

FEBRUARY 1970 75c

rc Modeler



*The
Leading Magazine
For
Radio Control*



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COVER: Sandia Laboratories uses R/C as an engineering tool in work supported by the A.E.C. Ektachrome by Bill Lasker. Chuck Borel transforms an Aero 600 into a scale-like twin. Ektachrome by Chuck Borel. Pat Oden-Hall poses for Dan Wall at 1st Southern R/C Trade Show. **FRONTSPIECE:** Bucker Jugermeister by Jim Jennings, photographed at recent Meroke meet by Bill Coons.





BY DON DEWEY

Forty-five representatives of twenty-four member countries were in attendance at the annual plenary meeting of the FAI's International Committee in Aeromodeling (CIAM) held in Paris, France on Nov. 6 and 7, 1969.

From the United States the delegation included Maynard Hill, voting delegate and chairman of the RC subcommittee; John Patton, AMA president; John Worth, Executive Director of AMA; and G. Harry Stine, chairman of the model rocketry subcommittee; and Bryant Thompson, who will manage the first U.S. rocketry team at the 1970 World Championships.

The following is a brief summary of decisions affecting radio control taken at the meeting, as reported in a recent A.M.A. news release:

The RC Aerobatic rules were changed in several areas with the objective of obtaining smoother operation of contests and less loss of time between competition flights. Commencing in 1970, the pilot will have ten minutes in which to start his engine and complete the maneuvers. He must start his engine in three minutes, or he loses that flight. If his engine stops during take-off, he may restart it but will receive no score for the take-off maneuver. Only one attempt will be granted for each flight. It is now mandatory that the pilot announce the start of take-off as well as all other maneuvers except landing.

The sequence of maneuvers in the aerobatic schedule was altered. Several old maneuvers (the Inverted Figure 8, the Rolling Circle, the Tail Slide and the Vertical 8 were deleted. A Four Point Hesitation Roll was inserted and the Double Stall Turn was redefined as a Figure M.) The second stall turn is in a direction opposite to what it was in

the double stall turn; no longer needs to be flown in a direction away from the pilot.

The American proposal for Formula II pylon racing was adopted with some modifications. The significant changes are (a) standard fuel (75% methanol/25% alcohol); (b) silencers are required; (c) retracting landing gear is not prohibited and; (d) cheek cowl and spinner rules were modified to permit wider choice of prototype models. The 0.40 cu. in. engine size was retained. Conversion to metric dimensions resulted in rounding off of some U.S. rule figures to slightly smaller dimensions (models which meet existing AMA Formula II model specifications will also meet the new FAI rules). These racing rules were adopted on a provisional basis for use in 1970.

Provisional rules for thermal and slope soaring of RC gliders were also adopted. Basically, the thermal rules are for duration with one point granted per second of flight, along with a bonus of 50 points for landing in a 25 meter circle. Towline length is 150 meters and the suggested maximum flight is six minutes. The slope soaring event involves distance travelled back and forth over a 100 meter course during a six minute flight period.

The USA proposal to alter the course for RC glider speed records was referred back to the RC subcommittee to be included in a study of various records which is currently in progress.

It was also announced that Great Britain will hold the first world championships for Scale RC in 1970, (Aug. 27 - 31), as well as the next RC aerobatic championships in 1971. Italy has requested permission to hold the World Championships in 1973.

We'd like to remind all of you to reserve February 28 through March

1, 1970 to attend the greatest RC hobby show in the country, which will be held in the Lucas County Recreation Hall in Maumee, Ohio. Sponsored by the Weak Signals Club of Toledo, Ohio, the 16th Annual Toledo RC Conference will unveil the latest and best in RC equipment as presented by the largest number of RC manufacturers assembled under one roof at one time. You will see equipment and accessories, many of which will be shown for the first time, and you will have the opportunity to operate these new systems. Here, you will meet the people that build the gear you purchase and get all of the answers to all of your questions first hand. You are invited to bring your latest RC model and enter it in the model competition with trophies for first place and plaques for second and third in the following award classes: Best in RC Scale, Best in Pattern Competition Design, Best RC Boat, Best Sport Flying Design, Best RC Glider, Best Pylon Racer, Most Outstanding Finish (RCM Trophy), Best RC Model Built by a Junior, and the Arthur Christen Award Trophy for the Most Advanced RC Accomplishment. There will be ample display space for more than 225 models. This is your show, so bring your latest projects, models, and RC movies. Facilities are available to accommodate the increased attendance expected for the 1970 spectacular. There will also be a raffle with chances for three different proportional sets. Admission is \$1.00 per person, which covers both days festivities. For further information, contact the Weak Signals RC Club, P.O. Box 5772, Station Wernert, Toledo, Ohio 43613

We're also pleased to announce that the 1970 Spokane Internats is scheduled for 13 - 14 June 1970 at the Washington Air National Guard's

base on Spokane International Airport. The host organization is the 142nd Air Defense Wing, commanded by Colonel Lyle W. Scott.

The Spokane Internats is a two-day model festival which is one of the many related programs undertaken by the Washington Air Guard and its Academy of Aerospace Science and Modeling. The overall objectives are to: (1) Arouse public interest in modeling, (2) encourage youngsters to participate in wholesome and constructive activities such as modeling, (3) promote development of modeling as a recognized sport and as a worthwhile recreational and educational activity, and (4) establish rapport among youngsters, educators, modelers, civic groups, and people in business, industry, and government.

Activities on 13 - 14 June 1970 will fall into one of several categories: (1) Radio-control, free flight, control-line, and rocketry contests. (2) Manufacturers' exhibits. (3) The Model Aviation Hall of Fame banquet, and (4) static displays of models.

Contest director for the 1970 Spokane Internats will be Lt. Col. Robert R. Hepker. Assistant director in charge of RC events will be Richard Carson of the Barons Club. In addition to the Barons, several other clubs will be involved in the management of the Internats, including: Radio Aero Modelers of Seattle (RAMS), Portland Stardusters, Mt. Rainier RC Society of Tacoma, Seattle Radio Aero Club and RCFC of Vancouver, British Columbia.

The honorary contest director will be Colonel Frank Borman, commander of the Apollo 8 space vehicle which made the historic first-flight around the moon. Colonel Borman also will be the principal speaker at the Hall of Fame banquet. He is participating at the request of the Honorable Daniel J. Evans, Governor of Washington.

In accepting Governor Evans' invitation, Colonel Borman said, in part, "Model aviation meant a great deal to me during the development of my career and I am looking forward to being with you in June." John Worth, Executive Director of the AMA, was instrumental in assuring his attendance. We are most fortunate and honored to have a man of Colonel Borman's stature headline the 1970 Spokane Internats.
(continued on page 80)

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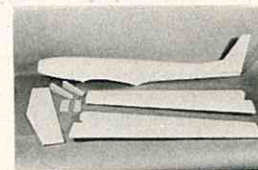
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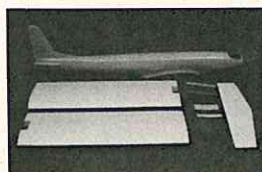
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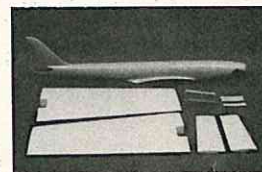


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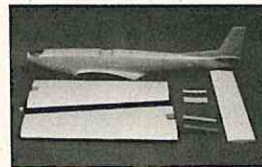
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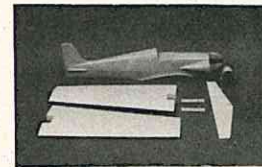
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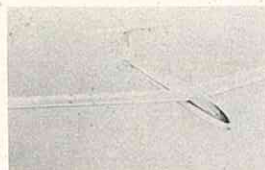
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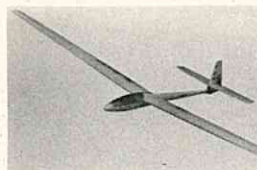
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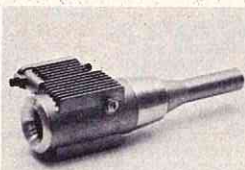
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WAGGER

A dog's EYE VIEW . . .

It is with mixed emotions that I take pen in paw to write this particular column. On the one foot, I'm gratified that the mail has been coming in so steadily from all you dog lovers. On the other foot, I find that the short column each month is just not enough to share all the conversations we have going on in the mails at this time!

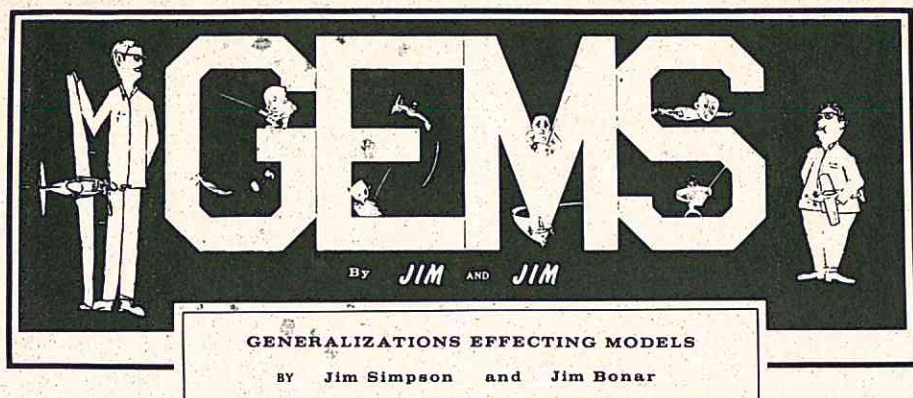
Walt and I invite you guys to write in with your ideas and comments each month; originally, we figured you would just respond to the challenges that we threw out. However, we are now finding out that you have a lot of ideas and gripes that have been chewing on you for some time, too. Now we are discovering that the personal reply we send to each letter is getting longer and more specific each month. That doesn't bother us because we like shooting the breeze about modeling (you mean somebody doesn't?); however, at the present rate it will be about six months before some of your ideas appear in print. That's too long for a good, juicy crisis.

Therefore, Walt and I have decided to throw in a long column every once in a while to kind of 'catch up' before the ideas get cold. I know that Dewey will think we're just trying to pad our part, but I can thrash any dog in Sierra Madre, so the heck with him . . .

GROUND TRAINER: Regarding the challenge we threw out in the September, 1969 issue for a good flight simulator, we've received word of several very promising solutions in progress. Gregg Chandler of St. Joseph, Michigan, sent some nice sketches of a possible way to hook one up. Gregg is 13 years old and thinking every minute. (Old duffers in the audience take note!) Also, from Dick Robb up in Ward Cove, in Alaska, we received the following encouraging letter:

Dear Waggon: Your comments on a model 'Link Trainer' made quite an impression on me. I have built model aircraft for about 12 years but just recently became active in radio control. Because Alaska is so isolated I have had to teach myself to fly. I have gone through 3 airplanes with several major rebuilds required for each and I still

(continued on page 68)



This particular section of GEMS (Generalizations Effecting Models) will be devoted to the period of time from when you install your radio in your airplane up until you are ready for the first flight. Because these are merely generalizations, the only two assumptions that will be made are: (1) that you have a four (or more) channel proportional radio and, (2) that your miniature aircraft has the big wing in the front and the little wing in back. This way you, yourself, must decide whether the GEMS apply if you have a Delta, Canard, Saucer, etc!

The first thing to do is fasten the aircraft together with the entire radio gear located APPROXIMATELY where you want it, but NOT secured in place. At this point, be sure the aircraft is simulated as completely ready to fly with the exception of fuel in the tank. Now what we're going to do is locate the Center of Gravity (CG) vertical line or, in other words, the pitch axis balance point. If your plane is small enough you can do this alone. If not, have a buddy help you. Put one finger under each wing tip about half way between the leading and trailing edges and, with only these two fingers, gently lift your plane. If you find that you can, indeed, lift it clear of the surface but that the nose is low, you're in good shape. Set it down and move your fingers until you can pick up your plane by only the two fingers and it stays level. Note the position of your fingers. If they are back from the leading edge one third of the total distance to the trailing edge, your plane's balance is in the acceptable range. If your fingers are not 'back 1/3' then, using the principle of the 'teeter-totter', move your radio gear until it does balance. Once it balances, you know approximately where it should be located.

Most of today's manufacturers furnish very good instructions on how to mount their radio gear. Some say their guarantee is void if not mounted

as directed (that kind of straps you doesn't it?). At any rate, if you have directions, follow them, if not, we offer some GEMS in their absence.

We'll start with the battery pack because it should be mounted in front of all other radio gear. Why? Simply because it is the heaviest and, in the unlikely event that your plane crashes, with the battery pack anywhere except next to a solid bulkhead, it will generally go through everything between it and the solid bulkhead! If you mount the pack anywhere that fuel could possibly get on it, then first wrap it in a heavy plastic bag and seal it with tape. Next, because it is expensive, you should wrap the pack in a shock absorbent material to cut down the possibility of failure due to vibration. If you use a perfectly round pack, resist the temptation to mount it in a tube for three reasons: (1) no fuel soakage protection, (2) no shock protection, (3) most crashes we've ever seen (which were caused by power failure) could be attributed to a round battery pack mounted in a tube, which in turn, rotated with vibration and twisted the wires right off so the little ole electrons had no wire to go through on the way to the receiver!

The switch, which is generally part of the battery pack, should be bolted firmly to the side of the airplane that is opposite to the engine's exhaust stack. We've seen a lot of planes crash due to switch failure which was, in fact, a switch that had become saturated with castor oil. Those same little ole electrons which 'won't go anywhere without wires won't go from one side of the switch (through old castor oil, or fuel, or dirt) to the other side of the switch!

The next thing to be mounted is the receiver. It is also the one most expensive piece of the airborne gear. The conventional mounting method for the receiver is to locate it forward of

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The BIG 3

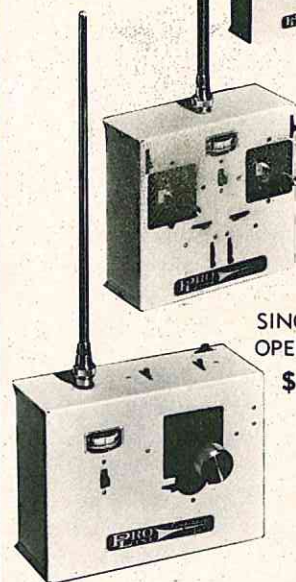
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FOOD FOR THOUGHT

By DICK HILL

Some people call it a junior problem, others, a generation gap. Articles and editorials have been written by the score, but I have yet to see anyone propose a concrete program to help alleviate the problems that beset our hobby and communities. Yes, it is also a community problem because many towns and cities are failing to provide adequate recreational facilities.

It is most interesting to note that the very people and organizations that scream the loudest are the ones that must take the lion's share of the blame. Strangely too, these factions and groups are the ones that could significantly help alleviate the situation, and stand to gain the most by helping. Towns and cities across the country are complaining about the youngsters hanging around street corners, gang killings, and just about children in general.

Aero modeling, and modeling in general, is a

wholesome recreation in which people of all ages can participate. Our hobby breaks down the age and sex barriers with communication between adults and juniors freely exchanged. Many youngsters have their only real communication with adults through this hobby of ours. Further, I know of no youngster who is an avid modeler that has ever had a serious run-in with the law. These youngsters are usually off the streets building their models, or at the field flying them. As these kids become older they get jobs to support their hobby. More often than not, aero modeling is the first step in a chain of events leading to a career in the aerospace industry, or allied technical fields. I know hundreds of military, commercial, and private pilots, as well as engineers, all of whom will tell anyone willing to listen that they got their start by building and flying model airplanes. The ultimate examples are many of our astro-

nauts. I cannot help but wonder what these men would be doing today had their ambitions been throttled by their communities.

Let's analyze the different groups and see how each fits into the overall picture, and what each can do to help. It simply isn't possible for any one group to tackle the problem. What is needed is an overall attack involving local clubs, the hobby industry, industry in general, model magazines, the AMA, and federal, state and local governments, and organizations.

The Community

Many communities recognize the value of aero modeling and have aggressive programs along these lines, with some even providing model airports, others, flying sites. The vast majority, however, have done nothing along these lines, but do spend many times the cost of a flying field in other recreational areas. The rest, I am sorry to say, have even gone so far as to outlaw model airplanes and thus have demonstrated their total disregard for the legitimate needs of some of their citizens. This is, indeed, tragic, for these good people evidently do not realize the harm that they have done to their towns. I submit that the local recreational committees should provide an area for the expressed purpose of model aviation! The towns then need to be educated as to the benefits that can

be gained by providing a flying site, or, at least, helping to obtain one.

Government Agencies

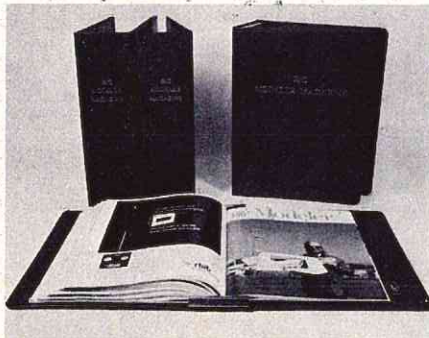
There are many federal, state, and local agencies that could help the modeler, but make no effort whatsoever to do so. The only federal organizations that traditionally help are the military branches. Could it be that they have a vested interest? You bet they do! Modelers are their prime source of future aviation specialists and pilots. The other agencies must, therefore, be educated and enlisted to aid by making government land available as flying sites. Further, there are many reserve units that can put down a runway, or at least, level the ground. The Army has the Corps of Engineers, the Navy and Air Force have their own versions.

Industry

The Aerospace Industry is a large recipient of the ultimate result of an early interest in modeling. Other engineering and technically oriented firms benefit as well. Some of these companies do recognize this and their responsibility to further perpetuate the hobby, thus insuring a continued flow of new blood. All too many of these companies will exclude people from clubs which are company sponsored, and restrict membership to employees only. Other companies choose to ignore the modeler completely, thus sidestep-
(cont. on p. 77)

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CUNNINGHAM ON R/C



Move over, gang, we're about to do it to you again.

After much discussion between Don and myself, with liberal verbage tossed in by Bill O'Brien on the California end, and Helmer Johnson on the Texas end, we have decided to offer a sporting event to the non-competitive flier on a national scale.

There are plenty of guys that don't have the desire, or the time, to become serious pattern pilots, just as there are thousands of modelers that don't want to take the big jump into racing. So for you men that are good pilots, and like competition, R/C Modeler is going to sponsor the **National Fun Fly Competition**. This event will be hosted by the Fort Worth Thunderbirds at their field in Fort Worth, Texas. It will be held during June of 1970, and if it is well received, and enjoyed, may become an annual event. The exact date will be announced in the March issue, but if you want to start making your plans now for a vacation, then give a thought to coming to Fort Worth in June.

The Thunderbird field is right on the shores of beautiful Lake Benbrook, and this area abounds in campsites, as well as being a pretty good lake for fishing. The weather in Texas as this time of the year is usually mild, with high temperatures in the upper eighties, or low nineties, and nights in the 60 to 70 degree range. Lake Benbrook is a Corps of Engineers flood control project, and all of the activities around the lake, with the exception of the R/C flying, are devoted to campers, picnickers, boaters, and fishing.

Ok, that's the sales pitch on the flying site and the lake facilities, so now, how about the events, and why should you try and make this contest?

Since the events will not be any type of a pattern or racing event, there are no rules to go by. The Thunderbirds are hard at work developing a series of events, or tests, that will

allow for a very tight time trial to allow as many flights as possible for each contestant. When we finalize these plans we will present the entire flight pattern in these pages so that you can be at work practicing for the event. The main purpose behind these events will be to have each portion that can either be timed, measured, or counted. No judge's opinion will be involved.

As of right now, the flight will be flown like this: Each contestant will have a maximum of five minutes, including engine start time, to fly his 'pattern' each time he is called. When his time starts, he will start his engine, take off as quickly as he can, and climb out for thirty seconds. At the end of thirty seconds he will chop throttle and spin for as many spins as he can do. He can pull out either above ground, or below ground depending upon his 'guts'. (No, no! You don't spin down for thirty seconds, Dewey!) At the end of the spins the flier positions his aircraft wherever he wants and then loops for thirty seconds. At the end of this, he again positions himself and rolls for thirty seconds. Then he must make a full speed pass going upwind over the runway, chop throttle, and make a 180 degree turn and land, without ever again touching the throttle. Landings will be measured on a spot landing basis, with the spot being 10 feet square. Extra points will be given for the engine still running after the plane comes to a full stop on landing.

All in all, it doesn't sound hard, and there is nothing really startling in the entire event. We have considered, and discarded many, many other events, such as the limbo, balloon bust, carrier take-off, etc. The reasons that these were discarded were from a standpoint of time, and safety. We think that there will be a large number of contestants, so a good tight event is required to give everyone a maximum

(continued on page 75)

ENGINE CLINIC

BY CLARENCE LEE



I have been receiving a large number of letters lately, asking questions concerning tank position, tank location, what kind of fuel line is best, etc. The majority of these letters come from beginners in the hobby who are building their first R/C model and are completely in the dark when it comes to the fuel system or, for that matter, the radio installation. And justifiably so, I might add. With all of the kits and 'ARF's' we have on the market for the beginner, very few give any specific information as to tank or radio installation. Most plans have the tank and radio compartment locations called out and simply let it go at that. Some go so far as to mark the servo positions. Any information as to the actual installation, connecting up of the pushrods, etc., is missing. Why don't you kit manufacturers show a typical radio installation, and the actual method of mounting the tank? Too much is being left to the imagination, assuming that modelers already know how to accomplish these things. Sure you are going to have to put a little more work into the plans, but it would be well appreciated by the modelers. This lack of information on kit plans has always been a big source of irritation to me. Several years back I drew the plans for Jim Kirkland's Beachcomber that was kitted by Veco. We showed three complete radio installations down to the last Kwik-Link, as well as the correct tank position. Nobody ever complained about the lack of information on these plans. Quite a few did complain, however, about the quality of the kit over which neither Jim nor I had any control. In fact, I still shudder when I think about some of the motor mounts that went out in those first kits, not to mention the die crunching job!

As you may have guessed by now,

this month we are going to talk about proper tank installation. There is not really that much to it.

A number of you have asked me to recommend a particular brand of tank that is better than the others. This I cannot do because they all work well. I know of no bad ones on the market; they will all do the job. Whether you choose a Veco clunk, Williams Brothers, Sullivan, or one of the new Kraft-Hayes, is up to you. But, be sure and choose a tank that is comparable in volume to the size of engine that you are going to use. You should use a 12 ounce with the .60's, an eight ounce with the .45's and .50's, a six ounce with the .29's through .40's, and a four ounce for the .19's. Many beginners will make the mistake of using a six or eight ounce tank with a .19 just because they happen to have it around, and then wonder why the engine leans out at the end of the flight, loads up at idle on a full tank and, in general, does not perform properly. The same thing pertains to your larger engines as well. Do not use a 12 ounce tank with a .45, etc.

The big confusion seems to be over the correct tank position. Most modelers know generally where it should be located, but do not know why. The center line of the tank should never be any higher than the needle valve on the engine. If the tank is any higher than this, the gravity feed will be too great, and the engine will load up at idle with a full tank. If you adjust the idle mixture to compensate for the full tank, it will then go too lean when the tank is nearly empty, depending, then, upon suction to draw the fuel. A high tank position will also result in flooding the engine which, in turn, makes for difficult starting, and some mighty sore fingers!

The engine will tolerate a low tank position much better than a high one,

but if the tank is too low, the engine will lean out towards the end of the flight and not hold a constant setting. As the tank level drops, the engine is just not capable of pulling the fuel the increased height. With your larger .60 size engines the center line of the tank should never be more than $\frac{3}{4}$ " below the needle valve. With the smaller .19 size engines, $\frac{1}{2}$ " is maximum. Now you can get away with lower positions if you are just going to fly around level with a fairly rich setting. However, if you intend to do any stunt maneuvers, the low position becomes a high position when the airplane is inverted. Even some of the old 'pros' have had trouble with their engines cracking rich during horizontal rolls, etc., and subsequently, wondered why. It is simply because the tank position was on the low side. The best position has proven to be with the center line $\frac{1}{4}$ " to $\frac{3}{8}$ " below the needle valve. This is true whether the engine is upright or inverted. If the engine is side mounted, visualize a line through the center of the venturi. The center line of the tank is the actual center line and NOT where the pick up tube comes out. If the pick up tube comes out of the center, fine, but on some tanks such as the Sullivan slant series, and the blue World Engines tank, it does not.

The tank should be kept as close to the engine as possible, and all fuel lines as short as possible. These engines depend on low pressure in the venturi to draw fuel - they do not have a fuel pump such as is found on your car. An extra inch of fuel line can make a big difference in the way the engine performs. How many of you are leaving the fuel line a little long at the needle valve just because it is easier to grab hold of for refueling? I've seen fellows with two or three extra inches of fuel line being used just for this reason.

