

# MODEL AIRPLANE NEWS

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# Model Airplane News



48th YEAR OF PUBLICATION

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## 48th YEAR OF PUBLICATION

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I'm timing Eddie Meester (Australia) third round duration flight. Mike O'Reilly, new owner of Taipan props and other products, also

Australian team member watches as do the Tophs from Canada. The Australian team was early on for lots of practice and it paid off!

JACK HUMPHREYS PHOTO

## m.a.n. at work

• Before we begin the second part of our travels (better known as our South African Saga), let me point out the report of the Soaring World Championships on pages 45 through 49, which covers the contest in photos and text. This report does not finish our trip reports, as next month we will have the South African National Championships at Potchefstroom, the photos of the Pretoria Flying Field and Club, of the Salisbury Model Airplane Club and then finish up with the Cape Town Flyers. Hopefully it will tell the story of flying as it happens in that part of the world.

Now back to our travels—July's column ended with the Sterns, Rog, Anne and Michael, about to take me under their wing for the long drive (1100 kilometers) to Salisbury, Rhodesia and this they did. Starting from Pretoria on Sunday morning we

headed north with Briet Bridge on the border of South Africa and Rhodesia as our target for that day. This part of the trip was quite uneventful with only four or five small towns on the way, no really large cities at all. We crossed the border at Briet Bridge and spent the night at a motel, rising early to join the 7:00 a.m. convoy departure. Because of terrorist border incidents in Rhodesia it has become necessary for civilians to travel in military convoys to a point about 175/200 kilometers inside the country. Actually it was at Fort Victoria that we separated from the convoy and continued on, unescorted. My only reflection on this part of the trip, Pretoria to Salisbury, is what a huge, beautiful part of the world this is, with enormous potential for development! It's rich and lush, quite

(Continued on page 110)

## ON THE COVER

While our Jumbo 747 jet on the cover may not be the largest model aircraft to date, it must rank right at the top! It is the product of a group activity headed by Enrico Giorgio, who was the principal planner and draftsman, designed by Pepino Uberto. (Continued on page 00)

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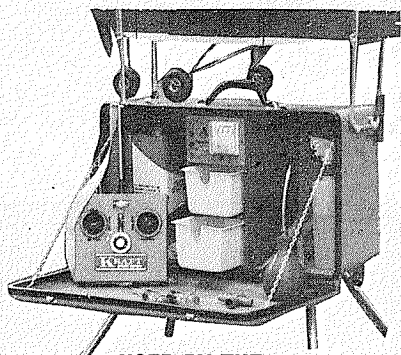
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# FOREIGN NOTES

BY P. G. F. CHINN



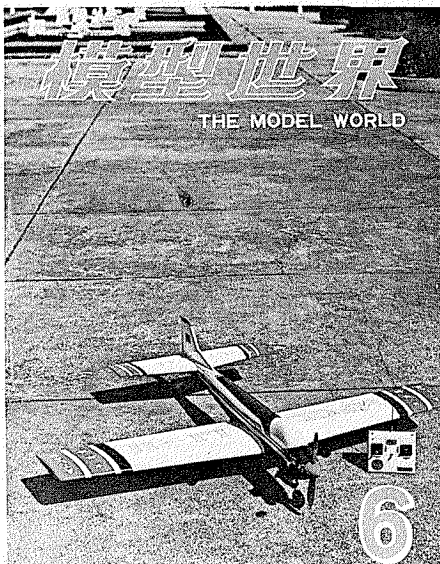
Korchagin (L) and Listopad, Soviet Air Force team members at USSR Nats, with C/L stunters.

• **EBICK AUDIO TACHOMETER.** Ebii Products of Kyoto, Japan, make tachometers and two of their earlier types of tachometers for model engines have been described in this column. The first of these, in 1970, was a conventional photocell type with a large, easy-to-read meter covering a 0-15,000 rpm range. It was also available with the range extended to 25,000 and was later sold in a dual-range version covering 0-20,000 rpm plus 0-4,000 for checking idling speeds. In 1975 Ebii introduced the

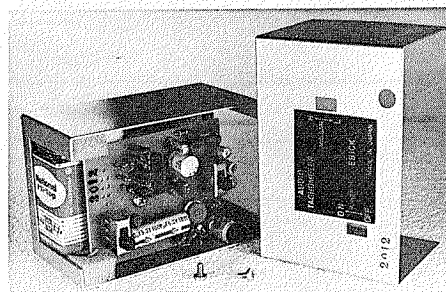
Ebick Digital Tachometer, a new photocell tach with LED digital read-out in place of a meter, capable of covering a range of 10 to 999,900 and with a claimed accuracy of .01%. This latter was described in the December 1975 "Foreign Notes."

Now, the same manufacturer has introduced yet another instrument, the Ebick Audio Tachometer which, as its name suggests, is operated by sound waves. It picks up the engine's exhaust note through a

(Continued on page 88)



The Model World is title of new magazine in Chinese language. It's published in Taiwan.



With Japanese Ebick Audio Tachometer, engine rpm can be checked while in flight.

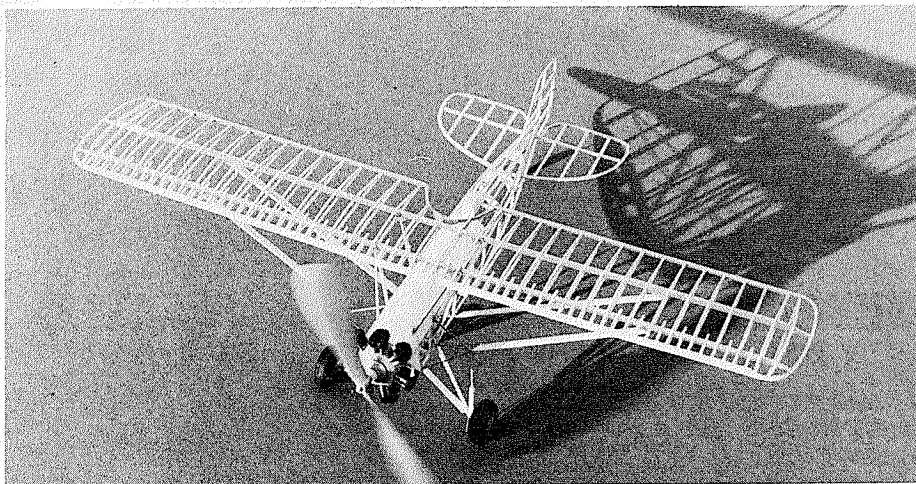


# Timm Collegiate

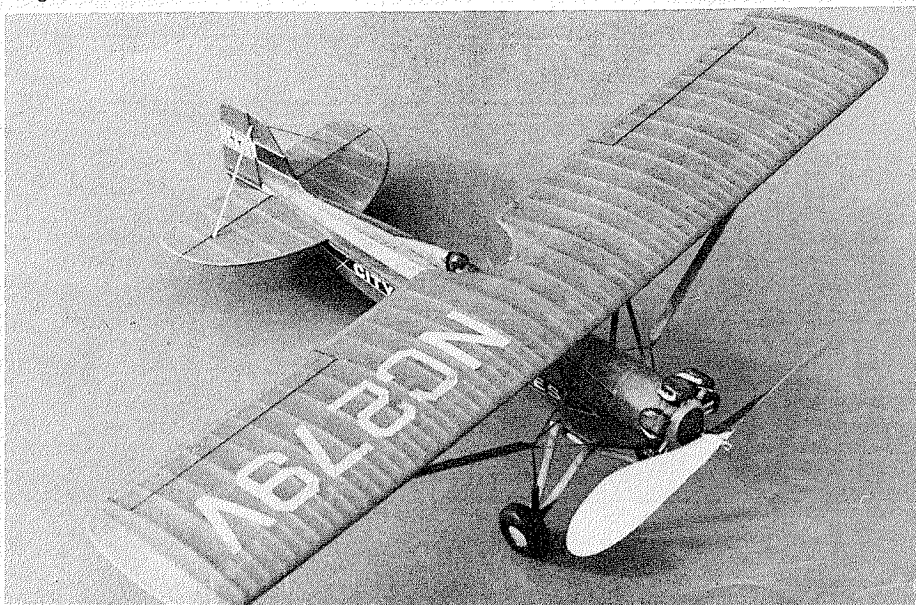
Fabulous Peanut Scale for 1928 Collegiate that can garner the scale and flying points from the toughest judges!



It flew right off the drawing board! Radial engines don't add weight & they are ballast.

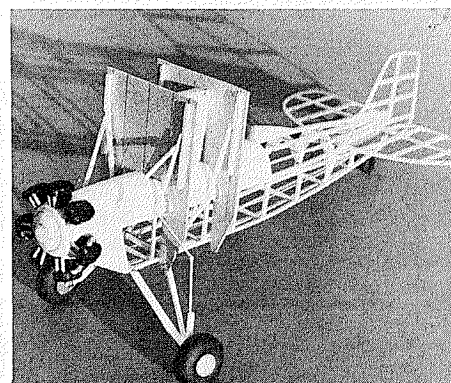


The "barebones." Note the bond paper covering around nose section back to the headrest. Registration numbers were cut from white tissue. Don't use too much thinner to attach.



Timm emblem, "1911" signifies Otto Timm's first efforts in the aviation design field.

**BY AL LIDBERG**



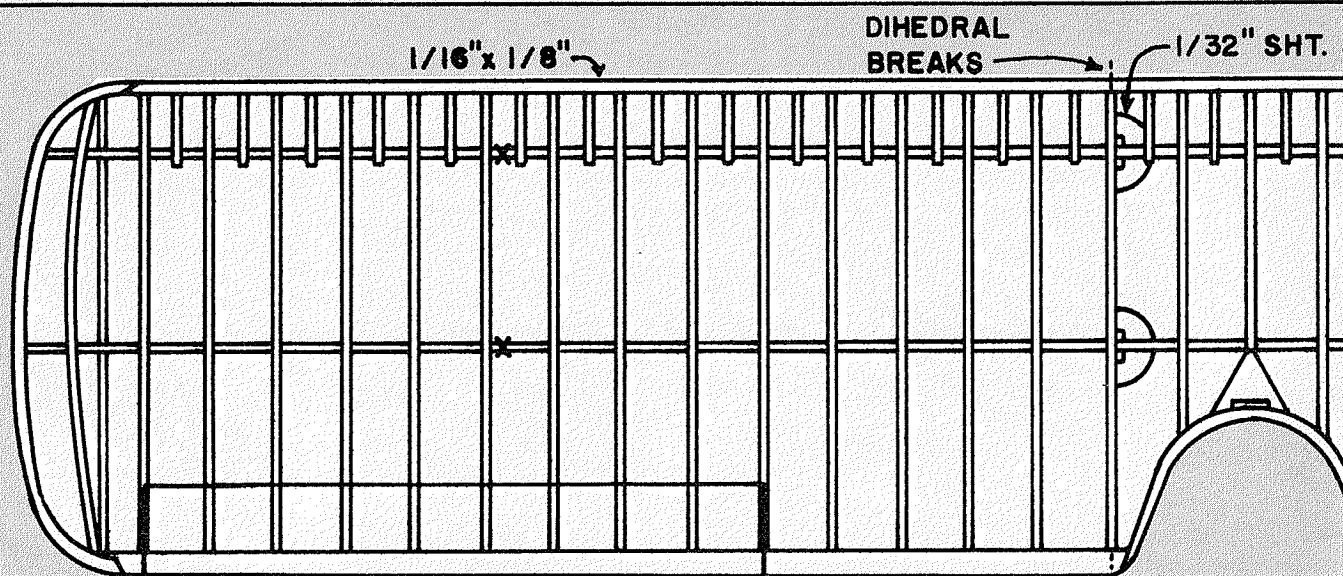
Fuselage with completed engine/wing strut jig. Slots in top of strut slide on wing spar.

- Otto Timm designed the Collegiate in 1928 when he saw the need for a modern training plane with better visibility than that of the conventional biplanes of the period. This particular plane, *NC279V*, was sold to J. Warren MacClatchie who wanted to demonstrate the durability of his new "Panther," an 'L' head radial engine. Named *City of Los Angeles*, the plane and engine established a unique endurance record in November, 1930 by flying for 27,667 miles without the pilot's shutting off the engine. Pilots flew in four-hour shifts and the engine ran for 378 hours and 48 minutes. Ninety-seven landings for refueling were made. Despite their unusual feat, neither plane nor engine were accorded any fame or even further interest! This same aircraft, rescued from a junkyard, is undergoing restoration at the Glendale, Arizona airport. It still carries the "Panther" engine and when completed will be an extremely unusual and rare antique. The owners hope to fly it to the EAA Fly-In at Oshkosh in 1977.

The basic scale reference for this model is an article by The Rev. Boardman C. Reed in Vol. VIII of *Historical Aviation Album*, which contains scale drawings by Paul R. (Text continued on page 70)

**FULL SIZE PLANS ON  
FOLLOWING TWO PAGES**

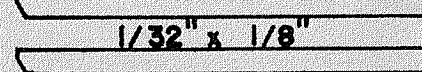




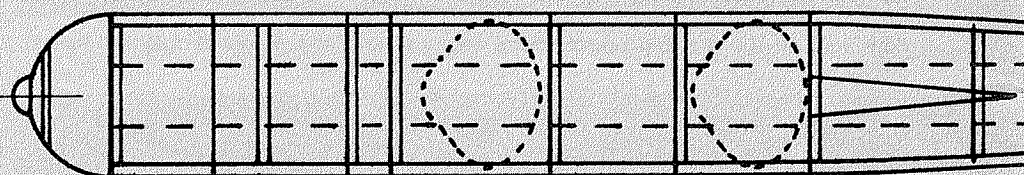
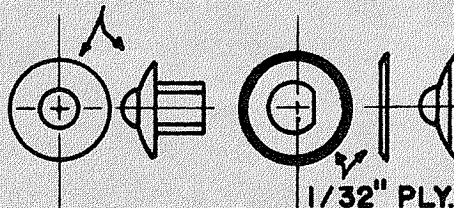
1/32" SHEET  
SLICED RIBS  
AND SPARS



APPROX. LENGTH STR

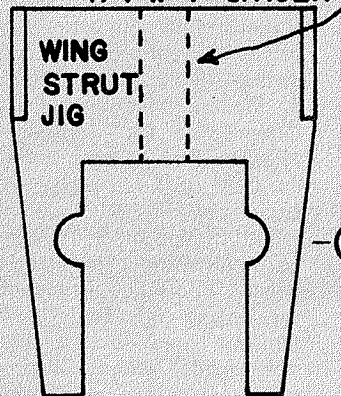


WOOD NOSE BUTTON WITH PECK BRNG.

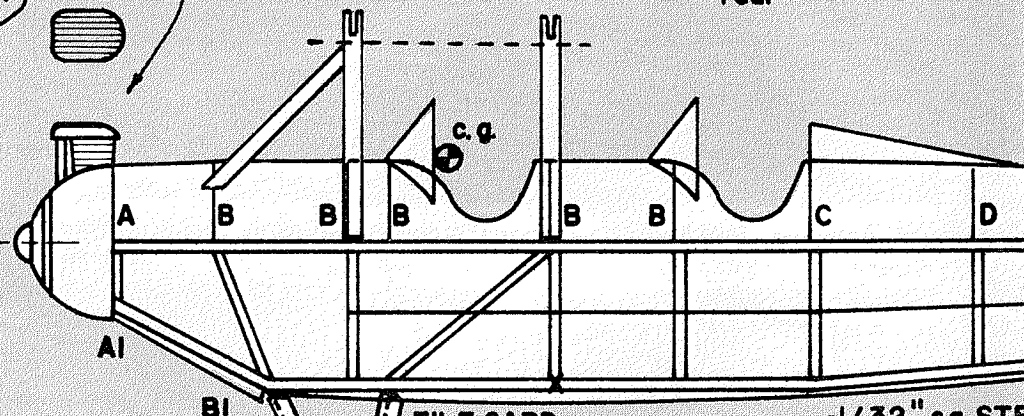
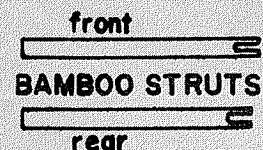


ALTERNATE RIBS

1/4" x 1" SPACER

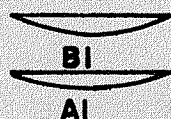


MacCLATCHIE "PANTHER"  
7 CYL. "L" HEAD ENG.

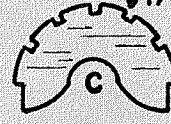
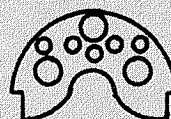
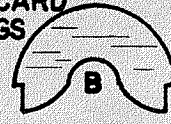


PROP - 4 3/4"  
PLASTIC

POWER-LOOP OF  
3/32" RUBBER



INST. PANEL  
(rear cockpit)



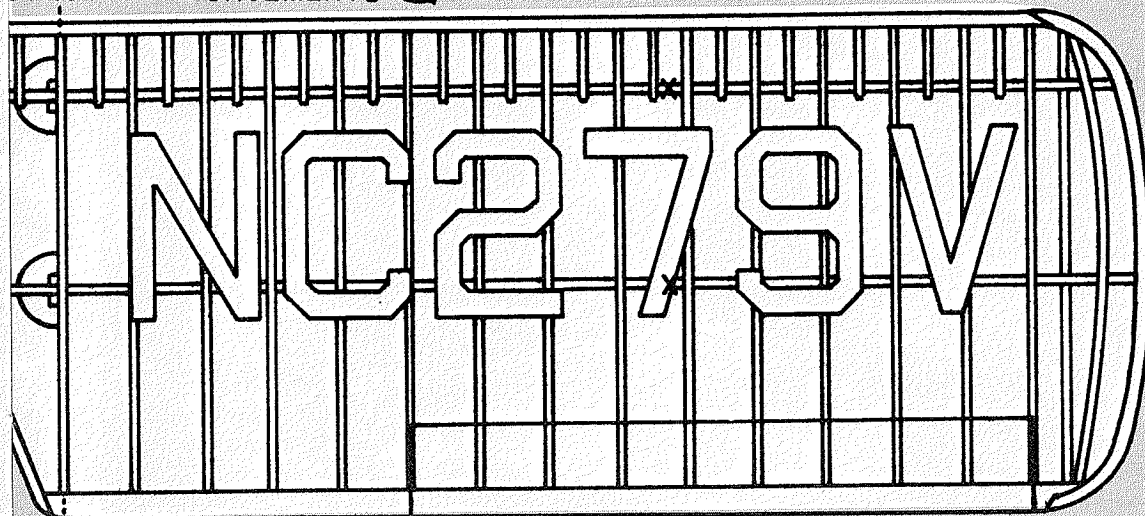
1929 TIMM  
COLLEGIAT

DES. & DRN. by  
AL LIDBERG 9/12

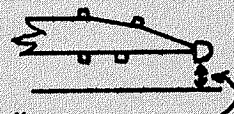


STRUT REINFORCEMENTS

X = STRUT MOUNTS



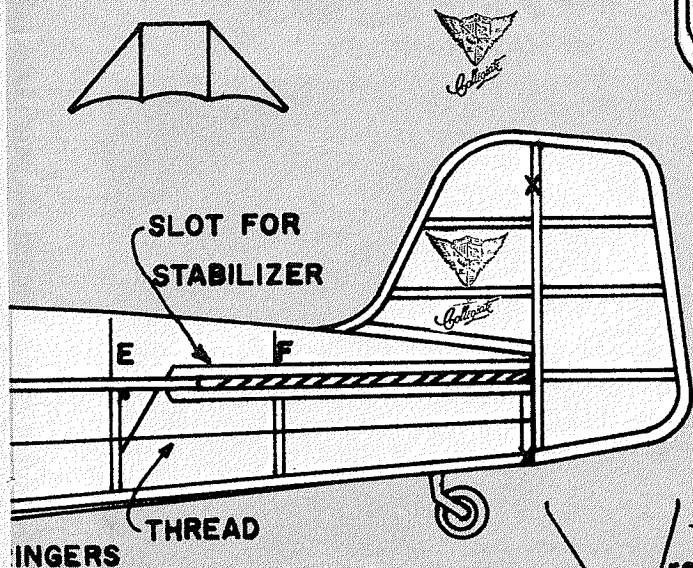
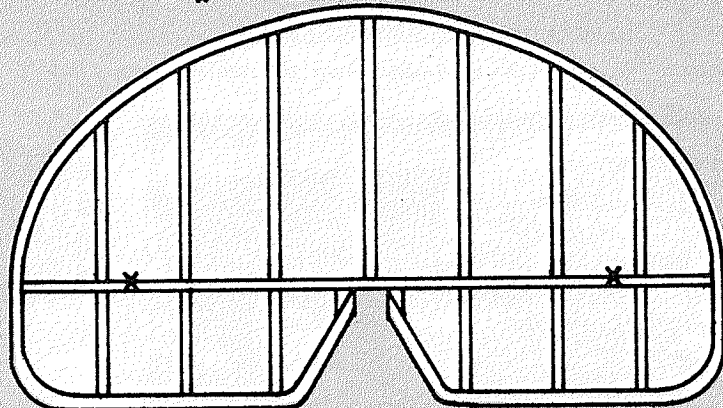
TIP SECTION  
AT SPARS



1/4" DIHEDRAL  
EACH TIP

1/16" x 1/8"

LAMINATE CURVED PARTS FROM  
1/32" x 3/32" BASS



CYLINDER  
CENTER LINES

1/32" dia.  
BAMBOO

TURNED  
BALSA  
WHEELS

PAPER TUBE

MAIN  
GEAR

ALL LDG.  
GEAR WIRE  
.020" dia.

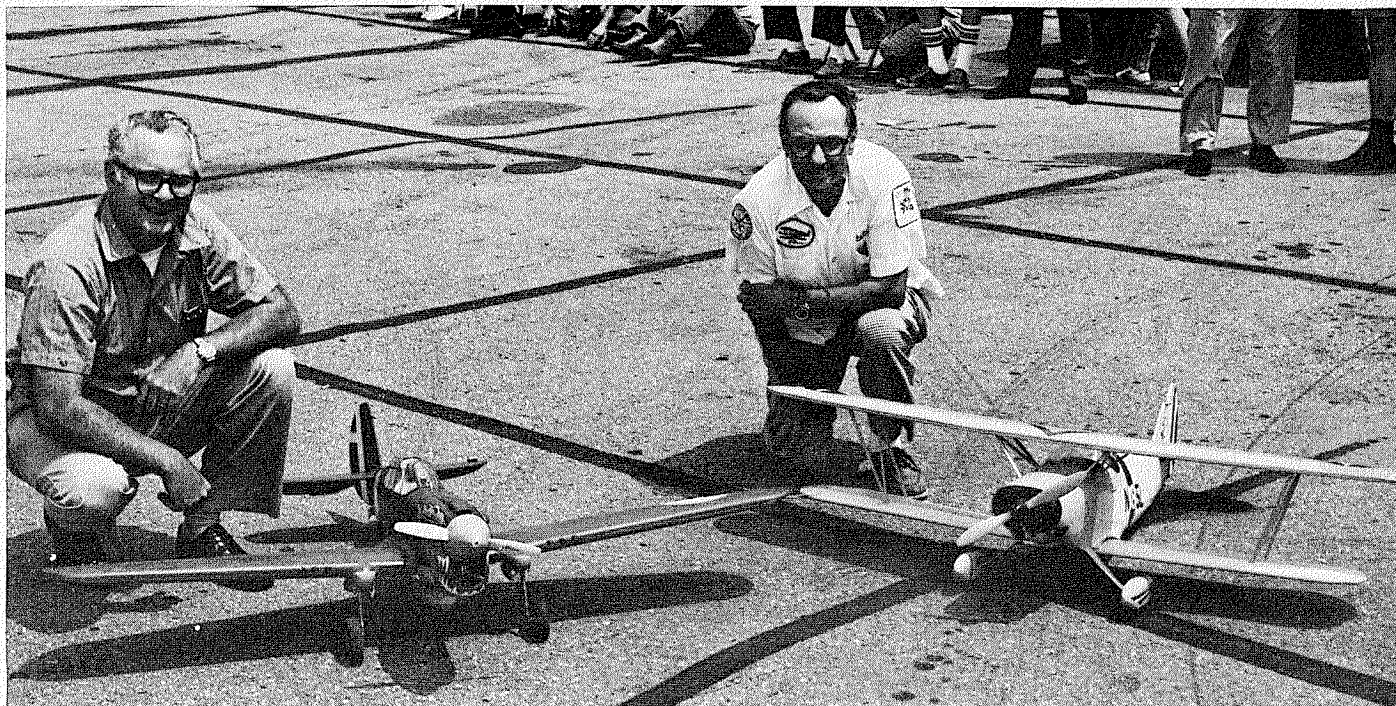
REAR  
GEAR BRACE

ALUM.  
CAP

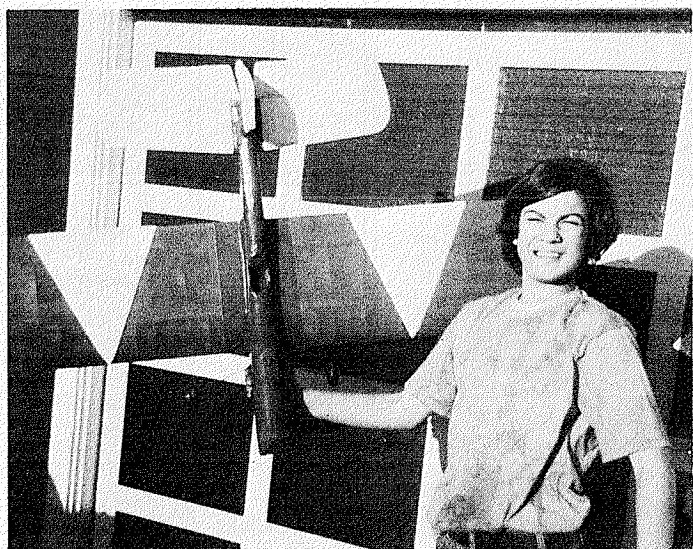
side  
view

76





Bill Boss and Pete Bianchini at M.A.D. II show at Rockefeller Center in NYC. Bill is quite a Scale man, works hard at it (see text).



John Pohlpetter shows scratch-built stunter made from balsa log.

# ROUND & ROUND

BY HARRY HIGLEY



Two OS 30 Wankels power Charlie Bauer's Grumman Skyrocket.



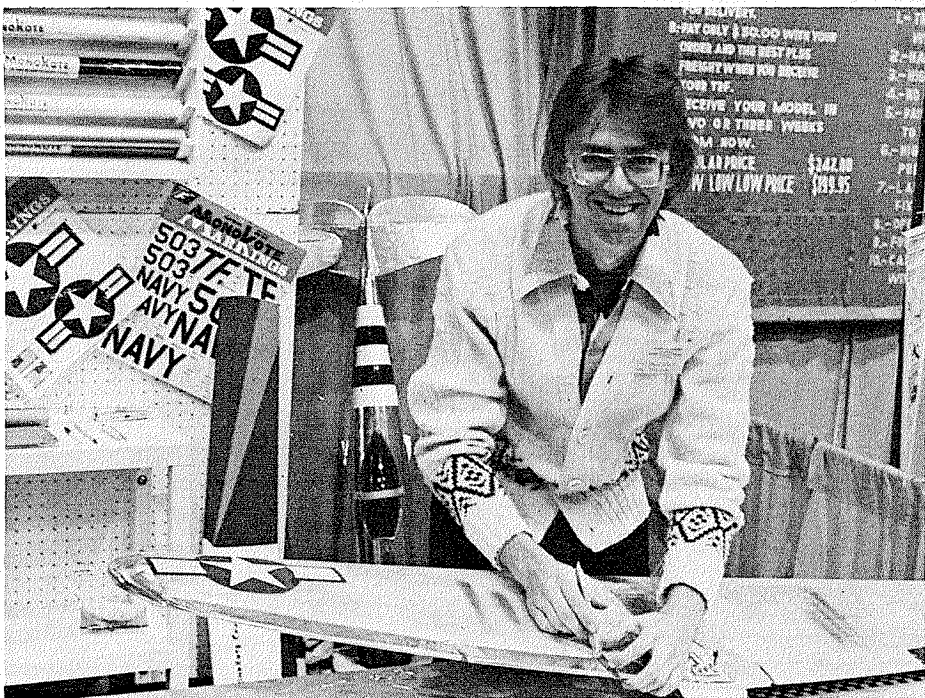
Texas's Al Rabe with his scale famous Seafury and P-51 Stunters!





Bob Paul markets muffler shown in this photo.

• TOLEDO. I happened to find myself at the Toledo Weak Signals' R/C Conference earlier this month; and since most magazine coverage of that activity would not be oriented toward the U/C flier, it seemed appropriate to write a few words to emphasize our special interest. The name of the conference is very misleading as *any* modeler could have found a lot there to be interested in. Virtually every major model

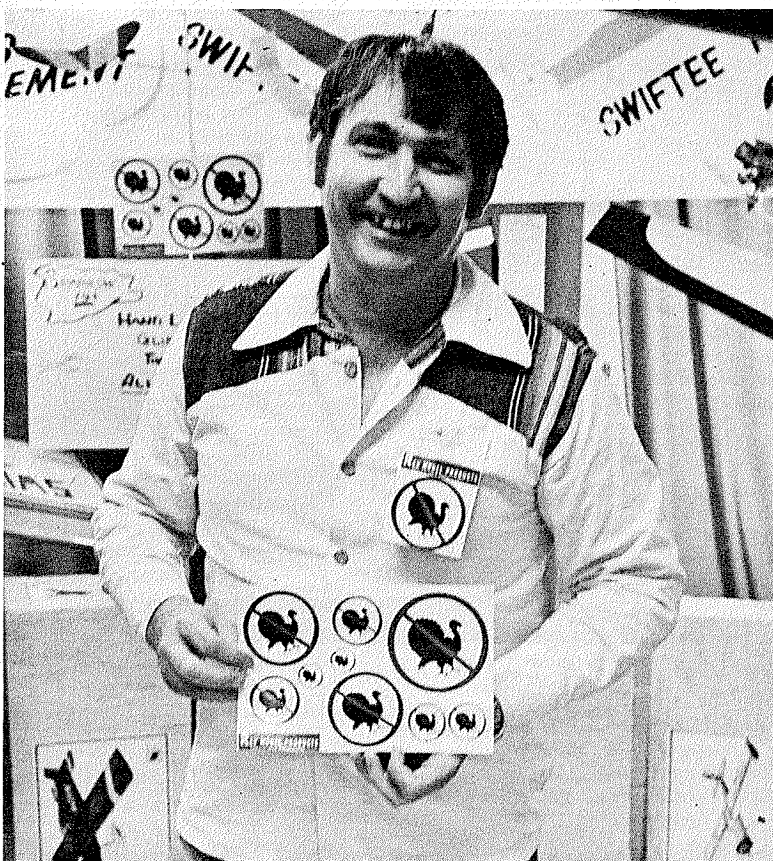


Mark Bauer demonstrates how to use Silver MonoKote to best achieve very realistic finish.

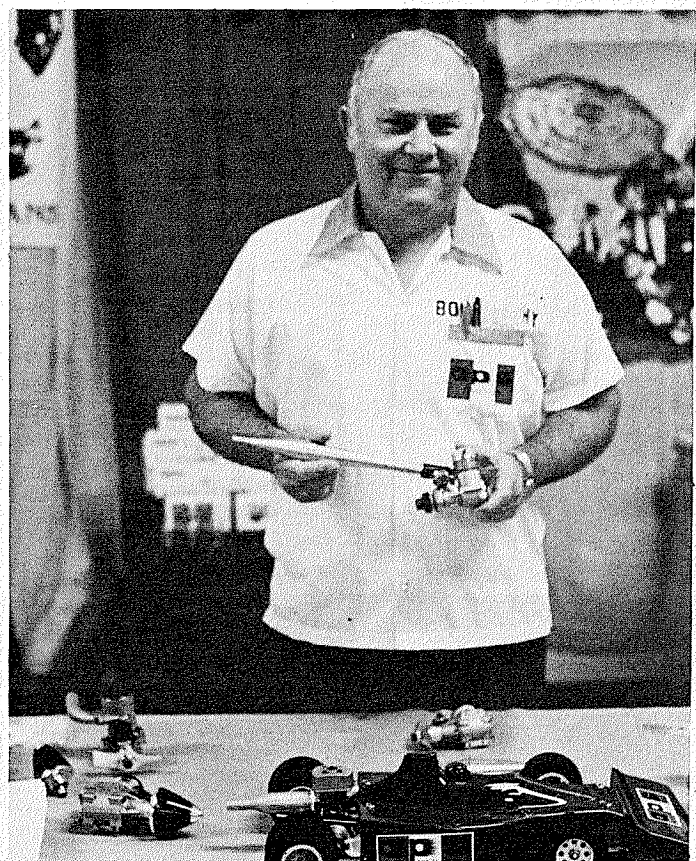
industry member was represented; new products, prototypes and special displays were in abundance. Manufacturers gave demonstrations of how to use their products which were far more effective than the normal, unread, instructions. A prime example of this appeared in the Top Flite Models booth, where Mark Bauer was showing the crowd how to obtain an ultra-realistic aluminum finish from silver MonoKote. It

is worth noting that the subject used in Mark's demonstration was a Top Flite P-47, converted to Control Line. Mark and his dad have been active in Control Line for as long as anyone can remember. Charlie Bauer was seen covering complex foam plastic shapes with Top Flite's new covering material, Econo Kote.

K&B had a board full of new motors and  
(Continued on page 22)

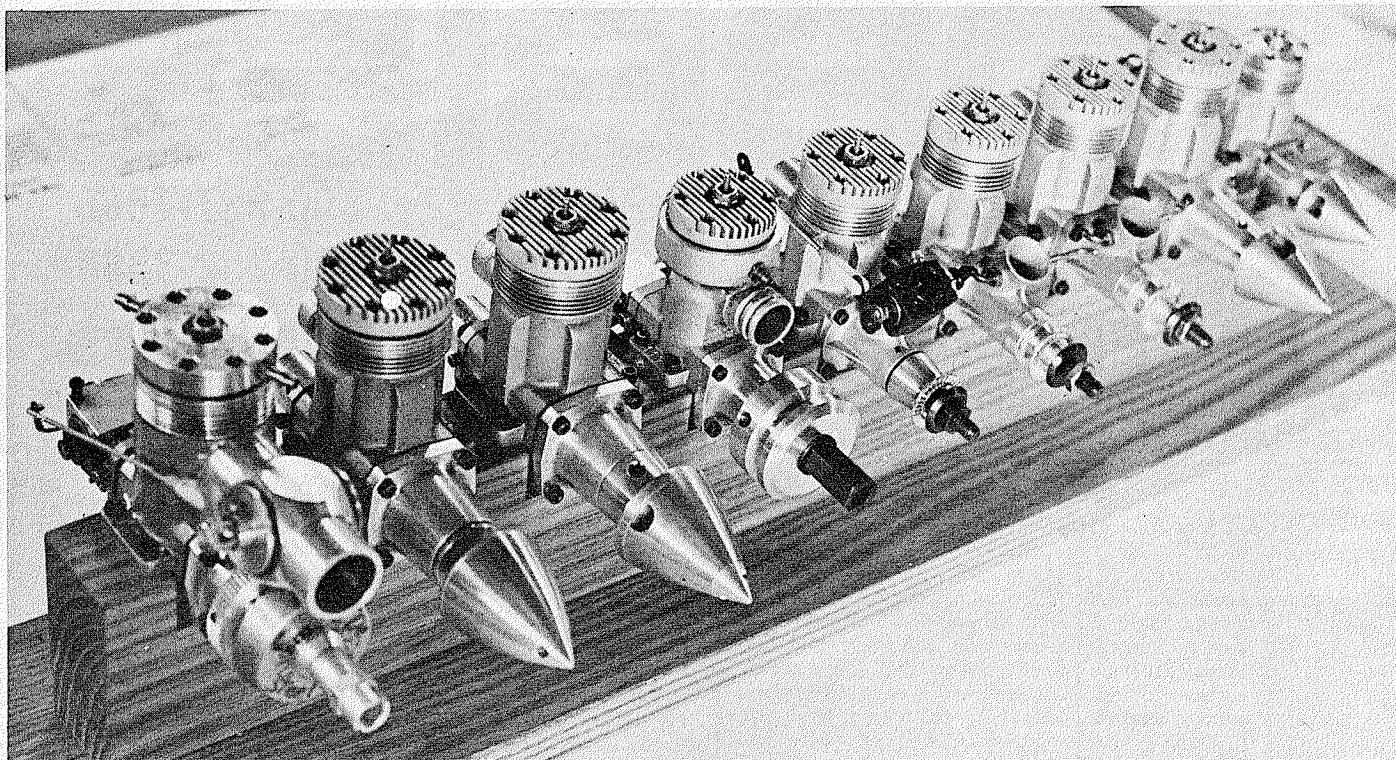


Nats C/L category director Bob Vojislavsek shows "Turkey" decals.

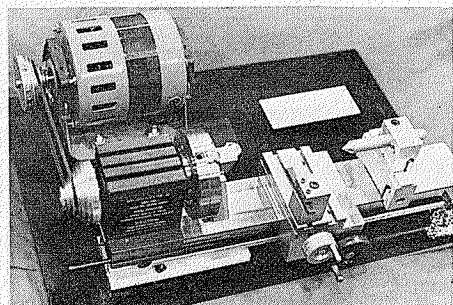


Bob Murphy of Shamrock Imports shows new O.P.S. tuned pipe.

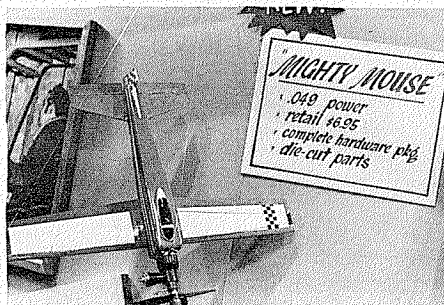




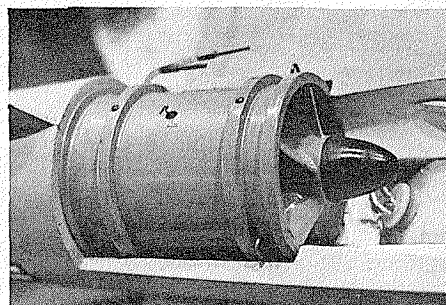
Series of TWA engines offered by Glen Dye of Performance Parts and Products. Imposing lineup of high quality hand made engines!



Functional lathe available from Hobby Lobby.



Midwest Products' .049 Mighty Mouse.



Prototype ducted fan from Midwest Products

## ROUND AND ROUND . . . CONTINUED

more than a fair share were designed strictly for Control Line competition events. In addition to their higher price models, they displayed a modestly priced 35 with a carb that should find use among the many Sport fliers who read these pages.

While we're on the subject of engines, Duke Fox of Fox Motors had a whole line of U/C accessories. His selection of gas tanks is very extensive: it is hard to imagine a plane into which one of his tanks won't fit. Fox has made a number of significant changes in their old Veco series of tanks. Among the most notable is that of relocating the fuel pickup on some models to a more convenient place. Duke is likely to offer a beginner's kit which has everything for a Control Line model except the model itself and the liquids needed to build and fly. Parts contained in the kit include a handle, lines, bellcrank, engine and prop wrench, to name a few. Fox was beaming with pride about his 35 Combat-Special. The Combat contingent seems to like his latest offering.

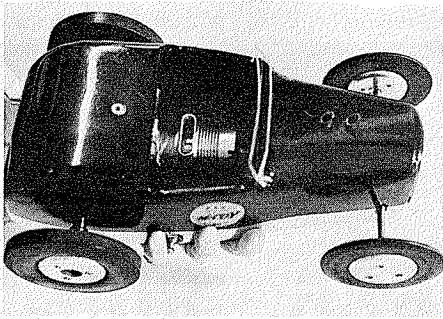
Midwest had their new Mouse Racer

prominently displayed. I don't know much about it but we'll include a photo for your examination. They also showed prototypes of ducted fans of various sizes, some of which may be adequate for Control Line jet scale models.

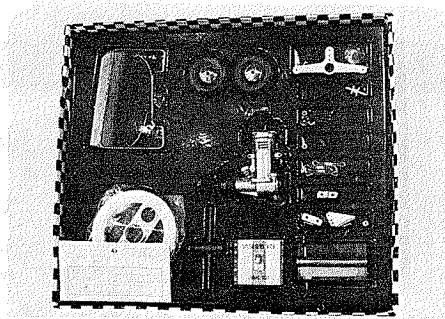
Three manufacturers of smaller engines were there with their latest products. Glen Dye had his complete line of TWA engines displayed for all to see. Glen literally hand-makes these, and the workmanship is very

nice. Bob Murphy of Shamrock Competition Imports had all the latest O.P.S. innovations. O.P.S. enjoys a good reputation among U/C Racing, Speed and Carrier fliers. Bill's Miniature Engines had the new Rossi R/C and several prototypes of some interesting Racing 60's. Sorry I couldn't get a shot of these, as they really had snap and sparkle!

Cleveland's Bob Paul had a very nice  
(Continued on page 100)

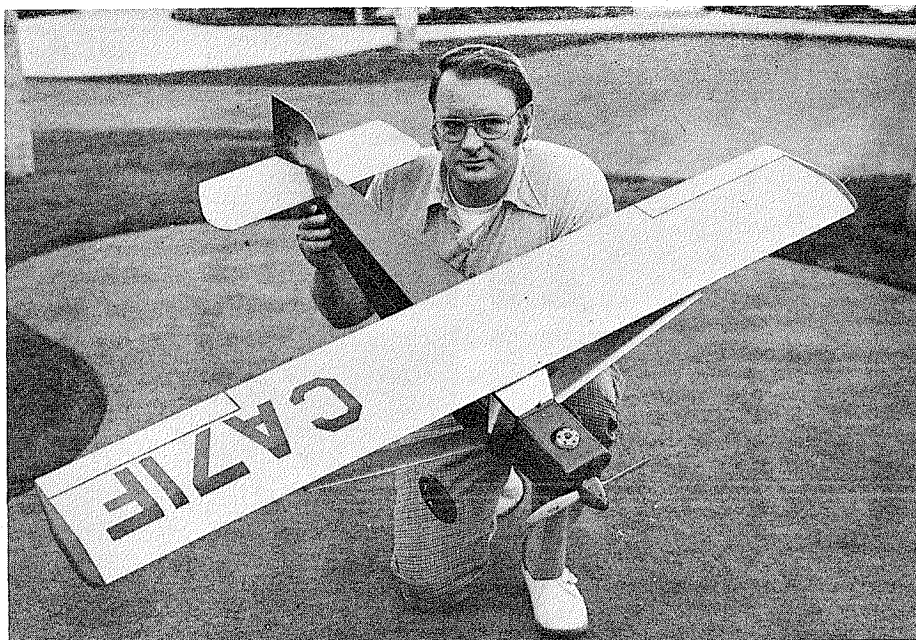


Tether car racing making comeback, very fast!

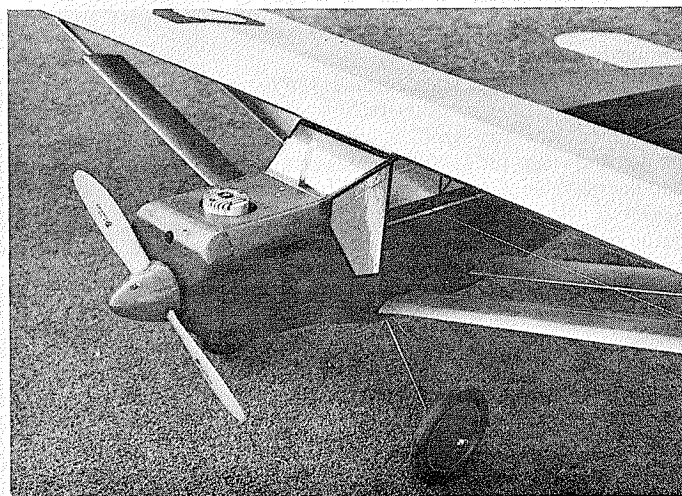
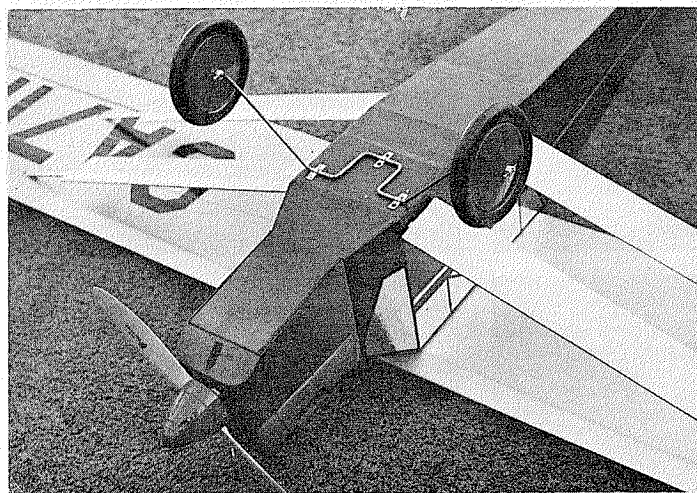


Fox's new accessory C/L kit has everything.





In the photos above we see the author with his finished Robin and at the point of no return, tail up and moving slowly down the runway.



In the two photos above we see the engine and landing gear installation. Not too much to see of engine, simply the cowling around it.

# Control Line Curtiss Robin

**BY CHARLES FELTON . . . looking for that something different to build? If so, why not try this corrugated cardboard semi-scale machine of the early Thirties!**

• The search for new and different materials for model airplane construction has led from balsa to foam to plastic and fiberglass. However, each new material has generally proved more expensive than its predecessor and has required specialized techniques and skills not always readily available to the average modeler. Modeling thus becomes more expensive and complex, discouraging beginners from joining our ranks, and we fall into the trap of assuming that each innovation *must* be more exotic and intricate. Sometimes we can't see the forest for the trees, and simple solutions are overlooked. What *is* needed for our work are inexpensive, readily available, easy-to-work materials which can be used in a wide

variety of applications.

The purpose of this article is to present a model utilizing just such a material possessing all of the qualities described above. And what *is* this new "wonder" material? It's **CARDBOARD**, plain old  $\frac{1}{8}$ " corrugated cardboard! The advantages of cardboard as a construction material are numerous. Its most important factors are low cost and availability—in fact, it's essentially free, yours for the asking. One large cardboard box from a local appliance dealer will provide enough material for a large size model. Try to match this price with that of balsa, foam or any other material! All that's needed in the way of tools for you to be able to cut out cardboard pieces is a sharp razor

blade. Sharp corners or rounded edges are equally easy to cut, with no fear of cracking or splitting the material as one would worry about with balsa sheets. In addition, since cardboard comes in big sheets, large sections may be made from one continuous piece. The ease of cutting cardboard, combined with the large shapes which may be formed from one single piece, have resulted in simplified design techniques and the reduction of building time to an absolute minimum.

The weight of cardboard models is usually equal to or less than that of their balsa counterparts; however, cardboard has a greater strength. In addition, it possesses a

*(Continued on next page)*



## CONTROL LINE CURTISS ROBIN CONTINUED

unique feature which represents another tremendous advantage over balsa—its shock-absorbing quality: since it is a non-brittle, non-crushable material, impacts are absorbed locally and not transmitted throughout the entire structure. A crash that would convert a balsa model to splinters usually results in minor local damage to a cardboard one.

The technical term of cardboard is "corrugated fiberboard" and it is specified by test strength, facing weight and flute style. In its usual form, it consists of an outer facing paper, an inner flute paper and an inner facing paper. Test strengths are dependent on the weight of the three components specified in pounds-per-thousand square feet. Flute sizes are B, C or A, which result in an approximate thickness of  $\frac{1}{8}$ ,  $\frac{3}{16}$  and  $\frac{1}{4}$  inches, respectively. The material used for the Curtiss Robin model is  $\frac{1}{8}$ ", 125-pound test B flute, which is the lightest weight for standard cardboard of this thickness, but the flying qualities of the model will not suffer with the use of heavier cardboards, including even two-hundred-pound test board.

