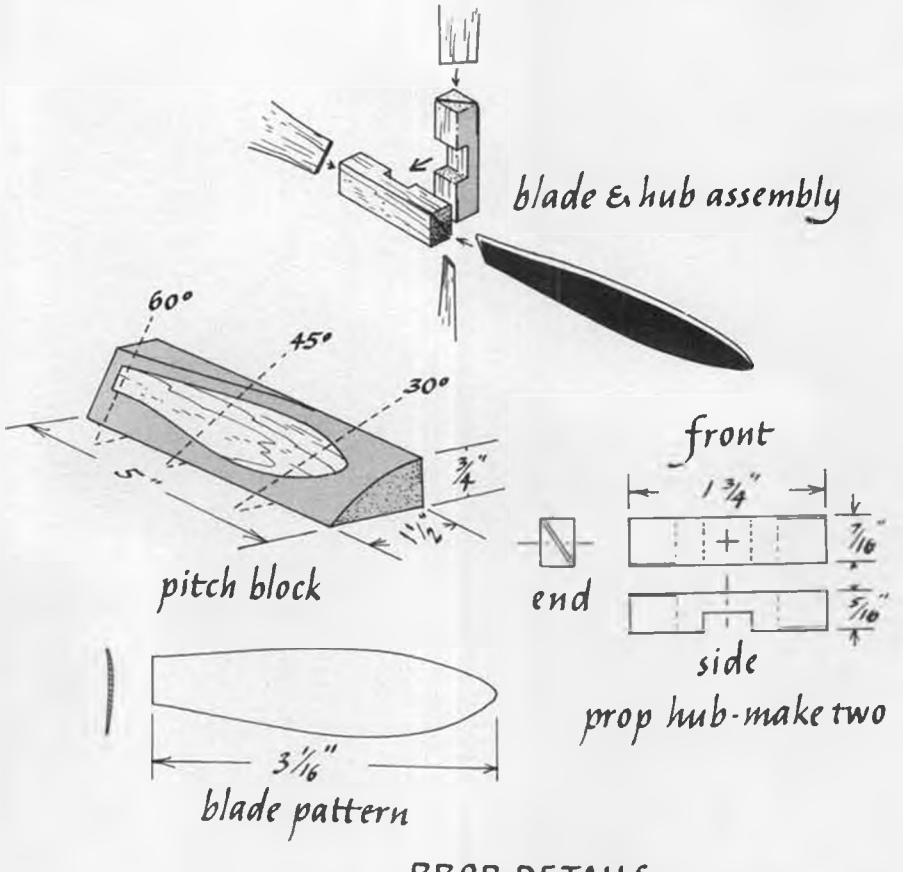
FUSELAGE CONSTRUCTION

Before anything else is done, it is necessary to cut formers for the right and left sides of the fuselage. These may be from soft 1/16 sheet, or, if you don't mind a little more work, structural benefits may be had by laminating two pieces of 1/32 sheet balsa at 90 degree angles, and cutting the formers from this more rigid stock. The advantage becomes more apparent later on when filing notches to receive the stringers.

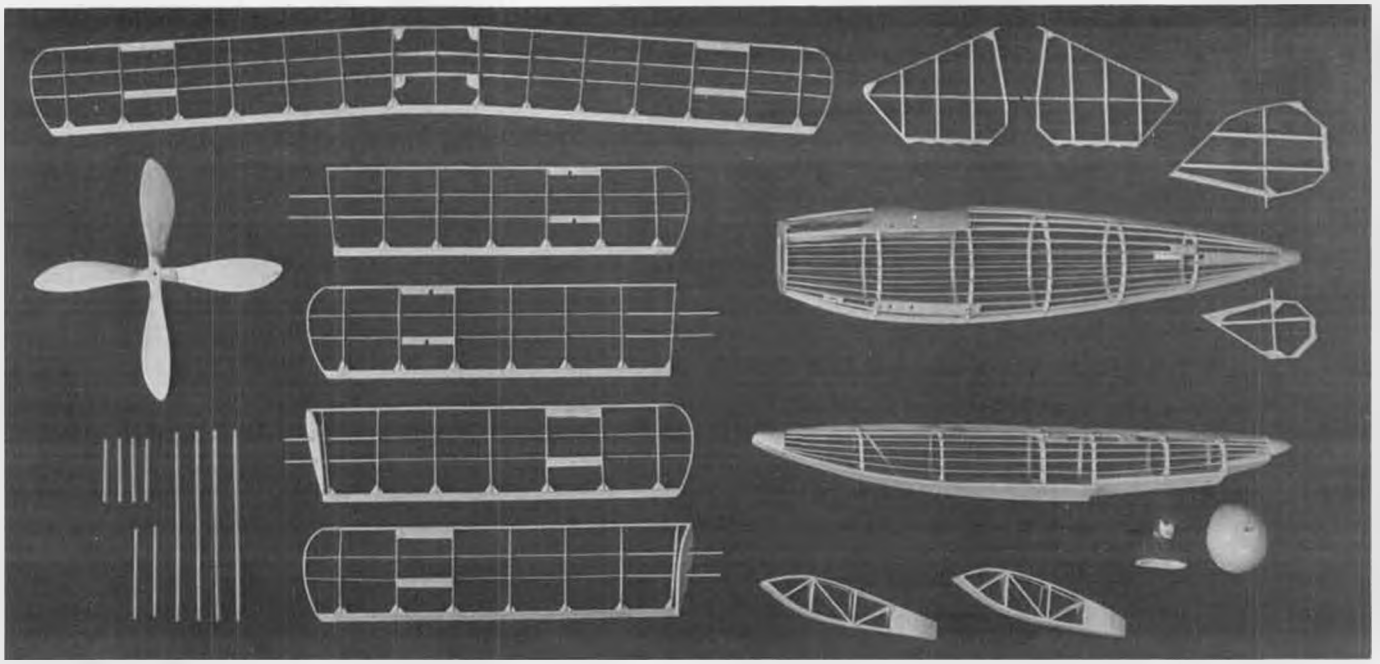
Pile the accurately cut right and left formers in a safe place on your workbench. No stringer notches at this time, they come later.

Protect the plans from surplus cement with Saran Wrap or wax paper. Apply cement along the edge of a piece of hard 1/16 square balsa slightly longer than the fuselage length. Mate this to a similar piece to make up a laminated "backbone." Secure to side view and form both top and bottom components. Do not pierce wood with pins.

Take formers for the left side and check them for fit at their respective stations. Notches at top and bottom of each former should index snugly with backbones. After making any necessary alterations, cement left side formers in place, checking for perpendicularity with a small 90 degree square as you proceed.



PROP DETAILS



Finished surfaces, uncovered and unassembled, showing the structural details. Fuselage and main float look like a fair bit of work, the rest is relatively simple. Only the top and middle wings do any lifting; the bottom wing has a symmetrical airfoil and just goes along for the ride.

When this assembly is thoroughly dry, remove it from plans and repeat the procedure with the right-hand former halves, carefully mating them to form the full former shapes. Check for any distortion by sighting down fuselage centerline.

The plans show stringer locations on former 3. These reference marks should be transposed to the balsa former (both right and left halves) prior to cementing to backbone.

Here's the procedure we followed to establish correct stringer notch locations: Take any size flexible strip material (3/32 square is OK) and lay it along the fuselage side at stringer No. 7 (counting from the top). Tape the strip lightly at the tail and nose. Mark reference points on all formers. Loosen tape and repeat the process at each stringer location, using former No. 3 marks as primary reference. Follow this by filing 1/32-inch stringer slots, 1/16 inch deep. All stringers are medium hard balsa, 1/32x3/32. Confirm accuracy of notches by occasionally inserting test stringers. Whenever you insert a left-side stringer, counter its tension with a corresponding right-side stringer. When you finally have all the little beggars in place and have checked the fuselage for symmetry, apply cyanoacrylate glue to all stringer notches.

Trim excess length of stringers flush with front and back (1 and 7) formers. Fill between formers 1, 2, and 3 and down to the fourth stringer, with soft 1/16 sheet balsa. Sand to fuselage contour. Cut paper pattern of cockpit opening and lightly scribe outline in appropriate place, immediately in front of former 3. Cut and remove stringers, backbone and filler pieces. Sand cockpit edge to achieve neat and symmetrical oval.

Cut and rough-shape nose block from medium balsa. Tack glue temporarily to former 1. Carefully contour to conform to fuselage shape, using progressively finer sandpaper. Follow same procedure for fairing cone at tail. Cut nose block away from the former, and drill to accept prop shaft thrust button.

Fill in between stringers at tail where the two stabilizer halves cement to fuselage. Also fill in between stringers with hard 1/16 sheet to provide for 1/8-inch diameter aluminum rubber anchor tube.

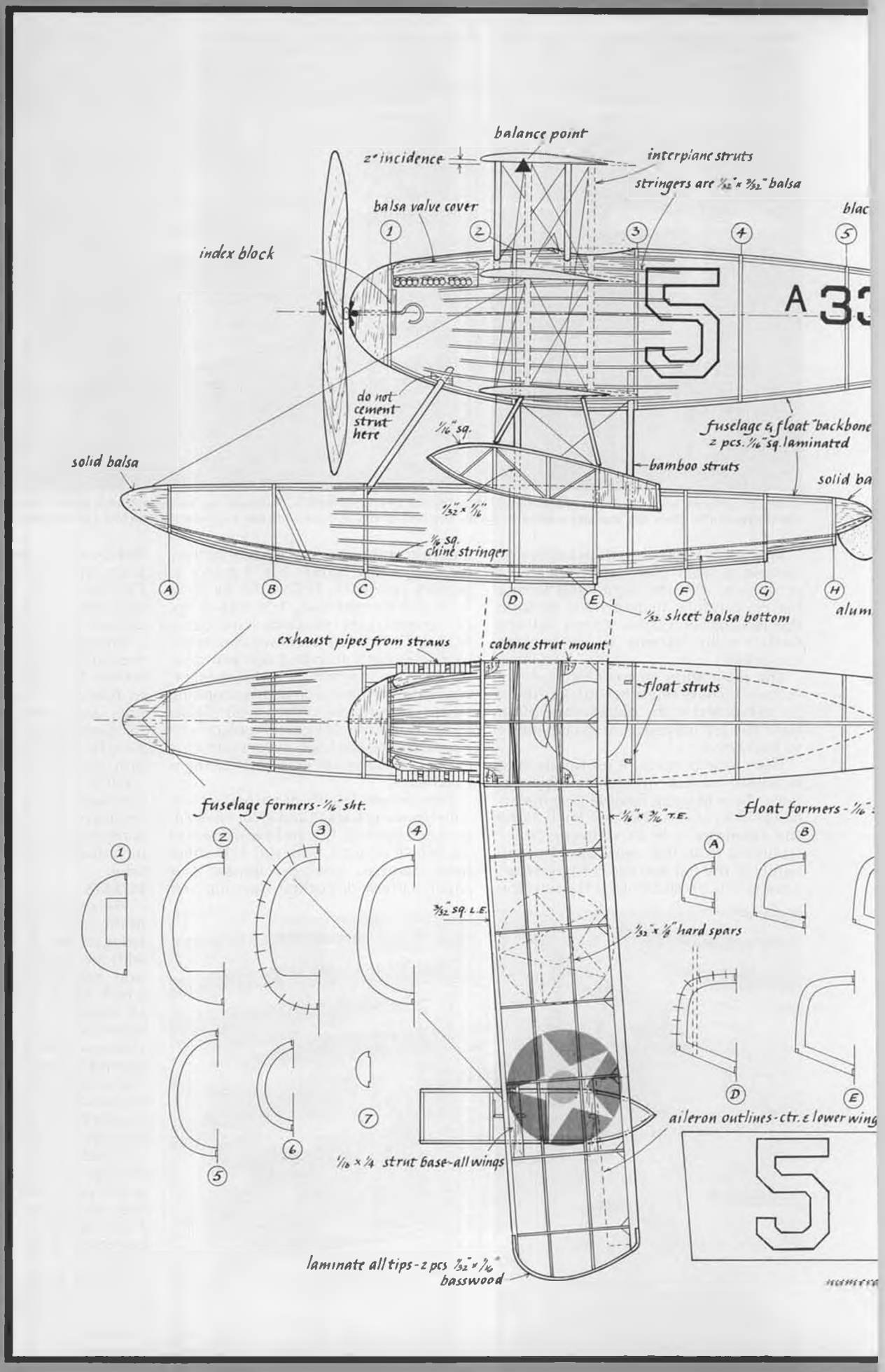
FLOATS

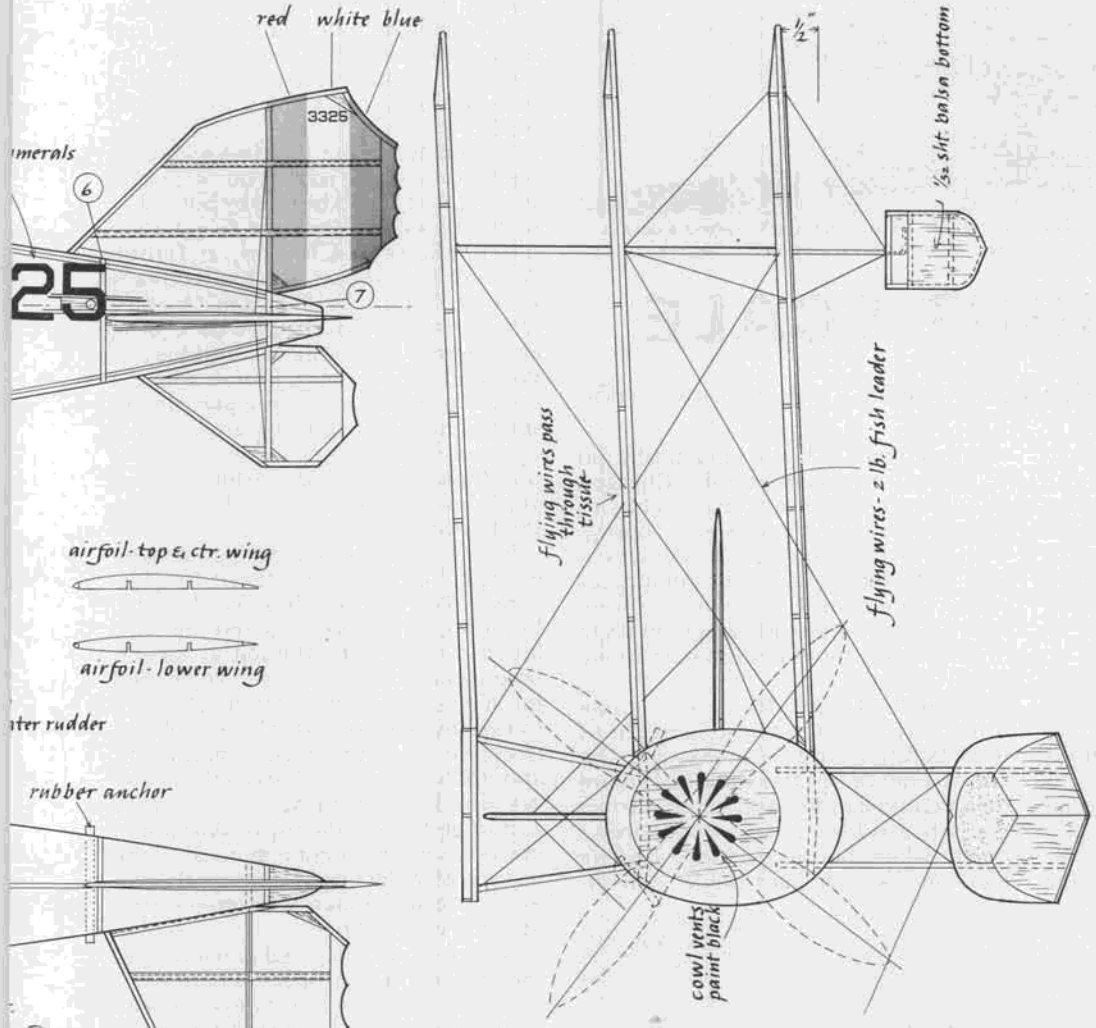
The center (main) float is constructed in the same manner as the fuselage. All stringers are 1/32x3/32 medium balsa with the exception of the chine (where side and bottom intersect) stringers, which are 1/16 square. The bottoms of all floats are covered with light 1/32 sheet balsa. Keep the chine edges as sharp as possible, as this is hydrodynamically important. Float struts are made of bamboo. The front struts are cemented to the back side of float former D. All four struts are made long enough to reach inside fuselage about 1/2 inch. These will be cemented to fuselage formers 2 and 3. Wherever struts pass through fuselage or floats they are surrounded with a 1/16 sheet balsa "collar" to allow securing of tissue covering. Add .010 aluminum water rudder.

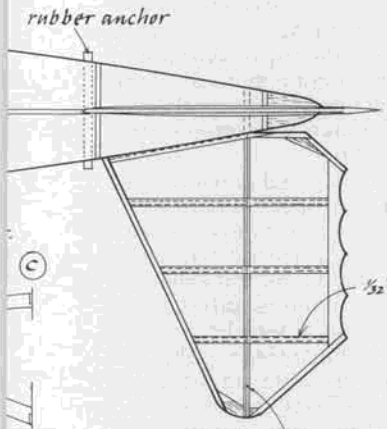
The tip floats are simple boxes with pinched trailing sections. Lay down frames for four identical sides. Main components are 1/16 square balsa, diagonal braces 1/32x1/16. When as-

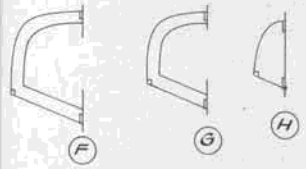
Continued on page 78

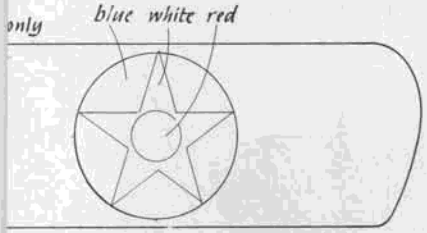
Bill used a freewheeling device on the prop for longer flights. Some of the struts are made from cocktail straws. Monofilament "wires" add greatly to the model's strength.


balance point
2° incidence
interplane struts
stringers are 1/32" x 3/32" balsa
balsa valve cover
index block
do not cement strut here
1/16" sq.
fuselage & float backbone 2 pcs. 1/16" sq. laminated
solid balsa
bamboo struts
1/32" x 1/16"
1/16 sq. chine stringer
1/32 sheet balsa bottom
exhaust pipes from straws
cabane strut mount
float struts
fuselage formers - 1/16" sht.
1/16" x 3/16" T.E.
float formers
3/32" sq. L.E.
1/32" x 1/8" hard spars
aileron outlines - ctr. & lower wing
1/16 x 1/4 strut base - all wings
laminate all tips - 2 pcs 1/32" x 1/16" basswood









CURTISS 18·T·1

3/4" FLYING SCALE · RUBBER

Designed and drawn by *Bill Noonan*

AIRCRAFT COLOR SCHEME

Wings, top: chrome yellow - underside: silver
Fuselage: silver · Floats: silver
Stabilizer: top - chrome yellow - underside: silver
Fin: silver, with red, white and blue stripes
Engine details: black
Struts: gray, flying wires: silver

MODEL BUILDER magazine
621 West 19th St., Costa Mesa, CA 92627
Plan No: 11492

FULL SIZE PLANS AVAILABLE — SEE PAGE 116

Absolutely immaculate orange and yellow Travel Air 4000. Used to belong to famed aviation writer Richard Bach, now sports name "Mary Morris" under cockpit rim. A real beauty.

FREE FLIGHT SCALE

By FERNANDO RAMOS PHOTOS BY AUTHOR

• This month I'm going to depart from my usual format. On July 25, Jack McCracken and I embarked on an adventure that I would like to share with you. For the past 10 years, it has been my desire to build and fly my own aircraft to Oshkosh, Wisconsin. After 5-1/2 years of construction, my dream has finally come to fruition.

For all of us interested in airplanes, Oshkosh certainly needs no introduction. It is often referred to as Mecca, and rightfully so. It is a place where thousands of aircraft and people gather to see and talk airplanes, but I'm getting ahead of my story. It really starts a couple of weeks prior to our actual departure, with the preparation of my biplane for this long haul. Jack and I practically did an annual inspection on the Charger, checking everything imaginable to assure that everything was in tip-top shape. Anytime you leave terra firma, it is wise to have everything going your way. As one of my Charger friends from Atlanta says, "I would rather preflight my airplane a thousand times, than die once!"

We had planned to fly with three other airplanes, making a gaggle of three biplanes and a Cessna Skylane. The anticipation of this trip was nearly more than I could handle. Add to this the fact that I had ridden a ladder two stories down while house painting, landing hard on the pavement below, spread-eagle on my stomach. Needless to say, all I could think of was, "There goes my trip to Oshkosh." At that time I had determined that luckily I had no broken bones, therefore no trip to the doctor was planned, in spite of all my aches and bruises. No way was I going to have him say that I would have to stay at home and rest! Murphy wasn't going to ruin this trip!

On the eve of our trip, Jack spent the night at my home so that our 4:00 a.m. starting time could be met by both of us with little effort. We were to meet the other fellows at 6:00 a.m. at Flabob Airport. That meant we had to leave Corona Airport by 5:30 a.m. As luck would have it, Corona was socked in, and there was no way we could leave. We tried calling out to Flabob where a couple of the "crew" were planning to spend the night, but no answer. We decided to drive over to see what was up. We arrived to find sunshine and no airplanes. They had left on schedule . . . the bums!

By 9:30 a.m. the weather had broken enough that we could depart for Wisconsin. We reached Prescott, Arizona, by noon, where we refueled and had lunch. The density altitude at takeoff time was around 8,000 feet. We headed for Winslow, Arizona, climbing but not too swiftly. We needed at least 9,500 feet to get over the next range of mountains, and 8,500 feet was all I was able to get. We decided to turn back to a nearby airport and spend the night. We landed in Cottonwood, Arizona, both of us the picture of dejection. Seems as though not too many things were going well. Murphy was smiling!

At dinner we discussed and analyzed the problem. The propeller I have is not fixed-pitch, nor is it a constant speed (one that can be adjusted from the cockpit to vary the pitch); it is called an "Aeromatic." It changes pitch automatically by the use of weights and the throttle settings. The problem is that the amount of weights were adjusted for flying at near sea level condition, and here we were flying from airports 5,000 feet above sea level, plus the very hot temperatures raises that several more thousand feet. Early the next morning we made a change in the weights, and were off again. We left Cottonwood with our destination for the second day being Liberal, Kansas.

We arrived at Liberal about 8 p.m., just a bit before the sun set over the horizon.

Very nicely restored Waco Cabin showed up at Oshkosh. Color is red and black. These ships are bigger than most modelers realize.

Piper Aircraft's first low-wing retractable gear airplane, the one and only prototype ever built. A very interesting plane, would make a good model. Blue fuse, yellow wings and stab.

Cockpit details of Piper shown at right. Tandem seating, lots of window area.

One of our columnist's favorite aircraft at Oshkosh was this Puss Moth. It's not as big as you might think. Coloring is blue fuselage, orange wing and stab. Can you imagine how much one of these ships is worth today?

Liberal is a common stopover place for many pilots going east or west, and we met several pilots enroute to Oshkosh. After securing the Charger for the night, we inquired about a room for the evening and transportation into town. The airport operator arranged for both, and soon we too were secured for the evening.

On the third day, we arrived at the airport early and changed the weight on the prop for sea level conditions. We had hoped to be in Oshkosh by evening. Our stops were planned at about two hour intervals. This is more than enough time in the cockpit, and it gave us an opportunity to get the kinks out for the next two-hour leg. Up to this point, the weather had been just fine, with only one thunderstorm encountered north of us beyond Albuquerque. However, while flying north over the Mississippi River, we ran into a rain squall which forced us back to the town of Hannibal, in Missouri. It was evident that we would have to stay the rest of the day and night there, as all indications were that the weather was not going to improve.

As it turned out, Hannibal wasn't too bad a place to get stranded, since this was the home of Mark Twain. One of the pilots out of Hannibal graciously gave us a ride into town (about 8 miles), and showed us some of the spots we should take in and where we should eat. He then took us to a motel which was within walking distance from all of these sights.

The following day we had a two-hour delay in Burlington, Iowa, where the clouds were again right on the deck over the Mississippi. We finally got off and made our next fuel stop in Rockford, Illinois. Rather than land at the large municipal airport, we chose a 2000-foot grass strip. This was the first time I had ever landed on grass. What a thrill! After refueling, I asked the owner of the field if there was any place nearby where we could eat. He said that down the road were several places to choose from, and that he would get us some keys to a car. It turned out that the keys belonged to a brand new Oldsmobile. No questions asked. We found this to be a rather common occurrence in the Midwest. The people there were so very friendly and trusting. I'm afraid you wouldn't see this happen too often in California.

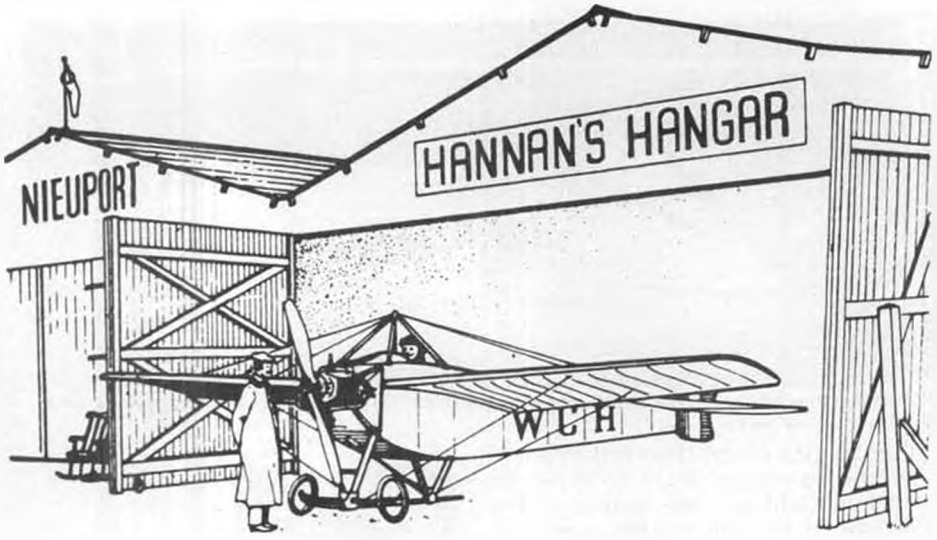
At any rate, we continued northward to Fond du Lac, Wisconsin, where we again topped off the tanks and prepared for the 15-minute flight to Whitman Field in Oshkosh. We arrived in the prescribed holding pattern a bit late, and I heard over the radio that the field would be closed due to an airshow and that it would not reopen for about 3 hours. We returned to Fond du Lac and enjoyed watching about a hundred or more varied aircraft land that were also too late for Oshkosh. Jack and I decided that it would be better to take off a bit earlier than to get in line with all of the other aircraft waiting to leave Fond du Lac near the opening time of Whitman Field. We did and for about a half hour flew lazy patterns over the beautiful Wisconsin countryside. There were no other airplanes around to be seen. This meant we could be first in line, which would uncomplicate the landing a bit. When the radio said the airport was again open I headed for the prescribed area as spelled out by the EAA. I was

Continued on page 98

Puss Moth cockpit details. Note the unusual turn and slip indicator.

A big Howard, NC52928, in red and white trim, for the benefit of Flyline kit builders. These aircraft are not an uncommon sight at airports around the country.

A real nice Tiger Moth. Color is yellow overall. Note original DeHavilland insignia on hub cap.



"Erratic failures are loathed by engineers; it is much easier to fix a dependable flaw."

• We think most model builders would agree with that opinion, taken from the book *Diesel, The Man and the Engine*, authored by Dr. Morton Grosser. The story of Diesel the man is a fascinating account of struggle against mechnical, financial, and even romantic odds, worthy of a Hollywood epic. In a most readable fashion, Grosser weaves his thoroughly researched history against a background of the social environment prevailing during the developmental years. Outside influences are seldom sufficiently understood in relation to their effect on inventors and inventions, but they are absolutely crucial. The very existence of diesel engines represents a triumph of patience and persistence over adversity.

