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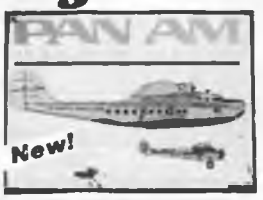

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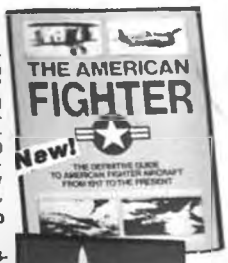

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FEBRUARY 1988

volume 18, number 193

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CONTENTS

FEATURES

CONSTRUCTION

COVER: The first unlimited free-for-all speed event sponsored by the Thompson Products Company was held at the 1929 National Air Races in Cleveland, Ohio. The Travel Air Model R "Mystery Ship," piloted by Doug Davis, beat the swiftest of the military's big iron to win the first Thompson race. This win began the golden era of intuitive engineering coupled with the biggest radial engines available and the finest of piloting skills when big, bad, beautiful airplanes were pushed to the limits. Only five examples of the Model R were ever built. Three are known to have been destroyed. R613K, owned by "Pancho" Barnes, is believed to still exist; the fate of R-2005, which was shipped to Italy, is unknown. A superb replica of R614K has been built and flown under EAA auspices. This original painting, by Bob Benjamin, is available for sale through Robert A. Benjamin Aviation Art, 1222 26th Ave., N.E., Olympia, Washington 98506 (206) 352-2602. For information regarding limited edition prints of other work, contact Frame House Gallery, Inc., at (800) 626-1836.

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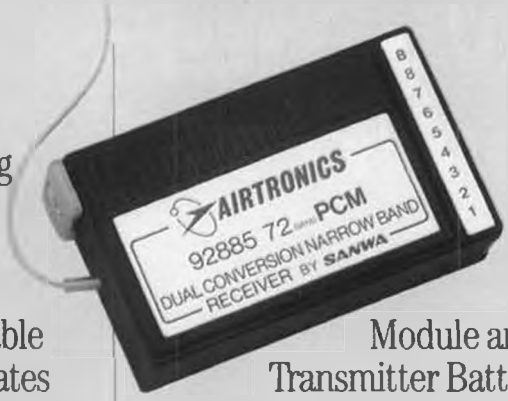

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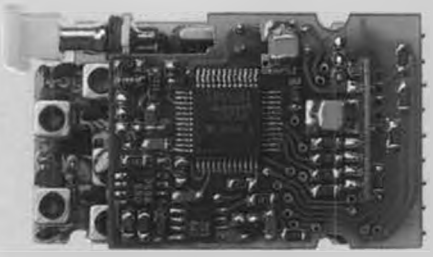

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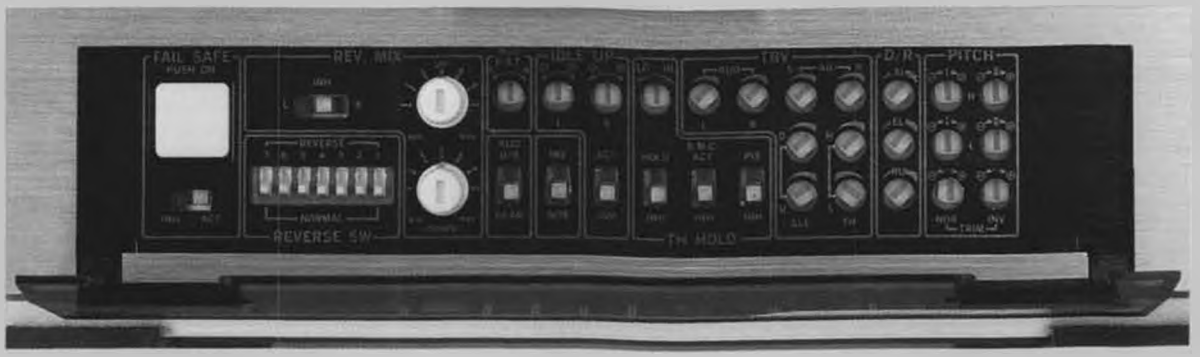


Spectra 7H control adjustment panel. Shown actual size.

from Bill Northrop's workbench

Sal Taibi launches our K&B .40-powered 900 Starduster on its first flight, at the 1976 NFFS Champs, Taft, California. That's WCN on the transmitter. Completely hidden R/C system controls rudder tab and trimmable stab platform. Tatone cutoff timer is only engine control. Details on R/C installation in next issue. See Ron St. Jean's letter in this month's text. At end of flight, we steered 'Duster back to starting spot, and Sal caught it. His comment, "How am I going to keep my trim figure if I don't have to chase it!"

• Last month we put forth a discussion about the fact that radio-controlled model flying is becoming more of a sport than a hobby. We clarified this further by defining the hobby as including the *building* and flying of model airplanes, whereas the sport consists of the *buying* and flying of model airplanes. Obviously a gray area exists, in which the amount of "assembly" required to get an R/C aircraft into the air can vary from "flying out of the box," to many hours of putting things together. The term ARF, or Almost Ready to Fly, as it appears on a box top, can be, and is, pretty loose.

Between last month and this, we discussed the hobby versus sport concept with quite a few longtime R/Cers (hobbiests, that is), and the consensus of opinion is that, like it or not, the majority of today's R/C flying is done with the use of ARF-type models. Of those who fly ARF planes; some cannot and have no intention of building a model airplane; some have built models, but for one reason or another, simply prefer to buy-n-fly; and others, still the majority, do both. The latter category consists of modelers who build and fly, but also buy and fly, for a variety of reasons; i.e., a test bed for engines or radios of dubious behaviour, to learn on or accumulate flying time while engaged in a long building project, or to "have something to fly for next weekend," when the old standby suffers a temporary setback (spelled crash!) that will take a little too long to remedy.

Whatever the reason may be, "the experts agree" that the majority of R/C model flying being done today is with ARFs, and the estimated percentage of this majority averages 70 to 75! So what are we going to do about it? We're going along with it, that's what! In this issue you'll find the introduction of a new monthly column by Art Steinberg, a fellow member of the Joint Military Flyers, of Camp Pendleton, California. Art is a longtime model builder who has made the switch to ARFs, but because of his model building background and experience, he knows how to fix them, how to improve them, how to make them fly better, and how to modify the assembly to lengthen their useful life. If you're in that 70- to 75-percent category, we know you're gonna like the column.

HOW TO BALANCE A MOTH

Many have been built and successfully flown, but we still receive occasional letters asking where our Gipsy Moth (Plan No. 6771) should be balanced, and we still fail to get around to adding this info to the drawing. In the meantime, we'll give you the system, which will work well for most every conventional model (prop/engine in front, wing behind that, and stabilizer at the back end) with a flat or symmetrical stab. . .the balance point is one-third of the wing chord measured back from the leading edge. If the wing is tapered, take the measurement of the chord at half the distance from the center of the wing to one wing tip, and measure back one-third at this halfway point. If the wing is swept (back or forward), take the chord measurement halfway to the tip from the beginning of the sweep, whether the wing is tapered or not. For a biplane, first establish the above measurement on each wing. If the wings are not staggered, as on the Gipsy Moth (wings are directly above and below each other), you have your balance point for the model. If the wings are positively staggered (as with most bipes) or negatively staggered (as with the DH-5 or Staggerwing Beech), the balance point will occur halfway between the balance points of the two wings. One thing must be remembered. . .this is a rule-of-thumb method that is quite reliable, but then very few thumbs are stable flyers, so a bit of caution must be exercised. In any event, it's a good starting. . .er. . .point.

HOW NOW, FREE FLIGHT?

The material that follows will attempt to address a problem that is or should be of greatest concern to all who competitively fly (or wish to fly) free flight model airplanes; the poor quality of sites used for many contests. While this may seem more appropriate for Bob Stalick's column, we feel the problem reaches beyond that, as you will see as you read on. The problem will be discussed, two solutions offered, both pro and con arguments given and evaluated, and recommendations for grassroots-level action provided. The author is Ron St. Jean, who no longer competes, but who has been an active free flighter for 50 years. It is the author's hope and prayer that a clear exposition of the small field problem in general, and the poor fields typically used for many major meets, will serve to bring about real solutions to these closely related problems. Every attempt will be made to explain the arguments on both sides of any given issue; ideas expressed are not necessarily those of the author, but attempt to set forth the best thinking, from whatever source.

THE PROBLEM DEFINED

When the United States had less than 100 million people and the land was not so intensively cultivated, good free flight fields were plentiful. Today, with 250 million people in the nation and therefore a much higher portion of the land totally committed to agriculture, good free flight sites are scarce. As a result, more and more free flighters have abandoned the sport as their old fields become unavailable to them. Because of this, plus the attractiveness of alternative activities such as radio control, national interest in free flight is now about 20 percent of what it was 25 years ago, per AMA estimates.

The annual National Model Airplane Contest has traditionally been held either at one site or closely coupled multiple sites. Such "unified" Nats have been generally preferred because they permitted each contestant to easily cross over model categories to compete in more than one. In addition, this approach created a larger gathering, desired by local businesses, and permitted all contestants to attend Nats meetings, demonstrations, banquets, etc.

As long as the US Navy cosponsored the Nats, the unified approach worked wonderfully; as the Navy provided an accepta-

ble site for all categories of models, except Indoor, and there was always a good indoor site nearby. The Navy-provided food, billeting, and repair hangar made the Navy Nats the best ever, in the minds of most who had the opportunity to attend them.

But since the Navy Nats ended and good free flight fields became more scarce, the AMA has been hard-pressed to provide decent outdoor free flight sites at the unified Nats. The problem seems to be that such sites just don't exist close enough to the population centers bidding for the Nats. Normally, to find a good site that is also available, it is necessary to go long distances from the population center, and this would violate the "unified" concept, so is rejected. Thus, those who fly free flight are forced into inadequate fields that make it very likely that they will lose and damage models because of the poor "best available" site provided them.

But there is a second reason why major free flight contests, such as the SAM Champs, are held at poor sites; the desire for luxurious accommodations close to the flying site. Here again, good fields (available) are rarely found close to the population centers, where luxurious accommodations are found. The current thinking within SAM, at least at the leadership level, is that luxurious accommodations are more important than good fields.

The evidence that supports this conclusion is the fact that SAM summarily rejected a proposal made by a Carson City club to have the SAM Champs at one of the best natural free flight fields in the world, which is located 100 miles north of Reno (Gerlach, Nevada). The reason given for SAM leadership rejection was that the facilities (food, billeting, etc.) were "not adequate." This was done despite the fact that the proposal contained a highly detailed plan to provide adequate (but not luxurious) facilities to the number of attendees projected by SAM. In other words, the proposal that was said to contain provisions for facilities that were not adequate, in itself proved that the facilities would be adequate.

Why are many free flighters. . .even those directing free flight events at the Nats. . .complaining about the site provided at the Nats? Just what characteristics may make a free flight field a "poor" one? Generally speaking, there are only two types. The first is any field characteristic that results in a high probability of a model being lost. This would include dense foliage, the nearness of forests, swamps, houses, lakes, etc., as well as any obstacle that would make chasing difficult or impossible; creeks and irrigation ditches, walls, cliffs, freeways, dams, fences, corn fields, etc. The second type of characteristic needed to make a field "poor" is any condition that would be likely to cause damage to models; power lines, fences, woody sage brush, oil derricks, missile silos, buildings, rocks, lakes, trees, etc.

It would seem that most would not wish to fly their models under any of these conditions because of the likelihood of loss or damage to ships which had a great deal of time, energy, thought, and money invested in them. A few, however, could be expected to welcome such difficult circumstances because they discouraged other competitors from flying, the modelers enjoyed the challenges involved, or looked forward to the loss or damage of models because it gave them more opportunities to work in their shops.

Simply stated, free flighters are complaining about the sites provided by contest management, because of the model loss and damage they have suffered in the past because of these poor fields. . .the case of Phil McCary keeps coming to mind. Being a perfectionist, all of Phil's free flight models are works of art. In 1979 he attended the Salt Lake City SAM Champs, only to put one of his best ships in the lake itself! He was able to get the ship back, but by the time he did, this gorgeous creation was ruined. It is not hard to understand why Phil McCary is adamant concerning the selection of good free flight fields for contests.

SOLUTION 1

If it turned out that free flighters were more interested in saving their models from loss and damage from poor fields than they were in having luxurious accommodations while attending a contest, they could change the minds of contest organizers and managers who believed fine accommodations and the need for "unified" meets was more important.

Jim O'Reilly's idea for a separate free flight Nats is a good one. If a good site could be found and acquired within a couple hundred miles of the main Nats site, and scheduled for the week before or after the Nats, the free flighters desiring to do so could still attend the main part of the Nats as well.

When the Gerlach site was being actively offered as a separate free flight site for the Reno Nats, and later for the SAM Champs, one of the arguments heard was, "One hundred miles is too far to go." Apparently folks using this argument forgot that most free flighters going to Taft, California, travel at least that far to get there!

Perhaps the free flighters within SAM should push for separate sites. The SAM members flying only R/C have no need for good free flight fields. Why shouldn't SAM members think in terms of letting the R/C fliers have their luxurious accommodations in Reno, while the free flighters settle for

Continued on page 106

ADVICE FOR THE PROPWORN
—By Jake

Dear Jake:

I have a petition here signed by the Moral Majority, the League of Human Decency, and Pat Boone calling for the banishment from your column of all glossary items. Private citizens, community leaders, and major corporations have also signed this universal appeal for an end to this form of torture. If we knew your real name we would get a court order, but for now we are limited to the petition and an appeal to your sense of fair play. Please, in the name of all that is decent and just, abandon your pursuit of cheap puns and tawdry innuendo, and forever set aside that abomination known as the "Glossary of Misunderstood Modeling Terms."

The Right Reverend Linus Pockets

Dear Reverend:

I had no idea that my glossary items were so widely read or so universally disliked. There are over 80,000 signatures on your petition (not counting the Xs). I may not be too bright, but I know a landslide of opinion when I see one. I will, of course, yield to so overwhelming an outcry and permanently discontinue the glossary feature in my column. Thank you for your concern, and let me apologize publicly for having offended you.

Jake

* * *

Dear Readers:

Due to circumstances beyond my control, I have been forced to discontinue the information which occasionally appeared in this column under the heading of "Glossary of Misunderstood Modeling Terms." I enjoyed doing the glossary, and I will miss it.

On a happier note, at this time I would like to introduce a new feature which will

Continued on page 86

OVER THE COUNTER

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

• This month we have a lot of new models being introduced, as well as some familiar ones that have been updated. Nowlen Aero, the purveyor of fine Peanut kits, has released a new Bristol Peanut. The prototype was the Scout which led to the B, C, and D versions used by the Royal Flying Corps in 1914. The fine Nowlen kit features a long stick and tissue fuselage with a good-sized gap between the wings. Standard Nowlen features include a finished, machine-pressed aluminum cowl; Williams Bros. cylinders; ball bearings; special lightweight round reed; and all the usual materials necessary to complete the model. A special item is a pair of silk-spoked wheels to enhance the looks and flying ability. Price for the kit is $13.95, plus $2.00 postage and handling. Plans are also available for 50 cents, postpaid from Nowlen.

* * *

Coverite, 420 Babylon Rd., Horsham, Pennsylvania, is out with the third kit in its "Sort-A-Scale" series, the Fokker. It sorta looks like the Fokker D. VII, which was said to be the easiest to fly German fighter of that era, tolerant of a novice's mistakes. The model is likewise forgiving. Designed by Henry Haffke, this is a single-wing version of the Fokker biplane (we told you it was sorta scale), with tricycle landing gear. A 20-page instruction book is included, with exploded isometric drawings to guide the builder. The kit includes mylar pressure-sensitive decals, pre-formed landing gear, a complete hardware pack, plus balsa and ply parts that are pre-cut for easy assembly. Specs on the Fokker are: wingspan, 50 inches; weight, 5 pounds; wing area, 560 sq. in.; power, either a .40 two-cycle or .40 to .60 four-cycle engine. Suggested retail price is $69.95. See the Fokker at your hobby shop now.

Aerodrome Models' Jester for .45 4-stroke.

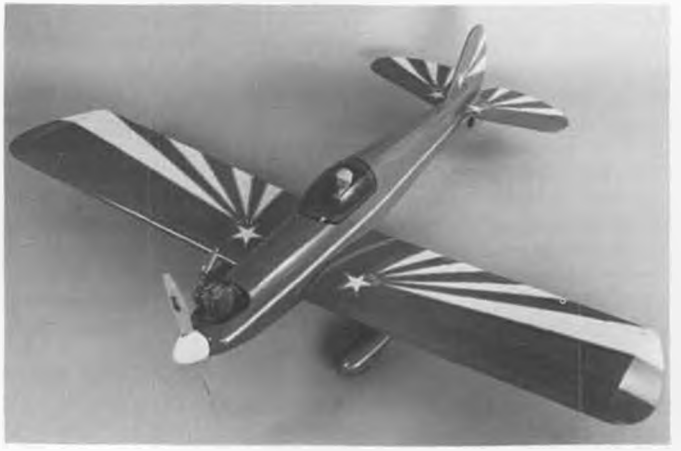
* * *

Aerodrome Models has a new fun flyer that is suitable for water flying, the Jester. You can build it in a week, says Aerodrome, and the airfoil has been designed for an extremely gentle, slow takeoff and landing. Recommended engine size for the Jester is .45 four-stroke. You can work your way up to

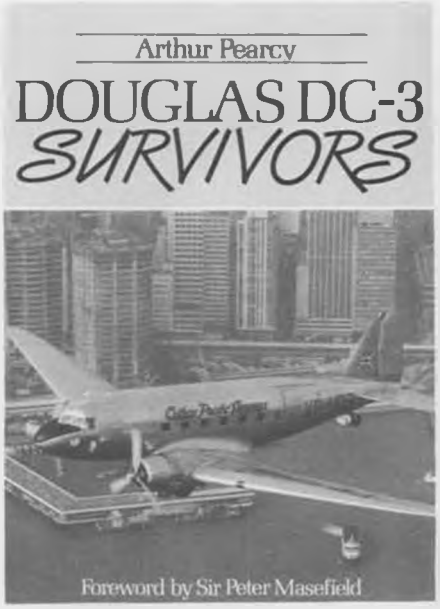
Bristol Scout Peanut by Nowlen Aero.

Polk's gas-powered scale J-3 Cub.

Sort-a-Scale Fokker D by Coverite.



Super Sportster 90/120 from Great Planes.



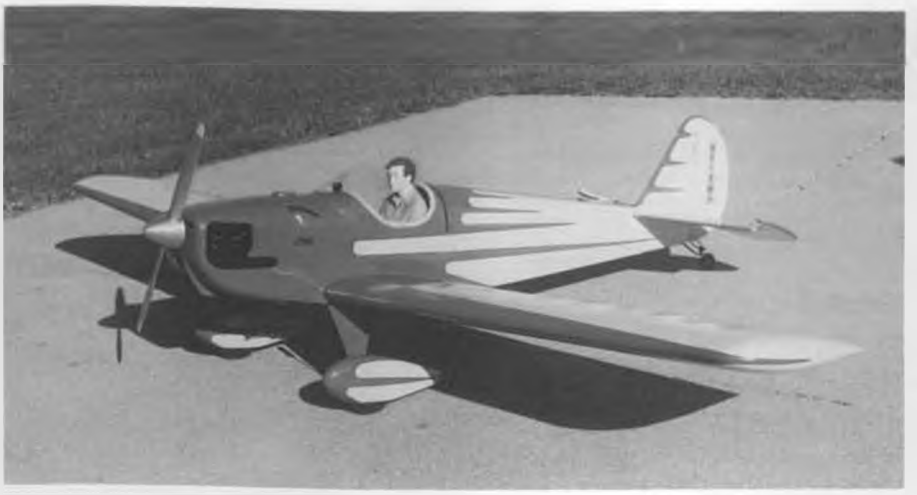
Zenith Aviation Books' DC-3 Survivors.

a hotter model by switching to a .65 to .90 four-stroke later on. It has the angular fuselage, shoulder-wing lines of a basic trainer, but inverted flight, knife-edge 360s and inside and outside loops are possible. You can get an Aerodrome Models Video Catalog, in either VHS or Beta, for $12.50. You'll get a $5.00 rebate when you place an order. Write to Aerodrome Models, 2623 S. Miller Road, Saginaw, Michigan 48603.

* * *

Sig Manufacturing has a model that looks like it came from the Golden Age of racing planes, but the design is brand new. The Spacewalker was designed by EAA member Jesse Anglin as a full-size homebuilt kit, and the new R/C version by Sig is in 1/3 scale. The big wing, thick airfoil, and long tail moment make for stable approaches and soft, slow landings. Loops, rolls, snaps, and spins attest to its aerobatic playfulness. Features include pre-formed fiberglass cowling, wheel pants, and wingtips; three-piece wing design and aluminum wing joiners; pre-bent wire landing gear; photo-illustrated instruction book; four sheets of plans; authentic decals; complete throttle and aileron pushrods; and more. The Spacewalker's wingspan is 104 inches, and weight is approximately 20 pounds. A 1.5 to 2.4 two-stroke or 1.8 to 3.0 four-stroke engine is recommended, along with a four-channel radio. Contact Sig Manufacturing for more information, or visit your hobby dealer.

Kingson KS-1200 Charger from Circus Hobbies.



Sig's new Spacewalker in 1/3-scale.

Bill Fries tells how to build a model on tape.

* * *

Great Planes has released a new sport model, the Super Sportster 90/120. With a 72-inch wingspan, it's the largest Sportster yet. Power is from a .61 to .91 two-stroke or .90 to 1.20 four-stroke engines. The model is extremely easy to build, with interlocking parts similar to the Big Stik series of planes. The photo instruction book makes building an easy step-by-step operation. For more information, contact Great Planes Model Distributors, Box 721, Urbana, Illinois 61801.

* * *

Polk's Model Craft Hobbies, 346 Bergen Ave., Jersey City, New Jersey 07304, has a new scale gas-powered model, the Piper Cub J-3, in an all-wood ARF configuration that's easy to assemble, and even easier to fly for the novice. You can find the Polk's Piper J-3 at your hobby dealer, or by contacting Polk's directly.

* * *

What's new from England, you ask? How about the return of JETEX! A company called Powermax, in England, is producing near-replicas of the Jetex rocket motors,

Ribbon and frequency numbers from Du-Bro.

Analog Tach from Royal Products.

Jet-X is back! All-new, from Peck-Polymers.

called Jet-X, for cars, boats, helicopters, and airplanes. Weighing only 10 grams, these new motors have a power run of about 20 seconds, with enough thrust to fly a 14- to 22-inch span model. If you'd like to experiment with some of those old Jetex designs from old model magazines, now's your chance. The new Jet-X products are available from Peck-Polymers, Box 2498, La Mesa, California 92071.

* * *

The Kingson KS-1200 DC Quick Charger from Circus Hobbies is a perfect quick charger for the R/C car enthusiast, with a variable amperage charging ability and an adjustable 0- to 3.6-amp charge current output, and a built-in meter display, along with an adjustable 5- to 30-minute timer that shows charging status through a countdown LED display that beeps continuously when charging is complete. There's a built-in fuse for protection against shorting out, and large battery terminal clips for solid connections. The Kingson KS-1200 will give you hours of reliable performance, and it's only $39.95, direct from Circus Hobbies, 3132 S. Highland Drive, Las Vegas, Nevada 89109.

* * *

New books from the library this month include a beautiful hardbound volume called *Douglas DC-3 Survivors*, which traces in 215 pages the surviving models of this durable passenger and transport plane. Author Arthur Pearcy traces the fate of every DC-3 produced in Douglas plants in Santa Monica and Long Beach.

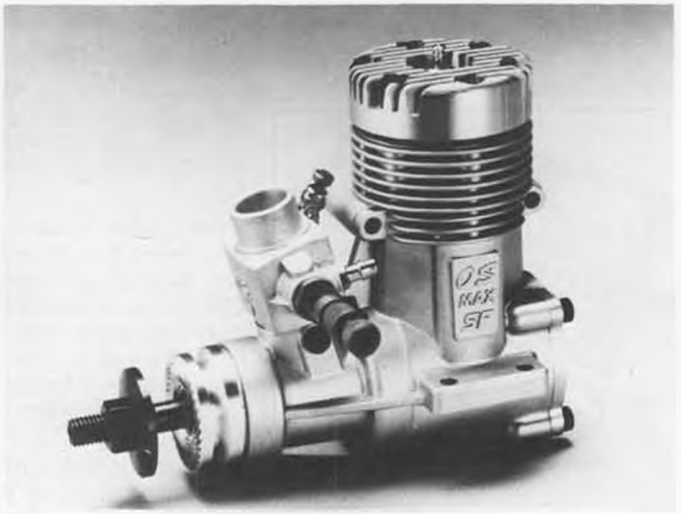
Also this month, *North American F-100 Super Sabre*, by David Anderton, is the first in-depth story of the first operational supersonic fighter, the F-100. In a detailed study resulting from two years of research, the author presents the complete story of the F-100, from assembly line to low-level missions in Vietnam. *Super Sabre* and *DC-3* are both available from Zenith Aviation Books, Box 2MB, Osceola, Wisconsin 54020.

Continued on page 85

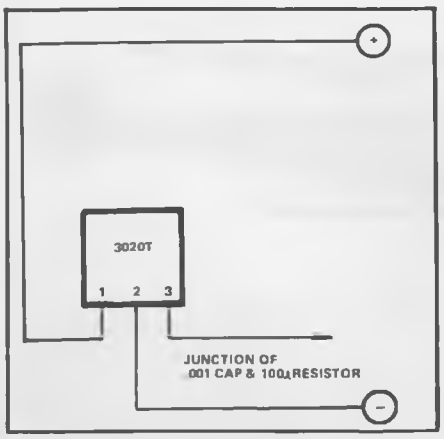
MEPS-11 Speed Control by Midwest Products

R/C scale Typhoon from Cox Hobbies, almost ready to fly.

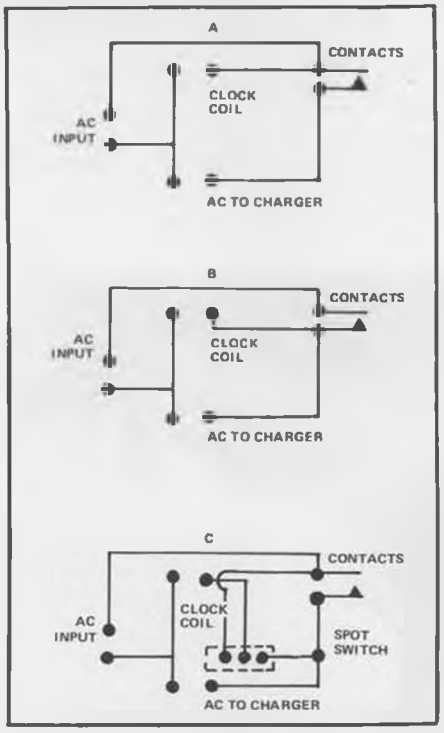
New body for the RC10, the Sidewinder.



New O.S. Max FS engine from Great Planes Model Distributors.



Various modifications to a household-type timer charge to provide more useful Ni-Cd charging chores. See text.



Modification of the spark ignition system described in our November issue, to include a Hall Effect(magnetic) pickup in place of the old-fashioned points.

Electronics Corner

By ELOY MAREZ

• Mail Call! First up at bat is Clyde Wealand, from Akron, Pennsylvania (Did they move it?), who writes:

"During a conversation with a flying buddy, he stated that he constantly forgets to disconnect the Ni-Cd battery charger after the 14- to 16-hour period and sometimes a few days pass before he remembers. Even using a regular 24-hour timer with a 14 to 16 time period set, it may be forgotten and will trip on again after 10 or 8 hours respectively.

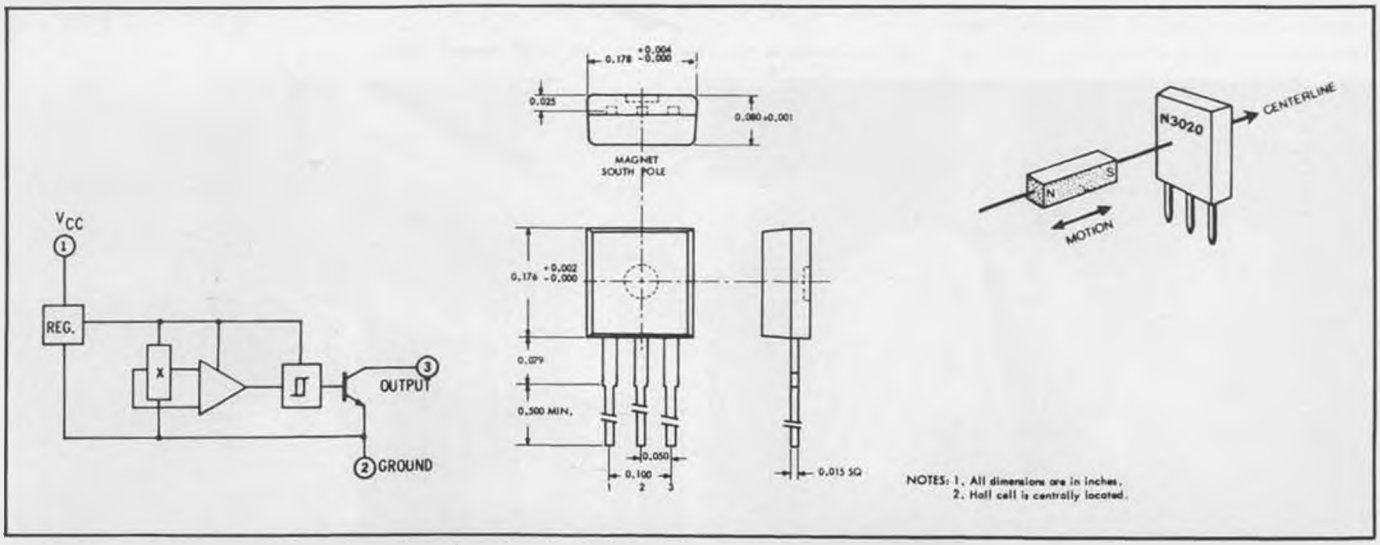
"I modified a regular 24-hour timer many years ago when Ni-Cd button cells were first used. Possibly the newer R/C pilots would benefit with the modification.

"Figure A is how a regular inexpensive 24-hour timer is wired.

"Figure B is a simple change requiring you to manually turn to the on position and will automatically turn off and remain off after the preset number of hours. With this change the timer would not operate in the normal mode anymore, so I added a single pole double throw switch in the circuit in order to use it either way. That is, either constant on-off cycles or mechanically on and automatic off cycles.

"I use the manually on-automatic off cycle for normal charging and then throw the switch to constant on-off cycles after installing the proper resistors for trickle charging." This requires no further explanation, as Clyde tells it quite well. It sure sounds like an excellent solution to the problem that faces us all sooner or later. You know, the one heard about concerning the three things that we lose first as we get older. The first one is our memory—and I forget what the other two are!

Continued on page 87



The block diagram(A), physical configuration(B), and method of mounting Hall Effect cell and magnet(C). Details about these useful devices are included in the text and are further available from Sprague Electric Co., Pembroke Road, Concord, NH 03301.

CHOPPER CHATTER

BY DICK GROSSMAN

• It really doesn't matter how old you are. The moment you walk through those doors you're a little kid in the biggest toy store in town. The Chicago Hobby and Model show has become one of the country's showcases for the hobby industry. For the trade it's the opportunity to view the products, meet the people, and make the deals that will show up in that all-important bottom line. For the hobbyist, it's a chance to line up some winter building projects and knock off some early Christmas shopping. Window shopping, that is, because no over-the-counter selling is permitted, except for the co-op hobby shop and the few people selling out of their vans in the parking lot.

The helicopter end of the show came together this year with the first appearance of Circus Hobbies. Jim Morley, of Morley Helicopters of England, was here too, but absent were John Gorham of GMP and Walt Schoonard of Miniature Aircraft USA. Their booths were ably manned by second generation Gorham (Robert) and Schoonards (Ted and Tim).

CIRCUS HOBBIES

If you like radios, you could have spent a whole day at the Circus booth. In helicopter radios alone I counted ten different models of JR radios. The Galaxy 8 computer radio does things you can hardly believe. I think it's the best buy of any helicopter radio in the world for the advanced flier. But that's another story. A radio I haven't seen before is the Vegas (as in Las Vegas), a moderately priced seven-channel PCM computer radio that will be sold exclusively through hobby shops. Besides having the exceptional JR line of radios, Circus is the exclusive US distributor of the Kalt range of helicopters. The Baron 30MX is a terrific buy at under $200. It is a slightly larger and updated version of the Baron 20, and I picture this with the new O.S. 32H with bottom cone start, providing some extra power and eliminating the one thing I don't like about most Japanese helicopters—belt starting. At the other end of the spectrum is the Baron 60, a premier competitive grade chopper noted for its smoothness and stability. Put this in Kalt's Bell 222 fuselage, and you have the ultimate flying machine in looks and performance. Or, for some impressive realism, how about the KG22S, the gasoline-powered Baron 60, with a built-in pull starter. It's got plenty of power, sounds real, and runs a half hour for about a quarter. Picture this in a five-foot two-inch Jet Ranger shell, and if that doesn't send a chill down your spine, put a mirror under your nose to see if you're breathing.

The *Hobbyist* is a 24-page brochure of Circus products. You can get a copy from Circus Hobbies, 3132 S. Highland Drive, Las Vegas, Nevada 89109-1042; phone, (800)782-0022.

ROBBE MODEL SPORT

You read about the new schluter Scout 60 and Junior 50 in last month's column. (If you don't have that issue, you can write to *Model Builder*, and they will sell you a back copy.) In my opinion, they haven't come up with anything better than the Champion, still one of the best choppers around. You certainly can't go wrong with any one of the three. But don't overlook the Heim helicopters, of which Robbe carries the slick-looking pod and boom Avante Guard and the scale Aerospatiale Ecureuil. These are solid, high-performance choppers utilizing the lightweight Heim mechanics that have a fine reputation established in competitions throughout the world. With their counter-clockwise rotation (opposite to most models, but the same as full-scale

Static winner in sport helicopter: the GMP Hughes 300C.

Steve Helms of Futaba with the YS helicopter engine.

Du-Bro's helicopter products are promoted by Dan Costa.

Mike Bird of Circus Hobbies with two of my favorite radios: Galaxy 8 and Apollo 7.

Colin Cameron-Tough with his new magazine, Helicopter International.

machines), these might be a little too much for the entry-level flier to handle. *He* might try the newly designed Robbe Clou, which utilizes some unique construction features to make it easy to assemble and especially stable. The fly in the ointment is that a helicopter radio is required that has transmitter collective-cyclic mixing. Unfortunately, these are not readily available in the US.

The new Schluter Catalog is worth having. It's a very attractive and informative publication; and since it's written with both the English and French translation, it will help you with your French lessons. "Le modele 'Avant-garde' est un appareil d' entrainement destine' aux pilotes deja' experimentes." Translation: "The 'Avant-garde' is a trainer for the advanced helicopter pilot." (?!!)

Robbe Model Sport, 180 Township Line Road, Belle Mead, New Jersey 08502.

GORHAM MODEL PRODUCTS

Watch for my review of the Special Edition Stork. This is another successful combination of the innovative designs of Hirobo of Japan and the engineering talent of John Gorham. Two of their previous efforts created the Competitor and the Cobra, which, between the two, compiled the following record in 1987: U.S. Nationals—*first and second*; British Nationals—*first*; and the World Championship—*first*. Any questions? GMP is importing a trio of preassembled and pre-painted scale fuselages for. . .the Shuttle! Current selections are a Hughes 530, an Aerospatiale Squirrel (A-Star), and a Bell Jet Ranger. Speaking of the Shuttle, they're still as hot a seller as ever, and probably responsible for more new chopper fliers in the past couple years than anything else. All of the Hirobo line is available through GMP, including the scale SST-DDF range of choppers and the pod and boom Hawk and Eagle SST. The Cricket, Competitor, and Cobra are still in demand. Look for a optional belt drive for the Cobra in the near future; and keep in mind their many accessories including the GMP gyros, pitch gauge, ball link tool, Z-starter, and base-loaded antenna. The new GMP video contains some excellent instructional material and features a flying exhibition by Robert Gorham that we mortals can only dream about.

Two-dimensional chopper from David Stern of Ambrosia Microcomputer Products.

MINIATURE AIRCRAFT USA

Tim and Ted Schoonard looked a lot more relaxed than the last time I saw them. Maybe that's because 1500 of their X-Cell helicopters are now in the hands of distributors, hobby shops, and modelers. That wasn't the case just a few months ago. With one setback after another, people were wondering whether this highly publicized and promising new helicopter was ever going to hit the market. More than one flier I know spent all summer waiting for his new X-Cell. But that's history now, and by all reports the X-Cell has been getting good grades throughout the country—particularly by the top pilots. This is the first domestically produced helicopter since the American R/C Eagle—an imitation GMP Competitor that might have made it if a single-engine airplane hadn't crashed into the factory and burned it to the ground. (Why don't airplane fliers like helicopters?) The X-Cel 60 is a lightweight (around eight pounds), high-performance chopper that is considered a strong candidate to become the machine to beat under the new FAI contest rules. Aerobatics are now compulsory, and it's going to take a versatile helicopter to negotiate the loops, rolls, and stall turns while still locking into the tough hovering maneuvers. Tim and Ted looked good flying their prototype models to a fourth and fifth place respectively at the F3C team trials in

Continued on page 81

Rave's R/C and owner Dave Carter.

Lord Jim, Jim Morley of England.

BIG BIRDS

By AL ALMAN

Roger Ringelman's nice-looking Citabria made a boo-boo and is undergoing repairs.

• These nifty wheels are marketed by Dave Brown Products, and let me tell you that Dave named 'em well.

They are L-I-T-E, or L-I-G-H-T, or however else you may want to spell it. But in this case what's a lot more important than spelling is putting a pair of these wheels on your BIG Bird because with the typical sizes we use, you're gonna save at least five to six ounces of dead weight.

What you'll find is that when comparing the same size wheels, two of Dave Brown's Lite Flites weigh no more than one of Brand "X's" inflatables. And saving a third (or more) of a pound is nothing to poo-poo about. Even on our biggies this amount of lightness makes for a better flying, more nimble, and safer airplane.

Frankly, I was kinda hesitant to use these wheels at all just because they are so light, oops, I mean lite. Even though I usually fly off grass, it seemed that they wouldn't be able to stand the gaff; after all, when doing a comparison squeeze test they do come off feeling much like sophisticated marshmallows.

Nevertheless, the pair I've been trying out are on my 14-pound Lavender-flavored Ace 4-120, and, after many dozens of flights and who knows how many bump and go's, these four inchers are still in prime shape.

I never have tried these tires on asphalt or concrete, so I don't know whether the usual amount of grit found on these surfaces might have chewed them up or not. I suspect there was some kind of problem like this with his first tires because Dave has recently changed the recipe, and now the improved Lite Flites should stand up well to abuse on any kind of runway.

You've got a wide choice of sizes, from 1-1/2 up to a whopping 6 inches, which means that you won't have to worry about a heavy tailwheel screwing up your airplane's balance because the 1-1/2 and 1-3/4 inchers are feather-light.

In spite of their low weight, these wheels are sturdy. Don't be afraid to give 'em a try!

PROPS

Back in July Bill Carpenter let me use one of his 15 x 8 Graupners, and I became an "instant" convert when I saw how that prop turned on an already fine-flying 1.2-powered 4-120.

Since then I've put more time on that 15 x 8, and a number of other sizes ranging from a 16 x 8 down to a 9 x 5, and have to agree with many of the guys I fly with that a Graupner not only delivers more rpm but appears to be quieter when compared to a wood prop of the same size.

Unfortunately, Graupner doesn't (yet) make anything bigger than a three-bladed 16 x 8, which is too small for the Super Tigre 2500/3000 or OPS Maxi-30, although I did hear a rumor (so far unsubstantiated) that Graupner will be coming out with larger 18- and 20-inch props for these engines in the near future. However, they do have 13-1/2, 14, 15, and 16-inch two/three blade props that are tailored for the 90, 120, 160, and 240 four-strokers that so many of us are using now.

There are four safety notes included with Graupner props. Two of these are sort of old hat and apply to any brand, wood, or composite; not using a damaged propeller and not standing in line with the prop arc. But the other two warnings are red flag items for the Graupners only: don't let tip speed exceed 180 meters per second, and don't let the prop dry out.

According to the example given, a 28-centimeter (11-inch) prop will hit this max allowable tip speed of 180 m/s when turning 12,279 rpm (you can figure out the tip speed for any prop by multiplying the prop diameter, in cm, by 3.1416 to get the circumference of the prop arc; dividing the actual rpm reading by 60 so you have revs per second; and then multiplying the first two steps together. With a four-stroke you won't have to sweat even coming close to the red-line tip speed, although you do want to be careful when using a two-cycle.

As for not letting the props dry out, Graupner's note states: "To preserve the strength the water contents must stay

Dale Campbell and his B&B Laser. A Q-50 makes her fly, and the B&B smoke system accents Dale's impressive flying.

After home-brewing his Aero 94 four-stroker, Jack Moore needed a bird to put it in, so he built this Q-scale Heath Parasol LNB-4.

More bare bones: an O.S. FS-90-powered Aeronca LB belonging to Ken Pruitt. Scaled up from Paul Matt drawings.

trapped in the material. For that reason they should be stored as cool and as moist as possible. A lack of water contents can be compensated either by putting the propeller in boiling water for a short while or by submerging it in water at ambient temperature for a couple of days."

If your local hobby shop doesn't carry Graupner propellers, you'll have to order straight from Hobby Lobby. But even the regular retail prices are not out of line, especially when you consider that in addition to being quieter and more efficient, these reinforced nylon props are much more durable than their wood counterparts.

SERVOS

I've adopted a set of standards in regards to servo installations, and it reads like this:

If the bird is BIG but light and slow, like the 7-1/2-pound humongous version of the Prairie Bird 50, I use only one servo for each of the primary flight controls.

But if the bird is over 10 or 11 pounds and particularly if it's aerobatic, I double up on both ailerons and elevators. This redundancy, having a separate servo for each aileron and elevator half, gives me the capability to bring my plane down safely in case any of these four servos decides to quit.

And although this redundancy would usually allow the use of standard servos (the ones that are rated in the 40- to 43-ounce/inch category), I feel a lot more confident using 72-ounce/inch servos, like the Airtronics #94554 and the newer #94732.

These smooth-operating little jewels are coreless and have ball bearings and no backlash. My older model 94554s, in spite of being very used and very abused these past three years, have performed flawlessly. Reminds me of the old Timex commercials when John Cameron Swayze would do terrible things to a watch and then have the TV camera show that it was still working while he said, "It takes a licking but keeps on ticking."

MORE FROM DOERR

BIG Al Doerr can build more BIG Birds faster than anyone else I know. Yet, in spite of being a prolific builder, Al is a craftsman; he doesn't believe in turning out a schlock airplane, and he doesn't believe in turning out a small airplane either.

A perfect example is his new project. But this isn't just another mundane 80, 99, or 140-inch Robinhood. Nope, this time Mr. Doerr cranked in over 13 feet of span.

"Enclosed you'll find some bare bones photos of my latest project; another Robinhood. This time a BIG one: span, 160 inches; wing area, 33 plus square feet; weight, 46 to 50 pounds; wing loading, approximately 23 ounce/square feet; and engine, O.P.S. 3.6 cid.

"Al, this is a very strong engine. It swings a 24 x 8 Zinger at about 6,000, and it pulls in excess of 26 pounds on the ground. It won't make the plane fly like a pattern ship but should certainly get her in the air with no trouble.

"I now have a full set of these Robinhoods. John Maloney of World Engines was really interested in these BIG ones but didn't live to see them."

Al didn't mention any target date, but I'm sure that he'll have this new jumbo of his flying by early spring. And as I pointed out, although he seems to crank 'em out pretty darn fast, he makes the time and effort to insure that safety is the bottom line and that all of his planes are airworthy, which is a lot more than I can say for some other "modelers" who literally do throw their airframes together without really knowing what they're doing and with little or no regard for anyone's safety.

Like the vast majority of other BIG Bird lovers, I'm not obsessed with building a 13-foot, 50-pound behemoth; an eight, nine, or ten footer is BIG enough to suite my needs and keep me off the streets and out of the pool rooms for quite a while.

CLEANUP

Here's a tidbit from Doug MacBrien about cleaning up your bird after a flying session. He sez:

"I just discovered that Vista car wax/cleaner does a great job of cleaning off exhaust residue, so you can forget about 409 or Fantastik!"

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Al Doerr's 160-inch version of the Robinhood with an OPS 3.6 twin on front of all that lumber. Didn't say who the lady was.

A 16-1/2 pound, Q-35-powered Byron Pitts by Doug Kincaid.

Bobcat Mark II

By BOB BENJAMIN. . .This 'could-be-scale' model is the imagined counterpart to an imaginary sport aerobatic homebuilt. The original Bobcat was a construction article in the January, '85 Model Builder.

• What do you call a model that looks like a scale replica, but isn't? "Semi-scale" suggests a heavily compromised scale effort. "Scale-like. . .?" I rather like "could-be-scale." When I first saw this term several years ago (I think it was in the pages of *Model Builder*), I understood it to refer to a model of some possible, but nonexistent full-scale aircraft, or to put it differently, a model which might reasonably be scaled up to become a man-carrying machine.

The Bobcat Mark 2 is a could-be-scale model of a hypothetical full-size single seat sport aerobatic homebuilt airplane and is indeed intended to be a serious aerobatic machine just for the fun of it. As a matter of fact, there is no reason why it shouldn't be right at home in some aspects of serious competition. The original Bobcat, presented in the January '85 *Model Builder*, was a much smaller airplane developed along could-be-scale lines to explore the capabilities of smaller Davis Diesel engine conversions in aerobatic R/C models. That ship was a real hot dog (I should say "is"; it has been retired to a place of honor on the wall of my shop); it performed on a .15 diesel conversion the way other similar airplanes do on glow .20s. The bigger airplane presented here was developed for much more "mellow" performance. Keeping in mind the imagined 100- to 150-hp fifties or sixties homebuilt single-seater that I wanted the airplane to represent, I thought in terms of maneuver radii and rates of acceleration that would bring to mind such an airplane. Everything in the design, from control surface sizes through the choice of airfoil and considerations of cross-sectional area right on down to the use of a four-stroke engine turning a large prop at moderate rpm, was intended to contribute to the illusion of having reduced a man-carrying airplane.

A similar effort was made with the ap-

The Bobcat in flight: a good performer with an O.S. .61.

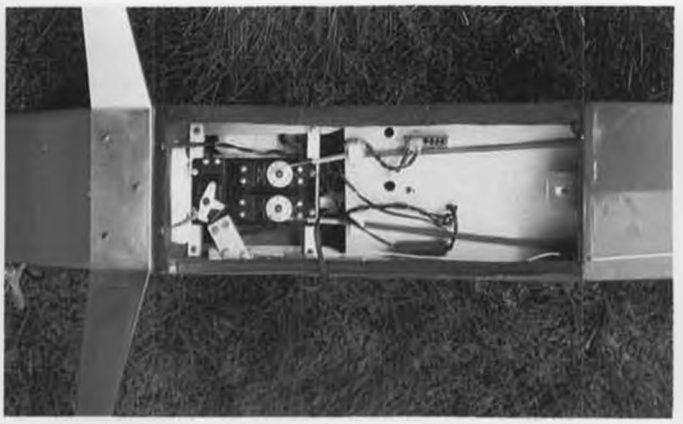
Nose detail on the Bobcat. A cowl available from Ikon N'West will fill the bill. Author advises reinforcing the entire cowl unit with 2-ounce fiberglass cloth and resin or cyano glue.

pearance. Aside from the obvious devices of cowling the engine, fitting a spinner to the cowl, and making a serious effort to create a believable cockpit, the most important aspect of the Bobcat's design in terms of appearance is the use of the fuselage cross-section such that a scaled-down man could really sit in it. I actually drew a template of a one-fifth-size, six-foot man in a sitting position and used it as a guide to laying out the original drawing, just as though I were working on a full-scale homebuilt. This feature caused two reactions. Experienced modeler friends, seeing the working drawings, exclaimed that it was "too big." These same friends, looking at the completed airplane, couldn't understand why it looked so realistic compared to the thinned-down, skinny models they were accustomed to. We are indeed used to looking at "pencil bombers." Slender fuselages have been with us for decades, mostly in the name of minimal cross sectional area to reduce drag for peak performance. While this is a legitimate consideration for categories like FAI free flight or racing events, it may work the other way around for aerobatic airplanes to be flown at moderate speeds. It has been demonstrated that in the speed range we are flying in, a long, thin shape (fuselage) can be less efficient when forced to assume an angle of attack than a well-streamlined, thicker body. The best fuselage shape for what we want may well be a well-finished, fat teardrop! Some experimentation has convinced me, albeit on a qualitative basis, that the greater-than-customary fuselage cross-section of the Bobcat Mark 2, combined with attention to streamlining and finish, has contributed significantly to the airplane's flying through maneuvers at a very consistent speed. Using various four-stroke engines turning 13-6 and 14-6 props in the 8600 to 9500 rpm range, the Bobcat seems to be flying at speeds between 60 and 75 mph and does in fact go up and come down at just about the same speed. This is just what you want for smooth, consistent maneuvering in close where it can be appreciated. Don't take my word for it; build one and try it yourself.

Some specifics on power: The prototype airplane which you see in the photos initially used an O.S. FS .61 engine turning a Top Flite 13-6 prop on Red Max four-stroke fuel. I flew the airplane in this configuration for nearly two years. A .60 to .65 four-stroke will provide plenty of power for fun-type flying. I'd compare it, based on experience with full-scale airplanes, to the performance you'd expect from a scaled-up version, a single-seater of about 1200 pounds gross weight flying on a 150 hp engine. The airplane will do nice round sequential inside loops from level flight for as long as you pay attention, but will eventually fall out if you're careless.

