

R/C **MODELER**

THE LEADING MAGAZINE FOR RADIO CONTROL • DECEMBER 1966 • 50¢



**THE CHALLENGE OF R/C SCALE
T-28B BY DAVE PLATT**

**COMPLETE BEGINNERS SECTION
WHIZ KID & CESSNA 150**

FOUR ENGINE SINGLE CHANNEL B-24

COMPLETE FAI FINALS COVERAGE

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.

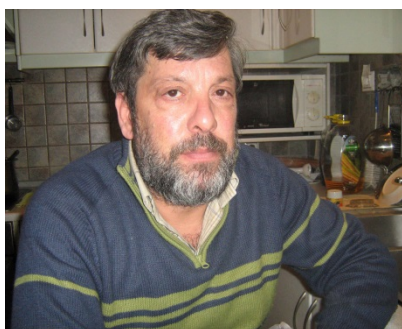
Now after all this experience I have decided to digitize, to clean and to re publish in digital edition and free of all issues RC Modeler magazine from 1963 to 2005 and others books and magazines.

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 ψηφιοποίηση τους, τον καθαρισμό τους αλλά και να τα μοιράζομαι μαζί σας αφού τα δημοσιοποιώ στο διαδίκτυο (όσα από αυτά επιτρέπεται λόγω 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.

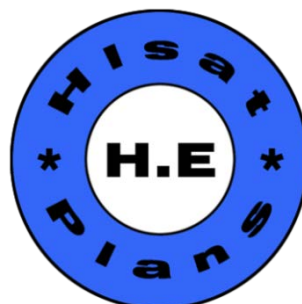
Δεν είναι η μητρική μου γλώσσα γιατί είμαι Έλληνας.

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. (H.E)

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>

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Thanks Elijah from Greece.

RADIO CONTROL MODELER

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DECEMBER

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COVER

Miss Karen Anderson, 19-year-old sophomore at West Liberty State College, West Virginia, poses with a 9' scale Taylorcraft by Vic's Custom Models. The full size Taylorcraft, in the background, is owned by Earl Ewing. Ekthron taken at Montgomeryville Airport, Pa. by Lenhardt Brune.

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EDITOR'S MEMO

BY DON DEWEY



I DON'T know how many of you read the general electronics magazines, but one of them, "Radio-TV Experimenter" (October-November 1966), carried a most disturbing statement and recommendation about utilizing the "so-called" radio control channels for "hamming" on the unlicensed walkie-talkie units now so prevalent among the younger set. The following is a letter sent to Mr. Julian M. Sienkiewicz, Editor of the Davis publication:

Gentlemen:-

This is a letter of protest to a statement and/or statements made in your 'CB Rigs & Rigmarole' column on page ten of the October-November issue of Radio-TV Experimenter Magazine. The item referred to reads as follows:

"By the way, with these unlicensed units (CB walkie-talkies), you don't have to toe the mark with the FCC's strict Part 95 (licensed 5-watt station) rules. You can gab for hours, work 'skip,' even play music! The only things to remember are that you can't cause interference to the 5-watt CB stations, as they have priority use of the channels. Here's a hint: don't operate on any of the 5-watt channels, use the so-called 'radio control' channels which lie between the regular CB channels. The radio control people seldom use the channels (they seem to favor CB channel 23 and will shortly be moving to 75MHz, at least most of them). See if you can get crystals for: 26.965, 27.045, 27.145, 27.195, 27.235, 27.245 MHz."

This excerpt was made by the author in conjunction with a product report on General Electric's new CB walkie-talkie. I am quite surprised at the irresponsibility of this statement, particularly from a magazine with the reputation enjoyed by Radio-TV Experimenter. Apparently, it is based on a complete lack of information concerning the national sport of radio control. To begin with, there are between 75,000 and 100,000 radio control model aircraft and boat enthusiasts operating on the "so-called radio control channels." The frequencies used are: 26.995, 27.045, 27.095, 27.145, and 27.195 MHz. The only allocated channel frequency not used too

frequently is 27.255 MHz, or Channel 23 as you call it, simply because it is shared with Class D stations, thus posing a definite interference problem for both operators.

Ours is primarily an adult hobby, as evidenced by the fact that the age of our average reader is thirty-four. The models they fly, both for sport and national and international competition, range in cost from \$150 to \$1000, not counting the labor involved in each. If you will take the time to glance through the pages of the copy of R/C Modeler, enclosed with this letter, you will see that a great percentage of the basic radio systems advertised are in the \$300 to \$600 price range — and this does not include the engine, brakes, or numerous accessories involved in a single aircraft! The damage that could conceivably be done as a result of a published statement such as you have made is almost beyond comprehension. Imagine, if you will, the result of a group of young walkie-talkie operators "hamming" in the vicinity of the seven-day National Model Airplane Championships where over two hundred of our top competitors are competing in front of a quarter of a million spectators. As another example, I can just imagine the repercussions involved if one of our U. S. team members, due to compete internationally against virtually every major country in the world next September, lost his competition aircraft due to interference from a walkie-talkie operator who had been urged to "work skip, gab for hours, or even play music" on the "seldom used" radio control channels! And this is to say nothing of the majority of RC enthusiasts who will suddenly be confronted with a new source of interference that could prove quite costly to each.

With regard to the latter part of your statement, concerning the 75 MHz frequency, this is also inaccurate. Just as with the RC frequencies on the 27 MHz band, it took a great deal of time, effort, and money on the part of the Academy of Model Aeronautics, members of the radio control industry, as well as individ-

ual enthusiasts, in order to obtain these frequencies from the Federal Communications Commission. To date, there is no equipment approved for use on the 72-75 MHz frequencies which we have obtained. When this equipment is available, this will enable us to thin out both bands so that there will be room for the ever-growing population of participants in this sport. The 27 MHz frequencies, however, will continue in use. In addition to the tremendous interference problems that could well be created by your recent statement, especially if a correction is not printed, the more ethical side of publications involved in any discussion of the Citizens Band Service would certainly predicate a responsibility not to encourage "hamming" on the Service — this particularly in the light of the problems that continually confront the Federal Communications Commission along the lines of this very subject. Although, in the purest technical interpretation, it is legal, it certainly does present very concrete problems for all of the more legitimate uses of the Citizens Service. Such a disservice to all such legitimate users of the 27 MHz frequencies could be corrected in the future by simply advocating that there is a place for "hamming" — on the amateur bands and not on the Citizens Service. It is not that difficult to obtain an amateur radio operator's license.

We trust that the statement in the October-November issue of Radio-TV Experimenter was simply an oversight on the part of the Editor and will be corrected at your earliest possible convenience.

Photo-copies of the letter have been sent to the Federal Communications Commission, Academy of Model Aeronautics, the model press, and members of the Radio Control Industry Association.

The only remaining word I have on the subject is that this type of misinformation is just what we **don't** need! We hope that any RCM readers who sees anything of this nature in the future, regardless of its source, will bring it to our attention as quickly as possible.

With this issue it becomes our sad duty to bid adieu to Chuck Waas, RCM's Production Editor, who has been with the magazine since its beginning in 1963. Chuck has been our "man in the field," covering meets and contests around the country, as well as being responsible for co-ordinating advertising and production schedules. Chuck, who is accepting a position with Micro-Avionics Inc., will be missed by all of us at RCM — especially this writer who has been privileged to enjoy his friendship for many years. We take this opportunity to wish him the very best in

(Continued on Page 6)

his new association.

We would also like to welcome aboard the RCM staff, Doug Tucker, an old-time friend of this writer, who will be the new Assistant Editor of R/C Modeler Magazine. This position will encompass the duties of the Production Editor as well as that of an Assistant Editor. Formerly a sales and general manager in the industrial construction field, as well as having been a California peace officer for several years, Doug is an extremely competent field representative and photographer. We hope that all of you will look for him at the major contests and trade shows and help to make him at home in this new field of endeavor. Although he has been inactive for several years in modeling, it hasn't taken him long to re-orient himself to today's R/C activities. Besides that, I have taught him all I know . . . which, as one sage recently put it, "must have taken all of five minutes and is somewhat similar to the blind leading the blind!"



Doug Tucker

I would also like to publicly thank the Port Arthur Oily Birds (of which I am proud to be a member, by the way) for their hospitality to a recent visitor to Texas. Willie Richards, a minister and active RC'er, was about to leave his home in Compton, California for a vacation through Texas. I suggested that he contact the Oily Birds and see what mischief my fellow club-members were up to. A few weeks later, Willie returned, and said outright that the Port Arthur group was the finest group of modelers he had ever met — gracious, considerate, and a credit to the entire R/C fraternity — a group he had been proud to meet.

And then we received the Port Arthur Squawk Sheet, monthly bulletin of the Oily Birds. We are reprinting for your enjoyment the account of this meeting:

"The monsoon rains were pattering against the plate glass window as usual, and flying was pretty much at a low ebb as it has often been this summer. Now,

in case the gentlemen members of our group don't know, I suggest that they ask their wives what happens on the one day of the week that they decide not to fix up their hair or not to clean the house. Sure — company comes — isn't that right?"

"That's what happened to us last week. The caller, who had a special recommendation from Don Dewey, RCM Editor and Life Member of the Oily Birds, presented himself to Calvin Scully with a request for a demonstration of how this 'lively little group' operates. Oh, yeah!

"After some telephoning around, Cal managed to rouse a minimum of mild enthusiasm (would you say that was putting it too strongly, Cal?) and the party proceeded to our pride and joy out on Highway 73. Now you must know that this year is only the wettest for this area in 60 years (more or less), and all that dust which we used to complain about has been, for most of the summer, buried under a most unusual amount of water. Grass of an almost poisonous green and unseemly vigor is working night and day to try to imitate the nearby rice fields.

"The visitor's grey suede Hush Puppies soon were a sodden mess and the rain still came down. A token amount of flying was done, just to prove that we could operate without pontoons and despite the flickering lightning.

"Then, to bring the whole episode to a real disaster area finish, the visitor in helping to push one of the stuck cars out of a monstrous mud pie (which we laughingly call a road), became covered from head to toe with muck thrown up by the rear wheel of the vehicle.

"We have been laughing at this fiasco, but believe me, it is as much from embarrassment as from the humorous aspects of this affair. We wish to apologize here and now for the trouble our guest had to endure and to assure all concerned that we are indeed sorry.

"If the weather will only get back to normal (say, only a hurricane or two to contend with), we promise to try our best to get our access road in a more presentable condition. In the meantime, what we wouldn't do for a little dust, say about 30 or 40 truck loads of it to drop in the mudholes!"

Anyway, Bob — Willie thoroughly enjoyed the entire event, and I would like to thank you, and all of the Oily Birds, for your usual Texas hospitality.

And to think that all of this time Cunningham and Kleinburg have been lying to me about Texas weather. Fortunately, I live too far from Port Arthur to attend club meetings. Besides . . . who likes riding to and from the club field on a Caterpillar 'dozer' . . . ?

In Japan, baseball fans are avid and devoted.

Masaru Ueda, the Tokyo manufacturer of the excellent Ueda engines distributed in the U. S. by Associated Hobby Manufacturers, flew into town to confer with Bernard Paul, president of the latter firm. Mr. Ueda's reservation for a return flight to the West Coast allowed the Japanese manufacturer exactly two hours. It was on a non-struck American Airlines plane. If Mr. Ueda had missed the plane, the strike plus overflow business on the operating lines, would have stranded him in Philadelphia for an unlimited period of time.

"If you can get tickets for the Philadelphia Phillies ball game," he told Mr. Paul through an interpreter, "I'd like to stay even if I miss my plane."

Mr. Paul got the tickets. Mr. Ueda saw the game and they talked business the next day. Baseball came first.

Fortunately, the Japanese industrialist was able to change his reservation flight back to the following night. He probably wouldn't have cared if he was compelled to remain in Philadelphia, because the Phillies were scheduled for two additional games at Connie Mack Stadium!

A note to Bernie Murphy: It is definitely not proper protocol to telephone the Editor of RCM and open the conversation with — "Is this the West Coast drunk?"

Bernie, by the way, wanted to know what to "wish" you readers in this month's Kits & Pieces. As he put it, "I'm writing this during the first week of August; Labor Day Weekend is still to come; the magazine will come out in November for the Thanksgiving season; and the cover date is December. Do I wish them Happy Vacationing, a good Thanksgiving, or Merry Christmas?"

I really couldn't tell you, Bern. We have quite a few seasonal cover shots around here, but the same problem confronted us. So, I settled for an East Coast shot of lovely 19-year-old Karen Anderson in a bathing suit, posing with a 9' Taylorcraft by Vic's Custom Models.

And models are my first love.

Followed very closely by model airplanes.

I don't care who you guys are, or if Bill Northrop did send you, quit tromping around on my roof. . . .



KITS & PIECES

BERNIE MURPHY

THE most difficult part of this column is where to begin. Ah! At the beginning!

In the beginning there was printed balsa, sticks, razor blades, cement, paper, rubber bands, and cut fingers! After many hours of diligent labor, some resemblance of an airplane was created. A few seconds of "flight" and the entire assembly was usually reduced to sticks, paper, and rubber bands.

As the state of the art advanced, the rubber bands gave way to gasoline engine, the printed balsa to die-stamped parts, the paper to silk, the razor blades to knives. The cut fingers remained. Wires were added for control, and soon the possibility of a successful flight became a reality.

Today, for us at least, the wires have given way to complex radio systems, and prefabrication has reduced assembly time to a minimum. Ready-built ships are now available, even reducing the ever present cut fingers. Successful flights are a reality for most.

But then, there's still our old friend, Harold Goldklank! Harold's outstanding building and flying are unequalled in the annals of R/C history! The tales about the "Red Baron of the Brooklyn Garbage Dump" appear to be based around some imaginary comic strip character. 'Tain't so! Harold's for real!

The official flying site of the PARCS, of which Harold is a member, was the Brooklyn, N. Y., dump! To quote Harold — "What better place? When we land we just leave the junk lay!"

Imagine (if you can), walking through the dump on a hot, humid, Sunday afternoon. Then imagine trying to explain to the fellows at the funny farm that you really did see fourteen adult men sitting in beach chairs with umbrellas, playing with toy airplanes, right there in the middle of the dump!

On a recent visit to a neighboring club field, Harold executed a beautiful "Oh No!" followed immediately by his exclusive Rolling Nine, followed with a precise Spot Crash into a nearby harness racing track. Judging by the spot in which the crash occurred, the Baron must have really frightened several horses! Needless to say, Harold was left alone to retrieve his wreckage. The entire airplane and its delicate control mechanisms were covered with "smelly's." True to form, Harold pack-

aged his "Spongeatrol" exactly as retrieved and returned it to its unsuspecting manufacturer with the following note:

"Dear Sir: Your equipment STINKS!"
Ah! That's our Goldklank!

We recently received a letter asking why everyone continually refers to our Editor, Don Dewey, as "Fearless Leader." The answer should be quite obvious — re-read the last few paragraphs and you will certainly agree that any editor who would print that should deserve the title!

A review of the reams of mail that have poured in during the past months indicates a very disturbing need among the novice and newcomer ranks — assistance, guidance, leadership, call it what you will — **HELP!**

One letter queried us about the use of a Rand actuator in Sterling's Cosmic Wind . . . "is the plane too big . . . will we be reviewing it?" The writer gave no indication of his experience other than the questions asked. Since I built and flew the Cosmic Wind over four years ago, and flew it on escapements, it is apparent that this fellow is new to the ranks of R/C. The Rand actuator, sufficient to fly a .19 powered Falcon .56, is more than adequate for the .049 Cosmic Wind.

This is just an example of the many, many letters we receive, and try as I might, it is impossible for me to personally answer more than just a small percentage of the letters that come in each month. This also holds true for each of the columnists, not to mention old Fearless who personally receives several hundred a month. Do continue to send them along, anyway, as they do help form the trends of this, as well as the other, columns, as well as broadening the views of each of the columnists. Still, there are many of you with your own seemingly insurmountable problems. The one best single answer to most every letter is simply this — if you are serious about R/C, regardless of the phase, search out the nearest club. Most "hobby shop" proprietors will take an interest in your problems and try to render aid. He is also your most likely contact with an R/C club. Try to locate an organized group with a few "old timers" — fellows

(Continued on Page 8)

who are flying successfully. A group of novices can offer little, if any, help.

While on the subject of organizations, don't forget to cast your vote in the forthcoming AMA election. Of course, if you are not a member, you cannot vote. If you don't belong, or don't vote, don't be surprised at the outcome. The Academy and its leaders have received some hard knocks in recent months, some of which can be attributed directly to apathy among its own members. I, personally, as well as most of the staff, feel that Cliff Weirick has the vitality and integrity required of an Academy President. Let's all support Cliff and give the Academy and all model flyers one of the best Presidents ever! Now I'll get off the soapbox.

Here is a fairly simple formula for achieving a good "Sunday Flier" finish. Not the super-duper prize winning finish used on those "special" ships — just a good job that you don't feel you have to hide from the rest of the group.

First, get plenty of clear dope and thinner. Thin all of the clear dope at least to a percentage of 60% dope and 40% thinner. Brush on two coats on all wood surfaces and allow to dry. Sand lightly, and apply a third coat to seal the grain opened by sanding. Using silk or silk-rayon blend, cover the framework, doping first around the edges, followed by a coating of dope over the entire surface. (Again, using the 60/40 thinned dope mix.) Continue applying dope until you are satisfied that the pores are completely sealed with no pin-holes showing. This is where many of you stop. Now, apply at least three more coats of clear! Allow to dry thoroughly, then sand well, using 300 or finer wet paper. Do not attempt to sand the open silk areas, such as on a wing panel. Sandpaper, even the finest, will cut through where the open silk meets an edge. For open areas, the best method is the careful use of steel wool (works well in other areas, too). Be sure to remove and isolate all radio gear before attempting to use steel wool, as the servo motors in particular will attract the small slivers! At this point, a thin coat of sealer or filler is advisable on all wood areas, but not a must. If a filler is used, sand again, until the only filler left is in the depressed grain areas. The idea is to sand

off 85-90% of the heavy filler. Apply two thin coats of clear and lightly sand. The ship is now ready for the color of your choice. At this point, it is best to spray if at all possible, since one good spray coat will generally be sufficient, keeping the pigmented dope weight to a minimum. The use of thinned clear dope throughout reduced, if not eliminated, runs and heavy spots. Since the dope is thin, you can brush on a thinner layer, and upon drying, have a layer of dope about 40% of the thickness of an unthinned brushed coat. Twelve coats of clear dope, brushed on in a thinned consistency, produced a build-up that is more uniform, does not show brush marks, and is about as thick as five undiluted coats! Since the dope is thinner, it dries faster, allowing almost instant recoat. All that is needed is a little extra "push" behind the sandpaper.

Have you tried bending the windshield material supplied in the Aeromaster kit? The piece of plastic material supplied is about twenty thousandths of an inch thick, and will not readily bend into a sharp three-sided windshield. Okay, here's how. Fasten a piece of $\frac{3}{32}$ " wire about 6" long into a vise. Cut the windshield to shape, then heat the wire with a soldering iron or torch until too hot to touch. Sorry 'bout the burned fingers! When the wire has cooled to about 200 degrees F (touchable, if you are quick!), try bending a piece of the trimmed scrap material by laying it on the wire. Test a few times until you get a feel for the bending. If the wire is too hot, the plastic will melt — if too cold, it will not bend. With the proper temperature, the plastic will bend easily after laying on the wire about ten seconds!

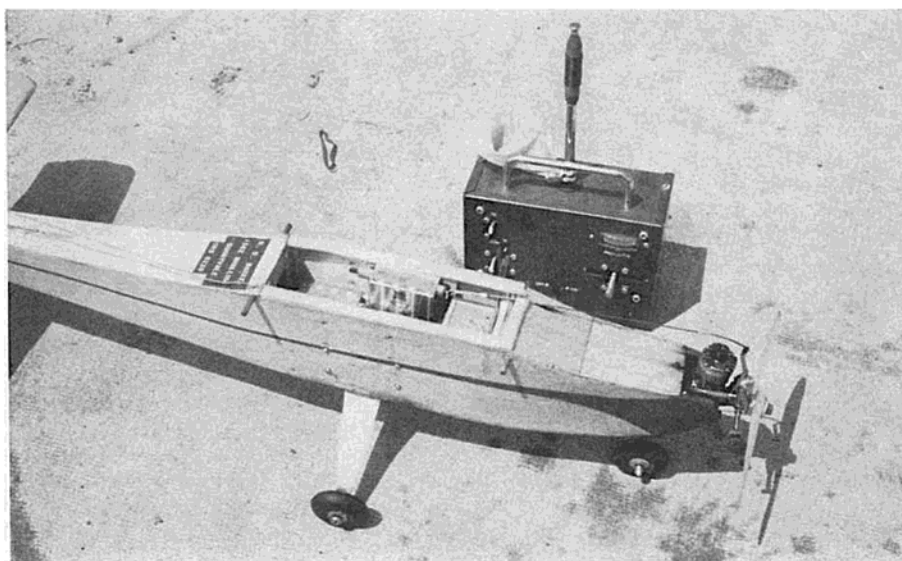
A strong, non-flexing, lightweight pushrod can be easily fabricated using fiberglass tubing. These tubes are generally available at sporting goods stores as fiberglass arrow shafts. The $\frac{5}{16}$ " O.D. shaft is ideal, since the ends are easily made from $\frac{1}{4}$ " dowel. The rod end is installed through a hole drilled in the plug, bent over on the inside, and the whole mess epoxied together.

The R/C Craft NyLink marketed by World Engines has been used and tested in our multi ships for over a year without a failure. Recently, we have installed them on rudder and elevator pushrods in Galloping Ghost systems. After encountering several failures and one disastrous crack, it is apparent that the yoke pin will not withstand the constant pounding produced in this type of system. It is our belief that this link should not be used on pulsing surfaces — it could cost you an airplane!

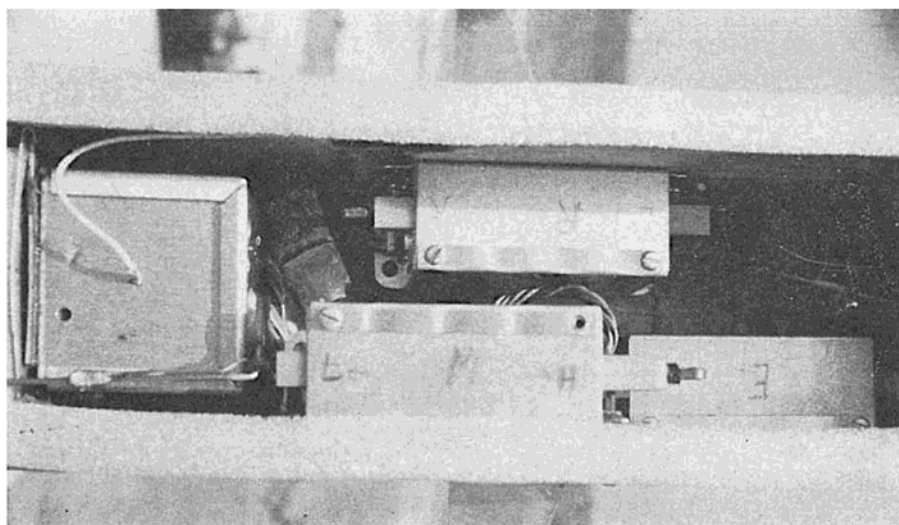
'Til next month — see you at the field, and don't forget to vote!



KEN WILLARD



Ollie Bakken's Schoolmaster; REM via RCM Digitrio!



Interior view of the Digitrio receiver and three servos.

SUNDAY FLIER

KEN WILLARD

YOU may think that what I am about to recommend to you this month is a little out of my line. Perhaps — but hear me out.

If you haven't done it already, then go see the movie "Flight Of The Phoenix." By the time this recommendation gets to you, the movie may be playing in the boondocks, but seek it out! You'll be glad you did. That is, if you're a real Sunday flier.

In the first place, it's a whale of a good drama. The tension buildup is excellent, and there never is a really weak scene in the entire picture. Some reviewers questioned the need for the vision of the belly dancer in the desert — but since she only exists in the demented mind of a man being driven crazy by the desert and his own futile situation, who can say what goes through such a mind?

If you don't already know the story, it is about a beat up, twin boom cargo plane (Fairchild Packet) carrying men and tools back from a desert oil drilling location. They are forced down in a sandstorm, two men are killed, one seriously injured, and the rest badly shaken up. In the crash, one boom of the airplane is broken, the other is intact. One of the passengers, a young German airplane designer, figures he can use the good boom, attach the other wing, brace it, and fly out with the men hanging on

to the wing behind makeshift windshields.

Now, admittedly, this is a pretty far-fetched idea — and some of the technical problems involved are glossed over — but isn't completely implausible. And the story that's built around the idea is one of the most engrossing I've seen.

In the second place, the acting is excellent. Jimmy Stewart, as the grizzled old pilot, confronts Hardy Kreuger, the coldly methodical young designer, in a struggle for command, and you can feel the hate born of frustration. Kreuger wins out, while he's building the plane, but then, when the time comes to fly it out, there's another tense moment as Stewart, the pilot, assumes command of the aircraft. And I want to tell you that when he struggled to start the engine, using every trick he'd learned through the years, and the men whose lives depended on him, watched . . . praying, cheering, cursing . . . well, if you don't choke up a little, you're not even human!

But, in the third place — and this is where you can "identify" with the movie — the young airplane designer, it turns out, is a radio control airplane designer! When this becomes evident, and the old pilot and his boozy navigator realize the irony of it all, their scornful reference

to "toy airplanes" goads Kreuger into one of the most lucid statements of the similarity in design of man-carrying aircraft and radio controlled models that I've ever heard. I don't know how the audience will react when you see it, but when I viewed it, the movie-goers laughed at the "toy airplane" concept, but at the end, as Stewart turned to Kreuger and asked — "Did you say that Stringfellow's model (an 1851 concept) flew 600 feet or 600 meters?" — I had a feeling that not only the old pilot had developed a respect for the science of model design, but so had the audience!

So, go see "Flight Of The Phoenix." You'll enjoy it — especially when the airplane built around the single boom takes off. It looks for all the world like a big shoulder wing R/C job!

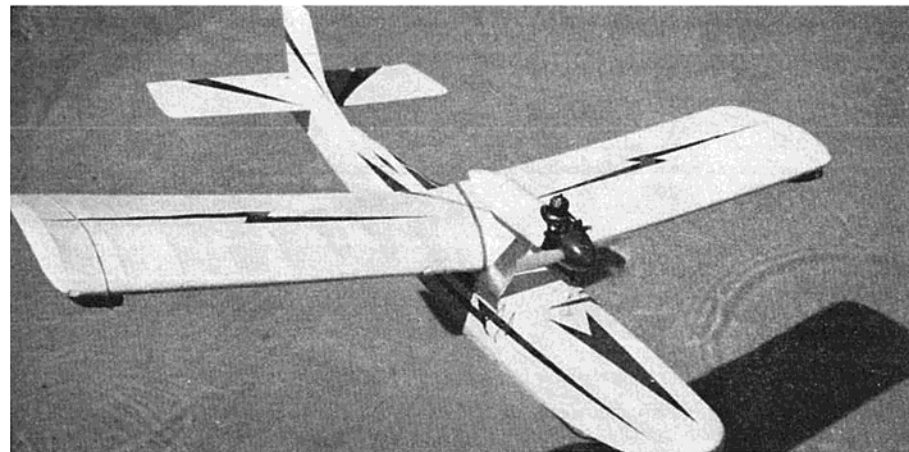
Vibration continues to be a source of trouble with many models. A couple of ideas in this regard have come to my attention lately, simply because they apply to the smaller models.

One new item is a vibration damping mounting plate for the Cox .049 engine — Baby Bee, Golden Bee, and Quiet Zone — that have integral tanks for firewall mounting. Herb Tomoser is marketing the item. I mounted a test sample behind a QZ engine to which I had attached a Golden Bee tank, then ran the engine with the plate installed and then with it removed. There was a very noticeable reduction in the vibration which was transmitted to the mounting arm. Now it is true that with a well-balanced prop, the QZ engine doesn't vibrate too much, but Tomoser's plate reduces it enough so that it might make the difference between relay chatter or perfect operation if your receiver is mounted horizontally. So, if by any chance you've got a Galloping Ghost

Cox QZ .049 astride Tomoser's vibration damping motor mount.

(Continued on Page 10)

The Shearwater . . . an .049 powered flying boat for single channel. To be presented next month.



actuator that seems to make the surfaces wander, or even stick at times, vibration could be "confusing" your receiver relay. It doesn't take much, you know.