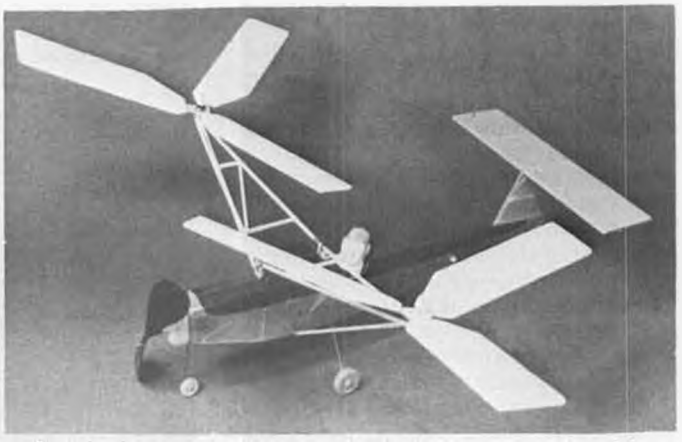
Apart from the personalities directly and indirectly involved in the design, development and marketing of the engines, the book is also devoted to a survey of the machines themselves, and the various applications to which they have been turned. Diesel engines have been produced in a bewildering variety of sizes, ranging from tiny model engines through massive powerplants that almost boggle the mind to contemplate. And while the advantages of these engines are stressed, the disadvantages such as their unfortunate smelling fumes are not ignored. Like other forms of energy converters, diesels are now facing renewed scrutiny, since some of their previous disadvantages have been nearly eroded away by what may appear to be political and economic problems.

Many photographs and drawings are featured which provide a graphic proof of the variety of diesel engines which have evolved over the years. Among these are the aircraft units, such as employed in the Junkers flying boats and others.

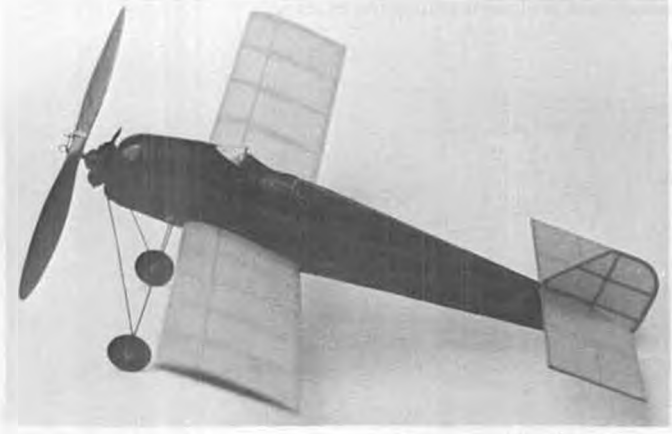
No reservations? Only one, which may perhaps class me as an old stick-in-the-mud: all of the engine specifications are presented in the International System of Units. And while I am well aware of the logic behind trying to convert the United States to this system, old comfortable habits are hard to shed. Even though conversion "shortcuts" and tables are furnished, I found myself inhibited at encountering, for example, power ratings expressed in kilowatts rather than horsepower. "Decoding" this information interferes with ease of communication, at least for me. Doubtless future generations will have an easier acceptance of it, but for us "old

Continued on page 94

Randy Wrisley gets a good launch on his Jumbo Rubber XP-51. Spans 54 inches, weighs 16 oz. with rubber.



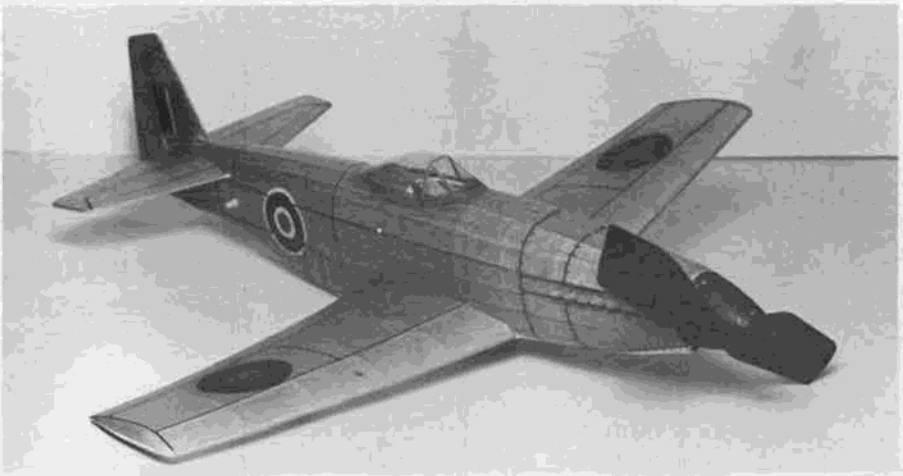
Cute semi-scale FA-61 Peanut by Richard Howard, based on Skip Ruff's R/C plan in MB. Pilot by Paul Steele.



Sherman Gillespie's original Gadfly, built in 1954 and published in M.A.N., is still flyable. Peanut version won '79 P.P.P.P. Contest.

Ernie Wrisley's rubber-powered Andreason bipe. Can't vouch for the chick in the cockpit, but the registration numbers are authentic!

PHOTOS BY AUTHOR



PEANUT SCALE

Martin-Baker

By MARK DRELA . . . One of the hottest prop-driven fighters ever built, the MB-5 makes an excellent subject for experienced Peanutters.

• The MB-5 was a British fighter designed during WW-II by Martin-Baker, today known for its ejection seats. It was the last word in piston-driven prop fighters, possessing good maneuverability, forgiving handling characteristics, and a top speed of 460 mph plus. If that wasn't enough, its simplicity of design made it easy to service and manufacture. Unfortunately, the war was drawing to a close and jets doomed the prop-driven fighter to extinction. The MB-5 was never put into production and only the single prototype remained.

The airplane has very good proportions for a Peanut scale model. No intentional deviations from scale were necessary. The scale dihedral is adequate even in rough air. Like any low-winger, however, it is rather demanding of precise trim and is not suitable as a first Peanut model.

The fuselage is built according to the standard half-shell recipe. Be sure to pre-curve all the 1/16 sq. longerons by lightly rolling with a pencil before assembly. This is necessary to avoid pulling everything out of line. Add about three degrees of right and down thrust to F1 to minimize shimming later.

Cut the stab slot in F10 after everything is finished. Leave off the three bottom stringers until the wing is installed. The missing stringer slots are easily made by first sighting along the fuselage, marking the stringer positions, and cutting the slots while supporting the formers on the corner of a table. Don't leave off the 1/32 sheet fill-in between F1 and F2.

The wing is fairly straightforward to build. Cutting all the tapered strips might be a little tedious, but is well worth the results. A note about the landing gear: my model was built without wheels, since they add weight and drag, take a long time to make, and put the wing in peril in a hard landing. If you decide not to build the gear, leave off the 1/32 sheet web.

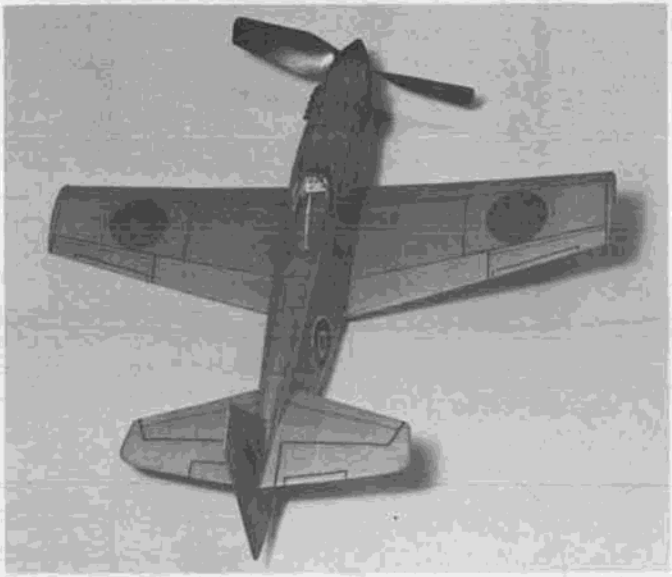
The tail surfaces on this model are rather unique for a Peanut, in that they are cambered. This not only makes them warp-proof, but also improves their appearance. Although the plan shows the rudder cambered on only one side for ease of construction, it can be built with double camber if desired. Simply shim up the leading and trailing edge with 1/32 sheet.

The wing installation is kind of hairy. First of all, cover the entire wing with tissue, including the center bay. The dihedral should already be installed. Next, shrink the wing *lightly* with steam from a steamkettle. Full water-shrinking is a very bad idea with fragile Peanut structures. Now, in the center bay only, trim away the tissue between the front and spar and and the L.E., and also between the rear spar and the T.E. To prepare the fuselage for receiving the trim away the tissue between the front spar and the L.E., and also between the rear spar and the T.E. To prepare the fuselage for receiving the wing, mark the L.E. and T.E. positions on F4 and F7. Cut away the bottom longeron between F4 and F7 by making diagonal cuts; save the two pieces. The wing should now slip into the fuselage, with F5 and F6a sliding into the holes in the wing. Keep in mind that this is strictly a custom job, and be prepared to do some hacking or shimming if things don't fit properly.

When everything does fit, glue the spars, L.E. and T.E. to the formers, getting everything lined up right. Now add the longeron pieces which were removed earlier, install the missing stringers, and add the scoop intake. Trim a bit of the bottom tissue so the bottom stringers can be notched into the bottom rear spar.

To prepare the fuselage for covering, add the wing saddle pieces flush with the wing tissue. Covering is best done

Continued on page 97



Good photo showing the excellent moments and areas on the MB-5. Panel lines and instruments add greatly to realism.

The author launches his fast-flying Peanut. Climb is steep even on medium winds. MIT domes in background.

soft block
1/16 washin
1/8×1/16 tapered to 1/16 sq.
dihedral breaks
cannon stubs
DIHEDRAL: 1 inch
light 1/32 sh.
1/16 sq. tapered to 1/16 × 1/32
wing L.E. T.E. and spars are hard
1/32. sh. web
white rings
bottom roundel
blue
top roundel
red centers
flaps on bottom only
install top spars after adding dihedral
1/20 sq. tapered to 1/20 × 1/32
1/8×1/16 tapered to 3/32 × 1/16
COLOR SCHEME
standard British WW II camouflage
light 1/16 sh.
.020 m.w.
stab spar - 1/32 sh.
1/8 × 1/32 - sand in airfoil after assembly
1/20 sq.
rudder spar
F1
F2
F3
F4
F5
F6
F6a
F7
F8
F9
F10
-F1 is 2 lams. of 1/16 hard-
all other formers are 1/32 med.
-all stringers are 1/16×1/32 med.
-cut missing stringer slots after assemly to prevent wavy stringers
-add bottom stringers after installing wing
molded canopy
medium 1/16 sq. longerons
1/32 sh.
red
blue
soft balsa spinner
1/16 sh. blister
1/8 sh. stacks
1/32 sh. saddle - add after attaching wing
white
red
blue
1/32 sheet fill-in
1/20 sh.
1/8×1/32 end post
L.G. door
precurve
6 inch TESTOR'S PROP
scrape prop with razor blade if model is nose heavy
hard 1/16 sheet
Peck bearing
1/32 m.w. shaft
1/16 alum. tube
1/16 ply
L.G. doors card or balsa
notch bottom spar for stringers
1/32 sh. scoop
3/32×1/20
1/32"sh.
.015 m.w.

SEE MAY 1971 AAM FOR 3-VIEWS

MARTIN-BAKER MB5

PEANUT SCALE

Designed & Drawn by:
MARK DRELA

Control line

By "DIRTY DAN" RUTHERFORD

• Even though a lot of the stuff in the C/L column here in **R/C Model Builder** may not always please the readers, it is usually fairly original material. Other columnists seem to enjoy using other people's material as much as possible, while I have tried to stay away from it. But for *this* column, anyway, it will be a bit different. I happen to have a few interesting letters here that deserve to be published for one reason or another, plus we will be ripping off PAMPA's Stunt News for a piece on Bob Whitely's '78 Derringer.

First we hear from George Lieb, out of Omaha, Nebraska. . .

Dirty Dan,

I was looking through some of my old **Model Builder** *magazines and read one of your articles on beginner events. Also, I've read a lot about Northwest Sport Racing.*

We fly a similar event here, but our most popular events are Class I Mouse Race and Class II Goodyear. A lot of limited Goodyear is flown in different parts of the country but ours is a bit different than any I've heard about. We require AMA-legal Goodyear models, but further specify plain-bearing .15's (no conversions allowed), *one-ounce tanks, suction fuel feed, no fast-fills, no fuel shutoffs, and no hot-glove set-ups. We probably will require stock wood or nylon props next year.*

It is a cheap event to get into, the planes are easy to fly and races are close. Most of the time is spent with all three planes up at once, which is a lot of fun. A lot of different engines are seen, although most are using the Fox .15 Schneurle engines in the plain bearing version, of course.

A couple of fliers from Denver were at our contest this year and they both said they would bring planes for this event next year. They would also like to get it started in Denver.

As you have stated before about other similar events, we are not in the least interested in getting our limited Goodyear as an AMA event! It's too much fun now. George Lieb.

It is personally pleasing to me to see another group of C/L fliers pick up on a limited-cost racing event and make it work. This kind of racing can be a lot of fun, if the rules are damn good to begin with and then stay stable for as long as possible. Another factor in the equation is the attitude of the modelers involved in the event, and here it sounds as if the group George flies with has it under control.

Without belaboring the point, I want to again mention that the attitude of the Northwest modelers towards the Northwest Sport Race event is one of the big reasons the event caught on quickly and has continued to grow. We do, just as you would suspect, have people who spend more time on the event than others, and we have also had a few small disagreements over equally small items, but when it comes right down to it, every single person involved in N.W.S.R. is prepared to compromise in order to keep the event as intended; an event where big bucks is not required, enjoyment is the most important thing, an event where a relatively green novice can be as equal as possible to the seasoned experts and an event that inexperienced modelers can participate in.

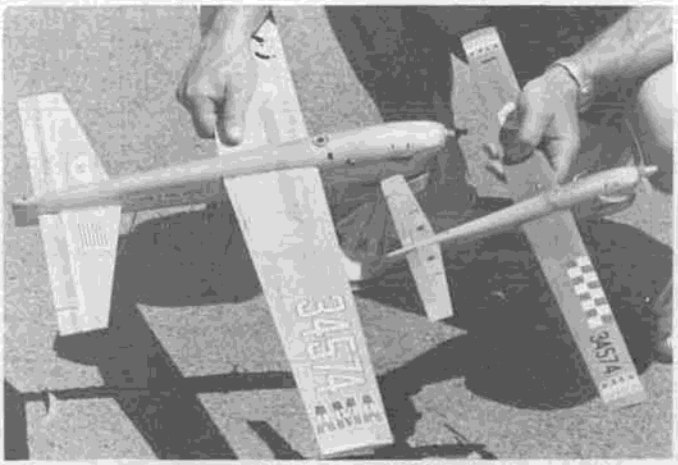
As if to emphasize the point, I have yet to see anybody build a model for N.W.S.R. that is trick-to-the-limit. Even within our restrictive rules there are all kinds of little detail things one could incorporate into a model, and these small things could add up to an advantage, if done properly. But at every race the guys pull out models that are almost stone-stock kits powered with equally stock engines . . . just exactly what we had hoped for when the rules were being laid down a couple of years ago.

PHOTOS BY CHARLIE JOHNSON

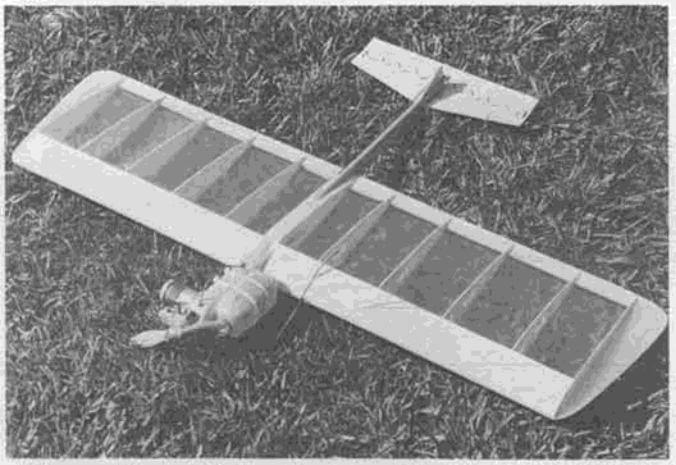
Fred Buschbaum gives Rod Onder's model a clean launch and points way for it to go.

Another point. Although, in the first paragraph of his letter, George refers to reading about "beginner" events, I don't believe the limited Goodyear thing really is, and I *know* that N.W.S.R. is not. Yes, a beginner (I much prefer the term "novice") can compete without being blown away by anything but lack of experience, but these events are a common meeting ground for experts and novices alike, ground where the expert can't blast the novice into submission and where an on-the-ball novice can come through with at least a good time, maybe even a high finish.

Commenting on rules, it sounds as if the limited Goodyear rules work and have been kept stable . . . a very important item. The N.W.S.R. rules are still used as originally done by Mike Hazel



Dave Braun built both the AMA Rat and 1/2A mini-Rat, complete with metal half-pan. Seen at San Marcos, CA contest.



Sherwood Buckstaff's Slow Combat model. A tame S.T. pulls around 100 mph, just think what a killer Slow Rat engine would do.

If you want to try FAI but only have AMA size models, try lashing a .15 on with an aluminum adaptor. Works great!

Mike Hoffelt holds while Frank Tomicich lights the fire in the Fox in his AMA Monoboom. How come the ground is so bent?

and will be the same for our 1980 season of racing.

One change that we are considering is allowing the use of fuel shutoffs, which are presently not allowed. A couple of reasons for that. Vic Garner and myself. I wanted to allow them when the original rules were drawn up, but the majority decided otherwise, which, considering the popularity of the event, certainly couldn't be referred to as a mistake. Still, I would like to see . . . wait, let's hear from Garner on the subject, as put forth in a letter to John Thompson and Mike Hazel, Editor and Publisher of the newsletter *Flying Lines.*

John and Mike,

I decided to respond to your Drizzle Circuit questionnaire even though I only fly the event (Northwest Sport Race) once a year. As such, my reply probably shouldn't be counted in any tabulation you might make for popularity of the event and/or proposed changes.

However, here goes. . .

First of all, I do like shutoffs, and anyone can make a simple shutoff that will work every time. Heck, I'll even build the shutoff for people who can't do it themselves. It might take 10 or 15 minutes of my time per shutoff for N.W.S.R.

I am sure the use of shutoffs would permit safer races, due to being able to stop the engine when lines get crossed, etc. Take a pit stop and not lose an airplane. For my personal situation I cannot run more than 15% nitro in my fuel system anyway, so I won't be able to go any faster. However, a shutoff would have prevented the problems that occurred to me both in '78 and this year at the N.W. Regionals. In '78 I had run out of fuel after just passing this very slow-flying airplane. I had to hold it up till he got out from under me so I could land.

My airplane got hit in mid-air. Had I been able to pick my shutoff time I would have come down a few laps earlier, behind the slowpoke and to my pit crew with no damage to the airplane.

Then this year on my second pit, in the final, my airplane ran out of fuel just after going crosswind, and I was unable to get it down before 3/4 of a lap. My pitman restarted it and let go, headed into the wind. Naturally, it came in, dusted the prop and shut off the engine, also damaging the prop tips. As a result, I finished 8-10 seconds behind Mike Hazel for second place.

As you know, I have a shutoff on my airplane so that I can get needle valve settings in short order. After I get the needle set I remove the shutoff and no trace of it can be found 10 seconds later. Sure enough, this adds a complication to the event, but I feel this minor complication is more than justified by the increased safety and reduction of damaged airplanes. Vic Garner.

One of the reasons Texas Combat fliers don't lose many arguments. Ernie stands on opponent's plane to determine its lift capabilities.

I'll have to agree with Vic that although the installation of a shutoff is a complication, the benefits to its use outweigh this consideration of complication. Besides the safety aspect, which can't be argued with even by those in favor of keeping shutoffs out of events like N.W.S.R., the ability to go out and get that super needle setting in less time than it would take to run out just one tank of fuel has to be considered. With this in mind, the novice would be helped considerably, as they are generally the ones who have trouble getting the needle just right, yet many don't feel like taking a lot of test flights for fear of holding up the experts who also want to test.

Although Vic didn't mention it, another advantage is being able to shut the thing down if the motor is making funny noises. Granted, we aren't talking about saving an expensive racing engine, but even a stocker represents *some* investment, and to have to listen to a motor literally die a slow death, all because use of a shutoff is not allowed, seems to be a waste.

ONE PERSON'S OPINION OF AN "EXPERT" IN MODELING

The above is the heading to a piece done by Morrie Leventhal and appearing in the Control Line Flyer. And following is that piece. . .

First of all, there is no such thing as an expert. If a person is willing to get involved enough in his or her hobby to spend time testing, trying, failing, trying again, asking questions, making phone calls to other modelers, then testing and trying again, he becomes very good at the hobby. He puts in the time, pays the dues and eventually wins . . . then the whole world says he is an expert.

What the whole world does not know is how long and how hard he worked at

Continued on page 95

Guntis Sietins placed 1st in F1A class in international postal meet last fall, sponsored by model club in Sao Paulo, Brazil.

Ted Stalick scored 4 maxes to win BCD Gas event at Hawks Spring Opener, using a Spacer. Dad Bob applies starter.

FREE FLIGHT

by TOM HUTCHINSON

PHOTOS BY AUTHOR

WHO'S AFRAID OF THE BIG BAD SCHNEURLE?

(By Ralph Prey, writing in the San Valeers' *Satellite*)

"Have you noticed recently that there are fewer and fewer entries in the AMA Gas classes? And more and more in the rubber classes? And have you seen any really new AMA Gas designs that were developed strictly for the Schneurle engine? It's the same ole Satellite design of 20 years ago that is being built with smaller tails and auto rudder/stab to handle the power. I'm not saying that the Satellite design isn't good (it's winning most contests), but it is an old design that is being reworked.

"Where is the imagination and originality among today's free flighters to come up with an entirely new design just for the Schneurle? There are many good ones out there who are capable of designing an entirely NEW design, and not just rework a Satellite or a Duster. I'm baffled as to why so much effort is being put into rehashing old designs to use NEW engines, and the end product is invariably an inconsistent power pattern, ending up in a screaming kamikaze crash dive. Is this progresss?

"If I were a newcomer to free flight and went to Taft for the first time and saw these modified designs of the late '50s being overpowered with an engine of the late '70s, I'd shake my head trying to figure out the logic of that approach. Certainly the rules are not that restrictive as to limit originality, like in FAI Power where they all look alike. I'm sure, too, that I'd think twice before I'd invest a "C" note in an engine and hours and hours of my time to build something that the odds . . . were unbelievably against its survival. Maybe that's why we aren't seeing many newcomers in the AMA Gas classes.

"Or look at it this way . . . maybe you don't need a Schneurle to be in the winner's circle. Did you ever think about that? Time on the clock still depends upon the basic principles of power-to-weight ratio and glide sink rate, plus other goodies such as altitude. But you can design a winning model, I'm sure, that incorporates these basic principles without a Schneurle. But again, why isn't it being done? Could it be that the Schneurle has SPOOKED a lot of potentially good designs from becoming a reality? And why not build a model without a Schneurle? That's a good question, I'd like to hear your answers."

Ralph's point about not needing a Schneurle to be competitive is one that I've stated previously in the past. In free flight, you're only judged on time in the air, not cost or power of the engine. If you design the model to suit the power available, you should be competitive.

The problem seems to be one of most people having more power than they can handle, not the type of engine porting being used. There are a couple of ways to tame the beast. Easiest way is to use a milder fuel until you get the feel of the model, then gradually "tip the can" until you reach your trimming limit (the nitro shortage may make this necessary anyway). Next step would be to build bigger models. More wing area will slow down the climb and improve the glide, even if the overall weight is increased. Try about 650-750 sq. in. for a 3.5cc (Joe Foster uses 650 squares on his Buck), and maybe about 1000 sq. in. for a .40. This may cause problems if you have a small car, so you might have to consider other alternatives.

I don't agree with Ralph that it's necessary to come up with a completely new design just for the Schneurles. Such designs already exist; you just have to look for them! Look for them in areas

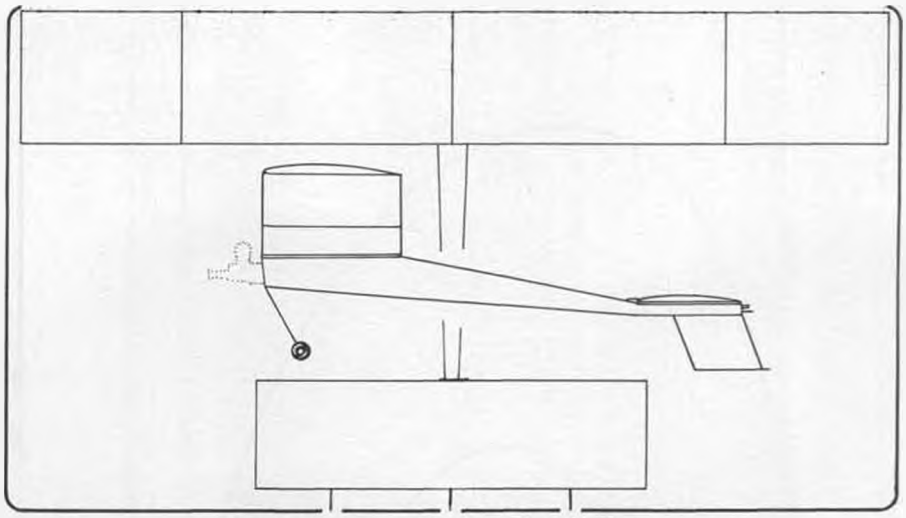
Larry Delaney used up 2 year's balsa rations building this "Gool." Hump on top of wing houses spoiler DT mechanism. Spoilers can be seen in half-up position.

outside Southern California, however. In other parts of the country, gas fliers have had to cope with short engine runs and maxes and have concentrated on designing and trimming for climb. Look also across the ocean, where British fliers have been trimming their Open power models for maximum climbs (400 sq. in. on a .29, for example) for years.

It is possible to handle a lot of power without auto-surfaces (although don't overlook them as trimming devices, if needed), but the model might not look like a Satellite. I've found that a reasonably tall pylon, enough dihedral, and sufficient rudder area, combined with wash-in on the right wing, will give a fast, safe right/right pattern. Many of the ships that have inconsistent power patterns are being flown right/left and are marginal on rudder area. Noted British power flier George French once commented in print that as power increased, fin area had to be increased, and I've found this to be true. Mel Schmidt also found this out when developing his SHOCer design. If you're interested in developing a model that can handle a lot of power, you might begin by taking a look at Mel's designs (SHOCer and Maxhog) for ideas. My "Flying Burrito Brother" and "Zingo" designs are very similar to Mel's, and will handle power very well. (A lightweight Zingo will handle a K&B .21 Schneurle on 450 sq. in., if you're interested.)

Anybody out there have some comments?

Marian Joyce waits patiently to launch hubby Doug's A/2 canard.



NOVEMBER MYSTERY MODEL

THE WINNING TEAM

Most free flighters remember who won an individual event at previous World Champs, but not too many pay attention to the team winners. That's unfortunate, since success in the team events is a much better indication of a nation's prowess in an event than the nationality of the individual winners. Becoming a World Champion depends a lot more upon the vagaries of Lady Luck than does winning the team championship. Individual titles are won by one flyoff flight, which is not often a true indication of a model's potential. Such factors as a tree on the horizon, position at the starting line, a broken strand of rubber, or a capricious thermal all have more effect on who is world champion than the model or the flier. A lot of well-respected, expert fliers have never won a World Championship outdoors: Verbitski, Lepp, Bob White, Joe Bilgri, Max Hacklinger, Peter Allnutt, Doug Galbreath, and Henry Spence, for example, have come close to winning, but have never managed to grab the brass ring.

The team championship, on the other hand, is based on 21 flights made all during the day by 3 fliers. It is less subject to the whims of Dame Fortune. It is possible to plan and train for the team championship, since a hard-working team of consistent fliers and models has a much better chance than a bunch of brilliant individualists. The lowest placing team member is the most important man on the team. If he gives up at an early point in the contest, his team's chances are ruined, even though one man on the team may do well. The Eastern bloc countries have realized this for many years, and have concentrated on winning the team championship with remarkable success. And they have succeeded in producing individual winners at the same time.