Late last year I put in one of the then-new Saito .80s, and the Bobcat really began to snarl. I use a 14-6 prop, which the Saito consistently turns at 9500 rpm or better as measured by my Ace Tachmaster II, on good ol' Red Max 10-percent, four-stroke fuel. With this engine at full throttle, the airplane will climb at a 60- to 70-degree angle until I chicken out. (Note: There are some inconsistencies on the translated performance

Bottoms up Bobcat showing belly and nose detail.



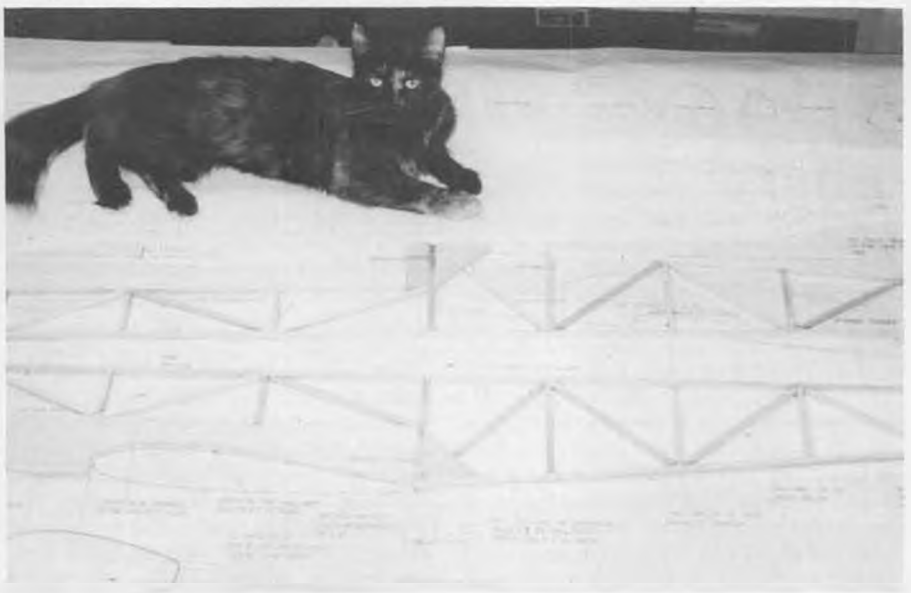
Radio area, including throttle servo-actuated micro switch for on-board glow heater.

figures on the instruction sheet provided with the Saito .80. I did some careful checking with the folks at A&M Aircraft Supply, who distribute the engines, and determined that the numbers I just mentioned are right on. Contact A&M if you have specific questions.) Takeoffs are effortless at about 60-percent power. In fact, I always take off at partial power to keep things slow enough to enjoy watching. It's not uncommon for me to go through an entire flying session without even opening the throttle all the way except for a preflight check, even in maneuvers like great big square loops. I have had the opportunity to fly a couple other locally-built Bobcats on four-stroke .90s and found their performance consistent with that of my airplane on the Saito .80.

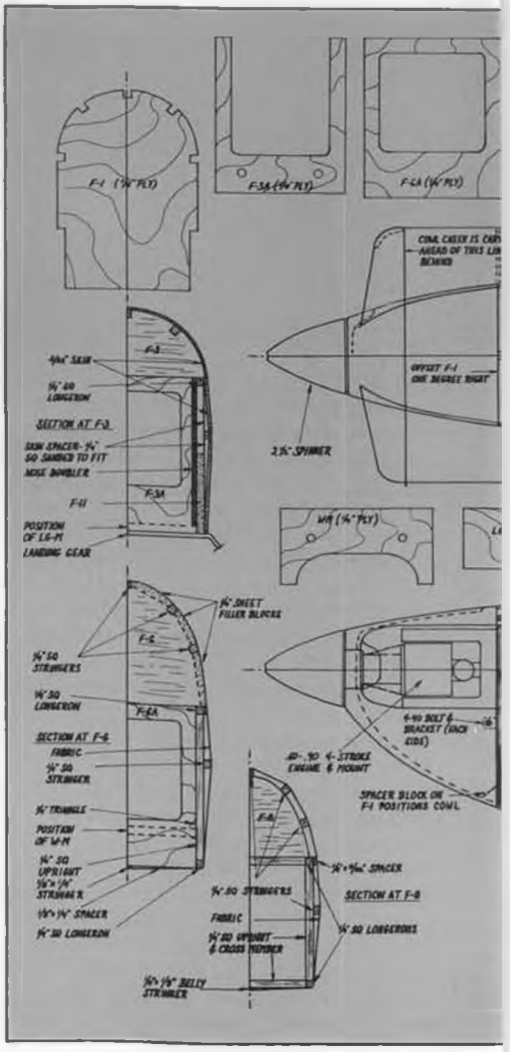
Structurally, the Bobcat Mark 2 is for you guys who take pride in your ability to do a good building job. There are plenty of airplanes around designed to be built over a weekend or two and tossed into the air and, unfortunately, most of them look the part. This airplane will give you a chance to show off your skills. Don't be scared off by the cowl. This is not a first-timer's airplane, so I'll assume that you've carved a few blocks before. I haven't provided a lot of detail on the cowl, as those of you building one up from scratch will have your own ideas and will be fitting dimensions to a lot of different engines. Another option is a ready-made cowl. Ikon N'wst has agreed to make styrene cowls moldings available for $9.95 plus $2.00 shipping. Contact them at P. O. Box 566, Auburn, Washington 98071.

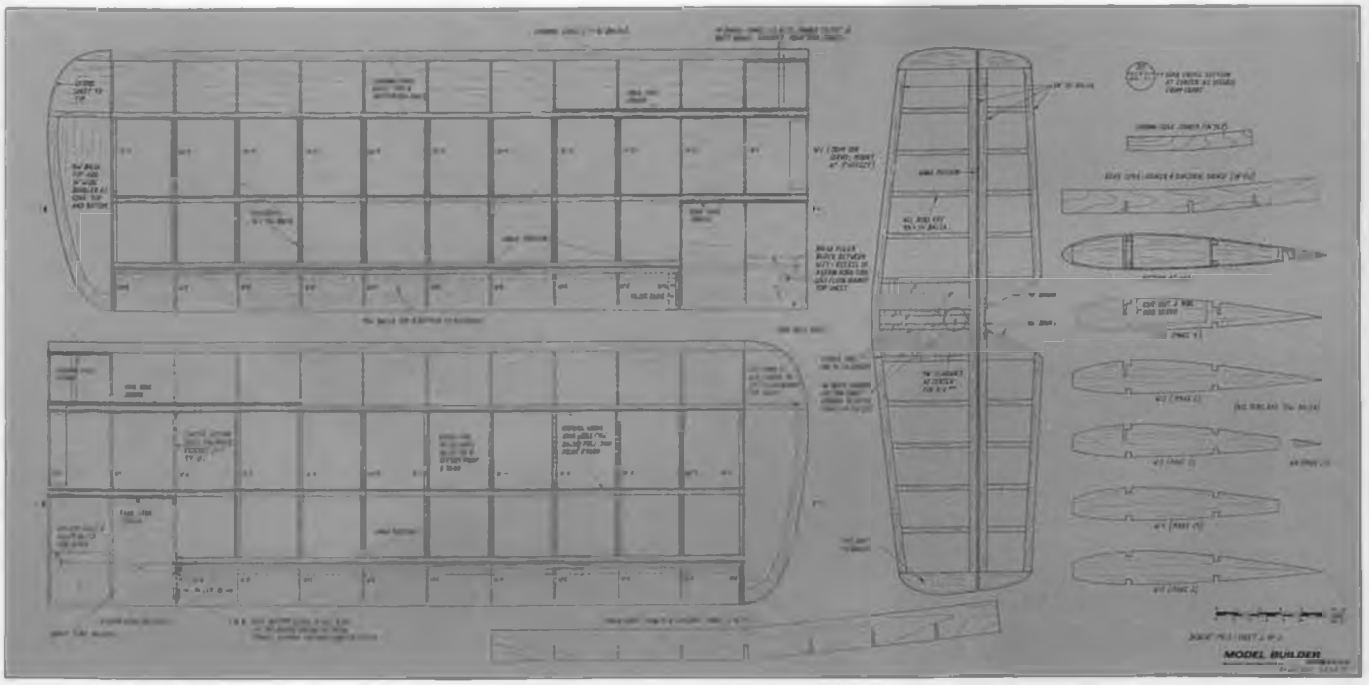
Let's get on with the building. I won't go

Jenny, a pretend bobcat, with the basic fuselage assembly of the model Bobcat.



Quality control person Connie studies side frame assemblies on the Bobcat.





through all the details of the stuff you should already know if you're going to tackle this project. Materials are called out on the plan. Plywood means good aircraft grade stock, except where lite ply is specified. All balsa should be good, firm medium weight B-cut stock except as follows: use medium weight A-cut for the top cowl sheeting *if* you intend to use fiberglass reinforcement; otherwise, put up with the difficulty of bending the stiffer wood to get the strength you'll need. The leading edges of both the wing and horizontal tail should be the hardest pieces of balsa you are comfortable with to withstand dents and dings over the life of the airplane. Use super-hard 1/4-

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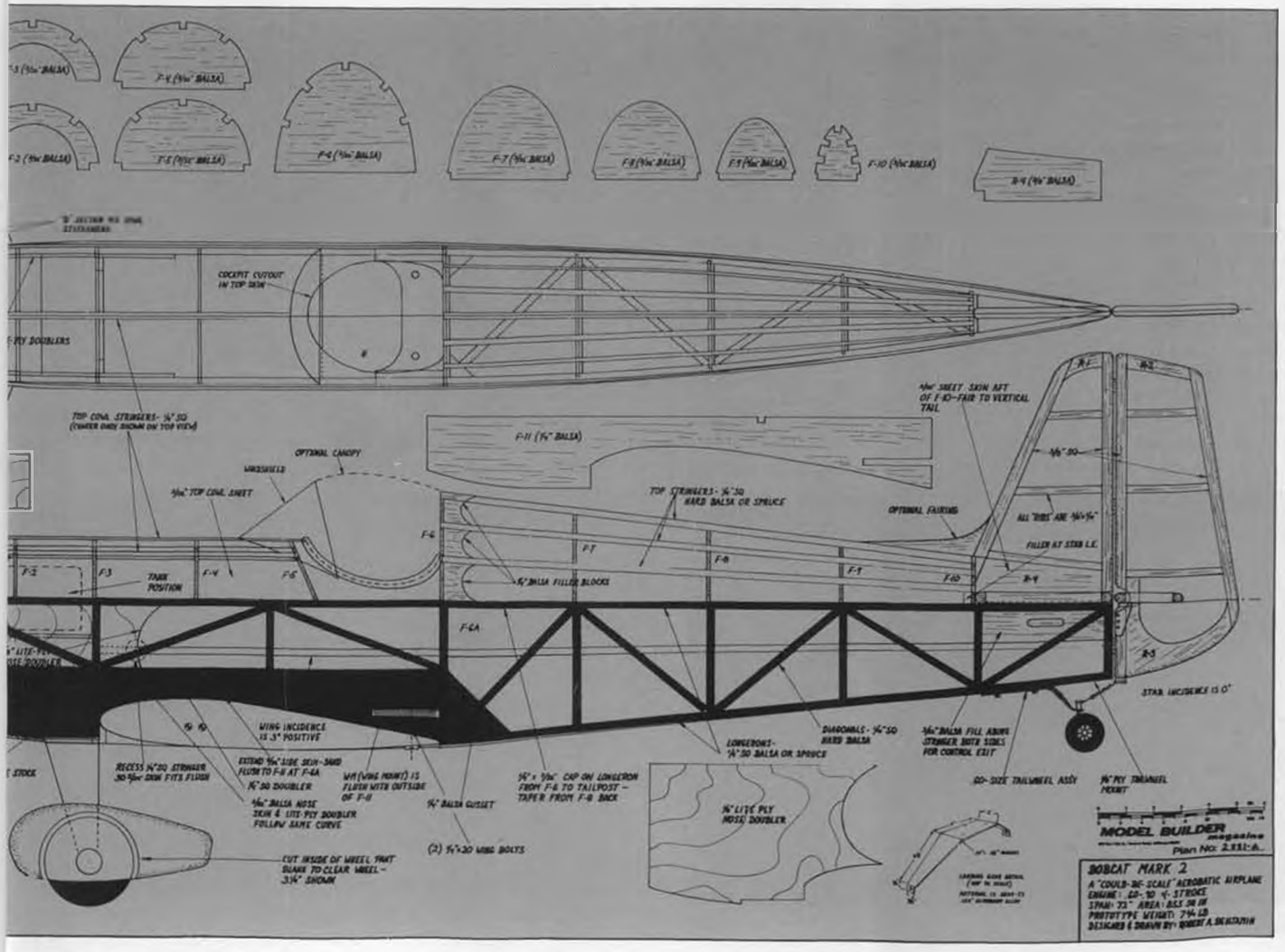

Simply Scale

BY STEVE GRAY

• This year's Kitchener-Waterloo Scale Rally was another successful gathering of scale modelers to fly and show their handiwork and renew old acquaintances. As usual, there were too many excellent models to mention all of them in this article. This year's event was mercifully blessed with good weather while all around us it rained for almost the entire weekend. The rain was so close that it was often visible in the distance. We did get some rain at the field late Saturday afternoon, but it only shut down the flying for a short time and after supper the skies were full again.

For those of you who don't know, Kitchener's Rally is unique in that to my knowledge, it was the first all-scale non-contest ever organized. The tradition goes back some 15 years or more. Today the rule still is, scale models only! Anyone coming to the Rally knows that he can expect a good showing of scale models to be displayed and fly. There are a lot of scale modelers out there whose only outing with their models is the K-W Scale Rally. This no-pressure fun-fly type of event provides an air of relaxation and good times for all who attend.

This year's event saw its share of excellent models displayed and flown from the STARS (Southern Tier Aero Radio Society) from western New York state were in attendance with their fine Bristol Scout Biplanes. They have been regulars at the Rally over the years and the Scouts have been flown annually for several years now. These Scouts are historic models as most of them are over 10 years old and for many of us were the first models we saw flown with converted chain saw engines. Most of the models are powered by Quadra 35 engines. Also from the STARS club was Bob Dunn and his Curtis A-1 Triad Quadra-powered pusher biplane. The model flew most realistically and won the pilots choice award for the most interesting model.

From Rochester, New York, another spectacular flying model and pilot was Paul Weigand and his 1/4-scale Clipped Wing Taylorcraft. The lightweight model was Paul's original design and when powered by a 1.20 four-stroke engine was probably the most aerobatic model at the show. Four-point rolls, knife edge flight, and snaps were all carried out very impressively. The models' light weight obviously contributed to its fine flying characteristics. Although I don't remember the actual weight, an educated guess might put it around 12 pounds.

Larry Pierce from Wasaga Beach, Ontario, brought to the show his new Cap 10. The large well-built model was powered by a Saito 270 Twin. This model rivalled Paul's Taylorcraft for performance. Larry is one of the best model builders I have met and his careful attention to detail and neatness in building was very apparent in the Cap. I hope he decides to publish the plans for this model as it surely is a winner.

As usual, Dick Speidel from Buffalo was in attendance with his great-looking Sopwith Camel. The Q-50-powered model was as remarkable in the air as it was in static detail. Dick's models are not hangar queens. He constantly flies them, and the Camel flies as well as any in his stable.

This year's Rally had its share of ducted fan models flying. Rudi Mayer from Kitchener rigged up a dolly and catapult to help his Avro Arrow Delta model into the air. The high-speed low passes and jet-sized loops had the crowd all applauding the model's performance. One low pass was so low there was an audible gasp from the crowd. (I think it actually touched its belly to the ground at well over 100 mph.) Two other good-flying fan-powered models were flown by Bob Parkinson, who, by the way, designed the Arrow kit that Rudi flew. Bob

Bristol Scout biplanes from the Southern Tier Aero Radio Society. Most are Quadra .35-power.

Hawker Typhoon by Bill Smith of Rockwood, Ontario.

BF109G by Brian Topnik was built from Platt plans and powered by an ST 2500.

flew his Regal Eagle and new F-18 Blue Hornet models. Both are wood and foam construction and use the "Byrojet" for propulsion. Both models took off the grass field with no problem. We were all suitable impressed with the flyability of Bob's low-tech sport-scale designs. I recommend them highly as a low-cost, no-nonsense approach to getting started in ducted fan flying.

I can't end the report on the Rally without mentioning that scale electric models were making their presence known. Both a Cap 21 and Dalotel were flown to demonstrate that electric models can have performance and look scale too. Many who saw them could not believe that they were electric. Look out, electric is here and growing in popularity. The technology is with us now to produce fine scale models that will fly well silently. We may have to devote a column to Scale Electrics in the future.

After talking about how great fun-flys like the Rally are, I find it difficult to gear up for this next topic. It has to do with contests and how to get ready for them. I have found that many modelers, especially novices to the scale contest circuit, have a need for more preparation and planning before they get to the contest. To be successful in competition it requires a high level of preparedness so that the modeler will be ready for anything. As Murphy says, "Anything that can go wrong will and at the worst possible time," so it pays to be prepared for the worst.

Several days before the contest your model should be readied. It should have been flown by now since sitting in storage all winter. Make sure that you actually fly your model. Start and adjust the engine and go over all systems before the check-out hop. Things that fail don't usually show up on the workbench so get out and fly. Call this a dress rehearsal for the contest. Take your rule book with you and make up your flight routine at this time. Practice it a few times at the field. Do not wait until the day

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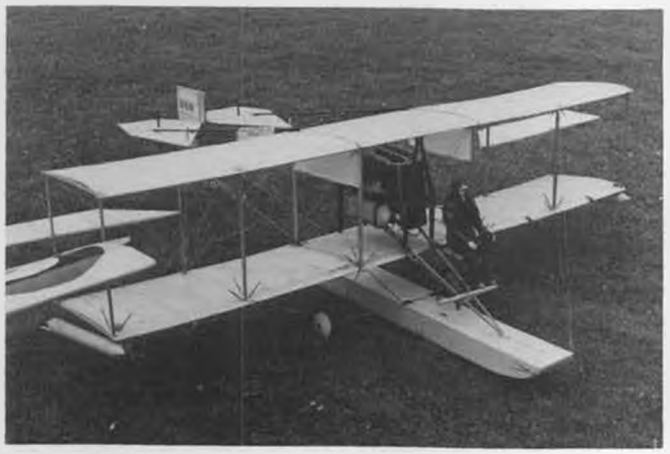
Four-in-one Canadian Snowbird demonstration team by Don Albright. Graphics are homemade; power is a T.D. .049 pusher.

Detail on Bob Wischer's Douglas Mailplane is very apparent in these photos. Louvers and metalwork around engine is exquisite.



Bob Dunn's beautiful Curtiss A-1 Triad, Quadra-powered pusher biplane. Flew great, won Pilot's Award as most interesting model.

Canadian version of the Tiger Moth had canopies due to frigid Canadian flying conditions.

European Scene

BY CEES KAIJIM

• Reduction units, to bring the crankshaft speed of the engine down to rpm that enable the use of larger and thus more efficient props, have never become very popular. About six years ago I tested several belt-driven units for .61 engines for the Dutch magazine I write for. Although I was not very impressed by the units themselves, I was surprised by the possibilities those reduction units opened up. An 80-inch, 11-pound workhorse changed from a relatively fast but not very impressive flying ship into a little slower but much more realistically flying aircraft with an amazing climbing ability, even when pulling large gliders. The weak point were the belts. Most units at that time used toothed belts, but the teeth couldn't stand the revs and the centrifugal loads imposed on them by those high-revving .61s. Some units lost their teeth, all of them within two hours.

However, I knew of one reduction unit with a toothed belt that worked relatively well. It was Practical Scale's unit for the Quadra, and the reason those belts kept their teeth much longer must have been the lower revs from the gas engine.

The other units disappeared silently over the years. Webra and O.S., convinced as they were of the advantages of reducing prop speed, made an attempt with the introduction of .61 engines with enclosed geared reduction units, but for several reasons, among which lubrication problems and noise level, they never became popular.

As said, the Practical Scale (from Lubbecke, Fed. Rep. of Germany) unit survived. More than that, it has been improved over the years up to a point where after initial installation and adjustment, you can almost forget the belts! I guessed you would be interested in this, especially if you are a big bird lover like I am, as a reduction unit is often an alternative for that more powerful, but more expensive and heavier bigger engine. What's more, the construction is relatively simple, and that's why many modelers who have access to a lathe have built their own units along the same construction lines.

If you built one yourself, you can choose the gear ratio that suits your purpose, but don't forget to inquire after the availability of the size of belts you need in your case!

Practical Scale offers two ratios; 2:1 and 2.8:1. The first enables the use of 24 x 12 to 24 x 16 props; the second makes it possible to turn a 32 x 18 prop at 2900 rpm with a Zenoah Q 28. I own the 2.8:1 unit, waiting for my Sopwith Pup (1:3.3) to be completed. To make the possibilities clear: I once witnessed demonstrations with a 31-pound Tiger Moth with this 2.8:1 unit up front. The 32-inch prop pulled the Tiger straight up after a takeoff roll of not more than 20 feet. Of course, it did not pull the ship out of sight, but it was at least 250 feet high before it stopped climbing. The pilot kept it hanging on its prop for the next few minutes, while the ship slowly drifted with the wind like a hot-air balloon! The smaller ratio is, for instance, a good choice for a 1/3-scale Pitts. An 18-pound Pitts with a Q 38 and this unit with a 24 x 16 prop (or a smaller three-

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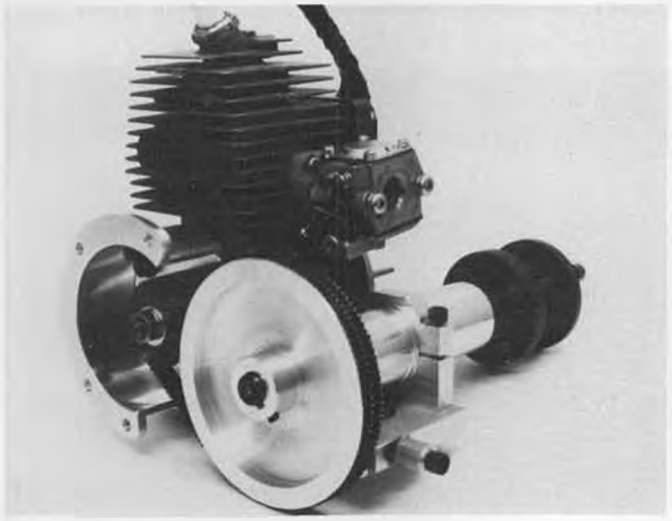
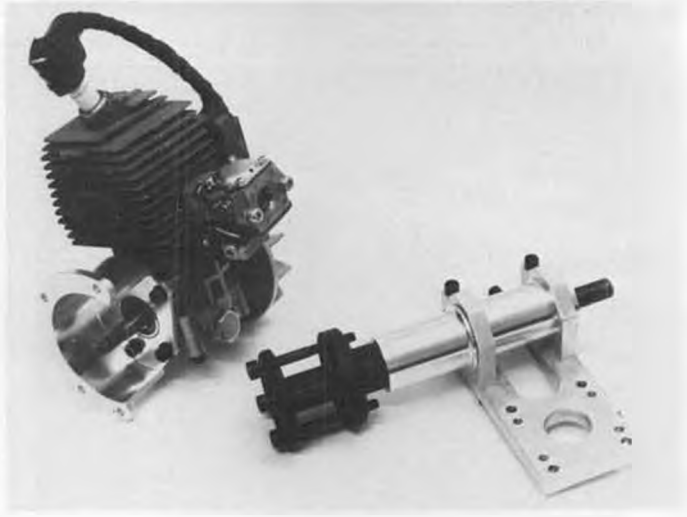
A large biplane, a narrow-stance landing gear and a sudden gust of wind on takeoff, all the ingredients for disaster. The reduction unit in this Tiger Moth, homemade, enables the plane to accelerate to a safe maneuvering speed when necessary, like in this instance!



Zenoah Q 38 with specially prepared motor mount(included with unit). Prop shaft is bolted to 3/8-aluminum base.



Complete unit. Belts are from Gates, with V-shape, are 0.2-inches wide at top, and are toothed on outside.

Pattern Flying

By DICK HANSON

• Regular readers of our column may have noticed a five-month absence of articles. Frankly, I wasn't suffering from "burnout" as much as "confused" out.

This was caused by trying to develop a design which fit the FAI rules only to find that various interpretations of the rules kept shifting away from the apparent original intent.

I know I'm not alone in this; the US team really came face to face with "interpretation" in France.

Most fliers who compete in pattern for more than a few years get to travel at least a couple of states and see the variations in the accepted "winning style."

These interpretations can be more than just a little exacerbating. Bad flying is always just that—bad flying— but allowing more points for style over precision just isn't fair to competitors who really do it by the book.

Starting this year, pattern flying in the USA will be heavily oriented to FAI. The swing in interest appears strong. If we really intend to field topnotch FAI teams, we need to start with clear rules that will eliminate the old interpretation problems.

For instance, if points are to be awarded for having a low noise level, it is important that this should be considered at all FAI contests. This will encourage better design work to reducing noise.

Also, if flight boundaries are a critical factor, points should be awarded for compliance, not for "stretching" the boundaries. You may or may not agree with the FAI regulations which are definitely oriented toward quieter, more maneuverable designs.

The point is that you *must* fly by FAI rules to develop equipment and for the fliers to become leaders in international FAI events.

Our own work on FAI designs has really been interesting to say the least. We started in 1980 with an enlarged and modified version of our Tiporare design. We really thought a slightly slower model was the wave of the future. Eight years later this larger model is finally the accepted size.

Our adventures into scale aerobatic models has also been interesting. Some designs, notably the Dalotel and the Zlin, can be tweaked into being absolutely topnotch aerobatic models; other scale designs, such as, the Cap series and the mid-wing Laser-type models, can also be coaxed into flying FAI.

Originally we heard comments of "scale models just aren't pattern models." Also some fliers felt more comfortable with a model they could identify with as being their own design. Understandable. We are now seeing more "scale-like" FAI designs—a clear canopy, rather realistic layouts, etc.—which leads me to believe we are headed for even more scale-like designs in the future.

At least we are again seeing variety in design. It was interesting to me to see that a number of the top finishers at the world championships flew designs that are quite similar to our "Runaround" design shown in *Model Builder* three years ago. (Available through *MB* plans service.)

For those interested, we have updated this design which was originally intended for the O.S. 90 four-cycle engine. It's now a slightly larger model for 60 two-cycles and new four-cycle 1.20s. One feature we have

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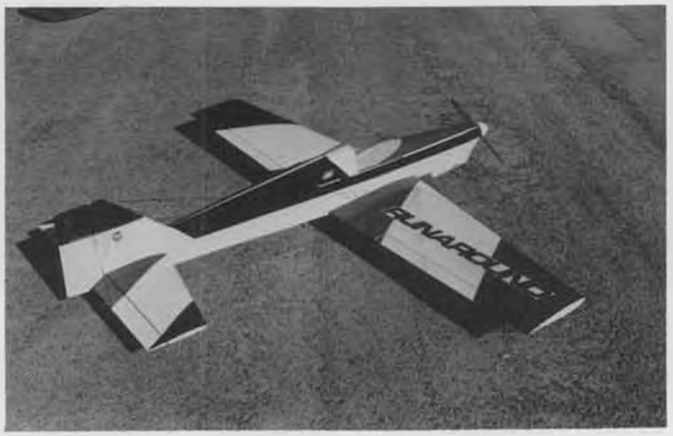


New Runaround pattern ship, a slightly larger version designed for .60 two-cycle or 1.20 four-cycle power.

Author with the new Runaround. Original model plan is available from Model Builder Full-Size Plan Service.

Jim Bennett, from Chicago(left), watches as Greg Marsden, from Canada, flies at the big FAI Las Vegas meet. Field was very big--only thing you could hit were the mountains, and they are 20 miles away!

1987 NMPRA CHAMPIONSHIP PYLON RACES

By GEORGE P. BURDELL. . .This year's Pylon Championships in Florida saw the winner, Gary Hover, finish with a perfect score! Everyone proclaimed this to be one of the best Championship races ever held.

• "Gentlemen, you're on the clock," bellows the starter. The four fliers on the line watch the hand-start at 90 seconds and run down towards zero, the time of takeoff. As the hand nears the 60-second mark the Sullivan starters get shoved to the spinners and the Formula One R/C pylon racers come alive with 25,000-plus rpm roars. One of them isn't running; it won't start! Its pilot suddenly realizes he's gone to the starting line at the 1987 National Miniature Pylon Racing Association's *Championship Race* in Florida with a dead burned-out glow plug. He was so busy helping others in the pits he overlooked his own maintenance. The Prince of Speed is in trouble. Henry Bartle, the NMPRA President, is also flying in this race, he senses the Prince's problem, dumps out his starter box (and its contents) on the runway next to the Prince's feet and runs back to his takeoff position. The pile contains a new plug; off comes the check cowl, out comes the dead plug, in goes the new plug, on goes the cheek cowl, on goes the glow plug battery, the Sullivan starter gets shoved to the spinner, and another 25,000-plus rpm joins the roar. The clock reads five seconds to zero, no time to set the needle valve, run like hell for flying position on the runway and be thankful it's running 'cuz when the clock gets to zero the flag will wave and the four racers will get shoved into racing flight.

Henry Bartle won this particular heat, and the Prince of Speed (Dave Shadel) finished second with the borrowed glow plug. I tell you this to point out the spirit of encouragement and help that I've seen exist among the R/C pylon racing model builders since the event was originated by Gerry Nelson in 1965. There's no AMA event that's had so few rule changes throughout the years. There's no event that requires the high degree of flying, building, and technical proficiency as the R/C Formula One racers require to be among the top 20 percent in their racing district, which allows entry to this championship race.

Fifty-three registered and fifty-one showed up at Deland, Florida's, Municipal Airport October 24 and 25, 1987, for what has been acclaimed to be one of the three best races ever held at championship level. Race management was by the Remote Control Association of Central Florida who also hosts the Tangerine International R/C Championships annually in the Orlando area. The starter was Dave Tyson, President of RCACF. Start line management was the President's lovely wife Doris. At #1 pylon the Pickle Master was Jack Jackson, a Form I flier himself. His crew was made up of winning sport pylon fliers. The #2 pylon had a father-son team; #3 pylon had a husband-wife team (she flies too). Computer management was in a rollaway Hilton mobile home; a pickup truck shuttle made almost ten round trips an hour carrying contestants to the flight line who were called up by a modeling talk show host from WFLA in Tampa who belongs to the club and brought the station's mobile radio equipment. Much of the RCACF racing equipment had been recently upgraded by the Facilities Committee under John Poole's guidance. The two days saw a total of 130 races flagged off the start line with two reflys a true testimony of the proficiency of this contest's management! (There was one equipment failure and one help screw-up.)

Only 2 of the 51 entrants had fast time

Big welcome sign at Deland, Florida Municipal Airport greeted arriving contestants.


'Spot' rounds Number 3 pylon at something over 150 mph.


Jim Shinohara, builder and caller for the Samurai Racing Team; Jessica Thurrot, 3rd; Dave Shadel, 2nd; Gary Hover, 1st, with a perfect score. Jim calls for the team as well.

Flight course was set up on a WWII closed runway. Pit area was on a taxiway, seen in background.

Bruce Richmond and Dub Jett start Spot, the simple racer that won the FAI event at the '86 Nats, and went to Australia as a reserve plane.

slower than 1 minute and 30 seconds. Only 2 of the 51 entrants had times faster or less than 1 minute and 10 seconds. It was a tightly contested true championship race. There was good luck, and there was bad luck. FAI World Speed Champs Bruce and Brian Richmond brought a beautiful new racer that had three test flights only. On the last turn of its first race there was a midair with Scott Manning of Burbank, California. Mid-airs are *never* anybody's fault in racing and *both* beautiful models were lost to the trash barrels.

The Mayor of Deland, Florida, and his Airport Manager were at the 100-plus person banquet Saturday night for NMPRA year-ending awards. Bruce Richmond gave a descriptive talk of how the USA's pylon racers helped get a team formed that resulted in travel to Australia and TEAM USA winning the FAI World Champs there in April '87. A short slide program showed how it was done and ended with the winning group picture that's appeared in the Airtronics ads.

American aviation has some famous women. One who's making history in today's *model* aviation is Jessica Thurrot of Connecticut who's attending Duke University in North Carolina now as a pre-law student. Jessica was taught to fly R/C by her dad and has since been adopted by the famous Samurai Racing Team which is so able managed by Jim "M-80" Shinohara.

Dick Nutting kept the race heats called up and also entertained the crowd with commentary.

Seems Jim met Jessica at the Chicopee W.C. in '85 and said, "if you'll come to the Nats, I'll build you a F-I racer." Jessica said, "yes." Then she told me that four months later Jim called to ask what color Jessica wanted the plane to be. "Pink," she answered. He sez "no way, no pink." But at the Nats when she showed up, her new plane *was* pink. That plane lasted about a year, and Jim built her a second plane that's predominantly baby blue. The Princess of Speed keeps her Super Tigre X-40 in tune. And for the vital statistics on Jessica:

1. 19 years old and has been pylon racing for 5 years.
2. Sophomore at Duke University with 3.9 grade point average.
3. Wants to be an attorney.
4. Has been "adopted" by Pete Reed, Don McStay, and the Samurai Racing Team as well as many other well-wishers.
5. Won third place at this NMPRA 1987 Championship Race.
6. Fastest time was 1 minute 12.79 seconds for the 2-1/2 mile course; fourth fastest for this contest!

And the winners were:

Place/Name	Points	Best Time
1. Gary Hover	40 (perfect score)	1:11.60
2. Dave Shadel	39	1:09.74
3. Jessica Thurrot	39	1:12.79
4. Henry Bartle	37	1:11.07
5. Gary Long	36	1:12.79
6. Dub Jett	34	1:09.61 (fastest time)
7. Mike Helsel	31	1:12.90
8. Bruce Brown	30	1:13.46
9. Lyle Larson	30	1:16.15
10. Gail Jacobson	29	1:20.01

Best Finish award went to Rich Tocci. Best Crash award went to Scott Manning (a professional stunt man in Hollywood).

The contest was two days of exciting racing, at a superb site, with excellent management, in beautiful Florida fall weather, by 51 accomplished model builders/fliers. Lotsa fun! •

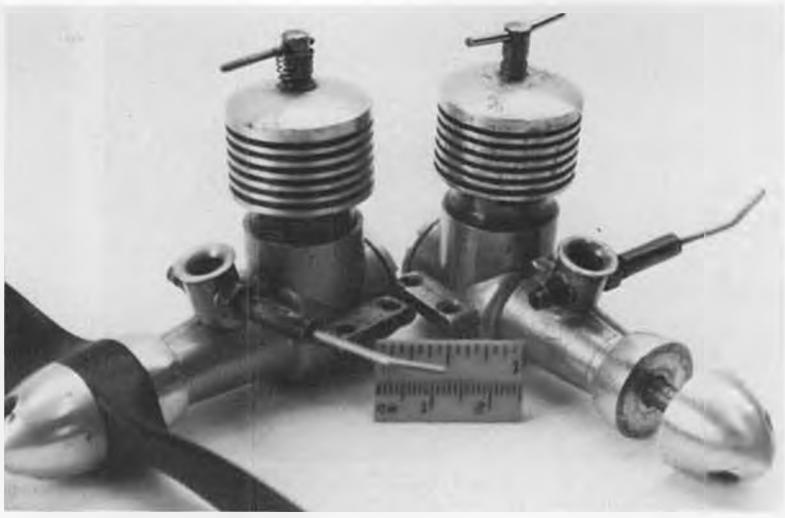
Jack Johnson (left), was Pickle Master at the Number 1 pylon. His crew included three highly experienced pylon fliers.

Nineteen-year-old Jessica Thurrot holds her baby blue racer with team builder, Jim Shinohara. Jim has built over 160 racers!

ENGINES OF THE WORLD

...by Stu Richmond

KATIPO



Katipo's hefty prop driver and spinner had flywheel action. Stu couldn't start either engine.

VITAL STATISTICS: 2-3/16 inches long to the face of the prop driver, 1-5/16 inches across the mounting lugs, 2-3/16 inches to the top of the cylinder head, weighs 3-3/4 ounces and is an .09. The engine carries no markings or identification.
UNIQUE FEATURE: Made in New Zealand.

• Precious few model engines have been commercially made in New Zealand. With only 3 million people and about 1200 to 1500 model builders, their marketplace is a bit slim for model manufacturing. Airsail has operated there for years producing kits and packaging model supplies, like glass bottles of dope closed with cork stoppers. The USA hasn't seen cork stoppers for 40 years! While visiting New Zealand in spring '87, there were all the colors in the toy store, closed with cork.

New Zealand's poisonous spider is the Katipo; USA's is the Black Widow. Australia's poisonous snake is the Taipan. Why engine makers name their products after poisonous crawlers is beyond me; and as long as the engines run, we shouldn't really care. Except I couldn't get either of my Katipo engines to run . . . a disappointment.

Model Builder reader Bill Cooksey lives in New Zealand, and both these engines arrived through Bill's kindness. Seems Bill managed to acquire the final inventory and, with help, was able to assemble a number of Katipo examples suitable for collecting.

Katipo production began in 1965 as a sideline to Mr. Jenson's L.P.V. Ltd. machine shop in Auckland and continued until 1976 when the business closed. There was a MK II version that has a "K" in a circle on the right side of the case casting and a small strengthening web under the shaft. A final MK III version had the "K" on both sides and a longer strengthening web. Bill says the MK II and MK III engines easily broke crankshafts and should therefore not be run if you're lucky enough to find one. I was curious about the engine's exact size: bore measure, .5250 inches and stroke measure, .4250 inches. The math formula of Pi x (r^2) = area, multiplied by the stroke, yields 3.1416 x .2625 x .2625 x .4250 = .0920 cubic inches or 1.5 cubic centimeters displacement. The total piston-rod-wristpin reciprocating weight is 7-1/2 grams and no effort is made at counterbalancing the crankshaft's disc (common on smaller sizes). I pressed off the prop driver and weighed it with the spinner; a heavy 10 grams of flywheel action *not normally seen*. Mr. Jenson must have had starting problems from day one! (Maybe he was ahead of time in his engineering flywheel approach). A further indication of possible starting problems is in the instructions that include: "Put one drop of S.A.E. 40 motor oil into exhaust port using small oil can, with piston at bottom of stroke," and, "A little drop of S.A.E. 40 oil now and again will make motor start much easier if you are having trouble . . . ." This is a trick we used to use starting our prewar ignition engines during WWII when wear was extreme or we were starting (?) a slag engine or pumping on a G.H.Q.

RATINGS

Design gets four points, manufacturing excellence gets five points, and performance gets no points as neither engine would run for evaluation. Total is 9 out of a possible 30. A Katipo is *highly* collectable and should be worth $35 to $50 depending on exterior condition/appearance.

AND SPEAKING OF. . .

And speaking of the G.H.Q. featured in the June '87 *MB*, I thought you'd enjoy the following:

From Bob Boomer who runs Beemer R/C West (Multiplex radios), "I come from that point in time when I owned a G.H.Q. as a fifteen-year-old model builder. I assembled it with the assistance and use of the high school tool and die shop where I was studying tool making in Detroit. It was very poor in the tolerance areas, but after a little reworking I ran it for several years." From Steve Ditta in New York City, "I read your ar-

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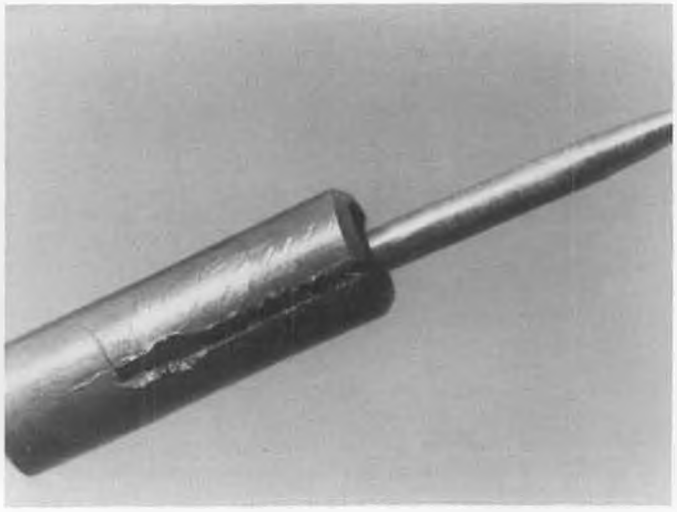
Low piece count of screw-together engine is apparent. It was mass-produced in small volume in New Zealand.



Collet on the needle valve was split with a simple saw cut.

ALL ABOUT ARFS

By ART STEINBERG

• In between flights at my local flying field, I like to sit back with a cup of coffee and take one-man surveys. For instance, on one occasion, out of a total of nineteen engines, I determined that six of them were four-strokes, and from that I tried to extrapolate that about 31 percent of our powerplants are of the four-cycle variety. Anyway, this certainly justifies the fact that some model aviation publications devote a significant amount of space, and even an entire monthly column to four-stroke engines, even though many of us may feel that two-stroke engines are the only way to go. But the point of all this is that our hobby/sport is constantly evolving, and one man's passion is another man's poison.

Take today's ARF models. Another recent survey at my local field disclosed that about one-third of all the aircraft present were ARF types. Some of those I didn't include in the ARF category were purchased all framed up and ready for covering, but for the time being I counted only those which required no covering or painting. Finding all this quite astounding, I came up with some conclusions. There are R/C fliers who do not build, have never built, and have no desire or intention to build, but they do enjoy flying. Not everyone enjoys puttering around in a workshop every night. Another category can build, used to build, but has given it up for one reason or another in favor of flying ARFs exclusively. Then we have those who do build conventional models but also enjoy flying ARFs, and they probably represent our largest group. Last, we have those who wouldn't dream of fooling around with ready-built models; they take pride in their building skills, and they look down at those who fly "store-bought" models. If you are in this group, you probably have no interest in what we will discuss from here on. But if you have a true love of the R/C sport you will find that ARFs can be a truly fascinating subject.

It is entirely safe to assume that ARFs are here to stay. Their fans are growing in number, and their quality and performance are improving by leaps and bounds. They are a real part of the R/C hobby today. Available ARFs include sailplanes; pattern planes, some of which are highly competitive; others are excellent scale models; trainers; high-performance weekend sport planes. Furthermore, they are affordable, and for the most part fly like gangbusters! Therefore, in recognition of this popular facet of the R/C sport, this column will be devoted to the world of ARFs and will deal with topics having only to do with prefabricated flying models of every type.

When I finally achieved some skill in R/C modeling in the late sixties, there was a smattering of ARFs (mostly foam models), and perhaps in some future column we will discuss in greater depth the origins and history of ARFs. Back then, the undisputed leader in the ARF field was Lanier with a full line ranging from sailplanes to three-channel trainers to full-blown .60-powered pattern-type planes such as the Jester and the Caprice. This remarkable company was far ahead of its time, and it is still going strong today. While their ARFs had a loyal following, some builder-fliers found fault with them and referred to them as "rubber ducks," a name that seems to have stuck even to this day. Granted, there may have been reasons to criticize ARFs. They tended to be heavier than built-up models; some felt that because of this they lacked good handling qualities, and this was especially true because of the lower-powered engines we had available in those days. There were also complaints that they developed stress cracks from normal engine vibration, and they were usually quite difficult to repair.

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Lanier Models' R/C ARF Sea Bird.

Royal Products' Cherokee 25 RTF low-winger.

Soprano ARF model from Altech Marketing.

Cox Hobbies' E-Z Bee for the beginning R/C flier.

ELECTRIC POWER

By MITCH POLING

• Every once in a while every columnist will get a case of "foot in mouth" disease, and I am no exception! Fortunately, when this happens, I get letters telling me what I did wrong, and hopefully it all gets straightened out. This time it all happened when I quoted a value for the SC-4 throttle of 1.4 volts drop. I knew that was wrong, it couldn't possibly be right, and I said in a comment that it seemed high (Nov. '87). What I should have done was test the throttle right away and find what the real value was, but I was in a hurry and did not check until the next column, when I found the value was about .17 volts. This is, as far as I know, the lowest drop of any throttle on the market. There is no question that the SC-4 is one of the best, if not the best, throttle around. It is the one I prefer, hands down, in any plane, right up to the Astro 40. I see no rpm drop compared to a toggle switch, and that is about as good as any throttle can be. It is also a very smooth throttle, very linear, and the opto coupling results in a solid glitch-free radio link. I know of no throttles other than the SC-4 that has all these features.

Anyhow, Joe Utasi, of Jomar Products (2028 Knightsbridge Drive, Cincinnati, Ohio 45244) wrote a letter detailing the care and quality put into his speed controls, and here is his letter: 'Jomar throttles use Siliconix SMP50N05 transistors with a nominal .028 ohms each. Four of these are used in parallel, for a typical on resistance of .007 ohms. Even if every device was at the upper end of the spec, which is .032 ohms, the total resistance would be only .008 ohms. Using Ohms Law, this would give at 20 amps 20 x .008 = .16 volts! This is a far cry from the 1.4 volts that was reported. Since I *personally* build and test every Jomar throttle, I know for a fact that every throttle meets or exceeds these specs, or I won't ship it. It sounds to me as if Roger does not have his speed control properly matched to his throttle channel, and it is not rally at 'high throttle.' Oh, yes, just for the records, the MOSFETs used in the Jomar line are more efficient (lower on resistance) than those used in the Cano throttle. Since I operate with a lower overhead than many other speed control manufacturers, I can afford to use a higher cost grade of part.'

I think Joe has said it very well, my own experience with the Jomar throttles agrees with what he says. If a throttle does not seem to be putting out full power, check it with a DVM and see if it is turning on completely. This is very easy to do if you have a DVM. Use the mini hook test clip adapter, Radio Shack part 270-334, or the mini clip test lead, 278-1160 or 278-016, to hook up the DVM to the speed control leads. The speed controls regulate the negative (black) line, clip the test leads to the input and output black lines. If there is not heat shrink on these lines, this will be easy, as all you have

Don Hughes at the '87 Nats with his Satellite 450.

Jeff Pfeifer with his 'Lectric Coke Machine, an original design, seen at the 1987 Nats.

Don Hughes with Future Shock Sr. at Waegel Field, Sacramento, California. That Hughes character really gets around!

John Renken at the '87 Nats with his Starduster 320.

Bob Nichols with his original design, at the '87 Nats.

to do is slide the insulation up a little on the line to expose some bare wire for the test leads to clip to. If there is heat shrink on the line, you will probably have to remove the heat shrink, a sharp-pointed pair of scissors or a modeling knife will do the job. Set up the speed control with the motor and prop you usually use for flying for a normal load. Use the two-volt scale, turn on the throttle, and watch the voltage drop as the speed control is turned up. Most speed controls will test out at between .600 down to .100 volts at full throttle (I usually measure at 15 amps). You can then adjust the speed control if there is an adjustment for the lowest possible voltage drop. If you adjust by "ear" you can get quite close, I find that I can be within .010 volts of the very best adjustment by ear alone. On the other hand, you usually can pick up that "last little bit" by using the DVM.

As I have mentioned before, I have been flying the Jomar SC-5 extensively, and it is a really fine throttle. It is designed especially for 020 to 05 motors using two to eight cells. It has a voltage boost/isolation circuit to keep the throttle operating reliably on small battery packs, and the low current requirement of the throttle allows use of receiver battery packs as low as 150 mAh. I fly with an Ace Olympic V set, on this the idle current is .25 amps, and at full throttle the drain is .4 amps. This would allow 20 minutes of full throttle flying on the 150 mAh packs, in practice this would mean about three flights if the throttle is on all the time. I strongly recommend the SR Batteries packs; I like the 175 mAh size. The TRC charger is excellent for in field charging of these packs. The SC-5 is quite small. The circuit board is 1-3/8 inches by 1-5/8 inches. The bare speed control with no wire is 0.7 ounces; with wiring it is 1.0 ounces, but the

Duane Renken at the '87 Nats with his Scrambler 550.

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Flittermouse on floats, by Dr. Peter Mezciems, of Ontario, Canada. Resemblance to Mitch's Seagull 05 floatplane is uncanny, says Mitch.

Flittermouse is kitted by Mole Technology in England. It's flying on a Leisure 05, but Dr. Mezciems is converting to Astro 05 for floats.

JOMAR SC-5 ELECTRONIC SPEED CONTROL

By BERNARD CAWLEY JR.

• Electric-powered flight has grown a great deal since I reviewed the original Jomar SC-1 in the May 1984 issue of *Model Builder.* Motors have gotten better, some new types of cells for our battery packs have become available, and electronic speed controls have come into wider use. They have also improved in several notable ways. Thanks to continuing advances in power MOSFET technology, electronic throttles have gotten much more efficient (and consequently they require much smaller heat sinks, too). Thanks to design improvements they have become more flexible; that is, they can be used with a wider range of motor/battery combinations. Other design improvements have given us greater ease of use, thanks to the migration of the spike suppression diode to the throttle circuit board and prewiring of the motor power handling side of the circuit. Also, some bad habits, like the throttles going to full power when the radio signal is lost rather than to "off," and RF interference have been eliminated or reduced. The currently available Jomar SC-4, for example, incorporates all of these improvements and works well with any motor/battery system of 6 or 7 to 26 cells, with continuous currents of over 30 amperes. This covers that entire range from all the various 05s to the Astro Flight Cobalt 50 in all but the super high currents used in F3E-type competition. All of this from a unit that weighs only a quarter-ounce more and costs only $11 more than the original SC-1 did in 1983. Other electronic throttles, such as the Adams ETC-1A, are similarly well-performing and flexible.