The clearance between open and closed positions on some relays is paper thin. The vibration damping mounting plate could be the answer to the problem. If you're using a Cox Tee Dee engine, a Tatone mount can also fit on the Tomoser damping plate simply by drilling two additional mounting holes. Price is \$1 from Tomoser Electronics, P. O. Box 88, Kenmore, New York.

The other item in the field of vibration reduction is the twin .049 motor put out by Flight Control Products in Salina, Kansas. Those of you who read Walt Good's analysis of vibration will recall the point that two opposed cylinders, firing simultaneously, will tend to balance each other out, thus reducing vibration to a minimum. This unit certainly bears out the point—and also gives you a good, powerful, opposed twin cylinder engine suitable for scale jobs that would ordinarily need an .09 or .15.

Peace—it's wonderful!

The competition in the covering and finishing field can be rough. When HobbyPox first came out, some modelers pooh-poohed it. Then they learned to use it, and now swear by it.

The same thing is happening to MonoKote. As modelers learn to use Top Flite's new material, they're more pleased. In addition, Top Flite is discovering ways of overcoming some of the covering technique problems. One of the answers for a suitable covering around the nose area, or wherever raw or burned fuel is concentrated and may seep under the MonoKote, is to seal the area with Hobbypox. So, just to show you the manufacturers have the modelers' interest at heart, note the shot of Bev Smith—Hobbypox's honcho—holding Top Flite's "Top Dawg." The model is covered with a combination of MonoKote and Hobbypox!

Digitrio in a Schoolmaster?

Yep! Ollie Bakken of Sunnyvale, California, worked out the installation and has been flying the combination regularly. He uses an Enya .09 and gets tremendous performance.

Next month I'll publish plans for the Shearwater. The photo this month shows the model with the 7 degree dihedral wing for escapement or servo flying. An optional version has 4 degrees dihedral. Some of you have asked why the increased dihedral is used for escapement or servo flying as compared to the lesser degree for proportional control. The reason is simply that the rudder must always take a full throw if an escapement is used, and this tends to make the nose drop too fast and too far with low dihedral. With proportional control, on the other hand, such as the new pulsing actuators provide, you can make gentle turns with just a small rudder move-



Flight Control Products .09 twin drastically reduces vibration; two Babe Bee's opposed.



Hobbypox's Bev Smith with author's Top Dawg.

ment and the nose will stay up even though low dihedral is used. Then, for stunting, the full throw of the rudder drops the nose rapidly to pick up speed, and the model must be flown out of the spiral dive. Of course, you can do the same thing using an escapement, but the slipping and skidding is much more pronounced.

As I write this, Summer is coming to a close. Only our Editor refuses to admit it, persevering to the end by running a shot of a girl in a bathing suit on the December issue! It was an interesting Summer in many ways. For one, the heat and humidity of these months is an unavoidable evil to modelers and manufacturers alike. Top Flite, for instance, who had tested the bejabbers out of MonoKote (and I helped), found out they had a problem with sagging, and had to develop a way of correcting it—which they did. In a less apparent area, Cox has done some experimentation. You oldtimers know that for constant performance in any weather, you can't beat a well-balanced wood prop. Plastic props are rugged and don't break as readily, and at ideal temperatures, they are just about equal to their wooden counterparts. However, at high temper-

atures and humidities they suffer a performance loss due to flexing.

Dale Kirn, at Cox, sent me some experimental props which I used during the past Summer. They are made from some kind of white plastic (most Cox props are black), and in hot weather, there is a noticeable improvement in thrust using the same .049 engine. The props seem to be a little stiffer and maintain a better blade angle. As of this writing, I don't know what plans there are, if any, for marketing them. There is one thing I noticed, however—although I didn't conduct laboratory tests (just some good clobber jobs) the white props seemed to break more often than the black ones. Especially when I goofed and flew the model right into the ground! Even so, the props didn't break as regularly as wooden ones, so they're well worth considering when peak performance is desired on a hot Summer day. And you guys won't goof as often as I do—I'm always testing some design beyond reasonable limits just to see how far I can go before clobbering.

And I usually find out—just about one second too late!

So Winter is coming. Less flying, more building, more time to write. Take five, as the saying goes, and tell me what's going on.



T-28 B

BY DAVE PLATT

R/C Modeler Magazine is proud to present what may well be the world's finest scale design. Winner of the 1966 British Nationals, Dave Platt's T-28B is a project for the dedicated scale builder. As a bonus, its flight characteristics equal its appearance!



DID you ever start building a model, and somewhere along the line you went cold on the project and left off half-way through? If you did, I would bet that the pieces still hang in the workshop. I'd further guess that your wife, anxious that so much money (wives don't remember *time*) shouldn't go to waste, asks if you'll ever complete the model. Invariably you reply that you will "one day." Really, you couldn't care less, but you still keep the remnants.

The fact is, I know a couple of guys who *never* finish a ship. As it is, they have the best collection of wings and fuselages in town, but unfortunately, they are all for different models!

I mention this well-known malaise because, in a way, it is the direct opposite of what happened to me with this particular scale model. It was started merely because it seemed so ideal a subject, but without any real love or feeling on

the part of the builder. But, as it gradually took shape, a genuine affection for the T-28 took hold of me, and the finished model was, in my eyes, the most beautiful ship I had ever constructed. It is often said, usually with a good deal of truth, that a scale modeler must *love* a plane before he can face all the effort of designing and building a model of it. But, as I now know, this doesn't *have* to be a rule of the game. At least, not at the start!

After the 1965 British Nationals, where I flew my Miles Magister, I began looking for a suitable subject for the 1966 event. As the Maggie's Doom had been due to flying from grass with the two-wheeled landing gear, I stipulated that the new project *had* to be a trike geared design. (I now feel that proportional gear will be the end of this sort of trouble—the pilot can hold *slight* up-elevator, thus avoiding stalling the model

right off the ground. But, at the time, I was designing for reeds.)

It should be remarked at this point, that here in England, it simply isn't good enough to build a scale job less than perfect, and such items as motors sticking out, or servos in the cabin are taboo! If your model can't measure up to these high standards, someone else's *will*, and it becomes pointless to bother with less than the best. In the same vein, any alterations to the outline or sections of the model can, and will, lose you the contest. In 1965 the judges found something (actually the wingtip section chord/thickness ratio) on the Magister to be $\frac{1}{10}$ " out, and docked points accordingly. These considerations, then, ruled out types like the Airacobra (motor sticks out) and the Comanche (nowhere to put the RC junk except in the cabin). Not that I would consider the Comanche, since I have always stuck to military



aircraft.

But I digress. To cut a lot of searching short, the decision was resolved to a choice between the Ryan Fireball or the T-28. One day, someone (perhaps me!) will tackle the Fireball, but in the meantime, I decided on the T-28.

Even then, it wasn't all plain sailing. After scaling the plans, the fuselage looked so enormous that I couldn't visualize it flying. The cowling worked out at $8\frac{1}{2}$ " diameter, and to my knowledge, no-one else had ever made a model with so little working prop-blade! After a month or two of horrified looks at the plans, the fateful decision was made in earnest — we had to make it or we'd never know! If it didn't fly, at least we would have learned something!

Just about this time, I purchased a McCoy .60, the only motor likely to heave the bird aloft as I saw it. Remember, we are required to use silencers, too! Similarly, I obtained three deBolt retractable gear units — in my blissful ignorance imagining these would solve the undercarriage problems. I have to laugh when I look back on it, but more about the retract units later.

Some time later, the model now finished, we were confronted with the immediacy of the first flight. After I had run out of excuses to my clubmates (you know the form — "Deac's not charged," "No fuel," "Someone else flying on my frequency," etc.), we ran up the motor on the $\frac{1}{2}$ " prop I had selected. Thrust seemed excellent, so after a final check of the gear, it was chocks away!

I needn't have worried! The lumbering bird gathered speed, and when I was well satisfied of flying speed, she was lifted off. Grab altitude quick . . . what have we got? . . . a nasty left turn and

a slight down pitch that full up-trim won't quite correct . . . get used to it, man . . . they're all screaming at me . . . fly around for a couple of minutes, you can't hit anything up there. . . .!

After a somewhat hairy landing, trim adjustments were made, then more flights. An hour later she didn't frighten me anymore, and flying was a breeze and a pleasure! Just like a Taurus, really, and the appearance in the air was wonderful!

Later on, the T-28 went on to win the Nationals for me, after 15 years of trying in various categories. The Bristol RC Rally, a well-known contest gaining countrywide support, fell to her winning ways too.

In case any of you readers are as daft as I am and fancy owning one of these ships, I'd better see if I can help you along. The very first thing I suggest you do is purchase a Monogram plastic kit of the T-28D South Vietnamese COIN fighter-bomber. (Since my own model was built, I notice that Monogram is producing a T-28B, but I haven't examined the kit.) This does emphasize the variable nature of the model — it can be made in a tremendous variety of color schemes and versions. Build up the plastic model as a replica of your chosen scheme for the RC model — it will prove to be of great value later on, guiding you on small details. Anyway, you need the kit to get the stencilled instruction notices which, by the way, run into hundreds of words. Also, the cockpit details will be helpful. These things would have made our plans too involved — they're bad enough as it is! Likewise, the Monogram plastic Wright-Cyclone 9-cylinder radial engine is well worth building, and will be handy when

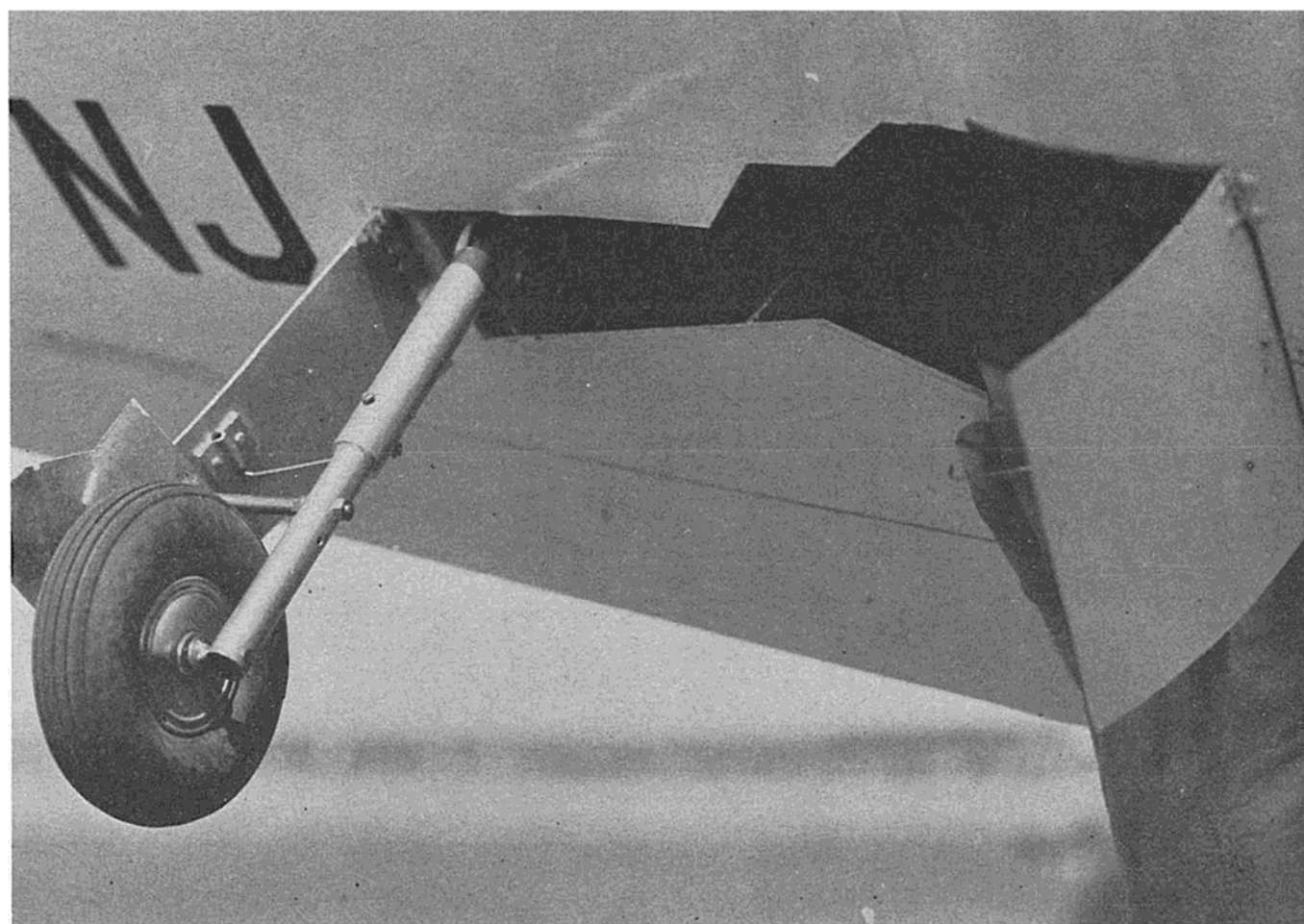
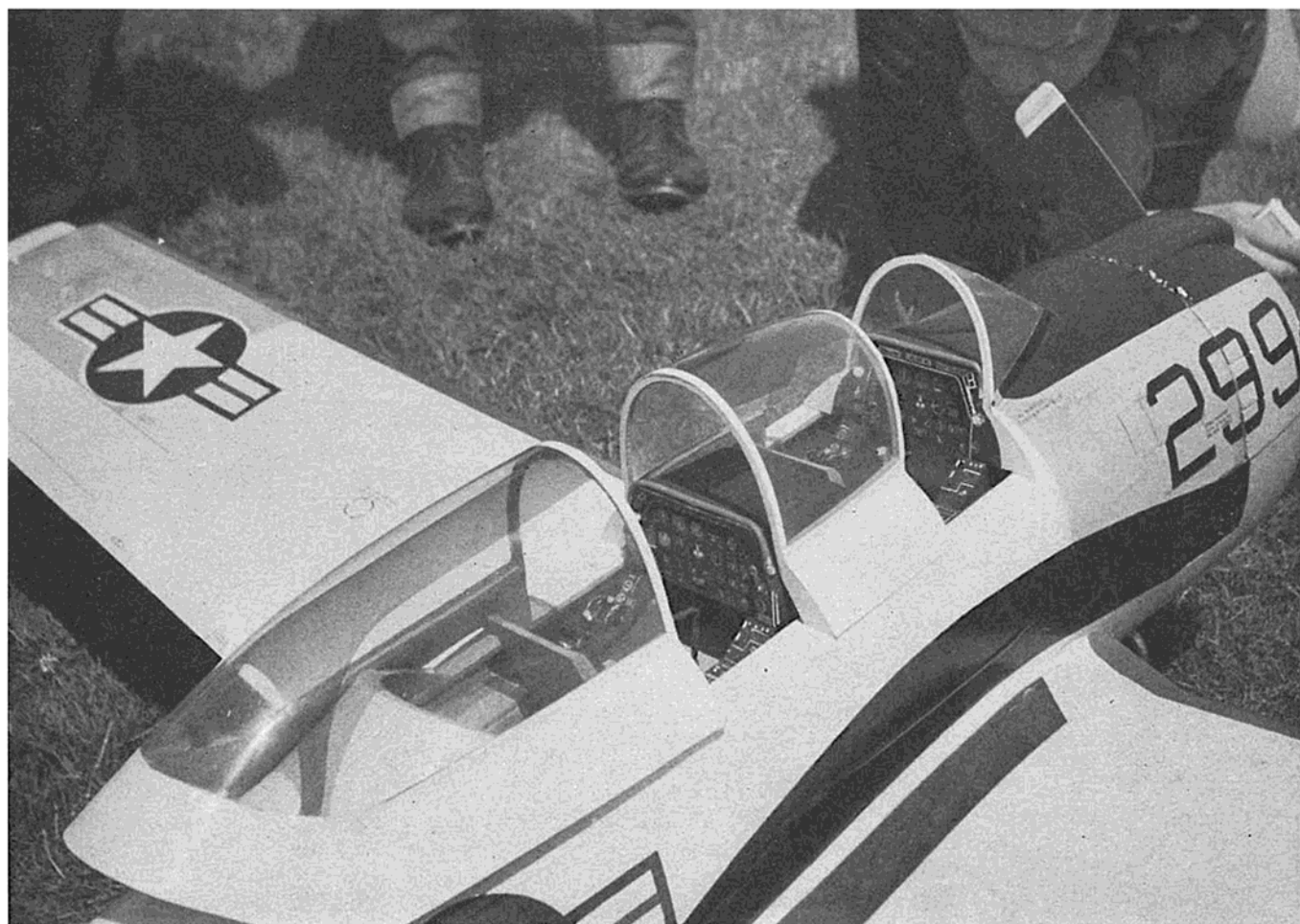
you tackle the dummy engine.

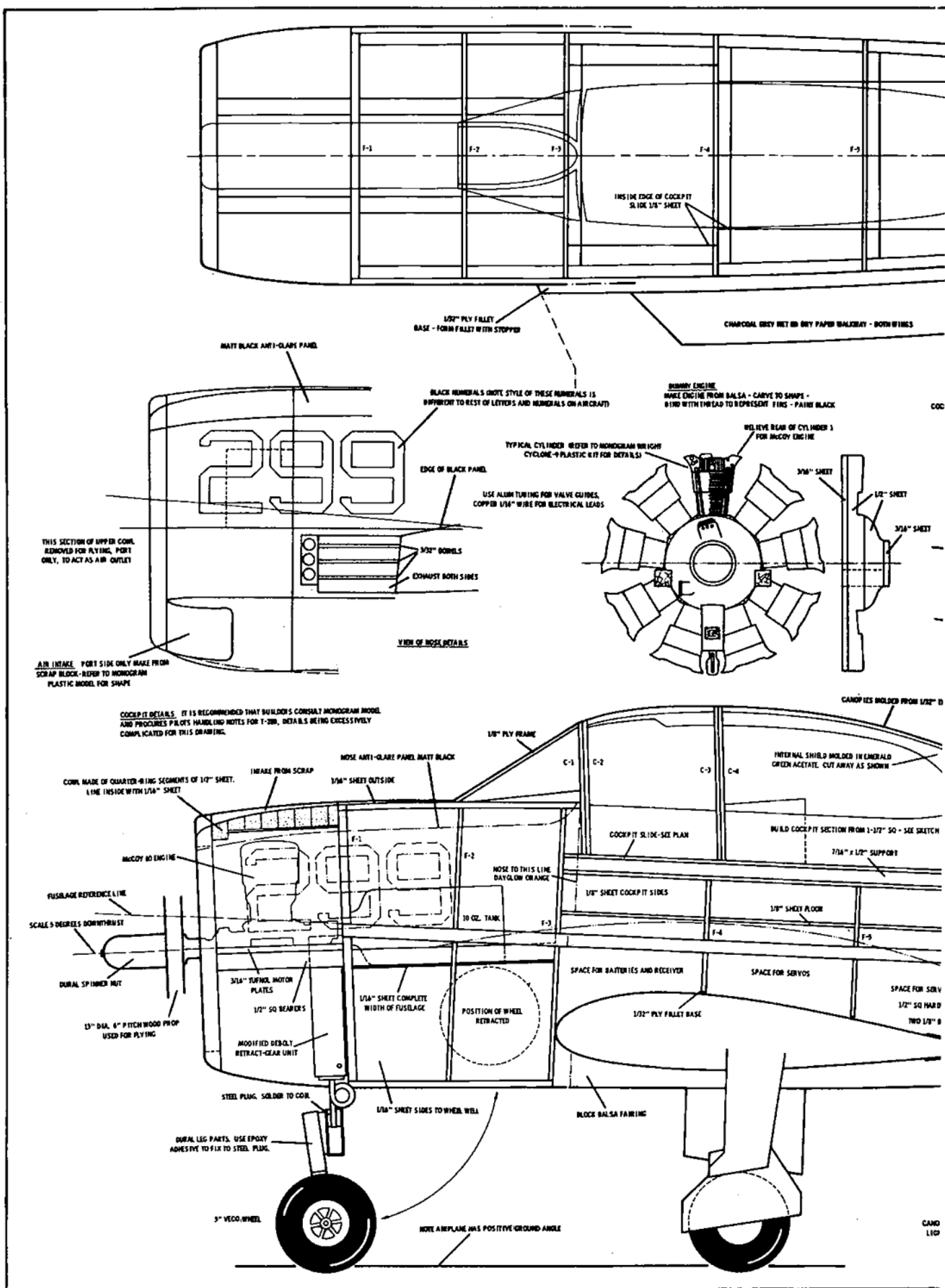
Before you start cutting wood, there are a few things you're going to need, and inasmuch as some of them will take a little time with a machinery owning friend (if you can't do them yourself, that is), we'd better get to rounding up these bits. First, a Mac .60 and a Merco throttle assembly. Drill out the throttle to the maximum bore it will take and assemble the motor. Make a new disc-rotor of Tufnol, check the run of the crankshaft races, and replace if necessary. You have no more problems here.

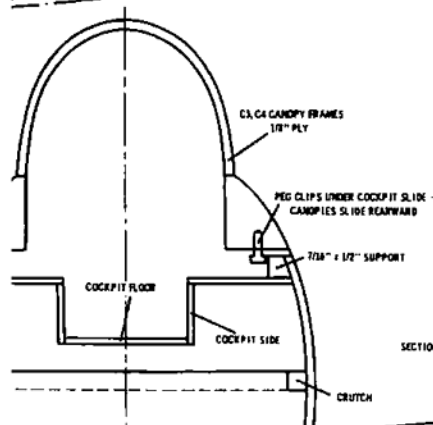
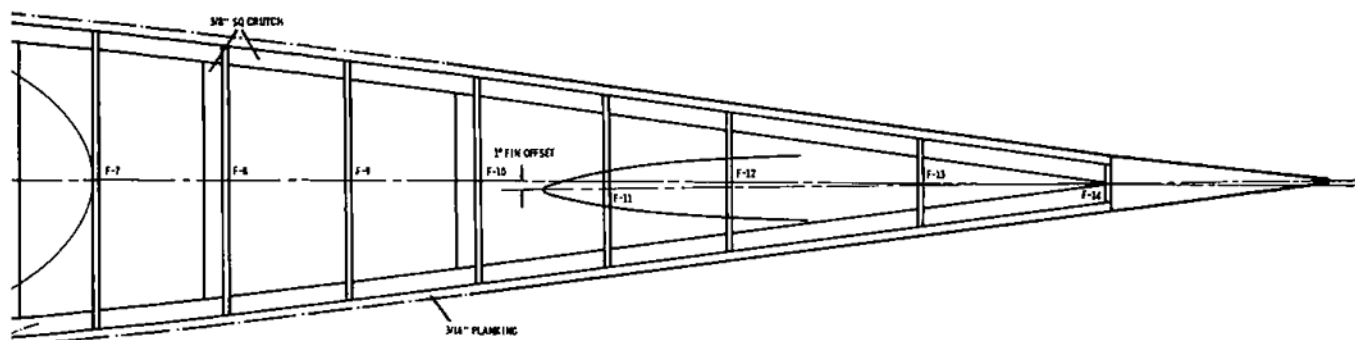
Next, the retractable undercarriage units. I quickly learned that, while obviously perfectly okay for their intended purpose, the deBolt units do not have sufficient power to lift the longer and heavier leg/wheel setup usually found in a scale model. Also, they are too fast for scale realism. Both of these problems are solved by further gearing-down of the unit by about 7:1. That is, it takes roughly seven seconds to retract instead of one second. The power, which, incidentally, I took from the same Deac 6V pack as already supplies the rest of the F&M Midas/Matador outfit is considerably increased and makes mincemeat of the leg/wheel combo of this design.

Now, since it is not possible to add extra gears within the existing train, it is necessary to add the 7:1 reduction gearing as the first stage. This means taking out the motor and putting said gearing in its place. Now we can mount the motor on extended side-cheeks. You will notice that, on the plans, the unit gets about 1" longer, but it is not necessary to cramp things inasmuch as there is plenty of room in this direction. Actually, in my own units, we replaced the





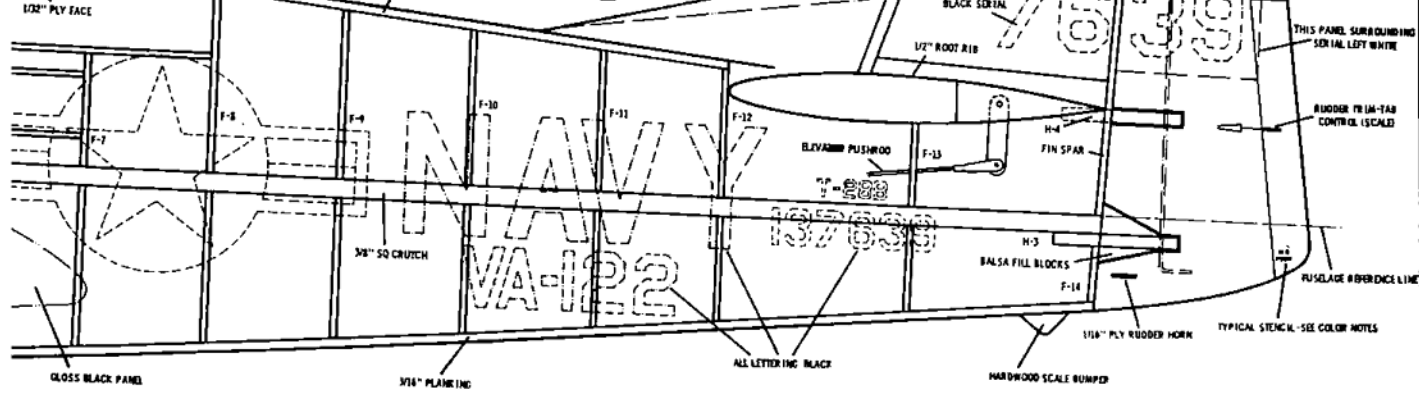
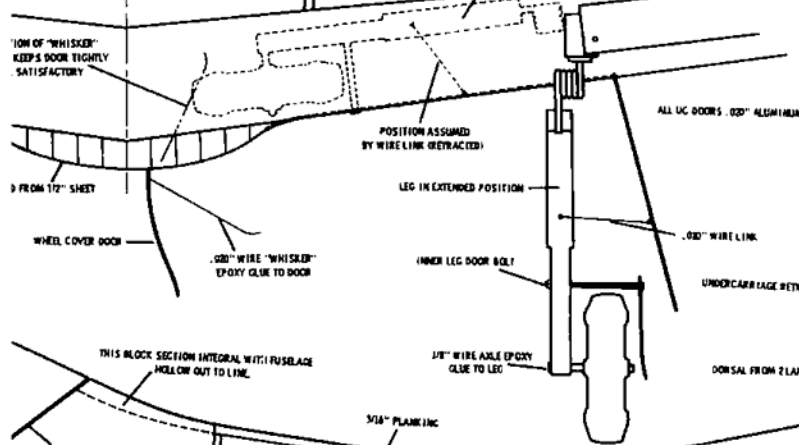




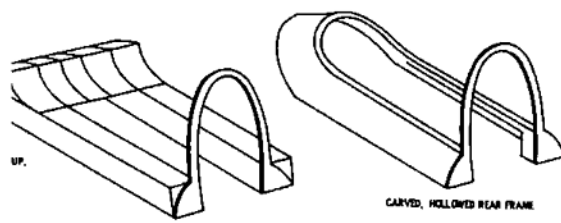
NOTE 'A' - RETRACT-GEAR UNIT IS REMOVABLE FROM WING FOR SERVICING. USE "DEAN" CONNECTOR OR SIMILAR FOR WIRING. AFTER UNSCREWING UC LEG GEAR IN DOWN POSITION REMOVE 4 SCREWS RETAINING UNIT & LIFT OUT UPWARDS. AREAS BETWEEN W-4 & W-5A NOT SHEETED. MAKE 1/8A" ALUM COVER WHICH BECOMES WING UPPER SURFACE. SCREW COVER IN PLACE WITH WOOD SCREWS.

NOTE 'B' - OUTER LEG DOOR IS ATTACHED TO WING LOWER SHEETING BY MINUTURE HINGES (DOLL HOUSE SUPPLIES), AND IS PULLED UP BY UC LEG VIA A WIRE LINK. INNER LEG DOOR IS ATTACHED DIRECT TO LEG WITH A MACHINE SCREW. WHEEL COVER IS ATTACHED TO BLOCK UNDERWING FAIRING WITH MINUTURE HINGES, AND IS FOLDED UP BY WHEEL CONTACTING THE WHISKER. REFER TO FRONT VIEW OF WING/FUSelage JUNCTION (SECTION F-8) IMPORTANT - BE PREPARED TO ACCEPT THAT GETTING RETRACTION "SPOT-ON" WILL TAKE TIME AND PATIENCE.