The Curtiss Robin was chosen as the subject of this article for two reasons. First, most modelers are familiar with this airplane and can judge for themselves the degree of scale appearance which can be achieved with cardboard. Secondly, the airplane possesses simple shapes, such as a rectangular fuselage, which can easily be modeled in cardboard. Naturally, cardboard cannot be used for all models. However, the Robin clearly demonstrates that cardboard can be used in a wide variety of scale applications such as WW I airplanes and cabin airplanes which generally were built along square lines. In addition, biplanes and triplanes are equally easy to build at almost no additional cost.

The model is built to a scale of  $1\frac{1}{2}$ " to 1' which gives a wingspan of 60 in. and a wing area of 555 sq. in. With a weight of  $4\frac{1}{2}$  pounds, the wing loading is light and the landing glide is very shallow and stable. The flat bottom semi-diamond airfoil section results in high lift at low speeds and enhances the model's stability and handling qualities. Engines of from .29 to .40 sizes can be used.

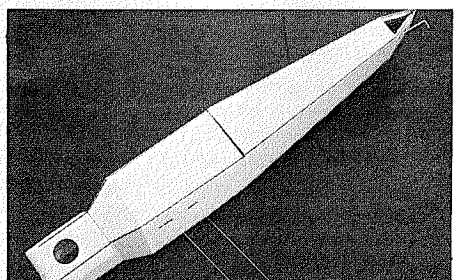
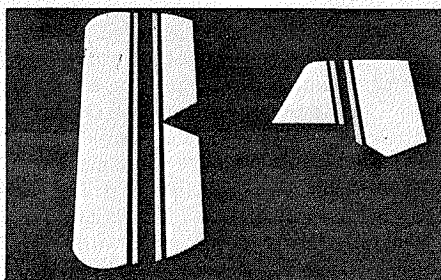
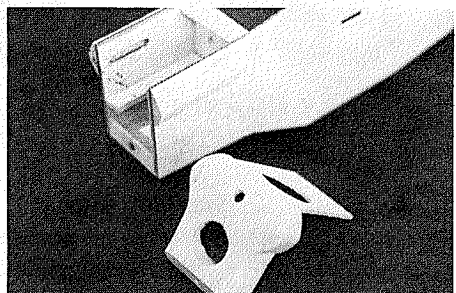
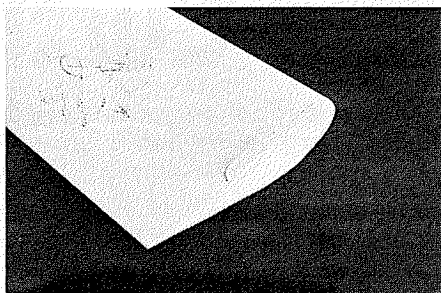
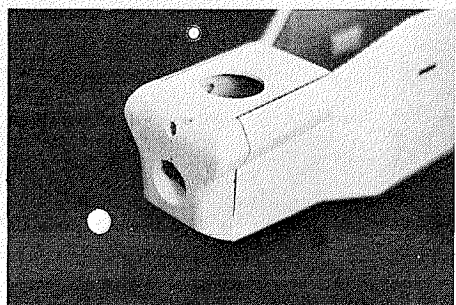
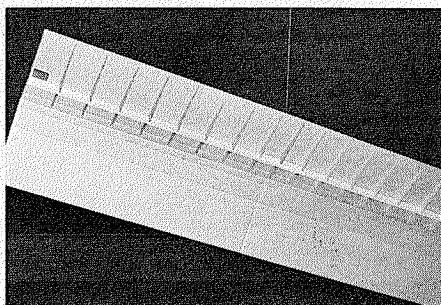
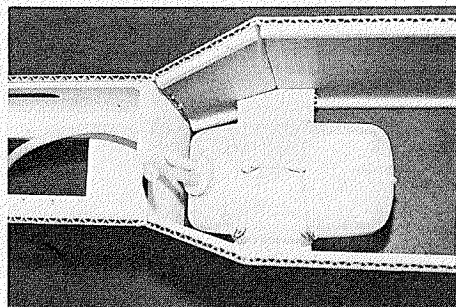
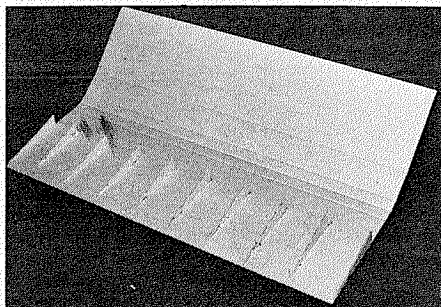
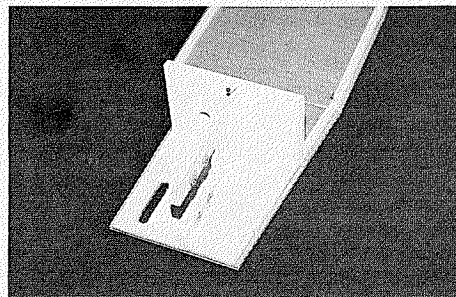
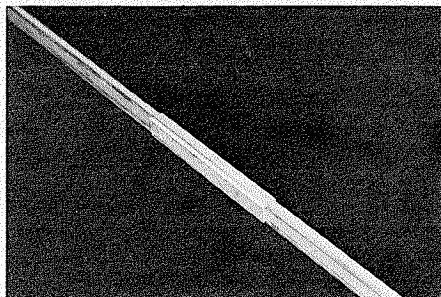
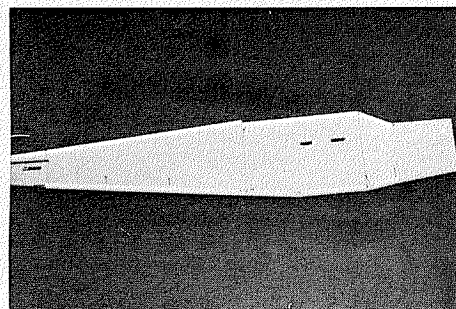
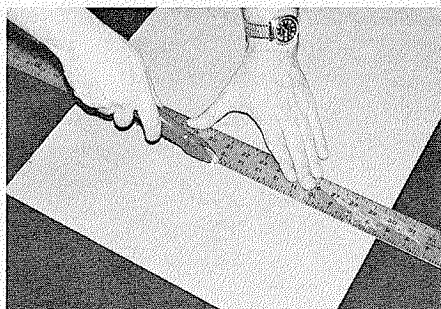
The Curtiss Robin model is just one example of what can be achieved with cardboard. I hope your interests will be stirred enough by this for *you* to venture trying *your* hand at building a cardboard airplane of your very own design. I would welcome the opportunity to answer your questions and read your comments on this subject. Please write me at the following address:

Chuck Felton  
10459 Artesia Blvd. #72C  
Bellflower, Calif. 90706

### CONSTRUCTION HINTS:

*Glue:* Water base glue such as white glue or Titebond is recommended. Contact cement

(Continued on page 86)

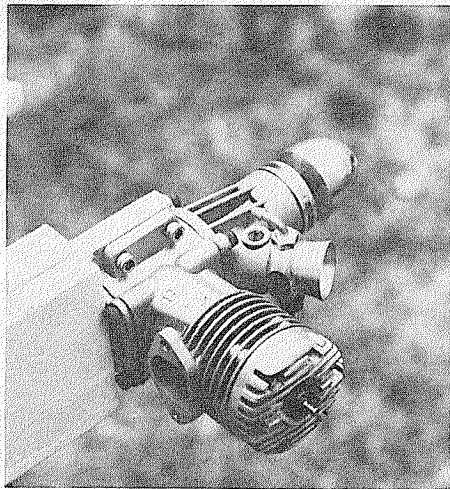


Photos above show interesting construction shots for the corrugated board assembly.









Hot new Class B mill K&B .21 FF Schnuerle.



## FREE FLIGHT AFFAIRS

POWER • RUBBER • GLIDER  
SCALE • INDOOR • ANTIQUE

BY DAVE LINSTRUM

• **SENIOR CITIZEN SWINGER.** In May, "VTO" saluted Walt Ghio of the U.S.A. Wake Team. This month we want to introduce you to genial Tom McLaughlan of Pensacola, the senior citizen member of the 1977 U.S.A. Power Team. He attended the 1971 W/C as a spectator and the 1973 W/C as a flier (see photo) and now he will journey to Copenhagen to compete for the U.S.A. once again. We know he will have a good chance with his *Swinger* design, which was one of the hottest models at Wiener-

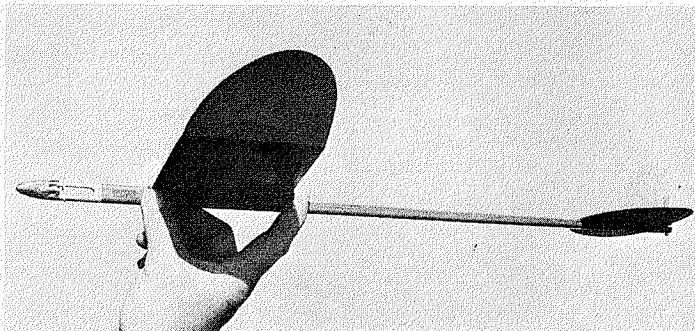
Neustadt and still ranks among the best. (Watch out, Koster!)

Tom is celebrating an anniversary—this is his fiftieth year of Free Flight. He is another kid who, at age twelve, was influenced by Lindbergh's flight in 1927. He is a retired USN Overhaul and Repair supervisor and has been in the aircraft industry since 1931. Before moving to Pensacola, he worked for North American and Sikorsky. His wife Evelyn encourages him in his flying and team efforts.

The Old Timer of the USA Team also flies OT—he has a hot Veco .19 glow "Zipper" that really moves. He comes by his OT expertise honestly—in 1929 he took a Pullman to Detroit to fly his twin pusher in the 1929 Nats. It was a low camber single-surface wing job. He put the wing on backwards, flew it, and it crashed! He lost a chance at a scholarship and this was a low point in his modeling life. Second low point was the disaster at the 1973 W/C when, after maxing 6 rounds, he got a 179 and

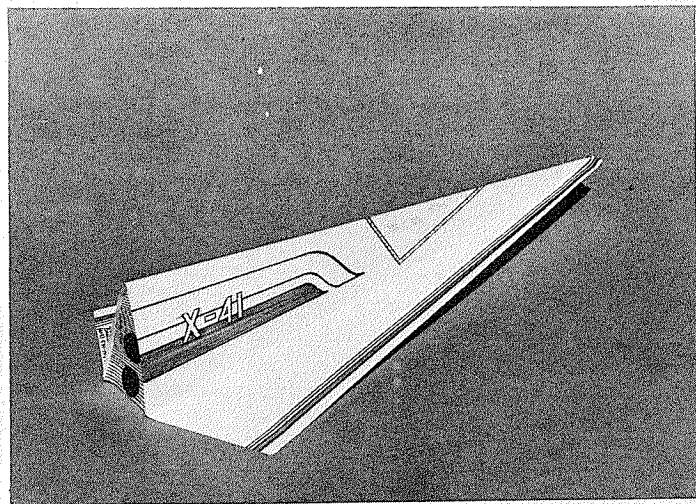
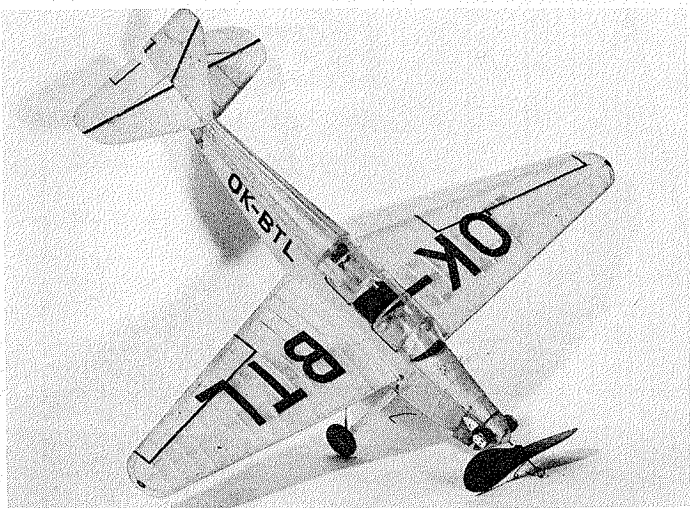


VTO LIVES! VTO launch by Guy Markham at San Valeers Annual, TD .09-powered Starworm.



Peck-Polymers' *Baby Ace* new Walnut Scale kit, 17½" wing span. Ray Harper's *Max Flyer* OHLG kitted by House of Balsa, \$5.95.





Zlin XII Peanut scale by Milan Kacha, VTO pen pal, Prague, CSSR. Bob Meuser's winning aerobatic design in Cal. paper plane meet.

missed the flyoff by 1 second. Tom has been flying Power since the 1950's, when he was inspired by a FAI meet at Hagerstown, Md. where Dave Kneeland won an FAI Team berth.

McLaughlan gets a lot out of his hobby; it is a true relaxation and he enjoys design (like his superlative *Swinger*), craftsmanship and competition. He has his own machine shop and a second hobby has been reconditioning surplus machine tools for his shop. His models always exhibit intricately machined front ends, folding props etc. We wish Tom and the rest of the USA Team (along with manager Lenderman) the very best of luck at the World Champs.

**P-30 PROXY POSTAL REMINDER.** By now you should have your P-30 Plastic Prop Rubber model in flying trim for the AMA Nats and the *MAN*/Orbiteers meet at Lake Elsinore. For details on the latter refer to the June "VTO." Note that only 9 1/2-inch props are allowed—commercially available. Drop your P-30 off at the Nats (att: Guy Kirkwood SDO) or mail it to Peck-Polymers for entry in the postal meet. Entry form (June *M.A.N.*) must accompany the boxed model, along with return postage if you want it back.

**STING YOUR 1/2A.** Ben Bowsky of GloBee advises us that the new Stinger starter will be available at hobby shops early this summer, in time to start your maxing models on the way to a winning season. Just the thing to start your model in a flash when that thermal comes through, the Stinger should be in your field kit. A lifetime purchase at \$39.95, it comes with rechargeable lead/acid batteries and charger. It is the handiest of the small starters, being cordless. Try one today.

**MAG RISES AGAIN.** Ron Firth of England has resumed publishing the excellent and newsy *Model Aeroplane Gazette*. This has much of interest to international modelers, including 3-views and news of British modeling. It is now in a new reduced-size format (along with *Scatter* and *Free Flight News*) in response to postal

rate increases, but it is still full of goodies. We recommend you subscribe. Send a buck (or 50p) to Ron Firth, *MAG*, 22 Slayleigh Ave Sheffield S103RB, England.

**MEUSER MAKES IT IN MILPITAS.**

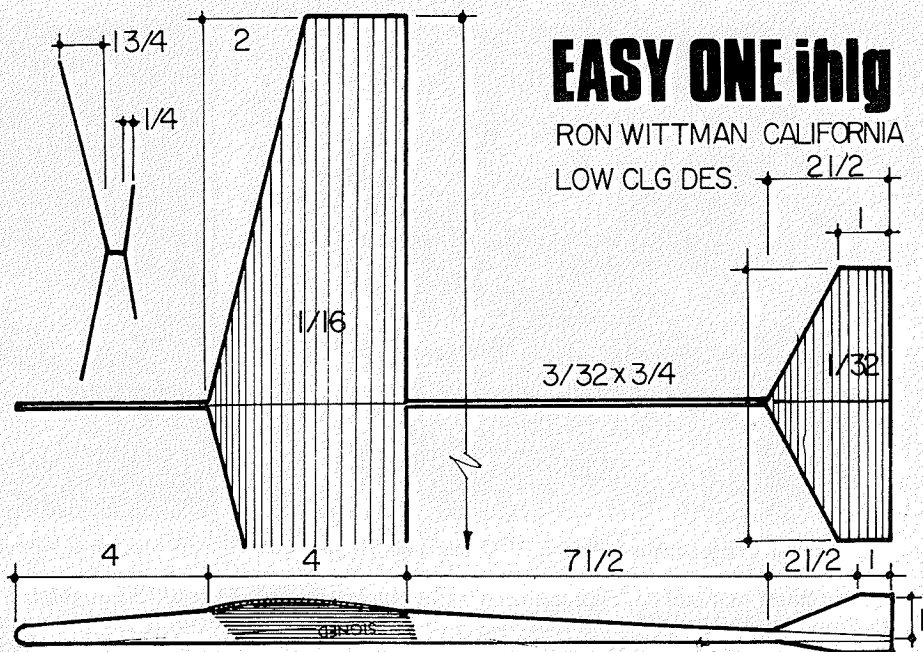
Mention paper airplanes to fellow columnist Bob Meuser and he will discourse for hours on how he designs paper planes for one event and they invariably win in another. Such was the case when he won  
(Continued on next page)



In 1973 at FF World Champs - Tom McLaughlan jokes with Hungarian timer. Tom on '77 team.



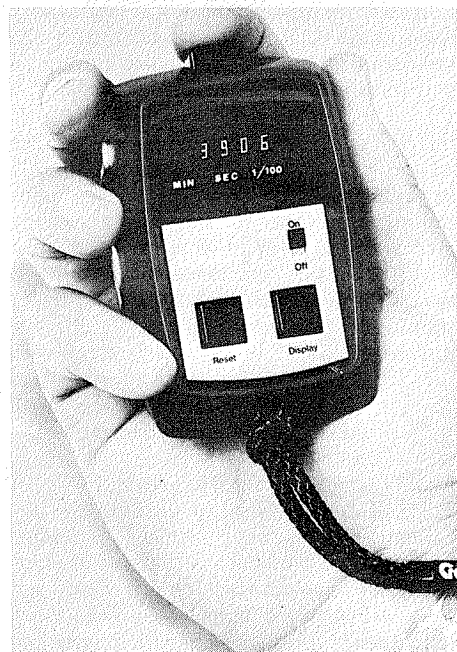
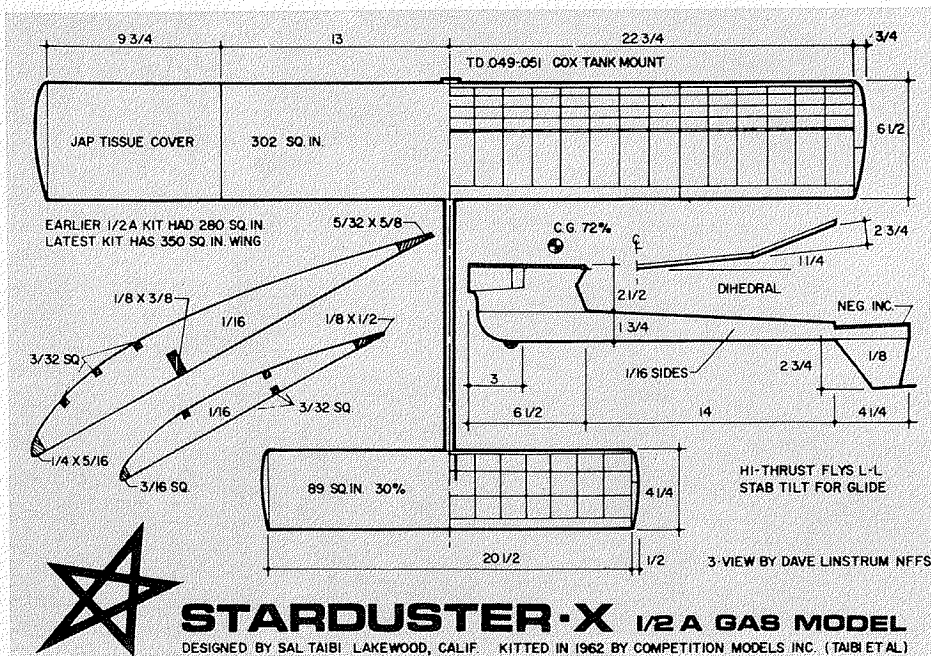
**SUPERSTOPWATCH.** The new Cronus digital stopwatch (Cronus Precision



RON WITTMAN CALIFORNIA  
LOW CLG DES.  $\frac{21}{2}$

### International classes (FAI)

The selection committee included: Ed  
(Continued on page 80)

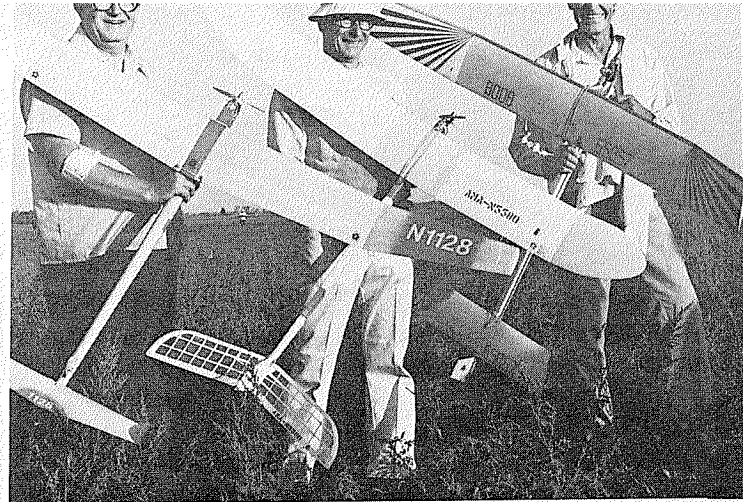


Digital Stop watch from Cronus Precision





1977 Wake team, (L/R) B. Piserchio, W. Ghio, and P. Tsiknopoulos.



1977 Power team (L/R) C. Martin, T. McLaughlan, A. Bissonette.

# FFFAI Team FINALS

## Finale or Fiasco?

BY DAVE LINSTRUM

**At last we are finally getting the full story on the ill-fated FAI Team Finals for the '77 World Free Flight Championships in Copenhagen, Denmark!**

• **FLASH NEWS.** The 1977 Nordic Glider Team, selected at 3 sites over the Memorial Day weekend to represent the U.S.A. at the FF World Champs in Copenhagen in early July are:

### Glider

1. Charles Markos Deerfield, Ill.
  2. Jim Walters Seattle, Wash.
  3. Robert Sifleet Glen Rock, Pa.
- They will accompany the other U.S.A.

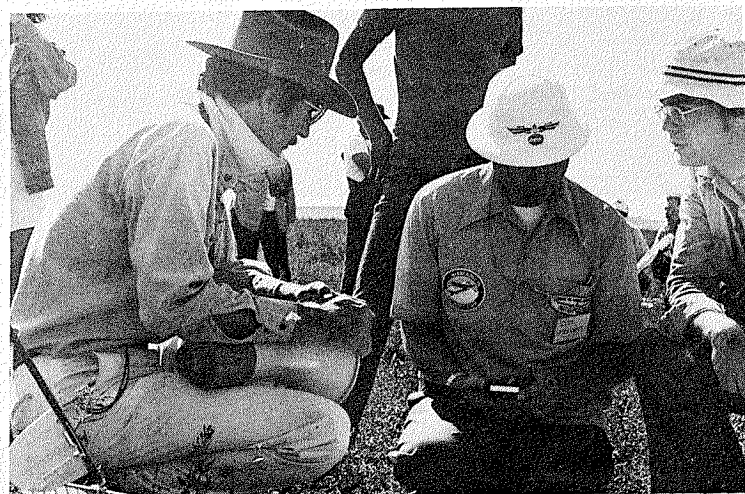
Rog Simpson revs up Cox Conquest in his German-influenced original design; AR & VIT.

Teams selected last Labor Day at Hastings, Minnesota. Team manager is John Lenderman. The balance of the team:

### Power

- Tom McLaughlan Pensacola, Florida 1675 sec  
Al Bissonette Tinker AFB, Oklahoma 1668 sec  
Charles Martin Seattle, Washington 1664 sec

Bob White gets off a super launch in Wake but motor broke in flight, so he didn't make team.



Jury (L/R) Hardy Brodersen, CD Don Monson, Linstrum debate glider event cancellation. Tough decision stirred very many pros and cons.

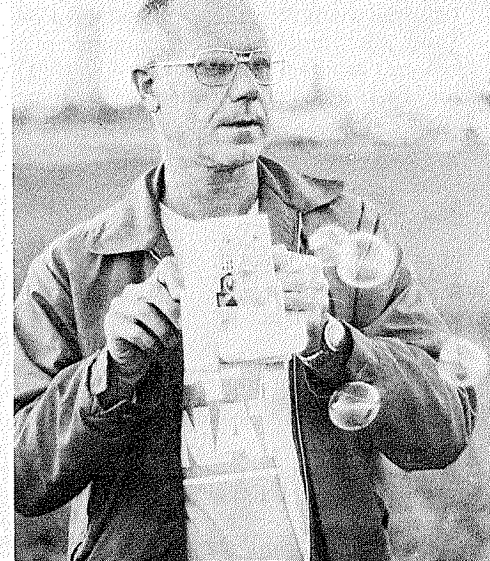
### Wakefield

Walt Ghio Stockton, California 1806 sec  
Phedon Tsiknopoulos Los Angeles 1762 sec  
Bob Piserchio San Diego, California 1760 sec

**DAY ONE.** Lee Hines quietly crept out of bed in our room at the Hastings Sunset Best Western Inn in the early predawn hours.

*(Continued on next page)*

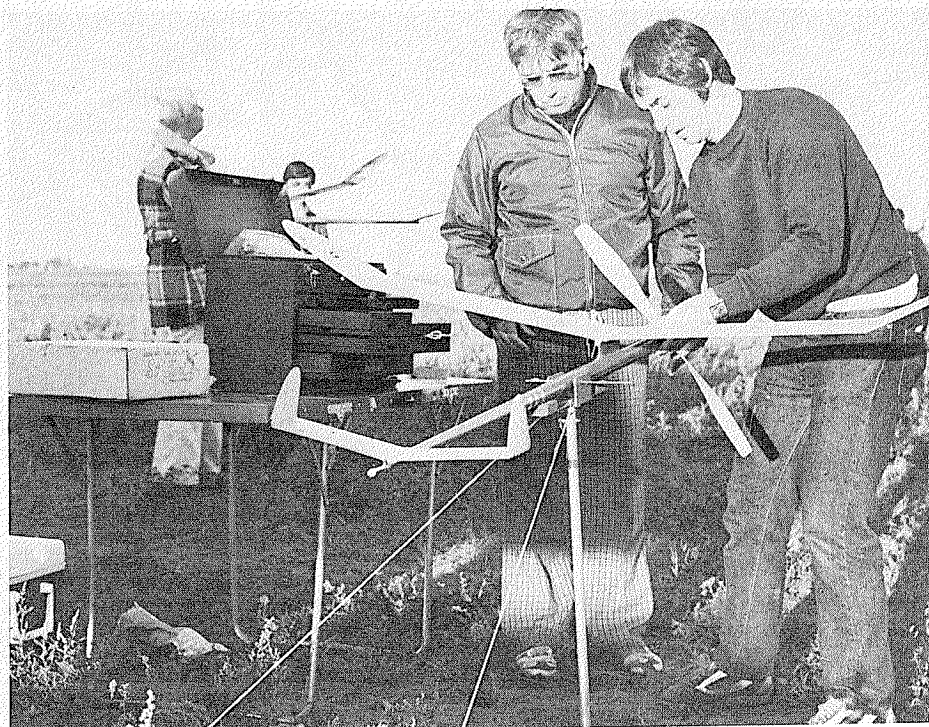
Dick Swenson demonstrates bubble-making capability of Tarco toy—good thermal finder!







"Buckett" Johnson frees his Sifleet Centaur.



Bob Piserchio gets some expert advice from designer Bob White as he winds Wake in stooge.

## FAI F.F. TEAM FINALS . . . CONTINUED



'75 Team Member Jim Walters gives it another fling with his sheetwing Snobird.



Lee Hines searches sky for signs of lift as he holds Piserchio's Wake, Bob White design.



Chicago Aeronut Charlie Markos flew his Drew Lively Lady but was cancelled.

After the windy days that preceded this FAI Team Selection Finals (the culmination of a two-year program involving over 450 fliers) Hines was anxious to get out and do some circle towing with his recordbreaker

"Ultimax" Nordic A/2 glider. After a late night of bull sessions and renewing old FF friendships, we groggily dressed and flagged down a ride to the field with Detroit flier Hardy Brodersen. He wheeled his sleek

white Z car into the only cafe on the way to the field for a hasty breakfast, then we roared off in search of the 41 Wakefield fliers who would compete this day.

Contemplate this pastoral scene at



Doug Galbreath contemplates still another max with elegant Cox Conquest-powered bird.



Chicago Aeronut Dick Lyons flew foam wing, alum mount Strutter, unusual configuration.



Tom Hutchinson's kit for his fine A/2 Ultimate Dragmaster (M.A.N. May '73); hooks line.





Jersey's Cliff Montplaisir takes five before he puts in another max, unusual forward fin.



Team member Tsiknopoulos weighs Wake ship in front of MMAC scoreboard.



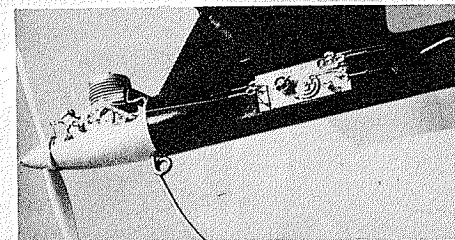
Old timer Henry Struck with equally venerable Wakefield, Hank still flying strong since 30's.



Nordic Glider record holder Lee Hines joins line for 1st round of flying with his Ultimex.



Tinker AFB flier Al Bisonette made Power team with all-sheeted, Rossi-powered bird.



Galbreath ship fitted with Cox .15, Oliver pan, Kerr brake, Seelig multifunction timer.



Isaacson used Wilder's winch and circle tow on his Wishbone; note pylon shape on A/2.

sunrise: an elegant, slim-winged glider wheeling in the misty air, silhouetted against the sun's rays. Another model is towed up, wings flexing, then assuming the mystical rhythm of the circle tow. Models D/Ting into the dewdrops on the soybeans. Vans and rented station wagons with fliers plugging in wings, banding on stabs.

Utter quiet, except for the murmurs of commentary on towing technique and model design. Notable is Ken Bauer's ship, with the long wing; note that it was built in memory of an earlier version which did not DT. There was no premonition, natural or supernatural, in this peaceful, calm scene of the turbulent, discordant, disastrous days to follow. The stage was set for the picking of 9 team members; no one expected that only 6 would emerge. Having discovered that we were at the test site, Hardy and I hopped back in the Z machine and drove North to the official flying.

Another pastoral scene, but action here was on the upswing. Cars parked in a long row, models in stogues waiting to be wound, the throbbing whirr of a balsa prop

as a model rises steeply on a test hop. Fliers starting to check in with the Minneapolis Model Aero Club CD, Willard Anderson, at the Control table. Weighing their puny 40 grams of rubber and their frail balsa and tissue Wakefield Cup craft, we found fliers like Bob White, former U.S.A. team member, tense and uncertain of today's outcome. All who had come early had experienced frustration. The wind inhibited testing and a change in sites from Blaine, over 70 miles away, had confused and upset everyone. There was much grousing, but everyone was ready to fly. We saw Allen, Sifleet, Montplaisir, Hatschek, Struck, Parmenter, Pearce, Monson, Matsuno, Crowley, Gard, Hartman, Hotard, Quinn, Davis, Smitz, Xenakis and other notables rigging their ships for this first still-air round. The FAI committee had decided on a 9-round contest with flyoff. This was in contrast to some previous finals with as many as 15-18 rounds but with a next-day flyoff in still air, it seemed equitable.

Did we say Bob White was tense? So was his vintage Pirelli in round one. In fact, it

snapped during the motor run, stalling out the model as it bunched in the rear of the motor tube. A 71-sec. flight killed his chance of making the team, but after some strokes by wife Toni, he gallantly flew the rest of the day, ending up about tenth. However, his design was flown by Sifleet and Piserchio, and the latter made the all-California Wake Team. This no-nonsense, gadget-free model is a real winner.

Round two began at 0930 with a move of the start line due to drift into nearby crops. The guys who flew at the end of the line (FAI spec poles) were in the corn. This was certainly a harbinger of the next two days. However, the wind did stabilize and the thermals picked up dramatically. Maxing continued, but no one maxed out. The end of the day saw half-a-dozen fliers in the flyoff, set for dawn the next day. Victorious were Piserchio, with his high pylon ship, Ghio with his diamond boom low pylon bird, and Tsiknopoulos flying a similar model with a complex front end. Everyone was relieved to see at least one of the teams finally chosen. (Continued on page 95)



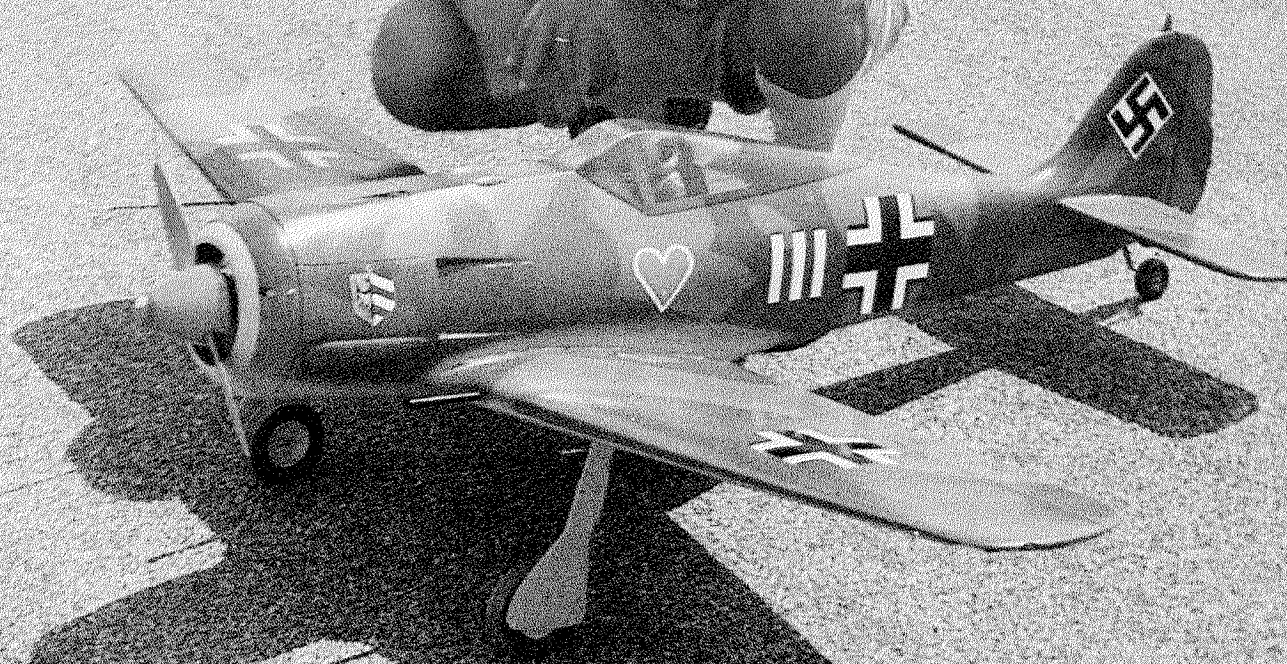


# Radio Control

## SPEED & SPORT

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Scene at Rhodesia-Stand-off scale Focke Wulf A/4-U/8 by "Lu" Sembiante. Built from Marutaka kit, Webra Speed .61 powered, Rhom retracts, Sanwa 6-ch. radio.







Unusual shot of the *Vill Doo* showing the V-tail configuration and the spoilers plus flaps in fully extended position, very clean machine.

# VILL DOO

BY JOHN L. HOOVER

**TGX Terraced wing sailplane has proven the new wing concept with its history of contest wins. Concept started with hand-launch gliders and progressed to its present form, the Vill Doo.**

PHOTOS JACK IAFRET

Author with his beautiful bird that has won the Toledo design event two years in a row.



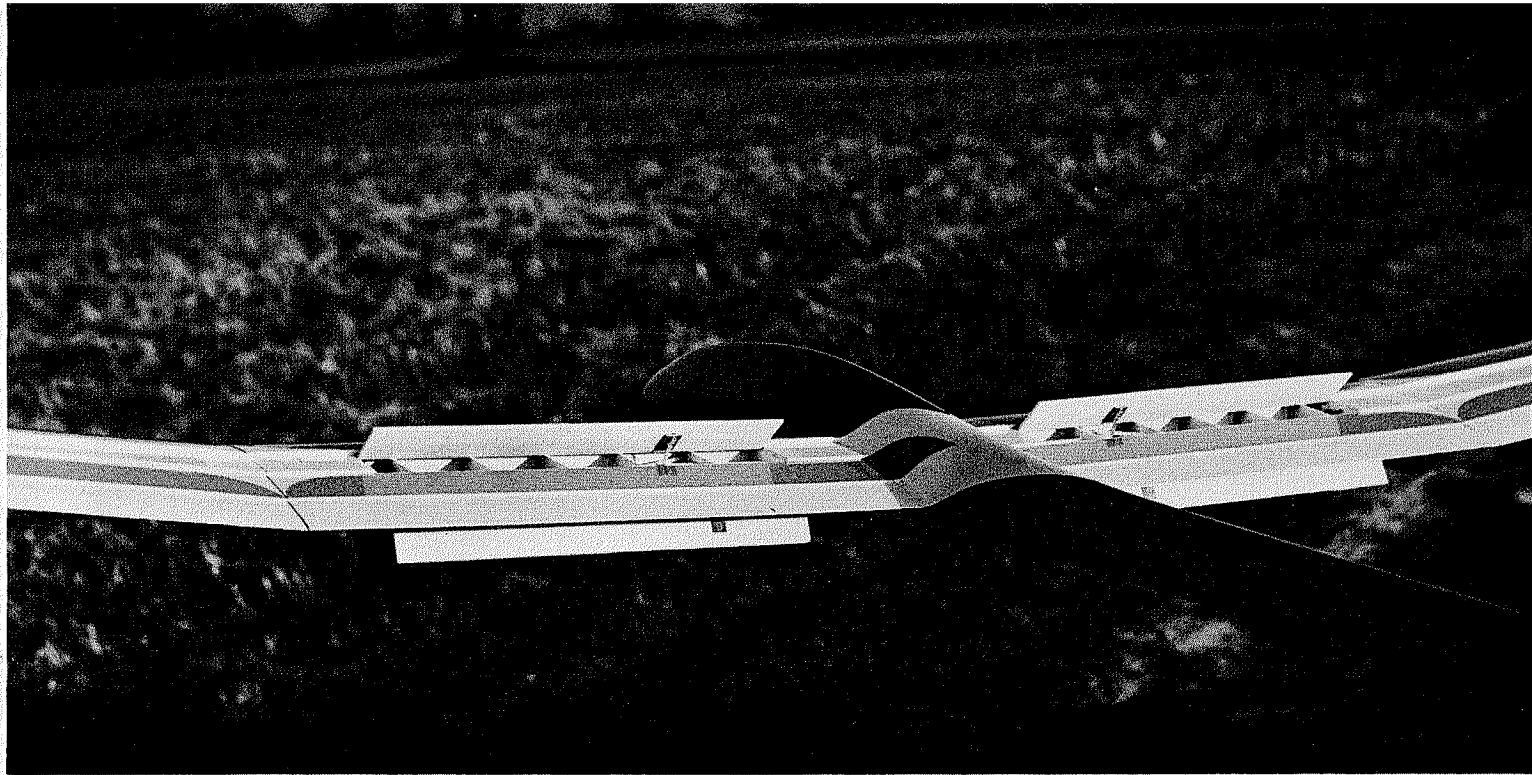
• The concept of my *Vill Doo* terraced wing hand-launch glider is based upon studies and experimentation done by Dr. A.M. Lippish, as reported in the October 1971 issue of *American Aircraft Modeler*. Dr. Lippish theorized that, with regard to a terraced wing glider, the air flow is induced to remain attached to the wing longer than it is on a conventional smooth airfoil. For several years previous to my reading this, I had been experimenting with a satisfactory V-tail and a good control mixer. Combining elements from several sources, the final outcome of my years of trial and new ideas was a 12 ft. 7 in., cleanly designed sailplane, *Vill Doo*.

Since my son John and I both have *Cirrus* sailplanes, we decided to further check the validity of the theory. John kept his sailplane stock in order to compare flight time on changes, while I modified the design on my plane's wings to three terraces. Operating on calm winter nights, from a high-start, I found at first that she needed more down trim, the hand launch distance was greater, and there was no glide speed change. She stalled on high-start but recovered nicely with down trim back in, giving increased lift with little noticeable drag.

My flight tests averaged twenty-five seconds more than stock, only six seconds more working cross-wind on both. *Vill Doo* exhibited no bad habits (other than that the terraces give out a whistle, even at normal glide speed), required less positive wing incidence, and had surprisingly good turn control. Flown at the Canadian Nationals, under cloudy and cool weather conditions, the *Vill Doo* on a duration flight stayed in the air one minute longer than all the other sailplanes!

The terraces previously mentioned have





Another view of the flap/spoiler combination, this time from the rear. Flaps are very effective in their fully extended configuration.

been the cause of some mighty funny experiences. One evening, as *Vill Doo* was in the air over a field near my home, hundreds of noisy starlings chanced to be preparing for their nocturnal roost in a nearby tree. One flight by a *Vill Doo* with her whistlers going, over the westerly side of the tree, and the starlings were last seen frantically migrating east. Build a *Vill Doo*, and you and your equipment could hire out as pest chasers! (No, you guys, it's not "for the birds.")

Enjoy your *Vill Doo* as much as I have mine, and watch with smug satisfaction as the other men puzzle over your plane enviously!

**CONSTRUCTION.** If you have an extra pair of *Cirrus* wings laying around your workshop, you have *Vill Doo* half-made already. It is only necessary to uncover the top rear of the wing and install the three terrace stringers. Remember to taper out between ribs A, B and C. To recover, it is best to cover the center terraces last. Wing pins 3/16" dia. can be ground down on one end to fit the metric *Cirrus* wings.

The plans are full-scale and self-explanatory, but I would like to offer some helpful suggestions.

**FUSELAGE.** The material used was blue color aircraft plastic foam purchased from a local lumber company. This foam has a close density and is easily carved. Start by sawing the flat outlines of side and top. Mark the center line references with a soft, dark pencil. Also mark cross-lines at template locations 1 through 9. File corners to shape, using print templates. I use a 8" double-cut bastard file for this. Keep bottom flat between stations 5 through 9 for reference between wing and elevator. It helps to spot-glue this flat surface to a board and finish filing the triangular

taper. Notch in the three Nyrod tubes and epoxy in place. You are now ready to double-wrap the fuselage with 1/64" plywood, starting as shown on the plans and ending at the tail. Before you epoxy, tape first end down and dry run this wrap. Due to the fuselage double taper, this lap will begin to open. This is all right because strength and weight are not needed at the tail. Cover with Easy-Does-It cloth from nose to back of wing. Use as many coats of epoxy as required for a smooth finish, and wet-sand between coats.

Cut the canopy out and hollow all walls to 1/4" thickness, also lay out wing openings now and remove just enough plastic foam for a good wing fit. Pick out a cavity above the wing for control rods and ballast box. You can now epoxy servo rails in place and

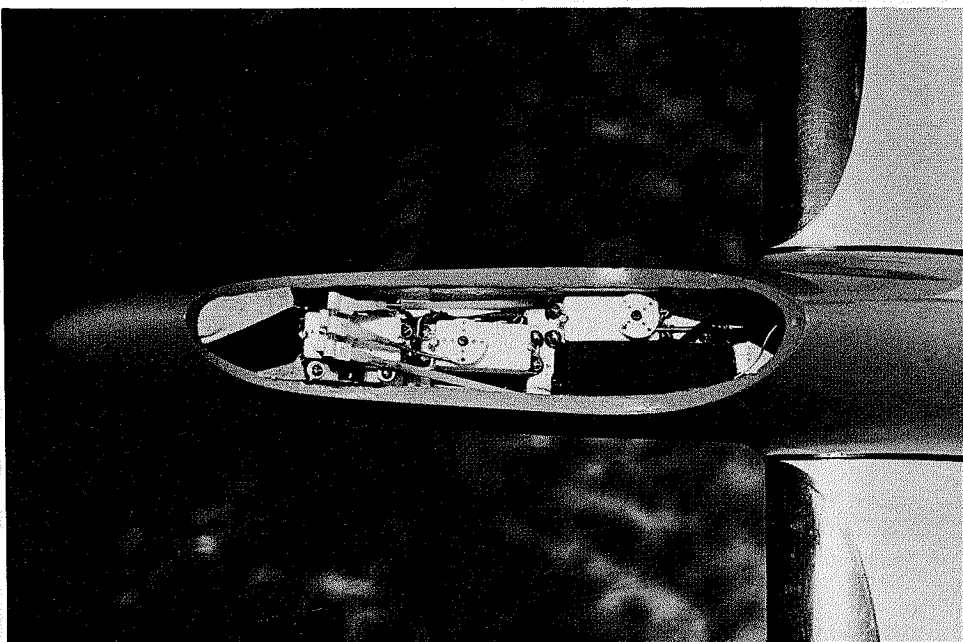
apply epoxy on the inside walls for added strength.

**CENTER WING.** Cut out 26 center wing ribs from 1/16" sheet balsa. You could stack these to be sure they are all alike. Notice that there are three holes only in eight end ribs.

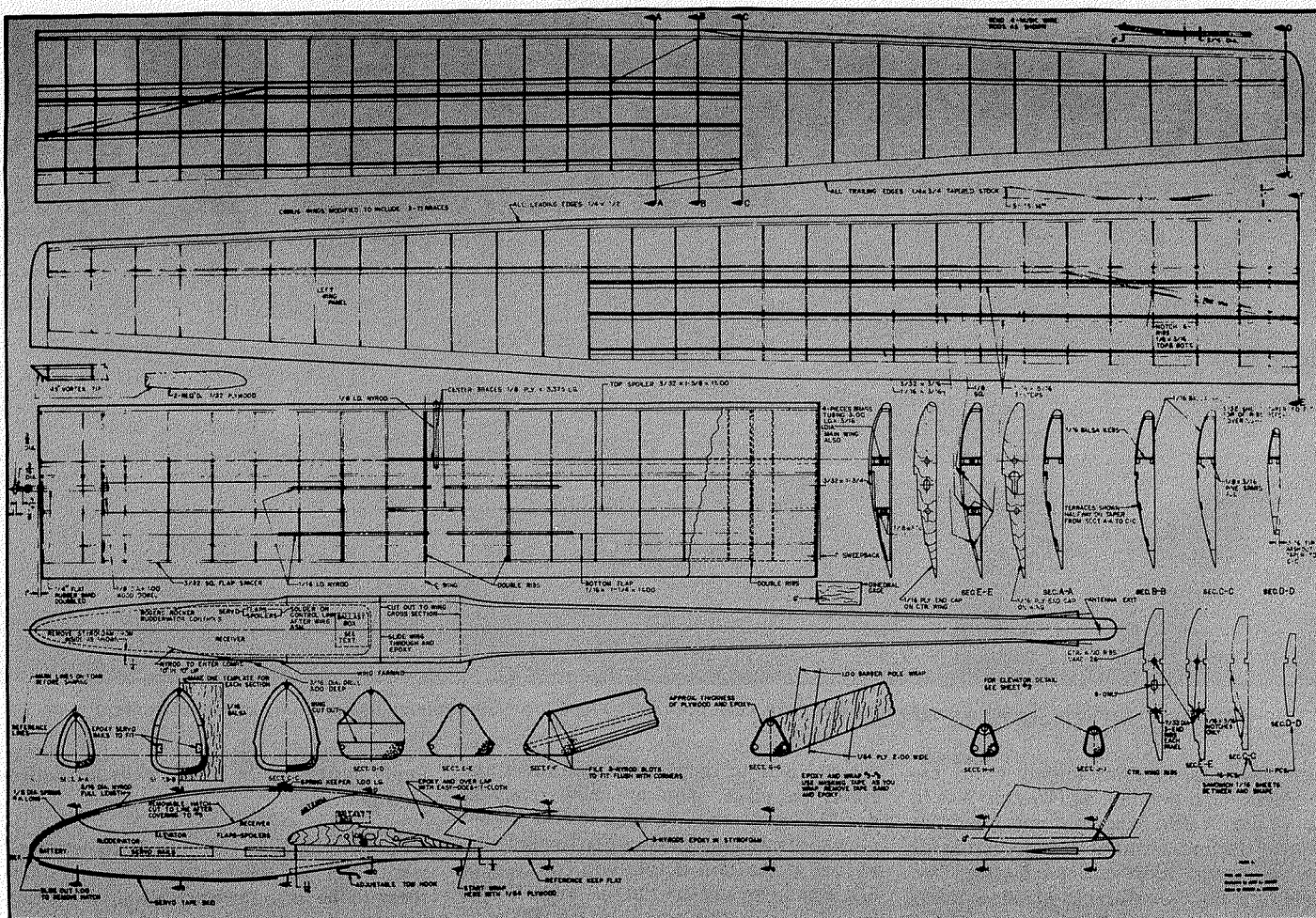
Use a flat surface to build on. Before laying wax paper over the plans, extend rib locations with a pencil outward from leading and trailing edge.