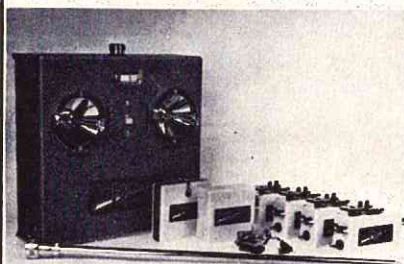
(continued on page 70)

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SUNDAY FLIER

KEN WILLARD

Happy New Year!

OK. So it's only just a few days past Halloween as I write this - and you're getting the greetings in the February 1970 issue. Sorry about the delay and all that, but it seems that's the way it is in the printing and publishing business. Don't rush the printers, copy-readers, and typesetters - you might wind up with a mishmash like we did with the November issue, where, unless you were able to figure it out, the Cliffmaster article seemed to be talking about servos in the leading edge and dihedral in the equipment section! It took a bit of figuring to find out where the continuity really belonged.

Anyway, when you read this, it will be early in January, 1970, and you'll be busy planning your modeling activities for the coming year. Well, some of you will - and then there'll be a lot of guys still in the same boat with John Ott of Lafayette, Indiana, who writes:

Help! Help! Help! Help!

I want to get started in R/C. In the late 40's and early 50's, I mastered U-control. I dropped modeling and picked up photography; I dropped photography and took up ham radio and teletype. Now at forty-two and with a son eleven, I want to acquire and fly R/C.

I do not know anyone in the hobby or business to turn to for advice. I have never had an opportunity to talk to an R/C'er. I purchased the October issue of R/C Modeler and found out how stupid I am. Remember this is a guy that was building models before foam, fiberglass and epoxy. Such terms as 'galloping ghost' mean absolutely nothing to this neophyte. So what does a guy do that wants to get started in radio control???

For a beginner, I would guess that a good stable slow flying plane would be the best, but!! What type?? What size?? What size motor?? And most important (I guess) what control?? I'm sure that sooner or later I am going to want full control, taxi, touch-n-go, stunt, etc., but how much should you put into that first plane??

If possible please recommend a book, a couple of plane kits, motor, and size, con-

trol, etc.

I see ads that say the plane is for single to ten channel, but the transmitters usually go to six channel. These are the types of things that make the magazine, copy by copy, not much good. To get the needed information out of the magazines, would take a lot of months to come before they would have all the needed articles, and I am in a hurry, (but not in too big a hurry to learn what I should do and then try to start out right).

Any and all help that you can give me will be greatly appreciated.

John R. Ott K9AHX/AFA9AHX
2319 Dakota Drive
Lafayette, Indiana 47905

There's no doubt about it - those of us that are 'members of the fraternity' have developed a language of our own that is completely bewildering to the neophyte.

So what can we do about it? I don't know the answer, but I've got an idea - and it will require your help.

The idea is this; here's a questionnaire which I've developed for beginners. Now I know that the majority of R/C Modeler readers are not beginners - but you all know some, and most beginners haven't been introduced to the model magazines, or if they have, they're confused just like John Ott by all the jargon and advertising claims.

So, if you happen to be a beginner, then please consider the questions which are asked, and give me a straight answer. And if you're not a beginner, then give the questionnaire to a beginner that you know, and ask him to fill it out.

Send the replies directly to me at my home - 665 Riviera Drive, Los Altos, California 94022. I'll compile the results, let you know how it came out, and later on in 1970 I'll try to come up with the airplane that the majority of beginners wants to have. OK? Here goes.

BEGINNER'S QUESTIONNAIRE

(continued on page 71)

Since late 1966, I have been a fascinated bystander, observer, heckler and sometimes (I hope) helper to an event few modelers ever witness - the genesis and evolution of a truly thoroughbred R/C Pattern winner. As all roads have a beginning, so it is with all good models. Starting with only the battered nose section of an old Kwik-Fli II, Calvin, Dick and John Scully have gradually brought forth what I consider to be the finest flying contest machine I have ever seen in my 16 years in R/C.

Some years ago, Ed Kazmirski decided that it would take more than a Smog Hog to beat another Smog Hog, so he designed the Orion, from whence came the Taurus and a whole new generation of multi's. Likewise, Cal decided that it was going to take more than a Kwik-Fli to beat another Kwik-Fli. Even more, he also realized that the other top fliers he would be competing against were also aware of this fact. He also knew that these top fliers all seem to have three ingredients that are very scarce in this area - practice, time, and money. (More on the money angle later.) As to the practice time, the Scully brothers and their wives operate three businesses, including a large construction company and A.C.E. Hobby Shop, so time is always at a premium for them. The only way around the practice time angle would be to simply design a model which not only had superior flight characteristics, but also one which would have no odd flight traits to master and would not require constant day-in and day-out practice in order to stay in trim. In other words, one helluva good basic design - and Mr. Ed IV is just that.

With these thoughts in mind, Cal

drew first on brother John for the basic design and aerodynamics, and then on brother Dick for the engine and pit work. This combo produced the Mr. Ed series. Since early 1967, Mr. Ed, versions I, II and IV have been entered in 15 contests, taken 6 firsts, 5 seconds, 1 third, 1 fifth (hic!), 2 High Point Trophies and have been forced to withdraw twice because of equipment failure. I often wonder what this record would have been like had Cal been allowed the time to practice as much as the other top fliers and the money to make even longer trips to more distant contests. Just to prove that these were not small time events, these placings include 3 Houston Space City Championships, the 1968 Mexico City Nationals, the recent Memphis State Championships and 2 New Orleans Crescent City Championships.

Starting with the nose of that old QF II, a new fuselage back end, including a turtledeck, was added. Two sets of foam wing cores were designed and cut. Moment arms and tail areas were changed from the QF configuration. Covered with red, white and blue MonoKote, Mr. Ed I proceeded to cut a swath through the contests of early 1967. Then one day we decided to fly from the abandoned midway on Pleasure Island in Lake Sabine, south of Port Arthur. I was tending my chores with Cal flying behind me when I heard a groan and an "OH, NO!" followed by a quick engine cut; I turned around just in time to see Mr. Ed I disappear below the seawall at a 45 degree angle, followed by a loud splash and a geyser of water. The elevator horn had come off in the middle of a Cuban Eight!

After a brief swim and a lengthy

drying out process, Dick decided that the only useable portion of Ed I would be the tail feathers. Around these Mr. Ed II was built. The spare foam wing cores were covered. The moments were, again, slightly altered and soon Ed II picked up right where Ed I had left off - winning contests, until early in the 1968 contest season when an elevator servo gave out. And that was the end of Ed II.

Three Mr. Ed III's were quickly built to take advantage of the newer, smaller radio sets that were just then becoming available. Where Ed I weighed 7 lbs. and Ed II had weighed in at various times anywhere from 7½ lbs. to 8¾ lb. with no real change in flight characteristics, the new Ed's came out at about 5 lbs. A new built-up balsa wing was designed, using a slightly different airfoil and a higher aspect ratio. Inset ailerons were added in place of the strips previously used. 'Manta' tips on the empennage were tried and discarded, as well as a conventional landing gear. Unfortunately none of the Ed III's ever lasted long enough to see a contest day because of unreliable radios.

Mr. Ed IV was started, using the same basic wing as the Ed III. The moment arms were again slightly altered, and a new airfoiled tail section was built to replace the usual slabs. Large wing fillets were added and a new contest winner was born.

At this point, I interrupt this thrilling narrative for a word from Old Motor Mouth - me. One day, I staggered into A.C.E. Hobby on clean-up day and saw a familiar looking tail sticking up out of the pile of scraps about to be burned. It was the remains of Ed II. There was no fuselage left from the trailing edge of the wing forward and

BY CALVIN, DICK & JOHN SCULLY

TEXT BY BOB TALLEY

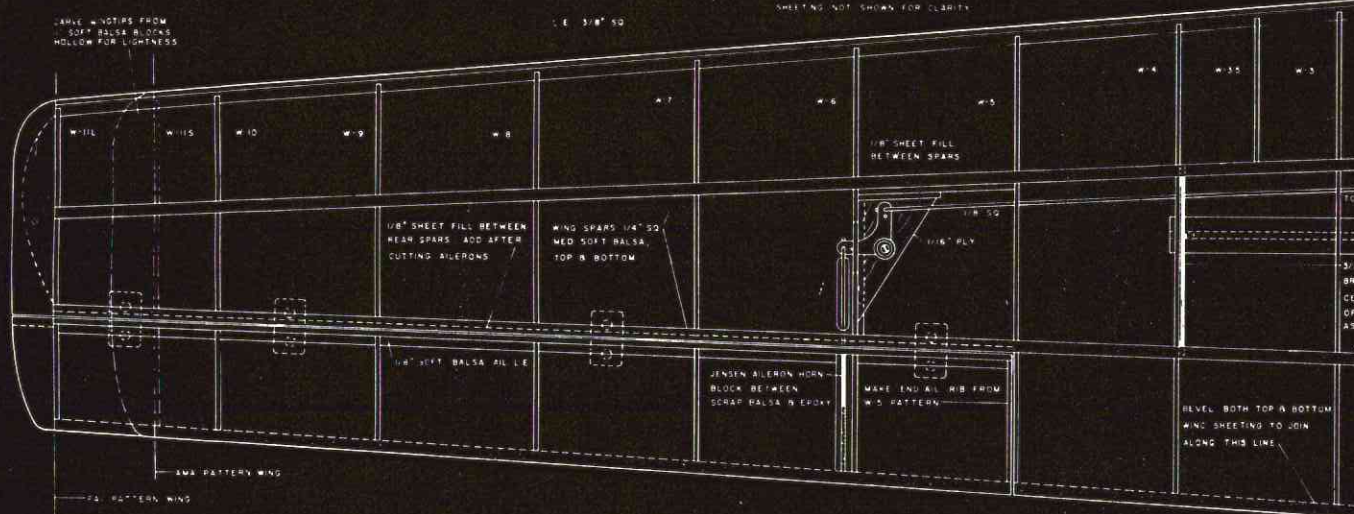
MR. ED IV



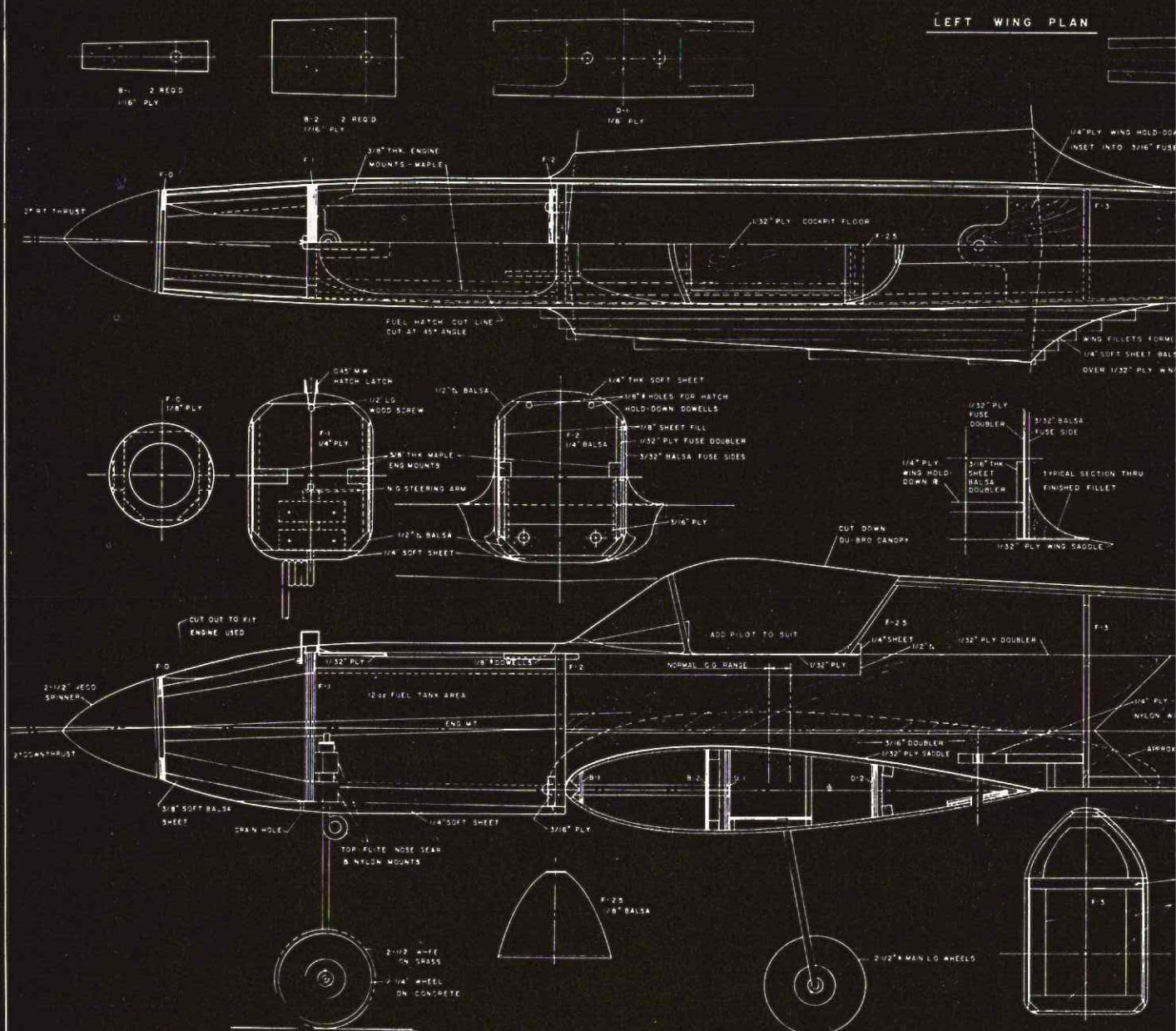
"Flying Mr. ED IV is like
writing your name with a very
high quality ball
point pen
... it goes where
you want it to go, exactly
when you want it to,
and nowhere else."

HOLD WING UPSIDE DOWN OVER PLAN
ENTRE WING IS SHEETED, TOP IS BOTTOM, WITH 3/32" SOFT BALSA
SHEETING NOT SHOWN FOR CLARITY

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LEFT WING PLAN





the wing was a mangled mess of balsa and foam, but even in that shape it was a better flying machine than I was then building. Using all my powers of tact and persuasion, I stole it. At last, I was going to have a contest winner and beat Cal, Ed to Ed! Much epoxy, Titebond and MonoKote later, and on the very day that Ed IV was unveiled on the flying field, I drove up, smirked and produced the resurrected Ed II to a bunch of dumbfounded Scullys. After several trim flights, it was its old self again and I was ready to take on Cal - I thought. My readiness to take him on lasted until Cal pulled a knife-edge the length of the flying field - at head height! Oh well, Ed II was a ball to fly, even if I couldn't beat Cal with it. I flew Ed II for over 6 months and compared to any of the plastics or a Kwik-Fli III, I can truthfully say that it outflew any or all of them, even with an old Class II flier like me. Finally, I relented and gave Ed II back to its master so Cal would have a back-up ship for the 1969 contest season. This was fine until one day when it was accidentally shot down.

Since that time, Ed IV, the one shown in the photographs, has gone through many, many gallons of fuel and quite a few contests, the latest being the win in New Orleans. It has also survived a 30 minute upside down excursion as a pleasure boat for some crickets in a local canal - the engine

quit 10 feet up inverted over the canal. Five days later, still quite water logged, it took a second place at Baton Rouge. The clay you may notice under one wingtip in the photos was necessary to compensate for one wing remaining slightly heavier from the water than the other. It has since dried and the clay is no longer necessary.

Now let's get back to that money angle that I mentioned way back there. I said that Cal lacked two ingredients to be a top contest flier, and one of these was money. By this I mean the money to buy the latest of radio and sufficient back-up sets to keep the machine up on the flight line for practice and contests. Look at all your nationally known top contestants. They all seem to have some sort of an 'in' with a manufacturer or else they are so knowledgeable about electronics that they can fix their own sets. Not so with us. Furthermore, we in the extreme southeast corner of Texas seem to be looked upon as the 'drain plug' of the R/C industry. Every defective component and poorly assembled part seems to gravitate down to us. Maybe they think we will lose all these bum parts in the Gulf of Mexico. At any rate, Calvin has been extremely fortunate in having a group like the Oily Birds (the Port Arthur Radio Control Club) to stand behind him. No less than 8 different people's radios other than Cal's have been used

at one time or another in the Ed series. I have even seen club members remove their radios from their models at a contest for Cal to use, this being done without being asked, and knowing that it would void their own chances in their particular class! With a team like that behind him, plus his two brothers, plus the superior design of the Ed, Cal has been able to slug it out on a fairly equal basis with his competition. This team effort is apparent even at practice sessions. Invariably two or three members will gather behind Cal as he practices. One of them will judge his every maneuver as hard as he can, trying to be the typical contest 'tough' judge, and telling Cal what he is doing wrong. The others are there to rattle him - yell at him unexpectedly, make fun of his flying, run engines behind his back - in general, put so much pressure on him while he is practicing that, by comparison, a tight contest becomes an exercise in peace and tranquility. Sometimes our practice sessions look like a Three Stooges Comedy, but the flight goes on!

CONSTRUCTION

If you need a complete set of instructions in order to build this bird, I'd advise you to go get a Sr. Falcon and learn how to build an R/C model first. Only a few peculiarities will be touched upon. The toughest of these are the wing fillets, but before you can

"... A lot easier to learn
than any other design
I've ever seen or flown.
Try ED — stick with ED,
and you'll win with ED."

“... A ball bearing up in
the air — a frictionless
three
dimensional gimbal
with your thumbs on the
axis.”

build them, you'll need a completed wing, fuselage and tail. The wing can be built very quickly by the following method. Mark the center lines on both sides of the root ribs, W-1 and W-11. Mark the rib locations on all four wing spars. Pin the top front spar flat on a flat work bench. Place ribs W-1 and W-11 in place and level the center lines, fore and aft. Block these ribs in place with scrap stock and glue in place. The remaining 9 ribs may then be set on their marks on the spars, leveled and glued in place. Both bottom spars and the leading edge are then put in place and glued and allowed to set up firmly. Now add the L.G. blocks, the plywood L.G. mount ribs, and the plywood reinforcing for the nylon screw. When all this is set up, add the bottom wing sheeting. Let it dry for a few days while you work on the tail or the fuselage. Then pick it up, turn it over and add the rest of the wing internals, such as the L.E. dowels, plywood plates B-1 and B-2, aileron mount plates, bellcrank, pushrods and all that fancy stuff. Then sheet the top of the wing, blocking it in position while it is drying so it will not warp. When both halves are ready, cut out and hinge the ailerons. Cut both center wing ribs to receive D-1 and D-2. Sand these ribs so that the top of the wing will have no dihedral, the only dihedral coming from the tapered bottom of the wing. Join the

two halves with D-1 and D-2 and epoxy.

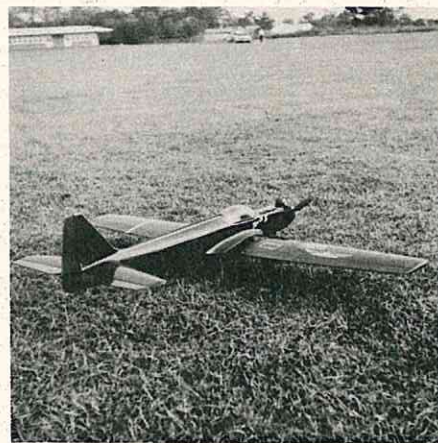
On the fuselage, notice that the 1/32" plywood fuselage doublers in the front and rear of the fuselage are INSIDE the triangular corner balsa. That is, the triangular balsa stock is glued directly to the balsa fuselage sides and then the 1/32" ply is cut to fit inside. The only exception to this is in the area from the firewall forward, where the balsa doublers and triangular stock are glued onto the plywood.

Now you should have the basic fuselage, complete with tail glued in place and the wing completed before proceeding onto the wing fillets. Cut the 1/32" plywood wing saddle to the outline shown on the plan top view, allowing for the curvature of the wing. If you need to, make a trial piece out of cardboard first. Now place this plywood wing saddle in place and screw the wing tightly in place with the nylon screw. Now check the angular difference between the wing and the stab. It should be 0 degrees. You can check the downthrust at this time if you like. Check to see that the wing, fuselage and tail are all square with each other and you still have 0 degrees difference. If not, shim under the saddle until it is absolutely perfect. When it is, loosen the wing and glue the saddle to the fuselage, tighten the wing back and re-check while the glue is still wet. Now, while this is drying;

start building up the wing fillet blocks out of 1/4" soft sheet balsa. Be sure you make each fillet out of pieces from the same sheet of balsa or you will get some weird curves when you go to sand it out. When the saddle is dry, carve the L.H. and R.H. blocks to fit both on top of the saddle and the side of the fuselage. Now add a 2" wide piece of masking tape to the sides of the fuselage. Tack glue the fillet blocks to the saddles and sand them to the curve shown on the plans. The tape on the fuselage sides will insure that you don't gouge into the fuselage sides with the sandpaper. When finished to your satisfaction, unglue from the saddle, remove the masking tape and glue the fillets permanently in place. This entire process should use only regular model airplane cement, no white glues or resins or epoxies - they're just too hard to sand. More on this later.

The tail section is completely conventional except that, when all is in place and squared up and glued up, the entire assembly is heavily filleted to the fuselage sides and the fin with mucho Plastic Balsa, sanded to a minimum radius of 1/4". Don't overlook these little things that take up so much time - they make the difference between a smooth flying model and just another model.

About this time you should be
(continued on page 82)



SOUTHERN GENTLEMAN



BY WALT MITCHELL

Photos by **BILL BELL**

A man makes a mistake, by God, he ought to stand up and admit it. Ought to stand up real tall and say, "By all that's holy in Funk & Wagnall's, I was **WRONG!**" This story is about the time I was wrong.

When I first joined the Atlanta R/C Club, I terrorized the runways. Strong in my belief of the ultimate victory of single channel over the gray flannel conformity of multi-proportional, I confess that I caused much dissatisfaction among other members as I shut down all frequencies while adjusting my superregen B-17 with eleven cascaded escapements. Although I felt they were simply envious, sometimes their pettish cries carried the curdle of insult; yet I ignored them and tinkered endlessly with my intricate contraption.

*An investment in
learning
to fly R/C
the Southern Gentleman is a
Curtiss Robin-like, Travelaire-like
Straightwing Stinson-like, easy-to-build trainer*

"WE WANT TO FLY, YOU NINNY!" they bleated, "GET OFF THE RUNWAY AND OFF THE AIR!"

"Let them eat figs," I thought. "My dues are paid." So I tinkered while they fumed and passed the time consuming many a bottle of the nut-brown ale with beaded bubbles winking at the brim.

One electric night a group of figures came to my house draped in sheets. Now in the deep South, when people come to your house in sheets, you got trouble. BIG trouble. Glancing quickly through the French doors, I saw what I took to be a Taurus stuck tailfirst into my lawn ablaze. Terror clawed at my throat as I suddenly realized that I was confronted with the dreaded RKK . . . the Secret Nation . . . the Radio Kontrol Klan. I sunk to my knees as the GRAND KLEEGLE addressed me.

"Fren," he intoned, "We-all wants you-all to git yo self a proposhunal rig. We don' want you-all coming' roun' owah feel wifout wun. An' we wants you-all to git a reesonubul airypplane to fly hit in."

Now a true Southern boy respects the wishes of the GRAND KLEEGLE just as though they were commands. So, as the hooded figures slanted away into the autumn mists, I hastily broke open the can of money I had been saving against a vasectomy for my wife. Straightway I took it to my local friendly hobby shop and made the buy.

Fortunately I had a reasonable airypplane under construction at that very time . . . a Stearman PT 17 which could easily be converted from Galloping Ghost (with interacting ailerons and pilot's eyeballs) to proportional.

I deftly installed the new goodies and went to the airfield in a mood of quiet confidence. My bright yellow Stearman sparkled in the October sun.

But still the members were not happy. They shook their heads and made 'tsk, tsk' sounds like Joe Palooka. After a bit, one of them approached and said, in a voice that was hauntingly familiar, "Fren, thet ain't no reesonabul airypplane. You-all hain't got the reflexes to fly thet thar airypplane. You-all gonna crash."

Well, I was polite to him, of course. But that was rich! Criticizing my reflexes. Me, the big man who moves like a cat. I, whose athletic supporter, Old Number 34, is retired to a place of honor in the University of Georgia Hall of Fame. Reflexes, schmefflexes! I fired up the engine. Its tiny thunder cracked across the field. Up, up, and awham!

I dumped it.

Sullen, but undaunted, I repaired to my laboratories where I prepared in quick succession a Waco E (RCM Ltd. 1968) a J-3 Cub, a Focke Wulf 190 (RCM Nov. 1969) and a Brown Racer, Miss Los Angeles. All flew well while piloted by experienced R/C'ers like D. C. May, Neal Kilby and Bob Roberts.

With me on the box, however, each of my pretty birds was an accident looking for somewhere to happen and they have all gone to model valhalla.