- COLOR SCHEME**
1. ENTIRE AIRCRAFT IS GLOSS WHITE
 2. ALL LETTERING & NUMERALS GLOSS BLACK
 3. LEADING EDGES OF WINGS, TAILPLANE, DORSAL & FIN ARE INTERNATIONAL ORANGE (HOBBY POINT). AREAS SAME FOR UPPER & LOWER SURFACES
 4. ANTI-GLARE PANEL FROM FRONT OF COCKPIT TO NOSE HATY BLACK
 5. NOSE OF FUSelage, RUDDER & TIP PANELS OF WINGS "DAYGLOW" HIGH-VISIBILITY ORANGE. AREAS SAME ON UPPER & LOWER SURFACE OF WINGS. PAINT DOES NOT TRESPASS AILERONS, AND STOPS 3/32" SHORT OF MEETING U. S. INSIGNIAS AND NAVY MARKINGS ON WINGS, GIVING THESE A WHITE OUTLINE
 6. STENCILLED INSTRUCTIONS BLACK OR WHITE ACCORDING TO BACKGROUND COLORS. TO GET RUNDOWN OF POSITION OF STENCILS & WHAT EACH READS, USE MAGNIFYING GLASS ON TRANSFER SHEET OF MONOGRAM 1/48 PLASTIC N.A. F-280 FIGHTER-BOMBER. STENCILS TO BE APPROX. 1/16" HIGH
 7. INSIDE OF WHEEL WELLS & COCKPIT L.C. GREEN (ZING CHROMATE). USE EMULSION PAINT WHICH DOES NOT RAISE GRAIN OF BARE BALSA WOOD



NOTE: RUDDER IS DAYGLOW ORANGE, BUT HINGE EXTENSIONS ARE LEFT WHITE.



MODEL IS EXACT SCALE AS DESIGNED - NO CHANGES HAVE BEEN MADE TO WING, TAIL OR CONTROL SURFACE AREAS, DIHEDRAL, WING & TAIL SECTIONS, HINGE LINES OR FUSelage CROSS-SECTIONS, ETC.
WING SPAN 86-20" WING AREA 731 SQ. IN. WEIGHT 11 LB. FOR ADDITIONAL INFORMATION SEE "FLYING SCALE MODELS" BY R. G. MOUTON (HOMER BOOK) HAS SCALE DRAWING OF T-28B.
THE SCALE OF THIS MODEL IS 1:7.2

PLATE 1 OF 2

Radio Control Modeler T-28B

DESIGNED & DRAWN BY: G. FLORES

DATE PLATT: _____

INKED BY: _____

SCALE: _____

entire gear train and more-or-less started from scratch, as the stamped dural gears did not seem too clever. These we changed to brass machine cut gears throughout. This, however, is up to you.

Two more things need doing to the wing units before they are ready. One is to fix the nylon switcher plate to the shaft by better means than the friction-fit that was originally intended. This feature, if left alone, could and ultimately will, cause a failure of the retracting gear as a whole, since everything will go out of sequence. To overcome this, drill a $\frac{1}{16}$ " hole into the wheel as far as the shaft, insert an Allen screw (serrated end type) of a suitable size that will tap its own thread as it goes in. Tightly screw it up until the serrated end grips the shaft firmly, then check to see that the wheel cannot rotate. Adjustments to the cut-off point can always be made by loosening the screw and re-tightening afterward.

The other item is to replace the stamped-out $\frac{1}{16}$ " dural con-rod with another made of $\frac{1}{8}$ " thick steel. New bearing-collets will be needed, and for the $\frac{1}{8}$ " con-rod should be about .127" wide. **Keep all clearances as tight as possible**, or you will find excessive wobble of the undercarriage legs. This will cause not only an inexactness of retraction, but also makes the airplane sit and run along in sloppy fashion, causing excessive ground-drag.

This lot disposes of the wing units but there is one additional thing in addition to the above modifications to be made to the nose unit. Since we need a retraction angle of about 112 degrees instead of the 85 degrees of the stock unit, it will be necessary to make a new "output drive wheel." The angle of retraction is governed by the distance of

the con-rod screw from the axle shaft in the wheel, together with the length of the rod itself. Unfortunately, as my own nose unit is all locked up in the model, I cannot give you actual figures for this, but from memory, the increase was about $\frac{3}{32}$ ". Really, the angle is not too critical for the nose unit, so approximately 110-115 degrees will do, and the difference will not be noticeable in actual practice. Unlike the wing units, you will need to try to keep the increase in length of this nose unit down to a reasonable figure, so mount all parts as compactly as possible, or even mount the electric motor at 90 degrees to the unit if necessary. There is, of course, room to spare in the forward direction.

About the only other things that need sorting out now are the spinner nut and the undercarriage legs, themselves. By now, you'd better ask a different chap to make these, as the first will probably have had a bellyful with the retract-units!

It is fair to say that the wing constitutes about one-half of the building work of the whole model. Although, basically, a simple straight-taper design with no more parts than are necessary, the retraction of the undercarriage, along with the proper closing of the doors, tends to take a good deal of patient work. It is as well to start out with this realization and avoid the frustration that results when you seem to work endless hours and get nowhere!

The plans contain all instructions necessary regarding the latter job. Structurally, the wing is of normal configuration with one full-depth spar of substantial strength and all ribs half-slotted into it. Ailerons are of the usual form as found on a "Candy" or similar design, and present no problems. I would defi-

nately recommend making the wing in a dihedral building jig, and in this connection, must remind you that although the mean dihedral angle of this aircraft is $6\frac{1}{2}$ degrees, the angle at the wing lower surface is 8 degrees, and this will be the angle required in the jig.

A word about the wing rib drawings is in order. These are shown on the plan as full shapes, less only the $\frac{3}{32}$ " of the outer wing skin sheeting. This is done simply because I feel that when building a wing of this type in a jig, it is better to make it as if complete, with the trailing edge extending to the tip rib, etc. Ailerons can be made later and inserted in a section removed from the basic wing. This method guarantees a straight and true wing without warps — which could easily creep in with some ribs long and others short. Similarly, the rear twin spars of $\frac{1}{4}$ " x $\frac{1}{8}$ " are fed into slots cut while the wing is in the jig, after marking their exact position with a long straight edge. Remember to draw chord lines on all the ribs, making sure these are parallel to the board while construction progresses.

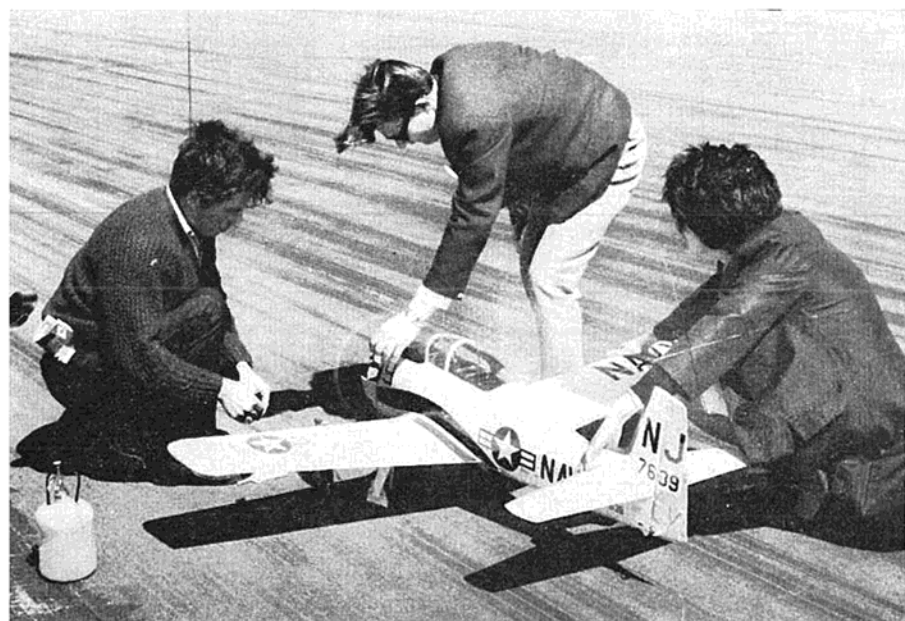
Observe that the central part of W5 is removed from the wing, and after cementing the undercarriage bearer in place, is trimmed a little in length, then glued back at the outer end of the bearer.

The wing upper surface sheeting should be completed while the wing is in the jig. The retract units are then installed and checked for proper operation before sheeting the lower surface, because sections of ribs W2, W3, and W4 will need to be removed to form a well for the legs and wheels. The undercarriage leg-doors are installed next and checked for good operation and fit. Incidentally, the inside wheel covers are hinged onto the under-wing fairing, so they cannot be made until the wing and fuselage are completed. Likewise, don't install the $\frac{3}{8}$ " dowel wing keys at this time — these will be better done when fitting-up the wing to the fuselage.

When the wing is completed, you can give yourself a pat on the back. But don't take too long because the next item to make is the tailplane. This will be needed as a finished unit at an early stage of fuselage construction. The tail, being only a simple structure, needs no explanation, except to say that all of the wood, especially the $\frac{1}{2}$ " sheet chosen for the elevators, should be fairly light — about 5 pound stock. Observe the aerodynamic balance of these elevators — this is as used on the real ship.

Constructionwise, the fuselage has been designed to assemble accurately, and to guarantee this, the horizontal crutch system was used. After making the crutch, glue all upper former halves in place, using a set square to ensure

The T-28B at the 1966 British Nationals. Actual flight movies viewed by RCM evidenced excellent handling characteristics.



(Continued on Page 20)

perpendicular formers, except for F1 for which an angle template should be cut from scrap. The tailplane may now be added and blocked to an accurate horizontal setting and zero lineup. The cockpit floor, sides, and outer shelves are added next, and planking may commence. When finished, the canopy frames and outline blocks are made, hollowed, and fixed to slide properly. Canopies are molded and added next. Finally, the fin is constructed, making sure it is perpendicular to the workbench. The full-size T-28 has 1 degree right fin/rudder offset and I recommend you this, as a scale job cannot use sidethrust. In any case, although the model is highly aerobatic and really enjoys being thrown through loops, rolls, reversals, vertical upward rolls, and all the rest, it is unlikely that you will do a great deal of inverted flying.

The upper part of the fuselage may now be removed from the bench, and the fuel tank inserted before gluing the lower former halves in place. Before planking the lower fuselage, almost all of the remaining equipment installations and other details should be completed, such as RC gear, pushrods, batteries, nose retract unit, wing attachment fittings, engine bearers, and so on.

After the lower fuselage is planked, the cowling, dummy engine, and under-wing fairing are made. The latter should be built up of $\frac{1}{2}$ " sheet laminations rather than solid blocks, as the shape would be too difficult to form by the latter method.

Your plastic kit now proves its worth in making the dummy exhausts, air intakes, and sundry small exterior details. Cockpit details are next on the list. Make a good job of these as the greenhouse shows up your workmanship to an alarming extent!

With the model finished structurally, I always think the most pleasurable work is at hand. Covering and painting a scale job, especially one so vivid and beautiful as the T-28, is an exciting and rewarding experience, and since the exterior finish and color-scheme of any model is all one **really** sees, it pays to have infinite patience at this point.

My own T-28 was covered in white MonoKote which made a very good job I would stress, however, that I regarded this material merely as a "covering and sealing" agent, and **not**, of itself, a finished result. The MonoKote does give a lovely **level** surface on which to work, and provided the bare balsa is nicely finished, the planking of the fuselage and other joints will never show through.

Which is more than can be said, at least from my own experience, to the most carefully done sealing job using paints and fillers.

Accordingly, the whole model is now painted gloss white, over the MonoKote, using fuel proof type paint (Hobby-Poxy will be fine). All of the lettering except the '299' on the cowl and the 'J' on the rudder must now be painted, together with the U.S. insignias and the black fuselage panels. The International Orange areas are next, followed by the Dayglow orange paint on the nose, wingtips, and rudder. Finally, the rest of the lettering and the stencils are applied.

Regarding these stencils, these are letters called Letraset, and are a dry-print transfer used for typographical display work. They are available in many sizes and type styles in U.S. stationery stores as well as in England. The height of the letters we will use are about $\frac{1}{16}$ ".

To any modeler who would make such a thing as this scale job, instructions about flying it would be an insult. The only thing I will mention, however, is that the model is intended to be flown from a tarmac runway and will not get sufficient speed up on a grass surface—even a very smooth one. Ailerons, being quite large, are sensitive, as is the elevator. The increase in airspeed with undercarriage units retracted, at an estimate, is around 20 MPH, the "clean" configuration giving a very fast model despite the huge size of the bird.

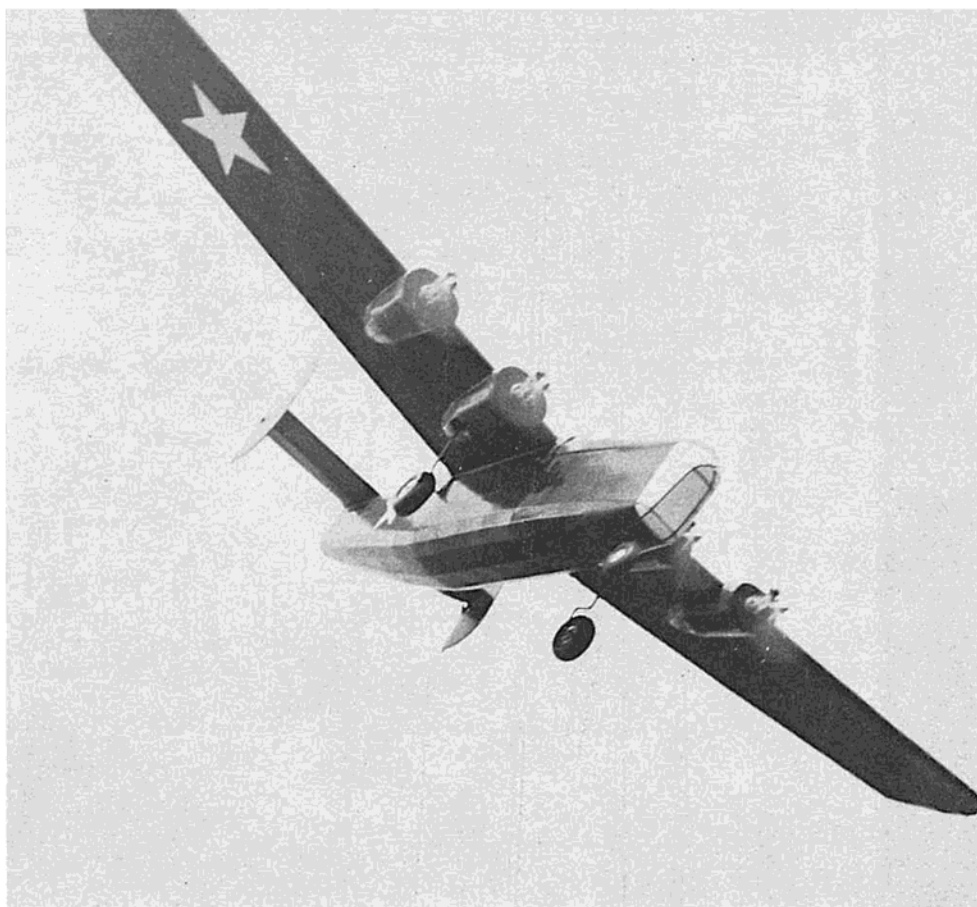
Clear the bench!

The author poses with his Nationals winning T-28B.



WHEN I indicated my intention to build a radio controlled scale B-24 at a meeting of the Madison Area Radio Control Society, I received the usual smiles reserved for such projects. Mentioning that it would be for rudder only brought a chorus of "you are out of your mind!" Thus encouraged, I proceeded to build and successfully fly what appears to be the world's first four engined rudder only scale R/C model.

The B-24 was a natural choice due to the large twin rudders which are directly behind each pair of engines and the general bulky airframe configuration. Before building the B-24 I constructed a semi-scale PBY which was used to test several radical ideas about multi-engined R/C models. The PBY turned out to be a very docile ship on either or both engines. In fact, the PBY was used as my practice plane for our local limbo contest. Experience with the PBY indicated that the secret to successful multi-engined rudder-only design was fourfold: First, some form of proportional control is mandatory. Second, build the plane large. Third, make it as light as possible. Fourth, do not over-power the plane. A glance at the B-24 plans reveals all four of these maxims have been closely followed. The radio equipment is simple pulse proportional, the span is a generous 60", the weight ready-to-fly is only 44 ounces, and the power is provided by

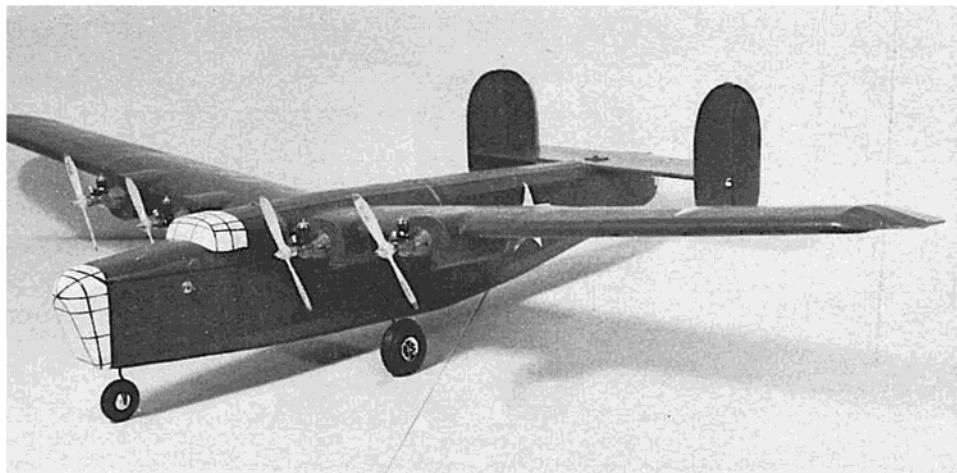


FOUR ENGINE SINGLE CHANNEL

B-24

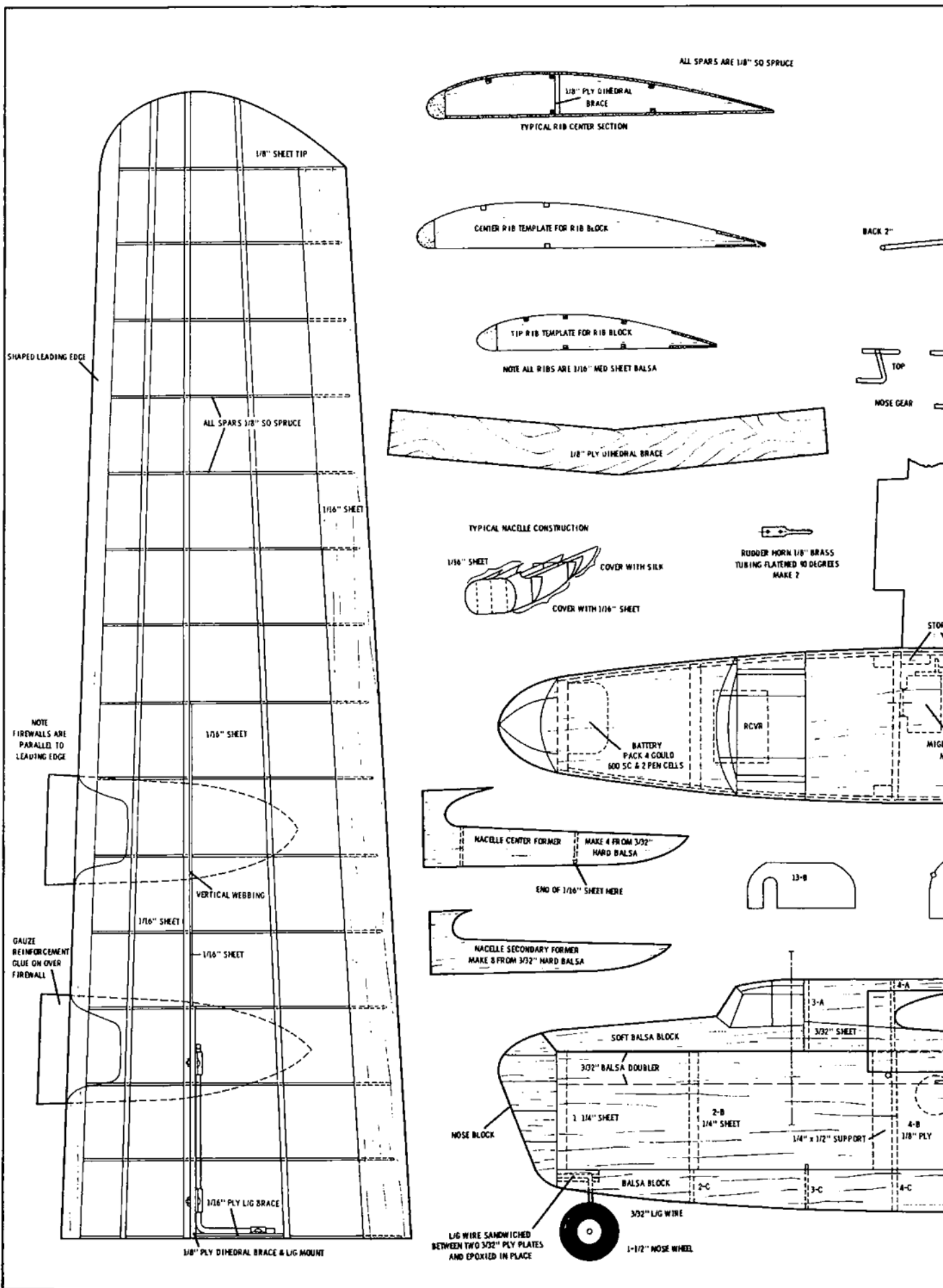
BY FRANK BAKER

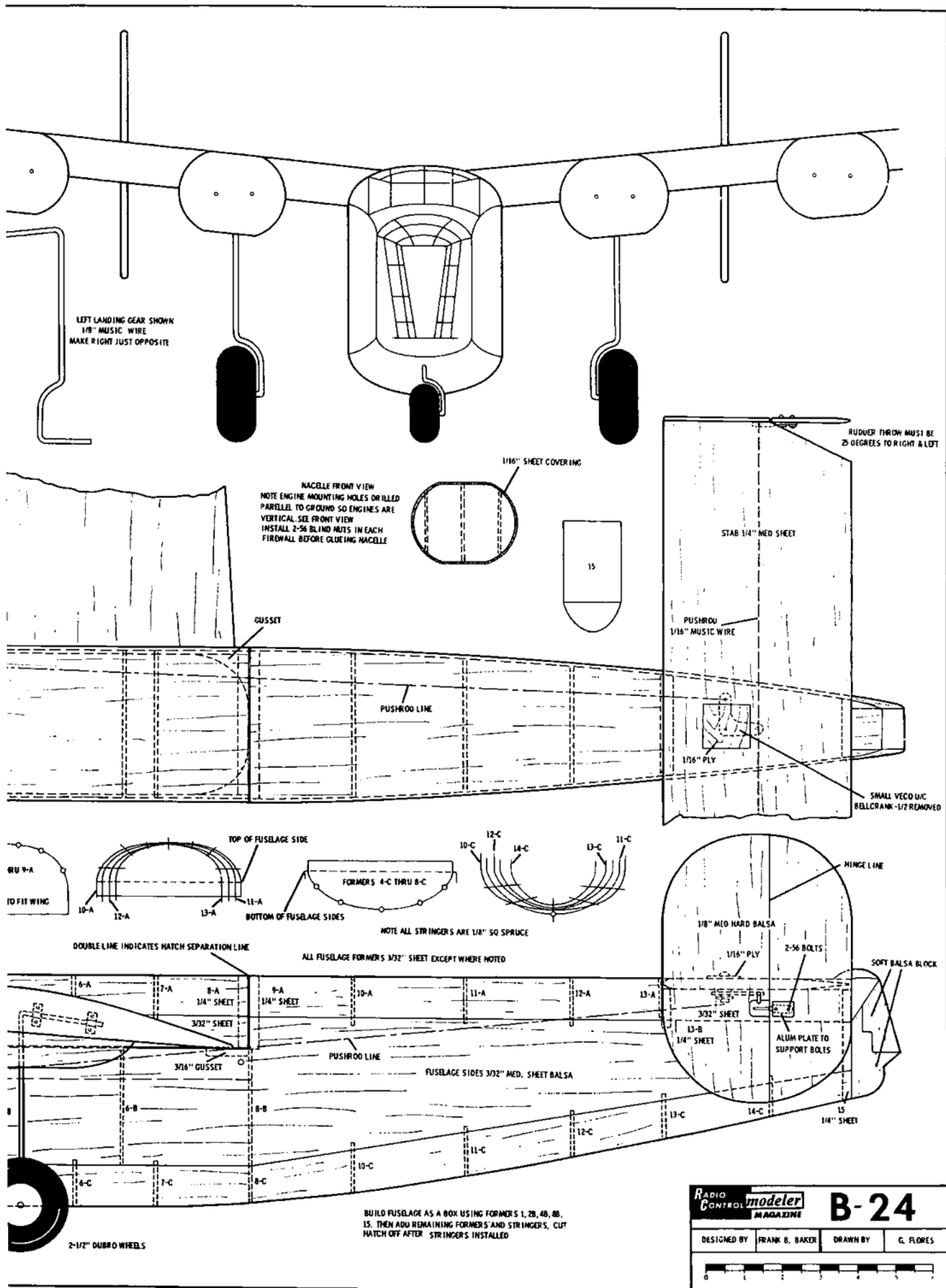
Easy To Build, Stable Semi-Scale
Model For Single Channel Proportional

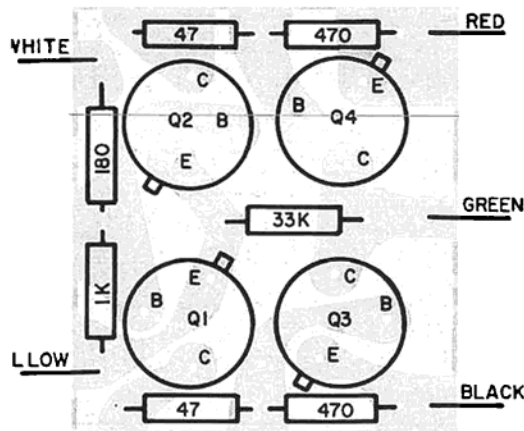


four Cox TD .020's. These characteristics are diametrically opposed to the usual multi-engined scale plane which is normally heavy, overpowered, and aerodynamically unstable. Hopefully, the B-24 will start a new trend as I am convinced nearly any four engined plane can be flown following the four axioms given above.

The most common question heard at the flying field is, "How are you going to start all those engines?" Rather than keep you in suspense, here is how it is done. Start the outboard right (facing the model) engine and adjust it to run smoothly. I do not attempt to peak out the engines but settle for a smooth running engine on sport type fuel (Cox Blue Can). Then, start the next engine and repeat the process until all four engines are running smoothly. On larger multi-engined planes tachometers are used to synchronize the engines but this is too much bother for sport flying. Hence, the engines are synchronized by sound and sight and not too well at that. When all four engines are running, I quickly stop them by stuffing a cloth into the props. The tanks are topped off, and I restart each engine. Using this procedure, the Cox's will actually start with ONE flip, hence, engine starting is no problem. Normal practice has been to start the two outboard, then the two inboard engines in hopes that they will quit in the same order. It has also proved more convenient to let one person start the







COMPONENT LAYOUT

engines while a second person holds the plane.

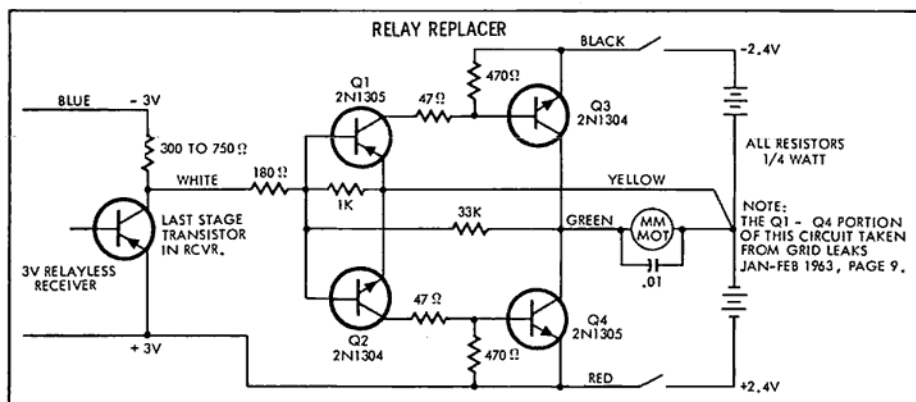
The B-24 is a very docile aircraft to fly and behaves similar to a Midwest Esquire or a Debolt Champion on a .15 engine. The first few flights were hand launched but it was discovered quite by accident (someone let go!) that it will R.O.G. from a grass field in about 50 feet. An R.O.G. with the four Cox's chiming away and the rudders banging back and forth is a breathtaking sight which never fails to elicit oh's and ah's from those assembled. Upon breaking ground it climbs out at a good pace and gains altitude quickly. The engines tend to terminate in a random pattern which does not cause any problems. The first several "stoppages" can usually be detected by a shift in the center position of the stick even before they can be heard. With all four engines running the B-24 will climb; on three it will maintain altitude; on two it will start a slow descent; and on one it will enter a fast powered glide. Landings are easy, with or without power, as the big wing produces a natural flare out at about 18" from the ground which results in nearly three point landings. Now that the joys of flying have been clarified, a few construction pointers are in order.