Start by laying 1/16" sheeting over complete bottom, cut out flaps and save. Install leading edge, trailing edge and two 1/8" x 3/16" pine spars. Cut four 1/16" inside dia. Nyrods to length and assemble pre-bent music wire for flaps and spoilers. Assemble  
(Continued on next page)

Sufficient room for the radio installation. Note elevon mixer control on the front servo.







FULL SIZE PLANS AVAILABLE . . . SEE PAGE 92

## VILL DOO . . . CONTINUED

ribs in position and glue, aligning end ribs to 1° sweepback and using 6° dihedral gauge. Remember to use double ribs in the five locations. Glue the top pine spars in place as also the 3/16" I.D. brass wing rubings in hard balsa blocks, and epoxy. Install ply gussets and all balsa webbing front and rear of spars. At this point complete flaps and spoiler controls, making sure they

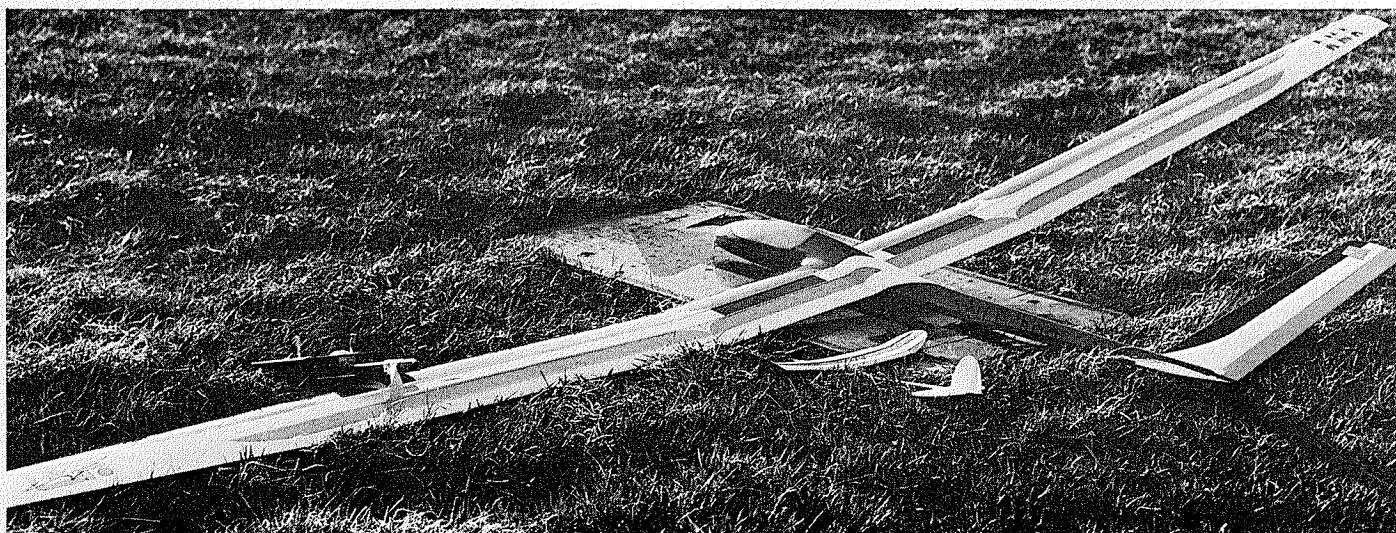
work freely.

You are now ready to sheet top of wing, starting with 1/16" sheet balsa from leading edge to high point stringer. Now for the terraces, first step down 1/8" sq. stringer, second down 3/32" x 1 3/4" sheet and cut out spoilers from this. Third step down 1/16" sheet balsa. Block-sand wing ends and epoxy 1/16" ply end ribs. Block-sand wing

smooth with flaps and spoilers temporarily spot-glued in place.

**WING MARRIAGE TO FUSELAGE:** Recheck for positive wing incidence at 11/16" in front fuselage opening down to fuselage Ref. flat. Slide wing in fuselage, and when in position, epoxy. Be careful not

(Continued on page 38)



The hand-launched glider that started it all is set behind the wing of the Vill Doo and demonstrates the contrast in size of the two planes!



to let epoxy run into controls. Make streamlined fillets around wing and fuselage. Epoxlite is great for this.

**WING PANELS.** Are constructed much the same as the center wing with the exception of one center spar only and single webbing after rear angle braces. Due to the double taper in wing the ribs are stacked with 18 pieces of 1/16" sheet balsa for E through C and 13 pieces for C through D. Build on a smooth flat surface and allow for wash-out in trailing edge as noted on plans. Terraces are made up with stringers tapering out from A through B and C. The vortex wing tips are epoxied on at 45° and parallel with fuselage.

**V—TAIL.** Is constructed fully symmetrical, meaning you need only one plan side with which to build two frames. Make the two ribs each as shown on the plans and sandwich eight pieces of 3/32" sheet balsa between and shape. Mark center spar location and cut out 3/32" wide. Build between 1/4" x 1/2" leading edge, 3/32" x 1/2" center spar and 5/16" x 1/2" trailing edge. Do not glue the center double ribs now. Keep all ribs level and when glue is thoroughly dry, trim off excess. Cut and fit geometric 1/8" sq. balsa braces. Balsa tip blocks can now be glued on and carved to shape. Repeat the above for second side and block-sand both alike. Ruddervators are made from 1/4" x 1 1/2" tapered stock. I like to use small hinges for installing ruddervators which can be made very strong by bolting the horn through the hinge. After fitting the six hinges, leave ruddervators off (for now) to install elevators in fuselage. Carve six angle holes out of fuselage to match the six spars, and epoxy in place on the 0 reference as shown on plans. Now epoxy 4 center ribs flush to fuselage.

**FINISHING.** The fuselage on mine was painted with Hobbypoxy paint. The canopy can be painted silver or black. Use a sliding 1/8" dia. spring to hold this on, which can be extended for use in quicker spot-landing stops. MonoKote was used extensively for wings and tail. Trim MonoKote is used for hinges on flaps and spoilers.

Since the plane's terraces have so many corners, it is best to cover each separately and this is your chance to have differently colored striped wings.

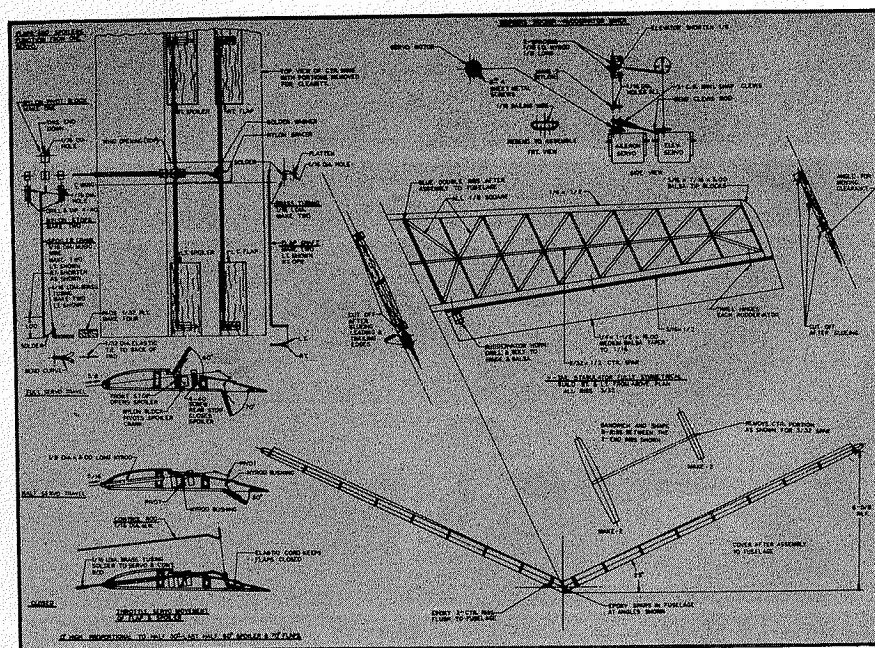
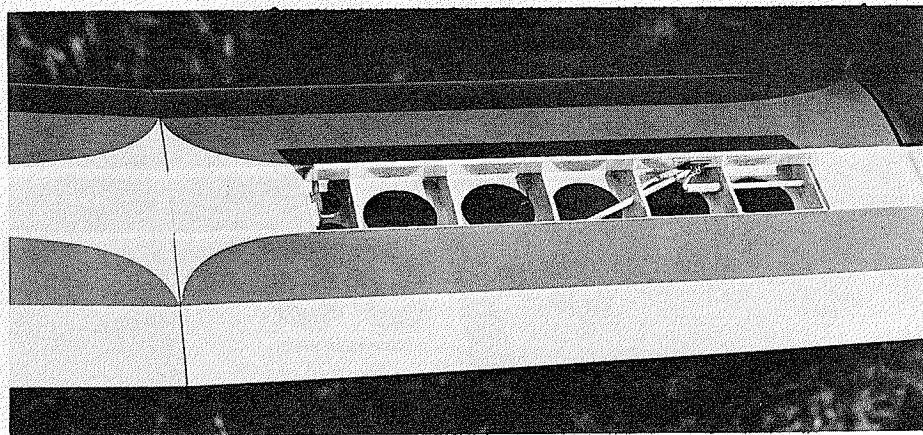
Get permission to raid your wife's sewing basket for 4 loops of 11/6" dia. elastic thread for flexible door keepers, (also keeps servo from stalling).

**RADIO INSTALLATION.** There is enough room inside for three small servos and a Thermic Sniffer. If you omit flaps and spoilers, two large servos could be used. When three servos are used, the flaps and spoilers servo is off-set to the right rear of the fuselage and the receiver to the left. Forward of these in line are elevator servo, and the ruddervator is next with mixer and batteries.

(Continued on page 94)

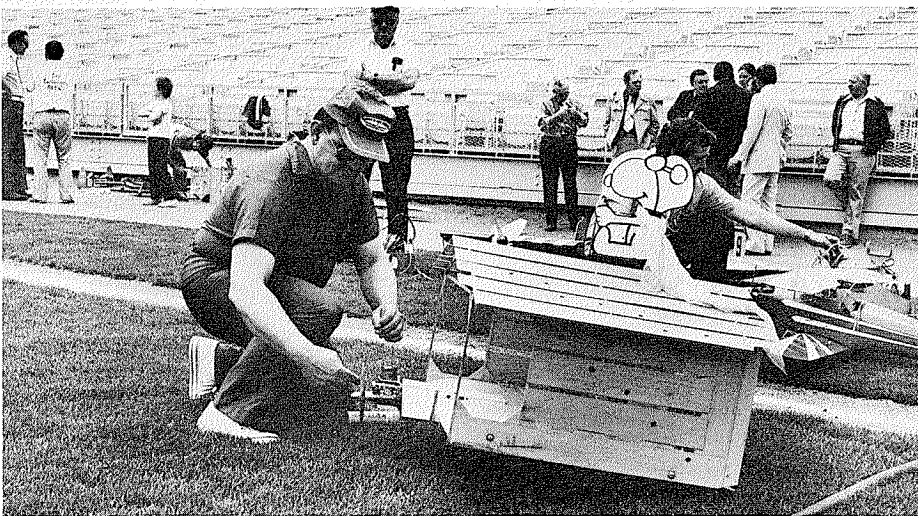


Two pix. above show workings of *Vill Doo*, top is the flat glide, other spoiler hook-up.





Excitement at Shea Stadium, home of the Mets, Dick Maloney's Snoopy fliers past scoreboard.



Dick Maloney fires up his Snoopy Doghouse at Shea Stadium while Fran McElwee watches!

• **YOU SHOULD GET "TUNED" IN.** Ever since Hanno Prettner "wowed" them all at Las Vegas, tuned pipes have been drawing increasing modeler interest. At Las Vegas we saw obvious performance improvement and tremendously lowered noise levels from Prettner's Webra Speed on a

pipe and it seemed to be a case of "having one's cake and eating it too"! Other mufflers that knocked down Db levels knocked down power as well; why was this one different?

I did some reading on the subject and found that the principles of tuned-pipe

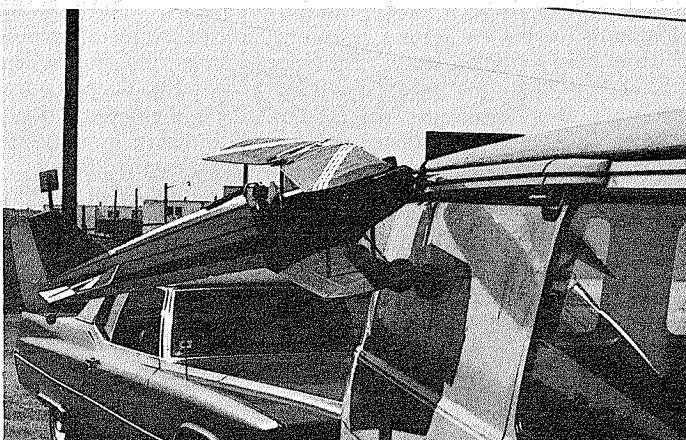


**BY ART SCHROEDER**



Bebe deRoulet, asst. P.R. director N.Y. Mets, model Mini-Pathfinder used in demo flights.

operation have been well known for forty years and have been used to good effect on motorcycles and other racing vehicles. In 1967, *MAN* published an article by Bill Wisniewski that outlined experiments in U-Control racing which he had conducted  
(Continued on next page)

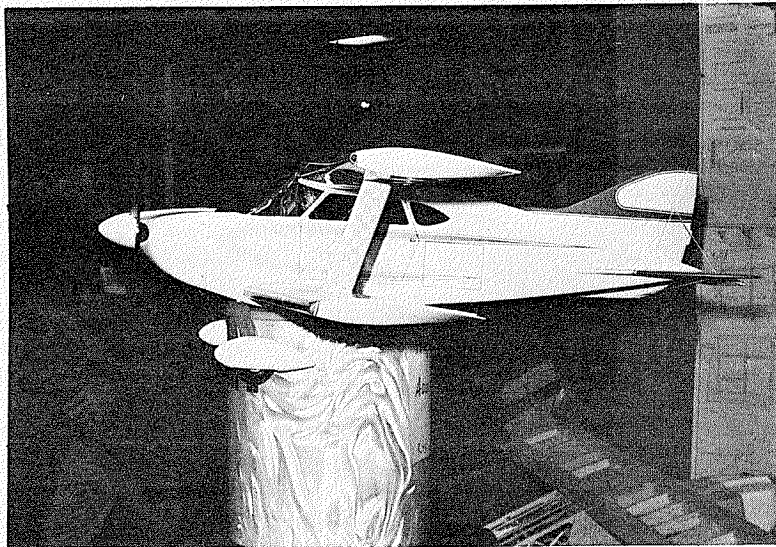


Karl Franke's Aeromaster firmly impaled to rain gutter of Tom Pirrone's van. Photo at right shows Karl (R) with his Aeromaster.

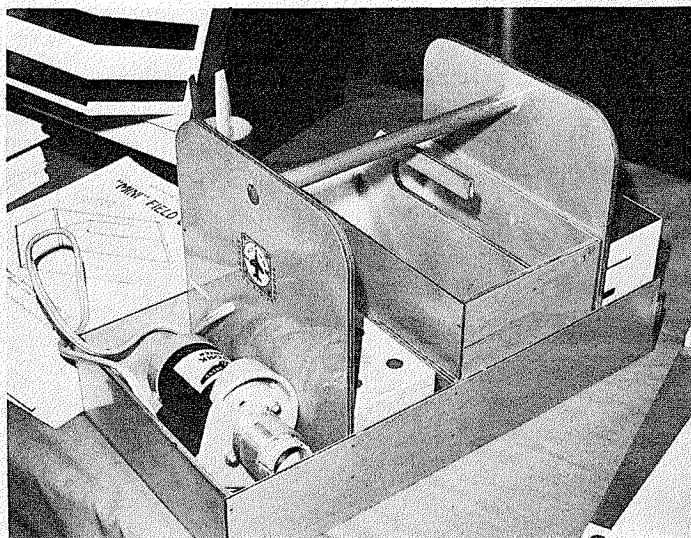




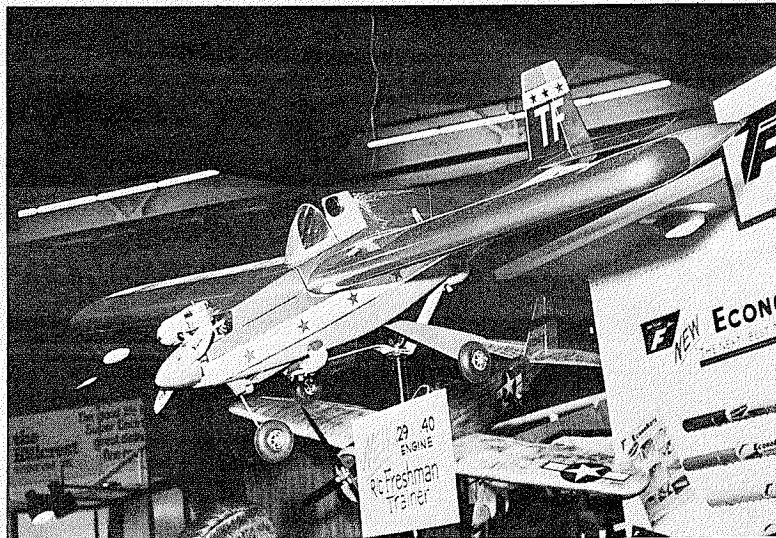
Delta Products' new Skyhawk. Molded fuse and wing, 15/25 engines.



Hyperbipe by Master kits—all-balsa construction for 40 engines.



New all-plywood field box by Southern R/C Products. Is in kit form.



New from Top Flite, their *Freshman* trainer designed for 29/40 eng.

## R/C NEWS . . . CONTINUED

with Roger Theobald over a five-year period. From this article stems much of our knowledge of modeling applications for tuned exhaust systems. Wisniewski produced power increases in excess of 10% with substantial noise reductions and greatly improved speed averages from his "pipe" dream.

Except for U-Control racing and some Free Flight work, by and large, no mass movement toward tuned pipes has occurred; particularly in R/C Pattern flying. That is, not until Prettnier and other European flyers started the movement all over again with their wins at Vegas and elsewhere.

Even after watching Prettnier's fantastic flights, this writer still felt a pipe was just not necessary. Perhaps it was valid for "International Class" fliers looking for that last possible "turn of the screw," but certainly not for Joe Average—contest or sport type. After all, they were large, not particularly attractive (some refer to pipes as a kind of "growth" on your sleek Pattern

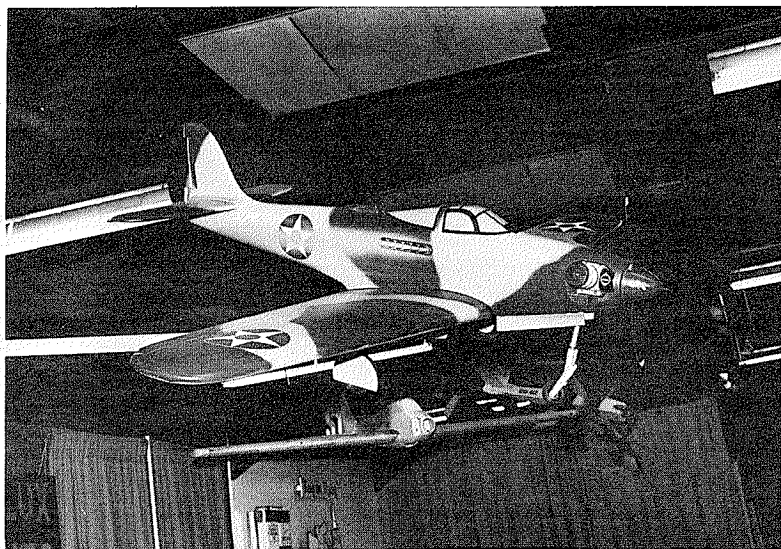
bird), heavy, hard to mount and still harder to adjust to any real advantage! Our engines were producing enough without adding this extra complication.

How wrong can one get? Savo Mele, our resident "try anything" expert, proved to me in one short flight that pipes are worth the effort—no matter what your level of flying skill may be. Savo had mounted a Webra pipe (#1100/7, available from hobby shops via MRC) on his OS Schnuerle 60 in an inordinately heavy fiberglass/foam *Troublemaker*. I had flown this *Troublemaker* on numerous occasions and it could hardly be called a top Pattern bird; weight will do that! With the pipe it was a different machine, fast and positive. There was not so much an improvement in level flight but vertical potential was fantastic. The *Troublemaker* handled Figure "M"s and Top Hats with ease. In fact, it was possible to nearly climb out of sight vertically.

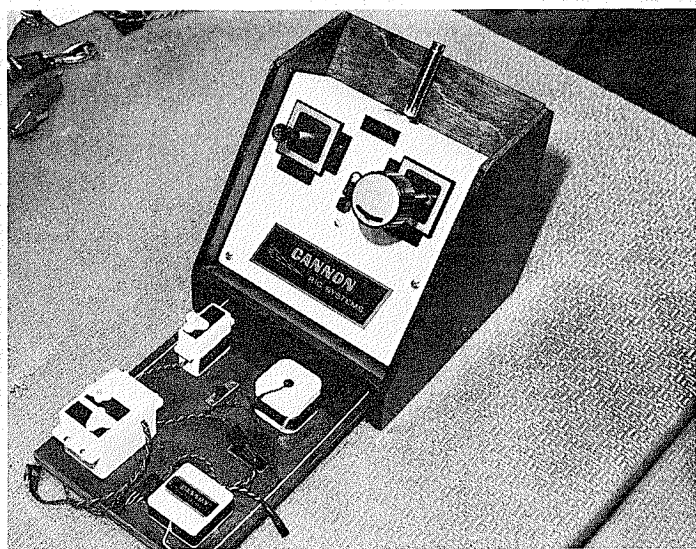
After this experience of a "dog" turning into a fine flying bird, I just had to try one

on our current Pattern machine. A contact with MRC netted a pipe and it wasn't long thereafter when my Webra Speed in Jeff Tracy's *Super Circus* was fully "tuned" up. Mounting proved fairly simple by using a bracket fabricated from 1/16" sheet aluminum to hold the pipe's rear. This bracket used two screws, that hold the pipe's rear cone, to capture the aluminum strap. The strap's other end was bolted through 3/32nd plywood pads epoxied to the fuselage's interior and exterior sides.

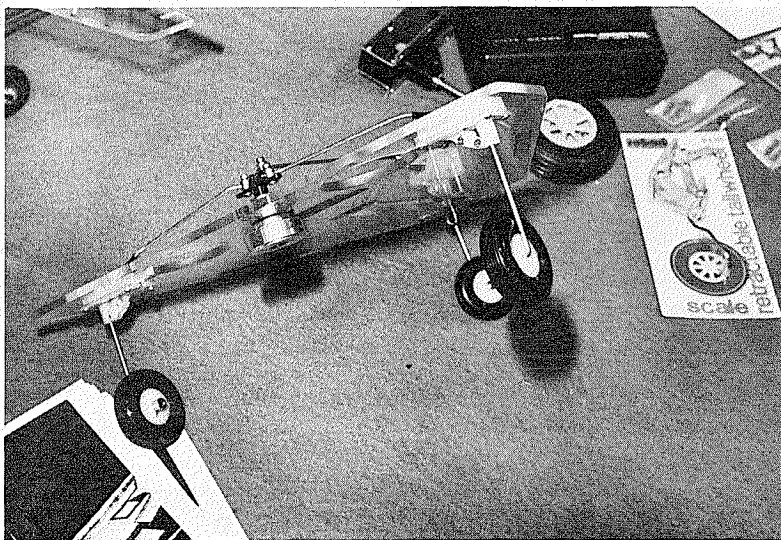
Since the pipe is a Webra product, the manifold fit nicely with no modification—other engines may require a bit of fudging. One thing to keep in mind, the exhaust system must be leak proof for proper operation. Webra includes a thick exhaust—stack gasket to make sure you get a good mating of the manifold to the engine. The pipe is connected to this manifold by a piece of heavy wall coated tubing. The tubing is sufficient to hold the pipe's front end and it serves a dual purpose, that of eliminating heat transfer back to the engine resulting in



Cass Engineering's latest, fiberglass fuse P-39 for 60-size engines.



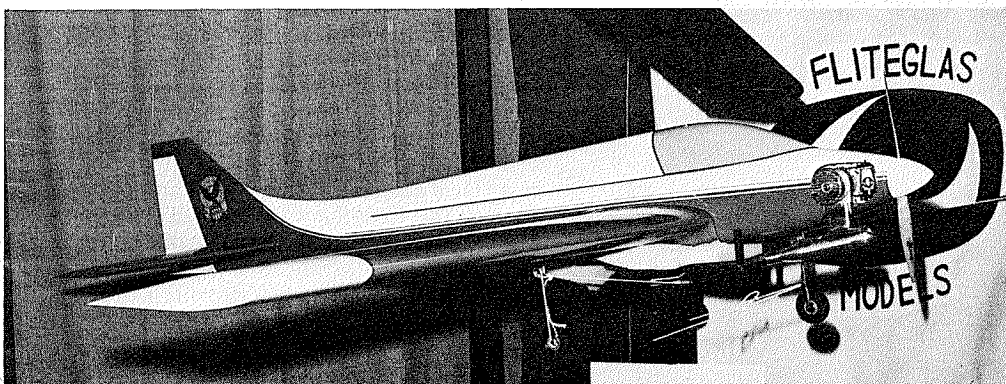
Super-mini radio from Cannon Electronics weighs 2.5 to 5 ounces.



New Robart retracts with variable geometry, could fit Corsair types.



Webra tuned pipe used in *Super Circus* tests, see text for details.



Alan Dupler's *Trion* kitted by Fliteglas Models is of fiberglass and foam, 60-size eng.

very cool runs.

All in all, installation wasn't much of a problem, and when done it really didn't look all that bad. Frankly, the pipe gives *Super Circus* a new, functional look. It certainly generates a fair degree of comment on the flight line.

Our Webra Speed, on 10% nitro, with a Top Flite Power 11 x 7½ prop, normally turned between 12,900 and 13,500. First ground run with the pipe in place went over

14,000 and minor pipe shifting brought rpms up near 14,500. In the air we once again found level flight only a bit faster but vertical capability almost limitless. That's not an exaggeration: we could climb that 9-lb. *Super Circus* as far as we desired, rolling all the way!

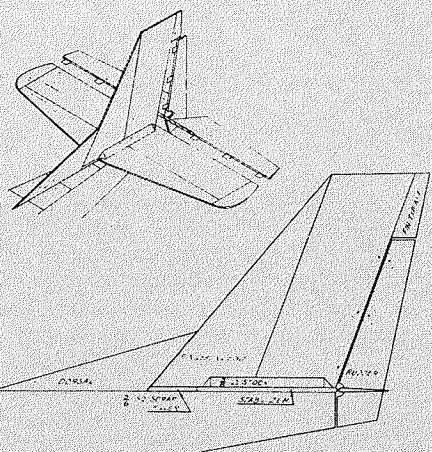
As to my concern that pipes would be fussy to set up, I found that only a slight shortening of the coupling between pipe and

(Continued on page 106)

#### the GEE BEE line

P.O. BOX 18 214 N. MAIN STREET EAST LONGMEADOW, MASS. 01028

To improve the slow speed stability of our Mallard we have redesigned the vertical stabilizer. All kits will now contain all of the necessary parts for this modification pre-cut from 3/16 balsa. Disregard the large drawing and build according to the drawing below. Full size templates for the new fin and rudder are on the reverse side if needed.



See "R/C News" July issue for details





Young son (16) of well-known pylon pusher and pattern competitor carries on the tradition; here Barry cleans up the small bundle of fun.

# Field & Bench

**COX HOBBIES' Q-TEE KIT  
COX/SANWA 2-CH. DIGITAL SYSTEM  
COX .049 BLACK WIDOW ENGINE**

**BY BARRY REED**

• One evening late as I was sitting on the edge of my bed feeling soundly thrashed by the system at the nearby jai-alai fronton, my father poked his head in my room to tell me that Walt Schroder had called. My eyes widened, as ten different thoughts raced through my mind at the same time. Dad went on to say that *M.A.N.* wanted me to do a "Field and Bench" on the Airtronics Q-tee and the Cox/Sanwa 2-channel radio. After a few more minutes of conversation I climbed into bed saying to myself, "What fun can you have with a 1/2A airplane, and a trainer, yet?" To quote good friend Arnie Wile, (*M.A.N.* January '76), "Boy, was I wrong!"

About a week later the material arrived. I spent the evening playing with the transmitter which almost fit in the palm of my hand. I was still bewildered, remarking to my father on why they had picked me when they could have asked someone with greater writing ability. I could see my father building up to one of his trite sayings like, "Don't look a gift horse in the mouth;" I decided to retreat to the basement and start building.

The plane's packaging is excellent, and all parts for wing and fuselage are assembled



Cool but typical New England day was chosen for first flight—note thumbs on sticks.

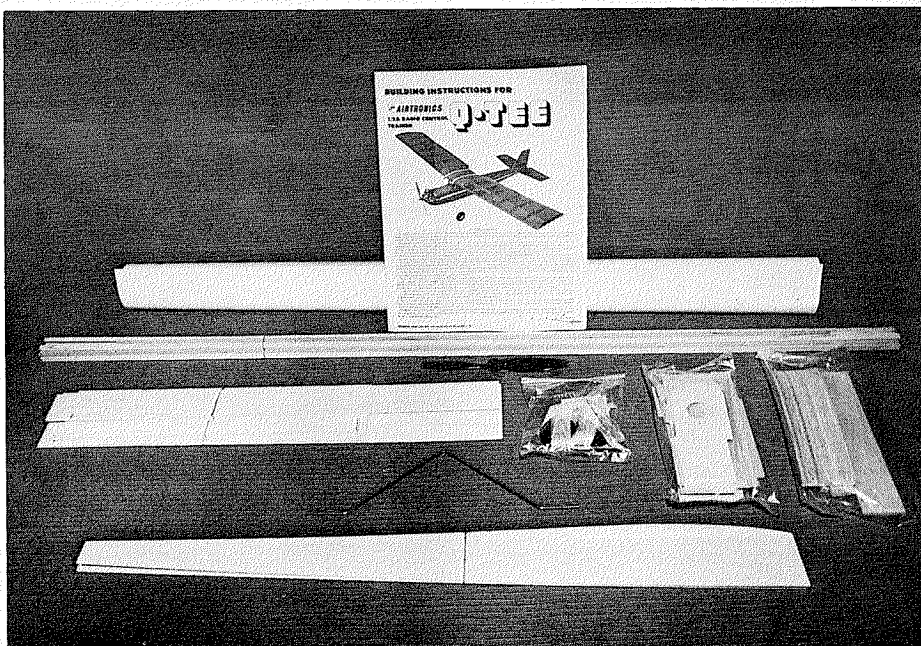


separately for easy identification. There are numerous slips of paper with helpful information for first timers including the Cox people's toll-free number if one has problems. I found them very helpful.

To say construction is easy and quick would be an understatement, (three nights with Hot Stuff). Every step is spelled out in detail and nothing is left to your imagination as is the case with some kits. The construction sequence described begins with the easier steps and progresses to the more difficult ones as your knowledge and ability also increase. The well-thought-out instruction booklet is aided by a well-detailed plan and also by pictures showing what each sequence should look like.

The wing is built flat and cut apart at the end. It is an extremely basic box construction with all parts fitting perfectly. The wing is very strong with  $\frac{1}{8}$ " x  $\frac{1}{2}$ " hardwood spar and a preshaped hardwood leading edge. The hardwood leading edge came in handy when my father caught one of my poorer landings by the wing. The wing is separated after both top and bottom sheeting is completed. A wedge-shaped block with the correct angle of dihedral built in is supplied which makes joining the two panels simple.

I found nothing hard to swallow with respect to the fuselage until I reached the part talking about the installation of the landing gear. The gear is just a piece of preformed  $\frac{3}{32}$ " music wire. The method



Kit package typical of Cox line is very complete, well-cut parts and clear instructions.

they use to fasten the gear to the  $\frac{1}{8}$ " ply bulkhead is just to take six pieces of one-inch long soft wire, come through the bulkhead around the wire gear and back through the bulkhead. The soft wire is then twisted together a few times and the whole assembly is smeared with glue. I knew that

with my landing ability that gear wasn't going to stay in for more than one flight. As it turned out I was wrong: the gear went two flights. To my surprise though, it wasn't the gear that had pulled away from the bulkhead—it was the  $\frac{1}{8}$ " ply bulkhead itself which broke. So this is the only place I would suggest beefing-up. A piece of  $\frac{1}{8}$  ply, the width of the fuselage, glued in front of the gear worked well for me.

The only other thing on the airplane that didn't seem right was the open hatch underneath the parasol wing. I would like to have seen some sort of hatch cover to keep out the oil from the exhaust. Not only does the oil get on the servos and soak the foam, but the MonoKote on the rear bulkhead lifts away because of all the oil seepage. A hatch can easily be made from a piece of  $\frac{3}{32}$  sheet. I cut my hatch a hair bigger than the opening on the sides and just wedged it under the  $\frac{3}{16}$ " top stiffeners. The foam from around the receiver, and the stiffeners were enough to keep it in place.

The instructions say to test-fly on a day with about 5 mph winds. These days seem few and far between in New England so I had to settle for wind a little stronger. Maiden flights are usually pretty exciting, and this was no exception, as my father found out when he tossed the plane into the wind. These little .049's run backwards as well as forwards and if you toss one too hard, the engine reverses direction and the plane comes fluttering to the ground like it was hit with a giant flyswatter. After I sorted out the launching problem I really learned what  $\frac{1}{2}$ A is all about. There is nothing like the feeling of flying all day for less than a dollar. The Q-tee is very stable, even in stiff breezes, and penetrates very well. It will do all the maneuvers a beginner can handle and I found that a shot of down before rolling out of an Immelmann Turn helps keep the plane in a straight line. In-

*(Continued on next page)*

**Small but extremely potent supply of goodies that make an unbeatable package for beginner or experienced R-Cer—it's good!**

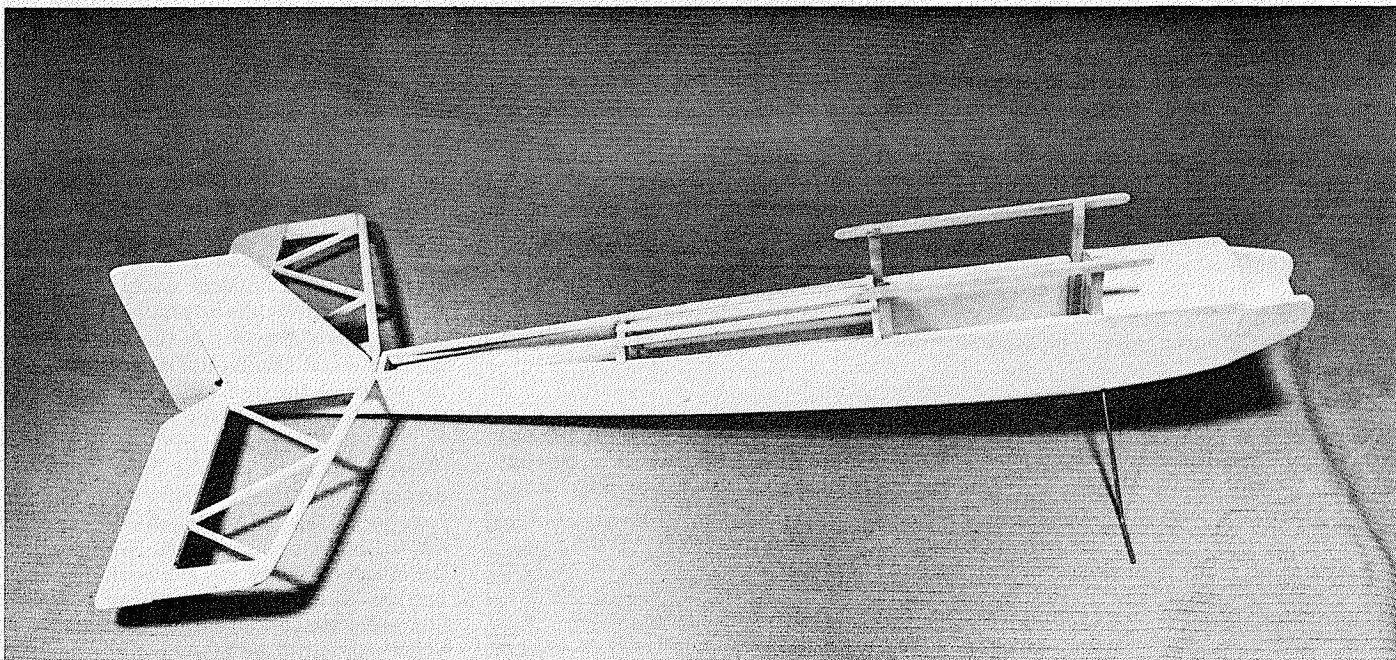


The power and control systems also carry the good Cox name, each tiny but very potent.





Two pix this page called "the usual before and after arrangement." Above we see the Q-Tee on its way home for a dead-stick landing.



And in this photo (before) we see the fuselage framed out with vertical fin and stabilizer also completed—typical sturdy Renaud design.

## FIELD AND BENCH . . . CONTINUED

verted flight is possible for stretches of about thirty feet at a time. With the fixed pickup in the Cox engine that is about all you get before the engine starts to sag. If you are quick on the up, though, you can usually get the engine to come on again. The Q-tee handles equally as well in a glide. I set up my approach short, figuring it would drop out of the sky. Wrong again, I ended up walking all the way to the other end of our six-hundred-foot strip.

The Cox/Sanwa 2-channel system is very different from most conventional radios. The servos are small enough to fit in any 1/2A ship but offer plenty of power for even larger models. The output wheel has twenty-three teeth and eight holes which allow for many different neutral settings and unequal control surface movement. The system takes twelve alkaline dry-cell

batteries, (8 in the dual-stick transmitter and 4 in the battery pack). I thought that the dry cells would pose problems in the battery box, but I haven't encountered any yet, and we've flown in some pretty cold weather. The only problem I have had is with the two LED indicators which continuously monitor the battery voltage and output power, in order that when the bottom indicator light on the transmitter becomes dimmer than the top one, one will realize the batteries need to be changed. Too bad it didn't work that way! After ten minutes of flying time, the transmitter's bottom light went out. (It didn't get dim, it *went out*.) When I got the transmitter back home, the bottom light was on again and the voltage measured 11.5 volts. I didn't know if I should fly it as it was, or send it back to the manufacturer, so I decided to

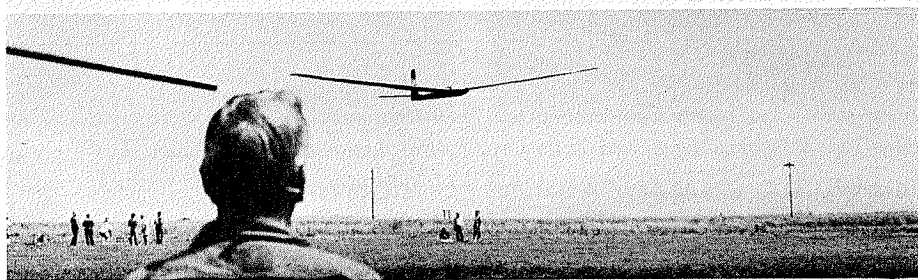
call the toll-free number and see what they had to say. Very helpful, they referred me to Cliff Weirick of Cox Airtronics. Cliff told me that he didn't know why my bottom LED went out, but that I could run the system down to about nine volts before changing batteries. If after a short period of flying, your bottom light gets dimmer than the top one or goes out, do not go out and spend another six dollars on batteries. It would be to your advantage to measure the voltage first.

If an airplane that is quick to build, inexpensive, and fun to fly, plus a good trainer in gentle breezes is what you are looking for, I think you will find it in the Q-tee. If a moderately priced, reliable 2-channel radio is what you need to complete your system, I think the Cox/Sanwa is well worth your money. ■





Fifteen of the 34 pilots and their birds line up for a picture; even with a wide-angle lens it was impossible to get all of them into this pic.



LeMon Payne's huge *Legionair* right on heading for the duration landing spot, slid right by.

# 1<sup>st</sup> RC Soaring WORLD CHAMPIONSHIPS

Hosted by SAARF (South African Association of Radio Flyers), the 1st ever Soaring World Championships was a total success.

## BY M.A.N. AT WORK

• I am sure you dedicated contest type Soaring and thermaling enthusiasts will claim that not enough expertise or little secrets will be included in this report of the first ever FAI Radio Controlled Soaring Glider World Championships, while you general interest types will believe that I have gone into too great detail; however, this report is directed to everyone who might be interested, and let the chips fall where they may!

As I said, this is the first ever; I realize that at the Aerolympics in Lakehurst in '74 there was a Soaring Championships included but this was only a provisional meet. It was won by South African Mike Malherbe who, because of military requirements, could not defend his provisional champs. His Dad, Monte, with many other South Africans made this a really memorable  
(Continued on next page)

What it takes to put on a super World Championships, lots of manpower! Actually this is not the entire complement of workers: a few are missing.







It's not all that easy. Austria's Karl Wasner about to launch *at left*, quite relaxed watching the timer and then *on right* see strain of the launch.



Canada's J. Humphreys launching *Alpha*.



Julius Topf of Canada sends bird on its way.



West Germany's Decker tows mate's plane.

## FIRST R/C SOARING WORLD CHAMPIONSHIPS . . . CONTINUED

event for the competitors, their supporters, and the press. I don't think Ron Moulton of *Aeromodeller* and this writer were ever entertained with more splendor, more verve or more food! Usually I lose anywhere between four to ten pounds on these junkets, but on this trip believe it or not I gained ten of the most unwanted pounds, with my clothes reaching the elastic limit.

Monte was chairman of the welcoming and festivities committee, and included among arrangements were a *Braai* (we call them cook-outs) at the Pretoria Flying Club facilities, which included steak, lamb chops

and farmers' sausage, also a salad, a variety of liquid refreshments and dessert. Then we had a buffet that you can't imagine, still another *Braai* of the same style and quantity at the contest site, as well as lunches each day which were full meals of staggering proportions. Included also in this food consumption contest was an outstanding cocktail and hors d'oeuvres party put on by the Mayor of Verwoerdburg (don't ask me to pronounce it!), the Honorable Dr. W. Scott and the full council of this fine community—in which Swartkops Airforce, site of the Championships, was

located. The Mayor's talk to the assembled group included a promise to prepare the site for the 1979 Pattern World Championships if South Africa's bid is accepted. The community was proud of its part in this Championships and wanted to continue our fine relationship in any and every way possible!

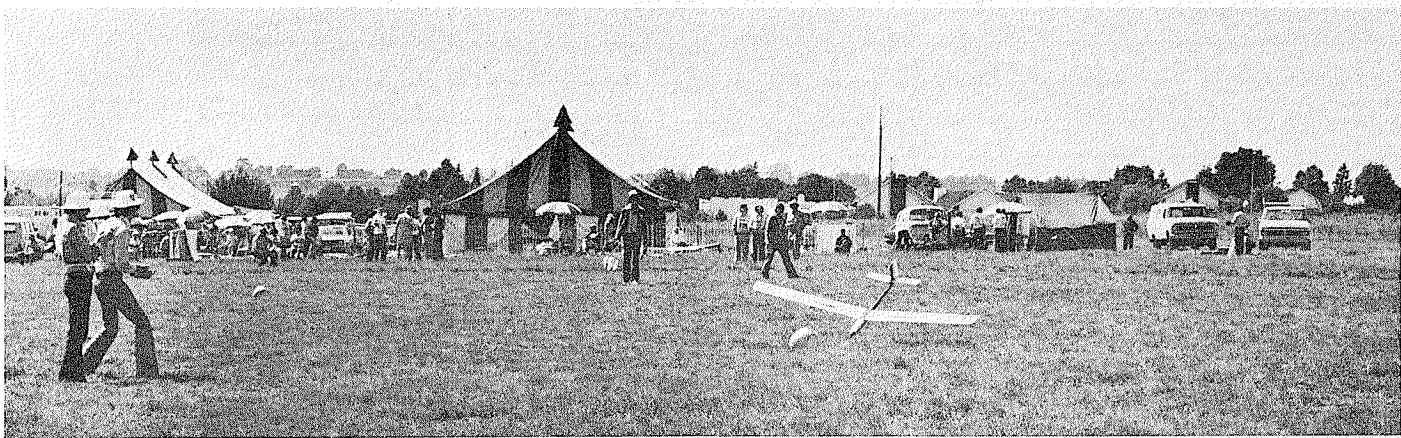
The flying site, while adequate, could have used a bit more running room for the hand towers, and was quite rough in spots. Facilities at the field were very adequate with a large processing tent, and very large plane impound. The transmitter control was very good, frequency monitoring was out-



Paolo Casadei of Italy sets up for landing.



So. Africa's famous Buzzards soaring majestically in a thermal; some pilots piggy-backed!



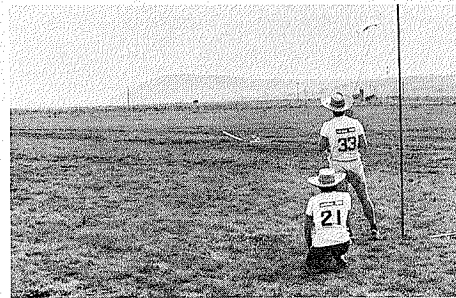
End of a Duration flight with spot (point ?) landing. Interesting technique, this business/of diving into the spot; but a little hard on the planes!



3rd pl. winner UK's Bannister launching.



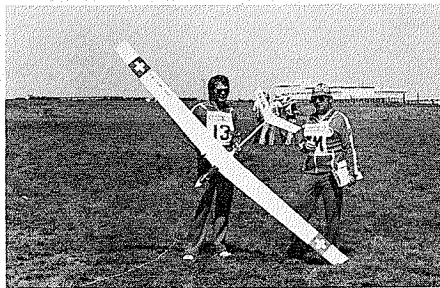
D. Nutter launches as D. Pruss TM directs.



Italy's F. Givone finishing Duration flight.



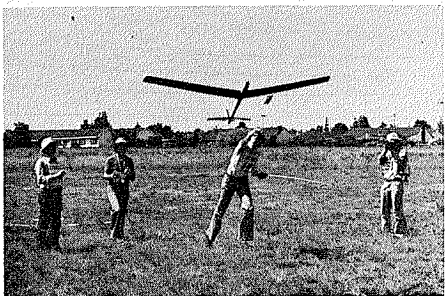
Host, Monte Malherbe, prepares a *Braai*.



R. Baumgartner with TM H. Schlapfer.



Processing team of N. Gerneke, J. Steyn, and B. Pautz works on LeMon Payne's sheet.



Germany's A. Saager launches original.



Switzerland's Laderach flew *Hobie Hawk*.



Spectators J. Brink, Hanno and Hans Prettnr.

standing, and scoring results were absolutely the best ever. Fifteen minutes after the completion of a task or a round, a full computer read-out was available to every team manager, the press and other interested individuals. These read-outs were so perfect and professional as you can see in one of the photos accompanying this article. Computer and copier were arranged for on loan, as was the Hewlett-Packard monitoring equipment. Imagine just fifteen minutes after the completion of the final round, we had the final standings in our hands!

In addition there was a complete

telephone link between the transmitter control, the contest directors' tent, Base A and Base B during the Speed and Distance events and even a link with the city.

Duration spot markers were semi-inflated beach balls anchored by rubber bands to the ground. These however were immediately deflated before the beginning of the contest, as there were those who believed that catching a wing at the root and the fuselage might cause some damage to the models. I can't believe that they would have caused any more damage than some of those spot(?) landings which were almost vertical dives.

