R/C MODELER

THE LEADING MAGAZINE FOR RADIO CONTROL • JUNE 1967 • 60¢

FOAM WINGS: STEP-BY-STEP

SMALL FIELD SOARING?
TRY THE 'TERN'
.020 POWERED GLIDER

.15 POWERED OUTBOARD HYDRO
DICKIE-DO

REX TAYLOR'S BEAUTIFUL SWEEK FOR CLASS III

A few words about me.

I am Electronic Engineer and this is my day job.

From tender age two things attracted my interest and I managed to have them in my life.

The first was electricity and the second the bluesky.

I´ve found the model airplanes hobby in October 1973.

I love the wooden structures from scratch airplanes and boats also.

I started collecting plans, articles, books and anything else that could help the hobby of many years ago and have created a very large personal collection of them.

Since 2004 I became involved with the digitization and restoration of them and started to share the plans from public domain with my fellow modelers.

Now after all this experience I have decided to digitize, to clean and to re publish in digital edition and free of all issues RC Modeler magazine from 1963 to 2005 and others books and magazines.

Certainly this will be a very long, difficult and tedious task but I believe with the help of all of you I will finish it in a short time.

I apologize in advance because my English is poor.
It is not my mother language because I am Greek.
I wish all of you who choose to collect and read this my work good enjoyment and enjoy your buildings.

My name is Elijah Efthimiopoulos. (H.E)
My nickname Hlsat.

My country is Greece, and the my city is Xanthi.

Λίγα λόγια για μένα.

Είμαι Μηχανικός Ηλεκτρονικός και αυτό είναι το αληθινό μου επάγγελμα εργασίας.
Από μικρός δυο πράγματα μου κέντρισαν το ενδιαφέρον και ασχολήθηκα με αυτά.
Πρώτον ο ηλεκτρισμός και δεύτερον το απέραντο γαλάζιο του ουρανού και ο αέρας αυτού.
Το χόμπι του αερομοντελισμού το πρωτογνώρισα τον Οκτώβριο του 1973.
Μου αρέσουν οι ξύλινες κατασκευές αεροπλάνων και σκαφών από το μηδέν.
Ξεκίνησα να συλλέγω σχέδια, άρθρα, βιβλία και ότι άλλο μπορούσε να με βοηθήσει στο χόμπι από τα πολύ παλιά χρόνια.
Έχω δημιουργήσει μια πολύ μεγάλη προσωπική συλλογή από αυτά.
Από το 2004 άρχισα να ασχολούμαι με την ψηφιοποίησης τους, τον καθαρισμό τους αλλά και να τα μοιράζομαι μαζί σας αφού τα δημοσιοποιώ στο διαδίκτυο (όσα από αυτά επιτρέπεται λόγο των πνευματικών δικαιωμάτων τους).
Σήμερα μετά από όλη αυτήν την εμπειρία που έχω αποκτήσει, αποφάσισα να ψηφιοποιήσω, να καθαρίσω και να ξαναδημοσιεύσω σε ψηφιακή έκδοση και ελεύθερα όλα τα τεύχη του περιοδικού RC Modeler από το 1963 μέχρι το 2005 και κάποια άλλα βιβλία και περιοδικά.
Σίγουρα είναι μια πολύ μεγάλη, δύσκολη και επίπονη εργασία αλλά πιστεύω με την βοήθεια όλων σας να την τελειώσω σε ένα καλό αλλά μεγάλο χρονικό διάστημα.
Ζητώ συγγνώμη εκ των προτέρων γιατί τα Αγγλικά μου είναι φτωχά.
Δεν είναι η μητρική μου γλώσσα γιατί είμαι Έλληνας.
Εύχομαι σε όλους εσάς που θα επιλέξετε να τα συλλέξετε και να τα διαβάσετε αυτήν την εργασία μου καλή απόλαυση και καλές κατασκευές.
Το όνομα μου είναι Ηλίας Ευθυμιόπουλος.(Η.Ε)
Το ψευδώνυμο μου Hlsat.
Η χώρα μου η Ελλάδα και η πολη μου η Ξάνθη.

RCM Magazine Editing and Resampling.

Work Done:

1)Advertisements removed.

2) Plans building plane removed and hyperlinked.

3)Articles building plane removed and hyperlinked.

4)Pages reordered.

5)Topics list added.

Now you can read these great issues and find the plans and building articles on multiple sites on the internet.

All Plans can be found here:

Hlsat Blog RCModeler Free Plans and Articles.

http://www.rcgroups.com/forums/showthread.php?t=2354459

AeroFred Gallery Free Plans.

http://aerofred.com/index.php

Hip Pocket Aeronautics Gallery Free Plans.

http://www.hippocketaeronautics.com/hpa_plans/index.php

James Hatton Blog Free Plans and Articles.

http://pulling-gz.blogspot.gr/?view=flipcard

Vintage & Old-Timer RCM Free Plans.

http://www.rcgroups.com/forums/showthread.php?t=2233857

Contributors:

Scanning by ser001

Editing by Hlsat.

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RADIO CONTROL MODELER

on Dewey Editor
oug Tucker Assistant Editor
d Thompson Technical Editor
ob Dance Art Editor
ick Kidd Technical Art Editor
athleen Acton Secretary
arol Ludden Secretary

INE 1967 VOLUME 4 NO. 6

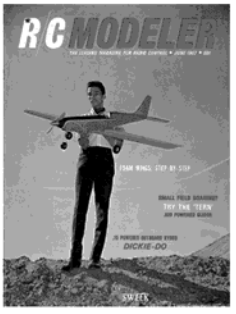
features

COMING NEXT MONTH!

- DON DEWEY'S "CIRCUS"
- JAN SAKERT'S "LIKI TIKI"
- FOAM WINGS: STEP-BY-STEP PART II
- **PLUS MUCH MORE!**

ON SALE JUNE 10TH

departments



OVER

ohnson Quarles and his fiberglass and foam Classic," one of the most magnificent finishes ve have ever seen on an R/C aircraft. Photo y Reed Packard.

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EDITOR'S MEMO

SOUTHERN Californians are being informed about the benefits of model aviation through the means of radio broadcasting. A progressive modeler, Steve Glass, spreads his enthusiasm for flying in general, model flying in particular, via the airways — the airways in this case being the 5,000 watts of KTYM-AM and FM, transmitting from the heart of Los Angeles. Steve produces and directs all of the stations' aviation programs.

Steve began four years ago at radio station KPER in central California. He organized the K-per Hobby Clinic in order to interest the youngsters of the area in model flying and to solve any problems that might arise in their model flying.

Returning to the Los Angeles area in 1964, Steve began an aviation program called, "The Steve GLASS SHOWCASE." Steve, an aircraft owner himself, used this show to acquaint the general public with full-scale flying and to dispel their fears of flying. This past year marks the inception of the aeromodeling program, "What's Up" which features news of people, places and products of model aviation. In addition to the latest club news, events, and AMA contests, Steve also provides, with his 20 years of modeling experience, the most complete and factual product reviews in the industry. This, of course, is designed to instill a desire for the products plus acquaint not only the modeler but the general public as well, with the fun and rewards of model aviation. The people who become interested in wanting to learn more about flying will be able to visit one of Steve's sponsors, which include leading members of the modeling and aviation industry; organizations who have recognized the need of communicating with the general public.

Steve is well qualified to campaign for model aviation. He began his modeling career in 1947 with several "stick and paper" models that were popular after the war. He has built and flown nearly all types of models ranging from indoor to R/C. He started his radio career in 1958 and, after working in that field for several years, realized that in spite of the tremendous advances that modeling has made in recent years, the general news media had not taken a serious interest in it. Steve decided to start his own one-man campaign to combat this feeling of apathy. He was thus able to successfully combine his experience in, and love of, modeling with his desire to inform the public about the merits of aviation in "The Steve GLASS SHOWCASE."

Steve believes that the modeling industry could help in bettering their communications with the public. He says, "The public only thinks of models as toys. Because of this a lack of communications exists." Steve realizes that the modeling industry generally doesn't have an outside sales staff for the sole purpose of selling modeling to the public.

Steve's "What's Up" broadcast, one of several aviation programs on KTYM, is regarded as a public service to the modelers and future modelers and, of course, there is no charge to the manufacturers or distributors for reviewing their products on the show. There is also the General Aviation edition of "What's Up" with a similar format plus "The Steve GLASS SHOWCASE," a record show with in-between-record patter devoted to both modeling and General Aviation and special interest shows furnished by leaders in aviation education.

Steve was born in Des Moines, Iowa, on October 6, 1939. He moved to California with his mother, Jo Ann Stevens Glass, when he was 21 months old. His father, Captain Charles M. Glass, was an Army Air Corps B-24 and P-38 pilot. He was killed during World War II flying "The Hump." Steve first became interested in modeling when he was only 7 years old and it was just two years after that when he bought his first model engine — a Baby Spitfire .045. Shortly thereafter "U" control became his main interest. R/C and Free Flight began for him almost simultaneously in 1956 with the opening of the Los Angeles Model Airport (Sepulveda Basin). At present he maintains equal interest in all phases of aviation.

In addition to the modeling activities, Steve is a commercial pilot and aircraft owner. He started taking flying lessons in 1957 while attending Loyola University of Los Angeles. He soloed in an Aeronca Champion after eight hours of dual instruction and received his Private license after only 42 hours of total flying time. Since that time, he has added a Commercial license to his list of achievements.

In 1961 Steve met Marcella Claussen. Steve got Marcy interested in building

and flying models and, after several visits to the Sepulveda Basin, she decided to start building her own planes. The first one was a free flight Ranger powered with a Cox Pee-Wee engine. She then progressed to a Dakota which she covered in a traditional feminine fashion, with lavendar tissue. Marcy has built several hand-launched gliders, one of which she lost OSS at the 1963 Nats. Marcy also flies "U" control planes. She appeared on the March, 1964 cover of WEST COAST MODEL NEWS, holding a Starduster 900 that Steve built.

While Steve got Marcy interested in flying model airplanes, he also got her interested in flying full scale planes. She received her Private Pilot's License in September, 1964.

Steve married his "co-pilot" in July, 1965 and they have since added a 1946 Luscombe to their family.

For the future Steve plans to write a series of Public Service Announcements for the other disc jockies on KTYM, promoting modeling and he would like to get the "What's Up" program syndicated at other radio stations across the country.

Steve hopes that everyone who is connected with aviation modeling will see the value in telling the public about the benefits and fun involved with model airplane building and flying and that they will campaign for the cause even if only to tell their friends about the wonderful excitement of modeling.

— Don Dewey

THE CONTEST SCENE — BUCKEYE '67.

CRYSTAL air + light wind + mild temperature = perfect mid-winter chemistry for an RC meet. This was the formula that drew a record 85 radioplanes to Buckeye (Phoenix) Arizona for the 17th annual Southwestern Regionals held on 18 & 19 February 1967. Bob Burand, Bill Roseberry and the Arizona RC Society (ARCS) provided a first class RC operation which opened the 1967 contest session with a real bang! Class II & III pattern along with Scale shared a three flight-line ramp with Goodyear pylon racing that drew crowds who stayed long to watch close competition develop in all these events.

Phil Kraft and Cliff Weirick, both members of the 1967 U. S. Internats team, were on hand to pace entrants in class III expert, while Jerry Nelson and Ray Downs headed up a 27 plane field in Goodyear. J. R. Cox and Gil Horstman provided a competition standard for class II Pattern while Scale fans licked modeling chops over winged gems shown by RC artists such as Granger Williams and Joe Bridi. When the final bell rang on regular competition this is how the hardware lined up:

Class III — expert — Phil Kraft, Ted White, Jerry Krause

Class II — J. R. Cox, B. O. Fabor, Gil Horstman

Class III — novice — Al Cox, Bob Upton, Jim Witt

Goodyear — Jack Butler, Jerry Krause, Chuck Watkins

Scale — Joe Bridi, Jack Stafford, Granger Williams

As an example of the closeness of pattern competition, Ted White and Jerry Krause ended in a tie for second place. This was settled by an extra Kraft-White-Krause fly-off that saw Ted and his Galaxy-Gringo combination edge Phil's Kwik-Fli by 3 points for top Pattern honors. Scale judges, Dale Payton and Alex Forsyth, also had a tough chore as scale planes continue their advance in perfection. Joe Bridi's Twin Piper had an outstandingly detailed interior and flew quite well. Jack Stafford unveiled his scale Chipmunk replica that flies so well Cliff Weirick plans to use it at the Internats.

Cliff, incidently, despite heavy AMA prexy tasks and duties, is keeping up on flying practice with an eye on the June date in Corsica. The Buckeye exercise was his Chipmunk's first taste of competition with Cliff logging flights 4 through 8 as the thorough trim process was continued on the neat red and white sparkler. Looking for trends, it's not difficult to foresee a continuation of the 'sportplane' look started in 1966 in Pattern ships and being given added impetus this year with the introduction of the Chipmunk. It may well become another standard along with the "Hog" and

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Phoenix quartet enjoyed perfect Buckeye weather — l. to r. — Bob Elgines, Glen Goodman, Bill Roseberry, and Chuck Watkins. That's Chuck's Spitfire and MARC-6 — the Elgines-Goodman produced propo radio equipment used by many Phoenix ARCS flyers.

"Taurus" breeds of yesterday. The new miniature propo gear waiting off-stage in the wings will fit in well with such a development and make smaller planes more feasible for contest performance in all events and categories. In any case, it was an interesting sidelight of the Buckeye meet to watch Cliff and Phil 'tune' for their international competition chore. Doug Spreng, the third man of the U. S. team, was busy elsewhere with his Thunderstormer so Buckeye visitors missed a chance for a complete preview of the radioplane delegation that'll be defending U. S. World RC Aerobatic Championship in Corsica next June. We might add, with an earlier date than usual set for the Internats this year, it's fortunate all U. S. team members hail from southern California where winter flying and contests may give an advantage in the race for World honors.

Spectators, however did see the Thunderstormer of Rob Kelly — the well-known class III senior — who came down from Denver with a sizeable Mile-Hi RC Club delegation including hobby shop tycoon John Kelly and Bob Green who brought along his superb scale rendition of the Gypsy Moth 60M. It flew beautifully in the solid and calm Arizona air, showing off its multi-multi ribbed wings and spoked EB wheels. A Supertiger 56 equipped with a VECO carburetor hauled the 7 pound biplane easily using a Fox plug and Missile Mist fuel. (Incidently, we see a big increase in use of MM in areas experiencing a shortage of K & B Hi Lo as flyers continue to seek added engine performance.)

With RC equipment now 'arrive' as far as quality and dependability are concerned, Buckeye was expected to show evidence of improved flying technique and aircraft design. In Joe Bridi and his original pattern bird, Sunfli III, was seen the extra touch that spelled progress in our mind. Featuring a sub-rudder that's finding increasing favor again among multi designers, the VECO 61 powered aerobatic ship also sported a 'progressive' wing. This type has attracted designers a long while and Joe's — which had a symmetrical 18% root section tapering to a 12% symmetrical tip — worked well enough, especially in landing patterns, to keep him in the upper brackets of competition. The ship was functional in construction using well executed and familiar frame-and-fabric cover techniques. A VECO plug capped the mill and dependably ignited K & B 100 fuel favored by Joe. A single stick Logictrol 7 kept pilot and machine linked so that the Harbor City, Cal. BIRDS member could concentrate fully on his aerial artistry. In all, the Buckeye outing showed this is a pair to watch in future Pattern circles.

Despite the 'arrived' status of radio gear, the Arizona shindig provided a backdrop for field trial of a brand new

Mile-Hi RC'er, Bob Green and Gypsy Moth 60M at Buckeye. Well done, from Aug. '58 Aeromodeler, uses ST 56 on Missile Mist. Spoked EB wheels popular for vintage types.

Sunfli III, Joe Bridi's original pattern ship. VECO 61 and Logictrol give life to excellent design featuring progressive airfoil, sub-rudder.

TOP OUT

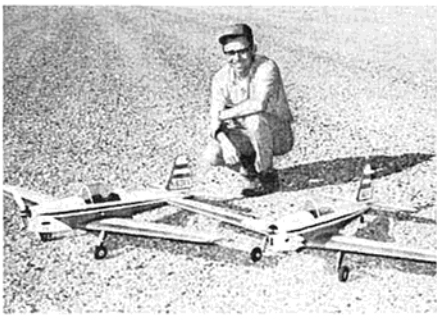
(Continued from Page 6)

propo development hatched and grown right there in sunny Phoenix. We're referring to Bob Elgine's MARC (for Model Aircraft RC) system which he and Glen Goodman turn out for the Phoenix ARCS in 4, 5, and 6 channel configurations. Using some Digitrio hardware, the rigs are of professional quality and ruggedly tested on the bench and in the air before being released by the young designers. About a dozen are currently in use as prototypes with one set having migrated to San Antonio, Tex. along with Lt. Col. Rex O'Conner. (He's not an L/C yet, actually — this is our way of 'averaging' our error in the March issue where we tagged the good-natured Air Force major with captain's tracks. . . .) Rex and his MARC 6, along with several others, were on hand for the Buckeye workout with one being used by Chuck Watkins in his Goodyear racer that placed 3rd in the tough 27 plane competition. Performance readily matched that of the many 'standards' seen in abundance at the 85 plane affair. By the way, count of radio equipment saw 20% each of Logictrol, Kraft, Orbit, and PCS, while Digimite, MARC, Citizenship, and F&M made up the remaining 20%. Other equipment highlights included a neat high rate electrical fueler by Appollo Advanced Products of Houston (Jack Beauchamp's new RC concern) and retracting gear featured in the ships of Cletus Brow, Jack Butler, Joe Bridi, and Ted White.

Other Buckeye spotlights included a close-up view of Model Trends fiberglass "Classic." George Sosic and Johnson Quarles combined to create this feature kit item which was formerly known as the "C-100."

For the meet the glass fuselage and empenage was fitted with a foam wing and decked out in an orange-with-gold-trim finish that has to be ranked in the 'best ever' category! Right down to its polished chrome Kwik-Links, the Los Angeles beauty is in a class that clearly aims to garner "Best Finish" honors at the forthcoming Los Alamitos Nats in July. Due to interest in finishes we took time to get the 'inside' dope on Model Trends method which, be assured, is different. Try this: After 2 initial sanded down coats of a mixture of clear butyrate dope and talc, apply 2 coats of acrylic (read carefully, now) primer and clear butyrate mixture (50-50). Next comes 2 coats of color, also a 50-50 mixture of acrylic and butyrate colored dopes. Apply trim, rub down masking tape edges (fine steel wool's best — Ed.), and finally, seal the entire surface with one or two coats of clear 50-50 acrylic-butyrate mix. Results, we assure, are pure satisfaction. . . .

And speaking of finishes, the twelve (yep 12!) foot creation by Wincel Pogue of Mesa, Arizona may not excel in the paint and brush department but never-



Internats twins — Weirick & Chipmunk. Jack Stafford scale design does well as pattern ship — is due for early release as kit. Buckeye was 1st competition outing.

the-less was a definite attraction as it gracefully negotiated the blue sky over Buckeye. Wincel's son, Jim, handled the Kraft propo radio controls on the Enya 60 powered original cabin design that somehow seemed to look like a combination of Funk Aero Sedan and Dick Korda's Wakefield. Despite its bulk, the blue and — uh, red silk-span covered plane only weighed 13 pounds and moved well through the air as it was pulled by a 14 x 6 prop that, by the way, was on its 200th flight! Wincel's exceptionally complete log on the craft showed it had 967 flights amounting to about 300 flying hours prior to its demonstration at Buckeye. Initially, the ship had been powered by a K & B 45 — it lasted 347 flights — and was still going strong on the Eyna that had logged a straight 337 flights before having a mid-air stoppage due to a bad needle setting!

Wincel assures the ship was simple to build and only took him and his brother Bill a month to put together. Admittedly rough, the plane none-the-less was an example of extra light construction combined with a healthy durability that had seen it through almost a year of flying and 967 flights. An interesting construction feature was use of ordinary string that spanned the wing as a series of 'spars' to minimize the catenary-like droop (sag) silk-span assumes on the

Joe Bridi and first place Piper Comanche. Pair edged scalers at 17th SW Regionals. Two Merco 49's on Champion gloplugs, K&B 100, and Logictrol 7 S/S. Was 3rd in 1966 West Coast Championships. Lotsa details inside. . . .

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Fast Goodyear — Don Menzimer's modified Goldberg Shoestring. K&B rear rotor 40 and 8 x 8¼ prop with K&B 1000 puts go in Garden Grove RC'ers entry at Buckeye meet.

upper and forward wing camber between ribs. Jim Pogue, who has done all the piloting on the craft, is helped by his brother, Dave. Jim told us the 25 foot take-off run was typical and that the 12 foot ship was very stable and easy to handle and that it had even been looped! Using flashlights strapped to the landing gear, 8 flights had been safely logged at night on "Lucky 7," as Wincel calls his paper and balsa bird. Other useful tasks included aerial movie taking (no space problem at all) and even an 11½ mile cross country jaunt on only an 8 oz. fuel tank — its regular supply. One recent flight, we were told, lasted for 13 minutes on power, then for 27 more minutes bringing the bird down out of a thermal! Glow plug mileage is also impressive with the log showing an average of 300 flights per plug using the K & B variety.

Up to this point in relating the Lucky 7 story, we purposely avoided use of words such as "giant" and "monster" for good reason. Not for any esthetic purpose, but to leave room to describe Wincel's spare plane just being finished. After adjusting to the proportions of Lucky 7 we were taken back a bit when Wincel and his 3 man crew rather casually unpacked what appeared to be a 15 foot version of his RC pastime! This one wasn't completely finished since wing

Williams bros. and well-traveled Nieuport 28. Has long string of scale honors, garnered 3rd at 17th SW Regionals.

TOP OUT

(Continued from Page 7)

slats (in place of ailerons) were still lacking, but that hadn't stopped Wincel. He had already air tested it as a glider towed aloft behind Lucky 7! Sporting a taller rudder, this giant (there, now) blithely spread 20" chord wings distances enough to bring pure joy to Sid Axelrod and the folks at Monocote. Except this one, following the construction example of its 'litter' brother, had about an acre and a half of silk-span draped over the typical Pogue balsa and string structure. Looking inside, as in Lucky 7, the Kraft radio — lost in that cavernous cabin — went about the job of actuating control cables reaching many feet to the flight surfaces. . . .

In case you're wondering, we'll admit that, perhaps like you, we're not sure where Wincel Pogue's construction ambitions will take him and his brother and sons next, or to what new uses he'll put his outsized creations that turn winged fancies into tissue and wood reality. We're certain however that in his own corner of the RC world — a corner having select company of other builders of "the Big Ones" — Wincel enjoys his hobby as much — or more — than the rest of us who follow the comfortable path of the many. . . .

Back at the contest—Hector Guzman ably set up Goodyear competition that saw 27 of the country's best RC racing pilots safely stack thrilling heat upon heat. Proving it isn't always the fastest ship that wins in Goodyear, Jack Butler's blue Mustang and Jerry Krause's

Outstanding Goodyear lineup at Buckeye readies for preliminary heats. Jack Butler's Mustang topped 27 plane field. Midget was popular with Denight, Knarf, and Shoestring also numerous.

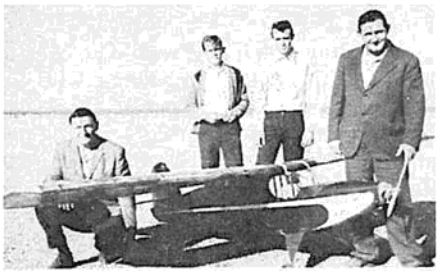
Community awareness of Southwestern Regionals was high in Phoenix-Buckeye-Litchfield area, is reflected in Litchfield motel sign welcoming competitors. Sundowner accommodations excellent, inexpensive. Big crowds attended meet, had bleacher seats to view proceedings.

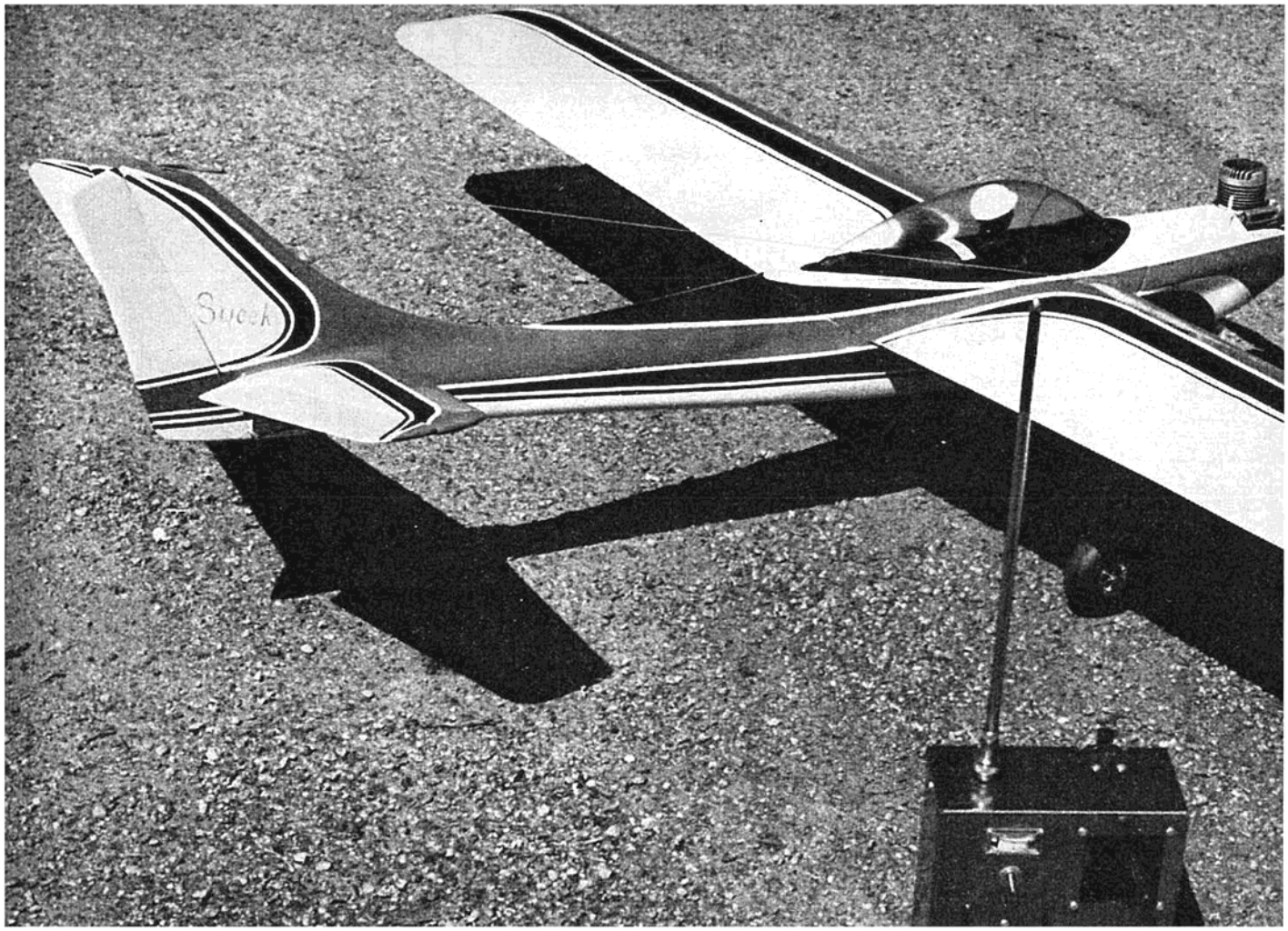
Denight, along with Phoenix's Chuck Watkins and his Knarf, outdistanced Don Menzimer's modified Goldberg Shoestring which flew the fastest heat at Buckeye. Matching the smooth technique of Weirick and White, the top three established their consistency and staying power as their main stock in the exciting Goodyear racing business. The 17th SW Regionals, it may safely be said, raised the curtain on a mighty eventful Goodyear season. . . .

When racers weren't whizzing, Dave Kincaid, using his original and effective flight scheduling board, kept Pattern and Scale moving smoothly all the while aided by Denny Kohlman and Jean Paul Frignac. Pit 'bosses' Dr. Frank Vigil and Gerry Gerstner also helped achieve really maximum use of the 3 flight line runway. We always admire the ARCS ability to keep those three lines busy while operating only 100 feet or so apart. While wondering at that we noted Ellis Williams who kept the records table perculating so that scores flowed from the Luke AFB pilots who did the judging, to the standings chart with no hitch. Lavoy Henry provided ground equipment for the extensive operation while it was nice to see Blake Mueller's familiar face at the magazine equipped sound

(Continued on Page **46** *)*

"Lucky 7 II" demonstration at Buckeye stopped show. Twelve footer flew easily on Enya 60 with 14 x 6 prop. To date 967 flights, has even towed larger craft! Wincel Pogue (r), sons Jim and Dave, along with brother Bill (l) created outsized fleet in Mesa, Ariz.





ONCE upon a time there lived a designer of radio controlled aircraft who dreamed of designing the perfect airplane. Oh, it would be a thing of beauty. It would fly perfectly through all maneuvers and always bring its builder great glory in the contests.

Well, maybe it works that way in the fairy tales, but for me it has taken a period of seven years and four airplanes to come up with the airplane which each of its ancestors was designed to be. Like a lot of other modelers, I had grown a little weary of the sameness of all of the multi-stunt designs, low wing, stab on or about the thrust line, almost identical force arrangements on them all, and so forth.

When looking over the ships at any local flying site they are all the same, basically, except maybe the rudder or wing tips are shaped a little differently. Sure, they do fly excellently, but why not try to improve even this and, at the same time, design a ship that has a different look, one that will stand out on the flight line **because** it is different? This is what I had set out to do, and, while none of the first three designs I produced was a bad airplane, none seemed to be exactly what I wanted.

It seemed to me that a good multi ship would have to have these features:

A. A steady pitch axis to keep it from hunting up or down.

B. It should roll about the thrust line, keeping the fuselage as a pivot, and not show any tendency to barrel roll. It should not change its headings or lose airspeed excessively during consecutive rolls.

C. It should enter spins easily and recover instantly with no overspin or excessive corrections.

D. It should be fast, smooth and have a relatively light wing loading.

E. It should look good as well as fly.

Normally, at this point, the designer goes into a long dissertation relating to aerodynamic theory and gives complicated and wondrous reasons why his particular design is aerodynamically perfect for the job intended. I spent a period of seven years fiddling with this force arrangement off and on, with numerous kits and magazine plan ships in between, but always seemed to come back to my first love.