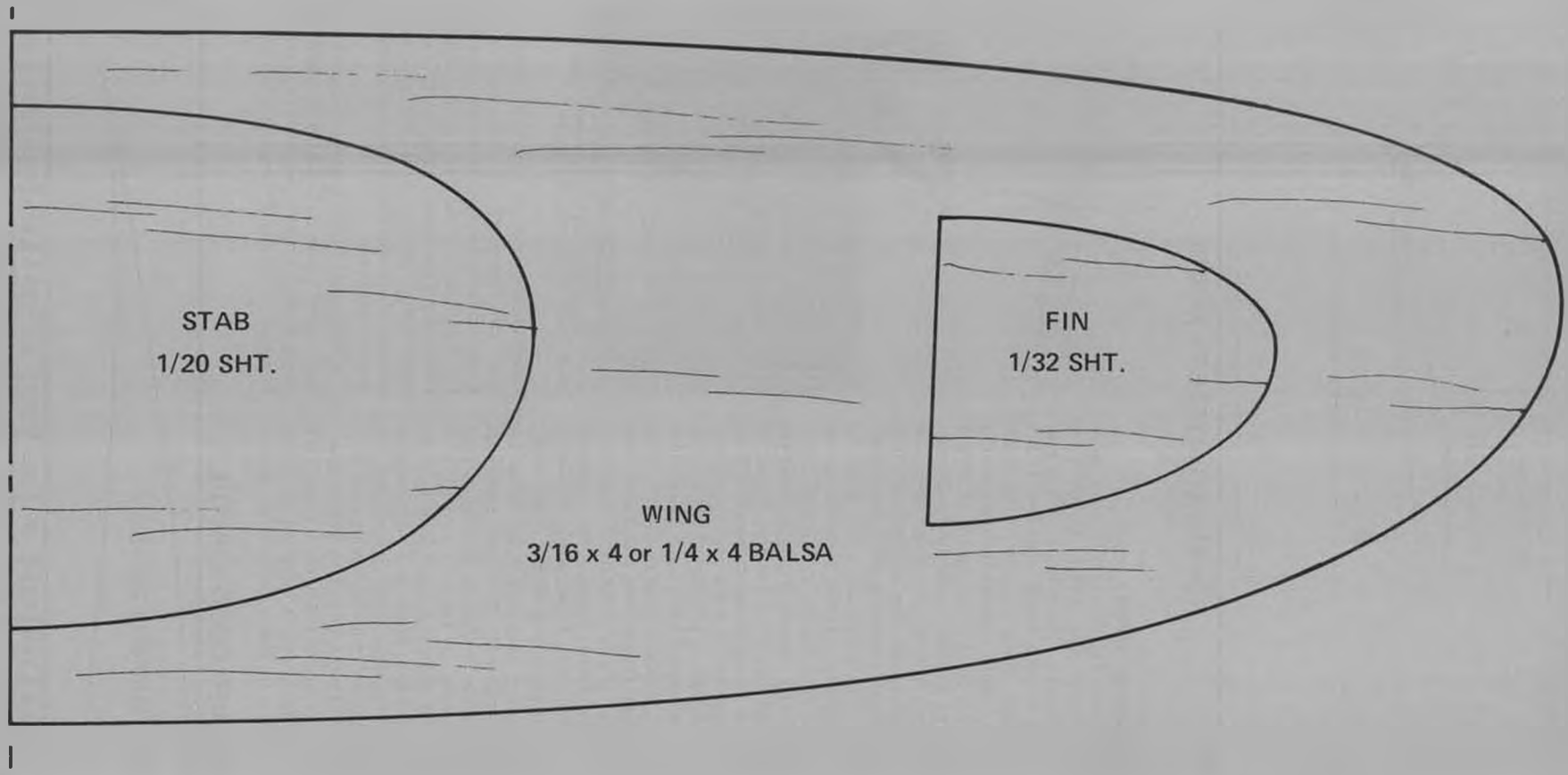
Avery Clark flew this fast-climbing Zingo with K&B .21 at Hawks Spring Opener.

I compiled table 1 while researching last month's piece about the home field advantage. It shows the countries which have won the team championships since

DARNED GOOD AIRFOIL

WORTMAN FX60-126, THINNED TO 10%

STATION	0	2.7	5.2	10.3	14.6	19.6	25	30.9	40.2	50	59.8	69.1	80.4	89.6	100
UPPER	0	2.9	4.1	5.6	6.4	7.1	7.6	7.8	7.8	7.4	6.6	5.5	3.7	2.1	0
LOWER	0	-1.2	-1.7	-2.2	-2.5	-2.5	-2.4	-2.1	-1.4	-0.4	0.5	1.1	1.4	1.1	0



UN – POLLY

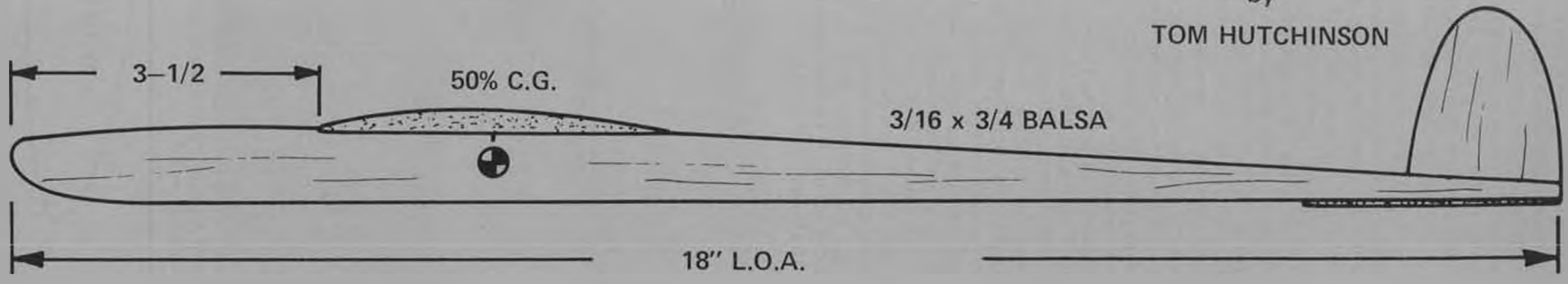
V – DIHEDRAL 2–5/8 EACH TIP

FINISHED WT: 24 – 30 GRAMS

OUTDOOR HLG

by

TOM HUTCHINSON



1953. Table 2 counts the number of team victories by event. Some interesting facts come out of all these statistics. Italy is the only country to win team championships in all 3 events. The Italians have also won the power championship more than any other country, while the Russians have dominated the A/2 event even more thoroughly. The host country has won a team victory only 3 times in the past 10 years. The North Koreans have won 3 out of the last 6 team championships.

Meanwhile, the U.S. hasn't won a team championship since 1965. We've placed 2nd once and 3rd three times since then, but the most recent good team placing was in 1971, when the Nordic team finished 3rd. Maybe some home cooking will improve our team placings this year!

THIS MONTH'S THREE-VIEW: THE UN-POLLY HLG

With all this talk of VIT, laminar flow, circle tow, Schneurle porting, thermistors, etc., how about a break for something simple? Like a simple hand-launch glider, as in this month's 3-view. Not much to it: V-dihedral wing, no DT or fancy finish, and you can get 2 wings, 2 fuselages, and 6 stabs from a 36-inch length of balsa. Looks like you could build it in less time than it takes to put in a DT on a regular HLG! And that's the idea, to have a simple, expendable HLG that I could make fly.

This last part was critical, since I've had trouble in the past in building H.L. gliders that were straight and well-aligned. It looked like my chances of getting a straight glider would be enhanced by using V-dihedral in the wings, since I'd have 1/3 the joints to make. Most of my indoor gliders have had V-dihedral, and nearly all had flown well. The few outdoor V-dihedral gliders I'd built had usually been quickly lost, so

Continued on page 103

Gene Bartel turns loose his Witch Hawk 1/2A. Gene was overall champ at Hawks meet.

Bucket Johnson flew this colorful A/2 at Fiesta of 5 Flags meet in Pensacola, FL.

TABLE 1
WINNING TEAMS AT FAI FREE FLIGHT WORLD CHAMPS, 1953-77

YEAR	A/2	WAKEFIELD	FAI POWER
1953		USA	USA
1954	West Germany	USA*	USA*
1955	Italy	Sweden	England
1956	Czechoslovakia	Sweden*	England
1957	USSR	—	—
1958	—	Hungary	Hungary
1959	Finland	USA	—
1960	—	—	Hungary
1961	Netherlands	Poland	Hungary
1963	USSR	Italy	Italy
1965	England	Sweden	Italy/USA
1967	Czechoslovakia*	USSR	England
1969	USSR	USSR	Italy
1971	Austria	Denmark	Sweden*
1973	Austria*	East Germany	France
1975	USSR	North Korea	Austria
1977	North Korea	North Korea	Italy

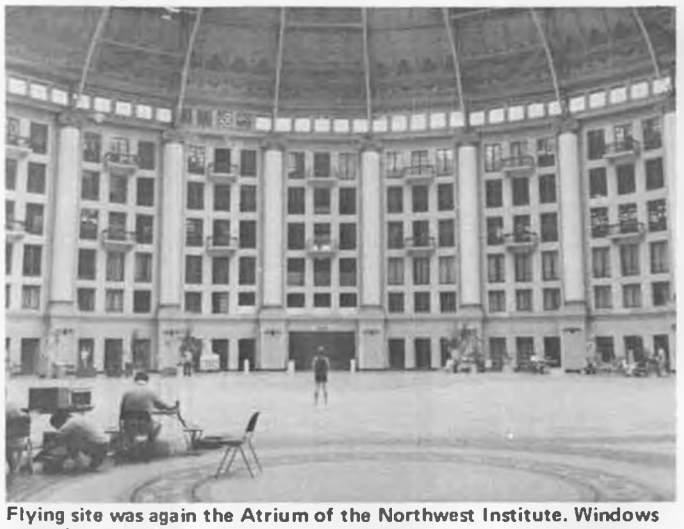
*Denotes host country

TABLE 2. TOTAL NUMBER OF TEAM VICTORIES, BY EVENT AND COUNTRY (F/F WORLD CHAMPS)

COUNTRY	A/2	WAKE	POWER	TOTAL
Italy	1	1	4	6
USA	0	3	3	6
USSR	4	2	0	6
England	1	0	3	4
Hungary	0	1	3	4
Sweden	0	3	1	4
Austria	2	0	1	3
North Korea	1	2	0	3
Czechoslovakia	2	0	0	2

Mark Valerius and C.C. Johnson came up with this new design to handle power of new Schneurle engines (see Ralph Prey's comments in text). Resembles current FAI trends.

Mark Valerius turns loose his Class D ship at Pensacola meet. Hot climb!



Flying site was again the Atrium of the Northwest Institute. Windows around perimeter are classrooms and dormitories.

Stan Chilton, master craftsman, deciding which one he's going to fly next. Sure has a lot of models in that box!

PHOTOS BY AUTHOR

1979 INTERNATIONAL

INDOOR RECORD TRIALS

By JOSE TELLEZ . . . Once a year, the best indoor fliers in the country get together at Westbaden, Indiana, for the sole purpose of setting new records. No less than 13 were set at this year's meet!

• For those of you who missed the 1977 or 1978 reports published by **MB**, I will repeat that the Westbaden meet is held yearly at the Northwood Institute's Atrium. This beautiful and historic building provides close to 95 feet of ceiling, thus qualifying it for Category II (under 100 feet).

The short-form impression of the meet was well characterized by Contest Director, organizer, record keeper, timer, and friend of everybody, Dr. John Martin, at the start of the meet. Looking over the entrant's list he said, "I see Jim Richmond is going to be here, this is going to be like batting practice for Babe Ruth."

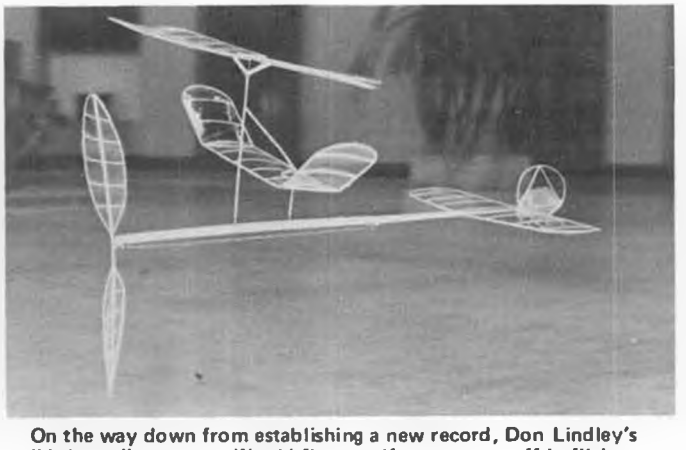
For those of you who don't follow indoor closely, Jim Richmond recently beat out all competitors in World Competition held in England to become the World Champion, and as you will see in our report later, this title is well deserved. Like Jim, the other registered fliers were true top-of-the-line indoor modelers, and they were at Westbaden to set the standards for the year.

Whereas in 1977 and 1978, when we reported that large numbers of models had perished to the ceiling obstacles, this year saw very few models suffer this fate. Our thanks for this welcome change go to Roy White, who risked his neck ceiling walking 95 feet overhead (we hope his insurance agent is not an **R/C MB** reader) to shroud the main obstacle (a suspended platform) with a plastic fence. Ron's courageous act won him the double case suds prize during the awards ceremony.

If you ever had an inclination to learn about indoor, you could do no better than to attend one of these meets where you can listen to, ask questions from, and observe in action the best indoor fliers on this planet. An example of what you may expect is a synopsis of the first day's action. During this opening day we saw Dave Lindley and Mike Van Gorder (two sharp young Junior fliers) establish new national records; Dave for R.O.G. and Mike for Novice Pennyplane. Mike

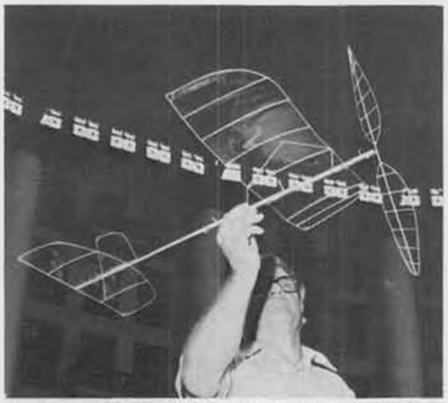
Dave Linstrum neglecting his duty as reporter and playing with his helicopter, an Obarski design that set a record last year.

Stan Chilton carefully observes torque meter and turns counter as he packs them in. Motor will be transferred to EZB on stand.

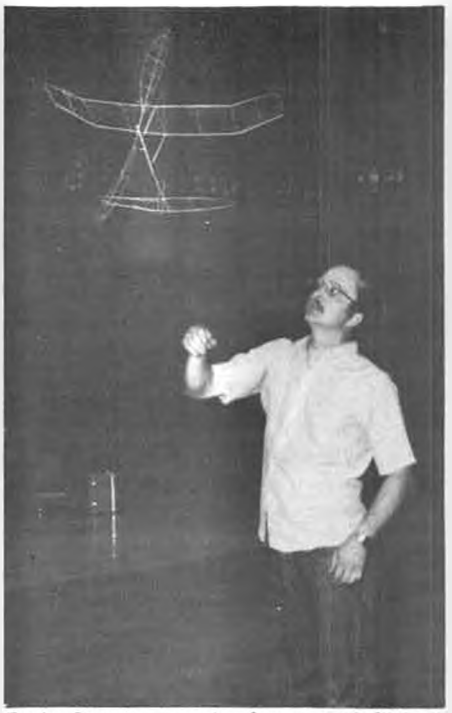


On the way down from establishing a new record, Don Lindley's "Agitator" autogyro. Would fly even if rotor came off in flight.

Ballet sequence by Stan Stoy. Swan Lake launch was good for 75 seconds. Stan flew his amazing "Folder" folding-wing HLG. Set new Cat. II record at 2:32.4.



Ron Ganser was mostly trimming out his ships and getting ready for FAI eliminations.



Bucky Servaites launches for a record, flight later topped by World Champ, Jim Richmond.

Jim Miller of Cincinnati displays a Curry Wot bipe built from an Andrew Morehouse kit.

also set a new mark for Junior AMA Paper Stick at 16:01, which gave him the high point award for the overall meet.

This same opening session saw Bucky Servaites improve the existing FAI mark set by Jim Richmond in 1977, leaving the new number to beat at 33 minutes and 24 seconds. (This new mark was to be topped later in the meet.)

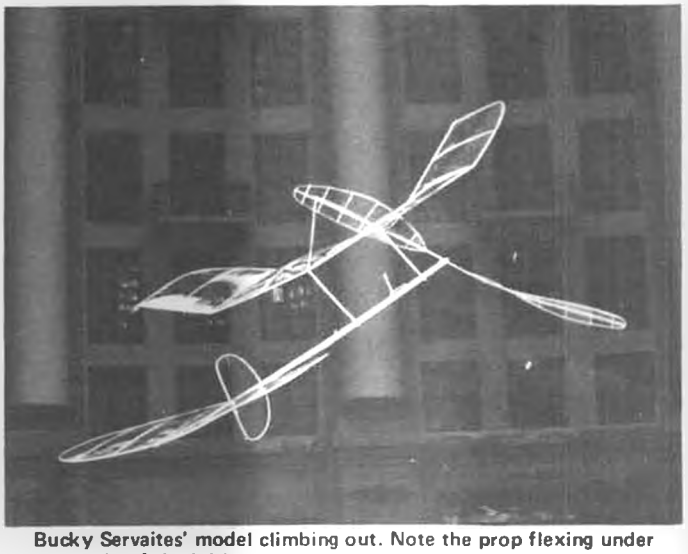
To close the session late in the evening, Mr. Jim Richmond showed us his championship class by putting up the big H.L. Stick for (would you believe) 44:42! Only four times in history has anyone anywhere under any ceiling height with any kind of a model ever exceeded 40 minutes. Westbaden is a Category II building, which makes the accomplishment shine even brighter.

I have just given you the highlights of the opening day in terms of the results; what really makes Westbaden is knowing that the fliers you are questioning and observing are of the caliber to obtain those results we have described. Look at the way they pack their models, the way they assemble, wind or adjust; observe the way they measure and record torque, turns, rubber size prior to each flight, and then take careful records of performance. Look at the jigs, tools and tricks they use to do the job in record fashion; this is an experience well worth a trip to Westbaden.

I had the opportunity, for instance, to talk to Stan Stoy, a young man with a well earned reputation in the H.L.G. field. Not only did my respect for this fine engineer become well established, but I had a most valuable education and pleasant time learning how he has solved what I (and I am sure very many of you) have dreamed about for years and gave up because it was too complex. I am talking about folding wings.

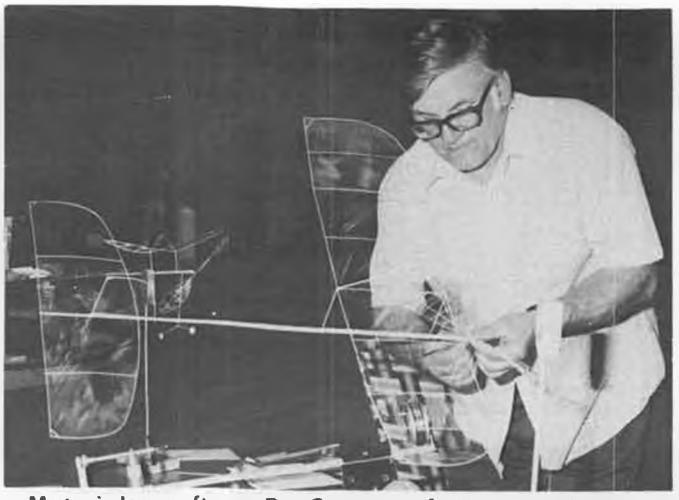
Stan's gliders have a six-panel wing. For the launch, the two outer or tip panels are folded down under the central panels, then in turn these central panels fold under the inboard section panels. This folding process leaves the glider at launch with a very short wing having an approximately symmetrical section. This configuration allows the

Current World Champion, Jim Richmond, shows off his "Cat Walker" which set FAI Stick mark at 37:52.



Bucky Servaites' model climbing out. Note the prop flexing under the strain of the initial power burst.

Stan Chilton, top EZB man, launching for a record. Stan made a brilliant comeback when his model was disqualified... see text.



Master indoor craftsman Ron Ganser transferring a wound motor to his model. Winder counts turns, stooge measures torque.

Jeff Everson, an enthusiastic Junior flier from Miami. Had good times in Pennyplane.

model to be thrown to top height much easier than the usual big-wing glider. At launch it behaves more like an arrow than an airplane. A lever which Stan calls the "Q trigger" holds the wings folded during launch, and this lever is held flat and forward against the fuselage by means of a small aerodynamic surface. As the glider slows down at the top of the launch, the aerodynamic forces diminish and a rubber band rotates the lever backwards against the fuselage, allowing the wings to snap open. The mechanism is designed such that the action is rapid and positive and adjusted such that the wings pop out at the very top of the climb, producing an excellent transition. Since Stan does not need to compromise the size of the wing to obtain a good launch, he has a nice big wing which lets his models float gracefully down after the arrow-like climb.

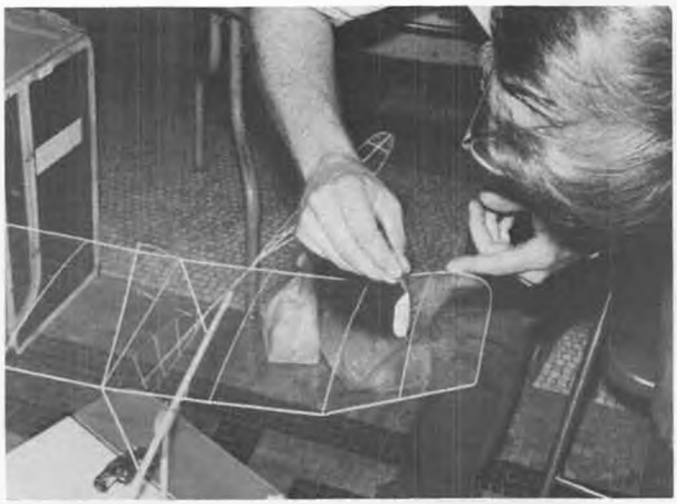
Having witnessed this performance, it is easy to forecast that future H.L.G. fliers will have to abide by Stan's new "technology" if they expect to be competitive. Furthermore, I can forecast that in the not-too-distant future we will see F/F power (particularly FAI) use some of these concepts to take a quantum jump in performance.

From a spectator's viewpoint, it is like watching ballet to see Stan or his brother, Mike, pick a spot on the floor, concentrate, break into a short run and toss a climbing arrow which explodes at the ceiling and is converted into a graceful floater which circles down within a consistent seventy-five seconds or more.

Incidentally, it is fortunate that Stan is a surefooted rock climber, since he managed to land his Folder a couple of times on high and narrow ledges, thus putting on some exciting side shows for the spectators during recovery operations.

Dave Linstrum instructs Roger Wathen Jr. and Sr., spectators at the meet, how to build an indoor. They were a success!

Autogyros seem to be attracting the fancy and competitive spirit of the indoor builders. We saw two which deserve a report; the first, of course, the winner and record setter, designed and built by Don Lindley from Naperville, Illinois. Don shattered an old 1966 mark with his "Agitator," leaving 7:15 on the books. The second autogyro of interest was the double rotor machine built by Ron Ganser from Pittsburgh. Ron had



Bucky Servaites shows how to patch microfilm. Film is stored between two pieces of newspaper; cut a piece for patch, peel off one side of newspaper, place on model, peel off second side of newspaper very carefully with tweezers.

High Point winners at Westbaden '79, l to r: Dr. John Martin, C.D.; Stan Stoy, HLG; Jim Richmond, F1D; Don Lindley, Autogyro; Mike Van Gorder, Paper Stick; Mike Clem, Pennyplane; Richard Obarski, EZB; Walt Van Gorder, Novice Pennyplane.

tried this arrangement before and had trouble with the rotors spinning at different speeds, causing the ship to capsize. This time Ron had coupled the rotors by means of pulleys and a drive belt (thread). To maintain proper belt tension, there were pulleys mounted on adjustable arms which were hinged by tissue tubes. The workmanship of this fragile craft was so good we were sorry Ron was not a winner also.

Friday's flying let us witness the battle of the EZB category. Although these models are not recognized in the current AMA or FAI books for records, there is a large following and unofficial scores are known around the world. A real specialist in this class is Stan Chilton, who uses scientific methods to build and fly, as reported previously by **MB** (September 1977). Shortly after the start of the session, Stan went up for a flight exceeding 21 minutes, good for a national top time. Unfortunately at this time, science failed for Stan. When the model was initially built, it was accurately sized to employ the maximum dimensions allowed by the rules, and we have no doubt, knowing how Stan works, that this was done with all the precision and accuracy known to mankind. We all know that heat rises, and all the hot air in Indiana seems to concentrate at the apex of the Westbaden dome. Having spent a good part of twenty minutes in this hot, humid sauna, Stan's EZB suffered a minor transformation. The fragile wing ribs flattened out ever so slightly, so that when the model was processed for record purposes, it did not pass the inspection. Chord was over by a few thousandths of an inch! You can well imagine the disappointment after a full year of preparation. We felt very sorry as we watched him pack up and disappear. But hang on, the story has not ended.

Taking advantage of the situation, another of our EZB pros, Richard Obarski, from Pittsburgh, sent his ship up for a respectable 18:52 and passed all the processing rigors. Having established a top mark, Obarski received that evening a well-deserved trophy at the awards banquet. However, flying was to continue for another day beyond the awards banquet, and little did we realize that when Stan Chilton packed up, he left only as far as his hotel room, where he carefully peeled back the paper covering of the trailing edge of his wing, chopped precisely 1/64 of an inch off from each wing rib, and reattached the covering to the trailing edge. On Saturday, to show us that science, dedication and perserverance pay off, Stan clocked in at 20:24.5. This time, I hear, is not only a national record but also tops the British high time by about 20 seconds. Thumbs up, Stan. Stan commented that he was preparing material for publication on this fine model, and we look forward to its appearance.

Another very popular category of indoor models is the Pennyplane (these ships, as their name implies, are to weigh at least one penny). The Junior fliers were battling for the lead in this category; Mike Clem set the pace by breaking the existing record established in 1977 by Marnie Meuser (daughter of F/F expert, Bob Meuser). Mike's feat lived only a short while under the pressure of Mike Van Gorder, who left future Juniors a challenge of 10:44. In the meantime, Walt Van Gorder (Mike's father) was contributing to the decoration of the family's mantlepiece by establishing a Novice Pennyplane time of 12:49.

California was represented by Cezar Banks, who topped the open Pennyplane mark of 13:55 with his extremely successful design, which is claimed to be infallible! To prove this point, Dave Linstrum, our good friend and F/F editor for *M.A.N.*, took two enthusiastic but totally inexperienced spectators, Roger Wathen and Roger Jr. from Indianapolis, and guided them into building a pair of Cezar's design. By Saturday, these total novices were sending their models to the ceiling with times of four minutes with a tissue ship and six minutes with the lighter Microlite covered model. We give first an A for the instructor, followed by A's for each student.

Also on Saturday, we witnessed the consistent performance of which our World Champ, Jim Richmond, is capable. Jim had pulled an unfinished ship from his model box and proceeded to give us the pleasure and privilege of watching an expert work with sure hands, using only makeshift jigs (bottles, pencils, rocks, and fingers) to build in dihedral,

wing posts, brace, and assemble a "Cat Walker." The completed ship flew on Saturday to a new record of 37:52, topping Bucky Servaites' time earlier in the meet.

The only disappointment of the meet was the small participation in Scale and Peanut, especially when the flying site is so well suited to the event. Doc Martin committed himself to a big drive for a super Scale event next year. The date is now fixed and the building reserved for the last week in June (June 26 through 29), so hear this, all you scale types, and start building. Remember that you will be able to mix with the best of indoor modelers, you will be very economically fed right on site by Northwood Institute's School of Hotel and Restaurant Management, and if you choose, you can be housed in one of the rooms which surround the flight dome. I heard a contestant comment, "Where else can you wake up at 6 a.m., look out the window from your bunk, and see an indoor cabin fly by!"

Reflecting back on the meet, I would choose the participants as the highlight of the event, and you should plan to take advantage next June of the opportunity to meet with this outstanding group. If you forced me to pick the outstanding model from the meet, my choice would be Stan Stoy's "Folder," which represents a quantum jump in indoor H.L.G. technology.

Any questions and comments are welcome either through **R/C MB** or at P.O. Box 733, Laguna Beach, CA 92652.