The organization responsible for all of the up-to-date equipment and coordination is the South African Association of Radio Flyers, better known as S.A.A.R.F., and under the capable chairmanship of Don Mackenzie with Jack Abbot as contest director. Jack is that rare combination of diplomat and hard nose so necessary to properly conduct a contest of these proportions. His smile coupled with firmness of manner made it impossible to argue any of his decisions which were always fair and impartial. As to the competition it consisted of six rounds in five days of three tasks with

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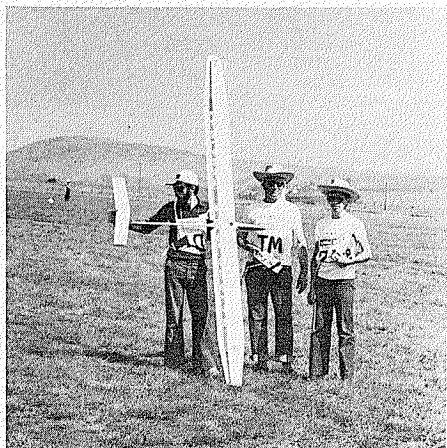
Sighting plane as it crosses line in Distance.



Aussie M. O'Reilly checks air before launch.



C.D. Jack Abbot sams his usual warm smile.



Italy's Eugenio Pagliano holding his plane.



Winner and Champ, Denver's Skip Miller.



2nd pl. winner Frikkie Roos, of South Africa.



U.S. Team Mgr. Dan Pruss, photographing.



Germany's Albert Saager launching his plane.



Private *Spitfire* put on demo after contest!

## FIRST R/C SOARING WORLD CHAMPIONSHIPS . . . CONTINUED

the lowest round thrown out. Tasks were Duration, Distance and Speed; Duration was limited to a six-minutes maximum, one-point-per-second deducted for all time over the six minutes with no landing points after six minutes, thirty seconds.

Landing points totaled 100 points maximum for right on the spot, with a five-point deduction for every meter away from it. Distance is where a flier must complete a maximum number of laps for a 150-meter course in four minutes. This task to my way of thinking needs considerable research and study, as in its present form it depends entirely too much on luck and the wayward thermal. (More later on this.) Speed is ex-

actly that—complete a 150-meter lap as fast as possible! All of these tasks must be performed with the same aircraft, and it is only the speed event that permits alteration to the model, and that is the addition of ballast or weight to aid in the speed requirement; most of the floaters would require a calendar to time them instead of a stop watch.

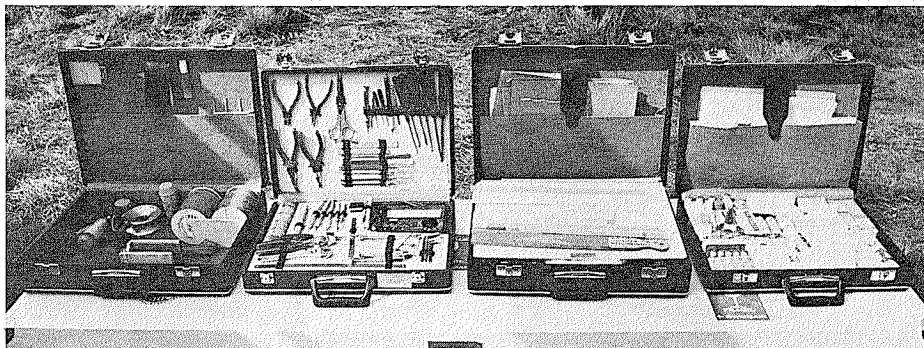
Launching methods are three-fold, First is the winch tow, second the hand tow, and the third is the high start. The predominant method used at the Championships was the hand tow; only five used the winch system and Skip Miller of the U.S. was the only one I knew who used the high start for a distance task, the wind stopped just at launch,

and the model barely reached a twenty-meter height.

Methods of using the tow varied; the South Africans who used the winch tow exclusively used a method of catapulting off the line which gained back the height which was lost by the winding in of the line. The Swiss used two men with a pulley system. Both would run together and towards the end of the run the lead person would stop and the other with the pulley would continue running for a short while. This would speed the model up to the height lost by the length of the line lying parallel to the ground. All in all, I am sure most everyone reached the 150-meter mark.

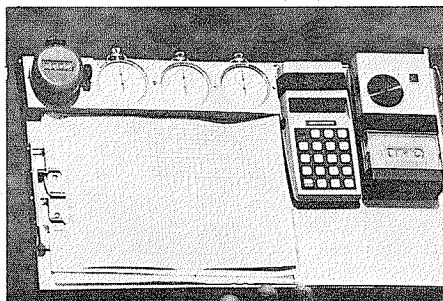


Most popular spot at contest, the "Beer Bar".



The Swiss team was the best prepared at the contest. 4 briefcases of tools and supplies.

Typical computer readout after each round!



Swiss Team Mgr.'s flight board very complete.

POS#	COUNTRY	POINTS	POS#	COMPETITOR	COUNTRY	POINTS
1	USA	6530	2	BANNISTER	U.K.	2754
2	UK	5608	3	TEN HOLT	NETHER	2725
3	USA	6531	4	DECKER	GERM	2712
4	NETHERLAND	6301	5	MILLER	USA	2645
5	SWITZER	5357	6	VANDER MELEN	BELG	2202
6	USA	5742	7	MATTINGLEY	U.K.	2198
7	AUSTRALIA	5429	8	GASSMAN	SWITZ	2141
8	GERMANY	5577	9	GREIS	LUX	2135
9	BELGIUM	5443	10	KEIM	NETH	2080
10	CANADA	5220				
11	LUXEMBURG	2741				
12	AUSTRIA	7835				

Scoreboard had all the information for public.

Many others of the hand tow variety did about everything in the book to get that extra bit of height. It was interesting to watch the many techniques shown, but the big thing was the running, and Dave Thornburg ran every tow for the American team—his efforts were above and beyond the call of duty. Dave combined with team manager Dan Pruss, made a formidable front office

team and played a very large part in the total success of our winning team.

More variations of models were seen at this one event than I have ever seen before at any contest.

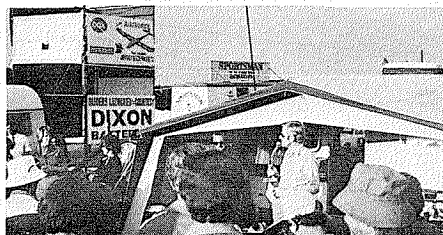
Some of the planes flown were small—approximately 2-meter span up to the large 3½-meter model of LeMon Payne. Most models were of kit or magazine plan with a

great many having modifications of one sort or another. Skip Miller's *Aquila* had a minor modification. All types of configuration were on hand, 'T' tail, 'V' tail, 'V' dihedral, polyhedral, conventional control surfaces, all-movable control surfaces. Many models had extra functions such as flaps, spoilers, flaperons, ailerons and

(Continued on page 98)



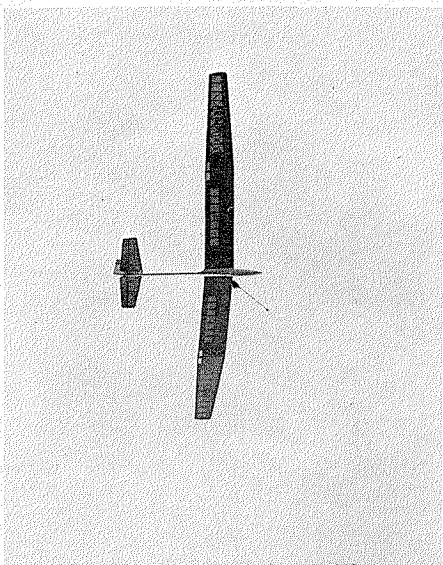
LeMon Payne launches, TM Dan Pruss calls.



SAARF's Don Mackenzie addresses crowd.



Left-handed launch by Italy's Franco Givone.



LeMon Payne's *Legionair* on its way up. . .

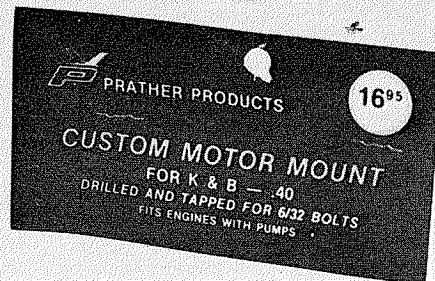


Pagliano glider's magnificent workmanship.



U.S. Team (L/R) Nutter, Thornburg, Miller, Misch, Pruss and Payne made a total effort.





New (R) and old Klotz packaging labels - note the model engine included on new label!

Prather Products produce the RNS mount.



## PYLON PIT PATTERN

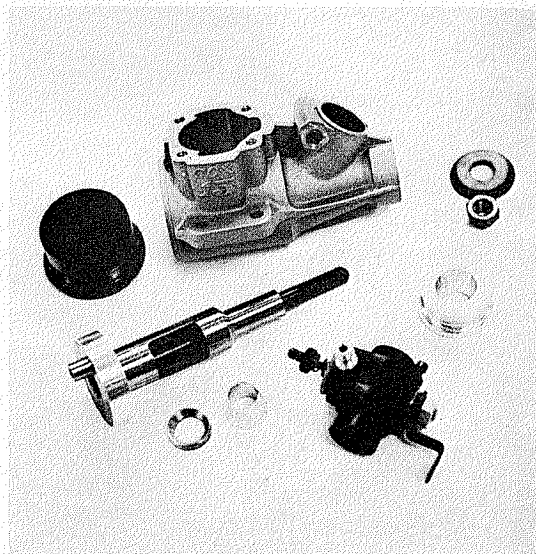
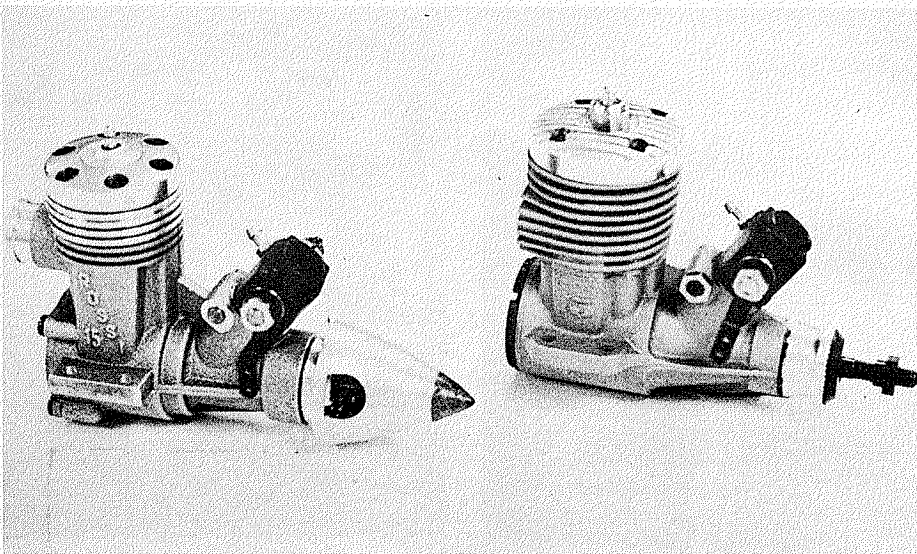
BY JIM MAKI

• KLOTZ KLOTZ, FIZZ FIZZ, OH WHAT A RELIEF IT IS. The relief is that after a short discontinuance, Special Formula Klotz returns to availability by popular demand. Part of that demand was from the modeling community, and it was interesting to note in the shipment recently received that a picture of a model engine now appears on the new label. It would

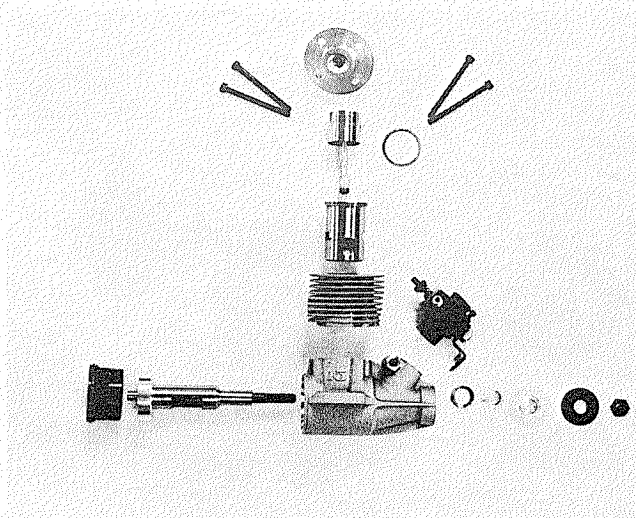
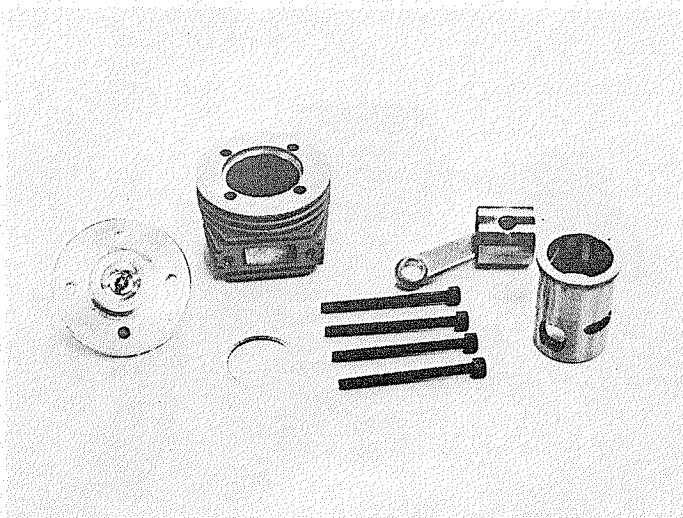
seem that our dollars and demands are actually making inroads on the real world.

What is a Klotz? Named after company founder and president, John C. Klotz, Jr., Klotz Special Formula Products, Inc. offers a wide range of synthetic lubricants and fuel additives aimed primarily at the high performance, two-cycle market. Go-cart, motorcycle, outboard and snowmobile speedsters have been using this oil for many years.

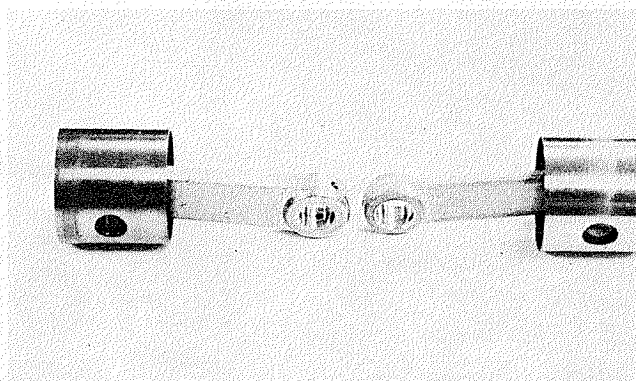
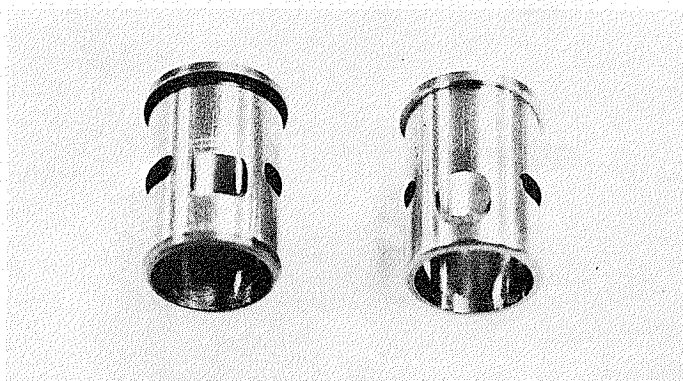
The primary advantage of synthetic lubricants over castor oil in model fuels is that synthetics do not tend to form carbon and varnish deposits as quickly as castor oil does. Varnish build-up on pistons and sleeves is a great power robber and this energy loss goes directly into heat. Another



Lower crankcase assembly for the Cox .15, Cox Rossi .15's for R/C Quarter Midget. backplate screws in crankcase, "O" ring seal.



Upper crankcase and cylinder head of the Cox .15, held by 4 screws. A "Pylon Pit Patter" blow-up for the Cox .15, impressive power plant.



Rossi 15 sleeve (L) compares with Cox (R); note the angled ports. Rossi piston/rod assy. (L) with Cox assy. (R). Rossi rod beefier.

benefit is synthetic oil's willingness to mix easily with high percentages of nitromethane. This was an important discovery for racing fans since castor oil can fall out of solution in high nitro fuels (50% and above) unless a mixing agent such as nitrobenzine is used. This additive was responsible for that "shoe polish smell" often detected in the pylon pits in days of old. It is rarely used these days since nitrobenzine was discovered to produce a highly poisonous gas and only the unknowing or foolish continue its use.

As far as protective qualities go, castor oil is probably still the best lubricant known to man, but synthetics do offer a very adequate level of protection even under the strenuous conditions found in racing engines. Tests run on a racing .40 using Klotz oil showed no appreciable wear in the crankshaft bearings and connecting rod bushings after an entire racing season. Fortunately for the unconvinced, it does not have to come down to an either/or situation, since a combination of synthetic and castor oils is possible. Racing fuel up in the 60-70% nitro level can be mixed with 18% Klotz and 2-4% castor oil, and the castor will stay in solution on all but the coldest days. (Shake well before using.) Sig Manufacturing packages Klotz oil and it should be available at your local hobby dealer's. If there is no hobby shop in your area, Klotz can sometimes be

found in motorcycle accessory departments or custom speed shops. If none of the above works, write to me and I'll tell you how I found it.

**THE INSTANT PAPERWEIGHT TRICK.** I'm sure that most of you have noticed that the average hardware store variety 4-40 or 6-32 tap will only work for three holes in hardened aluminum. Since four bolts are needed to mount an engine, this means that the tap will break as you try to thread it through the fourth and last hole in the mount. Not only will it break in the last hole, but it will get almost, but not quite, all the way through the mount before snapping off just below the surface and become hopelessly buried in all that expensive aluminum.

One solution to the problem is to locate a two-fluted gun tap. Once you have located it, buy it. These little gems seem to work very well in hardened aluminum and are very resistant to binding up and breaking in motor mounts. If you also happen to have a two-fluted gun around the house . . . well, need I say more?

An alternate and easier solution however, comes in the form of the Custom Motor Mount marketed by Prather Products. As mentioned in months past, this is the bar stock, milled mount previously sold under the RNS label. Prather Products has taken

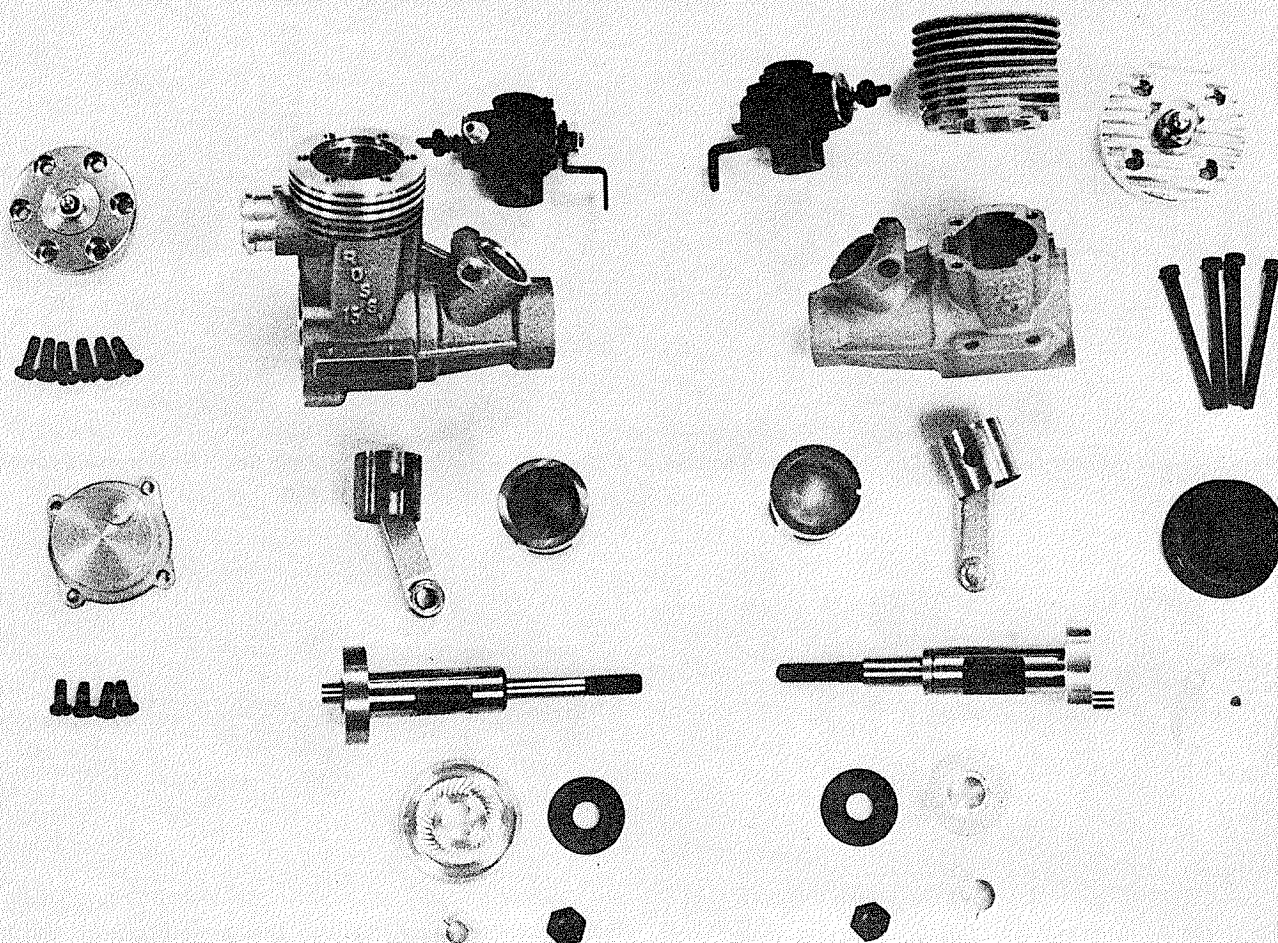
over the line and expanded it to cover the S.T. X40, K&B .40, Kraft, Webra, Veco, O.S. and S.T. .60's. They come already drilled and tapped and will accept engines with pumps. For those of you who enjoy the challenge of tapping your own mounts or wish to use some other engine, the Prather Custom Mount is also available undrilled. The price is \$16.95 which makes it one of the highest priced mounts on the market, but it is also one of the highest quality mounts available and the predrilled/pre-tapped feature alone makes it a good buy. Mounts (at any price) with broken taps embedded in them by their owners are not good for much more than paperweights.

**OF THE ROSSI AND THE COX.** Just to prove that I actually do read and appreciate all the newsletters that are kindly sent here, I'm going to include this month a short item written by Bob Root that appeared in the *Q.M.R.C. Newsletter* edited by Nick Nichols. Bob is one of the top Quarter Midget competitors out in California, and he has come up with some performance evaluations on the Cox and Rossi .15's.

"These last two races have indicated that the Cox engine is competitive with the Rossi. It's a healthy sign for racing to have varied competitive equipment available. The fastest Coxes seem to be using the non-

*(Continued on next page)*





Major subassemblies of both Cox and Rossi .15's, Rossi on the left and Cox on the right. Note Cox uses back plate gasket to seal case.

## PLYON PIT PATTERN . . . CONTINUED

finned high compression heads with no copper head gasket. However, several paper crankcase gaskets are needed to get proper head clearance. It seems best to keep adding gaskets until maximum rpm is achieved. This usually occurs with a head clearance between 9 and 12 thousandths."

"The Cox is not a torque engine like the Rossi and it needs a lot of rpm. The best prop seems to be a Rev-Up 7-5N cut down to between 6½ and 6¾" diameter and thinned to give a ground rpm of 21,500 to 22,500. The Rossi, however, seems to work best with a little more prop than this. I have observed an awful lot of lean runs and corresponding sick or blown engines in the last several races. For my racing I usually check for peak *sustained* rpm (after the engine is warm) and then back off about 600 rpm. My feeling is that a slightly rich engine goes faster and lasts a lot longer than a slightly lean one."

Substantiating Bob's feelings are the real proof of the pudding in the form of race results. In two races earlier this year at Rabbit Dry Lake and Pomona Valley, Bob

managed to take first place at both contests flying a Cox. At the Lake race he also turned in the fastest time of the meet and at the following contest second-placing Kent Thomas won this honor also with a Cox.

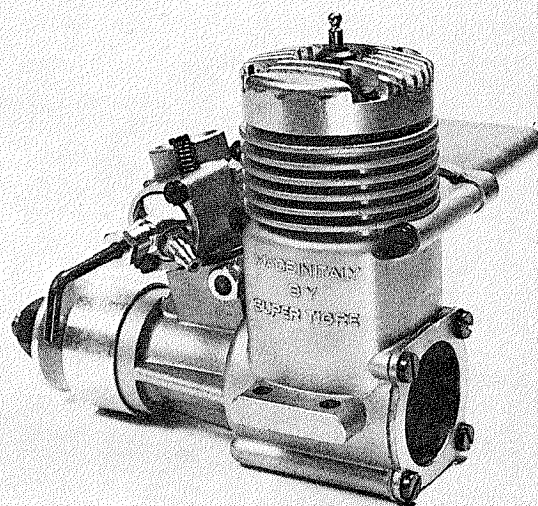
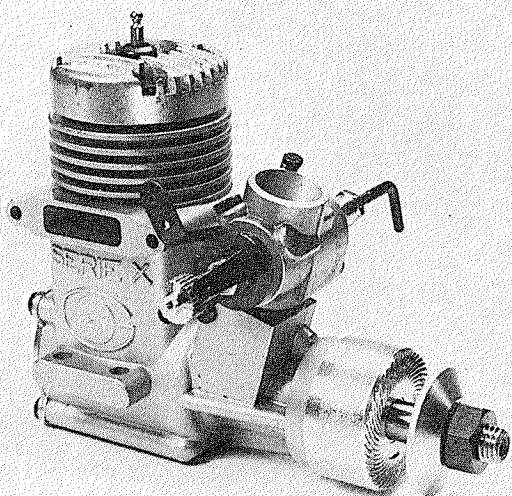
**QUARTER MIDGET AT THE NATIONALS.** When magazine writers get into the information distribution business, we are at the mercy of our sources of supply. The modified AMA Nationals rules for this year's Quarter Midget event reached all major publications earlier this year with a request to distribute this information via the various racing columns. Unfortunately, this information was not accurate although the source was considered official. The incorrect rules have already appeared in print in other publications and hopefully will not cause too much confusion at this late date.

From 1977 Nats Pylon Event CD, Mike Atzi, comes the following final word on Q.M. rules for this year's Riverside Nationals, "Rules for Q.M. at the 1977 Nationals—The AMA rule book, page 49, will apply, plus the following: 'The two-

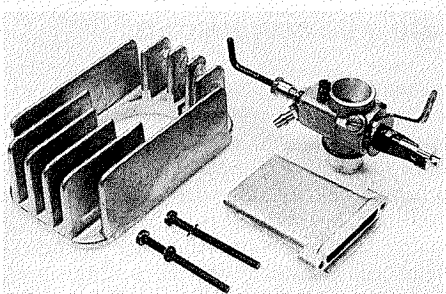
mile course will be used with flagmen at Pylon No. 1. The scoring method will be per Formula 1. Idle check will be accomplished before takeoff—may be required prior to any takeoff. Deadstick Landings—½ point loss. Profile Check Canopy—Williams Brothers' Pilot Head 1.5" scale must fit inside to a point where he would have proper clearance to see out and fly aircraft: only questionable canopies will be checked. Props—only wood props allowed; prop modification only as per rule book. Exhaust Extractor—tuned pipes will not be allowed. An exhaust extension may be used if it or any other device used to get the exhaust out of the airplane has a slit no less than ¼ inch wide for its entire length. Mufflers are not required. K&B 500 fuel will be supplied. Hard hats required for pilot and caller; will not be available from management'."

**BAKERSFIELD BOUND.** This month's column is my famous annual deadly deadline that backs up to only hours before having to take off for California and our In-

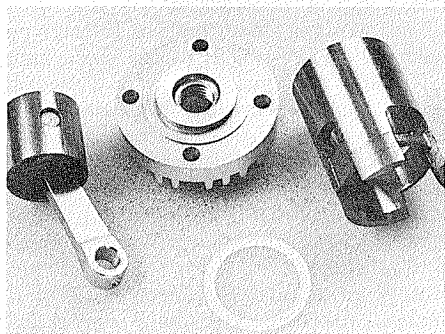
*(Continued on page 98)*



Latest Supertigre X .21 has its own (bigger) casting instead of X .15FI body used for introductory model last year. The X .21 is available in standard R/C version and racing car versions as well. X .21-CAR model shown in photo (at right) with its special exhaust stack.



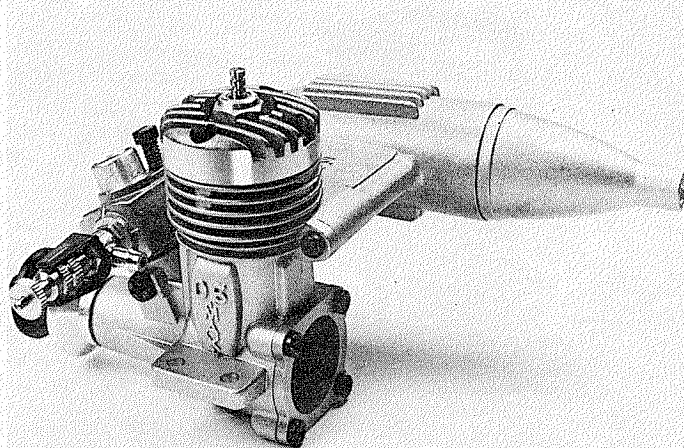
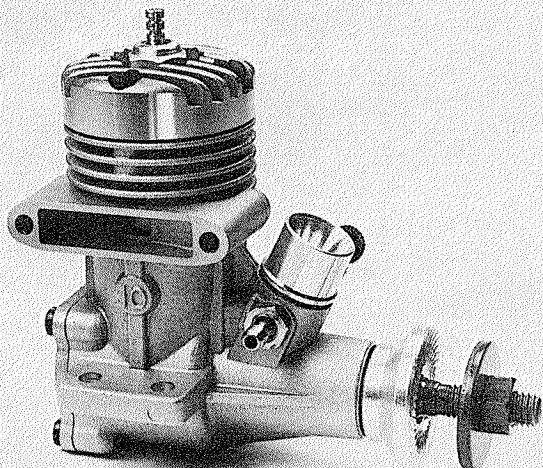
Parts that distinguish X.21-CAR version are its bigger carb, heat-sink, and exhaust stack.



Unique Max 10F-SR feature is its spec. cast cylinder. Piston/rod assy., cyl-head shown.

O.S. Max 10F-SR has Schnuerle scavenging and replaces the old Max 10 model. New OS-761 muffler also included. R/C version shown at

right. The "S" version of the new O.S. Max 10F-SR has a standard venturi and needle-valve assembly for Control Line and Free Flight use.



# Engine Review Round Up

BY PETER G. F. CHINN

**Five reviews of new and improved motors. Described in order of displacement, this month's selections from .10 to 61 cu. in.**

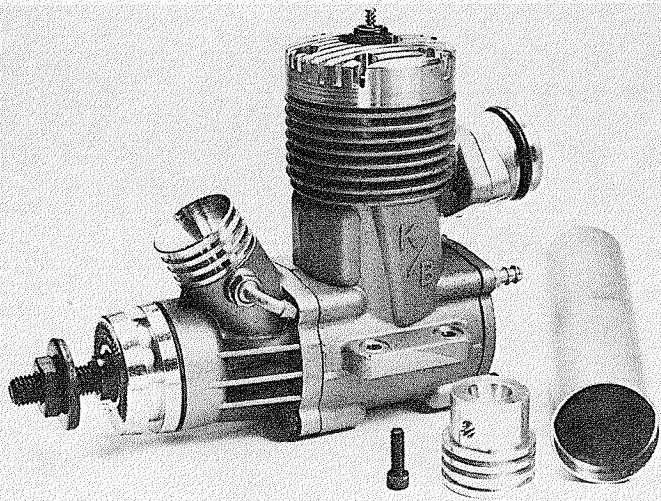
- O.S. MAX 10F-SR. The Max 10F-SR engine has the distinction of being the one-hundredth model to be produced by the O.S. company in its 40-year history. Put into production at the close of last year, it replaced the twelve-year-old Max-10 crossflow design and, with the withdrawal also of the low priced O.S. Pet 099 beginner's engine, it is now the smallest of the 27 engines in the 1977 O.S. range. Like the Max-10, the 10F-SR is available in both throttle-equipped and standard sport or stunt (10F-SRS) versions. It has the same bore and stroke as the earlier engine but is a

more refined and up-to-date design offering a higher level of performance.

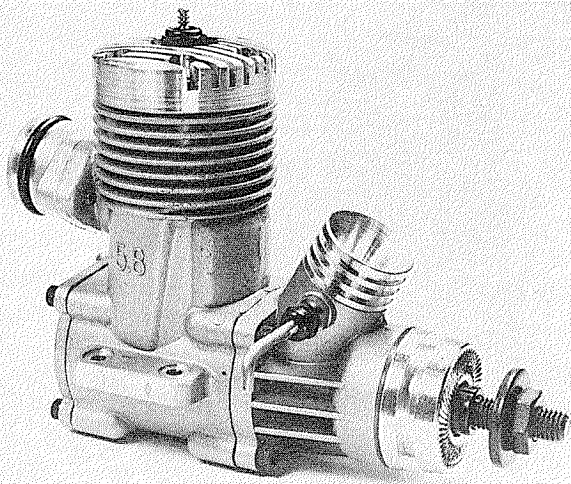
The most significant feature of the Max 10F-SR is its special Schnuerle-ported cylinder. Schnuerle scavenging is, of course, also to be found on other "SR" series O.S. motors but the 10F-SR is unique in that its cylinder-liner is produced from a thick walled casting (see photo) with its four ports cast-in instead of being machined. Moreover, the 2.3 mm wall thickness has allowed all three bypass channels to be cast into the outer wall of the liner. These take

*(Continued on next page)*





Latest from K&B are powerful front-valve, rear exhaust, ABC Control Line and Free Flight engines in 4.9cc and 5.8cc displacements. 5.8



version shown in pix above. The K&B 5.8cc (.35 cu.in.) supplied with a large and a small venturi insert, Mini-pipe both engines.

## ENGINE REVIEW ROUND-UP . . . CONTINUED

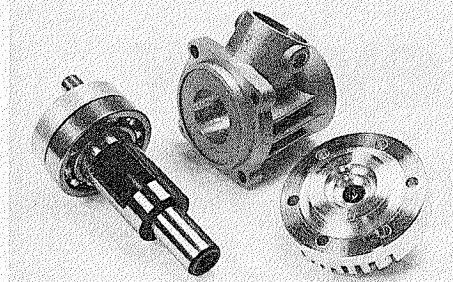
the place of the passages normally found in the inner wall of the surrounding aluminum cylinder jacket.

Another unusual feature concerns the actual location of the liner within the cylinder jacket. As with the O.S. Max 25F-SR described last month, the exhaust discharges slightly to the rear of the right side and the other ports are positioned accordingly, i.e., the two main bypass ports are located front-right and rear-left, while the upwardly inclined third port is left-front. The liner is rotated in the case approximately 30° to achieve these locations. The liner does not have the usual top flange. Instead, it is vertically located at the bottom by a narrow seat in the main casting and, unlike the 25F-SR, is not pinned against rotation. This needs to be borne in mind whenever the engine is disassembled. The correct location of the liner can be easily checked by noting the position of the forward edge of the exhaust port relative to the casting (about 0.5 mm) before loosening the cylinder-head. This will ensure that the three slots in the case seat are correctly lined up with the three bypass entries when the

engine is reassembled.

The rest of the 10F-SR is modern but fairly conventional in design and construction. The well-produced body casting, comprising crankcase, cylinder-jacket and front housing, has a cast-in phosphor-bronze main bearing supporting the counter-balanced hardened one-piece crankshaft. This latter has a 9 mm o.d. journal, a 6.7 mm induction passage and a 4 mm crankpin. The flat head lapped piston is fitted with a full-floating 3.5 mm o.d. tubular wristpin having pads of Teflon type material. The conrod is of machined high duty alloy with plain eyes. The cylinder-head is machine-finished from an aluminum pressure casting, is fitted with a 0.2 mm (8 thou.) soft aluminum gasket and is secured with four Phillips 2.5 mm screws.

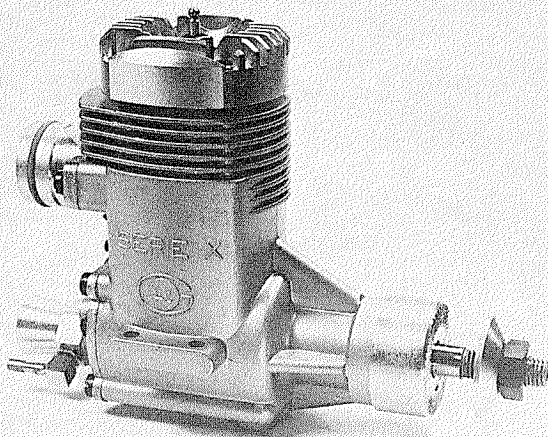
The Max 10F-SR is equipped with a conventional barrel-throttle carburetor similar to that fitted to the Max 15 R/C but without an adjustable airbleed and with a smaller choke. Effective choke area is approximately 10 sq.mm. The Max 10F-SRS has a machined aluminum 6 mm choke venturi and a 3.4 mm spraybar, giving an effec-



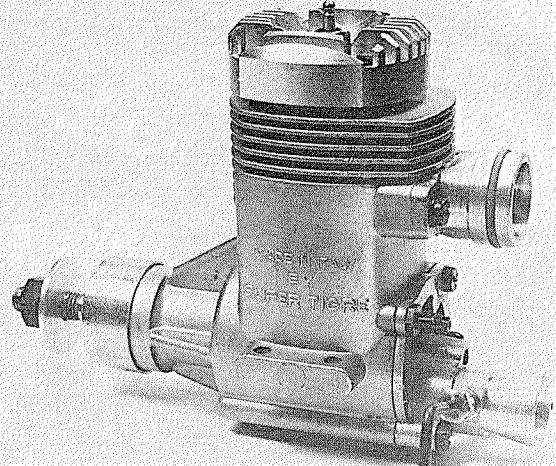
K&B's 15x28 mm main bearing supported in case barrel instead of front housing. Head has double-bubble combustion chamber.



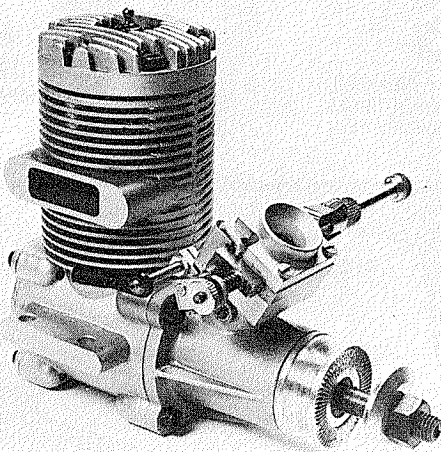
Supertigre X.40 has ABC piston cylinder set-up with ST variant of Schnuerle porting and dual concentric bowl combustion chamber.



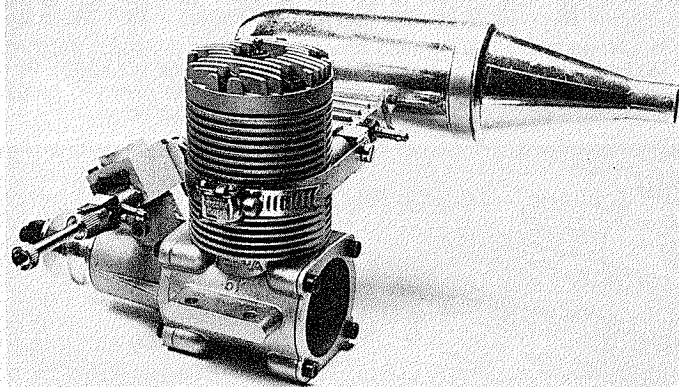
Current model Supertigre X.40 has one-piece main casting and revised Schnuerle porting. A tough, well-built motor. The X.40's cylinder



fin area is increased at rear to help remove heat from the hottest part of the engine. Note rear exhaust porting for pipe installation.



1977 Webra 61F, matte finished castings and Webra's new Dynamix carburetor which incorporates an "accelerator pump." Compared with



M.A.N. "Engine Review" test motor, 1977 Webra has new crankshaft, extensive porting modifications. Webra 1100/E-G6 muffer shown.

tive choke area of approximately 9 sq.mm.

Like all O.S. motors (with the exception of the racing units) the 10F-SR comes complete with a silencer designed for it. The unit supplied is a new one, the OS-761. It is a neat expansion chamber of adequate volume with a 4.8 mm i.d. outlet (area 18 sq.mm.) and is secured directly to the engine's exhaust duct with two long screws.

On test back in 1966, the Max 10 R/C developed just over 0.14 bhp at nearly 14,000 rpm when fitted with an O.S. Jetstream muffer and running on 5% nitromethane fuel. Our guess is that the new model will better this output by at least 30% but the actual figures will have to await the results of a forthcoming "Engine Review" test report.

The Max 10F-SR has a bore and stroke of 13.4 x 12.4 mm, giving a piston displacement of 1.749 cc or 0.1067 cu.in. The checked weights of our samples were 120 grams (4.23 oz) for the 10F-SR and 107 grams (3.77 oz) for the 10F-SRS. Adding the muffer increased these figures to 147 gr. (5.18 oz) and 134 gr. (4.73 oz) respectively. The engine has the following overall dimensions: overall height (less glow plug) 2.28", length (from prop driver face) 2.24", crankcase width 0.90", width across mounting lugs 1.52".

**SUPERTIGRE X.21-CAR.** When the Supertigre X.21 was first announced a year ago, it was a much smaller engine externally than the new version dealt with here. This earlier model was, in fact, based on the Supertigre X.15FI body casting and was essentially a bored and stroked version of the X.15FI, with 1.6 mm added to its bore and 2.0 mm to its stroke to increase displacement from 2.47 cc (0.151 cu.in.) to 3.46 cc (0.211 cu.in.).

For prospective purchasers, there is no problem in distinguishing the old model from the current one. The old version has "X.15FI" in raised characters on the left side of the case. The new engine has a bigger and heftier casting with "Serie X" on the exhaust side above a large letter "G" surrounding a disc with the figure "21".

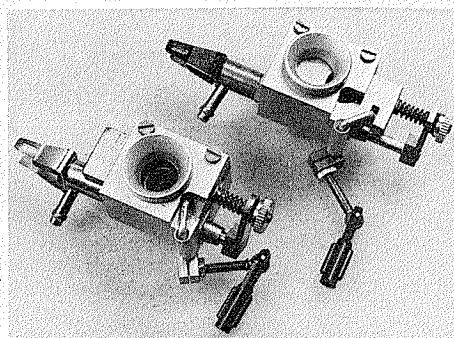
Although the new X.21 is heavier, there are obvious benefits to be gained from the

adoption of a new and larger body casting in regard to both performance and durability. Extra performance should result from the fact that gas passages have been enlarged and rigidity and cooling improved. Increased durability should also stem from these two latter points, plus the added resistance to damage of stronger component parts. These qualities will be welcomed by R/C racing car enthusiasts in particular and it will be observed that the model dealt with here (see photos) is actually the X.21-CAR model, although the same description, in general, applies to the regular X.21 R/C aircraft engine.

The first and most obvious improvement to emerge when the X.21 is stripped down, is its new crankshaft. This has its main journal increased from 10 mm o.d. to 12 mm o.d., which has allowed the induction hole through the shaft to be opened up to 8 mm while still leaving enough metal for further enlargement, should this be necessary in the future. The shaft also has a much stronger front end: its o.d. has been increased from 5 mm to 7 mm. The 11.5 mm long rectangular valve port in the shaft is fed from a large intake aperture in the front housing, entirely offset in the direction of shaft rotation to produce a tangential gas flow.

The X.21 employs a ringless aluminum piston running in a chromed brass cylinder-liner and a Schnuerle scavenging system, but there is a slight difference between the porting used for the X.21 (and also for some other recent X series Supertigres) and that seen on other Schnuerle designs. The modification consists of the addition of a pair of narrow (2 mm wide) supplementary bypass ports and is fully described in the report on the Supertigre X.40 which follows later in this article. The flat head piston is very light and a 4 mm o.d. tubular wristpin, retained by wire snap rings, couples it to a machined conrod having a bronze-bushed lower end. The machined cylinder-head has a flat squish-band surrounding a bowl-shaped combustion chamber and is tied to the main casting with four 3 mm screws.

The X.21-CAR engine is fitted with a larger carburetor than the standard X.21



New Dynamix carburetor with throttle in high and idle speed positions. Below throttle is the sliding rod which controls fuel mixture. R/C. Both engines are equipped with Supertigre "Mag" automatic mixture control carbs but the car engine carb has the body size used for the ST.35 R/C with a 7.5 mm i.d. choke, in place of the 7 mm choke carb of the X.21 R/C. Effective choke areas for the two engines are 15.5 sq.mm. for the X.21-CAR and just over 12 sq.mm. for the X.21 R/C.

Also supplied for use with the X.21-CAR is a pressure-cast exhaust stack extension, 1.47" long and a large pressure-cast clamp-on heatsink having six 23 mm deep tapered cooling fins.

Like all Supertigres, this is a nicely engineered motor and we expect it to prove to be among the more powerful of current 3.5cn class motors. It has a bore and stroke of 16.6 mm x 16.0 mm and a displacement of 3.463cc or 0.2113 cu.in. Checked weights of the two examples examined were 8.0 oz for the X.21 R/C and 8.25 oz for the X.21-CAR. Adding the heatsink and exhaust stack to the latter increased its weight to 10.9 oz. The engines have the following dimensions: Overall height (less glow plug) 2.85"; Overall height with heatsink added 3.45"; Length (from prop driver face) 2.83"; Crankcase width 1.10"; Width across mounting lugs 1.65".

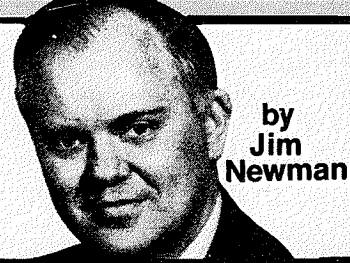
**K&B FRONT ROTARY-VALVE 4.9cc and 5.8cc.** For the 1977 season, K&B have introduced a high-performance front rotary-valve design, based on their highly

(Continued on page 91)

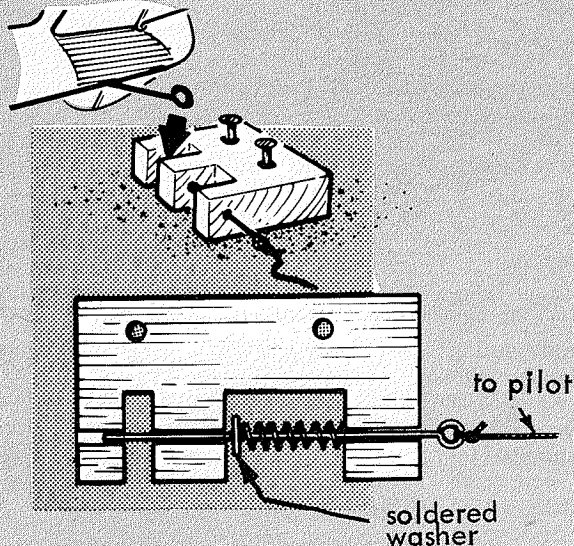


# Hints & Kinks

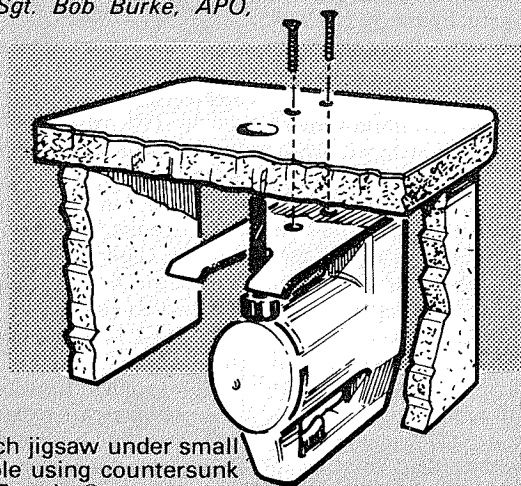
M.A.N. will pay \$5.00 for each idea used in "Hints & Kinks." Send rough sketch to Jim Newman, Model Airplane News, 1 North Broadway, White Plains, NY 10601. Be sure your name and address are clearly written on each sketch, so that we can give you proper credit—and payment. For practical reasons, material submitted will not be returned.