My first airplane was an 800-square-inch shoulder wing design, .45-powered on an 8-channel reed rig. It flew well but rolled much too slowly, and had too much trim change between high and low throttle.

The second ship was the first taper wing job, with a fast, smooth roll, but unfortunately, it didn't last long because of the P. I. O. factor (pilot-induced oscillations). A bad case of more-airplane-than-I-had-experience-to-fly!

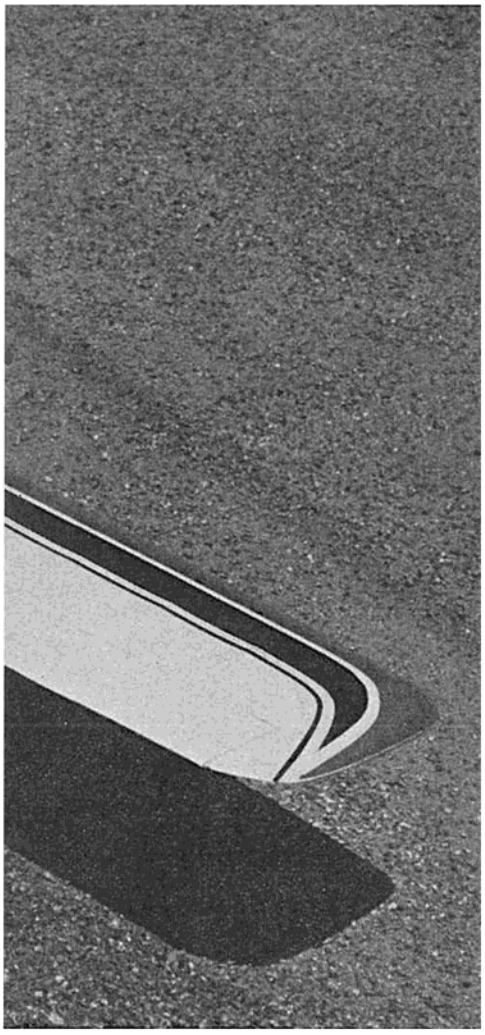
The third job was very close to the dream but still just wasn't quite right. It went through all the maneuvers well except spins. It had to be flown out, or it would take an extra 100 feet coming out. This resulted in a major rebuild job twice. This airplane was the only one to use strip ailerons and seemed to have more yaw in the rolls than the versions with conventional ailerons.

Since I had just acquired a new Kraft KP6-S which has a very small airborne package, I could finally put the wing where I felt it should be — in the center — because the receiver and servos required only a depth of one and three-quarters inches below the wing.

I had been building strong for two weeks when one of my flying-type buddies came by to visit. Upon seeing this newest bird he asked, "What the hell is that?" I replied, "It's a sort of swept back kind of freak."

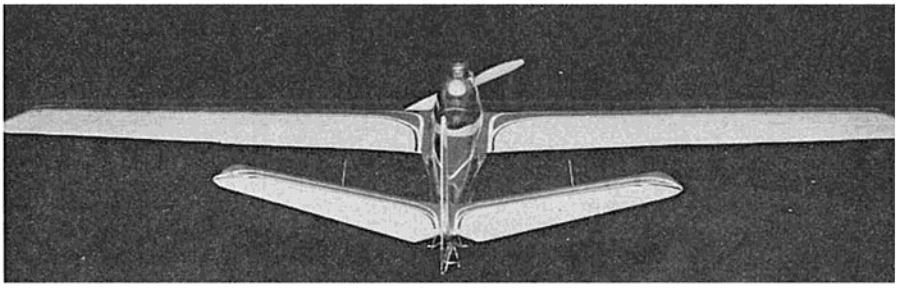
So Sweek is a shortened version of this description although it does sound like some sort of disease. Maybe it is a disease, but probably one any modeler who builds it will be glad he got.

Before drawing the Sweek, all the



SWEEK

RCM presents the second in a continuing series of challenging new designs for Class III competition or sport.



BY REX TAYLOR **PHOTOS BY WHITEY PRITCHARD**

good and bad habits of the first three ships had been analyzed. The poor spin recovery I felt was the result of the stab riding in wing turbulence and becoming less effective. The dihedral in the Sweek stab is not just for looks, it cures this problem. Many modelers have been curious about this stab treatment and the only peculiarity I have found is that it takes more down elevator travel than up to bring about equal maneuvers. This is accomplished by raking the horns back 15°.

Sweek will enter a true spin easily on command, the spin has fast rotation and recovery is automatic when controls are neutralized. The ailerons were made conventional and big, while throw has been held down, which results in a fast, smooth roll and almost no loss of airspeed. Sweek will roll from the limit of radio range in one direction to the opposite extreme and maintain altitude and heading all the way.

The ship has very good slow flight characteristics and aileron control is positive at all speeds. This is accomplished by using a 16% section at wing root and progressively tapering to a 20% section at the tip, causing the wing to stall from center out to the tips and holding aileron control to the bitter end.

Sweek uses a full symmetrical zip-zip airfoil for the simple reason that it flies very well, and it seems logical to me that an aircraft which is to fly equally well upright or inverted should be as near symmetrical in all respects as possible.

The ship is flown on a .60. While it is light enough to be flown with a good .35, it is my opinion that the more power the better. With speed and power to spare you have an adequate safety factor. I have seen many underpowered airplanes stagger around in a poor imitation of flight, or stall on takeoff, or not have the power to pull through maneuvers; but I've never seen a plane lost from too much power. You can always throttle back, you know, but when the little engines are extended full out, that's all; and, Brother, if it ain't enough — look out!

Sweek is the easiest ship to fly I have ever flown. It goes exactly where you aim it, and just does not have any bad habits. The original ship flew right off the drawing board and has never had any trim changes. The first flight was actually a letdown as I was prepared for trouble and nothing exciting happened. Each flight is pure enjoyment from takeoff to touchdown.

Sweek is not yet the ultimate airplane — probably no airplane ever will be — but it is a far better-performing airplane than any I have built in the last eight years of very active building and flying of multis.

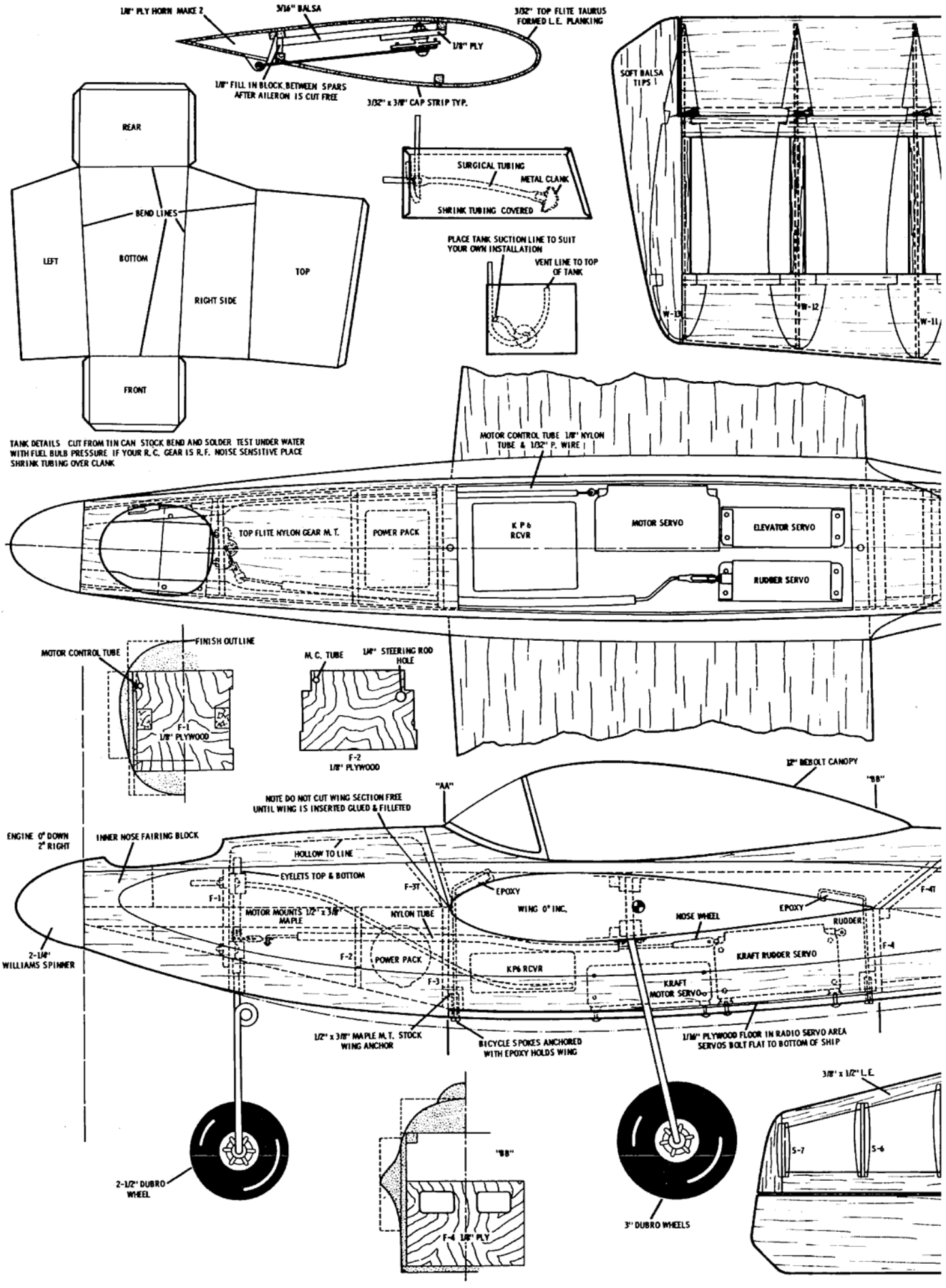
So if you want something different, if you want to break the low-wing habit, if you get your kicks out of flying an airplane that really performs, then get out the old glue pot and a bundle of balsa and let's build a flying machine!

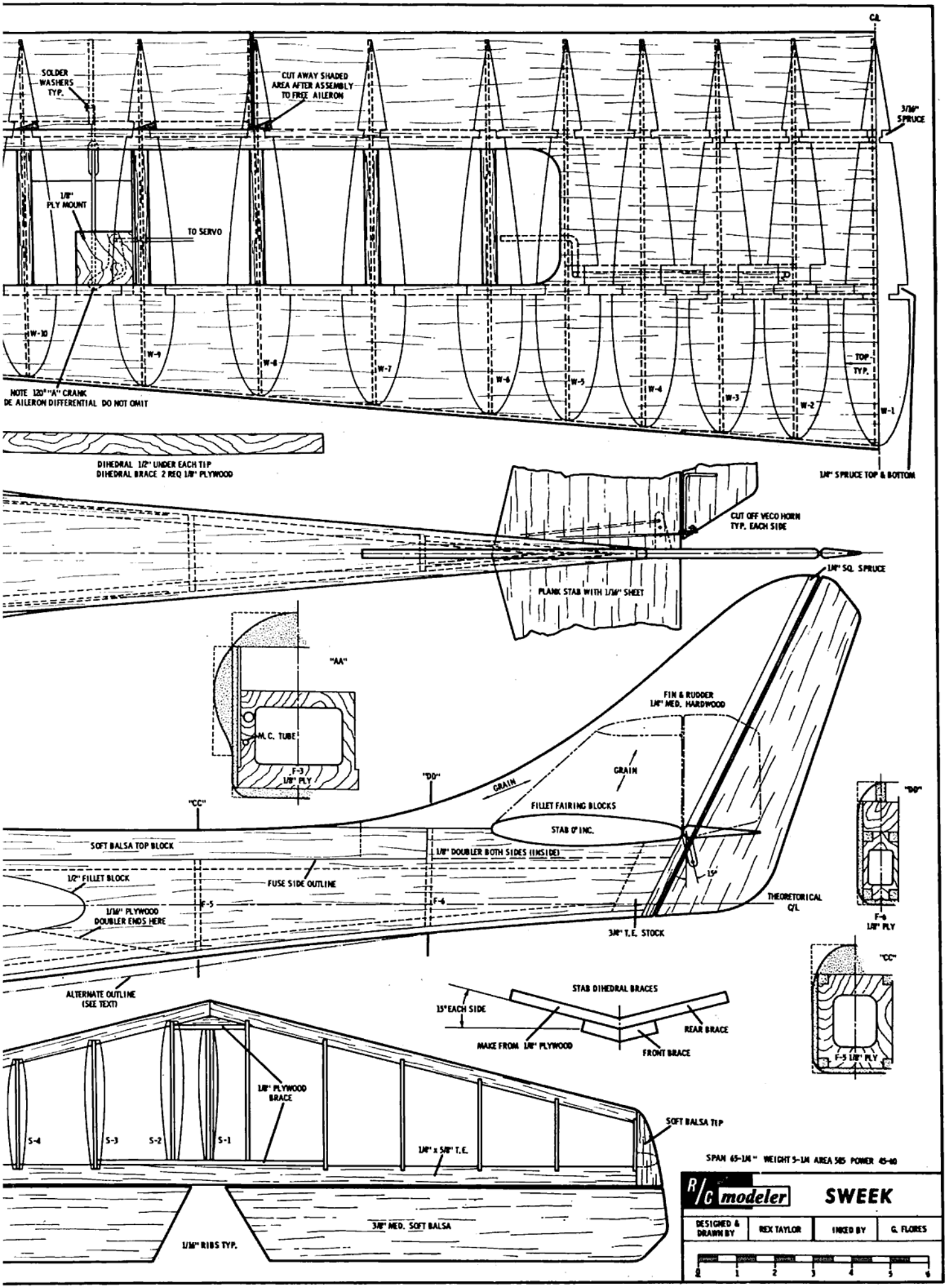
CONSTRUCTION

Since Sweek was designed around the new Kraft gear, which is pretty small, you'd better make sure your gear will go in it. Lay the gear on the plans, and if there is not enough room, you'd better fatten it up in the belly to the alternate outline.

Once you have arranged your gear on the plans and determined that it will fit (and don't forget to leave room for wiring harnesses), construction is started by cutting fuselage sides and plywood doublers, and joining same with contact cement. Fuselage sides are cut out with a hole for wing to slide through only. Wing is installed in fuselage and everything faired in before the cutout for wing through fuselage top is made. This method saves quite a lot of time in shaping and sanding. Fuselage formers and

(Continued on Page 13)


1/8" PLY HORN MAKE 2
3/16" BALSA
3/32" TOP FLITE TAURUS FORMED L.E. PLANKING
1/8" PLY
1/8" FILL IN BLOCK BETWEEN SPARS AFTER AILERON IS CUT FREE
3/32" x 3/8" CAP STRIP TYP.
SOFT BALSA TIPS
REAR
BEND LINES
LEFT
BOTTOM
TOP
RIGHT SIDE
FRONT
SURGICAL TUBING
METAL CLANK
SHRINK TUBING COVERED
PLACE TANK SUCTION LINE TO SUIT YOUR OWN INSTALLATION
VENT LINE TO TOP OF TANK
W-13
W-12
W-11
TANK DETAILS CUT FROM TIN CAN STOCK BEND AND SOLDER TEST UNDER WATER WITH FUEL BULB PRESSURE IF YOUR R.C. GEAR IS R.F. NOISE SENSITIVE PLACE SHRINK TUBING OVER CLANK
MOTOR CONTROL TUBE 1/8" NYLON TUBE & 1/32" P. WIRE
TOP FLITE NYLON GEAR M.T.
POWER PACK
K P 6 RCVR
MOTOR SERVO
ELEVATOR SERVO
RUDDER SERVO
MOTOR CONTROL TUBE
FINISH OUTLINE
F-1 1/8" PLYWOOD
M.C. TUBE
1/8" STEERING ROD HOLE
F-2 1/8" PLYWOOD
12" BEBOLT CANOPY
"AA"
"BB"
NOTE DO NOT CUT WING SECTION FREE UNTIL WING IS INSERTED GLUED & FILLETED
ENGINE 0° DOWN 2° RIGHT
INNER NOSE FAIRING BLOCK
HOLLOW TO LINE
EYELETS TOP & BOTTOM
F-1
F-3T
EPOXY
WING 0° INC.
F-4T
MOTOR MOUNTS 1/2" x 3/8" MAPLE
NYLON TUBE
NOSE WHEEL
EPOXY
RUDDER
2-1/4" WILLIAMS SPINNER
F-2
POWER PACK
F-3
KP6 RCVR
KRAFT RUDDER SERVO
F-4
KRAFT MOTOR SERVO
1/2" x 3/8" MAPLE M.T. STOCK WING ANCHOR
BICYCLE SPOKES ANCHORED WITH EPOXY HOLDS WING
1/16" PLYWOOD FLOOR IN RADIO SERVO AREA SERVOS BOLT FLAT TO BOTTOM OF SHIP
2-1/2" DUBRO WHEEL
"BB"
F-4 1/8" PLY
3" DUBRO WHEELS
3/8" x 1/2" L.E.
S-7
S-6


SOLDER WASHERS TYP.
CUT AWAY SHADED AREA AFTER ASSEMBLY TO FREE AILERON
C/L
3/16" SPRUCE
1/8" PLY MOUNT
TO SERVO
W-10
W-9
W-8
W-7
W-6
W-5
W-4
W-3
W-2
W-1
TOP TYP.
NOTE 120° "A" CRANK DE AILERON DIFFERENTIAL DO NOT OMIT
DIHEDRAL 1/2" UNDER EACH TIP
DIHEDRAL BRACE 2 REQ 1/8" PLYWOOD
1/4" SPRUCE TOP & BOTTOM
CUT OFF VECO HORN TYP. EACH SIDE
1/4" SQ. SPRUCE
PLANK STAB WITH 1/16" SHEET
"AA"
M.C. TUBE
F-3 1/8" PLY
FIN & RUDDER 1/4" MED. HARDWOOD
"DD"
GRAIN
GRAIN
"CC"
FILLET FAIRING BLOCKS
STAB 0° INC.
SOFT BALSA TOP BLOCK
1/8" DOUBLER BOTH SIDES (INSIDE)
1/2" FILLET BLOCK
FUSE SIDE OUTLINE
1/16" PLYWOOD DOUBLER ENDS HERE
F-5
F-6
15°
THEORETICAL C/L
3/8" T.E. STOCK
"DD"
F-9 1/8" PLY
"CC"
F-5 1/8" PLY
ALTERNATE OUTLINE (SEE TEXT)
STAB DIHEDRAL BRACES
15° EACH SIDE
REAR BRACE
MAKE FROM 1/8" PLYWOOD
FRONT BRACE
1/8" PLYWOOD BRACE
S-4
S-3
S-2
S-1
1/4" x 3/8" T.E.
SOFT BALSA TIP
3/8" MED. SOFT BALSA
1/16" RIBS TYP.
SPAN 65-1/4" WEIGHT 5-1/4 AREA 585 POWER 45-60
R/C modeler
SWEEK
DESIGNED & DRAWN BY
REX TAYLOR
INKED BY
G. FLORES
0 1 2 3 4 5 6

SWEEK

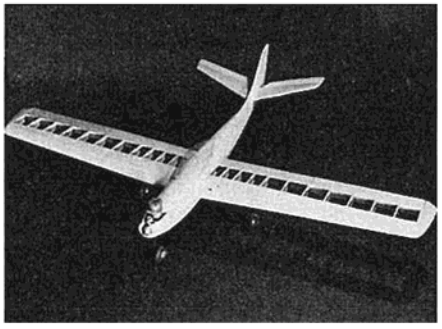
(Continued from Page 10)

" . . . SORT OF A SWEPT BACK FREAK!"

motor mounts are installed next. Begin by installing F2 and F3, then before installing F1, drill it for nose gear mount. A Top-Flite nylon nose-gear mount was used in the original. Fuselage is now joined at extreme rear and rest of formers added.

Tank

The fuel tank is constructed of tin can



stock on the original, and templates and bending instructions are provided on the plans. This is a small airplane and in order to pack a maximum fuel load (9½ oz.) all available space must be utilized, which dictates a custom tank. Don't let this scare you, though, they are easy to build. Why, way back in ignition days we built all our tanks . . . etc., etc. Seriously, though, it does give maximum capacity and adds a lot to the strength of the nose as it becomes a strength-bearing member. Access to the inside of the tank can be made from the rear if it should ever need clank replaced. I have found these metal tanks always outlast my airplanes. Plans also show clunk tank outline for those who prefer the easy way out.

After tank, nose gear and steering rod, throttle tube and blind nuts for motor mounting bolts are installed, fuselage is ready for bottom planking and top block. Next add fillet block cut out for wing clearance and rough carve shape of nose and fillet, but don't finish any contours yet.

Sweek's fuselage, when shaped out, loses all its slab side appearance and looks very rounded. The fillets and cheek bulges look far more attractive than a square box and are worth the extra effort involved. The wing fillet fairing block serves to increase strength across the wing cutout section and should not be omitted.

Wing and Stab

The wing and stab are pretty standard, so I will not go into any great detail. Do not fail to use spruce spars and lots of white glue on the internal wing structure, particularly gear mounts, aileron crank mounts, and dihedral braces.

The stab is like all sheet covered stabs except that it has dihedral. Be sure to select reasonably light balsa for stab and elevators to avoid a tail-heavy condition.

After all sub-assembly work is complete, join the stab to the fuselage and fillet with plastic balsa. Next slide the wing through the fuselage and glue to the top section only. Now finish contouring the fuselage and the fillet area around wing root. This will give you an airplane that looks as if it were almost one piece when it is finished, and assures excellent fits on all mating parts.

Now carefully cut fuselage top to release wing, and you are ready to start sanding and finishing flight surfaces. Take your time here and resist that urge to hurry so you can fly it.

The original uses bicycle spokes to retain the wing and no provision is made for knock-apart on rough landings. Use your own judgment here. Wing can be rubber-banded or nylon screws as you like. It seems when you hit hard, it damages the aircraft no matter how the wing is held on.

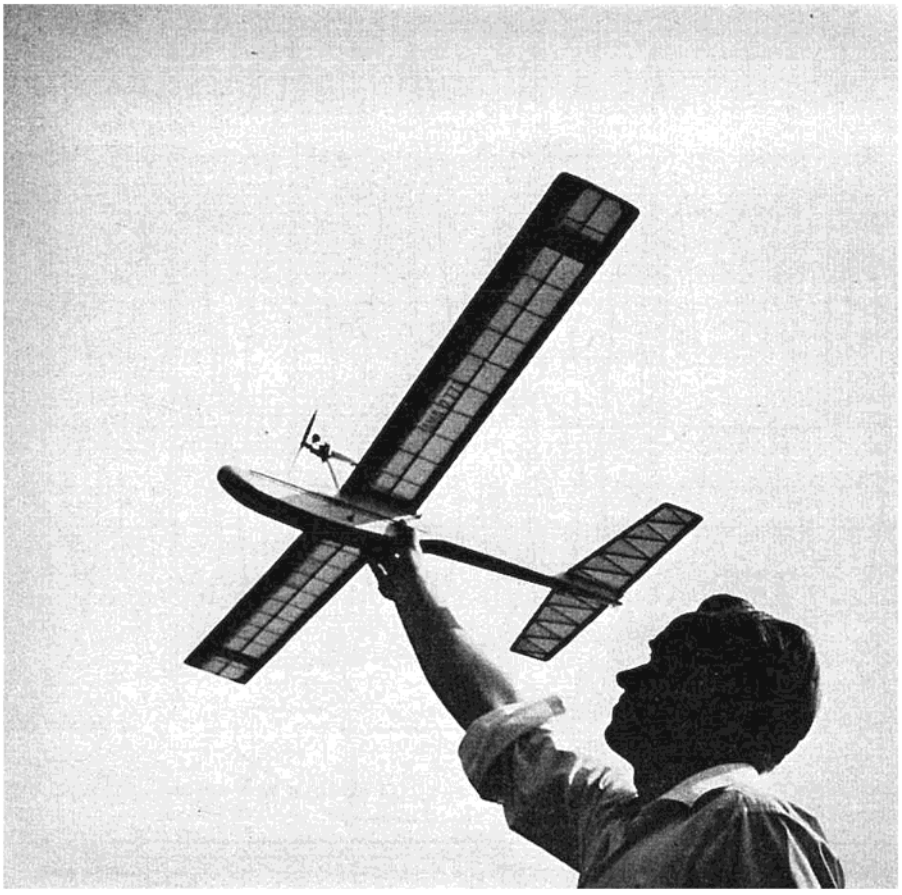
Cover flight surfaces with silk or nylon, MonoKote, or whatever you prefer. The original has the fuselage covered completely with lightweight glass cloth and polyester resin. Some will tell you this results in a heavy airplane. 'Tain't so. Sweek weighs 5¼ pounds with empty tank, and that's light.

Now that we have this bird built and covered, how about that paint job? Why settle for less than one that will really draw attention? Let's face it, we're all a bunch of hams and we love to have the spectators admiring **our** plane, don't we? So don't stop now, Tiger, put on that wild paint job, use all those bright colors! The few extra hours you put in will be well worth it on the first trip to the field.

Install your gear as per manufacturer's instructions, remembering that a little extra time spent here may extend the life of your plane considerably.

Before flying, check carefully for warps, binds in control surfaces, and check your engine out at all speed ranges for electrical noise, vibration, malfunction, etc. If all checks well, fill 'er up and push the **GO** lever!

Sweek is fast, sweet and gentle, and you will soon fall in love with this little bird.



CHUCK ANDERSON'S

TERN

TEXT BY DON DEWEY

CHUCK ANDERSON'S "Tern" is a remarkably well-designed .020 glider that will serve as the perfect introduction for the newcomer to powered flight, or as an "easy-on-the-pocketbook" sport design for the single channel Sunday Flier.

Chuck designed and built the original prototype of the Tern in three evenings, back in 1964, to meet the rules of one of the club contests of the Coffee Airfoilers of Tullahoma, Tennessee. The latter group sponsors a category for ½A or smaller single channel models which is a combination endurance and spot landing event. Points are awarded for the time after engine cutoff and up to a specified time limit. Landings are judged as to the distance from the specified landing spot. In order to achieve maximum points in this combined event, a design must have a good glide capability as well as excellent controlability. The Tern excels in both of these categories.

As originally entered in RCM's Second Annual Design Contest, Chuck's glider sported a Controlaire 5 receiver, Citizen-Ship SE-2 escapement, and two nickel cadmium pencells. The model has been flown continually since its concept in 1964, and has actually worn out two Cox Pee Wee .020 engines!

Chuck's entry in the Design Contest consisted only of a set of full size plans and a single photograph of the original prototype. For this reason, and due to the fact that when we contacted him, Bill was about to leave for Southeast Asia with the Air National Guard, we decided to build up another version for the article. Suddenly, the as yet unnamed glider, became a joint project of several individuals. RCM's Editor, Don Dewey, built the version shown in the photographs. Dave Gray of Airtrol contributed one of their 4 ounce R1 proportional rudder only systems. Bill O'Brien, RCM's Special Projects Editor, supplied the name. Doug Tucker, RCM's Assistant Editor, took the photographs, and in-between picture sessions on Dewey's Hill, everyone flew it.

And there you have the background of the Tern. It's so simple to build that we won't go into any elaborate construction details. A few notes are in order, however.

First, if you use an escapement, reinforce the escapement mount bulkhead (F4) with 1/16" plywood, or if you prefer, substitute 3/32" plywood for this bulkhead, as we did.

Second, the fuselage is built upside down. Begin by installing F1 through F5. Do not glue the upper part of F3 at this time. When the glue is dry, add the remaining formers and F8. After the glue has dried, remove from the workbench and glue sides to upper half of F3. Add all remaining sheeting and blocks. By the way, RCM's prototype used 1/32" vertical grain balsa doublers on the fuselage back to the TE of the wing. This is not shown on the plans, however, and is up to the discretion of the builder. Tite-Bond glue was used throughout.

Glue a strip of sponge rubber to the top of F3 to seal gap and to prevent fuel from getting inside the model. If you use an escapement, add a ground wire from the escapement to the torque rod. The canopy we used was cut from the front of a standard small commercial canopy available at all hobby shops. A Junior Falcon canopy can be substituted or a soft balsa block can be carved to shape and painted white.

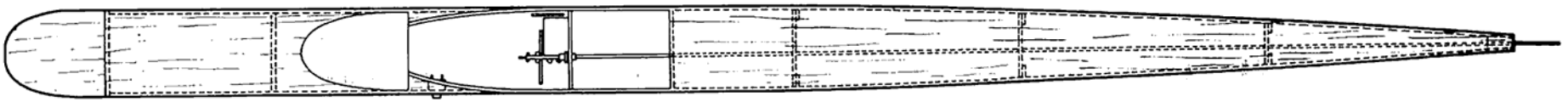
RCM's prototype used yellow silkspan stolen from an old Breezy kit finished off with several coats of clear butyrate dope and Finishing Touch decals. The fuselage had no fabric covering and was painted with AeroGloss white. The hatch was held on by gluing two small rails on the hatch, itself, and when in place, cut-off lengths of straight pins were used to secure it in place.

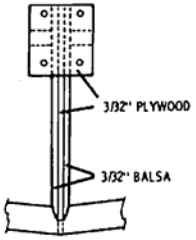
If you don't use an escapement, the area occupied by the 5/32" rubber can be utilized for stretching the antenna to the plywood rear skid.

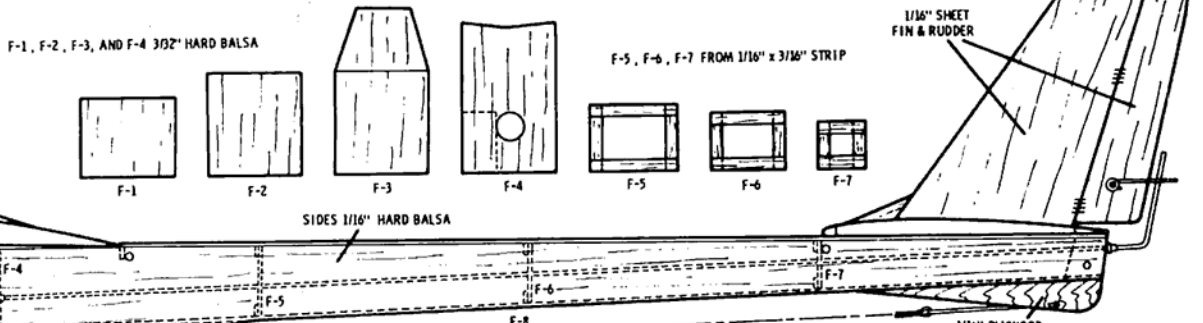
Make sure that your model balances as shown on the plans. If building a powered version, remember that the thrust on a pylon mounted engine is exactly the reverse of a conventionally mounted mill — in other words, up is down, etc. Follow the plans for the proper setting and adjust from that point as trim indicates.