But these throttles don't work at all with the motor systems in one of my favorite types of planes—the small planes—powered by the Astro 02 or 035 using four or five cells. Granted, most 02-powered planes I have flown would probably not be able to make

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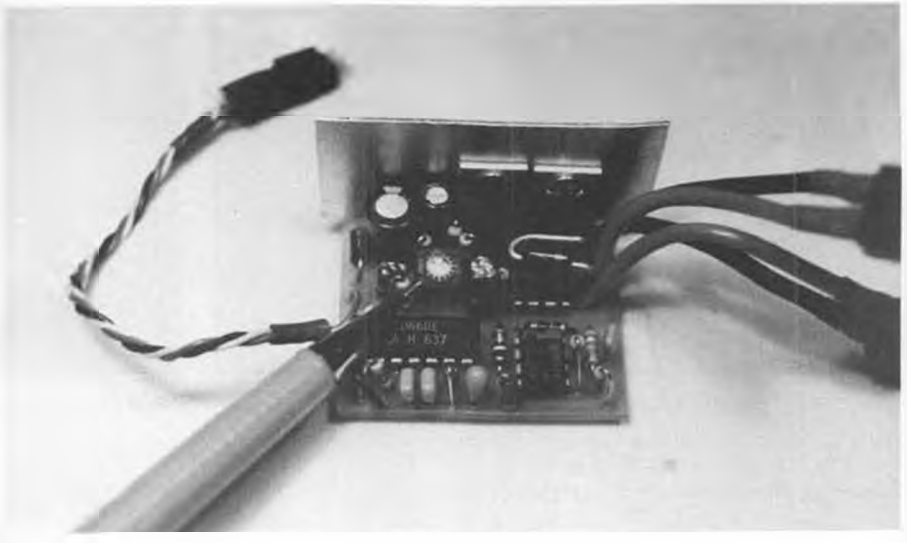
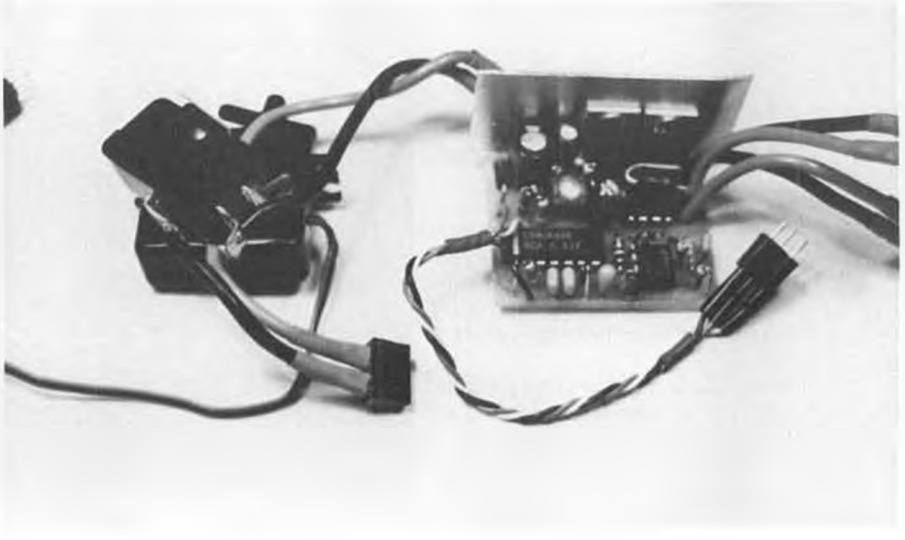
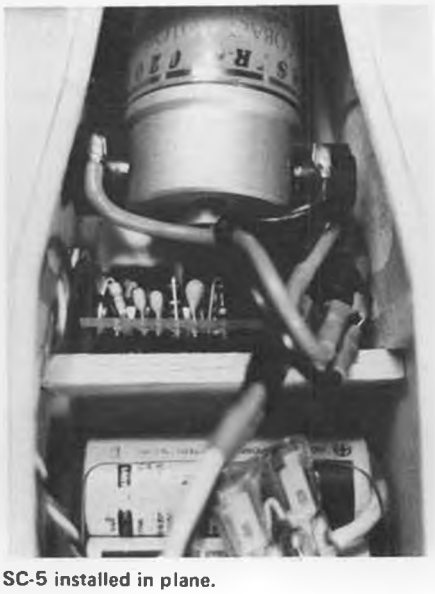


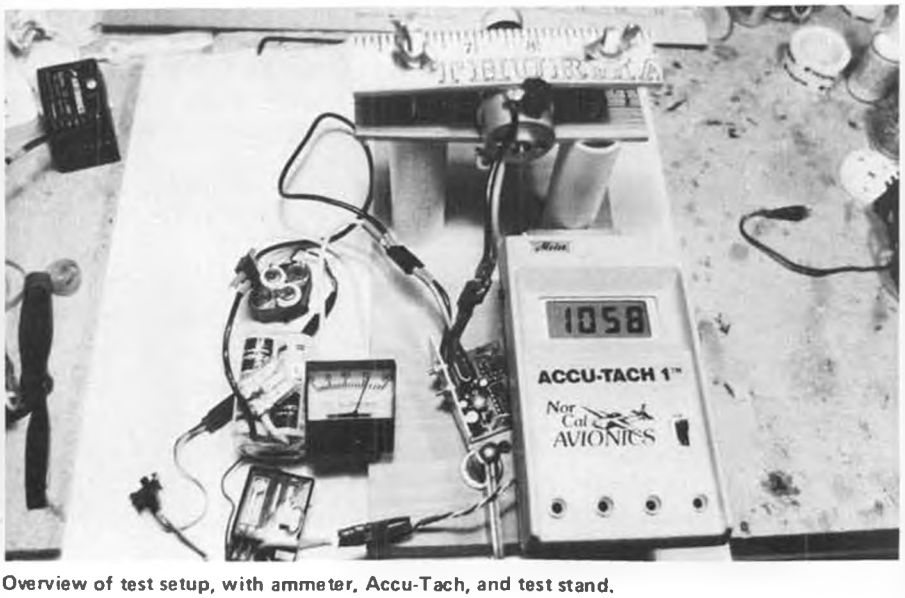
Jomar's SC-5 Speed Control, with pencil pointing to to adjustment potentiometer.



Comparison of SC-5 and World S-22 servo/microswitch combination.



SC-5 installed in plane.



Overview of test setup, with ammeter, Accu-Tach, and test stand.

PLUG SPARKS

By JOHN POND

• As is the general format of this column, we like to select the outstanding meet of the month and report on it. With this columnist writing on the Australian and American National contests, a four-month gap developed. During this time, quite a few excellent contests have come and gone including such meets as the West Coast SAM Champs, Spring Annuals by SAM 30, 49, and 26, and others such as SAM 56 and SAM 58.

We are fortunate to have received an excellent write-up from Bob Angel on the Pond Commemorative and photos of same by Don Cuthill. Things like this make a reporter's job a lot easier.

Angel reports the weather was mild with spotty lift. The only airplane-eating thermal was encountered by Ron Doig's Class B ship. The model disappeared overhead and was found several days later a mile beyond the kitty litter factory. Talk about luck! The model landed just off the only paved intersection in the desert!

The "Old Hayshaker," Nick Nicholau, had himself a time with his "free flight" model. For the "receiver-off" flight, Nick had to chase the model towards Taft. As the model rose higher, it encountered a wind shear which brought the model back to the field. Some contestants claimed this was one of the best landings they had seen Nick make, sans the transmitter. Haw!

Despite the kidding, a search of the rules showed the model had only to take off and land in the designated area. Whether it was radio controlled or not did not seem to be the deciding factor—double haw!

In spite of the foregoing, Nick had the last laugh as he collected a digital watch for the best crash (was that one ever a doozy with the wing shredding at better than 1,000 feet) and also got a second place in Texaco.

For those modelers looking for the Pond Commemorative to be held at Lompoc (River Park Flying Site), SAM 26 lost their field in a most unusual takeover. Having some surplus tax money, the city officials decided to pave half of the flying site with a new parking lot. Between the curbs and parked cars, the situation got too hazardous and the flying was given up at this field. As Angel puts it, "We were pushed aside in a most bloodless coup."

Before we go much further, let's take a look at some of the action. Photo No. 1 shows Jack Albrecht checking the alignment of his Class B size Lanzo Bomber with Ken Myers holding. Of special note is that Jack Albrecht has built a whole series of Lanzo Bombers for each class. One thing for sure, he should never run out of Bomber parts!

Photo No. 2 shows a fairly rare model, a Schmaedig Flying Stick Gas Job that appeared in April 1937 issue of *Model Craftsman* of which Carl was the model editor at that time. Ron Doig reports the model flies well with a good glide although a trifle unstable in turns (will fly easily each way).

Part of the SAM 51 team is seen in Photo No. 3. Eut Tileston persuades the engine in a 1/2A Texaco size Alpha Corsair. President Ken Kullman lends a hand. The team with Bob Grice made best showing at the meet with a most surprised Bob Grice winning the Pond Perpetual Trophy. Grice actually won using a borrowed model from Eut Tileston, Eut being nosed out by one point! Howzat for irony?

After the dust had settled, the 12th Annual John Pond Commemorative Contest results looked like this:

Class A

1. Ken Kullman	RC-1/Elfin	21:00

1. Check the alignment! Jack Albrecht looks over the surfaces of his Class B Bomber as Ken Myers holds. Photo: Cuthill.

2. Ron Doig built this unusual Flying Stick designed by Carl Schmaedig in 1937. Photo: Cuthill.

3. SAM 51 members Eut Tileston and Ken Kullman attend to fueling a 1/2A Alpha Corsair. Photo: Cuthill.

4. Little-seen cabin version of Guaneiri's MG-2 by Larry Jenno. It has a Fox .60 ignition engine.

5. Everett 'Woody' Woodman won the Jumbo Flying Scale event with his Rearwin Speedster.

6. Walt Geary sizes up the competition. His Ohlsson .60-powered Comet Clipper is very well built, even to streamlined gear.

2. Larry Jenno	Gas Bird/Elfin	20:15
3. Jack Albrecht	Bomber/McCoy 19	19:04
Class B		
1. Ken Myers	Bomber/Torp 29	18:27
2. John Gates	F. Merchant/Torp 29	17:40
3. Eut Tileston	Scorpion/OR 29	16:45
Antique		
1. Bob Grice	RC-1/Saito 65	28:45
2. Eut Tileston	Westerner/OS 90	25:25
3. Ken Myers	MG Cabin/Fox 60	19:00
Antique (Pure)		
1. Jack Albrecht	Bomber/Anderson	30:00
2. Don Bishop	Bomber/Edco	30:00
3. John Gates	Goon/OR 60	17:06
Texaco		
1. Eut Tileston	Westerner/OS 90	41:55
2. Nick Nicholau	Dallaire/OS 60 4C	28:16
3. Bob Grice	RC-1/Saito 65	26:09
1/2A Texaco		
1. Ken Kullman	RC-1	28:26
2. Ken Myers	Playboy	22:37
3. Bob Grice	Brigadeer	21:52
Electric		
1. Ken Myers	Playboy Cabin	20:00
2. Don Cuthill	Playboy	17:14
3. John Pond	Playboy Cabin	16:45

Before we get away, we would like to run a shot of Ken Myers' MG-1 Cabin as seen in Photo No. 4. Ken is getting excellent economy runs from his Fox .60 converted to ignition. So he was ninth in Texaco, where were you?

WESTERN NEW YORK SAM CHAMPS

Jack Brown again reports the Western New York SAM Champs hosted by SAM 48, "Niagara Frontier Chapter," on August 1 and 2 drew better than ever for contestants. It truly was a shame the weather didn't cooperate. I have been telling you fellows for years—get your reservations in early to Jupiter Pluvius!

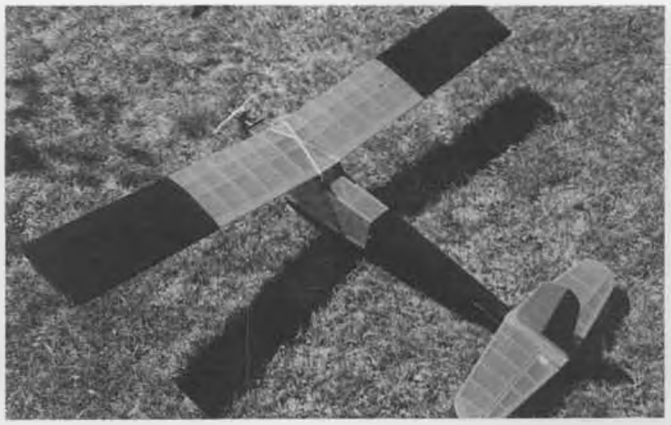
Jack reports the weather was simply great with plenty of thermals and a mile wind

7. Caleb Butler, SAM 60, assembles his Goldberg Gas Bird. Seen at the Western New York SAM Champs.

8. Waiting for the rain to stop, Larry Jenno, Joe Beshar, and Matt Ficner (SAM 48 host). Larry came all the way from California.

9. We need more enthusiastic youngsters like 16-year-old Jeff Fechter with Jumbo Stinson Voyager. That's grandpa winding!

10. Don Lockwood poses with the winning compressed air design. Despite heavy wind, this model flew well without damage.



13. A colorful yellow and red Monokoted Tlush Mite by Allen Laycock seen at the Australian MAAA Nationals.

14. Shimpie Yamamura enjoys old timers in Japan with original Japanese designs, this one a 1942 YMK 306 modernized with R/C and an O.S. 20 four-cycle engine.

from the northeast. Much to Jack Brown's pleasure, the meet was swamped with 48 contestants and 159 entries. Seven states and two Canadian provinces were represented. Members from thirteen SAM chapters participated. Great showing!

Bucky Walters of SAM 39 reported that Buck Zehr drove all night from St. Jo in Michigan to arrive at Grand Island by early morning. Whew! With such good weather on Saturday, the weather went sour on Sunday. By noon the rain was coming down so hard that the meet had to be called at that time.

With activity the way it was on Saturday, this column is indeed fortunate to have photos of the action. Photo No. 5 shows Woody Woodman returning to his original love, rubber-power flying, with a flying scale model of the Rearwin Speedster. Woody was honored at the Saturday evening banquet for his service to SAM with the presentation of an original nine-fin Orwick engine.

Photo No. 6 depicts Walt Geary with his Antique entry, a Comet Clipper powered by an Ohlsson .60. Walt was in some tough competition with fellows like Steve Boucher, Bucky Walter, and Art White. As can be seen, the field was good by eastern standards for free flight. Only one heavy competition event (rubber cabin/stick combined) was held with two flying scale events and hand-launched glider.

The next shot, Photo No. 7, is one of Caleb Butler of SAM 60 who also failed to place in the top three. The Gas Bird being assembled is the scaled eight-foot version originated by Don Bekins. Since Don's spectacular successes with this model, numerous ones have been built all over the country.

Photo No. 8 about tells it all. Larry Jenno (from California), Joe Beshar, and Matt Ficner (Treas. Sam 48) are sitting in the main tent hoping for the rain to stop (never did!). Some of the trophies and awards can be seen in the background.

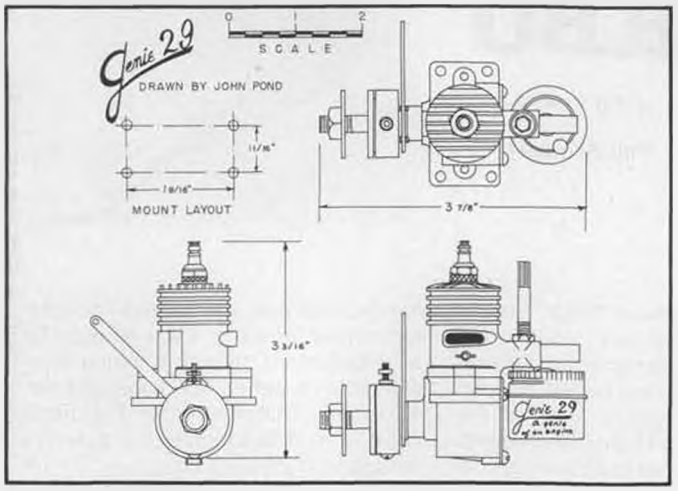
Well, enough of that! Let's get on to the results:

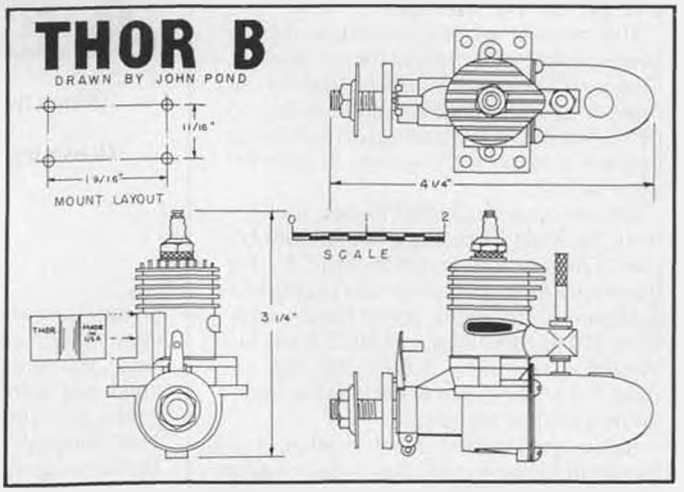
1/2A Texaco (18)

1. Joe Beshar	Fox 107	2613
2. Doug Payne	Kerswap	2554
3. Art White	Bomber	1694

11. Colin Borthwick sends this shot of Merrilyn holding his Sky Devil .60-powered Feather Merchant. Hot combo!

12. Marion Knight seen at Seguin AFB SAM Champs with little-known Comet Golden Eagle. Photo: Buice.





Texaco

1. Daniel Schneider	Dallaire/OS 61	1800
2. Buck Zehr	Bomber/OS 90	1246
3. George Murphy	Dallaire/OS 60	1140

90-Second Cabin

1. Robert Walter	RC-1/OR 60	1134
2. Buck Zehr	Playboy/Orwick 64	812
3. Art White	Kloud King/OR 60	738

Antique (Pure)

1. Fred Quedenfeld	Bomber/Anderson 65	852
2. Robert Walter	RC-1/OR 60	782
3. Steve Boucher	MG/McCoy 60	224

Antique

1. Daniel Schneider	Bomber/OS 90	1665
2. Steve Boucher	MG/McCoy 60	1632
3. Art White	Bomber/KB 35	1452

Class A

1. Art White	Bomber/Elfin	964
2. Robert Walter	Bomber/Hornet 19	769
3. Steve Boucher	MG/Veco 19	652

Class B

1. Ralph Turner	MG-2/KB 29	309
2. Walt Geary	Zipper/OR 29	182
3. Joe Beshar	Fox 150/KB 29	167

Class C

1. Steve Boucher	Playboy/McCoy 60	1060
2. Larry Jenno	Kerswap/Edco	891

FREE FLIGHT EVENTS

Hand Launched Glider

1. Nicholas Pitas	256
2. Jeff Fechter	22
3. Marc Salisbury	14

AMA Scale Rubber

1. Jack McGillivray	Cessna	90
2. Everett Woodman	Rearwin	30
3. Walt Liszewski	Piper	23

Cabin/Stick Comb.

1. Nicholas Pitas	Gollywock	360
2. Larry Jenno	Korda	202
3. Joe Beshar	Light	187

Jumbo Rubber Scale

1. Everett Woodman	Rearwin	45
2. Jack McGillivray	Sea Hornet	30
3. Jeff Fechter	Stinson	28

That last place reminds the columnist of Photo No. 9 showing Jeff Fechter with his Stinson Voyager. That's grandpa winding! SAM 48 has adopted this Junior two years ago and results are finally starting to show! We need more 16-year-old contestants!

ENGINE OF THE MONTH

This month we are running a double header (baseball parlance) for two reasons. One is that we have gotten behind on our one-a-month presentation, and the second one is that we are presenting two look-a-like engines or better yet, two engines from the same casting.

We are again indebted to Bob McClelland, Secretary Treasurer of the Model Engine Collectors Association (MECA). For those who have often wanted to join this organization and didn't know how, simply send $10 to McClelland at 3007 Travis St., Westlake, Louisiana 70669. You will receive the MECA Swap Sheet and the Bulletin on alternate months.

Before proceeding much further, one must remember that all "slag" engines were produced by the Judson Williams Co. with

15. Winners of the SAM/TOSCANA Contest at Orentana: Silvano Macero with original design, called Nibbio.

changes to suit the competition. The two engines following were known as "AHC" engines, so-called as they were marketed by America's Hobby Center in New York.

THOR

Early in 1946, this New York firm announced the "Thor B" as the "Mighty-New Thor B," factory tested, ready to run, complete with coil and condenser for the price of $9.95. This was followed by an announcement in the October 1946 issue of *Air Trails* offering the Thor in kit form for $6.95 without coil and condenser.

The specifications for the Thor engine were given as follows: horsepower, 1/6; bore, 13/16 in.; stroke, 9/16 inch; displacement, .29 cu. in.; weight, 4-1/2 oz.; and was rated at a top of 11,000 rpm. This writer is also indebted to his late friend, Bob Reuter, who described the timer of a Thor in a se-

Continued on page 97

16. Ann Smith seen with Paul Gates' rendition of Copland's prewar Wakefield design, the Northern Star. Photo: Imrie.

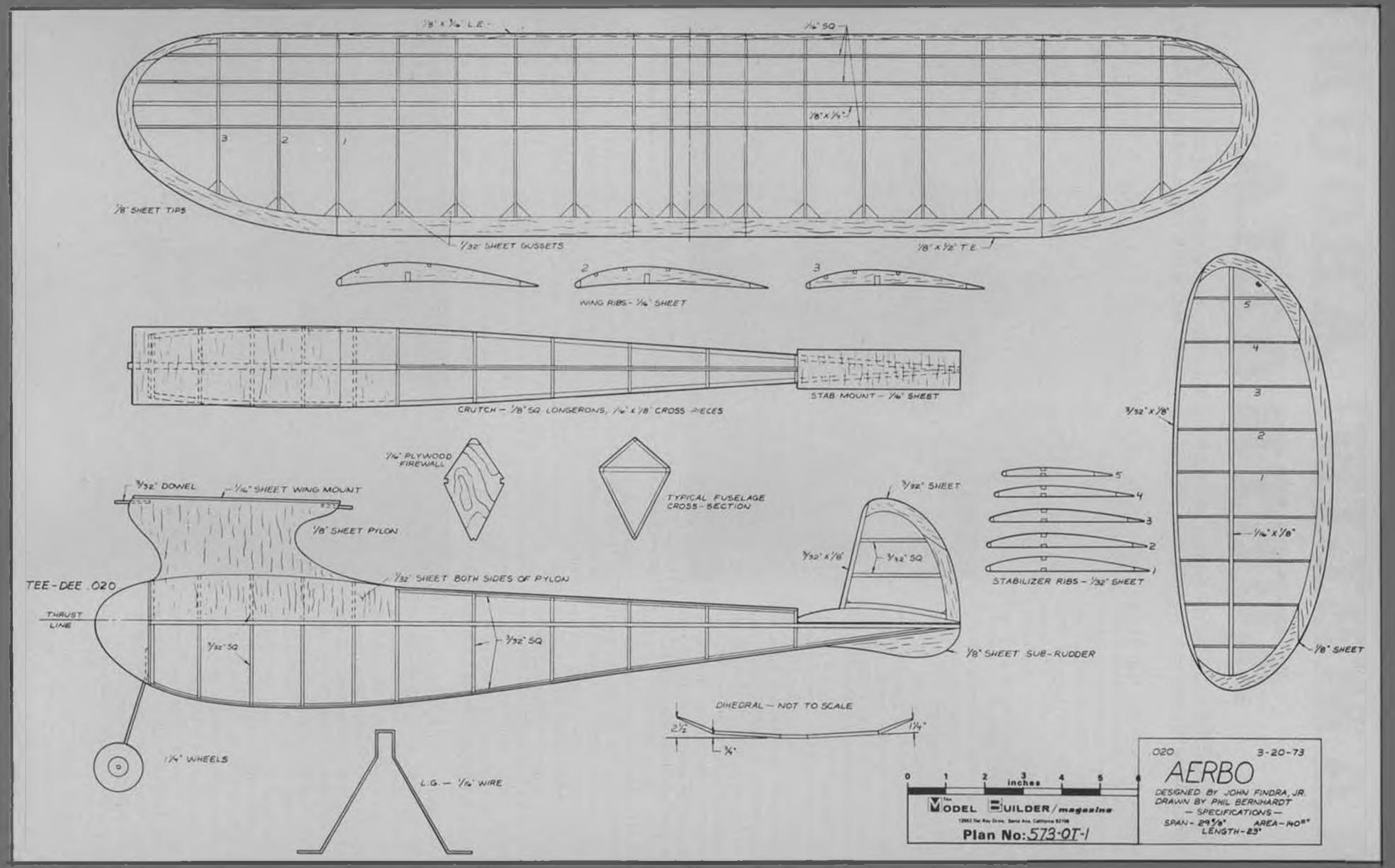
Old Timer of the Month

AERBO

Design by: John Findra

Drawn by: Phil Bernhart

• From the early days of *Model Builder* (May 1973), comes this month's old timer, the Aerbo, designed and developed over a three-year period by John Findra Jr., culminating in a win in the 1941 Nationals Free Flight Class A event. The winning ship was built two days before the Nationals and was test-flown the morning of the event. It was powered by a 1940 Bantam .19 with a 9-inch Standard Ritz propeller. The wingspan was 42 inches. This version, by Phil Bernhardt, is an .020-powered version with a wingspan of 29-5/8 inches. •



CLASSIC GAS: This Old Timer replica of a 1941 Class A Nats winner, redesigned as an .020 model is from the May, 1973 issue of MODEL BUILDER. See page 106 for plan order list.

RAMBLIN' AROUND AUSTRALIA

By STU RICHMOND. . .In his continuing adventures downunder, Stu assembles a team to compete in the Australian Nationals, meets a friendly local gal at the pub, and takes a trip to a pumping station. Wow!

• I did lousy at the Australian Nats. There were four other American contestants there; Ernie Nicodem (he's thinking of retiring in Oz) won third in FAI R/C pylon, Gary Gau from Tonawanda, New York, followed Ernie and also was sixth in Quarter Midget racing; Tony Frackowiak was second in Master's Pattern (he beat two others); and *Model Builder*'s own John Pond was the true BIG winner 'cuz he won second in Hangar Rat (a very popular indoor event) and beat 24 others! I managed 17th in Thermal Glider. But did we have fun!

Central Florida Hobbies gave me three advertising shirts to take along, so Australian Ron deChastels and I formed the Central Florida Hobbies R/C Pylon Racing Team, wearing two of the shirts, and we also slipped the third shirt to Bob Carpenter who was the CD and race starter. Then Ron and I challenged Gary Gau and Ron's son Bruce to a *geezer* versus *upstart* pylon race. The starter was wearing the third shirt *under* his other clothing. We older geezers were gonna take on the younger upstarts. At race time starter Bob Carpenter stripped down to display *his* Central Florida Hobbies shirt, and somehow father Ron and I had *all* courtesies of time and patience extended to us on the FAI Pylon starting line; the younger upstart team constantly incurred the good-natured wrath of the starter's bellowing voice. We geezers really had the starter on our side. Final score for Ron deChastel flying and me calling was 435.5. Ron's son Bruce with Gary Gau calling only managed 223.1 points. Just look at the smiles on the winning team as we pose with the Caudron FAI racer.

Another example; I'm half way around the world drinking an evening can of Foster's glow fuel in the crowded Waikerie Glider Club's bar and before I know what's happening, this curvaceous thing runs up to me laughing and screams out, "Honey, where have you been . . . here *I* am for you!" and she presses every curve on the front of her body into me as my beer spills and my neck gets strangled. I've just met Valerie Vickers, the New South Wales state model secretary from Sydney. Yes, buddy Bob Carpenter put her up to it. Then he introduced me to Val's husband Steve. I shook his hand and looked up about 45 degrees all red in the face and sheepishly grinning. Lotsa fun. Good model competition, but mostly done with a relaxed smiling attitude.

And here's a switch. Valerie Vickers flies a double-size CAVU (old Ken Willard design) in Texaco and Old Timer Duration. She beat *MB*'s "Pondy" in one event, and he beat her in the other. Val's mechanic is her patient, tolerating husband Steve! Nice, huh?

The Central Florida Hobbies Racing Team in Oz. From left, Stu, the caller; Ron deChastels, pilot; and Bob Carpenter, CD. This geezer team beat a simiar USA-Australian team.

Australia has *many* R/C frequencies like we'll have in 1991. They use a frequency key on each transmitter instead of a clothespin. When it's time to fly, they insert their Tx key into a common style of frequency keyboard. In advance of the contest they *specify* which frequencies will be used for what events, like "36 MHz channels .605 through .629 inclusive," and you put crystals or modules in your system to conform! Here's the real kicker, every year their Tx is spectrum analyzed (costs $15 up) and a certifying sticker is attached indicating it passed a narrow band, medium band, or broad band test. The .605 Tx I used was medium band in key width. When in use, it prohibits use of the channel on either side of me. A broad band spectrum analyzer check has a key that covers your own aim frequency and *two* frequencies on *each*

Ron deChastels with winning R/C scale DeHavilland Venom.

Peter Twiss and his free flight scale winner, with British DC diesel. At right, Peter launches his model on a successful flight.

Ian Watts' Giant Scale Aeronca C-3 Collegiate used a Saito .90 twin.

The full-size DeHavilland Comet 88 won the first England to Oz race.

side of your own takes up a total of *five* frequencies for you to fly! With a broad key on a busy day, it is possible you might have a lonnnnnng wait to be able to insert your key into what they call the "keyboard." Once you get it there, you're using *five* total frequencies to fly! Peer pressure works well to get your transmitter sent back for servicing or for buying a more modern R/C system built for true narrow band use. I can see real problems in the USA. All intelligence says that December 20, 1987, the USA should have *outlawed* via the FCC all AM (amplitude modulated) R/C systems, as most AM transmitters have pesky sidebands that modern FM receivers see as control signals. The AM-FM problem presents a tremendous total safety hazard, as long as both operate on the same frequencies. Some countries have arbitrarily (and wisely) outlawed AM sets. Other have allowed FM sets to be built on a *different* radio spectrum with narrow band (simply means many frequencies are squeezed close together electronically), and *only* FM sets are allowed on that band, which is super smart legislation.

But back to Ramblin' at Oz's Nats. Free flight was up the road a few miles from Waikerie, along the Murray River (famous like our Mississippi) in a huge open field. The Oz free flighters probably total no more than 200 in the entire country (about the same in U-Control), but they had a ball at this Nats. Old guys and young kids all hoping for the great God Thermal to suck upon their model during an official flight. Ivor F. (that's his whole name) got me to time for him, said something about he'd be honored to have a Yank record his official flight. The honor was actually reversed, as Ivor F. carries a VH number (like our AMA number) that is 1. . .VH-1! The honor was mine. Anyhow, Ivor wound and launched while the watch ticked on. Up. Higher. Toward the

Model of one of the 114 flying Tiger Moths in Oz. Builder is unknown; sorry!

Close-up of Ivor F's single blade folder. Ivor was a professional model prop carver after WWII. He got paid by the carved inch of diameter!

Quarter Midget pylon racers Bruce DeChastel and Gary Gau in foreground, and Model Aeronautical Associaton of Australia President Mr. David Axon in rear.

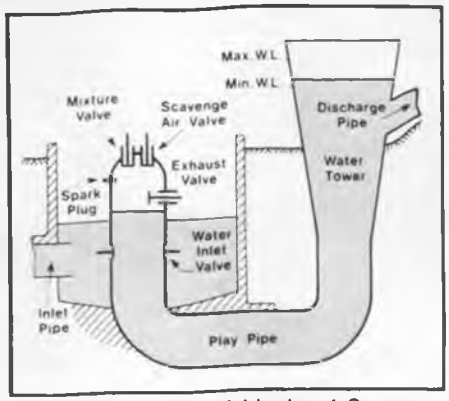
Ivor F. prepares to "Assault the atmosphere" as he says. An OOS flight.

sun. Higher. I sez, Ivor, "you better run like hell!" Instead Ivor faces Mecca and does a Yoga-style headstand and starts talking to the great God Thermal about how loosing a model is great. . .or sucks. . .or sumpin'. . .and I'm bent in two roaring with laughter. It was—it was like straight out of a Phineas Pinkham story in *Flying Aces*. I hurt from laughing and others joined in too. Ivor F. is one of Oz's premier model builders as you'll see later when we visit him in Sydney or Doonside, New South Wales.

You R/C scale fliers well know about the World Champs and the competitors from Oz. Pictures are numerous this month, but hopefully most of them will be used so you can see the high caliber. Ron deChastel won Stand-Off with a scratchbuilt ducted fan DeHaviland Venom fighter; they add static and the best single flight. Ron's engine ate itself on the second flight, but the first flight was a real winner.

Free flight scale fought the winds, but the winner was having so much fun flying he even put in a nonofficial flight just to show me how nicely his diesel ran! These people from Oz are great.

Oz solved the 1/2A pylon racing status by going up to .11s. They use O.S., Enya, and SuperTigre, hand launch 'em like javelins, and go like lightening on two channels. Real fun! Mike O'Reilly won with a screaming Enya .11. Japan uses .11s too. Quarter



If you're ever in the neighborhood, Stu recommends a visit to the Cobdogla Irrigation Museum. Lots of interesting exhibits, really!

Gary Gau's QM use one-blade Bolly prop and O.S. inflight mixture control with flood-off. Bolly details coming in future Ramblin' column.

Gary, from New York, was vacationing in Oz and won the fast time award at Oz's Nats.

Midget racing is much like ours, only they use either Magic Mufflers or tuned pipes instead of extractor pipes like we do. The MAAA president, David Axon, flew in QM and had a bad time with lots of smiling fun and friendly flak. He only got on the scoreboard once in seven rounds (his time was 12 minutes and 73 seconds) but whatta smile after he won that heat! Fun without tremendous contestitus pressures.

Most of you *MB* readers know of my engine interests. In Australia I found, along the Murray River, the *biggest* four-cycle engine in the world that still runs today! Bob Carpenter took me there late one afternoon and we explored every bit of the huge thing. The cylinder is about *fifteen feet* in diameter, and the stroke is indeterminable in length!

An engine is nothing but a pump to which volatiles are added and combusted to develop more useable energy.

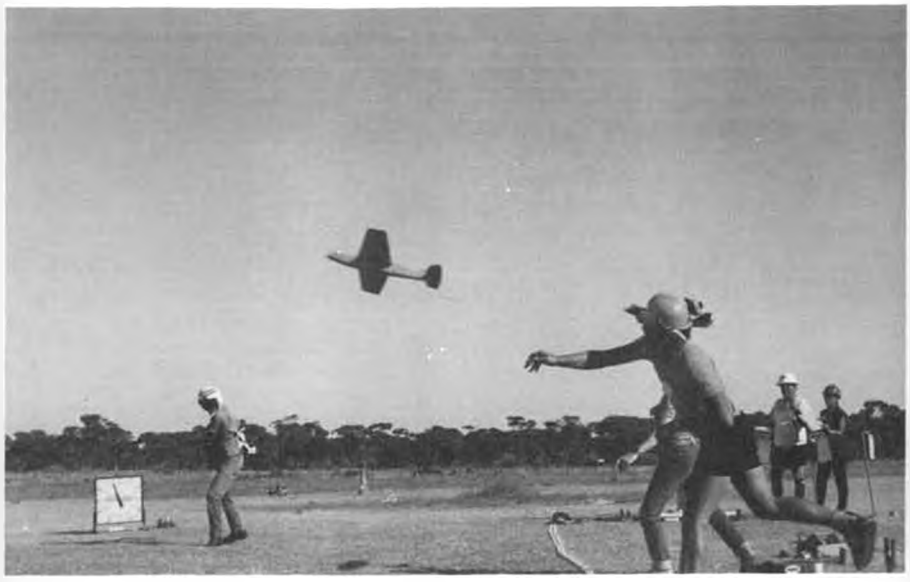
The piston for this four-cycle is a *column of water.* The engine has intake valves for methane gas, exhaust valves, and a spark plug timed with the valves' cycle. The porting included a series of water inlet valves so that the "piston" of water was always available to compress the methane before firing.

This is the last of 12 Humphrey water pumps in working condition. The others are in Germany and London and are dismantled. This one is in Australia's Cobdogla Irrigation Museum, and it takes its inlet water from the Murray River to form the piston. When it fires its methane, the piston of water travels downward, across, and upwards above ground level by a huge tubular conduit into what is best described as a gigantic upright funnel. The side of the gunnel, high above ground level, has an opening for the water to spill out by gravity onto the land for irrigation purposes. The water that spills out for irrigation is replaced by water drawn in from the Murray through inlet valves circumferentially placed in the combustion cylinder. If our editor can include only one sketch of this "thing" I'm sure you astute *MB* readers can see how the durn thing works! *Big engine!*

And finally, I direct your attention back to the September '87 issue of *MB*, page 77. There's a full-page advertisement for a replicated model engine that's sure to be a future piece of aviation history. The radial engine concept was invented by an Australian model builder 100 years ago and from those original drawings a production run of 500 museum-quality compressed air rotary runnable model engines are to be built during their bicentennial year, 1988, and the same Burford family is involved in this engine too! The ad carried a price of A$700, which means 700 Australian dollars, which translates to a bit under 500 USA dollars. We'll tell and show you more about the engine's designer, Lawrence Hargrave, in a future Ramblin' column. If you missed the ad, write to Australian Model Engine Co., 12 Bolgart Court, Elanora Q, 4221 Australia, for current details. Tell 'em you read about the Hargrave Replica in *Model Builder.*

Ramblin' next month will include Vintage and U-Control and *Scramble*. . . Australian style. Don't let your subscription run out! •

Models are shoved off at one second intervals. Full-size hangar in background with building on right for dormitory use. The 1985 F3B glider World Champs were held here.



1/2A Pylon uses .10s and .11s for power. Starter's face shield is in place and second model is behind launcher's head.

MAAA President David Axon won a heat with a time of 12 minutes, 73 seconds. Prather Lil' Toni, Nelson, Magnum fuel, carbon fiber Bolly prop, and Futaba all contributed to fun smiles of victory. Caller Eddie Rich shares in the celebration.

R/C SOARING

The Sophisticated Lady will become the next logical step up from the Gentle Lady for the novice sailplaner.

By BILL FORREY

• As regular readers of *MB* "Soaring" will recall, I am in a rather unique position as a contributing editor. Because I work in the hobby industry, I am privileged to attend two or three of the biggest hobby shows each year. Then, through the medium of this column, I am able to pass along what I have seen and heard so that you also benefit from the trip. What follows are a few highlights of my trek to the last major trade show of the year 1987.

The Radio Control Hobbies and Trade Association has now played host at the Chicago Model and Hobby Show for the third consecutive year. As in past years, the CMHS was held at the O'Hare Expo Center, a short five-minute drive from Chicago's famous international airport. The CMHS has quickly become one of the three biggest and most prestigious annual R/C hobby expositions right along with the Toledo and IMS Shows. Each year has proven bigger and better than the year before both in terms of exhibitors and modelers.

The first part of my report will highlight the new sailplane models seen at the show which are or soon will be available to the modeling public. Unfortunately, this month there will be no accompanying photographs of the show because for the first time since I became known as an "editor" of any soaring publication (October 1979, SFVSF *Silent Flyer* newsletter), I had a major camera malfunction which produced totally useless negatives. Perhaps with a little help from the manufacturers themselves I will be able to secure pictures by press time.

ACE R/C, INC.

Ace R/C is a model company that has been actively serving the modeling community since 1953. Many readers out there are already familiar with the regularly published Ace catalogs which feature all of the Ace model airplane kits and radio control systems as well as kits and accessories produced by all the major brand name US model kit companies. Guys who for lack of a neighborhood hobby shop do a lot of mail-order business from catalogs find the Ace book very complete with everything from small hardware items to tools and adhesives. Ace even has a wholesale program for qualified hobby dealers.

Into this diverse environment comes the first Ace all-wood sailplane kit designed by Leon Kincaid (Key West, Florida). It is called the Scooter, and it is aimed to satisfy the needs of both the club contest flier and the kickback Sunday sport flier. The Scooter is a three-meter span polyhedral ship with an all-moving horizontal stabilizer and a rather slim but attractive fuselage. Spoilers and releasable tow hook are options.

The new 3.5 meter ASW-24 is coming. Kit is highly prefabricated and features advanced aerodynamic design.

Leon Kincaid and his 2-meter Scooter. The 3-meter version looks bigger, but is otherwise identical. Both are up for consideration by Ace R/C as kits.

Dimensionally, the Scooter's wings are a dead ringer for those of the classic Pierce Aero Paragon with identical span (118 in.) and nearly identical area (1040 sq. in.). The most significant deviation from the Paragon wing is the fact that the Scooter has an Eppler-like flat bottom airfoil with Phillips entry and D-tube wing construction. The Paragon, of course, has a more open, "turbulated" flat-bottom section and would undoubtedly have a more floating glide. The advantage of a wing section like the Scooter's is a faster top-end speed for penetrating wind or covering more ground in search of lift.

The Scooter's debut at the CMHS was quite a bit in advance of the kit release which will be sometime in late spring or early summer. The manufacturer's suggested list price will be announced later as will the possibility of a two-meter span Scooter.

The other news gleaned from the people at Ace is the fact that they are working on a sailplane mixer board for the Silver Seven transmitter which will allow the glider guider to use flaps or spoilers and have adjustable elevator compensation for easy precision landings. This can be accomplished using existing mixer boards with some modifications, but the new mixer kit will be specifically designed for this purpose.

CARL GOLDBERG MODELS, INC.

Just about everyone who has been into R/C soaring for any length of time is familiar with the Gentle Lady. It is a simple, two-meter span, lightweight trainer glider which has been around almost as long as the similar Mark's Models (now Dynaflite) Wanderer; i.e., the late seventies. Well, it now appears that Goldberg will be giving the satisfied GL flier a logical next kit choice with their catalog introduction of the Sophisticated Lady.

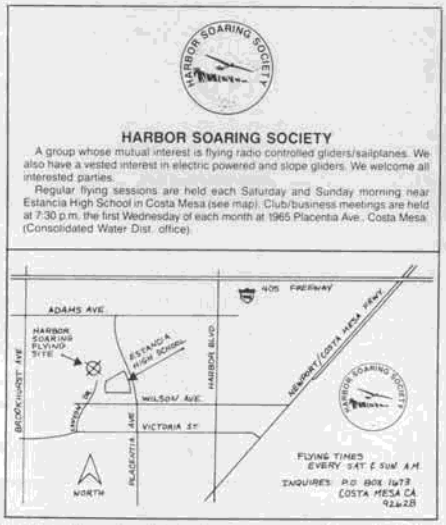
The Sophisticated Lady is actually going to be shown to the public for the first time at the International Modeler Show in Pasadena this January 9 and 10. There was only a photograph from the 1988 catalog on display in Chicago. However, I can and will describe to you what the differences between the two Ladies are right here.

The SL is a T-tail design. This makes it stand apart from the GL a mile away and is by far the most immediately noticeable change. The T-tail stab has a moving elevator and fixed horizontal stabilizer. The elevator is actuated by a Sullivan .030 cable-type push rod which S-curves from the fuselage up to and out of the trailing edge of the fixed part of the vertical stabilizer just above the moveable rudder. Here the cable connects via clevis to the elevator horn

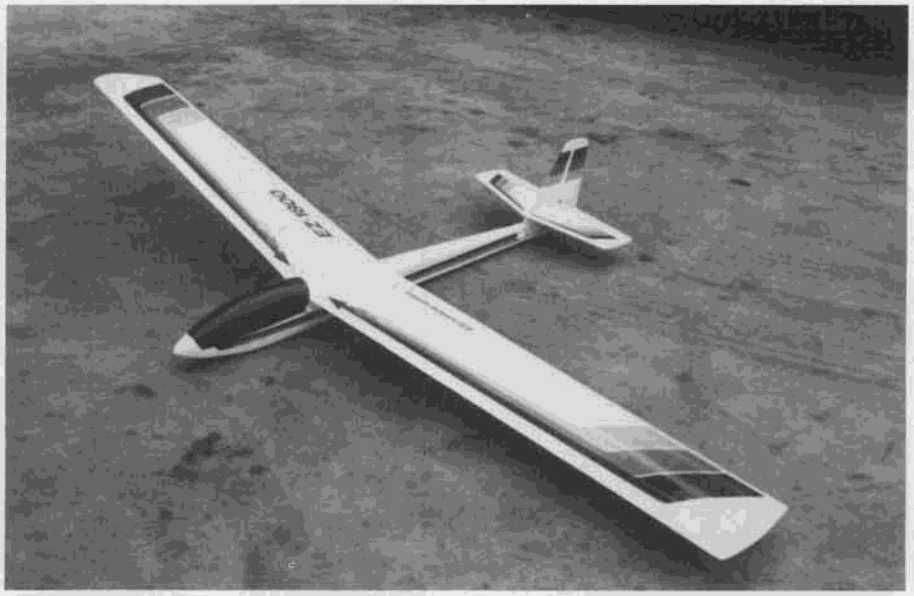
which hangs down from the bottom surface of the elevator. The fin is a three-layer sandwich of preshaped balsa. The middle layer of balsa has the S-curve precut for the cable rod thus assuring the model builder a proper, friction-minimized curve which exits at the right place to meet the elevator horn. Good idea.

The second obvious difference between the two Ladies is the shape of their fuselages. The GL has a slender boxy fuselage with a plywood hatch up front for access to the radio compartment. The SL has a scale-like clear plastic canopy and a matching scale-like fuselage profile. The canopy is removable and has a "formed, detailed cockpit interior" according to the catalog copy. The overall effect of the T-tail and scale-like styling of the fuselage gives the new sailplane a markedly different look.

The third difference between the two Ladies is not readily apparent unless both wings happen to be covered in transparent Monokote. The SL wings are borrowed directly from the Goldberg Electra kit which in turn were modified from the GL. The differences are in the spar location and the upper surface sheeting which extends from root to tip. Goldberg feels the Electra/Sophisticated Lady wing is one step stronger than the Gentle Lady wing.



Harbor Soaring Society gains new blood with business cards with a message of welcome.



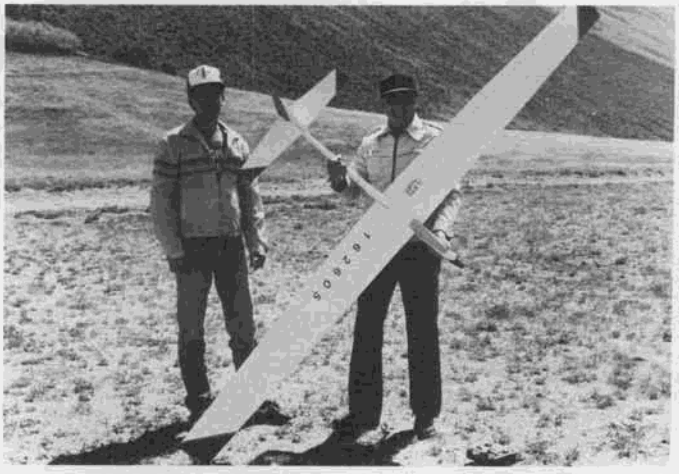
The new EZ-1800 from EZ Sports Aviation has E195 section and fully sheeted wings for efficiency. Almost ready to fly.

Sleek new Arcus from Robbe promises either electric-powered or pure soaring excitement. It would make an excellent 7-cell or 10-cell F3E ship or slope racer.

As with all Goldberg kits, the modeler gets a detailed, illustrated construction booklet and full-size plans with the Sophisticated Lady. The price will be announced later when the kit is ready to ship from the factory, which should be in late January.

The second new product for R/C soaring use is the electric Power Pod. Although the Power Pod was designed to fit both the GL and SL gliders, it should adapt well to all other gliders in the 72- to 78-inch span range.

As far as the appearance, the Power Pod



Ron Carter's Quama sailplane uses some fancy composites and airfoils to come up with a winner. Ron's OFB Harley supervises.

The Brillant glider is now less of a mystery. Ralf Markwort gives us a clue. See text.