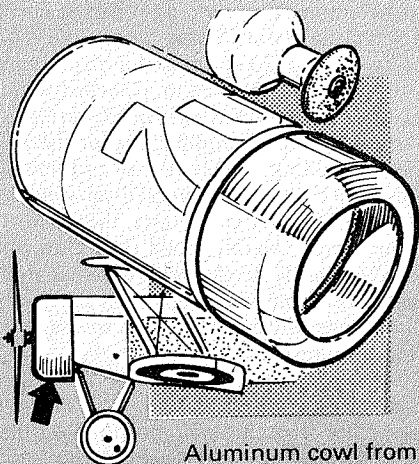
by  
Jim  
Newman



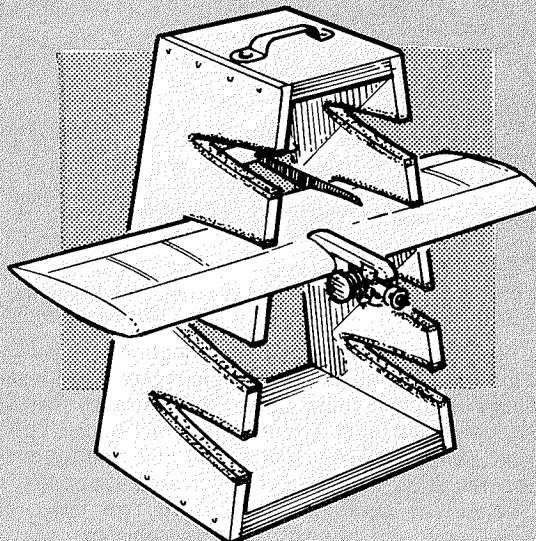
Simple, self-resetting U-Control stooge. Attach to heavy object, tool box or nail into ground. *S/Sgt. Bob Burke, APO, N.Y.*



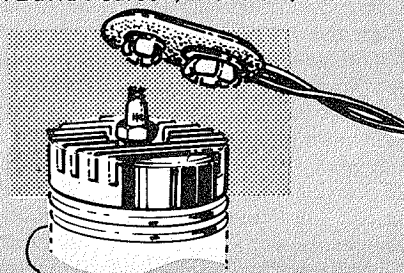
No bandsaw? Attach jigsaw under small formica-topped table using countersunk screws. See your Formica® counter top dealer for scrap sink cutout. *Don Olson, Metairie, La.*



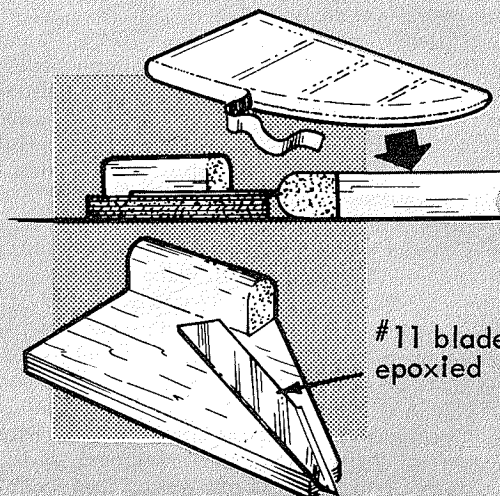
Aluminum cowl from round bottom 'pop' can. Cut with Dremel abrasive wheel. *Lt. Col. H. H. Rice, Staten Island, N.Y.*



Model carrier, tailored to fit small car seat. Retain planes with rubber bands and use felt or foam strips to prevent wing damage. *David Pearson, Montreal, Canada.*



Nine-volt battery snaps will fit glow plug. Press other snap against cylinder head to complete the circuit. *Andy Strong, Concord, Calif.*

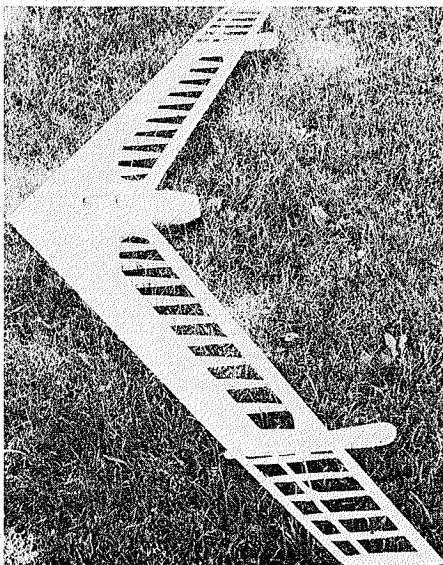


Simple tool trim covering on the center line. Use separate 5/16" wide strip to cover the joint. Makes fantastically neat job on Coverite. Use with other materials, too. *Frank Fodor, Racine, Wis.*

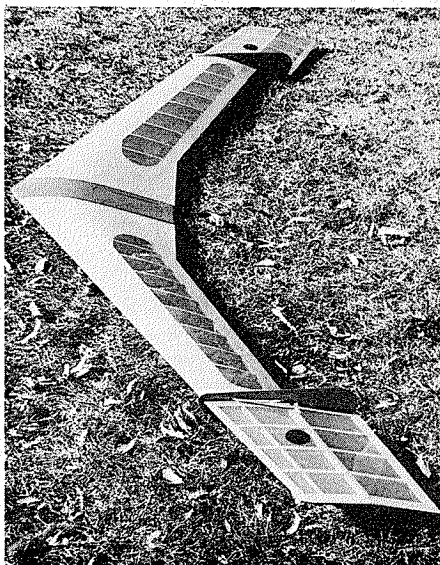
# S.O.A.R. subjects

## GLIDING NEWS AND VIEWS

BY JAMES GRAY AND GUEST EDITOR ED HARRIS



At top—our guest editor Ed Harris about to launch his Spectre 1. Above: bones of prototype Spectre 1 that led Spectre 2 with 96" span, 27° sweep in each wing, flat bottomed airfoil, reflex action in tips & tip elevons.



Spectre 2 with tip elevons has good turn response, circles tightly, flies at reasonable speed range, tows well except in dead calm air. Center pod fiberglass, wings covered with transparent orange MonoKote, very visible.

• A number of months ago "Soar Subjects" requested designers and builders of flying wing sailplanes, i.e., tailless aircraft, to submit their designs and relate their experiences with these unusual and interesting craft. One result of this request was Dave Jones' excellent and authoritative article in the May '77 "Soar Subjects."

Completely unknown to me, until recently, was another submission by Ed Harris of Cedar Falls, Iowa. Ed's material apparently never arrived at *M.A.N.*'s offices in White Plains, New York. Obviously and rightfully concerned, Ed wrote to me in March and inquired about the fate of his article. I explained the situation to him, and he quickly prepared a duplicate article, complete with drawings, photographs, and descriptions of his designs and constructions during the past several years.

This month, "Soar Subjects" takes pleasure in presenting Ed Harris' fine article—a much needed and beautiful complement to Dave Jones' study.

Ed Harris is associate professor of art at the University of Northern Iowa in Cedar Falls. He has taken a different approach to the design of tailless machines, viewing them more from an artist's point of view than an engineer's. Somewhat tongue-in-cheek, Ed ruefully admits that he "needed the engineer to avoid some of the stupid mistakes in my trial-and-error approach."

Ed's credentials are certainly impressive, and he is not the happy bumbler that he'd have you believe, because he holds AMA number 74470, NSS 71-150, and LSF 193: hardly a beginner!

### Airforms/Flight As An Art by Ed Harris

"Art has developed as a reaction to the human's sensory experiences; he has tended to exaggerate and/or distill these experiences in attempts to heighten and extend further experience. My development and flying of airforms as an esthetic statement or expression is a continuation of that premise. This is important to me since artists back to Leonardo daVinci and before have envisioned art in the sky; although drawings and models have been made, very little has flown as art. I find it particularly interesting that while only a small percentage of the population use and experience aircraft as transportation, most people are observers of natural and man-made flying things. It seems therefore logical that an art form should evolve that is related to this universal experience.

"Birds, insects, swarms, flocks, smoke, clouds, windy weather, tornadoes, and all of the man-made flying objects provide the models for this new art form. Full-scale aircraft builders and fliers are beginning to speak and act in more esthetic terms than ever before, especially those engrossed in soaring and aerobatic performance. There is recently increasing evidence that the idea of flight extends the human beyond the mere transportation of his body and his goods. More interest is apparent in kites, balloons, hang gliders, sailplanes, and small, home-built aircraft.

(Continued on page 60)



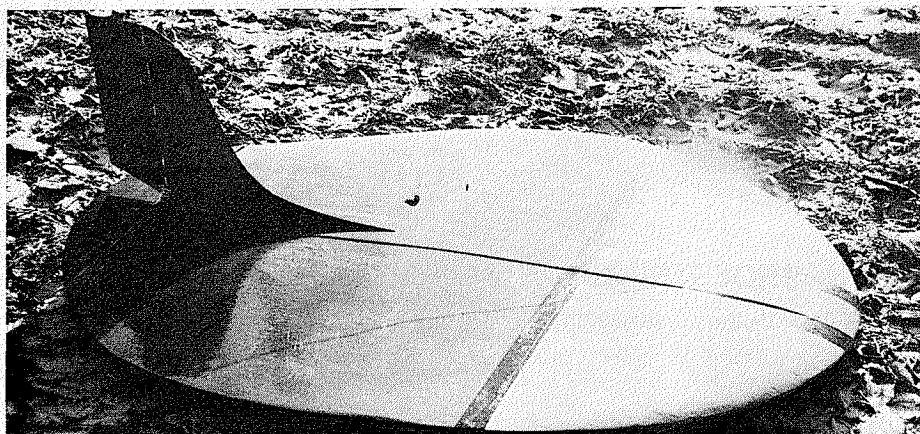
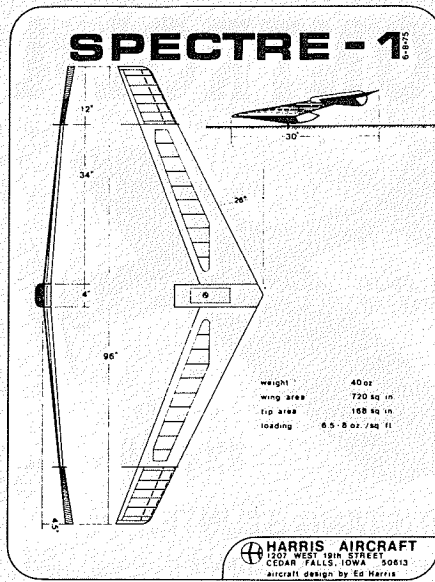
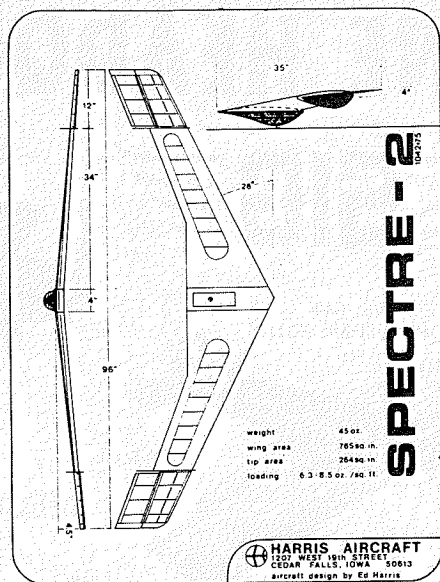
# S.O.A.R. SUBJECTS CONTINUED

"The logic of flight as art is not quite the same as art that flies. It is different from mobiles, kinetic sculptures, art objects that illustrate or give the illusion of movement; *it is motion as art*, not motion in art. Flight as art is not a concept of an object such as a painting or sculpture, that for some reason, also flies; it is the flight, the performance that constitutes the art. This idea differs from most usually associated with the categorized visual arts; it relates more to the ideas surrounding the performing arts. It could be conceived that flight performances would involve directors, performers, technicians such as in music, dance, and theater.

"As in many art forms an illusion is being created, staged to stimulate, excite, surprise; flight movement provides natural optical illusions as the flying objects change their position and form continuously; they often appear to reverse, proceed or recede; that appearance may be actual or it may be optical illusion. Flight creates many three-dimensional relationships, changing spatial relationships. It describes invisible and possibly visible trailings of the flying objects (smoke, streamers); it provides a movement path perhaps related to that in a novel, a play, a dance; it presents an actual time relationship, a past, present, and anticipated future of the flight path.

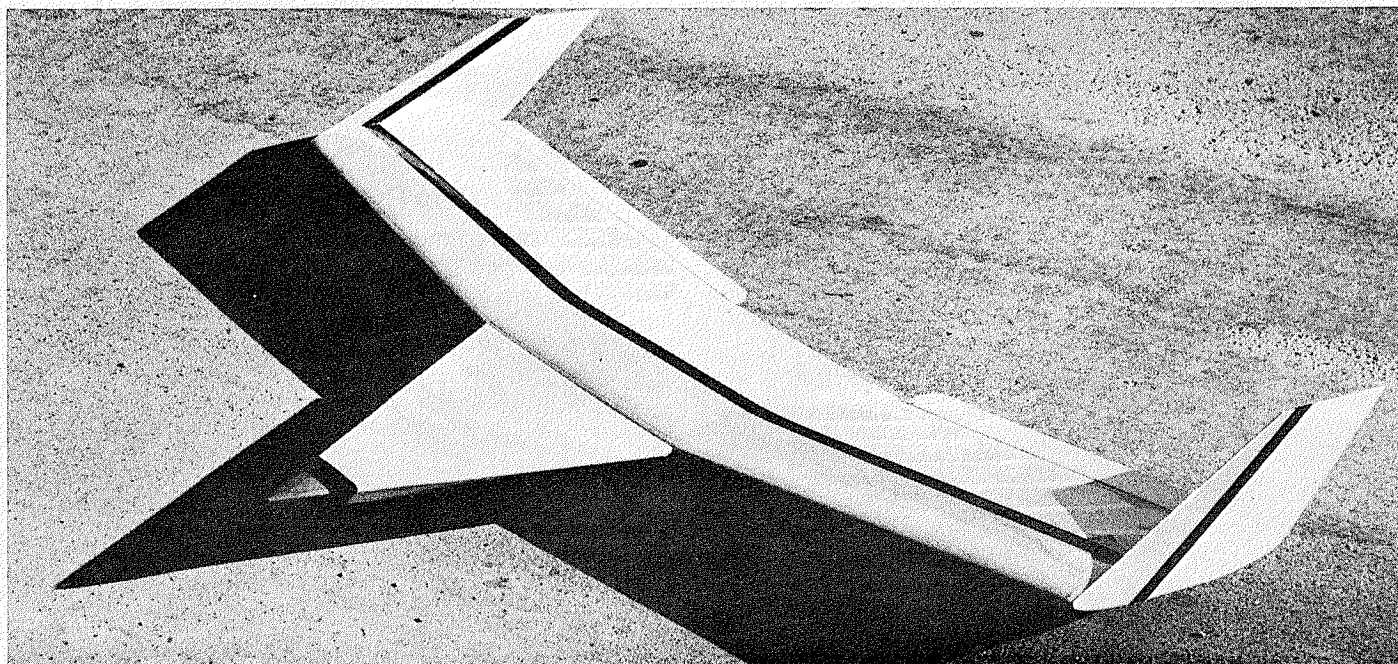
"This art form includes the implementation of the functioning (flying) object that is related to the machine as much as to the pictorial/sculptural form. The success of the art is in direct proportion to the "workability" of the parts (aircraft, flying objects.)

"The possible variations of the flight are greater in spatial relationships than perhaps most visual art forms. Inversely the possibilities of error, failure are also greater;



A 3-foot diameter disc, made of solid Styrofoam,® spruce, plywood, covered with Solarfil. Disc is controlled with simple rudder

and elevator, balanced at 23%, very stable and positive in its control. Is capable of inside and outside loops, inverted flight, near-axial rolls.



**SLINGSHOT:** 5-foot wingspan, reflex semi-symmetrical airfoil, with elevon control. A sheet balsa over spruce-framed lifting body fuselage.

It flies in both thermal and slope life; thermals in good lift but you must work at it. Very stable control on tows and flight, good speed range.

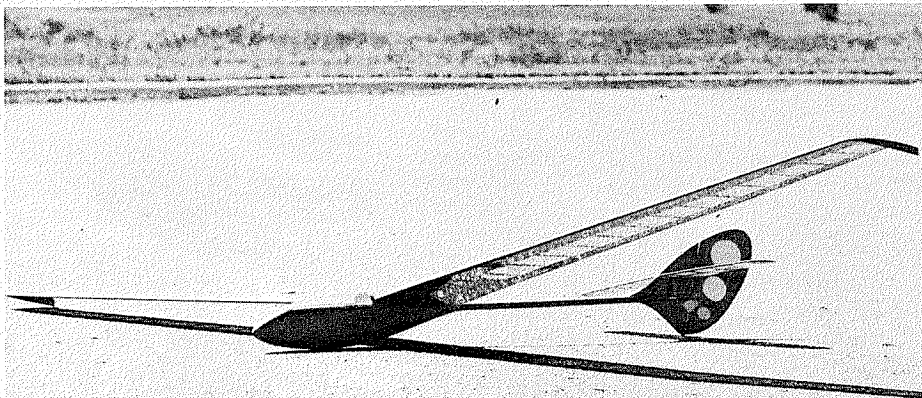
there is more risk involved than in the anchored, static art objects, or of those possessing surface movement potential (land, water.)

"In 1973 after four years of flying R/C sailplanes I began in earnest to think of gliding or soaring forms as visual, moving, controlled sculpture. My first attempt was the disc, trying to get away from the conventional wings, fuselage, and tail configuration. The disc gave me the kind of visual appearance I was seeking but the soaring duration was lacking so I began work on the *Slingshot* adding stub wings to a lifting body, but still there was a lot of drag there and the duration of the flights was not much improved. I somewhat reluctantly went to the high-aspect wing for soaring efficiency deciding on the swept wing for a graceful form even though we had started to fly Dave Jones' *Standard Plank* and knew how well it controlled and performed. The two versions of the *Spectre* were flown for a considerable time and three *Spectre-2*'s were built to be flown in an exhibition by myself and two friends, Jim Porter and Mike Carroll; for some reason or another their wings were subject to erratic control tendencies and both had several crashes. Most of the trouble seemed to be flutter of the wing and elevon surfaces especially at higher speeds. I have tried to duplicate the same problems with my wing and have never been able to make it happen. I suppose I still think that some day it will even though I have flown it now for over two years without the problem. My last design, the *Sailbat*, was more like the plank designs, but I couldn't resist employing the tip spoilers for turn control instead of using a mechanically more simple control system. This wing has shown no flutter tendencies and I believe that I'm convinced that the undercambered, reflexed airfoil section is more predictable and stable for a tailless sailplane.

"I was interested in observing the reactions of spectators watching the forms fly. As one might have expected, both the artist and the non-artist alike saw the two kinds of aircraft in two completely different contexts. The conventional aircraft was automatically a "model airplane" and the non-conventional form (airform) was "something else," but the persons were not sure that it could be art. When the airforms were flying they were seldom referred to as sculpture, even by the artists present; but when the same forms were in a static, gallery display, they were called "sculptures" or "sculptural forms." When only the airforms were flown and the other aircraft were not in evidence, the spectators seemed to more easily understand the concept of flying objects in esthetic terms. This has led to my present work that involves the flying of several gliding or soaring airforms as a performance that relates more to theater, dance, or aerobatics than to the art gallery.

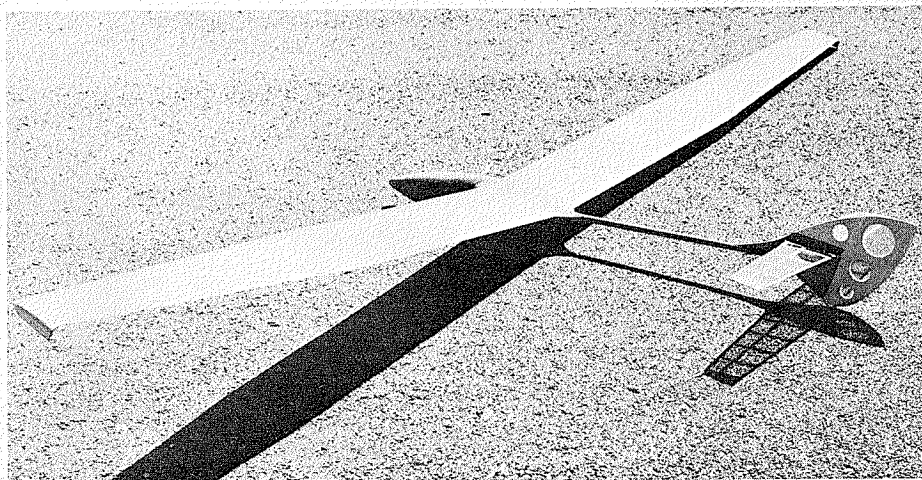
"At the moment I'm not working on any new wings of my own, and plan to build Dave's *Raven* for comparison with my own

(Continued on page 94)



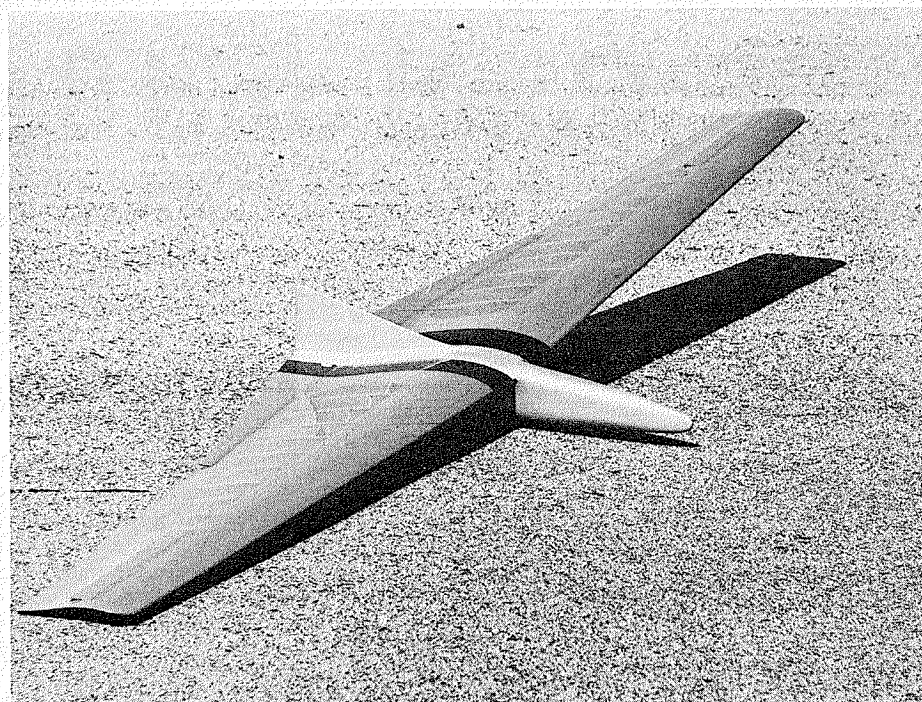
TULIP: 100-inch wingspan; 8% Clark Y airfoil, Hoerner tips. Pod and boom fuselage; pod of balsa, spruce, plywood construction covered

with light fiberglass and resin. Boom is a section of fiberglass fishing rod. Gold-N-Rod push rods in boom. Rudder/elevator control.



TULIP 2: 100-inch wingspan, partial constant chord with tapered tips. Hoerner tips, 8% Clark Y airfoil. Fuselage is Pod and boom;

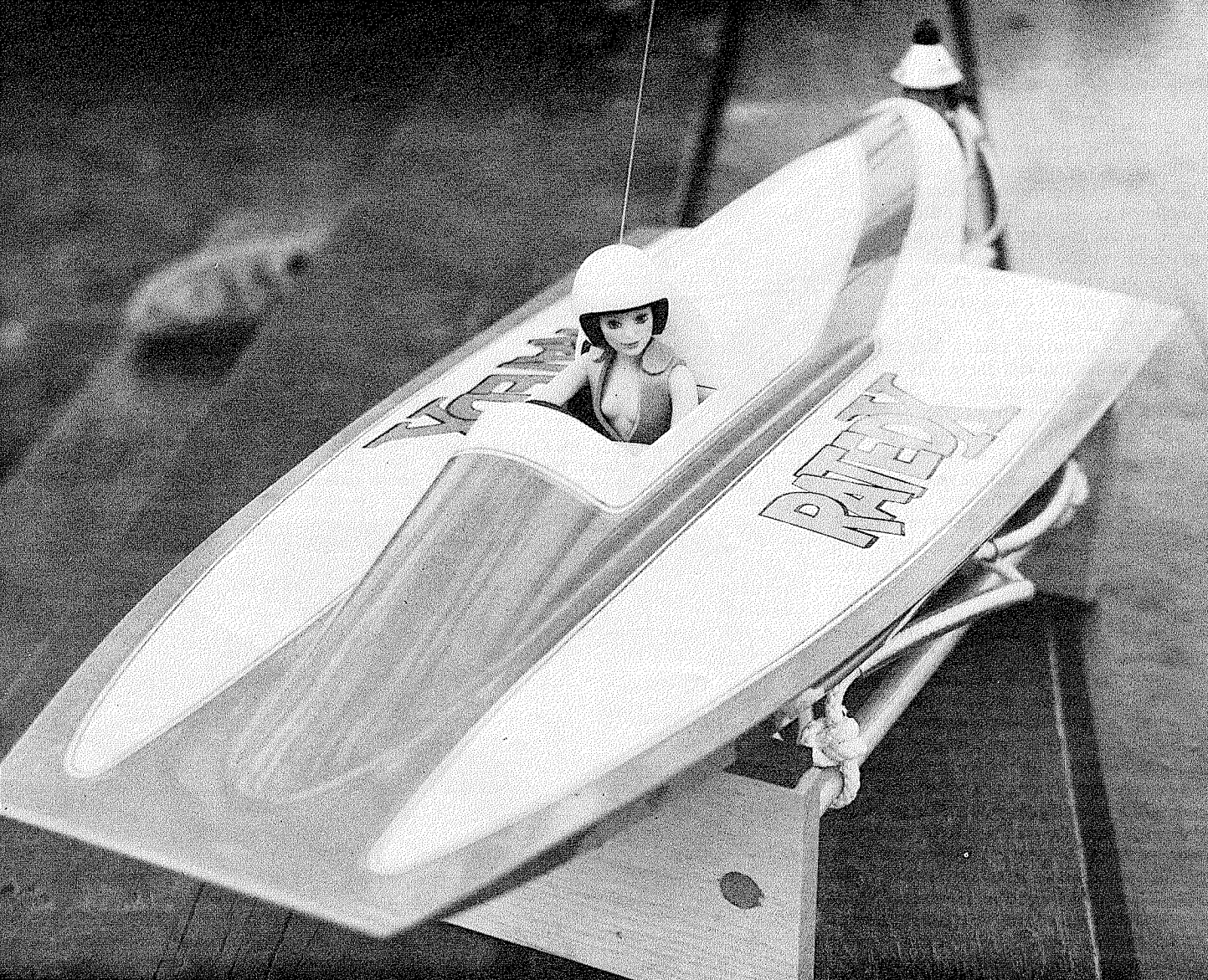
anchored in a bulkhead-wingroot framework, block foam shaped between the framework and forward of wing to provide for pod form.



SAILBAT: 100-inch wingspan, 3° forward sweep in each wing, undercambered and reflex airfoil controlled by elevator and tip

spoilers (each spoiler rises independently) flies at a good speed range, has very positive control, responds very quickly to thermal lift.





General view of completed boat. Driver is a "Jody" doll from Ideal Toy Co., life vest from foam place mat and helmet from Williams pilot.

# Pond and Bench

**DUMAS HOT SHOT KIT • K&B 3.5 CC OUTBOARD  
COX/SANWA 3-CHANNEL SYSTEM**

• When the K&B 3.5cc outboard motor appeared last year it was obviously going to be just a matter of time before kit manufacturers designed some boats specifically for this exciting engine. Sure enough, it wasn't long before Dumas introduced their "Hotshot," a 24" tunnel-hull boat which, following Dumas' tradition for realism, is a stand-off scale version of a typical Molinari racing outboard.

The kit holds no surprises for anyone familiar with Dumas plywood boats. It has many sheets of die-cut plywood, plans drawn to half-scale with construction photos and concise instructions, some strips of spruce, a turn fin, but no other hardware. In typical Dumas fashion, the exterior

planking is of birch plywood, with bulkheads and internal framing of mahogany ply of the type used to face closet doors. I personally don't like this splintery wood, and would much prefer to see the entire boat made of aircraft-grade birch ply—but in all fairness, the mahogany is perfectly adequate for the task, and its use has no adverse effect on the strength, appearance, or performance of the finished boat. And it does help to keep the price of the kit within reason! All in all, a compromise which I'll accept . . . albeit with tweezers handy to remove the splinters from my fingers.

The instructions recommend building a simple jig to keep the hull from twisting during construction. A pair of straight 2 x

2's nailed to a suitable flat board is all that's required, and takes just a few minutes. Once the jig is done, mark the bulkhead positions on it with a try-square or triangle, then temporarily nail the longitudinal tunnel sides to the jig using 1" brads driven about one-third of the way in. This will hold them straight and parallel while you glue the bulkheads in place. I used Hobbypoxy Formula 4 (the five-minute epoxy glue), and completed the frame in less than a half hour.

The remainder of the construction goes smoothly, following the kit instructions for each step. It's a good idea to paint the entire framework with Hobbypoxy Formula 2 glue (use a stiff bristled brush) before planking, then paint the entire inside surface of

**BY DON TYPOND . . . exciting combination of a new engine; outboard type, fast racing boat and latest Cox/Sanwa radio system brings a new dimension to boat racing competition or sport.**



the planking with Formula 2 when gluing in place. This assures that all wood surfaces are sealed and waterproofed, and that all joints are thoroughly glued. The 45-minute working period of Formula 2 gives you plenty of time for this process.

I find the easiest way to hold planking in place is with a combination of pins, clamps, weights, tape, spit, gum and foul language. First, I urge you to visit your nearest sporting goods shop and buy a 25-lb. bag of fine birdshot. Pour some of these tiny lead BB's into sandwich baggies and seal them with masking tape. The resulting little beanbags will do wonders in holding the plywood down while the glue sets. Any edges that pop up can be disciplined with pins, clamps or masking tape. Be sure you don't build any warps in while planking 'cause once they're in, they won't come out. And your boat will forever run funny unless you can figure out some way to warp the water.

Because I'm an incurable tinker, I must admit to having meddled a bit with the original layout of components within the boat. I have this thing about center of gravity location—probably as a result of thirty-five years of experience with model airplanes—and am loathe to allow CG shifts if I can help it. So instead of installing the fuel tank back at the transom as designed by Dumas, I made a metal one and located it in the turtledeck over the radio compartment. This puts it on the recommended fore-and-aft CG location, and doesn't raise the CG enough to hurt the stability of the boat. I then removed bulkhead #3 in the radio compartment, extended the hatch cover mounting rails and

*(Continued on next page)*



Cox/Sanwa 3-ch. system. Small servo comes with set, large one is strong, waterproof type.

Doing what comes naturally, Jody & Hot Shot handle slightly choppy water very well, with boat riding on back 4" of hull.





## POND AND BENCH CONTINUED

made a longer hatch cover from 3/32" clear plastic. The tank has a sump on the bottom, which is made from a quart fuel can cap. This required a recess in the hatch cover, which I made by cutting a hole in the cover and inseting a larger cap from a Hobbypoxy Thinner can or gallon fuel can. Silicone rubber sealer holds it in place and waterproofs it. For convenient charging of the Rx batteries, I added another screw cap to the hatch cover. This was made from the entire neck of a thinner can, inserted up through a hole in the cover and fastened with silicone rubber. Removing the cap allows access to the charging plug without having to open the hatch. Foam wing-saddle cushion material seals the edges of the hatch cover which is held down with #4 x 3/8" sheet metal screws.

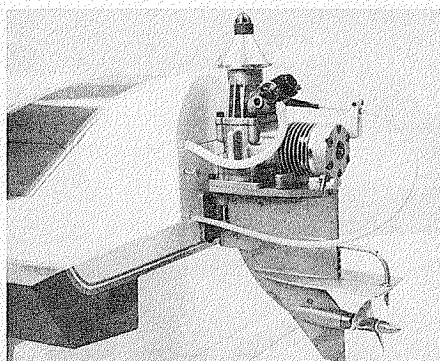
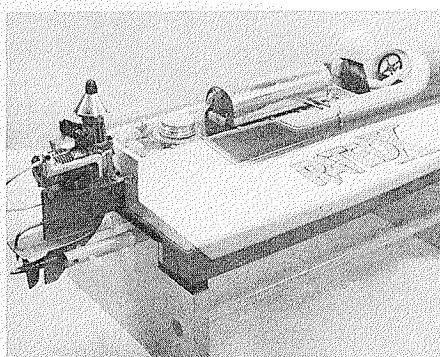
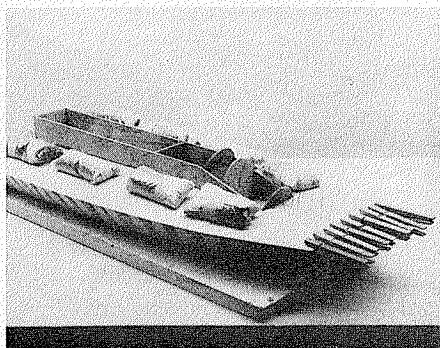
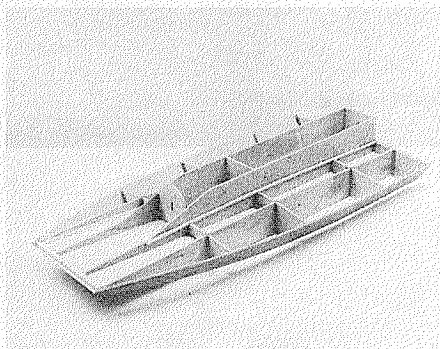
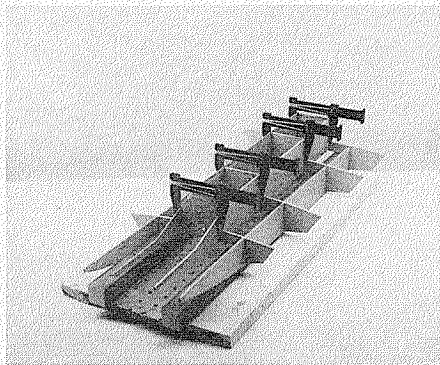
For finishing I like Hobbypoxy paints. I brushed on one coat of clear, sanded, followed by two brushed coats of Undercoater White, sanding between coats. Then two sprayed coats of white, sanded between coats, followed by blue trim. A light sanding was followed by one coat of clear. Striping is gold DJ Multistripe, and the name is genuine gold leaf. The driver's name is Jody, and she appears in toy stores dressed in very demure 19th century clothing. A life vest made from a foam place mat, plus a helmet from a Williams pilot makes a world of difference.

The outboard engine bolts directly to the transom, but I suggest you use 6-32 machine screws rather than 4-40. You'll have to enlarge the holes in the engine mounting plate just slightly to accept the screws. Also, don't use blind nuts in the mahogany plywood—it's too soft and the nuts will crush the wood, leading to eventual loosening of the engine. A thick metal plate tapped for the screws is ideal, but you can also use blind nuts in a plate made of 3/16" or 1/4" aircraft ply. Control hookups using cable and Gold-N-Rods were made as per the plans.

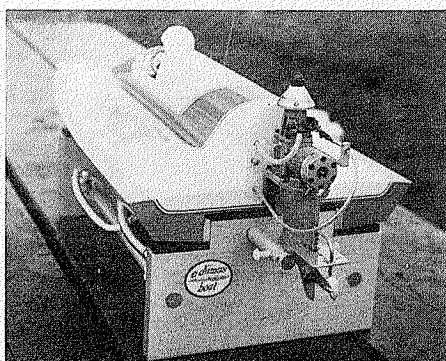
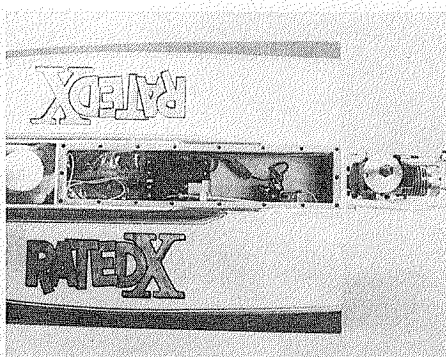
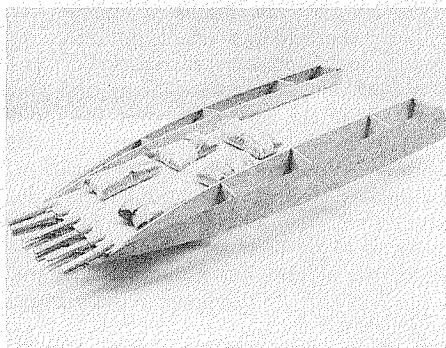
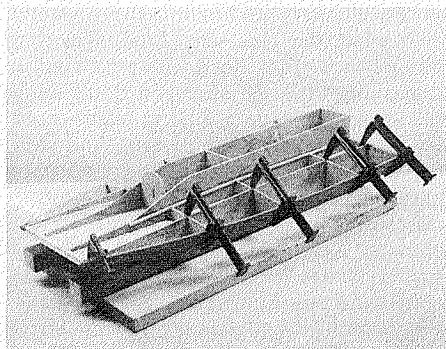
The K&B engine runs *strong* without any modifications—other than the prop. As is my habit, I disassembled the engine before running it in order to clean out any metal chips and other debris that tend to infiltrate during manufacture. When reassembling, note that the oilite bearing for the prop shaft has a small hole in it. This hole should align with the channel leading from the exhaust duct so that the exhaust oil can lubricate the bearing. Use Loctite on all screws. As is recommended by Dumas, I installed a JG E-20 prop—stock except for balancing and polishing.

The radio in my boat is a Cox/Sanwa three-channel. Although only two channels are required, I chose the three-channel set for the rechargeable batteries in both Rx and Tx, and to have a third function available for use in scale model boats. (I understand Cox/Sanwa intends to have nickel cadmium packs available for their two-channel sets sometime in the future.) I'm using one of the micro servos supplied as stan-

(Continued on page 96)

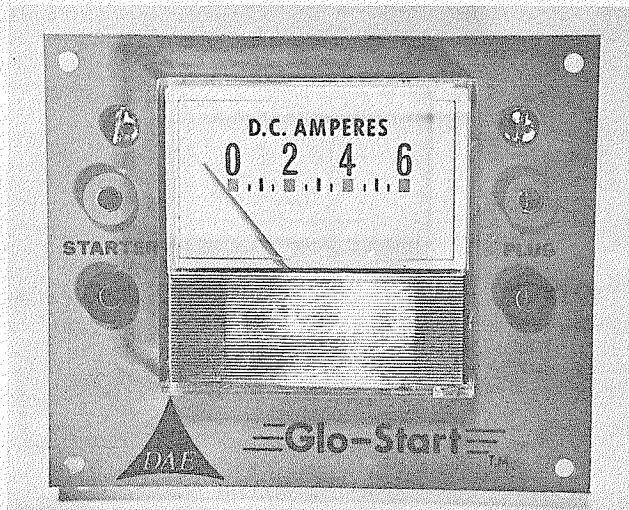


Kit contains die-cut plywood parts, spruce strips, alum. turn fin, foam tape and plenty of instructions. All photos above show the boat through construction to the finished form with



engine mounted and ready to go. The sandwich bags filled with lead shot ideal for holding planking down while glue sets. Note receiver and servos in waterproof plastic bags.

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## Timmm Collegiate

*(Continued from page 15)*

Matt, photos, and a history of each of the six Collegiates. One scale feature not covered in the *HAA* article is the instrument panel. Fortunately, the original panel from *NC279V* was available, and I was able to make a tracing from it which was then scaled down for these plans. Although the original instruments are lost, we do know that the panel was covered in brown leather (seats and headrest, too), and that there was no panel in the front cockpit. By the way, a simpler, less decorated model can be constructed from these plans by building one of the other Collegiates. See the table of possible configurations.

I felt the Collegiate had a lot to offer as a Peanut Scale model, being a parasol with a fairly low aspect ratio. And, as *NC279V*, it would be a colorful model in red with black and white trim. The finished model fulfilled my expectations as it is respectable looking and a fine flyer as well. Radial engines are a bit of extra work, but starting with the Williams Brothers' ⅜" scale cylinders simplifies that chore.

Begin the fuselage by building up 2 side frames from 1/16" or 1/20" sq. balsa. Cut the formers from 1/32" sheet and assemble the fuselage with square crossbraces on the bottom and formers on the top. Be sure to leave enough clear space through the formers because the rubber motor will be between the upper longerons. Bend the two major wire landing gear pieces and install them between the second and third crossbraces. Thread and epoxy will hold the wires together near the wheels. Make the two bottom stringers of 1/32" sheet and install them as well as the two shallow formers under the first two crossbraces. Add the 1/32" sq. stringers behind the cockpit. Note that notches are needed only in former C; the stringers lay on the surface of the following formers. This allows a smoother covering job without bumps from formers. Cover the top of the fuselage from C to the first B former with bond paper. Wait until the tissue covering has been added later on to make the cockpit cutouts. The forward fuselage areas from A to B and A1 to B1, plus the side panels between, are also covered with bond paper.

Make the nose block of soft balsa with the plywood ring cemented on the front. The D-shaped hole (with a matching shape on the nose button) ensures that the removable wooden nose button always goes in the same way, preserving any thrust adjustments. Sand the nose block and button to shape and attach the block to the fuselage. Add the prop shaft, a couple of washers, and the prop to the nose button. Now, put the thread stringer on each side of the fuselage. Thread was chosen for this stringer because the actual Timmm plane has only a ¼" tubing stringer in this location. Hold off on making up the center section wing struts for now, as it will be easier to line them up once the wing is completed and available for reference.

The MacClatchie engine is fairly simple to model. For the cylinder-heads, start with a balsa form shaped per the plan and add some threads to represent fins. A mold can then be used with thin plastic sheet to make seven duplicates. After trimming, each head shell is contact-cemented to a balsa filler piece, which in turn is contact-cemented to the Williams Brothers' ⅜" scale cylinder. For those without a mold, separate heads can be made from balsa with only a bit more trouble. The bottom of each cylinder must be trimmed off below the last fin. Then, drill 7 holes in the nose block for the cylinders. When satisfied with the fit of each cylinder, you can bend the intake pipes to shape from 1/16" aluminum tubing. These pipes attach to the right side (viewed from the rear) of the heads near the front, go back and down and curve toward the thrust line as they approach near vertical. Check the photos for ideas on how they should curve. Push rod tubes can be made of rolled paper and cemented to the balsa filler pieces. Make up the exhaust pipe from 3/32" styrene tubing (from the model railroad counter) or a piece of plastic model 'tree'. The plastic can be bent easily with

*(Continued on page 76)*

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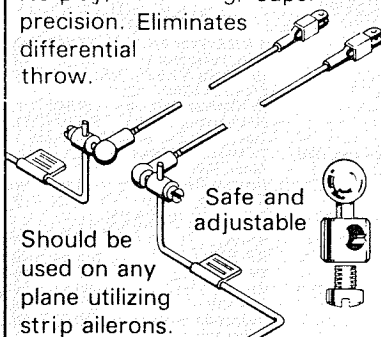
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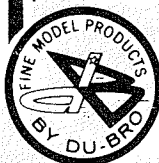
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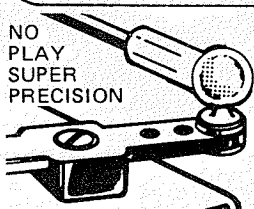
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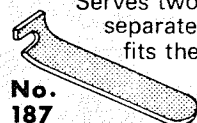
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## Timm Collegiate

(Continued from page 70)

the heat of a candle (carefully though, as plastic burns easily).

For one of the alternate models, the Kinner K-5 engine could be built in much the same manner, although the Kinner heads don't lend themselves

to molding very well. Make the heads by starting with some 1/16" x 1/4" balsa with two pieces of 1/16" x 1/8" balsa glued on to represent the rocker arm covers. A few minutes spent shaping with a sanding stick, using the photos for reference will produce respectable looking heads. Note that the Kinner cylinders have no taper to the fins, and thus they can be duplicated using dowels and heavy thread. Exhaust pipes of 1/16" aluminum tubing and other details can be added as desired.

Start the flying surfaces by laminating all the curved edges from 1/32" x 3/32" basswood. Two layers of this wood give more than adequate strength. Cardboard templates can be used as forms or you may want to try setting up the required shapes with closely spaced pins. In either event, soak the strips in water for a few minutes, put Titebond cement on one strip, add the other strip, and immediately begin to form the pair of strips to the proper shape. Your holding a bit of tension on the strips while bending them around the forms will help prevent breakage. Closely spaced pins or balsa scrap will clamp the strips to the form until they are dry. The extra thickness of 3/32" wide strips allows both the upper and lower surfaces of the completed laminations to be sanded smooth. Complete the tail surfaces using 1/16" or 1/20" sq. in. balsa. At first glance the wing structure may look a bit overwhelming if you've never done sliced ribs before; they were chosen so that scale rib spacing could be used without a tremendous weight penalty. (If sliced ribs are not desired, use the alternate, solid rib pattern shown on the plan and put in only half as many ribs. Start with the center rib and put in every other rib out to each tip. Use 1/32" x 1/16" and 1/32" x 3/32" balsa for spars.)