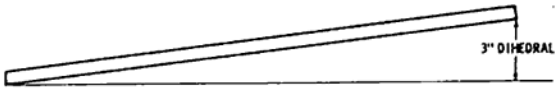
Trim settings can be adjusted for various wind conditions by adding shims under the trailing edge of the stab. For extremely light wind conditions, add 1/16" at a time up to a maximum of 1/8".

Good flying. You'll like the Tern!

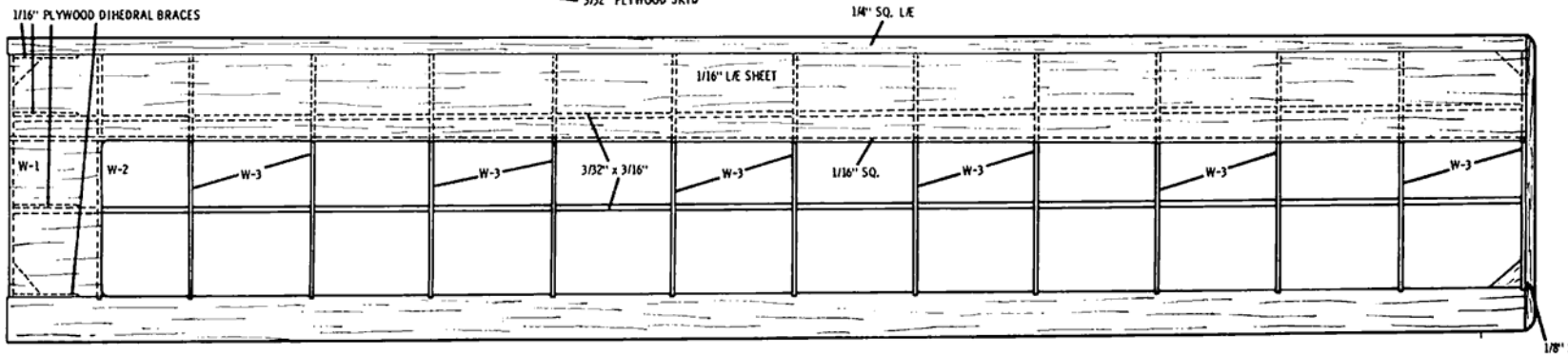




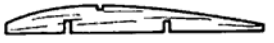




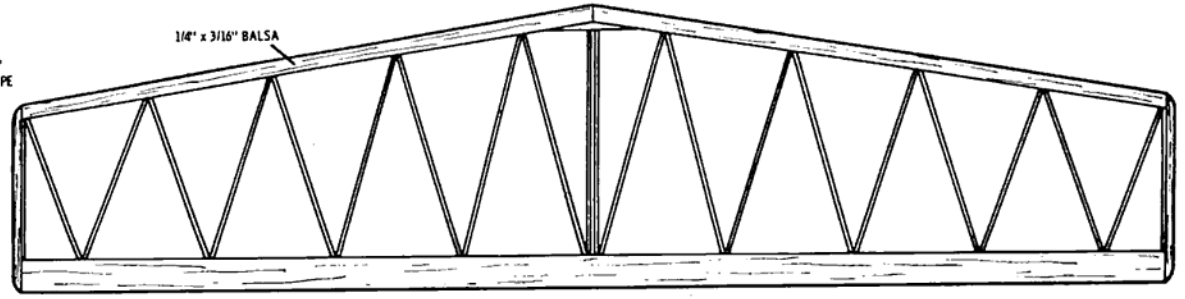
NOTE STABILIZER SET FOR WINDY WEATHER FLYING FOR THERMOL FLYING OR CALM WEATHER ADD 1/16" TO 1/8" SHIM UNDER TRAILING EDGE OF STABILIZER



ALL RIBS 1/16" SHEET



STAB RIBS 1/16" x 1/4"
SAND TO AIRFOIL SHAPE
AFTER ASSEMBLY



RADIO CONTROL modeler MAGAZINE

TERN

DESIGNED & DRAWN BY	C. ANDERSON	INKED BY	G. FLORES

R/C Scale is one of the most popular events at every Nat's. Pictured above is the 3rd place winner at the 1966 Nationals, Chuck Smith's Ford Trimotor.

Welcome to California!

WELCOME to Southern California and the 1967 National Model Airplane Championships!

Sponsored by the Academy of Model Aeronautics and hosted by the U. S. Navy, the '67 Nat's will be held at the Los Alamitos Naval Air Station from Monday, July 24 through Sunday, July 30. This year, this largest of all model airplane contests, promises to attract a record number of both contestants and spectators. And, for this reason, according to Nat's Director Eldon Lind, the theme for this year's Nationals is simplicity and efficiency — a streamlined program that will provide contestants with the finest meet in Nat's history.

A great portion of the first planning conference, held in February at the NAS, near Los Angeles, was devoted to eliminating any repetition of past problems in the radio control events, with a special effort being made by both representatives of the Naval Air Reserve Training Command and the twenty two Academy representatives in attendance, to provide RC'ers with increased flying opportunities, improved judging, and better contest information.

This year, RC contestants will arrive on station Monday, July 24th, and will be registered from 8:00 a.m. to 5:00 p.m. This year's processing will not require the flier to stand in a long registration line, loaded with equipment. Upon your arrival, and during the hours from 8 to 5, you will be required to clear your Nationals entry, display your AMA and FCC license, present your transmitter for frequency check (which you may wait for, or leave and pick up later), and receive your assigned flight number and flying site number. The latter will be permanent numbers throughout the meet since all contestants will be in one location during the entire week. The models, themselves, will be processed at the flight line, eliminating one of the major bottlenecks at past Nationals.

All R/C contestants will be briefed Monday evening, July 24, 1967 as to field procedures and judging criteria. This year the task of judging will be performed by industry sponsored civilian judges. Four judges employing the new ten point scoring system will judge each flight. Again, this is another part of the pre-Nat's planning program to eliminate the inequities attending judging in the past.

Tuesday, Wednesday, and Thursday, July 25-27, will be devoted to Class I, II, and III stunt pattern qualifications. An abbreviated pattern will be used, and the total time allotted to include engine start and pattern flight for all classes will be five minutes. The following maneuvers will be performed by all contestants, in order: Engine start (2 min. maximum); take off; Four Point Roll; Cuban Eight; Three Continuous Outside Loops; Wingover; Rolling Eight; Traffic Pattern Approach; Landing Perfection; Spot Landing. This qualification event will run from 8:00 a.m. to 5:00 p.m. each day, and each contestant should receive two flights per day for a total of six flights.

The top percentage, or Finalists, from each class will fly on Friday, July 28th. During the 8:00 a.m. to 5:00 p.m. finals, each finalist will fly at least two, but as many flights as possible of the full AMA pattern.

The NMPRA Goodyear Pylon Event will be held at Mile Square Marine Heli-

"IT'S A SMALL World" — Disneyland welcomes visitors for a water-borne journey with the children of the world — more than 500 "Audio Animatronic" figures singing and dancing. Here is the entrance to "It's a Small World" with its 30-foot high clock tower "performing" the time every 15 minutes.

MAIN STREET U.S.A. — Disneyland's re-creation of America at the turn of the century takes visitors back to the era of horse-drawn streetcars, surreys and horseless carriages. The Penny Arcade, Main Street Cinema and intriguing shops are among its other attractions.

copter Field, fifteen minutes adjacent to the Los Alamitos Naval Air Station, from Monday through Thursday, July 24-27. Goodyear finals will be held at the Naval Air Station from 9:00 a.m. until 1:00 p.m., Saturday, July 29th, and from 9:00 a.m. until 12:00 Noon, Sunday, July 30th. The standard AMA pylon event will not be held.

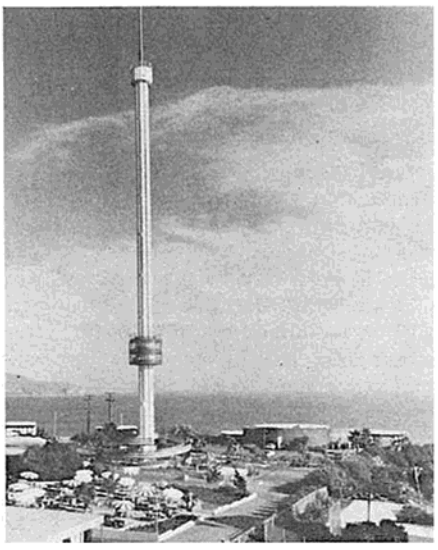
The Scale event, which promises to be one of the largest ever held, will have a qualification flight for each model before it is judged. This flight must be flown on Monday July 24, or Tuesday, July 25, at Mile Square following the entrant's processing on Monday. All qualified RC Scale models must be in the judge's cage at the Los Alamitos Naval Air Station by 9:00 p.m. Tuesday, July 25th.

All trophies will be awarded at the RC flying site at Los Alamitos Naval Air Station. Both Novice and Expert trophies will be awarded in the Pattern and Pylon categories.

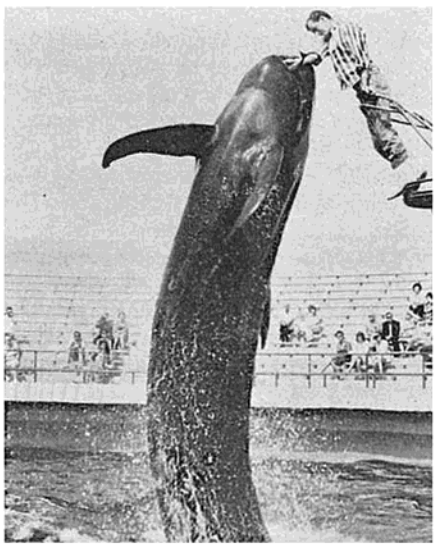
In years past, RC'ers have gathered at a few motels within easy reach of the contest site. This year, arrangements have been made for special rates at the Golden Sails Inn Motor Hotel, 6285 East Pacific Coast Highway, Long Beach, California 90803. This outstanding motel has 106 units and is five minutes from the NAS. Special rates to AMA R/C contestants are $9.00 for a single room, and $12.00 for a double. Each accommodation includes a 21" color TV, King and Queen size beds, air conditioning, and a refrigerator in the room. The Golden Sails has complete provisions for dining, cocktails, and dancing, as well as a large, heated pool. As the "night headquarters" for RC'ers, you are urged to make your reservations well in advance. On Friday night, an R/C banquet will be held at the Golden Sails. You are invited to attend, and to make advance reservations by writing Eldon Lind, 11661 Newbury Road, Los Alamitos, California. The banquet cost will be $5.00 per person.

The 1967 Nationals also offers an outstanding opportunity for the RC'ers entire family to enjoy a week's vacation in sunny Southern California. As an example, your family will discover the magic kingdom of Disneyland the moment they pass the huge face of Mickey Mouse "painted" in flowers and step on to Main Street, U.S.A., only a few minutes from the Air Station. Located in Anaheim, California, you will see the Main Street Railroad Station, the Matterhorn Mountain, Tom Sawyer's Island, the Swiss Family Treehouse, the new fantasy palace for "It's A Small World," the New Orleans' Square, and Sleeping Beauty's Castle, standing out against the Disneyland skyline. The 185 acre, $75 million kingdom of fantasy features fifty major adventures, plus many shops, exhibits, and restaurants, and is open every day during Nat's week from 9:00 a.m. until Midnight. You won't want to miss it — the concerts, parades, dancing, colorful stage shows and entertainment of every kind. Wherever you look, a profusion of happy sounds, colorful flowers, and intri-

(Continued on Page **18***)*



MARINELAND OF THE PACIFIC: Going up, Marineland's Sky Tower slowly revolves to the top of its needle, 344 feet above the ocean, giving viewers an extraordinary panorama of the Pacific.



MR. BIMBO makes a breath-taking leap of more than 20 feet to take a five-pound bonito from his trainer. At 5,000 pounds, Bimbo is the biggest whale in captivity.

cate designs which create a unique and magical atmosphere for happiness.

Another Southern California attraction is Marineland of the Pacific — the world's largest oceanarium and only three-ring sea circus. This is a unique combination of marine scientific research and show business, of trained animals and gasping spectators who come from all corners of the world to see Bubbles the Whale and her salty friends swimming in more than two million gallons of filtered sea water.

Marineland is located on 90 acres at the tip of Palos Verdes Peninsula, between Redondo Beach and San Pedro, a short drive from the Air Station, and open daily from 10:00 a.m. until sunset. One of the newest attractions is a Sky Tower rising more than 400 feet above sea level, and equipped with a two-tiered, rotating elevator car for a panoramic sweep of the ocean from Ventura to Orange Counties. In a way, it's difficult to describe Marineland to you because of its unusual collection of animals and fishes. To some, it's a 90 pound octopus with a 12-foot tentacle span, to others it's Swifty, the killer whale who leaps 16 feet in the air to grab a mackerel from the mouth of her trainer. To others it's Flipper, the dolphin, and her man-like antics. Perhaps, most of all, Marineland is Bubbles, the giant whale, and "show stealer." When she swims across the pool in her latest Parisian hat and jumps to give it to her trainer, everyone agrees it is the most spectacular modeling performance in show business!

And if that isn't enough for the family, let them "strike it rich" by panning for gold at Knott's Berry Farm and Ghost Town in nearby Buena Park. Plucked out of California's Mother Lode country, Knott's is a living tribute to the old west. This unique town is complete with stores from yesterday, stocked and operated by costumed 49'ers. Throughout the streets you will see costumed characters reenacting the lives of the old pioneers. In the gold mine you can walk through a tunnel and see how gold was discovered. Then, step up to the sluice box and try your hand at panning.

There is fun for every member of the family at Knott's. You can ride a stage coach, a steamboat, visit a haunted shack, and enjoy an old-time western melodrama at the Bird Cage theatre. Don't miss seeing the high-stepping French can-can dancers at the Calico Saloon, where the strongest drink served is punch — boysenberry style.

The all-time American favorite, golden fried chicken, is the specialty of Mrs. Knott's world famous Chicken Dinner Restaurant. Or, for beef lovers, the Steak House in Ghost Town offers a complete menu of char-broiled steaks. There are numerous snack and buffet spots to satisfy any appetite.

Relive the excitement and dangers of the early west when you visit Knott's Berry Farm and Ghost Town. While riding the Ghost Town and Calico Railway, only narrow-gauge passenger train in the United States operating on a daily schedule, or the authentic Butterfield Stage Coach, be on the lookout for bandits who always sense when it's gold shipment time.

And if all of this isn't enough, there is the Movieland Wax Museum, famous for its perfect re-creation of movieland greats; Movieland of the Air Museum; the Air Museum at nearby Claremont, California; and famous Hollywood, home of the motion picture industry, where daily tours can be made of the lots and sound stages.

We'll be looking forward to seeing you in Southern California for the 1967 National Model Airplane Championships. Make it a trip you and your family will cherish for years to come!

A study in Class III Aerodynamics by

JACK CAPEHART
BEN HERMAN

part II

PRECISION PATTERN AIRCRAFT DESIGN

II. Aerodynamic stability and damping

IN the previous section we considered some basic fundamentals in which forces were related to linear accelerations and torques to angular accelerations. Any discussion of aerodynamics will involve forces, either applied by the pilot (on purpose or in PANIC) in the form of a control surface deflection, or externally by wind gusts and turbulent conditions. For the most part, these applied forces result in torques about the center of gravity which cause the aircraft to deviate from its flight path. When this occurs, it is very helpful if other forces can be induced to either oppose and/or correct for these deviations. These forces, which develop as a consequence of deviation from the flight path fall into two categories, stabilizing and damping. It is our opinion that these terms are frequently used, but infrequently understood. Perhaps the best way to begin this discussion is to define stability and damping by means of simple illustrations.

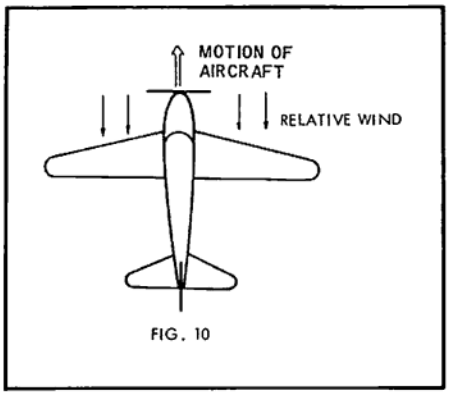


FIG. 10

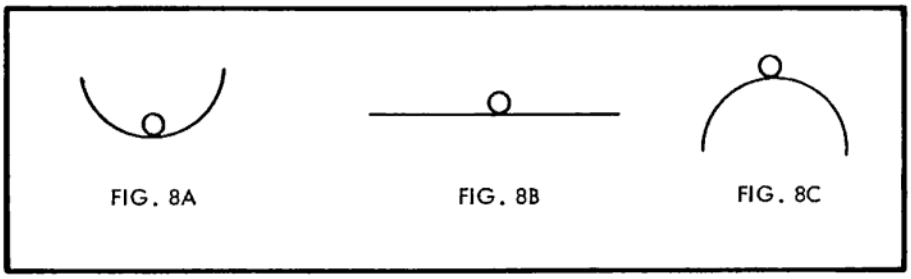


FIG. 8A FIG. 8B FIG. 8C

Consider first, Figure 8A. Let us suppose that the ball in the center of the bowl is displaced from its indicated position. Obviously it will always want to return to its happy home at bottom dead center. In Figure 8B, we have replaced the bowl with a flat horizontal plane. If we displace the ball, it will stay wherever we place it with no tendency to return to its original position. Finally, in Figure 8C, the ball is resting on the top of an upside down bowl. Here, any displacement from the indicated position will result in the ball continuing to move away from its initial position. These three cases are examples of positive stability, neutral stability and instability.

Consider now Figures 9A and 9B. In both of these illustrations we have positive stability, so that once displaced, the ball will return to its original position. However, it is quite obvious that in case A the resistance of the ball to a disturbing force is much less than in case B. This is because ice, being much smoother than sandpaper, presents much less resistance (in this case friction) to any motions of the ball. Furthermore, once displaced, the ball in Fig. 9A will tend to oscillate back and forth many times before finally coming to rest at the bottom while the ball in case B will come to rest much sooner after the same initial displacement. We speak of case A as being stable, but underdamped, while case B is stable and highly damped. Thus, we have stability whenever our ball tends to return to its initial position, while we have high damping when the ball resists displacements and also resists the return back to its neutral position. These same examples applied to our aircraft simply mean that a stable plane, if disturbed by some force, will return to its original position after the force is removed. Damping here refers to the resistance of the airplane to the disturbing force, and by the same token, to the stabilizing force, once disturbed.

The same principles may be applied to determine the stability and damping characteristics of our aircraft. It appears to the authors that optimum stunt aircraft must represent a very fine balance between stability and damping and control surface power. We need ample stability and damping to resist transient or short time disturbing forces such as wind gusts, etc., yet not so stable and highly damped that the aircraft will not respond to control-surface deflections.

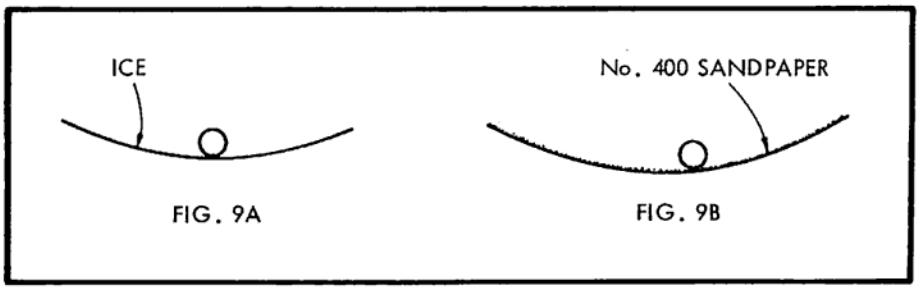


FIG. 9A FIG. 9B

Now, we'll consider stability about the various axes of rotation. First let's consider the yaw axis. Stability along this axis is commonly referred to as directional stability. However, as we shall see, true directional stability can never be achieved, but rather what we really have is a sideslip, or weather-vane stability, along this axis. If we really had true directional stability, no matter what direction we force the plane into, it would always want to return to its original heading, presumably that at takeoff.

Directional stability, as we all know, arises primarily through the action of the vertical fin and rudder, the reason being that, by virtue of these surfaces, we have a larger vertical area behind the center of gravity than in front of it.

Let's look at the action of this area to see how it provides us with a stabilizing force. First, however, we will need to understand the concept of relative wind. To simplify matters, let's assume the actual winds are dead calm (except for a few brief gusts which we'll shortly introduce). For this case then, the relative wind is simply equal and opposite to the aircraft's velocity. In Fig. 10 below, we have a plane flying straight and level. With no actual wind, relative wind is simply blowing over the airplane from nose to tail.

Assume now that one of our conveniently controlled gusts strikes the plane from left to right. Due to the large vertical surface located far behind the C.G., the torque tending to rotate the tail to the right is greater than the torque tending to rotate the nose to the right. This unbalanced torque condition yaws the plane to the left. However, inertia tends to keep the C.G. moving in its original direction, resulting in the situation shown in Figure 11.

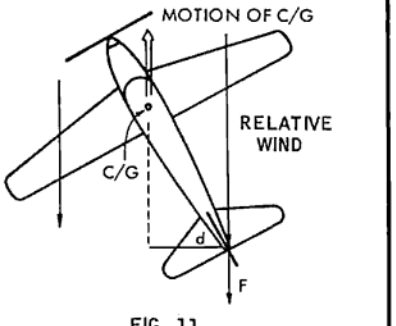


FIG. 11

The plane is now in what is called a side-slip condition. The relative wind striking the vertical surface results in a force F with a moment arm d about the C.G., giving a torque F × d tending to rotate the plane back to its original heading. It is probably obvious that there are a number of factors determining the magnitude of the righting torque. First, we can increase the size of the vertical area, and secondly we can fly at a higher speed. Both these factors increase the force, F. We may note that the righting force, F, increases with the speed of the relative wind and therefore with the speed of the aircraft.

As we will see, most stabilizing forces increase with flying speed, thus pointing out a definite advantage to high-speed aircraft. This is probably one reason why recent years have seen a steady progression in engine size. The darned toys just seem to fly better the faster they go, and we believe the above is probably one reason. It is important to note that in the above example, what we actually described was a stabilizing condition with respect to sideslip. Continued application of either the disturbing gust or a rudder deflection would allow the engine to change the direction of motion of the C.G., thus changing the relative wind, thereby changing the stable direction of the aircraft. Thus, a vertical fin is a stabilizing influence for short period side gusts which result in a condition of side-slip. It should be noted here that the vertical surface also generates a damping force with rotation about the yaw axes. That is, the vertical fin tends to oppose rotation about the yaw axis, the opposing force being proportional to the speed of rotation about the axis. Note that the damping force, unlike stabilizing forces, is virtually independent of the **Forward** velocity of the plane. Since the forward velocity is normally much greater than the rotational speed about the yaw axis, once disturbed, the stabilizing effect returns the plane back to its original position, overcoming the damping force described above. At lower speeds, however, the two forces become more nearly equal, and once disturbed the plane does not readily return to its original position and control surface deflection is frequently needed. We have all experienced this effect when landing our aircraft.

Lateral or Roll Stability

We will here be concerned with those stabilizing forces which come into play when an aircraft experiences a disturbing force causing one wing to drop, i.e., rotation about the roll axis. Before we go any further, turn off the boob tube boys; this one is bad news and will require some concentration.

There are three primary ways for achieving roll stability. First, and most often overlooked, is the position and size of the vertical fin; the second is through the well-known dihedral effect, and the third is wing sweepback. Sorry about this Bryan, but sweepback of the wings does give a degree of roll stability even at sub-sonic speeds. Let's consider what happens when a plane, flying straight and level, suddenly drops a wingtip due to some external force.

In Fig. 12A we have shown a conventional winged aircraft with dihedral, flying straight and level, where we have indicated the lifting forces due to the wing and the downward force due to gravity. Due to dihedral, the lifting force on each wing is not vertical, but has a small horizontal component also. In the figure we have broken the lifting forces into 2 components, the horizontal and vertical components labeled l and l , respectively. For straight and level flight the 2 vertical components add up to exactly cancel the downward force. The 2 horizontal components, moreover, are (or should be if you build true) exactly equal and opposite so that they cancel one another. Now look at figure 12B. Here we have assumed one wingtip to have dropped. If we look at the 2 horizontal components, the 2 l 's, we see that they are now in the same direction and thus do not cancel. This unbalanced horizontal **force** will cause an acceleration of the aircraft to the **left.** These 2 horizontal forces also have a moment arm about the CG and thus, also produce torques. However, examination of the figure reveals that the rotation produced by these torques are in opposite directions and will tend to cancel. Thus, the result upon dropping a wingtip, is that we have a sideslip produced in the direction of the low wing. Furthermore, since the vertical forces are now less, the lift cannot balance the weight and the plane will also fall as it slips to the left.

We thus have a relative wind as seen from above, as shown in Fig. 13A. We may break the relative wind into 2 components, a sideways component denoted by V and a normal component denoted by V . In Fig. 13B we have indicated the relative wind as seen from

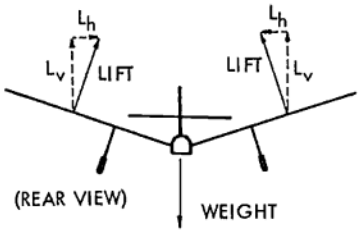


FIG. 12A

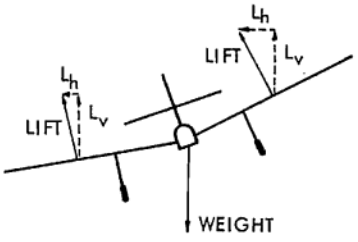


FIG. 12B

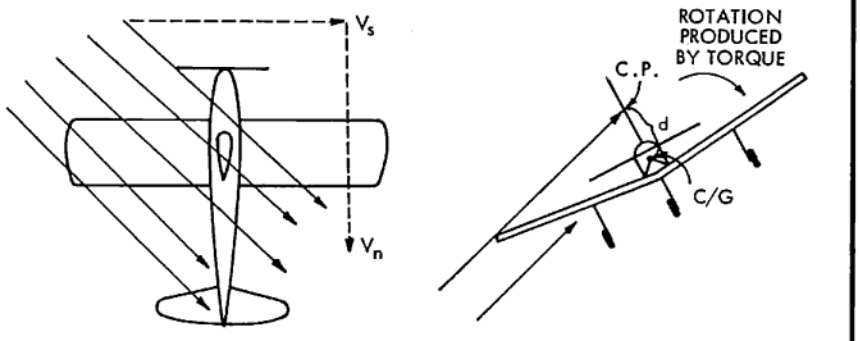


FIG. 13A

FIG. 13B

the rear. Since the plane is falling as well as slipping to the left, the relative wind will be upwards and to the right, as indicated. If the vertical fin is above the CG as in the figure, the effective force acting at the center of pressure, CP, has a moment arm d above the CG. This force times the moment arm d produces a torque tending to rotate the plane to the right as shown in the figure. If the vertical fin were placed below the CG, the torque would be in the opposite direction, further aggravating the roll disturbance. That is, this fin placement would be destabilizing in roll. But wait a minute fellows, don't go out and kick those sub-fins off yet. If we were to place equal areas of vertical fin above and below the CG, the torques about the roll axes produced by a sideslip condition would be equal and opposite and would cancel. This type of fin placement effectively eliminates the vertical fin from contributing any torques about the roll axis (this should be food for thought for you worshippers of the truly axial roll even though it's impossible for other reasons).

In the above discussion our initial disturbance was the dropping of a wingtip (a roll disturbance) (Fig. 13). We have seen how this causes a high vertical fin to be stabilizing in roll, a low vertical fin to be destabilizing, while the symmetrical vertical fin was completely neutral. However, once again there are complications. Consider the airplane to be disturbed purely in the yaw axis. We have already seen how the vertical surface is a stabilizing factor about the **yaw** axis for such disturbances. However, that old devil torque is with us again for the vertical fin may also produce a torque about the roll axes when the airplane yaws. (You fellows will wish you never heard of the vertical fin before this is through, but try flying without one; we have!)

In Fig. 14A the plane has undergone a right yaw disturbance giving the rel. wind with horizontal and normal components as shown. Comparing with Fig. 13A you will note that the relative wind (as seen from the top) is the same. We thus note that dropping the left wing results in the same relative wind as seen from above as does right yaw. Similarly then, the high vertical fin produces a right rolling torque as indicated in Fig. 14B. Only now we have succeeded in converting right **yaw** to right roll as opposed to the previous case where we converted a left **roll** to a right roll. **Thus, for a disturbance along the yaw axes the high fin produces a destabilizing torque on the roll axis, while for a disturbing force along the roll axis, a high fin contributes stability about this axis.**

The low fin, of course, also produces a "destabilizing" torque for **roll** in a yaw condition. That is, right yaw gives left roll. As you will note, the low fin condition is what occurs when we are flying inverted. The low fin and negative dihedral (anhedral) can combine to give such a strong **roll** tendency that left rudder gives left turn **inverted.** With lots of dihedral this will almost always be the case. With little or no dihedral, the direction of turn will almost always be opposite to the rudder deflection; that is, right rudder gives left turn. We say almost always, because with an exceptionally high and large fin, enough dihedral "effect" may be present from the fin alone to convert right yaw (i.e. left rudder deflection while inverted) to left roll.

When combined with dihedral as will be presently shown, the **low** fin leads to roll **stability** for a yaw displacement while again the symmetrical fin is neutral with respect to the roll axis.

PART III WILL APPEAR IN THE JULY ISSUE OF RCM.