RECORD STATISTICS

Mike Van Gorder
- Jr. Novice PP 10:44.7
- Jr. AMA Paper Stick 16:01

Jim Richmond
- Open AMA Stick 44:43
- FAI Stick 37:52

Mike Clem
- Jr. Novice PP 10:40.5

Walt Van Gorder
- Open Novice PP 12:49.8

Don Lindley
- Open Autogyro 7:15.0

Stan Stoy
- Open HL Glider 2:32.4

Cezar Banks
- Open PP 13:55.2
- Open Novice PP 11:45.7

Stan Chilton
- Open EZB 20:24.5

Bucky Servaites
- FAI Stick *33:34

Richard Obarski
- Open EZB **18:52

*Topped by Richmond
**Topped by Chilton

R/C Auto . . . . *Continued from page 26*

good controllability in the sweepers and good top end. Pieter Bervoets, of the Netherlands, looked good and got a good time, but teammate Ronnie Ton appeared to be really throwing his car around, with the differential losing time and getting into trouble. The Italians seemed to be driving their cars with differentials the same way (wild). Even though the British cars had differentials, they didn't seem to be unloading as much in the corners and appeared a little smoother than cars from Italy or the Netherlands. When the first round results were posted it was:

1) N. Ishihara (J) 7:26.xx
2) Jeff Rold (USA) 7:40.35
3) Pieter Bervoets (NL) 7:40.44

Ishihara had surprised everyone and was top qualifier of the round by 14 seconds, or about 2/3 of a lap in 20 laps. One thing that really helped him was no pit stop. The small carb allowed him to go about 9 minutes on a tank of fuel, but

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most other drivers had to make a pit stop. By the time you pulled down the pit lane and drove to your specified position, a pit stop could cost 8 to 10 seconds.

One fact stood out: all the Americans (except Carbonell) and Japanese cars had straight rear axles, and practically all the European cars had differentials. There was no doubt in my mind that the straight axle cars were faster because traction was up, and the cars drove much smoother (if you used a little will power on your throttle finger). I had taken my differential out for the last day of practice. But when I talked to Phil Booth he said he wasn't going to remove his because his driving style is now dependent on the differential, and he didn't think he could get the car set up again for a straight axle.

The next two rounds of practice saw Curtis Husting get in a very good heat, as did Chuck Phelps. Rick Davis, Gene Husting, and Rich Lee also got times that put them in the top thirty. But some of the real clutch drivers did not have good times in the first two rounds. Jianas hadn't put one together, even with the fastest laps, but he stayed away from the discs the last time. Art Carbonell had a differential go out on the first heat, and challenged the discs the second heat (and lost). Art said, "This is just another race," relaxed and then zapped off a good time. Little Repete Fusco had been having engine and car problems, but in his last heat you never would have known it, as he whipped right past all the other cars and won his heat. In the meantime, Ishihara went out and bettered his time, as did several of the other Japanese drivers.

The top ten in the original qualifying were:

1) Ishihara (J) 7:18.57
2) C. Husting (USA) 7:28.83
3) Carbonell (USA) 7:29.89
4) Fusco (USA) 7:34.50
5) Jianas (USA) 7:34.57
6) Rold (USA) 7:40.35
7) Bervoets (NL) 7:40.44
8) Phelps (USA) 7:41.82
9) Sasuga (J) 7:44.21
10) Takeda (J) 7:44.27

Some of the names further down the list were: 11) R. Ton, 13) P. Booth, 17) R. Hassig, 19) P. Greeno, 20) Sabattini, 24) U. Franke, 35) G. Ghersi, 38) K. Plested, and many more.

The Saturday schedule for the 65th to 128th place drivers was more of the same. Lots of crashes, problems, trashing, etc. Anybody who got any kind of a reasonable run made the semis, where there was a tough race to be in the top three. Then again, any kind of a run in the Saturday final was good enough to go to Sunday. The eight Saturday move-ups were:

1) Grunder (CH) 60
2) Shudo (J) 60
3) Kruhsberg (S) 59
4) Dosch (D) 58
5) Codeluppi (J) 57
6) Fruhwirth (A) 52
7) Rowland (USA) 49
8) Errington (GB) 39

So now it started all over again on Sunday for the top 72 drivers. The incentive to be one of the top four qualifiers was high because everyone knew the semi races would be tough. The Sunday race program was three requalifying heats, with top four going to the Finale and the next twenty going into two 10-car semis with the top three finishers of each going to the Finale.

Bill Jianas was really excited because he had another chance to beat THE Japanese driver. Ishihara put the pressure on again by turning a terrific 7:24.2 in the first round. Jeff Rold and Curtis Husting both got some of the heat off themselves by turning in 7:29 and 7:33 times respectively. Other drivers turning in good first round times were Phil Booth, Pieter Bervoets, Rick Davis, F. Sasuga, Rich Lee, Gino Ghersi, P. Hassig, and K. Takeda.

In round two the pressure was building. In this round good times were turned in by Chuck Phelps and Ronnie Ton. As you can see, lots of the big-name, good drivers still had not made the program.

Repete Fusco started round three of Finale qualifying with a bang by running a super race to come in second behind Dave Martin (GB). Then Gene Husting pulled himself out of the five, as did Ljungcrantz of Sweden, Errington (who had moved up from Saturday), Kondo

and Sasuki of Japan, Sabattini, Carl Petri, and last but not least Jianas, who again had to come through under pressure.

So the top 24 drivers on July 8, 1979, were:

1)	Ishihara (J)	7:24.2
2)	Rold (USA)	7:29.0
3)	Ton (NL)	7:30.5
4)	Jianas (USA)	7:31.3
5)	C. Husting (USA)	7:33.3
6)	Phelps (USA)	7:35.4
7)	Booth (GB)	7:35.7
8)	Davis (USA)	7:37.1
9)	Bervoets (NL)	7:37.3
10)	Sasuga (J)	7:38.8
11)	Sabattini (I)	7:43.2
12)	Ljungcrantz (S)	7:43.9
13)	G. Husting (USA)	7:44.3
14)	Kondo (J)	7:44.4
15)	Suzuki (J)	7:45.1
16)	Lee (USA)	7:45.1
17)	Martin (GB)	7:45.9
18)	Ghersi (I)	7:46.1
19)	Fusco (USA)	7:46.5
20)	Kishi (J)	7:47.x
21)	Takeda (J)	7:47.7
22)	Hassig (CH)	7:47.7
23)	Petri (USA)	7:48.x
24)	Errington (GB)	7:48.8

Ishihara had done it to everybody again. In fact, his backup time (7:26.5) beat everybody too. What consistency! But Rold, Ton, Curtis Husting, Phelps, Booth, Davis, Bervoets, and Sasuga all had good backup times, and Jianas is a hard runner. So it looked like there would be some super racing coming up.

Chuck Phelps was concerned that he had to run a semi (rather than be a sit-out). I pointed out to him that most often, drivers who advanced from the semi's would win. Just look at the Saturday results; only one semi driver was beaten by the sit-outs. The semi is shorter and if you place third or better you're in good shape . . . and if you are lower than that you probably wouldn't do any better in a longer race. It's hard to believe this reasoning if you have to run a semi, but it is very often true.

When the "A" semis was flagged off Bervoets had problems immediately and was in the pit. Ton worked on the car furiously but found the problem to be terminal. Bervoets was out with no laps completed after being super consistent. In the meantime, Curtis Husting was running in first with Booth second. Repete Fusco started off good and was driving great. But then his engine started sounding sick, crackling and cackling. Repete had to finish the race in a four-cycle. Too bad, because the crowd was really with him. At the 75 lap finish, it was Curtis Husting (USA) first, then Phil Booth (GB) and Dave Martin (GB). Suzuki (J) was fourth, only one lap down. Then it was a drop down to 70 laps for K. Takeda (J), Gene Husting (USA), and Franco Sabattini (I), who finished in that order. Then came Carl Petri (USA), Repete Fusco (USA), and Pieter Bervoets (NL).

Now it was time for the "B" semi. At least in this race, everybody got off at the start. Phelps, Davis, Sasuga, Ljungcrantz, and Kishi were all running good. But Chuck Phelps put together quite a few good laps and pulled to a firm lead, then stayed with his game plan and kept away from the dots. Ghersi was out of the race early but the four drivers above were all within a lap of Phelps most of the race. At 75 laps it was Phelps (USA), Sasuga (J), and Davis (USA) in first, second, and third respectively. Kishi (J) was fourth also with 75 laps and Ljungcrantz (S) was fifth with 74 laps. It was quite a close race. Then it was Kondo (J), Lee (USA), Hassig (CH), Errington (GB), and Ghersi (I).

The "B" semi move-ups quickly went to their pits to check over their cars and change tires, etc. The Finale would come all too soon. The "A" semi move-ups had quite a bit of time to prepare, but there was still all kinds of activity in the pits. Some drivers were making frequency changes and car number changes. Soon the drivers were called out to line up the cars on the grid for picture taking, etc. When Phelps got to the grid he hadn't changed to the right car number yet. After a chewing out, a possible disqualification, and some more rushing to get and change the numbers, everything was ready. Actually, it seemed like a very short time from the end of the "B" semi to the grid call.

On the grid it was the sit-outs, N. Ishihara, Jeff Rold, Ronnie Ton, and Bill Jianas, then Curtis Husting, Phil Booth, and Dave Martin from the "A" semi, and Chuck Phelps, F. Sasuga, and Rick Davis

from the "B" semi. They all looked relaxed standing behind their cars, but I can imagine what they felt like inside. All had made it this far by being consistently fast. It is interesting to note that nine were in the top ten Sunday qualifiers, and six were in the original qualifying top ten, with the others not far back.

The start of the Finale was pretty clean, with Ishihara getting his usual good start, as did Jeff Rold and Bill Jianas. Booth partially blocked Husting at the line, but this made little difference. Rold went into the lead on the back straight with better acceleration than Ishihara. Rold held the lead for about 15 laps when his engine flamed out just past the start/finish line. Curtis Husting then went into the lead. Husting, Jianas, and Phelps all seemed to be able to get by Ishihara without too much difficulty on the first part of the back straight, where acceleration really counted. But early in the race Jianas had some trouble (hit some of those "dots" and bent up the wing and body, I think) and was out fixing the car for several laps. Husting led until lap 38, when something let go and the car retired (it turned out to be a jammed brake disc). After this I really don't know who led or who was in the other positions. I would guess, though, that Phelps probably led for a while (to about 50 or 60 laps) when he completely lost his brake pads and had to finish the race with no brakes. Ishihara also had some crash damage and was out for a while. Rold continued to flame out every ten laps or so because the front plate on his engine was loose, probably sucking in air and screwing up the idle. Davis' car looked pretty cockeyed, so he must have tangled with the dots, and was not running very fast. Toward the end of the race Jianas and Ishihara were both running laps in the mid 21 seconds and picking up time. The fastest lap I timed was a 21.3 second lap by Ishihara. Phelps was running right near 22 seconds, even without brakes, and Booth was at about 22.5 seconds. One U.S. driver looked like he took a couple of cheap shots at Ishihara, and I would have black-flagged or disqualified the U.S. driver had I been out there. So the question was, who was in the lead, and could Jianas or Ishihara catch them before the end of the race? So the race ended with no English-speaking people around me knowing who won or the next positions.

The finishing order of the Finale was presented earlier, but the remaining overall finishing positions were: 11) Kishi (J), 12) Suzuki (J), 13) Ljungcrantz (S), 14) Takeda (J), 15) G. Husting (USA), 16) Sabattini (I), 17) Kondo (J), 18) Lee (USA), 19) Petri (USA), 20) Fusco (USA), 21) Hassig (CH), 22) Errington (GB), 23) Ghersi (I), 24) Bervoets (NL).

I'm sorry I didn't watch Sasuga closer, because he was always in the top ten qualifiers. But my mind was boggled by Ishihara's times; my ears came to attention by the screaming engines on the unloading differentials of Ghersi, Ton, Sabattini, and Bervoets; and my eyes were dazzled by the driving of Ishihara and Jianas. Sasuga was just another of those smooth, quick, unnoticed Japanese drivers. Sasuga went out and beat most of the name drivers every time. In fact, *all* the Japanese drivers looked extremely smooth. Kishi, Takeda, and Kondo were also always quick.

I would like to thank Johnny Brodbeck Sr. and K&B Manufacturing for providing fuel at cost and paying all shipping charges for the fuel used by most U.S. racers. It was a load off my mind when Johnny took care of the fuel situation by shipping about 60 gallons of fuel to Geneva via his distributor (Helmut Noll) in Germany. Also, thanks to Stig Anderson of Viking Hobbies for holding the fuel until we got there.

Thanks to MICRO-RACING for sponsoring (dollars) a good portion of the race program and a fabulous all-you-can-eat-all-you-can-drink affair one evening after qualifying. The food was fantastic and plentiful and the drinks were large and cold.

Finally, thanks to the Auto Modele Club de Geneve for putting on a fantastic race. I hope the standards of preparation and race conduct established at this competition can be upheld in the future.

NEXT MONTH: Technical evaluation of the cars, drivers, and goings-on at the 2nd World R/C Car Championships. •

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Curtiss . . . . . *Continued from page 54*

sembling model, tip floats may be held in place under wing with 1/16 O.D. aluminum tube struts, fastened with 1/32 wire, or you may prefer to use bamboo. We used the aluminum tube held in friction fit with the wire fasteners. In case of rough landing, the float will separate from wing rather than transmitting stress to spars, etc. At least, that is our theory.

WINGS

Being a Seat-of-the-Pants engineer, I decided to try a theory that had been used with good success on another multi-wing model, and this is to make the two upper wings do the work, while the bottom one is streamlined and goes along for the ride. Think of the model as a parasol. The combined lift area of the two upper wings is more than enough. How flying characteristics would have differed if we had followed conventional practice is a moot point.

Cut 29 lifting airfoil ribs from 1/32 medium sheet balsa for upper wing panels, and 14 streamlined ribs for the bottom two panels. Pin both batches together for convenience of sanding and notching. Unpin and set ribs aside for a moment.

Each wing panel follows the same assembly technique; just don't build six right-hand panels!

Secure hard 1/32x1/8 balsa spars over plans with plastic "pin-downs" (available from Peck Polymers, P.O. Box 2498, La Mesa, CA 92041). These hold the wood in place without the hazard of splitting. Allow the spars to overhang end ribs by about 1 inch. Cement ribs in place on spars, with the exception of the root ribs on the middle and lower wing, which are angled to mate properly with fuselage contours. These ribs may be cemented after confirming correct angle by slipping finished panels in place with appropriate dihedral setting. Cement leading and trailing edges in place, followed by tips, which have been laminated from two pieces of 1/32x1/16 soaked basswood, bent around a cardboard or scrap balsa form. This is the only place on the model (except prop) where white glue was used, all other joints being secured with Ambroid or Hot Stuff. (This is an R.O.W., you know!) Leave laminations around form overnight. Waxing the edge of the form with a crayon or candle facilitates basswood removal.

Add hard 1/16x1/4 balsa strut base pieces as shown on plan. The pieces in the center wing panels are drilled to allow clear passage of cocktail straw interplane struts. The struts are slightly flattened to an oval cross-section. (Substitute balsa if you don't drink cocktails!) Cementing 1/4-inch long balsa stubs (which fit inside straws) in place after the wings have been covered makes it easier to accurately index the struts to the wings. These stubs are on the underside of the top wing and on the top side of the bottom wing. Add 1/32 sheet gussets where ribs cement to trailing edge.

Cut and carefully sand leading and trailing edges to proper airfoil shape. Tips should be sanded to semi-circular cross-section, tapering to fair in smoothly with trailing edge.

Construct top wing center-section. Secure this unit to workbench and slip right and left panels in place, allowing spar stubs to contact at center section center rib. The spar stubs will require tapering along the bottom to accommodate the dihedral. Prop up tips 1/2 inch before cementing. Fill in between spar stubs with tapered "bridge spar" that makes allowance for the 5 degree sweepback. Add the four laminated cabane strut mounts. Laminations should be of two pieces of hard 1/32 sheet balsa, to make 1/16 inch thick parts. These will be drilled later to insert strut ends.

TAIL

Construct vertical fin(s) and horizontal stab from 1/16 square balsa. Trailing edges are 1/16x3/16. Stab tips are 1/16 sheet. Be sure to incorporate gussets as shown. Construction incorporates 3/32x1/32 cap strips on ribs to enhance rigidity. Sand surfaces to streamline shape. Note that each part allows the spar stub to protrude about 1/4 inch. This makes assembly easier when cementing surfaces to fuselage and provides a stronger installation. Scallop trailing edges as shown.

PROP

The four-bladed prop looks formidable, but isn't difficult to make. See sketch for details. The blades are made

by laying up two pieces of 1/32 sheet balsa over a pitch block made from pine. Soak the sheet balsa blades in hot water for about an hour before applying white glue between laminations and binding them to the pitch block with a length of an old rubber motor. Protect the balsa blade with a piece of thin cardboard before binding. Make four blades, letting each dry overnight on the block before removing and shaping with sandpaper to an airfoil section.

The center hub parts are cut from hard balsa and slotted as shown to receive the blades, which should have about a 40 to 45 degree angle at their centers. Wedge-fit all four blades and check for alignment and symmetry before cementing. Cut and sand hub so blades fair in smoothly, giving the prop a finished appearance. Drill hole in center to receive aluminum tubing which will accommodate the .045 prop shaft wire. This provides for free-wheeling. Prop hook is bent in a conventional manner and installed later, after prop and nose block have received final coat of dope. A lightweight compression spring at the hub front assists in disengaging free-wheeling mechanism.

COVERING, ASSEMBLY, AND FINISH

The Curtiss 18-T-1 followed the contemporary Naval aircraft color scheme. The top wing and stabilizer surfaces were chrome yellow and the balance of the plane was either light gray or silver. Silver seems to make a more attractive model, so that is what we chose. All struts were painted with Floquil railroad color, called "concrete."

Model is covered with Japanese tissue. You can use silver tissue, however, we elected to spray the pigment on white tissue.

Wing and tail covering does not need any special mention. The only suggestion we might make is to spray the entire model framework with diluted clear dope before covering. When flying off water, the model is sure to get soaked once in a while. The doping slows down the water absorption, thereby preventing excessive weight gain.

We never did have much luck with covering with wet tissue, but the fuselage might lend itself to this practice if you have had success with it. We chose to cover dry, cutting tissue widths corresponding to the distance between former bays and wrapping about one-quarter around the fuselage circumference. Start at the tail, and be sure tissue grain runs parallel with fuselage centerline. The main float is covered in the same manner. Cover float bottom (which is 1/32 sheet) with tissue also. Shrink tissue with alcohol spray.

The covered model is sprayed with two coats of diluted 1-to-1 clear nitrate dope, with plasticizer added to prevent excessive warping. Pin down wings and tail surfaces during drying. The third, and last, coat of dope has silver powder added. We added about a toothpaste tube capful to an ounce of dope. You don't need more. This allows the translucent quality of the tissue to be main-

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KP-3AS w/KPS-15IIA's	155.95	103.98	MBM434
KP-4A w/KPS-14IIA's	309.95	191.98	MBM350
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KP-6A w/KPS-14IIA's	339.95	212.98	MBM352
KP-6A w/KPS-15IIA's	351.95	219.98	MBM353
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KP-7C w/14II's or 15II's	529.95	377.98	MBM356
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KPS-15II Servo	44.95	34.88	MBM359
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tained. All solid balsa parts such as the nose block, tail fairing, float nose, and tail cone should be prepared with two coats of sanding sealer, before spraying with silver.

Engine valve covers and exhaust stacks are painted black. We rubbed them with powdered graphite to simulate the worn metallic look.

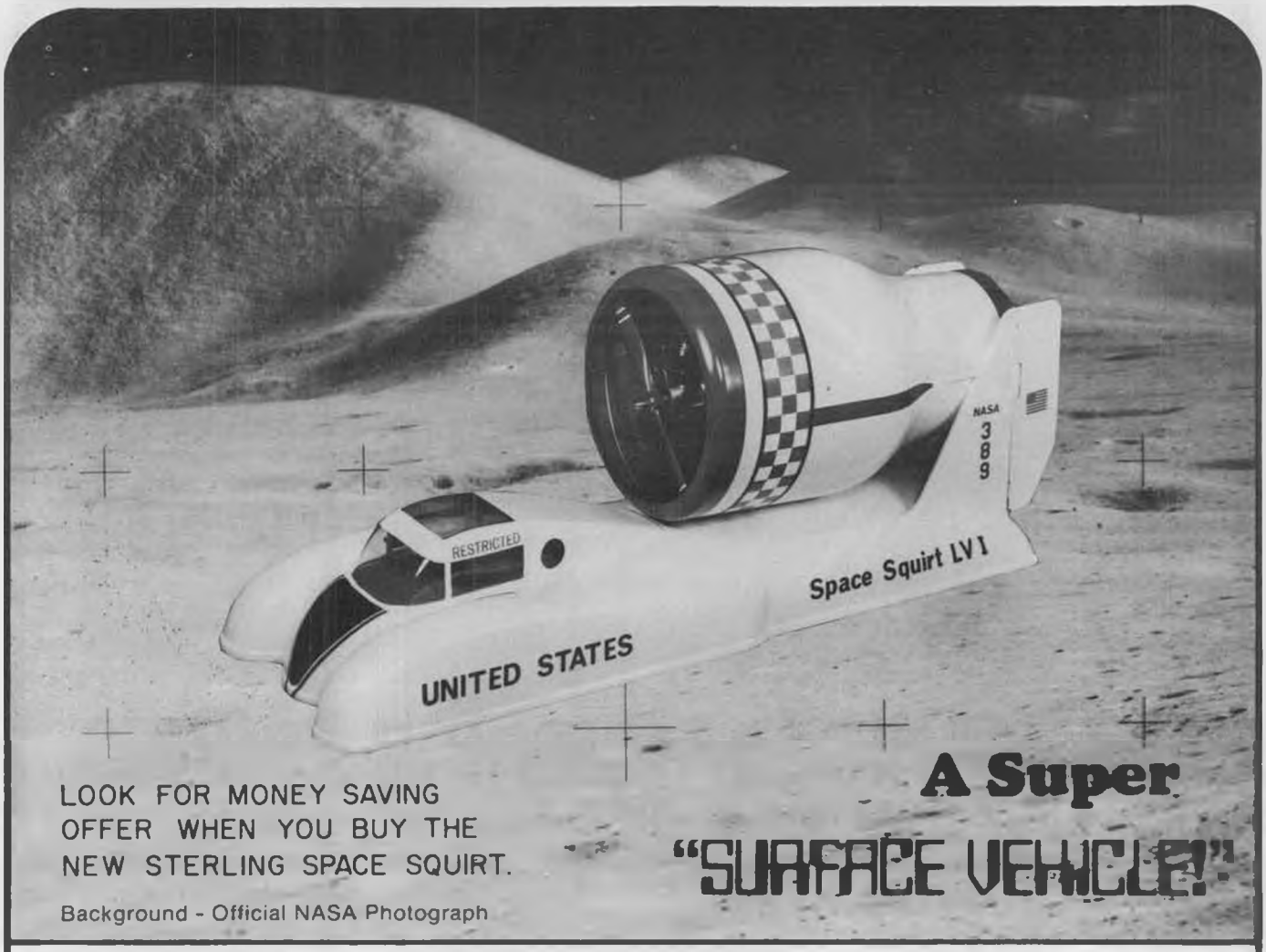
The prop is stained mahogany brown and given two coats of clear dope. Numerals and insignia are cut from colored tissue and doped on. The large numeral five which appears on the fuselage and on top of upper wing and bottom of lower wing is white with black outline. The A 3325 serial number is cut from black tissue. A red band which denotes danger area immediately below prop arc on the main float is 1/8x1 inch red tissue applied across float top.

Assembling a triplane calls for a little more care than putting the wings on a Taylor Cub. The procedure we used seems about as good as any:

Cut and position bamboo cabane struts. These penetrate the balsa filler pieces surrounding the cockpit, and cement to support pieces inside the fuselage. Cut holes in the cabane strut mounts on the underside of the top wing center-section. The bamboo cabanes should slip into these snugly. Eyeball the top wing for alignment and incorporate about 2 degrees incidence before Hot Stuffing the wing in place. Slip center and lower wings in place, with the spar stubs (hopefully) touching where they meet inside the fuselage. The center wing should have about 1 degree incidence, the bottom 0. Position the model upside-down on workbench, cushioning the top wing center-section with soft rags to prevent distortion of dihedral. Now clear everybody out of the room and lock the door. This is the time you will wish you had an auxiliary hand as there are a lot of wings flopping around.

Force interplane (straw) struts through the holes provided in center wing. Index the struts over the short stubs in top and bottom wings. These were described earlier. Check wing gap with dividers to make sure everything is OK. Check wings from top, front, and rear, before applying cement to struts and wing roots. Spar braces should be cemented to spars inside the fuselage. If everything looks good, pick up the model and admire it. Unlock the door.

The fin(s) and stab are installed in a similar manner. Set stab at zero degrees incidence. No provision is made for incidence changes. If this is necessary, install a small trim tab.



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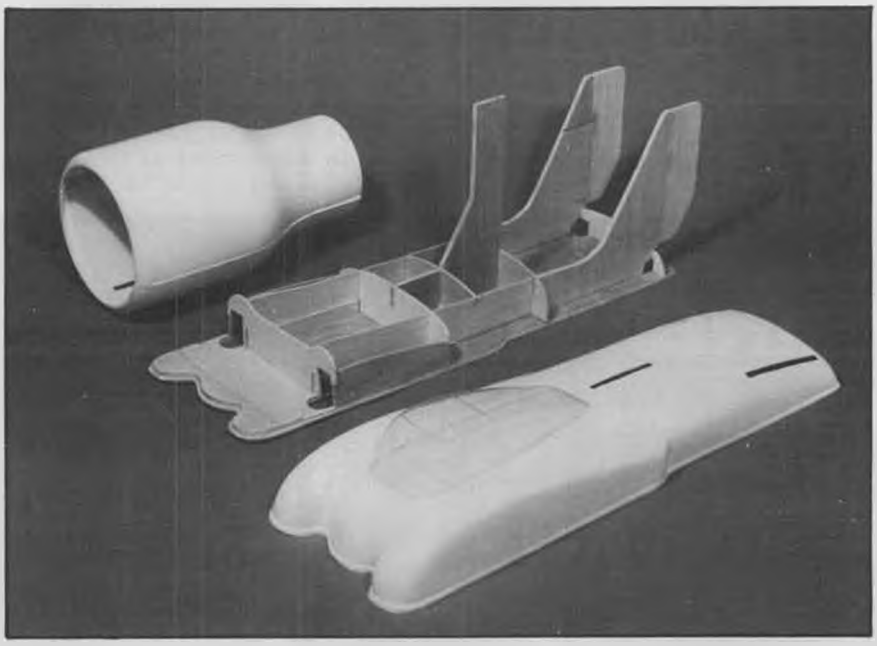

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Flying wires are of 2-pound nylon fishing leader, sprayed silver. These wires, which are not difficult to install, not only add to the character of the plane but also contribute a great deal to the structural integrity of the wings. Simply stitch the wires in place with a fine sewing needle drawn through the hollow straws and wing tissue. Apply Hot Stuff sparingly at intersections.

FLYING

Balance model as shown on plans, approximately at front wing spar. Power model with 8 strands of rubber, 24 inches long. Always lube before flying.

R.O.W. takeoffs need quite a bit of poop to break the water's surface. Eight strands seems to be adequate if flying conditions are ideal, this being a slight breeze and some slight wave action. The idea with a single float model is to get it in the air fast, before a tip float has time to cause excessive water drag and slew the plane around. Some modelers have success in tying a length of thread to the stern of the float, allowing it to trail in the water and somewhat counter the drag forces exerted on the tip float.

Wind about 250 turns for initial test. If a deep grass area is convenient, make hand-launched tests, checking for flight trim. On rise-off-water flights, try letting the wind come about 10 degrees off the starboard (right) side when launching. Slight adjustment of the aluminum water rudder may be needed for water

control.

The Curtiss 18-T-1 is an unusual subject, and provides a challenge to the more experienced builder. •

Shuttle . . . . . *Continued from page 21*

to the flexing of the wings. The 1/4 by 1/8 leading edge strip is put in, then there is the 3-inch top leading edge sheeting and 1-inch top trailing edge with 1/4-inch cap strips. Make sure the root rib is properly angled for dihedral and positioned so that 1/8-inch of the aluminum tube is protruding at the root. This excess is for the 1/8 ply root rib. The bottom of the wing panel is the same, except that both the leading and trailing edge sheeting is 1-inch wide. The 1/8 ply root ribs should be glued in after both panels are finished and the 1/16 sheeting trimmed flush with the ply rib. All that is left now is to build the tips, which are cut on the plans. To join the wings to the fuselage, add the 1/8 dowel index pins and make sure the incidence of both wing panels is the same and that the bottoms of the wings are parallel to the stabilizer.

EMPENNAGE

The stab and rudder are 1/8 sheet, but could be changed to 3/16 sheet. This might be a good idea, especially if you are in the habit of cartwheeling your planes on landing, or folding car seats on long skinny stabs.

FINISHING

The finished product was covered with transparent red and white Super Monokote (or "Moneykote," as my dad calls it). I decided on a simple color scheme, because I was using only two colors and the black trim would be just enough to set it off. I imagine a lot of crazy things could be done with Monokote on this airplane.