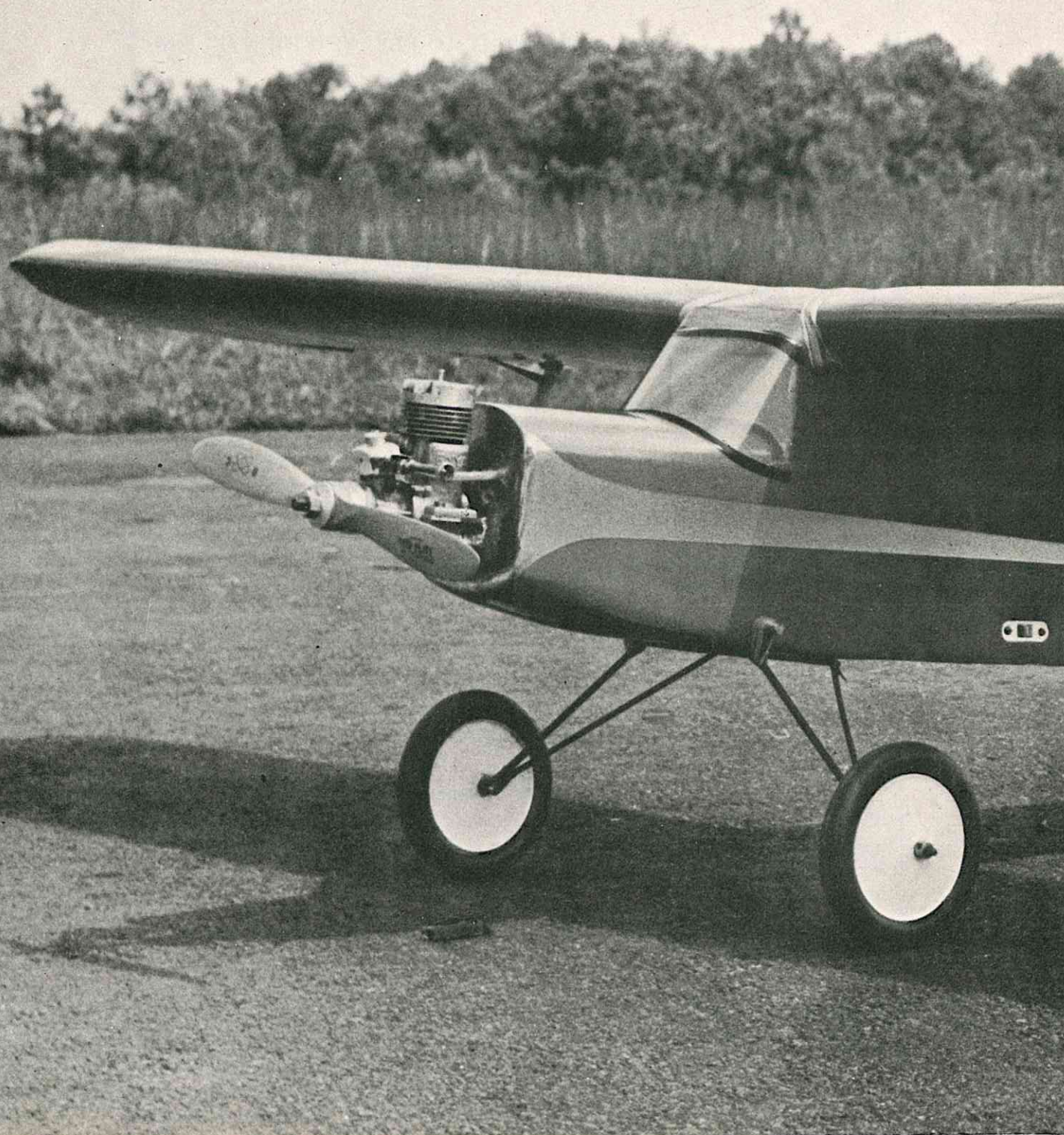
My dear mother used to say, "Walter, Jr., he has got a head like an iron ingot." But gradually, by

osmosis, the message began to penetrate: I needed a light, forgiving, flyable airplane to learn on. Something like an UGLY STIK. But really, anyone who has been to the University couldn't be associated with anything so crass as an UGLY STIK. Beauty is truth, truth is beauty; an Ugly Stik is truth, but beauty it ain't.

So here's where the SOUTHERN GENTLEMAN comes in. Here's a Curtiss Robin-like, Travelaire-like, Straightwing Stinson-like, easy-to-build model airplane. Since completing the GENT, I have gotten

in 53 flights and at this point I am just about to dig which thumb is up, which is left and which digit concerns the engine. I can even land it, although I have no witnesses, as the cowardly members of the Atlanta Club insist on getting beneath their cars when I make my approach.

Since the basic purpose of this article (other than to make money for Dewey . . . and he needs it, you don't know how tough it is in the publishing business — he doesn't even have a color TV on his yacht, poor lamb) is to help scale nuts learn to fly, we will



assume modeling expertise and hope the plans will be self explanatory.

The wing on the prototype was purposely not keyed to a constant position. I have found that changing its position causes the pilot to learn to react to different sets of variables. This is invaluable experience when you crank up that Bristol Beaufighter with the 30,000 man-hours behind it.

I have also experimented with bending the LG to different positions to change ground handling characteristics, for the same reason. Having someone scramble the trim levers is

also good. And the best in-flight experience is dog-fighting with some other novice with an expendable airplane.

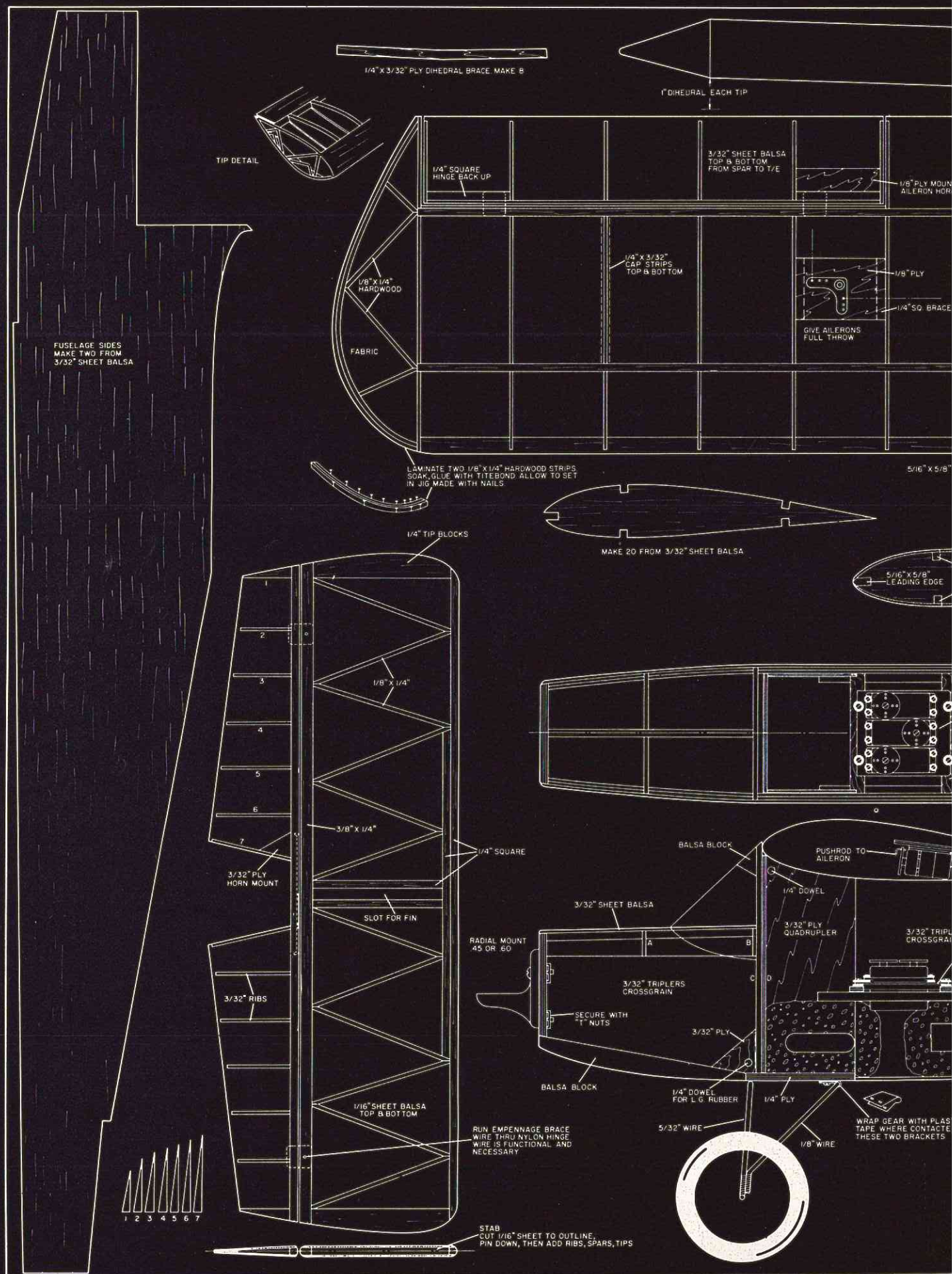
Properly aligned and trimmed, the SOUTHERN GENTLEMAN will fly hands off, like an old time free flight. The best configuration I have found is an Enya .60 up front (though a .45 does nicely) and the light-weight PATTERNMASTER radio gear offered by Champion Electronics of Chamblee, Ga. The Champion goodies may well be the best stuff on the market today . . . and it's important

to have GOOD RADIO GEAR. With limited skill, you can't afford to be sabotaged electronically.

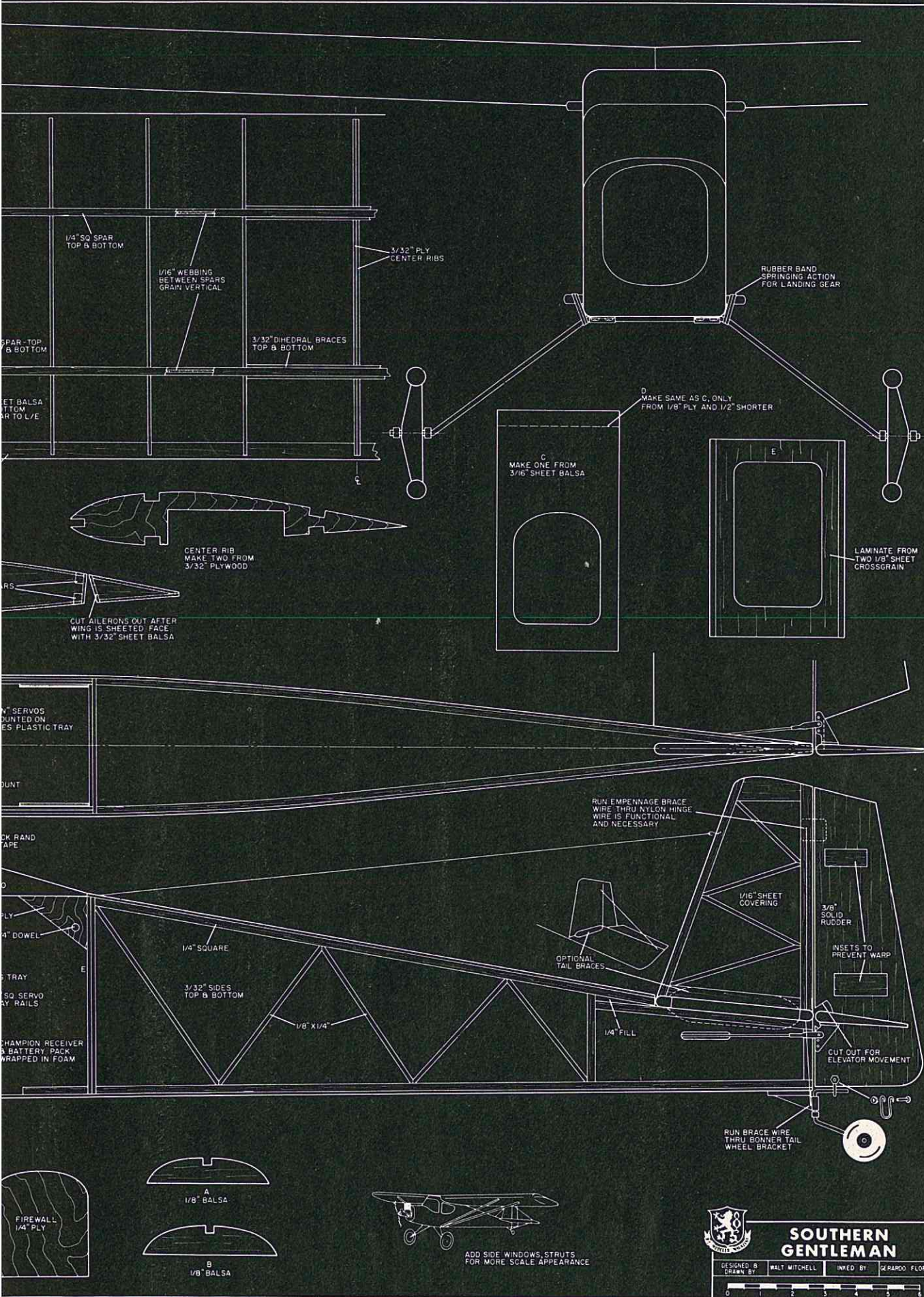
The SOUTHERN GENTLEMAN will be a fun airplane for you and well worth the building. It's an investment in learning to fly R/C, which has got to be one of the most difficult sports to master . . . even for old Number 34.

Write me c/o R/C Modeler Magazine and let me know how you make out. ●

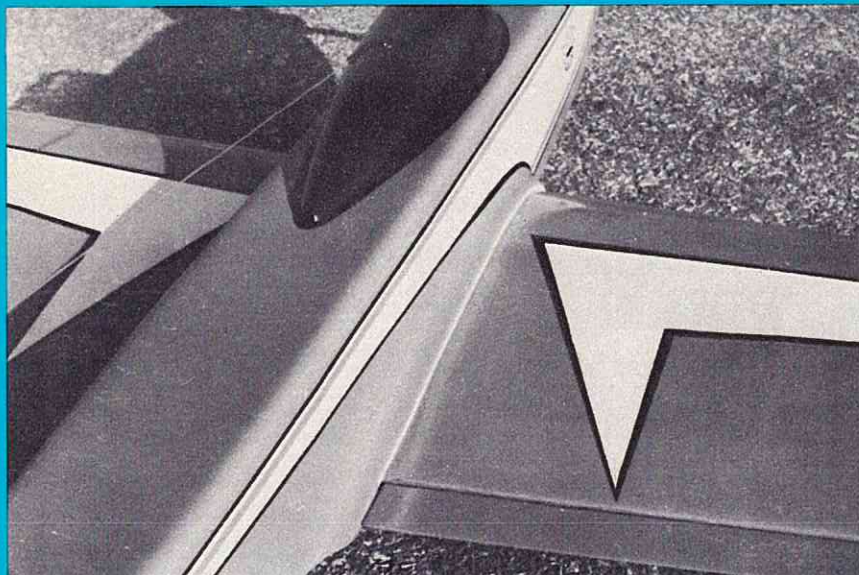




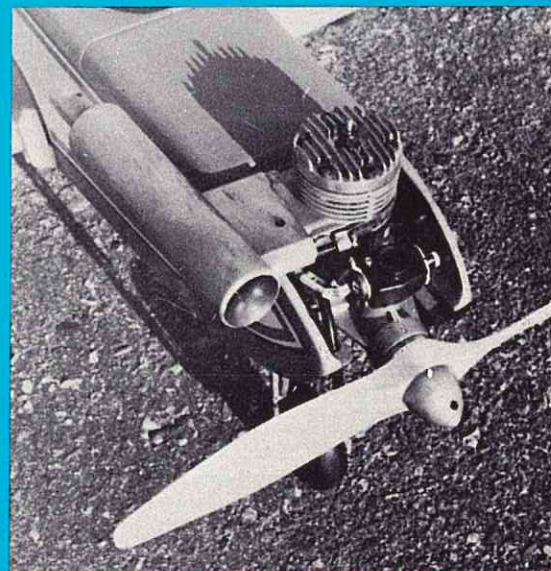
FULL SIZE PLANS AVAILABLE - SEE PAGE 71



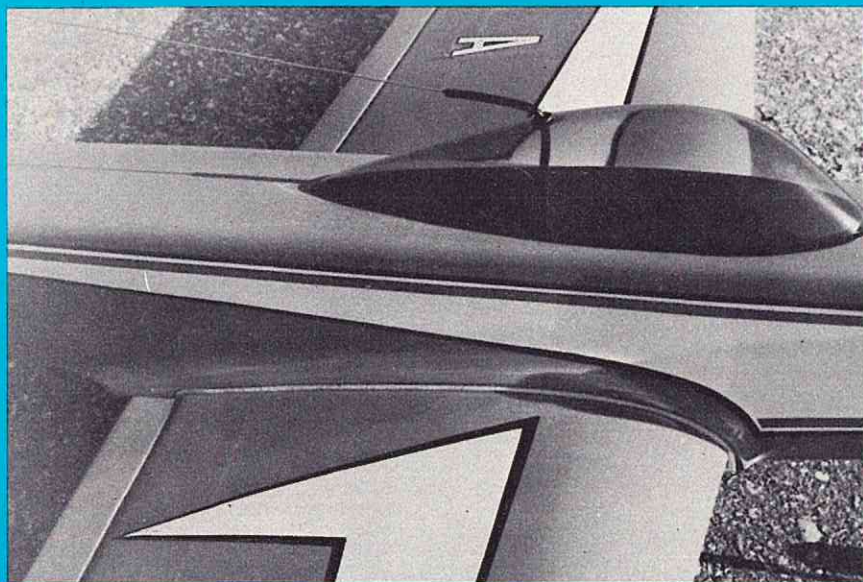
By JOE BRIDI



Above: Fillets add to the appearance as well as to the performance. Right: The Veco-Lee Custom .61 with Perry carburetor provide all the power necessary.



THE KAOS



Close attention to details, such as fillets and fairing-in canopy, will add to the overall flight characteristics of the Kaos.

The Kaos may look like its predecessors, notably the Sun Fli III and IV, but a line-up of minor changes has been made to improve the performance of this model. We have gone to a double taper wing to help the rolls and, by doing this, we also improved such maneuvers as the slow roll, 4-point, and the spins. The root rib is a 19% thickness and the tip rib is 17%. Again, like the Sun Fli IV, the top of the wing, at the spar, should be flat across the entire span. If dihedral is used the model will have the tendency to roll out on the knife edge and the vertical portions of the 4-point rolls.

We were experiencing some warping in the elevators on the Sun Fli, so we increased the thickness to eliminate that problem. The rudder area was also increased for obvious reasons. There never seems to be enough rudder area for maneuvers.

Again, 3/16" full-length balsa fuselage sides were used. We haven't experienced any need for doublers when using 3/16" thick stock. The top block is built up with 1/4" x 3/8" strips and 1/4" sheet. This was done in order to reduce weight and the overall cost of construction.

The wing spars are grooved for each rib as illustrated on the plans by the dotted lines. We used the same procedure for the leading and trailing edges. This makes for a sure-fire alignment of all ribs. A radial saw is a handy tool for the notching of the spars, trailing, and leading edges. If at all possible, use this method even if you have to borrow your friend's saw. The leading and trailing edge cannot be cut with the same spacing as the spars. By tapering the leading and trailing edge, an increased spacing is necessary. Just follow the spacing on the plans and you'll be all right. The fuselage sides are also indexed for the bulkheads. If you

- 4) Glue the top sheet in place and sand the stab to shape.
- 5) Connect the two elevators together using epoxy glue to secure the wire to the elevator.

Fin and Rudder

Glue the pine control horn insert, sub-rudder, and rudder together. Do not glue the dorsal fin to the fin since it is glued in place after the fin is glued to the fuselage.

Fuselage

The fuselage is built upside down. Start by placing the fuselage top on the building board. Next glue all the 1/4" square stringers and cross braces in place. The fuselage sides are indexed to receive bulkheads No. 2 and No. 3. The fuselage sides and bulkheads No. 2 and No. 3 are glued to the top block at the same time, making sure that the sides are square to the building board. Add the 1/4" square fuselage rear stiffeners to the sides. Glue the motor mounts and bulkhead No. 1 in place (epoxy recommended). Use small C type clamps to pull the sides into place, keeping bulkhead No. 1 even with the fuselage top, which will automatically give the proper downthrust. Glue the 1/16" balsa sheet planking on the bottom of the fuselage, again checking to be sure that the sides are square to the building board. Note that the planking immediately behind the wing saddle is a piece of trailing edge stock. Glue the bulkhead double plywood wing dowel plate in place, being sure that the narrow edge from the holes is toward the bottom. Glue the plywood wing nut plates into position on the fuselage sides. Drill the wing dowel holes through bulkhead No. 2 using the holes in the plywood plate as a guide.

The fuselage can now be removed from the building board. Cut the triangular glue block from stock and epoxy in place as shown on the plans. A light coat of epoxy is

***World renowned R/C flier, Joe Bridi,
presents his pattern contender
for 1970. Although it may look like
its famous predecessors,
a closer look will show you
why the Kaos will be
the year's top multi.***

don't index the bulkheads, cut down the width of the bulkheads to fit properly.

By the time this article and plans are featured in RCM, the Kaos will also be brought out on the market as a kit by Bridi Hobby Enterprises, 23625 Pineforest Lane, Harbor City, Calif. 90502. Plans, of course, can be obtained through RCM. Whether you purchase the plans or the kit from your local hobby shop, you should give the Kaos a try. I'm sure you'll be more than happy once you've tried it. Well, we've given you enough of the propaganda, now we'll go into the building instructions step-by-step as best we can. If you follow the instructions, I'm sure you won't experience any problems.