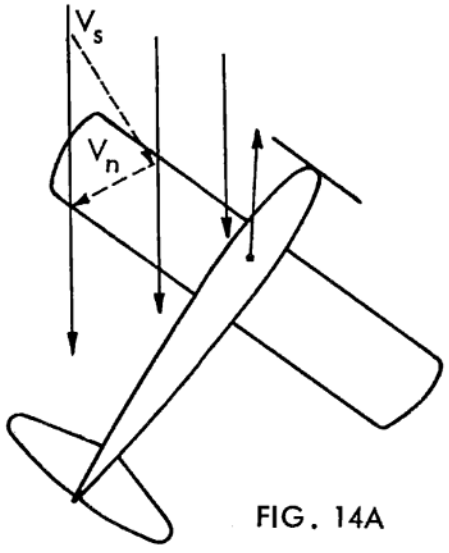


FIG. 14A

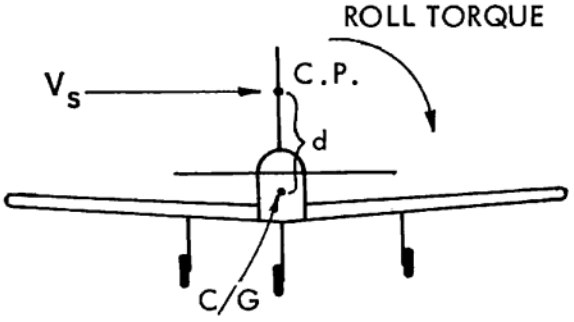
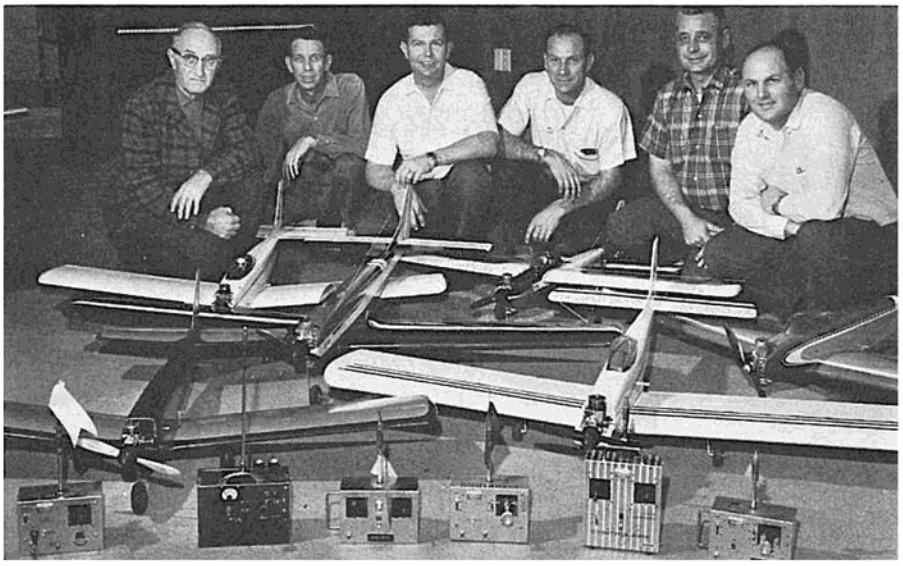


FIG. 14B

RCM ELECTRONICS
OPEN CIRCUIT

By Ed Thompson, Technical Editor



Six of the nine members of the Topeka, Kansas, R/C Club who fly Digitrio propo systems.

NO longer an orphan, I have a name for the column, thanks to Stanley O. Andrews of Belleville, Illinois. I think it fits my column well and doesn't pin me down to a stereotyped content. Stan also entered the "Deadbeat Contest" and a picture of him is shown this month. A picture of Stan's son, Ken, is also included, and Stan says the reason he entered the contests was to win the Digitrio parts offered as the prize to get Ken started on his own Digitrio so he doesn't borrow his (Stan's) all the time. Stan is also the editor of "The Splatter Sheet" for the Centreville Cadets R.C. Club.

I have also selected the winner of the "Deadbeat Contest" who is Harry E. Goodykoontz, Goody for short, from Conover, Ohio. Goody's Digitrio is a 4-channel on six meters using a Lyman stick. The alternate winners of both contests will be announced next month.

The Digitrio form response has slowed down to a trickle so I compiled information from them for presentation this month. Overall, the forms indicate that the Digitrio is well accepted and performing well. I would be less than candid if I said I believe all the information to be absolutely factual. I have a feeling that some of the answers may have been prejudiced by the "good luck" of the builders. For example, question 10 asked what the builder most disliked about the Digitrio. In spite of a direct invitation to list a "dislike," 30% of those responding wrote the word "Nothing" in this block. I am sure that most of those responding could have been more objective if things had not worked out well. In any case, the information compiled will give a good idea of how the Digitrio has worked out for those responding.

Another thing to remember for those of you who might be tempted to build the Digitrio is that one person's cup of tea might not be yours. In other words, these results came from individuals, and the success of any project such as this depends on the individual more than statistics. Your best source of recommendation is someone who owns one and that you can trust for an unbiased opinion.

Here are some items I found that won't be listed below but I find interesting.

1. Two boys from different parts of the country each 14 years of age, built a Digitrio. One worked without help and the other worked with the help of a father.
2. The oldest person reporting was 56 years young. His equipment worked right off — so far he didn't have servos at the time he reported. He checked his gear against a buddy's system.
3. Several people reported building more than one Digitrio.
4. The majority of the builders were over 30 years old, many of them in their forties.
5. Many different versions of 4, 5 and 6 channels were built before the -4 mods were presented.
6. At least one person flies a single-channel version.
7. Many are on 6 meters.
8. Geographically, according to questainnaire response, the east coast has the most Digitrio's with New Jersey leading slightly. The remainder were scattered throughout the country and almost all states represented.
9. Outside the U. S. at least 10 countries have Digitrio's flying including some behind the Iron Curtain. (England seems to have the edge here. I'll make a more accurate check of this later on.)
10. Many original digital systems have been designed using the Digitrio articles as reference. This is especially true in England and Europe where exact parts are difficult to obtain and more modelers seem to build their own equipment than in the States.

Here are the form results in the same order as the questions were asked.

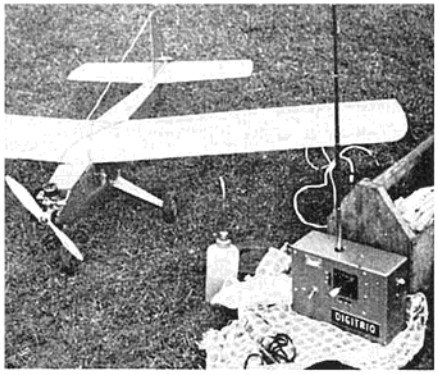
1. I built my Digitrio system from:
Kit 36%
Scratch 13%
Both 51%

2. My Digitrio:
Worked right off or with modifications — 76.4%
Worked with help of technician — 20.0%
Doesn't work — 3.6%
a. This may be misleading as some of those building were probably technicians to start with.
b. Of the 3.6% that were not working I have received confirmation on all but one system that they are now working.

3. How well does your Digitrio compare to other proportional systems:
Excellent — 83.9%
Fair — 14.1%
Poor or doesn't — 2.0%
a. The 2% represent those whose systems were not working at the time they filled out the questionnaire. No one rated the system poor if it was working.

4. Did you like the presentation of the Digitrio:
Yes — 99%
No — one person

(Continued on Page 23)



A Digitrio and Falcon 56 from Russ Johnson on the other side of the world — New Zealand to be exact!

OPEN CIRCUIT

(Continued from Page **22***)*

The one person who said no based it on the fact that it cost $4.50 in Anchorage, Alaska, for an 8 x 10 PC board negative regardless of how many individual PC boards you crowd onto it. He said all PC boards could have been printed in the first issue.

5. **How much experience do you have in electronics:**
   More people reported 0 years experience than any other level (30%). That surprised me. The remaining people were scattered from 1 year (2 people) to 26 years (3 people). About 25% of those reporting were in the 4-8 year experience level.
   Radio Control: R/C experience varied also but 80% were within the 1 year to 8 year group. Two reported 0 years and two reported 16 years.
6. **How many Digitrios are flying or being built in your area:**
   The majority of replies indicated two or more. Three replies indicated 12 or more and one simply said "dozens." The high replies came from New Jersey, Connecticut and Illinois.
7. **How much (approximately) did it cost you to build your Digitrio.**
   The cost of the majority of Digitrios varied between $180.00 to $220.00. Several were assessed below $100.00. The lowest being $45.00. The highest was $300.00. The person reporting $45.00 said he used Bonner servos and no doubt had a well-stocked "Goody Bin." The person reporting $300.00 liked almost nothing about the system and said he wouldn't do it again. Both persons had 5 years or more electronics experience and built the system mainly from scratch.
8. **If you had it to do over, would you still build the Digitrio:**
   Yes — 99%
   No — 2 persons
   Both who said no felt that the savings in money was not justified for the work involved.
9. **What single thing do you like most about the Digitrio:**
   The things most liked about the Digitrio were: Do it yourself building and troubleshooting, range and/or stability, compact size, cost and detailed articles. Others were: first or only propo flown or owned, expandable to more channels, one scratch builder even liked the easy availability of parts.
10. **What single thing do you dislike most about the Digitrio:**
    The single thing disliked most about the Digitrio was throttle drift or instability of the 3-channel version (16%). Some of these reporting corrected this with the modifications printed later. The only other dislike receiving a significant number of votes was dead spots in servo motors. All other dislikes were scattered and one or two of a kind. Some of them were: Too many articles, system too small (hard to build), sloppy stick, parts hard to get, choice of transistors, no failsafe and errata to articles.
11. **What other gear do you own:**
    Reeds — 35%
    Single Channel — 40%
    Proportional — 25%
    The type of proportional owned was not specified so it's unknown what type they were.

Remarks:

Remarks were a hodge podge and contained mostly comments about the builder's system or generalities. Where like or dislikes were mentioned I included them in questions 9 & 10.

I'd like to thank all of those who responded to the questionnaire for their time and trouble. Frankly I was amazed at the response to the forms and the two contests I just ran. I promise not to call any of you Deadbeats again and will write 100 times "My Readers are not Deadbeats." I'd do it here but Dewey is getting wise to my writing inane things just to fill out an article. I still don't understand how Bernie gets by with it month after month!

At the present time I have three much delayed articles that I'll get out as soon as possible. One is a construction article for the Digitrio servo amplifier in an Orbit servo case. This makes an excellent servo and will possibly be available in kit form. Jack Albrecht wrote it, Bernie did the final work on the PC board and art work, and I am holding up the works until I have evaluated it further to my satisfaction.

The second article is a six-channel modification to the Digitrio, and is also nearing completion. PC boards by Bernie hold up Thompson!

The third is a different battery charger that will be a state of art advancement by L. Jack Weirhauser. This is in the final stages, requiring very little work now, and I'm pushing it.

I mention these things for two reasons. One is to keep Dewey hanging as he won't fire me as long as he thinks he'll get another article out of me. Ken Willard has done this successfully for years!

In a further attempt to bankrupt RCM I am going to run a couple more contests this month. The prize for each contest will be a one year subscription to RCM.

Contest #1

The prize goes to the person who has built the most Digitrio systems. A system will consist of transmitter, rcvr/decoder and at least 3 servos. The systems can belong to the builder or can have been built for friends. Not eligible is someone who built them primarily for monetary gain. All entries must contain the names and addresses of current owners of the systems you build. Some form of proof, statements, affidavits, etc., must accompany the entry.

Contest #2

Prize goes to the youngest builder of a Digitrio system. Entrant must have built all parts of system himself with only minimal assistance. Technical help to get it working properly will not detract from his effort unless major rebuilding was necessary. Statement of a parent to the above will be sufficient proof to validate entry.

R/C MODELER

TECHNICAL FEATURE

By W. F. Hebestreit

Part 11

So, we're crazy . . . but don't discount reed equipment! There's still a lot of uses for proportional's predecessor.

CONSTRUCTION

The three assembly drawings show only those components related to a specific phase of assembly. A composite drawing is not provided and, if the order of construction is followed, is not needed.

1. Mechanical Preparation:

Trim circuit board as shown and drill all holes with a #67 drill. If ½W resistors are used in lieu of ¼W, enlarge resistor holes to #60. Next enlarge the six-tank coil and coupling holes to #56. Depending on the brand of electrolytics used, their mounting holes may have to be enlarged. The board is set up for axial lead components, not plug-in type. Cut slots for the trimmers and crystal socket by drilling a series of #60 holes and filing or cutting out the space between holes. Drill the tone switch cutouts and file square.

The circuit board is designed to fit an ACE R/C 3" x 5½" x 8" aluminum case. There are six small crosses on the board adjacent to the tone switch cutouts. These are used to pilot drill the switch mounting holes in the front of the case. The two large crosses are battery polarity indicators only. Enlarge the pilot holes for the transformers and toroids to suit. The modulation transformer and elevator trim switch frame are positioned to retain the nine volt dry battery.

If building eight channels or less, a bracket will be needed to replace the trim switch as battery locator. Locate the antenna jack, on/off switch and meter as shown in figure 2. No battery test switch is used but the panel meter can be calibrated by noting the meter reading with a fresh nine volt battery and the antenna fully loaded, and then connecting a 1½V "D" cell in series with and bucking the nine volt battery. The meter reading will then be equivalent to what you would get with a 9V battery dropping to 7½V under load. The 820 ohm resistor shown in series with the meter is an average value based on tests run with six different output transistors. It may be varied as necessary to obtain 90% deflection with a fresh battery.

As long as your work bench is full of drill chips and filings, now is a good time to tackle the antenna. Figure 3 illustrates the basic steps. The only difficult part is drilling a hole down the middle of the core piece. It might be smart to make the core before you saw a good antenna in half. For the faint-hearted, Ace and World Engines have antennas that will work.

2. Center loaded Antenna Construction:

Make from four-section Orbit antenna or equivalent.

( ) Cut second section 1½" below joint.
( ) Remove chrome as shown and tin with solder. Wipe off all excess solder with clean rag.
( ) Wrap with #22 copper wire and sweat solder.
( ) Run ¼-28 die over copper wire and then wire brush threads to break the burrs. NOTE: Put the die on the antenna before step #3 and the O.D. of the antenna will act as a pilot to keep the die straight.
( ) Make one core piece as shown.
( ) Assemble antenna and core piece.
( ) Wind loading coil and solder as shown.
( ) Cover coil with coil dope and wrap with tape, paper, string or old shoelaces. NOTE: Nylon tapped at room temperature will give a good tight-fitting thread and no set screws will be needed to keep antenna together.

3. Switch Installation:

Bend switch terminals as shown in figure 4. Adjust contacts if necessary to have padder contacts close before power contacts and open after power contacts. Add tension to the common contact blades if necessary to assure wiping action on the innermost contacts. Install switches in case and align before tightening nuts. Place circuit board over protruding switch terminals. Solder and slip off excess terminals close to board. Remove board and switch assembly from case and complete wiring. Dress battery leads down between rudder and auxiliary switch frames. String tie to suit.

4. Component Installation:

Install all parts shown in figure 5. Install all resistors first; then capacitors;

then transformers and coils; then transistors; then toroids. The toroids are stacked and mounted with one #6-32 screw. Tin the screw head, insert in circuit board and solder in place. Place antenna bracket over elevator and throttle switches and install board/switch assembly in case using ⅛" thick washers between switch shoulders and case. Connect power leads to on/off switch; connect meter leads; connect short wire to antenna jack (or base loading coil if used). Note that meter leads are twisted.

5. Final Assembly:

All remaining work is done on the copper side of the circuit board. Install the .1 cap as shown in figure 6. Install trimmer pots (figure 6). Modify dual pots as shown and install (7 places). The remaining capacitors are installed during calibration.

TUNING AND CALIBRATION

1. RF:

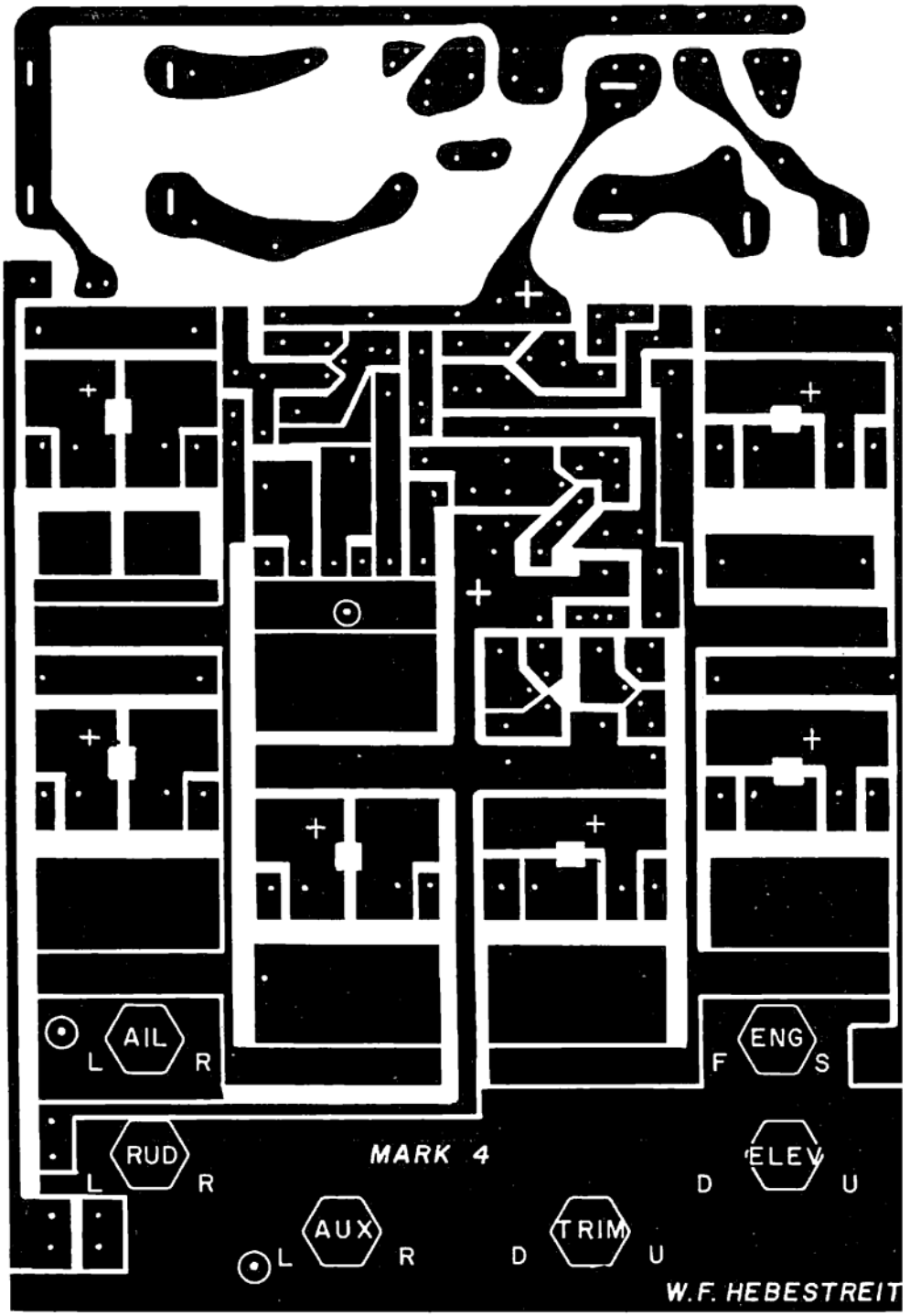
Connect antenna, connect milliammeter (100 MA scale) in series with secondary of modulation transformer at jumper location in lower corner of board. Set all RF trimmers three turns out from closed and apply power. Slowly close OSC trimmer until MA meter "jumps up," continue turning this cap in until MA reading falls approximately two MA from peak reading. Adjust antenna trimmer to its fully closed position. Adjust collector trimmer for a current dip on the MA meter (approximately 15 MA). Turn power off and disable oscillator by removing crystal. Apply power and switch test meter down scale to measure "no signal leakage" in the final. Leakage should be less than 50 UA.

2. Tone Generators:

Set modulation balance pots fully clockwise. Connect a decade capacitor across location of fixed padder for toroid (either one). Using a receiver tuned to the proper frequency, find the total capacitance required to tune to the highest frequency reed in the group. The next standard value below the total is the maximum possible value for the fixed pad. Continue adding capacitance until the total value required to drive each reed in the group is determined. Subtract the value of the pad from the value for each reed and then add about 20% to the remainder. The answer is the approximate sum of the fixed and the adjustable capacitance needed for the particular reed. Select and install standard value capacitors and check for range of adjustment. Try to stay within a 2/1 ratio of fixed to padding capacitance. EXAMPLE:

Total	.073
Minus fixed pad	.045
	.028+20%=.0336
Standard Values	.022 & .010=.032

In some cases, for the higher frequency reeds, the value might be so small that the 2:1 ratio can be ignored and the total capacitance can be made adjustable. The reason for the 2:1 ratio is that if too much of the capacitance is in series with the pot the resulting phase shift will reduce the output of the tone generator. If standard value capacitors do not give adequate adjustment range on the pots, it may be necessary to decrease the value for the fixed pad and then recompute the values needed for each reed. If a decade capacitor is not available, the padding can be accomplished by the cut-and-try method. To save time (and solder) tack some clip leads to one of the tone pots, collect a pile of .01; .015; .022; .033; and .047 capacitors and have at it.



Actual size PC board for Li'l Bandit.

3. Modulation:

At this point a little discussion of the wave shaping is warranted. The (nominally) 3 MFD capacitor shunting the driver transformer primary is the basic method for reducing the excessive drive and smoothing up the low frequency tones. The .033 capacitor from collector to base provides the feedback necessary to keep the high frequency tones approximately equal. The values shown are those used when the beta of the

TABLE OF TYPICAL CAPACITANCE VALUES vs FUNCTION FOR "LIL BANDIT"

Function	Fixed	Padding
R. Aileron	.015	.022
L. Aileron	.01	.015
R. Rudder	.043	.022
L. Rudder	.033	.015
D. Trim	.02	.01
U. Trim	.015	.01
D. Elevator	.022	.01
U. Elevator	.022	.015
F. Engine	.033	.022
S. Engine	.033	.015
L. Auxiliary	---	---
R. Auxiliary	---	---
Fixed High Osc. Basic Pad	.01	---
Fixed Low Osc. Basic Pad	.033	---

Note: The transmitter from which these values were taken used the Allen Toroids.

audio transistors are in the 90 to 100 range. As an experiment, one transmitter was built using a low gain (35) driver and a mixed pair in the output (one 40 and one 130). The optimum capacitors for this setup were 1.5 MFD and .01. It is preferable to tailor the audio gain with the capacitors rather than using series resistance between the driver and the tone generators. The .1 capacitor across half of the modulation transformer primary does two things. First, it allows unsymmetrical modulation (more up than down), and it improves the wave form. The principle of this modulator design is to essentially provide much more modulation capability than needed, and then reducing the drive with degenerative wave shaping techniques with the net result being a clean, stable sine wave modulation.

MK 4 PARTS SOURCES

N — Newark Electronics Corporation
Ace — Ace R/C Inc.
W. E. — World Engines, Inc.
L — Lafayette Radio Electronics

Quantity

1 Case — 3 x 5½ x 8 — Ace #21A13 #3
1 AM Tuning Meter — L #99G5025
6 Switchcraft #3037P Lev-R-Switch — W.E., N, Ace #30A10
7 30K dual potentiometer — Ace #29A13
27 Mylar capacitors — misc. values — .01 to .068 Mallory PVC, ARCO, AJAX — N, Ace
1 36 uh choke — Miller — Ace #17A10, N #59F285
3 Trimmers — ARCO 423 — Ace #18A16, N #14F96
2 Toroid — Torotel — Ace #17A33, W.E., 2 Hy. ct or
*Allen Organ Co. Low frequency 2.19 HY Hi frequency 1.81 HY
1 Switch — S.P.D.T. — W.E.
1 Antenna — Orbit 4 section (modified as shown) or Orbit centerloaded — Ace #37A67 — CLA
1 Antenna mount — Amphenol series 75 non-shorting microphone connector — N #39F002
1 Modulation transformer — Thordarson TR66 — N #2F529
1 Driver transformer — Calrad CR70 or Argonne AR-109 L #33G8505

*The Allen Organ Co. has agreed to supply a set of toroids for this transmitter for $4.25, if you order their toroids mention this article to insure delivery. Their address is:

Components Division
Attn. Milton F. Nelson
Allen Organ Co.
Macungie, Pa.

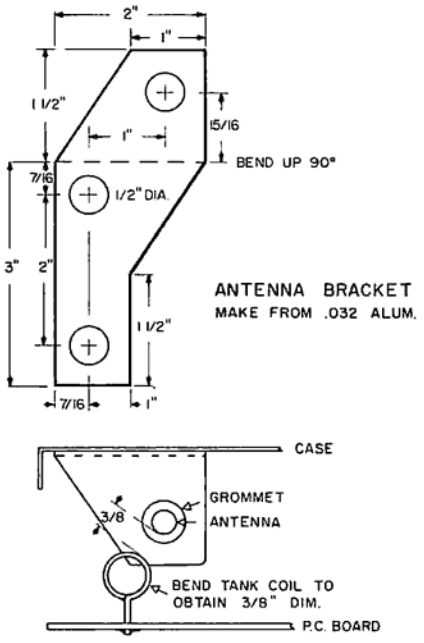


FIG. 1

4. Final Tuning:

( ) Extend the antenna fully and open all compression trimmer capacitors in the RF section approximately three turns from fully closed position.
( ) Turn both audio balance pots fully clockwise (minimum audio).
( ) Insert MA meter in series with positive battery and final RF amplifier.
( ) Connect scope between ground and top side of modulation secondary transformer. Polarity should be as follows: Scope ground terminal to transmitter ground and center scope terminal to top of modulation transformer secondary.
( ) Turn the transmitter on and slowly close the oscillator tuning capacitor until the MA meter jumps up. Continue closing the capacitor approximately ⅛ turn past the point where the oscillator comes in or until the MA meter falls approximately 2 MA from its peak reading. Your MA meter should be reading 30-35 MA.
( ) Fully close the trimmer on the antenna side of the PI network.
( ) Close the trimmer on the final side of the PI network until a dip in current is obtained on the MA meter (approximately 15 MA). If you are unable to obtain a complete dip, add a 100 PF cap or so across this trimmer and repeat this step.
( ) Key one of the tones and adjust the scope for a convenient display.
( ) Key all of the tones, one at a time, and observe the audio displayed. Note any distortion (flat topping) of **either** positive or negative peaks. If flat topping is present on the negative peaks it indicates excessive negative peak modulation. If flat topping is present on the positive peaks it indicates RF amplifier saturation. One solution to either of these indications is reduction of modulation power. Since both audio balance pots are adjusted to minimum level an external method must be used. The easiest method I found was to shunt the secondary of the modulation transformer with a resistor. The value of this resistor should allow the audio balance pots to fall in the center of their range when adjusted to eliminate flat topping of the displayed audio. A 2.2 K resistor is about right.
( ) While keying a tone adjust the associated balance pot in a counter-clockwise direction until flat topping of the negative peaks are evident. Slowly adjust the balance pot in a clockwise direction until the flat topping just disappears. Key all the tones on that side of the transmitter making your final balance pot adjustment with the strongest tone.
( ) Repeat the above adjustment for the remaining tones on the other side of the transmitter. This should result in a fully modulated carrier of approximately 160 MW RF power input to the RF amplifier. If more power is desired, an increase is possible by decreasing the capacitance of the trimmer (a little at a time) on the antenna side of the PI network (until the MA rises 4-5 MA) and re-

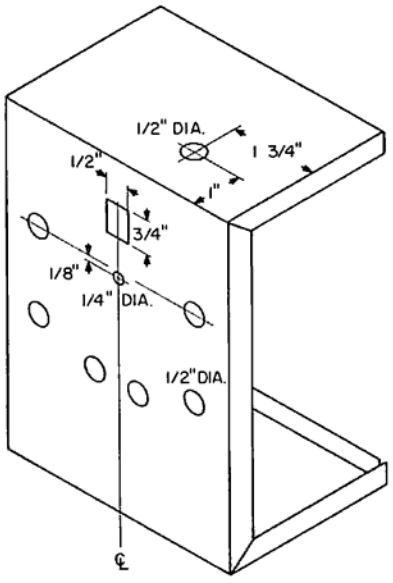


FIG. 2

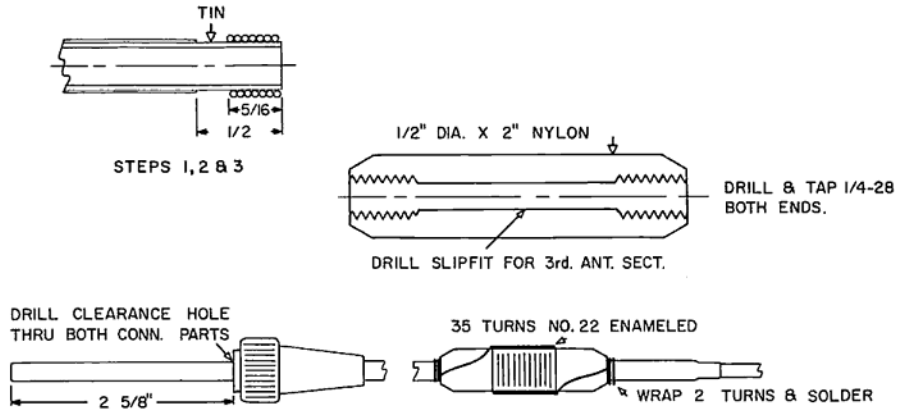


FIG. 3

dipping the final current with the trimmer on the final side of the PI network. Each time you load and dip, check and adjust the balance pots as above. You will eventually reach a point where positive peak flat-topping will remain when the negative peak flat-topping has just been adjusted out. This indicates that the RF amplifier is saturating on positive peak modulation. The ideal overall adjustment would be where the negative and positive peak flat-topping just disappear at the same time. (As your RF and modulation power rises the resistor shunting the modulation transformer [if you used it] may be removed).

Once you establish the dip, you intend to use (it will be quite sharp) you can make small changes to the collector trimmer setting if necessary to improve the waveform particularly if you are working near the modulation limits. Since we don't have test equipment on hand to actually measure the RF and modulation by the conventional trapezoid or envelope methods, we are tuning by symptoms and secondary effects instead. It is desirable, of course, to peak up against a good FSM. The final test is to check for interference on TV channel 2. (I use the family Packard Bell as a laboratory standard.)