Start the wing structure by laying out the leading edge, tips, trailing edges and the center section cutout piece. Now, strip some 1/32 sq. in. for rib bottoms. These are cut to fit flush with the wing bottom surface between the leading and trailing edges. Make a pattern for the upper surface of the ribs from 1/32" plywood or aluminum. Using a piece of 1/32" medium balsa 2 7/16" long (grainwise direction), make cutting guide marks along the vertical edges. The marks should be 1/32" apart. If this is your first try at sliced ribs, make the marks 1/16" apart. Now, lay the template on the balsa so that it touches the fourth marks from the top of the piece. That should be far enough down so that a full rib cut can be made. Cut along the template with a X-Acto knife. Move the template down to the next set of marks and cut again to produce one rib top piece. A fresh #11 X-Acto blade is recommended here, and two passes with the blade may be necessary to produce unsplit pieces. Keep moving the template and cutting until you have enough rib tops. Then, cut a 7/16" wide piece of balsa and cut false rib tops. Try a rib for length. It should require some trimming for a nice fit between the leading and trailing edges. Trim the ribs from the trailing edge end. Once that rib fits satisfactorily, it can be used to gauge the proper height for the two spars, which are cut from 1/32" balsa. Cement the two spars in place on the rib bottoms and proceed to trim and cement each rib, and then each false rib top. Note that the final rib top near each tip is angled over about 30° from the vertical to establish the tip shape. The spars require some tapering at the tips to allow this rib top to be installed. After allowing your eyes to rest for a while, and the cement to dry, remove the wing from the workboard and add the 7/16" x 1/32" sq. false rib bottoms. Now the half-circle reinforcements for the main struts can be added. Cut some small rectangular filler

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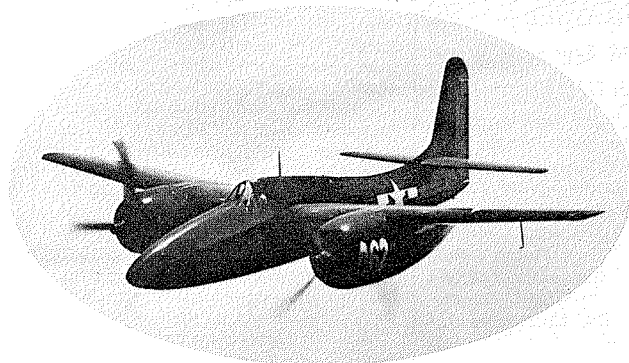
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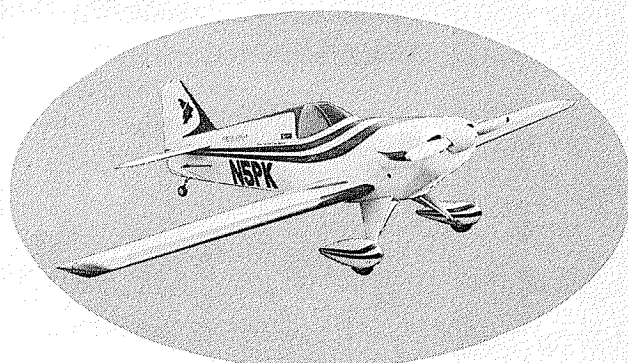
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## BRIDI HOBBY ENTERPRISES

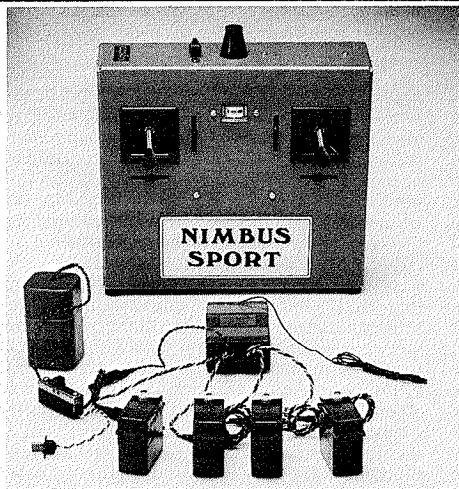
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pieces and add them to the lower surfaces of the spars where the outer struts will attach. The wing can now be very carefully sanded to shape. Each rib will be slightly different in height or shape because of the difficulties in cutting so this must be corrected with sandpaper. Sanding the top surface must be done chordwise and with a block that spans 6 or 8 ribs. Sanding spanwise or with a narrow block will probably wipe out some ribs, so be careful. The basswood tips are surprisingly strong, so they can tolerate a bit more force with the sandpaper. O.K., lean back and admire the wing for a while, and then we'll move on to the covering. Use real Japanese tissue if you can, otherwise domestic tissue will be all right. NC279V is basically red all over. Cover the model dry, using as many separate pieces of tissue as are required to prevent wrinkles. For a gentle shrinking action on the tissue, try steaming the covering. Hold or pin the surfaces to keep them unwrapped until they dry. A single coat of plasticized nitrate dope (or Sig Lite Coat) will finish the

covering without adding much weight. For NC279V, make up the black tissue trim pieces. Making the white pin stripe trim is easy if you just cut a piece of white tissue about 1/32" larger than the black pieces. Attach the trim, putting the white pieces on first, with very thin dope. For better contrast, try for a minimum of dope on the edges of the white tissue. The fuselage and fin lettering were put on my model with white stick-on letters meant for model cars and obtained from Auto World in Scranton, Pa. Lettering sizes: "City. . ." 3/16"; "World. . ." 1/16"; Registration on rudder 1/4" thin. Similar lettering is available from most well-stocked art or drafting supply stores. The wing letters and numbers can be cut from white tissue or sprayed on through a mask. If tissue is used, be sure to apply it with a minimum of thinner for adhesive. If the white tissue gets too wet with dope, it will dry in a blotchy, partly translucent manner.

The remaining landing gear parts can now be made. Make the shock struts from paper tube

(roll about 3 layers of bond paper on some 1/32" or 3/64" wire, unroll, apply cement and reroll. Cut to length with a razor blade leaving the tube on the wire form. This helps to get a smooth cut without crushing the tube.) The upper portions of the shock strut, going up to the triangular brace, and from there up to the fuselage side, are made from 1/32" round bamboo. Attach the triangular wire piece to pin holes in the lower longerons. Epoxy the bamboo brace between fuselage side and the wire piece, and then attach the shock strut upper piece to that intersection. This piece telescopes into the paper tube which is slid onto the bamboo and then epoxied to the axle. The completed assembly looks and acts like it has working shock struts because of the main gear wire and its brace bend, allowing the telescoping action. The gear fairings can now be made from file card stock and cemented or epoxied to the main and rear gear wires. Make up the tail wheel from a loop of .015" wire the size of the wheel. Fill the loop with a scrap of 1/32" balsa. Bend the



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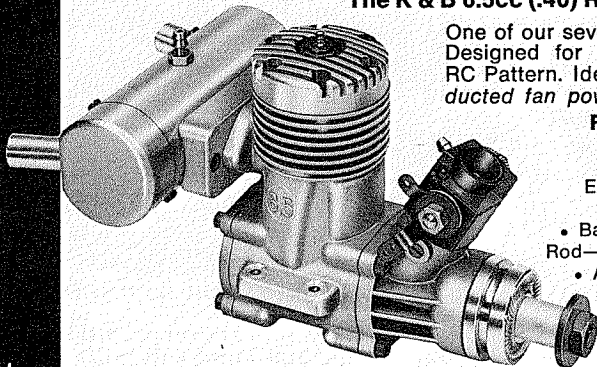
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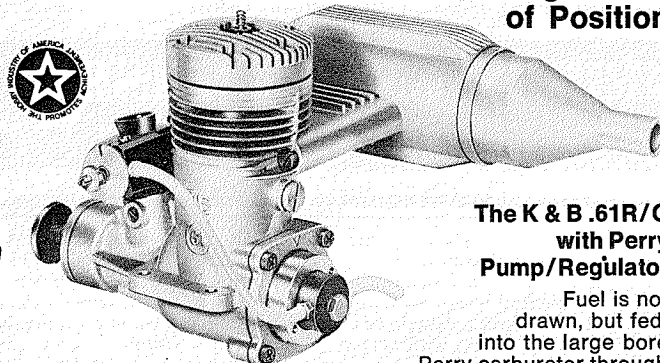


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using a razor saw. Some practice will be needed to produce wheels this way, but when you see what can be done, and feel the minimal weight of the finished product, you may be as enthusiastic as I am. Small aluminum disks, cut from printers' offset plates or aluminum can stock, are used for the inner wheel hub and the outer wheel cap. Sharpen one point on a set of dividers and scribe a circle on the aluminum going around and around until it cuts through. For the outer cap, a more realistic result can be obtained without the wire axle showing so an unpunctured disk is needed. This can be done using a circle template and a very sharp scriber, going around until cut through. The cap should be given a convex or cupped shape and this can be done using a marble or the spherical end of a tire pressure gauge as a tool. Place the disk on a slightly soft working surface (soft balsa or 3-4 layers of handkerchief) and press down with the forming tool. Move the tool around quite a bit and the disk will take on the right shape. If wrinkles appear, try a new disk and don't press so hard. Keep the tool moving while you press down for best results. The finished aluminum caps look very realistic against the flat black enamel-painted wheels.

Assemble the wing strut jig from shirt cardboard and a piece of 1/4" x 1" balsa for a spacer. The length of the spacer should be exactly the same as the center-to-center distance of the wing spars less one thickness of cardboard. Make up the center section struts from split bamboo. A good source of bamboo for small models is probably as near as your neighborhood supermarket. Look for barbecue skewers; I bought one hundred skewers, 10" long, for 49¢. Experiment with splitting the bamboo for a few minutes and make up some 1/32" x 3/32" strips. If splitting didn't produce very smooth strips you can shape and smooth bamboo by scraping with the edge of a razor blade. Cut the finished strips to length, marking the longer, front strips so they will end up in the right place. Slot the ends of the strips so they will slide over the spars by drilling a small hole near the base of the slot and then cutting out the excess material. Put the strut jig on the fuselage and cut small notches in the bond paper covering so that the struts can be epoxied to the longerons. The jig will hold the struts vertically and at the proper spread until the epoxy sets. Add the diagonal braces to the front strut, noting that they are attached to the fuselage about 1/4" above the upper longerons.

Final assembly includes attaching the stabilizer (with a small filler piece in the slot behind the stab) and rudder, and the 1/64" x 1/16" bamboo struts for the tail surfaces. Add the headrest, windshields, and some split insulation from very small wire to simulate leather padding around the cockpit. Make a couple of photocopies of the plan and you can cut out an instrument panel plus two sets of the Timm emblem and Collegiate name. A pilot can be made from paper or small plastic cowboy or soldier figures. The plastic figures can be reshaped with heat from a soldering iron and changed around quite a bit with an X-Acto.

Now, attach the wing to the main struts after making sure that there will be about 1/16" of positive incidence. Make up the outer struts from 1/32" x 1/8" balsa and cement them in place after the wing is checked for warps (and corrected if necessary). About 1/32" of washout will be useful in each panel, and can be put in after the struts are in place. Check the center of gravity after installing a loop of 3/32" rubber, and adjust as necessary with clay ballast. Glide tests can follow but they won't reveal very much. Try some hand-wound power flights with 50-75 turns and watch for bad tendencies. (I've been cultivating some tall grass and weeds for Peanut Scale testing purposes, but my wife says I really ought to mow that back yard!) Thrust adjustments or warm-breath-induced warps in the stabilizer or rudder will help get the best from your Timm. Work up slowly to maximum turns with a geared winder.

I hope you enjoy this example from the Golden Age of Flying as much as I have. As a matter of interest, the model has scale outlines and very nearly scale construction. The small amount of dihedral is the only obvious deviation from scale.

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142" \$12



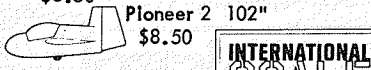
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wire so it can attach to the last fuselage crossbrace and to one longeron.

I've never been able to find exactly the right kind of wheels for small models (correct shape, size, weight), so I have been making my own by turning them from balsa. Soft balsa sheet squares are laminated cross-grain and epoxied onto a piece of 1/8" dowel about 2" long. The dowel can be held in a hand-powered or electric drill chuck and the wheel turned to shape using an X-Acto knife as a lathe chisel and sandpaper for final shaping. Don't laugh at the hand drill idea—it works quite well, and turning the handle gives my four-year-old something to do when he wants to "help Daddy." An electric drill or motor gives slightly better results because it turns faster, however. After shaping is complete, a center hole can be drilled in the dowel using a cutoff needle held in a pair of pliers. Let the motor do the work of turning and just push the pin, needle or drill bit into the end of the dowel hub. Leave the motor running and you can carefully cut the wheel loose

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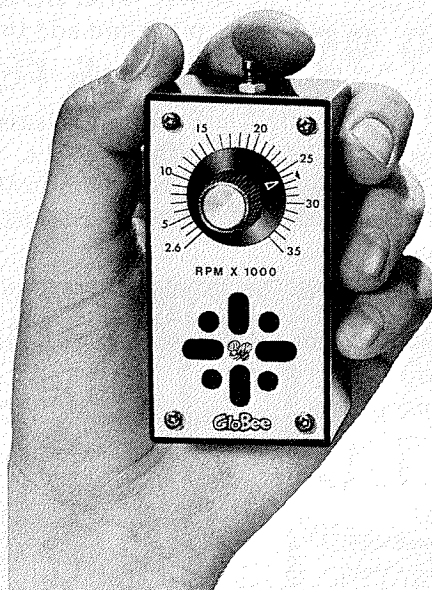
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## VTO

(Continued from page 28)

Carroll FAI, Tony Italiano AMA gas, Jim Richmond indoor, Charlie Sotich special, and Clarence Mather chairman.

This is the eighth consecutive year of the Model-of-the-Year awards. Drawings, photos, and articles about the models will appear in the *National Free Flight Society Digest* which will be available at the Nats and by mail order from NFFS. Customarily the awardees and their models attend the NFFS Symposium held at the Nationals in August.

Interestingly enough, half of these Top Ten Models-of-the-Year have been covered in "VTO," where we record the state of the art and the models that make history. For a preview of the Symposium presentation, look them up in the following "VTO" columns: *Flux* (Dec '76) *Wishbone* (April '76), *Les Trumeaux* (Oct '76),

*Grand Gram* (Feb '77), *Li'l Hooker A/1* (Nov '75). VTO extends congratulations to all the NFFS Ten winners this year.

**MAX OUT WITH MAX FLYER OHLG.** House of Balsa is proud to present Ray Harper's Max Flyer Mk. 8, Outdoor Hand Launch Glider, in kit form. This design has over 40 wins to its credit, including such notables as '76 Nats Open, '76 Nats Senior, '76 SHOC Annual, '76 San Valeers Annual. It won the prestigious Tulsa Glue Dobbys in '73, '74, & '75, was the '73 Eastern States Champ, and '74 NFFS Model-of-the-Year. It is also the current Senior OHLG record holder.

The quality of the kit insures a winning future for the design. All wood is of the highest quality, light, contest-grade wood, 'C' grain as required. It features a hardware bag pack with lead, D/T line, eyelet, spring, screw, finger grips, snuffer tube, etc.: in short, everything required to make a D/T glider. Plans are full size, and are accompanied

by templates so you don't have to cut up the blueprint. Also included is a 24-page, pocket-size instruction book, with 68 step-by-step construction sequence photos, and trimming and flying techniques by Ray Harper. There is also a coupon for two pro-kit models (everything except plans & book) for the price of a regular kit. A perfect combination for the upcoming contest season.

House of Balsa informs us that although the Max Flyer kit has been available for several months, they have not publicized it because of a shortage of wood to meet their standards. A recent purchase of excellent 'C' grain, 4-lb. density & lighter balsa has corrected the situation and the kit is now readily available. \$5.95 at your local Hobby Shop or, if not available, order direct from House of Balsa, 20134 State Rd., Cerritos, Calif. 90701.

We had a chance to preview a couple of these kits and we can only think of one superlative that applies—"incomparable." They are by far the best OHLG kit ever produced. Superb hand-selected wood and plentiful instructions make for a sure winner. The D/T feature will appeal to contest flyers who want to keep on maxing all day long.

**NEW WALNUT IN PEANUT CITY.** Bob Peck of Peck-Polymers advises us that he is now into Walnut Scale: A new size kit from Peck-Polymers—the Walnut 17½ inch wingspan Baby Ace. Baby Ace is known as the king of the homebuilts and the model is an ideal size to be flown with rubber or CO2 power. Drawings show rubber and CO2 motor installations. Kit is complete with photo instructions, 3-views for proof of scale, formed plastic wheelpants, nylon thrust bearing, contest balsa, wheels, plastic propeller and correct size rubber band for flying. The Peck Baby Ace kit is \$4.25; available at your dealers or from: Peck-Polymers, P.O. Box 2498, La Mesa, Calif. 92041

**GB TEAM SELECTION FINALS.** If you think the U.S.A. Team Selection has had problems and dissent, you haven't seen anything yet! Great Britain's fliers, also anxious to select a team to fly at the W/C in Denmark (which VTO hopes to attend) went through some of the same trying circumstances as did their U.S. counterparts. Finally, at Barkston Heath in February, they selected the team. We have photos by Dave Goodwin and this *FFN* report:

"After all the alarms and excursions of last season, the new Free Flight technical committee of the SMAE found themselves not only with a contest season programme to finalize, but a team to pick. The decision of the December CIAM plenary session had been to allow a World Championships to be run by Denmark this coming July.

Having completed so few rounds in the '76 Trials meetings, it had been agreed by both old and new committees and contestants that a further event would be needed to complete the selection process, and the meeting duly took place at Barkston. For those driving from London, the 09.00 start meant leaving home well before dawn, and a somewhat soggy process it was. However, the first thing of note when the writer left North Kensington was that it was mild. This proved a happy foretaste of the rest of the day. Although the weather was to remain for the most part rather grey, the wind was never more than moderate and for the majority of the time blew gently with no more than a short sprinkling of rain in the late morning.

Arrangements were made for three rounds of the three classes to be flown, each of 40-minutes duration, with no lunch break. First away was Glider with 22 people still remaining in the fray. A notable absentee was Tony Young, who perhaps felt that the 63-second deficit to the front runner was likely to be too great a bridge to cross. In the event, this conjecture proved too pessimistic a view.

The early morning sky was still full of broken clouds, with only odd patches of brightness, and what thermals there were proved exceedingly awkward to capture. Most flyers were content to



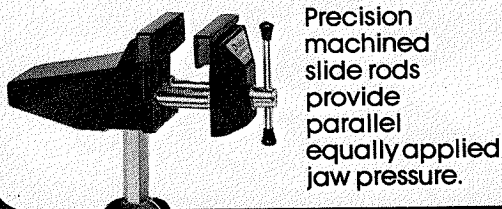
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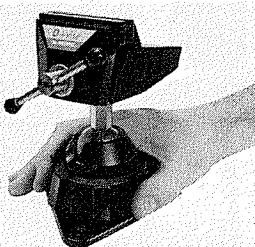
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'do a Micawber,' waiting on the ground for something to turn up. A few were more adventurous and got into the air to circle-tow downwind of the pack. Of these people, John Cooper finished the round with a max, but Elton Drew had a 'technical' and lost the model off the line low down. He had the satisfaction, though, of being able to trace the fault—so no doubt 'Maxaid' users will gain the benefit of his experience in these columns before long. Elton con-

tinued to fly on his own in the other rounds and scored two excellent maxes, each time catapulting his *Lady* off into its open left gliding turn. The third (I think) launch was into a powerful bump a short distance downwind and to one side of the main bunch of flyers on the line. Those who glanced round had the usual envious look when they realized Elton was entirely on his own!

The prime casualty of this round was Peter Williams. His full house disappeared when he launched, along with a number of other flyers, into what appeared to be a marked patch of air, but the launch proved too late and along with other hopefuls, the models were down in quick time. Meanwhile, Andrew Crisp, who had dropped only 2 seconds, went on to find the necessary air to take himself into the lead.

In the next round, which was Power, it was a similar story. Jack Allen was in the lead, but before the start of flying commented gloomily that he had been out the weekend before and nothing had been going right. His first competition launch was a disaster, and the model fell out of the sky into a tight right spiral dive. As is often the case, the model recovered enough to avoid hitting the ground over-hard, and most spectators assumed the flight would be classed as an attempt—but the watches showed 22 seconds. So Jack dropped from top to next to bottom of the field. Of the seven other flyers still in the race, only Ken Faux failed to max. His score was now such that he stood no chance, and so he dropped out.

The first Wake round started a regular ding-dong shuffle. Since flight scores were so tightly packed, any contestant who dropped a few seconds was likely to slip several places. Thermal activity and tactical flying gave more than half the field maxes, but Alan Jack and Brian Kenny, the previous leaders were not among them. Alan's dropping nearly a minute pushed him from leader to eighth place, while David Digby's model steadfastly refused to turn to the right and stalled violently throughout the limited time it was in the air, effectively putting him out of contention.

The second bash resulted in an interesting statistic. In Glider, the ability to find lift began to improve, while in Power and Wake, it got considerably worse, though there were several near misses in both classes. Perhaps it is worth noting that the three groups of fliers—by now down to the 'hard core' Free Flyers of England and Wales—were down to flying equipment which was, almost without exception, the old, reliable stuff. By now, the sophistication of the airframe was forgotten; the contest was by now purely limited to chucking the hardware at the right time.

Thermal detection came from a variety of sources. In the case of Bob Wells, it was 'feel,' hand-blown bubbles from his son for Brian Kenny, the fully automatic Norwich bubble machine supervised by David Oldfield for Mike Woodhouse (and lots of the rest, of course) and the Croydon air temperature chart recorder for the Croydon competitors, plus bubbles from Jack North's hand-held machine. In this second round, Glider flyers did manage to avail themselves of at least one definite and widespread thermal, though the seven remaining in Power appeared to be flying by the seat of their pants. In the Wake round, in spite of bubble indications and a steady and protracted rise in air temperature recorded on the chart, the two Croydon flyers Hipperson and Kaynes found deep trouble, the former dropping from the lead to fifth place, while a max from Kenny put him into the lead. More roulette in the mediocre air. Pollard, for example, though failing to max by nearly half a minute moved up from fifth to fourth, while Williams dropped down the field from third, to join Hippo.

And so we came to the crunch—the final round which was (leaving aside any exercise of unforeseen whims by the SMAE Council, of course) to decide our teams for Denmark in July. Williams, in Glider, made another max but the single mistake of the day—and the Trials—only left the European Championship runner-up as runner-up again. Crisp and John Bailey kept their heads, as did that veteran Cooper, in spite of his dropping time, to maintain third slot.

Tactics had become crucial in Wake, and many and devious (and entirely legitimate, may it be added!) were the tactical ploys construed to encourage mistakes by the opposition. Croydon, for example, stayed in camp and steadfastly refused to leave it. After all, their flyers had little to lose and everything to gain by letting others make errors. Maxes proved very, very hard to find, but bits of air were there, though Kenny was not to find one. His hundred-odd-seconds took him out of the team to 'first reserve' slot, while the penultimate round's first reserve, Pollard, jumped the vital two places into the team—again. Similarly, Woodhouse, whose flight was some way short of a max, dropped one place, but this was to third—and good enough. But the winner? He did find the air, and it was Williams. Leaving Hipperson behind at fifth, Peter jumped to the top of the tree, so showing that he can fly other ships beside gliders!"

**NEW FAI PROGRAM ADMINISTRATOR.** Bob Stalick advises us that he has resigned and Rol Anderson will be taking over the reins on the 1979 FAI FF team selection program. Bob will now be able to devote some time to building and flying instead of resolving the eternal disputes that go with a program. If you have suggestions, write Rol Anderson, 2020 Winchester, Toledo, Ohio, with your ideas. The 1979 program is already operational, and you have through August 1 to qualify to fly in the Labor Day semifinals. Full details can be obtained from AMA, but send along \$5 if you want to enter the

(Continued on page 86)

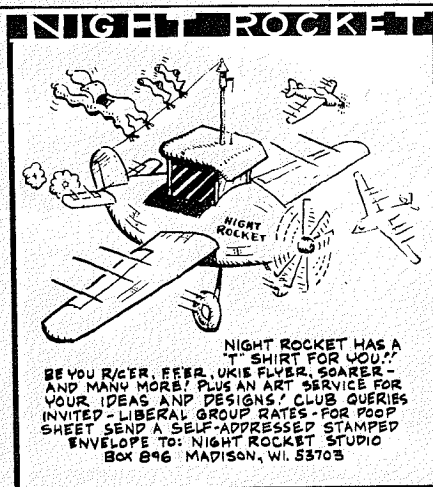


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### VTO

(Continued from page 82)

program immediately. We wish Rol the best of luck in his new job.

**BIG BASH IN PHILLY.** Philadelphia has long been known for its scale model experts and now their craft is experiencing a resurgence, with Peanut Scale in the forefront:

"The first of a regular series of monthly model airplane contests for indoor endurance models, peanut scale models, and hand launch gliders was held at the Big Bash Flea Market at D and Tioga Sts., Sunday, April 24th.

Sixteen contestants were registered with an array of over fifty different models, varying in size, shape and color all the way from hand-launched balsa wood, three-inch-wing-spread gliders to silverfoil-covered flying auto gyros.

Several peanut models were scaled after 1910 French Demoiselles to some scaled after the latest civilian-type aircraft. All the models performed in

the new flying area adjacent to Big Bash in the former Philco warehouse. Several thousand people watched the contests.

The oldest entrant was Pat Ciambrella, 59, of Levittown, Pa., and the youngest entrant was Walter Eggert, Jr., 6-year-old, of Huntingdon Valley, Pa. Official contest was held in the peanut scale category and prizes were awarded for the first three places as follows: 1st prize . . . George Myer, Warminster, Pa., flying scale model 1910 Demoiselle; 2nd place . . . Walter Eggert, Sr. Huntingdon Valley, Pa., flying Gere sportster; 3rd place . . . Dave Rees of Teleford, Pa., flying a Fike E.

A test flying area at D and Tioga will be available every Saturday and Sunday. Official contests will be held on a regular schedule, and dates will be announced in the near future. All persons or clubs interested in competing in these events are requested to write to Charles Janton of the Big Bash at D and Tioga Sts., Phila., Pa. 19134, for complete details." ■

### Control Line Curtiss Robin

(Continued from page 24)

is not recommended since parts cannot be shifted when the surfaces are being glued.

**Folding:** The scoring of the fold lines is done with a screening tool available at any hardware store. It consists of a handle with a 1½"-diameter radiused wheel at one end which is run along a straight edge on the fold line.

**Finishing:** Cardboard gives a solid surface with no open areas to cover and is nonporous. The easiest method of finishing is to give the material three coats of color dope and two coats of clear dope; however, a wide variety of other finishing materials can be used on cardboard. Coverings such as Solarfilm, MonoKote and vinyl paper can be used, but with any of these, it is recommended that the surface not be doped, in order to effect a better bond.

**FUELPROOFING AND WATERPROOFING.** One of the questions often asked is, "How do you

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waterproof cardboard so that moisture will not penetrate the aircraft finish with only a few coats of dope?" The process is quite simple and can be done to the raw material before you cut out the parts for your aircraft. Simply mix one part clear polyurethane with eight parts paint thinner. Both can be of the cheapest hardware store variety. Brush liberally onto the corrugated cardboard sheet that you are going to use in the construction of the aircraft. Allow this to soak throughout the cardboard and dry for forty-eight hours. This coating adds no appreciable weight to the cardboard, but it renders it completely waterproof and fuelproof. In addition, you will find that the cardboard is as crisp as wood and cuts sharply and cleanly.

**CONSTRUCTION.** Cut out all cardboard and wood parts using the template outlines. Be sure to note the direction of the grooves. Score and fold cardboard parts as indicated on the plans.

**STABILIZER AND FIN.** Glue  $\frac{1}{8}$ " x  $\frac{1}{4}$ " spruce strips to stabilizer trailing edge and elevator leading edge. Round off edge of spruce for smooth control surface movement. Hinge elevator to stabilizer with cloth hinges at four places. Fill raw edges of cardboard with glue.

Glue  $\frac{1}{8}$ " x  $\frac{1}{4}$ " spruce strips to fin trailing edge and rudder leading edge. Rudder is then glued to fin with rudder trailing edge offset  $\frac{1}{2}$ " to outside of flying circle. Fill raw edges of cardboard with glue.

**WING.** Be sure to make strut cutouts in both wings as shown. Begin wing by making two wing spars. Spar-a  $\frac{1}{4}$ " x  $\frac{1}{2}$ " balsa strip capped with  $\frac{1}{4}$ " square spruce strips top and bottom. Spars are joined at the center with  $\frac{1}{8}$ " plywood joiners on each side.

Mark spar location on inside bottom of wing. Glue aft wing ribs in place in both wing panels. The shortest ribs go nearest the centerline. Glue the wing panels together along the wing bottom seam only, and glue spar in place. Now glue leading edge ribs in place. Again, the shortest ribs are nearest the centerline. Glue 1 oz. weight to inside of right wing tip. Apply glue to top of wing spar, ribs and trailing edge. Fold the wing over and weigh down with books, etc. until dry. Wing tips are made from two laminations of  $\frac{1}{2}$ " balsa sheet and sanded to shape. Make wing tip leadout guide from  $\frac{1}{4}$ " plywood. Cut slot in left balsa wing tip and glue guide firmly in place. Seal wing trailing edge and centerline joint with gummed paper tape or masking tape.

**FUSELAGE.** Before starting, be sure the following cutouts have been made in the fuselage sides: slots in both sides for stabilizer; leadout holes and push rod exit in left side; engine exhaust in right side; strut cutouts in both sides. Line the upper and lower edges of each fuselage side with  $\frac{1}{8}$ " x  $\frac{1}{4}$ " balsa. The strips are recessed  $\frac{1}{8}$ " from the fuselage edges. Drill hole in C1 for fuel tubing exit. Glue C1 to right fuselage side making sure it is perpendicular to fuselage side. Cut engine exhaust hole in side doubler C3 and glue in place. Drill motor holes in motor mount C2 and install

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4-40 blind nuts in bottom side. Glue motor mount C2 in place. Add lower doubler C4. The left side fuselage is now glued to C1 and C2. Add doublers C3 and C4 to left side fuselage. C5 is now glued in place. Glue C6 to upper aft cowl. Drill and install a 4-40 blind nut in back of C7 and glue in place on forward lower cowl. Glue triangular strips along upper cowl sides. Make from  $\frac{1}{2}$ " balsa sheet. Apply a coat of epoxy to the inside of the engine compartment for fuel-proofing.

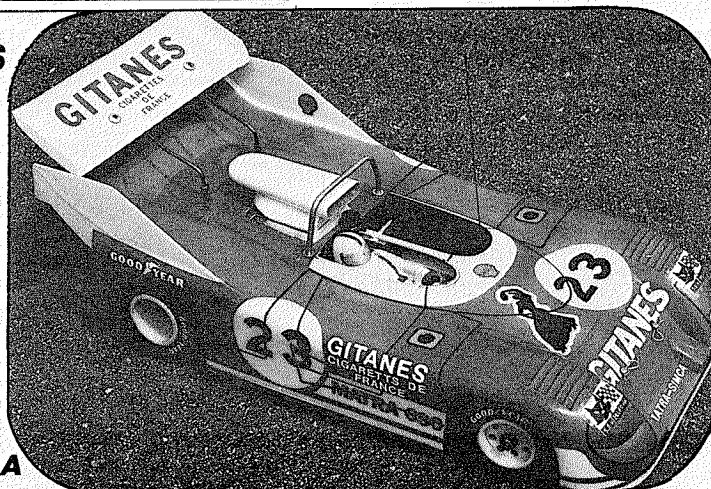
Fuel tank and bellcrank supports are installed next. Supports are cut from scrap cardboard and glued to fuselage sides as shown in side view. Attach fuel tubing to 6 oz. clunk tank and secure tank to  $\frac{1}{8}$ " plywood support with rubber bands, using a paper clip to secure rubber bands. Glue assembly to cardboard supports. Attach  $\frac{3}{32}$ " wire push rod and leadout wires to bellcrank. Attach bellcrank to  $\frac{1}{8}$ " plywood support and glue to cardboard supports.

Fuselage top and bottom are now closed up.

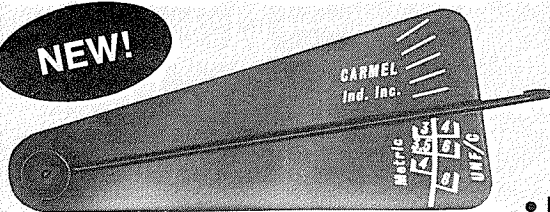
Glue F1 through F7 in place. Cut small hole in F1 for fuel tank fill tube, and F7 for fuel tank overflow. Glue  $\frac{1}{8}$ " plywood main gear mount in place. Make tail gear form  $\frac{1}{16}$ " wire and attach to  $\frac{1}{8}$ " plywood support with thread, and glue in place. Make  $\frac{1}{8}$ " wire main landing gear and attach to plywood support using metal gear clips. Seal raw edges of fuselage with gummed paper tape or masking tape.

The removable cowl is next. Top of cowl, C8, is  $\frac{1}{8}$ " plywood with cutout for cylinder-head. Front of cowl is two laminations of  $\frac{1}{2}$ " balsa sheets. Position both in place and glue together. When dry, add triangular balsa brace at inside edge of joint. Make cutout in front of cowl for engine shaft. Cut out  $\frac{1}{8}$ " deep recess in aft bottom of front cowl and install C9. Drill  $\frac{1}{4}$ " hole in balsa cowl in front of C9. Then drill hole in C9 for a 4-40 bolt. Hole in C9 must line up with blind nut in C7. Cowl is attached by 4-40 bolt through C7 and small wood screw through C8 which screws into C6. Add triangular pieces to upper front cowl so

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that they line up with triangular pieces previously  
installed on fixed cowl. Sand cowl to shape.

**WING STRUTS.** Make four wing struts as  
follows: Glue ¼" x ¼" spruce strips along outside  
edge of fold line. Apply glue along top surface of  
spars and cardboard trailing edge and fold card-  
board over and weigh down until dry. Strut  
cross-section is shown on plans. Seal trailing edge  
with gummed paper tape or masking tape.

**FINISHING.** It is easier to paint and finish the  
model now before it is all assembled. The fuselage  
and wing tips are Fokker red and the wing, tail  
surface and struts are silver. Three coats of  
colored dope followed by two coats of clear were  
used. The number, letters, fuselage stripe, win-  
dows and aileron outline are made from black  
and silver MonoKote.

**FINAL ASSEMBLY.** Glue wing to top of  
fuselage. Insert long end of spruce strut in cutout  
in wing. It will slide into the wing far enough so  
that the other end of the strut can be lifted up and  
inserted into the cutout in the fuselage side. When  
positioned, glue firmly in place. Glue stabilizer  
and fin to fuselage. Attach control horn to the  
elevator and hookup push rod. Attach 1"  
diameter tailwheel to tail gear and 3¼"-diameter  
vintage wheels to main gear. Pass the leadout  
wires through the wing tip guide and tie off. Bolt  
motor to motor mount and attach fuel line. Bolt  
on cowl, add a 10-6 Top Flite propeller and  
Williams Bros. 2" red plastic spinner and your  
ship will be complete. Be sure to balance the air-  
plane as shown on the plans.

**TRIMMING AND FLYING.** No additional  
trimming should be required if the model is  
balanced at point shown on the plans. Obviously,  
the Robin is designed for scale sport flying. It was  
not designed for stunt flying, although fairly  
sharp wingovers are routine. On takeoff, the  
tailwheel lifts off after an extremely short run and  
takeoff continues on the main gear until flying

speed is reached. The forward position of the  
main gear eliminates any tendency to nose-over.  
In fact, touch-and-gos on the main gear can only  
be performed at full throttle. The light weight and  
thick airfoil give a lot of lift at low speed and  
result in a smooth and stable landing glide. The  
landing speed is very low and the model can be  
stalled out just prior to touchdown with almost  
zero forward velocity. Although big, it makes an  
excellent trainer because of its stability and rugg-  
ed construction. ■

## Foreign Notes

(Continued from page 8)

small microphone in the back of the case and  
registers its frequency on a front-mounted meter,  
calibrated in rpm.

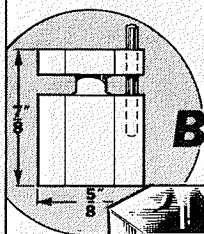
Covering an rpm range of 10,000 to 20,000  
marked in steps of 500 rpm, the Ebick Audio  
does not permit such precise speed measurement  
as is possible with the types already mentioned,  
but it does have one advantage offered by no  
other tachometer. This is its ability to indicate  
engine speed when a model is actually in flight—  
or, in the case of boats or cars, on the move. We  
have found that there are some practical dif-  
ficulties to recording in-flight rpm (wind,  
Doppler effect, etc) but, given reasonably  
favorable conditions, it is possible to determine  
the approximate rpm build-up that occurs in  
flight on a given prop, compared with static rpm,  
and this is of considerable value when one is try-  
ing to match a prop to an engine's performance  
curve.

Ideally, the tach should be used as close as  
possible to the engine in order to exclude ex-  
traneous noises (other models, speech, etc) and  
there is a microphone gain control which should  
be switched to "Low" when checking ground  
rpm. For in-flight rpm readings it is usually best  
to have the model fly a circular path, checking the  
rpm from the center of the circle. Naturally, it is  
of no use trying to check rpm if other models are  
operating in the vicinity.

The Ebick Audio Tachometer is quite com-  
pact, measuring approximately 4.2" x 2.8" x 2.8"  
and weighs less than 10 oz. including its 9-volt  
battery.

So far as we are aware, the Ebick Audio  
Tachometer is not yet available through retail  
sources in the United States. Enquiries may be  
directed to the sole exporters, the S. Kosaka Cor-  
poration, P.O. Box 10, Abeno, Osaka, Japan.

**TWO RUSSIAN STUNTERS.** From the earliest  
days of the World Control Line Stunt Cham-  
pionships, one thing stood out for all to see and  
this was the appearance of the models flown by  
American team members. When we were report-  
ing on World Championship contests back in the  
60s, the big names, as we remember, included  
Lew McFarland, Jim Silhavey, Bob Gialdini and  
the late Steve Wooley. Not only did they top the  
results with their skillful flying, their models  
made most of the opposition's look positively  
dowdy. However, among the latter there were



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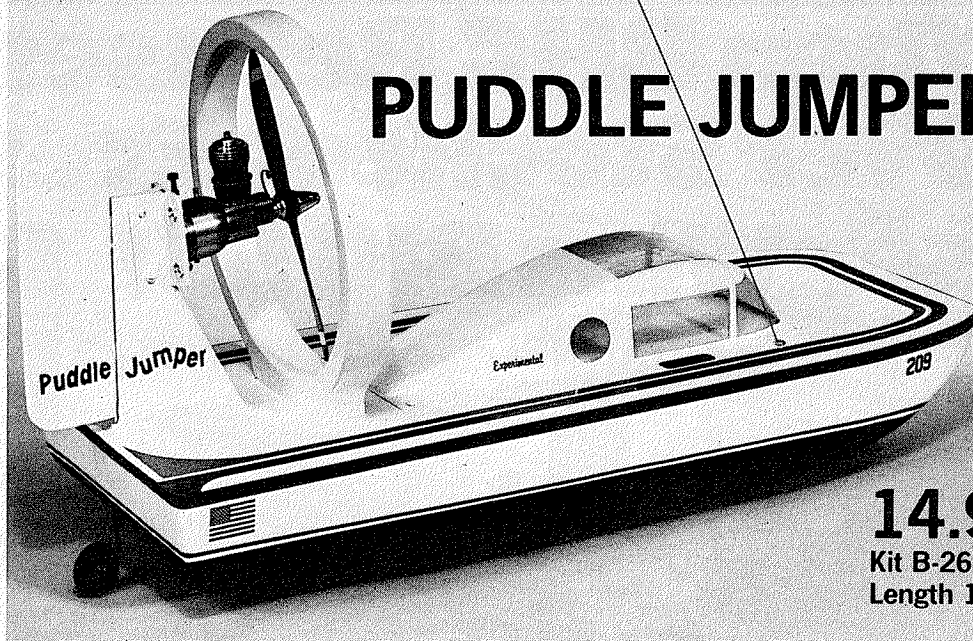
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just a few exceptions, including some of the Russian models. While they lacked the immaculate finish of, say, Jim Silhavey's, they were attractively proportioned and colorfully decorated. Soviet stunt models have largely followed this line ever since and, as an example of typical current Russian practice, this month's photos include a couple of models flown at last year's USSR National Championship Stunt event.

These models were built and flown by two members of the Soviet Air Force team, A. Korchagin and A. Listopad. Korchagin's model spans 1420 mm (55.9") and is 1030 mm (40.5") long. It has a wing area of 39 sq.dm. (605 sq.in.) and a stabilizer area of 6 sq.dm. (95 sq.in.) and is powered by a Russian Akrobat 40 engine driving a 270x125 mm prop (i.e. 10.6" x 4.9"). Listopad's model is slightly bigger: 1500 mm (59") span, 1060 mm (41.7") long and with a bigger (108 sq.in.) stabilizer. It also has an Akrobat 40 but with Listopad's own ABC piston/cylinder conversion.

**NEW 40 FROM CZECHOSLOVAKIA.** The Russian Akrobat 40 mentioned above first appeared in 1970. We acquired one shortly afterwards and it was described in this column back in May 1971 (photos of this engine were squeezed out of the "F.N." pages and appeared instead in the "Round and Round" column of the same issue). Engines in the .40-cu.in. displacement class are rather uncommon in the East European countries and the design and construction of the Akrobat were certainly nothing to get excited about. However, the people at the Czechoslovakian State Model Center, MVVS, at Brno, have recently come up with a 40 which looks and sounds very much more in keeping with Western ideas.

MVVS is, of course, recognized in the West as being one of the very few East European sources of quality motors (twenty years ago the MVVS 2.5cc glow and diesel motors were challenging the best that the West was then producing) and the new MVVS 6.5F (6.5cc - .40 cu.in.) would seem

to be an attempt to manufacture a competitive engine in this displacement category. The engine is a front rotary-valve, twin ball bearing Schnuerle-scavenged side-exhaust design and is available with a standard venturi and needle-valve for control line, or with a throttle type carb. In the latter form the engine is known as the MVVS 6.5FRC.

The Czech magazine *Modelar* reports on a brief side-by-side comparison of the new MVVS 6.5FRC with the Webra Speed 40R/C. This quotes the MVVS as recording 13,600 rpm on a Graupner 10x5 prop, compared with 13,900 rpm for the Webra, both engines running on a straight fuel of 75% methanol and 25% castor oil. With the Webra recognized as one of the better 40 R/C engines around at the present time, this sounds quite promising.

**ENTERPRISE IN TAIWAN.** Just over two years ago, in this column, we illustrated and described an engine of Far Eastern origin that had temporarily come into our hands, namely a Thunder-Tiger 15 made in Taiwan which, to the best of our belief, was the first model aircraft motor to be commercially produced in that country. As a result of this "Foreign Notes" item, contact was subsequently established with Thunder Tiger Hobby Enterprises, manufacturers of Thunder-Tiger engines.

Recently the Thunder-Tiger 15 has become available in the U.S. through one or two discount houses and, in the near future, it will be supplemented by some new motors, including .10, .20 and .25 cu.in. models. Later, these will be followed, it is hoped, by a .40 and a .60.

All this activity suggests that Thunder Tiger Hobby Enterprises is a somewhat larger operation than we at first supposed and this has just been confirmed by a most interesting and informative letter received from Brother Gerard Lemieux, Procurator of the Viator High School in Taichung. Bro. Gerry, as he is known, has been a missionary in Taiwan for nearly 18 years and a model enthusiast for more than thirty years.

Several years ago he formed a model club at the school called "The Flying Knights." He also became acquainted with Mr. Aling Lai of the Chung Yang Industries Co. Ltd. and we gather that it was with Bro. Gerry's encouragement that this company eventually decided to enter the model industry.

Thunder Tiger Hobby Enterprises was formed as a subsidiary of Chung Yang Industries in 1973 with Mr. Aling Lai as manager and Bro. Gerry acting as advisor. Chung Yang Industries has a work force of approximately one hundred employees and is engaged primarily in the manufacture of Singer sewing machine parts, an activity in which they have been involved for some 20 years. Six months were spent by Mr. Aling Lai in studying production techniques and then, using the Enya 15-III as a model for their first production, a pilot-run batch of 100 engines was made in February 1974. Tests on these indicated the need for several modifications and a second batch of 300 motors was then produced with these corrections incorporated. The third run was of 500 units and subsequent batches were of 1,000 each.

Of this first production Thunder-Tiger engine, 4,000 units were made and most of these were sold locally. "The price being very low," writes Bro. Gerry, "they sold like hot cakes. The quality could not be compared with foreign engines but they worked and got an airplane in the air. A whole new crop of young beginners were now building and flying all over the island."

In 1975, the improved Thunder-Tiger 15 Model II was introduced. 14,000 of these were produced. Sales were helped by the fact that locally made low-priced kits suitable for the engine were being manufactured by another company. Later, Thunder-Tiger began making their own kits, firstly profile-type beginners' U-Control models and then fuselage models. In all, six kits have been produced to date and the company now markets practically everything the modeler needs to operate a U-Control model, all locally made.

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Mr. Aling Lai now began to look to the export market and samples of the TT Model II were sent to Hong Kong, Japan, Australia and the U.S. "Our first big order," Bro. Gerry reports, "came in July 1976 for 1,000 engines. We knew that if we wanted to stay in business and grow we had to improve on our Model II. Our first attempt to make mufflers and throttles was not too successful. We decided to have a bigger company make the die castings for our new .20, .25 and .15-III and also our muffler and throttle. This was a big order but they promised delivery by the end of August. Having the experience of our first two engines, we wanted something better this time so we rejected the molds until we had what we wanted. Finally, at the end of January, they were acceptable."

In February this year, the Thunder-Tiger 15-III was released, along with the new 25 and, in March, the TT 20 was put into production. The next model will be the TT 10 and it is hoped to introduce .40 and .60 cu.in. models in due course.

Not content with being engine, kit and accessory manufacturers, Thunder Tiger Hobby Enterprises are also the publishers of Taiwan's first and only model magazine, *The Model World* (see photo), the first issue of which appeared in 1975. Clearly, this is a most enterprising enterprise!

**ENGINE NEWS FROM JAPAN.** Several new motors have recently appeared in Japan and a few more are in the offing. Enya have announced a "Sixth series" 19, i.e. the 19-VI, in both bronze bearing and ball models and in standard, R/C and R/C Marine versions. These, like the 19-V models they succeed, are conventional crossflow ported motors, not to be confused with the recently introduced and more powerful Schnuerle-scavenged Enya 19X. We understand that Enya are also about to release a Mk.4 version of the Enya 15.

The Fuji company are in the process of marketing several new models, including a new .09, Mk.4 versions of their 19-S and 19-SBB, a

ball bearing 25 and two .40 cu.in. models—the largest Fuji engines to date. Hiness also say that they are bringing out a new 40, plus a 40 version of their Arrow axial engine and a ball bearing 25.

An addition to the big engine market last year was the Yamada YS-60SR. This, like the original YS-60 tested for the M.A.N. "Engine Review" series nearly four years ago, has a built-in regulated pressure system and pressure carb but is a new design with Schnuerle porting. It seems to have been well accepted by the contest fraternity in Japan and is reported to be offering a strong challenge to the O.S. 60F-SR.

### Engine Review

(Continued from page 55)

successful SR-II 6.5cc (.40 cu.in.) rear rotary-valve ABC pylon racing motor, but with an entirely new front end. This new motor is being made in three displacement sizes: a .30 cu.in. model and a .35 (called "4.9cc" and "5.8cc" respectively in accordance with K&B's recently adopted Metric designation system) in addition to the .40 cu.in. "6.5cc" model.

Of these three, only the 6.5 is obtainable in both R/C and standard non-throttle racing versions at the present time. The 4.9cc and 5.8cc with which we are dealing here, are essentially Free Flight/Control Line contest motors. All three engines, however, have the same stroke, enabling the same crankshaft and front housing assembly to be used for all of them.

Needing to employ a large rotary-valve port area and a large bore gas passage through the shaft to ensure free breathing for maximum power, K&B have adopted a 15 mm o.d. shaft main journal in place of the "solid" 3/8" (9.52 mm) shaft of the rear rotary-valve SR-II. This is the same o.d. as that of most modern .60 cu.in. shaft-valve motors. A few .40 size engines (e.g. Enya 40, Fox 40BB, O.S. 40F-SR, Webra Speed 40) also now have 15 mm shafts, but the K&B is the



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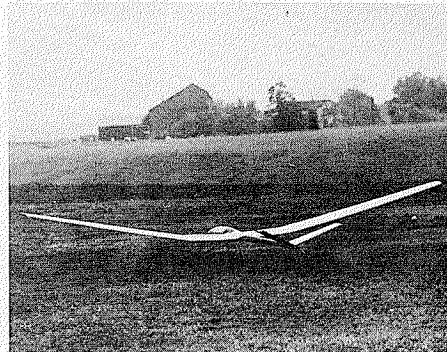


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first design to use such a large size with displacements of only .30 cu.in. and .35 cu.in.

The shaft is bored 10.4 mm i.d., the charge being admitted through very large rectangular ports in the main journal and bearing housing. The latter incorporates an enormous ( $\frac{3}{8}$ " i.d.) intake boss into which is inserted a machined aluminum venturi. The standard venturi fitted to both the 4.9 and 5.8 has a throat diameter of 9.6 mm which, after allowing for the needle and jet, give a very large effective choke area of some 56 sq.mm. for maximum top end power. This, of course, will require a pressurized fuel system and crankcase pressure-fitting is included. Supplied with the 5.8cc engine examined was an alternative smaller venturi having a 6.4 mm ( $\frac{1}{4}$ " nominal) throat diameter which virtually halves the effective choke area to approximately 27 sq.mm. for use where the owner may prefer this, as for "slow combat," etc.

Needless to say, the crankshaft is carried in ball bearings front and rear. The shaft has a  $\frac{3}{8}$ " o.d. front journal and this is supported in a  $\frac{7}{8}$ " o.d. 7-ball brass caged bearing. At the rear the bearing o.d. is  $1\frac{1}{8}$ " but instead of being fitted into the detachable front housing, either completely or in a half-and-half installation, it is free of the housing and is aligned in the i.d. of the crankcase barrel.