E 195

Profil 195 Dicke 11.82%
CmO=-.0703, AlfaO= 3.055 Grad

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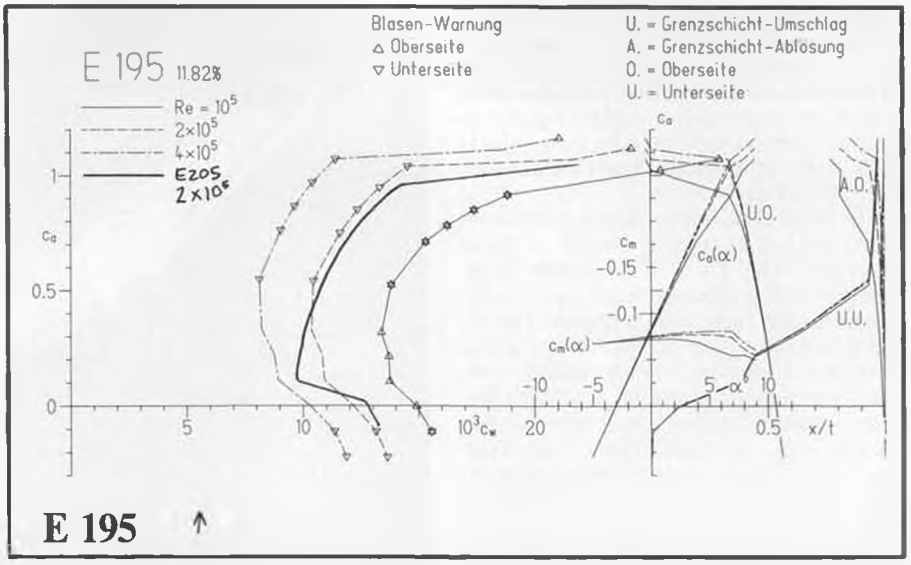
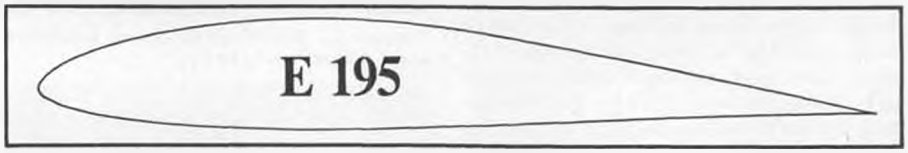
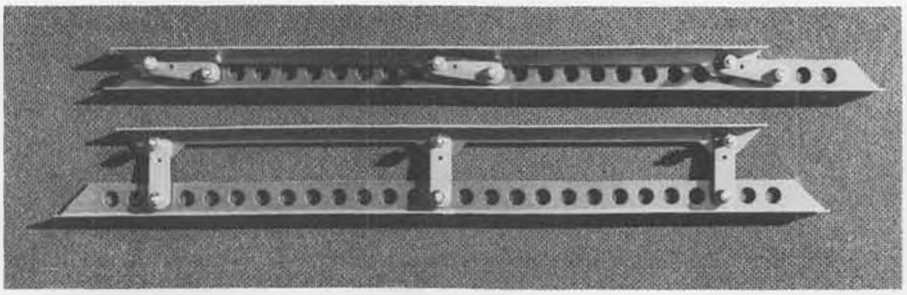
1	0.99652	0.00050
2	0.98640	0.00220
3	0.97037	0.00527
4	0.94904	0.00948
5	0.92280	0.01448
6	0.89185	0.02014
7	0.85658	0.02647
8	0.81753	0.03341
9	0.77529	0.04083
10	0.73046	0.04859
11	0.68368	0.05648
12	0.63559	0.06428
13	0.58686	0.07170
14	0.53813	0.07835
15	0.48985	0.08374
16	0.44222	0.08756
17	0.39550	0.08968
18	0.34994	0.09004
19	0.30580	0.08865
20	0.26330	0.08563
21	0.22276	0.08123
22	0.18460	0.07564
23	0.14922	0.06903
24	0.11697	0.06154
25	0.08817	0.05334
26	0.06310	0.04460
27	0.04198	0.03551
28	0.02500	0.02629
29	0.01228	0.01721
30	0.00393	0.00862
31	0.00008	0.00114
32	0.00196	-0.00496
33	0.00986	-0.01041
34	0.02295	-0.01551
35	0.04112	-0.01996
36	0.06422	-0.02368
37	0.09206	-0.02661
38	0.12441	-0.02873
39	0.16098	-0.03006
40	0.20140	-0.03064
41	0.24526	-0.03051
42	0.29209	-0.02973
43	0.34135	-0.02831
44	0.39260	-0.02622
45	0.44545	-0.02360
46	0.49935	-0.02070
47	0.55362	-0.01774
48	0.60754	-0.01484
49	0.66043	-0.01210
50	0.71158	-0.00959
51	0.76034	-0.00737
52	0.80605	-0.00548
53	0.84809	-0.00391
54	0.88590	-0.00266
55	0.91895	-0.00167
56	0.94685	-0.00082
57	0.96935	-0.00017
58	0.98607	0.00014
59	0.99646	0.00009
60	1.00000	0.00000





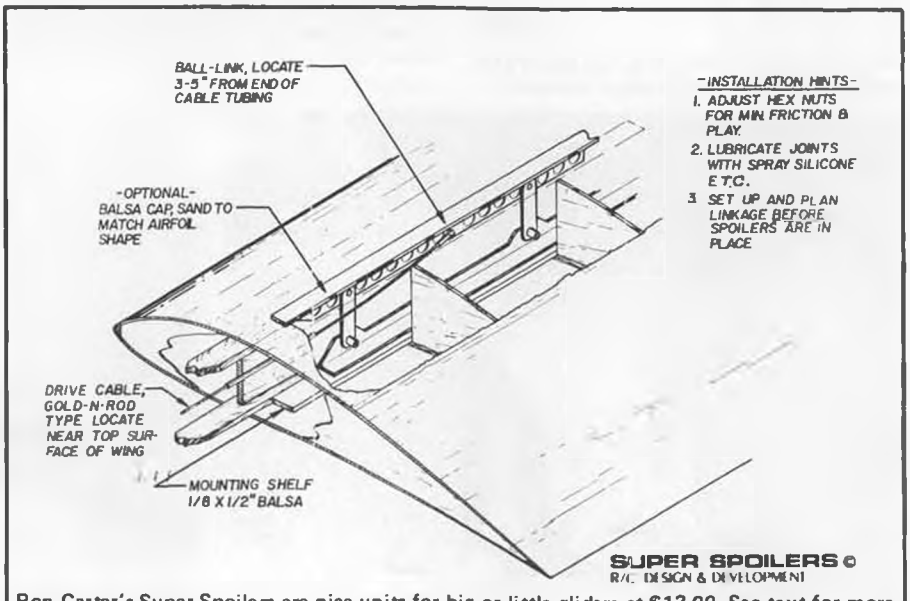


A photo of Ron Carter's Super Spoilers. Illustration below.

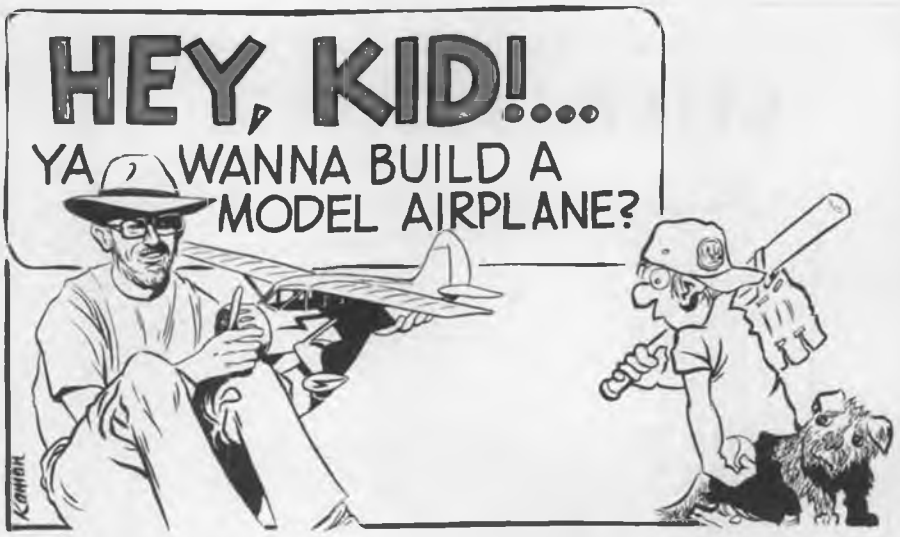
looks very streamlined, as the spinner blends perfectly into the body of the unit. It is tall enough to allow the use of an 8 X 4 prop and tall enough to house either a 6- or 7-cell electric car-type battery pack within its streamlined vertical section. The unit is a plastic, clamshell design with a die-cut plywood backbone. A hole is required through the wing to allow the passage of the switch harness so that the motor may be turned on or off at will during flight. Either a third servo or full throw on one of the two existing servos can be used to throw the switch.

The Power Pod includes a Turbo 550 mo-

Continued on page 90



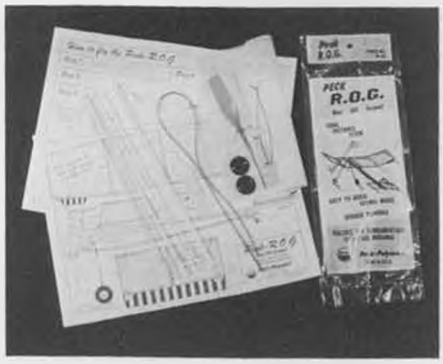
Ron Carter's Super Spoilers are nice units for big or little gliders at $13.00. See text for more.



By BILL WARNER

Illustrations by JIM KAMAN

Finished model ready for indoor or outdoor flight. Check the trimming chart for advice on how to get your model to fly right!



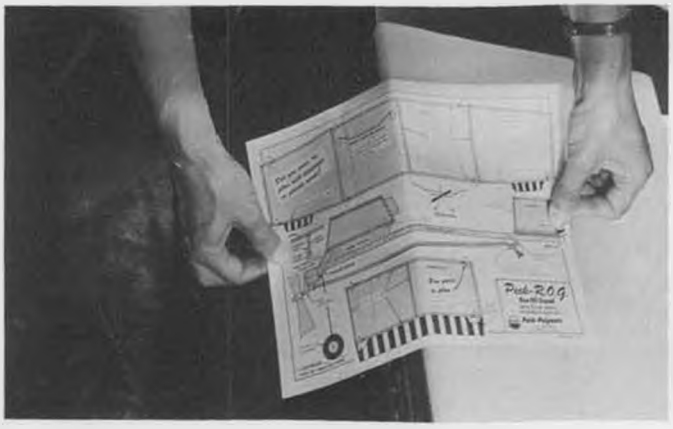
The Peck-Polymers 'Rise off Ground' model.

• There's just *something* about opening a model kit that makes you want to start sticking balsa together! Most kids make the mistake of starting with something way too hard, usually something from World War II that had a pretty picture on the kit box cover right over the words "Flying Model." This, of course, is sheer nonsense in most cases, as most of them get so messed up by the time they are finished, if they ever are, that you couldn't tell if it was a B-24 or a Piper Cub. Fly? With the wood and heavy plastic-formed parts most kits contain, even an expert could not get it to fly, let along a beginner. Well, you're not a beginner anymore if you've faithfully followed our series. You know the names of some things, some things to do and some things not to do. Lets take it from there. If you're just joining us, why not subscribe to *Model Builder* so you won't miss a single exciting installment of coming articles!

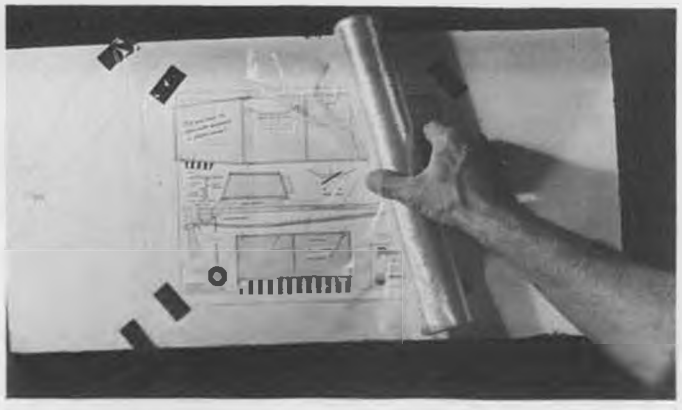
If you haven't sent for the free list of all the kits and materials for this series, send your self-addressed, stamped envelope today to Peck-Polymers/Beginners, Box 2498, La Mesa, California 92044. If your dealer doesn't carry beginners kits like the Peck R.O.G., ask him why not.

The first thing you want to do is read over the instructions which come in the kit and then read over this article, making a list for yourself of the things you'll need that you don't have.

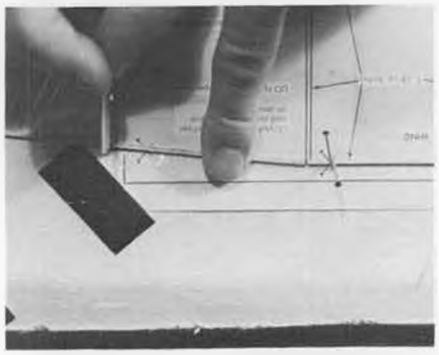
It may seem like we're taking a long time just to build a couple of simple models, but I want you to remember that the basic stuff you are learning applies to *all* models you will build, and even to full-size airplanes too. Remember how you balanced your



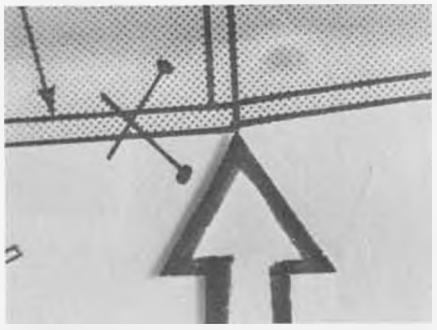
Taking the curl out of the plan using the edge of a table.



Tape down plan first, then tape plastic wrap or wax paper over it. The building board is 1/2-inch Celotex.



Trim parts even with lines on plan using a razor blade. Be careful when cutting!



Note where parts meet. Three 1/16-inch sticks come together here. Arrow points to dihedral joint cut which is not glued until later.

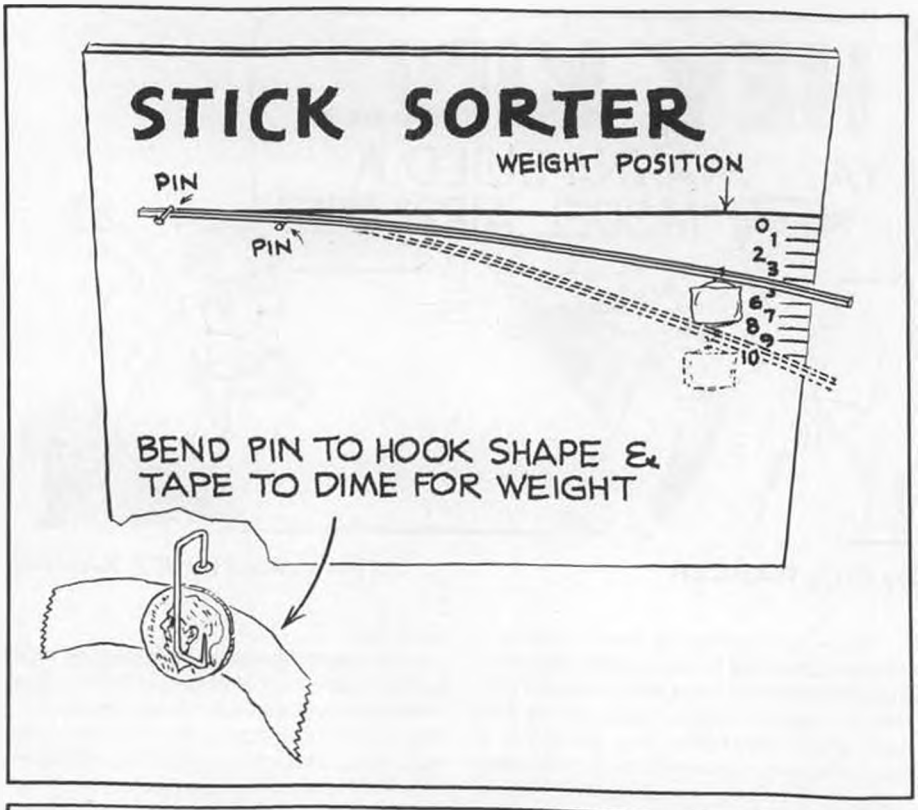
Sleek Streek R.O.G. so you'd get the wing on in the right place? I just got a snapshot from a friend who's building a full-size airplane, and he had it off the ground balancing it!

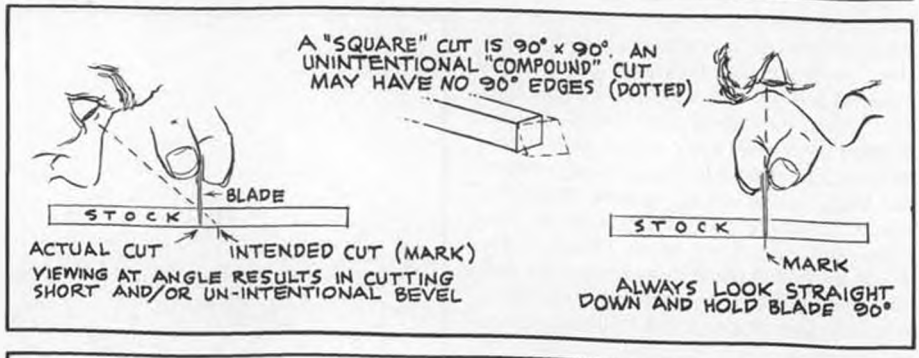
THE BUILDING BOARD

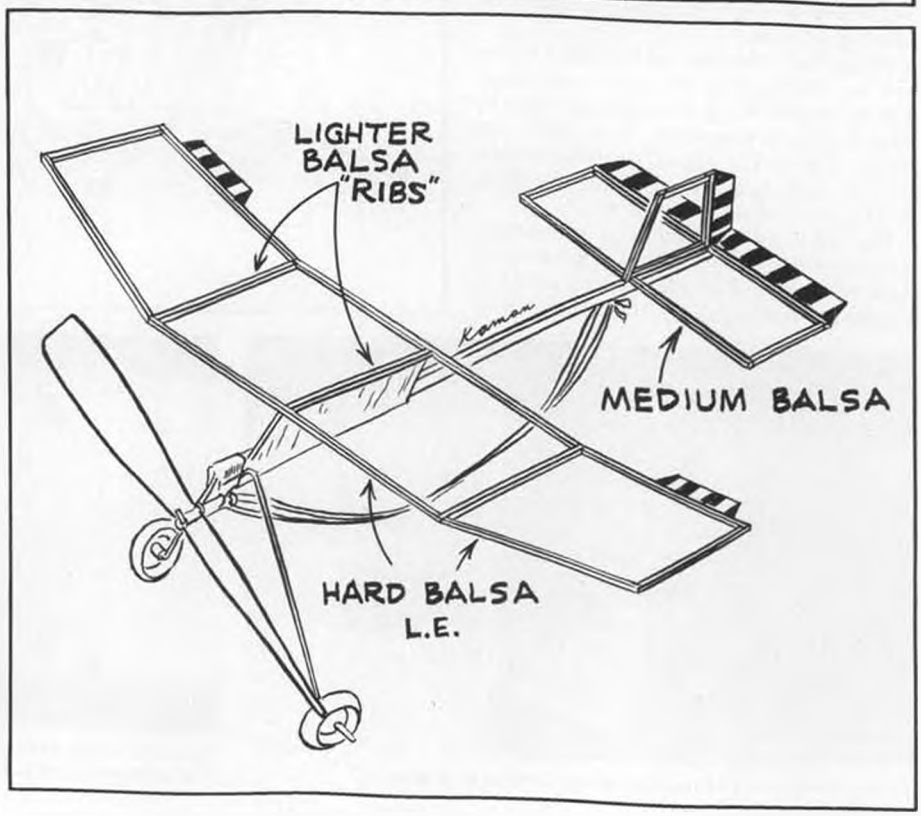
One of the things that makes life easier for a model builder is the building board. This is a flat board on which the pieces of the model are pinned down to dry, insuring an untwisted framework. It should be soft enough to stick pins into easily. "Celotex" wallboard 1/2-inch thick is the best thing I have found. It's made of soft fibers and painted white on one side. You can get it at your local lumberyard in a sheet four feet wide by eight feet long for not much more than you'll pay a hobby dealer for a small piece (about eight dollars or so). You can cut it up with a knife to get it into the family car. Just make a cut part way through and you can break it the rest of the way. You can sell the extra to friends to make models on or, as I do, have three or four models going at the same time. You'd be amazed how many 14 x 24-inch boards with partly built models on them you can stuff under the bed! Or you can pin pictures on it and use it for a dart board! If you can't get Celotex, heavy cardboard like they use to pack refrigerators in is the next best. If it isn't flat, maybe you'd like to glue it down to a board or old bench that is. Flat is where it's at.

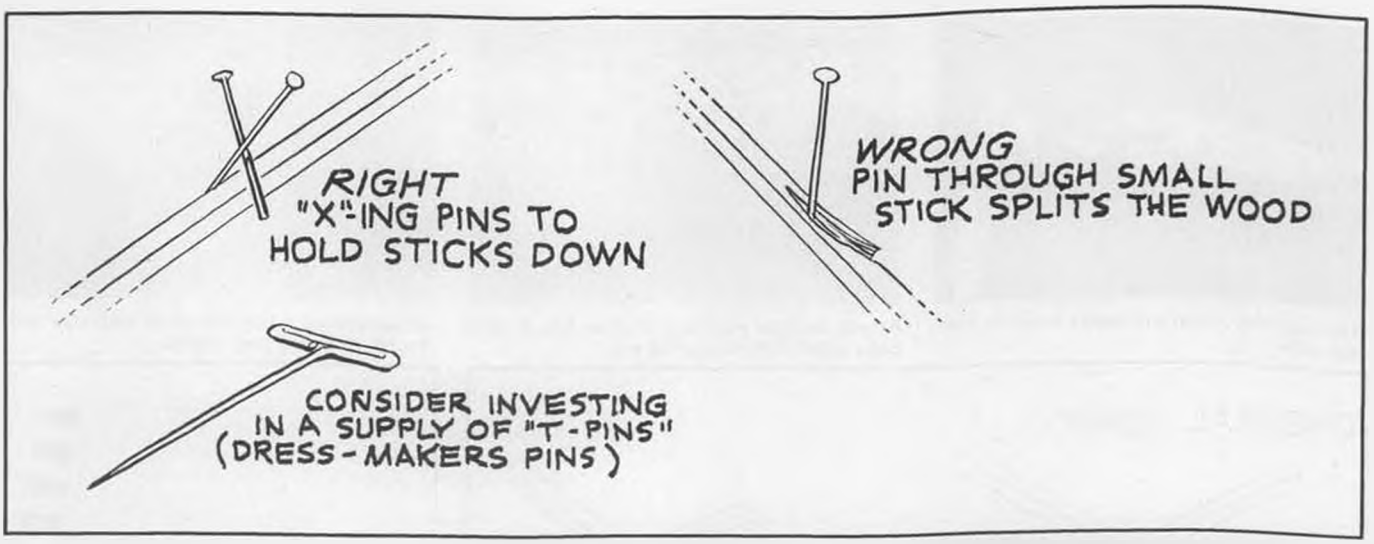
THE CUTTING BOARD

There are two reasons for not cutting on your Mom's formica kitchen table. One of them is that you'll dull your knife, and I'll let you guess what the other one is. One modeler I know uses old phone books to cut out parts on, tearing off a few pages when the surface gets too cut up. Another uses old linoleum tiles. I like heavy, solid cardboard about 1/8-inch thick, but I have no idea where you can get it outside of an art store. Don't cut on your plan or building







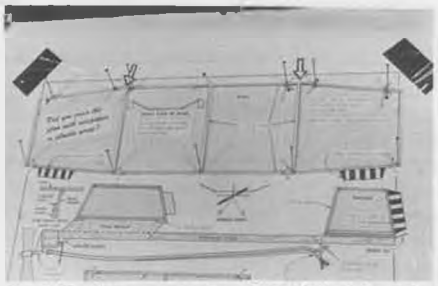


board if you can help it; it really makes a mess.

THE PLAN

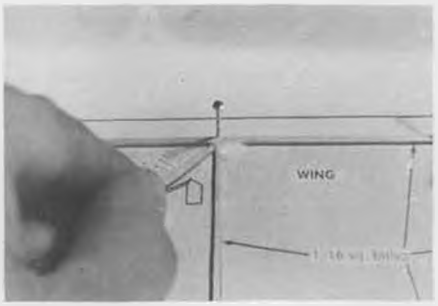
Model airplanes are built right on top of the plans. Because many structures like wings and tail parts have to be pretty flat to fly, this is a good idea, but if your plan has been rolled or folded up, it may be hard to use. Hold it by the ends and run it over the edge of a table a few times, putting a little pressure on it to "erase" the curl and ridges. You can iron it if you aren't in a hurry! Then, tape it down on your building board, pulling out the wrinkles. I usually use frosted "Magic Mending" tape, but for the pictures I used vinyl black electrical tape so you could see it. Pinning your plan down isn't good enough, as it won't stay flat.

Once the plan is taped down, tape a layer of plastic wrap or Saran Wrap over the plan to keep the parts from getting glued to the plan. I used to use waxed paper, but the wax seems to get into the glued joints and keeps the glue from drying as well as it should. Some older modelers rub the parts of the plan which will come in contact with glue with a wax candle or a dry bar of soap. I even knew a guy once who glued all his parts to the plan on purpose, so he would have less covering to do. He just cut out around the edges of the wing and tail parts!

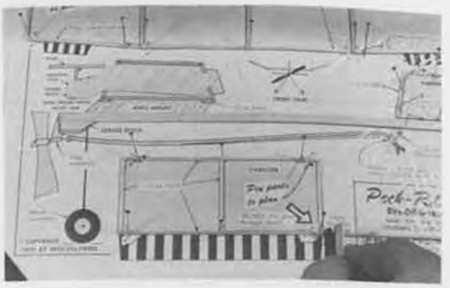


Pin L.E. down as shown. Add 'rib' sticks, trimmed to correct length before adding T.E. The arrows show joints left unglued.

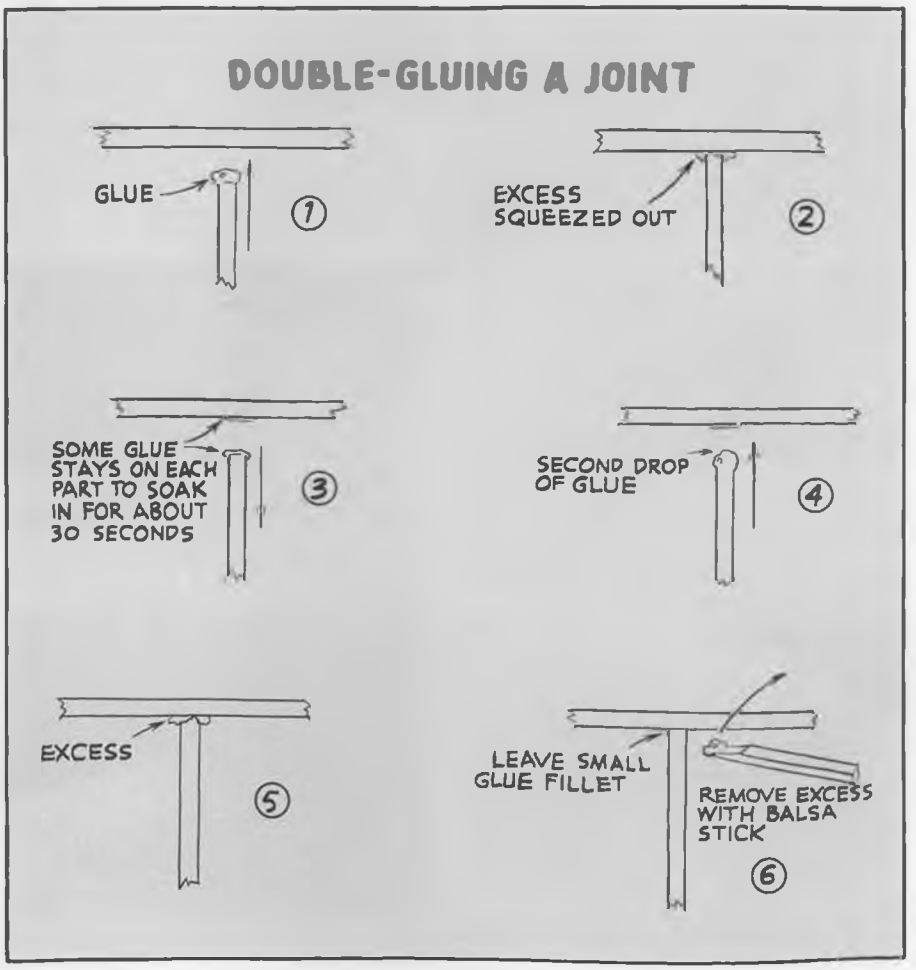
Put drop of glue on part you are gluing to make sure parts are wetted with glue. By double-gluing joints, you make a stronger union. Note drop of white glue for dipping ends of 'rib' sticks.

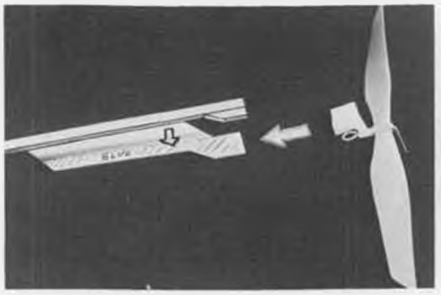


Wipe excess glue out of joints with balsa stick. Leave small fillet of glue for strength.

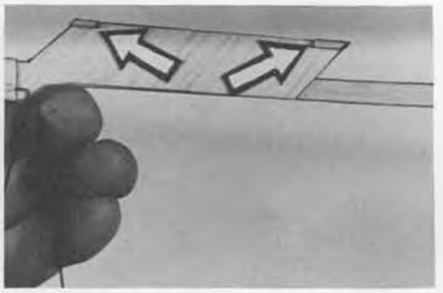


Trimming parts to length. Sight straight down over plan line, cut straight down.



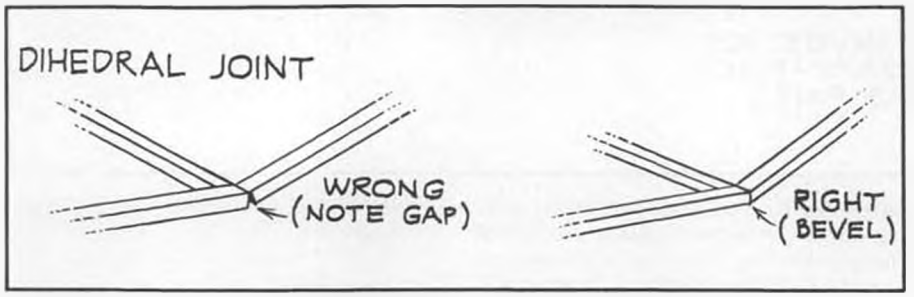


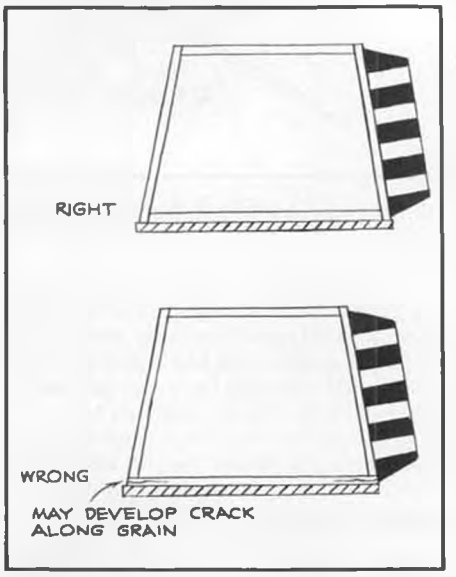
Now assemble pylon and spacer block to fuselage stick.



Arrows indicate positions of small bits of scrap balsa which help hold wing on.

Attach special rear motor hook with glue and thread. Rub glue into thread.





You can do this if you don't intend to fly the model, but you really *don't* need all that weight on a Peck R.O.G.! It will weigh too much to fly for long. Some kids like to try to use the Saran wrap to cover the model, but glue doesn't want to stick to it. That's why we're putting it over the plan, right?

PICKING THE STICKS

Before you start cutting parts to length, it's a good idea to separate them: hardest to softest. The hardest ones will make great leading and trailing edges, as they have to take a lot of stress. The sticks which make up the "ribs" (pieces which connect the L.E. to the T.E.) can be weaker. The tail parts need to be kept light, but not so light that they tend to warp out of shape. Save the "medium" for those. A simple "stick sorter" can be useful here. The more complicated your models get later, the more important it is to put the strength where it is needed, and the lightness where it counts.

You can make your own sorter out of a piece of cardboard with something on it (two pins, a bit of soda straw, a clothespin or ?) to hold one end of a stick. The end of the stick can be weighted with a small nut or a dime hung on with a taped-on pin or wire bent into a hook. The little lines are just for comparison to see which ones bend down the farthest.

You may think that this is no big deal, but I have seen three out of four kids use the spruce (harder wood) tail boom included in a popular beginner's kit for a wing part, using soft balsa to hold the tail on. Guess what usually happens on the first flight. Now is the time to begin thinking about what takes the most strain.

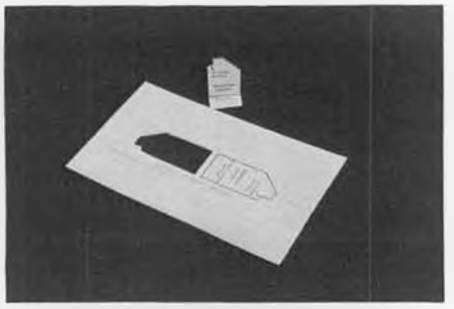
CUTTING THE "STICK" BALSA TO LENGTH

When I was a kid, all we had to cut balsa with were razor blades, usually dull ones at that that Dad had shaved with. They made 'em out of real steel in those days, and they cut pretty well. Today's blades that you get in the market are garbage, having softer but non-rusting metal mixed in with the steel to make them better for shaving, but lousy for anything else. You can get "industrial" single-edge blades at paint or hardware store which are still pretty good. If it says "stainless" on the package, pass it by. There

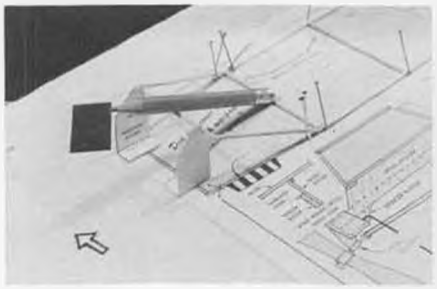
Continued on page 83

Bend pin for rear motor hook to replace the straight one shown on plan.

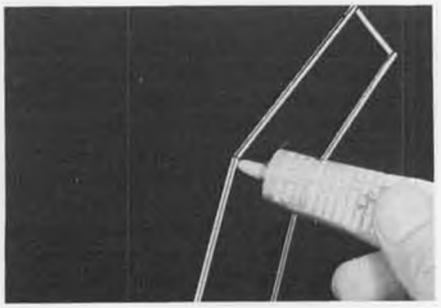
Using sanding block or sanding stick, make an angle on end of L.E. and T.E. before gluing in the dihedral. Careful, sticks are fragile.



Glue dihedral gauges from plan to a piece of card stock, cut out.



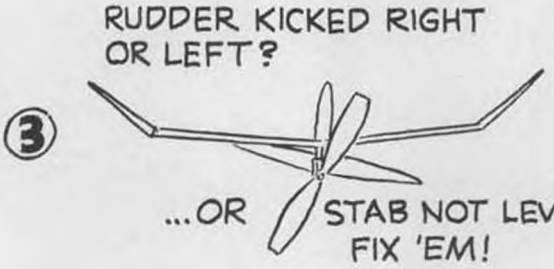
Use dihedral gauges to hold up wing tip while gluing. Using two on one tip insures a no-twist structure. Do other tip in one hour.

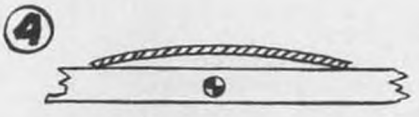


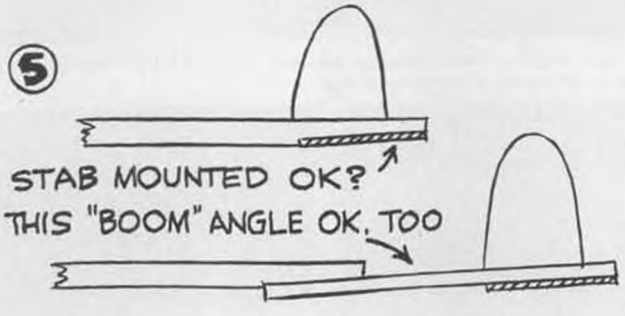
Add extra glue to dihedral joints when dry for added strength.

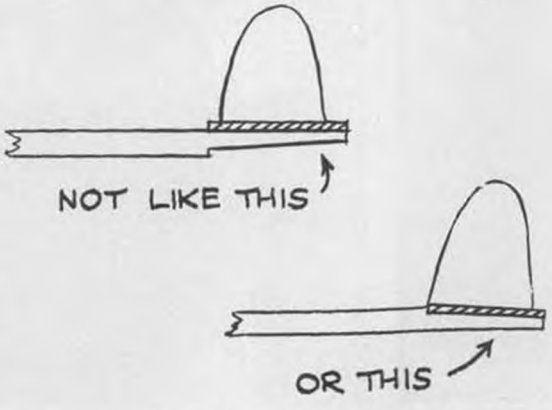
Bend ends of landing gear wire up with pliers to keep wheels from falling off. Wheels should be free to turn.

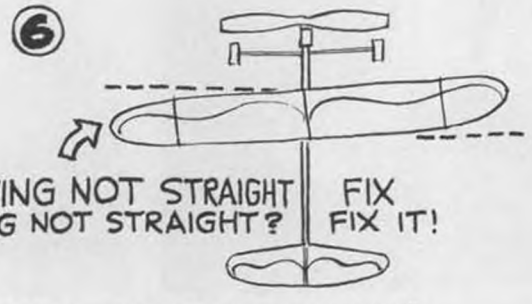
PRE-FLIGHT CHECK











Note: Disregard chart published in the December issue! This revised version supercedes it and is correct!

the INSIDERS

INDOOR FLYING REPORT

By DAVE "VTO" LINSTRUM

Bristol Scout is a super-flying Peanut from the Nowlen Aero kit. See text for details.

• After all the hype and follow-up coverage that the U.S. Indoor Champs got last year, we expect that the concept of an Indoor Week at the Mini-Dome in Johnson City, Tennessee, will get wide response from the indoor community. Tony Italiano and Hardy Brodersen of the National Free Flight Society are hard at work on the details, trying to put together an outstanding package. We know it will be a winner.

For now, all we can tell you is to reserve the week of May 29 to June 5, 1988, on your calendar. If you need to apply for vacation (as your "Insiders" scribe does), do it now. We realize the date conflicts with the U.S. FF Champs (outdoor) at Taft, but this was unavoidable. We hope to see you at the meet, held under a 116-foot ceiling on a football field-size floor. It is one of the best Indoor sites in the world that we know of.

OBSCURE AIRCRAFT

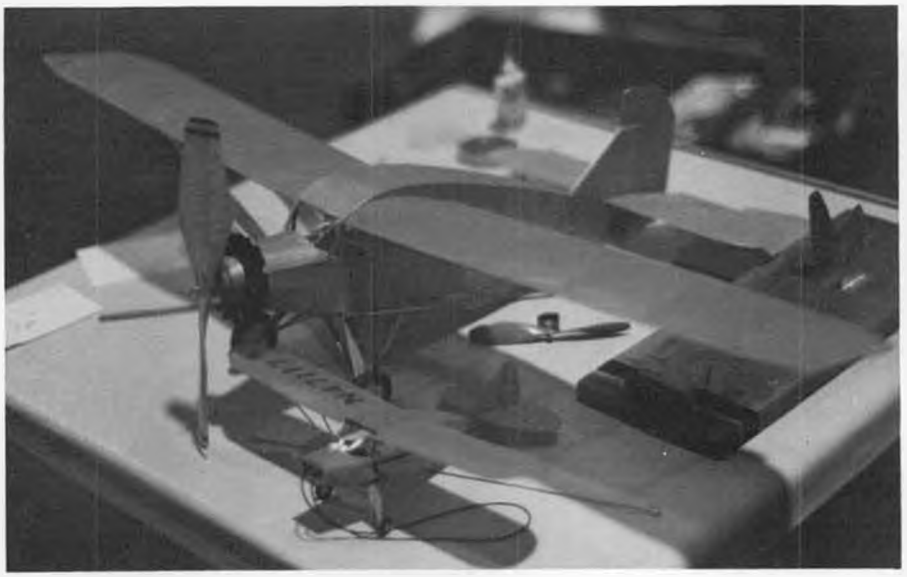
As promised, this month we have a photo of the obscure homebuilt Tefft "Molecule" as built by your "Insiders" columnist. It is a midwing with the wheels mounted on the lower longeron, so ROG is impossible with any normal prop. However, for outdoor where HL is common, you can launch with ease.

We are looking for nominations for the Obscure Aircraft feature. If you have an unusual A/C in mind that has not been modeled before or at least in indoor scale form, send your info to Obscure Aircraft, c/o Linstrum, 4057 San Luis Dr., Sarasota, Florida 33580.

NOWLEN AERO BRISTOL SCOUT

Dennis Nowlen has come up with a terrific new Peanut kit that is going to make your mouth water. The ship is the WWI bipe Bristol Scout "A" which led the way to the B/C/D versions used by the British Royal Flying Corps in 1914. It is truly a historic, classy machine.

Nowlen Aero's kit is complete with good wood and lots of fine detail. The design features a long body with a wide gap between



John Tudor's 36-inch Coconut Scale Bellanca dwarfs his Peanut Piper Vagabond. Coconut Scale is taking off(no pun intended) as a contest event.

Charles Slater preps his modified Chilton EZB at MIAMA meet.

Dean McGinnes with British Homebuilt P-Nut, Parnall Pixie. See this month's Peanut Plan!

Millard Wells inspects his immaculate Waco bipe, a Golden Age gem.

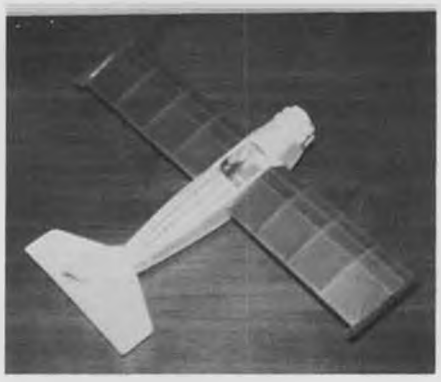
Nancy Beitz of MIAMA club built this neat 24-inch Piper J-3 Cub. Flies majestically!

John Tudor built this smooth-flying Coconut scale Bellanca Columbia.

Butch Hadland of London works on Pistachio in his immaculate workshop. See text.

wings, a configuration that makes for long flights. Included are a shiny machine-pressed aluminum cowl (very light), Williams Brothers scale engine cylinders, ball bearings, special light reed parts, and a fully detailed set of plans. A thoughtful item is

Continued on page 79

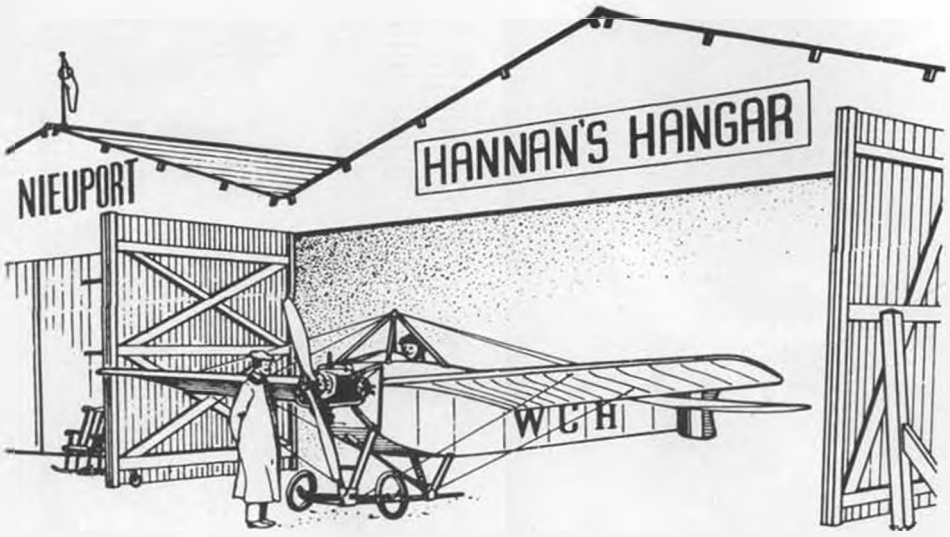


An obscure aircraft, Tefft Molecule, by VTO.

Another jewel from Millard Wells' Golden Age collection, a 30s Stinson Reliant.

Carl Headley puts rubber power into his birdlike Bostonian--note the odd wing sweep.

Mike Arak advertises Indoor Week on his shirt. It will repeat this year at Johnson City, May 29. Be there!



"Experience is knowing a lot of things you shouldn't do."

• Our lead-in line, by William S. Knudsen, via Jim Alaback, would seem to apply perfectly to model building!

AVIATION IS WHERE YOU FIND IT

From the *Banana Republic* mail-order clothing catalog, the following leather-jacket testimonial: "It protects me on those cool early mornings in the desert when we're flight-testing Voyager"—Dick Rutan.

MODELS IN/ON BOXES

Did you know Cracker Jack once was in the model airplane business? Long ago they offered models such as "the Hummingbird Monoplane" as premiums. Also available were little Cracker Jack Air Corps pins, for anyone willing to send in the sides from ten Cracker Jacks boxes. We like the enthusiastic tone of the advertisements: "Chances are you'll eat lots more than fifteen packages with half-trying. . ."

During the 1930s and 1940s model gliders were popular premiums for breakfast-cereal companies. Some were printed right on the outside of the boxes while others were packed inside and were made either of cardboard or thin wood. (We used to tease that the cereal tasted like cardboard too.) However, considering that the cereal, complete with the glider, usually sold for about 25 cents it was quite a bargain.

Recently Ralston Honey Graham Chex cereal boxes contained gliders of the patented "Dip-er-Do" design. These bear more than a passing resemblance to the trademarked "Sail-Me" gliders offered by Butter-Nut Bread, circa the 1930s. Some things never change. On second thought, the Honey Graham Chex is much more flavorful than the old prewar cereals. And the *price* has certainly changed; $2.19 per box!

CORREX DEPARTMENT

Our mention of the forthcoming film which features Steve Pitcairn's restored PCA-2 Autogiro in a rescue scene, contained an error. The film, entitled "The New Adventures of Pippi Longstockings," is not a Walt Disney movie, as we had thought, but was created by *Silk Stocking Productions*. Watch for it at your local theater.

THOUGHT FOR THE DAY

"Free flight is both the beginning and the summit, the simple but still profound soul of modeldom. Simple is profound enough." So says Tom Winter, editor of the Lincoln, Nebraska, newsletter *The Winding Stooge*. See photo of Tom during one of his profound moments.

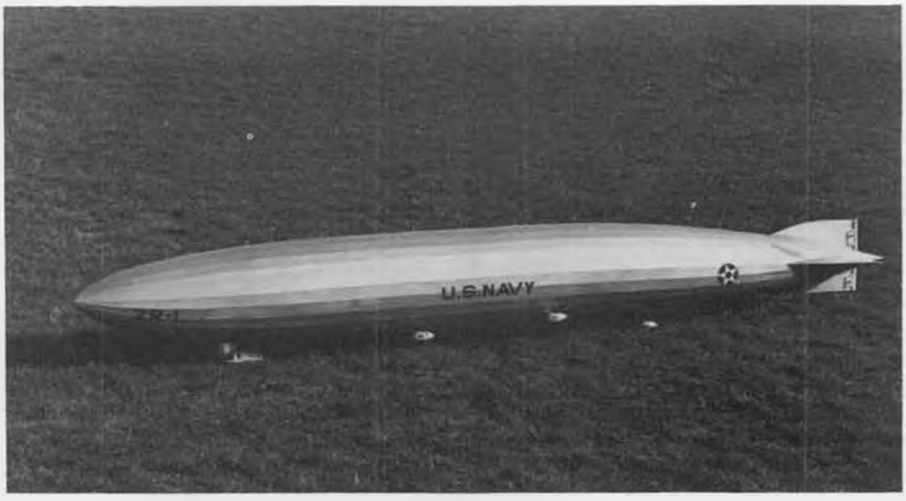
ALSO FROM THE *STOOGE*

Perry Peterson recently compiled a list of Peanut Scale plans which have been published in the magazines, for Tom Winter's newsletter. *Insider* Dave Linstrum took the time to count and discovered that 85 of the plans were by *MB*'s own "Prolific Professor" Walt Mooney!

AND FROM ANOTHER NEWSLETTER

The Skywriter, edited by Dave Mullens, is published by the Seattle Skyraiders control line club, and from their October '87 issue, we extracted the following from an article by Jason Huntress:

"I guess I could best address beginners and pilots who, for one reason or another, become discouraged when they finally see the mind-boggling complexity of this sport. There is a lot to it, I suppose as much as one



Bill Pinkston's display model of the ZR-1, constructed for the Seattle Museum of Flight, is 10 feet long, yet weighs less than three pounds.

Jack McGillivray's beautiful rubber-powered Sea Hornet flies overhead in this photo from Frank Scott.

Pistachio Scale Albatros DII by Tonda Alfery, of Czechoslovakia. It features foam styrene fuselage.

wants to put into it, and that's well and good, but it takes time. To see an expert put a beautiful plane through its paces is inspiring and exciting, but it's also frustrating. 'Gee, I wish I could do that.' They don't learn to build it or fly it overnight. So don't lose your sense of humor.

"Murphy's Law runs true in every activity, and control line is no exception, so keep building and flying as much as your time and enthusiasm allow; get the experience, ask questions, even if they sound stupid, and read, read, read.

"I don't have any great pointers, but these are a few ideas born by reading, flying, and talking with other pilots that have helped me out. (*Of the eleven ideas Jason presented, we've selected our favorite three. w.c.h.*)

"1. Pulling out of a maneuver when the plane is in a vertical dive is really important if you want to try that maneuver again with the same plane.

"2. Patience in building (for me) is probably the hardest thing to keep. Having a plane that is ready to fly at all times is very helpful.

"3. And most important, to eliminate any and all problems that come up in this hobby, take up a different one."

AND FROM A FREE FLIGHT SCALE MODELER'S POINT OF VIEW

Tom Arnold, Editor of the *San Diego Scale Staffel* newsletter, reflects after a contest:

"The day begins bright and early. You leap out of bed with a song on your lips (this part is true poetic license). You shave, gulp down some cornflakes, and head for the garage as your family slumbers on. Into the workshop you go, mentally reviewing the equipment needed. A quick glance into your tool box—yep, this time you have your winder for sure—and with your four arms you carry aircraft, equipment, and documentation into the car.

"A look at the rising sun, a deep breath of cold morning air, a nervous look at the trees to check the wind, and with great zest you head out. *Today is the contest!* Today the true brethren will be out, the finest will be waiting with their aircraft. The cold, clear air waits, the timers wait, the field waits. Today you will witness some truly great flying by your cohorts. Today you'll see exquisite models that belong in a gallery as an expression of fine art instead of at a windy flying field. Today you'll swap stories and examine everyone's entries and come away saying 'Why didn't I think of that?'

Tom Winter, philosophical editor of the Winding Stooge newsletter, ponders removal of his twin pusher's rubber motor from the model's thread bracing. Photo: Billie Olsen.

"As the morning wears on and the breezes start taunting you, you'll see who can really trim his airplane. Today you will discover warps that did *not* exist 24 hours ago.