If you don't have access to a scope, and can't talk your local TV repair shop into participating in the tuning part of this project, you can still get pretty close to peak tuning by using the milliammeter and an audio monitor. First adjust the RF and go through the tone padding as described. Then set up the monitor. Starting with the balance pots in minimum drive, key a tone and slowly increase the drive. There will be a very noticeable change in tone quality when distortion due to overmodulation occurs. Back off from this point a little and then try the remaining tones the same way. If you have set the front panel meter for 80% to 90% upward deflection with carrier on and antenna extended, it should not drop more than one needle width when modulating. If it does, you are getting close to overmodulation.

EPILOGUE

At this time I would like to dispel any impression you might have that this project was calmly designed and executed in an orderly and scientific manner. It is true that a lot of preliminary design was done before the decision to build was made, but then things got somewhat frantic. The prototype was on the air a week after the mailman delivered my parts order from Ace. Then followed untold hours of testing, adjustments, cussing, filtering, re-design, measuring, and more cussing. Typical of the problems encountered was when the RF oscillator started regenerating at 8 KC (which was finally traced to resonance between the crystal socket and the B+ land due to my choice of feed point), or when the RF output transistor developed leakage exactly equal to the normal operating current. Also, the development costs were much higher than I had anticipated when I started and included such items as 40 cartons of cigarettes, 85 gallons of coffee, 3 Falcon 56 wing kits and most of my wife's patience. It was almost worth it.

(Continued on Next Page)

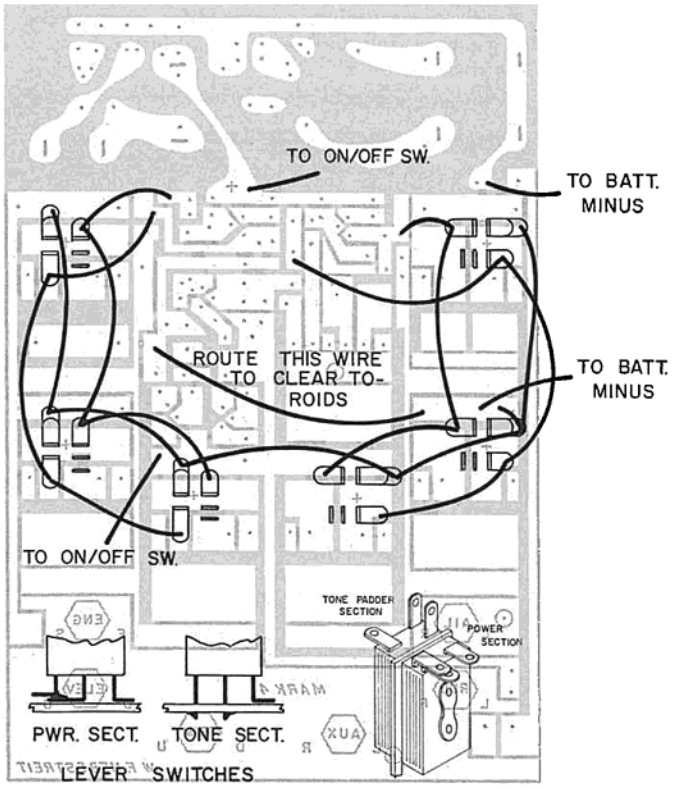


FIG. 4

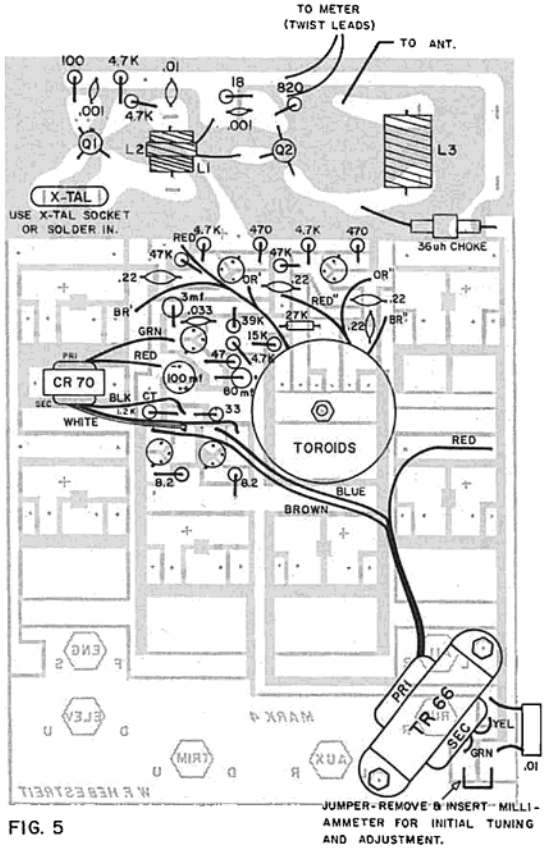
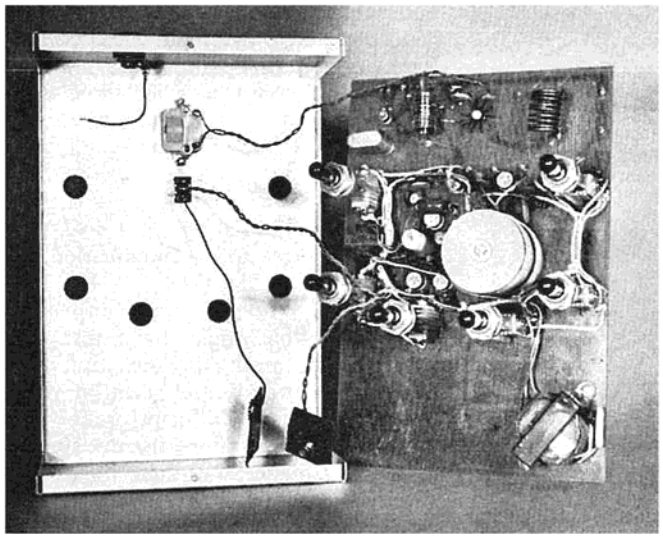
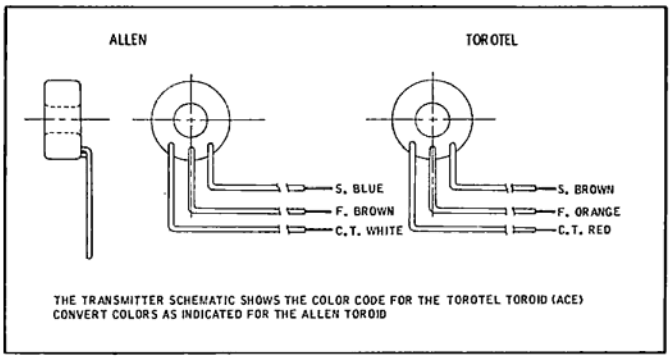


FIG. 5





THE TRANSMITTER SCHEMATIC SHOWS THE COLOR CODE FOR THE TOROTEL TOROID (ACE) CONVERT COLORS AS INDICATED FOR THE ALLEN TOROID

Easy to work on — remove lever switch nuts and unsolder antenna lead. Crystal can be changed by just taking off the back cover. Note routing of battery leads (see text). RF choke (not shown in this picture) should be mounted on this side of board below L3.

RCM TECH EDITOR'S FINDINGS

The test transmitter had a total current drain of 65 MA, of which 15 to 18 MA was drawn by the RF amplifier. All tests were made with a dry 9V battery which indicated 8.7V under load. Receiving equipment used for tests was an Orbit 12 channel, transistorized superhet. The modulation was extremely clean with 95-100% positive and 90-95% negative peak envelope modulation. Field strength meter and flying tests compared favorably with two commercial transistorized transmitters. Additionally, the feel of the Lil Bandit was noticeably better due to its balance. None of the tones needed adjustment throughout the tests and simultaneous control was positive at all times during test flights. The panel meter reading decreases slightly when a tone is keyed indicating a small amount of non-linearity in the RF amplifier which is normal in this type of circuit and not noticeable on the scope.

Overall the transmitter is well designed, both electrically and mechanically. The Table of Capacitors relating to tone function below was taken directly from the test transmitter for your convenience.

Recommended reading for adjusting tones are articles contained in RCM, September, 1965 and March-April, 1966 issue of Grid Leaks.

On the transmitter I tested the RF choke for the final amplifier was mounted on the component side of the board. I moved it to the copper side of the board, as the pictures show, and found a difference in tuning characteristics. Mr. Hebestreit was contacted and concurred that for proper tune up as per the article the RF choke should be mounted on the **component side** of the P.C. board.

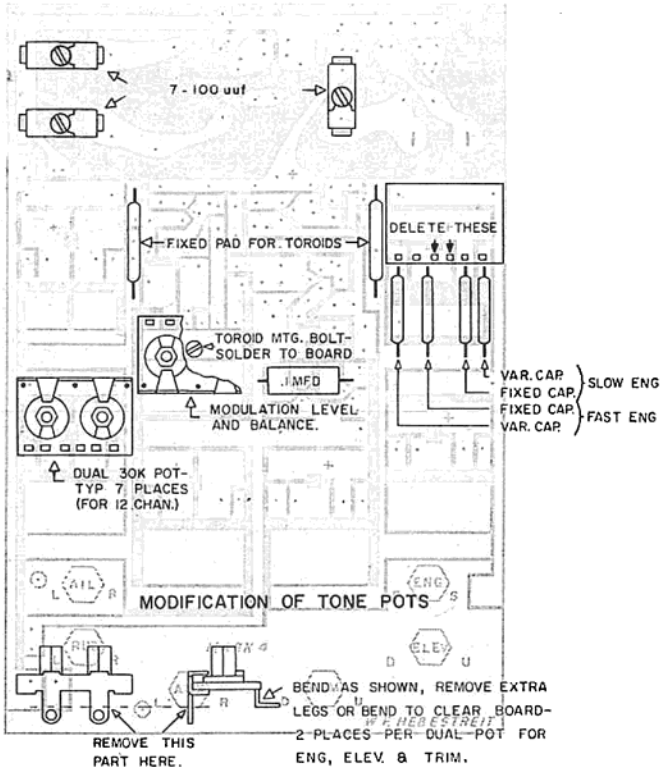
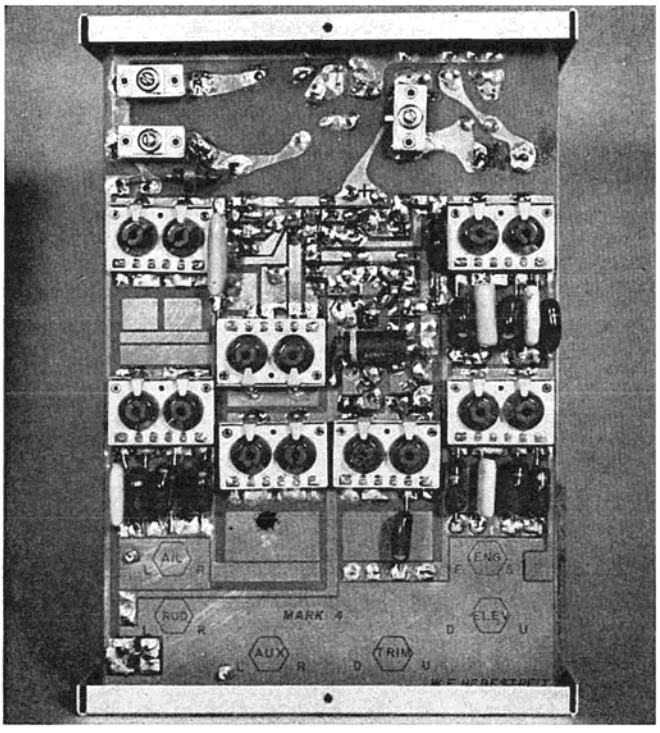
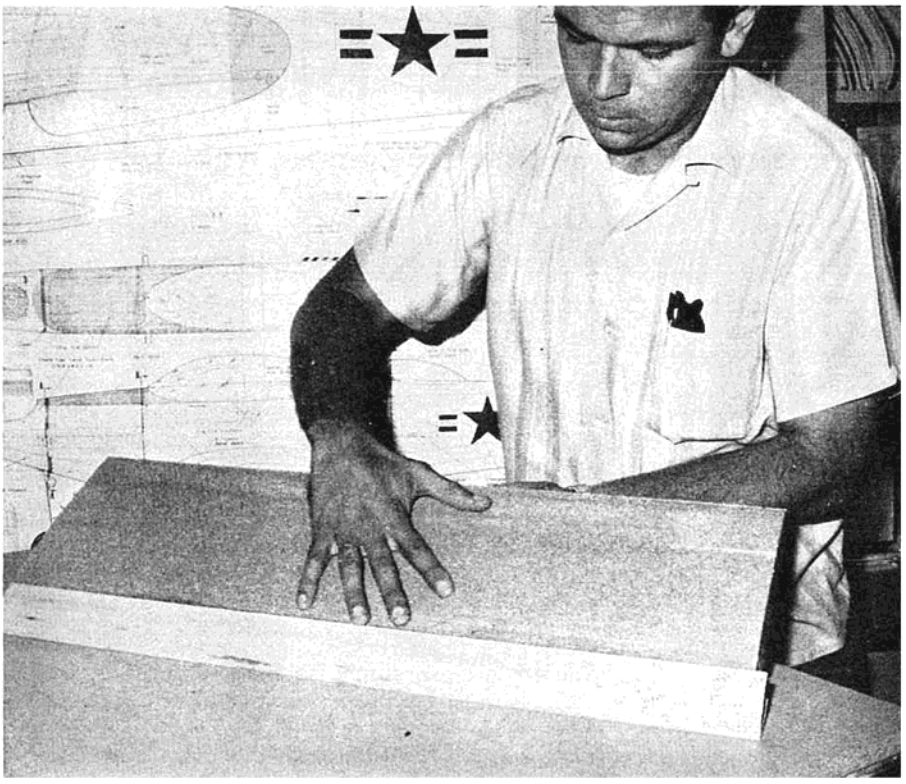


FIG. 6

The MK4 with tone padding completed for seven of the twelve channels. Jumper for tuning in lower left corner of circuit board (see text).





PART I

FOAM WINGS:

ONE of the most significant and important contributions to the art and technique of model building, yet one of the least understood and most abused, is that of the foam core wing. Perhaps no other single construction technique has offered so many advantages to the RC'er, yet, interestingly enough, no other such technical advancement has, to the best of our knowledge, been subjected to such widspread misinformation and misuse. Only recently, several years after its initial development, is the foam core wing coming into its own realm of acceptance. This is due in large part to our tendencies toward a reactionary outlook toward our sport and hobby of model building. Too many of us view the fading "good old days" with nostalgic alarm, entertaining the feeling that the introduction of new ideas and methods are an attempt by some radical minority to rock the boat and dump the sacred cow of yesteryear overboard.

Since its original introduction several years ago, RCM has continually experimented with virtually every type of foam core wing, adhesive material, as well as covering and finishing techniques. The results of these tests comprise the basis of this series of articles. We have carried these tests to a point where we are not going to offer you "just another method" of constructing a foam wing. From our own successes and failures, we are going to give you a step-by-step method which will assure you complete satisfaction and success on your first attempt — if you follow these instructions **to the letter.** All of the materials used in this series of articles are commercially available. The fact that they are does not constitute a paid commercial for the manufacturer, but rather, they are, in our opinion, the very best available at the time of this writing.

WHY A FOAM WING?

The major advantages of a foam core wing is that it enables the builder-flyer to construct a **perfectly true flying surface, with more consistent flight qualities, greater durability and crash resistance, with far less investment in building time, with no increase in weight** over the conventional built-up wing.

Why is it, then, that we see foam wings that weigh twice as much as their conventional counterparts, are severely warped and misaligned, and which demonstrate erratic flight characteristics that are definitely less than the desired optimum? Again, this is due to a severe lack of technically correct information on the subject, combined with an improper selection of materials and construction methods.

How then, can the desired optimum, stated in boldface type above, be accomplished? Let's break that statement down into its various segments and set some definitive ground rules, upon which we will become more specific later on in these articles.

First of all, we want a **perfectly true flying surface.** In order to build a warp-free wing by conventional built-up methods, a jig is a virtual necessity. Many times, even after completing a warp-free structure using jig assembly, warps are introduced in covering and finishing. With the foam core method, no such jig is necessary, and all that is required is a flat building surface. Yet, if improper techniques are used, built-in misalignment will occur, and these are virtually impossible to remove once the wing is completed.

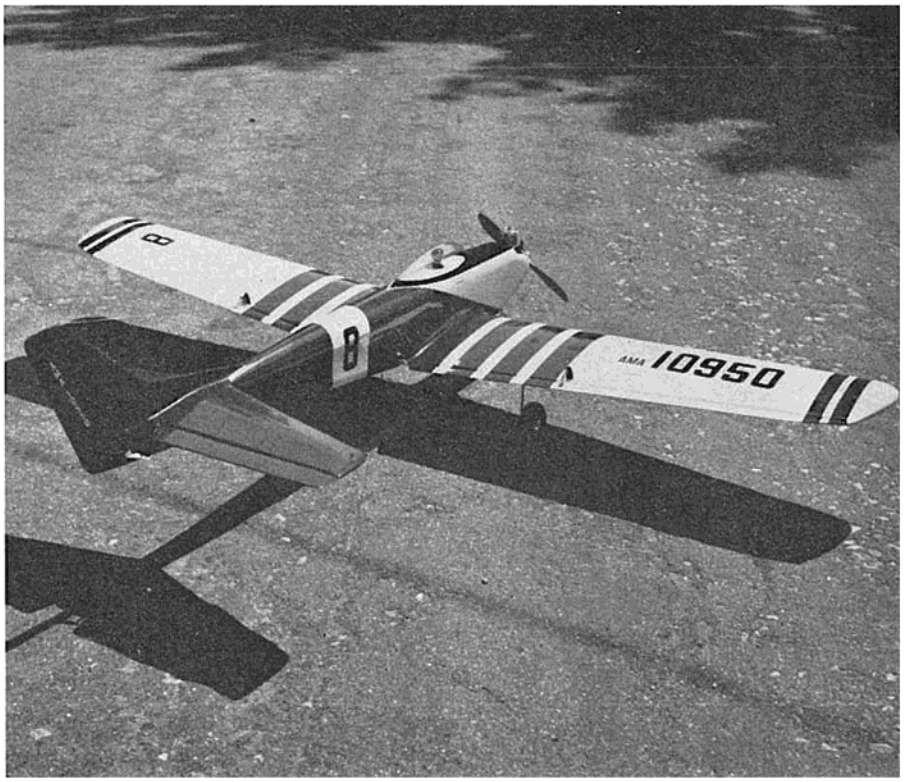
The second factor, that of **more consistent flight qualities,** is obtained by the fact that a correctly built foam wing will always maintain the same flight characteristics in spite of varying weather conditions. This is simply not true with the majority of conventional type wings which are affected by temperature and humidity changes.

At this point, let's dispel an oft-heard rumor to the effect that the moment of inertia about the lateral axis of the airplane is increased if a foam wing is used. This is completely false and is based upon the false premise that a foam wing is always heavier than a built-up version of identical configuration. Even if this were true, which it is not, and a foam wing turned out a few ounces heavier than the conventional wing, the increase in the moment of inertia would be so small that nobody but the very best contest fliers would notice it, and it's somewhat questionable if more than just a few of them would be able to tell the difference. If, in fact, they did, it could be compensated for quite easily by a slight change in timing on the part of the flier, himself, or in the mechanical design of the plane by a slight decrease in the span, or a slight taper to the wing.

The next point, **greater durability and crash resistance,** has been graphically demonstrated to our own satisfaction to a point where we can say, unequivocally, that a foam wing will generally outlast a built-up wing by a factor of several times. We have deliberately induced crashes that would completely demolish the conventional wing, while the foam structure survived completely. In many cases, damage to a foam wing results in a clean break that can be butt-joined with epoxy adhesive, resulting in a repaired area that is generally stronger than the original construction. We have, too, seen many "in-the-field" repairs to foam wings that allowed the flier to continue in a contest, where he would have been washed out, had the damage been to a conventional structure.

The factor of **far less investment in building time** is simply an indisputable fact. After you have mastered the techniques outlined in these articles, you will find this out for yourself. Using an example other than one of our own experiences, one modeler received a Falcon 56 wing core on a Friday. He commenced work on it shortly after noon on Saturday, and by 5 P.M. Sunday afternoon the wing was completely finished in MonoKote, ready for flying. The weight, all up, was 12½ ounces. The times stated included the waiting time for the center section epoxy to dry! Just compare this, yourself, to the time necessary for building, covering, and finishing a wing by conventional methods!

The last point — **no increase in weight** over the conventional built-up wing — is, perhaps, the most important. Early foam cores used heavy density foam material which, when combined with the commonly used balsa-skin-to-core adhesives, added up to a wing that was extremely heavy when compared to a conventional structure. We know from actual test experiences (and not limited to one or two designs), that a properly



STEP-BY-STEP

constructed foam wing need not be any heavier than a conventional wing of the same configuration. Here are four cardinal rules for building **lightweight** foam wings:

1) The use of lightweight 1/16" (5 to 8 lb./cu.ft.) balsa for the core covering. Sig Contest Grade Balsa is an excellent choice. If you use balsa in the correct density range, the weight of the sheeting will be approximately 75% of the weight of the cores themselves (less landing gear blocks) or less. We have tried many different core coverings, other than balsa, such as paper, thin veneer, aluminum, plastic, etc., but all have various shortcomings which in our opinion, overshadow their limited advantages. After extensive testing, we still feel that lightweight contest grade 1/16" balsa is superior.

2) The use of foam cores in the correct density range (.8 to 1.0 lb./cu. ft.). Cores must be true in all respects. We have found Foamcrafts' foam wing cores meet these specifications exactly.

3) An adhesive for sheeting the wing cores that adds one ounce or less for a typical multi wing while maintaining the proper bonding strength. We have found Core-Grip meets these specifications exclusively.

4) A finishing technique that results in the type of finish that satisfies the aesthetic values of the builder without adding excessive weight.

Now let's look at a table of actual weights, utilizing Foamcrafts' cores, Sig Contest Grade Balsa, and Core-Grip cement:

ITEM	WEIGHT (Per wing panel)
Balsa sheeting	2 to 2½ ounces
Foam cores	3½ to 4½ ounces
Adhesive	½ ounce
Landing gear blocks	1 to 2 ounces
Fiberglass & epoxy center section	1½ ounces
TOTAL	8½ to 11 ounces

Thus a large sized multi low wing (on which these figures are based) will run between 17 to 22 ounces, prior to finishing. These figures are based on a low wing design with 45 degree sheeted tips. A Beachcomber wing would run approximately 15 ounces, while a thicker wing, such as the Cherokee, would be in the 20-ounce range. A Taurus wing would be somewhat lighter than the Beachcomber.

Although we will go into recommended finishing techniques later on, here are some figures to play with. The fastest finishing method is Top Flite's MonoKote. This material weighs .003 oz./sq.ft. It is a simple matter to double the wing area of any model and multiply by this figure to get the actual weight of a MonoKote finish. Let's take our hypothetical Beachcomber wing, as an example:

780 sq. in. × 2 × .003 oz./in. 2 = 4.7 oz.

Since our Beachcomber wing, less finish, weighed 15 ounces, we now have a finished weight of 19.7 ounces plus an ounce a piece for ailerons. Let's throw in another ounce or two for miscellaneous and we have a finished Beachcomber wing on the order of 23 to 24 ounces.

If you prefer a conventional dope type finish, a good one can be applied at a penalty of about one to two additional ounces. A medium finish can be applied for about the same weight as MonoKote. If you are particularly weight conscious, you can save an ounce or so by putting on a minimum finish. More on this later.

A Look At Foam Adhesives

The model builder has been exposed to more new building products and techniques in the past five years than in any other equal period of time. Among these are contact cements. And, when new materials are used, new techniques must be used in building in order to insure the desired results. To use old methods on new materials can prove disastrous. This has been evidenced all too frequently in the case of foam wings. For example, the early foam wings were sheeted using white glue as an adhesive. This resulted in three-pound foam wings and the widespread fallacy that "if it was a foam wing, it was heavy!" Next came the contact cements. It was quite rapidly discovered that quite a few of these con-

(Continued on Page 33)

CUNNINGHAM ON R/C

A "Show-off" bipe from A. W. McEwen of Australia. Complete with Aussie Snoopy in cockpit!

IT'S a rather common malady when you are getting a little bit grey on top, your breath is growing short, and a goodly amount of lead is beginning to creep on to your a — fter section, to think back on the "good old days." Some things were always better then, or, at least they seemed that way. 'Course two years from now we'll all be looking back on this year as a pretty good one, unless you happen to be spending this year in Viet Nam, as a lot of RCers are! But, in looking back on the old days, one of the common troubles that we don't hear of too much now is the bug-a-boo of interference. Ha!, we think that we've had it rough, well, give a listen to Joe Nehring on the subject of interference in Viet Nam.

"Last Friday Ed Paxton and myself were flying in the early evening. At the time Ed had his Taurus up, making touch-and-go's. Seeing that his pattern was a little wide, and that he was going to overshoot, he hit throttle. Nothing happened. The Taurus landed about 400' short of the runway and smashed into a telephone pole in the process. We ran over to it and found the reason for the no-throttle. Some smart alec V.C. had put a .30 cal. round right through one of the servos. The bullet entered just behind the engine, went through the fuel tank, and shattered the servo."

Now, that's Interference! As an after thought, Joe went on to say that now they make a much tighter landing pattern! It's pretty darn good shooting too! Getting back to the good old days, last night a bunch of us were sitting around after the monthly club meeting discussing retractable landing gears. Several of the new types on the market are relatively inexpensive, and will no doubt get more so. It suddenly struck me that back in the "good old days" we used retracting gears on our free flights, that did a reasonably good job with just the aid of a rubber band. So how about some of you inventive types coming up with a good idea for a simple home-built retracting gear. Remember, simple, so even I can build it.

Some time ago we put out the word for good ideas to pass along in these pages, and here are a few of the ones that filled the mail bag. Jack Jecelin, who hangs his hat in Baltimore, sent along a very easy to duplicate idea for using a miniature hacksaw blade, with one end sharpened, to cut slots for the new, thicker hinges such as the R-K, and the Rand. Jack even goes so far as to stick a handle on the other end. Works a lot better than trying to wedge out a slot with just an X-acto knife.

Speaking of hinges, last month I reported what fun I was having flying a Lanier Bronco. The fun was great while it lasted, but it didn't last long enough. Right in the middle of what was to become this little ship's last roundup, it suddenly went out of control and dived to the ground. At the autopsy we discovered that the hinges had pulled out of the horizontal stab section, and quick as a wink, instant crunched plastic! I also discovered the only piece of concrete on a hundred-acre flying site. You guessed it, a crunch landing, upside down with a brand new Enya .60 taking the full load. The head bolts are still good, and I think the case bolts may be, but the rest is just a memory. Any hoo, if you are building a Lanier, or already have one flying, take another long look at the hinges. I used R-K hinges on this ship and stuffed them in complete with all of the GE Clear Seal I could get in the slot. The glue stuck, but the foam came out. Suggest that you reinforce each hinge location with an extra piece of Air-O-Skin that comes in the kit, and then peg the hinges with toothpicks, just like in a balsa surface. It may be a little extra work, but it also is a little extra insurance!

Mike Gudley from Indianapolis has an idea which he says he lifted from a PT-17. That is the use of stall strips located on the wing leading edge. Mike thinks that a ⅜" sq. piece about 8" long and located at the tip will do the job. Carve the strip to a point. The "Sultan of Sierra Madre" and I were kicking this bit around one night on the phone. He had good reports from a Goodyear racer that employed this idea, only this ship had ¼" sq. stuck on the leading edge near the root, and these pieces were not sanded, just left square. Might just solve the hard landing bug-a-boo at that.

Got a storage problem? What to do with all of the fuselage parts and spare wings and stabs? Elmer Hubbard of Flagstaff, Arizona, has solved this very neatly. El uses a 1⅛" wood dowel about 8" long suspended about 6" from the ceiling of his workshop. Then he takes two coat hangers per aircraft, slips the bottom of each hanger under the wing dowels, wraps a rubber band around the wing dowels and the hanger, and hangs them up to dry. What do you do about the fuel drips, El? It's a good idea for everyone except the guy with camlocks in place of wing dowels! El also uses a control system similar to that featured in RCM about a year ago by Ralph Sawyer, except that he uses bellcranks to control each surface and runs a pushrod from the servo to the bell crank. I wonder how many fliers are now branching out and trying different control systems. Should eliminate a lot of vibration to the servo.

Cliff Kerns of Denison, Texas, has devised an interesting fuselage jig, and since receiving his letter some time ago, I have adopted a similar method for building fuselages. Cliff cuts slots in his building board perpendicular to the center of the fuselage. Then he makes 1" x 1" x 4" wood pegs and drills a hole down the center of these pegs for a bolt. The pegs are placed over the slots, the bolt stuck up through the slots and then through the pegs and topped off with a wing nut (that's a guy that enjoys building wings). When it is time to hold his embryonic fuselage in place he simply slips the pegs into the right place, tightens the wing nuts and smears on the glue.

Speaking of glue, one of the best sources for inexpensive epoxy glue is Sears. They sell two five-ounce tubes of filled epoxy glue for a buck-eighty-nine. The glue is stiffer than normal but makes beautiful fillets. There is one slight problem with it, though; one of the tubes contains a white liquid, the other, a black. Mix 'em together and you get a tattle-tale-gray, but, ten ounces of epoxy for less than two bucks is a great price.

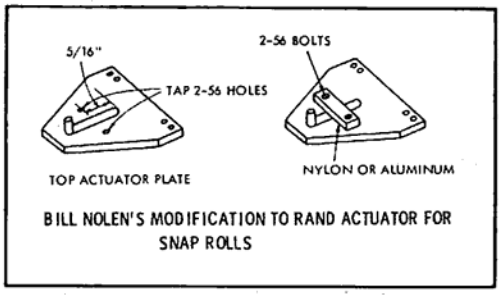
In the March 1966 issue of R/C Modeler I presented a simple homebuilt muffler for large engines. My pen pal, Bill Aldridge from New Zealand, came up with a suggestion for improving this muffler design which is shown in the drawing. Bill tells me that this type muffler has worked very well on race boats (full size that is). It is really surprising how many flying fields are now restricted to mufflers. Most of these are in the East, but with people sprouting out all over, it's only a matter of time until we will be faced with anti-noise gripes from all over. The time will come when all new engines will have a muffler as an integral part of the engine, and properly designed, will gain more power from them. One of my flying partners, Bob Campbell, wandered up with a thought the other day and wanted to know if I had realized that in my article on trimming a few months back I had disagreed with Hal deBolt, writing in the same issue about his Encore. Now, I'm not about to get off on the wrong foot with Hal; he was turning out kits when I was still learning the three R's, but in order to erase any confusion that might exist in the minds of those who read both articles, let's examine what was said. In my text, I said "Incidence in the horizontal stab is to be avoided like the plague." Hal, on the other hand, said "There should be a ¾-degree more positive incidence in the horizontal stab than in the wing."