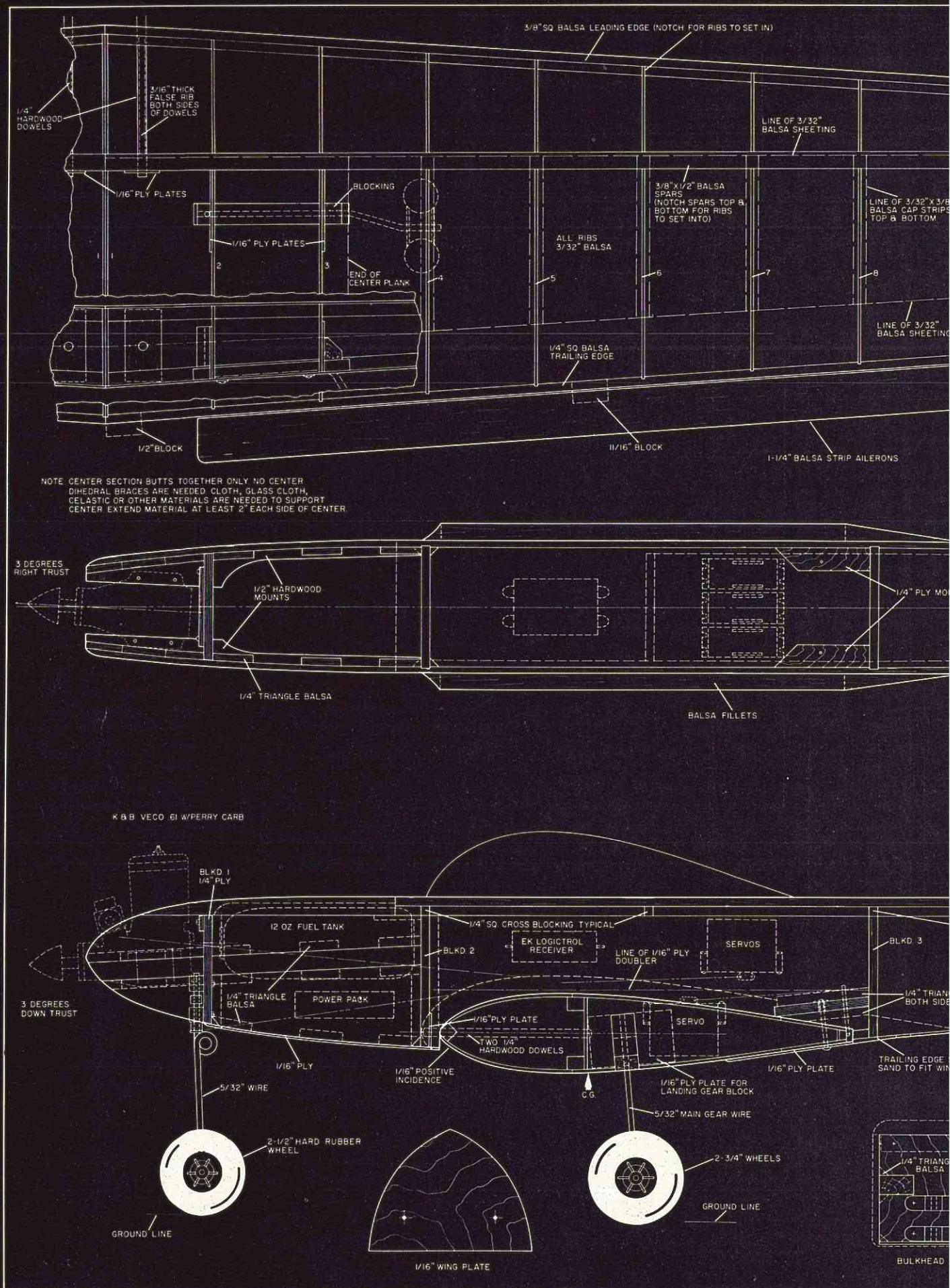
Stabilizer

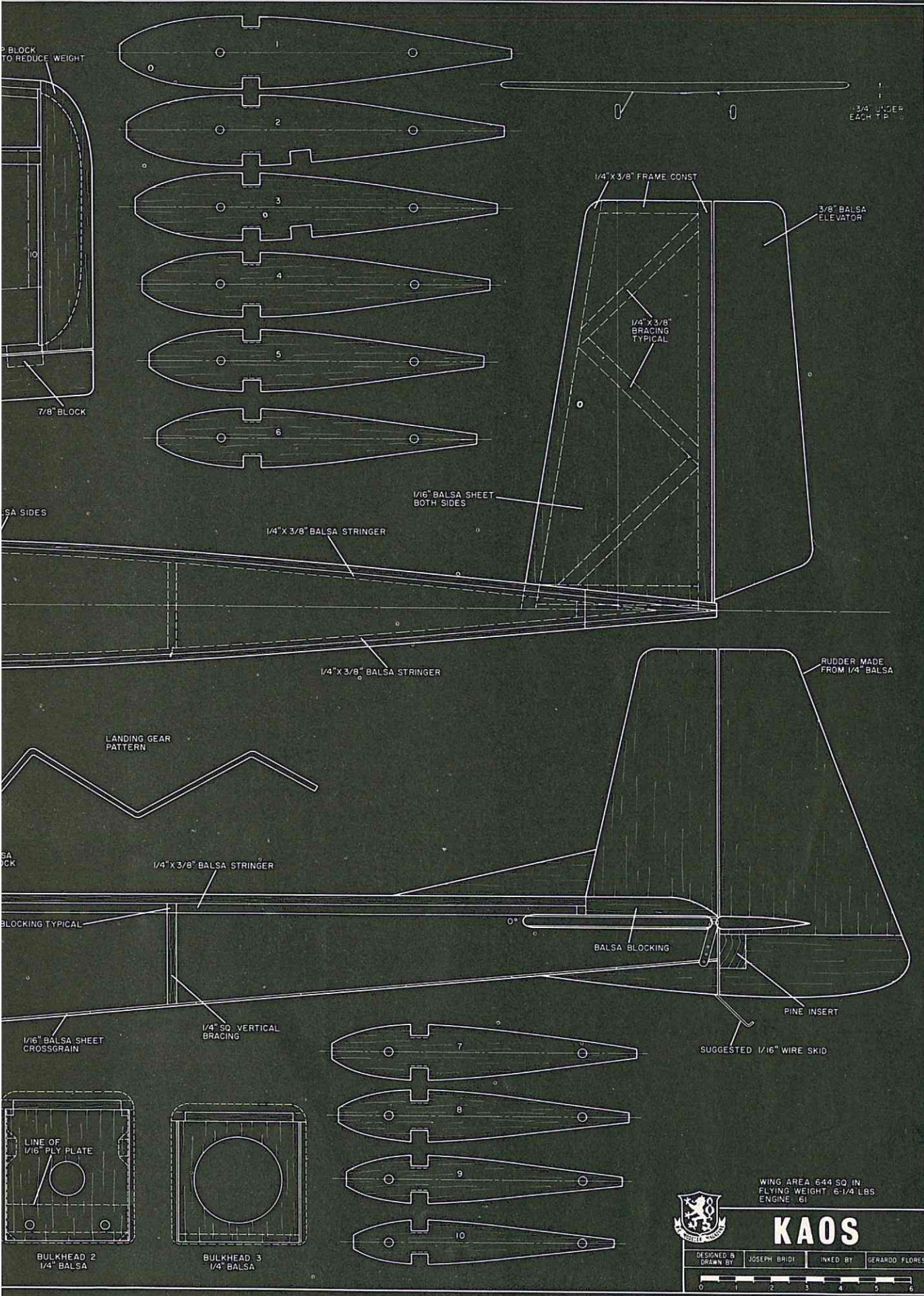
- 1) Edge glue the sheeting together.
- 2) Lay one sheet on the building board; glue trailing edge spar, tips, leading edge spars and center fillers in place on the sheet.
- 3) Glue the ribs in place starting at the tip and working in to the center filler.

recommended for the entire tank compartment. Glue on the hatch hold-down pins extending 1/4" past the hatch. When dry, place the hatch in position and mark on the bottom at the front of bulkhead No. 1. Remove and glue the plywood hold-down forward of the mark. Glue the wing fillets together at the beveled joint. Do not glue the fillets to the fuselage as yet. Sand the entire fuselage, then glue the stabilizer and fin in place. Check to see that the stabilizer is parallel to the top of the fuselage. The fin is centered and at right angles to the stabilizer. After they are dry, add the dorsal fin and small blocks at the bottom rear of the fin.

Wing

The RCM wing jig is highly recommended for assembly of the wing. (Refer to the August 1967 issue of R/C Modeler Magazine.) Using 1/4" steel rods in the holes in the ribs, this jig can give you a true wing in much less time and work than the usual construction methods. Pin the blocks to the position shown on the plan. Glue the ribs to the spar with the landing gear notch in ribs No. 2 and No. 3 DOWN. Do NOT glue in the false ribs or 1/4" inch dowel as yet.





FULL SIZE PLANS AVAILABLE - SEE PAGE 71

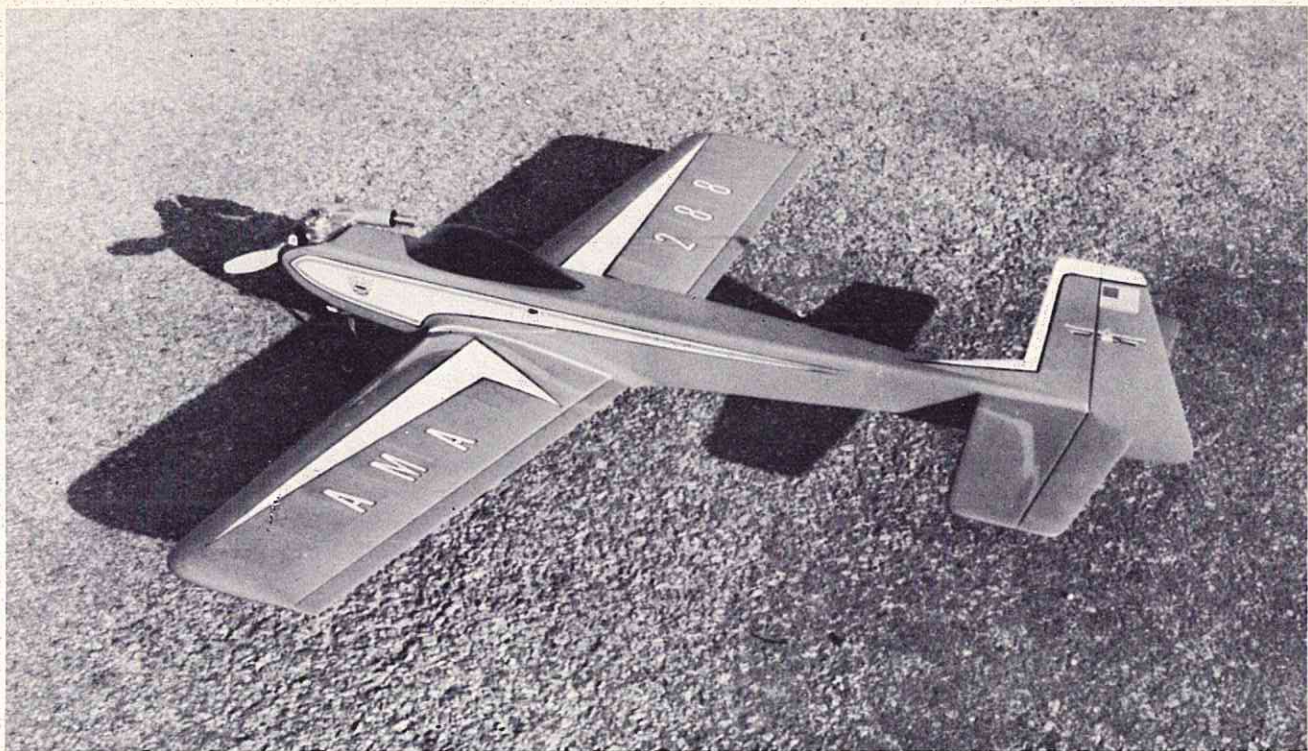
WING AREA: 644 SQ IN
FLYING WEIGHT: 6-1/4 LBS
ENGINE: .61



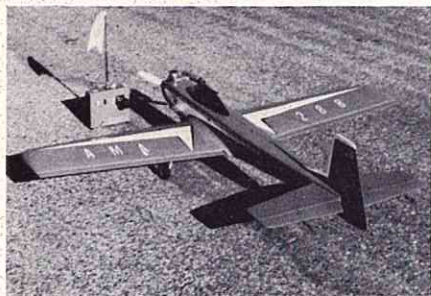
KAOS

DESIGNED & DRAWN BY JOSEPH BRIDI INKED BY GERARDO FLORES

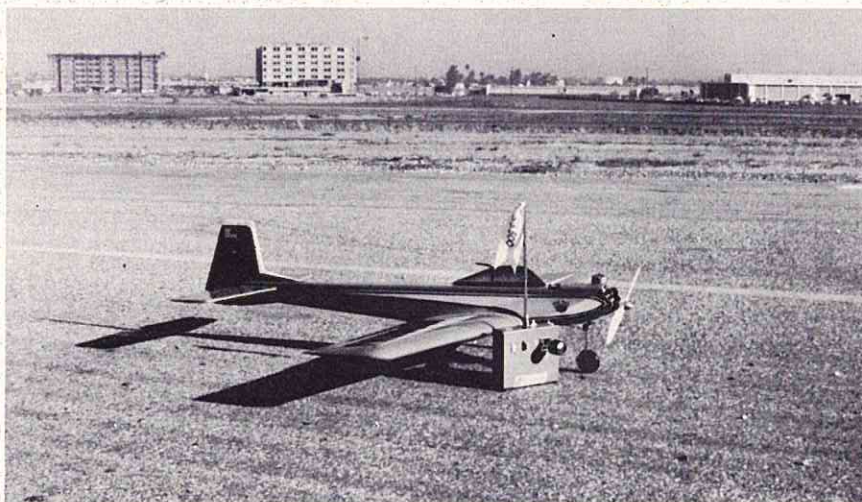




Longer tail moment emphasizes larger, more graceful maneuvers. Larger rudder area improves maneuvers.



Left: 3/4 rear view of Kaos; E.K. single stick. Right: Landings such as this are easy to accomplish with Kaos. Tail skid recommended to protect rudder.



Kaos weight between 5 3/4 and 6 pounds with 644 sq. inches of wing area.

Glue the top spar into position. Glue the notched trailing edge to the ribs and pin to the block. Glue the notched leading edge to the ribs and let the glue dry before proceeding further. Glue the front and rear planking in place. (The leading edge of the front planking is tapered.) Glue the cap strips in place.

When all of the glue is thoroughly dry, turn the wing over and glue the rear planking in place. Glue the plywood landing gear doublers to the ribs and install the landing gear parts as shown on the plan. To install the wing tip blocks, cut the overhang of planking, spars, etc., flush with the tip rib, then sand flat with a large sanding block. If you wish to hollow the tip blocks, glue at two small spots and sand to shape shown on the plan, then break loose and hollow inside. Now, re-glue into position. To build the other wing panel, repeat this process being sure to **KEEP LANDING GEAR NOTCHES UP** so you will have a right and left wing panel. Remember that this panel is upside down, so do not glue the leading edge planking in place. When the wing panel has dried, turn it over and complete the top sides.

Joining Wing Panels

Trim the overhang flush with the root rib. Place the bottom of the wing down on a flat building board and block the tip up one inch. With your sanding block, sand square across the wing until the rib is 90 degrees to the building board. When both panels are

sanded, check for a proper fit. Now glue the two panels together with epoxy or Tite-Bond glue. When the wing is joined, glue the plywood wing bolt plate in place with no overhang at the trailing edge. Block the wing $1/16$ " down in the wing saddle making sure it is square in the saddle. Now mark the leading edge of the wing through the bottom of the tank compartment. Remove the wing and drill a $1/4$ " hole through the leading edge of the wing. Glue the $1/4$ " dowel and false ribs in place. Complete the bottom of the wing leading edge sheeting and the cap strips. Refer to the plans for completing the center-section reinforcements.

Tank Compartment Bottom & Fillets

Place the $1/16$ " plywood tank compartment bottom in position and mark the sides. Remove, cut to shape, then glue in place and allow to dry. Place the wing in the saddle and bolt in place. Block the wing down $1/16$ " from the fuselage sides. Now check all alignment again including wing incidence. When you are satisfied that all is right, glue the wing fillets to the fuselage allowing $1/16$ " clearance between the bottom of the fillets and the top of the wing. The $1/16$ " gap will allow the use of wing sealer tape. Now COMPLETELY finish the airplane. Install all equipment, engine, tank, wheels, pushrods, etc., except the fuselage servos.

Balance

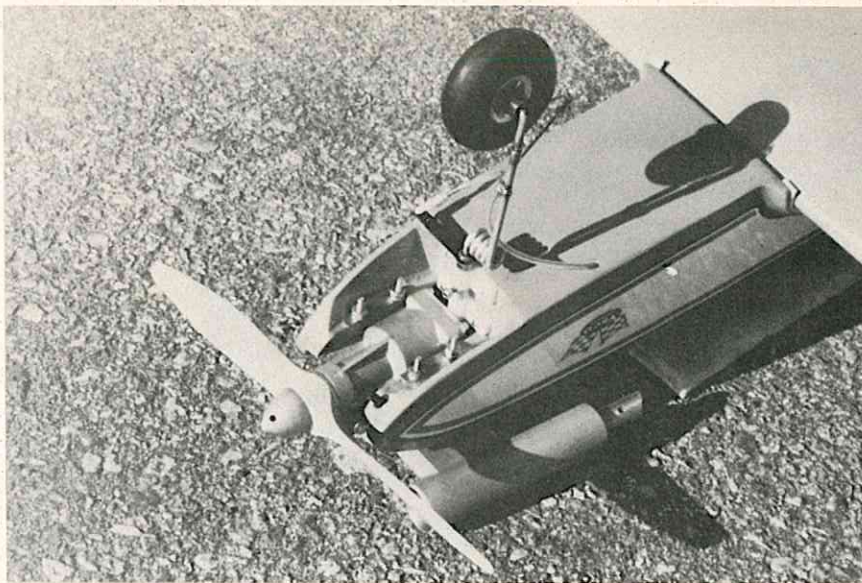
With the airplane complete (except for the fuselage servos) make sure the battery pack is pushed to the rear of the tank compartment. Now place the servos on top of the fuselage and move fore and aft until the desired balance is found. Now mount the servos inside at this pre-determined position. If a change in CG is found necessary after flying, the battery can be moved.

Preflight

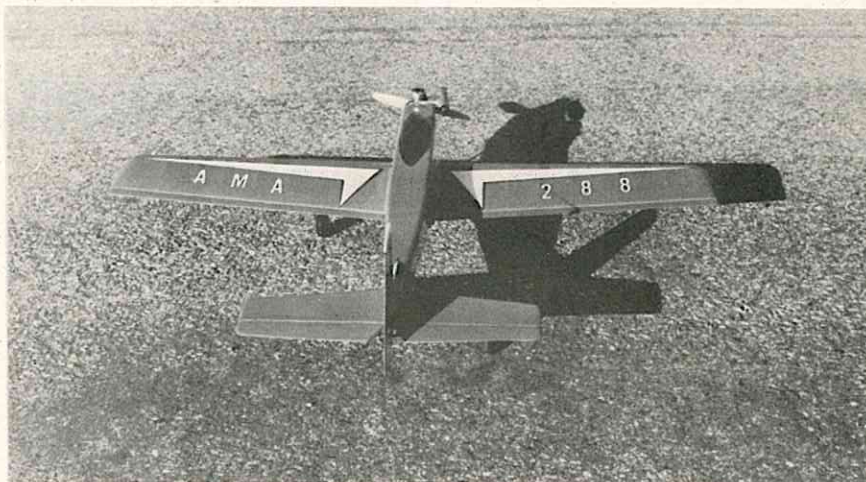
Always check your controls for direction and binding. Check the CG for proper position. The CG shown on the plans is approximate. Move your power pack, radio equipment, etc., to suit the flight characteristics you may desire. We have, in the Kaos, tried to bring you the latest in building techniques and design with easy index construction. The Kaos is capable of all F.A.I. and AMA maneuvers with complete ease, yet docile enough for the beginner.

Try the Kaos and I'm sure you'll be more than pleased with its performance.

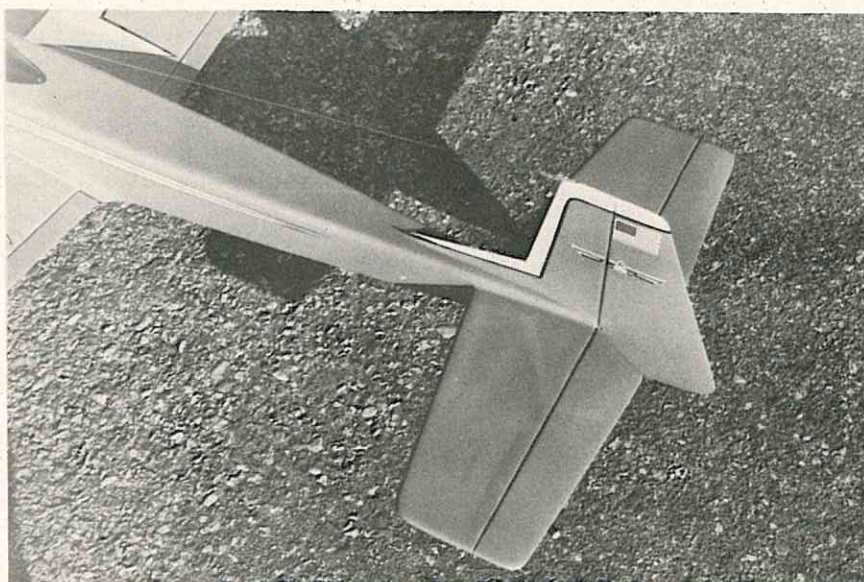
Happy flying! ●



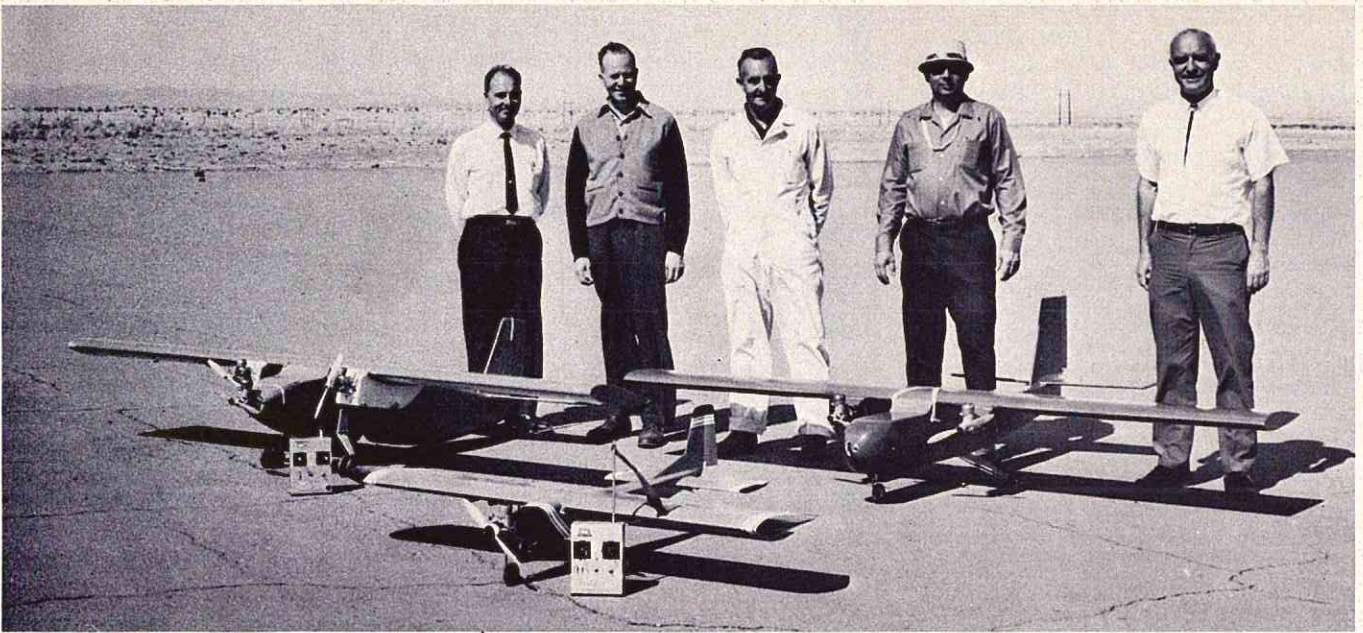
Open area in nose section for steering and engine mounting allows easy access for repairs or changes.



Full rear view of Kaos shows clean lines, ample control surfaces for all F.A.I. and A.M.A. maneuvers.



Rear section of Kaos shows how rudder area was increased over its predecessors.



Sandia's "fleet." The single engine aircraft carries four balsa "bombs." The twin engine model on right flew to 19,600 feet. L to R: Jim Stark, Karl McGinnis, Chad Miller, Ted White, and author Dan Parsons.

R/C MODELS AS ENGINEERING TOOLS

NEW MEXICO'S SANDIA LABORATORIES USE R/C MODEL AIRCRAFT
AS ENGINEERING TOOLS AT A MUCH LOWER COST THAN
CONVENTIONAL DRONES OR AIRCRAFT

This work was supported by the U.S. Atomic Energy Commission

By **DAN PARSONS**

Photos By O. F. GOODWIN

The use of R/C model planes as an engineering tool by Sandia Laboratories, Albuquerque, began about four years ago. At that time, several local R/Cers flew their own planes as targets for a newly developed tracking telescope mount. This first use, though brief, was highly successful and quickly demonstrated their advantages over full scale aircraft.

It wasn't until two years later, however, that a program developed to put the R/C planes into regular operation here at Sandia Laboratories. Sandia had obtained a tracking mount with one of the first TV automatic tracking systems aboard. With automatic tracking of telescopes still in the developmental stage, it was obvious R/C planes would provide an ideal target system for the many tests that would be conducted during this long development program. Again, the first tests confirmed the advantages of using R/C planes, but this time a long

term program has kept them working. Their first use quickly suggested additional uses, two of which are discussed below; and, as usual, interesting things happened.

A study was underway to determine the best film and test vehicle color pattern to use during a typical free fall test. Drop tests simulating, as closely as possible, the regular tests would provide the best answers. Why not drop scale test vehicles from R/C model planes? Accordingly, balsa "bombs", about 14 inches long, were quickly made by the pattern shop, painted in various colors, and four soon hung under the wing of a Stormer. A simple pin mechanism allowed the units to be released, one at a time, or salvoed. A salvo would place all four units in the same picture thus providing a direct comparison of four different color patterns. With the exception of time of fall, these scale tests simulated the real tests perfectly.

Another strong advantage of the R/C plane was the turn-around time between drops, averaging about four minutes.

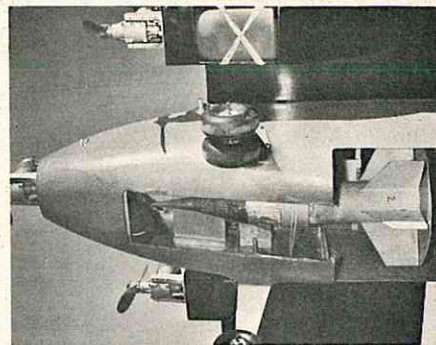
A special project at Sandia involved the effectiveness of anti-aircraft guns. Preliminary tests in the development of photo-instrumentation required firing at drones painted different colors. In place of the standard military drones, Lanier plastic R/C planes were used with complete success. Not only were direct operating costs reduced by a factor of 20 or 30-to-1, but the versatility of the R/C planes added savings in time and adaptability to weather conditions. A bladed area in front of the guns was the flying field which not only simplified communications and saved launch time but provided interesting moments to the entire project crew. A twin 40 mm gun was doing the firing and on one pass, a direct hit was obtained. Since an explosive shell was involved, there

wasn't much left; however, by piecing together the remains it appeared the shell made contact with the fuselage in the radio compartment. True to the tradition on the firing range, the gun crew was granted a three day pass for shooting down a drone.