The rest of the engine broadly follows the SR-II design. A conventional backplate replaces the SR-II's rear rotary-valve unit but, except for such modifications as are essential to adapt parts to the reduced cylinder bore of the 4.9 and 5.8, the components are generally the same. The original SR-II main casting, for example, is used by the 6.5cc front rotary-valve engine unchanged, while, for the 4.9 and 5.8, it is simply bored slightly smaller to take these engines' smaller o.d. cylinder sleeves.

K&B's variant of the standard Schnuerle-scavenging system with its twin upwardly inclined "third" ports is continued unchanged except that, in the 5.8 and 4.9, the four ports are closer together. As with the SR-II, the ringless

aluminum piston is very closely fitted to the chromed brass liner at the top of the stroke and will, presumably, call for the same special "hot" break-in technique found necessary with the SR-II. All three new models have the SR-II's sturdy forged conrod, bronze-bushed at both ends. Cylinder-heads are of machined bar stock and, in the case of the 4.9 and 5.8, have dual concentric bowl ("double bubble") combustion chambers and fairly steeply sloped squish-bands.

The 4.9 and 5.8 are each supplied complete with a  $4 \times \frac{1}{8}$ " o.d. minipipe and although no actual performance figures have yet been claimed by the manufacturer for them, they are obviously very powerful. As befits a design which must necessarily be quite highly stressed, they are very sturdily built but are not excessively heavy. The 5.8, with exhaust stub and mini-pipe, checked out at 11.9 oz. The 4.9, whose smaller bore cylinder sleeve has a thicker wall, is a  $\frac{1}{4}$  oz heavier. Checked cylinder bores of the two engines loaned to us for examination were 0.726" (4.9) and 0.790" (5.8) which, with the nominal 0.720" stroke common to both engines, gives displacement figures of 0.2980 cu.in. or 4.884cc for the 4.9 and 0.3529 cu.in. or 5.783cc for the 5.8. The engines have the following external dimensions: Overall height (less glow plug) 3.21"; Length from prop driver face 3.9" (with exhaust stub, less mini-pipe), 7.5" (including mini-pipe); Crankcase width 1.32"; Width across mounting lugs 1.91".

**SUPERTIGRE X.40.** This current version of the Supertigre X.40 differs from the earlier X.40 mainly in its use of a one-piece body casting. Earlier models, while featuring the same rear-induction, rear-exhaust layout, had a separate cylinder jacket.

The new casting is extremely robust and very well executed. The crankcase section is of substantial wall thickness, heavily braced to a short front housing and extending up to include a really solidly proportioned cylinder block containing three smoothly finished and well-shaped bypass channels. As with the earlier model, cylinder fin-

ning is asymmetrical, the fins being lengthened to provide extra cooling area at the rear where the exhaust and reduced air flow cause extra heat to gather. The idea of locally increasing fin area to help cool areas of high heat concentration is common in full-size practice and is not entirely new so far as model engines are concerned. Older model engine buffs may recall that "streamlined" cylinder fins were used, for example, by the American Dennykite Airstream nearly forty years ago and by the Canadian Super-Hurricane thirty years ago.

The X.40 crankshaft has a 12 mm dia. main journal and a 7 mm front journal running in, respectively, 12x28 mm 8-ball steel-caged and 7x19 mm 8-ball brass-caged bearings. The shaft is of the internally counterbalanced full disc type with an aluminum sealing rim and an integral 6 mm solid crankpin. The latter incorporates an elliptical drive spigot for the rear rotary-valve which is of the machined, counterbalanced, hardened and ground steel disc type as pioneered several years ago by Supertigre designer/manufacturer Jaures Garofali. The valve runs on a 4 mm dia. hardened-steel pin that is firmly anchored in a very deep machine-finished backplate carrying a conventional machined aluminum intake venturi. The venturi has a choke diameter of 9.5 mm and an effective choke area, after allowing for the needle and jet assembly, of approximately 54 sq.mm.

The X.40 is, of course, of the ABC type (another Garofali innovation) with Schnuerle scavenging. As in the X.21 previously described, the port design differs from the usual Schnuerle system (including that used by the earlier X.40) in that it features the addition of a pair of narrow vertical slots, one each side, sharply angled through the cylinder wall and located close to the exhaust side of each of the main bypass ports. These slots, 3 mm wide, might be equally well described as extensions of the existing bypass ports, as each is separated from its adjacent bypass port by only a narrow (1 mm) vertical bridge which, in effect, forms a vane to direct the

charge away from the exhaust port and towards the front of the cylinder and the upwardly inclined "third" port. It is reasonable to suppose that this arrangement is more effective than standard Schnuerle porting in reducing charge loss through the exhaust port.

The supplementary slots open about 5° later than the main bypass ports and the X.40's general port timing is slightly different from that of the earlier model X.40 examined. The exhaust port is now open for approximately 158° of crank angle, the main transfer for 134°, the third port for 124° and the supplementary slots also for 124°. The rotary-valve period has also been extended by about 12 degrees. On the engine examined, the valve opened at 31° after bottom dead center and closed at 63° after top dead center.

The engine's long exhaust period is reflected in a very high nominal geometric compression-ratio of approximately 15.5:1, the true compression ratio being substantially reduced, of course, by the engine's shortened effective stroke above the exhaust port. The effective stroke is, in fact, only 11.8 mm, so that the effective compression is reduced to approximately 10.7:1.

These measurements were made with the standard gasket thickness (0.1 mm or .004") under the cylinder-head. The head is of machined bar stock and is secured with four 4 mm screws. It features a dual concentric bowl-shaped combustion chamber with a very wide (4.6 mm) moderately sloped squish-band. The ringless and deflectorless aluminum piston is machined from a permanent mold casting and is fitted with a 5 mm o.d. wristpin retained by wire circlips. The rod is machined from bar stock with bronze bushes at both ends.

The manufacturer rates the X.40 at 1.5 horsepower at 24,500 rpm, a quite conservative output figure which relates to the performance of the stock engine and presumably on FAI fuel. The X.40 does, however, respond readily to the attention of tuning specialists of the caliber of George Aldrich and Terry Prather and, so modified, has proved to be the only motor to seriously challenge the K&B SR-II in Formula One Pylon Racing.

The X.40 has a bore and stroke of 21.5 mm x 17.8 mm and a displacement of 6.462cc or 0.3944 cu.in. Checked weight of our sample was 340 grams or just under 12 oz. The engine has the following external dimensions: Overall height (less glow plug) 3.35"; Length (from prop driver face) 3.92"; Crankcase width 1.30"; Width across mounting lugs 1.89".

**WEBRA SPEED 61F WITH DYNAMIX CARB.** Our full "Engine Review" test report on the Webra Speed 61 appeared in the March 1974 issue of *M.A.N.* At that time this motor, built at Webra's newly established Austrian plant at Enzesfeld, was new to the market and we were aware that many Pattern flyers were dubious of the Speed 61's ability to win the kind of acceptance enjoyed by the earlier German-built Webra Blackhead 61. At the conclusion of our test report we were moved to comment: *The Webra reputation in the R/C field was built on the success of the Berlin-made Blackhead 61, and the Enzesfeld Speed 61 has a lot to live up to. We think the potential is there for another success story if all the engines leaving the new Austrian factory are as good as the motor we tested.*

In due course, these expectations were realized and, over the past three years, the Speed 61 has become one of the most widely used Pattern contest engines, also gaining much good publicity by winning such events as the World R/C Aerobatics Championship and the Las Vegas Tournament of Champions events in the hands of Wolfgang Matt and Hanno Prettnner.

Outwardly, the current production Webra 61F does not differ from our original 1973-4 test model, apart from a matte, rather than tumbled, casting finish. Inside, however, there are a few modifications and, for 1977, there is also the option of an entirely new carb.

Significant porting modifications have been made: some port areas have been increased and timings changed. In the original test model the measured exhaust period was 142° of crank angle, the main bypass 120° and the third port

period 110°. In the latest model examined, these figures have been amended to, respectively, 150°, 116° and 112°. The rotary-valve timing has been quite drastically changed with uncommonly late closure at 70° after TDC instead of only 45° ATDC. A very much wider valve port in the shaft has been used to achieve this extended induction period and, rather surprisingly, one finds that the induction hole through the 15 mm o.d. shaft has been reduced from the original 11 mm i.d. to only 10 mm. Presumably this was considered necessary to maintain shaft strength with the intrusion of the wider valve port. The shaft is now machined in one piece instead of having a pressed-in crankpin.

The new optional carburetor, called the Webra "Dynamix" is totally different in design from the Webra TN that has been a feature of Webra 60 motors for the past ten years. Instead of a rotating barrel-type throttle valve, it has a flat slide valve which slides horizontally across the venturi to close the throttle.

Below and parallel to the throttle valve and installed at a tangent to the rear of the venturi choke is a brass tube through which fuel is fed from the needle-valve on the left side. Fuel is released into the choke through a slot in the tube but the amount released is first metered by a brass rod within the tube. This rod has a channel on the outside through which fuel must first flow to a cross-hole which then releases it into the choke via a tapered slot on the opposite side of the rod.

The rod, which therefore forms a metering valve, is coupled to the throttle so that it moves parallel to and simultaneously with it. Thus, as the throttle is closed (i.e. the throttle slide and rod withdrawn) fuel flow, metered via the tapered slot in the rod, is reduced to maintain the correct mixture strength. The correct balance of fuel and air at low speeds is controllable by means of a spring-loaded adjustment.

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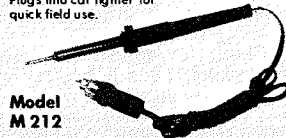
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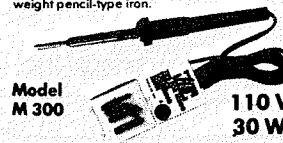


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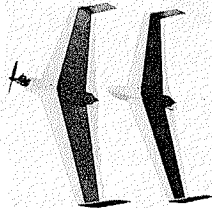


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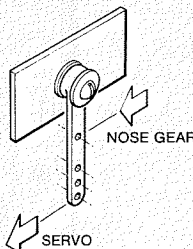
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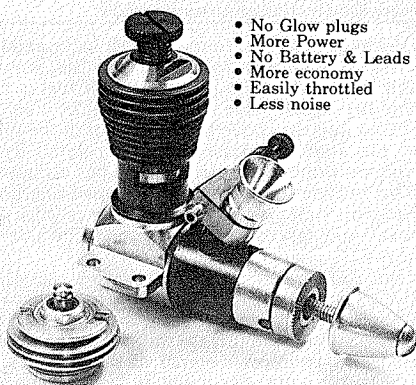
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effect to be gained with this particular type of fuel-metering system. When the throttle is closed to the idling position, the quantity of fuel within the carburetor between the needle-valve and the jet is increased by about .045-.050cc—that is to say, it is increased by the extra volume within the brass tube caused by the partial withdrawal of the metering-valve rod. Suddenly opening the throttle, therefore, has the effect of pumping part of the accumulated fuel through the jet which, as with an accelerator pump on an automobile carburetor, can be an asset in certain circumstances by ensuring rapid and more positive pick-up. Webra also claim more power with the Dynamix carb. This is reasonable since the effective choke area of the new carb is some 44 sq.mm. compared with 35 sq.mm. for the version of the Webra TN carb used on the original Speed 61.

When we tested the Webra Speed 61 back in 1973, the maximum power output, less muffler, was just under 1.50 bhp at 15,000 rpm on 5% nitro fuel. Webra are currently claiming 1.65 bhp. A new and quieter muffler is now available for the 61. Alternatively, one can use the separate Webra tuned-pipe muffler which combines an increase in power in the 13,000 - 14,000 rpm range with a reduction in noise level.

The Webra's bore and stroke remain unaltered at 24x22 mm giving a displacement of 9.953cc or 0.6073 cu.in. Checked weights of the 1977 model with Dynamix carb were 16.75 oz less muffler, 21.1 oz with Webra 1100/E-G6 muffler and 25.2 oz with tuned-pipe muffler. The engine has the following external dimensions: Overall height (less glow plug) 3.85"; Length (from prop driver face) 3.74"; Crankcase width 1.54"; Width across mounting lugs 2.36".

## Vill Doo

(Continued from page 38)

FLYING. Check for proper C-G and, with everything working, hand-glide first. For first flights I prefer to use an electric winch before us-

ing a catapult, until the plane has been trimmed. Be sure to use ballast when it is windy.

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32.5 in. span, 170 sq. in., 5.25 mean cord.

Symmetrical Airfoil.

## S.O.A.R. Subjects

(Continued from page 60)

designs; I have just finished building his small *Alar-2.5* and hope to use it for some slope soaring soon. I have put the "Flight as Art" idea aside for awhile and will come back to it sometime in the future.

"I would like to talk to or correspond with individuals interested in any aspect of my work or concept. (Write:) Prof. Ed Harris, Department of Art, University of Northern Iowa, Cedar Falls, Iowa 50613."

J.A. Gray of the Montreal R/C Club, up in beautiful Quebec, has announced plans for their annual Sailplane Contest, to be held at St. Clet, near Montreal, on August 6 and 7 of this year. Trophies and prizes, for the day and for overall performance, will be awarded in Open, Class "C", and Standard Class "B". Additional features will be a power "fun fly" after 4 p.m. on their excellent tarmac runways, and a barbecue on Saturday evening. Those desiring additional info are invited to contact the contest director, Ric Reuland, 192 Meloche, St. Laurent, Montreal, Canada (514) 336-0882.

This is perhaps the most unusual approach to an intriguing subject that Soar Subjects has yet seen! Let's hear from some readers. I'll see you next month.

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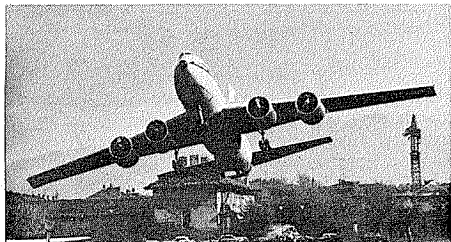
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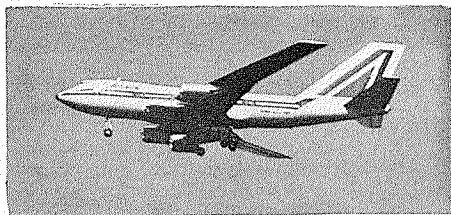
(Continued from page 3)

Constructed by Camussa Ferdinando (520 hours) and Enrico Giorgio (1200 hours), avionics and electronics by Oberto Marcello with collaboration by Gabriele Racca, Angelo Melloni, engineer Armando La Marca, and Robert Dezotti; pilots were 1st, Roberto Dezotti and 2nd, Enrico Giorgio.

Some of the principal characteristics of the Jumbo Jet are a 3.94-meter wing span, maximum chord 96 cm, maximum thickness 18% of chord, incidence 1 degree positive, wing area 220 square decimeters, wing sweepback 39 degrees at 50% of the chord. Fuselage length 4.03 meters, maximum diameter 48 cm, maximum height 1.30 meters. Landing gear oleo pneumatic, 18 wheels, each 90 mm. dia. Four engines with a calculated power of 6 hp, propellers 13'x5'. Empty weight 38,810 kilograms.



**Snappy takeoff of Jumbo 747 jet airliner is accomplished quite nicely at Torino airport.**



**Hard to tell from the real thing. To complete the Italian theme, it's in Alitalia colors.**

Other interesting facts—for the avionics and electronics there are 198 meters of electric cables, and 12 servos are required as follows: 2 elevators, 1 rudder, 4 engine, 2 ailerons, 1 flap and 2 auxiliaries for the lighting plant.

Flaps extend for a total of 90 degrees which aid in braking and are activated by two 6-volt electric motors.

Running lights include navigation lights, anti-collision beacons, ILS lights and all can be activated from the transmitter. Construction required 3 cubic meters of expanded polyester, 16 square meters of balsa block and 6 kg. of paint and varnish.

First flight, which was very successful as attested to by the many flying pictures, was made by Roberto Dezotti. All of the facts and information was translated from Italian and hopefully it tells the full story of this incredible semi-scale version of the famous Boeing 747 airliner crafted by our Italian compatriots. ■

## FAI FF Team Finals

(Continued from page 31)

Even as the Wake flyoff was held, Power hopefuls gathered in the wet field of alfalfa, with cars parked along the country road and field gear littering the shoulder. They check-weighed their ships, then stopped to fuel them on the plywood sheet provided next to control. The wind had started at 0530 and first test-flights showed that velocity at higher levels was much greater than on the ground. Even early DT gave a long drift downwind. Fliers had their chase crews stationed near a farmhouse which was to figure later in a tragedy. A local modeler had volunteered to pilot a spotter plane to find power models down in the



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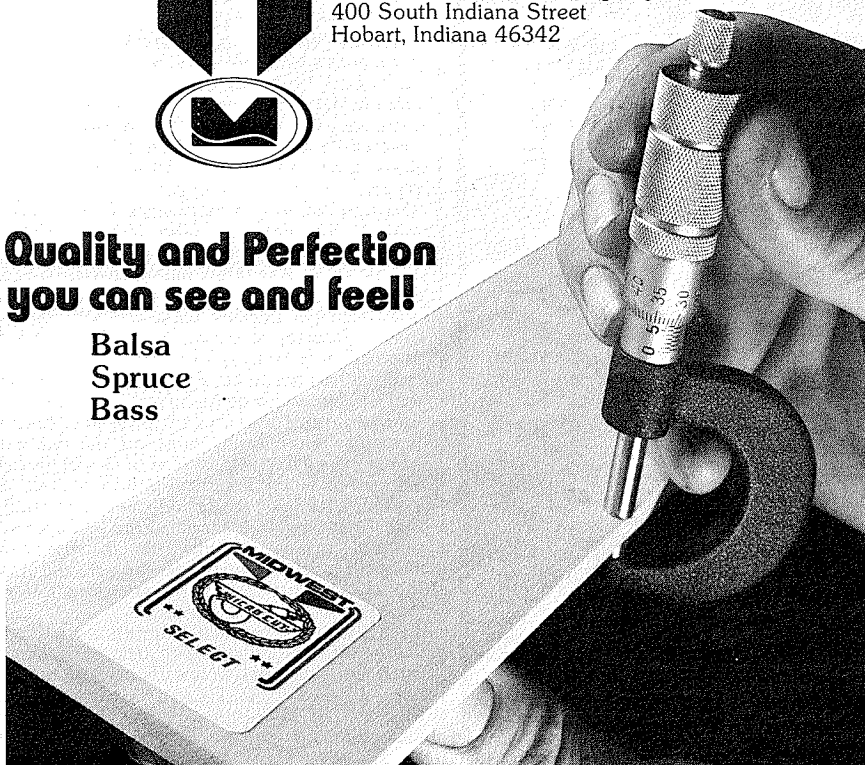
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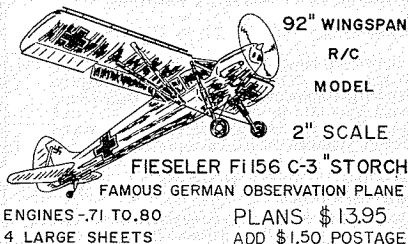
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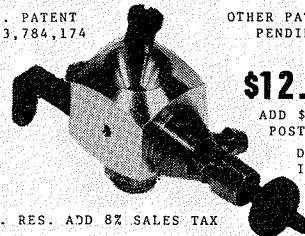
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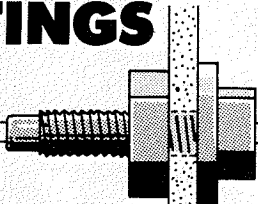
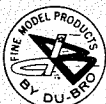
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thick crops. He flew low and slow all day, helping many fliers to get their models back in time for the next round. Near the end of the 7th, he landed for fuel and picked up a spotter passenger. Making a turn over the farmhouse, his plane stalled, crashed and burned. The tragic deaths of both Peter Simonson and Darold Nilsen cast a pall over the rest of the day. No one had the spirit to keep flying as they saw the black smoke drifting from the vicinity of the crash.

Earlier in the day, Markos started the aerobatics with a nice wing fold after a premature D/T. Both Galbreath and Simpson stacked their ships in the second round. By and large, however, there were few prangs and a lot of maxes. Models were easily able to do 180 on a 7-sec. run. Next day's dawn saw another half-dozen qualified to flyoff. Tom McLaughlan sent his white "Swinger" off into the dark skies for a team place, and Al Bissonette followed with his sunburst-decorated bird. After some hairy testing, Charlie Martin made it with his natural balsa, tri-finned ship that had a nice European flavor. Again, relief that yet another team was set. Everyone looked forward to seeing the end of flying and another team to fly gliders for the U.S.A.

But it was not to be. Perhaps all the evil omens and tragedy had been too much. The wind picked up and no one was able to circle tow. Even experts like Hutchinson came off the line early. Many fliers asked to postpone or cancel the meet. They even voted, a radical gesture at best. The FAI jury, using an inadequate meter, determined that the wind indeed exceeded the FAI spec of 27 mph at towing altitudes. So the flying was stopped, much discussion took place, and finally the CD and Jury came to the same conclusion as the majority of fliers: cancel.

This decision resulted in much recrimination later and a lot of voting to determine another finals for glider only. Now that this is over, we hope all U.S.A. FAI fliers will leave discord behind, stop calling the FF finals a fiasco, and unite behind a very strong U.S.A. team in Denmark.

## Hotshot

(Continued from page 64)

dard equipment to operate the throttle, but opted for the big strong waterproof #80306 servo to steer the outboard. That 16-oz. motor puts a big load on a servo, and I didn't think the little servo would stand the strain. To keep the weight as far forward as possible, I put the receiver and battery at the front of the compartment, followed by the two servos—side by side on a homemade tray. DuBro flex cable operates the throttle, with rudder (engine) wiggled via a length of 1/16" music wire coupled to a short length of Gold-N-Rod inner tubing where it passes through the transom. Water is kept out by a homemade seal. A DuBro ball link completes the connection to the engine steering arm. Initially adjust the throw so the motor travels 3/4" to each side as measured at the tip of the prop nut.

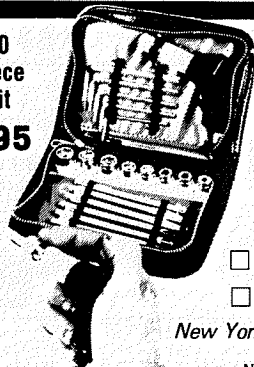
I won't go into detail on the electronics of the Cox/Sanwa radio—because I don't know anything about electronics. I'm just an average guy who simply wants a radio to work, and the Cox/Sanwa radio works. The transmitter feels good, the sticks feel good, and the "locking" switch is a nice feature. I ran the boat without experiencing any glitches, and everything functioned smoothly and precisely. What else is there to say? For what it's worth, I like the radio a lot.

One thing that always comes to me as an afterthought, and a job I regard with distaste, is building a stand for a boat. Usually you can get away with something as simple as cutting a couple of V-shaped notches in an old cardboard box or foam plastic ice chest—but that won't work for this boat. You see, the outboard presents a unique problem. When you apply starting torque to the flywheel, the only thing that's holding the motor is the steering servo—which means that you're abusing the servo every time you start the motor. And if you ever flood the motor and lock it up, the starter torque could do terrible things to the servo gears. What's needed is a way to lock the motor in position while starting. Some people have suggested wedging a block of wood between the crankcase and the transom, but that has two disadvantages: One, the crankcase isn't flat, so it rocks on the block of wood; two, if you forget to remove the block before launching, you're in big trouble. What's needed is something that holds the bottom end of the motor, yet releases when the boat's lifted off the stand. The stand I built has two extensions projecting from the rear that straddle the engine's lower end. A pair of 1/4"-20 nylon screws are threaded through these pieces, and bear against the engine, holding it gently but firmly. After the boat's been run and the proper "rudder" trim has been established for straight running, the nylon screws can be adjusted to hold the engine in this new position.

And now for putting it in the water! Compared to an inboard, the outboard is a snap to operate. The carb is so high the engine won't flood from gravity feed, yet one or two hand flips to choke will bring the Missile Mist through the line. Be sure your starter is hooked up to run backwards (looking down from the top, this engine runs

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clockwise), set the Perry carb per instructions, open the throttle about half way, connect the glow plug and apply the starter. My engine started immediately, but did require some fiddling with the mixture on the Perry to run strong and idle well. With the engine at a fast idle, the boat chugged away from the dock, gradually picking up speed as the throttle was advanced. There was no hint of cavitation with the E-20 prop. When the throttle was opened wide the boat rose up on the sponsons and when the prop surfaced, all hell broke loose. This little boat is fast! I'd heard that the speed of the Hotshot could be compared to a 40 powered 'rigger—and

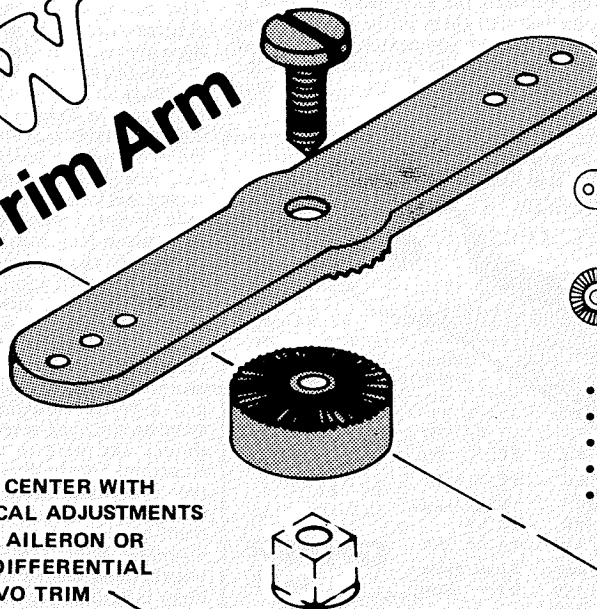
although I wouldn't go that far, I'd say it would give the average 20-powered hydro a good run. Anyway, the boat was really honkin' when a gust of wind got under the bow and the thing did an inside loop about three feet in the air, cartwheeled a couple of times and landed on its feet with the motor full of water. By the time I got it back on shore the wind came up, the water got choppy and I decided not to push my luck.

The following weekend I taped three more ounces of lead to the nose (in addition to the three ounces I had installed during construction), bringing the CG to 8-1/4" forward of the transom, and tried it again. In calm water and light wind

the boat ran fast and flat with no tendency to bounce or become airborne, and handled well in the turns. I'd say this is just about right for racing. For straight-line speed runs on smooth water you can balance at 7" to 7-1/2" from the transom, and get a bit more air under the boat for best speed. A tunnel hull runs fastest just before it flips over backward!

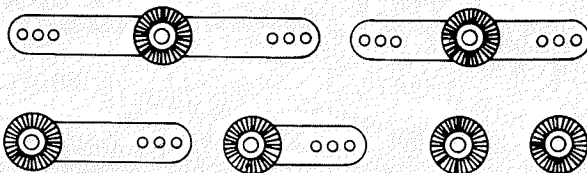
In summary, I'd say the Hotshot/K&B/Cox-/Sanwa combination is the quickest and easiest way to get a fast-running competitive boat in the water. I'm sure the outboard class is going to be very popular, so why don't you give it a try? I did, and I like it!

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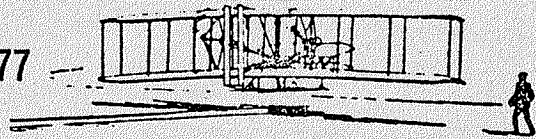
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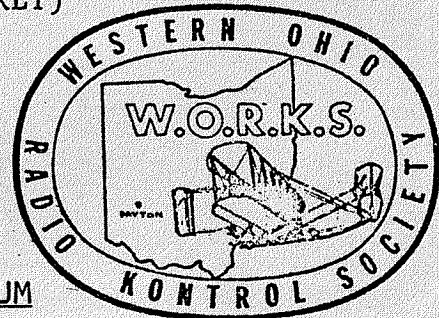
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**Pylon Pit Patter**

(Continued from page 52)

ternational F-I M.A.N./BARKS bash in Bakersfield. Please notice this year's column has no exciting story to tell of hurried late night rigging crews or painting new racers on the way to the airport. No, my friends, no more hair-raising episodes (true though they were) about speeding to the airport and catching planes seconds before departure. No more cars left parked at the curb at the airport and no more beating on the doors of DC-10's taxiing out for takeoff.

This year everything is calm and peaceful. My column is done not only on time but is several days early . . . this will set Schroder and company on the floor as an all-time first.

This new leaf comes from having finished the new season's racers weeks in advance of their usual Bakersfield debut. While it seems impossi-

ble, it is true. And although I enjoy this relaxed atmosphere as opposed to all the last minute rushing, I'm not exactly sure if I really like things this way or not. The reason is that having finished my beautiful new plane so far in advance, the old nasty devil made me test-fly it. Well, whenever Old Mr. Devil gets involved, not-nice things happen. You probably guessed by now . . . my pretty new bird fell down and went bang. The one nice thing about going out to Bakersfield and test-flying a new racer is that if you crash, at least a big crowd gets to enjoy it. Is there no justice?

Well that's it for this month. I've enclosed some pics on our two prototype .15 engines with nothing else in mind other than showing some comparisons between the two. Most notable is the similarity between them in the piston/sleeve department. We will see you next month with our full color coverage of what promises to be the biggest and best Bakersfield yet . . . less one plane.

## 1st R/C Soaring World Championships

(Continued from page 49)

releasable tow hooks. Aileron-equipped models mostly had low angled 'V' dihedral with the ailerons coupled to the rudders. All turned quite smoothly but the question is, did they help all that much?

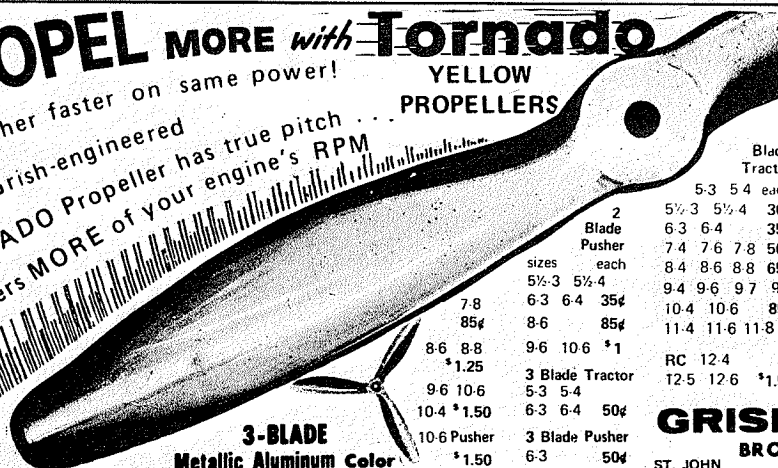
Building standards for the models were all good, very neat and most were covered with the plastic films, i.e., MonoKote or Solarfilm or something similar. The continental models, particularly the German were outstanding. Wings were of foam with carbon fiber reinforcing and covered with balsa and glass fiber. When their flaps are retracted you cannot see the joint line in the wing covering. Most fuselages were fiberglass moldings of the usual glider shapes and only a few were the wooden box type.

Flying styles were many and quite varied. During the practice sessions LeMon Payne of the U.S. and Ralf Decker of W. Germany were so strong that most others were about ready to concede. Nothing went wrong for either. Duration was outstanding with thermal hunting just a cup of tea, and then when the contest started, all the baddies dropped up: Le Mon had the line break during a Distance task tow and managed a zero. He did manage the fastest time in the Speed task with 12.4 seconds and with the largest model there—144" span and 1300 sq. in. On one of his Duration flights he was right on with 5.59 time and a perfect straight-on-the-spot landing that went on and on, never seeming to want to stop sliding, and went to the maximum (which says something for the dive-in type landing.) And then there was Dale Nutter's final Duration flight that ended with the plane's nose right on the spot, but then, he was sliding uphill whereas LeMon was downhill. Poor Ralf Decker never did get it all together and stayed right in the middle of most every task, finally placing 7th overall and LeMon

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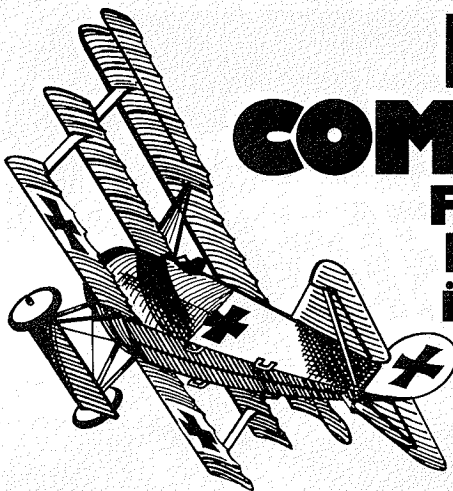
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was 11th overall. So much for precontest predictions.

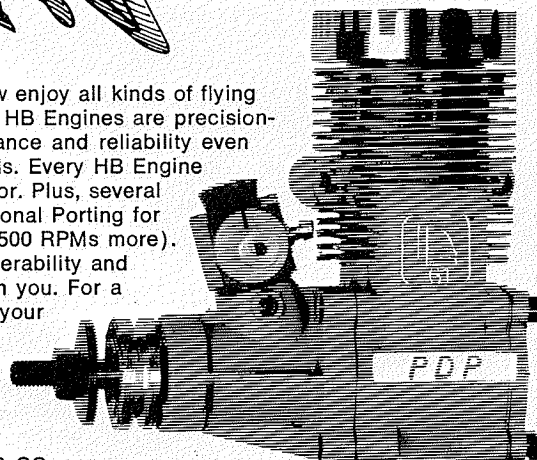
The Speed task had all sorts of flying with only one course being flown at a time and the most time being lost with the base B turn. Here we saw every possible type turn from the smooth, very efficient pylon turn without gaining height or losing speed to a barrel roll turn, to half the field width 180° and on. Most of the fastest runs were made by those who climbed high for the downwind approach, then made very fast dives toward base B, anticipated turns right at the buzzer or bell depending on the course they were flying, with a continued downward course until some were almost scraping the ground when they passed the finish line! Some of the zeros were caused by planes actually scraping the ground, crossing to the wrong side of the course and others by bits falling off the plane. The Distance task varied from zeros to 19 laps for the longest time by Frikkie Roos of South Africa. As I said earlier, this is strictly a luck maneuver as it requires latching onto thermal immediately after towline release and then milking it dry, starting at once on the course and then utilizing every bit of air for maximum laps. If one doesn't get that immediate thermal it's almost impossible to get a high score with some even-scoring zeros while hunting. Two courses were flown simultaneously with a buzzer used for one course and a bell for the other. Wish I had suggestions, but my not being a glider type, they will have to be left to those who care and they should care enough to make this a worthwhile task or find an alternate.

Duration was the usual old standby with six models flying at a time or in one slot. Here again techniques were important and it was amazing to watch a Ralf Decker milk the thinnest thermal, or watch LeMon Payne scooting all around the sky hunting up one. Here we see gliding in its truest form where it's a battle of man against the elements and, speaking of elements, the most fantastic maxes were achieved by the United Kingdom's Tony O'Shea under conditions which were seemingly impossible. Imagine a drenching downpour with hail about 3/8" diameter pelting down, coupled with a strong wind. Six birds came off the line just as the storm hit, every pilot stayed with his plane, but five were down in 2 1/2 minutes while Tony's hung far upwind, weather-cocked to the wind and just remaining poised, going up ever so slightly, then coming down ever so slightly, but not penetrating one inch forward from the spot. For 5 1/2 minutes Tony and the plane were motionless, and then he started back to the spot watching the plane slide sideways in a full yaw coming down ever so slowly, and then just bump onto the ground for a total Duration score of 882. This was a remarkable achievement that got the organizers off the hook as most likely they would have called for a replay if Tony hadn't made his max! As the weather worsened, every person at the field, with the exception of the men actually flying, quickly found some form of shelter from the storm. I was in the computer caravan, peeking out the door; the five other pilots scampered for cover as soon as their planes landed; Tony hung in there to the bitter end. He only uttered this comment while walking back



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with his bird, "Quite a drizzle!"

With score sheets reaching us for every task and every round it was a simple business to run comparisons to show who was slated to win and in what way, but a careful analysis shows that it was anybody's ball game almost to the end. Imagine Frikkie Roos of So. Africa standing 9th at the end of Round 5 and then, with a win for round 6, he moved into 2nd place for the finals.

It's easier to show the movement by actual placing, so herewith the placings for the first three men of every round plus how the winners stood at the end of each round. Wish I could show it for every task but it's not feasible in time or space. First Round: Frikkie Roos, So. Africa 1st, Sean Bannister, U.K., and Joris ten Holt. The Netherlands, 3rd and Skip Miller, U.S. stood 5th. Second round: Skip Miller U.S. 1st, Michael O'Reilly Australia 2nd., Dale Nutter U.S. 3rd, Roos of S.A. stood 11th. Third Round: Stefan Smith, Australia 1st, Friedhelm Schiborr, West Germany 2nd, Paolo Casadei, Italy 3rd, Miller

stood 4th and Roos 24th. Fourth Round: Skip Miller, U.S. 1st, Michael O'Reilly, Australia 2nd, Joris ten Holt, Netherlands 3rd. Roos stood 6th. Fifth Round: Neville Mattingley, U.K. 1st, Skip Miller, U.S. 2nd, Ruedi Baumgartner, Switzerland 3rd, Roos stood 9th. Sixth Round: Frikkie Roos, S.A. 1st, Stefan Smith Australia 2nd, Ralf Decker, W. Germany 3rd, Sean Bannister U.K. stood 4th, Skip Miller, U.S. stood 5th and Mike O'Reilly of Australia stood 8th. Plenty of movement is apparent but with all of that it finally wound up with the following placings:

Placings for Competition up to Round 6

No.	Name	Total Place
17 Miller	U.S.A.	13185 1
16 Roos	S.A.	12919 2
7 Bannister	U.K.	12844 3
8 ten Holt	Netherl.	12508 4
12 O'Reilly	Austral.	11960 5
24 Smith	Austral.	11855 6

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9 Topf	Canada	8629 30
26 Kemp	Luxemb.	8599 31
23 Gouverneur	Belgium	8540 32
3 Sfredda	Belgium	8129 33
30 Wasner	Austria	7007 34

and the team finishes as follows:

TEAM POSITIONS		
1	U.S.A.	: 35579
2	U.K.	: 34489
3	Australia	: 34359
4	Netherlands	: 33462
5	Germany	: 32618
6	South Africa	: 32521
7	Switzerland	: 31367
8	Belgium	: 28915
9	Italy	: 28267
10	Canada	: 27929
11	Luxemburg	: 26351
12	Austria	: 7007

So, to the thirty-four competitors from twelve

countries, you all fought the good battle and as in every competition there must be losers along with the winners. You all can go home with banners flying high, as all did your best in an uncommonly beautiful country competing under the most magnificent conditions, thunderstorm and hail notwithstanding, with the finest possible organization working for your best interests at all times. Many will be the memories of the Burgerspark Hotel, Kruger Park, Monte and the Braai's, Jack Abbot and his deep voice and always smiling countenance. And, of course, the thought always in mind, "If I had only done it this way!" And who among your friends can say that they have been to South Africa with its modern cities, beautiful parks, extraordinary amounts of food? Not many, therefore you are a winner and certainly in no way a loser. ■

## Round and Round

(Continued from page 22)

muffler, especially for a serious flier. This is a compact and aerodynamically clean unit with no unsightly mounting strap. Harry Roe and John Kilsdonk, both U/C fliers, were manning the Globee booth; they were quite proud of their new products which included an audio tack. Bob Vojslavek, who has the big job of Control Line category director at the Nats, was there extolling the virtues of his new kits which are sold under the REV label. The foregoing account is by no means all-inclusive, as there were hundreds of model manufacturers' booths and it would exceed our allotted word count to even begin covering them.

Aside from the new products shown, there was an abundance of completed models ranging in size from a small rubber-powered Peanut Scale ship to huge multi-engine Scale models spanning a dozen feet. A beautiful plane is a beautiful plane regardless of its method of control, and I couldn't help but be awed by the scope of some of those projects.

The first area that almost everyone heads for at the show is the Swap Shop. Everyone wants super bargains and will trample on anyone in his way to get to it, or at least so it seemed. My personal experience would indicate that at any given time, this area would be the most crowded. I know of an individual who drives three hundred miles to the show, yet his only interest in it is the Swap Shop. I don't think the super bargains existed for the U/C flier, but there were many very nice buys on kits, engines and completed airplanes. I was able to find a nicely built Sterling P-51 complete with a new Fox 35 and all necessary hardware for \$25. I'm sure our family will enjoy many hours of fun with it, and Pop didn't have to do the building!

One Toledo participant who deserves special mention is Phil McDonald, 3217 Sherman Court, Anderson, Ind. 46014. Phil has been trying for several years to stimulate interest in Tether Car Racing, and among methods he has used are the rental of space at various shows, displaying of cars, and explaining to the flying public the virtues of going round and round but not up and down. Any serious U/C flier cannot help but feel that a strong common bond exists between the two activities. It is interesting to note that most of the early racing engine development was oriented towards cars, not planes. This is particularly true in the case of the Dooling and McCoy engines. We wish Phil good luck in stimulating new life in this very old event.

In summary, it can be said that from the standpoint of the control liner, Toledo was certainly worth the trip. I think that with a little encouragement the Weak Signals might be favorably disposed towards having a static Control Line competition, though space may be something of a problem.

**FOR THE NOVICE.** I have often noted a common problem at our club flying field, and at many other sites as well. A Sport flier brings his assorted planes out for fun in the sun but then something goes awry, engines don't start, or run poorly, discouraging this not-too-serious flier. Next Sunday finds him instead, duffing around at

the local golf course. His non-golfing problems stem from his lack of understanding of engines and how they function. In the past such a deficiency meant that his plane would never get off the ground; with the new improved engines and starters in use today, the plane gets airborne but performance is often so poor as to be frustrating. A Sport flier in general cannot take the time to learn how to make an engine run well but would have the time to do all the things necessary to assure himself of a pleasant Sunday afternoon, if only he knew what to do.

I have asked Al Raby, one of the nation's top Control Line Stunt pilots to present a low level approach on how to get good performance from a sport engine. Al has had extensive experience with these problems because his airplane designs are always very unconventional in such a way as to cause engine problems, and in solving these he has learned a lot about engines in general. He is also well qualified to advise the Sunday sport, as is any Stunt flier because this event comes closest to what the average Sport flier is trying to do. Al's suggestions will require that one Sunday be spent preparing the power plant but then good performance will be realized for the remainder of the season and several more summers to come.

What follows will also appear in the PAMPA newsletter and while it is a little less technical than what they normally publish, there are many hints in *Stunt News* that make the \$6.00 membership fee a good investment for the Sport flier. If you are interested contact, Wynn Paul. His address is 1640 Maywick Drive, Lexington, Ky. 40504.

"By the time most Sport and Stunt fliers hear of and join PAMPA they have progressed beyond the painful beginnings of engines which won't start and planes which fly poorly. As PAMPA grows we are beginning to reach people who are attempting to learn to fly without the help of experienced stunt fliers. These new fliers need basic information just to achieve the initial successes which most of us take for granted. To this end, the following is offered.

"First, Sport and Stunt engines must not be operated at their maximum rpm. The combination of maximum rpm and a relatively large stunt propeller cause the engine to run much too hot. The excess heat causes pistons, rings and sleeves to expand and rub harder against each other causing still more heat and severe wear. This heat and wear will ruin the engine in just a few runs. These ruined engines will be very difficult to start and will run poorly with only a small fraction of their normal power output.

"So, how do you adjust your engine? First start the engine and lean the mixture by screwing the needle-valve in until the engine is running fast and smooth. This is called two-cycling. Screwing the needle out until the engine begins to sound rough and uneven is called four-cycling. The mis-firing which causes the uneven sound is due to excess fuel, which, when not burned during four-cycle operation will serve as a coolant for the engine and carry off excess heat. With the engine running at a fast four-cycle, point the nose of the airplane straight up. The engine should lean out into a smooth, powerful two-cycle. The engine, having to lift fuel vertically from the tank, will run leaner and develop its maximum power. If the needle is properly set, the engine will return to four-cycling when the airplane is leveled. This is the way the engine should sound in flight. In level flight or dives the engine runs slow and cool. In maneuvers the engine leans out, and develops its maximum power, then slows down again when the airplane is leveled allowing the rich mixture to cool the briefly heated engine. Depending upon individual airplane and tank configuration you may have to set the needle a little richer or leaner on the ground to make it run properly in flight.

"If your airplane doesn't seem to fly well at this setting consider these possible causes: 1) the airplane may be overweight; 2) you may need a larger engine or an overhaul of your present engine; 3) your airplane may need trimming; 4) your lines may be too long; 5) you may have a bad plug or improper prop or fuel.

"We have still another consideration in setting the needle. In flight, centrifugal force presses out-

## COMPET-TOTE



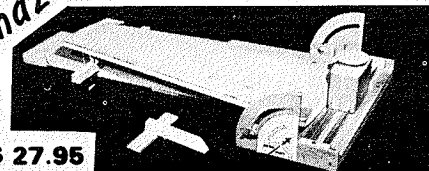
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ward on the fuel in the tank causing a tendency for the engine to run richer while the tank is near full than when the tank is near empty. It is normal then for suction-fed stunt engines to run somewhat faster at the end of each flight than at the beginning.

"An engine in good condition will resist this tendency to run faster and will increase rpm's during the flight only slightly. This engine can be set slightly rich to produce almost normal maneuvering power when the tank is full and will lean to full power in maneuvers near the end of the tank. Level flight should be a slightly increasing four-cycle as the tank empties to cool the engine between maneuvering power bursts.

"An engine which has been ruined from overheat will not only be difficult to start but will have little resistance to the normal tank leaning tendency. Its rpm change in flight will be large. Even though it may be launched rich, it will run faster as the flight progresses and usually produces some destructive heat on each flight.

"If that last paragraph sounds familiar here are some specific suggestions about what to do next. First, either return your engine to its manufacturer for repairs or buy a new piston, sleeve, ring, rod and gasket set and get help, as necessary, to overhaul your engine.

"Second, use a good 5% nitro fuel. The type of oil doesn't matter as long as it is at least 20%.

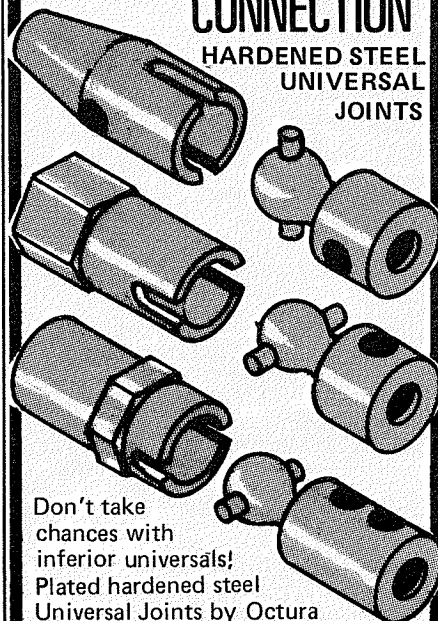
Third, select a good plug for stunt use and don't hesitate to change it when in doubt. Most defective plugs still light brightly but for some unexplained reason don't work well in flight. I use K&B 1L and K&B long idle bar.

"Fourth, buy a new 1½-volt hobby battery. A poor battery causes poor starts. More than 1½ volts frequently damages the plug causing erratic operation though, as above, it may still "look" good.

"Fifth, I use a two stage break-in. I start with 2 to 3½ hours of more or less continuous running on the bench as slow as the engine will run on its small break-in prop. While bench-running, I can hold the engine's cylinder head in my fist without

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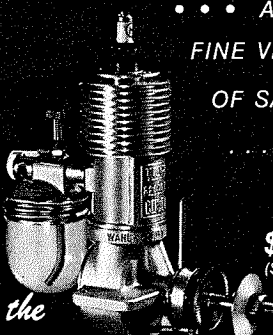
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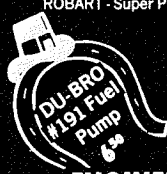
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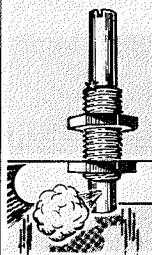
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being burned. Frequently the engine will require a starter at first but hand-starts easily as the break-in progresses and the "seal" or compression improves. I know that burning a gallon of fuel at a time is not an optimum break-in but it is safe for the engine and it works.

"Now put the engine in the airplane and fly it slow. After each flight set the needle for the next flight depending upon how fast the engine ran the last few laps of the previous flight. Try never to run more than 2 or 3 laps of two-cycle.