The two enemies of success are weight and vibration, hence the plane must be light, yet rigid. The wing is built first. The center section of the wing is a D-tube structure to a point just outside the engines in order to provide a rigid mount for the engine nacelles. Prior to installing the outboard engine nacelles it is advisable to silk cover between the ribs where the nacelle fits in order to simplify covering the balance of the wing. The engine nacelles are constructed on the wing from the sets of three profile formers. After the profile formers are in place, the firewalls are installed, being careful to keep the engine mounting holes parallel to the ground. Do **not** change the engine offset from that shown on the plans as the rudder behind each pair of engines eliminates the need for any other offset. The nacelles are cov-

ered with $\frac{1}{16}$ " sheet and the firewall joint reinforced with gauze or fiberglass cloth. The combination of well constructed nacelles tied into a D-tube wing provides a strong rigid assembly upon which to mount the four engines.

The remainder of the construction is conventional and should offer no problems. It should be noted that all wing spars and body stringers are $\frac{1}{8}$ " square spruce, and balsa should **not** be substituted for any reason. A major source of the favorable strength to weight ratio is the spruce. Build the body except for formers 5A-7A and then glue the completed wing onto the $\frac{3}{32}$ " incidence blocks. Formers 5A-7A are then trimmed to fit the wing and the $\frac{1}{8}$ " stringers are added the full length of the upper body. The stringers are then cut with a razor saw between formers 8A and 9A and the whole forward body section lifted off as a unit. Such a hatch provides access to the whole front half of the body for ease of radio installation, etc. In keeping with the "keep it light dictum," two coats of clear were brushed on to fill the silk and two coats of olive drab were sprayed on. The early (1941) B-24 was used primarily as a trainer, hence few, if any, markings are appropriate.

As mentioned earlier, the B-24 requires some form of proportional control due to a requirement to be able to hold the rudders in an off-center position. A Mighty Midget motor was used on the prototype, as a motorized actuator is necessary in order to hold the rudders against the slipstream. It is not recommended that actuators of the magnetic type be used due to the low power involved. In addition, with four engines running in only slight semblance of synchronization it is impossible to use a relay type receiver, yet most relayless receivers will not switch a motor. This dilemma was resolved by the use of an all transistorized "relay replacer." Figure 1 contains the schematic and a PC board for this device. Any 3 volt receiver such as a Kraft or Controlaire 5 can be used. The only additional requirement is that



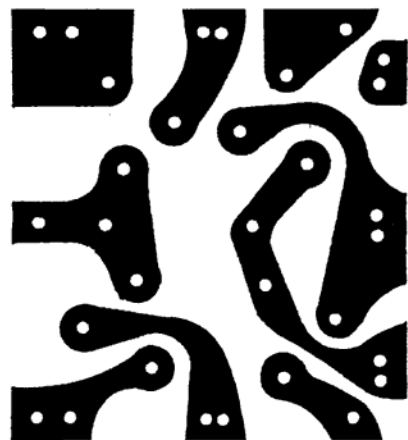
Schematic and component placement for driving a motorized proportional actuator from a relayless receiver.

the receiver be operated at a voltage higher than one side of the servo batteries, i.e., 3 vs. 2.4 volts. In place of the usual escapement add a 300-750 ohm resistor (this will vary with receiver) on the receiver board from the collector to -3 volts. Connect the receiver +3 to the servo pack +2.4. The wire which normally goes to the escapement serves as the input to the relay replacer. Using this device, one has a completely solid state radio installation which is immune to vibration. A number of these relay replacers have been used for over three years in planes ranging in power from .020 to .35 without a single failure.

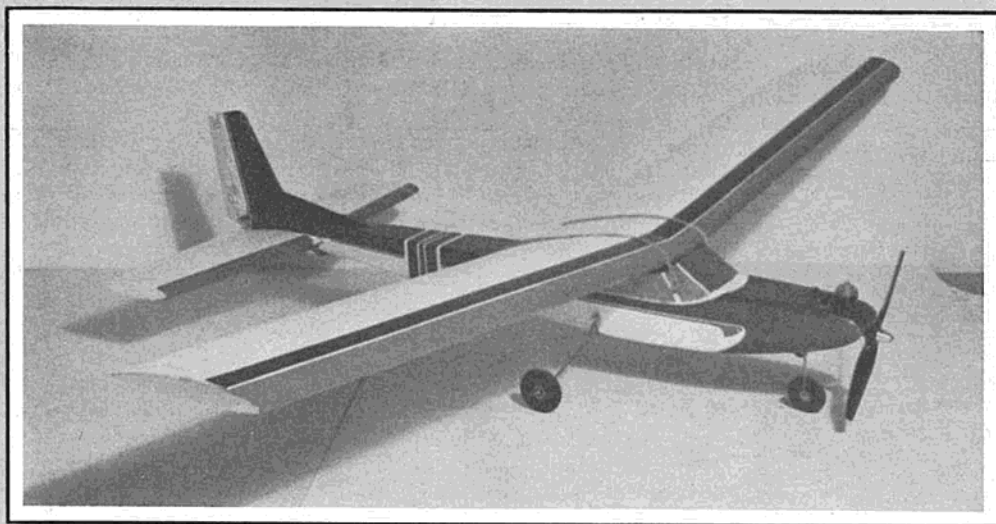
The original design of this B-24 model was near optimum as it has been flown as designed without adjustments of any kind for a period of over two years. The only further refinement suggested is to install a feedback servo using the filter technique given in the February 1965 issue of RCM. The relay can be replaced in the diagram by the relay replacer given above to produce a proportional system which should result in even more realistic flights of your B-24. In addition, any of the smaller full house proportional systems can also be used, utilizing only one servo for the rudder.

Regardless of your choice of equipment, you'll enjoy building and flying the B-24.

Printed circuit board shown twice normal size. Reduce 50% for actual sized board.



GETTING STARTED IN R/C



**WHIZ
KID**

AND

**CESSNA
150**



A STEP-BY-STEP PROGRAM FOR BEGINNERS

BY OWEN KAMPEN



At the time of writing, this Lodi, Wisconsin, trio has made over 400 flights with their Whiz Kid's. L to R: Mike Zink, 11; Paul Knutson, 13; and Dan Knutson, 9. Their spot landings put many elders to shame. Proof positive!



17-year-old Steve Rife, assistant at RCM's editorial office, had never built or flown a model airplane. The Whiz Kid was his first . . . and completely successful!



Frank "Digitrio" Baker — flies multi scale and 4-engine types. This is his second Whizzer, a sort of semi-something Curtis Robin variation. Note QZ engine — this combo great for the schoolyard bit. Frank flies them till engines fall out.



Dad Knutson (Dick) flies scale propo — Goodyear, big bipes, and all. Has fun with a Whiz Kid.

IN almost every sport or hobby it is customary to start at the beginning. I say "almost" for radio control remains a stubborn exception! Here, the compulsive urge to begin at the top has been, and is, one of the greatest barriers to enjoying the rewards of R/C flying. A large part of this is due to adult ego which causes many otherwise intelligent grown-ups to shy away from anything labeled "for beginners," even though they have never built or flown anything more complex than a 10c glider. They soon learn, to their dismay, that age and money are no substitutes for experience, but by then it's too late and they are soon pursuing a new "lifetime hobby of the month." On the other hand, there are large numbers of would-be builders and flyers of all ages hanging on the fringe who are itching to get into "wireless control" but are held off by the confusing jargon, double talk, and conflicting advice volunteered from all directions. They are perfectly willing to start moderately with minimum controls, minimum building time, and minimum investment, but aren't quite sure just **where and how** to begin. If this latter description fits you, hang on for some straight words on the subject. And you old timers — don't go away, because there's something here for you, too — unless you're hooked on status symbols — in which case you'll have to seek success elsewhere. Now, let's get the proverbial show on the road with some specifics.

The Whiz Kid and Cessna 150 introduce a new approach to $\frac{1}{2}$ A R/C models. Each is designed to fit a specific step in a building program guaranteed to get you off to a flying start in single channel radio control. Both feature an unusual molded foam wing and stab which combine to give a flight response unique in .049 class models. Thoroughly tested in hundreds of flights by modelers of all ages and degrees of experience, they have proven to be exceptionally easy to build and fly, yet have a survival rate far beyond the average! While they lend themselves to the "trainer" category, it would be unfair to label them exclusively as such, for many advanced multi modelers have enjoyed the sheer "fun of flying simple" with this progressive pair. Let's take a look at them, individually, and learn the secret of their success as well as how they can be modified to grow with you as your flying skill increases.

WHIZ KID

Through the years many models have appeared offering themselves as the answer to a beginner's prayer. As a whole they have been (1) too complicated, (2) too fragile, (3) too fast, (4) too prone to warping, and (5) too many pieces. All too often the net result has been that the "first" model has had the effect of a revolving door in terms of getting new

people in and out of our R/C hobby in record time.

The Whiz Kid has been designed to welcome you to the group and keep you here coming back for more. Big words? You bet! Let's see how it's all accomplished and you can judge for yourself.

First there's the matter of the curved slab that keeps the whole business airborne — the wing. Note: **All wings are not alike.** Obvious? Well not so much as you might believe. If you are new to building and covering them, they are all alike — **DIFFICULT!**

We solve that in a hurry by using Midwest's new molded foam wing that eliminates building and covering. It also does a lot more than save time — it prevents **warping**, one of the most haunting voodooes to ever plague flying machines!

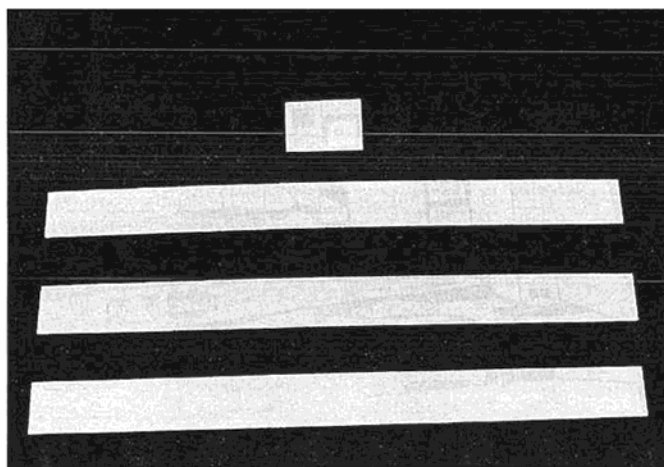
The foam wing and stab do not need to be covered — more on that later — yet they are strong through extra thickness and flexibility. "Thickness" is a key word in describing the flight characteristics of this pussy cat so let's pause a moment to see how and why it is important. This is not the time and place for an involved discussion on airfoils so we will keep it simple: (1) The more wing area the more lift. (2) The more area the more drag. (3) The thicker the wing (within limits) the more lift and also the more drag. (4) The opposite also holds true. In other words, lift and drag walk hand in hand and you can't have one without the other.

The use of thick airfoils is not new — being used by most large multi ships today. The common practice is simply to overpower them with large engines.

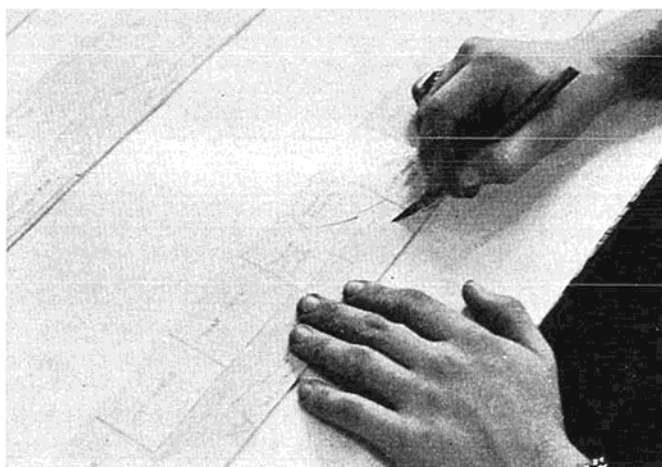
The Whiz Kid doesn't try to fight this combination but puts it to work with the following results. The thick 17% section gives high lift and high drag to keep flying speeds **down**. Reduced speed means more time to anticipate the action of the model and to give the proper control. It also results in a slow lazy glide from altitude after the engine quits to help you learn to set up proper landing patterns and get extra flying time from small engine tanks. (Under thermal conditions the Kid will soar and one flight was terminated after 11 minutes only because of low batteries.)

Another very important factor to be considered is airfoil shape. Most $\frac{1}{2}$ A jobs today use the reliable old flat bottom Clark Y section, or one of its descendants. A characteristic of this airfoil is its tendency to balloon when turning into the wind or when excessive speed is built up. Its high lift also makes it difficult to penetrate wind. The Midwest foam wing has a semi-symmetrical airfoil (convex curve on the bottom) which minimizes these problems, and as a result, ballooning is tamed and penetration is surprisingly good.

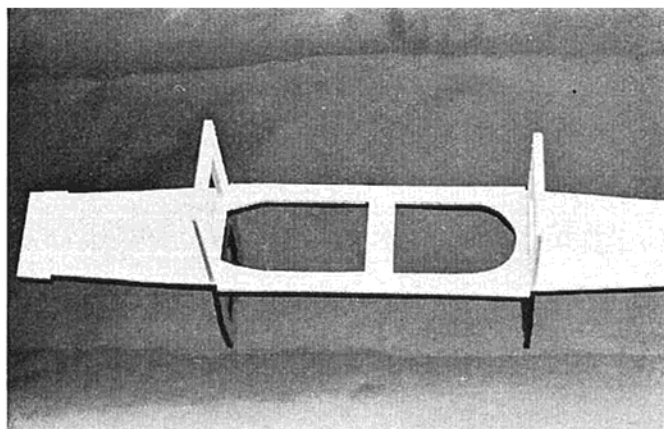
One final consideration is the shape of the wing leading edge. Sharp leading



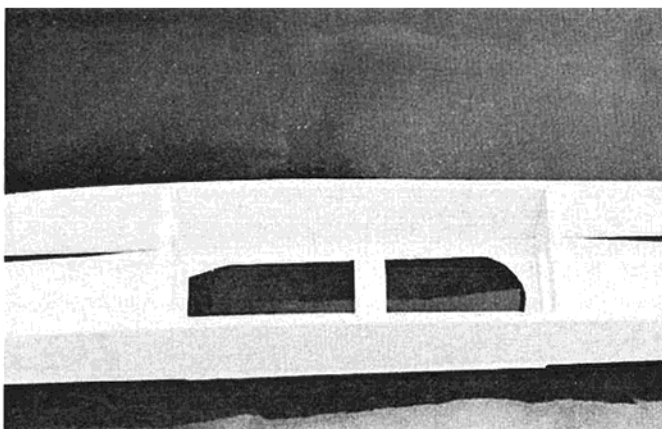
Templates rubber cemented to balsa sheets.



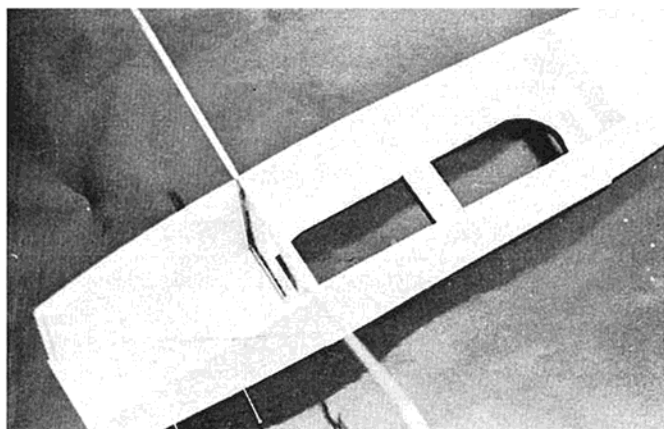
Cutting out the Whiz Kid parts.



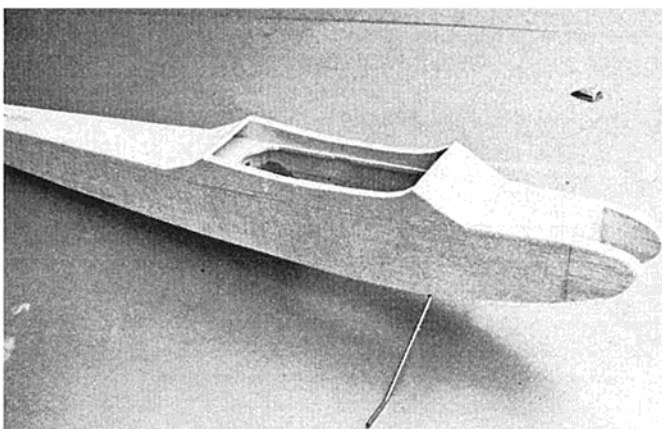
Formers glued to fuselage crutch.



Sides fitted to crutch and formers.



Two wheel gear in place behind doubler.



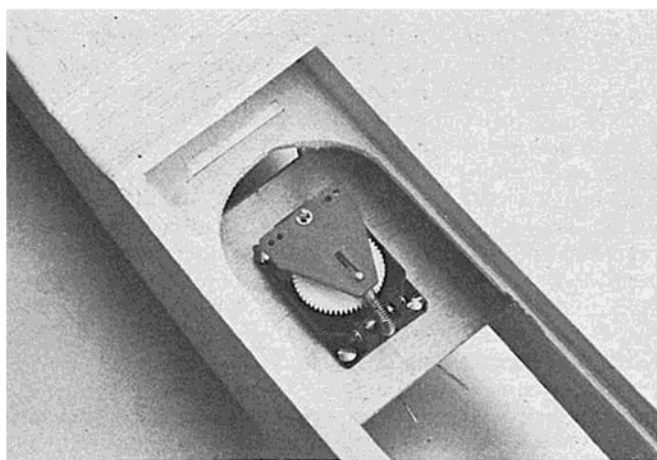
Basic fuselage completed.

edges affect stall characteristics tending to give an abrupt and sharp braking stall which we can do without. Ed Kazmirski's "Taurus" pioneered the use of a blunt rounded leading edge to tame this effect and it does the same for "The Kid." The thick semi-symmetrical stab also goes to work in stalling attitudes. It's quite surprising at first to watch the tail lift up allowing the ship to pick up speed and move out again without dropping off on a wing.

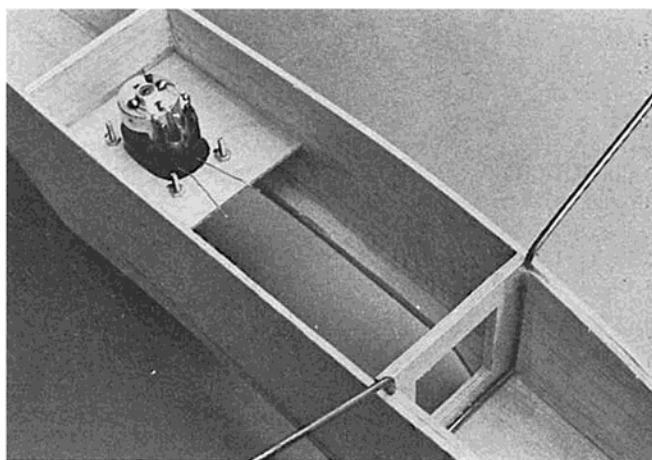
So much for flying surfaces — now

let's put them to work. The distinctive appearance of the Whiz Kid is the result of a couple of nagging questions which reared their round heads some time ago — to wit — why must models be built from plans? Why not patterns? Silly questions? Not at all! Those of you who have dressmaking wives — mothers — girlfriends or whatever, can ponder how far this billion dollar business would have gone if they sold dress "plans." So, included in this ball of wax are patterns showing how to cut a Whiz Kid from

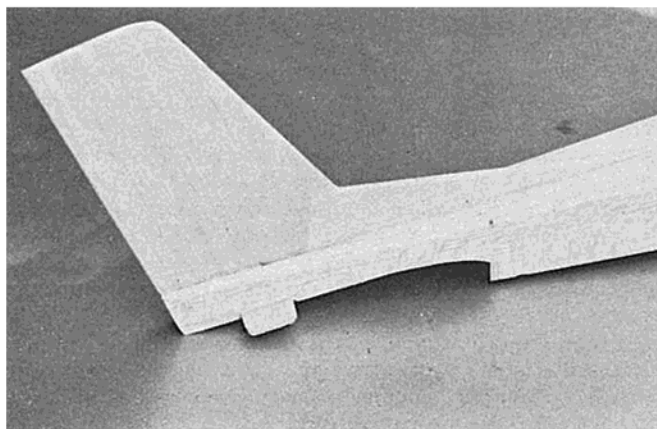
3 sheets of standard size balsa. How about that? If you've already peeked you might have noticed that the sheets are 50%-100% thicker than normally used on a 1/2A job. That's one of the ways the survival problem was solved. There's more to it than that, however. In addition to the extra strength the thicker wood allows a really meaningful keying of sides and formers to a central crutch. This, combined with both sides being cut from the same sheet of balsa, makes it impossible not to build a true



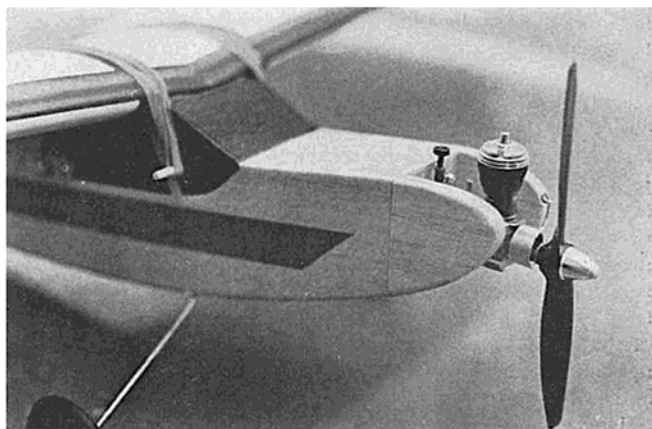
Rand HR-1 on plywood mount.



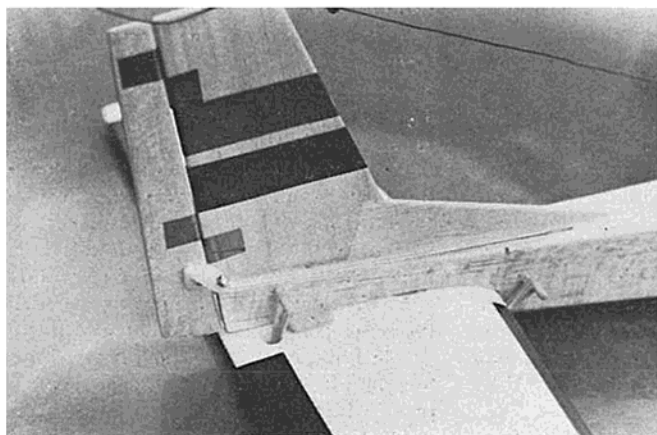
Underside of Rand actuator.



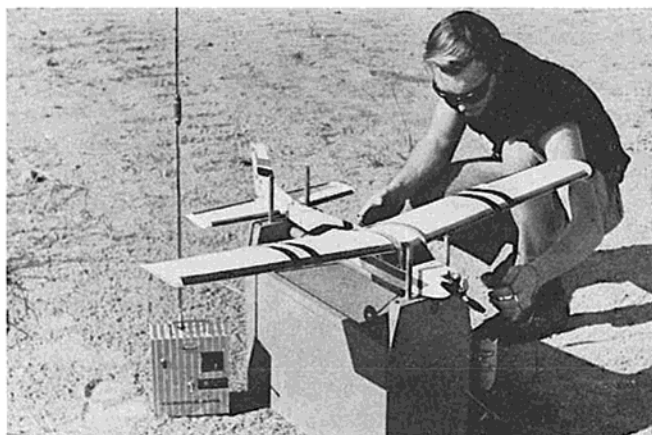
Tail assembly showing stab mount.



Golden Bee .049 in place.



Tail assembly with Midwest foam stab.



Steve Rife with Whiz Kid, ready to fly.

fuselage. Touche!

Another bonus is the ease with which repairs are made — more gluing surface makes stronger joints — right? All of this for an ounce or less of added weight. Our high lift wing won't even notice the 20 oz. all up weight and in fact flies better than when lighter. We're not flying free flight, men — remember? Also with today's lightweight equipment we can afford to put more of the overall weight back into the structure where it belongs.

Regarding equipment, a strong loud

pitch is hereby made for simple pulse proportional. Almost all of the hundreds of flights to date have been made using single channel receivers with add-on switchers or dual output rigs such as the C&S Finch, coupled with the Adams actuator. This deceptively simple magnetic actuator is the result of more than 16 years of development and for simple, reliable Rudder Only operation it's excellent. It has one moving part, three connections to solder, and that's it. Its big brother, the Adams Dual, can also

be used for more positive response and is definitely recommended for the Cessna. On the slow moving Whiz Kid, however, it's really not necessary.

The Whiz Kid has been flown on escapement but it is honestly not itself and tends to be jerky and jumpy, especially when the newcomer forgets how many times to punch the transmitter for a left turn when the plane is flying toward him!

A personal bias enters here, as time and time again, those who have been

having control problems on pushbutton, have been given the Whiz Kid and a Controlaire Galloping Ghost transmitter to try. Usually just three flights using proportional stick control and they are sold. The funny, wiggling rudder doesn't bother their aesthetic sense when in the air. In answer to your next question, let's hold off on the Rand LR-3 until the Cessna, OK?

Hang on readers — we'll get to the construction shortly. First, a comment on the long nose and tail moment arms which give you the smooth gentle maneuvers, and then the clincher on how to give the Kid a hotfoot! It is strongly recommended that you start out with the standard 40" version and fly it until both you and the plane know who is driving! When the easy, lazy flights have become cinchy and a yawn begins to creep in now and then, here's what you can do to stir up the action (but not all at once!). (1) Move the pushrod closer to the rudder for more throw. (2) Increase the size of the rudder $\frac{1}{8}$ " to $\frac{1}{4}$ " by adding a strip on the trailing edge. (3) Saw off some wing. That's right — or use a bread knife if you wish, or a razor blade, or a scout knife! Remember that lift-drag discussion a while back? Well, now we're going to get rid of some drag — some lift, too — the net result is faster airspeed, faster response, and faster butterflies in the stomach!

How much? Try a 38" span for a start, and if you feel bold, knock off a couple of inches more! You still want more go? Try a Cox Tee Dee, only be sure you know what you're doing! To give you an idea of the extremes to which some people will go just for kicks, Frank Adams has a 28" version that does consecutive rolls upwind — in 20 mph winds! Needless to say, this is not quite what we had in mind for our gentle trainer, but to each his own! Modifications are beginning to show up on the field and where it will all end, nobody knows, but for a couple evenings time and three sheets of balsa — what can you lose? Two wheel and three wheel versions add to your options. So, enough of this — let's cut and glue just like they say in the model mags. Oh — one final thought! If, for some unexplained reason the whole bit pales, build the fuselage anyway to take with you on your next vacation. It's great for driving tent pegs!

Wing Preparation

The Midwest wing and stab need little additional work other than a light sanding to remove any ridges or flashing. It is desirable, however, to seal the foam against oil and dirt. The easiest method is to give the raw foam a few coats of white glue which has been diluted about 50% with water. Another method, used by Fearless Leader, is as follows: (1) Two coats of thinned white glue. (2) Lightweight silkspan or Japanese tissue

applied damp, followed by two more coats of glue mixture. NOTE: DO NOT USE MODEL AIRPLANE GLUE ON FOAM! 'Cause it dissolves the foam, that's why! And if the white glue tends to burble and bubble during application, try the addition of a few drops of a wetting agent such as Kodak Photo-Flo. (Ed's Note: We have successfully used AeroGloss dope filler, clear dope, and colored dope over silkspan and white glue covered foam wings. Extreme caution must be used to be certain the surfaces are completely sealed inasmuch as butyrate dope will also melt the foam. If you use dope over the glue-silkspan surface, we recommend all coats be sprayed.)