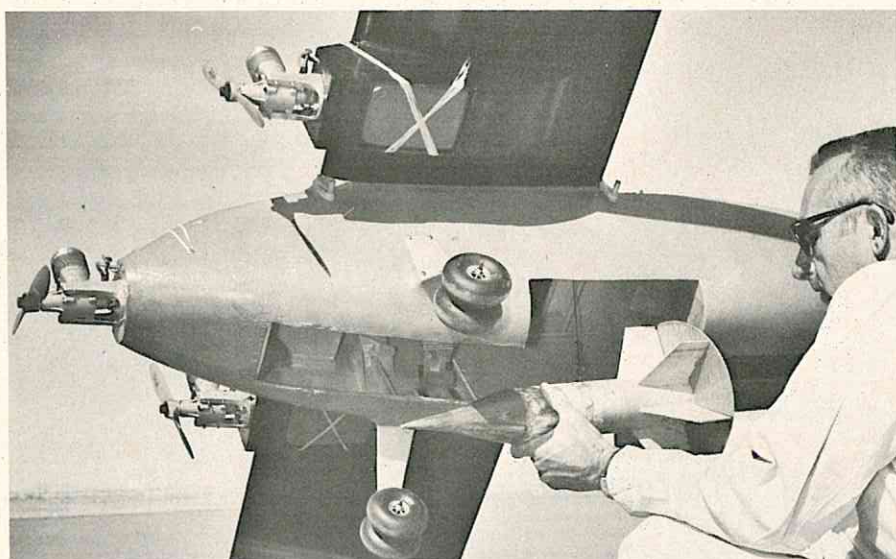
In the projects discussed thus far, 'standard' sport R/C planes had been used. It was only a short time until a request was made to carry equipment and test objects too large and heavy for a typical sport R/C aircraft. I was asked if we could carry a pressure pickup and telemetering equipment to an altitude of 18,000 feet and orbit over a point on the ground for 15 minutes. Some quick tests with a regular R/C plane confirmed that we could fly while guiding through a tracking telescope and orbit in position within

the required limits. During this first test flight to relatively high altitude (approx. 10,000 ft. above ground) the pilot, Ted White, lost sight of the plane in his telescope just after the engine ran out of fuel. Fortunately, I was tracking the plane with a large tracking telescope and was able to talk Ted down for a landing. We estimated the plane was three miles away when he lost it and Ted never saw it again until it was within 1000 feet! I just kept it heading directly towards us and had no idea where it was coming in since I couldn't remove my eye from the telescope for fear of losing the plane. Believe it or not, the long straight-in approach landed the plane right at our feet!

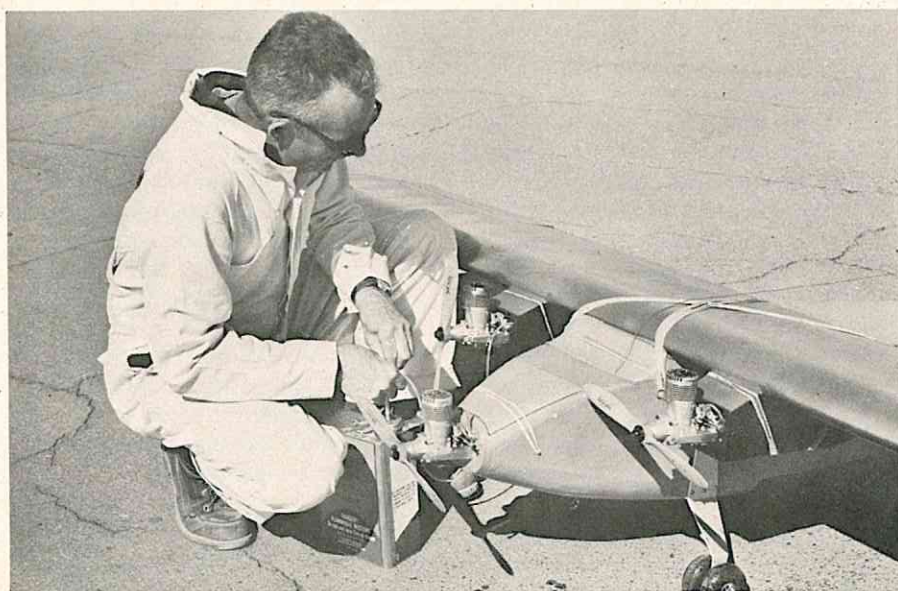
Since we had successfully flown with the pilot controlling through a



Unit loaded and ready to go. Bomb bay doors on narrow portion were discarded.



Above: Loading the twelve pound test vehicle. Below: A real fuel guzzler! Model gulps three ounces per minute!

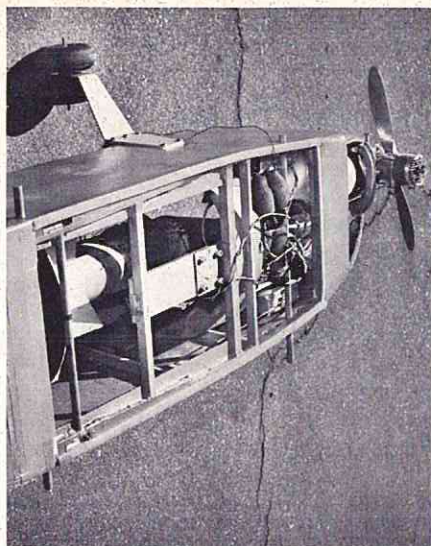


telescope, and even indirectly through an observer, we concluded the odds were much in favor of the feasibility of the technique as a standard operating procedure. Thus, we set out to design and build a plane that would meet the requirements. And stiff these requirements were: climb to 18,000 ft. MSL with a 6 lb. instrumentation package, orbit on station for 15 minutes, and return.

At this point, the use of R/C planes by Sandia split into two phases. Phase I involved the use of inexpensive standard sport R/C models in projects where they have proven their worth as an engineering tool. Phase II was the experimental use and development of specially designed R/C model-like drones tailored to a specific project. The remainder of this article will concentrate on Phase II, certainly the more challenging and interesting part of R/C activity at Sandia Labs.

Before launching into the details of the design, flying and operational results of Phase II drones, I should point out the basic premise under which we are working. Namely, in this stage of usage development, only R/C modeling supplies, equipment and techniques are used. Any divergence into non-modeling equipment such as engines, propellers, construction materials, etc., could quickly lead into the regular drone field and that is already well developed. In a nutshell, the challenge is, can the R/C models provide a real engineering tool at a much lower cost than conventional drones or aircraft? Keeping this in mind, we'll get down to the interesting part.

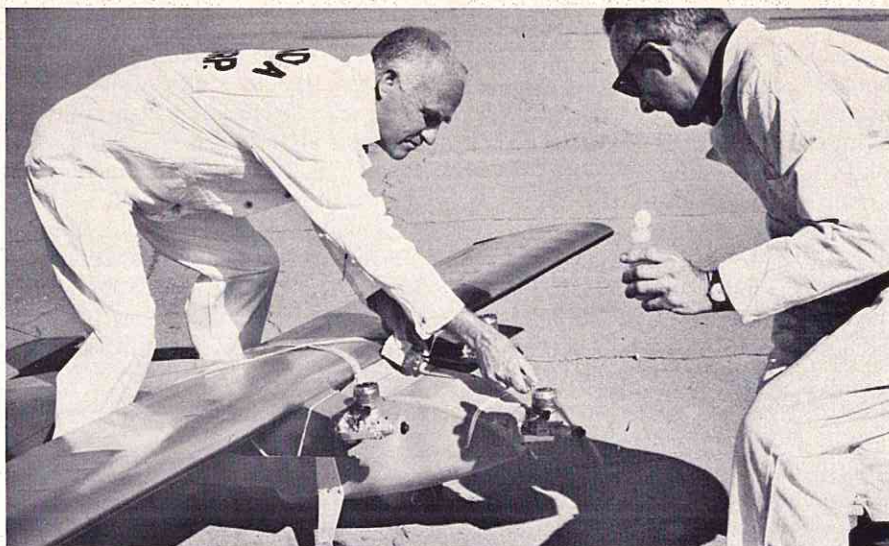
In the first experiment in carrying instrumentation, a Stormer was rigged with a pressure gauge and telemetering system made in two packages with one package slung under each side of the wing. The total weight of this instrumentation was four pounds. The



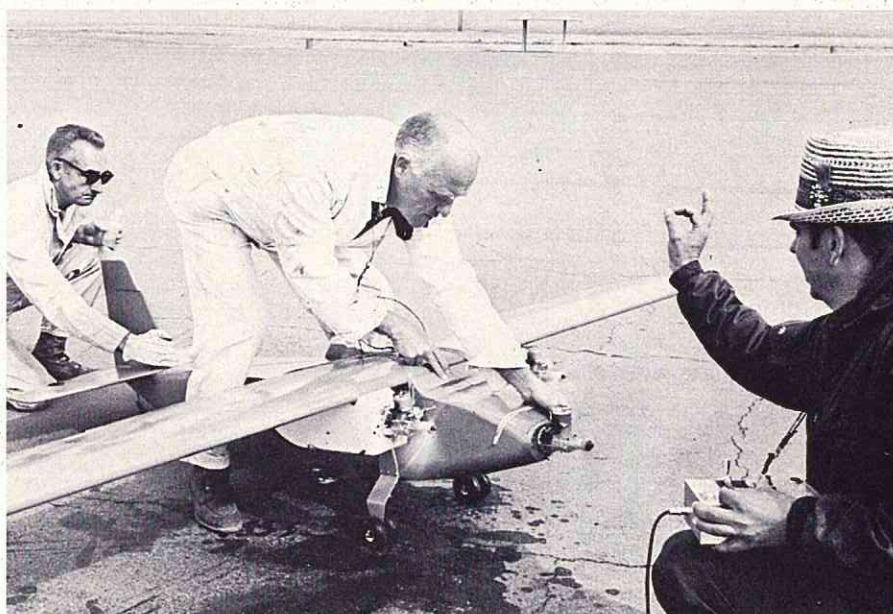
Top view of radio compartment and bomb bay with unit loaded.

objective was to place this instrumentation directly over ground zero at an altitude of approximately 1000 feet. Ground zero consisted of about 30,000 lbs. of high explosive buried some 25 feet underground. The pilot took off on a gravel road at minus four minutes, had the plane in position at approximately minus 30 seconds, telemetered out the shock wave from the shot and was back on the road within two minutes after the shot. Overall results? Very good, especially since this was the first attempt at such a task! When you consider the conditions: Stormer at 12 lbs. gross wt., gravel road for a runway, and runway elevation 5100 feet, I believe some words about the pilot are in order. All of Sandia's R/C small drone flying is done, under contract, by Ted White. Many of us that know Ted's flying consider him the best all around flyer in the country. His flying for Sandia for over a year, at times under extremely difficult conditions, has been nothing short of fantastic. Enough said - I don't want to make him feel TOO good!

With the successful trial run of the instrumented Stormer under our belt, we moved right ahead with designing and building a plane to carry 6 lbs. to 18,000 feet. It was immediately obvious that we would have to go multi-engine. My own experience with a twin ME-210 back around 1961, and Ted's with a twin Stormer several years later, convinced us that a twin engined instrumentation model was completely practical. Accordingly, Ted and I designed what amounted to a 9 ft. span Stormer. No attempt was made to optimize the aerodynamics



Chad Miller swinging on number three engine during starting sequence.



Careful, Parsons! Ted signals A-OK. Note fine paved field (300' x 300') for R/C built by City of Albuquerque.

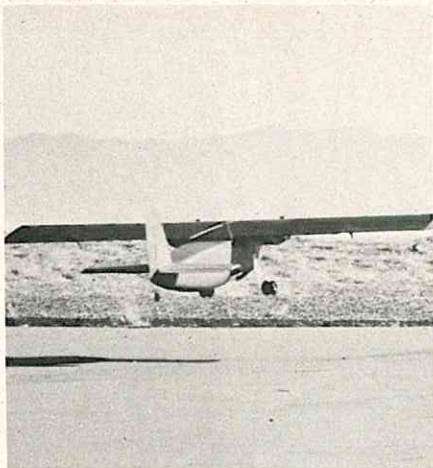
for high altitude flight; time was short and we stuck with well proven designs and techniques.

Sandia ordered two planes of this design, one made by Karl McGinnis in Sandia's pattern shop and one by Ted. Both flew well right off the board with no bad characteristics; and being a large plane, all maneuvers were slow and graceful. One was powered by 60's and the other by OS 80's. Needless to say, the takeoff and climb performance with the 80's was much better. With preliminary flight tests completed in the Albuquerque area, both models were shipped to Sandia's test range at Tonopah, Nevada.

Final flight testing was performed at our Tonopah range for two reasons: we had excellent radar coverage and

no flight altitude worries. The radar provided position, rate of climb and altitude data. Our radar people had estimated they could track our drone to 30,000 yards. We worked out to only 10,000 yards where the radar was still receiving a strong return signal. The remaining questions we had to answer were: could we climb to 18,000 feet, how quickly, and once there, could we orbit over a given point within a 600 ft. circle, and finally, what was the maximum slant range at which we could control the drones while looking through a simple hand tracked telescope?

The results of these tests were most encouraging. The 80 powered plane reached 19,600 ft. and was still climbing at 250 ft./min. when one engine



Takeoff with unit aboard.

ran out of fuel. The time to 18,000 ft. was 23 min. (take off altitude 5300 ft.); we could orbit within the 600 ft. circle and maximum operating slant range while controlling through the telescopes up to 4 miles. The 60 powered plane reached only 13,500 ft. where one engine would mysteriously quit. The performance of the 80's was so superior in every way, that 60's are now considered only for low altitude work where endurance is a prime requirement. The 80's consume 1 oz. per minute per engine vs 5/8 oz. for the 60's. We had one disappointment, however, in that the consumption of the 80's is the same at all throttle settings. It is interesting to note that all flight operations at TTR were conducted from roads, which work fine if traffic is light and if there is little or no crosswind.

Not long after this series of tests, I was asked if we could fly a 12 lb. test vehicle and drop it. Due to a high drag configuration, the unit would have to be carried in an enclosed bay. This called for a new fuselage and consultation with Jim Stark, an aerodynamicist in the Aero Department at Sandia, who advised us as to the shape of the large fuselage in order to minimize drag. Calculations showed we should have no trouble with the high drag unit clearing the bomb bay even at maximum speed.

With the general configuration worked out, we again got together with Karl McGinnis in our pattern shop. Karl had made the twin engined plane, and though a non-modeler, came up to speed very rapidly on the typical model and R/C construction techniques. Working out most of the details himself, Karl had the new fuselage ready in about three weeks. Early in this project I decided to place a third 80 in the nose. Reasoning that if



The climb out.



Just before touch down. All engines idling perfectly. Go-around routine.

it worked so well for Ford, why not Sandia?

Seriously, the 80's had been so completely trouble-free, I felt it was entirely reasonable to add another one since we would have been marginal with only two engines. With good help from Chad Miller, a test vehicle support and release system was designed and bolted onto the strong-back in the fuselage that not only supports the 12 lb. test vehicle but the landing gear as well. The strong-back is a 5 layered laminate of Maple formed into a U-shaped arch. It greatly simplified the structural problems inherent in, what is basically a model plane carrying a heavy, concentrated load. Conventional two wheel gear was used to allow shorter takeoff runs. To get around a throttle linkage problem for the third engine, a second throttle servo is operated in parallel with the wing engine's servo.

After thirty or forty 'drops' of the test vehicle in the laboratory, we were ready for our first flight. The first

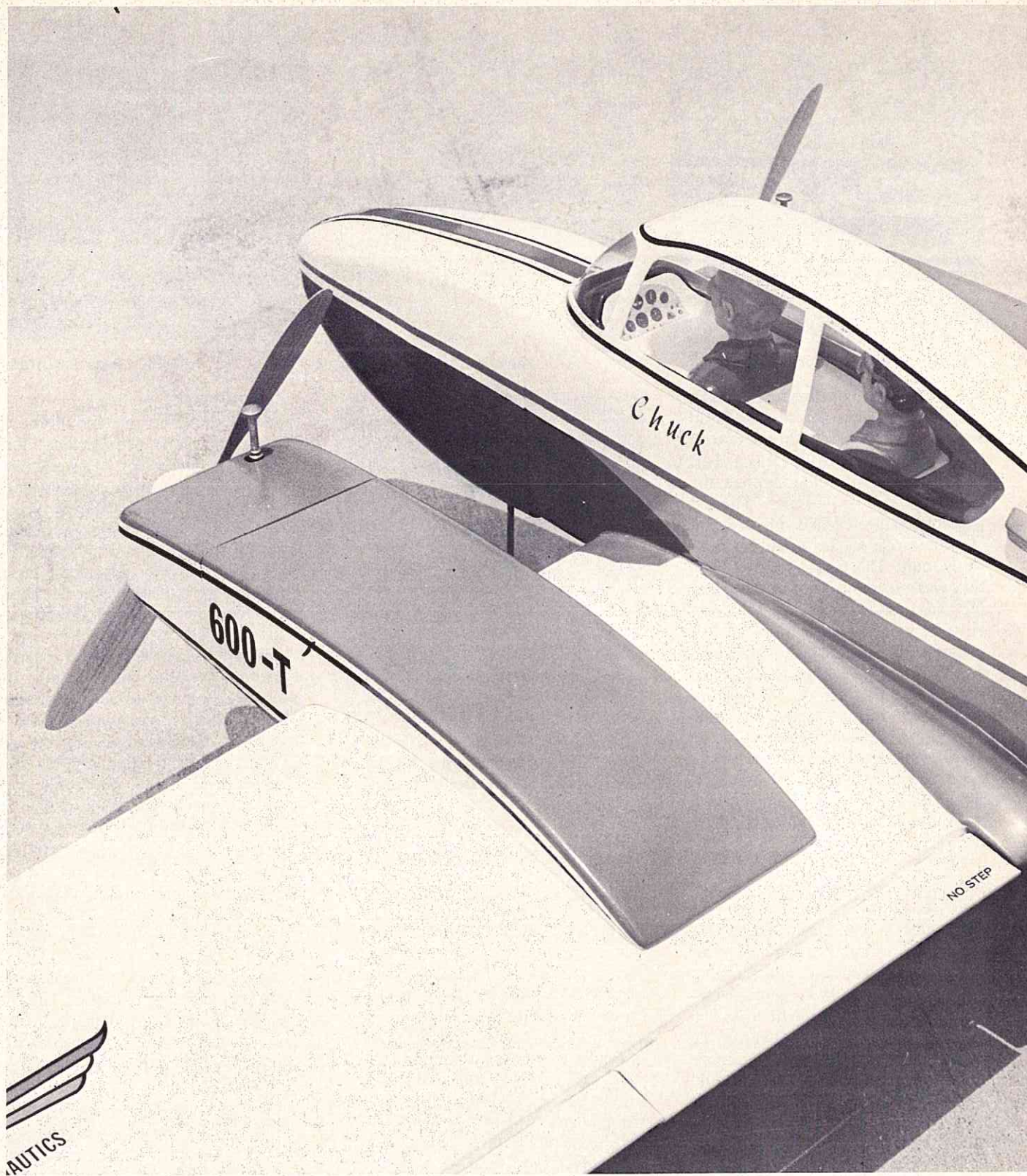


Bomb release at altitude.

flight was made empty and everything went fine except for some additional down trim. The performance at an empty weight of 24 lbs. was rather spectacular even with a field altitude of 5600 feet. Not wasting any time, the 12 lb. test vehicle was loaded aboard and Ted taxied out and turned into the wind for its second flight. After a very realistic takeoff, in about 200 feet, (300 ft. runway) things went suddenly bad when the left engine quit. The plane was just off the end of the runway and about 15 ft. high, the worst possible conditions! A violent yaw to the left was immediately corrected by Ted by introducing full right rudder. By truly skillful flying, Ted struggled up to about 50 feet altitude where I finally jettisoned the unit. He was so busy flying, it took him about 30 seconds to tell me what was wrong and that he was too busy to operate the unit release lever. To make matters even worse, the unit hung in the bomb bay after release for 2 or 3 seconds before falling out (this tendency had been corrected in the laboratory, so we thought). Upon examining the engine, we discovered it was our fault - too lean a setting. Needless to say, the third engine saved the day. Once some altitude has been obtained, the trimotor will fly quite well on any two engines, even with the 12 lb. unit aboard.

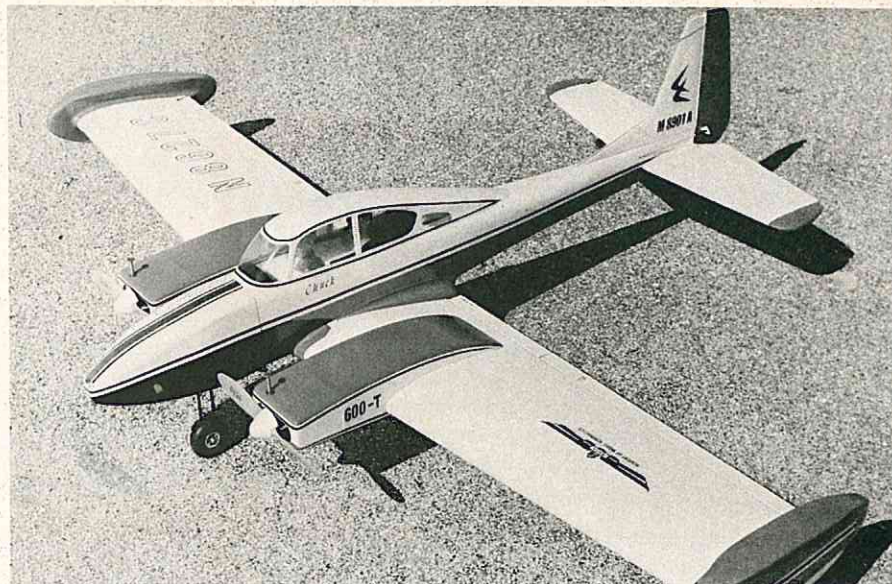
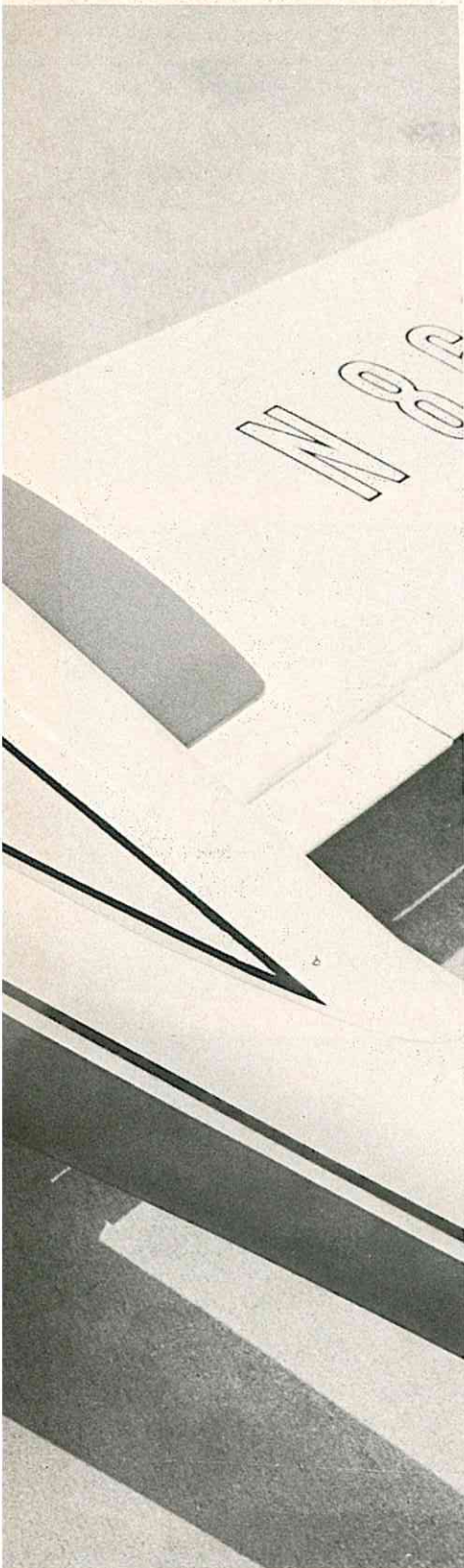
Since that flight, we have made probably 200 drops with these 12 lb. units, at altitudes from 25 ft. to 4000 ft. above terrain. In the majority of cases we obtain good clean releases. In addition to the regular drop units, test vehicles of rather odd shapes have been successfully dropped. As a further demonstration of the capabilities of the plane, engines, and the pilot, two uneventful landings were made

(continued on page 84)



YOU CAN BUILD A LANIER

AERO 600 TWIN



If you are like most of us, you daydream a little about flying something really way out, instead of the same run-of-the-mill plane you see so frequently at the field. But, you just don't have the time to build one.

I've always thought about a twin engine job tearing across the sky and the beautiful sound those engines would make. So, I looked for the easiest way out of the work that would be involved in making one, and arrived at the Lanier 'ready-to-fly' planes, which you can have finished in just a few days. The only work left would be to make the nacelles.

The Aero-600 was picked because it has the closest appearance to a private twin aircraft with its nice big canopy and the ROLL-AIDS that come with the kit simulating tip tanks.