"Finally, filter your fuel before you put it in the tank and between the tank and engine. Clean these filters frequently to avoid accidental lean runs due to trash.

"These suggestions will greatly improve your chances for excellent runs and durable engines. However, your chances for a truly fine run will be improved by a shrewd choice of engine and improved still more if your engine receives some special attention by an expert to insure proper fits and replacement of substandard parts.

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engine may last eight hundred or more powerful runs between \$15.00 overhauls. The overall result will be increased satisfaction with our hobby and reduction in its costs."

MISCELLANEOUS. Each month we have a number of totally unrelated topics that are very short but important enough to warrant your attention. They may be news of coming activities, special requests or a short explanation of some of the photographs. Any reader is invited to submit a tidbit should he care to.

Bill Dawson, 11226 Bel Air #4, San Antonio, Tex. 78213 is engaged in a small research project concerning the very early Stunt fliers and designers. Two people Bill would like to locate are Dee Rice and H.D. (Hawk) Hawkins. The last mentioned was on the Air Force Team in the early 1960's.

Laird Jackson, 623 Meadowbrook Circle, St. Davids, Pa. 19087, has served as our C/L FAI team manager for some number of years. Laird is on the Control Line contest board and served as board chairman at one time. "Doc" Jackson also serves as editor to the *Speed and Racing Gazette*, a small newsletter of interest to those who like to go round and round very fast. If you're so inclined it would be worthwhile to send Doc a self-addressed, stamped envelope asking for subscription rates as the publication is being rendered in a very workmanlike way.

Another special interest newsletter is just starting and the first issue has just been mailed. Ted Kraver, 1212 E. Manhattan Dr., Tempe, Ariz. 85282, is serving as editor and has done an outstanding job with the first issue. If you Carrier types can help Ted with publishable material and addresses of those who would be interested in joining a Carrier organization, I'm sure he'd like this info.

I've received a couple of letters from a youngster, John Pohlpter from Sebastopol, California. John has built a very large stunter from scratch even to the point of sawing up a balsa "log" for some of the wood. We included a photo of John and his project to serve as a stimulant to some of you younger modelers.

Bob Burch serves as Control Line contest board member for District VI, which includes my home. Bob and I tend to share similar ideas about rules and even when we disagree he demonstrates a certain open mindedness which I respect. People like Bob have made the CLCB do an about-face in the last five years by beating the bushes trying to get the feel of what the various types of competition fliers want. Bob and I heartily agree that stable rules are an absolute must. Related to the issue of stability is the question of who should propose new rules. I'm publishing a part of a letter from Bob to R. McNally, chairman of the CLCB. I'm sure you will want to give Bob's ideas some careful thought.

"If you are not aware, Control Line competition is extremely keen in District VI. Unfortunately we have only one vote on the C.L.C.B. which does not accurately reflect the interests of a large number of competition Control Line fliers in District VI and the surrounding states. I am especially grieved at the latest rule proposals by people who do not even fly a particular Control Line event, but feel some primitive inner need to propose rules.

"To a great extent, the advisory boards are a great help, but far too many changes are proposed on rules that are in fact untested in competition before someone decides that it is his unalienable right to bring down the competitive Control Line flier to some level of mediocrity which exists only in his mind. The engine controversy that exists in Profile Carrier, Slow Combat, Slow Rat Race and now, Mouse Race is a discredit to the C.L.C.L.; the competition fliers continually have their very expensive investments obsoleted and the manufacturers of engines are sure that Control Line fliers are loonies.

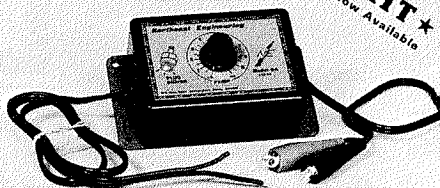
"I feel that we should not accept a rules proposal for review unless the proposer is an active competitor in the event. Proposals should improve the rules, not just be submitted by someone with an axe to bury or just a plain meddler. Let's face it, there are too many rules proposals. We cannot effectively manage the

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C.L.C.B. when rules proposals are accepted from non-affected persons."

Bill Boss, one of the driving forces behind C/L in the New York area has the following thoughts about the scale events and would like to hear from you. His address is: Bill Boss 77-06 - 269th Street, New Hyde Park, N.Y. 11040.

"Dear Scale Modeler:

During the past year there has been talk about creating a National Scale Society so that Scale modelers could be better represented in the rules-making process. Mike Stott called for such a society several months ago in his *Model Aviation Magazine* Scale column. The Flying Dutchmen of Pennsylvania have also called for such a society to be formed but with little success. Most recently I have received comments from Bill Northrop, R/C contest board chairman, that indicated he and many others agree that a change in the way Scale modelers are represented in AMA might be in order.

"In 1970 when our present Scale board was formed it was felt that Scale modelers would be better represented, and that a full time board rather than an advisory committee would add stature to the building and flying of Scale models. While the Scale board has made significant contributions toward the improvement of Scale it is felt in many quarters that each facet of Scale (F/F, R/C, C/L) is still not adequately represented.

"The recent additions of new events and the tremendous increase in rules change proposals has called for a wider range of knowledge and expertise on the part of each board member. It is felt that while a board member may be extremely knowledgeable in one or two facets of Scale, the addition of new events and increase of rules proposals makes it almost impossible for each board member to be expert in all categories. Therefore, the suggestion for a Scale Society which would function in much the same manner as the various advisory groups we have for Stunt, Carrier and Free Flight. While a National Scale Society would no doubt be beneficial I don't

believe it is the full answer to the problem. A Scale Society would still be one organization dealing with all categories of Scale as in the case with our present Scale board.

"I therefore suggest the following alternatives:

1. Disband the present Scale board in favor of establishing three separate advisory committees one for each category of Scale, and have each committee report to an appropriate Contest Board—F/F, R/C and C/L.

2. Each committee would consist of 11 members, (one from each AMA district) and would be appointed by the district v.p. based on the individual's expertise for the appointed category.

3. Chairman of each committee would be selected by the AMA president, or if so desired by the president, chosen by the appropriate contest board chairman.

4. Each committee would only consider rules changes affecting his Scale category. In the case of Unified Rules changes all affected categories would consider the proposed rules.

5. Voting by the committee on all rules changes would be in accordance with current contest board procedures.

6. Results of each committee's rules change considerations are to be accepted by the appropriate contest board chairman as final unless the committee's findings are contrary to rules in that competition category regarding safety, or contest administration.

7. Each committee chairman would be responsible for final rules change wording and updates for the rulebook.

8. AMA would be expected to provide mailing services to the committee as part of each contest board's activities.

"The purpose of this letter is to determine just how much support there is from Scale modelers for a change in our rules-making process for Scale events. I therefore ask you to fill out the attached form and send it to me with your YES, NO or comments. Only you, the Scale modeler,

(Continued on page 106)

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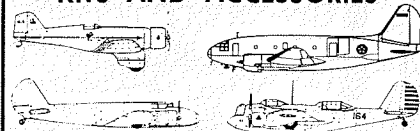
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### Round and Round

(Continued from page 103)

by your response will determine if the talk that has been going on about the need for a change is just that, "TALK", or if you really want a change.

If the response is favorable I will make every effort to get the matter before the executive council before the close of 1977. I will also make every effort to have published, or otherwise make known a tally of the responses received.

Yours truly,

S/ Bill Boss, AMA CD 19701"

Last of the miscellaneous for this month comes from Russ James, 4840 E. Leisure Street, Fresno, Calif. 93727. Russ is looking for Reactor and Omega plans. These are old Combat models. Can anyone help?

### R/C News

(Continued from page 41)

manifold was needed. This is the method by which the pipe is tuned: The pipe is moved closer to the manifold until the tachometer, which is necessary for effective tuning, shows no further improvement. After top results are obtained, the pipe is moved (shortened) just a touch closer to make up for the cooling effect that occurs when the plane is airborne. Webra claims a 20% power boost and I suspect really fine tuning of pipe, props and fuel could reach that level of improvement. I am sure that I haven't reached the optimum point but I'm satisfied for the moment. Needle settings are a bit more difficult, since the exhaust sound is garbled and quite different, but a bit more experience should cure this.

The pipe's five oz. weight caused no trim problems at all either in pitch or in roll. Actually, most of the pipe's mass is evenly spread on either side of the ship's normal CG and mounted close to the fuselage side not far enough from the ship's center line to foul things up.

Why is a pipe of value to sport flyers who really

don't need all-out performance levels? Simply, it is because the engine runs cooler and increased performance permits use of non-nitro fuels. One can use these cool fuels and still outstrip their previous nitro levels of performance. Both factors should extend overall engine life. A tuned pipe can also extract new levels of performance from favorite power plants of two and three years ago. Surprisingly, fuel consumption is somewhat reduced, even though power is substantially increased. Engine runs seem more consistent with practically no variation from beginning to end.

The big advantage is, of course, quieter operation—noise levels well below that produced by the use of any muffler we've seen to date. This may help us keep those rapidly disappearing flying sites a little bit longer!

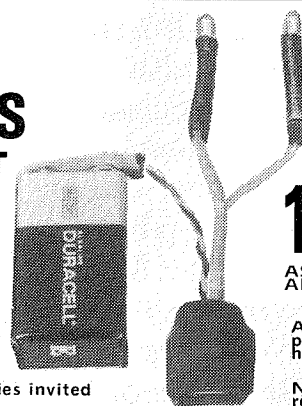
If you're interested in pipe operation, the MRC/Webra system is a recommended starting point. Pipes are also available from other sources, OPS for one. MAN ran a very interesting piece on low cost, home-constructed units in the October 1976 issue. This piece titled, logically enough, "Tuned Pipes" was authored by Ray Sargent and explored the virtues of pipes made of aluminum, cardboard, fiberglass and wooden dowels. The building requirements appear to be simple, materials are very low cost, absolutely no fancy tools needed, only some imagination and time to get you on the "pipe." The article is well worth your investigation. If you want to check out Wisniewski's March 1967 article I am sure we can provide duplicated copies at some nominal cost.

For those of you wondering why pipes work at all, I find Bill Wisniewski's explanation from that article as clear as any I've read. "A few words on the principle of exhaust tuning are in order. The engine on the intake compression stroke pulls air and fuel into the crankcase and also compresses the fuel and air in the cylinder. The power and exhaust stroke is next. This is where we make use of the hot outgoing gases to scavenge the cylinder and pull the excess fuel and air in the crankcase through the engine, fill the cylinder and pull part

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of the mixture into the headpipe of the exhaust system. Then the pressure builds up in the pipe sending back a positive pressure just as the transfer port closes and the exhaust port is still open, thus, pushing the mixture in the headpipe back into the engine under positive pressure giving a supercharging effect."

Tuned pipes are worth a close look and I expect a lot of development will take place in the next few months and years. Designs will soon incorporate the pipe into the fuselage to reduce drag and improve looks. Maybe the time has come for you to get "tuned in."

\* \* \*

The *Troublemaker* that introduced me to piped operation also included a stabilizer with anhedral, a la Hanno Prettnr's *Curare*. Prettnr claimed improved stall turns and, sure enough, even on this *Troublemaker*, stall turns became a snap. Haven't the foggiest idea why—improved airflow over the rudder perhaps—and we would sure like to hear from others on the subject. Savo Mele is running out of things to try on his Pattern bird but with his positive attitude who knows what's next!

**TOLEDO TOPICS—ACT II.** Continuing with the survey of Toledo's 23rd R/C Exposition we'll get into more normally sized items. Last month we explored R/C's outer reaches—giant quarter-scale and teeny-weeny 1/2A items—both were in plentiful evidence at the big show. But our regular R/C fare, for .15 to .60 power, was not slighted at all.

Radios have reached the zenith of reliability and sophistication, such that frequently changes in any manufacturer's line are subtle and not easily observed. All lines had some changes in circuitry and components to improve already fine performance. It's impossible to buy a bad radio these days; it all boils down to features, size and influence of your local hotspot.

Kraft Systems' (450 West California Ave., Vista, Calif. 92083) new, low-cost system should cut your flying costs for equipment down quite a bit. It has a quality feel and traditional Kraft reliability. Heard that Kraft will be marketing a new, small and light rig for the 1/2A operators. Firm's modular concepts continue for this year as does the famed Signature Series.

Brand new is American R/C Helicopters' (23811 Via Fabricante, Suite 102, Mission Viejo, Calif. 92675) system specifically designed for rotor wing flying. System features electronic reaction control that helps to cancel reaction torque, dual trims for hovering and flight requirements and ball bearing servos.

Pro Line Electronics (10632 N. 21st Ave., Suite 11, Phoenix, Ariz. 85029) has updated its line with a Custom Competition system for 1977. New rig has adjustable and reversible push-button trim functions for aileron, elevator and throttle, reversible and throw adjustable throttle, seven channels, high voltage stability in Tx and airborne pack, high interference rejection and much more. Regular Competition and Challenger Series continue in production.

Pro Line is also manufacturing a special boat system for International Marine Exchange (24501 Los Serranos Dr., Laguna Niguel, Calif. 92677) that features side-by-side throttle controls for twin screw operations, rudder control and four additional channels—two are momentary on-off and two are on-off toggles. All four switches are activated electronically through an electronic switch rather than mechanically by servos. An electronic speed controller gives full control of DC motor speed. System should be a winner for marine fans.

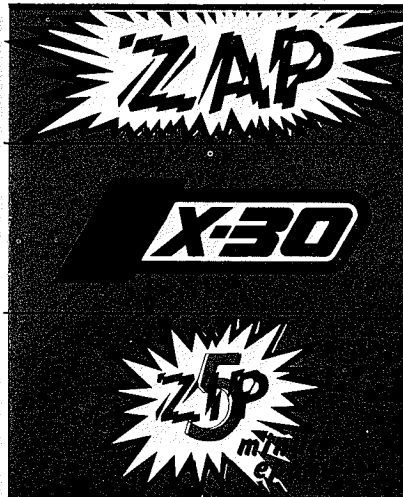
XRS for racing (5-channel) and pattern (six channel) is now available in dual-stick versions from R/S Systems (5301 Holland Drive, Beltsville, Md. 20705). System features cross trims, new improved servos, sloped transmitter case for optimum antenna positioning, new sticks, battery test meter, trim setting identification and interchangeable frequency modules.

From EK Products (3322 Stoval St., Irving, Tex. 75061) comes a new, low-cost system with features that belie its price. Included are a double-tuned receiver, ultrasmall EK SM servos, EK's adjustable sticks and nicad cells. Available

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as a two-stick, four-channel, system may be converted at a later time to five-channel capability.

MRC's (2500 Woodbridge Ave., Edison, N.J. 08817) fine radio line continues into 1977 with one of R/C's most complete group of servo options—eight in all. The one that really caught our eye is the MR-8), a servo with a coreless motor that has a very fast response time, more torque and claimed long service life. The coreless motor is coupled to mechanics that feature a ball bearing-supported output gear. It all combines to provide a .5-second response time. We've used these servos and can recommend them highly—smooth, powerful and fast! Concern's 775 series radio features machined all-metal, open gimbal sticks for a professional feel. Receiver is now in a metal container.

Royal Electronics (3535 S. Irving, Englewood Colo. 80110) showed their new Classic Custom that really falls in the "super radio" class. System features metal, open sticks, programming switches to control servo travel and sensitivity, slow roll switch, servo reversing, linear trim controls, low voltage indicator, double-tuned front end receiver, all-new linear response servo amplifier and 6 or 8-channel operation.

Futaba Industries (630 West Carob St., Compton, Calif. 90220) had their competition radio for all to see at Toledo. This is a beautiful rig that should prove popular in the field; more on this at a later time.

Specialist by Millcott Corporation (1420 Village Way, Unit E - Santa Ana, Calif. 92705) was unveiled at this year's show. New radio has full 8-channel crossed trims, metal open gimbals, front panel controls, variable dual or exponential rates, electronic mixer option, 3 variable maneuver buttons, servo travel adjustment and reverse and. ESV battery monitor. Servos are custom matched for throw, linearity, dead band and resolution; available in dual-stick modes.

Westport International Inc. (345 Boston Post Rd., Milford, Conn. 06460) continues their unusual Variant line with four-watt output on 27 mhz. Systems, which are also available on 72 frequencies come in two-stick and single-stick versions. Variant's 5-channel micro single-stick is one of the smallest transmitters around, yet has a fine, balanced feel. Other system features include open gimbal sticks, electronic trim control, coax antenna connector, trainer connection, RF meter and separate battery condition indicator.

Optional on R/C Manufacturing's (7717 Fair Oaks Blvd., Carmichael, Calif. 95608) new Model 1000 is a mixer that allows mixing of any of four functions and the two auxiliary receiver outputs; possible to have switchable coupled ailerons and

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rudder, flap-a-rons—the combinations are endless. System has options for adjustable throw limits and a low voltage indicator. Standard features include dual rates, slow roll button and reversible functions.

So much for radios, what's around to put them in? Well, this writer will never cease to be amazed at the variety of building projects available to today's R/C fans. And each year it simply becomes more extensive. Construction styles range from classic balsa built-ups to ships requiring no more than engine and equipment installation. Unquestionably, sport scale was a Toledo trend in 1977 with dozens of new airplanes with roots in full-scale aviation. It's possible to find a kit for nearly every well-known airplane since Wilbur and Orville gave Kitty Hawk reason to erect a monument.

Royal Products (790 W. Tennessee Ave., Denver, Colo. 80223) continues with its very extensive line of projects ranging from a 1910 Bleriot to an impressive F4J Phantom. Most of Royal's line is for 60 to 80 power with a sprinkling of 40-power birds. Some come in two versions (40 or 60 size); Spitfire, Zero, Hein and Piper Colt are examples. New at Royal, to be available soon, are three beauties—ME-109, Beechcraft Baron and a B-17, Flying Fortress. Royal kits have outstanding prefabrication and wood selection. I've built a number of them and have yet to be disappointed on the bench or at the field.

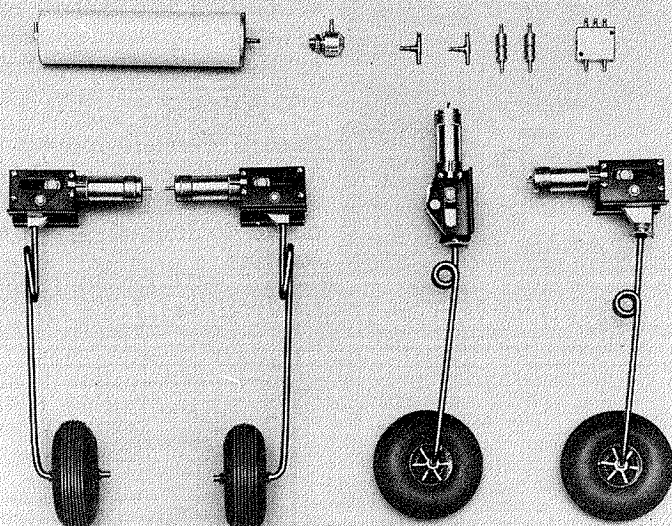
"500" class racing has grabbed Lou Andrews' interest and this has resulted in a fine new kit for the Quikray 500. Lou's AAMCO organization (US Route 1 & North St., Topsfield, Mass. 01983) has always produced outstanding kits (Aeromaster for one) and this one is no exception. 50" wingspan bird has 500 square inches of area; Box-Lok construction is featured in a 12-15 hour project that should perform well in Quickie 500 pylon events. Firm has also enlarged its popular H-Ray into Big-H for 19-45 power. Big-H is a trainer/sport type that is a near ideal entry point to R/C for any novice.

Fliteglas Models (RR 1, Box 324, Neoga, Ill. 62447) is kitting in fiberglass/foam, Alan

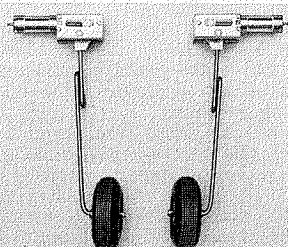


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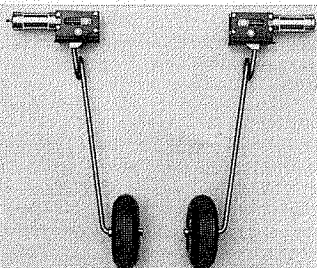
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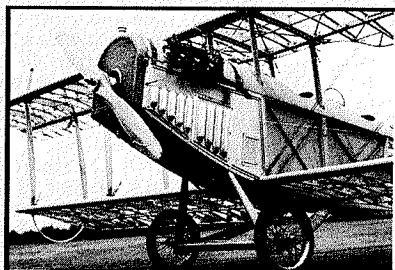
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Dupler's fine patter bird, *Trion*. Kit has a beautifully formed fuselage with bulkheads installed and is available in a basic or deluxe version. Deluxe kit includes all wood and a hardware package.

GMF-80, a swept wing twin that appears to be doing 100 mph while still setting on the flight line, it's so racy in appearance, is available from Ohio Superstar Model Products (PO Box 2522, N. Canton, Ohio 44720). Ship is intended for twin forties and is a balsa/foam creation.

Midwest Products (400 South Indiana St., Hobart, Ind. 46342) continues its line that includes something for everyone from beginner to expert. Their Jerry Nelson-designed, Pitts Special Biplane is still one of the best flying and looking two-wingers around today. Of particular note is the 40-powered Mini-Star, a fiberglass/foam pattern bird that has competition capability as well as being suitable for the sport field. We wonder how many Tri-Squires have been produced; this design has been around for years and is still an outstanding sport/trainer aircraft.

From Cox Hobbies Inc. (1505 East Warner Ave., Santa Ana, Calif. 92702) comes a  $\frac{1}{2}$ A powered Cessna Centurion that is made of molded material and is completely finished. Only the radio need be installed and cavities are premolded to make this chore a snap; even the Cox QRC .049 engine is already installed. Prepainted, this one can get you in the air in a hurry.

Another molded project, a bit larger, comes from B&J Design Corp (PO Box 6035, Bridgewater, N.J. 08807), this is a DeHavilland Mosquito for twin sixties. All major components, except the foam wing, are molded of a "space age material" that is not known to this writer. Weight should be OK and strength appears to be more than adequate. One thing sure, the detailing and overall appearance are excellent. The Mosquito is a favorite with WW II fans and this one should prove to be very popular.

Thousands of R/C fans have been thrilled by Bob Violett's demonstrations of his great Skyhawk II, powered with a Scozzi fan. Ship is now available in a kit by Bob's own company appropriately called Bob Violett Models (26516 Aiken Dr., Clarksburg, Md. 20734). Kit features an epoxy glass fuselage that includes ducting system, canopy, tail pipe, wheel pods and certain hardware items. Adhesive-backed mylar rib and former templates are also included.

Span Aero (4 Beverly Place, Norwalk, Conn. 06850) has the long awaited, Dan DeLuca-designed, Mini-Pathfinder ready for delivery in a fiberglass/foam kit. Ship is one of the best 40-powered Pattern designs I've ever flown and we can recommend you keep your eyes open for this one. Kit has a beautiful, gel-coated fiberglass fuselage with firewall installed; all balsa parts except wing skins are included.

A great flying P-39 is the new offering of Cass Engineering (Box 420, Rutherford, N.J. 07070) in a kit featuring a prefinished glass fuselage and foam wing. This is another project I've had an opportunity to try in the air and I can attest to its capabilities—fully pattern capable and very realistic. Trike gear should interest Pattern flyers. Big news from Cass is their next release for later this year, a twin sixty-powered Lockheed Lightning! Pulsar continues in great demand.

You're going to see a lot of the *Freshman Trainer*, a new offering for 29 to 40 engines from Top Flite (1901 N. Narragansett Ave., Chicago, Ill. 60639). Plane spans 48 inches and is intended for 3 or 4-channel operation; has a very clean and functional look. Top Flite has also introduced a low cost plastic covering called Econokote. Material is not intended to replace MonoKote since it has limited strength and is intended for covering sheet covered surfaces and foam structures.

Compensator, in this writer's opinion, is one of the best Pattern airplanes available today. Not only did it help bring the National championship to Rhett Miller four times but, in the hands of average flyers, it still performs exceptionally well. Up to now it has only been available in a built-up version by Southern R/C Products (R.3, Box 47 Nims Lane, Pensacola, Fla. 32503) but that company has responded to the preference by modelers of a glass fuselage, in their newest

release. Compensator is now available in a kit with epoxyglass fuse and foam wings; standard and deluxe versions are produced.

Model Engineering of Norwalk (54 Chestnut Hill, Norwalk, Conn. 06851) has a great version of the perennial favorite, the Piper Cub. MEN's exclusive wing design gives stability and slow flight characteristics that must be seen to be believed. Construction is based on an automatic alignment feature that insures an accurate airframe. Kit features considerable amounts of plywood that are very light and cleanly cut. 72" ship is intended for 29-35 power.

Brad Shepherd designed Doubler some years back and this mid-wing design gained considerable prominence as Austin Leftwich's airplane when he became 1/4 Midget Racing Champ in 1969, '70 and '73. Ship has been modernized in a new Sig offering (Montezuma, Iowa 50171). Printed fuselage sides for building directly on the wood, canopy, aluminum gear, molded wheel pants, die-cut ribs and formers are all kit features. Intended for 15 power the new Doubler II has a 36" wing and 315 square inches of area. If you haven't taken a look at Sig's newest biplane, Smith Miniplane, you should; it is guaranteed to turn you on. This 40-powered scaler is the cutest two winger we've ever seen and after witnessing Maxey Hester's flights at Omaha we can say it's a great flying biplane as well.

A model of a power-assisted glider, RF 5B Sperber is now part of MRC's growing line. Ship has a fiberglass fuselage, veneer-covered foam core wings and all parts necessary to complete the model. Suited to 20 through 40 power, ship is aerobatic on the bigger engines.

Hobby Lobby (Rt. 3, Franklin Pike Circle, Brentwood, Tenn. 37027) has a great looking 40-size Pattern ship with the lines of a jet fighter. Dubbed *Tiger*, the 52" bird comes with wings that are presheeted and a fuselage of balsa and plywood construction; suitable for 4-channel radios. Same concern has a new trainer that also has a ready-sheeted wing. This one is called Executive Senior and is 54" in span; for 19 to 30 engines.

An attractive but uncomplicated R/C power trainer that is easy to fly is the claimed virtue of Midwest Model Supply Co.'s (6929 W. 59th St., Chicago, Ill. 60838) newest, *Instructor*. Model features very tough fuselage construction in balsa and ply with all parts designed to interlock for accurate and simple assembly. Molded cowl and cabin front give complete access to engine and tank; 58" wing for 15-25 engines.

Bob Smith R/C Aircraft (PO Box 543, Chatsworth, Calif. 91311) has a small version of their very popular T 2A. This one is called the T 2-40 and is obviously for 40-size engines. Kit features an epoxy fuselage, foam wing and all wood.

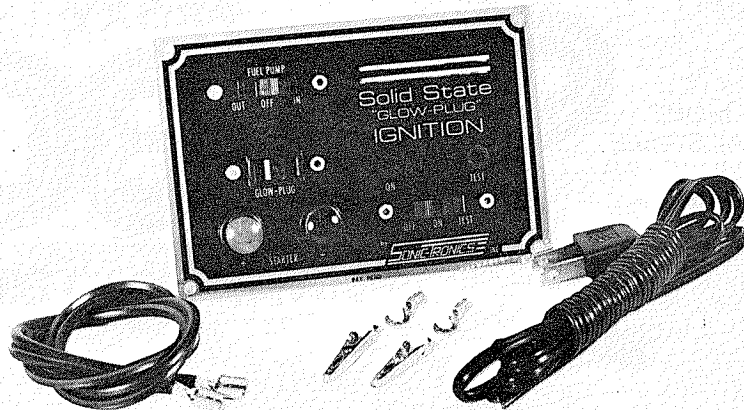
George Hill indicated he will be devoting his full time to Airborne Associates (4106 Breezewood Lane, Annandale, Va. 2203) and their fine line of R/C Pattern aircraft that includes Don Lowe's fantastic Phoenix 7. New release from Airborne will be the *Blazer*, a Pattern/Sport machine for 60 engines. An all-balsa, 40-powered Phoenix is also planned.

If you are looking for a great looking jet type, try R&S Hobby Products' (PO Box 61, Oak Lawn, Ill. 60453) new foam wing and fiberglass fuselage Northrop F-5, Freedom Fighter. Ship has a 50" span for 680 squares and 60 power. Kit is complete and includes all balsa sheeting. Company also has a YF-16 in the same format.

I've discussed the Duellists that are due soon from Dave Platt Models (2657 NE 188th St., Miami, Fla. 33180) and can only reaffirm the fact that these ships should fill a void for R/Cers hankering for a twin-engine Pattern bird. Ships will be available in twin 40 and 60 versions as well as a single-engine type; bound to be quality offerings with the Platt name involved.

Another jet fighter is being produced by R.C. Specialties (900 Hopkins St., Unit 2 Whitby, Ontario, Canada L1N 6Y9), this one the Mk VI-F86F, Sabre Jet. Plane is intended for ducted fan and features fiberglass/foam construction.

Sometime back a copy of *Sport Aviation* featured the homebuilt *Hyperbiplane* and I felt it would make an outstanding scale project. Master



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Kit (6 Fox Rd., Plainville, Conn. 06062) apparently felt the same way since their latest release in the *Hyperbiplane* in a 40-size version. Plane is of all-balsa construction and the uncovered one we saw at Master Kit's booth revealed some solid engineering. It's an ideal project for a biplane fan with excellent performance to boot.

Another ducted fan machine is now available from Model Jets Inc. (2012 Bickmore St.,

Dayton, Ohio 45404), a scale version of the C-101, a single-engine jet trainer currently under development in the U.S. for the Spanish Air Force. Plane spans 58 inches with area of 518 squares; intended for 40-powered Scozzi or Johnson units.

There is no way we can include everything at Toledo: all of the foregoing are the items that caught our eyes. That view was frequently obscured by crowds six deep. In future issues

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we'll discuss some of the new accessories that, in many ways, constitute the most interesting part of the show. It's in the accessory field that some of the cleverest design thinking is found.

**STORY OF THE WEEK, MONTH, YEAR—WHATEVER.** You are not going to believe this, but I'll relate the happening of one flight in New Jersey this Spring anyway. I say you won't believe it because I don't—and I SAW the results.

Karl Franke was flying his well-worn Aeromaster one warm afternoon as he had on numerous occasions. The ship was performing well and Karl was having a ball. Since all good things must end, and fuel was getting low, Karl decided to set up for approach and landing.

Now on this day, winds were cross to the runway and Karl had a bit of trouble maintaining heading and his Aeromaster drifted close to the parking area. At this point he realized he was coming up short and would likely clobber a car so he aborted, applied throttle and...

The rest of the story is typical, he was a hair too late and "kapow," right into the side of Tommy Pirrone's van. Since the ship hit the van on the side away from the field, all we heard was the noise followed by numbed silence, followed by Karl's muted expressions of concern for Tommy's van.

Of course all ran to pick up the pieces and "what to our wondrous eyes should appear?" Nope, not a miniature sleigh and all that jazz, but rather one completely intact Aeromaster firmly secured by its crankshaft to the rain gutter on the van!!!!

Not one piece of the plane was broken, not a scratch, not even a broken prop! The Aeromaster apparently hit at just the right angle, with just the right force—punched a hole and **THREADED ITSELF TO THE VAN!**

There—I said you wouldn't believe it. After seeing that I can truly say, "Yes, Cynthia, there is a tooth fairy!"

\*\*\*

This writer is on his way to Finland next week on a trip arranged through our AMA by "Suomen Ilmailuliitto," the Finnish Aeronautical Association, to visit the modelers in that part of the world. Therefore I won't see you on the field, at least not for awhile, but I'll be filling you in on the trip in a subsequent issue. ■

## M.A.N. at Work

(Continued from page 3)

flat with slight rolling hills much like our plains states. Of course there are areas of bush which break it up occasionally, but on the whole it holds considerable portent for the future. Salisbury, the capital of Rhodesia is a very modern city with many fine, tall buildings, plenty of flowering trees, tropical flowers and it is *clean*, very clean and painted very much like the better parts of our San Francisco.

First stop in Rhodesia was at Dennis Hunt's Southern Cross Hobbies, a well-established Hobby and Toy shop that sells forty copies of *M.A.N.* each month. Here we saw mugumgo wood for the first time; this wood is heavier, but not much, than balsa wood, of a finer grain than either bass or spruce, and very strong. Dennis also operates Model Products, a kit-manufacturing firm that produces both Ukie and R/C ships ranging from .049 single or two-channel types to a well-accepted Stormer (this should stir some memories, particularly Doug Spreng) that have been slightly modified to suit the climatic conditions. In addition there is an Express 500 for the pylon racers and some boat kits, all with mugumgo wood. Frank Garcher tells me that Midwest Products has been discussing importing the wood; it will be interesting to see what sort of reception it gets here, where we have been spoiled rotten by balsa.

My six-day stay in Rhodesia had two side trips. The first was to Victoria Falls which by itself would have made the whole trip worthwhile. Discovered by the famous David Livingstone and appropriately marked with a statue of that gentleman, the falls are huge, quite different from

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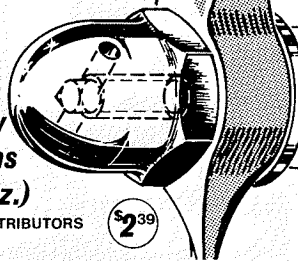
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our Niagara Falls, as the former is a very deep gorge with towering walls on both sides and empties or continues on into the Zambesi river downstream. From the air it appears as a huge 'T' gouged from the earth. I didn't photograph too much here as the rain forest with all its incipient moisture in the air dictated keeping the camera in its case, and also little old Montezuma got me for a short fall. The doctor at the local infirmary had the cure: three needles in three different spots which managed to shut off the problem quite well. But I wasn't any too anxious to move about!

My second side jaunt was to Matusadona, a state nature preserve on Lake Kariba with Dennis Hunt along for the trip. Here we stayed under canvas, in a tent right at the edge of the lake. It was strictly a bush safari with one big difference—gourmet meals. The camp's chef had a way with food: such homemade rolls, biscuits and bread as you can't believe. As a matter of fact, ten extra pounds reminds me how well they eat in South Africa and Rhodesia. Our first safari was by boat, a pontoon type, skirting along the shore looking for wildlife. The first animal seen was the African buffalo, a huge, very impressive beast who, they tell me, is one of the really dangerous animals in the bush. It appears that while the hunter may start out stalking the buffalo, the buffalo suddenly makes a 360° turn and now stalks

the hunter, with rather bad results on occasion. Next spotted was a huge bull elephant who was feeding on the marsh grass at the edge of the lake. We were downwind, and this permitted us to coast right up to within about 15' of him, shooting color shots all the while. By actual count I took 15 pix before Dennis reminded me there would be other animals, as well as plenty of birds of all types: cranes, fish eagles etc. It was a very rewarding trip. The second safari was made while sitting on the top of a Land Rover—with a difference. This time, as we were heading into the bush, a military escort had to ride with us. The reason was that Kariba, a man-made lake, separates Rhodesia and Zambis, a prime source for terrorists. This safari was a prime part of the trip, aside from the discomforts of a sore backside and fighting off the bush. Got to see some more buffalo, elephants, cat tracks, and was able to take two fabulous shots of an impala. This happened while searching through the bush with my long lens and suddenly there was this impala staring directly at me. Not freezing as I usually do, I shot the picture and, because the noise of the electric drive startled him, the impala took off in one incredible leap which was also caught by the camera: is he really stretched to his full length!

Most playful and funny animals of the lot were the hippos; they loved to play games. Watching from a distance, as you approached they would sink back down beneath the water and then sound once again at another spot. Their sounding is much like that of whales, as they blow out air as their nostrils rise out of the water. One group of seven finally allowed us to get up close and it was quite an experience as their Mickey Mouse-type ears, huge eyes and noses just above the waterline were something to see. They would stay there staring at us, never moving, and then quietly slip beneath the water only to rise up once again. You must see my slides! I could go on, but rather than bore you I will head back to South Africa. Before I do that, however let me tell you how we got to Matusadona.

First we flew by airline to Carribea on Lake Kariba and took a Cessna 185 on pontoons to the camp at Matusadona. Heading home we had a slight deviation by the 185 pilot, as for an extra \$10.00 he flew us down the Sanyatti gorge. This gorge is something else—a great cut through the mountains, quite steep and high. The pilot took us down into the gorge where we were flying only 30' above the river all the time as it wound through the gorge. At times it would appear that our wing tips were only 10 to 15' from the side of the canyon walls and it was in here that I ran out of film! Do have some shots though, but now to get back to South Africa. Dennis and I drove the entire distance of over 1400 kilometers from Salisbury to Potchefstroom in one day, a 17-hour day. "Old Potch" as it is affectionately called was the site of the South African Championships; however, I would like to backtrack a bit to two episodes that took place during the World Championships practice days. The first was a side trip to Johannesburg to visit with Jack and Nancy Immelman of Redley's. I have known Nancy and Jack for about ten years but this was the first time I knew that they were Redley's, one of our principal foreign distributors of M.A.N. All these years they had never mentioned it and I had never inquired as to what part Jack had in the hobby. A bit embarrassing to walk in on one of your good customers to find out that they are old friends! They have quite a hobby shop in Johannesburg, with the R/C section very capably handled by Dave Jenkins, a rather well-known Pattern pilot who will be team manager for the S. African team at Springfield. Nancy took me on a sightseeing trip of Johannesburg which included going to the top of Carlton Towers, (incidentally, where Redley's is located) the tallest building in the city, fifty stories to be exact! Again the camera came out and some of the pix of the city and its huge piles of gold tailings all about the city. These are small mountains and the city fathers have begun to landscape and seed them to make them into parks.

Second episode was a side trip with Commam-

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dant Robin Hoek of SAAF in his huge Puma helicopter. Our flight took us up and over a long ridge in which the famous S.A. buzzards roost and we stirred them up a bit; they had to number in the very high hundreds. Again the camera, but this time with a slight difference as the door in the side of the helicopter was opened for our photography and we were sitting, seat belts fastened of course, only about one foot from the aperture looking down and out of the helicopter. Unfortunately for me my camera did not have a neck strap, so they had to almost crack my fingers loose from the camera when it was all over. But the slides are worth every minute of it.

After the So. African Nats (for details see my report next month) it was back to Johannesburg to spend one night and a day with hobby shop "Fun 'n Games" owner, Jerry Levy before taking off for Cape Town. Jerry gave me the full Cook's tour of the city particularly the residential area, and some of the homes were slightly unreal; gold is a great provider.

Air trip to Cape Town was uneventful with the exception of the flying machine, an Air Bus 300 which is powered by two huge engines. The plane is as large as a 747 but with one big difference in the interior arrangement, as there are no galleys or bulkheads and it's just like sitting in one huge auditorium. Two hours later we were in Cape Town, the city of sudden weather, and met by Chris Sweatman, many times over, So African National Pattern champ and FAI Team Member. Chris, operator of R/C World hobby shop, a store devoted exclusively to R/C, was my host for the next seven days. Chris's lovely wife, Dr. Dorothy, took her hosting chores one step further as she is a practicing doctor of physiotherapy and in that capacity treated the pinkie finger of my left hand which was badly misshapen because of arthritis. Her daily sonic treatments eliminated the large deposit at the knuckle of the second joint of the finger—it didn't eliminate the pain but it did eliminate the disfigurement which is still gone.

My stay in Cape Town was arranged for to include daily sightseeing excursions with Dorothy and Chris one day, Len Salter two days—one to Stellenbosch, the wine country and town of fabulous homes, the second to Table Mountain and up the cable car to the top of the mountain. Here the slides tell it a lot better but it was something to see, a complete change from clear sunny weather to its being completely clouded in a matter of a few minutes. It changed so fast that it was almost impossible for Len to get a photo of me standing on the top. In addition, Len took me up Signal Hill where the view of the city and ocean is unbelievable. Pam and Laurie Withers spent a day taking me to Groot Constantia, a winery and vineyard in Cape Town, and then the long trip to Cape Point the southernmost point in Africa. It was on this outing that I got to see my first ostrich and there were a pair of them feeding but quite far out; I did manage some recognizable slides though.

And a one-day side trip managed by of all people, my Connecticut neighbors and good friends, Crystal and Jim Mathis who were celebrating their eleventh wedding anniversary in South Africa. We managed a short meeting in Pretoria but they knew I was to be in Cape Town so a trip to the local hobby shop, R/C World and John Cunningham, was able to locate me. This one-day trip took us about 150 kilometers back into the hills to a private game reserve and orchard "High Noon," and believe it or not, the first animal seen was a camel, followed by a llama and then a Bengal tiger, and this was in Africa! However we did get to see many others native to the country and it was all worth it, though Crystal and I had to fake our photos a bit to eliminate the wire fences from the background. Crazy giraffe racing after the food truck really shook me up.

My week in Cape Town was climaxed by my host and hostess, Chris and Dorothy, taking me out for a surprise birthday dinner (my over-seventy party) and of course I can't leave Cape Town without telling of the wine and cheese party put on for me by Bob Drumm and his charming

wife. Bob is a fellow modeler, member of the DCRS and a member of the American Embassy stationed in So. Africa. In addition to the wine and cheese party which had over forty of the local R/Cers and their wives on hand, the Drumms had a private dinner party for me and someday, somehow when they are on their way to California I hope to repay this hospitality.

Headed back to Pretoria from Cape Town for four days of rest and recreation with Monte Malherbe, my official host for the entire African trip. Nord Gerneke and Terry Brown had planned a trip to Kruger Park for this part of the trip but all I wanted was some days of rest with good friends and there were no new animals that I could see, so I begged off, but they did arrange two days of sightseeing for me around the Pretoria area. One trip was to one of the beautiful lakes and dams only to find it completely smothered by water hyacinth, a flower that was imported from South America to add a bit of beauty. What wasn't anticipated was any method of controlling this plant which has suddenly become a national pest. In South America they use the manatee fish to control its growth and this works well, but the native South Africans find the manatee to be a tasty morsel and fish the lakes clean.

Before leaving South Africa I must tell of one episode that really shook me: while window-shopping on Pretoria's main street I suddenly was touched on the shoulder and a voice said to me "You must be Walt Schroder." When I recovered from the shock I asked the man who he might be and it was Albert Clarence of Botswana who had just arrived that day on a hobby-shopping trip. Clary told me of his trip to pick up supplies and that it was only 475 miles from his place in Botswana, a trip of 17 hours over mostly dirt roads just to pursue his hobby. He most always makes it a five-day trip to justify it, but just think—a 17-hour drive through the bush just to get your hobby supplies—that's dedication, and to Clary I dedicate this entire trip!

To summarize—to all the modelers of South Africa and Rhodesia, yours is a beautiful country, peopled by some of the finest individuals I have yet to meet and with your dedication and purpose I am sure that you can weather current political storms. I know that with your help, if asked, all the problems would be behind you, but then I can say that for any modeler wherever he might be. Just wish the world was peopled only by modelers, as it would be a beautiful place in which to live!

I can't leave without telling of my astonishment when I realized that on my return trip home of 27 hours total elapsed time that I had traveled from the bottom of the world (the southern hemisphere) to the top of the world (northern hemisphere). My flight from London took me over Goose Bay, Labrador and the icy part of the world, while in that time I had gone from the beginning of fall to the beginning of spring with the Tropic of Cancer at the half-way point. Aviation or air travel has made some great strides in the fifty years since Lindy flew the Atlantic solo; we should be Proud.

\*\*\*

Will finish the column on a rather upbeat note with this letter which should put to rest all of those toxicity problems once and for all.  
"Dear Walt:

Bev has asked that I reply directly to you in response to that original article concerning the alleged toxicity of epoxy resins occurring in "The Ungarbled Word" of North Central Airlines.

We here have delayed in responding in order that we could bring this to the attention of two of the largest epoxy manufacturers in the United States, if not in the world, i.e., Shell Chemical and Ciba Chemical.

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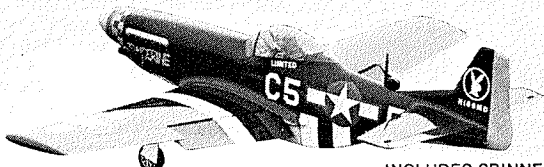


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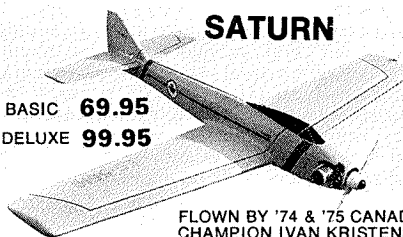
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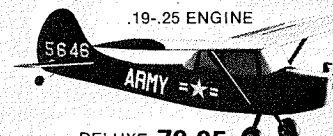
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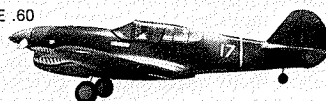
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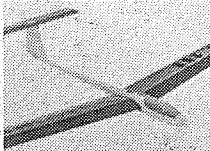
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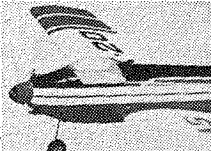
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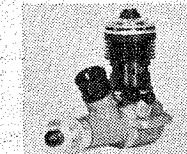
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#### SPRAY MIST: USE WITH ADEQUATE VENTILATION.

For whatever it's worth, I would like to pass on for the benefit of others a recent experience in the use of TOLUOL, XYLOL, N. PROPYL ACETATE, METHYL ISOBUTYL KETONE, better known as epoxy-based paint."

The statement that the solvents Toluol, Xylol, N. Propyl acetate, and Methyl Isobutyl Ketone are better known as epoxy-based paints is a grossly inaccurate misstatement of facts. The solvents have nothing to do with the description of what constitutes an epoxy-based paint. While these solvents are frequently used for epoxies, their use is just as common for many other types of coatings, such as many alkyd paints used around the home, lacquer-based coatings, and, to be sure, dopes and acrylic lacquers so often used by modelers when they are not applying epoxy paints. The point here is that the unnamed author in the above referenced article should have concerned himself with solvents in general and the need for adequate ventilation while working with them rather than epoxy resins.

As for the toxicity of the epoxy resin, the most commonly used resin for the type of coating such as ours has an epoxide equivalent weight of 450 to 550. This resin even uncured is classified as being relatively harmless, non-irritating, and non-sensitizing. The American National Standard Institute has assigned the resin as "Class I Type," which is the safest classification. The curing agent used with this epoxy resin varies and, depending upon the type, ranges in toxicity in an *undiluted* state from being strongly sensitizing to mildly irritating. The typical use level of the strong sensitizing curing agent is about 1% by weight of the coating *before* reduction to spray viscosity.

A completely erroneous statement is that the test resulting from dry-sanding an epoxy film is just as dangerous as the original wet spray. To the contrary, the danger from solvents no longer exists, and the safety of the cured epoxy films is indicated by their acceptance by the Food and Drug Administration for use as surface coatings of containers holding food and potable water. They are used extensively also as protective coatings on the walls and other interior surfaces of hospitals and food processing plants. It would be presumptuous to comment on the medical problem experienced by the anonymous author of the newsletter. However, if it were in fact the result of spray application of an epoxy coating, the solvents and *not* the epoxy resin most likely were the major cause of his problems.

In the more than 15 years that we have been marketing epoxy paints, to the very best of our knowledge, neither we, nor the largest suppliers of epoxy resins in this country have had access to facts supporting the deductions made by the author. To quote one major supplier,

"Resins, hardeners, and solvents do not affect the heart or coronary circulation. If this man suffered a coronary attack, we do not believe it was related to the epoxy formula he used—most of the effects of epoxy resins are not cumulative in the usual sense of the word. Some epoxy resins and hardeners, however, may eventually induce sensitization. (Meaning essentially that a certain very few allergically sensitive persons having been exposed at one time to excessive quantities of this material will, upon re-exposure at a later date, develop skin or eye irritation of one sort or another.)"

In short, we feel that the author was very much overly dramatic, and we feel that his comparisons of epoxies with cyanide and snake bites has done no justice to the hobby industry as a whole. We feel that the best justice, and the best service to him, would have been realized had he brought this matter directly to our attention or to the real experts in this field, i.e., the manufacturers, themselves, of the epoxy resins.

Most cordially,  
Pettit Paint Company, Inc.  
Robert A. Pettit  
President"

I am sure that, after reading Bob Pettit's words on the subject of whether the "ungarbled word" thing that made many newsletters was accurate or not, it's too bad so many people are prone to shoot from the hip.

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