The addition of $\frac{1}{8}$ " dowels notched into the center section of the trailing edge of the wing will give added strength to protect against crushing by the rubber bands used to attach the wing. $1\frac{1}{2}$ " wide cloth or plastic tape used along the leading edges will create additional strength as well as adding a nice touch of color trim.

A plywood brace (or a piece of flat popsicle stick) should be white glued in the notch in the stab bottom — also for rubber band protection. ANOTHER NOTE: A real bonus feature of the use of the foam is its ease of repair. On rare occasions a wing will break, but don't panic — the break is almost always clean, and the thick sections go back together real easy. USE EPOXY GLUE ONLY FOR REPAIRS. White glue tends to stay wet — the epoxy is self-curing and does not dry by air contact.

A final suggestion here regarding alternate covering methods. Each adds some weight and involves additional cost. (1) The use of contact shelving paper — this is particularly appropriate if you like red brick wings or perhaps yellow daisies or a nice plaid is to your taste. Now is the time to really express yourself! (2) A somewhat more conservative approach involves MonoKote. This can be applied to foam if you exercise some care to keep temperatures LOW. Some builders have used a hair dryer with success. WARNING: HEAT MELTS FOAM.

In addition to the above, a bit of experimenting has been done with thin contact sheets of Mylar. If you are the born experimenter type and come up with a better solution, by all means let's hear from you. So much for foam — now on to the balsa bit.

Fuselage

The "crutch" construction used here lends itself to a variety of building procedures. The fuselage can be built upside down, on its side, or holding it in your hands — it really doesn't make much difference as everything hangs on the crutch.

A word now about patterns. The assumption is made that you will order

real life size ones from Hobby House Plans Service, otherwise the whole point is lost. Notice that a standard sheet size is indicated, and all that remains for you is to transfer the patterns to the wood. Use tracing paper or rubber cement the paper directly to the balsa. The cement will rub off later. Please use a good steel straight edge for the straight cuts — no free hand work here! Many modelers have built more than one so you should consider the slight extra effort of cutting the patterns from cardboard for easy tracing. An all-out effort was made to get everything to come out of just three sheets, which accounts for the lamination of wing saddles and nose triplers. If you have some $\frac{1}{4}$ " scrap available, by all means use it. 'Smatter of fact, you can build the whole bird from leftovers if you so desire and have lots of new "littler" leftovers!

The only operation that might give you a little trouble is the bending of the nose wheel coil. Commercial gear is okay, although inexpensive bending jigs are available at most hardware stores. The alternate, and easier choice, is the two-wheel version. All this requires is shortening the fuselage nose doublers by $\frac{1}{8}$ " and sandwiching the gear against F1. A tail skid should then be added just forward of the stab. Stitch to a small piece of plywood and make the skid long enough so the tail doesn't drag. Now here we go, 1-2-3.

CONSTRUCTION

Fuselage

1. Glue formers F1 and F2 to the crutch.
2. Glue the two sides to the crutch between formers F1 and F2. Make sure the short side is on the right when looking at the top with the nose pointed away from you. Let dry.
3. Now glue the rest of the sides to the crutch working toward the nose — then the tail — hold with pins till dry.
4. Add the nose and tail doublers using contact cement such as "Weldwood."
5. While the fuselage is drying drill the holes for the engine bolts and install 3 x 48 blind nuts in the $\frac{1}{8}$ " plywood motor mount, then bolt the nose gear in place. Install using epoxy. Make sure it fits tightly against the nose doublers.
6. Add the wing saddles — measure carefully 3" back from the front of the left (longest) side as shown on plans.
7. Add fin and dorsal and plywood stab rest. Do not attach rudder yet.
8. Cut out the strip of the crutch between wing saddles — add front nose doublers and triplers.
9. Install equipment.
10. Line the battery compartment with foam. Add rubber hold down dowels and triangle L/G braces.
11. Glue on bottom sheeting — windshield and rear deck.
12. Sand and give 3 or 4 coats of clear dope, sanding after each.

13. Color dope using photos as guide or try your own design.

14. Attach rudder with nylon thread using a figure 8 stitch.

15. Bolt on engine and use rubber bands to strap on main landing gear.

FLYING

1. Make sure the model balances $2\frac{3}{4}$ " back from the leading edge of the wing when supported at each side of the fuselage. Do not try to balance holding the wing tips.

2. Test glide for a flat straight glide. If too steep add a shim $\frac{1}{32}$ " thick at a time on the leading edge of the stab. If the nose rises — add the shim at the trailing edge.

3. First flights should be made with the engine running rich — not at top speed. Do not signal turns until model has 30' or more of altitude. Make gentle turns until you have the feel of the plane. This model glides extremely well and being a slow flyer is best flown on calm days and evenings. Slow response is designed in to aid in learning to handle R/C painlessly.



Whiz Kid Material List

- 1 Midwest foam wing and stab kit (Midwest Products Co., 400 S. Indiana, Hobart, Indiana)
- 1 $\frac{1}{8}$ " x 3" x 36"
- 2 $\frac{3}{32}$ " x 3" x 36"
- 1 14" length of $\frac{1}{8}$ " dowel
- 1 18" length of $\frac{3}{32}$ " music wire (L.G.)
- 1 2" x 3" piece of $\frac{1}{8}$ " birch plywood
- 3 $1\frac{1}{2}$ " wheels or two $1\frac{3}{4}$ " and one $1\frac{1}{2}$ " dia. wheels
- 1 20" length of .040 music wire (push-rod)
- 1 pkg. 3/48 blind mounting nuts
- 1 pkg. 3/48 x $\frac{1}{2}$ " bolts
- 1 pkg. J-Bolts
- 1 rudder horn

R/C Equipment

Single channel transmitter with pulser, such as: Contolaire Galloping Ghost, Min-X Pulsmite, Contolaire Mule with pulser.

Single channel receiver, such as: Contolaire 5 with World Engines Add-on-Switcher, C&S Finch double ended receiver, F&M superhet (Vanguard or Pioneer), Min-X Pulsmite superhet.

Proportional actuator: Adams single or dual magnetic actuator, Rand HR-1 or LR-3. (The Rand actuators require a relay receiver, the Adams will work on relayless as well.)



Author's daughter Debbie, 15, and Cessna 150.

CESSNA 150

Models of full scale airplanes have always been the mainstay of our hobby, and while most do offer special problems for the modeler — both in building and flying, the "150" is a delightful exception! The clean, simple lines and excellent stability are made to order for us and this single channel version retains all of the fine flying characteristics of its "Big Daddy." As the big one is breaking all sales records for light planes, with the majority being used as trainers for student pilots, what better choice for Step 2 in an R/C building program?

The "150" is considerably faster and more responsive than the Whiz Kid, yet tame enough to allow you to easily make the transition. Properly trimmed it will fly hands off, and if you enjoy cross country running, don't bother with R/C! In the air, it's a joy to see as well as to fly, and the see-through windows give that extra touch of realism that makes it hard to distinguish from the real thing. As with the Whiz Kid, the major factor affecting performance is the thick semi-symmetrical airfoil of the foam wing. Now coupled with a heavier, faster plane, the results are surprising in terms of increased penetration plus the same gentle stall recovery and flat glide.

Added maneuverability is a direct result of the larger and taller rudder which, in turn, needs more power to move it. Here the Adams Dual Actuator comes into its own, giving true proportional control with plenty of bang when needed. The same battery pack can be

used, 3 pencells or 4 — 500 mah nicads with 3.6V tapped to the RCVR. The difference lies in the fact that the Dual puts out 3 times the torque of the Single at about the same voltage and current drain. As a result, response is immediate and positive.

Go easy to start with and set the push-rod in the outside hole of the rudder horn for less rudder throw. When full left or right is given the 150 will go into a steep bank and if the turn is held, will spiral dive rapidly and steeply. While a bit unsettling for the newcomer, this is the method for picking up excess speed to convert into rolls and loops.

A great deal can be done on rudder-only when mastered. The 150 also lends itself to conversion with the installation of a Galloping Ghost actuator such as the Rand LR-3 which will give elevator control for more advanced maneuvers.

Actually, the elevator serves a function even in unadvanced maneuvers. The obvious loops, elevator turns, and flare out landings are part of the package but another application sometimes goes unnoticed in the excitement. Like what? Well, like simple straight and level flight. A rudder only model without motor control tends to climb under power until turned. With elevator control — even elevator trim — straight and level flight is possible, turning engine thrust into forward speed which in turn makes it easier to perform many stunts.

(Continued on Page 33)



CESSNA 150

(Continued from Page 31)

The additional drag of the extra flapping surfaces would suggest adding more power, and here a Cox Tee Dee .049 or .051 is in order. As these engines do not have self contained fuel tanks, a $\frac{3}{4}$ oz. tank should be installed behind the ply engine mount. Beam mount adapters for the engine must also be used.

The Rand LR-3 also has provision for motor control, so this is another progressive step you may wish to take. Again, the option is yours.

As for construction procedures, the foam wing is treated the same as for the Whiz Kid with one exception. A notch is cut in the center trailing edge section for scale effect and to permit easier handling of the hold down rubber bands. Note the plywood lining as shown on the plans. The "150" weighs in at about 26 oz. with the Dual Adams and 4 nicads, so wing chopping is not recommended here.

The fuselage construction is quite typical and the triangular balsa makes it easy to make a nice rounded contour.

The aluminum landing gear can be cut from tempered aluminum or use one of the commercially available blanks. Again, the spring nose gear can be bought or built.

FUSELAGE CONSTRUCTION:

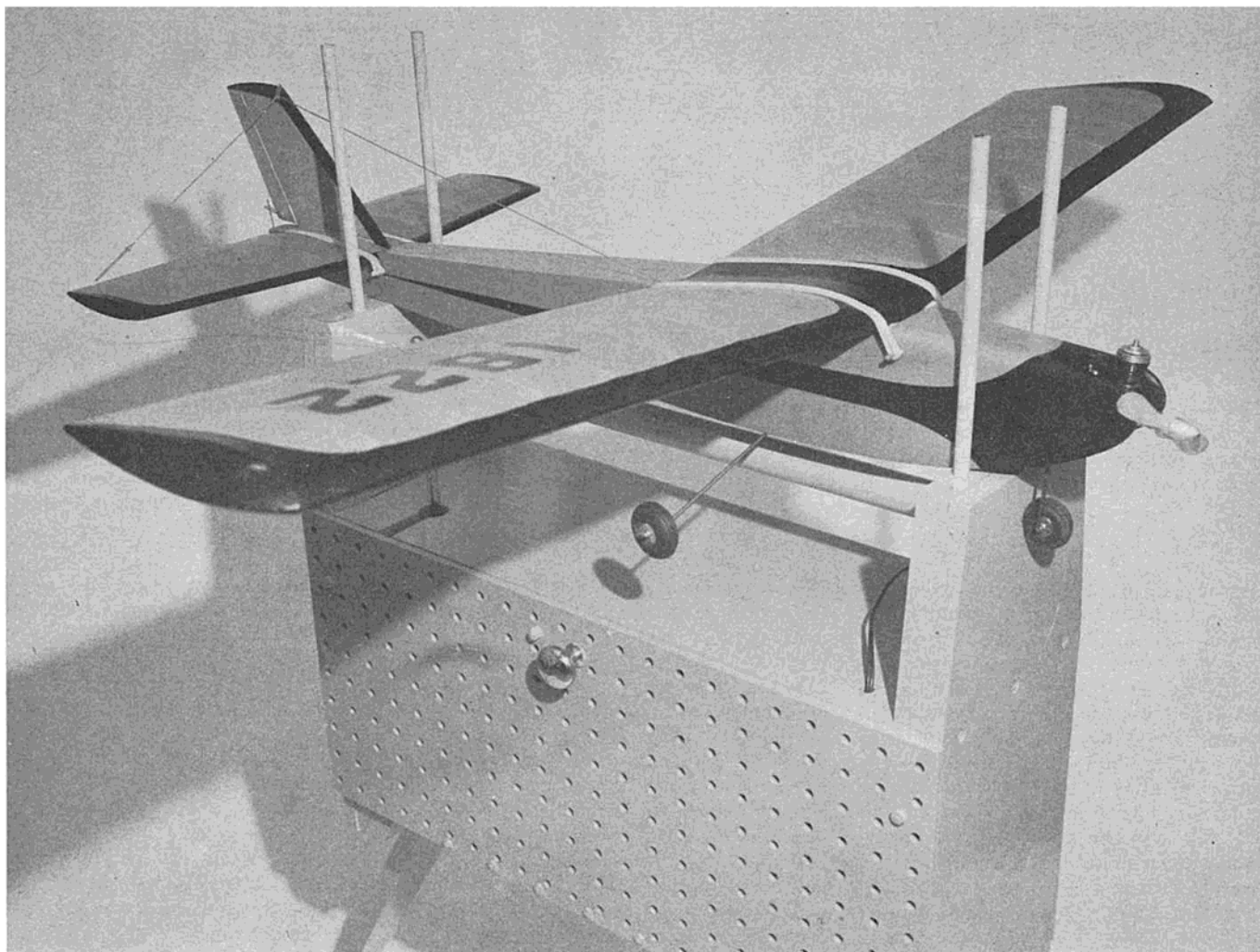
1. Butt glue the plywood windows to the fuse sides and then add the vertical doublers on the inside of each fuse side. Be sure you have a left and a right side. Add $\frac{3}{32}$ " sheet strips at top and bottom of windows.
2. Glue tail doublers in place and then add $\frac{1}{2}$ " triangular balsa strips to fuse top and bottom where shown.
3. Place the right side over the side view on plan and mark location of former F3 — glue F1 and F2 in place. Then add nose doublers using contact cement.

4. When dry, place the left side on top and glue to F1 and F2 making sure the fuse is square.
5. Drill the motor mount for the engine 3-48 blind nuts and install the nose gear.
6. Glue F3 and F4 in place being careful both sides bend equally. Hold with pins and rubber bands. Glue and clamp the $\frac{1}{8}$ " tail post between sides.
7. Glue top rear deck in place.
8. Glue ply motor mount in position. Cut slot for nose gear and add $\frac{1}{2}$ " nose bottom sheet.
9. Glue $\frac{3}{8}$ " nose blocks in place.
10. Add bottom sheeting back to F3.
11. Tack glue the $\frac{1}{4}$ " top of the battery compartment in place, then carve and sand to a rounded shape.
12. Mark location of rounded $\frac{1}{8}$ " ply front and back window formers then white glue in place. Add wing hold down dowels then finish with $\frac{3}{8}$ " sheet to complete top of cabin.
13. Glue fin together and install making sure it's vertical. Do not attach rudder at this time.
14. Install actuator, push rod switch etc. Remove nose top, line the battery compartment with foam and then glue top firmly in place.
15. Finish sheeting the fuse bottom and stab saddle.
16. Give fuse 2-4 coats of clear dope sanding between each coat, then add windows, color and trim and finish with a final coat of clear.
17. Bolt on landing gear and attach rudder using nylon thread in a figure 8 stitch. First flights should be made with about $\frac{1}{4}$ " rudder throw each side of center.

FLYING:

1. Make sure the plane balances with batteries and receiver installed at $2\frac{1}{4}$ " back from the leading edge.
2. The glide should be flat and quite fast — shim the stab if necessary to achieve this.
3. Plane performs best using a Cox 6 x 3 prop. Launch straight out or in a slight climb.
4. As the model is very responsive to rudder, give small control signals until familiar with the plane. The nose will drop quite fast if rudder is held too long.
5. Model slows up considerably when engine quits and glide is surprisingly flat and smooth.

Well, gang, that's the package as promised. If instructions are carefully followed, this pair will deliver many, many hours of flying pleasure for you. Keep your eye on the RCM for future words on a follow up program to hook you for good. In the meantime, you'll have plenty to keep you busy and happy.



The R/C field box ready for use with the author's modified Junior Falcon in place.

BUILD YOUR OWN

R/C FIELD BOX

BY ROBERT HAWKINS

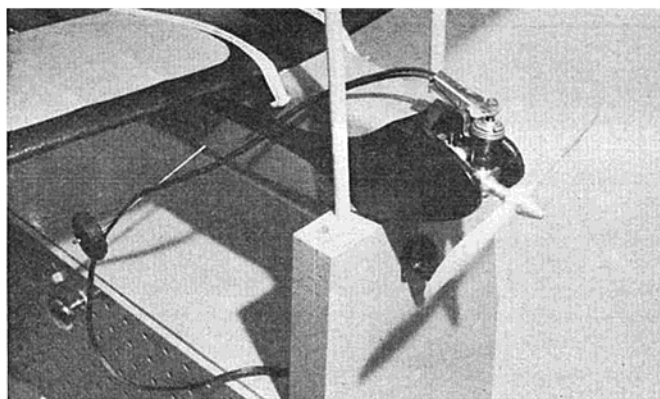
MANY of us who are flying R/C models today were the avid free-flight model builders of not too many years ago. Did we switch to R/C because of a long, suppressed interest in radio and electronics, or was it just that R/C looked like a way to fly free-flight planes and yet be able to return the planes to the vicinity of the launching spot? Most of us never did get a big kick out of searching through rows and rows of a cornfield for that pesky free-flight model! What the heck, let's admit it — we're getting older!

Another thing we old-time free-flighters would just as soon avoid is squatting down in deep grass or weeds while starting the engine or working on the "innards" of the plane. For quite some time, several factory-made R/C boxes

have been offered, but the prices, even for knocked-down kits, scared lots of us off. Another thing that many of us have in common is a workshop, with some power tools that will cut wood that's harder than balsa. So let's put them to use and build ourselves an R/C Field Box. The one shown here will hold almost any size plane — and it gets the engine on a modified Jr. Falcon up about 35" above the ground, where it can be started without bending over. Perhaps a little bending would be good for all of us, but let's face it — we don't like to do it! Maybe one of the items that makes the ready-made boxes so costly is the fine cabinet work that goes into making the neat set of drawers for storage of small parts. The box shown here uses the neat cardboard field box

offered by Sig Manufacturing Co. It's available from most Sig dealers and has four compartments to hold fuel, tools, spare props, rubber bands, etc. — and it fits neatly inside the R/C field box as shown.

The basic box is constructed with two $\frac{1}{2}$ " plywood ends and $\frac{3}{4}$ " clear white pine top and bottom shelves. After these four pieces are assembled, fasten the $\frac{1}{4}$ " tempered hardboard "back" in place with woodscrews. Cut the two small end plates from $\frac{3}{4}$ " pine and drill the 1" diameter hole in each one for the handle. Drill the $\frac{3}{8}$ " diameter holes $1\frac{1}{2}$ " deep into the top edge of the pine end pieces as shown in the drawing. The handle is a 21" length of 1" diameter closet pole. Sand and trim the ends of the handle until they each slide nicely into the holes



The wire from the glow plug battery is conveniently available and can be flipped out of the way quickly when the engine starts. Note the outer set of holes for the dowels to accommodate wider fuselages.



With the side door opened, one can see that the cardboard Sig field box forms the storage compartments for the many items needed by the average R/C flier. The transmitter is stored, with a slot for its antenna, securely in place. At the right hand end of the storage compartment, the glow plug starting battery is held in place with rubber bands and hooks.

in the end plates. Glue the end plates onto the handle and then assemble the end plates and handle as an assembly between the two $\frac{1}{2}$ " plywood ends and flush with the top shelf. Use white glue to hold these pieces together and drill three holes through each pine end piece into the $\frac{1}{2}$ " plywood as shown in the drawing, using a 1" — #10 woodscrew pilot bit. Fasten the parts together with 1" — #10 flat head woodscrews. Determine the location of the center of the handle on the outside of the plywood end and drill a hole into the handle, using a $1\frac{1}{2}$ " — #10 woodscrew pilot bit. Put screws into both ends of the handle.

The door is cut from $\frac{1}{4}$ " tempered hardboard and then drilled for the necessary holes for the piano hinge, eyebolts, magnetic latch and knob. The holes for the piano hinge should be carefully marked and drilled with a No. 27 drill. Holes for the eyebolts, magnetic latch and knob are all required to clear 8-32 machine screws, so use a No. 18 drill.

Mount the piano hinge onto the edge of the bottom shelf with $\frac{3}{4}$ " — #6 flat head woodscrews. Then install the door with 6-32 x $\frac{1}{2}$ " flat head machine screws, nuts and lockwashers. The 8-32 eyebolts are installed with the eye on the "inside" of the door using two nuts — one on the inside right up against the "eye" and the other on the outside. Cut off the protruding threaded portion about $\frac{1}{8}$ " beyond the nut on the outside of the door and then file it smooth. Pry open the eyebolt enough to insert a loop on the end of the sash chain. Bend it shut again. Prop up the door so it is exactly at right angles to the box and locate the spot for mounting the other end of the chain. The screw should be approximately 1" below the top shelf and about 2" back from the front edge. Install the knob and magnetic cabinet latch.

Next, cut the legs as shown from $\frac{3}{4}$ " pine. A power saw with tilting arbor makes these 30° cuts on the ends of the legs very easy to do. Note that the legs are shorter than the inside dimensions of

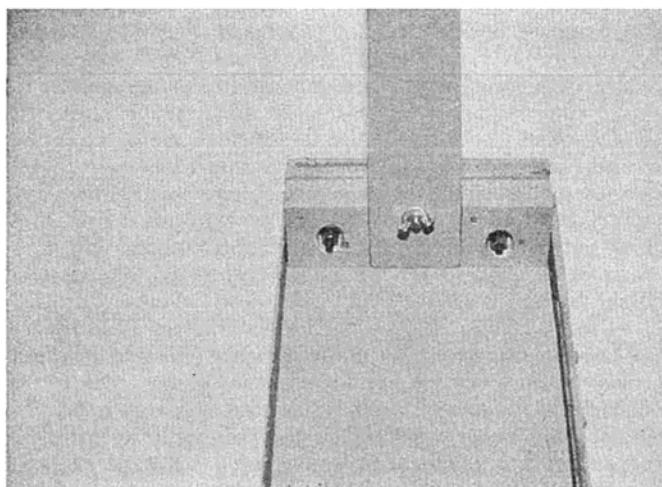
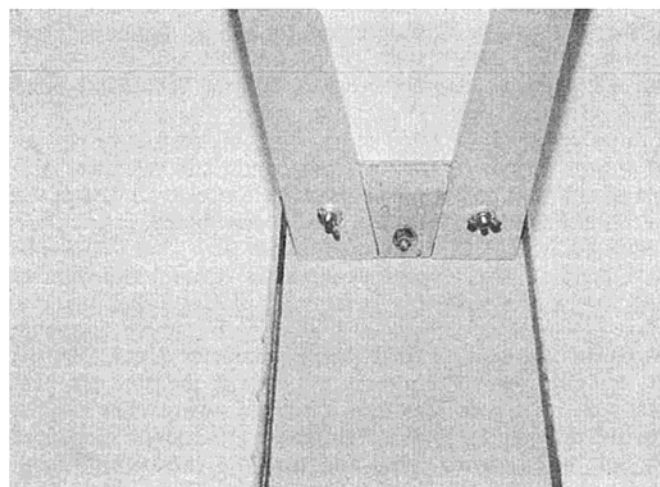
the storage compartment. This allows them to be stored inside the box for that ride out to the flying field. The $\frac{3}{8}$ " dowels are also removable. Actually, the dowels will fit too tightly in the $\frac{3}{8}$ " diameter holes in the end plates unless you sand them down slightly. If you have a drill press, insert the dowels in the chuck and sand the lower $1\frac{1}{2}$ " — $2\frac{1}{2}$ " with sand paper, checking for a slightly loose fit in the holes.

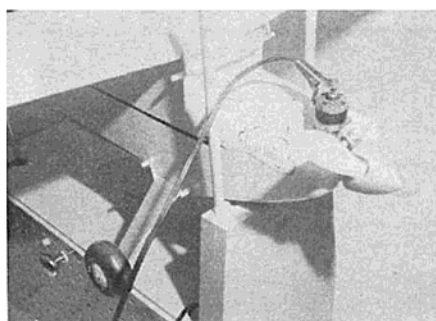
The brackets onto which the legs are mounted are cut at 30° as shown. The end having only one leg is made by drilling the single hole for the $\frac{1}{4}$ "-20 x 2" machine bolt and installing the bolt in the back where a 1" diameter counter-bore has been made. Glue this triangular piece, with the 2" bolt in it, in place under the end of the box. When dry, proceed with the remaining steps of assembly. Attach the leg and then position the two outer supports with $1\frac{1}{4}$ "-#6 flat head woodscrews. This is sort of a cut-

(Continued on Page 37)

The legs are held in place with $\frac{1}{4}$ " x 20 carriage bolts and wing nuts. Note the tapered spacer.

The single leg is again held in place with a $\frac{1}{4}$ " x 20 carriage bolt and wing nut and is positioned between two blocks for rigidity.





The author's livewire "Rebel" in place on the field box. Note that the dowels are now set for the "wide" position.

R/C FIELD BOX

(Continued from Page 35)

and-try assembly because you want these outer supports to fit snugly against both sides of the leg. Now drill $\frac{1}{4}$ " diameter holes through the supports, the triangular pieces and the plywood ends, as shown in the drawing. Counterbore or spotface a 1" diameter spot and install the 2" carriage bolts, nuts and lockwashers. This completes the assembly of the end having only one leg.

On the end having two legs, the construction is quite similar to that described above, but only one support is used and it is between the two legs. The best way to determine its exact shape is to cut the triangular piece, drill for two $\frac{1}{4}$ " bolts, install bolts and glue the assembly in place under the end of the

box. After the triangular block is securely in place, attach the two legs with wing nuts and make a small cardboard pattern that fits snugly between the two legs. Use this pattern to cut the $\frac{3}{4}$ " pine support. Glue the support in place and anchor it with two $1\frac{1}{4}$ "-#6 flat head woodscrews. Remove the legs now before they, too, get glued in place. Drill a $\frac{1}{4}$ " hole as shown for the $\frac{1}{4}$ "-20 x 2" carriage bolt, spotface on the inside and install bolt. This completes construction of the basic box.

The field box shown in the pictures has a slot cut out to clear the antenna of an F&M "Echo" transmitter. If your transmitter has a removable antenna, no cut-out will be necessary. The $1\frac{1}{2}$ volt battery for starting is held in place at the right-hand end of the storage compartment with two $\frac{1}{2}$ " cup hooks and rubber bands. Drill a hole in the top shelf to clear the lug ends of your Kwik Klip and then the door can be closed, yet the battery wires are available. When your engine starts, just pull off the Kwik Klip and drop it — it won't get dirty because it won't reach the ground!

Paint the Field Box to suit your taste. Mine is day glow orange so no one "accidentally" flies into the side of it. Be sure the paint you choose is hot fuel-proof. Most enamels are satisfactory. Well, there it is — a really useful field box that stores easily into the trunk of your car and yet provides a stable, convenient platform from which to start models at the field. Here is the Materials List from which it can be constructed:

MATERIALS LIST

Qty.	Size		Where Used
2	$\frac{1}{2}$ " x $7\frac{1}{2}$ " x $17\frac{3}{4}$ "	plywood	Ends
2	$\frac{3}{4}$ " x $5\frac{3}{4}$ " x $7\frac{1}{2}$ "	pine	End pieces
2	$\frac{3}{4}$ " x $7\frac{1}{2}$ " x 21"	pine	Top and bottom shelves
1	1" dia. x 21"	pine closet pole	Handle
2	$\frac{1}{4}$ " x $10\frac{3}{8}$ " x 22"	tempered hardboard	Door and back
3	$\frac{3}{4}$ " x $2\frac{1}{2}$ " x 21"	pine	Legs
2	1" x $1\frac{3}{4}$ " x $7\frac{1}{2}$ "	pine	Triangular leg mounts
2	$\frac{3}{4}$ " x $2\frac{1}{4}$ " x $2\frac{1}{2}$ "	pine	Supports for single leg
1	$\frac{3}{4}$ " x $2\frac{1}{4}$ " x $2\frac{1}{4}$ "	pine	Trapezoidal support for two legs
6	1" — #10	flat head woodscrews	End pieces to end
2	8-32	eyebolts, lockwashers & nuts (4)	Door
2		sash chains	Door
2	$\frac{1}{2}$ " — #8	round head woodscrews	Chain
2	$1\frac{1}{2}$ " — #10	flat head woodscrews	Handle
6	$1\frac{1}{4}$ " — #6	flat head woodscrews	Piano hinge
24	$\frac{3}{4}$ " — #6	round head woodscrews	Back
1	1" x 15"	continuous (piano) hinge	Door
1		magnetic cabinet latch	Door
1	1" dia.	cabinet knob	Door
2	$\frac{1}{2}$ " cups hooks		Battery mount
3	$\frac{1}{4}$ "-20 x 2"	carriage bolts	Triangular leg mount
3	$\frac{1}{4}$ "-20 x 2"	machine bolts	Legs
3	$\frac{1}{4}$ "-20	wing nuts	Legs
3	$\frac{1}{4}$ "-20	hex nuts	Leg mounts
6	$\frac{1}{4}$ "	flat washers	Leg mounts & legs
6	$\frac{1}{4}$ "	lock washers	Leg mounts & legs
4	$\frac{3}{8}$ " dia. x 8"	dowels	Plane supports



tournament of champions

SEPT. 23-24-25 1966

CIMARRON AIRPORT

OKLAHOMA CITY, OKLA.