FLYING AND TRIMMING

Before we first flew the Shuttle we made sure we had all the rudder throw we could get, because we weren't sure how the wide area of the fuselage would affect the rudder on the first flight. The Shuttle required quite a bit of left rudder trim, which was corrected at home by putting more washout in the left wing. Other than that, the Shuttle flew like a dream. It seemed to fly like it was on rails; just a very groovy airplane. It does beautiful loops, doesn't roll very well, and I couldn't get it to spin at all. However, with a straight wing and ailerons, I bet it would do all kinds of aerobatics. We were right about the amount of rudder it takes to turn this machine, especially when it's slowed down on landings. I haven't tried to thermal the Shuttle, due to a lack of flying sites where I live. But the Shuttle was primarily designed as a thermal ship.

Price of the 78-inch Shuttle is $56.00. The airplane is also available with 100 and 132-inch wings, at $66.00 and $78.00 respectively. These two larger models use the same wings as the Legionair 100 and 132, and most everyone knows how well those models fly. The Shuttle and Legionair sailplanes are produced by Legionair Sailplanes, 3017 Norwood, Arlington, TX 76013. •

Halt-A . . . . . *Continued from page 46*

even clean up those 4-point rolls . . . dunno fer sure.

So look at the picture. The tips are swept front inward about 5° and are 30° off vertical. They look very fast and sexy, which is all they were supposed to do originally. Who knows, they might even work to help spiral stability on a free flight.

BEGINNER'S WORKBENCH

Plastic film coverings: blessing or curse? Well, friends, I've found them to be, by far, my finishing method of choice. I do 99% of my models with plastic films even though I own a complete spray outfit with three sizes of guns.

On the good side, of course, there is the fact that you have a one-step finish. Film covering is very fast compared to any paint finish I've seen. In addition, I find it much easier to get a top-notch finish with film than with paint. It is surely a matter of practice, but there it is anyway.

On the bad side are several factors. First is cost; those film rolls ain't cheap! Second, not all films are appropriate for all covering tasks (more on this later). Third, you can't get entirely away from

paints on an engine powered model if you want it to last for a while. Finally, there is appearance. A plastic film finish is judged by some people to be too shiny. A painted, rubbed and waxed finish has a very special look . . . a gloss rather than shine. It is like the difference between well-used and polished sterling silver and shiny new stainless steel.

All of that aside as background, I like the plastics for my purposes. The quick building, lack of fumes and clean-up, reduced sanding (ugh, physical effort!), and ease of repair (who, me crash?) more than outweigh the disadvantages. For the beginner, much of the same sort of considerations hold true. Learn to fly first, then build that super model later. Time is definitely more than money; you can't usually buy time, and I, for one, never have enough.

How, then, do you do a good, long-lasting job of finishing with plastic films? There is really only one way to learn, and that is to do lots of models. I can, however, offer some hints and tips to improve what you are doing:

- Definitely get a sealing iron specifically designed for plastic film covering. The handle, small shoe, variable temperature, shoe shape, teflon coating, and weight all make your job easier.
- Take your brand new iron and sand the teflon surface very gently with 600 grit wet-or-dry paper. The teflon is sprayed on and tends to have bumps and spikes. Don't be too concerned if a few specks of metal show through when you are finished, the finish will retain adequate non-stick characteristics.
- There are differences in the working characteristics of different brands of films. Some are ideal for covering directly over foam, but won't hold dimensional stability. Others work at too hot a temperature to do foam, but can hold dimension well enough to stabilize an open structure. For example, Super Monokote will stabilize an open structure beautifully, but you would have a terrible time doing an unsheeted foam wing. Econokote, also from Top Flite, works much cooler, but doesn't have the dimensional stability; it is more flexible and creep prone, so you eventually get warps and wrinkles. The two types of film are both good, it is just a matter of selecting the material which is best for your task.
- Don't be afraid to pull hard on the film while heating it. You can go over wing tips, cowls, around surface edges, etc. without wrinkles if you have faith and courage. Pull in some areas, let it shrink in others. Remember that these films can stretch as well as shrink.
- I usually give the nose area of a power model a coat of epoxy before covering, then I epoxy the engine compartment including the film edges again after covering. If you want your model to really last, paint all the edges of your seams with clear epoxy everywhere that fuel or oil might reach.
- All films are paintable, but for reasonable adhesion, use very fine steel wool on the surface first.
- If you want to mate paint and film, as on, say, a fuselage and stabilizer or rudder, paint first, then film cover over it. Use trim tape to hide the seams if the color match isn't perfect.
- When you are using two colors of covering, do the lighter one first. The dark one would show through.
- Cover the bottom surfaces first if possible; your seams will end up on the bottom of the leading and trailing edges that way.
- Try for at least 1/8 to 1/4 inch overlap to avoid bare wood showing up when you heat shrink the film.
- Seal the edges well with firm iron pressure, then keep heat away from the seams while shrinking the film.
- I like to use a thin strip at all fuselage/surface right-angle joints. You need not try to do a perfect match of fuselage and surface films then.
- Go over your model and heat shrink the film twice. You will find that there are residual stresses set up the first time which could cause wrinkles later.
- On a lightweight structure, flat-bottomed airfoil, shrink the bottom surface first, then pin it down to a flat board and shrink the top. You avoid warps this way.
- For extra strength, use a tissue or soft cloth to rub the heated covering into a firm bond with balsa structure. Work your way from one end of the model to

the other. If necessary, you can use a pin to puncture any air bubbles.

- Plan your decoration scheme before you start covering.
- Use a hot-air gun for shrinking, you just can't do as good a job with an iron. Hair dryers don't work for this.

I hope some of the above will prove useful. If you have other hints you use, please share them. We all keep learning together. •

Pylon . . . . . *Continued from page 20*

available for release. See you at the races, Art."

No sooner said than done, Art. An NMPRA membership blank is included in this issue, somewhere in the back of the magazine.

From the Windy City Newsletter, of the Chicagoland Radio Control Modelers, comes the following tidbits of Food for Thought. While it is aimed at the general modeler, I bet that at any given race you can hear at least one of these excuses during the day. Thoughts are courtesy of Bob Berkley.

BRAIN MEAL (FOOD FOR THOUGHT)

Below is listed a number of excuses used by our fellow flying buddies on those occasions when they must take a long walk into the giggle grass, through the forest, or even to the parking lot. Some of these retrievals are for planes still intact with nothing other than a bent nose gear or a jostled wing. But others are simply the transport of garbage from the field to the can. Let's not pass judgment, however, until we have had a chance to check over the list. For the fun of it, put a check mark by those excuses you know took place because the source was reliable or you saw it happen. To make things more interesting, put a double check mark by those excuses you have had to use because it actually happened.

1) The needle valve was set too lean and the engine died.
2) There was too much vibration so the mounting screws came out.
3) The prop nut came off and threw the prop.
4) Vibration caused the muffler to fall off the engine.
5) The engine just quit.
6) I forgot to fuel up.
7) The hinge pin must have fallen out.
8) The wind just picked up the wing tip and it was too late.
9) All of a sudden the wing just folded.
10) I forgot to put on the rest of the rubber bands.
11) The nylon clevis wore out and broke off.
12) I forgot to extend the transmitter antenna all the way.
13) I forgot to put the servo screw back in.
14) I forgot to plug in the aileron servo.
15) The servo just went crazy. It wouldn't center or anything.
16) The battery just failed in the middle of the flight.
17) He said he grabbed the wrong clip, the wrong radio, or just wasn't thinking and turned on, all I know is the plane is in pieces.
18) I got glitched!
19) I must have got too close to his transmitter, he just swamped me.
20) I thought I was right side up!

NEW Q-M KITS

The stagnation in Q-M aircraft design may finally be over. Two recent additions of competitive aircraft kits are now available or will be by the time you read this.

First up is the Midget Mustang being produced as a basic kit by Jim DeYoung, 15958 Parkside, South Holland, Illinois. The kit consists of a polyester glass fuselage, cheek cowl, and belly pan, along with foam wing cores.

Fiberglass quality was about average, except for excessive pin holes in the removable cheek cowl; the foam cores were cut straight and accurately. The fuse and cowl weigh 5.5 ounces, which is an acceptable and obtainable weight while allowing adequate structural strength.

The plans are slightly better than normal with regard to materials used by the designer. No written instructions (i.e., step-by-step) are supplied, as it is assumed that only experienced builders will attempt to construct such a specialized aircraft.

The kit we constructed for this mini-review was set up for a Rossi .15; a High

Point Model Products raked forward landing gear was used. The wing was covered and trimmed with Monokote, and the tail surfaces were covered with 3/4 oz. K&B fiberglass cloth and polyester resin prior to priming with K&B Primer and final painting with DuPont "Imron."

A Super Tigre aluminum motor mount was modified to accept the Rossi engine and proved to be more than adequate and adaptable for the job.

A potpourri of radio equipment selected to conform to my standards of quality resulted in the following choices:
Transmitter: Proline 5-Channel
Receiver: Ace single deck
Servos: Futaba S-20
Airborne batteries: GE 225-mil pack

This airborne flight pack results in a lightweight, smooth operating and dependable system.

Interior fuselage space is sufficient to place the system far enough forward to compensate for a slight tail-heavy condition, should careless building habits prevail. Our completed airplane balanced right on the C.G. with no additional weight having to be added and weighed exactly 2-1/2 pounds less fuel. A 3-oz. tank was fabricated from a common plastic bottle in an effort to par off unnecessary flying weight.

TEST FLYING

No control surface movements were specified on the plans, so going by past experience the review kit was set up as follows: ailerons 1/8 inch up and down; elevators 5/16 inch up and down; and rudder 1/2 inch each side of neutral.

Flying characteristics are very good; the Midget Mustang went exactly where it was guided, control through full speed No. 1 pylon turns produced no bad faults, such as tucking the nose down. The rate of roll was satisfactory and the airplane was stable through all flight modes from full power to dead-stick landings.

The aircraft is currently being used by myself as my back-up ship, solely because I've become so used to flying my primary aircraft, which in itself is unusual as they don't usually last so long. (Just kidding . . . I said that so you "crashers" wouldn't feel bad.) The only disagreeable thing I found with the Midget Mustang was that the removable cheek cowl fit poorly and too closely to the engine. In order to have a smooth flowing fuel line and to eliminate the possibility of collapsing the fuel line between the cowl and a hot engine, I left the cowling off.

The second kit to report on this month is like the proverbial promise. Recently announced for sale by D&L Model Products, 1141 Columbus Ave., Lemoyne, PA 17043, they have experienced some production problems which has resulted in a backlog of orders. The manufacturers just recently assured this writer that the problems have been overcome and that the kits will be available shortly, if not already by the time you read this, assuming that you *are* reading this.

What's the kit? Why, the old favorite updated to today's current state of the art: RIVETS!

Right about now you're thinking of all the tales you've heard about this airplane snap-rolling and falling out of the sky when being pulled hard around the pylons. DON'T ALLOW YOURSELF TO BELIEVE THOSE OLD PILOTWIVES' TALES. They just aren't true; in fact, if you'll talk with a knowledgeable aerodynamics expert, he'll tell you that the Rivets wing planform is one of the most efficient for racing purposes.

Besides, try telling some of those Air Force pilots that their aircraft aren't safe because the wings are swept back. Enough conjecture. I've seen the aircraft race in the hands of Gail Jacobson and Dave Latsha and can attest to its competitiveness and smooth flying characteristics. The plane in the hands of these two pilots has already racked up a number of impressive placings and set some very fast times.

Our order is in for one, and as soon as we get it and have it flying you'll get a first-hand report on it.

* * *

P.S. I just received the following contest announcement through Walt Schroder (sent to him by Lars Giertz), and it sure looks interesting; enough so that it might even be worth taking up Q-500.

With 1000 bucks up front, they're sure to reach the maximum number of entries rapidly, so if you want to compete you'd better get yours in.

Just one note to Lars: get your biggest, strongest, smartest worker for the C.D.'s and/or Starters job, then back him to the fullest! Money tends to bring out some of the worst characteristics of anybody. "Dear Walt,

I wanted you to be the first to get the information on the upcoming National Q-500 Pylon Racing Championships. The event is hosted by the Manned Space Center Radio Control Club at NASA here in Houston, and organized by the Houston Area Pylon Racing Association. The date will be November 3 and 4 this year.

"Since the AMA in its great wisdom refuses for one reason or another to

recognize Q-500 as an official class in spite of its widespread popularity, and since the class therefore is not flown at the regular AMA Nats, we decided to take the bull by the horn and stage the Q-500 Nats ourselves.

"We already have acquired $1000 in cash for prizes, and the merchandise commitments are coming in with amazing generosity. K&B is sending engines, George Aldrich is furnishing fuel, etc.

"I am enclosing a set of aircraft rules. These are the same rules that we race under here in the Southwest, and they have proven to be very workable and easily enforced. Of course, there are slightly different rules being flown in other parts of the country, so we need to publicize the official Q-500 Nats rules as quickly as possible to allow all competitors to optimize his set-up.

"We are scheduling two days of competition with a list of 80 entries on a first-enter, first-served basis.

"Currently, the popular engines for Q-500 are the K&B .40 (No. 8011), COMO .40, and HB .40 PDP, all pretty much evenly matched when properly handled. The top pilots around here are capable of turning the course (2-mile Q-M) in the low 1:30's.

"Anyone interested in the event can write for a complete info packet from HAPRA, 6400 Westpark, Suite 490, Houston, TX 77057, or call me at (713) 781-9676 or (713) 723-6463. Best personal regards, Lars Giertz."

HOUSTON MINIATURE PYLON RACING ASSOCIATION
1979 Q-500 PYLON RACING
AIRPLANE RULES
GENERAL:

The airplane must be of common configuration, i.e. with a forward wing and aft empennage. Engine and engine mount must be fully exposed.

WING

Minimum area 500 sq. in. Minimum span 50 in. Minimum thickness 1.2 in. The outer one inch of wing may be tapered. The wing must have constant chord, no sweep or taper. Wingspan measured from tip to tip along the bottom of wing.

STAB

Minimum thickness 3/16 in.

FUSELAGE

Measurements in front of wing: min. height 3 in., min. width 2-3/4 in. Optional canopy not included in above measurements. No wing fillets. All cross sections must be square or rectangular and corners may be radiused no more than 1/4 in.

LANDING GEAR

Main gear must be fixed and have two fully-exposed wheels of min. 2-1/4 in. diameter, spaced at least 4 in. apart laterally.

ENGINES

Any stock, non-ABC, non-Schneurle, front intake, side exhaust R/C engine up to 6.6cc manufactured in numbers exceeding 500. Only modifications allowed: removal of exhaust baffles, removal of factory installed shims between head and sleeve. Prop shafts must have spinner or safety nut. Local field rules may require mufflers.

WEIGHT

Minimum 3-1/2 lbs. at landing.

FUEL SYSTEM

The fuel tank must be transparent and may contain no baffles or sponge material. Crankcase or muffler pressurization of the tank vent is allowed. Devices that modify the fuel flow between tank and carburetor are prohibited. The fuselage must have a readily removable hatch that allows easy inspection of the fuel system.

PROPS

Any commercial, readily available, two-bladed wood prop. Material may be removed from one blade only.

FUEL

15% nitro, furnished by organizers.

COURSE AND RACE PROCEDURE

As specified by organizers. •

Fuel Lines . . . . *Continued from page 19*

use someone else's property are infinitely greater if you show them your relatively small models.

OK, now that I have you just about convinced that a modest size model is very practical, let's talk a bit about some engines and fuel, etc. If you've been reading this column for any length of time, you know I have a high regard for the Cox T.D. .049 and .051. They're great engines, and the $24.95 price is quite reasonable by today's standards. If you

want a little more displacement and power, try a T.D. .09 at $26.95. How about throttled engines in these displacements? They are available from custom tuners, but if you don't want to go that route, you can use a Medallion .049 R/C at $18.95, or a Medallion .09 R/C for $22.95. They have a little less power, but they are certainly adequate.

Further, by the time you read this, a new Cox engine should be available. It's called the .049 R/C Bee. According to Cox, it is "A completely new engine designed for the requirements of R/C flying, featuring a smooth proportional throttle with a quiet factory installed muffler, plus a new larger capacity tank incorporating a weighted fuel pick-up for extended inverted flight. The R/C Bee features rear rotor induction for higher power than our popular reed valve engines, and provides other important features. The engine can't run backwards, is not sensitive to contamination from dirty flying sites, and is easier to start and adjust." The retail price will be $19.95.

At this point, you may still be a little reluctant. It's probably a visceral feeling that you'd like something a little more substantial with an honest-to-goodness throttled carburetor rather than an exhaust baffle. Want no longer. As this is being written (July), there are two superb small engines on the market: the O.S. Max .10 FSR R/C, $38, and the just-released Super Tigre X-11 R/C, $37.95. Both engines come equipped with mufflers, and both feature Schneurle porting. In future columns, we'll give you a more detailed review of these two as well as the R/C Bee. For the present, suffice it to say that they are well designed and manufactured. Their performance will amaze you, and the price is reasonable. How about operating costs? Well, how does six to eight hours of engine operation per gallon sound? Not bad at all.

I may or may not have convinced you to give small displacement modeling a try, but you can't deny that I made a good case for helping to keep the Society for Prevention of Cruelty to Animals away from your doorstep for starving a Great Dane. One parting thought. With the unavailability of Rossi .15's and the demise of the Cox Conquest .15, do you think somebody might get the idea of putting an O.S. .10 or X-11 in an existing quarter midget? •

Soaring . . . . . *Continued from page 31*

Here's a 'natural' design for a large soaring machine. We have hard rock hills here and soft models don't last long, so we use hardwood and plywood on the big models (we also build some 1/4-scale stuff and I have a couple of half-scale items in the framework stage now).

It might be possible to build the Cavalier from foam-and-balsa sheet or molded something-or-other for even lighter weight. (I'm experimenting with hand-molded paper mache' rubber band models now.)

"Plans are available for the basic model (at $3 a copy) from me at 3724 John L. Ave., Kingman, AZ 86401, although I haven't drawn up a conversion sheet yet . . . but could do so if requested. In fact, there are a number of old gas models that would convert into gliders very nicely . . . and they have plenty of designed-in strength . . . like the Skylark, Soaring Eagle, and so forth." Gordon then went on to describe other items of more specialized interest. He notes that he invented a "split tee" tail design back in 1952-53 while stationed in England. Interesting!

In the past, those concerned with R/C scale have continued to seek greater and greater fidelity . . . all the way down to pointers on the instrument panel and a miniature pilot staring blindly at those instruments. All that's *static* fidelity . . . a detailed simulation of the appearance of the full-scale counterpart. But what about the fidelity of *dynamic* simulation? Does the model adequately simulate the full-scale airborne performance? How do the cruise speeds compare in terms of number of fuselage lengths traversed per second? The full-scale Libelle cruises at about 60 knots; that is, about 5 lengths per second. How fast does your 1/5-scale Libelle fly in lengths per second?

And what about flight efficiency? The full-scale Libelle can exhibit a lift-to-drag ratio of almost 40:1. How close can your model come to such high quality performance? What about the dynamic stability and general handling quality of the aircraft? The HP-18 was primarily designed to win contests. Ease of handling was a secondary consideration. How easy is it to control your R/C scale model of that plane? Can we develop meaningful measures of handling quality in terms of spiral stability, phugoid amplitude, dutch roll tendency, and other characteristics?

Are we ready to recognize that R/C scale models are indeed *simulators* of their full-scale counterparts? Can we introduce scoring that reflects the significant aspects of dynamic performance in addition to the static appearance of these superb simulations?

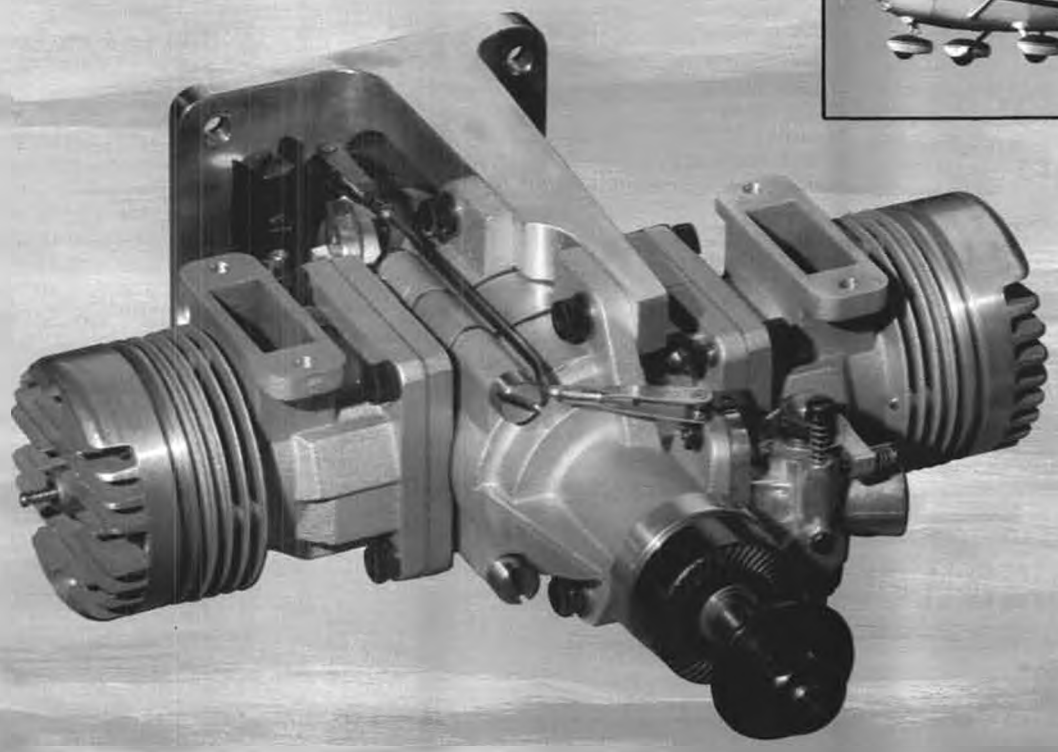
And if you're really competitive, you'll certainly want to read *Air Facts and Feats,* one of the Guinness family of books published by Bantam Books, New York, 1979 ($6.95). Here are *all* the records over *all* the years . . . from conventional to curious. Who knows, you might come up with a way to "do your own thing" and get into the next edition.

See you next month. •

Power Boats . . *Continued from page 49*

his Gator 40 and Wing Ding 60 to take these respective classes. Second place in both classes belonged to Randy Seiser's 40 and 60 Gators. Both Ron and Randy used K&B 7.5's in the .40 hydroplane class and OPS .65's in the .60 hydro class.

THE ULTIMATE IN RC FLYING
FOX 20CC OPPOSED TWIN



The Fox Twin is the finest two cylinder model airplane motor ever produced. Every design consideration and manufacturing care has been taken to make the Fox Twin a really practical power plant.

The two cylinder opposed simultaneous firing configuration was selected because equal and opposite piston motions cancel each other out vibration wise and produces a smoother running configuration than the alternate firing in line motor. In addition, the opposed cylinder configuration cools better and fits most scale models better.

The cylinder configuration is of the most modern and advanced schneurle porting, featuring Fox exclusive angle side flow bypasses. The cylinder is glass hard and the pistons are made of the hardest piston alloy available. The crankshaft is of hardened steel, and extremely massive compared to any other motor you have seen. The massive crankshaft construction was necessary because the terrific power of earlier experimental cranks twisted in two for conventionally proportioned shafts. The dual carburetion makes possible adjusting each cylinder for maximum power, a failing of most earlier twins, where a single carburetor would result in one cylinder running rich and the other lean. Although the Fox Twin can turn a 17, 18 or 19 inch propeller faster than most chain saw engines of equal displacement, its true potential is achieved by letting it rev up. The result is the ability to fly your airplane in a realistic manner, using a scale type propeller, but if you are performance minded, then put on a smaller propeller and really move out. We recommend a 15-6 for average models.

Each Fox Twin is factory run at full power, assuring you that when you buy this and put it in your model, you can fly. The carburetor has been adjusted and synchronized for atmospheric conditions at the factory. Unless you are at a rather high altitude, no further adjustments should be necessary.

TWIN Fox Twin $250.00

SPECIFICATIONS:

Bore ..... .907
Stroke ..... .937
H.P. (at 14,000 RPM) ..... 3 plus
Weight ..... 2# 8oz.
Standard accessories: Firewall type motor mount, carburetor interlink, fuel line "Y" fitting.

FOX
MANUFACTURING CO.
5305 TOWSON AVE. FORT SMITH, ARK. 72901
PHONE 501-646-1656

For More Information - Call: 1-501-646-1656.

Third place in the .40 class went to Gary Jensen, and Bill Smiley took third in the .60 class. Although not eligible for district points, Frank Ward and Bill Hornell ran their X hydros against the .60 hydros. Bill was successful in lowering the NAMBA Scale Hydro record to 1:23.3 with his twin K&B 7.5 Thriftway Too. Frank's original hydroplane used a Rossi .60 and made several runs around the five-lap course at 1:25. This was Frank's first race in the large hydroplane class in four years. It looks like the fellow who developed the Drag N' Fli hydroplanes and Wardcraft Vee has another winner in his outrigger/canard design.

The District 8 standings with only one race remaining are as follows:

A MONO
1) Ron Erickson *1819
2) Dave Austin 1419
3) Dave Blacksten 1054
4) Dunlap & Son R/T 1025
5) Don Nauditt 825
*Clinched at least a tie for District High Points.

B MONO
1) Bill Hornell 1600
2) Ron Erickson 1556
3) David Jensen 1463
4) Vic Roberts 1140
5) Doug Smith 958

B DEEP VEE
1) Ron Erickson 1950
2) Bill Hornell 1900
3) Vic Roberts 1269
4) Doug Smith 884
5) Jerry Dunlap 761

A HYDRO
1) John Moss *2300
2) Jerry Dunlap 944
2) Jack Peters 944
3) Randy Seiser 922
4) Doug Smith 821
5) Bob Hartsock 619
*Clinched District High Points in class.

B HYDRO
1) Ron Erickson *1750
2) Randy Seiser 1350
3) Doug Smith 873
4) Stan Hoagland 807
5) Vic Drew 776
*Clinched at least a tie for District High Points.

C HYDRO
1) Ron Erickson 1792
2) Randy Seiser 1700
3) Don Nauditt 900
4) Bob Hartsock 554
5) Bill Smiley 450

A OUTBOARD TUNNEL
1) Dennis Caines **2194
2) Mike Wight *1516
3) Leo Dreith 1054
4) Larry Knudson 869
5) Bill Amick 691
**Clinched District High Points.
*Clinched 2nd in the class.

YOUR BOATING EDITOR HAS A CHANGE OF ADDRESS

The Dunlap family made a change of residence in August. The new address is 119 Crestwood Dr. SW, Tacoma, WA 98498. This boating section continues to reflect pretty much the activities of model boaters in the Northwest because no one has taken the time to send in results, photos, or comments. To encourage readers to send me information, I'm able to offer a limited number of one-year free subscriptions to **R/C Model Builder** to individuals providing photos and write-ups that can be used in this column. People enjoy seeing their photos and names in model publications. So make yourself a hero among your local boating friends and send in some photos and race results. I'll also be glad to answer questions and would enjoy hearing comments about material presented in this column. Let me hear from you. •

Hannan . . . . . *Continued from page 54*

timers," I predict a stubborn resistance to change. Personal hang-ups aside, this book is highly recommended to anyone interested in internal combustion engines. Atheneum of New York is the publisher.

COLONEL THACKER SEZ:

"I don't like to repair a model . . . I just like to build it, taxi it out, fly it, land it, and be told how wonderful I am!"

SATURDAY NIGHT FLIER

Pat Curtiss favored us with a clipping from the *New York Times*, which indicates what the Russian press thinks of our hobby. Seems Yuri Borovoi of the *Literaturna Gazeta* had this to say in his review about American film star John Travolta, declaring him to be washed-up as an actor: "Only one joy is left to him . . . the childish habit of gluing together brightly colored model airplanes."

TALL IN THE COCKPIT

Orange County Airport (near Los Angeles) has been renamed John Wayne Airport, in honor of the late actor. Wayne had played a number of aviator roles during the course of his career, perhaps the best remembered of which was in "The High and the Mighty." Ironically, he reportedly had once signed a petition opposing the noise at the airport which now bears his name.

ANOTHER NEW AVIATION MUSEUM

We are always pleased to see fresh interest in the preservation of aero history. Mik Mikkelson brought to our attention the recent opening of the Donald Douglas Museum and Library, located at Santa Monica Airport in

Southern California. A non-profit corporation, the museum is devoted to all phases of aeronautics and space but concentrates at present on subjects relevant to Douglas Aircraft Company. Manned by volunteers, the current hours vary somewhat, so it might be best to phone before planning a visit. More volunteers are needed, both to serve as museum hosts and to assist in the restoration of aircraft models. Could be fun as well as useful!