First, I studied a few pictures of full-scale aircraft in order to get the shape of the nacelle. Then I cut some templates out of cardboard till I obtained the desired results. These were then transferred to plywood and balsa.

The photographs show each step as it took place except the nose of the plane had to be modified to make it look like a real twin. (Of course you guys with guts can just put another engine there if you like!) It is made up from the two bottom halves of a Lanier Eagle glider nose. Saw the Aero nose and motor mounts off just ahead of the firewall, then tape the two bottom halves together and try them on the Aero for a fit. When it is correct, remove and Aero-Cement the two shells on the inside. Now remove the tape and put Aero-Cement on the outside seam. Next, trim off the skid on the top and bottom nose pieces and

fill with strips of aero-sheet. Now you are ready to slip the nose on and Aero-Cement to the fuselage. (Lanier Industries will sell these nose pieces on request.)

The nacelles are painted with Aero Gloss dope, and so is the trim on the fuselage. Although the dope adheres well to the plastic, I do not recommend painting the wing skin.

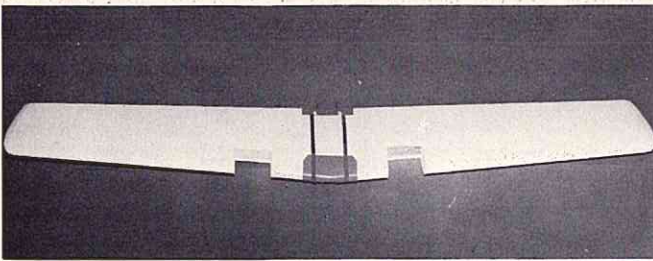
Now comes the best part. I had never seen a twin fly before, so all I had to go by was the bad stories you hear from the guys at the flying field (who, chances are, also have never seen one fly!). So don't pay any attention to them. Treat the plane like any other multi job, except that it has two engines instead of one, and it will fly no different from the others IF you keep both engines running. Here you must take care in breaking in your engines; make sure they will hold their setting and have a good idle.

The plane spins, rolls, and loops like the others except for the sound, "OH HOW SWEET IT IS!"

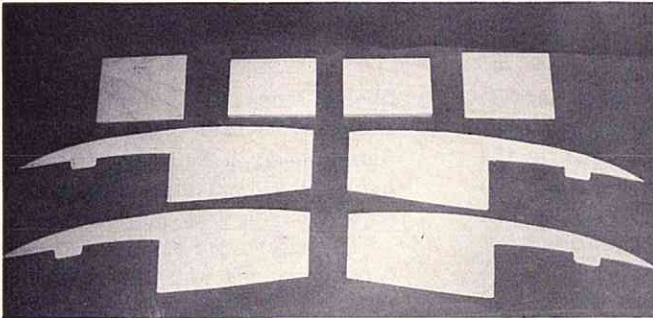
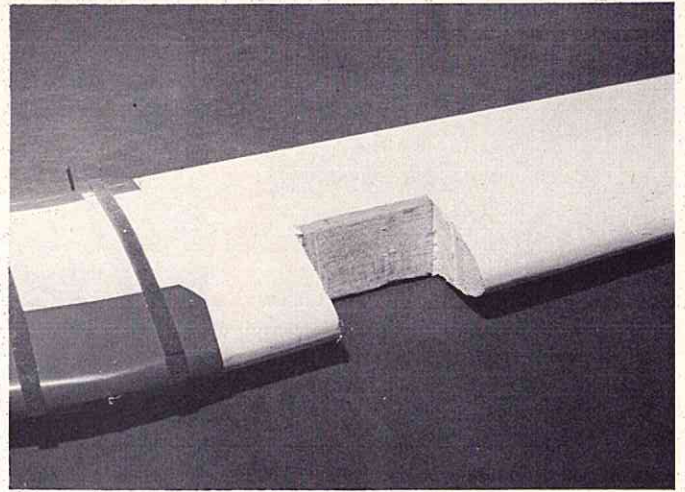
I found one thing out very rapidly on the first flight: When landing, DON'T cut the power until you are on the deck or a few inches from touch-down. When the power is cut it FALLS. I would recommend you spend a little more time and put flaps on your model, as they will slow the landing speed down and makes for better landings.

Well, that's it folks, I do hope you will try one of these jobs because the little time spent in making this bird is very rewarding when you see it take to the air for the first time. But, remember — keep those engines running and you will have many hours of fun flying your Aero-600 TWIN. ●

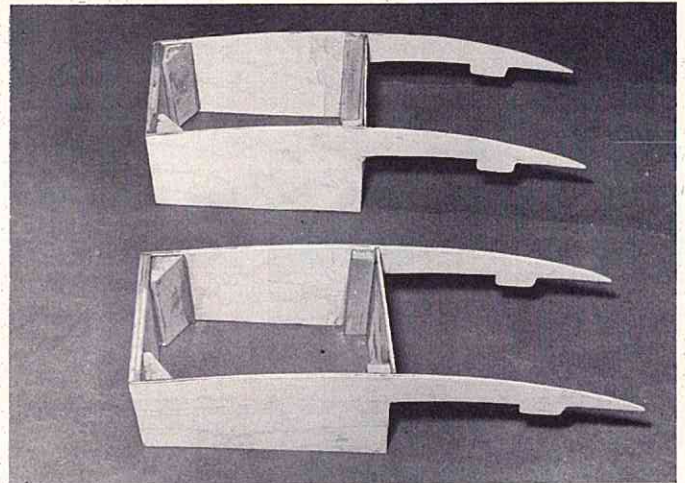
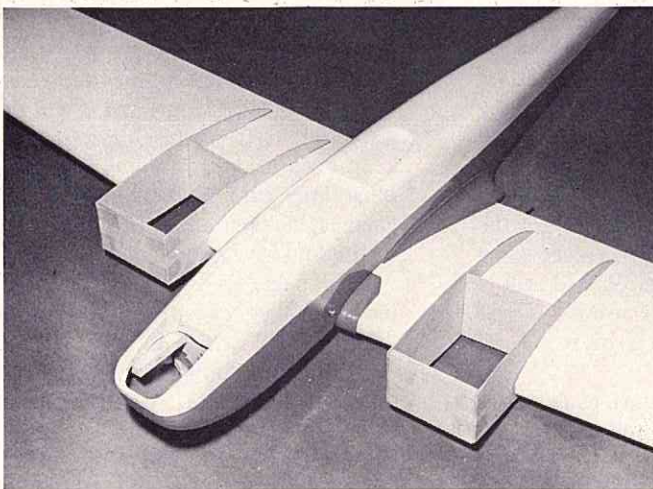
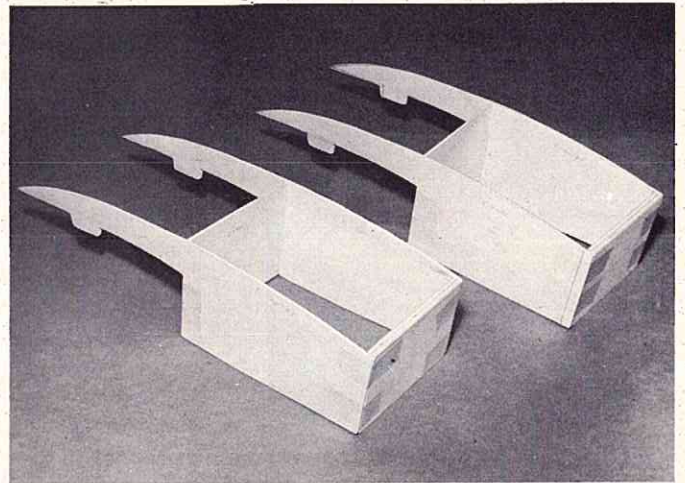
BY CHUCK BOREL



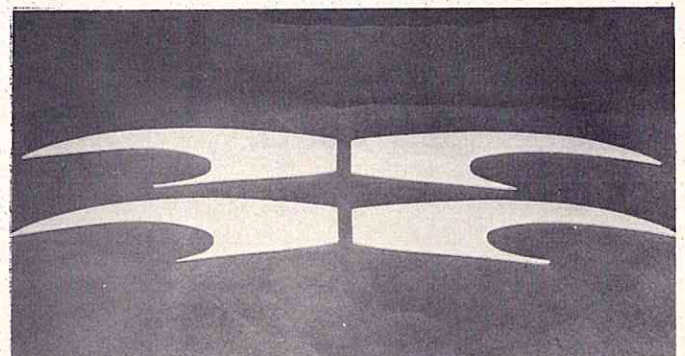
Above: Here we start by cutting notches three and three quarter inches wide in the wing all the way back to the spar. Distance from side of fuselage varies depending on size motors and props to be used, but try to keep them as close to the fuselage as possible with about $\frac{1}{2}$ " clearance from prop to fuselage. Right: Check distance from leading edge to spar on both sides. If distance differs, shim with balsa against spar to make sure it is even.

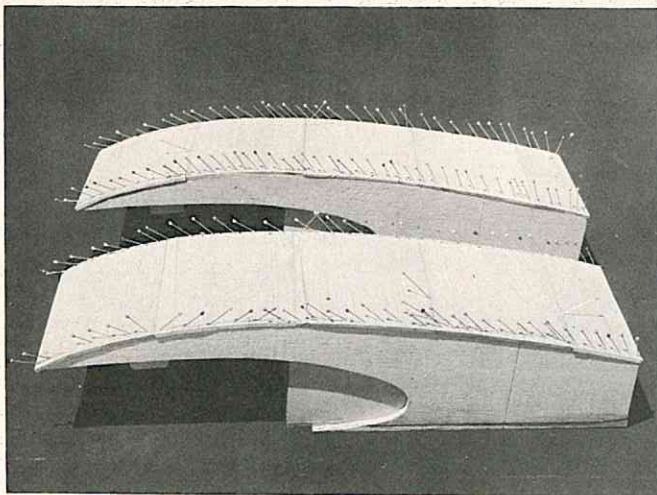


Above: One eighth inch plywood pieces are cut. Note the notch that fits into the wing to act as lock key. Firewall is $\frac{1}{4}$ inch plywood. Right: Tape the plywood boxes together and try them into notches for a good snug fit.

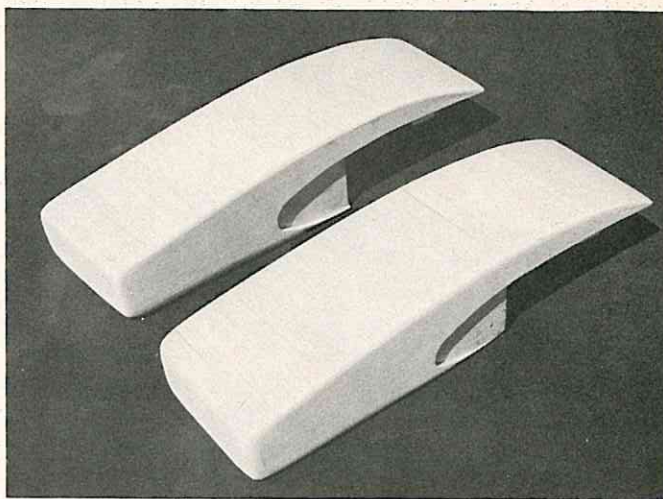


Above: Here are the boxes fitted into the wing. Now check carefully for alignment. Above right: Remove boxes and epoxy all corners. At the same time add the doubler peices to the inside for strength. Right: Cut balsa outer panels to fit over the wing and against the box. Glue these to the box while it is fitted to the wing, making sure they are straight. Be careful not to get glue on the wing. Note that the balsa panels are longer than the box because the front is cut off later to make the cowlings.

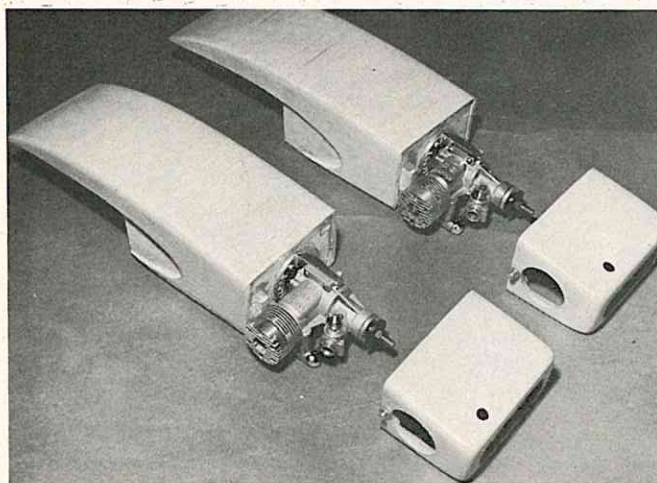




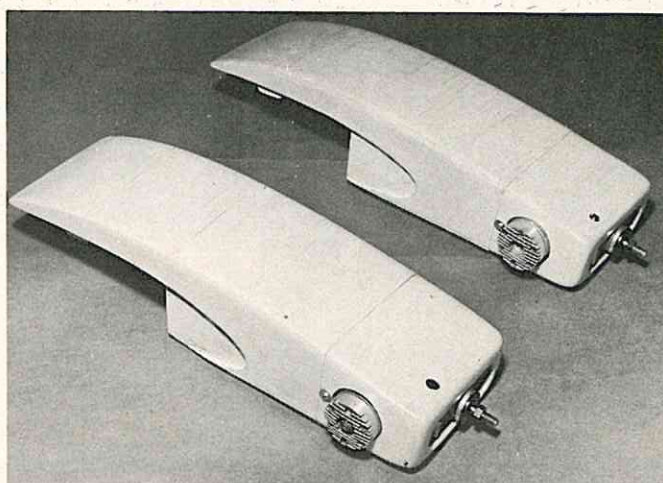
Remove box from wing and plank top with balsa. Tack glue the balsa plate to the bottom. The latter is removed after sanding for the tank hatch.



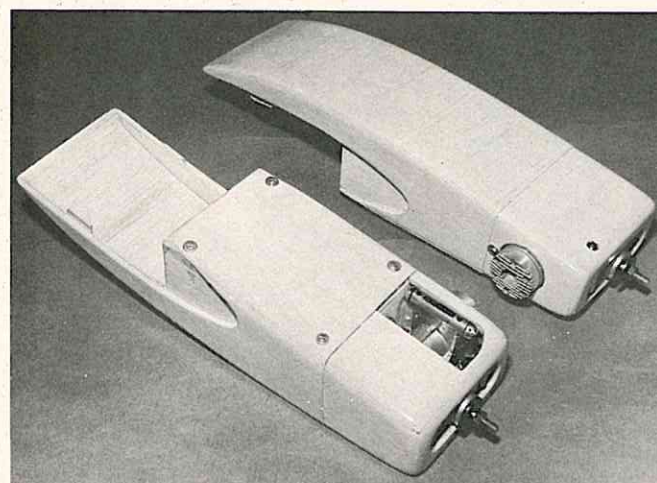
Sand both nacelles and cover with silk or silkspan then paint with clear dope. After doping, cut the cowling off just ahead of the firewall.



Now install the Tatone motor mount to the firewall and bolt engines in place. In this case two O.S. 40's were used. Cut holes in cowls for engines and attach.



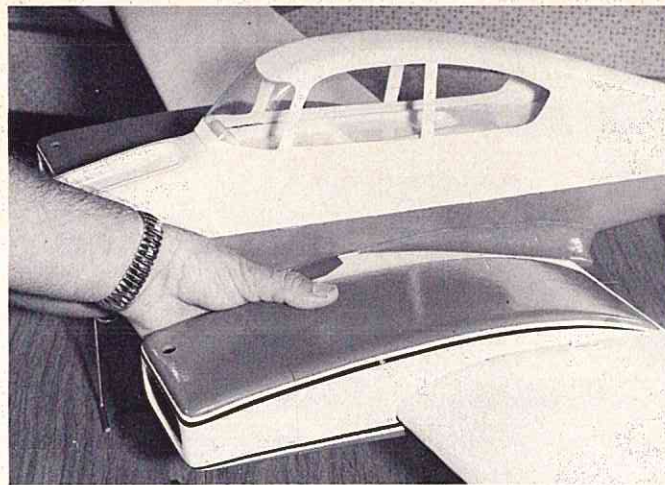
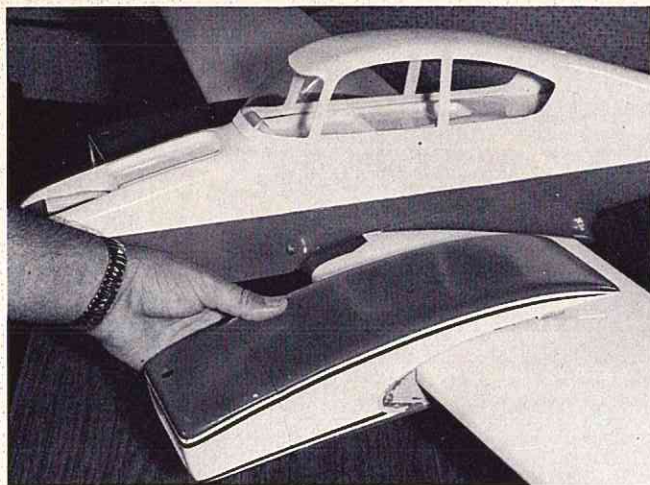
Here the cowlings are attached to the nacelles with sheet metal screws.



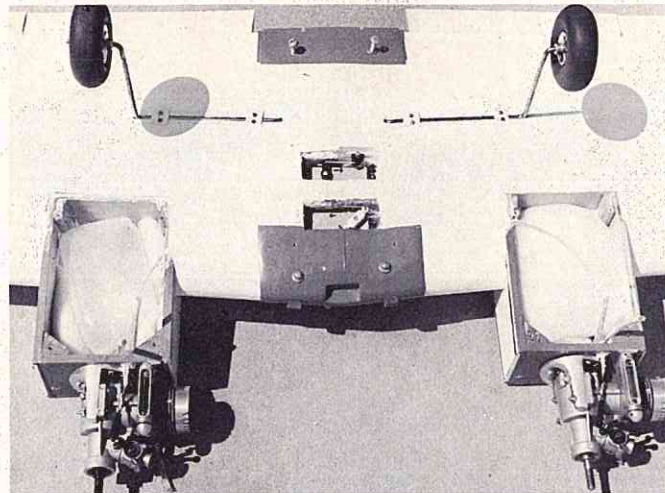
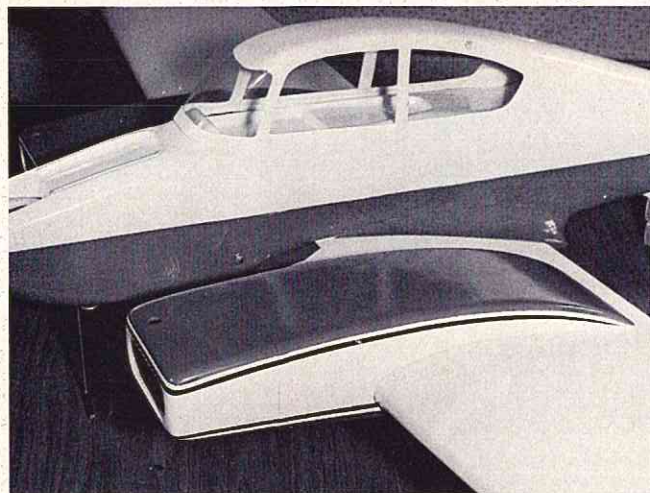
This bottom view shows the tank hatch compartment held on with sheet metal screws. Note cutout for exhaust is large enough for access to carbs.



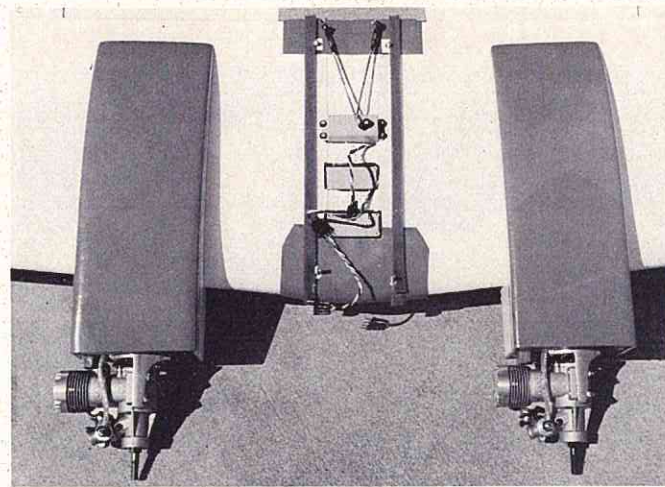
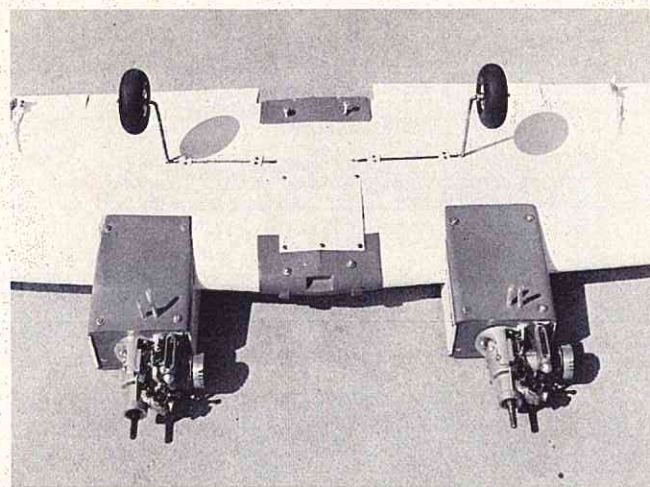
Now remove engines and paint nacelles, include trim. When finished, check the fit once more on the wing, then get ready to epoxy.



In this set of photos, above and below left, it shows how the nacelles should fit on the wing just before glueing. Epoxy the nacelles into the slots in the wing against both foam and spar. Keep a close watch on the epoxy until it firms up so that it doesn't get on the wing. When dry, reinstall the engines.



On the left we see the tank compartments with 10 oz tanks installed. Note position of servos with cables going to each, this works well and is simple to install. Cut a notch in the foam and run the cable in plastic tube in notch and hold in place with silicone rubber. Then cover with white wing skin. Servo in rear is aileron working NyRods which are sunk in foam and covered with Lanier skin.

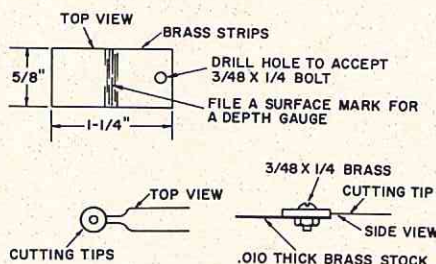


Left: This bottom view shows the aileron NyRods coming out of the wing and attached to the aileron horns. NyRods are sunk in foam and held in place with silicone rubber, and covered up with white skin. Square plate cut-out of Aero-Sheet covers servos. If you are using hold down bolts for the wing, I put a pair in front as well as the back due to the weight of the engines. Use the wood block that comes with the kit as well. Right: This top view shows the servo placement. The front servo is for engine, middle one for ailerons, and back one for flaps. Note that the flaps are very easy to hook up, simply using the aileron arms tied together with Kwik-Links. NyRods in bottom of wing were used for ailerons.

FOR WHAT IT'S WORTH

From the Whirlwind's 'Breeze' of Southwestern Michigan comes a hint for refinishing your model for the next season of flying. Instead of sanding the old finish off, try some commercial paint remover called Zip-Strip. This stuff will peel the dope or enamel finish down to the bare wood. Don't use it on fiberglass, though, and be sure it doesn't get to foam cores - it attacks both.

From Robert Greenall of Tamaqua, Pa., we received an excellent hint for cutting slots in foam wings and stabilizers in order to insert hinges. First, drill a hole in the tip of a Weller soldering gun, or whatever type soldering gun you may use, in order to accept a $3/48'' \times 1/4''$ brass bolt. Next, cut out a brass strip to the size hinge you use - the dimensions given being for a standard DuBro hinge. Finally, bolt this brass strip to the cutting tip and turn on the gun. With one quick touch of the brass extension plate to the foam and you have a perfect hinge slot.



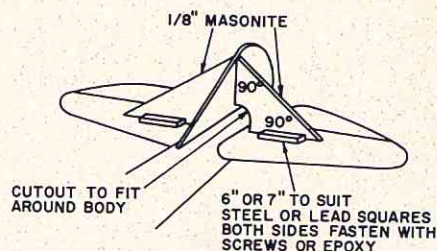
Having just purchased a VK Nieuport, Walter Perrin Jr., of Granada Hills, Calif., didn't like the $5/8''$ hole in the cowl for glow plug access. Instead, he uses a telephone plug and jack for battery hook-up with only a

single $1/8''$ hole needed to be drilled for the jack position. This can be located in the bottom of the fuselage or other location of your choice. Recess the inside to clear the $3/8''$ nut. Bolt the jack to a $3/4''$ square by $1/8''$ piece of plywood. Solder on wires long enough to reach the engine and glue to the inside of the fuselage. Be sure to insert your plug to check alignment of the jack to the hole. If your fuselage is made of fiberglass or plastic, drill a $9/64''$ hole and add a second piece of plywood with a hole in it large enough to fit over the nut. Epoxy this to the inside of the fuselage. This simple plug-in battery connection provides an added measure of safety for the fingers and also eliminates spoiling the looks of scale models which otherwise have to provide an access hole in order to connect the glow plug clip.