In effect, Hal has used down thrust in his engine by setting up both the wing and stab at positive incidence. By using more positive in the stab than in the wing he had accomplished the same thing as shimming a negative setting into a wing to kill a zooming effect. It would be most interesting to build an experimental ship that would have closely controlled incidence changes in both the wing and the stabilizer in order that we could more closely observe just what does happen with each change. If some of you have experimented with different force settings it would be interesting to hear the results of the experiments. Both Hal and I would profit from this type of an investigation. While on this subject, has anyone tried a thick symmetrical horizontal stabilizer section on a Kwik Fli? If so, what were the results?

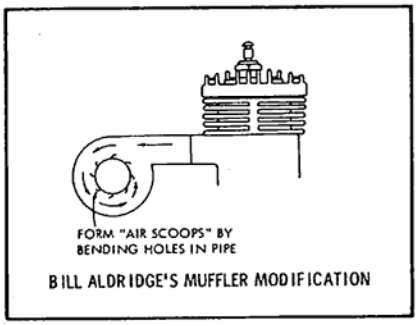
Unfortunately, this type discussion could rage on and on with no real settlement as each ship will be different, but it does make for interesting speculation. How about a Taurus with a flat stab?

Galloping Ghost has received both a shot in the arm from all of the articles written about it, and a lot of hard knocks from detractors who haven't even tried to fly it. The modern version comes just about as close to painless fun flying as I have seen. Bill Nolen, up in Moore, Oklahoma, dropped me a line to show me a modification that he has made to his Rand actuator. Bill uses this mod

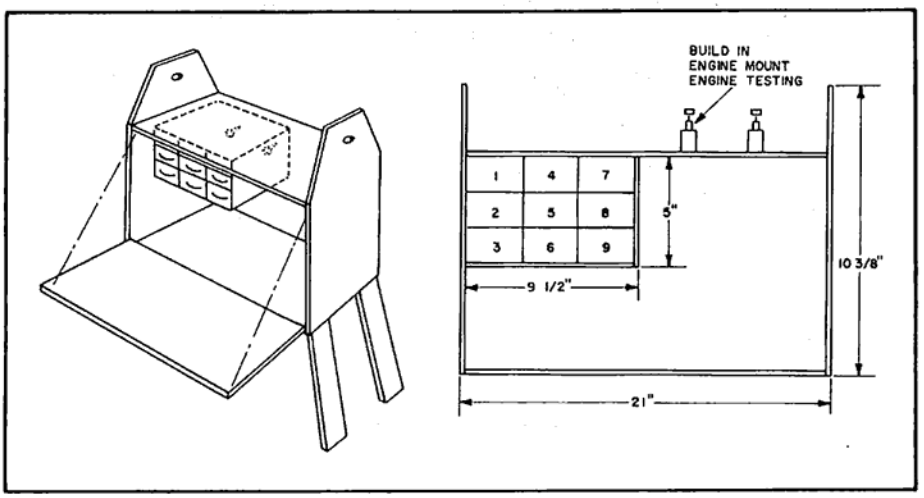
(Continued on Page 33)



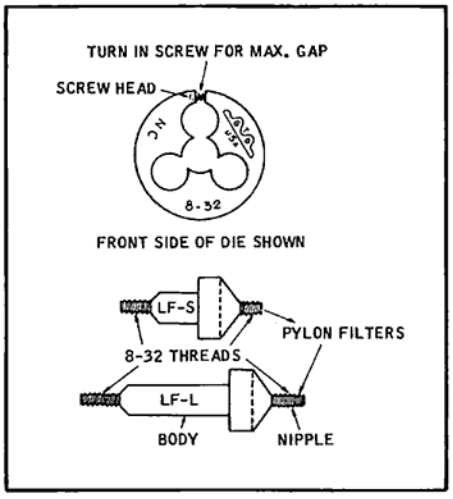
BILL NOLEN'S MODIFICATION TO RAND ACTUATOR FOR SNAP ROLLS



BILL ALDRIDGE'S MUFFLER MODIFICATION



Bob Van Orden, Dearborn Heights, Michigan, suggests this usage of plastic drawers in the RCM Field Box (Dec. 1966) instead of the cardboard tote box insert.



HAVE you ever checked your plane's fuel filter for obstructions and then after checking you find the fuel line slips off of the filter nipple each time you slip it on??? This problem exists only **after** the system has been fueled. A quick solution to this problem is to thread a well gapped 8-32 die upon the filter nipple until it touches the filter body. The filter and die can both be held in the fingers for this threading operation. **Thread the back side of the die on first** (side with least amount of thread taper) for ease of threading and clean threads. This method is also easier and more effective than trying to form a bead with a soldering iron. Try it and see for yourself.

— Ralph Sawyer

CUNNINGHAM ON R/C

(Continued from Page 32)

when he really wants to strut his stuff. This limits the movement of the actuator so that it will not go all the way around to give motor control, but rather will give full rudder and elevator deflection if the buttons are pushed. Snap rolls are a cinch with this setup. Bill has been getting his kicks with a Wolfmeister LR-3 as have a bunch of the guys around Oklahoma City. (Ed's note: Excellent Airplane!)

The longer we stay in this sport, the more that we learn, and sometimes the dumber we seem to get. It is often hard for me to remember that every day more and more people are jumping into R/C, and most of them have a dickens of a time just trying to understand the language, much less master the aircraft. My mail tells me otherwise, though, and it always comes as a surprise when I get a question that seems so very simple to answer. But, the answer isn't simple to the modeler. It's a good idea for all of the experienced modelers to take just a minute out to help the beginner, and it's also a good idea for the beginner to accept that helping hand. Too often I have witnessed a tyro out for his first day's flying, usually with a single channel ship, with a pretty deaf ear for fatherly advice. Take it if it is offered. It might not be a 100% correct advice, but on the other hand the chance of your being wrong is pretty high, too!

One of the most interesting pastimes for a beginner is to watch a well run contest. There he can see generally good flying with a bit of sportsmanship thrown in. If you can locate any competition in your area be sure and go. Down in the Texas/Oklahoma area there are a number of contests. Again this year the Dallas bunch will host their annual two-day contest on May 6th and 7th, and Oklahoma City will put on its outstanding contest over the Memorial Day weekend. Oklahoma City is talking of staging a Midwest RCM air race, so if you plan to be there, take yours with you, just in case.

All of you who have been sending in pictures and information to me for inclusion in Flite Line, don't give up. We had to ease up on some of the space requirements a while back to make room for all of the very fine articles and pictures. Uncle Don tells me that Flite Line will show up again in the future when space warrants, so keep on sending the pictures and newsletters.

Now that flying season is again upon us, I don't know what you all are going to do, but I'm going out to fly. See ya at the Nationals.

FOAM WINGS

(Continued from Page 30)

tact adhesives attacked foam and destroyed the cores. Following this, we went through a period whereby any contact adhesive that did **not** attack the foam surface was an ideal bonding agent. Many of these contact cements were repackaged industrial adhesives which were primarily designed to hold foam to concrete walls, with the consequence that the strength factor was more than adequate, but the weight of the adhesive put us back into the upper weight limit brackets. Other contact cements came on the market which were somewhat lighter, but with the end result that the strength factor was sacrificed and the balsa sheeting would soon begin to lift, either by aging, or with temperature and humidity changes.

Contact cements are called contact cements because the cement must be allowed to dry thoroughly before the two glue surfaces are contacted together. The modeler who thinks he can speed up assembly time by applying wing skins to foam cores with wet contact cement is asking for trouble! And, it costs money! Several factors have caused past difficulties with these new materials. One has been the somewhat reactionary attitude of the model press toward new materials and techniques, that is, cautiously waiting until a majority of modelers have accepted a product before publishing much material on the subject; the second is the introduction of new products without adequate in-use field testing; and the third is the over-emphasis by foam wing and cement manufacturers and distributors as to the speed with which these new materials can be used. Foam wings **are** easier and faster to build and much stronger than balsa and silk wings, but it takes slightly more effort than simply placing the wing cores in a large pot, adding balsa dust with contact cement, and then stirring gently 'til done!

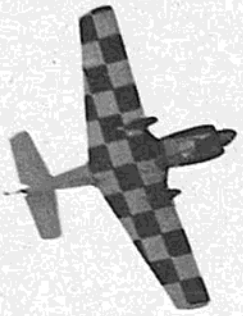
Fast evaporating thinners are used in foam contact cements so that the thinners will evaporate before a reaction can take place with the foam. When cement surfaces are exposed to open air, no reaction will occur. But — apply the wing skins to the foam core when the contact cement is wet and the thinner becomes trapped between the wing skin and foam core. A chemical reaction will then take place between the thinner and foam that will make one of your best days a mighty blue one! Hollow wing skins don't fly too well!

When using contact cement to apply sheeting to expanded bead foam cores, it is not necessary to saturate the sheet and core with cement. In most cases, a small amount of cement spread evenly over the surfaces will make a stronger and better bond. Foam contact cements are usually of a thicker consistency than most contact cements. If applied with a proper applicator, they will pose no application problems. Just remember that you wouldn't use a whisk broom to sweep a 2,000-square-foot floor space, so why use a ¾" camel hair brush to apply your contact cement? For proper application, use a 3" to 4" bristle paint brush with the bristles cut down to ¾" to 1" in length in order to stiffen the brush. Spread the contact cement evenly, thoroughly covering the surfaces to be cemented.

After the contact cement is applied, it should be allowed to dry thoroughly before the surfaces are contacted together. Be sure all the thinners have evaporated. If you follow these simple instructions, you will have no problems with contact cements attacking the foam. Many new and good products are tried and discarded by modelers who refuse to change techniques, or follow the instructions set forth by the manufacturer. These are costly experiences, and the little time it takes to read and understand the manufacturer's instructions thoroughly will net you a handsome savings and some real building.

(To Be Continued)

GOODYEAR RACING



How to organize and conduct an N.M.P.R.A. Goodyear contest

PART II

NMPRA BASIC SCHEDULES FOR PYLON RACING

INTRODUCTION

These schedules will cover most of the combinations that will come up in running a series of races. To set up races where everybody can fly against everybody else or running elimination heats based on the pyramid normally do not work out because of the frequency problem. This is a compromise that will allow you to come up with a satisfactory winner. If each schedule is flown completely, each contestant will fly against every other contestant, not in his group, an equal number of times. When time doesn't allow flying the full applicable schedule, most contestants will be satisfied with a partial series.

INSTRUCTIONS

1. Pick the schedule that meets your entry list.

2. Divide your entry list into the necessary groups by frequency — i.e., three plane heat, 3 groups — four plane heat, 4 groups, etc.

3. Assign numbers to each individual contestant by group and follow the schedule.

MODIFYING SCHEDULES

When your entry doesn't match a schedule you can still use them by running 3 and 4 plane races. Say you have 16 entries — use the 20 entry schedule and do not assign numbers 5-10-15-20, see illustration. This system will allow you to set up races with up to 28 contestants.

1	6	11	16	3	6	14	17
2	7	12	17	1	9	12	20
3	8	13	18	2	10	13	16
4	9	14	19	4	7	15	18
5	10	15	20	5	8	11	19

If you have more than 28 contestants, it is recommended that you have time trials and either eliminate the slower contestants or set up a consolation series. Your solution will have to be based on the time you have available. The estimated time on the schedules is based on six minutes per race. On well organized races, we have averaged under 5 minutes per race, but you must have the complete cooperation of the contestants.

SCORING

When running three plane races give 3 points for first, two for second and one for third. Four plane races, four points for first, etc. When you are running combined three and four plane races, first place always gets four points. When a contestant is unable to show for a race he is scheduled for, he is given a zero for the round. The race is flown without him with no penalty for the participants. A contestant that doesn't complete the ten laps gets zero for the round. Remember — the winner always get full points regardless of how many get to the starting line and finish the race.

8 entries — 4 plane heats — 8 rounds — 1½ hours

1-3-5-7	2-3-5-8	1-4-6-7
2-4-6-8	1-4-6-7	2-3-5-8
2-4-5-7	1-3-5-7	2-3-6-7
1-3-6-8	2-4-6-8	1-4-5-8
1-4-5-8	1-3-6-8	
2-3-6-7	2-4-5-7	

9 entries — 3 plane heats — 3 rounds — 1 hour

1-4-7	1-5-9	1-6-8
2-5-8	2-6-7	2-4-9
3-6-9	3-4-8	3-5-7

10 entries — 3 plane heats — 10 rounds — 3 hours

#10 must be on odd frequency

1-5-7	1-4-7	1-10-9
2-6-8	10-5-8	2-6-7
3-4-9	3-6-9	3-4-8
10-4-7	1-5-9	1-6-8
2-5-8	2-6-7	2-4-10
3-6-9	3-10-8	3-5-7
1-5-9	1-6-10	1-6-8
2-10-7	2-4-9	2-4-9
3-4-8	3-5-7	3-5-10
	1-4-7	
	2-5-8	
	10-6-9	

12 entries — 4 plane heats — 15 rounds — 4½ hours

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

12 entries — 3 plane heats — 8 rounds — 3¼ hours

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

15 entries — 3 plane heats — 5 rounds — 2½ hours

1-6-11	1-7-13	1-8-15

2-7-12	2-8-14	2-9-11
3-8-13	3-9-15	3-10-12
4-9-14	4-10-11	4-6-13
5-10-15	5-6-12	5-7-14
1-9-12	1-10-14	
2-10-13	2-6-15	
3-6-14	3-7-11	
4-7-15	4-8-12	
5-8-11	5-9-13	

20 entries — 4 plane heats — 5 rounds — 2½ hours

3-8-13-18	2-10-13-16	2-8-14-20
1-6-11-16	3-6-14-17	3-9-15-16
2-7-12-17	1-4-12-20	1-7-13-19
4-9-14-19	4-7-15-18	4-10-11-17
5-10-15-20	5-8-11-19	5-6-12-18
3-7-11-20	3-10-12-19	
1-10-14-18	1-8-15-17	
2-6-15-19	2-9-11-18	
4-8-12-16	4-6-13-20	
5-9-13-17	5-7-14-16	

21 entries — 3 plane heats — 7 rounds — 5 hours

1-8-15	1-9-17	1-10-19
2-9-16	2-10-18	2-11-20
3-10-17	3-11-19	3-12-21
4-11-18	4-12-20	4-13-15
5-12-19	5-13-21	5-14-16
6-13-20	6-14-15	6-8-17
7-14-21	7-8-16	7-9-18
1-11-21	1-12-16	1-13-18
2-12-15	2-13-17	2-14-19
3-13-16	3-14-18	3-8-20
4-14-17	4-8-19	4-9-21
5-8-18	5-9-20	5-10-15
6-9-19	6-10-21	6-11-16
7-10-20	7-11-15	7-12-17
1-14-20		
2-8-21		
3-9-15		
4-10-16		
5-11-17		
6-12-18		
7-13-19		

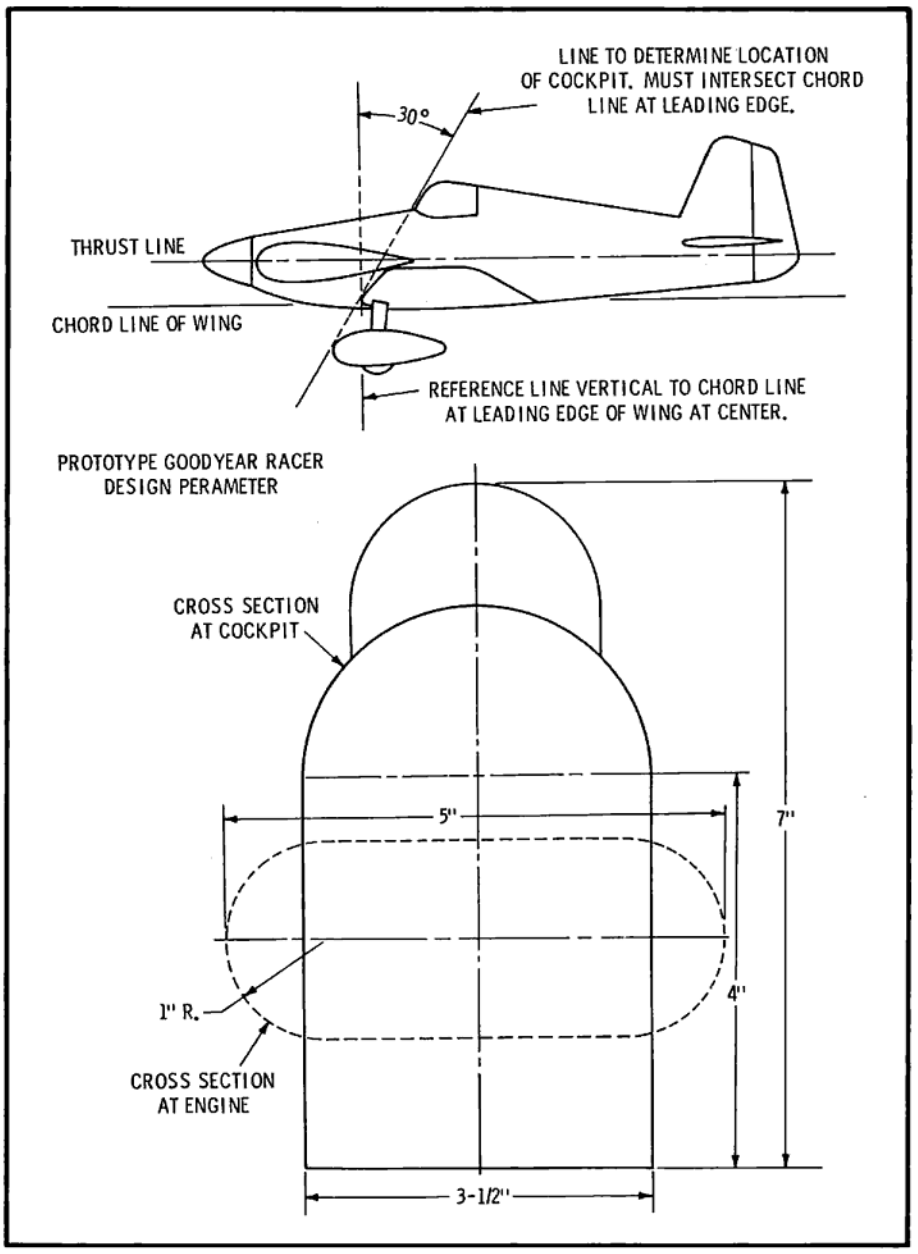
24 entries — 4 plane heats — 24 races — 2½ hours

Each contestant flys 4 times

1-7-13-19	3-10-17-24	6-11-16-21
2-8-14-20	4-12-13-21	5-9-13-24
3-9-15-21	6-7-15-23	3-7-18-22
4-10-16-22	1-11-14-24	6-8-17-19
5-11-17-23	5-8-18-21	5-10-15-20
6-12-18-24	4-7-17-20	2-11-13-22
1-8-15-22	3-12-14-23	4-9-14-19
2-9-16-23	2-10-18-19	1-12-16-20

25 entries — 5 plane heats — 5 rounds — 2½ hours

1-6-11-16-21	1-7-13-19-25
2-7-12-17-22	2-8-14-20-21
3-8-13-18-23	3-9-15-16-22
4-9-14-19-24	4-10-11-17-23
5-10-15-20-25	5-6-12-18-24
1-8-15-17-24	1-9-12-20-23
2-9-11-18-25	2-10-13-16-24
3-10-12-19-21	3-6-14-17-25
4-6-13-20-22	4-7-15-18-21
5-7-14-16-23	5-8-11-19-22
1-10-14-18-22	
2-6-15-19-23	
3-7-11-20-24	
4-8-12-16-25	
5-9-13-17-21	



27 entries — 3 plane heats — 9 rounds — 8 hours

1-10-19	1-11-21	1-12-23
2-11-20	2-12-22	2-13-24
3-12-21	3-13-23	3-14-25
4-13-22	4-14-24	4-15-26
5-14-23	5-15-25	5-16-27
6-15-24	6-16-26	6-17-19
7-16-25	7-17-27	7-18-20
8-17-26	8-18-19	8-10-21
9-18-27	9-10-20	9-11-22
1-13-25	1-14-27	1-15-20
2-14-26	2-15-19	2-16-21
3-15-27	3-16-20	3-17-22
4-16-19	4-17-21	4-18-23
5-17-20	5-18-22	5-10-24
6-18-21	6-10-23	6-11-25
7-10-22	7-11-24	7-12-26
8-11-23	8-12-25	8-13-27
9-12-24	9-13-26	9-14-19
1-16-22	1-17-24	1-18-26
2-17-23	2-18-25	2-10-27
3-18-24	3-10-26	3-11-19
4-10-25	4-11-27	4-12-20
5-11-26	5-12-19	5-13-21
6-12-27	6-13-20	6-14-22
7-13-19	7-14-21	7-14-23
8-14-20	8-15-22	8-16-24
9-15-21	9-16-23	9-17-25

28 entries — 4 plane heats — 7 rounds — 5 hours

1-8-15-22	1-9-17-25	1-10-19-28
2-9-16-23	2-10-18-26	2-11-20-22
3-10-17-24	3-11-19-27	3-12-21-23
4-11-18-25	4-12-20-28	4-13-15-24
5-12-19-26	5-13-21-22	5-14-16-25
6-13-20-27	6-14-15-23	6-8-17-26
7-14-21-28	7-8-16-24	7-9-18-27
1-11-21-24	1-12-16-27	1-13-28-23
2-12-15-25	2-13-17-28	2-14-19-24
3-13-16-26	3-14-18-22	3-8-20-25
4-14-17-27	4-8-19-23	4-9-21-26
5-8-18-28	5-9-20-24	5-10-15-27
6-9-19-22	6-10-21-25	6-11-16-28
7-10-20-23	7-11-15-26	7-12-17-22
1-14-20-26		
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4-10-16-22		
5-11-17-23		
6-12-18-24		
7-13-19-25		

KEN WILLARD

OOPS! Goofed again! But maybe I can talk my way out of it. You Sunday fliers are a pretty understanding bunch most of the time.

Anyway, last month I said I was going to discuss the problem of "How does a beginner begin?" in this column, this month. As usual, I forgot that the Toledo Weak Signals Club would be having their annual Midwinter R/C Symposium on February 25th and 26th, and you'll be wanting to know what's new and interesting.

So I went to the show, and, as before, it was fabulous, only this time it was "Fabulouser." No-o- that doesn't look right, better say "most fabulous yet." They topped last year both in attendance and participation. Paid attendance was around 2000, and with women and children free, and about 50 manufacturers with 2 or 3 representatives each, there must have been around 6000 people milling around Lucas County Recreation Hall during the two-day event!

The crowd was so thick you almost had to fight your way in to a booth.

And the R/C airplanes, boats and autos on display! The workmanship, finishes, and design variations all were of such a high standard of excellence that they virtually cannot be adequately described.

As in the past, I'll let the other reporters cover the technical details, but this time I have a different reason, two of them, in fact.

First, I was privileged to talk at the symposium. As a subject, I selected, after much thought, the title "Bull Session, R/C Testing and Reliability." At least I figured I was qualified as a bull sessioner. During the talk, just so I'd have an idea of how you Sunday fliers are changing with the times, I asked the audience how many flew "single channel" — escapements, servos, etc., then how many flew galloping ghost, and, finally, how many were using the "high priced spread," or full proportional.

The results startled me. I gave the talk four times, since the room was too small to accommodate everyone who was interested (plus that fact that I had a good movie to go along with it), and each time the audience was about equally divided one third single channel servo, one third galloping ghost, and one third "full house" proportional.

Now this gave me a message. In the past, I've held to certain beliefs regarding the best way for newcomers to get into the sport and hobby of R/C flying. But times are changing rapidly now and so are the ways, not only of keeping up, but starting out in R/C. I'll come back to that later.

Second, and perhaps a more significant reason for letting other reporters tell you about all the technical news. I came across a couple of human interest stories on R/C that I am compelled to write about. It's a little out of my line, maybe, yet at one time or another a lot of Sunday fliers have undergone experiences like the two I want to tell you about, but to a much lesser degree.

A year ago, at the Toledo conference, I saw a beautiful scale Waco on display. The identification tag told about it, and name E. W. Topping as the owner.

"Good," I say to myself. "I've known Bill Topping for several years, and haven't seen him in over a year. Maybe we will have a chance to get together."

A short while later that day I felt a tap on my shoulder, turned, and there was Bill. His face was drawn, his legs were in braces, he had a cane in each hand, and a friend with him to help him walk. I was so shocked I hardly recognized him, and found it difficult to talk. This was a man I'd seen on several occasions sprinting to catch a plane.

But the shock disappeared almost immediately as he said, "H'ya, Ken, have you seen my Waco? Lemme show you some of the features!"

He jobbled over to the plane and talked a blue streak never once mentioning his condition, until after he'd explained the details of his model. Then he told me a little bit about the physical troubles. Not much, he wanted to talk R/C! But it was apparent that he'd been through a very trying ordeal, and was still in it, for that matter. He let it slip once that the doctors weren't sure if he'd ever walk normally again.

Well, we spent a little time together, but I had to cover many things at the show, and he had to be taken back to his room to rest. I didn't see him again. As he left, though, he mentioned a glider R/C model he planned to work on.

(Continued on Page **37***)*

Bill Topping, Akron, Ohio, with modified Sisu IA. 120" span, max. 10, 10 ch. F&M.

Dr. Jacques Metford, Ontario, Canada, with scale JN4D Curtiss Jenny for Rand G.G.

SUNDAY FLIER

(Continued from Page 36)

This year, again, as I walked through the displays, I came on a model, a beautiful glider. The tag said "E. W. Topping."

"Good, I'll see Bill again. Hope he's doing better." But I didn't see him there. That was Saturday.

Sunday morning I went into the coffee shop at the motel for breakfast. There was Bill. "Come on, have some breakfast with me," he said, starting to rise.

I sat down quickly, not wanting to disturb him unnecessarily.

He sank back into the booth. "Hey, didja see my glider yet?" "Yes, and it's a beauty."

"Wait'll I show you some of the features on this job." His enthusiasm was boundless. He talked about the model all through breakfast.

"You look good," I said.

"I feel good," he replied and started talking about the glider again.

We finished breakfast, and I got up first, thinking I might give him a hand. I was dumb-founded when he eased himself out of the booth, stood up, and strode swiftly out of the room! There was only a trace of a limp.

"Got a ride?" he asked.

"No." "Let me drive you over to the hall. I want to show you my glider," he offered.

I accepted, but on the way I said, "Bill, how did you do it? I mean the walking and everything?"

"I didn't do it," he replied. "That darn glider did!"

"What do you mean, Bill?"

"Well, you know how my shop was set up in the basement? I used to go nearly nuts lying in my room, so I'd holler for help, hobble down to the shop, work on the glider, forget my aches and pains and troubles, then holler for help, hobble back up to bed, rest awhile, then do it all over again.

"I ran into some problems with the glider, rebuilt the wing, figured out some fittings (your should see them) and I guess I just didn't have time to think about ailments.

"And I went up and down those stairs so many times that my legs just kept getting stronger until here I am walking again!"

There's a lot more to the story than that. I know from experience, and so do a lot of Bill's associates around Akron, that Bill's a pretty good "bull sessioner," but the main point is that he's recovering, and he credits that R/C glider with giving him the combined motivation, concentration, relaxation and interest to bring it about.

If there ever was a good example of the therapeutic value of R/C modeling, this is one.

By an amazing coincidence, another human interest story on R/C modeling showed up when I examined another model which was right next to Bill Topping's glider in the display.

It was a beautifully detailed, but not quite finished model of a Curtiss Jenny, scaled at one inch to one foot. The justifiably proud builder was Dr. Jacques Metford of Hyde Park, Ontario, Canada. He had carefully duplicated all the complex rigging, even to the extent of scale "bungee" shocks on both the main gear and the tail skid. Also, he'd spent hours on the engine radiator and cooling louvres to detail them accurately.

As he told me about the model, I mentioned how tedious it must have been, but rewarding, and told him how the model next to his had helped a fellow modeler through some trying times.

"Well I'll be darned," he said. "Look at this."

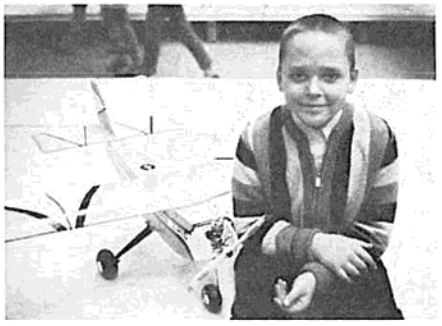
He pulled a packet of capsules out of a side pocket.

"What's that?" I asked, "nerve pills?" "Nope. Nitroglycerine, and thanks to that model, I haven't taken one in over a year!"

Well, I suppose every Sunday flier could tell a story about how he got so involved in working on his model that he forgot about his problems, aches, and pains to some degree. You could, couldn't you? But these two cases really seemed to bring the therapeutic side of modeling into sharp focus.

Let me close off this month with one more photo from Toledo. It leads into the discussion on beginners and how they should go about it.

The photo shows Eric Swenson of Lockport, Illinois. Eric is eleven years old, and that's his second R/C model alongside him.



Eric Swenson, Lockport, Ill., 11 yr. old RC'er with "Shoofly." Credit to R/C hobby!

His first R/C project was a Mayfly partially completed kit, you know, where the wings, fuselage and tail surfaces are almost finished, and all you do is join them together, paint and install equipment.

It was so successful that the next project was the Shoofly, this time from a construction kit. And he plans to have more controls than the rudder-only setup he used on the first model.

Eric admits he got a little help from his dad like the painting job on the Shoofly, but he did most of the work himself. He is, therefore, a successful beginner. Why?