SCIENTIFIC AMERICAN

The July 1979 issue of this magazine is a must for anyone interested in Wright brothers aircraft. Although there are a few questionable statements in the text, the discussion is well presented and gives an unusually clear understanding of the development of the Wright gliders which preceded the more famous powered "Flyer." The illustrations are exceptionally well executed and clarify the functioning of the control systems of these pioneer aircraft. Our thanks to Byron Whartnaby for bringing this magazine to our attention.

ESCAPE CLAUSE

Howard Johnson's restaurant offered a cardboard punch-out "Solar Explorer" model bearing this unusual bit of information on one corner of the card: "The Solar Explorer can fly only in outer space. If flown on earth it usually crashes. All litter and parts used in construction of this craft should be carefully disposed of." Sounds familiar, doesn't it?

JEWELS ON DISPLAY

Renowned Cartiers of New York, on the occasion of introducing a new sport wristwatch, sponsored an exhibition of vintage aircraft from the Cole Palen collection. Ed Whitten and Bill Warner both sent us copies of the program, which was quite a tidy presentation in its own right, featuring photographs and 3-view drawings! The display was held in an armory, and Whitten had this description to offer: "Exhibition was great! But a frustration, as your eyes couldn't do justice to all the planes in an hour or so! A few had modern engines, and a couple had very small props. Made me think of gas powered scale jobs . . . overpowered with dinky (non-scale) props buzzing. The Spad, Albatross, and some others were original with original engines."

HOW'S THAT AGAIN?

From a 1963 issue of *The Aeroplane and Commercial Aviation News*, this abstract purportedly from the DC-3 passenger manual: "Don't be alarmed if the weather is bad or if you hear strange noises or if the engines quit. In the entire history of aviation there is not a single reported case of any aircraft ever failing to return to earth."

FROM THE HORSE'S MOUTH?

Maj. Gen. John L. Hines, Chief of Staff, U.S. Army, quoted in 1925: "In my opinion, the airplane is never going to take the place of the cavalry. The cavalry will always have to supplement the airplane with its reconnaissance."

WORDS TO LIVE BY

Frank Zaic reflecting on the passing of Russ Barrera: "I guess when all is said and done, when the last moment comes, it is not the review of the life's past that we go through, but a judgment on ourselves. Did we deserve to live? I went through this once when we were going through the Strait of Gibraltar in an 8-knot convoy during 1944. We were being bombed. The Liberty ship (carried 3/8 shells) bunks were elbow high. No place to stand or be in a position to move fast. So, I did not take advantage of the Catholic last minute prayer, but simply told myself that I had lived the way I thought best. And somehow, just being honest with myself, I felt I gained a notch upstairs. As you can see, the bombs missed us."

FOR THE BIRDS

From *Aeronautics*, 1893, by Octave Chanute, this abstract: "The mechanical difficulties in obtaining safe support from so intangible a fluid as air are, however, so great that man would long ago have given up the attempt if it had not been for the birds. It is a mistake to suppose that the problem of aviation is a single problem. In point of fact, it involves many problems, each to be separately solved, and these solutions then to be combined. These problems pertain to the motor, to the propelling instrument, to the form, extent, texture, and construction of the sustaining surfaces, to the maintenance of the equipoise, to the methods of getting underway, of steering the apparatus in the air, and of alighting safely."

Eighty-six years later the problems remain exactly the same.

SIGN-OFFS

It is surprising how many letters we receive here at the hangar with sign-offs other than the usual "Sincerely yours." Perhaps the most popular among model builders has been the simple yet inspired wish: "Thermals." A new one to us appeared on a note from San Diego Aerospace Museum curator Ed Leiser: "Mirth is King." Think about it. •

C/L . . . . . *Continued from page 63*

being first. What separates the "also rans" from a winner is persistence *and* determination. *Every Olympic Champion has it.*

Therefore, if a modeler persists long enough and has the determination to win, then he is not an expert, but instead a damn good modeler.

Definition of an "expert": "ex" means a has-been, such as ex-president or ex-champ. "Pert" means a drip . . . therefore, an expert is somebody who is no longer a drip.

I will admit to having others occasionally refer to me as an expert (the last time being about three years ago), but never having claimed to be one, I guess I won't take offense . . or thank him, whichever action would be appropriate for defining an expert. Drip, indeed. . .

CL-RPM RACING NEWS

One of the most enjoyable of the newsletters to monthly cross this desk is the Racing News. Edited by Sherry and

Greg Holland, also known as Toodles and Chop, it comes across as being done by people who have a deep interest in C/L Racing and the promotion of same.

Naturally. You would expect that from people dedicated enough to take on the job of doing a newsletter. But the great thing is that they obviously don't take either themselves or racing too seriously. Hope that reads right . . . maybe it doesn't, however. Try this. It is possible to be heavily involved in something, right up to the point of winning at any cost, but there is a fine line that can be used as an indicator that the fun quotient is going down some in relation to the effort expended. Some people seem to be able to stay on this line, or just to the fun side of it (as opposed to the work side) and are able to recognize when they have crossed over. Toodles and Chop know which side of the line they want to be on and they seem to stay there, as witnessed by the following, which appeared in the July/August issue of *Racing News:*

BUSTED!!

On the evening of June 6, 1979, those notorious scroundels, the Levittown Flying Bucks (Chop's one of 'em!) were scooped up in the largest raid ever by the Middletown Township police! The cops confiscated 1,000 pounds of evidence to assure themselves of reaching their ticket quotas for the year!

Unfortunately, we were the evidence (there were six of us, including the famous "Tons of Fun" Racing Team)!!! Our crime? Criminal flying of model aircraft in an abandoned store parking lot!!!!

Everyone and their uncle has been using this place since the store closed five years ago! The three "officers of the peace" cheerfully issued us citations for committing the abovementioned crime. In the spirit of fair play, they also nailed the youngster learning to drive and those who were banging a tennis ball against the wall of the building!

Our club president took all of the tickets and went to see the Justice of the Peace, who promptly informed him that

the worst thing that could possibly happen would be a $300 fine each! *That made us feel a whole lot better!!*

Anyway, to make a short story long, justice prevailed and the best deal we could get was three guilty at $5 each and three not guilty, plus $26 court costs. EACH!! Think about it next time you go out to fly!!

With that, I am afraid we will have to close this month's C/L column. Yes, I know I said there would be a deal on Bob Whitely's model, but it is too long to fit in this month. Bob, why don't you just consider yourself as having been put on hold for a month or so?? •

Peanut . . . . . *Continued from page 59*

with separate strips of tissue between the stringers. Either dope or thinned white glue can be used. In any case, use a syringe or a glue gun to apply the adhesive. It's twice as fast as a brush and a lot neater. Use steam again to shrink the fuselage tissue. If there are still loose spots, they can more often than not be eliminated with a little water.

On my model I used dark green tissue on top and white on the bottom, as an approximation of the British WW-II camouflage scheme. If you own an airbrush, you can improve on this. For making the panel lines, rivets, and control surface outlines, a technical pen is hard to beat. If you decide to use a fine permanent marker instead, put it on last, since dope will dissolve the dye.

Because the MB-5 is a rather large and bulky Peanut, it is best suited for outdoor flying. The big Tern Aero or Testor's 6-inch prop is very effective on this model and will handle lots of rubber for good flight times. Before flying, check that the CG is about 1/8 inch behind the front spar.

The flight pattern on my model is rather unusual but effective. The ship turns to the left in a wide arc under the power burst and then turns right for the remainder of the flight. For power I use a 22-inch loop of 1/4-inch Sig rubber. This gives flight times of about a minute. Since the model is light for its size (about 12 grams), the flight performance is not unusual. Pirelli should boost the times still further. Have fun. •

1 to 1 . . . . . *Continued from page 15*

you couldn't be all three.)

For the uninitiated, the "St. Louis Robin" created history fifty years ago over the city of St. Louis. Curtis Robin NR59H began an endurance flight on July 13, 1929 and continued until July 30, 1929. It spent 17-1/2 days aloft for a record 420 hours. The test was begun for a newly developed 170 hp Curtiss Challenger 6-cylinder radial engine and wound up being quite an event. The pilots, Forrest O'Brine and Dale Jackson, flew the aircraft some 25,500 miles, consumed 3590 gallons of gas, and went through 48 air-to-air refuelings. The fliers earned $31,255 for their effort.

It was fun to stand on the apron of a small local airport and talk with Mr. Joe Erale, who with his son, lovingly rebuilt NR59H over a period of 10 years. His tales relate much the same kind of problems modelers encounter in the "restoration" of a project. The task was beautifully done and at no small expense. Mr. Erale related that tires which used to sell for $80 each now are more like $200 each. (It *does* sound like R/C, doesn't it!) The aircraft was located virtually in a junk pile on Long Island, New York. Fifty years after its famous trip, it returned to St. Louis to say hi! Pictures will follow.

LOOKING FOR SUBJECTS

If you're presently looking for a project for this winter, why not try one

of those from the pictures included this month. The stable of three in the one shot are those of the late Harold Krier. The famous Chipmunk in the foreground is shown after its last changes with a larger engine and three-bladed prop. The Great Lakes and clipped-wing Cub are also shown. These aircraft, I assume, have made their way to the museum being set up in southwestern Kansas in Harold's name.

The other aircraft would appear to be what is popularly referred to as a challenge. The Stits Sky Baby rests in the EAA Museum at Hales Corners, Wisconsin. The photo shows no size reference close by, but be assured it is small. As I recall, you could probably make it 1/4-scale and have less than a two-foot span! Come to think of it, you'd probably be better off making it 1:1 in the first place.

Have you got a scale project you think is unique? Let's hear about it. Along with this, it would appear that the Nats will see a ducted fan control line Mig 15. While it's not R/C, the builder, Dan Abel, a young man with a desire, has used a Scozzi fan and a K&B 7.5 with a pipe. Dan's dad, Dave, loves different types of aircraft as well. Several years ago, he flew an R/C model shaped like a Liberty Bell in the Nats pattern event. Dave has fostered many other scale and scale-type aircraft that came out of his exposure at his place of employment, McDonnell-Douglas.

Last evening, just four days before the Nats, the Abel family and a cheering section from the Underwoods witnessed the flight of the 12-lb. Mig 15 at Buder Park. The thrilling part of the event beyond the actual flying was watching Dan as his baby slowly gained speed and flew at his father's guidance for five or so laps, and then to take the handle himself and blast it skyward for his own "first." That's what it's all about, friends.

Next month the Nats! •

F/F Scale . . . . *Continued from page 57*

amazed at the number of planes that appeared from seemingly nowhere. Landing at Oshkosh behind a serpentine line of aircraft was quite a thrill. The controller was expounding directions like you wouldn't believe to 30 or 40 aircraft, keeping them spaced both vertically and horizontally. Oshkosh, by gosh, was finally realized! After checking in, we found our buddies from Flabob and had a most enjoyable evening talking about aeroplaning.

It wasn't until we were at the field the next day that we truly realized we were at Mecca, as we walked the many hundreds of acres of beautiful aircraft. Airshows were scheduled every afternoon and they were most spectacular, and were varied enough each day that you did not get tired of seeing them.

The area of most interest to me was the antiques. These are the type of aircraft that lend themselves more to modeling than some of the modern types. There are so many beautiful antique aircraft there in competition that I do not see how the judges can choose the best one out of the lot. I took several black-and-white photos of aircraft that I thought some of you may consider building. One in particular was a DeHavilland Puss Moth. To my surprise, this airplane is much smaller than I had expected. The cabin is not much larger than a J-3 Cub. The cabin Wacos and Staggerwing Beechcrafts are so plush that it would be most enjoyable flying cross-country in these magnificent airplanes.

We spent four most enjoyable days at Oshkosh before we departed for the long trip home. There is so much to see that it would really take the whole week in order to see everything. Not only that, new aircraft keep arriving throughout the week. One such example was a most outstanding Travel Air Mystery Ship. This machine was absolutely flawless, and get this: it even had an automatic pilot! Another incredible machine to arrive later on, the only example of its kind, was a trimotor low-wing Stinson. I can't remember the number, but there are no words to describe it! We found out later that a replica Bristol "Brisfit" fighter had also arrived later on in the week. Hard telling what other gems we missed seeing. Next time I'll plan to spend the whole eight days!

Each day the warbirds put on a magnificent show. It is downright thrilling to hear all of those sounds produced by the radials, Rolls, and Allisons. You have to

be there to know exactly what I mean. Along with all of the airplanes, there are exhibitions of all kinds, flea markets, and symposiums on every subject relative to airplanes. Maybe a week isn't enough to see everything!

Typically, on the day of our departure, the weather was stinko. All indications were that to the west everything was clear, but you sure couldn't prove that at Oshkosh. We finally left about four hours beyond our desired takeoff time. We flew home a different way, heading for Lincoln, Nebraska, where the Nationals were being held. We had figured on getting there early in the evening and spending the night with some of our modeler friends. We arrived at Lincoln Municipal about 5:30 p.m. We were loaned a car to get to the other side of the field where there is an ex-military airbase. Jack and I were both disappointed at what we saw once we were there. We were told that all of the F/F activities were 40 miles out of town and that many of the modelers competing were staying in motels near the flying site. With this bit of information we decided to cancel our plans to spend the night in Lincoln, so we pushed on with another couple of hours of sunlight left.

The rest of the trip home was fortunately uneventful. We flew into eleven states and were greeted warmly whenever we landed to fuel or spend the night. The trip was an experience from the standpoint of navigation, which Jack did with great aplomb, and of learning the weather. The weather in California is quite predictable, and I'm sure you Midwesterners would agree that that is definitely not the case back there. I now know what a genuine thunderstorm is and what visibility unlimited is as well. It is certainly great to be able to see as far as the eye can see over the horizon.

So, in closing, I hope you don't mind that I didn't talk model airplanes this month, but if you love airplanes like I do, I don't think you'll mind too much in me sharing this most memorable trip with you. If you can ever make this sojourn yourself, please do it. Especially those of you who are not that far from it. In spite of the fact that there are many thousands of people in attendance, there is more than enough space to move around, so that the crowds become incidental. Believe it or not, in spite of all these people, there was no trash to be found among all of those acres of ground. These are a fantastic group of wonderful people.

I'm looking for a Bellanca Crusair to restore so I can go back and compete in the Classic division. If any of you out there know of any such bird, I would appreciate knowing about it. Next month . . . back to modeling! •

Pitts . . . . . *Continued from page 23*

factory supplied optional epoxy resin/fiberglass cloth covering. I didn't have the Econokote experience to do a complex color scheme, and I was also concerned about the hangar rash problems on the foam. The surface produced with the fiberglass is very durable, but it does cost an extra 2-1/2 pounds or so. The extra weight isn't as bad as it may seem because of the 1400 sq. in. of wing area. The glass covering went on very easily. Simply coat the surface with a minimum amount of resin, roll on the glass cloth, and then squeegee the excess resin off the surface. Do be careful not to run the factory supplied squeegee with an excess of pressure, since you will form ridges in the foam. After the glass was laid in place and was completely cured (resin takes about 24 hours), three coats of K&B primer were brushed on and then sanded. A super finish is the result. One would never know that the basic structure was foam plastic. Looks like a solid fiberglass airplane. Total weight was 16-1/2 lbs. By the way, the paint scheme was obtained from the book, *Aerobatic Airplanes*, published by Repla-Tech. Several interesting Pitts paint jobs are offered in the publication.

The only fault I could find on my Pitts kit was the fitting of the bottom wing to the fuselage. I had to remove over 1/8 inch of foam from the fuselage to get a proper fit. The actual removal is quite easy, but I was concerned about removing too much. Checking the correct wing incidence was obviously in order, but the instructions don't state the actual amounts. I called the factory and was informed that the correct amount with the thrust line level is 3 degrees in the top and bottom wings and 1-1/2 degrees positive (l.e. up) in the stab. I

used a Robart incidence meter to check the angles. As it turned out, the incidence settings were right on the money. I also found that the pre-cut interplane wing struts fit perfectly. As noted in the instructions, the belly pan under the wing has to be fitted. This is quite easy to do, since the foam sands so well.

The installation of the radio is no big deal. There's lots of room. I used Kraft KPS-15H servos with my Signature radio system. Regular servos would probably work, but the heavy-duty servos sure can't do any harm. Don't forget to use an extra large (Kraft KB-4F) battery pack with the heavy-duty servos.

A Hirtenberger HP 61R Gold Cup engine with a Perry Pump Carb powered the Pitts. The Perry Pump carb was used instead of the HP Automix carb to provide additional power because of the larger diameter bore in the Perry. A Robart Pump and a Robart Auto Mix is required to operate the Pump Carb. I had trouble with the idle on the carb until the Auto Mix was installed, then the idle was fine. A Semco adjustable boat silencer was used because it was the only silencer I could find that would fit inside the cowl.

The HP as supplied with the mentioned equipment turned the Zinger 20x8 at 6,000 rpm. It appears that the silencer is reducing the rpm significantly; the installation of a tuned pipe is required for the more advanced aerobatics typical of a Pitts. I would recommend that the aircraft not be flown unless 5,700 rpm is obtained prior to takeoff. Another 200-300 rpm at the prop is a major power change. Probably 6,500 rpm is ideal and is easily within the capability of the HP 61R equipped with a tuned pipe.

On the first flight, with the engine running slightly rich and a prop rpm of 5,850, the takeoff was quick with a good rate of climb. Additional down trim was required (even with the 1-1/2° positive in the stab). Loops, rolls, positive snaps, and inverted flight was performed along with an uneventful landing. Flight characteristics are very docile and quite suitable for the beginner flier. The only place one could get in trouble is with dead-stick landings. The Pitts glides like a rock, and having some power on during the approach certainly is helpful. The roll rate can be adjusted to almost any rate you want; it's just a matter of aileron throw. The aerobatic potential is unlimited. Obviously, the aircraft can use more power. (I don't think there is a Pitts design that *couldn't* use more power! That's just the nature of the design.) Next step is to put one of the HP 120 twins on the Byro Drive. Doubling the horsepower should be quite interesting.

At $189.95 for the kit and $89.95 for the Byro Drive, the value is excellent. The engineering level is outstanding. The kit goes together very easily in a series of simple "fun" steps. Excellent results can be obtained by covering the model with Econokote or with the fiberglass cloth process. It appears that the Byro Drive is a zero maintenance device that will provide hours and hours of use. The flying ability of the Pitts is excellent, with performance to match any flying skill of the pilot.

The full-size Pitts factory has a slogan: "The Pitts is something special." So is Byron's Pitts. •

Slope . . . . . *Continued from page 32*

just plain turbulence, little spinning tops of violence and destruction, garbage-movers.

Almost every slope has an area or two that generates this kind of turbulence . . . even the famous cliffs at Torrey Pines. The only safe way to deal with such areas is to avoid them completely. And you can spot many of them in advance. Study the face of your slope. Picture the river of air rushing against it, pushing and crowding its way over it, flowing in and around every nook and cranny, every irregularity in its surface. Air is lazy, just like water. It won't pile up and climb over the top of a hill if it can squeeze around the ends, instead. Don't let your plane get caught in one of these high-velocity end-squeezes; you might as well try to fly out of a giant front-loading washing machine.

Next question: how do you know that ALL of the air hitting your hill isn't

squeezing around the ends? If the hill is truly 300 feet long, I can almost guarantee you that it isn't. But just to be sure, make the dust test. Go down to the foot of the hill, look both ways for environmentalists, then throw a few heaping handfuls of dry dirt up into the air. Step aside to watch the dust pattern over the face. If it rises briskly up and over the lip, you're in business; chances are your glider will do the same. (If your hill is too high, you may have to perform this ritual somewhere up on the face nearer the lip. Big hills often develop "dead spots" at their bases, where there's little air movement. Keep this in mind, come landing time.)

Now that you're satisfied that your chosen slope does indeed generate lift, you might want to apply this same dust-test to the area just behind the lip. Does the dust roll and tumble violently across the top of the hill like boiling water in a pan? Then maybe, just maybe, you don't want to land back there. Maybe you want to land someplace out in front of the hill, or down on its face. I think it's probably safe to say that more airplanes are wrecked *behind* the lip than out in front of it, on the average slope. Until you learn your site, you shouldn't fly back there any more than necessary.

Well, we've put this off long enough. Let's get the plane out of the car and prepare her for flight. Check that wind velocity again. Remember that if it's 12 mph on the flats out in front of the hill, it's going to be 15+ right over the lip. This is the "venturi effect" mentioned last month. It's perfectly normal, not just a

nasty little trick God has cooked up especially for you. This venturi velocity is the headwind you have to cope with during the launch, so you want to be *absolutely certain* that your plane is heavy enough to penetrate it. Some pilots prefer to avoid facing this venturi by launching their plane down lower on the face of the hill, where the wind isn't quite as strong.

If you have any doubts about penetrating, add a little ballast on the center of gravity. Some people put a half-ounce or so into the nose as well, to bring the CG slightly forward for slope flying. I don't recommend this, because it desensitizes the elevator, and you might just find yourself in a position where you need all the up-elevator you can get! But don't mind me; I'm one of those cranks who believe that if you have an airplane in good flying trim you should take care not to upset that balance. Adding weight to the middle of a see-saw won't change its balance, whereas adding it to either end will. But if you feel that sloping is largely a matter of flying downhill into rising air, you're welcome to add nose-weight "to make it fly downhill." Back in the Soap Box Derby days, I had a friend who added weight to the front of his car "to help pull him downhill faster." Stupid as it sounds, he seemed to win about as often as the rest of us. Which wasn't often.

If you insist in fiddling with the controls, I'd recommend that you leave the elevator alone and try adjusting the rudder for more throw. There are times, on a windy slope, when a whole lot of rudder isn't half enough, and way too much would probably be just barely adequate.

Check that wind once more, right at the lip of the hill. Have you ever flown in that strong a wind before? Suppose you heave your beast out into it, and it's too light to penetrate. It's going to blow backwards right over your helpless head and end up either in the lip turbulence just behind you or else in those infernal trees. Whereas, if you add *too much* ballast, your plane will penetrate fine, but it will slowly sink and you'll have to land it down at the foot of the hill somewhere. Better to add too much ballast.

And while you're stuffing that ballast inside, give some thought to crash-proofing. What will happen to that dead weight (or, more important, to your radio equipment) in the event of a crash? Don't stow something in there that will pulverize your receiver in a crash . . . pad both the ballast and the radio to prevent it. And don't assume you will never crash, because you almost certainly will, sometime. That's the meaning of SLOPE: **S**crapped, **L**ost, **O**r **P**ulverized **E**ventually. A cynical friend of mine used to say "We design thermal soarers to fly; we design slope soarers to crash." He built some tough, heavy airplanes in his day. Some hold him responsible for the current landslides in Malibu.

But enough of this sandbagging. The hour has come to give her the heave. Aim the nose slightly downhill, maybe ten to twenty degrees, grip the fuselage solidly, and shove her smartly out into the gale. Is the receiver on? The first ten seconds of a slope flight are the hardest: penetrating out away from the hill and into the smoother air of the lift zone. Be ready to apply down elevator in case she tries to balloon up over your head. *Fly the airplane;* don't expect it to fly itself. Take command of it and drive it forcefully around the sky. If you go to sleep at the controls you'll wind up back in the trees, or worse. Stay well in front of the lip, and do a simple figure-eight pattern, making all of your turns upwind, away from the hill. Don't turn downwind towards the hill until you have plenty of altitude . . . a downwind turn on the slope can be a real disaster if you're not prepared for it. The second you turn downwind the nose drops, the plane suddenly appears to double or triple its speed in a headlong dive towards the hill, the rudder controls turn to mush, the elevator becomes your sworn enemy, and your entire life begins flashing past in front of your eyes as you realize you're going to cra. . .

But wait a minute . . . what's going on here, anyway? Why is a downwind turn on the slope so different from a downwind turn when thermal flying? Answer: it isn't. Any time you turn downwind, your plane has to accelerate (relative to the earth) in order to catch up with the river of air and regain its necessary airspeed. This acceleration always costs you some altitude, and during the acceleration the rudder is bound to seem a little sluggish, since it hasn't got its normal airspeed back yet either. Even after the airspeed returns, the rudder may still appear sluggish, because the plane is being carried so far downwind during the time required for a normal turn. To an observer, even a perfect turn will look more like a long parabola than a half circle, and the plane will probably come dangerously close to splattering itself all over the hill in the process. Now you see why slope fliers say "too much rudder is never enough."

Once you get the feel of slope flying, you'll find it's a great way to build stick

time, since it gives you a lot more flying time per launch than flatland soaring does. I like to use the slope to make intermediates out of beginners; as soon as they show me that they can land their thermal ship approximately where they want to (or catch it consistently without losing teeth), they're ready for the slope. Up on a windy hill you have to actually *fly* the plane, not merely interrupt its glidepath with an occasional radio command. Because the whole show happens right out front, within a hundred feet or so of everybody, both student and instructor can see every mistake clearly, and the student quickly develops the visual-feedback loop so necessary to R/C flying. Of course, accidents seem to happen more rapidly on the slope, so the instructor has to be ready at a second's notice to grab the controls; fortunately, the learning curve is steep for slope fliers.

By the time the average flier has wrecked and repaired and jury-rigged and reflown two or three thermal soarers on the slope, he'll probably have discovered on his own the Great Secret that the slope-soaring fraternity has guarded all these years: *on a mediocre or better hill, virtually anything can be made to fly!* Flying wings, flying saucers, fuel-soaked power planes (take out the engine, replace it with ballast, and remove the landing gear, if practical.) Even control line combat ships with radios servo-taped to their wings and fuselages! One of my all-time favorite slope airplanes was a "profile" model of a J-3 Cub, complete with sheet dural landing gear and Du-Bro scale wheels. The cockpit area was see-through, and she looked very realistic in flight, in spite of being only 1 inch wide in the fuselage. Span was 54 inches, just about the right size to lead a 90-inch model of the Schweizer 1-29 across the sky. Yes, I realize that the full-scale Cub, with its 65 horsepower, wasn't much of a towplane, that I should have dolled her up to look like a Super Cub, at least. But it was like this, y'see: Sterling sells some nifty Cub decals, and Monokote comes in this incredible CUB YELLOW color, and it's so easy to cut out two long black lightning bolts from trim sheet, and . . . aw, shuckins, Grandpa, them was surely the days! •

F/F . . . . . *Continued from page 67*

maybe I was on the right track.

I based the rest of the design on Bill Blanchard's Polly, using the same fuselage and tail surfaces. I used a fully parabolic planform to cut down the wing area, give a slightly higher aspect ratio, and give a better spanwise weight distribution by allowing more tapering of the wing blank before carving the airfoil. This should cut down on the model weight, so I cut down the fuselage stock slightly and decided to leave off the DT until I started losing gliders.

The stab was made of 1/20 stock to speed up construction and aid incidence alignment, since I didn't sand in an airfoil, just rounded the edges and tapered the tips after assembly. If 1/20 sheet is not available, pick out some of the thicker 1/32 stock from your dealer's shelves or your wood box.

I finished my Un-Pollys with a couple of coats of lacquer sanding sealer (Glidden's is a good one) and a thin coat of nitrate dope. I built one version with a 3/16-inch balsa wing and another with a 1/4-inch sheet wing. The 1/4-inch thick wing came out about 30 grams; the 3/16 model was a bit lighter. Both ships performed about the same and trimmed out easily. I lost one while maxing out at the Hawks' Spring Opener this year, but it took less time to build the model than to rig a DT.

I found that the V-dihedral model lent itself very well to an unusual HLG trimming scheme. I left the glide a bit stally, but with a definite glide circle, by removing clay after initial glide testing. When the model hits lift, it stalls, then slides off the wingtip into the glide circle, keeping itself centered into the thermal at all times. This is an excellent trim for breezy afternoon conditions, since the glider will drift downwind in the thermal, rather than gliding through or out of lift. This bobbing and weaving "bounce" (hate to call it a glide) is not pretty, but it gets the time on the card. A more normal trim can be used in calmer, light-lift conditions.

MYSTERY MODEL

This month's mystery is another simple concept gas model. The designer came

up with an unusual fuselage arrangement and a type of wing construction that didn't require any ribs to be cut out. I saw one of these fly at the 1977 Nats, so a few of them have survived. If you think you can identify the model, send in your entry to the **R/C MB** office and see if you've won the free subscription.

COVERING (WITH WHITE GLUE)

From the Phoenix Model Airplane Club newsletter, Al Lidberg, editor.

"Tissue covering is normally done using dope as an adhesive. This is fairly convenient and offers few problems, even for those with little experience. There are some other methods, though, and the use of a 50/50 mix of white glue and water is worth a try. I had tried this method once before . . . just so I could keep working in the house without smelling up the place with dope fumes . . . but wasn't too impressed with the results. More recently, with the return of cold, rainy weather, I tried it again for a couple of small models. With a little practice the results are good enough to recommend that others try it, too.