Maurice Woods presents trophy to Phil Kraft. Cliff Weirick on left, Doug Spreng on far right.

KRAFT, SPRENG, WEIRICK WIN F.A.I. R/C FINALS

U.S. INTERNATS TEAM SELECTED AT NATION'S FINEST MEET



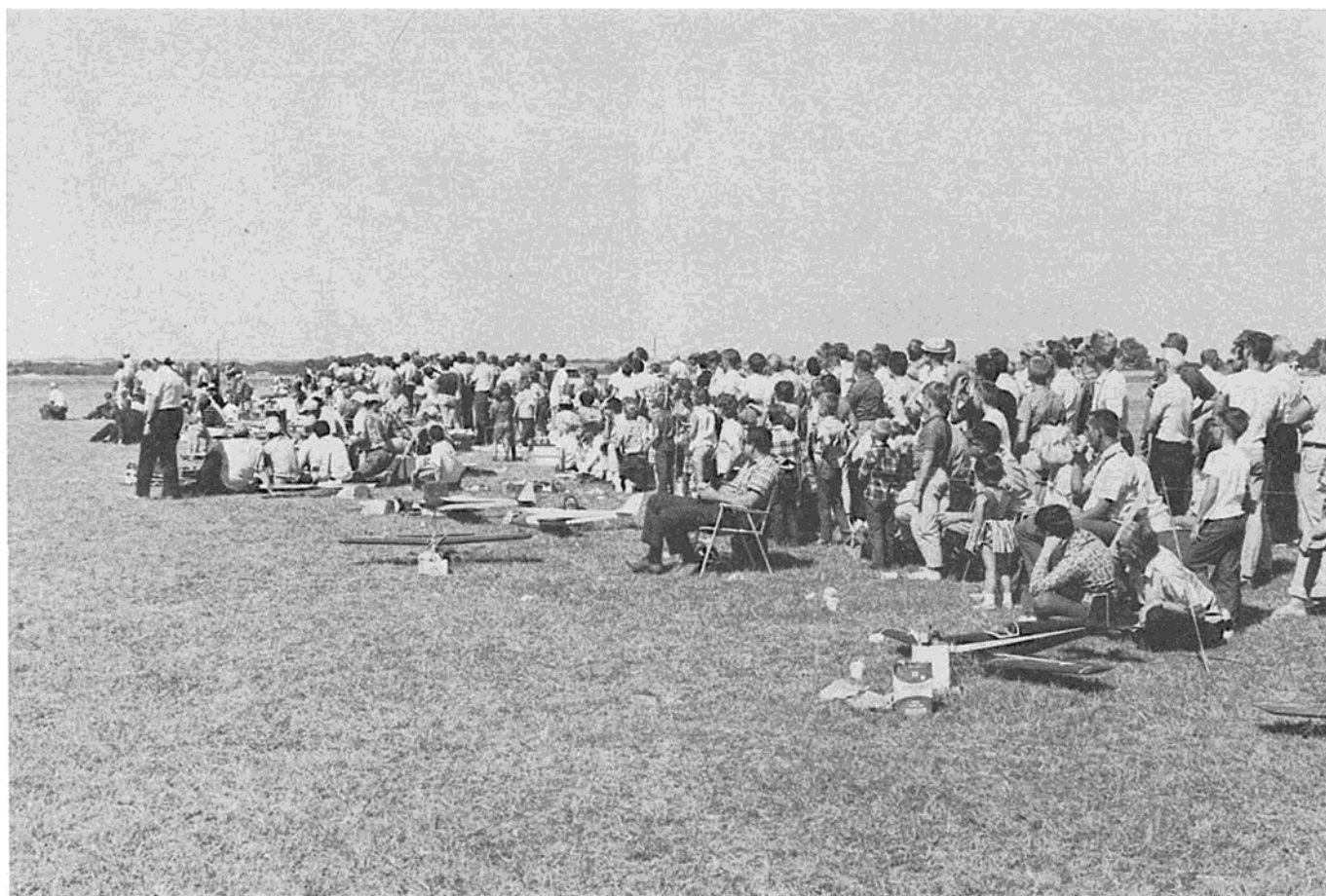
PHIL KRAFT
KWIK FLI (RCM): 3853½



DOUG SPRENG
THUNDERSTORMER (RCM): 3582



CLIFF WEIRICK
CANDY (RCM): 3436¾



Jim Grier: 2267½



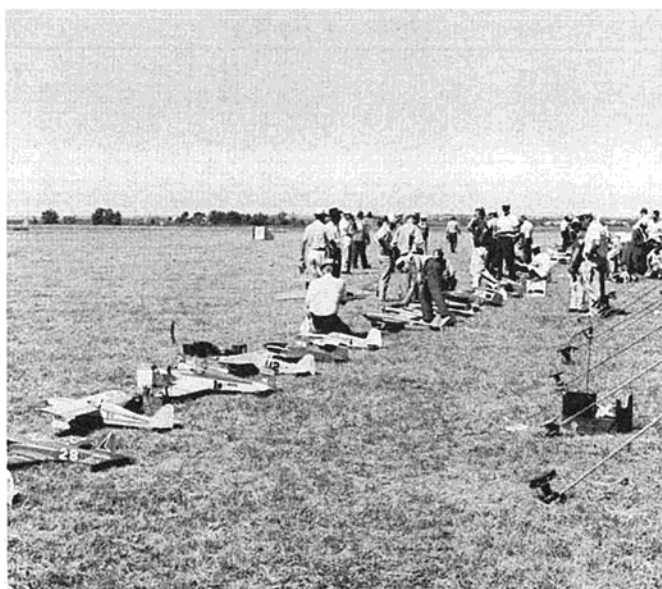
Hal deBolt accepting trophy.



Ralph Brooke: 3247



Paul Good: 3276½



Goodyear lineup at Oklahoma City.



Ralph Brooke with Bob Dunham and Maxey Hester.



Paul Good during top flight.



Jerry Krause: 3108½



Hal deBolt's fast Goodyear.



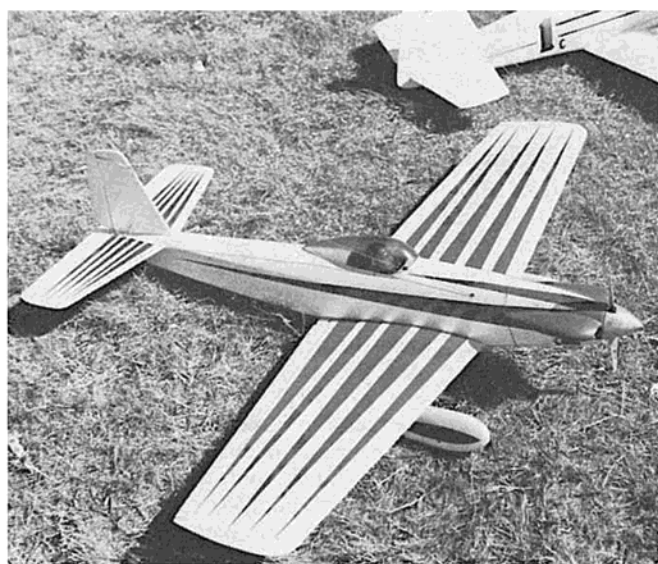
Maxey Hester and Stratus: 2919



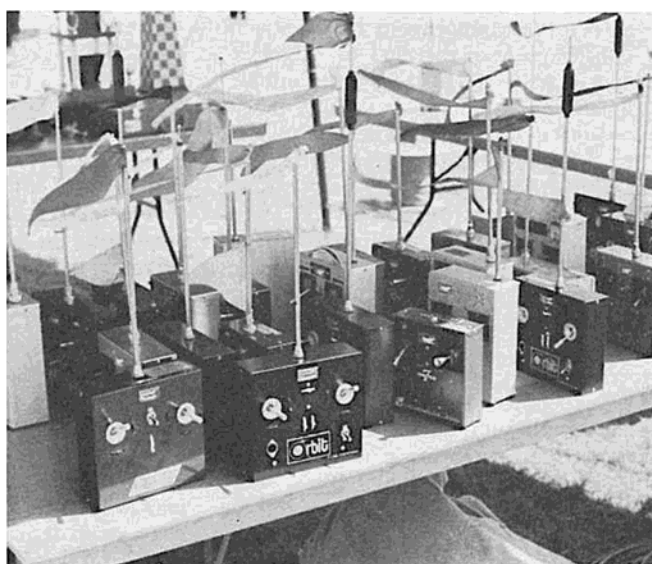
The TORKS — host club for T of C.



Ed Izzo at takeoff: 3165½



Tony Bonetti's Goodyear.



Transmitter impound area.

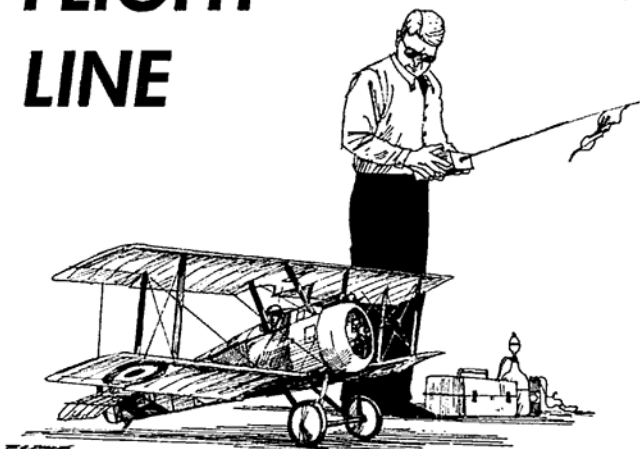


Goodyear start — Bonnetti and Downs in foreground.



The hard-working tournament judges.

FLIGHT LINE



HAVE you been crashing it more this past year and enjoying it less?

If you have recently moved into the age of proportional from reeds, you no doubt have been exposed to "glitches," "interference," "fail-safe," and numerous other little things that didn't plague you quite so much when you were thumbing reed levers. If, on the other hand, you have made your first entrance into R/C this past year and were rapidly initiated into the mystic order of the above mentioned maladies, then perhaps you are reaping the result of depending too much on that neat little source of power, the magic nickel cadmium battery.

There is no doubt in my mind that nickel cadmium cells are one of the best items to come along and help make our sport more enjoyable. Plus, more flights and an escape from those blasted battery boxes. **But** . . . hardly anyone really understands the nickel cadmium cell. I don't, most of the men that I fly with do not, the manufacturers of radio gear don't, and even the people

that see the batteries do not fully understand the little beasts.

Last month we mentioned that vibration could cause damage to many things, including nickel cadmium cells, so let's take this as a starting point and explore some of the facets of the mystery of the nickel cadmium battery.

These units are subject to vibration just like any other electronic component, just as are the wires that convey the current from the pack to the receiver and servos. **Always** protect your battery pack from this vibration by wrapping it in foam rubber. This also helps to keep the pack located in the same place in the fuselage, keeping it from revolving about in the aircraft where it could, conceivably, pull the plug loose or scrape the wire against a plywood bulkhead. As a matter of fact, the best way to install your nickel cadmium pack is to wrap it in foam rubber and then place this in a plastic sack, such as a Baggie. This will keep the fuel and dust away from the cells, the latter items major contributors to battery corrosion.

Okay, you say — so we'll wrap up the packs and even stick them in a sack — so what's the beef?

Simply this. After taking these necessary vibration precautions, we have to deal with the nickel cadmium unit itself. More specifically, the charging and discharging of the pack. Most new proportional rigs have built-in chargers, and all we have to do to make ready for the next day's flying is to plug in the cords and we can spend the evening at the flicks while the house current gets everything ready for the coming day. **But** — were the cells in good shape before you charged them? Were they, on the other hand, run down too far? Was one cell bad? Was the pack already charged too high?

The built-in chargers do not charge at a high rate, and in fact, most of them charge at about 40 mah. This is generally below the battery's actual charging rate and is simply a high trickle charge for most large cells. To compute

(Continued on Page 43)

Jim Bonnanno, Des Moines, Iowa, with Hawker Hurricane, built from RCM plans. Ship won 1st at Des Moines and Iowa Falls Annual Meets. Kraft propo, Super Tigre. Photo by Claude McCullough.



Charles W. Brannon Jr., Sioux City, Iowa, with 2nd place R/C scale Piper Comanche. Photo taken at Des Moines Modelaires Annual meet by Claude McCullough.



FLIGHT LINE

(Continued from Page 42)

the proper charge rate for a nickel cadmium battery, simply divide the milli-ampere rating of the cell by 10, which gives you the ten hour charge rate. For example, a 500 mah battery should be charged at a rate of 50 ma for at least ten hours to be fully charged. Frank Hoover, F&M's prexy, tells me that with today's built-in chargers you could charge the large packs for extended periods without doing any damage, so there isn't too great a worry about overcharging.

But, let's assume that you went out to the field to fly, made one flight and ran into some type of trouble, and could not make another flight that day. What should be done insofar as the nickel cadmium battery is concerned? There are several schools of thought on this. Some modelers maintain that you should simply let your batteries sit and go fly again the next day. Others argue that you should charge again before going out to fly, while still others feel that you should discharge the packs before charging again.

According to at least one major nickel-cadmium battery supplier, the best method is to recharge your batteries with the amount **actually** used **plus 20% additional**. And, if you fly regularly, such as several flights every weekend, a discharge every two or three months. Let's take these items one at a time, assuming for the moment that your pack is in good condition.

If you are flying proportional gear, it's a pretty good chance that your equipment, with the transmitter turned off, is pulling between 45 and 65 ma when all servos are plugged in and the switch is on. When the transmitter is turned on the servo motors begin to work electrically, even though there is no movement on the servo arm. My PCS rig pulls at 300 ma in this condition. It is important to know just what your gear pulls in order to arrive at a suitable charge rate. Now, let's assume that I have flown my rig for one hour's time.

Dr. Ralph Brooke at FAI finals



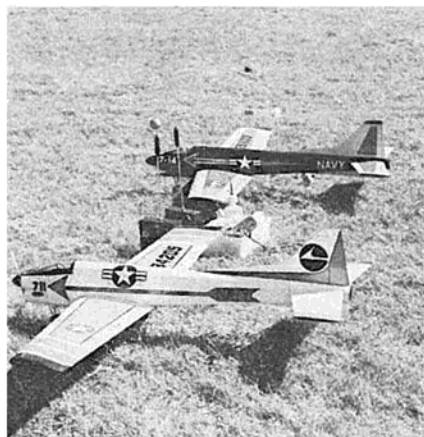
Let's assume that the average drain is 300 ma. I would then replace, before the next flying session, 300 ma **plus** 20%, or a total of 360 ma. If the charger charges at 50 mah, the amount of charging time required would be seven to eight hours. This, of course, applies to the airborne battery pack which has a much greater load imposed upon it than the transmitter. In the case of built-in chargers, where both the transmitter and airborne packs must be charged simultaneously, we find ourselves in a position of continually giving back much more to the transmitter than it actually needs in order to fully charge the airborne pack. This is an unfortunate circumstance in one respect, and one which the nickel cadmium cell manufacturers deplore, but is done as a convenience and safety factor for the average flier by our proportional manufacturers.

This rule-of-thumb formula will help you keep your battery packs in good condition for the time being, and will be followed shortly by a comprehensive article on nickel-cadmium cells that will be complete with construction details for an overcharge monitor and deep discharge unit. Don't miss it!

As we said last month, the Flite Line is your place for pictures of the latest effort and doings around the local flying field, as well as a place for exchanging information and ideas sent in by our readers, plus an occasional mention of new equipment and hardware and how they have worked out for this fumble-thumbed editor.

This year, our summer vacation included a trip to the wilds of New Mexico and western Colorado. Since Albuquerque is the home of the little blue box, it was only natural that we stopped by for a visit with Frank Hoover and the wide awake bunch of RC'ers at F&M Electronics. I had a great time touring the plant and meeting the individuals in charge of the various functions of the F&M operation. Ron Smith

The "Seattle Flightline" at recent tournament of champions.



is the sales manager of the outfit and has great plans for pushing the sales of blue boxes. Larry Neeley is production manager and is responsible for getting production up to Ron's sales. Other guiding lights are John Cline, in charge of product research and development, and Gail Graham in charge of repairs. F&M recently announced a new service policy in that they are guaranteeing a 72 hour repair time. Since most of us fly only on the weekend, this means that we can send the malfunctioning (or smushed!) piece of gear in, and in three days after receipt, it will be back in Uncle Sam's hands and heading your way. Sounds great!

Among many of the things that Ron and I discussed during our visit was the use of the 3+1 gear. It seems that interest in this type of equipment has centered more in the ranks of Goodyear fliers and boatmen than with those of us flying full house ships. My feeling is, and has been for a long time, that for the average Sunday flier, the 3+1 unit is a natural. Not only does it do everything that is needed, but at a cost substantially less than the four and five channels sets. We will be reporting on this in the future inasmuch as Ron is making available a 3+1 system for a month of flight testing.

While on the subject of equipment, one of the neatest gadgets to cross my desk is the new Ailer-Rand. This is used to take the place of a hard-to-mount bellcrank for strip ailerons. My first reaction upon pulling it from the box was to see how many different ways there were to use it. It could be used for flaps or throttle control, nose gear hook-up, and no doubt many ways that haven't even occurred to me. As Herb Abrams says in the instructions — "it may be used wherever required as dictated by the modeler's ingenuity." It is a well-built piece of hardware and immediately found a home in my Scimitar.

Another item is the R-K Nylon Hinge which we have tested for many, many flights and have found to be the best on the market. You cannot rip or tear them as they are made of two pieces of nylon to form a beautiful miniature hinge. Roy Klett has come up with a real winner in this item.

This month's tour around the model kingdom starts with a new world RC record set by MAN's man, Bill Northrop, on Labor Day, September 5, when he flew his glider through a measured speed course at an average of 25.92 mph. The new speed mark, set at the U.S. Naval Weapons Laboratory, Dahlgren, Virginia, exceeds the official record of 23.8 mph established there last year by the team of Maynard Hill and Ben Givens.

Bill's glider is an original design, having a wingspan of eight feet, and equipped with a Kraft KP4 proportional system operating rudder and elevator. Weight is five pounds and the official flight was launched by means of an electric winch.

The Labor Day Invitational at Indian-town Gap, Pennsylvania is an annual three-day fly-for-fun affair sponsored by the Blue Mountain Buzz Bombs. A great many of the East's finest flyers make a yearly pilgrimage to the Gap, which is located about twenty miles east of Harrisburg near Hershey and Lebanon, Pa. The large crowds which gather are treated to a great variety of relaxed, non-competitive flying, from single channel galloping ghost to the most exotic multi ships imaginable. The photos of the Invitational, accompanying this month's column, were taken by Tilman R. Frye, a fledgeling RC pilot, but certainly no novice with a camera!

This month's tour around the model world has sort of an international feeling as almost all of the news and pictures are from corners of the world far removed from us. RCM is widely read in virtually every country in the world, and it is a pleasure to read of the doings of other blokes. (See, it rubs off!)

The Alaska RC Society was planning an interesting Fly-In last summer. I haven't heard just how things came out, but they were going to have their annual all-night affair on the longest day of the year. Having spent a short time in Alaska, courtesy of Uncle Sam, you can sure get in lots of flying time "after hours" in the Summer!

Don't ask about the Winter.

John Carroll, RCM's man in Ireland, passed along this story: It seems that son of the old sod launched his single channel Robot, climbed it to a safe height, then handed the transmitter over to his son. Son proceeded to have a ball. When landing time rolled around, Pop retrieved the box from junior and promptly returned the model to kit form . . .

"Let Daddy land it," is the latest catch phrase around Dublin!

The picture of Rich Brand and his Panzer original should be pretty heartening to all beginners in RC. Rich took first place in South African Nationals held this past summer—he had been flying for just one year! The Panzer is pulled through the sky by a Merco 61 and the radio gear used is a Constellation 7 proportional system. That flying site that Rich and the Panzer are perched upon is enough to make the mouth water!

It would be interesting to run a survey around the country and the world just

to see what kind of fields most RC'ers use. I wonder how many are grass, how many are paved, what proportion are left over from WW II and so on. For those of us who have carved our areas out of the "toolies" those great big paved fields are just too much!

One of the most interesting ships to cross the desk this month (Ed's note: Chuck, buddy, if this one crossed your desk, you're in trouble!) was built by Lance Napper. Lance hails from Dunedin, C. I., New Zealand, and was just about the most unpopular man in

Rich Brand and winner's smile — South African Nationals.



Lance Napper and friend.

town while he was building this scale replica of the pre-war Monocoupe. He consumed the entire stock of $\frac{3}{32}$ " balsa sheet for some time! Lance is a hold-over from the old school of modeling. This ship has a nine foot wing span and at least ten thousand square inches of wing area! It is powered by an ignition Baby Cyclone. The prop is hand carved

and wisely removed for test gliding. (Ed's note: You're kidding!) The radio rig is a Mark I Wright of about twelve years of age and the rudder is flipped by an escapement! I'll stick to the slab sided ships of high power and small size and leave this field to Mr. Napper.

Another interesting photo from New Zealand looks pretty standard. Just another Taurus making a takeoff run from a grass field, complete with a few onlookers. But . . . the field isn't too standard. This is the southernmost Taurus flying. The ship is owned by Alec Taylor and his home is Mossburn, New Zealand, the last sight of land to the U. S. Navy pilots flying with operation Deep Freeze to McMurdo Sound near the South Pole! The frozen expression on the faces of the onlookers is only because it is about to hail again!

World's Southernmost Taurus—Mossborn, New Zealand.



As this column is being wound up, we must get in a few words about the Midwest-RCM Air Racers. These little ships are beginning to take the modelers by storm, and should be just what the doctor ordered for fliers with limited time, or limited flying fields. Reports have filtered in that a lot of fliers are having a ball — just what Ken Willard has been saying for years! I know of two dyed-in-the-wool multi fans that have put their big rigs aside for a while in favor of the lure of these little racers.

In addition, there is nothing easier to use to teach your wife or kids to fly than a well-trimmed galloping ghost ship with one of the new actuators flipping the surfaces. After trying my Min-X and Rand LR-3 combo in several small ships, I decided to put in my old faithful Klunker. This ship has a wing span of five feet and an ample radio compartment, even though a shoulder wing. The OK has been around for years, first with an escapement, then with ten channel reed gear, later with full propo, and now with the GG rig. Power has ranged from a .15 up through a .29 and currently, a McCoy .19 is providing the muscle. All of this is a long way around to tell you that this combination is perfect for teaching a tyro to fly. Long,

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JERRY KLEINBURG



Prose About Pros

1966 may well be best remembered as the year radio technology caught up with the R/C "pro." The wide availability of proportional transmitter/receiver systems, along with dependability described as being on par with the best that reed equipment ever had to offer, has brought on a new complexion to R/C pattern dueling. Consequently, legendary pros have found the 1966 contest circuit a tough proposition as they ran into rough competitive treatment coming from an ever widening and deepening group of "local" type experts.

The Class III melee that came off along Lake Michigan's shores in July during the annual Nats offers the most obvious case in point of shabby R/C treatment of hallowed names when Jim (Daddy Rabbit) Whitely patterned a decisive victory over an impressive expert gathering of R/C faithful. Upon hearing the news it would be a fair summation to say fans reacted with a "Who's he?" as they wondered what major upheaval brought on an apparent upset of this dimension.

There wasn't, and of course Gulf coast fliers — knowing the strength of their boy — were better informed. After all, a dedication to the accuracy and precision challenge of R/C that burns as much as five gallons of fuel in a week of practice has to be noticed along with the respectable string of wins among Dixie contests garnered by the Decatur, Alabama, flyer. But Jim Whitely has a quiet way about him, as does a host of other serious fliers who are now fortified by the latest electronic magic cryptically called "propo" by R/C buffs.

And it's the weight of that host the old pros are starting to feel. The hired hands did their job well in helping to create the hardware which now arms their more numerous adversaries and which has begun to bring down a competitive toll on their heads. As the "technical" gap disappears all together, we could possibly expect to hear a cry for a separate pro event to now protect them

from such embarrassing competition, as the call once went up to eliminate them when the shoe was on the other foot. But knowing the pros, we feel they won't endorse the move — they'll be much too occupied with new R/C frontiers to take part in any wailing wall act. . . .

Contest Capers

We're certain statistics will also show that 1966 was a record year for contest participation in all sections. Most meets sported multiple flight lines and fliers took advantage of this and their new propo equipment to rack up a peak of flights and flying hours which may be hard to surpass in 1967. As a consequence, most contests saw stiff competition in class III from a broad number of multi men who have reached the pre-

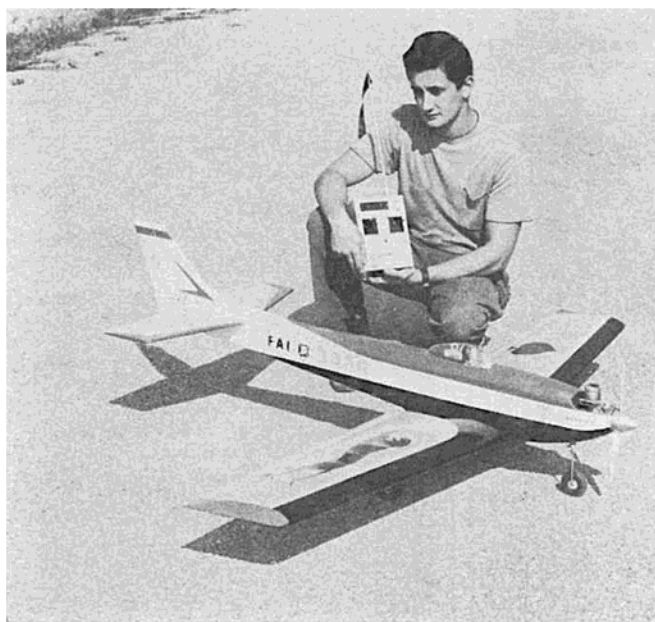
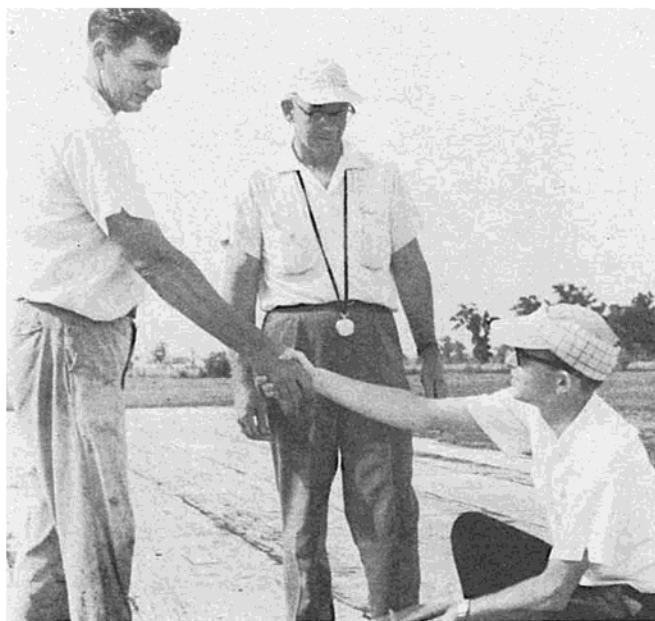
viously rarefied level of an "in" type hotshot. In other words, with present aircraft and equipment having become dependable and predictable tools, trophy circles are wide open on all sides to those who are hep enough to realize that success, in the long run, is a product of developed talent plus perseverance. While luck always remains as a recognized element, propo gear and current aircraft design and construction art have taken a fair sized bite out of it. And it appears contest fliers like the odds and the challenge — if 1966 participation rates are reliable indicators.