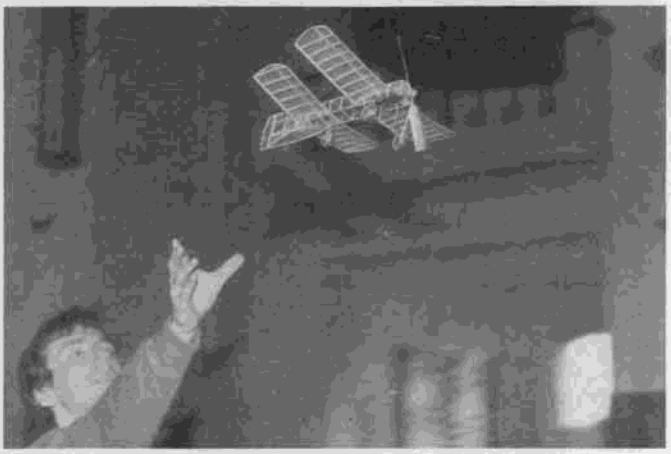
"You look at your watch, disbelieving how fast the time is going, and decide not to change your rubber motor after all. You watch the twisted rubber knot in agony, and bleed rubber-lube as you slowly crank in the last 50 winds, knowing full well you should be in church. You expect no divine mercy—but you ask for it anyway. Finally your trimming efforts begin to yield some stable flights, but now your rubber is so tired it's like wet spaghetti. Vowing to *never* again bring an untrimmed airplane to another contest, you swear you'll start weeks earlier next time.

"Now those casual breezes have picked up—why today does it have to blow? Why can't it wait until your times are in? Why do timers hide under cars when you are finally ready? A few good flights, a few disasters, and all of them too short. Why do stopwatches go so slow? Surely that was a minute and a half—are you sure it was only 25 seconds? You are torn between watching the action and fiddling with your own airplanes. As you glue more pieces on, you say to yourself that you could stand around

Continued on page 77

J.Baur and Georges Chaulet, of France, with most unusual autogyros. Photo:Parmentier.

Sixteen-inch wingspan Embraer Tucano by Arizona's Dick Howard, is rubber-powered, here equipped with a display propeller.



Peter Mikulese launches his contest-winning Peanut Bleriot during a Czech indoor meet. Photo: Lubomir Koutny.

PARNALL PIXIE

By FLORENT BAECKE. . .Build this two-seat low winger as a Peanut, or order the full-size plan from Model Builder's Plan Service(see page 106). Either way, you'll wind up with a rubber-powered flying fool!

• So you thought ultralights were something new? Well, so did I, until I came across a three-view and perspective drawing in the spring 1960 issue of *Air Progress* of the Parnall Pixie. They were done by one of my favorite aviation artists, Douglas Rolfe.

The Parnall Pixie was a two-seat semi-cantilever winged monoplane powered by a Bristol Cherub engine which developed 32 hp at maximum revolutions. There were several versions manufactured with various engines installed. Besides the two-seat version, there was at least one single seat, clipped-wing version, powered with a geared down motorcycle engine. It hit speeds of more than 100 mph.

The Pixie was entered in a contest put on by the Duke of Southerland, Under Secretary for Air in England. The contest was created to help renew interest in aviation. It was held in October 1923 at Lympne. Capt. McMillan's Pixie II, powered by a 30 hp Douglas Engine, won a prize by averaging 76 mph. Pixies were also entered in 1924 and 1925. The Pixie III, entered in 1925, had a modified tail with divided elevators and a full length rudder. It could also be converted into a biplane.

My model is based on the information in the *Air Progress* magazine. It was first painted silver with black trim; however, I did not like the results, so I stripped the model completely, resanded, and covered it with yellow tissue. Blue tissue was used for the letters. The cockpit padding was painted brown. The wing walks, engine, and control surface outlines were black. I like this color scheme much better. The model weighs 1-1/2 ounces without the rubber motor installed. The only deviation I made from the *Air Progress* plans was to add dihedral.

CONSTRUCTION

The bulk of the model was constructed from 1/16 hard square medium and various thicknesses of soft balsa. A Dremel Tool, Badger Spray Gun, and standard hobby tools were all that used to produce this model. The Japanese tissue and some of the other materials were ordered from Old Timer Models, P. O. Box 913, Westminster, California 92683. I made my own wheels; however, Old Timer Models has a good selection if you do not want to make your own.

FUSELAGE

Tape or pin the full-size plans on a flat wooden surface and cover with wax paper. Build two identical sides, one on top of the other. When the glue has dried, cut them apart, if necessary. Next, install the cross pieces, being careful to keep everything square. Now glue the formers in place and add the stringers. Then install the landing gear and the tubing for the wing pins.

Cover the nose with soft sheet balsa where indicated on the plans. Shape and tack glue the nose plug in place. Sand everything using 220-grit sandpaper until smooth. Spray with 50/50 thinned clear Aero Gloss, let dry, and finish sand with 600-grit sandpaper. While this seems like a lot of trouble, the end result is well worth it. Remember that Japanese tissue is very thin and the least imperfection will show.

WING

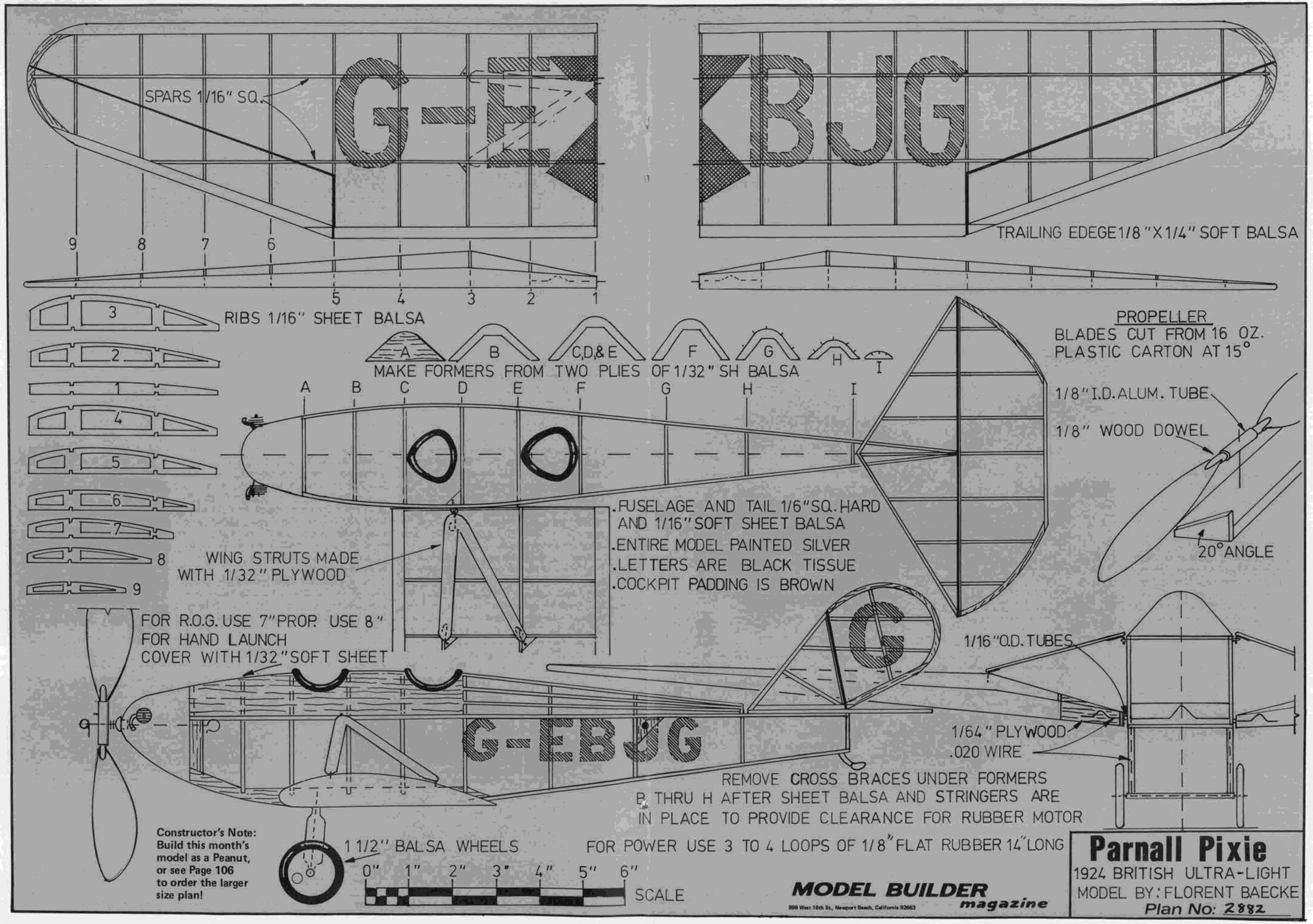
Begin by making the leading edge from very soft balsa, cut to the outside dimen-

Continued on page 70

Model is based on Air Progress article, with additional dihedral designed into it.

Delicate framework of the Pixie shows off its attractive design in this shot.

Parnall Pixie with plug-in wings unplugged.


SPARS 1/16" SQ.
G-EBJG
9 8 7 6
5 4 3 2 1
TRAILING EDEGE 1/8" X 1/4" SOFT BALSA
RIBS 1/16" SHEET BALSA
3
2
1
4
5
6
7
8
9
A B C,D,& E F G H I
MAKE FORMERS FROM TWO PLIES OF 1/32" SH BALSA
A B C D E F G H I
PROPELLER
BLADES CUT FROM 16 OZ. PLASTIC CARTON AT 15°
1/8" I.D. ALUM. TUBE
1/8" WOOD DOWEL
20° ANGLE
.FUSELAGE AND TAIL 1/6" SQ. HARD AND 1/16" SOFT SHEET BALSA
.ENTIRE MODEL PAINTED SILVER
.LETTERS ARE BLACK TISSUE
.COCKPIT PADDING IS BROWN
WING STRUTS MADE WITH 1/32" PLYWOOD
FOR R.O.G. USE 7" PROP. USE 8"
FOR HAND LAUNCH
COVER WITH 1/32" SOFT SHEET
G-EBJG
1/16" O.D. TUBES
1/64" PLYWOOD
.020 WIRE
REMOVE CROSS BRACES UNDER FORMERS B THRU H AFTER SHEET BALSA AND STRINGERS ARE IN PLACE TO PROVIDE CLEARANCE FOR RUBBER MOTOR
Constructor's Note: Build this month's model as a Peanut, or see Page 106 to order the larger size plan!
1 1/2" BALSA WHEELS
FOR POWER USE 3 TO 4 LOOPS OF 1/8" FLAT RUBBER 14" LONG
0" 1" 2" 3" 4" 5" 6"
SCALE
MODEL BUILDER magazine
898 West 16th St., Newport Beach, California 92663
Parnall Pixie
1924 BRITISH ULTRA-LIGHT
MODEL BY: FLORENT BAECKE
Plan No: 2882

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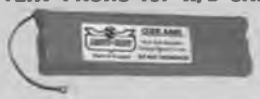

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CO_2 and Wee R/C in Czechoslovakia

By BILL HANNAN. . .Wee R/C and small custom-made CO_2 powerplants are becoming popular in Eastern Europe. The author has compiled information from several Czech modelers for this feature report.

• Compiled by Bill Hannan from information supplied by Stefan Gasparin and Antonin Alfery, translated by Fritz Mueller.

THE MOTORS

The Modela 270 powerplant is produced in quantities of several thousand yearly in Czechoslovakia, and has proven popular among builders of both sport and scale models. Larger in size than the American Browns or the British Telcos, Modelas are capable of flying fairly big models with good performance.

Also made in Czechoslovakia have been a series of custom-made CO_2 motors covering a wide range of sizes from subminiature suitable for powering Pistachios, up to a three-cylinder unit displacing 390 cubic millimeters. These motors are the work of master machinist/engineer Stefan Gasparin, who has fabricated more than 57 motors since 1974.

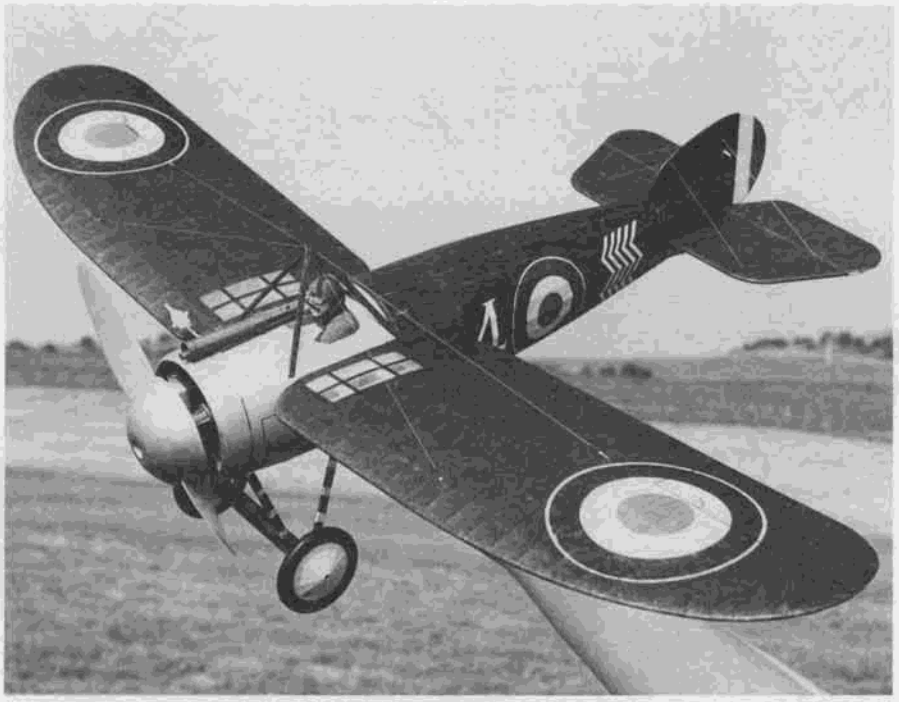
Originally inspired by an article about Bill Brown's CO_2 motors, written by Doug McHard for the *Aeromodeller Annual* of 1972-73, Stefan embarked upon producing eighteen different designs and some thirty variations. In a masterpiece of modest understatement he says: "Today I know a few things about them, but it was not so simple." His motto is "The lighter the better," and his tiny motors have special appeal to collectors and "engine gourmets." One can only marvel at the dedication, patience, and skill required to produce such engineering triumphs.

WEE R/C

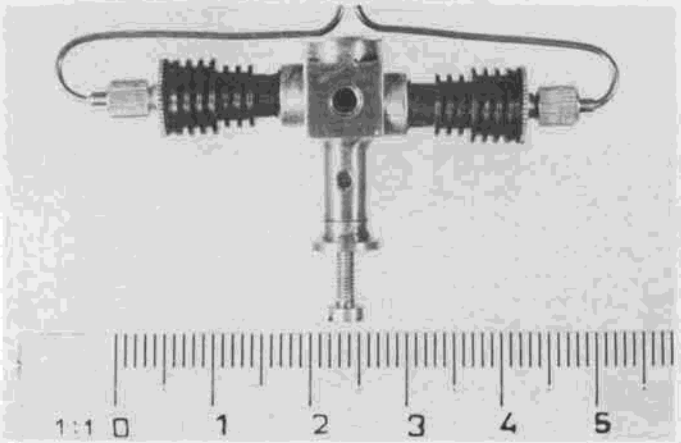
CO_2-powered R/C model experiments in Czechoslovakia apparently began soon after the Modela motors were introduced to the market. The first known example was a Helio Courier, the joint project of Antonin Alfery and Miroslav Kuba, both engineers as well as hobbyists. This model spanned 700 millimeters and could make reliable rise-off-ground flights of one-minute duration. Unfortunately, this satisfying flyer was put out-of-commission when it flew into an open automobile trunk!

The next effort was a Bristol Monoplane spanning 720 millimeters, and weighing 85 grams. Unfortunately, while being tested in free flight, the model engaged a thermal and flew away.

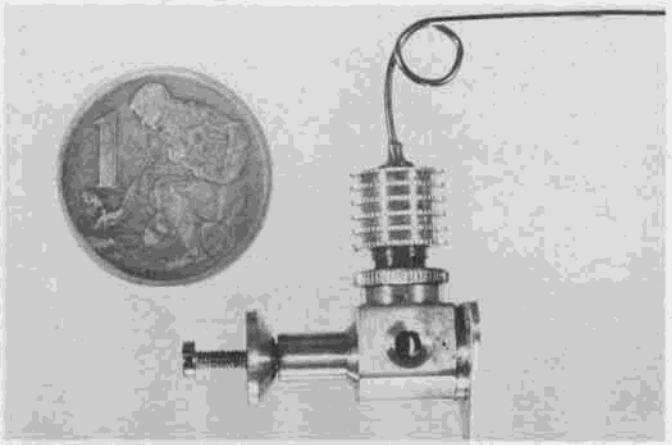
Later, Kuba demonstrated reliable CO_2-



This Modela-powered Bristol Monoplane by Antonin Alfery was intended for R/C, however it flew away while being tested in free flight!

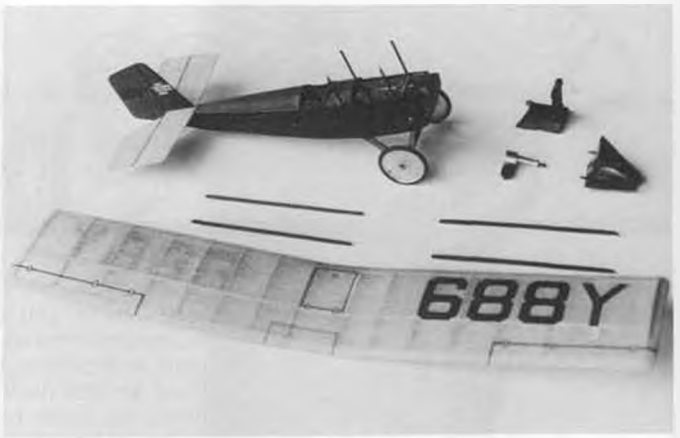


This Gasparin twin-cylinder motor was constructed during 1979 and displaces 100 cubic millimeters.



One of Stefan Gasparin's first CO_2 motors, constructed in 1974, had a displacement of 100 cubic centimeters.

An early CO_2-powered R/C Pietenpol was successfully flown indoors.



The Pietenpol dismantled.

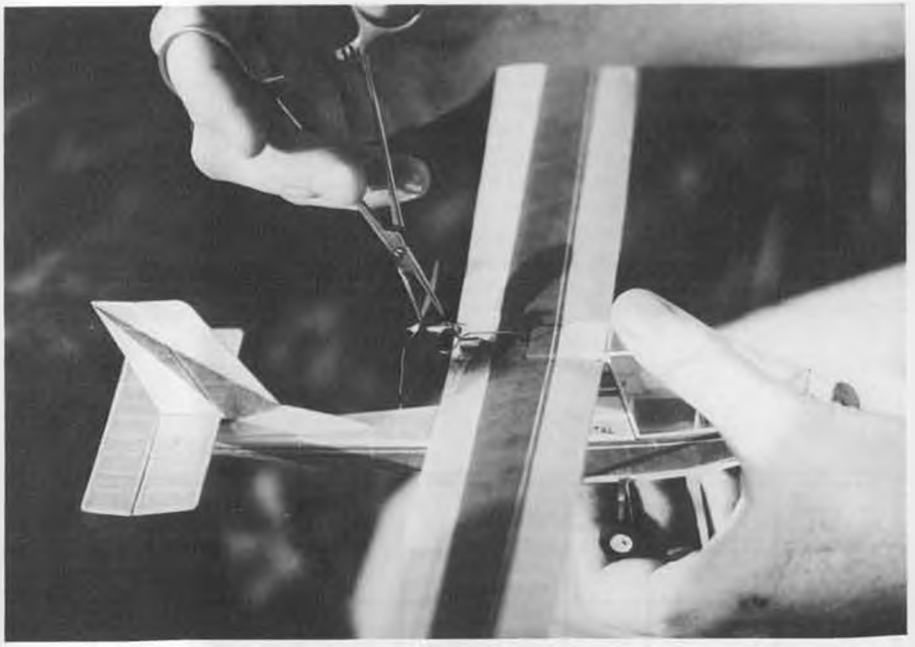
powered R/C flying *indoors* during a 1983 contest. It was this activity that inspired Stefan Gasparin to become involved in subminiature guidance systems. At the time, some of his tiny CO_2-powered free flight models were flying *too* well outdoors, and the thought of losing one of the little gems with so many man-hours invested, was disquieting to say the least. By contrast, being able to control a little scale model in order to keep it within close range was a most pleasing idea.

Starting with a Micro-Albin receiver circuit as miniaturized by an American model rocket builder, Gasparin created a dependable unit from domestic parts weighing less than four grams. The actuator, which was simple in design, featured a ceramic magnet rotating within an electromagnetic coil and weighed less than 1.5 grams. Two button-type batteries powered the receiver, and the entire airborne guidance system weighed less than 11 grams...a far cry from the so-called lightweight commercially available devices.

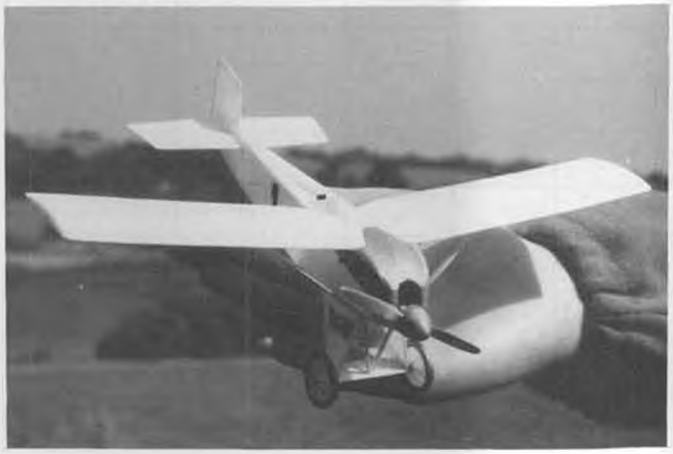
During 1983, a 1/20th-scale Morane-Saulnier served as an airborne test vehicle, and performed beyond expectations. Next, a Peanut-size Aero A-18 weighing 30 grams was successfully flown in a gymnasium, although control on the floor after landing was a problem, since the rudder became ineffective at slow speeds.

During the summer of 1984 the model was flown outdoors with excellent controllability. According to Alfery "This small model was the fulfillment of our dreams about small scale, CO_2, R/C, fun-flying." Other models including an Avro 504, a Pietenpol, and a Thomas-Morse Scout were subsequently flown, the latter still being operational after nine years!

Alfery and Gasparin feel that CO_2-powered R/C models are truly practical and yield broad possibilities for recreational flying. Additional advances in microelectronics are anticipated to reduce guidance unit weights by 50 percent, and the efficiency of CO_2 engines can also be improved via improved tank-filling techniques and better gas utilization. In conclusion, Stefan states: "I think motors of higher standards will be mass-produced in the future, just as history has had its course with combustion engines. One can foresee plenty of work with CO_2 for the pleasure of experimenting." •

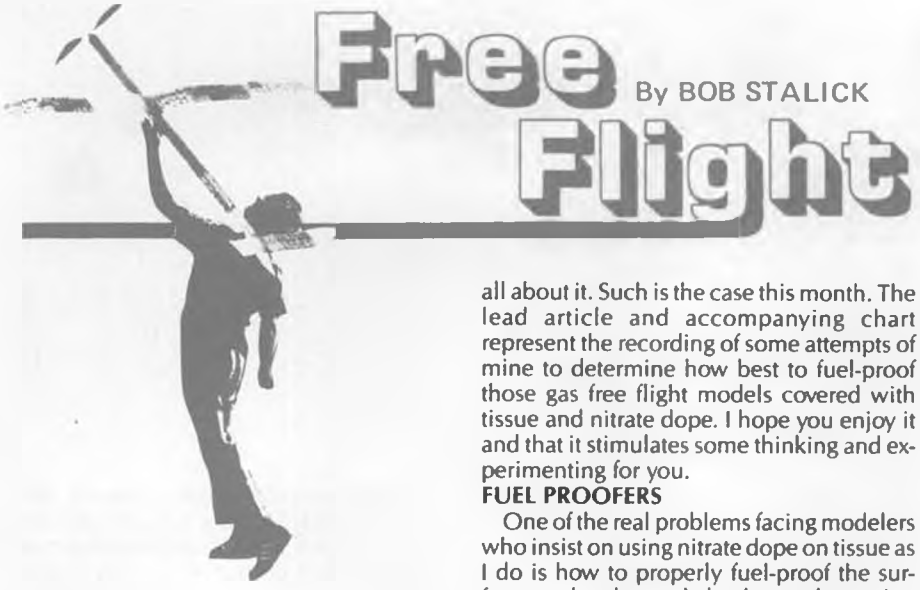


A close up of the 10 cubic millimeter powerplant being adjusted to decrease its rpm.



All-foam Benes/Hajn racer by Antonin Alfery is powered by a Gasparin motor of only 2 cubic millimeter displacement!

A 1/20-scale Ansaldo Ballila constructed by Antonin Alfery with CO_2 engine and R/C equipment made by Stefan Gasparin.



Free Flight

By BOB STALICK

• I think that most of the outdoor free flight world goes into a different mode during these winter months. Some become indoor fliers until the first rays of sunshine split the clouds. Others decide that this is the perfect time to design the new world beater. Still others experiment with new ideas or refinements of the old ones. I suppose that still others go into hibernation just like the brown bears and other critters. These luxuries are seldom afforded to the magazine columnists who face the monthly deadlines regardless of the weather, the urges, or the time of year. Some columnists, this one included, have the enviable opportunity to not only experiment, contemplate, and refine, but also the opportunity to tell others all about it. Such is the case this month. The lead article and accompanying chart represent the recording of some attempts of mine to determine how best to fuel-proof those gas free flight models covered with tissue and nitrate dope. I hope you enjoy it and that it stimulates some thinking and experimenting for you.

FUEL PROOFERS

One of the real problems facing modelers who insist on using nitrate dope on tissue as I do is how to properly fuel-proof the surfaces so that the gunk that leaves the engine does not soak into the covering. Even worse than protecting the model from the gunk is protecting it from the squirt of raw fuel from the broken pacifier tank or errant fuel bulb.

Over the years, I have tried all sorts of fuel proofers with only modest success. So, with the mind of a researcher at work, I decided to run some tests. The ideal fuel proofer, I opined, would be lightweight, cover any decals without discoloration, be easy to repair, provide a glossy finish, and repel any fuel I would be apt to use.

The result of this test will demonstrate to you that such a fuel proofer does not exist. Some do some of the above quite well, some do most quite well, none do none of the above. So, as you look down the following results, you can draw your own conclusions about the needs that you have and select the fuel proofer that fits those needs.

I would like to set the scene for you. The items subjected to the test were old and used nitrate dope-finished Japanese tissue-covered open surfaces. Each surface was measured to provide exactly 100 square inches of test area. This would be the equivalent of a 50-square inch wing or stabilizer considering that the total surface area is the combination of both the top and bottom of such a wing or stab. The surfaces were all old and well-cured. The surfaces were cleaned carefully and allowed to dry thoroughly. Each surface was marked in sections to identify the various treatments to which it would be subjected.

Each surface had a coat of the specified fuel proofer brushed onto it (except for the Black Baron spray clear) and was allowed to dry/cure for seven days in a dry, seventy-degree environment. The weight of the surface was measured on an Ohaus triple-beam balance gram scale, and the difference between the unfuelproofed surface and the coated surface was recorded. Limitations in the scale allowed accuracy to .05 grams. After testing, a second coat of the identified fuel proofer was applied and allowed to dry/cure for another seven days in the same conditions. Another weight test was conducted and recorded. Comments about the sheen of the surface were noted after each application had cured.

Another sample test was conducted using some old AMA decals placed upon a separate set of surfaces and a coat of the identified fuel proofer was placed over the decal. The effect of the fuel proofer on the decal was noted.

After all the surfaces had cured, a drop of the identified fuel was placed upon each

AN ASSESSMENT OF FUEL PROOFERS

TEST NUMBER	FUEL PROOFER	WT./100 SQ. IN. IN GRAMS	CHARACTERISTICS	FAI FUEL	K&B 1000	SIG 25%	COX RACING	MAGNUM 50	GLUE REPAIR	DOPE PATCHING
1.0	AEROGLOSS Cure=10 minute	Nil	Glossy-- Decal Covered	minimal Stain	Slight Stain	Slight Stain	Slight Stain	Slight Stain	Good joint, no curl, no discolor	Clear, No effect
1.5	AEROGLOSS Coat #2	.1 gr.	Hi-Gloss -- Decal Covered	No effect	Sl.Stain	Sl.Stain	Sl. Stain	Sl. Stain.	Good joint, no curl, no discolor	Clear, no effect
2.0	Black Baron Cure=30 minute	1.6 gr.	Glossy Decal Covered	No effect	Sl. Stain	Very Sl. Stain	Bubbled Surface	Sl. Stain	Good joint, no curl, no discolor	Bubbled Surface, Discolored
2.5	Black Baron Coat #2	.4 gram	Glossy-- Decal Covered	No effect	No effect	No effect	Bubbled Surface	Very Sl. Stain	Good joint, no curl, no discolor	Sl. Discolor
3.0	Lite Cote Cure=15 minute	.2 gram	Dull & streaky Decal wrinkled	No effect	No effect	No effect	No effect	Sl. Stain	Good joint, no curl, no discolor	Clear, no effect
3.5	Lite Cote Coat #2	.2 gram	Light gloss- foggy decal wrinkled	No effect	No effect	No effect	No effect	Sl. Stain	Good joint, no curl, no discolor	Clear, no effect
4.0	Formula U Cure=24 hours	1.0 gram	Glossy-- decal wrinkled	No effect	Sl. Stain	Sl. Stain	Sl. Stain	Bubbled Surface	Good joint, no curl, Some roughness	Bubbled Surface Slight Discolor
4.5	Formula U Coat #2	1.0 gram	Hi Gloss- Streaky- -decal wrinkled -Amber color	No effect	Sl. Stain	No effect	Sl. Stain	Bubbled Surface	Good joint, some curling, some discolor	No effect
5.0	K & B Poxy Cure=1 hour	1.4 gram	Low gloss-- decal wrinkled	No effect	Sl. Stain	Sl. Stain	Sl. Stain	Sl. Stain	Good joint, no curl, no roughness or discolor	No effect
5.5	K & B Poxy Coat #2	1.6 gram	Hi Gloss--Clear decal wrinkled	No effect	No effect	No effect	No effect	Very Sl. Stain	Good joint, Slight curl, no roughness or discolor	No effect

• Note: The fuel actually removed the fuel proofer from the tissue surface, due in part to a slight rubbing action during cleaning. Suggest that daubing the surface to clean it could prolong fuelproofer effectiveness.

surface and allowed to set in place. After 30 minutes the fuel was gently wiped off with a soft cloth. After another 30 minutes the condition of the surfaces was noted and recorded. No test was conducted on the fuel-proofed decals to determine whether the proofer actually protected the decals from the raw fuel.

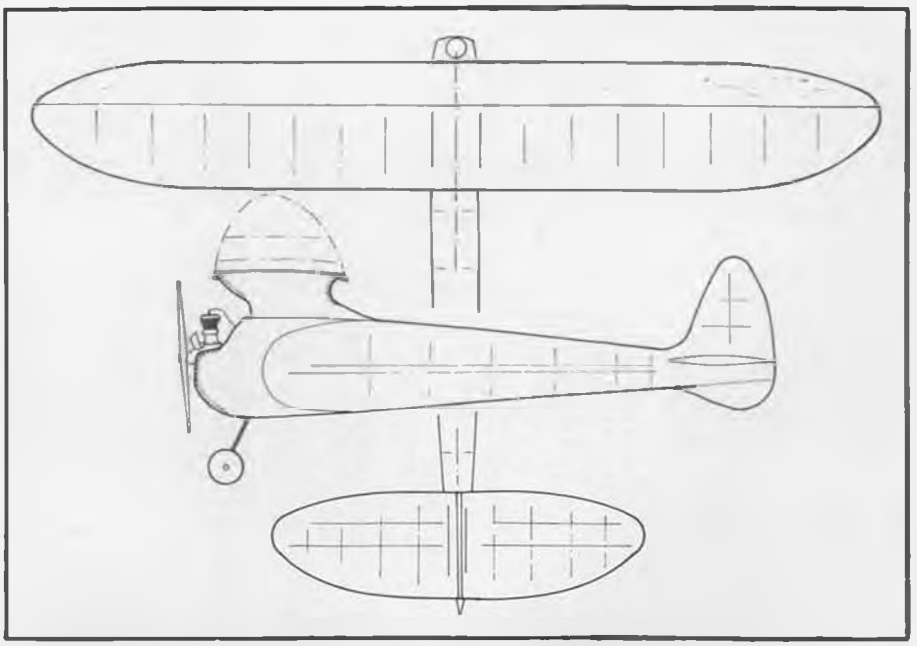
The next test was the rip repair test. In this instance a "star"-type cut was made in each surface. This was repaired by using Testor's Formula A Extra Fast-drying cement smeared over the star. After 30 minutes, the condition of the repair was noted regarding sealing of the surface, "curling" of the joint, and discoloration. Curling is my definition of the ability to make a smooth joint without either a ragged edge or other irregularities in the repaired surface.

The final test was to determine the effect of patching the surface. In this case, a tissue patch was applied over a small (one-inch long) rip in the fuel-proofed covering. The tissue patch was applied with nitrate dope. The effect on the repaired surface was noted as regards discoloration, repairability, curling, or other conditions.

Now, you know how the test was conducted. Here are the items tested. First, the fuel proofers themselves. I selected from the fuel proofers that I have customarily used myself. These were: Aero Gloss Fuel Proofer, the subject of test 1 and 1.5 (1.5 indicates two coats of the proofer); Black Baron Clear Gloss Spray Fuel Proofer, the subject of tests 2 and 2.5; Sig Lite Cote LoShrink butyrate dope, the subject of tests 3 and 3.5; Aero Gloss Formula U Clear, the subject of tests 4 and 4.5; and K&B SuperPoxy Clear Gloss brushing epoxy, the subject of tests 5 and 5.5. The consistency of the above subjects was as follows: Aero Gloss is very thin as purchased—similar to the consistency of dope thinner—it was used as is; Black Baron is a spray—it was used as is; Lite Cote is a dope and was thinned 50/50 to a thin brushing consistency; Formula U is quite thick as purchased, similar to cheap maple syrup, it was thinned considerably—probably 3:1 to get it closer to the consistency of the Lite Cote dope; and K&B Poxy, which comes as a two-part and is fairly thick, was thinned 50/50 with acrylic lacquer thinner, making it similar in consistency to the Lite Cote.

The fuels used in the test were those that I customarily use in my free flight competition activities: K&B FAI Fuel, K&B 1000 (25 percent nitro), Sig Competition 25 (25 percent nitro with Klotz oil), Cox Racing Fuel (30 percent nitro), and Magnum 50 (50 percent nitro).

So, if I have kept your interest this far, take a look at the chart in this issue for the results.



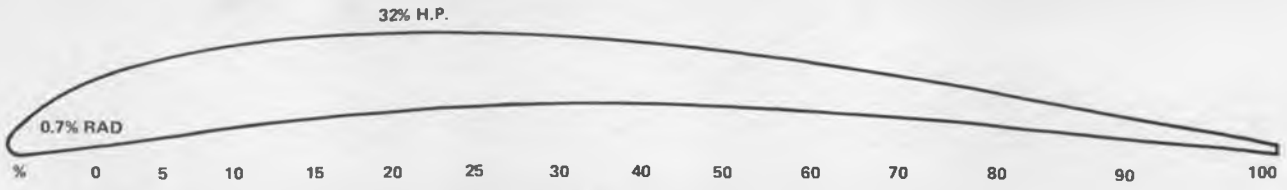
FEBRUARY MYSTERY MODEL

RECOMMENDATIONS FOR FUEL PROOFING

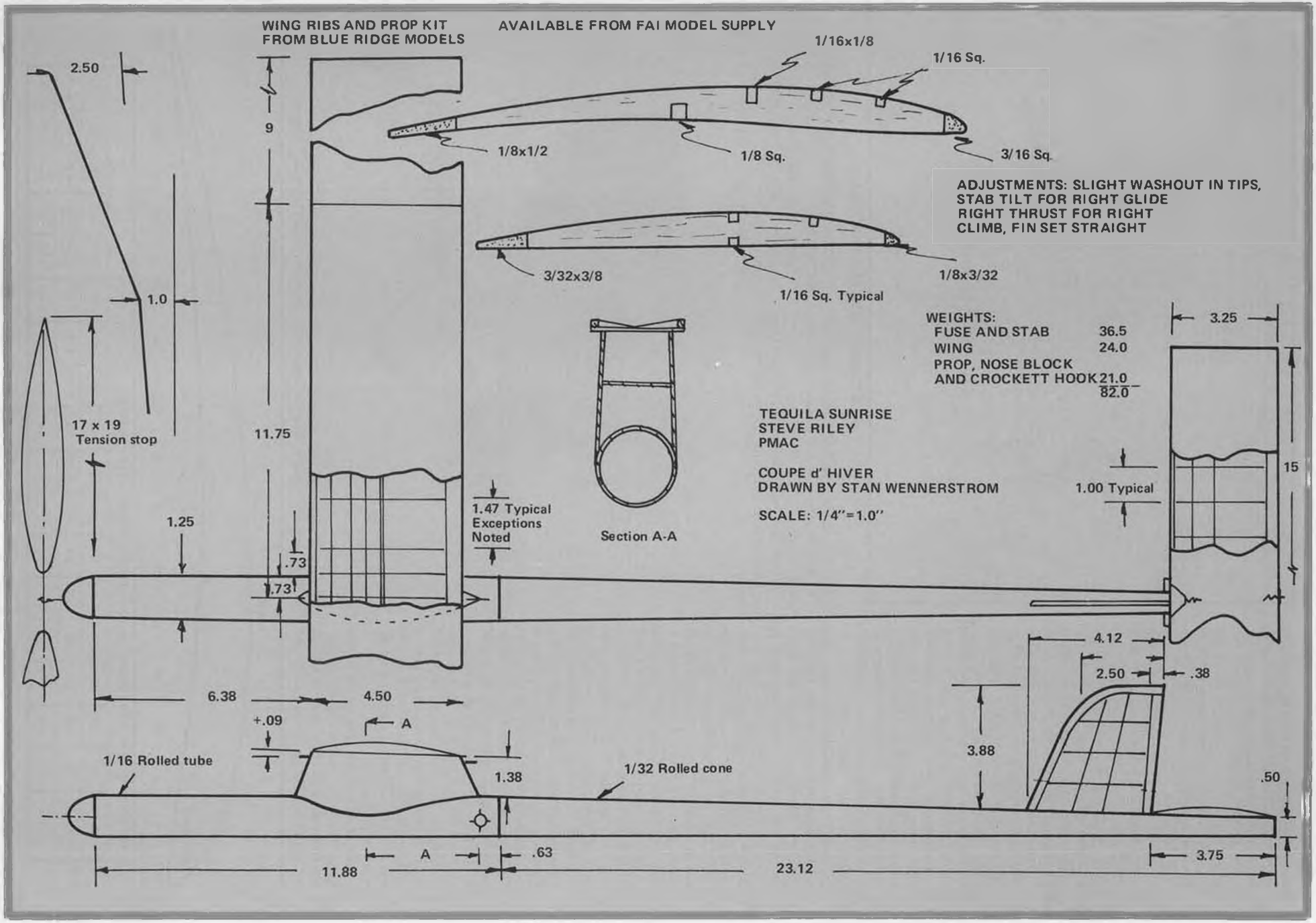
Based upon my tests, I would recommend the following fuel proofing for your consideration:

1. In areas where the raw fuel is apt to

Barnaby Wainfan and his red-hot PeeWee 30 Flying Wing at the MB/Northrop Flying Wing Meet at Taft, October 3 and 4. Ship has super glide, excellent ROG. Note D/T trapdoor.



JOE FOSTERS' SF-1 SARADENSKI SE-4410 UPPER CAMBER, FOSTER BOTTOM																	
X	0	1.25	2.5	5.0	7.5	10	15	20	25	30	40	50	60	70	80	90	100
Yu	0	2.05	3.1	4.6	5.3	6.4	7.55	8.35	8.8	9.05	8.95	8.35	7.3	5.9	4.3	2.6	0.75
Yl	0	-0.6	-0.4	0	0.3	0.7	1.4	2.1	2.6	3.1	3.6	3.7	3.45	2.85	2.0	1.05	0


WING RIBS AND PROP KIT
FROM BLUE RIDGE MODELS
AVAILABLE FROM FAI MODEL SUPPLY
1/16x1/8
1/16 Sq.
1/8x1/2
1/8 Sq.
3/16 Sq.
ADJUSTMENTS: SLIGHT WASHOUT IN TIPS,
STAB TILT FOR RIGHT GLIDE
RIGHT THRUST FOR RIGHT
CLIMB, FIN SET STRAIGHT
3/32x3/8
1/8x3/32
1/16 Sq. Typical
2.50
9
1.0
17 x 19
Tension stop
11.75
1.25
.73
.73
1.47 Typical
Exceptions
Noted
Section A-A
WEIGHTS:
FUSE AND STAB 36.5
WING 24.0
PROP, NOSE BLOCK
AND CROCKETT HOOK 21.0
82.0
TEQUILA SUNRISE
STEVE RILEY
PMAC
COUPE d' HIVER
DRAWN BY STAN WENNERSTROM
SCALE: 1/4"=1.0"
1.00 Typical
3.25
15
4.12
2.50
.38
6.38
4.50
+.09
A
1/16 Rolled tube
1.38
1/32 Rolled cone
3.88
.50
A
.63
11.88
23.12
3.75

Steve Riley with his Tequila Sunrise, this month's 3-view, a Coupe d'Hiver ship. Scene is Parker's field, near Albany, Oregon.

come into contact with the model, I would fuel proof it with K&B Poxy or other two-part epoxy finish. This would include such areas as the fuselage front, pylon, and perhaps the leading edge of the wing center section. This would provide maximum coverage and concentrate this relatively heavy material where it would give the smallest weight penalty.

2. In other areas where raw fuel is not the problem but the residue from the engine exhaust is the major concern, any of the other fuel proofers that were tested would do the trick. If you use decals, then you are limited to either the Aero Gloss Fuel Proofer or the Black Baron Spray clear—since neither of these adversely affect the decals. If you are interested in light weight, then two coats of the Aero Gloss should rate high, especially since its weight penalty is negligible.

3. If you are using only FAI fuel, then it would seem that any of the tested fuel proofers would do the trick.

I guess that it should come as no surprise that the best fuel proofing would come from the heaviest materials, but what came as a real surprise is how well some of the others performed. For example: If you were to cover a Ram Rod 250 wing with two fuel proofer coats of K&B Poxy clear, the added weight would be 15 grams (500 square inches of surface area times 3.0 grams; the weight of two coats), or just over 1/2 ounce. Whereas two coats of Aero Gloss would be .5 grams (500 square inches times .1 gram).

One combination that would be good to try would be using several coats of Sig Lite Cote over three coats of nitrate dope with two top coats of Aero Gloss. This combination could provide a solid base and fuel proofing as well. Since Lite Cote leaves a fairly dull surface but fuel proofs quite well, the Aerogloss would provide a gloss finish while adding proofing capabilities without weight penalty.

I would be interested in any tests that you care to conduct with different fuels or other fuel proofers not included above.

FEBRUARY DARNED GOOD AIRFOIL—SF-1 by Joe Foster

This is the airfoil that Joe Foster has been using on his Wakefields. Essentially, it is a combination of the Sarandenski SE 4410 top curve and Joe's lower camber. It has the characteristics for a really topnotch gliding airfoil. Might be useful as a Nordic (F1A) section as well. Joe's Wakefield uses a 6-percent flatbottomed stabilizer section of only 56 square inches with this month's featured airfoil. The wing structure features 1/32-inch top and bottom "C" grain balsa sheet from leading to trailing edge and from root to tip. A full depth balsa spar at about the 25-percent location for the first 6 inches of either side of the root gives it strength for those high-powered launches.

It's a good one from a competitive Wakefielder. Give it a try.

FEBRUARY THREE-VIEW—The Tequila Sunrise by Steve Riley

Steve is a transplanted Norwesterner who is now living in Phoenix, Arizona. Although his activities here in the N.W. were directed more to the gas model scene, Steve has taken up outdoor rubber model flying of late. The Tequila Sunrise is his latest attempt at developing a Coupe d'Hiver class model using rolled tube fuselage and tail boom. The tail boom was made using a system featured in the May 1987 issue of *Model Builder* Free Flight.

Steve simplified the building of his coupe by using the wing and stab ribs and the propeller assembly from the successful Blue Ridge Coupe De Ville kit. All of these components are available directly from Blue Ridge or FAI Model Supply, both advertisers in *Model Builder*. As with most of the ships that Steve has designed and built, the accent is on simplicity and good flying. The Tequila Sunrise is no different. The three-view scale is 1/4-inch, so multiply all dimensions by 4 except for the wing and stab ribs, and you will have a full-sized plan for your winter building activities.

FEBRUARY MYSTERY MODEL

Okay, you nearly old timer types, here is a ship that was designed for the Class A or B engines popular during the late ignition, early glow times. The designer was a fellow who was quite a prolific designer and flier during these times. In fact, for a while, he did some work for *Model Builder* during the early years. One unusual feature that sets this design apart from the rest is the unusual dihedral angles in the wing. It has a flat center section followed by three polyhedral breaks. So, you think you know what it is? If so, and if you can be the first one with the correct answer on Bill Northrop's desk, you can win yourself a free, one-year subscription to *Model Builder*. Here's your big chance.

WORDS OF WISDOM

Joseph Prescott notes, "There is one thing to be said about Country Clubs; they drain off a lot of people you wouldn't want to associate with anyway."

NFFS DISBANDS THE SUPPLIES SERVICE

A recent note from Anthony Italiano announces that the NFFS will no longer sponsor a free flight supply service. Tony notes that:

"Progress is our biggest problem; i.e., the Free Flight Supplies cottage industry has grown and become healthy. As such the NFFS Supplies business is now to a point where the NFFS cannot justify its need nor the drain that is realized from its operation.

Continued on page 101

Bill McConachie with a very original P-30. It's easy to pick out in a thermal; a pusher-canard design. Photo: Armstrong.

Roger Simpson's Lucky Lindy model. Roger is well known for his F1C competition and as manager for the U.S. FAI F/F team.

Glenn Schneider and his RamRod 750. He's a recent transplant from Bluegrass country to the Northern California F/F scene.

Control Line

By MIKE HAZEL PHOTOS BY THE AUTHOR

Here's a noisy crowd! Jet fliers pose at Dallas. Winners are kneeling; see text for more. Photo: Gene Hempel.

• This month we have no main topic to focus on, so it will be bits and pieces.

Our first stop is in Dallas, Texas. Gene Hempel reports that the new Sport Jet Speed event held at the 1987 Southwest Model Airplane Championships was a good success. This event is being promoted in order to provide a nontechnical type of activity for the Dyna Jet engine. The AMA jet speed event is quite technical, and with top speeds of 200+ mph, it is beyond the flying ability of many individuals.

The results were: Allen DeVeuve first at 144.17 mph, Bill Nusz second at 137.45 mph, and Charlie Davis third with 134.27 mph. These speeds look like they are from about 1950! A look at the rules will clue you why:

1) The engine must be a completely stock Dyna-Jet with fins. (Valve retainer must also be stock.)

2) The last three fins on the head may be machined to accept a mounting strap. It is permissible to silver-solder a pressure fitting into the tail pipe. Engine may run on either pressure or suction feed.

3) No cowling is allowed on the engine.

4) There are no restrictions on the model design.

5) The control system must be externally mounted on the wing and fuselage.

6) The flying lines must connect to the model with a scissor-type line connector.

7) The model must be flown on two .018-inch solid lines. The line length shall be 60

Scoville Starduster Goodyear racer built by George Lieb. Note the simple fuel shutoff installation behind Rossi engine.

Al Lidberg's Bad News and Annie 1/2A racers. Plans are available, see text for information.

Joe Armstead has a good grip on his Formula 40 speed ship. Site is Eugene, Oregon.

Assymetrical Sidewinder sport jet speed model by Steve Perkins of Houston. Photo: Gene Hempel.

feet, measured from the grip of the control handle to the center line of the model.

8) Fuel formulation shall consist of 80 percent alcohol and 20 percent methyl-ethylketone (MEK). Fuel shall be furnished by the contest management.

9) The model will be timed for seven laps after three laps have been completed in the pylon.

10) The model with lines and handle shall undergo a 40G pull test.

After reading the rules, now you know the planes aren't real fast. However, I'm sure it's just as fun. The MEK and alcohol fuel blend has been found to be very reliable, easy starting, and very unlike nitro fuel—inexpensive. Gene writes the speed column in *Model Aviation* magazine. You can refer to his past columns regarding the fuel formulation. Gene also comments that the secret to make a jet model go fast is to keep the weight to a minimum. The winning model at this meet weighed only 22 ounces.

One writing project or topic that has been in the file for a long time is a jet feature. Unless I flameout, you can expect this feature in next month's column.

MUFFLERS?

I dreamt I was a muffler and woke up exhausted! (I've been waiting a long time to use that line! heh, heh) But seriously folks. . .

Anytime the topic of mufflers for CL models comes up, there is a response from the troops. George Lieb, a frequent contributor of ideas and material, wrote in to say:

"I was just rereading some older magazines, and read your column in the January 1987 issue of *MB*. Even though most CL fliers are against mandatory mufflers, it looks as though it will be forced on us eventually. It won't be any fun trying to silence rear exhaust engines on profiles with the tank already right behind the engine. Also, because CL planes fly close to the ground, the sound does not carry nearly as far as it does from R/C planes. As you said, I also think that any muffler proposal should take place in a future rules cycle to allow modelers and manufacturers both time to prepare. It would be good to 'allow' mufflers for one complete rules cycle, then 'require' them in the following cycle. The problem then becomes, just what is a muffler? The recent proposal to require an effective silencer would not work. Under that, if I install a device that cuts the noise of an engine from 110 db to 109 db, it's an effective silencer! Also, if the CD wanted to, he could require all engines to be under 70 db, which is probably impossible, but, as the proposal wasn't specific, any CD could interpret it any way they want. I also wouldn't like to see full-length tuned pipes. Another recent proposal would have the CD measuring the volume of mufflers. Lots of luck on this one! What could work is a maximum length specification as presently on mini-pipes and a reasonable maximum db reading such as 95 db from 10 feet. Clubs could easily afford a Radio Shack meter. If someone invents an effective tuned muffler that meets the rules, fine, and I'll buy some. The club in Denver is thinking of allowing any mufflers and giving a bonus for using them in Carrier and Racing next year. Should make for a quiet contest, except for Formula 40. If they do it, I'll have a pipe on my Carrier ship for sure. It will be a good opportunity to see how it works."