"The major difference, comparing this method with dope, is that the water/glue mix stays wet and sticky for a much longer time. It neither soaks in quickly nor dries as fast as dope. Strangely enough, this quality allows working faster than can be done with dope, and a covering job can be completed in a shorter time. The secret is to put a coat of water/glue all around the perimeter of the area to be covered, and then to get the piece of tissue placed correctly the first time. After using a small brush to coat the structure, use a finger to distribute the mixture evenly around the edge . . . this helps to ensure fewer gaps and lumps. Because lighter varieties of tissue lose a lot of strength when wet, plan on placing the paper correctly the first time. Using Japanese tissue, you probably will not be able to lift or slide the tissue once it's in place without tearing. However, if it's just about right, you can press it in place and smooth the edges without too much problem. While the water/glue is wet, everything looks lost because the tissue picks up the water and expands just like it does when you water-spray, but in a few minutes the glue dries and trimming can take place with sandpaper or X-acto blade."

I've been having my junior high students use this method and agree 100% with Al's comments. The dope method requires too much speed for inexperienced builders, but I've had good luck with the white glue for attaching tissue to models like the Peck R.O.G. even with kids working on their first model. I'm probably too set in my ways to use it on my own models, but it's a good tip to remember when you do covering in the house with a family that objects to the smell of dope.

RETURN OF THE DGA:
THE WORTMANN FX 60-126
(THINNED TO 10%)

Bob Stalick published about 60 DGA's (Darn Good Airfoils) in his term as editor of this column. You'd think that this many different airfoils would be enough to satisfy everybody, but I've received many requests to keep on with the series, so after looking through a few sources, I'm ready to begin, with something sort of different!

I spotted this airfoil in the June 1979 *Aeromodeller*, along with an account of the Czechoslovakian champs. Ivan Crha used this on his A/2 glider, using full sheeted construction and Monokote covering. Ivan claims that this model is 10 seconds better in calm air, despite the looks of the airfoil.

Actually, the choice may not be as adventurous as it seems at first glance. Wortmann's airfoils are now being used almost exclusively by world-class competitors on full-size gliders (every competitor at the 1974 sailplane World Champs used his airfoils). He has been using computer techniques to obtain velocity distributions which yield a wider range of low-drag speeds.

At any rate, the thickness of the section should give a strong enough wing, and if the low drag is true at model Reynolds numbers also, the zoom launch capability should be high. Since this is a laminar flow section (as designed), the sheeted Monokoted construction may be necessary for best results. Notice that the ordinates are not the customary 5, 10, 15 percentage of chord stations. •

Sailing . . . . . *Continued from page 50*

righting moment.

OPERATIONS

TELEMETRY: In this system the boat carries some sort of a sensor, say one for boat speed through the water. The speed modulates a radio signal sent back to the skipper where it is converted to a tone in an ear plug. He picks the direction he wishes to sail, then trims sails and rudder to achieve maximum speed, as reported by his ear plug. Such a system has its information filtered through the long response time of the hull's inertia, but it does provide an edge.

AUTO TRIM: A more direct approach is to monitor the thrust component of the forces acting on the sails. Since the skipper needs to worry about tactics, cut

him out of the loop and install a pressure transducer in the mast heel. This will measure the thrust pushing the boat forward through the water. Lead the transducer output to a microcomputer. The microcomputer will control the sail control unit, trimming the sails in and out to maximize the forward thrust vector as wind vectors change, and as the skipper adjusts the helm. The sail trim function can be immediately overridden by the skipper, such as in the starting maneuvers. While functioning it would endevor to maximize the available power which the rig could deliver to the hull. My research indicates this can be done for under $250 in off-the-shelf components.

Systems like the latter will have to be very weight conscious and will make their first appearance in the A class, then evolve into the lighter 10-R and M's. Some one-design classes will be unable to prevent their installation, while others will be protected. How the organization at large (AMYA) will react is unclear. Maybe now would be a good time to consider the near future.

We are now settled in our new location, and it's business as usual from the great Pacific Northwest. I am happy to answer questions accompanied with a stamped, self-addressed envelope to Rod Carr, 4115 172nd Ave. N.E., Redmond, WA 98052.

Remember to send your $10 AMYA dues to the Secretary, 7013 Ansbrough Dr., Citrus Heights, CA 95610. •

Miss Philly . . . . *Continued from page 41*

laminations of 1/16x3/16 spruce to form the tail outlines. No steaming would be required.

When building the wing, we'd suggest the addition of diagonal bracing if you intend to use plastic film covering such as Monokote. Although the leading edge and spar are generous in size, the wing still needs the skin strength provided by inflexible bamboo paper covering to keep it rigid. Bracing will make up for it, with very little weight penalty.

The "Miss Philly" should make a great fuel-allotment event contender in R/C Old Timers, as it was one of the best in the "Flying Boxcar" era of gas powered modeling. Even with radio aboard, the weight should be right around 5 pounds. Use plenty of rudder area, but not much elevator . . . it's not a stunt ship! •

Plug Sparks . . . *Continued from page 41*

showed, the only two being the Herky and Anderson Pylon. Otherwise, it was the usual run of Clippers, Playboys, Rangers, et al that dominated the field. They (the rule changers) talk about handicapping this and that type engine, but the writer thinks they may have missed the boat in not penalizing the obviously better flying models. Food for thought, men!

VICTORY BANQUET

Would you believe twenty-five first place trophies, and that there was a total of 121 trophies to be awarded? Anyone who says the SAM Champs is not truly the Old Timer Nationals had better attend one of these functions.

Not many of the modelers realized it, but it took a group of 13 people to assemble all the trophies. All trophies are shipped unassembled to save freight costs; hence, the problem facing the President. It looked pretty desperate at 11:30 p.m. Tuesday, but thanks to Carter Watts, who made up the badly needed shafts, and Elaine Brodsky, who procured additional trophy parts, the trophies stood gleaming and ready for presentation at 7:45 Thursday night. Only 15 minutes to spare! Little did the majority of the modelers realize they were almost awarded do-it-yourself trophy kits!!

After opening remarks, the President turned the awarding of trophies over to Lin Haslam and Jack DeFond. After the permanent trophies were given out, the following perpetual trophies were awarded: Free Flight Sweepstakes Champion, Bruce Norman; R/C Sweepstakes Champion, Don Bekins; Ernie Shailor Trophy, Bruno Markiewicz; Pond Perpetual, Mitchell Post; Compressed Air Plaque, Karl Spielmaker; Sheelds Twin Pusher Perpetual, Fred Emmert.

Becky Whitney, Miss SAM Champs of 1979, made the presentations of the perpetual trophies while the President did the honors on the Sweepstakes trophies.

One of the highlights of the awards was the gift of a slag engine (Genie .29) kit to every contestant who entered and flew in the "Slag" event. Wotta sponsor!

Another sponsor who should be mentioned for his untiring efforts is Bob Boucher, of Astro Flight, Inc., who sponsored the Electric events both in free flight and radio control. These events are slowly catching on, as interest has now spread to the youngsters.

In the merchandise lottery (in which about forty people received prizes), the outstanding prize of a two-channel Cox Sanwa radio set was won by Cliff Silva. Cliff, who has been a real hero flying free flight models from his wheelchair, might be able to relax a bit with a black box!

To wrap things up, the President then awarded commemorative plaques to all the SAM officers who have unselfishly served SAM during 1979. In addition, Lin Haslam was awarded a special plaque for his work as Contest Manager of the 1979 SAM Championships. Nothing like recognizing the hard-working administrative crew!

RESULTS

Thought we'd never get around to them, huh? Well, this time we have the complete dope on the model and engine used. Based on the models that won, you can be guided as to which competitive model you would want to select.

FREE FLIGHT

30 SECOND ANTIQUE

1) Leon Nadolsky
Gas Bird/Torp .29 ..... 12:22
2) Leslie Norman
Clipper I/Cyclone 8:46
3) Bruce Norman
Clipper I/Cyclone 7:58
4) Mitch Post
Anderson/Spitfire 7:28
5) Walter Johnson
Clipper I/Madewell 7:07

CLASS A PYLON

1) Jack Jella
Ranger/Arden .19 ..... 9:00
2) Bruce Chandler
Thermal Thumber/Black Knight 7:56
3) James Robinson
Ranger/Arden .19 ..... 7:45
4) Wayne Cain
Playboy Jr./Arden .19 ..... 7:41
5) Joe Beshar
Fox/Bantam 7:22

CLASS C CABIN

1) Jay Jackson
Dodger/Torp .32 ..... 11:57
2) Bruno Markiewicz
Playboy Cabin/Ohlsson .60 ..... 8:46
3) Mark Fechner
Bombshell/Spitfire 8:06
4) Bruce Chandler
Clipper/Black Knight 7:33
5) Les Payne
Playboy Cabin/Cyke 7:07

RUBBER CABIN

1) Carl Cogar Sr.
Johnson Stout 6:58
2) Don Cogar
Johnson Stout 6:17
3) Fred Emmert
Toft Stout 5:51
4) Phil McCary
Smoothie 4:26
5) R.A. Hayes
Korda Wakefield 3:57

RUBBER SCALE

1) Carl Cogar Sr.
Lanzo Puss Moth 1:58
2) Les Payne
Miles Magister ..... :54
3) William Bell
Taylorcraft ..... :31
4) Ray Black
Taylorcraft ..... :27
5) Jim Persson
Fairchild Forwarder ..... :25

CLASS B PYLON

1) Bruno Markiewicz
Alert/O.S. .25 Cv. 10:46
2) Bruce Norman
Zipper/O.S. .25 Cv. 9:00
3) Mitch Post
Alert/Delong .30 ..... 8:28
4) Leslie Norman
Zipper/O.S. .25 Cv. 8:27
5) Ed Rangus
Zipper/Forster .29 ..... 8:05

CLASS A CABIN

1) Bruce Norman
So Long/Ohlsson .19 ..... 7:41
2) Wayne Cain
Dodger/Arden .19 ..... 6:21
3) Leslie Norman
So Long/O.S. .15 Cv. 6:04
4) Larry Boyer
Rockateer A/O.S. .15 Cv. 5:55
5) Phil McCary
Commando/Arden .19 ..... 5:10

RUBBER STICK

1) Carl Cogar Sr.
Lanzo 6:23
2) Steve Joseph
Gollywock 5:46
3) Wally Leiper
Lanzo 4:45
4) Tom and John Keppler
Gollywock 3:59
5) Larry Delaney
Cloud Charger 3:53

TWIN PUSHER

1) Fred Emmert
Manulkin 1:28
2) Tim Banaszak
Burnham ..... :49
3) Clarence Haught
Jr. Birdman ..... :09
4) Bill Bell (Sheelds)
Burnham ..... :08

.020 REPLICA

1) Bob Petro
Dodger 7:14
2) Mark Fechner
Ranger 6:58
3) Sal Taibi
Playboy 6:55
4) Wayne Cain
Interceptor 6:53
5) Jack Jella

Strato-Streak 6:35

COMPRESSED AIR
1) Karl Spielmaker
Hobart/Hoosier 2:12
2) Tim Banaszak
Hobart/Hoosier 2:07

ELECTRIC .020
1) Joe Beshar
Playboy/Astro 020 ..... 1:09

CLASS C PYLON
1) Bruce Norman
Zipper/O.S. .35 Cv. 18:10
2) Les Payne
Playboy/Atwood .60 ..... 8:54
3) Robert Findlay
Playboy/Cyclone 8:40
4) Larry Clark
Albatross/O.S. .35 Cv. 8:38
5) Jay Jackson
Wasp/Torp .32 ..... 8:30

SCALE GAS
1) Cliff Silva
Corben/Bunch 18:30
2) Bruce Chandler
Fokker E-111/O.S. .10 Cv. 16:59
3) Carl Cogar
Corben/TD .049 ..... 11:35
4) Jim Persson
Taylor Cub/Mac .19 ..... 10:37
5) Phil McCary
Cub/Ohlsson .60 ..... 9:43

FUEL ALLOTMENT ANTIQUE
1) Mitch Post
Anderson/Spitfire 13:58
2) Sal Taibi
Powerhouse/Forster .99 ..... 12:17
3) Mark Fechner
Lanzo/Cyclone 12:11
4) Cliff Silva
Roll/Baby Cyke 11:30
5) Bruce Norman
Clipper I/Brown Jr. 10:01

"SLAG" EVENT
1) Clarence Bull
American Ace/Genie .29 ..... 5:20
2) Larry Delaney
Ranger/Thor .29 ..... 3:30
3) Art Suhr
? 3:25
4) Paul Lewis
Playboy Jr./Thor .29 ..... 2:55
5) Tim Banaszak
Twin Cyclone/Thor .29 ..... 2:44

CLASS B CABIN
1) Jay Jackson
Dodger/Torp .29 ..... 8:20
2) Bruce Norman
Clipper/McCoy .29 ..... 7:50
3) Bruno Markiewicz
Boomerang/O.S. .20 Cv. 7:32
4) Larry Boyer
Clipper/Torp .29 ..... 7:27
5) Leon Nadolsky
Cabin Ruler/Ohlsson .23 ..... 6:35

RADIO CONTROL

CLASS A GLOW
1) Ross Thomas
Playboy/K&B .19 1076
2) Don Bekins
Zipper/Cox .15 813
3) James Robinson
Dodger/S.T. .15 222

CLASS B GLOW
1) Don Bekins
Playboy/O.S. .30 1145
2) Joe Beshar
? 914
3) James Buice
Playboy/K&B .29 841
4) Ed Solenberger
Challenger/K&B .29 660
5) Bruce Norman
Playboy/S.T. .29 583

CLASS C GLOW
1) Don Bekins
Playboy/K&B .35 1120
2) James Buice
Playboy/K&B .35 1096
3) Ross Thomas
Playboy/K&B .35 1072
4) Ed Solenberger
Challenger/K&B .40 911
5) Jim Kyncy
Playboy/K&B .35 871

CLASS C IGNITION
1) Bob Von Konsky
Sailplane/Spitfire 643
2) David Brodsky
Playboy/Cyclone 628
3) Edgar Smith
Gladiator/Cyclone 554
4) Andy Anderson
Quaker/Spitfire 480
5) Lawrence Bekins
Playboy/O.S. .35 472

CLASS A-B IGNITION
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Playboy/O.S. .30 998
2) Ferrell Combel
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4) Don Bekins
Gas Bird/Merco .60 1116
5) Jim Kyncy
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Playboy Cabin/Astro 15 889
2) Frank Tulp
Playboy Cabin/Astro 15 631
3) Ross Thomas
Eaglet/Astro 15 32

.020 REPLICA
1) Jack Jella
Clipper II 390
2) Ed Solenberger
Strato-Streak 285
3) Don Bekins
Playboy 186
4) Barnet Kernoff
Playboy Jr. 102

TEXACO
1) Bruce Norman
Dallaire/O.S. .60 4-cycle 1249
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3) Jim Kyncy
Gas Bird/O.S. .60 4-cycle 1053
4) Ross Thomas
Eaglet/O.S. .60 4-cycle 785
5) Don Bekins
Gas Bird/O.S. .60 4-cycle 774

FIELD PICKUPS

This SAM Champs being the first in the Salt Lake area, many varied comments were heard. Among those were: (Sal Taibi) "I never worked so hard to win a trophy in my life." (Herb Wahl) "I flew all models, they flew good, but not good enough. I zilched." (Barnet Kernoff) "Smoothest air I have ever seen. Not a bump in a carload."

With everyone moaning about the shortage of maxes, Bruce Norman came over from the free flight area twice around four o'clock on Wednesday and Thursday and proceeded to win both the Antique and Texaco events. The Antique event was won by three perfect flights. Maybe it takes a free flighter to spot the weather?

Winner Bruce Norman used a Dallaire Sportster to win Texaco. Interestingly enough, this design has won the Texaco event at the SAM Champs for the last three consecutive years (wanna surefire winnah?). O.S. .60 four-cycle engines are almost an absolute must for the Texaco event, with most fellows getting three to five-minute engine runs. Although glow powered models can climb to the same height in a minute and a half, they are down by three and a half minutes to the four-cycle engine. The biggest advantage the glow powered models have is that they can climb quickly to a thermal spotted overhead. On the other hand, the four-cycle model can cruise longer in search of thermals. As writer Caldwell used to say, "You pays your money and takes yer choice."

Karl "Baron Von Bearing" Spielmaker showed up with a Buzz .60 engine, a real rare one. Karl put one of his timers and a tank on the basket case and whadya know . . . it ran!! To show how much power the engine developed (for a slag engine), the motor was installed in and flew a Buccaneer C Special.

Almost forgot to mention the unselfish work of Bill Brenchly, former SAM 21 member, who moved from Santa Cruz to Logan, Utah. Bill showed up bright and early Tuesday morning and every morning thereafter. He was an invaluable aide to Doug Gorton and was completely unmentioned at the awards. Now you know how it feels to be an unsung hero, Bill!!

Well, that's about it this time. Next month, we'll talk about the Old Timer events at the AMA Nationals. The schedule shapes up like this: Wednesday, three R/C O.T. events; Thursday, two control line events; and Friday, the big day, will feature eight events. Quite a variety of events!! •

R/C World . . . *Continued from page 13*

modelers, and the "penetration potential" when they get in the air is frightening, especially in the hands of an inexperienced R/C pilot. Hopefully they are a fad that will disappear from the scene before they cause real damage and create bad publicity for modeling.

The point is this. We *can* build and fly large model aircraft without going overboard on power and weight. Unfortunately, the powers-that-be, AMA to be exact, is too timid to step in and specify reasonable absolute model aircraft limits. By absolute limits, we mean limits which apply across the board, regardless of individual event rules. Anything heavier or powered by larger engines than specified would be out of the model category and would come under jurisdiction of the FAA. That we can build and fly big models without going overboard on weight and power has been proven by the big fuel-allotment R/C Old Timers.

For example . . . our Sal Taibi-designed Powerhouse O.T. weighs 5-1/2 to 5-3/4 pounds (no two scales are alike). With an 84x14 inch wing, the area is over 1100 squares, and with a K&B 40 and 11x4 prop, it will climb at a 60-degree angle until it's out of sight, if allowed. Now try to tell us that a 9-foot J-3 Cub would need more than a .60 to fly properly! Many of Bud Nosen's big models have been proving that for years.

So . . . perhaps it's time again to make the pitch for Mammoth Classic Scale. The aircraft and engine specs are fairly simple, but modified a little from the January 1977 suggested rules, based on some things learned in the meantime.

1. Models shall be large scale reproductions of successful man-carrying aircraft of the 1918-1941 Classic Era, employing lightweight rubber scale model type, open construction.
2. Maximum total engine displacement shall not exceed 1.2 cu. inches.
3. Minimum prop diameter on engines over .60 cu. in. shall be 16 inches.
4. Minimum prop diameter on engines over .80 cu. in. shall be 18 inches.

(The above prop specs serve to permit the use of engines larger than .60 where big props are required in order to clear cowls and wide fuselages, but to prevent full power development from smaller props.)

5. Belt and gear drives are permitted.
6. Any scale is permitted, but the minimum wing area shall be 1200 for monoplanes and 1800 for biplanes.
7. Regardless of scale chosen, all primary components of model (wings, tail surfaces, fuselage width and profile, etc.) must be to the same scale.
8. Weight, ready to fly, but with empty fuel tank, shall not exceed 15 pounds . . . period!

As has been learned at several large-scale fun-flies in the last couple of years, the novelty of big scale models can soon wear off if you do nothing more with the models than putt around the sky looking realistic. On the other hand, not many fliers would care to attempt unscale-like axial rolls, consecutive loops, inverted flight, and other undignified maneuvers seldom attempted by Classic aircraft. (OK, so a Bucker is classic. Enter it in Sport Scale!) So, what do you do with that Mammoth Classic Scale ship?

At a typical full-scale antique and classic aircraft fly-in, no one is expected to subject their prize possession to the unsafe stresses of unusual maneuvers. Instead, the fun-like competitions, to give the owners a chance to show off their classics, are limited to fun-like events . . . short takeoffs, spot landings, slow flight, flour bombing, message drop, etc.

Here are some suggested tasks that could be flown at random during a gathering of Mammoth Classic Scale enthusiasts.

1. Shortest takeoff. From a starting line, measure to point where last part of aircraft leaves the ground.
2. Spot landing. Measure from spot to

first contact point of any part of aircraft (hopefully the wheels!).

3. Parachute and/or bomb drop. Measure from target to point of contact. Drop should be from at least 100 feet of altitude.

4. Three-minute precision. Time from takeoff to touchdown. Need not be deadstick. Think that makes it easier? Try it! Spot landing could be included.

5. Duplicate pylon time. Establish a base time for five laps around a typical 3-pylon course, any size. Make up to 3 subsequent attempts to duplicate the base time, without any means of telling time. Speed is not important, but consistency is.

6. Slow/fast flight speed ratio. Best score is greatest difference between slowest and fastest time between two markers spaced about 200 feet apart.

For the more adventuresome, there can be additional events for balloon bust, ribbon cutting, hankie pick-up, etc.

Note that static points are not brought into these rules whatsoever. In our opinion, these models should be judged on flying only; the scale requirement is to qualify the model for competition, and has no effect on the final results. OK, Claude? Scale models, but no static points!

Perhaps the main reason that our original MCS concept didn't take hold was the lack of specific construction projects that could prove the point. Within the next few months, we will publish plans for our own MCS aircraft (if we wait until the model is finished, you may never see it!). It's a Boeing 95 Mailplane (bipe, natch!) blown up from Cleveland 1/2-inch Dwarf series plans. At 2-inch scale, the top wing spans 88 inches with a 14-1/4-inch chord. That's not much larger than the Powerhouse wing. As the Powerhouse weighs less than 6 pounds, we see no reason that the Boeing can't come in under 10 pounds, maybe even 9. We have to allow for heavier wheels, strut rigging, more hardwood reinforcing, etc. The plan is to use a break-away type phenolic or aluminum plate engine mount so that various displacements and prop sizes can be tried. Remember that 60-degree climb on the Powerhouse with only a .40!

Other projects in the wind include our Assistant Editor Phil Bernhardt's 3-1/2-inch scale Aeronca C-2 from Paul Matt plans, and Le Gray's "Wimpy," using plans blown up from Walt Mooney's 1/2A free flight version published in *M.A.N.* some years ago. The Wimpy, a Les Long homebuilt design, spans 8 feet and is powered by an Astro 25 with belt-driven prop. By the time you read this, we may have the complete construction article, ready for publication.

Hmmm . . . maybe we better finish up that 9-foot C-3 that's been in the works for better than 10 years. . .

MY FIRST R/C

"Dear Bill,

"Your article in the June issue of **RCMB** re your first R/C being a Royal Rudder Bug really sprung the memory switch.

"My first R/C was also a Royal Rudder Bug, also completed in 1955. Power was a K&B 19 (it worked better upright), a Lorenz 2-Tube receiver was suspended on gum bands in the center of the cabin, and those pounds of batteries! Also, please note the upright antenna.

"Every time I see a modern Cessna in the air, I can't help but wonder if the designer flew one of these things. . .

"You've got a great mag. Keep up the good work. John Martin.

"P.S. I sold it at Xmas time in 1959 and bought a top coat which lasted almost as long as the plane."

T-TOP AIRCRAFT CARRIER

One photo this month shows our 1972 Corvette with an unusual load on its luggage rack. When Walt Schroder's Byron Originals Pitts arrived in its huge packing crate, we unpacked it at the office and figured to stick it into Walt's big Chrysler Cordoba. Forget it, Ricardo, neither the trunk, the back seat, nor the front passenger seat with the back dropped would accommodate the Pitts fuselage with tail surfaces and landing gear attached.

Unable to convince Walt to tie the tail wheel to the rear bumper and trailer it home, we set it on our *little* Corvette, placed a small pillow over the aft fuselage, and cinched it down with a bungee-cord holder. Now *there's* a way to attract attention!

Nautical nuts may enjoy the play on words. A Corvette is supposed to be a sloop of war or a small destroyer, but in this case, it's an aircraft carrier. . . Actually, the whole idea is the Pitts! •

Counter . . . . . *Continued from page 10*

9), plus two complete AMA's and, as stated on the fact sheet that came with our sample, "enough blank space to custom cut letters of your own choice." Don't get too excited about that last point, however. The blank space on our sample sheet (the 2-inch size) measured 2-1/2x3-1/2 inches, so if you are thinking about cutting out the name "Rumpel-

stiltskin" for your new ship, better forget it. On the whole, though, we have to say that Graphics look like an excellent product and should be just the thing for getting professional-looking results in a minimum of time.

Graphics are available at your local hobby shop or from Coverite, 420 Babylon Rd., Horsham, PA 19044.

* * *

Once in a while we come across some super-neat modeling item that has been on the market for some time, yet is seldom mentioned or seen at the flying field. Could it be that modelers need to be reminded from time to time of some of the great products in this hobby/sport of ours? Maybe so. At any rate, one of the items that fall into this category is the Bulkhead Switch Mount from Rosie's R/C Products. This clever little device was designed for those who prefer to mount the radio switch inside the model and operate it via a wire through the side of the fuselage. No modification to the switch is necessary; just mount the switch in place on the bracket, then bolt the whole thing to a convenient bulkhead. A sort of 90° bellcrank with two extra legs is mounted over the switch, the two two legs straddling the switch knob. As can be seen in the photo, the legs push the knob from side to side when the wire is pushed or pulled. Simple, quick, and inexpensive . . one of these little goodies will set you back a whole 98 cents.

To get a catalog listing all sorts of other interesting items, write to Rosie's R/C Products, 3501-B West Moore St., Santa Ana, CA 92704.

* * *

C.B. Associates is cranking out all sorts of good stuff for Mammoth Scale and other big models. Most impressive of the lot has got to be the monster 1/4-scale tailwheel assembly, which comes completely assembled and features a 2-inch DuBro low-bounce wheel. There are four spring steel leaves, each one 1/16 of an inch thick. The steering arm is the two-arm type with a spring at each end for attaching to the rudder control horns. The assembly mounts to the model with two No. 10 bolts and weighs 4-3/4 oz. It looks to be very substantial and should be just the thing for ships such as the Ag-Cat featured in the December '78 **MB**, or maybe even a taildragger version of the Big Stik in last month's issue. Retail price is $19.95.

Next up are some really big elevator

and rudder control horns (would you believe 1-3/8 inches from the base to the outside hole?) They are molded from glass-filled nylon and come two to a package for 95 cents.

Big bipe builders (try saying that ten times fast with a mouth full of saltines) should consider C.B.'s new Wing Strut Fittings for mounting the interplane struts. Everyone seems to have a different way of mounting struts, but this has to be one of the simplest (and safest) methods we've seen. Each assembly (there are four complete assemblies in a package) consists of a steel strip that is to be solidly mounted in the end of the strut, and a glass-filled nylon base, which is mounted in the wing with the top half protruding above the covering. A bolt is used to hold the strut end to the base. Nothing could be simpler! Of course, it's a pain in the tail to have to fool with those bolts every time you assemble and disassemble your ship, but most biplane enthusiasts will agree that owning and flying a two-winger is well worth the added effort. A package of four Wing Strut Fittings goes for $3.95.

Number four on the list of new C.B. products is a multi-purpose universal 3-prong bellcrank, also molded from glass-filled nylon. It can be used for cable control systems, reversing control direction, making 90° changes in push-rod direction, etc. It comes with a nylon bearing and mounting hardware, for $1.50.

Last on the list is an item we somehow managed to leave out when taking photos for this column, and that is a cable pulley and mounting bracket for cable control systems. The bracket is glass-filled nylon (what else?) and the pulley is machined from aluminum. The O.D. of the pulley is about 15/16 of an inch, and the edge of the pulley is close enough to the edge of the bracket that the cable will not jump out of the slot when there is slack in the line, such as when disassembling the model for transporting. The cable pulleys come in a package of four for $4.25.

All of these items are products of C.B. Associates, 21658 Cloud Way, Hayward, CA 94545.

* * *

Sonic Systems is bringing out a new air-operated retractable landing gear that looks to be very nicely designed and built. They're called "Turfmaster" retracts and feature two pneumatic cylinders in each individual retract mechanism, one to bring the gear up and down and the other for locking the gear in the up or down position. The system includes an adjustable onboard pressure regulator which eliminates slamming when the gear is operated, helps eliminate high pressure leaks and line blow-offs, and reduces wear and tear on the gear and airframe. The mounting holes are interchangeable with Rhom retracts. As mentioned above, this unit works on compressed air; no special gasses are required.

The Turfmaster main gear retract system retails for $89.95, and the trike gear set is $119.95. You can find out more from Sonic Systems, P.O. Box 192, Whippany, NJ 07981.