● The summer season wrap-up moved back to Dallas this year for the

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Masthead photo: Color me a winner — Jim Whitely, 1966 Nats Class III champ and trophies for his triple win. The Decatur, Ala., flier outpointed an impressive expert field. Success attributed to modern gear and plane — and lots of practice! Below: Hal Goldklank (r), the irrepressible, and his fellow SOB's (Sons of Brooklyn) fill the time at Glenview with a checker game. That's his Cherokee wing . . . does the fastest 4 point roll in the east!





Top row, left: Southwest Model Championships contestants from Mexico City receive Class I poop from Phil Roy (r) of Wichita Falls. Visitors (l to r) are: Prat, Feiner, Sadurni, Elizando, and Bolio. Top row, right: Jack Esslinger, Dallas high point reed winner shows his hardware at the early season meet. Second row, left: Joe Pasztor congratulates Lake Jackson Class I winner Jerry Jackson as Optimist club official, Carter Mason, joins in. Serviceable landing strip the trio is on, is made of roll roofing tarred to ground — a practical solution! Second row, right: Maurice Teter, Southwest Championships CD and past Dist. VIII V.P., introduces Lloyd "Pete" Peters, current Dist. V.P. for AMA Fellow award. Scene was annual Labor Day weekend Dallas, Texas, meet. Left: From Pisa, Italy, Pagni Graziano sends word of his "Morris 3" powered by an ST 60. Using a 20% symmetrical wing section the original design is Digimite equipment.

TOP OUT

(Continued from Page 46)

Labor Day weekend's Southwest Model Championships. This meet, sponsored by the East Dallas Exchange Club who promote the affair to help raise funds for their scholarship and charity foundation activities. Maurice Teter, veteran modeling officianado, provided the rugged obstacle course known as the Garland Model Park as a backdrop for the R/C events that have become a standard outing for Texas and the surrounding states of New Mexico, Oklahoma, and Louisiana. Despite the ruggedness of a domed U-Control speed circle for a landing and take-off pad, 19 contestants — including a surprise contingent of three of Mexico City's best — met the challenge in a no-quarter-given affair that was noticeably several shades higher than usual in competitive fervor.

The class III lead changed at least a dozen times among the seven top fliers during two days of good weather as the pattern struggle went on in the sky. Judging by John Reed, Keith Farrel, Charles Whiteside, and Jim Courtney was tough but consistent and kept contestants straining to put together the always elusive "perfect flight." Dick Huang, who directed the event and Ray Holcomb, who has been the R/C Exchange Club official for many years, kept the line running in an efficient business-like way that enhanced competition.

After it all shook down, and after the bell rang out the Sunday close-off time, Norm Rhodes with his red MonoKoted and Enya 60 powered Kwik-Fli had edged Bob Pearce and Lt. Col. Hank Walker to first place. Salo Feiner, of the Mexico City team, ended at 4th while his compadres, Feliciano Prat and Chatto Sadurni — aided by Rafael Bolio and Dr. Alex Elizando — dead-heated at the 6th spot. Lt. Joe Gross, the 1964 Southwest Champ, took an unbowed 5th place this time around with his ancient Nelson designed "Qualifier."

In other events, Bobby Woods, the junior from Oklahoma City, and Phil Roy trophied in class I. Open pylon,

Leonard Hudson peaks his ST 40 powered Goodyear original. Don Williams, co-developer, holds steady flying racer. Pair are active Houston team.



Witty Etchings' Hawker Fury I is Merco 61 powered and carries 6 1/4 lb. ship on its 58" wingspread. Orbit propo'd, the plane is scale, including the tall narrow gear. A ball to fly, the La Mesa, Calif. RC'er reports.

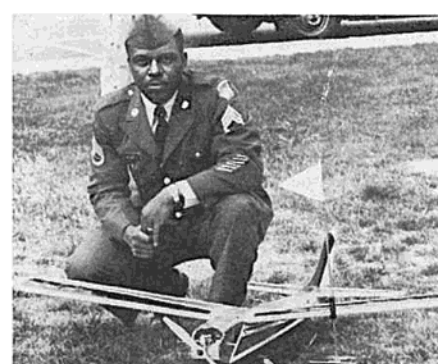
another hotly contested battle, saw John Jennings, Dallas' well-known senior, wrestle first place with a Mustang Good-year racer from the ever-present Norm Rhodes and his Kwik-Fli that's really quick. Winning time was 1:09.2 around the standard two pylon course. Ed Alexander, the Ft. Worth hobby shopper, was 3rd with his fast pattern original ship.

Before leaving this affair to history, we would like to recognize Ed Burk and Bruce Holland for their top timing jobs, as well as the record keeping ladies, Grace Minsko, Dorathy Chandler, and Lucy Salerno for their calming influence on competition fevers. We'll see you all soon again. . . .

● Lake Jackson's 8th annual R/C frolic dodged a few rain showers but produced a hot Class I contest as usual. This time Jerry Jackson outpointed Val Hutchinson while showing that he and his original 4 footer could produce some of the prettiest touch and goes seen to date. This was Jerry's first AMA win (sorta appropriate, Jackson winning at Lake Jackson) and the steak dinners were on him after the show. . . .

Interesting sidelight of the Lake Jackson contest was their landing strip in which we've been interested for the last couple of years. Measuring 130 feet by 24 feet wide, the strip was made by simply hot tarring down heavy roll roofing on scraped or bladed ground. Outer edges were curled down and packed in about a 6 inch dirt trough to finish the job done entirely by two people in a couple of afternoons! This novel and inexpensive strip is located on ground

S/Sgt. Jim McCray shows his K&B 45 powered Skylark. Jim, stationed with the 109th INTC Gp. at the Customs House in Baltimore, revamped the fuselage of his Citizen-Ship propo equipped plane.



A relatively new club, Vic Larsen sends news of the Kings County R/C Club with their equipment line-up. Ships of the Lemoore-Hanford area club show broad varied interests of its members.

often flooded and also covered with a heavy growth of marsh wire grass, a tough, well-rooted variety that readily grows through ordinary macadam. After three years the strip shows no sign of softening or of growth through it! Joe Pasztor, who along with Bob Lane built and gambled on this experiment, estimates the strip will easily last 2 more years. Repairs, brought on by hot-rodders running on the strip, were easily made by tarring roofing material patches over the broken-through spots. Take-offs are not at all affected by the lapping joints made originally or by the repairs. Since roll roofing costs about \$2.50 to \$3.50 for a roll of a 100 square feet, total costs come to about 1/3 of rolled hot macadam and about 1/10th that of concrete. If you're interested, Bob Lane (201 Pin Oak St., Lake Jackson, Texas) will be happy to provide more details.

Contest Calendar

Worth mentioning is the Tucson R/C Club's 2nd Cactus Festival which will feature a Team Pattern event along with another one labeled the Blue Angels Event. More ordinary activity will see Open Pylon and Goodyear for racing fans. Team pattern (in case you're curious too), requires a 3 member team to compile their individual scores each round. The highest total of any round takes first prize — which may well be the worn out adding machine used to figure it all out. The Blue Angels Event is something else again! This is described as precision flying performed by two fliers who simultaneously take off, fly back over the transmitter, make a low pass followed by an Immelman turn, two rolls (direction optional so long as both roll the same way), and then a planned termination of the flight by landing in unison! This ought to be interesting and Ken McDaniel (1501 N. Venice Ave., Tucson, Arizona) says it'll all come off at the Marana Air Park located 28 miles north of Tucson on route #83-#94. Incidentally, the Air Park has complete food and rooms accommodations as well as service for full size planes. How 'bout that?

While visiting with the RC'ers from Mexico City as they competed in Dallas, they reminded us of their next R/C Nats to again be held during the traditional

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TOP OUT

(Continued from Page 47)

Easter Week in the Mexican Capital. It's a grand time to visit the country and you could even combine pleasure with pleasure by bringing your gear and competing. Previous U.S. visitors had no customs problems with planes and gear and airlines people are somewhat amused by the sight of RC'ers carrying their planes aboard airliners. For added info drop Francisco (Paco) Gallegos a note at Modelandia Niza 81, Mexico 6, D.F.

The Mail Bag

● Dave Bowerman sends word of the Sky Rovers R/C Club which is hangared at Canandaigua, New York. Dave explains:

"Our club is a hard hitting (the sod) fast flying group that gets more fun out of flying than arguing with our wives, which happens every Sunday. (He means flying, no doubt. — Ed.) We have spent 2 years of hard work on an abandoned weed patch. It now looks like a golf course without the holes or hills. We use the field table for eating fuel soaked hot dogs and chips. Our wives just love to join us on weekends and have fun killing those nasty bugs and looking for those lost signals we talk about after a crash. (Maybe they do argue, after all. — Ed.)"

"After a successful Hobo meet last year we're having another this year. During last year's the visibility was low and the wind high but us 'wind chickens' flew anyway. All we had to do was point them into the wind and watch them fly backwards! After bailing water out of our planes at the end of the day, trophies were handed out. The most spins event ended up as the longest duration in the clouds. Spot landing — considering the gale — went to the ship landing closest to the field! Other categories were changed some too but we all went home happy as if we were in our right minds. We hope this year's meet will be as much fun. We are looking forward with great interest in hearing from other clubs. . . ." Dave Bowerman, 72 Buffalo St., Canandaigua, N. Y.

Sounds like a good group there. Skip Cady is the current club prexy. . . .

● Lt. Commander Vic Larsen of the Kings County R/C Club is now on duty in Viet Nam and sends word of intrepid fliers there:

"A lot of activity in R/C in spite of hostilities is going on in the Saigon area. I've also heard of a few brave souls in the 'field' who do some single channel flying. The Saigon troops fly on Sundays at the local air base (secure area). It's a nice field with grass and a paved runway. However, interference (the radio kind — Ed.) has been a problem. Majority of

fliers are U.S. military or civilians, with some local Vietnamese. Equipment is mostly proportional, both multi and single channel. Despite shortages of items like fuel, batteries, etc., and restricted flying time, the caliber of flying and construction is excellent. Needless to say, R/C over here softens the tour somewhat for Uncle Sam's warriors. . . ." LCDR V. D. Larson COMNAVOR V (40), A.P.O. San Francisco, Calif.

More on Class Ia

A letter from Alex Kabbaz Jr., brings latest developments on his survey to create another R/C contest event for single channel equipped ships. Alex relates:

"Here are results of my single channel survey as received to date. The opinion of the letters is overwhelmingly in favor of my proposition, but the volume of mail received does not nearly equal the amount of letters I sent out."

"The total as of 17 July 66 is: 108 for, 3 against."

Alex, as you may gather, has been interested in having a single channel subclass added to the rule book and is polling fliers as to their thoughts and desires. (See Oct. '66 RCM, page 77.) His effort parallels that of others in this matter and who for some have recognized the realities of what's happening and see the addition as overdue in helping to stimulate organized R/C activity of the S/C variety. A similar proposal appeared here in June of 1965 after having been submitted to the Contest Board in March of that year. The proposal, unfortunately, was apparently misunderstood and was not distributed for action. To aid in current discussions on this subject it is repeated:

"Item 6. NEW PATTERN CLASS. Somewhere along the line in establishing competitive regulations, allowance must be made for the beginner — and in the case of our R/C sport/hobby — for those who do not wish to invest in multi equipment. The novice-expert divisions afforded recently acknowledged this basic requirement but did not go far enough to answer the complete need. Encouragement of juniors is requisite to the future, as is generally agreed. This is also true to a lesser degree for adult newcomers — especially where building and flying time are limited. Local activities need support and prestige to provide added impetus to 'grass roots' developments, and this may be attained simply by creating an additional rudder subclass allowing the classic pulse or escapement routes so well known. As a local option event, the new class would also be limited to a popular size engine, say .15, rudder, and to optional motor." (The engine size was not necessarily a firm figure — it was only a discussion starting point and could range to .29 depending on what was being marketed at low prices at the time of CB action. —

Ed.)

Here was the specific rules language submitted to establish the class:

"22.4 GENERAL: — (no change to introduction)

"22.4a No radio equipment limitations or requirements in any class except as established for Class Ia.

"22.4.1 — add after last sentence: Class Ia, as a local option event, planes in this category are limited to escapement or pulse equipment for rudder control. Power is limited to engines of .15 displacement, or lower, with motor control permitted. No auxiliary non-flight controls are permitted."

Since the above was written almost two years ago it could be updated to specify "single channel" radio receivers and fixed (non-actuated) brakes on nose or main gears. These two items consider latest equipment developments as well as safety requirements now seen as minimal and need to be considered in any subclass rules development. Incidentally, Bill Northrup, MAN's R/C editor, discusses a single channel proposition in the October 1966 issue which deserves review by interested parties.

FLIGHT LINE

(Continued from Page 44)

slow lazy flights are possible with a ship of this type, and is a perfect entry into the mystery of RC. As I've said before, it's better to take it easy in RC and to get started in easy stages, regardless of your ultimate goal, starting with something you can handle and then, later, moving up to the hot equipment.


Remember — send in your club newsletters and interesting photos to R/C Modeler Magazine, c/o Chuck Cunningham, 5333 Wooten Drive, Fort Worth, Texas.

See 'ya at the Flite Line.

Scale line-up at New Zealand Nationals.



DIGITRIO DASH-FOUR



**R/C
MODELER**

TECHNICAL FEATURE

By **ED THOMPSON, RCM TECHNICAL EDITOR**

PREFACE A VOTE FOR CLIFF IS A VOTE FOR PROGRESS!

I RECEIVED a Digitrio tie board from the Hall Company in Urbana, Ohio, for evaluation this month, and while there is not much to evaluate, it either works or it doesn't. I must say that the P.C. board is a beauty! I had a chance to look some of their other boards over at the Garden Grove get-together and can honestly say that they do outstanding work. I don't normally use tie boards since it's usually a long time between airplanes (not because of proficiency — lack of building time). And, I am constantly shuffling equipment. I did, however, use the board to verify its accuracy and am going to install it in my next airplane since it makes such a neat package. It has provisions for 3+1 operation which can be used for an additional function — such as brakes with the -4. I'd like to thank Dick Carman of Mountain View, California, and Dick Nichols of Phoenix, Arizona, for their help in evaluating the -4. Dick Carman is a super-Einstein and Dick Nichols is a super-craftsman. Some of their recommended construction ideas were used in the -4 articles.

Since Dave Holmes stuck his neck out by stating the Digitrio Servo Checker could be used with other digital systems with modifications, I've turned him loose to work out the details. Now, if I can just find someone to turn loose on him, to make sure he does it, I may get some results. To those of you who have inquired: The reason I haven't evaluated certain of the related Digitrio items offered for sale is because they haven't been submitted. As they are received I will evaluate them. Since I have a fairly long article this month I'll get right to

the point and slip in a few more long overdue items another month.

GENERAL

Later in the article I'll cover final testing of the Digitrio-4 modification. From the phone calls I have received so far, many of these systems have been built from the articles and are flying with excellent results. All of these systems were operating properly before they were modified. If you were having difficulty before the mod, you may carry over your problems to the four channel. Remember, all we have changed is the decoder. If your trouble was in your decoder the new decoder may solve your problems. On the other hand if your problems were elsewhere, the -4 mod will not clear them up. When you troubleshoot the system keep in mind that we have only changed the decoding method and added two more pulses at the transmitter.

I have received many letters inquiring about repair service on the Digitrio. There are many places around the country that can repair your Digitrio. I have received several letters from different firms and individuals asking if they have my permission to service the Digitrio. Although it is impossible for me to vouch for the quality of the service rendered by all these people, I encourage them to perform repair service. My feeling is that I would like to see as many Digitrios flying as possible, and since the system is basically simple in concept to a qualified technician, careful selection of your repairman should yield satisfactory results. If you are having trouble beyond your capabilities, or just want to know that your rig is performing properly, I would suggest, first of all, that you get with your technician friend. He can probably tell you

whether your problems are serious or minor in nature. If he can't, try your dealer, he should know the really sharp technicians in the area. If your problems were minor they should have been cleared up by that route. If you can't get satisfaction locally, your problems may be of a complex nature and require expensive test equipment for a solution. Even simple troubles often defy detection. I have repaired many Digitrios for my friends that had improperly installed components. Some of these sets required many hours to correct. When told that their trouble was one of parts installation their reply was essentially the same, "I checked it over at least a dozen times and would swear it was right!" The problem here is evident — when checking back they simply repeated the same mistake they made originally. This could be due to reading the instructions improperly or having a "mental block." I have made this mistake many, many times myself. One improperly installed component can usually be found by observing symptoms and applying circuit knowledge along with common sense. However, two or more improperly installed components can lead to many hours on the test bench and involve expensive test equipment, as well as the best efforts of the technician for a cure. By the same token, one or more defective parts could be present in the system giving approximately the same symptoms and troubleshooting problems. On several occasions I have been subjected to a Digitrio builder displaying a temper tantrum because this system didn't work properly. This type person usually possessed occult powers because he had applied his mystic powers of electronic's knowledge to his built-in, "brain-powered" computer and came up with the revelation that the "Digitrio could never work properly! In a few cases a simple "tweak" of the alignment tool caused replacement of his crystal ball with a book on electronic theory. You'd be surprised how many people fail to peak their receiver and end up with a P.C. board full of useless parts.

Then, there's the type that starts changing parts values at the first sign of trouble. This type is doomed from the start unless he truly understands what he is doing. An example of this was a fellow to whom I loaned my original decoder so that he could get his system in the air. My decoder had been through well over 200 flights and performed flawlessly. At the first sign of difficulty a modification was made to my decoder, followed by some passable and some impassable flights. Of course, all the problems experienced were blamed on my decoder. As it turned out, my friend forgot to install the zener diode in his transmitter. The moral here, is: If you

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RCM DIGITRIO

(Continued from Page 49)

can't pin-point your trouble don't experiment with the circuitry!

One quick way to determine where your problem lies would be to swap your defective sub-systems with a friend whose rig is working properly. This is an often overlooked, but highly accurate, way to pinpoint your trouble. Say, for instance, you suffer from lack of range. It's easy to swap transmitter crystals with your buddy in order to check your transmitter against his airborne equipment. It's a little more involved to swap receiver crystals, but can quickly tell you whether your airborne equipment is at fault. This same reasoning applies to the decoder and servos. All parts of the system were designed to be built separately and can be interchanged — just remember to go through alignment of the transmitter and receiver if you swap crystals. Also, if you have to resort to the parcel post route, send the entire system to your repairman — including antenna, batteries, battery charger, etc. A lot of troubles are quite minor such as failure to resonate the antenna as described in the articles, bad batteries, improper polarity of battery charger, etc. Performing the modifications I recommend may clear up a problem for you, also. If there are any doubts about system performance, perform the recommended mods. These were worked out from actual case histories and won't degrade the performance so you have nothing to lose.

Another often overlooked item is interwiring errors, especially at the servo plugs. I know of several cases where the switch was improperly wired so that there was current drain on one or more batteries with the switch turned off. Check all wiring carefully and look for loose strands of hook-up wire that may be causing shorts, especially at the switch. One other place to check is where stranded wires are inserted in the P.C. boards. It is possible for one or two strands to "push" away from the hole and "short" to an adjacent component lead. This has happened on two known occasions with the white wire at the receiver causing failure of Q7.

Whatever your problems and regardless of how complex they may seem to you, systematic checking by a good technician should be routine, so seek

help if you get over your head. World Engines prints on each kit they sell that they will repair systems built from their kits. By the time this is in print or because of this article others should offer repair service so check the ads in RCM and check with your dealer. I'll try to compile a list of those offering this service for later publication. Now that the -4 mod is completed I'm undecided where to go next. Frankly, I'm glad it's over and I can assure you that the letters I received kept me going. I received more letters of encouragement than I could count and only a few critical ones. To you who wrote letters of encouragement I would like to say thanks again and urge you to let the other model editors know when you enjoy or are interested in an article. I am sure you don't realize what a profound impact you make on a writer's morale and incentive to do his best. To the critical writers, I'd like to say thanks also — you taught me a valuable lesson and expanded my knowledge of human nature.

A long overdue acknowledgment of patience and well wishing is due to our friends "down under." The Australian chaps have many Digitrios flying in spite of difficulty in obtaining parts and extra delay of magazine delivery.

From the letters received there seems to be a need for comprehensive Digitrio troubleshooting instructions which I am considering. Also the mail indicates a desire for a simple pulse system with which I am experimenting. I also have been working on some 72 MC gear which works well. Perhaps some of this will be published later on. The problems I encountered so far with these new frequencies are small and I foresee no problems except the type approval tests required. While the type approval will require a little more effort on the part of the designer the largest hurdle lies in compiling the information required by the F.C.C. It also appears that this new band of frequencies could develop into an "appliance operator's band" with the restrictions of type approval which is/was apparently overlooked and/or endorsed by the AMA. Since most of what has been written about this new "blessing" is either premature or in the form of publicity, I have no significant comments except that the "high desirability of these new frequencies" remains to be proven. Further, the restrictions placed on equipment at these frequencies will, in all probability, severely hinder state of the art advancement in the future.

TROUBLESHOOTING THE -4 MODIFICATION — TRANSMITTER

The transmitter mod only added two one-shots which are identical to those previously covered. I therefore don't have any troubleshooting advice here

except to recheck your modification installation. If possible look at the sync pause duration (adjustable by R13) on a scope. This can be viewed between the collector and emitter of Q11. Adjust R13 to 8-9 MS between the leading edges of the #1 pulses in the pulse train. This will provide a nominal 4 MS sync pause. To calibrate your scope, display one or two cycles of 60 cycles AC. Each cycle will have a time period of 16 2/3 MS. Eyeball a half cycle (either a positive or negative alternation) and you will have 8 1/3 MS. With your horizontal gain and horizontal centering control adjust this half cycle to occupy four divisions on the scope. Your scope is now adjusted to approximately 2 MS/DIV. Display the pulse train at Q11 and adjust R13 so that the leading edges of the #1 pulses are separated by four divisions on the scope face without adjusting either the horizontal sweep frequency or horizontal gain. The above procedure, while not super-accurate, will get you within design limits. The same procedure can be used by European and other countries that use 50 cycles for household voltage. The only difference is the period of one cycle being 20 MS. In that case, adjust 1/2 cycle for five divisions so that each division still represents approximately 2 MS and set up the #1 pulses between four divisions. For those of you who don't have a scope or easy access to one simply set R13 to midrange.

DECODER

It would be advisable to check the decoder for upper temperature limits before flying in hot weather. This can be as simple as exposing it to direct sunlight on one of the hottest days you anticipate flying or placing it in the oven. Since winter is coming on and the hotter days won't be with us for a while the oven is your best bet. CAUTION: Don't depend on the oven temperature dial for this test. Buy or borrow a centigrade thermometer if you want to go above 120° F. The normal household type only goes to 120° F. Decide what would be the hottest day on which you anticipate flying and add 30° F (20° F for direct sunlight effect and 10° F for insurance). By experimenting with the heat control and opening the oven door to varying degrees adjust the heat to your predetermined upper limit temperature. Insert the complete airborne system along with the thermometer and let it soak up the heat for at least 15 minutes after the thermometer stops rising or total of 30 minutes whichever is longest. Keep the bulb of the thermometer close to the decoder and use a piece of wood or cardboard (a small cutting board is fine) to support the equipment. Operate the equipment as it soaks up the heat and if it stops you can estimate what the upper tempera-

ture was when it failed. Also you can check servo drift with heat by marking the output arms with a pencil. The drift should be no more than the width of a pencil line to about 140° F. If you are satisfied with the test, place your transmitter in the oven and check it also. Since you have gone this far you might as well go the deepfreeze route too. You can either let the equipment cool to room temperature first or give it the shock treatment and go directly to the deepfreeze. If you don't anticipate flying with the eskimos, use the refrigerator. It will take awhile to get it down to temperature due to previous heating, so be prepared to wait awhile. Your equipment should work between 20° F to 140° F. I checked five systems and one worked to 170° F, three to 160° F and one to 110° F which was corrected to 160° F. The lower limits were below 20° F (limit of my deepfreeze) on four and 30° F on the one I corrected. Before I get into correcting for temperature I'll explain what factors influence temperature range.

As explained earlier in the theory of operation the turn-on line provides a positive pulse through a diode to each SCS gage. The circuit constants were chosen to provide a 200 ua positive pulse of approximately 2 us duration for this purpose. The turn-off pulse for each stage is provided by the preceding stage and circuit constants provide a 300 ua negative pulse with a 10 us duration. The difference in pulse duration and strength account for proper commutation by allowing the negative pulse to overcome the positive pulse when they arrive simultaneously at a gate and the selected stage is turned off.

Enter HEAT—the turn-on sensitivity rises with heat and the turn-off sensitivity decreases with heat. As heat is raised a point will be reached where the device will not turn-off with the presence of the turn-on pulse. A further increase in temperature will not allow turn-off even without the presence of the turn-on pulse and eventually the temperature will rise where the gate loses all control and the device is held conducting by minority carrier current flow. As temperature is lowered the trigger requirements will react in an opposite manner as far as circuit operation is concerned. This circuit was designed for proper operation between conservative limits of 20-140 F by selection of circuit constants. Some of the causes for premature failure could be that one of the SCS's trigger parameters has changed either by excessive heat or capacitive voltage coupling during P.C. board assembly. Or, possibly that one of the SCS's was on the parameter border line when you received it. If temperature effects cause failure before the upper temperature limit is reached a solution can be affected in one of two ways. Either re-

place the SCS that is failing or increase the turn-off/turn-on pulse ratio. Replacement of the SCS is the most expensive of the two methods and in most cases is unnecessary if you don't mind an increased lower temperature limit. If we increase the amplitude of the turn-off pulse the total temperature spread will shift upwards although the rise of the extremes won't be directly proportional. In other words, say our temperature spread was 20°-110° F. We may cause an increase of our upper limit by 50° up to 160° F and our lower limit may only rise 8° up to 28° F. As you can see this can get complicated since the discussion so far pertains to only one stage and we will be working with four. Actually the temperature checking procedure is rather simple if done in a systematic manner and I'll outline it for you as follows:

1. Select your minimum upper temperature limit as described previously.
2. Adjust your oven or place the equipment, with the receiver case open, in the direct sunlight on an extremely hot day. If your servos were not marked as to which output they are controlled by, mark them before you go any further. Mark them from #1 to #4.
3. With all the equipment hooked up (all servos) operate the equipment and look for a servo failure as the temperature rises. If the failure occurs in the oven, estimate as best you can the equipment temperature when the failure occurred. If you believe the failure occurred at an acceptable temperature (say within 5°-10° F of your target temperature) run further tests to insure that the failure temperature is not within your specifications. NOTE: Your first tests will probably be on the hot side until you are used to the procedure. Also there may be hot spots in the oven. If the failure occurs in direct sunlight of course the results will be unacceptable.
4. The next step is to decide which stage is failing. If more than one stage failed during the test concern yourself with only the first to fail. The failure of one stage will cause the following higher-numbered stages to fail also. For instance, if #3 stage failed, both stages #3 and #4 would be inoperative, but if #4 failed it wouldn't affect the other three. However, if #3 failed at a higher temperature then #4 would be the second one to go out. The objective here is to fix them one at a time systematically and prevent confusion. Keep notes of failures for further reference.
5. Fix the stage that failed. Here you have your choice of methods. Either replace the SCS or increase the value of the .005 coupling capacitor from the preceding stage to a .01. This can be done by paralleling the exist-

ing .005 with another .005 at the copper side of the P.C. board until the tests are completed. The coupling capacitors are C4, 5, 6 and 7. If #4 output failed (Q5) you would increase C7, #3 C6, #2 C5 and #1 C4.

6. Run another test to determine if any other stages will fail within your upper limit specifications and correct them as above.
7. When you are satisfied with the upper limit tests, run the lower limit tests in the refrigerator or deepfreeze. Here again you can use one of your coldest days and set the equipment outside but don't set it in the direct sunlight. If a failure occurs higher than your lower temperature specification check your notes to see if you added a capacitor to correct the upper limit of that stage. If so you will have to replace the SCS to maintain both high and low temperature extremes.

8. Replace the SCS's or the .005's with 0.1's and recheck the temperature range for insurance.

Here's another way to make a quick check. Although it won't tell you the temperature extremes accurately it will let you know whether you're in the ball park or not:

1. Heat the oven to what you feel is about twice as hot as you expect the equipment to operate.
2. Place the equipment in the oven and operate the servos until the cases get hot to the touch (not warm). At about 140° F the cases will be uncomfortable to hold but not hot enough to burn the skin. Or, you can wait until you have a failure and remove the equipment noting the case temperatures when the equipment starts operating again. A WORD OF CAUTION HERE: Your equipment could go beyond 160° F without failure and chances for heat damage to component parts will increase, so stay within reason on the touch test.
3. Run the deepfreeze test. Here the lower test limit will be determined by the temperature setting and the freezer's ability to recover from the added heat of the equipment. At about 20° F the servo wires will get stiff and servo response may slow down slightly due to the cold. It should be easy to obtain a household thermometer for this test.