Thanks for writing, George. Next is a piece from John Thompson, as published in *Flying Lines* newsletter.

"In all quarters of AMA, the talk is about noise. None of us want mufflers, but we'd better face that issue sooner, rather than later. I'm experimenting with mufflers in a number of contexts. I don't want to be unprepared when the rule goes through, as it eventually will. Even if it doesn't, mufflers can open up a lot of new flying sites. If you haven't heard the message yet, your ears already have been damaged by too much engine noise."

Now that the topic was again brought up, we can expect to hear from those who adamantly oppose mufflers, and offer the "solution" of hiding out in the boondocks where no one can hear us, and *no one can see us.*

People, I don't like the idea of mufflers for competition, but methinx, as the two previous writers stated, the legislation is inevitable. Okay, now let's see what the mailbox says.

MISCELLANEOUS

I received a note and package from Al Lidberg. He is selling plans and construction notes for two different Mouse Racers.

New!

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Inspired by Aviation's Golden Era. Although it looks like it's straight out of the 1930's, don't bother looking up this one in your aviation history books. The Spacewalker is the latest and most successful design effort by Jesse Anglin on Hendersonville, North Carolina, and first flew in 1986! Despite the fact that it is a new design, the Spacewalker manages to capture all the spirit of Aviation's Golden Era.

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The designs are ones that he had published by *Model Airplane News* some years back (obviously!), and now he has the rights to sell the reprints. The articles also feature very useful information on competing in this class. Both plans ("Bad News" and "Annie') sell for $4 as a package. Al also has a catalog of free flight plans, which you can get for a buck. His address is: Al Lidberg, 614 E. Fordham, Tempe, Arizona 85283.

Speaking of racing stuff, here is a summary of the racing articles featured in this column for the year for your quick and easy reference.

February: History of racing; origin and evolution of present events.

March: The pilot position of the team, including flying techniques, and explanation of circle layout.

April: The pit crew position of the team. Discussion of duties, strategy, one vs. two person crew, pitting positions, and circle layout.

June: "Quick Getaways." Techniques to ensure a fast initial start.

September: "Partsfinder." Where to get specialty racing products and services.

October: Shutoffs. How and why to use them, construction notes, and extensive pictorial.

Another miscellaneous note: Someone wrote in to offer their services in machine work, but I lost your name and address. Want to try again?

I received a new price list from J & J Sales, and it appears they are expanding their control line kit selections. Future additions include a profile carrier ship, and a couple of competition stunters. One plane available right now for Goodyear racing, is the Cassutt. It is offered in a standard or a deluxe kit version. Give him a holler at: J & J Sales, 709 Crescent, Sunnyside, Washington 98944.

BOOK REVIEW DEPARTMENT

I read a very enjoyable book a while back, that I would recommend. It is *Black Rainbow*, authored by Lloyd S. Jones, and published by Aeolus Publishing Limited. The press release begins:

"*Black Rainbow*, an action novel, deliberate in style, format, and content, centers on the development of the Stealth Fighter, the loss of a test aircraft and crew, and the recovery of both the aircraft and crew. The setting is a remote Air Force base in Northern Nevada. The story delves into science fiction. Or, is the technology of the WWII Philadelphia Experiment science fiction?"

From there the book becomes very intriguing, as one wonders where the fiction picks up and the science leaves off. (As far out as the book is, the story is supposedly based on several actual facts and happenings.) One thing that I particularly appreciated in the story line, were the multiple references to model planes, in a context that relates the activity as one being

meaningful and serious.

Check your local book store for it, or write direct to the publisher: Aeolus Publishing Limited, P. O. Box 2643, Vista, California 92083.

Stay tuned next month for. . .Jet Mania! (Somewhat of a paradox after this talk of mufflers, eh?)

Mike Hazel, 1073 Windemere Drive, NW, Salem, Oregon 97304. •

blade) flies a little slower than when directly driven, but the vertical performance is really astonishing. If you wanted to get the same performance from a direct-drive, you would at least need twice the number of cubic inches. A while ago I had the opportunity to compare two 30-pound Tiger Moths, both with Zenoah Q 38s, but one directly driven (with a 20 x 8) and the other one with a 2:1 unit and 24 x 16 prop. Although the direct-drive Tiger's top speed was higher, the geared one was much more fun, certainly safer to fly and above all far more realistic in the air. The ungeared Tiger needed some time to pick up speed after re-opening of the throttle, for instance when practicing touch-and-go's, but the other one was immediately grabbed by that big efficient prop up front and was back to a safe maneuvering speed within no time at all. That big prop also had excellent braking action, visible in the downward part of a loop with closed throttle, for instance.

Apart from the two gear ratios, two different layouts are available. The one showed in the pictures has the propshaft sidewards of the crankshaft and is meant for applications in wide cowls, such as the pitts and radial-engined ships. The other one has the propshaft above the crankshaft, in line with the center line of the cylinder bore. That's the one that fits in cowls from ships of which the full size one had an inline engine, such as the Tiger Moth. As I'm taking up a lot of space with the photos anyway, I won't go deep into the construction features of those units. Let those photos speak for themselves, but I owe you some dimensions to give you an idea of size and weight. To start with the latter, Q 38 with a 2.8:1 unit, including engine bearer but without exhaust, puts the scale at six pounds, three ounces. Distance between crankshaft and propshaft is approximately 2-5/8 inches, this also goes for the 2:1 version as the difference is only in the size of the largest pulley. About the total length of the unit: the distance between firewall and propdriver remains unchanged as compared with a Q 38 without the gear unit but with a Practical Scale mount, 6-5/8 inches. Well, I hope this makes you think twice next time you would like to have better performance from your big ship. There is an alternative to more cubic inches! •

Pattern. . . . . . *Continued from page 23*

added is the pipe through the wing idea that we showed last spring.

Strange as it looks, it works and eliminates the need for a belly pan to cover the pipe. Plans may be shown in *MB* for the scratchbuilders. It's very simple to build.

While I was spending time "confused out" I decided to accept an offer to build a model for the upcoming T.O.C. in 1988. One of the problems is weight in these larger models.

I took my trusty Ohaus gram scale and an assortment of materials to the bench for another long hard look at building techniques. It turns out that all things considered it's hard to beat a stressed skin (balsa over foam core) wing. Conversely, it's easy to beat a glass fuselage with careful wood construction techniques. Stabilizers, both horizontal and vertical, are still best done in balsa over foam, and they can be lightened if you keep great care to eliminate any loss of torsional stiffness.

This is an area where lots of work gains little weight savings. For example, a properly designed 300-square inch tail assembly weighs four to six ounces. To reduce it to two to three ounces is very risky (never mind very difficult), and you only save two to three ounces.

A commercial tail wheel assembly can weigh that much! Using conventional foam wing and tail feathers but going to a balsa sheeting and planking fuselage we built up a 800-square inch model at seven pounds, six ounces.

The engine is a 1.2-ounce surpass, and the radio has standard size J.R. servos and a 900-mil. battery pack. To accomplish this, the finished model, less any hardware, weighed three pounds. The model is not

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fragile and has *no* lightening holes and *no* carbon fiber reinforcing.

We intend to use the same techniques on the upcoming T.O.C. models. By the way, our 1/4-scale C.A.P. 21s of four years ago using these techniques weighed 8-3/4 to 9-1/2 pounds.

These were the same size as the Byron Models Cap's and were approximately 40 percent lighter.

In as much as FAI aerobatics will be the mainstay of all our contests in the future, I have decided to try to report on the developments and techniques that will allow all to become better at FAI model building and flying. •

Big Birds. . . . . *Continued from page 15*

MOIST APPLE AND DATE CAKE

Here's another delicious Field Food recipe, thanks to the RCFCBC's newsletter, *Glib Gliches*. As always I try 'em out first; after all, I wouldn't want to pass on anything that wasn't worthy of being called Field Food. And this particular recipe fascinated me because I love apples and dates but never had them together before.

Ingredients: 2 finely chopped apples, 1 cup chopped dates, 1/2 tsp. baking soda, 1 cup boiling water, 185 g butter (more than 3/4 cup but less than 1 cup), 1 cup sugar, 1 egg, 2 cups flour.

Grease a 23 cm (9-inch) square pan. Line base and sides with paper. Grease paper well.

Combine apples, dates, soda and water in bowl. Cover. Cool.

Cream butter and sugar with electric mixer until light and fluffy then beat in egg. Stir in flour and apple mixture. Pour into prepared pan. Bake in 350-degree F oven for about an hour. Let stand five minutes before turning out of pan to cool.

Eating these tasty apple/date cakes is a great (slurp) way to relax between flights, especially when they've been garnished with Cool Whip or whipped cream.

THOUGHT OF THE MONTH

Did you know that the propeller is a device specifically designed for measuring the pain threshold of a finger?

Al Alman, 16501-4th Avenue Ct. East, Spanaway, Washington 98387; (206)535-1549. Hope that you've already started to work on your winter project 'cause springtime will be here before you know it. Be *safety* conscious. •

Parnall Pixie. . . *Continued from page 53*

sions and round the leading edge. Remember to make a left side and a right side. They are not interchangeable. Next, draw in the positions for the ribs on the inside of the leading edge. Using a Dremel or equal tool, hollow out the leading edge between the places where the ribs will be attached. Remove material until the hollowed out portion is translucent when held up to a bright light. It should look something like frosted glass, except where the ribs attach, which will be solid. It is important that this material is removed because it probably weighs almost as much as the rest of the wing components. Pin the leading edge on the plans and cut out the ribs and other parts and pin and glue in place. Install the wire pins and tubing where indicated and finish sanding —using the same method as for the fuselage.

TAIL SURFACES

No special instructions are needed for construction of the tail surfaces. Just follow the directions on the plans. The only exception being that you need to build two frames, approximately 1/2-inch larger on all four sides from 1/4-inch pine, to use when covering. You need one for the rudder and one for the stabilizer. This is explained next.

FINAL ASSEMBLY

For wrinkle-free covering, the tissue must have absolutely no wrinkles or folds in it. If it does, use a warm iron and iron it before using. Use thinned white glue to attach the tissue. The sides and bottom of the fuselage can be covered in three pieces; the top, in whatever number it takes to get a wrinkle-free surface. Cover the wooden nose and cockpit with paper also. It makes for a neat finish.

The wings are covered with one piece on the bottom and three on top. Fogging on a mist of water will help in gluing the tissue in place. For the tail surfaces, glue tissue on the 1/4-inch frames and water shrink. If it is wrinkle-free, and only then, put glue on one side of a tail surface and drop it into

place on the tissue attached to the frame. When dry, trim away the tail surface, remove the scrap tissue, and repeat for the other side of the tail surface. This is a four-step operation and is slow, but the tail won't look like it was manufactured in a pretzel factory. Spray on two coats of 50- to 75-percent thinned Pactra Aero Gloss. Use more coats on wooden parts.

FLYING

Use the propeller of your choice. The plans show how to make one from a plastic yogurt container. Use three to four 14-inch loops of 1/8 well-lubricated rubber for power. The amount depends on how heavy the finished model is. Balance the model by adding clay.

Test-fly over grass starting with 50 turns. Add turns after each satisfactory flight until you reach the maximum number of turns.

The maximum is one turn less than the one which breaks the motor, which, in turn, makes instant scrap out of the fuselage.

I usually stop cranking at about 400 turns. Adjust the model to turn right under power and during the glide. •

Simply Scale. . *Continued from page 21*

of the contest to figure out what you're going to do. This flying day will prove invaluable to you. You should not choose to do maneuvers at the contest that you cannot comfortably perform in everyday flying. A well-executed loop will always net you more points than a poor Cuban Eight. Remember that you won't impress the judges with fancy maneuvers unless you are very good at them. They are looking for realism so pick easy ones and do them well. Do your test hop well ahead of the contest enough that you will have time to make adjustments or repairs before the contest day. When you have got things working satisfactorily, put your model away.

While you are waiting for contest day there are several things you should do. Dig out your documentation and make sure its all there. Compare what you have with what the rule book specifies you should have. Organize it neatly and put it into a binder so that it will be easy to look at by the judges. Extra copies of your three-views for the judges are also a good idea. Once you have your documentation in place, do a critique of your own model from your documentation. Correct any small details you can and add your last-minute details such as antenna masts. Make one last check of your radio system and all other mechanical operations and tighten nuts and bolts. Your model is now ready.

The day before the contest you should ready your tool kit. Make sure you are prepared for the worst. The following is a list of some of the tools you should take: Battery chargers, soldering iron and solder, prop wrench, all types of screwdrivers, allen wrenches, Uber knife and saw, tweezers and hemostats, side cutters and pliers, prop reamer, files, cyano glue and epoxy, starting battery, spare starting battery, glow clip, starter, fuel and pump, primer bottle, prop balancer, sand paper, pencils and paper, pins, and flight box.

You should also take some extra components. Take a servo, glow plugs, fuel line, wheel collars, nuts and bolts and screws, piano wire, balsa scraps, propellers, prop nut and washer, clevises, and other hardware. An extra battery pack and a frequency change could come in handy too, if you have them. The frequency change could help you to get onto a preferred flight line or avoid local interference. If you have an extra engine, take it along too.

The night before the contest you should put your radio on charge and gather all your stuff together. Now take your rule book with you and read yourself to sleep early. Some people have trouble with pre-contest nerves which prevent them from getting a good night's sleep. There is nothing like the AMA rule book for helping you to doze off. Set your alarm so that you can get up early enough to arrive at the site at least one hour before static judging must begin.

When you arrive at the contest site, check in to see where you must go with your model. Leave the wife and kids to fend for themselves (if you are crazy enough to have brought them), while you assemble your model for static judging. Have it ready early and get it judged as soon as possible. This will allow you more time after judging to ready your model for flying. After static judging and before you must fly, if you can, start and run the engine and check out all the controls. It is better to find out now if

something won't work right than to find out when you are called to fly and the clock is running against you. After you are satisfied that everything works right, top off the tank and have your flight kit ready for starting. Impound your transmitter and fill out your score sheets and call sheets while you wait. You should be ready to go at a moment's notice.

If you prepare in this manner, I assure you that by the time you are ready to fly for the judges, you will be more relaxed and in control of the situation than those others who arrive late, are running around borrowing tools, mixing glue, and filling out score sheets at the last minute. By the time you are called to fly, you will be ready to have fun flying your model.

Believe me, this preparation makes all the different when it comes to enjoying yourself at a contest. Good luck and may your engine always start on the first flip! •

Electric..... *Continued from page 29*

wiring weight is the same whether or not a speed control is used, so it doesn't count.

I found out just how small the circuit board was. Joe sent me the MOSFETs that are now used, SMP 60N05, and I replaced the NE-8s that had been in it. It was a job; the lands are close together! It definitely isn't a job for the casual type. My SC-5 had the NE-8s because it was one of the very first, and I have been flying it with them for about a year. The performance was excellent, the new FETs are even better. The original NE-8s had a .390-volt drop at 15 amps (.026 ohm resistance); the new 60N05s have a fantastic .180 volts drop at 17 amps (0.0106 ohms resistance). This is as good as my SC-4! My SC-4 does have older FETs in it too, it was one of the first made, so someday I will have to get around to updating it with the new ones. However, the rpm check was a surprise—on an Astro cobalt 05, six Sanyo 2200 cells, 7 x 4 prop, I got 10,570 rpm on the old FETs and 10,600 on the new FETs. I then took out the SC-5 and replaced it with a toggle switch for comparison, and got, guess what? 10,600 rpm! Not bad. This sort of performance from a speed control, and a miniature one at that, was unheard of two years ago. The surprise, besides the excellent efficiency, was how little difference, only 30 rpm, the new FETs made. Now you can ask, why go to better, more efficient MOSFETs as Jomar does if the rpm change is this small? Insistence on quality is one answer, the other is that heating has a major effect on a speed control. As long as the FETs stay cool, the rpm difference will stay small, but under heavy continuous load, the FETs can heat up, and the lower quality (higher resistance) FETs will heat up much sooner. A hot FET has much higher resistance than normal, and the rpm will sag.

Since heating is voltage times current, the two NE-8 FETs in the SC-5 will have to get rid of nearly six watts (three watts a piece) under my testing conditions, the 60N05 will have to dissipate only three watts (1.5 watts a piece). As any of you know that have picked up a five-watt resistor that has been run at full load, five watts is hot, and the speed control resistors in offroad cars are a good example! The high-grade MOSFETs mean that the cobalt 020, 035, and 05 will be able to "breathe deep" and show their full power. Well done! After a flight on the Astro cobalt 05 in my float plane, the 1-3/4 by 2-inch aluminum sheet heat sink on my SC-5 is hardly even warm. Last, but not at all least, the SC-5 is glitch-free. I fly in an extremely urban environment, and I have gotten used to speed controls "burping" every once in a while due to stray signals. The SC-5 is solid, no burps. I recommend it; it and the SC-4 are my favorite throttles.

Speaking of flying in a noisy environment, I have been flying my Ace Olympic V set for almost a year, and I am impressed, impressed, impressed! I have never had a radio this good before. I have been flying on 72.320 (now extinct), and all my other radios have had interference on this frequency. The Olympic V flew on this frequency with absolutely rock solid control, no funnies, no bumps, no burps, no glitches. There was no way you would know this was a bad frequency unless you had tried it with some other radio. The folks at Ace Radio have always had very high-quality radios, in fact, my first good radio was an Ace, the little pulse rudder only set. That radio was absolutely bulletproof; it took tremendous physical abuse in my learning days with no complaints. It flew faultlessly on the 27 MHz band even at the very height of the "kilowatt linear" abuse

the CBs went through in their teething years. Well, Ace has certainly continued the tradition with their Silver Seven and the Olympic V (a Silver Seven without extra options). The Olympic V (Silver Seven) transmitter passes the 1991 standards with flying colors (I had it checked by the AMA booth). The receiver is not 1991, but quite frankly, I think it comes very close indeed. Ace does offer a 1991 receiver too. I would not hesitate to buy the standard (non-1991) receiver if you wish, it will handle just about anything anyway. So, if you have had some interference problems, try the Olympic! (Or Silver Seven.)

Don Hughes sent photos of the FF events at the '87 Nats (no radio problems!). The cute kid with the Lectric Coke Machine (original design) is Jeff Pfeifer, and he took first place in Junior Class A and Class B. I hear he could have done very well in open too, but fortunately he spared the older guys! Don took first in Class B with his Air Supply 05-powered Satellite 450 on 10, 450 mAh cells and first in Class A with his modified Astro 035 ferrite-powered Future Shock (his design) with 6, 450 mAh cells. Well done, Don! Don's latest is his Future Shock Sr., powered by an Air Supply CP-05 (cobalt, from Indy RC) on 12, 450 mAh cells. This looks like a real performer. Bob Nichols took second place in Class A and B with his Astro 035-powered original design, on 7, 270 mAh cells for class B and 6, 270 mAh cells for Class A. Duane Renken took third in Class B with a geared Astro 05 Scrambler 550, on 7, 450 mAh cells. John Renken (must be brothers!) took fourth in Class A with his Astro cobalt 035 Starduster 320 with 5, 450 mAh cells. Thanks, Don, for the photos.

Don, as many of you know, is an expert in hopping up the 035 motors. Note that Don and many other free flighters favor many more cells than R/C fliers are used to, with cell capacities about 1/4 to 1/2 of what R/C uses. This gives very high power for a short burst, which, of course, is just what you need in competition free flight. The trick, of course, is to select the right prop/battery combination. This takes some experimenting, especially since the motor manufacturers do not have any info on what combinations work well for competition FF. This is an area where information is badly needed. If you know of good combinations of motor/prop/battery for competition FF and are willing to share it with others, please do write me, and I will be very happy to pass it on. Competition electric FF is an absolute natural, and the only thing holding it back is knowledge about plane/motor, prop, and battery combinations. This area of electric flight is sure to expand, and the more that are competing, the more fun it will be!

I mentioned the float plane I am flying with the SC-5, I don't have any photos of it right now, but Dr. Peter Mezciems, of Ontario, Canada, sent photos of his Flittermouse on floats. The resemblance to my Seagull 05 float plane is uncanny! Since I have never seen the Flittermouse before, all I can say is that there is something about this type of design that is a natural for floats, and we both arrived at the same conclusion. Dr. Mezciems has not flown his yet, from other reports of the Flittermouse, it is a very good flyer on wheels. It has a 56-inch span, a little larger than my Seagull at 47 inches. The Flittermouse is kitted by Mole Technology in England, and is distributed here by Stewart Pierce, 40 Holgate Street, Barrie, Ontario, Canada L4M 2T7. Peter is flying the plane on a Leisure 05, but plans to use an Astro cobalt 05 for float flying.

Hopefully the editor will have room to print the profile of the plane and floats; it illustrates some points that are very impor-

tant for electric float flying. The top of the floats are set just about right, zero or a little down at the front compared to the stabilizer. The step is located at the balance point, just right. There is a problem though. The step is very small, and the taper to the back of the float is too gradual. My rule of thumb is to have a 1/2-inch step, a 3/4-inch transom. This gives for most floats a 10-degree or more rotation angle. I feel you must have 10 degrees, no less. Measure this with the float rear flat on the table, and a straight line parallel to the top of the floats till it meets the table. The angle this line makes with the table should be 10 degrees or more. Mine vary from 10 degrees to 12 degrees. This, along with a flat bottom on the floats, guarantees an ROW with even minimum power.

Peter followed the articles by Chuck Cunningham in *RCM* last year, and built his floats from blue foam covered in the plastic packing tape that Chuck recommends. This works very well; I have been using the plastic packaging tape to seal the edges of the Solarfilm I use to cover my sheet balsa floats. It works perfectly and is the only method that does work! Do note, however, that most float designs are published for gas-powered planes, where the usual procedure is to put a larger engine on and use lots of power to take off. This means the floats can be much less efficient, that is, small step and flat rotation angle. Keep this in mind when reading about floats, and do use the high step and large motors, and it works great! Thank you, Peter, for the info and the photos. Let's get ready for spring and the water, fly electric! •

Jomar SC-5. . . *Continued from page 30*

much use of a throttle, since they needed most of the power they had available to fly. Nevertheless, I started bugging Joe Utasi at Jomar back in 1984 that I would really be interested in a throttle that worked with four cells and weighed less than one ounce. He said then that he'd think about it but thought that there wouldn't be much market for such a device.

Then in 1986 two things happened. First, Astro Flight discontinued my beloved ferrite 02 and later the ferrite 035. Then they introduced a Cobalt 035 and later a Cobalt 02. These motors began appearing in numbers at the end of 1986. While the new small Cobalts are bigger and heavier than the ferrite motors they replaced, they also can handle *twice* the power on the same number of cells, so the power weight ratio of the *system* is improved. These motors make small planes with plenty of available power quite possible and are perfect for use with the small electronic throttle I'd been bugging Mr. Utasi about. Well, he must have been thinking the same thing, because late last year I got a pleasant surprise in the mail, a prototype throttle meeting the requirements I had given over two years earlier, called (what else?) the SC-5. In the enclosed letter Mr. Utasi said that the new SC-5 had some special circuitry that allowed it to work with a motor pack of as few as *two* cells, and, thanks to yet another advance in power MOSFETs, the production version would be a bit more efficient than the 1986 version of the SC-4, with half the number of MOSFETs. Needless to say, I was tickled and set out to see how it worked, as soon as I got my Cobalt 02 from Astro Flight. I also set out to build a plane to replace my late lamented *Schoolboy*, so I could see how the combination of the Cobalt 02 and the SC-5 worked in the air, where it counts.

PHYSICAL DESCRIPTION AND PREPARATION FOR USE

The SC-5, as it comes from Jomar, is a board 1-1/4 by 1-5/8 inches, with the power leads for the motor and battery attached. The unit is about 5/8 of an inch tall. The power leads are supplied with insulated 1/4-inch automotive-type spade connectors. Mating connectors to use with your motor and battery are also included. The unit, as supplied, weighs just under an ounce.

In order to prepare the throttle for use, a receiver lead and connector must be soldered to the board. This is easily done by following the instructions. The hardest part may be locating a suitable servo connector.

Then a heat sink, made from a piece of aluminum or brass sheet having an area of about two square inches, must be attached to the MOSFETs. I used short 4-40 bolts and nuts to make the attachment. The heat sink serves two purposes: it helps keep the MOSFETs cool, and therefore, working effi-

ciently, AND it carries the motor current between them. The heat sink should get some air circulation past it in the plane. The best way to do that is to make the heat sink part of the fuselage bottom. If that doesn't fit your installation or sense of aesthetics, make sure some air flows over it! Making it larger than the minimum size will also help if the heat sink must be mounted inside the plane. *Note:* be sure that the heat sink, if it extends past the edge of the board, does not come in contact with the circuit trace at the edge on the back side of the board. Doing so will short across the MOSFETs and, at least, the control won't work.

Then the full throttle point must be adjusted to match the throttle to your transmitter. To make the adjustment, plug the receiver lead into the throttle channel of your receiver and hook up a motor (no propeller) and a charged battery to the throttle. This need not be the motor and battery you intend to fly using the throttle. Set the transmitter throttle trim at neutral, turn on the radio (with the throttle stick in the low position), then slowly advance the throttle to full. Then slide the trim up and listen closely to the motor. If it speeds up more when the trim is advanced, move the trim back. Then, using a small flat-bladed screwdriver, adjust the potentiometer—indicated by the pencil point in Photo 1—until the motor is just running at its highest speed. The adjustment is just right if advancing the throttle trim doesn't affect the motor speed, but retarding it from neutral does slow it down. With both of my transmitters (one Ace, one Airtronics), when the throttle is adjusted this way, full back throttle turns the motor completely off. If the motor doesn't stop with full back throttle and full back throttle trim, you will have to reset the high point so that the trim is necessary to reach full throttle. This is unlikely to happen, however.

With the required heat sink and a receiver lead attached as described, the SC-5 weighs about 1.2 ounces. This is one tenth of an ounce *less* as a World Engines S-22 servo and a 15-amp microswitch, with the same amount and type of power wire and connectors. It is also not much bulkier than the servo/switch combination, as is shown in Photo 2. (In the photo both the SC-5 and the microswitch have four-pin Deans connectors because they are less bulky and because using them saves me a tenth of an ounce over the spades.)

BENCH TEST RESULTS

Using the setup shown in Photo 3, I tested the SC-5, comparing it with the 15-amp microswitch, the (in)famous Radio Shack cat. no. 275-016 4-amp microswitch, and my last-year's-model SC-4. Most tests, except the SC-5/SC-4 comparison, were done with my Astro Flight Cobalt 02 and an assortment of three- and four-cell packs of various capacities. I also measured the current drawn from the receiver battery by the SC-5 and noted its general operating characteristics.

I found that the SC-5 was indeed very efficient, especially when compared with what I had been using in my 02 planes for motor control—the Radio Shack switch. A typical example, from the middle of a run of the Cobalt 02, using four Sanyo 900 SCR cells and a Graupner 6 x 4 looked like this: current, 17 amps; with 15A microswitch, 10,920 rpm; with SC-5, 10,750 rpm; with R.S. microswitch, 10,550 rpm; and direct connection, 11,250 rpm.

Another example, with a Mabuchi 540 motor (from my *Etude*), on six Sanyo sub C cells, and the same Graupner 6 x 4 prop: current, 12-1/2 amps; 15A microswitch, 12,340 rpm; SC-5, 12,200 rpm; R.S. microswitch, 12,100 rpm; last year's SC-4, 12,050 rpm; and direct connection, 12,450 rpm.

I measured the receiver battery draw as ranging from about 2 milliamps at low throttle (motor off) to about 18 milliamps at high throttle. This is comparable to an idle servo, so need not be considered in choosing a receiver pack size.

As far as general handling characteristics are concerned, the SC-5, like its predecessors, throttles smoothly from low to high following the throttle stick's movement precisely and repeatably. When used with an Astro Cobalt or Super Ferrite motor with skewed armature slots, the combination will run as slowly as you'd ever want on the low end—lower than my Accu-Tach would measure. Like its more recent predecessors, the SC-5 will shut the motor off in the event the radio signal is lost. This is much safer when glitches are encountered. The heat sink, even at the minimum size, barely rises

above the ambient air temperature.

It has only one odd quirk that needs to be watched, and it is only a problem if you do not use an arming switch in your plane along with the throttle—or if you forget to turn your arming switch off first. Approximately two seconds after the receiver power is turned off, a short burst of partial power is delivered to the motor. I imagine that occurs when the capacitor in the voltage doubler circuit discharges, momentarily turning the MOSFETs partially on. This is an insignificant drawback for an otherwise finely operating piece of equipment, especially considering that at the end of a flight the power left is low.

The presence of the SC-5 posed no problem for the particular receivers I tried it with, even though it is not optocoupled like the SC-4. In fact, the antenna off-ground range in my 02 plane—with a Tower mini flight pack used with my Airtronics SR-4 channel transmitter—was virtually unchanged between motor off and motor on at low throttle. Low throttle is where I have had problems in the past.

FLYING TESTS

In the air, it performs just as I expected—smoothly and effortlessly. I also learned of the benefits of having plenty of power and a throttle in a small plane. At full power the plane practically flies from my hand without being tossed, yet it will cruise at just above half throttle. The current draw at the cruise setting is just 6 amps, as compared to 17 amps at full power. This means I can get off and climb quickly, do some aerobatics, then extend my remaining motor run almost three times if I pull back and cruise. So, a motor system that will run three minutes at full power can give a nine-minute powered flight. And this with comparable weight to a simple on-off control and with little loss in top end performance.

Another possibility this opens up is one Mitch Poling has been using in his SC-5-equipped Leisure "stock" 05 motor-powered seaplane. He can use an oversize prop—one that overloads the motor—to help him get off the water quickly, then pull back to a more reasonable power level for the rest of the flight.

All in all, the SC-5 admirably fills the hole in the small power system part of the electric market. It will work with any motor that runs on two to eight cells, which covers the entire range from the Hytork 48A from VL products to the Astro Flight Challenger Cobalt 05 and Super Ferrite 10 (with the possible exception of the Cobalt 05 FAI motor, which is designed for super-high current—on the order of 40 amps). I am, as you can tell, quite pleased with mine.

WHERE TO GET ONE

The Jomar SC-5 is available directly from Jomar, 2028 Knightsbridge Drive, Cincinnati, Ohio 45244, for $60, plus $2 packing and shipping (per order). It is also available from Ace R/C, CS Flight Systems, and hobby shops who support electric power. There is one currently in stock at my local hobby shop, for instance. Your small electric plane, especially if it is powered by a Cobalt 02 or 035, deserves one. •

Hannan. . . . . *Continued from page 51*

with your head in your car trunk in your own driveway. You didn't need to go to all this trouble to do it here.

"So down goes your entry, and you wander around a bit, relishing all the action, crashes, flights, and friends. Looking in other car trunks, watching the air filled with whirling airplanes, you have a ball. Then, your watch tells you only 30 minutes to go, and at the same time you notice the wind seems to flap your pant-legs. Already? Things just got started! A few last flights; only now it's a crowd around the harried timers. That's it—no more flights."

The contest is over. Sound familiar?

THAT'S ENTHUSIASM

The San Diego Scale Staffel is a dedicated bunch alright. During their recent Battle of Britain contest, featuring Flying Aces Club style mass-launches, it began to rain. Did this stop the action? Not at all! Models were simply wound inside vehicles and launched from beneath umbrellas or just out in the open, unprotected from the falling drops. Most flew surprisingly well in spite of sagging tissue. The big winner was Bob Langdon's Heinkel, evidently the least soggy of the entries.

SAFETY TIP

Georges Chaulet, of France, came close to having a severe problem, and wanted to

share his experience with us. While driving some 30 minutes to the flying field, Georges began to notice a strange odor. Arriving at the destination, he soon discovered the source of the smell—his metal field kit. His starter battery had shorted against the box wall, overheating in the process. Although nothing serious happened, Georges considers himself lucky, because he had a plastic bottle of model engine fuel in the same box, which *could* have been melted and ignited. As he put it: "I realized that I was not far from a possible fire or explosion in my car. You can be sure I will no longer transport my battery in the same box as my fuel!"

THINK ABOUT THIS:

"Most people say that as you get old you have to give up things. I think you get old because you give up things." Senator Theodore Francis Green, at age 87 during 1954, as quoted in the Solvang flyer.

FROSTY PISTACHIOS ANYONE?

CO_2-powered indoor scale models have appeared from time to time; however, only in Czechoslovakia have they been reduced down to Pistachio size (although Bill Brown plans to build suitably sized engines for that purpose also). Stefen Gasparin, who has successfully flown such models, offers these comments: "Although the best flying weight for rubber-powered Pistachios is under two grams, the weight of a CO_2 engine and tank would be at least four to six grams. This indicates that the best type of Pistachios for CO_2 power would be fast-flying designs, rather than Pioneer Age aircraft. If models are heavy, they *must* fly like a bumblebee, employing a powerful CO_2 engine."

Interestingly, some successful rubber-powered Pistachios are in the four to six gram weight range, demonstrating that it is quite possible to achieve good durations when builders become more experienced with different configurations, propellers, rubber motors, and trimming techniques. We look forward to even greater progress with these mini-models.

GRAND CHAMPION PEANUTS?

According to the October 1987 *Sport Aviation* Magazine, Remo Galeazzi, who won the Grand Champion Award at Oshkosh for his Marquart Charger homebuilt, is also an avid model builder. A close friend of another Marquart Charger builder, Fernando Ramos, Remo placed first at the annual Watsonville, California Peanut Scale event. Big or small, he builds 'em all!

LIDBERG PLANS

Al Lidberg is expanding his line of model construction drawings. These offerings, all free flight types, include profile scale, CO_2 and electric-powered designs and rubber-powered types. Among the newer releases are a profile Zlin, a Dayton-Wright racer, and two variations (one profile, one scale) of the Blohm and Voss BV 141B-O asymmetrical aircraft.

For a complete catalog, send $1 (US and Canada) or $2 (foreign) to A.A. Lidberg, 614 E. Fordham, Tempe, Arizona 85283.

BLUE SWALLOW MODELS

A new line of cardstock flying models is being introduced by John Gaertner, of Blue Swallow Aircraft of America. These 1/18 scale designs are larger than the usual card models, and employ other materials such as hardwood dowel spars, balsa noseblocks, wire struts, plastic propellers, thrust bearings and wheels.

The majority of the parts are printed on colored stock, to be cut out and folded to shape. These are fairly complex construction projects, and the comprehensive instructions explain the techniques and patience required.

The example sent to us, a 20-inch span DH Tiger Moth, is first in a series to include an S.E.5a, Fokker D VII, Sopwith Camel, Curtiss Jenny, and Lockheed Winnie Mae. For additional information and prices, send a preaddressed, stamped return envelope to: John Gaertner, Blue Swallow Aircraft of America, 304-14th St., N.W., No. 11, Charlotteville, VA 22903.

HOW'S THAT AGAIN?

Jake Larson, of Pinellas Park, Florida, wrote in to ask: "Is it true that glider fliers use thermal underwear?"

THE MODEL BOX

Tony Italiano of the National Free Flight Society has announced that the supplies formerly marketed by that organization are now being sold by Joe Wagner under the name "The Model Box," and any inquiries should be sent directly to Joe at 12 Cook Street, Rowayton, Connecticut 06853. NFFS model construction plans are still available from Bob Klipp, 10115 Newbold Dr., St. Louis, Missouri 63137.

I.D. DEPARTMENT

Richard Mascuch, of Morristown, New Jersey, says: "I began modeling back in the late 1920s, but quit when I was in college in the late 1930s. Then came the war, marriage, etc. until a few years ago, a grandson was born, and now I'm back on the fringes of modeling again. I buy several modeling magazines, but only *Model Builder* concentrates on rubber-powered models, my chief area of interest. I've started building again and am amazed how much nostalgia can be generated by the smell of balsa, dope, and glue!

"Back in the early 30s, I used to get an indoor stick model that came, as I recall, in a red, white, and blue striped cardboard

tube. The wing span was approximately ten inches. The right and left panels were built separately and tied together by preformed wires that provided the dihedral and clamped onto the motor stick where it could be moved forward and back to adjust the center of gravity. The vertical and horizontal stabilizers were formed from extremely fine wire which you had to bend into loops. The price was around 29 cents, I believe. My folks used to buy me that kit when they were going out for the evening, and I could build it and fly it the same evening. It flew very well, and would make three or four turns around the room, with the propeller blades ticking on the ceiling, on one winding. Rooms were larger then! I often wonder if others remember those kits?"

We suspect Richard may be recalling the George D. Wanner kits. Does anyone think otherwise?

WHY DO MODELS LAND IN TREES?

At last, the mystery is solved, thanks to Chris Scott, of Dayton, Ohio: "Trees exude large amounts of *gravity*, thereby sucking passing models into their greedy, clutching limbs. This is why models always come down into forests, avoiding flat land. Further, inasmuch as trees do not inhabit deserts, such sandy wastes must therefore have less gravity! And this is borne out by the strong *up*-draughts common in such areas!"

So now you know. •

Insiders..... *Continued from page 49*

the silk spoke balsa wheels which add to authenticity. The Bristol is a good performer with a six-inch plastic prop. The complete kit is only $13.95 and worth every penny.

While we are at it, we should mention the other Nowlen Peanuts: 1907 Wright Flyer ($6.95), Langley Aerodrome "A" ($7.95), 1913 French Deperdussin ($10.95), and a magnificent WWI bipe, the Nieuport 11 ($10.95). California residents add six-percent sales tax, all USA mail orders add $2 postage and packing. To order write Nowlen Aero, 139 Boardwalk, Greenbrae, California 94904.

INDOOR MODELERS WORKSHOPS

Veteran indoor flier and *Hangar Pilot* publisher Doc Martin of Miami has come up with an outstanding idea for an "Insiders" feature. It is a photo and description of famous fliers' workshops (WCN and "Jake" are already illustrated in *MB*). For starters, Doc provides the photo and "Gen" on the Butch Hadland shop north of London. Butch plans on coming to Indoor Week '88.

Butch's shop (in a two-story house) is a small space about the size of the average American bathroom! It is crammed with files of plans and colour reference. There are shelves of reference books—vintage and modern. Drawers contain quality model supplies from four to six-pound balsa to all kinds of airbrush pigments. Butch puts emphasis on markings, realistic scale detail and art work. His models are noted for smooth finish—he uses a light wood filler. He builds fast when the mood is upon him, and he draws many of his own original

plans.

Butch feels that AMA and SMAE scale events are too "serious" to have fun, so he concentrates on FAC/SAM and indoor rubber or CO_2 scale. He prefers low pressure/high fun competition. In case you wonder how he does in those competitions, his immaculate workshop has many award plaques on the walls! •

ARFs. . . . . . *Continued from page 27*

But in the hands of a competent pilot they could turn in dazzling and spectacular flights. And over the years ARFs have kept their promise. Today they have reached a stage of development undreamed of fifteen years ago. And there are so many of them to choose from! Do you want a trainer? There are at least thirty of every size and color. Like sport scale? Warbirds with retracts? Just take your pick!

In future columns we will discuss and evaluate specific ARFs. We'll go into assembly techniques, use of adhesives, and most importantly, repair methods. We'll take a look at various power plants and examine the choices for ARF installations. How about ARF competitions? Fun-flys limited to ARFs? Are any clubs exploring this interesting concept? What about the cost of assembling an ARF versus the cost of building a comparable kit model? If you add up the actual cost of building a kit model, you come up with a total which may surprise you. Compare that to the cost of a quality ARF which comes complete with all hardware, wheels, spinner, fuel tank, engine mount, etc. The cost of the ARF is usually quite favorable. In future columns we will do actual cost comparisons. Of course, we do not assign a value to labor, but working on a model is supposed to be a labor of love.

The last few standard kits I have built have been accompanied by a lot of grumbling and complaining. As I slowly constructed my most recent models, I cussed out the designer, the manufacturer, and myself for my lack of patience, for my not having enough skill to build with my hands the beautiful sleek model I so clearly conceived in my mind's eye. As I sighted down the flying surfaces, I felt dissatisfied because they could never be absolutely, perfectly straight enough to suit me. My covering jobs and paint schemes always had flaws which bothered me, even if no one else could see them. I came to resent the long hours spent over my workbench. The desire to fly became more important than the desire to build, and the comradeship of my flying buddies came to take priority over all else in the hobby. After all, I knew I could build, so I didn't feel the need to prove that to anyone. So my motivation for building really began to decline. Meanwhile, the industry brought out better and better ARFs, planes that were overpoweringly tempting. Suffice it to say that I am now an ARF addict, and I'm not at all ashamed to admit it! Not too long ago fliers with ARFs were apologetic. They looked kind of sheepish when they arrived at the field with a rubber duck. That is all changed now. The guys gather around and ask questions and show a lot of interest. And the manufacturers are just beginning to tap the vast ARF market.

What does the future hold for the world of ARFs? We'll be talking to the manufacturers, and we'll inquire into their plans. We'll be coming up with ideas of our own, and most importantly, we'll be asking you, the reader, for your input. New prefabricated aircraft models are coming on the market in such profusion that it is virtually impossible to keep up with the latest releases. Indy has recently introduced a clipped-wing cub with a 79-inch wingspan, and that ought to satisfy those who like their models on the big side. If you like flying off water, you haven't been left out, as Hobby Shack has just brought out the EZ Mermaid, the first ARF seaplane on the market. Now I'll let you in on a little secret: one Japanese manufacturer is at this very moment getting ready to ship the very first ARF military-style ducted-fan jet model to a U.S. distributor. The model is said to use ducted-fan units made by an American company, and they should be ready to fly just a few hours after opening the box!

Let me describe another way in which ARF models have made things easier for us. I have always enjoyed teaching newcomers to the hobby to fly. The way it usually worked was some beginner would show up at the field with a plane he had already built, with no help or supervision, and in-

variably it was not at all suitable as a basic trainer. It was either too small, or too hot, or badly underpowered, painted with five coats of auto primer, or just plain poorly built. Not wishing to discourage the newcomer, I would do the best I could to reinstall his radio, his push rods, his engine and throttle, and one way or another we would make the darned thing fly. Often these guys would actually learn to fly on these contraptions, but there was a lot of aggravation and difficulty in getting the job done.

Eventually I realized that if I was going to put all that time and effort in instructing, then I would be choosy about the trainer we would use. I no longer take on a student just because he shows up with some kind of R/C plane. He has to do it my way. For the past few years I have actually specified what I wanted in a trainer, in an engine, and often in a radio. The student would build the airplane, and I would inspect his work along the way to prevent any serious errors. Some of my basic requirements for a trainer are: wingspan of at least 60 inches and/or a minimum of 700 square inches wing area, flat-bottom or semi-symmetrical air foil, tricycle landing gear for easier ground handling and hard-landing protection for the prop and engine, high wing location, hatch for accessibility to fuel compartment, plenty of room for radio installation, and enough dihedral so that it can be flown initially without the use of ailerons. As for the engine, I specify a good quality two-stroke engine with a .40-cubic inch displacement. I feel that we need as much reliability in the power plant as we can get, and a modern .40 engine will run reliably for flight after flight without needing a lot of adjusting. Imagine that the student finally completes this trainer. If he hasn't lost his desire to fly by now, we are really in business. But even now we encounter further gremlins, such as warps in the wing, important areas left without fuel proofing, a weak wing center section due to improper mixing of epoxy glue. Who ever said that to be an R/C flier you first had to learn how to build a model airplane?

In past years when a fellow took up R/C he usually had some kind of background in building U-Control models, and the transition into R/C building was not so difficult. Now we are getting people into the hobby who have never handled balsa in their lives. Some have only assembled a few plastic display models. But they want to fly R/C! When you take up golf, they don't start you with building your own golf clubs, nor do tennis players make their own rackets. Let's get serious! We cannot and should not deny the pleasures of R/C flying to those who are not interested in building. ARFs are here to open our sport to a whole new class of fliers, and I, for one, welcome them with open arms. And so I now ask my prospective student if he wants to build a trainer or get right down to learning how to fly. If he chooses not to build, then I recommend an ARF trainer/engine combination, and a few days later we have his flight instruction underway. No worries about warped wings, covering jobs, or fuel-proofing, so all of our efforts go right into getting our new pilot to solo.

Fortunately, there are some excellent trainers on the market which comply with the specifications I have laid down. Thundertiger has a Skylark 40T with flat-bottom airfoil, a wingspan of over 68 inches, and 736 inches of wing area. Top Flite Models has just brought out what promises to be a first-class trainer, and it is called the Headmaster, a Ken Willard design that has been around for years in regular kit torm. I haven't seen one of these yet, but it will certainly be on my list of acceptable trainers.

Now that's about as specific as we're going to get this month. I've attempted to tell you what this column is all about, and what we intend to deal with in the future. If you feel you have anything to contribute, please don't hesitate to communicate with me. But whether or not you are into the world of ARFs, keep an open mind and give us just a bit of your reading attention in the coming months. I promise, you won't be disappointed! •

Choppers. . . . . *Continued from page 13*

Dayton, Ohio, this summer. Some of the X-Cell technology has found its way into Miniature's accessory line. Special X-Cell tail blades and holders are being made for the Schluter and Heim helicopters. The Rotorsport blades are being fitted with a molded plastic blade reinforcement that can survive a pull test of up to 3900 pounds. This is about twice that of their other blades, and it seems to me that the blade bolt will break long before these blades will be pulling out. The JMW gyro that they sell continues to be the most expensive and best gyro system available. The Webra engines and Magna-Pipe mufflers, pipes, and headers remain in the MAS line.

Miniature Aircraft USA, 2324 North Orange Blossom Trail, Orlando, Florida 32804-; phone, (305)422-1531.

FUTABA

Steve Helms of Futaba, who proves you don't have to be 15 years old to be a championship pattern flier, is also a very competent chopper pilot. So, talking helicopters with him gave me the feeling that Futaba has really zeroed in on what the helicopter flier needs and wants.

The Conquest 5NLH is a moderately priced helicopter radio with most of the basic features. In fact, the only thing I miss is end-point adjustment on the collective channel to set the pitch curve. It's a fine radio, but I'm more impressed with their six-channel PCM, the Conquest FP-GNHP PCM, which has more features including top- and low-end pitch curve adjustment, and pulse code modulation, too. With its lightweight Conquest transmitter, relatively uncluttered as transmitters go, this is a good choice for the novice-to-sport-flier range. With the obligatory discussion of the Futaba bread and butter radios out of the way, I can now talk about the stuff I really love. One, of course, is the eight-channel PCM radio that I have been using for over a year. Futaba proved that if you design a radio right in the first place, it will never become obsolete. This radio has been around for over four years, and it's still one of the top two or three competition radios. Nevertheless, the day is going to come when all radios will be little computers. For Futaba, that day should be in April at Toledo, Ohio,

where they will debut their computer radio. Reports are that it will look a lot like the PCM 8, but its capabilities are certain to be at the very least mind-boggling. Futaba manufactures the Robbe CM-Rex computer radio, and what that radio can do is scary!

Futaba is also handling the YS helicopter engine with integral pressure system, and the Hatori exhaust systems. A little more expensive than most of the other engines available, the YS was very popular among competition fliers long before Futaba started to handle it. Now, with a much better distribution, it is certain to become one of the most popular engines even for sport fliers. Reports are that it develops tremendous power at minimum fuel consumption and holds needle valve settings exceptionally well. Futaba Corporation of America, 555 W. Victoria St., Compton, California 90220.

AIRTRONICS

A full year ago Airtronics introduced the Spectra and Quantum radios. Some licensing problems, I have heard, delayed the marketing of these radios, but now the Spectra radio is available. I don't think either one of these radios was intended to replace the 7H Module radio which is one of the excellent mid-price radios in use today. The Spectra is a PCM radio with all the important features of a helicopter radio including invert capability and two separate pitch curves. Most radios that have two or more pitch curves utilize each in combination with some other function. For example, one pitch curve will kick in with Idle Up, one with Throttle Hold, one with Invert. With the Airtronics, you independently switch in the pitch curve you want. This is certainly something different to get used to. The Quantum QMP8H will be Airtronics' top-of-the-line competition radio, fully programmable with all the features of very best helicopter radios around. The Spectra is available with either the 741 servo or the slightly more expensive 735 servo. A word about Airtronics' servos. They're getting a reputation as being the best you can buy. Now with radios of comparable quality and sophistication, Airtronics seem ready to regain the prestige and popularity in the helicopter market that they once had.

MORLEY HELICOPTERS

Jim Morley, all six-foot five inches of him, was here from England to help promote his line of scale choppers that are so popular over there, but practically nonexistent over here. Morley machines are noted for being a smaller and less expensive scale line, but they are good looking machines with many excellent scale features. The three-bladed rotor head for the Hughes 300C and the August 109 is a realistic addition at a reasonable price, and it flies well to boot. Retracts and floats are also available. My personal favorite is the Hughes 300C with three-bladed head. You see a lot of full-size 300Cs in Chicago reporting on traffic over the expressways, and it's the trainer for all the helicopter schools in the area. If scale is your thing, and you don't want to spend a bundle, Morley seems a good way to go. Their current line, besides those already mentioned, include a Bell 47G and, in the US only, a Huey Cobra. There are only 15 or 20 hobby shops in the US that handle Morley now, so you'll probably have to buy direct. They promise to ship within a day of your order, and that includes parts, too.

Morley Helicopters Limited, RC Models U.S.A., P. O. Box 6026, San Pedro, California 90734.

DU-BRO

When Dan Costa went to work for Du-Bro Products, I fully expected to see a bunch of new helicopter accessories on the market. Dan is a chopper flier, past president of our helicopter club, and has some background in the retail end of things, working with his wife and father-in-law at Al's Hobbies in Elmhurst, Illinois. Sure enough, the first thing they did was to start manufacturing and marketing a helicopter starting system for all cone-start machines. Next was a selection of metric hardware, ball links and ball wrenches, and now it's heat shrink blade covering. Not to say that Du-Bro is new to helicopter business. *Not hardly.* This is the company that produced the first helicopters in this country—the Du-Bro Shark, Whirlybird, and Hughes 300. The guy who designed all these was Dave Gray, who has been with the company for 16 years. He was one of the early helicopter hotshots way back then. Dan got him flying his Shuttle, but he had to reverse the tail rotor because Dave "flies the tail." Also the gyro had to go because, as we know, *real* helicopter pilots don't use a gyro.