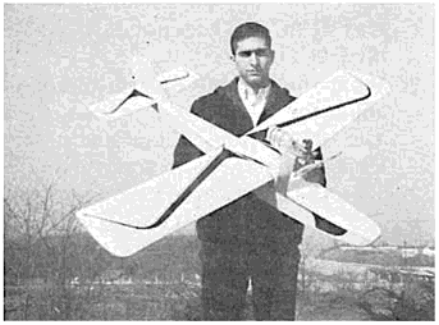
Maybe there are many reasons but here are the three that stand out, as I see it.

1. A strong desire to learn.
2. Understanding parents, who encouraged him.
3. An excellently engineered beginner's kit.

Well, Eric is a good example of one of the several types of beginners starting out in R/C modeling. Naturally, I'm not suggesting some of you older beginners need understanding parents; more likely you'll need an understanding wife! You will, however, need a good beginner's kit, and there are several to choose from.

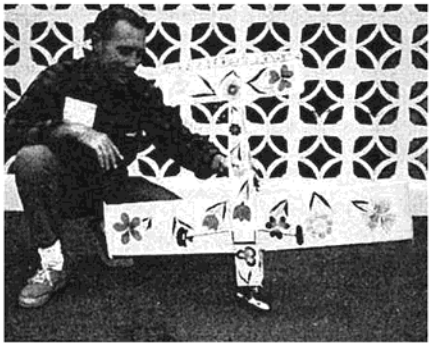
So next month we'll look at a few, and talk about how to learn the basics of R/C building and flying.

Howard Griffith, Baltimore, Md., with enlarged version of "Shearwater."



KITS & PIECES

BERNIE MURPHY



Special Projects Editor, Bill O'Brien, better known as "The Little Flower of RCM" poses with a fantastic version of Fearless's Royal Coachman, built by Mrs. Phil Phillips of Alhambra, Calif.

WE just did manage to squeeze in last month with photos of the '67 Toledo Conference (Old FL is still grumbling about holding the space until the last moment.) Any attempt on our part to convey the excitement and pleasures of the "Conference" must fall short of reality.

This year's show was the largest ever, as an estimated ten thousand people literally poured through the Recreation Hall. Fifty-three manufacturers displayed their "latest and greatest advancements, and most went home hoarse from answering the many questions thrown at them. If you missed Toledo, you missed a most enjoyable aspect of our hobby!

As has been the case in past years, R/C manufacturers again used the Toledo Conference as a sounding board, taking advantage of the opportunity to get first hand reactions to their new products. Space does not permit coverage of each and every item, as we could fill an entire issue of RCM. We will attempt to cover a few of the many interesting items.

With the rapid advancement of digital proportional equipment, and the achievement of reliable gear, the next direction for radio manufacturers to turn has been toward miniaturization. Howard Bonner has achieved a full four channel digital system (identical in mode of operation to any current four channel) with a total weight of 11 ounces! All of this without sacrifice of servo power! This new system, the Digimite 4RS, will be competitive with many of the current pulsing systems in the weight department, making full house digital propo possible in some of the smaller ships. The price is as yet undetermined, but undoubtedly will be close to $400. This new smaller system should also prove to be an asset to the hotter and larger ship flyers, since with the reduction in size and weight of the new system more "extra goodies" can be crammed in. In the event of a prang, system damage should be greatly reduced, since with the weight cut in half there is less energy to be absorbed — or something like that! Don't look for this one on your dealer's shelf before midsummer.

Of special interest to the boating members of our fraternity is a new system developed by Micro-Avionics specifically for use in R/C boats. The heart of the MS200 system is the self-contained receiver servo package. This package is water tight and houses everything needed for rudder and throttle control, including the nickel cadmium battery supply. The standard system has two servo outputs, one for rudder and the other for throttle. Servo thrust has been increased to five pounds. A three servo system is also available allowing two servos in parallel to be used in steering the larger and more powerful boats. Here at last is a system that is not only waterproof, but also one which requires no installation time, just four screws!

Transmitter control is via a single stick. Throttle is operated by vertical movement of the stick, and will remain in any position by means of an internal ratchet. Steering is by sideways movement of the stick, allowing single-handed operation of control functions. Price of the complete two-servo system is $319.95, while the three-servo version is $40 higher.

The boat model which Micro-Avionics used to display their MS200 was also of interest. The model, a 41-inch Baracuda, fiberglass ski boat, was designed and built by Bara-Boats, 656 Foothill, Pacifica, California 94044. This boat comes with the deck joined to the hull, and requires only the installation of running gear. Available in white or various metalflake colors and in various sizes. The 41-inch version in metalflake is $49.95, while the smallest, 33 inch, in white is $29.95. Overall workmanship is exceptional.

New kits that caught our eye, included Sterlings' 66-inch Stearman PT17. This ship now in final prototype stage should be a "big" one for Sterling, since the Stearman has long been a favorite. This new kit will feature a vacuum formed dummy radial engine. Hopefully, May delivery.

Also introduced was the Navajo from VK Model Aircraft. This 64-inch span, high-wing (Cessna type) ship purportedly will outfly their well-known Cherokee — this I gotta see! You can bet that we will be reviewing this one in the near future!

Sig displayed some of their latest additions to the R/C kit field, including Chuck Hollinger's scale PT19 and Maxey Hester's new Class 3 contest ship, the Stratus, both excellent kits at $29.95 each.

We were quite favorably impressed with Top Flite's rendition of the Top Dawg. What one of these, and Bonner's new miniature system couldn't do for the nearby schoolyard! The packing box for the kit folds up into unique fuselage assembly jig assuring correct alignment — this one you build "in the box."

Carl Goldberg's 62-inch Skylane looks like another big seller. Production difficulties delayed release of this new one, but by now they should be available.

More-Craft Products, 567 Darwin Blvd., Edison, New Jersey, is something of a newcomer to the R/C field. Their products are aimed at our convenience. Initially four products have been introduced; a field box, a "carry all," a wing storage rack, and a fuselage storage rack. All items are well made and the storage racks could prove to be "it" for those lucky enough to be able to maintain more than one ship. Each of the racks is designed to hold four units, and are $4.95 each, unassembled. More on these in a future issue.

Retractable landing gears are gradually creeping upon us, with two units displayed, and several others "in the wind." Royal Products displayed prototypes of a new BK retract gear, working entirely from mechanical linkages directly off of a servo output.

Wing Manufacturing's electric retractable gear has already gained wide acceptance. The Wing gear is a well made unit, principally of molded delrin. Extension and retraction is accomplished via a motor powered screw. These units are quite compact and simple to mount — equally important, they are attractively priced at $9.95 per gear. We have thoroughly tested this system, and have found them highly acceptable.

"Ready-to-Fly" also appears to be gaining in popularity. Testor's little .049 powered Skyhawk is just the thing for the beginner in R/C, while Lanier Industries and now Dee Bee Electronics vie for the full multi market.

We have had a ball with the Testor Skyhawk. Here is a stable, easy to fly ½A ship that is suitable for a beginner, and also a barrel of fun for the "old pro." For $89.95 you get everything needed except for fuel and starting bat-

tery. The receiver is equipped with rechargeable batteries, and the transmitter is supplied with eight pen cells. Five minutes out of the box and you are ready to go! This one can be unpacked on the field! Don't forget to charge the batteries, though.

Our little ship has been flown in schoolyards, backyards, and barnyards by just about anyone who wanted to give it a try (and that includes just about everybody!) without serious damage. The molded foam wings and stab nick and dent, but still she flies. The vacuum formed fuse has shown no sign of fatigue. Truly a bargain and bound to further the R/C hobby, for as more of these little birds appear in the local schoolyards and vacant lots more interest must follow. The Skyhawk will undoubtably perform before more "public" than any other model to date.

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In order to get a better look at the new "Stinger" from Dee Bee Electronics, prior to going to press, we traveled up to their plant.

A Stinger kit was selected at random, and we began the 100-mile trip home, envisioning a week or so of evenings assemblying our new "kit" which is advertised as "almost ready to fly."

We were somewhat surprised, when the kit contents were spread out at home, at the few parts actually involved. The wing is furnished in two halves, each completely finished. The stabilizer and fin are also complete, as is the fuselage.

Actual assembly consists of epoxying the two foam wing halves together (these were securely taped until the epoxy cured), cementing the plastic covered foam stab and fin into the aft end of the fuselage, and hinging the control surfaces. The front of the fuselage must be trimmed to allow clearance around the engine, and the plastic covering must be trimmed away in the landing gear saddles. Plastic sheet and suitable cement are supplied for covering the wing joint. The same cement is used to install the tail surfaces. A plywood servo plate is included and must be glued inside the fuse. Total time — less than two evenings — ready to install the radio gear.

The only caution required is to use ample epoxy (Hobbypoxy 2) when joining the wing halves, and care not to apply too much of the plastic cement when attaching surfaces or sheeting, as this is a solvent type cement and can work through the plastic and attack the foam if allowed to remain "wet" too long.

The Stinger is a swept-wing configuration with a 17% semi-symmetrical section, and a 66-inch span. The wing is covered with a plastic material with high impact characteristics and a unique ability to reshape itself after indentations.

The fuselage is a vacuum forming of the same high-quality plastic. Fuselage internal bracing is of plywood with hardwood motor mounts. A nylon nose gear block is pre-installed. Space is provided for a 12-ounce bottle tank and the firewall is drilled for passage of tubes. All control linkages and terminations are internal.

In general, the Stinger is a sharp looking ship which is more nearly ready to fly than most of the so-called ready-to-fly's. Although ours will not be flown for another 3 days we are confident that Don Brown would not risk his reputation on a ship that was not at least as good as and most probably better than the average Class III multi ship. From a "throw together" standpoint the Stinger is highly recommended, and we predict that you will be seeing great numbers on the contest trail. At $49.95 it's cheaper than building!

●

The following release has just come to our attention —

Lock Haven, Penna. 5 Dec. (AP)

The Piper Aircraft Corp. has just announced a brand new aircraft that holds the distinction of being the first and only full scale craft to be developed to fulfill a pressing need of radio control enthusiasts.

The scale event at radio control meets has always been the least important event because of the dearth of entries. Too many modelers have been unwilling to duplicate the intricacies of a full scale plane, so Piper Aircraft has reversed the usual procedure and come out with a FULL SCALE version of a popular radio control airplane — the Tri-Squire. Since there are hundreds of small radio control Tri-Squires flying in R/C now this latest move by Piper Aircraft has opened up the R/C scale event by making every R/C Tri-Squire a model of the new full scale plane.

The technical problems that were solved by Piper Aicraft were monumental. One of the toughest problems Piper came up against was described by Cordell Smoot, Chief Design Engineer at Piper. "We progressed rapidly into the design until we came up against the coil spring nose gear. 1/8" or 5/32" music wire had to be scaled up to a thickness of 2 inches. At first we had supply problems, as our steel suppliers could not provide 2" thick music wire. Finally, Bethlehem Steel's research and development department came up with our 2" wire. We subcontracted the coil bending job out to American Machine and Foundry.

"The sheet balsa fuselage sides were rather easier to procure. The balsa thickness only translated to 1½", and by laminating balsa logs we were able to get this thickness, in the widths necessary.

"Continental Engines was given the job of duplicating the K&B 19R/C into 125 HP version. They progressed rapidly until they came to the glow plug which had to screw into the 12" hole provided for it in the top of the head. Because of excessive development costs and the resultant high price of the Continental Glow Plugs we are recommending the cheaper plugs provided by Combustion Engineering's Boiler Products Division. Electric Boat Division of General Dynamics did a fine job of nylon molding to achieve a perfect 6-foot copy (complete with molded-in trademark 'Grish') of a 9" x 4 nylon prop. Early vibration problems with the huge one-cylinder engine were solved by making one blade of the prop 26 pounds heavier than the other blade. (A caution note here to our prospective customers: When tightening the 6" prop nut BE SURE to get the heavy prop blade — blade with 'Grish' trademark — directly opposite the position of the piston. Use ONLY the factory approved four way socket wrench marked 'Austin Craft.' At 175 pounds this wrench was left out of the approved list of airborne auxiliary tools, but is available in the optional 'ground service' package.) As the glow plug clip also turned out to be a piece of heavy equipment we also decided to put this clip into the 'ground service' package.

"We hope that our customers will approve of the 'Kwik Links' which were so faithfully duplicated by International Harvester. (These are the metal fittings attached to the one foot square spruce elevator and rudder pushrods.)

"We did take exception to the model builders' practice of sewing their control surfaces to the fin and stab. We did use the much easier-to-install one-foot-square pieces of ½"-thick nylon provided by Electric Boat.

"While the needle valve is full scale (don't get your head caught in the rotating prop while adjusting this) the clunk tank does not have a full scale wall thickness. We found that the radio control enthusiasts use an unnecessarily thick walled tank. During aerobatic flight do not be alarmed by the rather violent noise that the 30-pound 'Clunker' makes as it rotates around the tank walls. This is normal, and only slightly changes the trim.

"All in all, we at Piper Aircraft are highly pleased with the results achieved in our full scale Tri-Squire. We hope our customers will enjoy flying this very forgiving version of the radio control airplane."

Flying Safety Note: Under development by Weyerhauser Lumber Co. is a 12-foot long "Chicken Stick" used for starting the engine. As soon as a licensing arrangement is worked out between Weyerhauser and Tatone Products this item will be put on the market.

The foregoing was reprinted from the Carrier Wave, published by the McDonnell Radio Control Club.

All we need now is for Fokker to retaliate with a full-size Ugly Stik!

See **you** at the field!

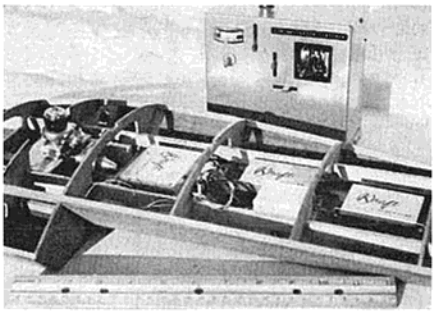
Beautiful Florida, and an afternoon's race. An unbeatable combination!

POWER & SAIL

DURING this past month, Jim Whitlatch has been testing a new Kraft KP-3 digital proportional set in his world record holding ski boat. This three channel rig comes with two servos, nickel cadmium pack for receiver/servo power, with the charger built into the transmitter case. The Kraft unit is completely wired with switch and harness, charger, and ready to install in your boat for only $250. The transmitter is 9 volt battery powered. Jim left it turned on, purposely, for two days, and although the voltage dropped to 7 volts, the transmitter still had more than adequate power. Jim feels that the battery will last at least six months of **every** Sunday running.

Servos with the Kraft three channel have over three pounds of static thrust, which is more than enough for all boat usage **except** steering struts pushed by Tass or Rossi power. Range and power is exceptional. Using a 12" vertical whip antenna on the boat (which is only one-third the recommended length for airplane usage), the range was "out of sight." And, by the way, this test was conducted on the water with the transmitter antenna half extended!

This is a true three channel set. By buying an additional servo and plugging it in (the receiver is already wired for it), you can have trim plate control, needle valve (mixture) control, bilge pump, or



any other third function you may desire. This third channel feature makes this new set adaptable to many other model uses.

In conclusion, RCM can highly recommend Kraft's new addition, not only because of its "out of the box" quality and low cost, but because of Phil Kraft's proven reputation for standing behind his product. Insofar as Jim's personal evaluation goes, he says—"boaters need no longer fear using digital proportional in their oily, wet, vibrating, mechanical noise producing monsters — that is, if their digital set says Kraft on it!"

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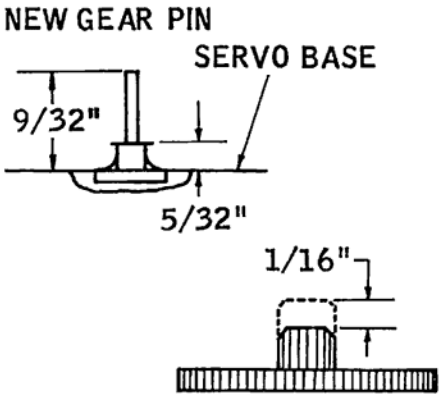
Needing a stronger rudder servo for use with his reed equipment when operating a power hydroplane, Elmer W. McKay of Pensacola, Florida, came up with a slight modification to the Bonner reed servo which should cost the average boater approximately 25c.

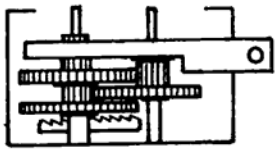
The first step is to completely disassemble the servo. Then, take and trace the pattern (see diagram) onto a piece of paper and punch out the original gear pin holes. Now fold the pattern on the dotted line and slip it in the servo case. Center punch the new pin location, along with the new motor mounting holes. Set "A" will put the motor alongside the case. Set "B" will put the motor toward the center more and the original mounting holes may be used.



Elmer used a 1/16" diameter nail for the new gear pin. A 1/16" I. D. brass tube is used to shim up the gear pins for the proper clearance. Two of them are 5/32" and the other is 3/32" long.

Epoxy the new gear pin in from the bottom, and when dry, place one 5/32" tube on the pin and fit the crown gear over it, spaced by a washer. Now put the motor on and mesh the gears, making necessary adjustments for proper clearance. When satisfied, epoxy the tube in place.

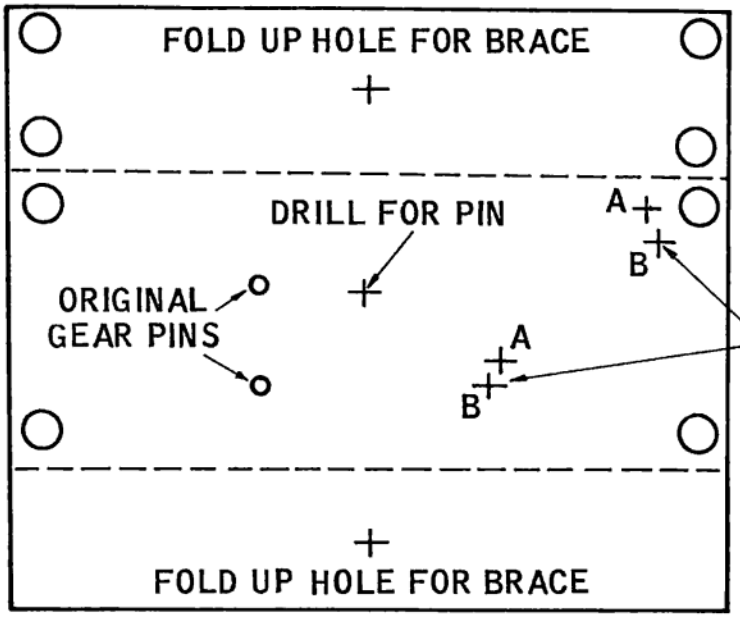
Next, cut about 1/16" off each gear, including the crown gear. Trim the top with a knife. A razor saw is ideal for cutting the gears. You may have to cut more off the gears, but do this with a file and fit it frequently so that you don't cut too far. You will need one more gear than is presently in the servo. This costs approximately 25c and must also be cut down, as above.



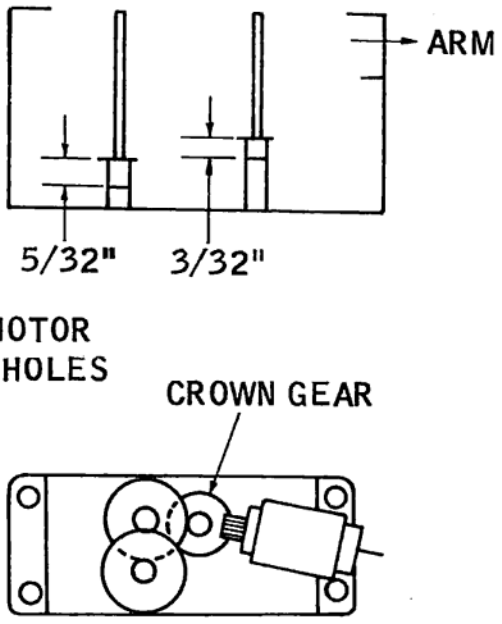
GEAR LOCATION

After all the gears are fitted, remove them and fashion a brace to hold the top of the new pin steady. Mel used a piece of 1/8" brass tube, flattened in the center, and drilled to accommodate the pin. After the brace is in place, reassemble the servo and test it out. It will run slower, but that should be expected.

Mel tested his servo by mounting it vertically, and hanging weights to the output arm, and then operating the servo. The tests showed it was pulling 6½



FULL SIZE PATTERN



MOTOR POSITION USING HOLES "B"

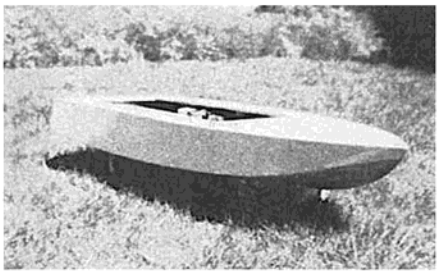
pounds without slipping. Mel didn't go farther than this, but it appeared capable of pulling up to 7 pounds. An inexpensive way of souping up reed servos, and well worth trying!

●

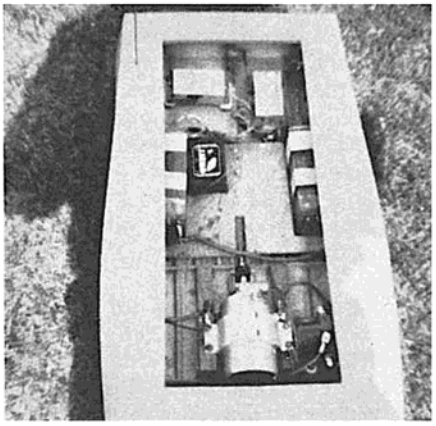
If you think electric powered boats are for sissies, and that they're too slow for you, how about trying to top Bill McCallister's IMPBA and WAM record of 25.89 MPH?

The first electric boat Bill set up for speed was a 48" balsa wood Corvette kit. This boat had a 12V Sunbeam automobile starter motor in the power compartment. The housing and end plates were turned down to make the motor as light as possible. Running the motor on 24V the boat did 13 MPH, which wasn't too fast due to the hull drawing an excessive amount of water due to the weight it carried. This early experiment with electric speed didn't even include a shut-off switch — Bill had to run the boat up on the beach to stop it!

Following this project, McCallister built a 48" plywood hull, 16" wide, with almost a flat bottom. Again, the Sunbeam motor was used. This second experiment was hampered, initially, with excessive radio trouble due to the high RPM of the motor and undue vibration.



After considerable experimentation, this hull set the WAM record at 18 MPH, running on 30V, but proved too big and



heavy to exceed its own record.

Thus encouraged, Bill began looking for a new boat and a new power source. The photographs show the new hull, which is 34" long, 14" wide, and constructed of thin plywood. A 6V Honda motorcycle motor was used with a set of six switches wired together to handle the amperage load. This hull went on to set a new WAM record at 23 MPH on 24V. The motor was drawing 100 amps and it took just 30 seconds to draw the nickel cadmium batteries to full discharge! Bill was, once again, experiencing radio difficulties, and unable to shut it off, lost full control of the boat at Delano. Its hull ran up out of the lake and the motor burned up.

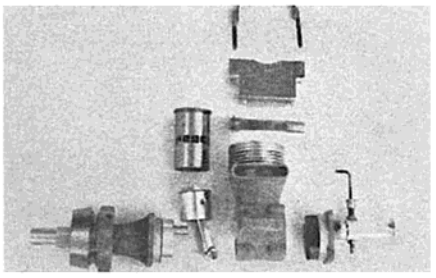
It was "back to the drawing board," and this time it was the same hull with a new set-up inside. All of the pictures are of this boat. This design is 34" long, 14" wide, and weighs 17 pounds with all the gear in it. The motor is a 6V Honda motorcycle motor with ball bearings installed in both ends. The bracket around the center of the motor was designed by Pat Alesendro in order to secure the motor in the hull. The shaft is 3/16" drill rod with brass tubing for a stuffing box, and a Narco thrust bearing after the U-joints. Battery power for the motor is 20 nickel cadmium cells (24V), 10 mounted on each side of the boat. This new machine would run about 25 seconds before the batteries start to go dead. A Bonner servo operates a small switch that energizes a 6V Ford starter solenoid. This latter unit is operated from the same batteries that operate the main motor, so that when the started motor would draw the batteries to discharge, the solenoid would kick out. This way, Bill would not burn up the motor if he lost control of the boat.

This boat presently holds the IMPBA and WAM record at 25.89 MPH on a two-way run using a 2¼ x 3¼ Sorrell prop. The radio is a four channel Orbit using 2 Bonner servos.

Bill McCallister mentions that he would very much like to see someone else try and break the existing speed record for electric class boats, and those interested in corresponding with him, can contact him at 303 Richardson Court, Mill Valley, California.

●

Is this the next .40 class record holder? K&B's new rear rotor .40, rat race



version with Octura's fine flywheel, universal, home made exhaust baffle for throttle, and home made intake tube with Super Tigre spray bar needle valve. Note the aluminum piston with one L-shaped

ring on the top edge. Steve Muck and Jim Whitlatch are running these in ski boats and they are very hot and hard to beat! The stock R/C version with carb is a good one, too.

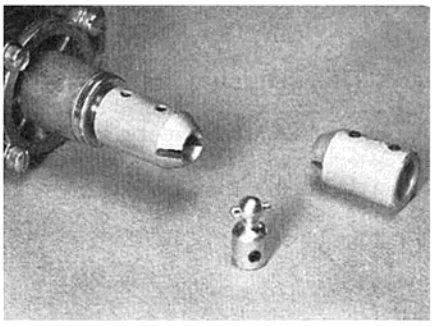
●

In the new products department, there is good news for the power boat enthusiasts. Steve Muck's world famous, record-breaking ski boat is currently being kitted by Dumas Boats. This will be an

extremely high quality kit, design approved by Muck. Watch for a future announcement about the availability of this one!

●

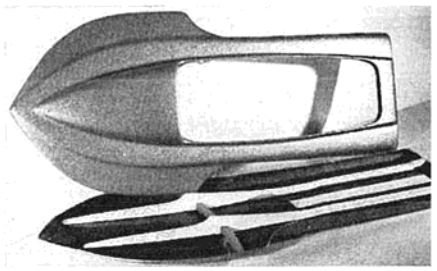
Tom Perzentka of Octura Models has announced their new universal joint for connecting the output shaft of the Cox 140 industrial engine to a 3/16" diameter



shaft. Order item #OC-C06, OC610M from Octura Models, 8148 N. Milwaukee Avenue, Niles, Illinois 60648. Price is $3.75 plus 25c for postage and packaging.

●

Sanger Boat Manufacturing, manufacturers of the world famous, full-size record holding drag hydro, has produced a fiberglass version for R/C usage. RCM will present a complete step-by-step construction and installation feature on this



new boat in a forthcoming issue. Available in 42 different colors, including metal flake, the boat will be distributed in the West by Joe Barazota, 656 Foothill, Pacifica, California. Price is $49.95.

In the club activity department, the Buffalo Model Powerboat Club is joining with the Metro Marine Modelers of Toronto, Canada, and the Rochester R/C Marine Modelers of Rochester, N. Y., in forming the Great Lakes Boat Association for the purpose of coordinating the model boating activities and to provide uniform competition among member clubs. The Buffalo group is starting its third year with a growing membership of 30 members. The City of Buffalo, N. Y., permits model boat operation at Delaware Park Lake from June 1 to September 30, every Saturday and Sunday from 1:00 P.M. to 7:00 P.M. Interested boaters should contact Secretary Ron Brounshidle, 159 Wendover Ave., Kenmore, N. Y. 14223.

●

By the time this appears in print, the Seattle Model Yacht Club, Seattle, Washington, will have held their Half Hour Marathon Rat Race, an event that proved quite popular last fall. This event is a thirty-minute straight affair, timed with a stop watch. Fuel tank size is limited to 4 ounces with switching tanks for refueling prohibited. Two pitstops are mandatory with the second pitstop required prior to the 25 minute gun. The pit crew is to assist with starting, launching, retrieving, and refueling. A triangular course is used. Following the Men's event, a special 15 minute marathon is held for the women entrants.

●

Ernie Baker, reporting for the San Francisco Model Yacht Club, mentions that their group meets the second Thursday of each month at the Club House near Spreckles Lake in Golden Gate Park. Power is run at the lake from 8:00 to 1:00 P.M. on Sunday mornings and sail yachts from that time on. SF area RC'ers interested in the club are invited to contact Secretary-Treasurer Frank Snowden, 1875 Alameda, Redwood City, California.

●

The first official meeting of the Desert Model Boat Club was held Friday, January 27, 1967. The acting chairman and organizer, George Mueller, called the meeting to order and immediately proceeded with the election of officers. The

new club officers are: President, Art Wehnert; Vice-President, Glenn Robb; Secretary, Fred Palmer; Treasurer, Fred Morgan. These officers are assisted by a Board of Directors that will help with policy and drafting of club by-laws.

The D.M.B.C. has about thirty active members and has plans for a full schedule of events for the coming year. The D.M.B.C. meets the last Friday of the month with the outing to the water the last Sunday in the month.

The D.M.B.C. membership was saddened by the news of the untimely death of Tucson model boater Len Aubuchon. Len was killed in an auto wreck returning from the January 22 D.M.B.C. Regatta at Lake Pleasant. It was felt by the members of the D.M.B.C. that the enthusiasm and sportsmanship displayed by Len should be remembered by all of us involved in boating and modeling in general. Toward this end the D.M.B.C. has established the LEN AUBUCHON Memorial Regatta to be held the last half of January of next year.

●

In the Sail department, Fred R. Gefken, Plainfield, N. J., scratch builds his own sailboats. The picture below is a 50" LOA version of the Schooner Emma C. Berry. Fred uses six channel Citizen-

Ship reed equipment for rudder and two winches on the model. His other original sailing craft include a 36" Hinckley yawl, the Patricia Anne; a 36" catamaran, the Knobi Knobi; a 50" brigantine, the Newsboy. Fred is a member of an informal group of boating enthusiasts which sails every Sunday of the year on a pond in Irvington Park, Lyons Avenue, Irvington, New Jersey. The group sports a fleet which includes R/C submarines, rowboats, steamships, fishing boats, barges, warships, sailboats, and even a couple of R/C ducks — all of which range in size from 18" to 7 feet.