Bill Davidson of Montebello, Calif., uses Mayply or Italian Poplar Plywood which is lightened as shown in the sketch, then covered with Super MonoKote, or Solarfilm, or $1/16''$ balsa, for light, strong, warp-resistant tail surfaces or ailerons. A word of caution, however, and that is don't use silk, Siron, etc., as it will warp the open framework.

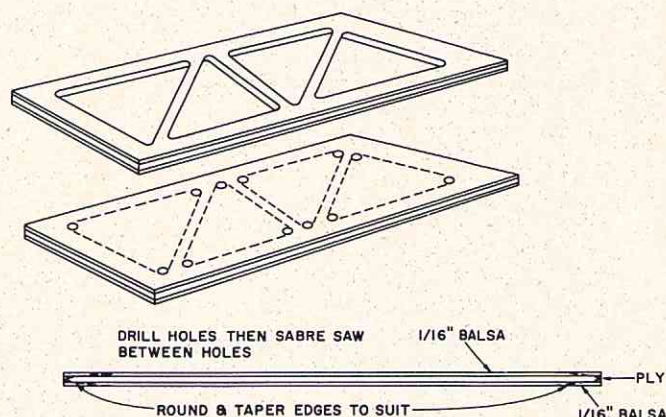
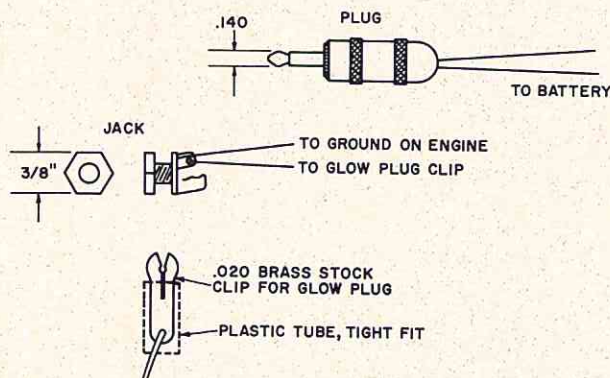
In order to make sure that your rudder lines up to a true 90 degrees to the stabilizer, W. C. Morrison of Owen Sound, Ontario, Canada, suggests two 90 degree squares made of masonite or plywood. Cut out the lower part of the squares so that each will fit on top of the elevator and against the rudder, clearing the body of the aircraft. Use

square pieces of lead or steel and drill and fasten these to the bottom of each square. All that is necessary is to glue your rudder in place and press the squares against the rudder allowing them to stand until the glue is set. The author of this idea uses Devcon 5 Minute Epoxy for his rudders and elevators and finds this adhesive much stronger than normal model airplane glues.



In case you are wondering how to get your decals to stick well on Super MonoKote, the trick is to put a slight amount of acetone on a cloth and rub well into the area into which you are going to place your decal. Make sure that there are no droplets of acetone left on the MonoKote; then place your decal on in the usual way, rubbing out the air bubbles. According to Wally Hurley of Fremont, Calif., who uses this method, the acetone vapors under the decal dissolves the decal just enough to make it really bond to the MonoKote. Wally has used this method on his scale Nieuport since May of 1969 with almost weekly cleanings of about 50 flights worth and it's still as strong as ever.

You could win a years subscription to RCM if your idea is published in this column. Send to RCM, P.O. Box 487, Sierra Madre, California



1969 R/C KALEIDOSCOPE

BY JERRY KLEINBURG



George Peterson tries a low one. Cherokee on inverted pass by prexy of Jersey Coast RC Clun. Flying skill on upswing everywhere during record flying year in 1969.

From the first meet in El Paso in January to the final heat of the 2nd Annual Tangerine International Contest on the 30th of December, 1969 had been the 'flyingest' RC year ever! Contests and fly-ins sprouted virtually everywhere in the U.S. and in countries clear around the globe. Together with the unmeasured sport flying, RC moved up to the dimensions of a major pastime and brought new membership marks to just about every club and association, including the AMA. 1969 contest flying was especially eventful due to a well-attended Nationals in Philadelphia, quickly followed by the largest Internats and capped by the RCIA Masters' Invitational in Atlanta.

And record action wasn't limited to flying as new trade shows were added to the established circuit of MATS, Northwest Conference, Toledo, Buffalo, and Monmouth. The North Jersey RC Club's Asbury show, the WRAM's 1st Jamboree in White Plains, and the RCIA Atlanta show hosted by the Cobb Co. RC Club, all set new stages for bringing RC's story to a growing audience. (A new round of shows for 1970 will be seen starting with the 12th Buffalo Winter RC Conference January 16 through 18,

then the 5th Northwest Conference on February 7 & 8, the Toledo show February 28 and March 1, followed by the WRAM's Jamboree set for March 14th and 15th. The MATS, normally held in January will be run in April in 1970.)

In other flying, pylon racing con-



Neither cold nor heat will keep the RC'er from his hobby. Ed Thielmann of Jersey Coast RC Club stuffs gear with cold fingers.

tinued its advance with the creation of a racing league in the Southwest and new contests across the country. Pylon II, the 600" class, was added to the racing roster and evoked good response as typified by the large enthusiastic turnout at the Nationals in July. The development of pylon racing was aided by having its own national association, the NMPRA, acting within the AMA framework to promote racing activity as well as to advise the RC Contest Board on matters involving pylon competition. Pattern contests grew during 1969 but didn't equal RC's overall growth rate. This was partly due to the tough precision nature of the competition and to insufficient rules development and promotion. (FAI maneuvers may be adopted for AMA expert pattern competition brought about by the loss of the Internats crown by the U.S. team in 1969...) Taking up the competition slack left by pattern drop-outs were a raft of 'fun' fly-ins featuring contests in limbo, spins, spot landings, and many other novelty events.

Scale flying took giant steps forward, with 1969 seeing added strength coming to the event through the continued broadened interest in WW I



Left: Club strength grew in 1969. Detroit Signal Seekers, over 50 strong and increasing. RC club growth repeated all over. **Right:** Many RC trade shows during 1969. Phil Cushman trophied with pylon entry at WRAMs 1st RC Jamboree. Ginny Ehrlich does honors, Bob Foshay at mike. WRAM 1970 show set for 14-15 March at Westchester Co. Center in White Plains.



Youngsters flocked to modeling in 1969. Best approach: their own club with activities scaled for young abilities and limits. Windsor, NY MAC filmed instruction movies of modeling techniques.

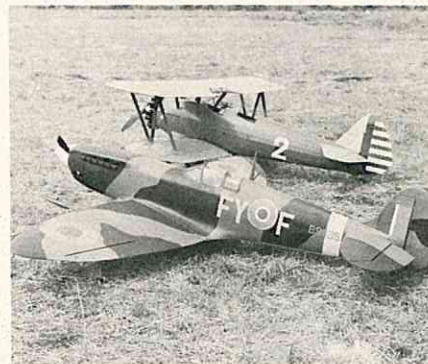
Dr. Bill Backer, president of Wausau RC Sportsmen, winds mill in sturdy P-51. Many professionals learned to unwind with RC hobby. Note donut 'bomb' - fun events abounded during 1969.



Mitch Epstein and Aamco pair. RC flown in many forms on land and water. Sportsmaster on floats does well, Trainermaster also. Popular kits.



Bob Ror's Aeromaster, 1st in Finish at Spokane Internats. Veco 61 in bipe beauty. Probable entry in 5th Northwest Conference set for Feb. 7 & 8.



Scale, going up everywhere. Pete Dryden's Spitfire and Roger Stern's PT-17 Stearman grace flying site in Rhodesia, Africa.

competition - an event as yet to be bridled within AMA contest rules. National and International unlimited contests during 1969 kept Scale in the limelight and competition visibly stiffened as amazing replica models were seen on the flight lines - models made possible through the dedication of scale buffs and the use of proportional

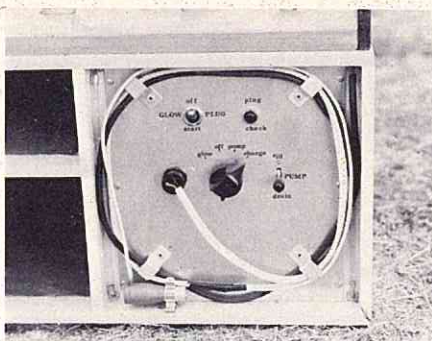
radio equipment to get the flying gems in the air. Glider meets also increased significantly around the world and experimental rules were devised for competition in many places. The glider market had the distinction of having models with the largest wing spans (22 foot and over are common) and the highest priced kit in the

modeling market (the 'really-ready-to-fly' Nelson KA6E at \$259.50 - before packing and shipping.).

Radio equipment reached its smallest size, was produced in the greatest quantities ever, and proved reliable and effective in the hands of pilots everywhere. New U.S. products were the Whitley Pro-Line and the Pattern

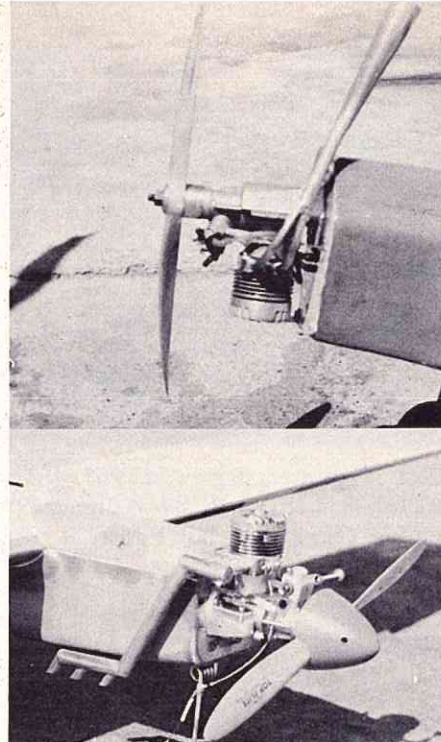


Muffled beauty. Roger Stern's Pitt Special sports cowled-in muffler, Merco 61. Weighs 6 lbs. with 720 sq. in. area and 12% section. Fast, 1st class modeling.



Above: Close-up of field box accessory 'control panel' by Pete Dryden. Hardware improvements all over the RC scene during past year. More coming . . . Pete's effort compact, efficient.

Right: Muffler pair at Tucson RC Club field. Dave Lyons shoots it over the top while Dick Schofield goes underneath. Saves wiping. Muffler use on increase. Improvements possible. . .



The girls joined too . . . Husband-wife teams keep RC balanced. Dave and Joan Alyea are center of Puebla, Colo. modeling action. Joan also edits Imperial Aces newsletter. Right: Glider guider - Tom Rankin, DCRC pres. shows gliding 'form'. Many RCers tried the 'silent' method in 1969



Daddy's helper. . . Susan Horstman poses Gil Horstman's Little Mike, a Prothero design. Pylon I growing in Las Vegas RC Club and elsewhere. Below: RC popular with servicemen, provides tour-easing overseas pastime. S/S Frank Britton of Udorn Royal Thai Flyers flies 7 lb. silked Aeromaster.



RC demonstrations excellent for public relations. Ernie Cawby, Pensacola Aeromodelers pres. gives injured navy man J.A. Hutchenson try at sticks during Naval Hospital show.



RC planes come in all shapes. Popular 'odd one' was Spiggen from May '67 RCM. This, by Paul Tumminia of Richmond, N.Y. Model Flying Club

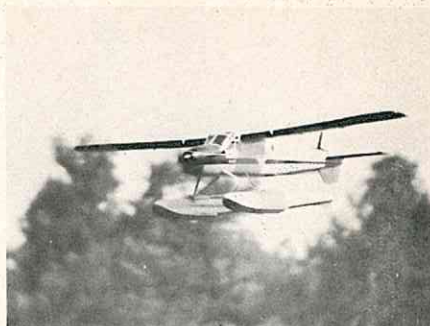




High school summer session had RC lessons by Signal Hill BIRDS. Bror Fabor flies for Lakewood, Ca. High School 'Wheels and Wings' course.



Canadian RC Patter Champions. (R to L) Warren Hitchcock, Ron Chapman and Dick Greive were 1, 2, 3, at Toronto Nationals. Close contest Big crowds.



Famous Turbo-Beaver by Don McTaggart used wheels to win 2nd in 1969 Canadian RC Nats. Camera equipped, it took aerial shots of traffic tie-up caused by extensive publicity.



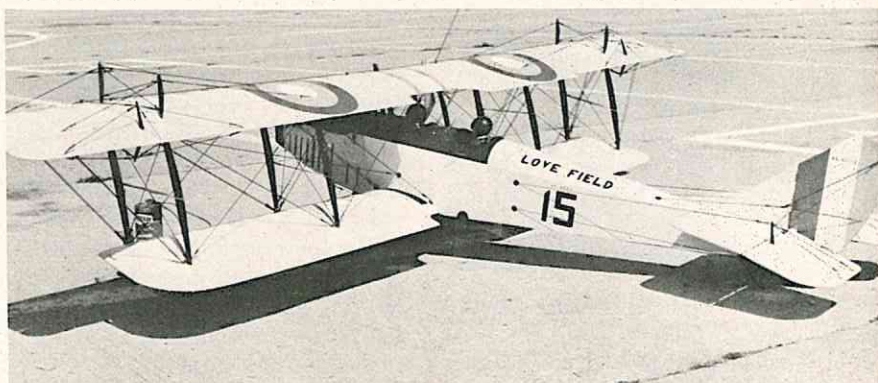
Bob Wischer and 1st place Bristol M-1 at McDonnell WW-1 Meet. Bob Teamed with Dave Burt for combat win. Vern Zundel's Brownie in background.



L: East Coast Scale Championship winners. Meet sponsored by Penn. Ave. RC Soc. of Brooklyn. Successful meet drew wide entry. Scale growing . . . R: George Peterson lifts off his 1st place Commanche at East Coast Scale Meet. George, president of Jersey Coast RC Club.



Walt Moucha's great Jenny. 1st in East Coast Scale Championships, 3rd at at 1969 Nats. OS 80 power, 12¼ lbs. 102 inch span, Micro-Avionics.



Master by Champion Electronics. These were matched in other countries by a whole gaggle of radio products. Integrated circuitry was the principle ingredient in electronic design development among radio innovators during the recent period. In the other area of major concern to RCers, engine production in the larger sizes seemed to falter during 1969 leading to delayed deliveries and shortages of parts all through the year. Consequently, U.S. made engines netted a decline in the growing market which saw Japanese, Italian, and German engines dominate in sport and competition flying. The use of mufflers grew somewhat with clubs calling for mandatory use as a means of mini-

mizing noise complaints in congested U.S. areas. In England, where muffler use was pioneered on a mandatory basis, appeared to slack off on their requirements. Further development of the noise suppressors was sought, however, to overcome drawbacks and to 'sell' muffler merits to reluctant fliers.

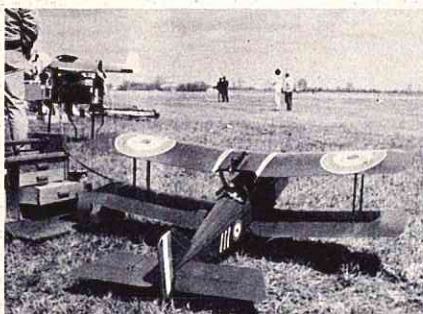
The Perry carburetor marked a major advance in engine performance and was widely adopted almost overnight. Featuring a built-in fuel reservoir, the California designed device was the brightest spot in an otherwise uneventful year in RC engine design. The latest engine offering of interest to serious competitors was the Webra 'Black Head' which came on the scene

late in the year and promises to be widely seen in 1970.

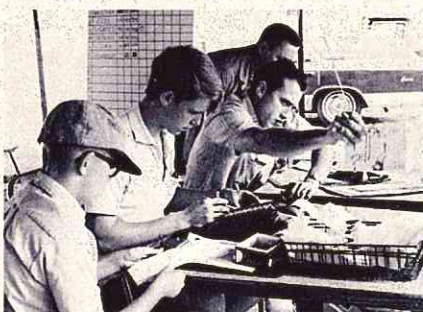
RC hardware lines continued expanding with a ream of new items appearing regularly. Retracting landing gears again attracted attention, especially due to the successful use by top Internats performers. Propeller products saw the wooden variety dominate, while the limiting factors of fiberglass and nylon props were recognized by an increasing number of modelers. Fuel technology was probed deeper than ever and showed there's much more to learn about satisfying the growing range of fuel needs by modelers flying in all forms of aeromodeling. Speed, sport and pattern flying in dry and moist, hot



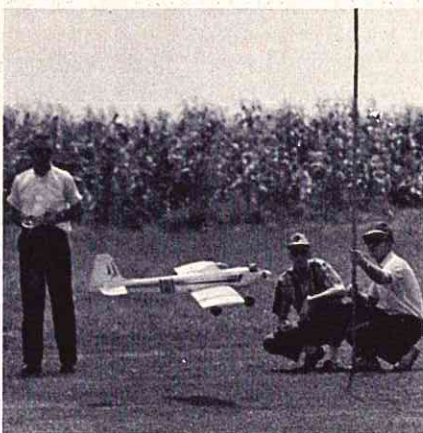
Bobby Gardner Jr. flew in Class A, did well. 8 year old pilot has poise, know-how. Clarksdale contest vet....



SE-5, by Ray Lievre was 3rd. in Yorkston 7th. Annual meet, frames idyllic contest scene of Canadian flying site. Competition spirited.



Busy place at contest is tabulation desk. TCRC members Mike Ye and Lyle Bohn handled chore at 13th Twin City meet in Shakopee, Minn.



Miles Reed heads for limbo line. Smooth and steady. Won C Novice at 7th annual Cleveland contest also.

and cold weather - all these variables were catalogued in terms of fuel formulas as maximum mileage and power were sought. Associated glow plug technology did not advance noticeably and modelers found fewer varieties to choose from in 1969.

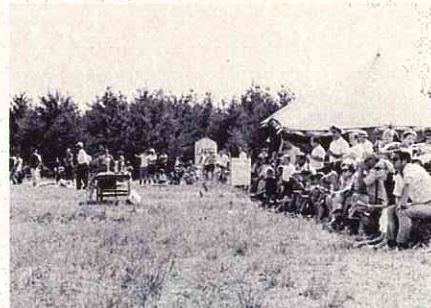
Flying safety received its share of attention during the year mainly in the form of extensively discussed opinions and suggestions. This topic received much attention at club meetings and almost universally in newsletters of the clubs. It also received major attention in the modeling press. Action, slow to start, sped a bit as a Modeling Code began to emerge through AMA machinery. Flying sites were another area of growing concern as fliers found themselves forced further into the countryside in search of places to fly. A few found new and satisfactory answers. 'Project 70' federal assistance was successfully used by clubs in Pennsylvania and New Jersey to secure flying facilities under recreational programs. Most, however, continued to worry.

The theory side of the hobby also came in for exercise during 1969 with considerable dialogue on basic aerodynamics appearing in RCM and many newsletters as well as in correspondence from many modelers. And this was only one topic newsletters devoted their pages to as they continued to reflect the growing sophistication of RC activity. More clubs found this medium useful to keep their growing membership informed of club activity and to reflect local opinion to the rest of the RC world. Picture coverage and offset printing were seen more often as content of the newsletters grew in utility to their readers and staffs.

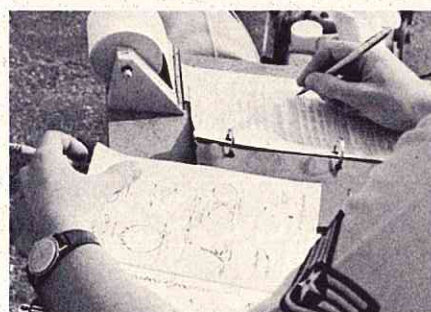
Juniors in RC proved their ability and demonstrated quick reflexes are beneficial in competition with adults. However, participation by juniors grew little in 1969 reflecting the limits imposed by economic realities, complexity levels, as well as time away from school books. Clubs and individuals, always concerned with keeping a flow of young blood into the hobby, increasingly recognized that assistance and encouragement to the younger set was best channeled through clubs composed of the youngsters themselves engaging the simpler forms of model flying. Attention to adult interests was reflected in magazines, on TV, and in RC news coverage generally. A 'Modelers Hall of Fame' was created
(continued on page 66)



John McLellan does judging chore during 1969 Clarksdale meet. Ralph Jackson flying, took 1st in B Pattern. John, Mississippi's main modeling maestro...



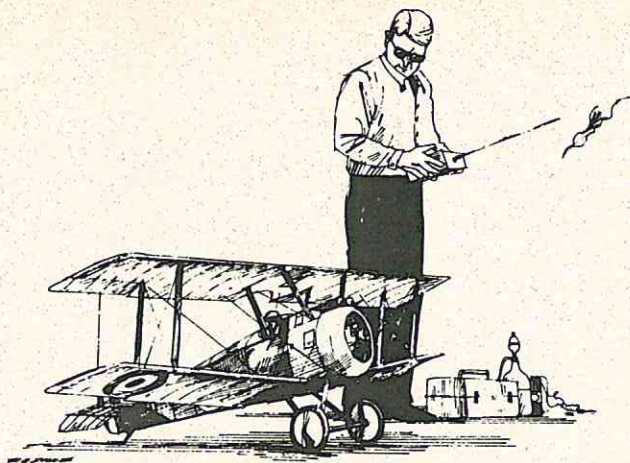
Scene at 13th Twin City RC Meet. Contest crowds growing as RC becomes spectator activity. Contest management job growing also.....



Twin City scoring method. Note roll tape that records scores from permanent maneuver list. Simple, inexpensive. Jess Farkas idea.



Oops! Tom Long, CORKS member caught in the act of testing wing strength during limbo pass.



by DAVE PLATT

(Designer — Top Flite Models)

SCALE IN HAND...

Before getting into our column this month, we want to correct a mistake that appeared here a couple of issues back. In an answer to a reader's query, we stated that we didn't think Nye or Wylam drawings suitable for scaling to a model. What we meant to say is that they are not suitable *without checking and correction if necessary*. In an effort not to be heedlessly critical of the drawings, we were overly brief, and on reading the comment again 'in print' saw how a wrong impression could be given.

The problem, basically, is this; these, and all similar highly-detailed drawings, are prepared from prints and information supplied by the manufacturer. Strangely, this material

sometimes contains incorrect dimensions, data, and so on. The draftsman, in turn, inadvertently repeats some of these errors, and the result is a set of dimensions that will not tally, or a shape which clearly is wrong when compared with photographs. We have frequently encountered appallingly inaccurate information from a manufacturer on his own product!

There are many ways this can happen. For example; a general 3-view may, in the factory, be crudely traced to show, in great detail and accuracy, some *one* aspect of the engineering - armament, maybe, or a color line layout. Now, if such a drawing is supplied to our draftsman, *as a 3-view*, then things can go awry. Another cause of

'inaccurate' factory information can be traced to the acquisition of an early print, made before some vital changes were performed and prior to the aircraft actually being built.

So, it can be seen how sometimes a very intricate and apparently accurate drawing can contain mysterious, and often complicated, errors.

Therefore, the normal procedure on using a drawing like this is: a) Believe the drawing *until* you find an error; b) If you do find one, try to find out what happened and make the correction, and c) Believe photos over drawings. If you come across a drawing with a number of severe errors, it's best to discard it.

But remember, don't shoot the draftsman! Most likely, the blame lies *originally* with the manufacturer! The job that our draftsmen do, and have done for untold years, makes scale modeling possible. Their labors of love (for that is what they are; the 'rewards' are slight) keep us going and never a month goes by that we don't turn excitedly to the appropriate pages to see what airplane has been
(continued on page 57)

One - Sixth full size S.E. 5 A
by P.J. Morrell. Power by O.S. 80.



R/C HARDWARE = SUCCESS OR FAILURE

THE MECHANICAL HARDWARE ACCESSORY ITEMS WE TAKE FOR GRANTED MAY OFTEN SPELL THE DIFFERENCE BETWEEN SUCCESS AND FAILURE ON YOUR NEXT R/C MODEL.

BY GERRY DALE

(Reprinted From The F.B.I. News Letter)

Club bulletins are the medium through which hobbyists expound on what pleases them and what disappoints them, in their endeavour to obtain personal satisfaction from their recreation. Too often the overall impression created by these documents of literary genius is one of discontent and dissatisfaction. In order to soften the blows that I may strike at the industrial kings of the hobby industry, it should be clearly understood that I feel we have advanced by leaps and bounds in the last few years in providing the hobbyists with the tools and equipment he requires to pursue his sport. He can purchase almost any item in various stages of assembly to enable him to possess a functional Radio Controlled Model Aircraft. The old days of 'build from scratch' are gone for some! I say 'some' because the vast majority of hardware products marketed for R/C use do not function satisfactorily as the designer may or may not have intended. It is hoped that the following ramblings will serve some guidance for the beginner to the hobby and also bring to light the need for refinements in the production of hardware items.