Du-Bro Products, Inc., 480 Bonner Road, Wauconda, Illinois 60084-1198; phone (312)526-2136.

GREAT PLANES DISTRIBUTING

No model engine company is more innovative than O.S., and that goes double for

helicopter engines. O.S. had the first built-in helicopter heat sink, three-way adjustable carburetor, 90-degree muffler adapter. . . I could go on and on. Now the 61 long stroke is their hot item, along with a 32 H with rear cone start—both of which I'll be reviewing in the next few months. Next up: rear cone starting on their 61H engines. Throw away your dial indicator, and you can use all those spare starting belts as rubber bands.

Great Planes Distributing, Urbana, Illinois 61801.

RAVES R/C

Raves is a tiny company, but they're hard to ignore. They keep coming up with all these neat products. They've modified their H & R True-Start system to eliminate the "rounding out" problem, and they've come up with adapters for virtually every chopper made, including GMP, Schluter, Heim, and the O.S. 32H and 61H with rear cone starts. A very efficient blade balancer is also a big seller for them.

Rave's Manufacturing, U.S.A., 2007 Mount Vernon Avenue, Alexandria, Virginia 22301; phone (703)273-9760.

MATRIX

If you ever want to transport your helicopter by plane, you will wish you had the Helicopter case made by Matrix. It is already molded to take any pod and boom choppers, and they have a special model for the Bell 222/Airwolf. The Robbe entourage used several of these cases to bring their helicopters to the show. These are very spectacular-looking cases, and walking to the gate at the airport you will attract more attention than Robert Redford. Great conversation piece, too.

Matrix Enterprises, 7015 Carroll Road, San Diego, California 92121; phone (619) 450-9475. •

Hey Kids!. . . . *Continued from page 46*

are two reasons why I like razor blades better than model knives for cutting balsa sticks off. First, they are cheap and can be thrown away when they are dull. Most modelers use the "throwaway" model knife blades far too long, and most no one knows how to sharpen one any more. The next reason is that a razor blade is easier to line up for a straight cut than some knife you hold like a pencil, off at some funny angle. By sighting straight down over the blade, you can make those cuts square and right where you want them. Model knives come in handy when you need to cut out ribs and other parts from sheet balsa on more complicated models.

CUT WHERE THE PLAN SHOWS

"Jeezz, I've cut it off three times and it's *still* too short!" Hard as it may be for you to believe, some people are *almost* that dumb when it comes to cutting parts off right. Study the plan carefully and try to figure out *why* a part should be cut where it is. I once had a kid cut a leading edge off every time it came to a rib. When I asked him why, he just said, "I dunno." Brain damage? Not really. He just didn't stop to think that the *purpose* of the L.E. was to add strength to the front of the wing, and that cutting it up made it weak. When the guy who drew the plan doesn't show a line crossing the stick, don't cut it off! Often when two sticks cross, you will have to decide which gets cut and which goes on through the intersection. Careful inspection of the plan will generally tell you which one the designer of the plan wanted left in one piece. Trust him. Ninety-nine times out of a hundred, he had a reason for drawing it that way, and it may be just a little better than leaving it to chance.

BUILDING THE WING

We build the wing right over the outline shown on the plan. Even though the wing tips are raised to give "dihedral" on the finished wing, we build the whole thing flat for now. The leading edge or "L.E." is made in three parts. Cut them from the hardest sticks in the kit and pin them down to the plan. *Do not stick pins through the wood!* Use the "X-ing" method as shown, leading the pins, which face each other on opposite sides of the stick, onto the wood just enough to hold it down without leaving a big dent in the balsa. Don't glue them together now, or you'll just have to cut them apart later when it is time to raise the wing tips! Now cut all the "ribs" from the softer sticks in the kit. They get glued to the leading edge, then any long ones trimmed to length to let the T.E. contact each one equally without bending. You can't very well stretch the short ones, so try not to cut them too short!

The way you get parts the right length is to

cut them out directly over the plan. I suggest that you cut them just a wee bit on the long side and then sand them to exact length and snug fit with your sanding block. If you have to force a part in place, it may wind up giving you a twisted structure when you take it off the board due to the stresses you put on the fragile framework. Better to make it just an easy snug fit.

It's also a bad idea to try and fill up the space between two poorly fitting parts with glue. It adds weight, it takes forever to dry, it looks bad, and a few other minor things like that. Either make another part the right length or glue in a bit of scrap balsa to fill in the gap.

If you have several parts to cut to the same length, you can cut one the right size and then use it as a pattern to cut the others. If you do this, be sure and use the *same* part as your pattern each time, and not the one you just cut off with it. This prevents the length from "growing" as you go along.

Again, remember to cut on your cutting board and not on the plan. You may want to use the plan again. I generally start a cut over the plan and finish it on the cutting board.

Another tip for good cutting has to do with keeping the blade perfectly in line with the line on the plan, both side-to-side and up and down. Pushing the razor blade slightly forward as you cut generally works better than just crushing straight down. Remember, a *sharp* blade is essential.

When you have all the ribs glued in place, then you can fit the T.E.

GLUING THE PARTS TOGETHER

You may use white glue such as Elmer's or Titebond aliphatic resin glue if you have them. If you use Testor's "Fast Drying Cement for Wood Models," as I do, you will put a drop on the end of each rib and then dab the drop quickly against the place on the L.E. where it goes. Getting glue on both halves of the joint is important. If you wait too long, it will be too dry to stick well to the L.E. Then lay it in place and "X" a couple of pins to hold it, with a third pin pushing it toward the glue joint at the place where the T.E. will go later. With the end of a stick, wipe out any extra glue which squeezes out of the joint to save weight and make it dry faster. Blobs of glue get a skin on them like an egg and do not dry inside. If you use white glue, the easy way is to put a few drops on the Saran wrap and dip the ends of the sticks in it. Allow the wing to dry "as is" for about a half hour or so while you go on and do the stabilizer and rudder. Pay attention to which sticks run all the way to the edge and which butt into the part they are glued to. Study the plan carefully instead of just assuming you know. Sometimes it makes a difference in strength. Notice, for example, on the plan the rubber drawing. Do you see that the L.E. and T.E. of the rudder go all the way to the part with the little angled lines on it (the side view of where the stab will go) and the top and bottom pieces of the rudder glue up against them? That will help keep the rudder from tipping to the side and breaking off. Before you glue the T.E. on the stab, go back and put the T.E. on the wing, as the ribs are probably dry by now.

Take the pins out that you used to apply end pressure to the wing ribs while they were drying, cut the T.E. sections and glue them to the rear ends of the ribs, using the end of a piece of scrap stick to apply a drop of glue to each joint before you touch the balsa together. Don't glue the T.E. sections to each other (remember how you did the L.E.?). A pin behind the T.E. at each rib location will hold enough pressure against it to keep it in place while it dries. Do the same thing with the stab.

THE FUSELAGE

While the wing and tail frames are drying for about a half hour, study the side view of the fuselage assembly on the plan. Glue the spacer block to the front end of the fuselage stick, on the narrow edge, not the fat part. Hold it over the plan to see if you did it right. Then, take the 1/16-inch thick balsa sheet wing mount and glue it on the *left* (pilot's left) side of the fuselage. Do you notice the broken or "dotted" line on the plan which runs just under the word "wing mount"? That means that you cannot see

that part of the fuselage when the wing mount is in place. That is how you know it is on the left side. Now glue the two tiny bits of 1/16-inch square balsa on to the wing mount as shown. They are on the left too, as they have no dotted lines. Now look at the center drawing on your plan by the left-hand margin entitled "Wing Mount Detail, Front View." What you are looking at is what you just did, as seen from the front (minus the wing, of course). If your work looks different, try and figure out what went wrong. Set the parts aside to dry.

Bend a rear motor hook from a pin as shown. It works better than the straight pin shown on the plan. Bind with thread and rub glue into the thread. Make sure that you glue the pin itself, as the thread alone is not going to hold it.

DIHEDRAL

Making sure the wing tip (three sticks glued together) is dry, slide your razor blade or a table knife blade between the sticks and the Saran Wrap. Pry the parts off gently, as they do stick just a little, and you could break the tiny structure easily. You are now going to glue the tip on at an angle, with the tips raised one inch higher than the center section of the wing. To make the L.E. and T.E. fit better, you will need to sand just a little angle where they join. Leave the center section of the wing pinned down and do your sanding of a slight bevel on the L.E. and T.E. of the tip, grasping the stick as close as you possibly can to where you are working on it with your sanding block. Take it easy. It is always easier to go back and sand a little more after you try the fit than to throw away the part because you sanded too much off. Cut the dihedral gauges out of the plan and glue them to thin card stock. Use them to check the proper angle as you sand the ends of the dihedral joint.

When gluing the tip onto the center section, always double glue and allow it to dry overnight if you can, especially with white glue. I recommend using *both* dihedral gauges under one tip, one near the L.E. and one near the T.E., to keep the tip from twisting. A little weight will hold it while it dries. I find that a video cassette is just the right height and saves making dihedral gauges. A block like that can be pushed farther in if you need more height at the tip.

THE FRONT END

I found that I had to cut a little off each side of the landing gear where the wheels fit on before I bent the ends up to hold the wheels on. Some modelers prefer to nick with a file just outside the wheel and then wrap glue-coated thread around the nicked area to form a knob big enough to keep the wheel on. Slip the landing gear wire into the white nose bearing and try the fit onto the front of the fuselage assembly. Chances are that it will not fit and that the balsa will have to be sanded down a bit before it will go into the plastic socket. *Do this a little at a time*, for if you take too much off, the nose bearing will be loose and will be pulled *downward* when you wind the motor. This will give you extra downthrust and prevent your model from climbing well. A little downthrust is built into the bearing to help prevent stalls or loops at the beginning of the flight when the rubber motor is putting out the most power. The downthrust has no effect at all when the motor has run down.

TACKING IT TOGETHER

At this point, you may want to tack everything together to see what it will look like. Just a tiny drop of Testor's or other cellulose glue is needed to hold the wing and tail on. When you are ready to cover, brushing a little acetone or dope thinner on the "tack" will loosen it so it can be taken apart for easy covering.

SO YOU CAN'T WAIT UNTIL NEXT TIME TO COVER, EH?

Well, you can always stick your tissue on now with a mixture of about two parts white glue to one part water, but it might be better to wait until our complete tissue covering session next month. We'll discuss ways to do it so your wing won't look like a Pringle when you're finished! Until then, happy building! •

Counter. . . . . . *Continued from page 10*

* * *

Here's a novel idea, in the form of an instructional videotape from Great Planes: How to Build and Fly a Radio-Controlled Model Airplane. This 85-minute cassette will give you 28 chapters on how to build and fly an R/C model. The Great Planes PT-40 plane is featured, but the information applies to any balsawood kit. Directed by Victor Milt, an accomplished video producer and R/C modeler, and featuring well-known modeler Bill Fries, this tape should

be valuable for any modeler seeking knowledge in the wonderful world of R/C.

* * *

Midwest Products Co., 400 S. Indiana St., Hobart, Indiana 46342, has a new MEPS-11 Speed Controller, designed to operate the new Midwest MEPS-11 Marine Electric Motor. It comes wired with a two-amp fuse holder, and provides two speeds forward and two speeds reverse. Double-sided tape, provided with the kit, makes installation easy on any standard-sized servo. Available at your nearest hobby shop now.

* * *

Associated Electrics, manufacturer of the famous RC10 1/10-scale electric R/C racer, have announced the release of a new aerodynamically designed body for the RC10, called the Sidewinder. This body has been designed to provide more downforce on the chassis, meaning more positive steering and rear traction for your racer. See it at your R/C hobby dealer now.

* * *

Royal Products has a new tachometer with a visual LED for easy reading of any model's propeller. This easy-to-use tach should be in your field box now! Look for it at your hobby dealer, or contact Royal Products, 790 W. Tennessee Ave., Denver, Colorado 80223. •

Jake..... *Continued from page 7*

appear from time to time in the column. It is called "A Guide to Modeling Jargon" and will include useful definitions of those technical terms which are prevalent in our hobby's vocabulary, but which, unfortunately, are not fully understood by everyone. Without further ado then, here for all of you to consider (especially you, Reverend) is the first edition of:

A GUIDE TO MODELING JARGON

Pilot—What you do with compost.
Tow Missile—Latest weapon in the fight against athlete's foot.
Pit Area—Center of the prune.
Clark Y—Superletter's secret identity.
Piper Vagabond—Scotsman without a job.
Cap Strip—Burlesque act in which women remove their hats.
Self Tapping—Latest innovation in beer kegs.
Polyurethane—Plastic parrot.
Cross Grain—Angry barley.
D-Gas—Powered free flight size classification.
B-Gas—Insect embarrassment.
Exhaust Port—Source of B-gas.
Stringer—Tennis racket repairman.
Semi-span—Half a bridge.
Sanding Block—Mental barrier that prevents modelers from smoothing their work.
Tap and Die—Dance yourself to death.
Battery Charging—Buying a Die-Hard on credit.
Fast Rate Charging—18 percent compounded monthly.
Overcharging—$74.95 for a Die-Hard.
Dead Stick—Rose bush frequented by a dog.
Vacuum Pump—New line of ladies shoes available from Eureka.
High Draft Carburetor—Carburetor selected in the second round.
Gasoline Additives—Petroleum industry policy of adding to their prices before major holidays.
Radar Approach—Coming up on a speed trap.
Pitts Special—What you have if you braid your underarm hair.
Knee Joint—Kind of bar where you leave on your knees.
Knuckle Joint—Kind of bar where you leave on a stretcher.

Resistor—A virgin.
Impedance—A chaperone.
Stern Drive—A ride in Beulah (Attila the) Hundley's school bus.
C-Grain—Average wheat.
Magic Muffler—Doug Henning's scarf.
Tow Line—What foot readers look at to tell your fortune.
Ultralight—New 14-calorie beer.
Combustion Products—What Ultralight tastes like.
Paint Thinner—What you should do next time if your finished airplane weighs too much.
Color Blending—The art of creating pink underwear by washing them with red socks.
Wing Warp—Point in space where your wing exists at some other time.
Cyclic Controls—Brakes, gearshift, and handlebars.
Wash-in—Wing twist producing higher angle of attack near the tip.
Wash-out—Postponement of a ball game due to rain.
Wet-or-Dry Sandpaper—Weather forecasting technique which involves putting some sandpaper outside and checking to see if it gets wet or stays dry. •

EOTW..... *Continued from page 26*

ticle on the G.H.Q. and enjoyed it very much. I've worked for America's Hobby Center for at least 40 years and needless to say, I've enjoyed it. The reason for writing is that while we were in Brooklyn, every so often it came time to clean up and throw some junk out. During one of these occasions I ran across photos of modelers who used the G.H.Q. engine. They're enclosed in case you care to make copies for yourself. Please return them. (*Many thanks, Steve, my copies came out* great—*Stu*) Some of the names of the builders were used in G.H.Q. ads. My boss, Bernie Winston was a 'whizz' in running up the G.H.Q.s." From Bill Mitch in Indiana, "I really enjoyed your write-up on the G.H.Q. I've had quite a few of these engines go through my collection. Only one would run, and I still have it. I had to make a new conrod for it 1/8-inch longer and made a 1/8-inch spacer for under the head, and it runs fine! The intake and bypass port holes were drilled 1/8-inch too high; has excellent compression!" And the letter from Dan Lutz (used to work for Kraft) really says it best, "I enjoyed your article on the G.H.Q. in the recent issue of *Model Builder.* This engine, if you can call it that, did more to discourage model building during the years of its manufacture than anything I can think of. The quality and workmanship was so crude that most purchasers just put it in the closet or cellar after trying to start their 'real gasoline engine.' Too bad there wasn't an Engine Clinic by Clarence Lee or Engine Review by Peter Chinn back then. I am sure they would have called it what it really was. . .a piece of junk!" Thanks for the letters; my personal G.H.Q. experience paralleled Dan's. •

Electronics. . . . *Continued from page 11*

Another Easterner is heard from next, in the person of Jordan Flakser, Flushing, New York, who has the following comments and questions:

"Perhaps you might remember me as the first to contribute to your first column in *Model Builder* magazine. I've moved back to New York, my home town, from Oregon.

"The reason for this letter is I've read conflicting articles concerning the 'care and feeding of Ni-Cds' in various publications —both in R/C magazines and photo magazines as well. I've read articles that tell us that when Ni-Cds are stored for long periods of time, that they should always be fully charged before storing. On the other hand, I recently read an article written by Karen Geller-Shinn in a photo mag where she states 'Nickel cadmium batteries are usually sold in a discharged state and must be charged before use. If you plan to store them, you should do the same; that is, discharge them first. They are chemically stable in the discharged state, and full capacity can be recovered more quickly after storage. As many as three to five complete charge/discharge cycles may be required to achieve full cell vitality after prolonged storage, depending on storage temperature.'

"This has left me scratching my head, so to speak. Can you shed any light on this matter? Have you any pertinent info or data one way or another regarding this matter?"

In spite of what I said earlier about memory, I do remember Jordan Flakser. Speak-

ing from personal experience, there are certain advantages in having names more unusual than Joe Smith.

As for Ni-Cds, I have mentioned here before that in my opinion, a lot of erroneous information about them has appeared; more than on any other R/C-related subject. Quite probably, the same thing has happened in the photographic field, since photo bugs have also discovered their advantages.

In trying not to add to the already existing confusion, I try to refer to manufacturer's literature as much as possible. My files include a lot of material from all of the well-known Ni-Cd battery makers—and some not so well-known to us R/Cers. Have you ever heard of Power-Sonic, Tadiran, or Varta Ni-Cds? All such material is lacking on two points important to us, storage being one of them and the other the "BOIL" charging rates in common use by the electric-powered model clan.

On the latter subject, the highest rates even mentioned are C1; the one-hour rate, which for the commonly used 1.2 AHr cell is 1.2 amps. Electric fans, particularly car racers, consistently charge their batteries at as much as 4C; over *four amps*! Mention this to a Ni-Cd battery representative, and he quickly changes the subject. There is a very important fact which must not be forgotten in the treatment that R/C car racers give their batteries: longevity is only a minor consideration, maximum speed for X number of minutes comes first and above everything else. The rest of us using Ni-Cds to power the electronics in flying models simply cannot accept that philosophy.

Storage to the battery manufacturer seems to mean longtime storage, which is recommended at refrigerated temperatures down to below zero. I have yet to read anything in a manufacturer's literature which mentions charge during storage. Or lack of! Again, the car racers have come up with a technique which works for them, that of storing their batteries with a resistor load across them, to run them down to and keep them at zero. The results are claimed to be a higher capacity on the subsequent charge. Again, this is not long-term storage, or even for the winter, but only from this race until the next one.

On the subject of the state of new Ni-Cds, Miss Karen is wrong. Partly, anyway! True, new Ni-Cds don't come fully charged, but neither do they arrive at absolute zero, and I know this not only as a casual use but from my involvement in the manufacturing and servicing of R/C equipment, since we all used button cells. There is some charge—whether it is a token charge used to test the cell or simply the residue of a full charge, the results of self-discharge, I don't really know.

Again, my experience has convinced me of a certain fact: by far, the greatest percentage of Ni-Cds stored in a charged condition and periodically topped off, will still have normal capacity when next flying season rolls around than those that have been allowed to self-discharge and stay that way over the months. The latter will generally also show signs of leakage, and, even though I know some of you are tired of the subject, you will often find traces of corrosion in the (black?) negative wire.

What do I do? For what it's worth, I charge and top off monthly. And, if the equipment has not been used for even three or four months, I test the capacity before I fly it. I have said it often: Ni-Cds are cheaper than airplanes!

Still on the subject of Ni-Cds, I must report that my Airtronics 7P Module Series R/C system is now in its third year of flawless operation. Initially, I charged and capacity-tested all Ni-Cds, a procedure which I have repeated occasionally since then. However, testing the capacity, or voltage for those of you that like to do that, of the transmitter's battery requires a little electronic trickery. I was reminded of this recently by a friend who asked how he should go about this process.

The problem is that like other R/C transmitters of Asian origin, the battery voltage of the 7P cannot be read at the charger jack. The reason is the installation of a rectifier diode between the jack and the actual battery, which allows charging current to go in, but nothing to come back out. I have never understood the logic of this, except possibly to prevent damage to the battery and associated wiring if, while attempting to connect any external testing devices, one was to short things together. With the use of properly connected and assembled leads, such an event is improbable, but I guess not impossible.

Anyway, that is the case! However, unlike

some other transmitters that I know of, battery checks on the 7P are quite easily made without having to resort to major surgery. Referring to the page in your manual entitled "Battery Charging and Replacement," you will see that it uses a prepackaged, removable battery pack, the back of which actually forms part of the rear cover of the transmitter. This pack can be easily removed by simply positioning two slide catches on the base of the transmitter, and pushing the case down and out with your fingers. Along with the battery case will come the charger connector, and on the same side, on the upper edge, you will now see a small three-pin female connector by which contact is made between the battery pack and the rest of the transmitter's electronics.

This little connector is the key to the whole thing—where the battery voltage is available without any diodes or other interfering devices. As I said, it is three pins, though only two are used. *Important!* As the battery case is installed in the transmitter, the pin connector towards the *outside* is battery positive. The middle connector is battery negative; the inner most connector is unused. Therefore, you will need to acquire a plug of the right type—more about that in a minute—and connect to your test equipment input with the polarity as just described.

The plug? The plug! It is important that you obtain the proper type of plug, and *only* the proper type. Control your impulse to stick a ten penny nail or something into the holes, as any distortion of the inside contacts could lead to improper contacts with the mating plug in the transmitter, and the whole thing might decide to quit on you at a most inopportune time—when you are in the air.

The plug required is used in great quantities in modern electronic equipment, and should not be too difficult to obtain. They are called "header plugs" or sometimes simply PCB (Printed Circuit Board) connectors, and are available in many configurations with and without a plug body. The pins used are of .025-inch square shape, on a .1-inch spacing. If your town or city has a real electronic store, just take the battery pack in with you and ask for a mating plug—the clerk will surely come up with something that will work. Further, such plugs are available with gold or tin-plated pins—go for the gold!

Radio Shack has them, but apparently considers them as kin to potato chips. You know, you can't have just one! However, sometimes it is the only way you can get one of the proper plugs, along with 197 others, in Header Assortment No. 276-1658. The good news is that the cost is less than two dollars, and you'll be able to be a hero at the next club meeting and pass them out to all of your Module Series owner friends.

Another Airtronics hint! For those of you who are fans of this fine equipment—there is a PCM in your future!

Spark Ignition is back with us this month. In our November column, we presented a diagram for an update of the traditional point driven model engine spark ignition system, developed by the guru of such things, Floyd Carter. This lead to the following letter which brought a confirmation that Floyd's circuit works as presented, along with an improvement and a challenge to your mechanically minded types. William Mitch, of Hebron, Indiana, writes:

"I built the transistor ignition circuit you described in the November '87 issue of *Model Builder*, except I added a Hall Switch and used it in place of the points. I used a small magnet taken from a pocket screwdriver and put it in the backplate of a spinner, a la CH Electronics. Works great! Keeps on working down to 2.6 volts."

Our thanks to Bill, and shown here is the schematic of his changes. Notice that except for the connection bringing the positive voltage to the Hall Effect Switch, the other two are connected at the same place that the original points were. In effect, this solid state device is acting *exactly* like the points, as a switch!

We talked about Hall Effect devices before, years before, so let's cover them once again. The phenomena, first noted by E.H. Hall way back in 1879, is that a magnetic field applied to a conductor already carrying current produces a voltage across the conductor. The effect is caused by electron deflection within the conductor, concentrating the negative charges to one side or the other depending on the influence of the magnetic lines of force. The difference in potential is called the Hall voltage.

It took the advent of the transistor and the many succeeding solid state developments before Mr. Hall's discovery really came into its own. It is now possible to obtain Hall Effect sensors capable of detecting motion, position, or change in a magnetic field; as well as just a simple on-off action such as we need to trigger our spark ignition system. Actually though, the device specified in a rather complex unit including not only the Hall cell, but a voltage regulator, signal amplifier, Schmitt trigger, and a current sinking output stage integrated into a single silicon chip.

There are many Hall Effect devices—this particular one is quite small; less than 3/16-

inch square. The "a la CH" usage referred to by Bill makes use of a stationary ring mounted on the front housing of the model engine and supporting the Hall switch. The actuating magnet is pressed into the aluminum spinner backplate, and positioned so that it will pass by the Hall switch during its normal rotation. Obviously, the timing of the switching action has to be correct, same as it was with the mechanical points. This adjustment is made in pretty much the same manner—by adjusting the position of the Hall switch for maximum engine rpm.

As the Sprague Company, one of the major manufacturers of Hall Effect devices, states in one of its manuals: whatever turns them on. . . .

R/C Soaring. . . *Continued from page 42*

tor with switch harness, Tamiya-style connector, and fuse (a la Deluxe Electra kit), an 8 X 4 nylon prop, a Goldberg Snap-On spinner, and complete instructions. (The battery pack and charger are obviously optional.) The Power Pod is another good idea from Goldberg! Stay tuned for retail price and availability.

EASYBUILT MODELS

Here's a model company I'd bet very few of you are familiar with. It's based in Ontario, Canada, and it specializes in free flight and static display models built from balsa wood, tissue, and dope. They also have a section of R/C 05 electric-powered models such as Steve Gray's DH Beaver, which appeared in *Model Builder* as a construction article, and others such as the Stinson Voyager, Taylorcraft, and Fairchild Ranger. What is more important to readers of this column, however, is their 72-inch span R/C glider called the Super Soarer.

Want to try something really different for a change? The Super Soarer would definitely be the one. Although trying to describe it from memory probably won't do it justice, I do have to try.

What caught my eye from a distance at the show was the Super Soarer's wings. They had that classic, late-thirties, gull dihedral look similar to a Minimoa, and a deep "guppy"-like fuselage with lots of stringers showing under the covering. Even though it looked like a stick-and-tissue old timer, the wings were of a high enough aspect ratio look very efficient. A closer inspection revealed a slightly "undercambered" root section that transitioned to a flat bottom section at the poly break and so on out to the tip. The structure was open on the bottom and sheeted on the top from the leading edge (LE) back to the main spar. I asked the gentlemen in the booth what kind of wing area the glider had, and they couldn't tell me. They did, however, indicate that the model weighs 32 ounces with radio gear aboard.

My first flying model was a Sinbad. It never flew beyond my initial hand tosses because I knew nothing about balancing a model for proper "CG" and the Sinbad was tail heavy. In spite of this, the experience did inspire me to move on and try a Super Sinbad, which I finished in a beautiful red, white, and blue pigmented dope stars and stripes motif. Having built nothing but plastic models up to that point, I was "bit" by the balsa wood bug in a bad way. Ever since then I've enjoyed building stick-and-tissue-type models and enjoyed flying them. Unfortunately, these days that is a rare treat.

The Easybuilt Super Soarer is like a high performance Sinbad. The fuselage is not as bulky, and the wings are 72 inches compared to the Sinbad's 48 and the Super Sinbad's 60 inches. For someone looking to tackle a real attention getter at the flying field, this one would do it.

Super Soarers are available now, factory direct from Easybuilt at Box 12, Grimsby, Ontario, Canada L3M 4G1, telephone (416)563-5582. The price of the kit is $32 and it will be shipped in the U.S. from Buffalo, New York, freight paid to destination (hassle free!). While you're at it, you should ask for their *Handbook to Balsa & Tissue Model Airplane Building*. This book takes you step by step through the building of a few typical stick-and-tissue models including covering with tissue paper and dope. There is a section for trimming out the model, making your own wood props, propeller assemblies, and rudimentary aerodynamics. If only I'd had this book when I built those Sinbads!

EZ SPORTS AVIATION

On display in the Hobby Shack booth was a new almost ready to fly (ARF) sailplane called the EZ Arrow 1800 (or EZ-1800 for short). This model is actually the latest

ZAP PROFILE #2

Pilot: Ramon Torres

Aircraft: Beechcraft King Air

Engines: OS.46 (2)

Radio: Futaba PCM

Span: 91"

Weight: 15 lbs., 4 oz.

Glue: ZAP "TOTAL ADHESIVE" SYSTEM

Ramon Torres, a resident of Hialeah, Florida and owner of R.T. Associates, recently took first place at the 1987 U.S. Scale Team Trials in Lincoln, Nebraska with the gorgeous Beech King Air pictured above.

Ray's skillful hands have also guided him to first place at the Pacer-sponsored 1986 U.S. Scale Masters in Fountain Valley, California.

This past Nationals and Masters winner explains, "We could have used almost anybody's glue, but past experience has proven to us that only the Zap Total Adhesive System provides both the security and the peace of mind we look for when constructing a 91" twin to under 15½ pounds! We learned long ago that low grade CA glues just do not give us the long lasting, secure joints that we have come to trust and expect from Zap. For us, there simply is no reason to use any other glue. We always use Zap... the best money can buy."

in the "Arrow Series" of gliders manufactured by EZ Sports Aviation of Japan and distributed exclusively nationwide by Hobby Shack and those hobby shops which carry EZ. This series ranges from the EZ-1800's little brother, the 64-inch EZ Slope Arrowhead aileron ship, to the bigger, polyhedral-winged EZ-2000. The EZ-1800 will actually be replacing a fourth glider in the series known as the EZ-1700.

I have submitted a photo of the EZ-1800 from an earlier shoot outside the Hobby Shack store in Fountain Valley, California, so that you can get an idea of its overall appearance. It is an attractive sailplane that comes factory pre-built, pre-covered, and pre-painted in a predominantly white color scheme with three-tone green arrows for trim. The canopy is a dark blue.

As you can see from the picture, the EZ-1800 has V-dihedral wings. Each side has approximately 6.5 to 7 degrees of dihedral angle with no polyhedral break for the tips. This gives the glider more than adequate roll rate for normal sport thermal or slope flying. The EZ-1800's wingspan is 1.8 meters, or about 73 inches. Its wing area is 530 square inches, and its flying weight is around 32 ounces. This works out to an 8.6-ounce wing loading, which for a sailplane with a fully sheeted wing is excellent.

The wing's cross section is the Eppler 195 airfoil which as you will recall from Keith Kindrick's comments from the Visalia meet a couple of month's ago is a much better "floater" section than the Eppler 205, yet with about the same ability to penetrate. Given the true airfoil section that only fully sheeted wings can give, the end result is a very efficient little six-footer that loves to go out, find lift, and then sky out.

The EZ-1800 is a two-channel, rudder-elevator ship that will accommodate any standard size radio equipment that you may already own. All necessary hardware comes in the kit so you won't be left wondering what else needs to be purchased. Some slow epoxy, some cyanoacrylate adhesive (Zap, Hot Stuff, Jet, etc.), some very basic tools (screwdriver, sharp modeling knife, etc.), and about two hours (at most!) of free time for the final assembly are all you need to get airborne with the EZ-1800. And for a going price of around $99.99, it sure beats building.

ROBBE MODELLSPORT

Not shown at the Chicago Show (except in Robbe's new catalog) was Robbe's ASW-24 scale ship, due out in January (or about the time you are reading this). This beautiful, T-tail, 3.5-meter (11.5-foot) span scale ship will likely be present in at the IMS show in Pasadena. I am submitting a clipping from my Robbe catalog in the hope that it will reproduce acceptably well in this magazine without a moire (checkerboard) pattern.

The ASW-24 is a highly prefabricated aircraft as are all of Robbe's sailplanes. It comes with Robbe's special Siros Expert wings which are a sophisticated structure of finish sanded balsa outer skin, laminated high-density PU (polyurethane? -wrf) foam, and expanded Styropor (EPS). This combination of materials yields a very strong, pressure resistant, lightweight wing panel.

The spoiler bays and aileron cutouts are already done for you as are the cable guide tubes in the wing.

Aerodynamically, the ASW-24 wing features the latest technology airfoil profiles developed by Dr. Helmut Quabeck, namely the HQ-3.0/13-10-13 family. I interpret this to mean that the root section is 13-percent thick tapering to 10 percent at the beginning of the tip panel and out to a 13-percent thick tip chord. This gives the ship the extra strength of a moderately thick section at the wing root, a low-drag 10-percent section about mid-wing, and a nearly constant thickness tapered tip panel, which resists tip stalling. If this is so, it's a very smart idea.

The fuselage comes molded in Plura, which is a trade name for Robbe's special kind of white pigmented, high-impact thermoplastic, paintable material. What I feel is a very nice touch in a scale sailplane kit is the molded pilot and cockpit detail.

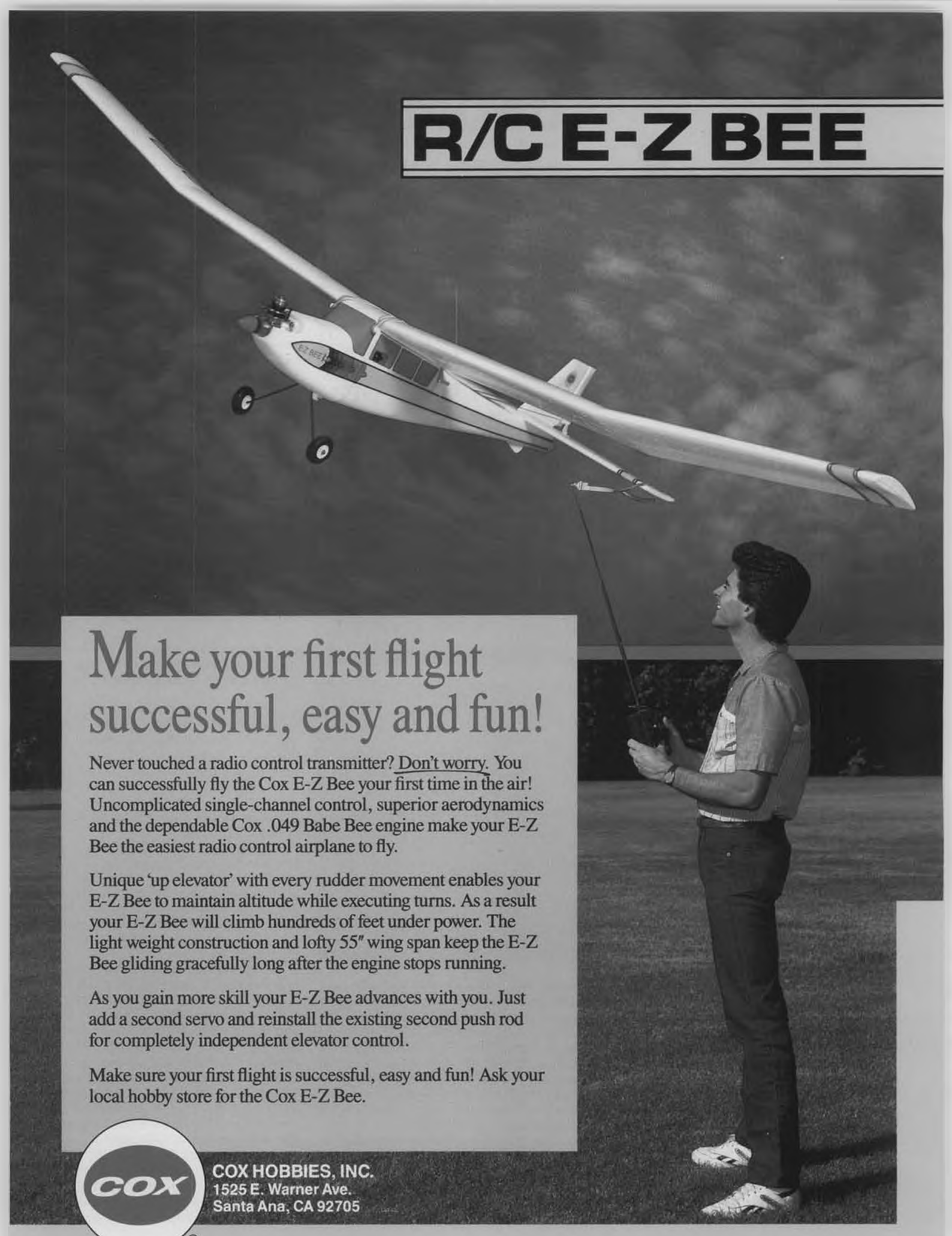
There are many more features of this scale sailplane than I have room for here, so I must save them for a later review which will be extremely detailed.

On display at the Robbe booth was a good-looking, F3B-styled two-meter sailplane or electric-powered glider called the Arcus. Like the ASW-24, this sailplane is also highly prefabricated and also a T-tail. It is the design work of several well-known European contest pilots, and it looks like a real winner. The finished model is purely sensational, and, to top it all off, you get to build one of four versions from the kit: a polyhedral-rudder-elevator version, a dihedral-ailerons-rudder-elevator version, or an electric-power model in either configuration.

The airfoils used on the Arcus are the Eppler 178 at the root transitioning to the 180 at the tip. This yields a stable, relatively thin and low camber wing which should be plenty fast. Slope racing is a definite here!

As an electric, you can fly it with seven- or ten-cell packs using Robbe's complete (and optional) geared flight systems. If you are into electrics, you really should check this one out!

I strongly recommend that you send away for the Robbe catalog for 1988. Anyone who may be a little jaded by the typical gas bag polyhedral floater and who wants to go shopping for some high-tech, high performance sport or scale ship will find what he is looking for within its pages. Send $4 to



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OFF THE GROUND MODELS

Paul Carlson hasn't been resting on his laurels since his development of the Prodigy three or four years ago and its subsequent release as a kit two years ago. The latest kit offering from Off the Ground Models is the three-meter Prodigy look alike, the Quasoar.

In product development and testing for over a year now, the Quasoar is finally ready in kit form. The Quasoar spans 123 inches, has 946 square inches of wing area, 130 square inches of horizontal stab area, and flaps that span the entire length of the center panels and are 25 percent of the wing's chord in width. The fuselage is molded epoxy/fiberglass, and the wings are foam core with balsa sheeting. The airfoil used is Michael Selig's computer-designed and wind-tunnel tested S4061. This section is said to have a better lift-to-drag ratio in the wind tunnel than the Eppler 214. And according to the Prodigy owners I've talked to, the feeling is that the S4061-equipped Prodigy is superior to similar and even larger aircraft with Eppler 205 sections both in L/D and sink rate.

Paul didn't have any Quasoar brochures ready for handout at Chicago, and when I went by his booth at the show, he was hurrying out the door on his way to a friend's wedding, so I didn't ask as many questions about the Quasoar as I wanted to or should have. Anyway, Paul promised me more Quasoar info on his return to Lawrenceville, and when it gets here I'll pass it along.

Off the Ground Models is located at P.O. Box 518, Old Highway 50 East, Lawrenceville, Illinois 62439; (618)943-7070. If you would like more info on the other kits and hi-starts in his line, I'm sure he'd be glad to supply you.

That wraps up my Chicago report for now. If I get better photos for the new models I'll certainly share them with you here. If anyone out there managed to shoot pictures of the static models at the show and cares to send some nonreturnable photos my way, I'm sure everyone would enjoy a look at them. Thanks in advance if you do.

AIRFOIL OF THE MONTH: EPPLER 195

The E195 airfoil profile has been around since the late seventies but has seen little model aircraft experimentation (that I'm aware of) in the US until the last couple of years. That's really a shame too because we have been ignoring a really great thermal glider section.

I've already mentioned the E195 profile in the above text as being the section used on the EZ-1800. In last month's column where I wrote about the Visalia Fall Soaring Festival, I told you about Keith Kindrick's new original design Unlimited Class ship which also had the E195. Keith said it compared favorably with the popular E205 and was actually a better thermal "floater" than the E205.

A few month's ago during a visit to a local kit manufacturer in Westminster, California, I discovered that the Astro Flight Challenger electric-powered glider uses the E195. In fact, the Challenger proved to be such a good flier that when there was a short run of Astro Partenavia Victors planned, the kit was redesigned for the E195.

Bob Sliff, head honcho at Midway Model Co., is in the testing stages of several kit prototypes for a two-meter polyhedral sailplane aimed at the beginner-to-intermediate, budget-minded glider guider, and it may end up with the E195 section depending on the outcome of some comparison flight tests.

Taking a look at the polars for this section, one sees that in theory the E195 can pull a slightly higher coefficient of lift ("Ca" in German) than the E205, and for "Ca" .5 and above (mid-range speed and thermalling) it also has slightly less drag for Reynolds Numbers 200,000 and above. Its drag coefficient in the "Ca" 0 to .4 range (steep to shallow dive) should not be quite as good as the E205's. A lot of this undoubtedly has something to do with the E195's thicker profile: 11.82 percent vs 10.48 percent.

To sum it all up, the 195 seems to be a gentler flying version of the 205. It should out-climb the 205, and be a bit stronger due to its extra thickness. Give it a try and let me know if you find this to be true also. Send

me a photo or two of the model and a short write-up so that I can share your findings with everyone.

SUPER SPOILERS, "QUAMA," AND WHATEVER HAPPENED TO PACIFIC SAILPLANES?

A few days ago I got a phone call from Ron Carter of Salt Lake City, Utah. He was looking for a phone number or current address of Pacific Sailplanes (formerly of P.O. Box 55155, Valencia, CA 91355-0155; 805/251-9663). He was very interested in buying either a Redtail F3B ship or a Kestral 19 scale ship. Well, try as I might, the information Ron already had was all that I had, except for the principals' names: Phil Waul, Sr. and Chris Benjamin. Calling directory assistance was fruitless.

Tonight I received another call from Gary Anderson of American Sailplane Designs (2626 Coronado Ave., Sp. 89, San Diego, California 92154) wherein he too asked me for information about the Kestral 19. Well, I still don't have any answers about whatever became of this company.

Help! Help! Does anyone out there know what became of this company? Please give me a call or write me a letter. I will forward the info to Gary and Ron, and I will pass it along to all via this column if possible.

As Ron Carter and I talked, the subject of his Super Spoilers came up. I had received a pair mysteriously in the mail back in October of 1985 from Vermont with no accompanying letter for an explanation why. Evidently a letter was sent separately and was never received. In a subsequent phone call from Jim Gray (former "Soaring News" editor, *MAN*) I learned it was Jim who had sent them because Ron had sent him two pair, and he didn't need both. Anyway, Jim told me of two sources for these spoilers: Jerry Slates of Viking Models (2026 Spring Lake Dr., Martinez, California 94553) and Ron Carter of Salt Lake. I submitted this info to *MB* at that time, and I guess it was edited out for some reason because it hasn't appeared to date (November 1987).

Well, here it is again. Originally there were 275 pairs of these rugged aluminum spoilers made by Ron at a time when he had access to a machine shop. Now there are only 40 pairs left in his possession (and about half that many at Viking). Each pair weighs 3.25 ounces (1.625 ounces per wing), measures 15 inches long by 7/16 inches wide, and fully collapsed measures 3/4 of an inch. Fully extended the spoilers reach out another 7/8ths of an inch for a total of 1-5/8 inches. Of course, you can cut these spoilers down to a length of only six inches if you wish, which is the least distance possible to maintain a parallelogram. Their full length would be adequate for an Unlimited Class ship of three meters span (118 inches) or more, and cut down to six inches they would work well on a two-meter (78 inches).

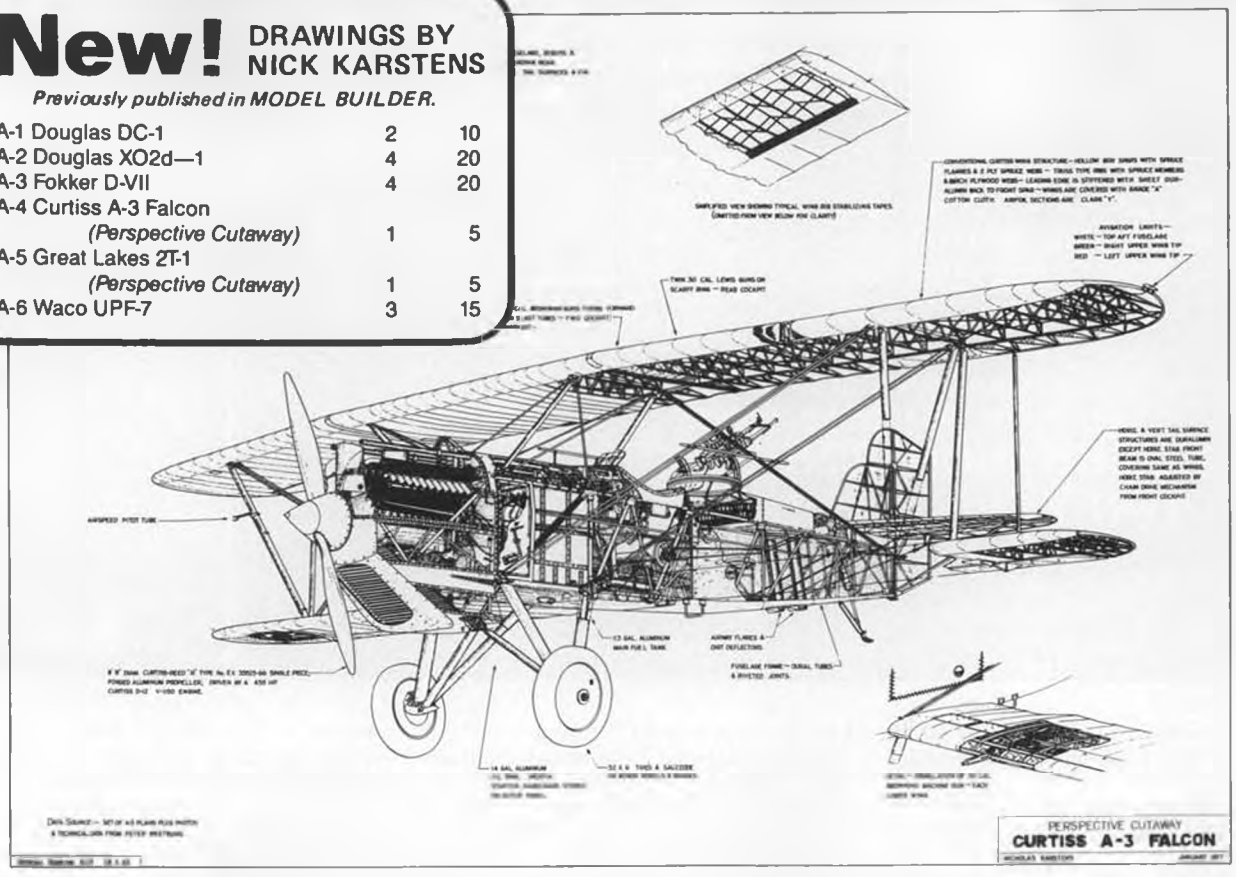
If these spoilers interest you, Ron will ship them to you for $13 postage paid. Con-

Peter Westburg's
SCALE VIEWS

New! DRAWINGS BY NICK KARSTENS

Previously published in MODEL BUILDER.

KA-1 Douglas DC-1	2	10
KA-2 Douglas XO2d—1	4	20
KA-3 Fokker D-VII	4	20
KA-4 Curtiss A-3 Falcon *(Perspective Cutaway)*	1	5
KA-5 Great Lakes 2T-1 *(Perspective Cutaway)*	1	5
KA-6 Waco UPF-7	3	15



SUPER-ACCURATE AIRCRAFT DRAWINGS. USE FOR SCALE DOCUMENTATION AND/OR FOR DEVELOPING MODEL CONSTRUCTION PLANS. ALL DRAWINGS ARE 28 x 40 INCHES BORDER- TO-BORDER, AND ARE SCALED AS LISTED BELOW.

1/24 scale: ½" = 1 ft	Sht	$
WE-18 Douglas O-35/B-71	5	
WE-23 Douglas XO-36-XB-7	1	5
1/12th scale 1" = 1 ft		
WE-2 Boeing F4B-4/-3	4	20
WE-3 Boeing P-12E	3	15
WE-4 Curtiss A-8 Shrike	3	15
WE-7 Curtiss Gulfhawk 1A	2	10
WE-8 Curtiss N2C-2 Fledgling	4	20
WE-9 Curtiss O-1B/A-3 Falcon	3	15
WE-10 Curtiss P-1B Hawk	3	15
WE-12 Curtiss XP/YP-23	3	15
WE-13 Curtiss SBC-4 Helldiver		
WE-14 Czech Avia B-534	2	10
WE-15 Davis D-1K	2	10
WE-16 Douglas O-25C	3	15
WE-17 Douglas O-31A/O-31B	3	15
WE-19 Douglas O-38/O-38B		
WE-20 Douglas O-43A	3	15
WE-21 Douglas O-31C/Y10-43		
WE-22 Douglas O-46A	3	15
WE-24 Fokker D-17	3	15
WE-25 General Western Meteor	1	5
WE-28 Grumman F2F-1	3	15
WE-29 Grumman F3F-2	3	15
WE-34 Stearman 4E Mailplane	2	10
WE-36 Travel Air 2000	2	10
WE-37 Waco ATO Taperwing	2	10
1/10 scale: 1.2" = 1 ft	**Shts**	**$**
WE-1 Berliner/Joyce P-16	4	20
WE-5 Curtiss BFC-2 Goshawk	4	20
WE-6 Curtiss F9C-2 Sparrowhawk	4	20
WE-11 Curtiss P-6E Hawk	4	20
WE-24 Fiat CR-32	3	15
WE-26 Great Lakes Trainer	4	20
WE-30 Hawker Fury Mk I	4	20
WE-31 Hawker High Speed Fury	3	15
WE-32 Hawker Persian Fury	3	15
WE-33 Monocoupe 90A	2	10
WE-35 Swedish Sparmann P-1	2	10

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U.S. orders, including APO and FPO, add 20% of total order for shipping and handling. Overseas orders (includes Canada and Mexico) add 50% of total order. Remit payment by International Money Order or U.S. funds, drawn on a U.S. bank. Please, no cash or C.O.

D.s. Master Card or VISA include card number, expiration date, and signature. Add 5% to credit card orders. Send payment to RCMB INC., 898 West 16th St., Newport Beach, CA 92663. Phone (714) 645-8830.

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tact him at: Ron Carter, c/o ESI, 827 South 500 West, Salt Lake City, Utah 84101, or call him at home at (801)798-6653.