The above "quick" check will depend a lot on your ability to determine temperature by symptoms.

Troubleshooting follows the same logic as the heat checks to pin-point a defective stage. Determine which stage is defective by observing servo action and repair as necessary. Don't run the heat checks until you are sure the sys-

(Continued on Page 52)

The Roostertail



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

THE IMPBA Regatta was by far the biggest and best we have seen to date. The Roostertail office is still processing the results and will report in detail in next month's column. However, the following is a report on the business meeting held after the excellent banquet.

The first order of business was the tabulating and results of the IMPBA elections. The waiver to allow a non-director to be nominated for President passed by a large margin. The following men were elected to office:

President: Robert J. Pachman
Vice President R/C: Cyrus D. Crites
Director: Tom Demesky
Director: Al Seidenberg

Mert Mischnick, the outgoing President, gave a status report on the IMPBA. He also outlined the actions that have been implemented to and in the growth and improvement of the IMPBA. Mert then reported the election results and turned the meeting over to the new IMPBA President, Bob Pachman.

Bob presented a dynamic talk on his plans for the IMPBA, one of the major points being that "we have to encourage new members by sharing our knowledge with them." He wants to provide a more comprehensive packet of information to those who have inquired about the Association. Such a packet would include names and addresses of manufacturers of model boat kits, hulls, fittings, and plans. A lot of club members living in large cities do not realize the situation faced by many of these would-be model boat men starting from scratch and hampered by geographical isolation. Another major point Bob made was that we must be more active in promoting and supporting radio control in general.

Following Bob's address the meeting was opened for discussion. There were several lively discussions that will result in IMPBA rules changes. In order to get

your help in resolving the problems, the following points were discussed:

Due to the largest R/C turnout in IMPBA history, the two-day regatta could only accommodate one heat in each class in each event. Naturally, no one was happy with this situation. But, to the credit of the hosting DeVry Club, everything that could be done to accommodate more than one heat was accomplished. So, how are we going to provide for more than one heat in the future? Keep in mind that future IMPBA Regattas will be even larger! Some suggested solutions were: (1) extend the IMPBA Regatta to three full days. (Again, in the future, this might be increased to four or five days.) (2) Establish regional eliminations and send only the winners to the IMPBA. (3) Conduct a qualifying event where only those exceeding some pre-determined criterion would progress to later heats. (4) Run the various events at separate lakes in the host club's general vicinity.

Well, you probably won't like some, or all of the above — all have some merit, none are without fault. Nevertheless, we are going to have to do **something** before next year, and you can certainly help by writing your suggestions down and sending them to the Roostertail.

The next discussion involved hull type. It would appear that the present delineation is not without problems. The primary element in hull definition that requires clarifying is the scale displacement type. We should be able to present a ballot on this in the near future. We think we have the hydro/ski definitions resolved.

The Roostertail is read by a great number of people. All of us, interested in model boating, want to know what's going on in our sport and hobby. **But** — the Roostertail does not depend on a wire service for information. We do not employ professional writers to collect and write our information. We **do**, however, rely on **you** for interesting information. Won't you send us your Regatta results, pictures, and descriptions of boats and boat parts?

INTERESTED IN R/C MODEL BOATING?

JOIN THE FUN BY
JOINING THE
I.M.P.B.A.

WRITE THE GENERAL OFFICE
3638 S. 61ST COURT
CICERO, ILLINOIS

RCM DIGITRIO

(Continued from Page 51)

tem is functioning properly as it will be a waste of time. From the letters received and personal observations I know there will be many cases of germanium and silicon diode swapping. Also diodes installed backwards or marked improperly. If you don't know for sure what type diode you have (hunches are sure to get you into trouble) don't use it. Also a check of each diode before installing them may prevent later problems. If you use a scope and want to look at the outputs you will either have to connect the servos or simulate them. They can be simulated by placing a 22 K resistor and a silicon diode in series across the decoder output with the diode arrow pointing to ground (SCS cathode). Don't check the SCS's with an ohmmeter unless you've got a lot of money for replacements. All the components used have been identified for you and if you make substitutions you know my favorite saying. I'll spare you the nausea this time and just say "good luck!"

One thing should be obvious at this point. Since each SCS stage is identical it would be an easy matter to increase the number of channels. I have gone to six without any circuit changes other than SCS stage addition. Beyond this R2 may have to be decreased to maintain on/off pulse ratio. 500 ohms should be about right for 8 channels. If I get enough letters I may publish a board for additional channels. How many depends on the requests. The same goes for a new transmitter board. If you write in please state your desires and spare me the lectures on why I should have done it in the first place. Also fellows, no more lectures on the number or content of articles it's taken to complete the system. When you write articles on the system you design I promise not to tell you how to do it. O.K.! Fair enough.

And, always remember that in spite of inflation the wages of sin are still death.



1966 NATIONALS

COMPLETE R/C DATA SHEETS

THE information contained in the following pages was obtained from RCM's individual data sheets, completed by a majority of the R/C contestants at the 1966 Glenview NAS National Model Airplane Championships. While every attempt is made toward accuracy, some discrepancies are bound to occur in the data listed.

As interesting indicators of possible trends in the radio control field, the following information was tabulated from this material:

The average contestant was 36.5 years of age as contrasted to 35.0 in 1965 and 33.5 in 1964. This year's contestant had an average of 11.8 years of experience in R/C. This experience factor reflected a 1.5 year increase over 1965 and a 3 year increase over 1964.

Of the aircraft they flew, 43% were original designs, a 4% drop from 1965 and the same as 1964. Kits and modified kits accounted for 33% of the entries, a six per cent increase over 1965 and 1964. Entries built from magazine plans constituted 24% of the total entries with the majority of those (52%) built from RCM plans. Overall magazine plan entries dropped for the third straight year, although in all three years, the majority of winners flew designs originally presented as magazine construction articles.

In the aircraft finish department, butyrate dope still constituted the popular majority with a 70% total, although this was a 12% drop from 1965 and a 10% drop over 1964. Epoxy materials, which had held constant at 15% in both

1964 and 1965 dropped to a new low of 9%. Both lacquer and enamels made a gain over 1964 and 1965 with the highest increase going to lacquer type finishes. MonoKote made its first appearance this year, and constituted 7% of the total entries, although in many cases it was used on wings only, with the fuselages being finished in conventional materials.

In the power department, the big Super Tigre .51-.60 mills retained their lead, although dropping off 7% over 1964. The Tigres constituted 36% of the entries with Veco coming in second at 23% due to the introduction of their new .61. For Veco, this constituted a 5% gain over 1965. Veco's percentage is still down from their 36% first place lead in 1964 when the .45 size mill was the popular favorite. This year, the Enya .60 was third with 16% of the total entries.

Insofar as fuel was concerned, K&B retained their lead for the third straight year, increasing 5% over 1965 for a total of 35% of the entries. Midwest Idle-X, in second place in 1965 with 12% picked up appreciably in 1966 to a total of 20% of the entries. The perennial third place favorite was homebrew fuel, although it has dropped each year to a new low of 17% in 1966. One interesting inroad into the Nationals was made by Cox Blue Can fuel—a large number of the well known top contenders in the pattern event used the Cox fuel in their .51-.61 mills, apparently for the reasons that it performs quite well over a wide range of temperatures as

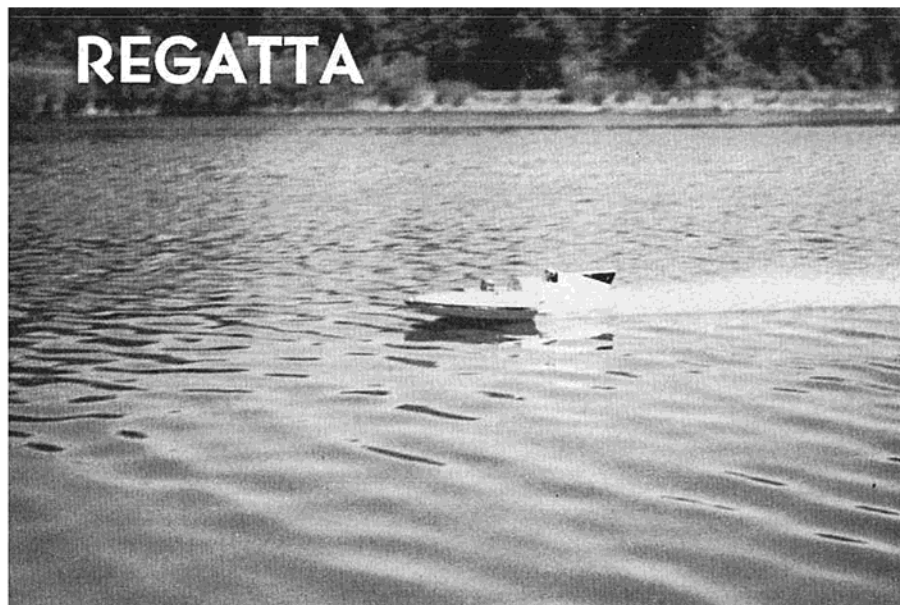
well as not varnishing up the engine. This will be one to watch in next year's contest circuits.

The greatest amount of interest, of course, was in the equipment category, with fourteen proportional manufacturers competing for popularity and the top spots in the winners' circle. Overall, proportional equipment constituted 88% of the total entries, an increase of 14% over 1965 and 49% over 1964. Reeds hit an all-time low of 12%, dropping from 26% in 1965 and 61% in the 1964 event—a point of no-return for reed equipment in competition circles. Of the fourteen commercial proportional systems at the Nat's, Kraft equipment was predominant in total number of entries, closely followed by Orbit and Logictrol, in that order. In the Class III winners' circle, Kraft equipment won all first three places, with the first three places in Class II going to Logictrol. The first two places in Goodyear Pylon went to Kraft equipment.

For the trends—study the data sheets and form your own conclusions. Here is the key to the coding used for abbreviation purposes: Plane source: O—original design; K—kit; MK—modified kit; P—plans (MAN—Model Airplane News; AM—American Modeler; RCM—R/C Modeler). Controls used: R—rudder; E—elevator; M—motor; A—aileron; T—trim (reeds only). All radio systems are proportional systems unless followed by a channel number such as 10 or 12.

Name R/C Club City, State	Yrs. in R/C	Age R/C	Class Place	Plane Source	Span Chord	Engine Fuel Prop	Finish	Controls	Radio
Abram, Edgar J. Windsor M.A.O. Oauquaga, N. Y.	40	5	I	Bubble Dancer (O)	52 11	OS 40 Nitro-X 11-4	Dope	RM	Citizen-Ship
Andrews, Lou NEHOM North Reading, Mass.	50	20	III	Aeromaster (K)	48 9	Mercer 61 11-7.5 KB 100	Dope	REMA	Bonner
Anthony, Bruce TCRO Hopkins, Minn.	48	4	III	Python (O)	68 12	ST 60 Own 12-4	Dope	REMA	Logictrol
Armstrong, Dallas C. Centerville Cadets Belleville, Illinois	38	10	I 4th	Windmill (O) AM	49 11	ST 60 Idle-X 12-6	Dope	RM	Kraft
Arnold, James E. Monroeville Model Fliers Trafford, Pa.	11	2	II	Cruiser (MK)	60	ST 45 11-6 Fox	Dope	RM	F&M
Atkinson, Bud ECRO Blue Springs, Mo.	41	16	Scale 1st	Stits Flut-R-Bug (O)	63 12.5	Veco 45 Idle-X 11-6	Dope	REMA	Logictrol
Atkinson, Bud ECRO Blue Springs, Mo.	41	16	II 4th	Aristo-Cat (K)	57 13	Enya 60 Idle-X 11-7.75	Dope	REM	Logictrol
Baldwin, Bob SAC Steger, Illinois	52	10	Pylon	Delta (O)	26 9.75	ST 15 Nitro-X 8-5	Dope	EA	Controaire 10

REGATTA



Challenger by Gary Preusse. Fibreglass 3 point hydro, submerged prop, new Rossi R/C engine, Orbit 3+1.

1966 I.M.P.B.A NATIONALS

BY JIM WHITLATCH, RCM BOAT EDITOR

THIS review of the 1966 I.M.P.B.A. R/C Internat's will be, primarily, a "Westerner's" report of the meet, comparing East-Midwest with West insofar as hull-types, designs, engines, types of construction, and radio equipment are concerned. We'll leave the full rundown of official results, winners, and new records set to IMPBA President Bob Pachman and Secretary Sy Crites.

One basic difference between East and West was discovered even before the meet commenced. On Friday and Saturday the weather was like a Spring day in California — breezy, sunny, and brisk, with temperatures around 65-70 degrees and low humidity. I thought it was ideal, but you should have heard The Natives moan! "Too cold . . . not enough humidity . . . the engines won't run right, etc." They got their wish on Sunday! It was drizzly, hot, humid and miserable — a typical Midwest Summer day. You know, they were right? Their engines did run better.

Mine didn't. I "fried" two Super Tigres. To each his own!

The pre-meet planning and preparation conducted by the DeVry Dolphins, host club, was truly outstanding! Pre-registration forms included a questionnaire asking what events you planned on entering and included a course layout with dimensions of the lake, motel brochures, and maps of the general area. It is too bad that so few of these pre-registration forms were completed and returned. With only twenty submitted, the Dolphins expected fifty to seventy-five

contestants. What a surprise when at least twice that number showed up, and each with several boats! As it turned out, this meant that only one "heat" (Eastern talk) or "attempt" (Western) was possible for each contestant per event. If your engine failed to start in the three minute Port Time, or "aborted" before timing began, you'd "had it." It couldn't be helped, since there were just too many boats competing in too many events for a two-day meet. My hat is off to Bob Ruffner and the other officials who had to make the "one attempt" rule — they stuck to it and no local favorites were allowed to make second attempts.

This same overcrowded situation faces the model airplane Nationals, and now the problem confronts the boaters. It's obvious that something has to be changed. This month's Roostertail poses the problems and some of the suggested action. Your ideas are needed — write the IMPBA.

Considering the unexpected turnout the DeVry Dolphins did a good job. Their lake and "scanning type" clocks were certainly more than adequate. Congratulations are due to Gordon Carlson and George Dean of DeVry Institute who designed and built a truly professional timing system. The only timer more accurate in the whole country is the "light beam" type designed by Wes Hunt of San Diego. Lake Potawatami was beautiful and large enough for everything except the fastest surface prop hydros ala Steve Stevens and Bob Foley. These require a longer run to get

"up on the prop." Even though I doubt that Steve could have raised his 49 M.P.H. record it was too bad he couldn't attend the meet. I was asked constantly for three days, "Where's Steve Stevens and The Sidewinder?"

The lake was open on Friday for tune-up runs. One of the few mistakes The Dolphins made was in not setting up the timers on Friday. Saturday was 1/16 and 1/4 mile timing. Sunday morning was more of the same, then the precision course event, and in the afternoon multiple boat racing. All transmitters and boats were numbered and the transmitters impounded. When it was your turn to go into the Ready Pit a runner delivered your transmitter to you. A transmission-interference monitor was in operation at all times. To my knowledge no one lost a boat because of interference. Port Time and Running Time were kept accurately and fairly. Periodically Bob Ruffner would run off on his stencil machine a list of Contestants and their expected running time. The actual running of the meet compared most favorably with any West Coast meet.

Hull Types

Comparing hull types was a real eye opener! Having read about, and seen pictures of, the Eastern hydros I was especially interested in seeing them run. And run they do! Or more truthfully, "turn the corners" they do! Most West Coasters have been rather skeptical of the low 30 second times being claimed in the 1/4 mile oval event by the O&R and Tass powered Class F boats. Well, they sure made a believer out of this "Doubting Thomas!" It's obvious that the emphasis, especially in the Midwest, has been on developing hydros that go reasonably fast down the straightaway and then turn very sharply, quick and with little or no slide when going around the small diameter (60 ft.) ends of the 1/4 mile oval course. As a result, the Eastern hydros look and run completely differently than West Coast hydros. An articulated-steering strut-submerged prop drive is used to push the Eastern hydros around the corners. The prop never loses its bite and the hull sorta' "hunkers down" in the corners. This is accomplished by a huge fin placed at an angle in the center of the hull, on the center of gravity, so that as the hull tries to slide, the fin bites into the water and tends to dig in — thus holding the hydro down tight. West Coast air-suspended hydros running surface props, with only a small turn fin on one sponson, can't possibly turn the corners as quickly or as safely. Also, when a surface prop hydro slows down in a corner, the prop cavitates and the boat loses headway. The hulls run by Steve Stevens, Bob Foley, Del Park and the rest of the Coast boys really scream down the straight but there's not enough in the water to make a sharp turn. To me it's

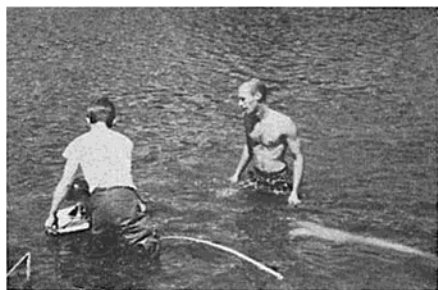
obvious that the Eastern type hydro can't compete favorably for all out straight-away speed records, and at the same time, it's equally obvious the Eastern boaters have a wide edge in "course running" hydros. It points out that the hobby is becoming more specialized. Even after seeing those Rossi, O&R and Tass powered hydros turn the corners I find it hard to believe. It's as if the boat becomes a tether boat at each end of the oval.

Another basic difference is in the direction of turn. The Eastern boats practically all turn to the right or clockwise whereas West Coast boats are usually trimmed to turn left or counterclockwise. After seeing how much better model boats turn to the right, which uses the torque reaction of the engine and prop to hold the right side of the hull down to the water, it's obvious that the West is "whipping a dead horse." That statement may have cost me some friends on the Coast, but it's the truth. 'Course I've been crusading for over a year to convert Westerners to right turners; why it's even unpatriotic to "turn to the left!"

In the development of monoplane, or Ski boat hulls, that go fast and turn well, I think the West is ahead. Most competition boats used for Speed Obstacle, Lap Speed and Multi Racing in the West are Ski boat types. An example of this was my own relatively small Ski boat. I was lucky enough to take first place trophies in the .29 engine class (C-3) and .40 class (D-3) quarter mile oval events as well as first place in the .29 class Multi Boat Race. In all these events it outran and out-turned (and to the right) the Eastern hydros. The Ski boats of Karl Offerman, Doug Nystrom and Bob Foley, all of the San Diego Argonauts, did well, too, with Bob picking up first place in the 1/16 with his screamin' S.T. 15 powered original design Ski boat, and Doug getting second with his S.T. 35 Ski boat in the D class Multi event. Bob Foley also took firsts with his hydro in .29 class (C-2) and .40 class (D-2) 1/16 mile. He now holds both of these records.

Radio Equipment

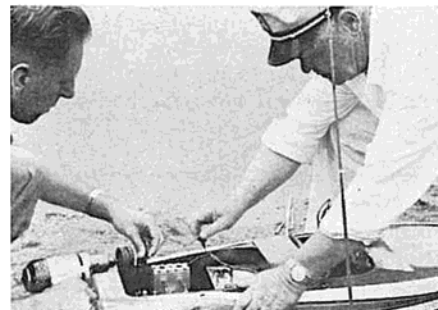
In comparing radio gear, East vs. West, I saw very little difference. Reed superhets still predominate, practically no superregens, perhaps more proportional being used by Easterners and Mid Westerners, especially Orbit 3+1's which are very popular and reliable. The R.C. Boaters big needs are (1) a two channel proportional set and (2) more powerful and more strongly geared servos. The big E and F class Hydros with steering struts are using two servos in tandem to get enough power, and even at that are tearing up the servo gears! Radio reliability was very good—few if any boats lost because of "radio trouble." I had converted my Ski boat



Another advantage of R/C boating on a hot day. "Tarzan" Ron Buck emerging from lake after saving a sinking boat.



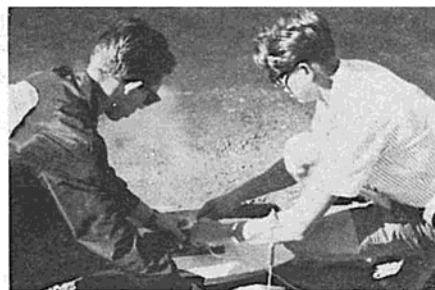
Bob Foley, right, and Doug Nystrom in ready pit waiting for signal to start. Doug's original ski boat, ST .35, Min-X reeds. DeVry Dolphins multi-boat racing clock and lap counter in background.



Bob Gregory, left, and Col. Jim Sorrell of Los Angeles. Motor generator power for 1/4" hand drill with small V-belt between V-grooved flywheels on drill and model engine for starting. Boat is true scale of popular West Coast ski boat. Home made 1.2 cu. in. twin by Sorrell.



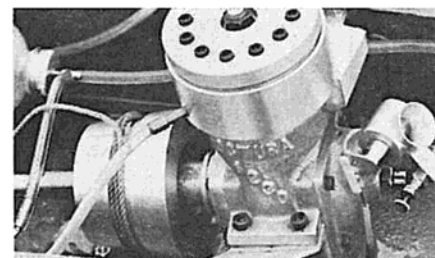
New IMPBA President Bob Pachman getting ready to award trophies.



Bob Foley, left, and Doug Nystrom of San Diego, starting Bob's record setting original design hydro. K&B .29, Min-X reeds, and then 34 MPH in the 1/16 Mile!



RCM's Boat Editor Jim Whitlatch at meet. Ski boat runs ST 29 or 40 in two classes, F&M Digital 3. Jim's holding his IBM Model 224 portable dictation unit, magnetic belt, battery powered, which he used to record comments and picture captions at meet.



Home made Class F engine, actually constructed from kit by Octura Models.



Ron Buck of Minute Breakers Club, Chicago. What a competitor! Four trophies won with two boats. Shown is his White Heat 4-60 of Octura. Rossi 60 R/C, submerged prop on steering strut using Orbit 3+1.

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from 4 channel reed regen to the new F&M Digital 3 just a week before the meet and encountered no problems whatsoever, and I've got a real vibrator! I'd have never believed how much better you can run a boat with proportional unless I'd gone through it myself.

Engines

Engines used in the smaller classes were the same East and West. It's a sad commentary on U. S. makes when you see how the two Italian designs practically dominate the .19, .29, .40 and .60 classes. The O&R and Tass mills ran so much stronger and faster than I had expected! I snooped all I could and saw much "hop up" in evidence. Octura rotary intake conversions on the hotter O&R's. Crankcase packing, porting, higher compression, bigger reed valve conversions on the Tass's by G.E.M. were really making those big jobs turn on. Again, I wouldn't have believed it unless I'd seen it! On both makes the recoil starters are made removable, and used only to start the engine, then thrown on the beach. Water cooled cylinder jackets of course. The magnetos are often removed and a threaded adaptor used to convert to a glow plug. A ni-cad battery is left in the boat to keep the plug lit all the time the boat is running. Not only does this give a more reliable idle, but a higher and more stable top R.P.M. is claimed. The needle valve is often controlled by an additional servo so that final "leaning in" of the mixture can be done after the boat is running at speed. Then, when you run those 1.3 cu. in. bombs on a mixture of 60% high nitro content glo fuel and 40% high octane gasoline, and you're not getting 3 H.P. at 10,000 R.P.M., I'll eat my hat! It makes me wonder if the present IMPBA 3 cu. in. engine size limit is safe. Looks to me like it's only a matter of time (and money) until someone imports a few Italian or Japanese 2 cycle racing motorcycle engines and starts racing them. Br-r-r!

I saw some outstanding homemade engines, some from casting kits by Octura, and one work of art by ageless Ed Kalfus of tether boat fame. Ed makes everything himself, even the patterns for the basic engine castings and all the internal parts, etc. I kidded him about having to buy glo-plugs. He had his tether record holding 1.8 cu. in. mill in a White Heat 60 and go it did! On test runs Friday I feel sure he was well into the Forty M.P.H. Club. Saturday, while trying to make a wide turn to get a long run at the 1/16 mile trap, he got caught in the weeds, 'nuff to make you give up boating! The straightaway record competition for Steve Stevens and the other West Coast hot dogs will no doubt come

from converted tether boat men like Ed Kalfus, Pete Yanzer, et al. They really know engines, props, fuels and they're sure learning fast how to make free running R/C boats move!

Multiple Boat Racing

The high point of the Internats, at least for the spectators, was the Sunday afternoon multi-boat racing. So many times on Friday and Saturday, during the time trials, a spectator would ask "Do you ever race against each other?" or "When does the REAL racing start?" Seeing a "toy boat" go up and down the pond all by itself will never match the crowd appeal of racing several boats together. The R/C flyers have discovered the same thing with their Goodyear Py-lon event.

Even a confirmed Westerner like me has to admit that the Easterners put on a fast and exciting boat race. A little rough, perhaps, since those big fibre glass hydros really bump each other around! It was obvious why so many kit fibre glass hulls are used in competition back East. They're strong, flexible, easily built in a short time, easy to patch, and all in all, make a good running, reliable multi-boat racing hull. Another advantage of turning right (clockwise) was again evident. Very few boats spun out or flipped on the corners even when crossing the wake of another boat. The racing rules were almost identical to West Coast — launching time, a milling start, 60 second clock were all the same. The DeVry Dolphins had a starting clock-lap counter combination that was better than any we had seen. Besides the usual 60 second clock it had warning lights in three colors designating Port Time, Clock Time and Start. It also had separate lap counters on its face for each boat. These were the colors of the frequency flags, so a contestant could glance over during the race, spot his color, and instantly tell how many laps he'd completed and also where he stood in the race. Very slick! Good idea for R/C Goodyear event?

Hull types were combined within engine size classes so the Ski boats, runabouts and hydros raced against each other but always against engines of like size. All the races were exciting but the two large engine classes E and F were really something to see! No one from the West Coast had ever seen so many big, fast hydros running against each other. It reminded me of dirt track sprint car racing, the only thing missing being the "nerf bars," and it looked to me like Ron Buck, The Jordans, et al, could use 'em! Being a monoplane enthusiast I was pleased to see how well a Tass powered Cobra, piloted by Marianne Preusse, did in competition with the hydros. What a "woman driver" she is!

In the smaller engine classes the Westerners came on strong getting firsts in

the .19 Class B and .29 Class C and a second place in the .40 Class D races. Reliability is important in all phases of R/C boating but it's absolutely vital in multiple boat racing. Time after time the fastest boat in a heat would not finish the eight laps and the winner would be a stable, reliable boat. I was reminded of the old story of the Tortoise and the Hare and how true it is!

Some variations of multi racing that we have started on the Coast are: Le Mans type start where the time for a race starts with all boats on the bank and engines **not** started, couple this to a twenty lap marathon, during which at least one pit stop must be made for fuel (engine must be stopped), and I think you'll keep the interest up?

Summary

The old saying (I just thought it up) "You get good at what you spend the most time at" was sure proven at the IMPBA Internats. The East-Midwest emphasis has been on submerged prop hydros in the larger two engine classes E and F, running the 1/4 mile oval. Nothing on the West Coast can touch 'em in these two events. The Westerners have the edge (and a wide one) in straightaway speed hydros in all engine classes and in the monoplane or Ski boat hull classes in the smaller engine classes. The West was represented by eight contestants: from Los Angeles, Col. Jim Sorrell, Bob Gregory and your R/C Modeler Editor, Jim Whitlatch; from San Diego, Bob Foley, Karl Offerman, Doug Nystrom and Al Gomez; and from Tucson, Arizona, Jay Brandon. These invaders came away with six first place trophies and one second place, a very respectable showing. However, the number of trophies won by each "side" was certainly not the important outcome of the meet. For the first time, even though on a small scale, East was competing with West and both learned from it. Meeting men like Tom Perzentka of Octura Models, Gary Preusse and Earl Mundt of G.E.M. and Jay Brandon of Dumas Boats, men who have made R/C boating possible or at least easier for all of us; meeting outstanding builders and competitors from other parts of the country, comparing "yours to theirs," seeing that **both** groups are darn good at this crazy hobby of ours, these were the truly important results of the IMPBA Internats. I sincerely hope this is just a start at more intersectional competition. It will help R/C boating develop just as much as the Model Airplane Nationals helped R/C model airplane development.

Next month pictures and report on the Western Regional IMPBA and WAM R/C Boat Meet in San Francisco. In the months to come, an article, "West Coast Ski Boat Speed Tips," and other construction articles — that is, if the demand supports the supply!



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