* * *

Latest piece of electronic wizardry from L.R. Taylor & Co. is the Accu-Charge, a charger designed for 12-volt, 4 to 6-amp wet cells or gel cells. The Accu-Charge puts out .5 amps, which is the maximum safe charge rate for these batteries. It's also voltage regulated, automatically going into what the manufacturer calls a "float mode" once the battery is fully charged.

The Accu-Charge sounds like a bargain at $24.95. Contact your dealer or order direct from L.R. Taylor & Co., 20831-½ Roscoe Blvd., Canoga Park, CA 91306.

* * *

Its performance might not be dynamite, but they decided to call it the "T.N.T." anyway. "T.N.T." stands for "The No Tow," which is the name of a slick little powered glider being kitted by Master Kit. The airplane was orginally designed by Bob Wallace and was featured as a construction article in the June '77 issue of RCM. The construction has been changed slightly in various places to make kit production more practical; otherwise it's the same good-flying trainer it was designed to be. The airplane has a built-up balsa fuselage, flat-bottom foam core wing with leading and trailing edge sheeting and false cap strips. The span is 72 inches, area is 518 sq. in., length is 36 inches, and uses .09 to .15 size engines (we'd opt for the .09 for a beginner). Flight controls are rudder and elevator; throttle control is optional but recommended.

Introductory price of the T.N.T is $32.95. For more info, contact Master Kit, 6 Fox Rd., Plainville, CT 06062.

* * *

Dunham's R&R is introducing its new D-8 heavy-duty servo, designed especially for large models and other high-load applications. Actually, it's not a complete servo, just the case and servo mechanics; you have to supply your own motor and electronic guts. The case measures 1-3/4x15/16x1-5/8 inches, which really isn't too big for a heavy-

duty servo like this. The gear train features one of the thickest output gears of any servo currently on the market. Other features are wheel and adjustable arm outputs, reinforced mounting lugs, and the ability to accept standard 20mm motors. Servo neutral position can easily be adjusted externally. Amplifier space is .8x.8x.6 inches . . . enough room for most servo electronics.

Waterproof seals or ball bearing outputs are available as options on this servo. With ball bearings, the output gear is supported so that vibration and the heavy loads associated with mammoth models do not cause servo damage or decrease efficiency.

The D-8 servo mechanics, less options, are available now for $11.95 each. For the ball bearing option, add $3.95 each.

For the waterproof option, add $1.95 each. From Dunham's R&R, 1100 North Lake Havasu Ave., Lake Havasu City, AZ 86403.

• • •

It's a well-known fact among R/C boaters that "success and enjoyment are inversely proportional to the H_2O in the radio." Of course, the best way to keep water out of your waterborne R/C system is to put everything in a waterproof box, but then you have the problem of how to get the pushrods to come out of the box and maintain free movement while going through some sort of waterproof seal. Various types have been tried with varying degrees of success, but as far as we're concerned, G&M Models has the problem licked once and for all with its beautifully made seals. They are made to be bolted to the side of your radio box and provide a very smooth, yet totally waterproof seal. A package contains 3 seals, 3 mounting studs, 3 packing nuts, and 2 stainless steel pushrod ends. In addition, there is an instruction sheet that gives an excellent and very detailed description on how to build a waterproof box.

Unfortunately, we didn't get a price on the G&M seals, but if you're interested you can write to G&M Models, P.O. Box 342, Broadview, IL 60153.

• • •

Robart has some neat new linkage hardware on the market now, all of which make use of Robart's exclusive toothed trim arms. The Differential Bellcrank is great for getting more control movement in one direction than the other, such as when you want more up than down on the ailerons or elevator. You can also place the arms 180° apart to change servo direction. The interlocking teeth on the trim arms assures a no-slip assembly. The spindle that the arms lock onto has a large bearing area for high strength and virtually no slop. Four mounting screws and a nylon nut plate are also included. This bellcrank looks like a very handy device and should find a myriad of uses by modelers. Retail price for a package of two is $2.49.

Next up is a Feed Thru Bellcrank, which is designed for getting the control linkage outside the fuselage or boat radio box. It is claimed to be sealed to oil or water and, like the Differential Bellcrank mentioned above features interlocking teeth on the spindle and trim arms and is totally adjustable. The Robart Feed Thru Bellcrank goes for $1.98 each.

The third new item is a Dual Trim Arm, which can be bought to fit just about any servo you care to name, including some that are now out of production. The adaptor and both trim arms have those interlocking teeth, so that each arm can be separately adjusted to any operating angle desired.

Since no two brands of servos seem to have the same size spindle end, the Robart adaptors are color coded, the colors depending on which brand and type of servos you are using. Two complete Dual Trim Arm assemblies (two adapators, two screws, and four arms) sell for $1.98.

All from Robart, 310 N. 5th St., St. Charles, IL 60174. •

Fan . . . . . *Continued from page 45*

V = wing velocity in ft./sec.
l = wing chord length in ft.
ν = kinematic viscosity of air = $.1572 \times 10^{-3}$ ft.^{2}/sec. @ sea level.

Rewriting the equation for mph and chord in inches gives:

RN = $778 V_{mph} l'$, where
l' = wing chord length in inches

Application of the Reynold's number formula to the tip section of a whirling rotor gives the following equation:

(Eq. 5)
$RN = 4.624\ RPM\ C_t R_t$
RPM = rotor RPM
R_t = tip radius in inches
C_t = tip chord in inches.

Another item of interest is blade tip Mach number, which is:

$M = V_{tip}/V_{sound} = .00872 RPM \times R_t / 1116 = 7.81\ RPM \times R_t \times 10^{-6}$

Table I shows some calculations of tip Reynolds' number for typical applications of both my RK-049 and RK-40 AXIFLO ducted fan rotors.

The RK-049 rotor tip Reynolds' number is quite low, being in the critical range less than 75,000, while the RK-40 has moved safely out of that range. There are two rather bad aspects of

INDEX TO ADVERTISERS

being in the critical low Reynolds' number regime:

1) The blades may stall prematurely, causing large lift losses and drag increases unless a proper airfoil is chosen.

2) Even if unstalled, increases in profile drag at low Reynolds' numbers cause a loss in rotor efficiency.

Fig. 4 illustrates both cases. The drag polars of the cambered NACA 4409 show a degradation in terms of less lift and more drag as the Reynolds' number decreases from 165,000 to 41,700. The design C_L of the RK-049 rotor tip section is approximately .7, as shown in Fig. 4. While the drag has increased at the lower Reynolds' number, the airfoil behavior is still acceptable. However, considering the drag polar of a symmetrical NACA 0009 airfoil of the same thickness distribution as the NACA 4409 shows a different story. Note that the lack of camber in the 0009 causes a veritable disaster, the airfoil being totally stalled at the design C_L. So camber is essential. Fig. 5 illustrates the loss in rotor efficiency due to increasing profile drag at low Reynolds' numbers. The profile drag increase for the NACA 4409 is illustrated in Fig. 4. Between the two Reynolds' numbers of 165,000 and 41,700, the rotor efficiency would drop 6%, resulting in a 5.6% thrust loss.

Happily, the new design RK-049 rotors which recently were tested in the A4D performed very well in flight at the desired lower rpm.

CARE AND FEEDING OF THE COX .049/.051

Properly treated, the engine is magnificent. You can hardly fail to achieve outstanding results. Improperly treated, it will buck like any thoroughbred.

For ducted fan applications of the engine, certain extra steps are necessary in the installation and flight preparation

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WANTED Old-Time spark-ignition model airplane motors magazines and gas powered race cars of the 1930's and 1940's Russell Stokes, Rt 1 Box 73J Keller, TX 76248

WANTED: Old model airplane engines, gas model race cars, kits, magazines, parts, related items, 1935-55 Arthur Suhr, W218 N5866 Maclynn Court, Menomonee Falls, WI 53051

McCOY SERIES 21 engines 19, $19.95, 29RC, $31.95; 35RC, $32.95 New World Expert Single Stick radio control with 4 servos $255 Used Ace Baby Twin pulse radio control $50 Smith's Hobby Lobby, 2123 Linda Road, Alexandria LA 71301 Phone 318/443-6510

WANTED Mattel Vac-U-Form or similar machine — any offer considered — shipping paid. Carl Silverman, Box 1027, Stuyvesant Station, New York, NY 10009.

FOR SALE Flying Aces and Air Trails magazines, 1936 to 1950 Send for list Bruce Thompson, 328 St Germain Ave., Toronto, Ontario, Canada M5M 1W3

FORSTER '99 Less than 2 minutes break-in time. Like new Complete with spark plug, dual points. Minus prop nut, front washer Will sell to highest bidder. Victor Zeanwick, 1064 Calvin Ave., Muskegon, MI 49442

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FOR SALE — Large collection of 1930-1945 rubber flying kits. Send SASE Jerry Antczak, 46064 Green Valley, Plymouth, MI 48170 (313) 453-1809

HOBBY SHOP MEET — M.E.C.A. COLLECTOGETHER Got lots of hobby things you don't need? Want to buy engines, kits, etc cheap? Come to the M.E.C.A. collectogether — swap-sell-buy Sat., Oct. 27, 1979 Mercury S&L, 4100 Long Beach Blvd., Long Beach, CA 9 a.m.-1 p.m. Info: (714) 826-0589 eves

cycle. Heeded, they will yield gratifying results; ignored, you will get poor results.

Excerpts from the Midwest RK-049 AXIFLO instructions, which I wrote, follow. Cox was very helpful in advising me on these topics, moreso than I have encountered before in the model field.

ROTOR BALANCE

Check the balance of rotor and spinner on a knife edge by inserting a firmly-fitting spindle through the hub, then setting the spindle across two knife edges. Follow the process in the steps below:

a) Mount spinner to rotor. Mark to allow removal and replacement in the same location. Make sure spinner is properly seated in rotor groove. If spinner rocks while seated, you need to drill out the spinner attachment holes to 3/32 in. It is probably wise to do this *before* attaching the spinner to the rotor.

b) Drill through rotor and spinner, working from the rear of the rotor, using rotor as a drill guide (1/8-inch drill).

c) Insert 1/8-inch spring wire or drill rod shaft.

d) Add masking tape pieces inside hub. Stick to outer wall in appropriate locations for balance.

VIBRATION REDUCTION

A good engine vibration reducer system can be made by rolling a strip of 1/32 ply x 1/4-inch wide twice around a 1/2-inch rod or dowel. Hot Stuff it to hold shape. Insert in front centerbody ring hole over the front end of the TD engine and push it back until it is aft of the gold colored engine prop hub. Glue in place with Hot Stuff or epoxy. The I.D. and O.D. of this plug must be sanded to fit. It should be a tight fit over front of TD crankcase. This process in effect firmly "grabs" the engine well forward of the mounts, greatly stiffening the engine mounting against vibration. •

Workbench . . . *Continued from page 6*

day, September 4, 1979. I hope he will be able to guide the company to provide a greater contribution to the sport of radio control.

"Our seven years association with our parent company, the Carlisle Corporation, has been a pleasant one. They are a fine group of people who have been very fair and reasonable in all of our dealings.

"I have been involved with model aviation most of my life; in fact, it has been my and my family's life. For whatever success I may have had, I owe a great deal to the hobby.

"My future plans are uncertain, however, I hope that all of my friends in the hobby will keep in touch. If I can be of any help at any time, please let me know. Sincerely yours, Phil Kraft, President."

* * *

Leisure Dynamics, Inc. announced in a news release on July 23, 1979, that on that date, "the company had acquired for cash the assets of K&B Manufacturing Division of A.U. Products Corporation. K&B, based in Downey, California, is a manufacturer of precision model engines and accessories sold to the hobby trade in domestic and export markets.

"Louis F. Polk, Jr., chairman and chief executive officer of Leisure Dynamics, said the existing management of K&B will continue under John Brodbeck,

founder and president. 'Mr. Brodbeck's reputation and experience in the hobby industry will be an important addition to Leisure Dynamics,' Mr. Polk said.

"Leisure Dynamics, Inc. is a Minneapolis-based manufacturer of game and hobby products and recently began to diversify into publishing. For the year ended December 31, 1978, it reported net income of $2.8 million on sales of $50.3 million."

In case you hadn't noticed, Cox Hobbies Inc., Santa Ana, California, is a subsidiary of Leisure Dynamics, Inc.

* * *

Some industry news that's not so pleasant. John Gorham, of "Heli-Center West," 23938 Craftsman Road, Calabasas, CA 91302, a Schluter R/C helicopter representative in the U.S., reports that his office was broken into recently, and the following items were stolen: a complete business computer system; a video system, along with many irreplaceable helicopter flying tapes; John Gorham's 1979 MAC Show R/C helicopter winner . . . a scale version of the Los Angeles Fire Department's "Ship 2," a red and white Jet Ranger, with S.T. Blue Head engine, but no radio. The computer and video systems will be extra hard to locate, but if a red and white Jet Ranger suddenly shows up, check it over carefully.

NEW KINDA STICKUM

Well, not entirely new. Carl Goldberg Models Inc. is about to release "Super Jet," a new version of its "Jet" cyanoacrylate adhesive. Where other instant glues are water-thin, Carl tells us that the new Super Jet is much thicker, allowing it to be used in ways not possible with the usual "quickie-stickies." For instance, Carl says you can lay down beads of S.J. that will sit there waiting for the application of a second piece of wood. Pushing the two pieces together spreads the glue into a thin layer, at which point it "goes off" in a few seconds. Not-so-accurate fits will also stick better, as the glue will harden, though not as fast, even in areas that aren't snug (a great help to hackers like us who can't make a solid joint!). The possibilities become interesting when you think about sticking leading edge sheeting to ribs and spars, making large area laminations, and installing bulkheads. S.J. will even make small fillets, for extra strength.

We're looking forward to this adhesive, and will tell you more when we've had the opportunity to try it in person.

NUFF SAID

This one was in the Aero Radio Club newsletter from Flint, Michigan, edited by Jack Pray, and he quoted from "The Flying Machine," Alabama.

THE POWER OF WORDS

The Lord's Prayer has 56 words.

Lincoln's Gettysburg Address had 266 words.

The Ten Commandments has 297 words.

The Declaration of Independence has 300 words.

The AMA R/C Pattern has only 2,456 words.

A recent government order setting the price of cabbage has 26,911 words!●

BYRON ORIGINALS

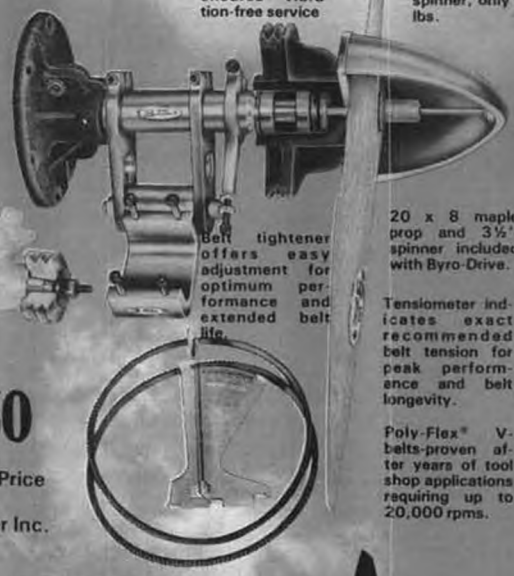
A product of Midwest Industries, Inc. Ida Grove, Iowa, 51445 Ph. 712-364-3165

Quick-Build
Exact Scale

Less than one year ago, Byron Originals introduced its Pitts Special with optional Byro-Drive reduction unit. We made some pretty strong product claims and were more than ready to back them up. We have since learned, from actual applications by customers both in this country and overseas, that the Pitts and drive unit have far exceeded our own ratings. Whether it be packaging, overall parts fit, ease of assembly, fidelity to scale, flight performance, materials quality, overall appeal or completeness, these firsts from Byron Originals have firmly established a new standard of excellence for the entire modeling industry.

No one will agree more than the proud and satisified Pitts and Byro-Drive owner. He'll be the first to recommend a Byron Originals kit for your next project. And you can count on him giving you a long list of reasons why.

We suggest you take his advice and look to Byron Originals for the newest and most intriguing concepts in recent modeling history. You'll agree it's like a breath of fresh air.



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Factory Direct Price

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Order Byro-Drive model number for matching engine.

Model No.	for Engine
MFR-10-	.60 & .65 O.S. Max, frt. & r. valve
RR-11-	.61 & .65 Rossi, rear valve
RF-12-	.61 & .65 Rossi, front valve
WFR-14-	.61 speed Webra, frt. & r. valve
TFR-13-	X.60 Supertigre, frt. valve, r. exhaust
KF-15-	.61 Kraft
HPFR-16-	Silver Star or Gold Cup, frt. & r. valve
OPSR-17-	OPS .60 Speed, rear valve

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Factory Direct Price

'78-'79 SCALE KIT OF THE YEAR

Wing Span: 68"
Wing Area: 1400 sq. in.
Length: 62"

Weight: ready-to-fly, less fuel,
★ Under 15 lbs. with Econokote finish.
★ Under 17 lbs. with Epoxy/Fiberglass finish.

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Send to: Byron Originals, P.O. Box 279, Ida Grove, Iowa 51445.

Ph. 712-364-3165

All orders SAVED by Nov. 10 will be billed at the introductory price. Pitts $188.00, Byro-Drive $89.95. Plus shipping.

Kits... Includes ALL ITEMS to complete models as shown!

Engine, radio, and final paint not included

BYRON ORIGINALS

A product of Midwest Industries, Inc. Ida Grove, Iowa. 51445 Ph. 712-364-3165

MiG-15

Wing Span - 57"
Length - 55"
Ready-to-fly wt. - 8½ lbs.
Wing area 600 sq. inches
For .60 size engines and 4 channel radio

The First Practical Approach to Realistic Jet Performance That:

- Is designed for the average R/C enthusiasts.
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With factory installed

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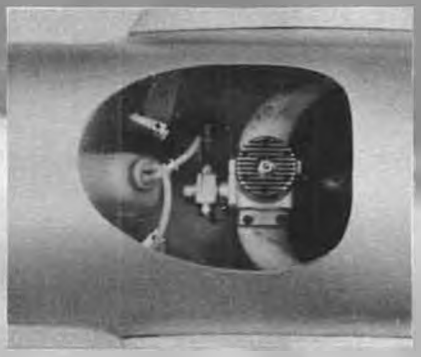

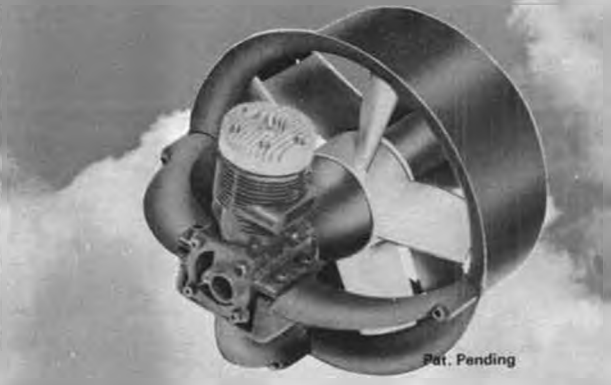

Pat. Pending

Unlike other quick-build kits that often sacrifice authentic detail for fast assembly, Byron Originals has kept both authenticity and simplicity high on the priority list. All die-cut wood parts and 11 foam components needed for completion are designed with quick assembly, scale accuracy and minimized weight in mind. All foam modules consist of lightweight yet impact resistant injection molded polystyrene.

Fuselage consists of hand-layed fiberglass and arrives with fan unit, thrust tube, radio compartment and push rods already installed. All decals and color scheme templates also included.

All control surfaces utilize center point hinging requiring standard servos. Every last item, except radio, engine and final paint are included in kit. No shaping or carving required. No guesswork involved. Only quick, accurate and enjoyable building.

Optional epoxy/fiberglass kit for glassing wings and tail surfaces available for $22.50.

The ducted fan with exclusive quick-start capabilities.

Starter extension provided with kit.

Add $8.00 for shipping to any U.S. address. Items shipped by United Parcel Service.

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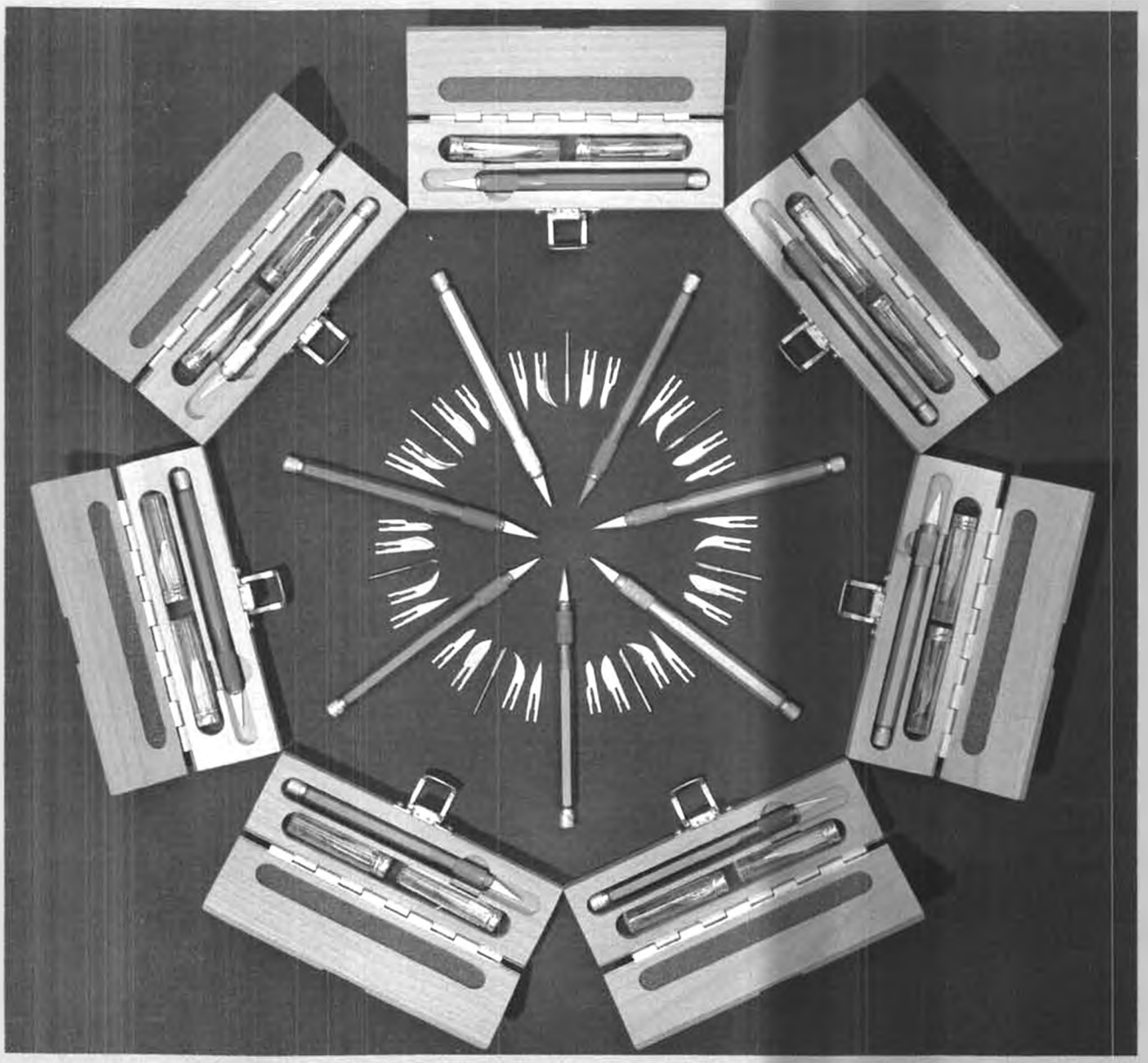

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Available in seven satin anodized handle colors: silver, blue, red, green, gold, copper, violet. Complete set in fitted hardwood case; includes uber Skiver, together with two vials containing four No. 11, and one each of Nos. 10, 12, 15, and 20 . . . . . $14.95
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After we ship our dealers priority orders on these we will show some inventory stock left so your dealer can get additional stock. These engines are super compact, lightweight, beautiful, excellent throttle response, with muffler.

MAX 15 R/C w/m . . . $42.00
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Dave Brown, for the third year in a row, has won the Nationals in Masters Class R/C aerobatics using a World Engines Expert radio. This, plus his win at the Masters, proves that these are contest caliber radios sold at sport flyers prices. Dave used an OS 61 FSR in his Tiporare.

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7 Ch. Expert (4S) $439.95
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65 RSR Marine

These water cooled marine engines show much heavier construction than anything previously offered. Complete with flywheel and universal. Large 7E series carb.

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Supertigre
X-60 RE & SE

The rear exhaust has begun to make its notch in the competitive arena. In airplanes with the buried pipe this engine has proven to be a potent, reliable powerplant. It also shows typical Supertigre's unsurpassed stamina and longevity. Our Tony Frackowiak is running X-60's.

X-60 R.E. ABC $129.95
X-60 S.E. ABC $129.95

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This engine represents a real engineering triumph for OS. A very quiet running engine, it really does not require a muffler. Glow plug ignition. .60 cu. in. $225.00

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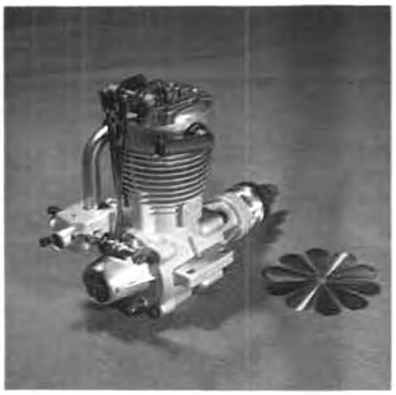
Promised in October. All new case and shaft – not a stretch job. Priced same as 45 FSR . . . $109.00



Supertigre
X-11 R/C

We are now distributing the plain bearing version of this engine. This price will go up December 1, 1979. The ball bearing version is expected July 1980. This engine has real Schnuerle porting and typically Supertigre, it is built on the strong side. Complete with nice muffler and blue anodized head. Carb action is the same as the big Tigres.

X-11 R/C w/m $37.95

61 FSR & 61 VF

The ABC 61 VF was described 2-3 issues ago. 61 VF = a very strong rear exhaust engine for use with a pipe. The 61 FSR replaces the 60 FSR in the OS line. Changes: stronger case, larger crank, stronger crankpin, larger rear bearing. 7D large bore carb. 5/16 prop shaft, draw bar carb retainer.

61 VF ABC w/o m. . $159.95
61 FSR w/o m $145.95
61 FSR w/m. $159.95

Supertigre
X-25 R/C

This engine is a custom extra heavy duty twin ball bearing engine that grew out of the X-21 S.E. This engine has .25 cu. in. displacement. It replaces the popular ST 23 R/C in the Supertigre lineup (a Schnuerle). Complete with muffler and a blue anodized head. Price will go up December 1, 1979.

X-25 R/C w/m $69.95

World Engines

8960 ROSSASH AVE., CINCINNATI, OHIO 45236 TELEPHONE (513) 793-5900 TELEX 214 557

We decided to test our R/C Guidance System at Lakehurst to take advantage of their jet runways. At 1,000 feet we placed visual spotters and chase cars equipped with two-way radio communications. Once the plane was out of sight, the spotters were to relay instructions to the flier. The test began.

MRC'S NEW R/C GUIDANCE SYSTEMS WILL GO THE DISTANCE FOR YOU . . .

MRC's R/C Guidance 2000 proved itself equal to the task. At a range of 4,400 feet it was still going strong. At that point we turned it around and decided we had already proved our point.

We proved MRC's new R/C Guidance radios were designed and built for a reliability, range and responsiveness you can depend on. What's more, they are among the most stringently tested radios ever made. Each one is range tested twice before it leaves our plant. And no other manufacturer we know does that.

When you're ready for your next radio, or your first radio, ask your hobby dealer to show you MRC's R/C Guidance Systems . . . they'll go the distance for you . . . and then some.

(We don't recommend you long range test as we did, because it takes an experienced flier to control a plane based on voice instruction and no visual contact.)

MRC'S R/C GUIDANCE SYSTEMS . . . TEST PROVEN FOR LONG RANGE RELIABILITY.

MRC

R/C Guidance Systems Available in 2, 3 and 4 channels.

"400 FEET UP, 2200 FEET OUT WE LOST DIRECT VISUAL CONTACT. THROUGH A PRE-ARRANGED, TWO-WAY RADIO COMMUNICATIONS NETWORK WE CONTINUED TO FLY."

RESULTS: AT 4300 FEET WE CONTINUED TO HAVE A SOLID LINKUP BETWEEN THE R/C GUIDANCE SYSTEM AND OUR PLANE. AT 4400 FEET, STILL IN CONTROL, WE TURNED OUR AIRCRAFT AROUND AND BROUGHT IT IN FOR A PERFECT LANDING.

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