Two points down, one to go. So you wanna know what the "Quama" is? I'll tell you. It's Ron's new original design, Quabeck airfoiled, AMA thermal contest ship. In Ron's own words, here is what it is:

". . . Enclosed is a photo of Harley, myself, and my plane. I've dubbed it the 'Quama,' that is, 'Quabeck' and 'AMA' combined because the design is for AMA competition with Quabeck 'foils. The specs are: span, three meters; area, 967 square inches; root airfoil, HQ3.0/11 by 250mm chord; mid-half-span airfoil, HQ3.0/10 by 220mm; and tip airfoil, HQ3.5/9 by 160mm with 3/16-inch washout. The flap and spoileron hinge lines are at 20 percent of chord. The horizontal stabilizer is 12 percent of the wing's area and 9-percent thick symmetrical. The fuselage is a Bob Sealy Antares part with carbon fiber (Hexcel GP 45-degree cloth) from the nose to aft of the wing joiner rod. The rod is .343 inch diameter RC 55 drill rod.

"The Quama uses six servos (one for each surface) and an Airtronics MD7SP 'Module Series' radio. This system gives the following functions mixed from the transmitter: spoilerons, flaps with elevator compensation mixing, elevator, and rudder coupled/uncoupled to the ailerons. I fly with the flaps and spoilerons on separate controls (spoilerons are on the left side transmitter pot, normally the flap lever).

"These wings use Windsong-type spars with adhesive transfer tape, balsa sheeting, and Monokote. The next set will be epoxy, foam, balsa, fiberglass, and vacuum-bagged.

"The plane weighs 65.7 ounces and has a wing loading of 9.8 ounces per square foot. And it flies great!" Thanks very much for your contribution, Ron. It is very much appreciated.

Lets see, the higher cambered wing tips that are washed out 3/16 inch should resist tip stalling very well. Hmmm, I wonder if the often-heard optimum elliptical lift distribution has been compromised?

BRILLANT GLIDER REVISITED

Back in the 1986 Western States Soaring Championships report I wrote about a slick-looking model called the Brillant. The modeler didn't have any info on it, so I took a gamble and said it looked something like a Multiplex design. Well, Ralf Markwort of Klagenfurter Ring 100, 62 Wiesbaden/T.810456, West Germany, wrote me a letter to inform me I was wrong. (I didn't really think I was right in the first place!)

Apparently, if you have *MB* back issues, specifically the September 1985 issue, you can see the electric version of this same model (the Brillant-E). The Brillant is a T-tail and the E-version is not. The wings look identical though, and Mitch Poling says the E-version has a span of 106 inches, a length of 47 inches, a weight of 4.4 pounds, an Eppler 387 airfoil, and 6 degrees of dihedral per side. The glider version will probably weigh about a pound less. At that time Ralf was supplying fuselages ($40) or partial kits ($65) to those who wanted them directly.

Ralf says, "I know the designer/manufacturer very well, he lives only 35 miles from my home." He also says the glider is available in the US, but he didn't say where. So, if it looks good to you, drop Ralf a note. Maybe he can get you a kit.

ONE LAST ITEM . . .

I'm taking too much space already, but I just had to get this item in. It is a business card that I picked up at my local hobby shop. So that you could see both sides, I picked up two and have submitted them with this article. They are self-explanatory, and once you've read them I think you and your club will be inclined to emulate the card and drum up new recruits!

THERMALS AND SPOTS! Bill Forrey, c/o *Model Builder* magazine, or phone (714)777-4514. That is all for this month, see ya the next! •

Plug Sparks. . . *Continued from page 34*

ries of articles for the *Engine Collector Journal*.

The so-called perma-designed foolproof timer made of berylium (actually phosphor bronze) was simplicity in itself, bordering on the flimsy side. The fixed point was only a small tab punched out on three sides that rubbed on the back of the drive washer. Crimped to the back of the drive washer was a disc of insulating paper with a hole. Through this hole a small part of the washer was pushed through the hole to form the moving point. This would contact the bronze tab every revolution.

Every effort to keep costs down was reflected in this engine beginning with a drawn aluminum fuel tank attached to the open crankcase and separated by a fuel gasket. To differentiate from the old Rogers layout (the original slag engine) the engine featured streamlined fins, a larger intake boss, and the name "Thor" embossed on the bypass.

The secondary follow-on called the "Super Thor" was identical to the "Mighty Thor" except for a longer needle valve and "improved" timer. The improvement was the deletion of the tab with a small rod

driven in the hole where the tab was located. This was held in place by a small piece of spring steel which also gave the tension against the drive washer.

Closing off the Thor engine, it is amazing to this writer how long the line of "slag" engines survived from Syncro P-30 to Rogers to the line of Buzz engines. Although the engines were difficult to restart when hot, they did provide a stop-gap between the very expensive engines.

GENIE 29

Here was another product of AHC, at first thinly disguised as an independently produced engine by Genie Models, Inc., using a different address in New York City. It wasn't until January 1948 that a full-page ad was taken in *Model Airplane News* advertising the Genie 29 in conjunction with the standard Thor ad.

The Genie was an improved Thor engine that sold for $6.95, three dollars lower than the Thor. The same castings were used for each engine with minor cosmetics to differentiate the engines. The cylinder fins were now machined round, and the embossed word of Thor milled off. The crankcase was altered somewhat to accept a new type timer somewhat resembling a K&B Torpedo timer on the inside.

To keep costs down, the fixed point was nothing more than the head of the hexagon head screw where the moving point could hit the flat of the hex head. Outwardly the timer, resembling an Ohlsson-type, was a great improvement over the Thor-type.

Probably one of the better improvements was the replacement of the fuel tank gasket with a thin sheet aluminum gasket. This did hold crankcase compression considerably and improve performance. The most distinctive change was the elimination of the drawn aluminum tank in favor of the clear plastic tank hanging from the intake tube. The tank screwed into a tank top; the whole assembly resembling a one-ounce dope bottle.

The specifications for the Genie engine were the same as all of the others: 13/16 in. bore; 9/16 in. stroke; .29 cu. in. displacement; and nominal horsepower of 1/6. With the weight savings outlined in the last paragraph, the overall weight was dropped to four ounces. High pressure Doehler-Jarvis die castings were used throughout.

One of the interesting gimmicks used in those days was the offer to send any AHC engine for a dollar with the balance being sent on a C.O.D. basis. Certainly was an easy way to order an engine!

LEE RENAUD MEMORIAL

Apologies are in order to Joe Beshar for inadvertently omitting the results of the Lee Renaud Event at the Seguin AFB SAM Champs.

Beshar felt really bad about the omission as Airtronics sponsored this event by providing Olympic-type medals for the first four places. In addition, Airtronics donated a complete Airtronics radio and model kits for subsequent places.

Let's hope we get better publicity out for 1988, as this writer was caught completely unaware as to the event and rules. Send the dope in Joe, and we will publish it.

A really interesting story was sent in by G.R. "Jerry" Nolin, 663 Wood Hill Drive, Fairborn, Ohio 45324. Jerry is a great admirer of Arthur Beckington, so let's hear his story.

"Back in 1938 a fifteen year old boy, Arthur Beckington, won the Stout International Trophy at the Detroit Nationals. The winning cabin design was published in the 1939 February issue of *Air Trails*. His article provided the first lucid description on how to adjust a rubber model (adjust glide with surfaces, power with thrustline).

"Armed with this 'inside' information, I quickly became the neighborhood whiz on small rubber models. I built sixteen-inch (reduced) versions of the big winners of the time. They flew great!

"Tempus Fugit, World War II arrived, and I eventually found myself coming ashore at Iwo Jima with a group of P-51 pilots. Art Beckington (as was I) was in the bunch. Art was assigned to one of the other Iwo Squadron. Art was a small, quiet, serious young redheaded man. He didn't think his article on adjusting was all that great.

"Shortly thereafter, we both set out for our first mission to Japan. We were to strafe Atsugi Airfield near Tokyo. This meant 750 miles due north over the open sea. The mission was a little wild for me, but I did get back to Iwo Jima that afternoon with a whole skin. Art didn't!

"I was shocked to say the least. Later review of the gun camera films showed a P-51 taking heavy hits over Atsugi. Apparently the ammo from the second P-51 wave were ricocheting into the first wave as it left the target. I have always thought that Art was

probably shot down by accident that day.

"The war ended and everyone went home. I heard nothing more of Arthur Beckington. In 1955, after taking up soaring, I went to a contest held in conjunction with the EAA Fly-In at Rockford, Illinois. It was then I noticed an experimental pusher design built by a local university with a welcome sign on the side with the plaque: 'Arthur Beckington, Pilot.' I tried to locate him but failed. I can only say Art came out okay after all!"

If Art or anyone knows Art, we would be most interested in hearing about him and what really happened to him. Should be a good story.

READERS WRITE

As a follow-on to the Old Timer Events held at the AMA Nationals, Lincoln, Nebraska, Carl C. Carlson, 22 Northwood Lane, La Crescenta, California 91214, sends in Photo No. 10 showing Don Lockwood holding the compressed air model proxy flown by Carlson.

Carlson mentions that Don Lockwood is President of the Illinois Model Aero Club, having joined the club in 1922. In addition, Bert Pond can also claim the distinction of membership in this club at its very inception.

Carl also says he was a member of the I.M.A.C. in 1928 and still holds his membership current. Carl finds he also has a lot of fun in his own backyard by flying with the Burbank Black Sheep Squadron sparkplugged by Tony and Addie Naccarato. The Black Sheep Squadron has gained considerable fame by flying indoor electric stunt control line at the International Model Show sponsored by *Model Builder* at Pasadena; always held in January.

SAM 1788

Latest information from Australia (SAM 1788) in the form of Mervin Buckmaster, Editor of *Airborne*, is that Colin Borthwick of Queensland is now the new contributing columnist to the old timer column, "For Old Timer's Sake." This, in this writer's opinion, will probably be the best thing that ever happened to this section of the magazine, as Colin is quite active and does get around enough to cover all aspects of Old Timer activities in Australia.

This columnist had no sooner received this note from Buckmaster than a letter from Colin Borthwick arrived. His first column was quite creditable, although rather restricted to activities in northern New South Wales and Queensland. However, in all due credit to Colin, he has been attending meets when he should have been to the hospital for his latest checkup.

The good news is that his eye test revealed he had the ocular vision of a sixteen year old. The bad news is that the rest of his functions are only about 50 percent compared to the eyes! Regardless, Colin is in great shape, a fact attested to by the doctor, who said, I don't want to see you for six months!

Naturally, a photo was also enclosed with his letter, as can be seen in Photo No. 11 showing Colin's best girl, Merrilyn, with his Fred Lehmberg "Feather Merchant" powered by an Edco Sky Devil. All of the above are his favorite items in the order listed!

SAM CHAMPS RERUN

Received some excellent shots from James W. "Bo" Buice of interesting models this columnist doesn't see very often. Photo No. 12 shows Marion Knight of Houston, Texas, with a little seen Golden Eagle designed by Ed Konefes and produced by Comet Model Airplane Co.

Marion is one of those modelers who shy away from the run-of-the-mill type of models. He dearly loves to build the offbeat models such as the Stormer and in this photo, the Golden Eagle. This model, incidentally, could be built in three forms as the original plans show arrangements for parasol, mid-wing, and low-wing versions.

Didn't get any reports on how this free-flight flew, as the wind was enough to discourage the boldest pilot. Hopefully, we will get a follow-on report.

MAAA NATS REVISITED

Some excellent photos came in from Australia as taken by Allen Laycock of 6 Marks Place, MacGregor, A.C.T. 2615 of the 40th MAAA Nationals held at Waikerie, So. Australia in April.

We selected Photo No. 13 showing his colorful Tlush "Mite" powered by a Cox Black Widow. This model was used in the 1/2A Texaco Event with fairly good results. Allen says he likes the smaller models from the standpoint of ease of handling and packaging.

Allen attended the Nationals and, although he was told attendance was down, he thoroughly enjoyed himself in all phases of flying. I do believe we have a convert!

JAPAN

Shimpei Yamamura, 603, 39 Nishi Onobosi-Cho, Omiya, Kitaku, Kyoto, Japan, writes to say contrary to what some people think, there is old timer activity in Japan.

Shimpei writes to say there was a magazine named *Model Airoplane* published in the 1942-44 era. In the issues was an introduction to gas engine models as seen in model designs such as J-1, K-1, Funmeln RC-1, not to mention many rubber-powered designs such as Korda, Fillon, C-1, etc.

About that time other designs such as the

YMK 301, YMK 311, and YMK 316 were introduced. Shimpei had enclosed photos and plans of these models. He states all fly well. Submitted for your edification is Photo No. 14 showing a 1942 design called the YMK 3H. Boasting of a 63-inch span, the model has been built for R/C and is powered by an O.S. FS-20 four-cycle engine. Other photos have been enclosed which we will use in future issues.

ITALY

Del Chicca Alberto of Pugnano 26, 65043 Fauglia (P1), Italy, writes to send in Photo No. 15, the winning glider of the SAM-Toscana Contest at Orentano on July 12. Holding the "Nibbio" glider of his own design is Silvano Macera. Alberto also states that plans of this design will be available from him in the near future.

ENGLAND

We still have a few excellent photos sent by Alex Imrie, Old Timer Columnist for *Aeromodeller*. His "Vintage Corner" column continually improves to the point where this columnist has no compunction about using his good shots.

Seen in Photo No. 16 is Ann Smith holding Paul Gates yellow and silver Northern Star, a prewar Wakefield design by Bob Copland. Bob is a real "retread" as he attends all the O/T rallies, contests, etc. and brings a beautifully built model that had everyone else hiding their creations. Worst part of all is that Copland's models fly well. He is truly one of Britain's greats.

NEW ZEALAND

Paul Lagan (a transplanted Aussie) reports the vintage scene in New Zealand is rather quiet. The old timer movement has been simmering for many years but lacks organizational drive. Lagan likens this to the situation in Australia five or six years ago.

Ivan Treen has been the leading light of AVANZ (Aeromodellers Vintage Association of New Zealand) but has finally decided to step down at the end of the year. Paul has offered to take over with a committee out of Christchurch hopefully with an eye to encourage O/T activity. Lagan states there is not a SAM Chapter in New Zealand at present, and is not sure if this is the answer that many claim would help.

Lagan states the first object would be to encourage more O/T R/C activity and then to rationalize the free flight power rules. At present, N.Z. has the same vintage rules as England with a cutoff dated January 31, 1950. There are no separate eras recognized such as Old Timer and Vintage.

Paul extends an invitation to come to New Zealand as their Nats finish just as the Aussie Nats start. Howzat for staying busy?

THE WRAP-UP

As usual, we must acknowledge the passing fellow modeler. Lee Norcross, longtime exponent of old timer flying, passed away on Thursday, October 8.

I will remember Lee very well when I was promoting old timer R/C. I allowed Lee to fly my large nine-foot Shereshaw "Champion," a very stable flying machine. Not paying any particular attention after seeing the model takeoff, I was rather startled to see the model come in for a rather had landing after running out of gas.

Upon questioning Lee why such a rough landing, Lee replied "This is the first time I have ever flown O/T radio!" In my case talk about ignorance being bliss!

We would like to wrap this column up on an upbeat note as we received a letter from Frank Zaic who forwarded a write-up by Robert Fukuda of 1043-C Ilmima Drive, Honolulu, Hawaii 96817. Although this columnist did not contact Bob directly for some photos, here is what Bob had to say:

"Finally dug out some old photos showing my Brown Jr.-powered KG-1, a Buccaneer, a Pacific Ace, and my pride and joy, the Megow Flying Quaker, which was powered by that classic Ohlsson 56 Gold Seal.

"I still have the IGMAA Charter 92 which I will send to the AMA Museum. A few old guys around here could have a great time with an old timers contest. Unfortunately, there is no place to fly. A friend of mine, who was a Navy pilot in WWII, has a 300-acre ranch. He used to own a fine commuter airline between the islands and is now thinking of putting in a private air strip on his ranch. We may get into R/C projects yet!

"A bit of trivia: The Japanese Army copied the Forster 1/3 H.P. engine and enlarged it for use as power plants during WWII. I saw these little gadgets in the South Pacific. After the war, a guy bought the surplus and started a small company in Japan. His name was Honda. The rest is history!" •

F/Flight . . . . . *Continued from page 63*

"Effective immediately, the supplies business of NFFS has been sold to Joe Wagner and now goes under the name of 'The Model Box.' Any inquiries and orders should be sent directly to: The Model Box, 12 Cook St., Rowayton, Connecticut 06853. Phone is (203)866-2426.

"The NFFS Plans Service was not part of the above transfer. Bob Klipp will be the new plans manager. He will be revising and updating the available plans in the near future. In the meantime, please use the previously published list. Send your orders with checks made out to NFFS to Bob Klipp at 10115 Newbold Dr., St. Louis, Missouri 63137."

SOME MORE WISDOM

"Many a live wire would be a dead one except for his connections." And, "The fellow who is a good sport has to lose to prove it."

FREEBORN'S MODELER'S PINS

I just received some really neat model pins that are being produced by Lawrence Freeborn. These pins have a very fine (.018, .025, or .030-inch gauge) steel pin portion. The extra feature is that each of them comes with a plastic handle of 1/2-inch or more. The pins can be used for the usual uses and for other purposes such as pinning balsa strips to the workbench using just the shank on the handle. Other uses are noted in a descriptive brochure that comes with each order. A sample kit can be yours for $2 post paid. Send to Lawrence Freeborn at 3416 Ethelwood Dr., Jeffersontown, Kentucky 40299.

MYSTERY MODEL ANSWERS

Model Builder's editor/publisher could have saved himself a couple of giveaway subscriptions on the October Mystery Model! One glance at Bob Stalick's column material, and bang, there was a model that we built back in 1946-47 while at Rensselaer Polytech, Troy, New York, after returning from naval service during The Big One. Now here's another thing for you to puzzle over. Does anyone recall seeing a kit for Chet Lanzo's "Wakefield Defender," the October M/M? There was a little hole-in-the-wall, below street level hobby shop in downtown Troy, not far from my fraternity house (Theta Chi). The "Wakefield Defender" I built back then was from a kit I bought in that hobby shop! Figure *THAT* one out if you can. I don't remember now whatever happened to it, but I sure as hell can remember working on that model, cabin-type DT and all, when I should have been doing homework!

Anywho, thanks to clever postal manipulation by John Stott, in Sandy Hook, Connecticut, and Ernie Johnson, Rancho Cordova, California (How's *that* for a spread?), we have to come up with two free subscriptions for their tied efforts in being first with the right answer. (Darn . . . shoulda mailed myself a card).

And we already have a winner for the November Mystery Model. By now, I guess Bob Stalick realizes that Bill Winter's plan book ain't so obscure after all! Fortunately for us, there was only one answer that was out in front of the many already received as this was being written. A 76 year old youngster by the name of V.F. 'Lad' Plachy, of Sagamore Hills, Ohio, who watched Dick Korda fly the Nationals Towline Glider winner on many occasions, is stuck with a whole year of *Model Builder* magazines!

Continuing our overseas Mystery Model special awards, we have a Far East winner on the June model, Lennart Petersson's "Sofi." It is Ron Magill, of Glen Eden, Auckland, New Zealand. Congratulations, Ron!

Computer Glitch! The above Mystery Model material was entered on the same disc as our December "Workbench" column, using our home-stationed PC Jr., but somehow it was overlooked when printing out the material, and never made it into the December issue. This fact was not discovered until I gathered material today (12/4/87) in order to write the M/M answers section for this issue. We looked through back issues, and could find nothing on the October or November M/M's, yet when I saw that Lanzo's "Wakefield Defender" was the M/M for October, I knew d . . . well I had related my story about the "underground" hobby shop in Troy, New York, and yet it never appeared! After about an hour of searching through everything in the office, it suddenly dawned that just maybe that stuff had been entered and never recalled for printout. What a relief to find it. I was about to chalk up another example of the second thing to go with old age!

Having disposed of that little gem, let's get on with the December Mystery Model. Although it is obviously well-known, it's the first M/M to have so many incorrect answers . . .well . . .you can't really say "incorrect," either. Maybe "Close, but no cigar" would be more fitting. This model is obviously one from a series of models, all created by some of the leaders in powered free flight in the early sixties. At this particular point in time, it was the "High Society," as designed and flown by George Albright. The guy whose name appeared as the designer in the majority of answers was Doug Galbreath, who also sent in his answer. . .which was correct, but too late.

Doug wrote, "I flew this design in 1962 and made the U.S. (FAI) team with it and flew a relative of it to third place in the 1963 W.C. This ship is 'High Society,' by George Albright. He and Bob Cherny flew these models at the 1960 team finals and nearly made the team. On 10-second engine runs and ST 15's on 50 percent nitro, maxes were routine." The "relative" Doug mentions was the "Jai Fai" (the "J" is pronounced like the "J" in jorse, those four-legged animals that run around a track and people lose money on) and the model that was named by most modelers who wrote in. The gentleman, however, who wrote in with the earliest postmarked and correct answer is Francis Heeb, of Xenia, Ohio.

We have to say that it is very heartening to receive and read letters having to do with the Mystery Models. The era of the models used in this series was certainly "Golden," and "Nostalgic," and the models themselves definitely emblematic of the hobby in its prime years. The letters themselves also indicate that the hobby, and free flight, will continue to live on in this world of ready-to-fly plastic, fiberglass, and foam machine-made objects, and we're glad to be a part of that society of special people.

THAT'S IT DEPARTMENT

I guess that that wraps it up for another month. Hope you found this column interesting and will tune in again next month for whatever new and exciting things await. In the meantime, catch a winter thermal just for me. •

Bobcat. . . . . *Continued from page 19*

inch square balsa for the longerons and stringers, or do as I did and use spruce for real long-term durability. My choice of adhesive for the past several years has been Satellite City's Hot Stuff line. While there are other CA-type products on the market, these guys were first and, in my book, are still in first place. Since they put Special T on the market, I have stopped buying epoxy glue entirely; I even install hinges with it. Forget the old wives' tales about CA adhesives being good only for light work, or for "tacking." It works. Try it.

I build the wing first, and then the tail surfaces, so that when the fuselage is put together, the flying surfaces will be right there ready to be used to set up the incidence angles. Make up your ribs first. Although the wing is of constant chord and airfoil (NACA 2412), there are enough variations for aile-

ron cutouts and different combinations of spar holes that there's little point to making a template and cutting them all together. I just traced the patterns and used a razor knife, then stack-sanded the lot. Anyway, hand-cutting ribs is good, nostalgic fun, and besides, this isn't a race. It wouldn't hurt, if you don't mind the extra work, to extend the ribs 3/32 inch on each end and then notch the L.E. and T.E. to accept the extra length. You'll have to fill the resulting holes ahead of the L.E. sheeting and behind the capstrips if you do this. Lay the lower front 1/4-inch square spars in place, add 1/4-inch square under the ribs as noted on the plan, then shim the lower rear spars to fit. Adjust all this as necessary to get the front edges of the ribs exactly vertical, as an aid to keeping everything in line. Assemble the ribs and then the top spars, followed by the leading edges and the trailing edge/aileron well edge pieces. Add the tips, then put in the vertical grain spar webbing on the front and rear spars. Now you can turn the panels over, square them up carefully on the board, and add the center section and leading edge sheeting to the bottom surface, followed by the bottom cap strips. Then you can turn things right-side-up again, true-up the center W-1s so that the panels fit smoothly together with a combined dihedral angle of six degrees, and line up both panels in place on the board prior to assembling the plywood leading edge and spar joiners. I'd suggest that you cut out the spar joiners without making rib cutouts, then measure and cut the rib notches by marking directly from the assembled ribs onto the ply; this assures that the spar joiners will match your particular wing assembly perfectly. I learned a new trick for getting all this into perfect alignment from Mike Montgomery of Columbus, Georgia, who wrote to me commenting on my Big Apprentice article. When the wing panels are in place on the board, stretch a string from tip to tip along the leading edge, using a reliable reference point such as the junction of the outer W-5s with the back side of the leading edge. Using a drafting square placed against the leading edge at the center W-1s, with a suitable extension added to it to compensate for the thickness of the L.E., keep wiggling things around until the string bumps the extension on the square and projects directly over the rear side of the L.E. at the center. Thanks, Mike!

Now you can assemble the joiners, followed by the hard filler blocks at the center rear to firm up the structure where the wing attach bolts will go through. Make up aileron horn assemblies, or use commercial units if you can find any to fit. Install these, slotting the top of the filler blocks so that the top of the aileron horn bearing tube will lie flush against the top of the blocks. Double check alignment, then add all the top surface sheeting, the top capstrips, and the reinforcing doublers at the tips. With the wing panels in final form, you can lay out the ailerons over the plan using the actual wing panels to get a perfect fit. Refer to the wing cross section drawing to cut the correct bevel into the top and bottom of the aileron leading edges, then assemble the leading edges, the WA ribs, and the filler block at the horn location right on the lower sheet surface. Add the top sheet surface and sand the ailerons to fit the wing cutouts accurately. Don't forget to drill for the horn. Now do all your preliminary contour sanding, and pre-fit the hinges at this point if you wish. The mounting bolt holes, leading edge attach dowels, and lower L.E. fairing will wait until you have a fuselage to fit things to.

The tail surfaces really are pretty much self-explanatory. Do be sure to use firm wood for both the hinge line edges and for the horizontal tail L.E., as a protection against weed-whacking if you land short. Make sure you understand how R-4 fits into the center of the horizontal tail before you start cutting.

The fuselage is built in the grand tradition of the rubber-powered free flight job, two side frames joined by formers. I'll repeat my caution to use good stiff material for the longerons. The primary side frame structure is indicated by shading on the plan; note that the primary structure includes F-11 and the triangular gusset behind the wing T.E. Add the lite ply doublers to what will become the inside surface of each side frame. Pre-drill 1/4-inch wing dowel holes in F-3A and holes to fit your wing mounting hardware in W-M. Join the sides over the plan top view, making certain that you keep everything square. The sides are parallel between F-3A and F-6A; join at these two stations first, then add formers F-3 through F-5

and W-M. Now draw the sides of the nose together at F-1, being very of alignment. I chose to build in one degree of right thrust by offsetting F-1; this turned out to be nearly perfect for both the O.S. FS .61 and the Saito .80. You may prefer to build the nose straight and add a thrust offset shim under your engine mount; take your choice. Add LG-M, noting that it rests securely against the front of F-3A, in the notches provided in the nose doublers, and against the inside surfaces of the F-11s. Add F-2 and triangle section gussets where indicated. Draw the tail together over the plan and add the 1/4-inch square cross members at the bottom and formers F-5 through F-10 at the top. Bevel the inside edges of the side frames to give a total tailpost width of 3/8 inch and join the tail, then add the 1/4-inch sheet gussets at the rear of F-6A followed by the 1/4-inch square diagonals on the fuselage bottom. Add 1/4-inch square doublers inside the lower edge of each F-11 to form a 1/2-inch wide wing seat. Install the top stringers between F-6 and F-10, working in pairs to avoid twisting the fuselage, then add the front cowl stringers between F-1 and F-5.

True up the top longerons behind F-10 and mount the horizontal tail, aligning as though your life depended on it. Doing this with the fuselage fixed in position over the plan top view will help; if the fuselage is aligned correctly, you can draw an extended stabilizer trailing edge line and square up on that. Establish that the fuselage sides are perpendicular to the board, then measure to insure equal distances from the stab tips to the working surface. The upper longerons will automatically determine the incidence at zero degrees. Now add the vertical tail, aligning it with the fuselage centerline and squaring it with the horizontal tail.

Now mount the wing, redoubling all the care you took with the tail surfaces. Start by trueing up the lower surfaces of the F-11s and doublers, then temporarily fix the wing in place and square it on the fuselage. I suggest establishing a centerline by measuring in from the edge of each W-5, then establishing lines which will align with the outer edges of the fuselage sides. With the wing aligned on these marks, trim the wing saddle as necessary to get the tips equidistant from the board with the fuselage sides perpendicular to and the stab tips equidistant from the surface. Now trammel the wing using the top of the vertical tail trailing edge and the junction of the W-5s and the back side of the leading edge as reference points. When you've got it right, screw both 1/4- x 20-inch wing mounting bolts down through W-M until they mark the upper surface of the wing sheeting, then remove and drill the wing and add your choice of attachment hardware to W-M. I used the 1/4- x 20-inch threaded brass inserts sold by Du-Bro. When this is done, replace the wing on the fuselage with the two 1/4- x 20-inch screws, recheck alignment to make sure nothing moved, and reinstall the airplane on the bench. Block up the fuselage until the top longerons (and the horizontal tail) are parallel to the surface. I used a Robart incidence meter for this operation; if you don't have one, or something like it, I suggest that you get one before you go any further. Relying on guesswork at this point is almost certain to leave you with an airplane that will never really fly right. Trim the wing saddle so that the wing rests at three degrees positive, that is, with the leading edge raised. When it's right, mark the L.E. through the pre-drilled holes in F-3A, remove the wing, drill through the L.E. and L.E. doubler, and add the 1/4-inch dowels, which rest against the front surface of the front spar and project about 3/8 inch ahead of the L.E. I use copious amounts of Special T, followed by Kick-It accelerator, for jobs like this. This is faster and neater than epoxy (lighter, too) and has held up perfectly in every installation I have done.

Now mount the main landing gear. If you use an off-the-shelf unit, it may not match the fore-and-aft measurement shown on the plan. This is not a problem; just be sure that the axles will line up under or slightly ahead of the leading edge. You can vary the length of the 3/32-inch lower nose sheeting to fit. Gear height and tread width are not critical. Make sure you have sufficient prop clearance. Increased tread width within reason won't hurt anything. The original on the gear shown has never shown any tendency to ground loop on landing or to tip over and is easy to control on takeoff with gentle right rudder correction as long as the throttle is advanced smoothly. I mounted the gear with three 4-40 bolts in a triangular pattern, with blind nuts recessed into LG-M.

Add the 1/8-inch ply tailwheel mount between the lower longerons at the tail, then install the tailwheel assembly using two 4-40 bolts and blind nuts on the inside surface of the mount. Mark and drill F-1 for the engine mount you are going to use. I mentioned side thrust before; if you haven't incorporated it in F-1, make provision for shimming the engine mount. The one degree right thrust I have mentioned has worked well in all the Bobcats I have seen so far. No downthrust is used. While the nose is open, make sure the tank you plan to use fits in the cutouts in F-2 and F-3.

Make and fit the 1/4-inch square side stringers. Notice that these must be relieved at the front end to accept the 3/32-inch side

sheet. These stringers must also be tapered from F-8 back to fair smoothly into the tailpost. As an alternative to leaving very little wood at the rear end of the stringers, I mortised them to fit down over the uprights and diagonals and tapered only the last few inches. Add a 1/4 x 1/8-inch filler strip at the bottom of F-6A, tapering it to blend smoothly into the lower longeron at either side. This will allow the 1/4 x 1/8-inch belly stringer, which you can add now, to blend into the lower surface of the wing at the T.E. Make sure that the stringer likewise fairs into the tailwheel mount at station F-10. Add 1/4-inch square balsa scrap to the outside edges of F-3A and taper at top and bottom to support the side sheet; check the F-3 cross section drawing to see how this works.

Sheet the chin area ahead of LG-M and between the F-11s with cross-grain 3/32-inch sheet balsa; this sheet rests on the lower edges of the Lite Ply doublers and flush with the bottom edges of the F-11s and serves as a doubler to provide a solid floor for the battery compartment. Now add another cross-grained 3/32-inch sheet layer overlapping the outside edges of the F-11s and F-1 and extending back over LG-M to where the front edge of the landing gear will rest. Sheet the entire top cowl with 3/32-inch sheet. I suggest that you start at the center of the top front stringer and work downward onto each side, wetting the sheet as necessary to facilitate bending. Extend this sheet to the lower edge of the longerons, flush with the forward face of F-1, and back to F-6, with the outer surface of the sheet lying flush with the outer edge of F-6. You will have to cut away some material in what will become the cockpit area to allow for bending; I suggest that you remove as little as possible while sheeting so that you can later fit a template for the exact cutout shape that you find pleasing and do a final trim when all the sheeting is securely in place. Add a 1/4 x 3/32-inch cap to the out-

side edge of the top longerons from F-6 back to the tailpost and a 3/32-inch sheet filler between the side stringer and this cap below the horizontal tail on each side. These will allow you to locate exit holes for the rudder and elevator pushrods and will be tapered along with the longeron cap to fair smoothly into the tailpost. Fit the nose side sheet pieces carefully, splicing stock if necessary to get pieces wide enough to butt against the lower edges of the top cowl sheet and reach to the bottom edge of the fuselage. Note that the rear curve of these pieces follows that of the lite ply doublers, then extends back at the wing saddle to form an attachment surface for the covering, in order to prevent unwanted adhesion of the covering to F-11. Fair this extension into the bottom stringer just behind F-6A. Add the 1/4-inch sheet filler blocks between the stringers behind F-56, being sure to do a careful job of cutting the inside curve on each of these, as this will really show up on the finished airplane and tell the world what a good builder you are. Cut, fit, and fair a 3/32-inch sheet fairing to the space between the top of the horizontal tail and R-4. As an alternative, if you choose to add a dorsal fairing as shown on the plan, you might want to add just a narrow fabric attachment strip to the top of the stab and use a fared fabric fillet.

Remount the wing and build up a fairing at the lower leading edge to blend the contour of the bottom center section into LG-M. Don't forget to allow for the thickness of the landing gear. Make a pattern using the top plan view of the fuselage or following a contour of your own choosing and finish the cockpit cutout. Now give the entire structure a thorough sanding to blend all edges and fair everything together.

Decide what type of cowl you are going to use. If you use the plastic molding from Ikon N'wst, I suggest that you assemble it and then reinforce the entire unit with two-ounce fiberglass cloth attached either with your choice of resin or using Hot Stuff. Check out Satellite City's *second* Hot Stuff video if you aren't familiar with this technique; it's well worth your time. If you are going to build up your own cowl, either sidewinder or inverted, mount the engine and spinner with all thrust offsets in place, protect everything with a generous wrapping of masking tape, and assemble the various blocks of wood or foam that you are going to shape right in place around the engine. It wouldn't hurt to put the plastic cowl together the same way. The sidewinder cowl as drawn provides more than enough cooling; just be sure to cut away enough material inside the cheeks in the cylinder head area to allow good air flow past the engine. An inverted installation would look good with the side profile of the cowl lowered in front to enclose the entire engine, if you don't like the sidewinder approach. If you go this route, leave an ample air intake at the front, and use either wide louvers at each side or a large air exit at the bottom edge (preferably both) to insure enough air exit area to cool the engine. Remember, the exit area must exceed the intake area by a significant margin to get the engine to cool reliably.

The sidewinder cowl shown is secured by aligning it with bent sheet metal brackets at either side, to which it is attached by 4-40 screws running into fiberlock nuts soldered to the brackets and by an alignment block at the bottom of F-1 which keeps it from wiggling around. I left an opening about one inch in diameter at the top rear edge for the needle valve, fuel filler, and choke extension. It's not necessary to get at the pressure line from the muffler to fuel the airplane; just use a separate filler as you would in an atmospheric pressure system, allowing the pressure line from the muffler to serve as a vent, then cap it for flight. With these connections provided for a reasonable size hole in the bottom of the right cheek for the exhaust pipe, I found it easy to remove the cowl from my airplane by removing the prop, spinner, and muffler and twisting the cowl while pulling it forward. I suggest that you rig up a remote glow plug connector and terminate it in a convenient spot away from the propeller and the worst of the exhaust goo. It has been my experience with this and similar airplanes that once the engine is broken in and adjusted, it is not necessary to remove the cowl for normal flight operations.

I reinforce all my cowls inside and out with two-ounce glass cloth, as mentioned earlier, and finish with several coats of polyester resin, well sanded, and suggest that you consider doing likewise. After three years of active flying, the original balsa cowl on the Bobcat Mark 2 shows *no* signs of deterioration or fuel infiltration.

If you are going to use wheel pants, this is the time to build them up. I laminated several cores of 3/8-inch light sheet balsa, faced them with 1/4-inch sheet on both sides, and invested a good session with the sanding block to get them shaped. They got the same fiberglass treatment as the cowl. The attachment system is based on a couple of 4-40 fiberlock nuts trapped inside the inner edge of the pant with Special T, and a mounting plate locked between the gear and the axle mounting nut. Take a good look at the photos. This system works just fine and has shown no tendency to slip or break during those occasional "drop-and-bounce" landings that sneak by on windy

days. Don't be scared off trying the wheel pants by the thought of a little extra sanding; remember, if you're building this airplane, you're one of the good guys, the last of the real craftsmen. Take another look at the pants in the photos and think how great they're going to look on your airplane.

Clean up all the dust, dig out your radio system, and add appropriate servo tray rails. I didn't show mounting details on the drawings because of the great variation of servo size and preferred style of installation. I used 3/8-inch square spruce rails notched to fit on the inside of the primary side frames between F-3A and F-6A; the servo board was screwed to 1/4-inch ply crossmembers which in turn screwed to the 3/8-inch square rails. My radio is an Airtronics Championship 7 which has served superbly since I first put it in this airplane three years ago. I'm using standard size servos, but have a 1200 mAh battery pack in the airplane because I do a lot of flying, including occasional demonstrations, and I like the idea of having some reserve capacity available. I would recommend fiberglass shaft pushrods. I used 2-56 clevises and hardware and have had no problems; however, if your style of flying is intense and you are using an .80 or .90, it wouldn't hurt to go to 4-40 hardware. My switch mounts on the cockpit floor along with the charging plug.

Add all the mechanical goodies, including fuel system plumbing, throttle connections, and whatever else will be inside the airplane when it is finished, hook everything up, and make sure the complete control system works while you can still get at it to make changes. When you are satisfied, pull everything out, remove the engine and landing gear, and give the entire structure a really good sanding job.

You have lots of options on covering and finish. I'll tell you what I used on the prototype. My standard system (after many years of experimentation with lots of different materials) is 3/4-ounce fiberglass cloth over all the high-stress areas—nose to trailing edge and the entire wing center section—attached with either Hot Stuff if I'm watching weight or polyester resin if I want to build up a really slick finish. When this is well sanded out, I follow with two heavy coats of clear nitrate dope over the entire structure. This is likewise well sanded, then Sig Koverall (untreated polyester cloth) is ironed on using Stix-It as an adhesive. Two coats of clear nitrate with a little plasticizer seal the fabric K&B superpoxy primer and perhaps a little autobody acrylic lacquer primer with *lots* of careful sanding bring the base finish up to specs. The final finish is K&B Superpoxy. The resulting airplane is a few ounces heavier than it would have been with plastic covering, immensely stronger, and built to last. As with the cowl, three years of regular flying of the prototype have resulted in *no* fuel infiltration, softening, sagging, or other deterioration. If you aren't familiar with this approach to covering and finishing and would like more information, check the July '87 *MB*; Al Alman's "Big Birds" column in that issue contains a much more detailed discussion of my favorite fabric and paint methods.

When the last coat of paint is really dry, it's time to reinstall the engine, radio, and all the other hardware you took out, and go through all the little rituals that insure that your shiny new flying machine really will. I won't go through the details of preflight checkout here, as many of you building an airplane of this type have enough experience not to need any help. Those of you for whom this is a first "plans-built" model who are using the Bobcat as an advanced trainer might like a little more detailed information. You guys get your hands on the May and June '87 issues of *Model Builder* and read the two-part article I wrote for you on trimming for flight.

Set the balance point at 26 percent (the forward location shown on the plan) for the first flights. I have control throws set as follows: ailerons at 40 degrees with no differential, elevator at 30 degrees up and down, and all the rudder I can get. These deflections give me all the control authority I want for the smooth flying style I prefer, with some reserve for getting out of trouble.

The Bobcat Mark 2 doesn't really have any bad habits, except perhaps to demand, as does every other high performance airplane, that you stay with it all the time. The airplane, once trimmed, will hold unaccelerated level flight very well and at low power settings is quite gentle as long as you stay in charge. As with any high-powered taildragger, be prepared to add some right rudder correction during the takeoff roll. You will have better luck at making smooth, professional-looking takeoffs if you develop the habit of opening the throttle gradually, rather than jamming full power. As I mentioned earlier, when using the larger engines, it won't be necessary to use anything like full power to make a good takeoff; this one is right out of the book on flying full-scale prop fighters. Smooth and easy does it.

Don't be afraid to slow down to land. The Bobcat will not fall out from under you without warning. It is, however, so clean that if you don't use the throttle properly in the traffic pattern to get it slowed down you'll probably run out of runway on landing. Make a couple of low, slow fly-bys before your first landing, and you'll have no trouble.

If you enjoy this airplane anywhere near as much as I have, you'll be leaving the field with a big, happy grin on your face. Share the fun, please. . . I'd like to see pictures of your Bobcat Mark 2 care of *MB* •

Workbench. . . . *Continued from page 7*

less comfort in Gerlach in order to preserve their models from loss and damage. Is there any good reason why SAM should have to have "unified" contests too? (We use "Reno" and "Gerlach" here only as an example; surely, parallel situations exist elsewhere, too.) Again, separating R/C and free flight portions in time as well as geographically would serve to permit dual attendance by the same fliers.

SOLUTION 2

SAM has already found a good solution

to the small-field problem . . . just put R/C in the model, and small fields can be used! Why does the AMA not follow suit? One of the arguments offered by some is that adding R/C to otherwise free flight models would bring an end to free flight. It hasn't in SAM; why should it in the AMA?

Another argument against AMA use of R/C is that R/C Assist is already used in SAM; so why should it be needed in the AMA? The answer is that SAM rules require that ancient designed be used, and many are reluctant to conform to this constraint.

Free flight purists usually hate R/C and coin phrases like, "Free Flight Forever" and "Keep Free Flight Free" to express their views. Although their love for free flight is admirable, their reluctance to unselfishly face the small-field problem is not. We too love free flight and prefer it to R/C Assist . . . when a good free flight field is available. When these purists are gone and the US population has again doubled, how many free flighters will be left to carry on the tradition? What the purists appear to be saying is, "We realize free flight is dying for lack of suitable fields, and we realize also that we must be prepared to lose and damage our models when forced to compete in unsuitable fields; but we are prepared to bear these costs . . . anything would be better than stooping so low as to put R/C units in our models so as to keep them in small fields. If others don't have any free flight field at all, let them move to Seguin; it isn't our fault." Perhaps one factor restraining the AMA from allowing R/C in free flight gas events is the current rulebook wording, which says, "A free flight model airplane is flown without controlling or guide line(s) and without any control by radio" (Paragraph 2, "Free Flight, General'). Before amending the "FF Power" section of the rulebook, this limiting general paragraph would have to be changed by adding, ". . . except as otherwise provided herein," or similar words.

In discussions with others about using R/C to keep an otherwise free flight power model in a small field, there is disagreement as to the degree of R/C use that should be permitted. At one end of the spectrum are those favoring full-time use of as many channels as desired, as is the case with SAM. Adherents at the other end say R/C usage should be limited to a single channel used as a dethermalizer. Some favor R/C use only during power, while others would limit it to the glide. When it is remembered that the sole justification for R/C use is to keep the models in small fields, there seems to be but little wisdom in allowing its use only during power. Alternatively, should DT use only be allowed, models flown in some fields might have to be DT'd by R/C after 30-second flights. This would discourage those who enjoy long flights. Also, there is the practical problem of knowing when the model to be DT'd by R/C is approaching the field's boundary, as the flyer might still be at the starting point.

Other adherents of R/C use believe it should be permitted only after the official part of the flight is ended; i.e., when a max is achieved. One problem here is that R/C use, from a practical point of view, would depend upon the adoption of ratio scoring to permit collapsing the current three flight-time categories, to in turn permit pure free flight to be separated from R/C Assist. Without ratio scoring there could be a wild proliferation of record slots. But when ratio scoring is used, there is no such thing as a max. Thus, the flier's problem would be to accurately assess the latest possible time he could go to R/C to guide his model back to the field. Many would wait too long and risk loss of their models.

Another idea that has been expressed is that the greatest challenge of free flight power is to attain maximum altitude with a good transition. Since this requires, for a free flight model, an inherently stable design combined with judicious adjustment technique, the essence of free flight could be retained, along with traditional design configurations, only if R/C were not *allowed during the power phase. If R/C were allowed during power, Harlan Halsey, of Woodside, California, believes that designs would evolve into unstable-powered sailplane configurations, and that much of the attractiveness of these events would be lost. Harlan hits the mark dead center when he says, "And the glide phase is really where you want the control anyway, to keep from drifting down wind." He feels that R/C use should be allowed only after the model has transitioned into the glide, in order to retain the essence of free flight power. Once in glide, the model becomes a sailplane, anyhow.*

WHICH SOLUTION IS BETTER?

Both solutions (use good fields, and use R/C to keep models in small fields) have advantages and disadvantages, depending upon your attitudes towards R/C and free flight and where you live. Should you be one of the R/C haters and have a good free flight field within a reasonable distance, you can be expected to opt for using the good field. But should the nearest good field be several hundred miles distant and you don't find R/C use objectionable, we would expect you to go the R/C route to avoid extreme commutes. Those hating R/C and being 500 miles from the nearest good field have less-attractive options. Unless they own a Lear Jet and have the where-

withal to fly it from home to the model port, they had better either give up free flight or change their minds about R/C use. No other feasible options are available to them, unless they would be happy with models that fly so poorly that they could be kept within the small field that was available to them.

Given the above, it appears that both solutions are needed. The AMA and SAM need to be petitioned to have the free flight events for the Nats and major SAM meets in suitable fields, with the criteria of luxurious accommodations and "unified" contests given a second-place priority instead of the first-place priority they now apparently enjoy.

But there will still be a need for R/C Assist in AMA Free Flight Power events, because of the many modelers who, for whatever reason, just cannot travel long distances to get to good fields, and don't have any available nearby. For these folks, it's either R/C Assist or no AMA free flight at all! Can we not help them? To do so would not eliminate pure free flight at all, but only add categories for R/C Assist. Thus, nothing would be lost and much could be gained.

MAKING IT HAPPEN

When one comes up with a new idea and is able to get some publicity for it, most of the folks responding are usually those against the idea. Human nature is such that most of us, upon seeing and idea we like, assume it will happen because it is good, so take no action. We make our voices heard only when an idea appears as though its implementation would somehow threaten us, then we scream like hell! Such is the case here; for the most part, only the R/C haters respond to this idea.

Although not all changes are improvements, it is still true that something can be improved only by changing it. But before any change [is made] that would serve to eliminate lost and broken free flight models because of poor fields being used for contests, the silent majority of free flighters must be heard from. As long as they take the attitude that, "The AMA (or SAM) should do something," nothing will happen. You are the AMA; you are SAM; let your leaders hear from you so that they will not continue to be led by the vocal minority.

POSTSCRIPT

As in all debates, there are those who use semantic arguments to obscure real issues. Do not be misled by them. When you hear an R/C hater say something like, "R/C in a free flight? Impossible! It would not longer be a free flight," be on your guard. Such arguments have nothing to do with solutions to real problems, but only with the definitions of words.

Ron St. Jean, 3394 Dale Dr., Carson City, Nevada 89706.

Using R/C for recovering free flight models has been of interest to this editor for many years. Our lead photo this month was in the same position in the July 1976 issue of *Model Builder*. We feel that Ron St. Jean and Harlan Halsey are both on the right track in not allowing R/C during the power portion of the flight. The damage has already been done in Old Timer R/C. Graceful old models that powered skyward in realistic aircraft fashion back in their heyday are now rocketing straight up in modern "Pencil Bomber" fashion, something that would be impossible without radio control to stabilize the model during the power run. Non-R/C during the power portion of the flight would not only prevent this travesty, it would also preserve today's design concepts for gaining maximum altitude under power and obtaining smooth transition into the glide. With any other system, the modern free flight would suddenly come to a regretful end. No. . . let the timer hand the transmitter to the contestant five seconds after the engine cuts (so model has to transition on its own).

And what about rubber and towline? Tony Naccarato flew an Unlimited Rubber ship with rudder and elevator radio control indoors at the IMS show several years ago. It was fascinating to see the bug-eyed expressions of spectators, many of them modelers, who for the first time witnessed the stretch-winding of a half-inch bundle of lubricated Pirelli, and then watched, hypnotized, as this monster silently flew about two-and-a-half figure-eight patterns over their heads and the exhibitor booths! Nordics could be a problem, but miniaturization is doing wonderful things in radio these days!

We welcome all comments and constructive criticisms on this subject. Letters to the editor will be copied and forwarded to Ron St. Jean. •

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A new challenge in radio control!

And you thought mastering off-road took all your skill.

Enter the dimension beyond off-road. Step up to the Tamtech zone.

You're racing against friends. Blasting down the straightaway at scale speeds over 200 mph...an exhilaration you've yet to experience. Oh, oh, obstacle ahead! A throw of the throttle sends you sliding into a controlled skid that takes the hairpin with barely a hair to spare. This is you, in command of precision R/C racing like you've never driven before. This is a sport that will develop and bring out your racing skills. And consider this. You'll be able to enjoy it indoors, in your den or outdoors on your driveway. Because this is Tamtech...a bold dimension in R/C driving.

Tamiya engineered a whole new formula for indoor/outdoor R/C fun.

Envision the aerodynamic advantages of the Grand Prix Formula I Porsche 962C and the Lancia LC2 condensed into 1:24 scale. Now speeds are quicker, turning radii tighter. To drive these performers, a powerful motor was miniaturized. To hold these bolts of lightning close to the ground, a coil dampened, independent suspension, link-type and stabilized in the rear, was perfected. Unique variable speed controller and receiver units were compacted together. And beautifully precise monocoque chassis and bodies were fashioned to set them apart. The results are dream racing machines.

There ain't no stoppin' you now.

Tamtech's racing system will take your best off-road skills to the next plateau. And its capabilities will demand your best agilities...reflexes, coordination, response. So it's a good thing you'll have all the time in the world to perfect your performance...rain or shine, day or night, indoors or out, parquet or pavement. Because these cars are better than their drivers. At least for now.

New Additions

(2111) Porsche 961 Complete Kit
(2108) Ford Mustang Probe GTP Complete Kit
(2109) Ferrari Testarossa Complete Kit

MRC™ TAMIYA®

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