●

John Reynolds, reporting for the Orlando R/C Model Yacht Club (3010 Chris Lane, Orlando, Fla. 32806) men-

(Continued on Page **43***)*

POWER & SAIL

(Continued from Page 42)

Have You Joined The I.M.P.B.A.?
See page 48 for details.

tions that their "first Sunday of each month" sailing event had more skippers from Tampa and St. Petersburg than they expected. Five boats were in the water simultaneously all afternoon. For lack of marks, the Orlando group played a "cops and robbers" game where you pick a boat to windward and with good way and everyone tries to catch him. Later, they set marks by towing them into position. Mark anchors were dumped by changing tacks. The attempts were crude, but proved feasible. No race scores were tallied, but Buddy Black, Cliff Hampson, and Harvey Klein should be commended for traveling more than 150 miles just to sail with the Orlando fleet. Incidentally, the group's annual regatta will be held on Lake Eola in the heart of Orlando on May 21, 1967. All RC'ers are invited to participate.

●

Frank D. Kelley, W. 2524 Francis, Spokane, Washington 99206, has been appointed Secretary of the newly formed Model Star Yacht Racing Association. Whitney Cutler, 65 E. Northfield Road, Livingston, N. J., is President of the organization which has been set up to coordinate the registering and competition of Dumas Star One Design sailboats. Dues in the MSYRA are $1 this year, which includes a certificate of registration for the boat, complete with sail number (number not furnished). All Dumas Star One-Design owners are invited to join this new organization which will help promote competition for the Dumas Star.

●

The BARONS of North Spokane, Washington, will hold a power and sail regatta on July 15-16 in Spokane. All R/C boat owners are invited to participate. Secretary Bruce Batch reports that the newly formed club has 29 members after only six weeks in existence! This is a combined aircraft and boat club with both aircraft and boat facilities. A chase boat and outboard motor is provided for the power boat enthusiasts.

●

Remember . . . Power & Sail is your department. Send your individual photos and notes, hints and kinks, articles and plans, as well as club news to Power & Sail, R/C Modeler Magazine, P. O. Box 487, Sierra Madre, California 91024.

The Roostertail

The Official Publication of the International Model Power Boat Association
General Office:
3638 S. 61st Court, Cicero, Ill. 60650

THE following is a letter from Bob Pachman to the members of the I.M.P.B.A.:

LETTER FROM THE IMPBA PRESIDENT TO ALL MEMBERS (for the Roostertail)

You have probably noticed that a major change has taken place in the method in which IMPBA memberships are handled. It is the purpose of this letter to explain the reasons for the change.

No doubt you realize that the IMPBA General Office is run on a strictly voluntary basis and this has resulted in some very long delays in the processing of membership applications as well as the other business of the office such as regatta sanctions, record certificates, rule modifications, inquiries, etc. all of which are first handled by the General Office. The end result at times has approached chaos with the backlog of work causing these delays.

Fortunately, someone upstairs was good to us and Luck in the person of Mr. Don Dewey, editor of this R/C Modeler magazine, has offered his office and help in speeding things up. Since the majority of IMPBA members also subscribe to R/C M and their subscription eventually ends up at the magazine's subscription desk, Don has offered to have his subscription dept. handle the IMPBA dues and magazine subscriptions directly, thereby shortening the time spent in waiting for the card and magazine. This will cut appreciably into the work of the general office and should result in much better service to all concerned.

I wish to publically thank Don for this offer of service to our Association. With cooperation such as that we can surely prosper and grow and then together we can enjoy this great hobby of boating.

Therefore in the future, PLEASE send all dues and subscriptions directly to the magazine at;

IMPBA
c/o R/C Modeler Magazine
P.O. Box 487
Sierra Madre, California 91024

Yours for better boating,
Robert J. Pachman IMPBA Pres.

At the last club meeting we were discussing some areas for rule improvement. One of the weak points was the standing start for the Multi Boat Event. It seems as though the port time of three minutes (this can be modified by most clubs to another unit of time) has created some skulduggery consisting of certain individuals letting the others start and get in the water, and then waiting for them to heat up and consume fuel, finally starting their engine in the last 10-15 seconds and starting the race. This little ritual slows up the regatta, and puts the early starters to a disadvantage. One way to avoid this would be to keep a three minute dock time, contingent upon the start of the first engine. The time would be reduced to a one minute, or thirty second, interval, for the rest of the Boats to start. Any boat taking longer than this would be allowed to race, but would have to catch up with the others. What do you think?

The second problem that seems to have created a lot of trouble is the demand for a re-run due to fouling by weeds, grass, or string. The demand for re-runs can reach extreme limits. It is easy to accept a thoroughly fouled prop as a ligitimate claim. However, those hairlike pieces trailing from the cavitation plate, or rudder seem to go on for ever. The only solution we can offer at this time is to have some better, and clearly stated criteria as to what constitutes a fouled boat.

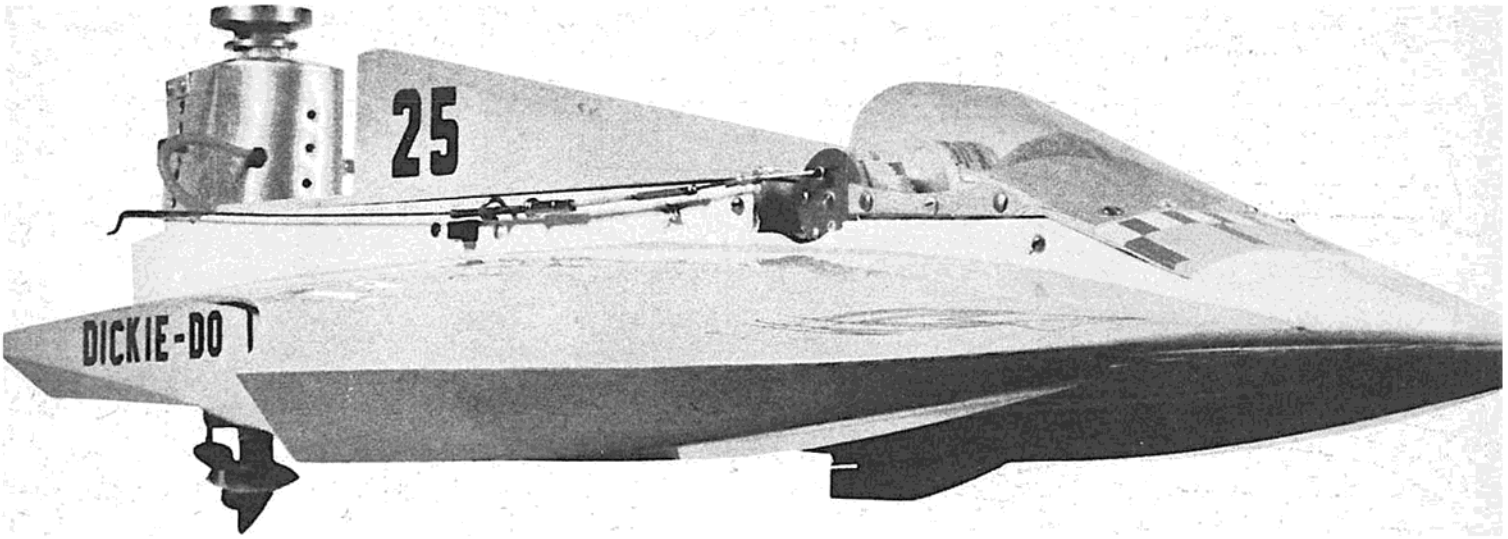
Our I.M.P.B.A. rules are generally good and comprehensive, but when you find a loop hole or point of confusion, please forward your findings so that the rule can be changed to a better one.

Here are some more lakes and times where you can see R/C model boating:

Minute Breakers R/C Boat Club
Lombardo, Illinois
Sunday afternoons each week
Lombardo Lagoon.
North Ave. At Grace Street.

De Vry Dolphins
Chicago, Illinois
Sunday Mornings
Otowatomie Lake, Wheeling, Ill.
Dundee Rd., East of River Road.

Marquette Park R/C Motor Boat Club
Wednesday evenings and Sat. mornings and Sun. afternoons
Marquette Park Lagoon
67th St. and S. Kedzie Ave.



DICKIE-DO

.15 powered outboard hydro by

DICK HANSON

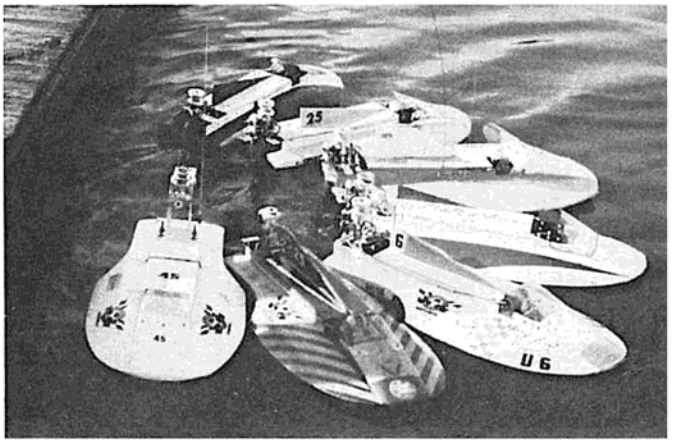
THIS particular outboard hydroplane was designed in 1958, following the purchase of a very unusual engine — a K&B Allyn Sea Fury Twin. Inasmuch as I had always enjoyed watching the full size hydros race, I decided to build a smaller version for use with this outboard glow engine.

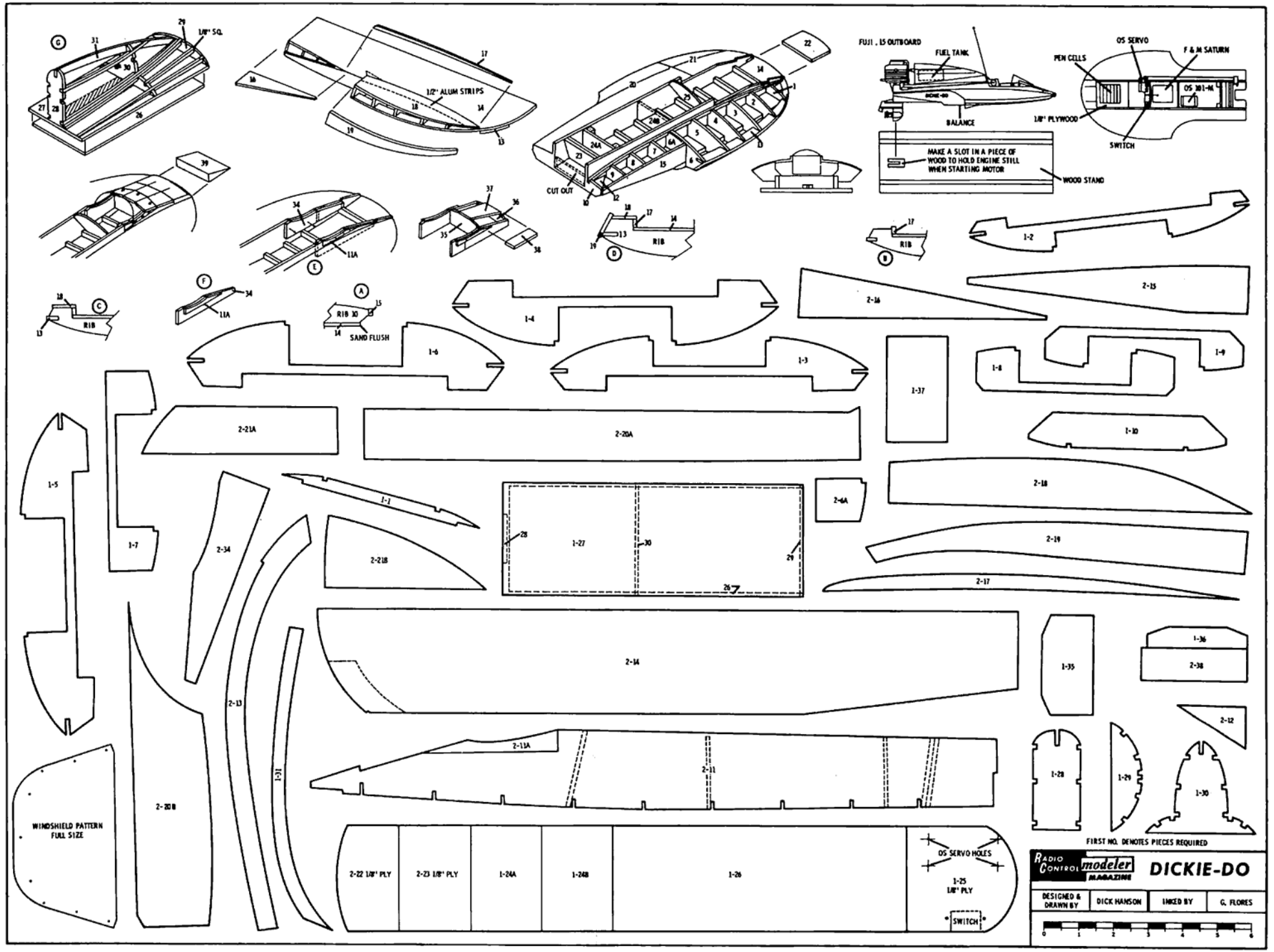
The completed boat proved to be quite successful right from the start, and it was in operation at the local pond each Sunday. The following year, I read in one of the model magazines that there was going to be an R/C boat race in Milwaukee. I attended the meet simply to find out what the other R/C boaters were using, and was quite surprised to find a majority of "V" hulls and air screw boats. In those days there really was one class of competition, with the result that the .049's ran against the .60's. The contestants who bothered to come over to see the little outboard thought it was cute, but too small and underpowered to produce much in the way of speed. They suggested that I enter in the Scale event, and that I might possibly win something in that category.

I didn't take their advice, however, and as it turned out, the Dickie Doo took second place for speed (the first time I ever went around a marked course), and I think the trend to hydroplanes began.

At the next sanctioned meet, it became the fastest racing boat in the I.M.P.B.A. The old record was something like 1:30.0, and on September 27, 1959, in Chicago, the outboard did the two lap quarter mile oval in 1:17.8. Back in those days, when one contestant had a good run, everyone would applaud. In this case, however, there was silence — broken only by occasional muttering! The following year, on May 22, 1960, to be exact, it set a new record of 1:13.0. This was topped by a young man who built an identical hull and captured the mark at 1:08.0. There are a few old timers who still say it was one of the finest running hulls to this day. Then the roof fell in — K&B stopped making the outboard engine! As a consequence, I stopped racing until a couple of years ago when I put an inboard in the hull and won a few trophies, but no new speed records.

At this point, I heard that Fuji of Japan had an outboard engine. Finally, last autumn, I located one in a hobby shop, put it on the old Dickie-Doo, and went out to the pond with boat and camera. I ran the rejuvenated hydro without breaking in the engine and also without the engine fairings shown in the photos. Nevertheless, it showed good speed even in its stock condition. It started quite easily, and by cutting open the exhaust hole and eliminating some excess metal, it has the potential of a




1/8" SQ.
1/2" ALUM STRIPS
CUT OUT
RIB
SAND FLUSH
FUJI . 15 OUTBOARD
FUEL TANK
BALANCE
MAKE A SLOT IN A PIECE OF WOOD TO HOLD ENGINE STILL WHEN STARTING MOTOR
WOOD STAND
OS SERVO
F & M SATURN
PEN CELLS
OS 301-H
1/8" PLYWOOD
SWITCH
1-2
2-15
2-16
1-4
1-6
1-3
1-37
1-8
1-9
1-10
2-21A
2-20A
2-18
1-5
1-7
2-34
1-1
2-21B
1-27
2-6A
2-19
2-17
2-14
1-35
1-36
2-36
2-12
2-11A
2-11
1-28
1-29
1-30
2-13
1-31
2-20B
WINDSHIELD PATTERN FULL SIZE
2-22 1/8" PLY
2-23 1/8" PLY
1-24A
1-24B
1-26
OS SERVO HOLES
1-25 1/8" PLY
SWITCH
FIRST NO. DENOTES PIECES REQUIRED
RADIO CONTROL modeler MAGAZINE
DICKIE-DO
DESIGNED & DRAWN BY
DICK HANSON
INKED BY
G. FLORES

good running engine.

One of the advantages of an outboard engine as compared to an inboard is the simplicity of the installation. It also leaves the interior free of oil as well as allowing more space for R/C installations. The engine, itself, has everything on it — cooling head, flywheel, throttle, and is fully adjustable. So, once the hull is finished, you can screw the engine onto the transom and you are ready to go.

I hope you'll like the Dickie-Doo. Fuji still makes a line of outboard glow engines, and I understand there is another line of various displacement outboards available in England.

Construction

Cement ribs 9 to 1 in that order, pin to side rails (parts 11). Cement rib 10 in place. Lay the assembly, from rib 10 to 7, on a flat surface with a weight across the side rails, and align very carefully. Parts 11 must be straight and perpendicular to rib 10. Glue parts 12 into place.

Glue parts 11A to the outside of parts 34 (see detail F). On a flat surface over wax paper join parts 14 together. It's optional as to joining the two pairs of 20A and 20B, 21A and 21B, or you can glue them separately on the hull.

Glue parts 6A on to rib 6.

Glue parts 13 into place.

Glue part 14 into place, and pin securely. The notches of parts 13 and part 14 should line up.

Glue parts 15 into place. They rest on top of part 14 at ribs 6A and 7, and flush up against rib 6.

Cockpit assembly can be started for a fill in, while the assemblies are drying. Pin the two cockpit assemblies (see detail E) to the side rails. Glue formers 35 and 36 into place. Glue part 37 into place. Glue parts 38 into place. Bevel both pieces where they join part 37. Do not get glue on the side rails, so that you cannot lift this assembly out. With cockpit in place glue nose block 39 in place. When dry shape and sand even with the hatch. Remove cockpit, take the celluloid windshield and assemble to cockpit with 2-56 screws.

Take a flat block of wood with a piece of sandpaper wrapped around it, and sand parts 15 and 14 flush to the ribs 10 to 7. Glue parts 16 into place.

Glue parts 17 into place. The front of 17 should be even with the notch on part 14.

Glue parts 18 into place (see detail C).

Two pieces of one-half inch wide aluminum strips (one with a tab) should be contact cemented to parts 18 later on (see drawing).

Wet the outside of parts 19 before cementing in place. Use tape and pins to hold front end down. Trim and sand flush when dry (see detail D).

Glue the two one-eighth square stringers into the rib notches along the side rails. Cut the stringers on an angle at the front, also bevel parts 13 from the side rails to rib 1.

Glue the pairs of 20A and 21A into place. Use the center line of rib 3 as a joining place. Glue the pairs of 20B and 21B into place.

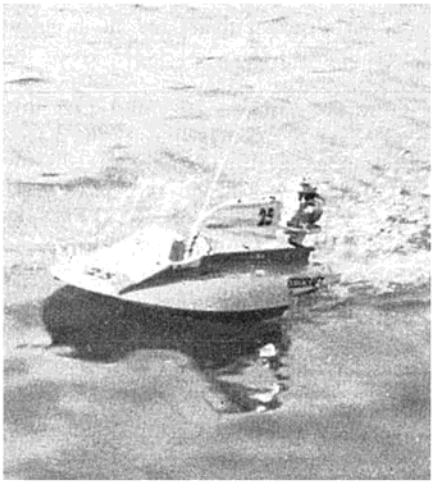
Cut out the section of rib 10 between the side rails. Glue transom parts 23 into place. Glue parts 24A, 24B and 25 into place. Cut the bracing out from rib 2, and cement a piece of one-eighth plywood to part 14. This will be used to hold the battery case down. Glue two hardwood squares by part 24A, to receive screws to hold fairing down.

Assemble fairing on the hull. Pin part 27 up against part 25, and on top of the side rails. Glue 29 at the same angle as part 25. Glue parts 30, 28 and 31 into place as indicated by the dotted lines on pattern 27. Glue one-eighth square balsa strips into notches of formers (see detail G). Remove when dry and glue part 26 to the bottom of 27. Part 26 will be between the side rails when fairing is locked on to the hull. Cut a hole through 26 and 27 for a fuel tank. Cover outside of fairing with silkspan and silk or balsa sheeting.

Sand hull smooth and cover with silk and if possible contact cement thin pieces of plywood around parts 19.

Use the engine fairing screw to hold the aluminum control arm and hook directly to servo. Do not use more than a three-sixteenths movement to right and left on the engine. Do not over-control the hydroplane, especially with single-channel R/C.

A starting stand, as shown, is very important, since it takes the strain off the servo when the cord is pulled.



TOP OUT

(Continued from Page 8)

car. Our own personal assessment of the conduct of the contest was confirmed by complete absence of complaint or dissatisfaction among contestants from flight line to the Saturday night barbeque dinner to the stout rib-sticking food served at the field refreshment pavillion by the enterprising ladies of Buckeye. To them all — to Ed Dolby who CD'd — and to the Arizona RC Society . . . good show, and we'll see you next February!

FAI DEMONSTRATIONS

Word just received from Larry Snedeker, president of the Weak Signals RC Club, relays that the Toledo conference was bigger than ever and that the raffle held there to support class I & II Internats demonstrations in 1967 realized $550. Chuck Wass, of Micro Avionics, aided in making one of the popular green-boxed proportional rigs available and that Al Betkey and Jack Clark along with Tom Schmitz did yeoman service in making the money raising effort the success it was. This energetic trio and Larry worked long and hard to add the raffle to their already over-full task of the conference itself. However, belief in the demonstrations brought out the 'extra' to make it all possible. Cliff Weirick, AMA President, officiated at the drawing and announced the winner: Walt Keith of Elyria, Ohio who gladly drove back to Toledo to pick up the prize. The conference saw almost 10,000 viewers who enjoyed 55 industry exhibits and about 250 models on display. . . .

"Classic," beautifully finished fiberglass-foam ship is future kit by Model Trends of Los Angeles. George Sosic and RCM's "Man on the Cover," Johnson Quarles, showed winged gem at Buckeye, have eye on "Best Finish" award at '67 Nats.

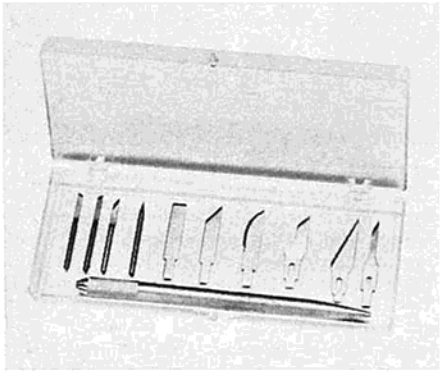
SHOWCASE '67

Additional information on Showcase '67 items can be obtained from RCM's Reader Service Dept. See page 77.

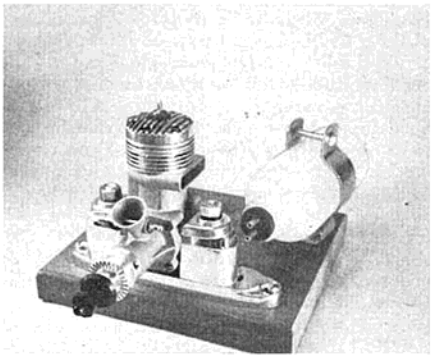
Darin Bros., 5221 Allen Road, Allen Park, Michigan 48101, has announced the release of their Qwik-Cote, a new covering material available in eight high gloss colors, including blue, red, white, black, yellow, aluminum, orange, and green. All that is necessary for a quick, durable covering job with no painting is to lay Qwik-Cote on the model, seal edges with iron, and shrink tight with iron set at 250 to 400 degrees F. The material is fuel proof, fade proof, and moisture proof. Price is $3 per 26" x 36" sheet, available at your dealer, or may be ordered direct. For further information, **Circle #1 on the Reader Service Card.**

deBolt Model Engineering Co., Buffalo, N. Y. 14215, has a complete line of R/C accessories. Among these are their Clean Flow fuel filters. The only real assurance of a clean fuel flow is to filter it as it enters the line. It is recommended that you use their FT-1 Filter in the fuel tank as a "clunk" weight, and their FL-2 filter in the fuel line between the tank and the engine. These are precision made metal filters that really do a job. Tested, approved, and recommended by RCM. For further information, **Circle #2 on the Reader Service Card.**

Griffin Manufacturing Co., 1656 Ridge Rd. East, Webster, N. Y. 14580, manufacturer of precision built tools for industry, has released their new kit #24-1. This craft kit includes a lightweight, precision made lifetime aluminum blade holder plus ten different highgrade tool steel blades, all packaged in an attractive pocket size styrene plastic carrying case. This is a most excellent addition to either shop or R/C field box. Tested, approved, and recommended by RCM. Price is $2.50. For further information, **Circle #3 on the Reader Service Card.**

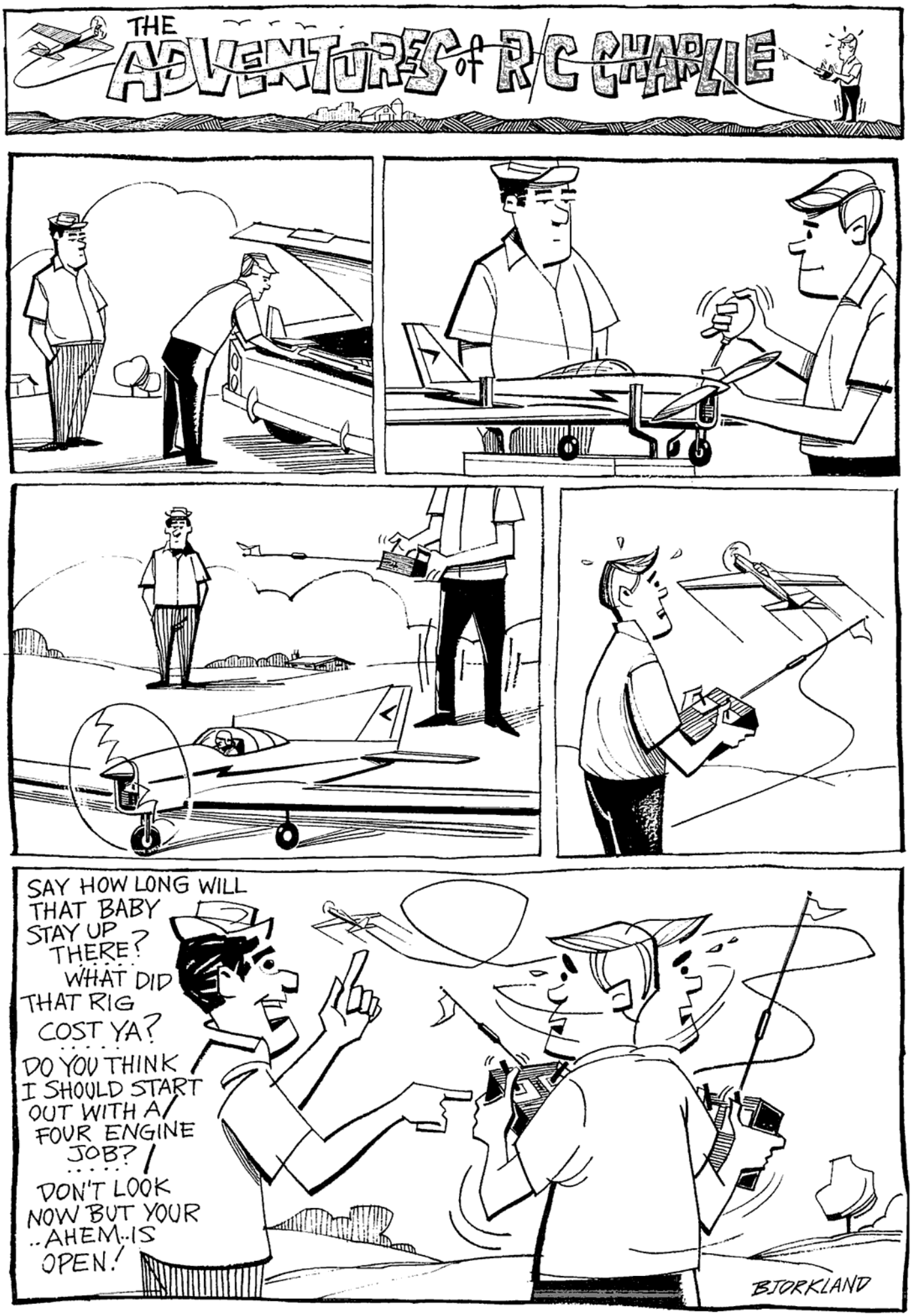


Tatone Products, 1275 Geneva Avenue, San Francisco, Calif. 94112, now have available a heavy duty, cast aluminum Engine Test Stand unit. The test stand is completely adjustable and will take any size engine, .049 to .74 displacement. The aluminum hold down pads are extra thick and can be tightened hard against the engine without fear of breaking. The stand is polished to a bright finish and is attractive enough to be used as a display stand. Each unit includes a 4-ounce polyethylene tank and fittings, a tank mounting bracket, and all the necessary mounting screws. Just screw the mount and tank bracket to your workbench or flight box, install the engine, and it's ready for running in less than five minutes. This complete, ready to run unit sells for $4.50. Sold separately, the engine test stand sells for $3.25 each. **Circle #4 on the Reader Service Card.**



R & D Products, Box 404, Paramus, N. J. 07652, has released a line of "hard to find" hardware components designed for R/C usage. One of these is a conveniently packaged set of high tensile strength molded nylon screws and blind mounting nuts which assure positive location and demountable lightweight fastening for wing and landing gear components. The second item is individually packaged commercial micro-switches which are particularly suitable in providing additional controls such as flaps, brakes, or accessory operation. This tiny unit measures a mere ¼" x ⅜" x ¾" and is furnished with two mounting holes and three solder terminals for normally open or normally closed operation. For further information, **Circle #5 on the Reader Service Card.**

Cleveland Model & Supply Co., 4504 Lorain Ave., Cleveland, Ohio 44102, has produced their #4 catalog, which, in itself, is a call to aviation buff's nostalgic desire to relive the glorious romantic days of early flying. This 1967 issue is a treasure-trove of "new" ¾" scale model designs of historic and classic aircraft, many of which have never been available before. Those desiring a copy of this collector's item must remit a 25c service charge to E. T. Packard, Founder, c/o Cleveland Models.


THE ADVENTURES of R/C CHARLIE
SAY HOW LONG WILL THAT BABY STAY UP THERE? . . . . WHAT DID THAT RIG COST YA? . . . . DO YOU THINK I SHOULD START OUT WITH A FOUR ENGINE JOB? . . . . DON'T LOOK NOW BUT YOUR ..AHEM..IS OPEN!
BJORKLAND

Greece City Xanthi by Night

Old City Xanthi Street

Old City Xanthi House

Xanthi Central Square

Xanthi Lake Vistonida

Xanthi River Nestos

Xanthi Old House M.Xatzidakis

RCBookcase H.E Hlsat