(1) **Nose Gear Tiller Arms:** There are three basic types currently on the market as illustrated below:

Types 'A' and 'B' have one thing in common, they are retained by an internal hexagon head set screw. The wrenches currently supplied with these units are of insufficient hardness to enable one to apply enough torque

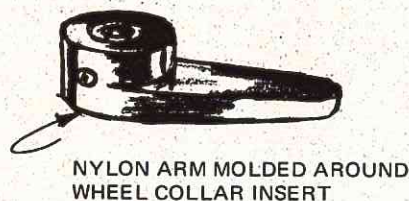
to tighten the screw securely. This can be overcome by replacing the set screw with a conventional machine screw. Of course, you must be able to reach it with a screwdriver. Type 'A' fails in one of three modes. The nylon arm begins to slip on the collar when fuel is introduced into the environment. The nylon arm splits on the back side of the wheel collar. The

nylon arm is so thin that it may bend under heavy loads and release itself from the pushrod end. - Type 'B' will split under heavy load at the location of the set screw. - Type 'C' requires soldering of the brass sleeve to the nose gear and I have never been able to figure out how you do this without damaging the lower nylon mounting block. - My own solution is shown

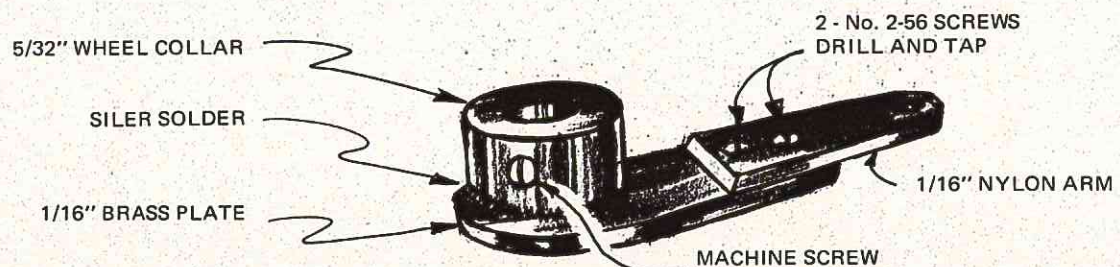
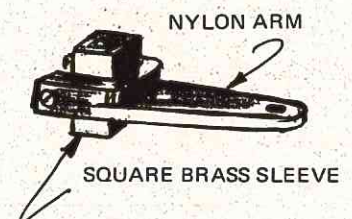
TYPE "A"



TYPE "B"



TYPE "C"



below but it requires considerable hand work and is not suitable for mass production:

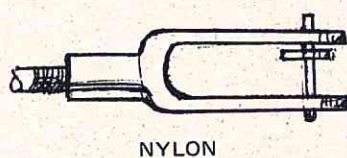
In all cases, of course, the nose gear must have a deep notch filed into it to accept the set screw and prevent the gear from turning. If anyone has an improved solution to a difficult problem, please send your ideas along to the editor and he will publish them in the hopes of interesting a manufacturer. There is nothing more frustrating than having a nose gear buckle just prior to an official flight, unless it's having it drop out during a flight.

(2) Clevises: These come in an endless variety that must be totally confusing to the newcomer. Some worth mentioning are shown below:

It's now well known that metal-to-metal contact of linkages cannot be tolerated according to the radio manufacturers' claims. Therefore, if the arm must be metal, the clevis must be nylon and vice-versa. Various attempts have been made at the production of hardware to solve this problem, but not all have been successful.

Type 'A' I have found unuseable. The manufacturer has attempted to produce the item in one shot by molding around the threaded shaft. The flanged rod insert is made separately and exhibits flash at the parting lines. The main two faults are that the diameter of the rod is too large to go through a 1/16" hole and the clevis cannot be rotated easily on the pushrod. Both types 'A' and 'B' should only be used for throttle hook-up as nylon does not have sufficient shear strength to survive the forces experienced on the horns of ailerons or elevators. Even when used on the throttle linkage it is essential that periodic checks be made to ensure that the fretting action caused by the vibration of the engine has not cut through the shaft.

TYPE "A"



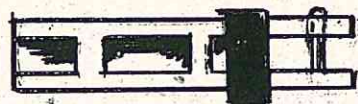
NYLON

While Type 'B' is near perfect for throttle linkages, two modifications

are recommended to make it acceptable: a) Clearance must be added to the clevis arm nearest the motor to allow the clevis to swing freely.

b) The hole in the throttle arm must be enlarged slightly to permit entrance of the clevis rod. I assume the problem here, is that the clevises are made in the USA to the inch system and the arms on imported engines have holes drilled to the metric system. "Please get together, you guys!"

TYPE "B"



NYLON

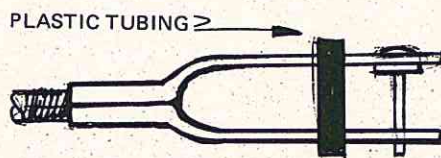
TYPE "B" MODIFIED
(SEE TEXT)



CLEARANCE FOR
THROTTLE ARM

Type 'C' of the smallest size is a fine product and can be used on elevator, rudder, and aileron connections to nylon horns without modification. Check to see that the pin will freely enter the hole in the horn before you buy. Some brands have oversize pins. Because of the material type 'C' is not to be used on the throttle linkage.

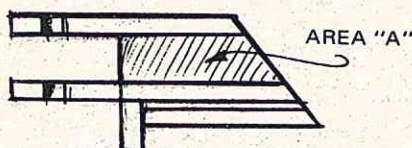
TYPE "C"



STEEL

Type 'D' is a quick connect, swing-in device for connections to servos. It is generally used with 1/16" music wire but may be drilled out to work

TYPE "D"



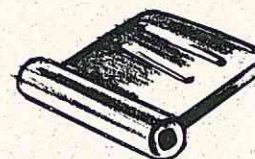
NYLON

with 'Quik-Link' size wire. It has one minor fault. Area A must be relieved of some material when the item is used with a rotary arm. The next time they re-tool for this one, maybe they'll change it.

Types 'B' and 'C' require plastic tubing to ensure they do not disconnect unexpectedly and type 'C' should be locked to the pushrod with a No. 2-56 nut to prevent rotation. With the exception of 'A' all considered good products. With the exception of 'C' all require minor improvements to make them first class.

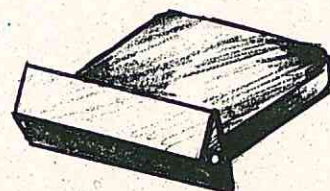
BEARINGS:

B



NYLON

B₂



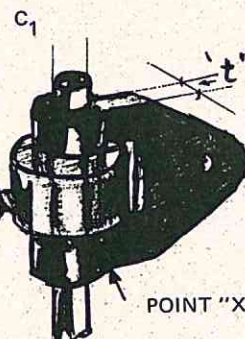
WHITE PLASTIC

B₃



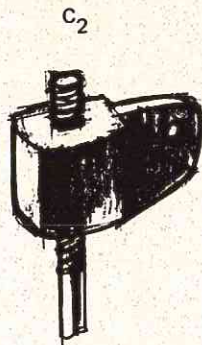
METAL TUBING

CONNECTIONS:

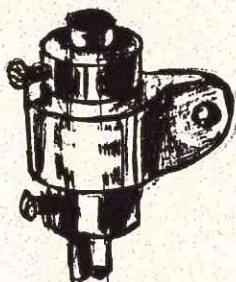


(3) Strip Aileron Linkages: This is a very difficult problem as there are many degrees of freedom required in the linkage. It is essential, how-

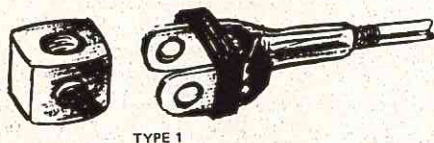
ever, that these degrees of freedom be provided without any play. This is of particular importance for Goodyear.



C₃



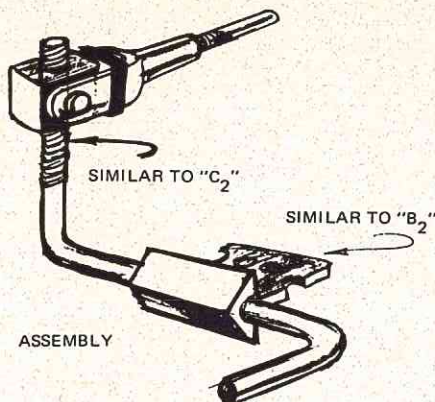
Above are shown a variety of bearings and connectors currently available on the market. B-1 provides the best bearing as the surfaces of the tab are sufficiently rough to bond well with epoxy. B-2 would be preferred as it is wider, had holes been provided in the tab to aid in bonding. C-1 will fail at point 'X' under heavy load and the connection tabs are too thin to eliminate side play when they are connected with the conventional quik-link or a swing-in keeper. C-3 is approximately 1/2" long in total and cannot be installed close to the bearing. C-2 is the closest to optimum providing the tab is wide enough to provide an acceptable degree of wear resistance and eliminate side play. A combination of C-2 and B-2 would provide the best known solution but is not currently available. - If we explore the problem a little deeper the device shown below might be just what we are looking for:



TYPE 1



ALTERNATE PARTS

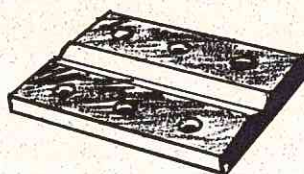


ASSEMBLY

This device would eliminate the side play which occurs at the joint of the quik-link and the horn tab. If the quik-link people were to make it, the parts would look like that shown in the alternate view. - It's not a major breakthrough, merely the difference between what is required and what is available. A small refinement.

(4) Hinges: Just about every manufacturer in the business has come out with his own version of a hinge. Below are shown a selection which would lead one to believe the problem is solved:

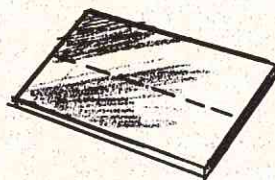
H1



POLYPROPYLENE

H-1 is the 'living' hinge, and its only drawback is that it must be assembled to the surfaces when you are building them and cannot conveniently be added after painting and covering. I prefer to add the hinges after the last coat of color has been applied.

H2

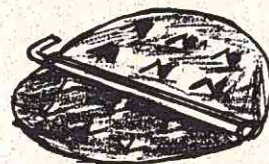


TEFLON

H-2 has all the advantage of Teflon including the property that nothing will stick to it, including epoxy. So you have to add three pins per side,

per hinge! A bit messy after that final color coat has been applied.

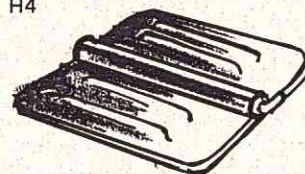
H3



BRASS

H-3 is metal-to-metal and like H-4, the hinge line has to be protected from adhesive. This can be done with some success with vaseline, but inadvertently one or two joints get jammed.

H4



NYLON

H-4 also requires a slot wider than that provided by the conventional X-Acto blade.

H5



MATT

MYLAR

H-5 has none of the above disadvantages and only requires that the joint be wiped free of epoxy after insertion. It won't pull out because the epoxy locks it in at the sides. It can be made from .010 drafting mylar, matte finish both sides and would be extremely inexpensive to produce with a rule die. Sorry, it's not available on the market, I have to make my own.

The failure of any of the above items could result in the loss of at least half of your whole investment and considerable loss in time and effort. I feel it is safe to say that each of us would pay double the prices we now pay for these little items to get exactly what we want and with a guarantee that they will function without unexplained failure. As our hobby seeks recognition as a sport, our sportsmen will continue to seek better quality and reliability in the little but very important things.

I doubt if Sammy Snead or Ben Hogan use a tee with a cut-off burr in the middle of it, or molding flash around the edges . . .

KITS & PIECES

DICK SONHEIM



Bob Upton with Sterling ME 109 profile model featured in this month's column.

The lead photo this month shows Bob Upton with the Sterling Messerschmitt ME 109 profile model. It is the aim of this magazine, as well as the desire of the writer of this column, to present to you, the modeler, the varied opinions of your fellow modelers, concerning some of the new products we report on. It is for this reason that we asked Bob Upton to build and fly one of the kits we will be reporting on this month.

Penford Plastics Corporation, 135 Water Street, Prospect, Ohio 43342, has just released their new Auto Start Electric Starter for model aircraft engines. The Auto Start can be used with any model engine from .049 to .80. The unit measures only 2½ inches in diameter and can easily be held in one hand. The Auto Start has an improved drive unit that comes with four drive inserts for spinners up to 3 inches and down to the smaller needle-nose half-A type spinner. The Starter only, will be \$24.95, or it can be purchased complete with a small 12 volt rechargeable battery for \$39.95. This is a great little unit for the contest flier and for the sport flier who would like to save his fingers!

Multi-Con Products, 1070B 9th

St., Upland, California 91786, the company owned by well-known RC'er Joe Martin, announced that they are now in production of a small lightweight servo. Joe Martin says that Multi-Con has spent a great deal of time and money over the past year developing an entirely new method of making nylon gears. The end result has been a perfectly formed 64 pitch gear which is the heart of the servo gear train. The servo measures .73" x 1.37" x 1.48" and weighs only 1¼ ounces complete with all the electronics. Power wise, it is comparable to most other servos on the market today. The servo features external centering, usually not found on most commercial servos. The Multi-Con servo is available for most currently manufactured radio systems. The manufacturer recommends that you send your present receiver and transmitter to the factory when ordering servos. The price will be \$39.95 each.

Technisales, P.O. Box 2233, Alhambra, California 91803, is now stocking a complete line of the KDH spring loaded nose gears manufactured in Germany. A wide range of sizes is now available including one small enough to fit the Flea Fli +10.

For those of you who are looking for some miniature screws, nuts, bolts, washers, or specialized electronics or jeweler's tools, I highly recommend that you send 25 cents to the Brookstone Company, 103R Brookstone Building, Peterborough, New Hampshire 03458, for their new Hard-To-Find Tools Catalog.

As long as we are on the subject of tools, K & S Engineering, 6917 W. 59th St., Chicago, Ill. 60638, has a new line of small precision screwdrivers. Set one consists of a screw chuck complete with five replaceable blades for \$1.95. Set two consists of a complete set of six precision screwdrivers in sizes from 2 7/8" to 4¾" long. The complete set is priced at \$2.95.

Several weeks ago I visited Jerry Nelson at Nelson Model Products Inc., 1414 W. Winton Ave., Hayward, California 94544. Jerry carries in stock a very complete line of gliders including many of those German scale kits. And, for those fliers who can afford only the best, Jerry is still producing his beautiful KA6E ready-to-fly glider for \$259.50. This is by far the most beautiful model every built by anyone, at any time, that is complete and ready-to-fly.

Echelon Publishing Company, 4401 W. 76th St., Minneapolis, Minn. 55435 has a beautiful set of six full color W.W.I air combat prints measuring 16" x 20" for \$8.95 per set. These excellent prints by noted illustrator J.V. Deneen will make an excellent addition to any wall.

PRODUCT REPORTS

When I first opened the box to Sterling's Messerschmitt ME 109 Profile Model I have to admit I was a little skeptical. After all, whoever heard of a board for a fuselage! I believe the wings are better than those that are supplied with some of the plastic ARF kits in that they are covered with a heavier plastic material that does not dent or scratch quite as easily.

Shortly after receiving this kit from Sterling Models, our well-known builder and flier of Formula I racing fame had just crashed his last stunt model. Bob was over at the house one evening discussing his lack of airplanes so I said, "Great, I have just the thing to get you back in the air by next Saturday." I handed the ME 109 box to Bob and I think he closed the box as fast as he opened it. His first remarks were about the same as mine. Bob took the kit and, about one week

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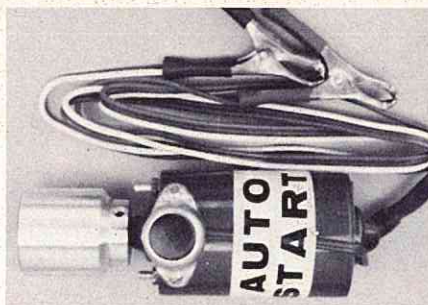
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later, showed up at the Valley Flyers meeting with a beautiful Messerschmitt ME 109 that I'm sure surprised everyone present. This model not only draws most of the crowds at the flying field, but it is also an excellent flier. Not only that, no one else but Bob Upton can make a low pass over the runway to check his fuel supply!

The following are Bob Upton's comments and some building tips on the Sterling's Profile model.

Sterling Models, in a bid to capture their share of the 'almost-ready-to-fly' market, has come out with a second profile R/C model since the P-51 appeared some months back. The kit is patterned after a Messerschmitt, ME 109, and makes into an attractive model. The wings are packaged in two halves and consists of foam sections covered with bright red plastic material contact cemented to the foam. The cores appear to be formed in a mold as opposed to hot wire forming. This is an obvious advantage in that the die process is the smooth surfaces obtained which enhances the bonding properties of the plastic covering material. The hardwood landing gear block is made an integral part of the core and is pre-slotted and drilled to accept the pre-formed landing gear. The wing joining procedure outlined and illustrated perspective in the plans is an ingenious construction method. The heart of the model is the wing, since all of the radio gear is housed therein. Two plywood spars framing the six inch by six inch box section (approximate size) housing the radio slides into slots in the wing cores, the front spar abutting the landing gear blocks. Initially, however, two short hardwood compression blocks are inserted and epoxied in one wing panel followed by placement of the servo platform. The platform is locked into position by the front and rear spars. When one-half of the operation is completed, the protruding parts are coated with epoxy and joined to the second wing panel, thereby complet-

ing the joining operation. The whole 'mess' is inverted so that the top is down and allowed to dry on a flat surface, the end result being an extremely strong wing providing maximum protection for your radio. I found that the rear spar had to be tapered slightly beyond the original taper to prevent it from lifting the plastic surface when inserted.

While the wing is drying, the fuselage is readied for painting. The front end plywood doublers are stapled to the one-half inch balsa slab to hold the hardwood motor mounts and wing hold-down blocks in place while the glue is drying. The staples can be removed, as suggested by the manufacturer, and the fuselage corners rounded to suit the builder.

The fin, rudder, stabilizer and elevators are cleanly die cut and easily prepared for mounting. The fin and stabilizer are glued into their respective slots adding the rudder and elevators after the tail surfaces are dry.

The wing is then fitted to the fuselage saddle and the fore and aft pre-drilled blocks, designed to accept the nylon wing hold-down screws are located and epoxied in place.

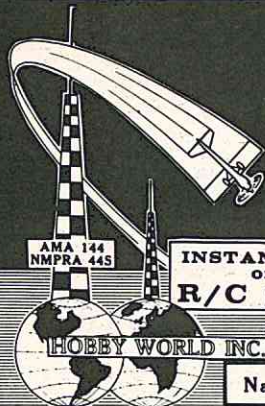
It should be noted here that extra care should be taken to obtain a perfect fit of the wing to the saddle as there is only about a two and one-half inch saddle width to support the wing. I used an epoxy putty, spread liberally on the saddle with a sheet of wax paper or the like between the top of the wing and the saddle, followed by tightening of the wing hold-down screws. The excess epoxy squeezes out assuring a perfect fit.

All fillets are then added to suit the builder. Fillets are a good idea, particularly in this type of model, since the flying surfaces are exposed to a minimum surface area for mounting purposes. The added strength is a sensible safety pre-caution, especially when using a .60 size engine.

The model is now ready for painting and even this requires a minimum of effort, since after painting the fuselage and tail surfaces the only part of the wing requiring paint is the strip ailerons.

The entire model can be finished in 10 to 12 hours and is especially suited for the smaller type of radio. The model weighs six pounds with a Super Tigre 60. No particular effort was expended to keep the weight down while building.

Dick Sonheim was on hand during the initial flights. The model needed



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just a 'smidgen' of down trim and it was off and running. I must say I was surprised and pleased with the way this 'bird' handled. I have since flown this model many times and find that it will perform all the maneuvers in the 'C' pattern. While the model could not be considered the ultimate in a 'pattern' airplane, it certainly holds its own.

After many flights on his ME 109, Bob recommends that the builder reinforce the corners of the plastic hatch cover, as it has a tendency to crack after a number of flights.

Lanier Industries has been rather successful in the last few years in the almost-ready-to-fly model market. Their plastic and foam models have made it very easy for many fliers to get into the air very quickly. Rather than going into great detail on how to build a Lanier almost-ready-to-fly airplane, I will try to give you a few tips on what some of the contest fliers have done to improve the flying qualities of the Citron Mark II.

The builder will find the instruction sheet supplied with the Lanier airplane of very little value. It con-

(continued on page 65)

SCALE IN HAND

(continued from page 51)

added to our list of (now) possible models.

So, let us apologize to anyone who took our earlier remarks in a way in which they were not meant to be taken due to our unfortunate phrasing. Let's hope this explanation will

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set the record straight.

Many people these days are saying that there needs to be a second 'class' of scale. While acknowledging the care and expertise that goes into an FAI Scale RC model, they feel, (and we wholeheartedly agree) that there ought to be a scale event for the AVERAGE RC flier, the guy who enjoys flying more than building, and who, perhaps, buys an ARF glass-and-foam job, or who just wants to stay with good honest simplicity.

As we said last month in our report on the unfortunate rule banning glass-ware from scale contests, simplified 'scale rally' events for 'semi-scale' models, (if that's what we want to call them) are a wonderful breeding ground for scale interest. Besides giving the modelers great fun at the time, herein lies the 'apprenticeship', so to speak, for the flier who wants to go all-out for scale, but wisely wants to tread slowly into this complex activity. Further, such events give the modelers with too little time for the

'real thing' an event that will give them a break from pattern aerobatics and the constant rigid practice sessions that these contests demand.

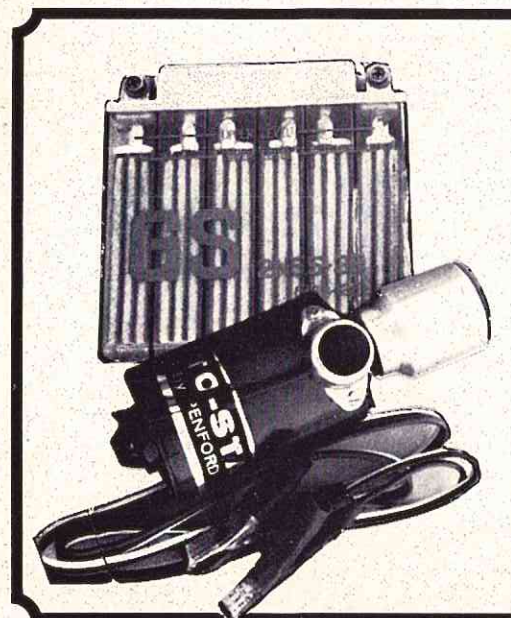
All in all, this column sees nothing whatever to be lost by incorporating a new and different scale class while there is everything to be gained.

So far, little has been accomplished toward bringing about this desirable state of affairs. It's the old story of many people wanting it but nobody doing anything about it. In order to break this apparent deadlock and, at least, get *something* started, we decided to lay down a set of proposed rules for a 'Stand-off' Scale Class.

To do this, we engaged in many conversations with scale, sport-scale, and pattern fliers with the object of sifting out some core of general agreement. Our tentative schedule, reproduced below, is the result of a concentration on essentials and the ruthless elimination of frills. Read them over and see what you think. If you care enough to write us with your

ideas - good! Nobody is going to claim that these rules are necessarily the best that can be devised. But right now, that isn't important. The important thing is to get something down on paper that we can talk *about*. What we really hope to get out of this is enough modeler opinion to frame a reasonably final set of rules that will gain nation-wide club acceptance. The more clubs that run such contests, the better the chances of the AMA taking notice and incorporating 'Stand-off Scale' into its rulebook.

It is undoubtedly impractical for the AMA to go so far as to add another RC class at the Nationals. And, as long as we can have only one class of Scale at the Nats, we think this should be the FAI, or 'expert', class. While realizing that 'Stand-off', or Class 2 Scale, probably would be much more popular in terms of number of competitors, we feel that a meeting of the size and importance of the Nats should stay with the 'highest level of proficiency' event. The only way that we



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could see Class 2 Scale flown at the Nats is if it was run in *addition* to FAI Scale; and we can't visualize this happening unless the declining interest in Pattern Aerobatics progresses to the point where this class has too little support to warrant a Nats event - and we doubt that this will happen to that extent.

Remember — we need *your* opinions! If you disagree with our schedule, write and say so. And tell us how *you'd* like to see it. We'll come back to this subject when some trends emerge from our correspondence. So get those cards and letters coming in — we'll give a year's RCM subscription to the best letter.

Proposed Rules for CLASS 2 SCALE (known as 'Stand-Off')

1. All AMA limits and safety rules, etc., to apply.
2. Flying before static judging.
3. Entrant to fill in options on flight

Maneuver Out Of K-factor Max. Score
10 Possible

Start engine
within 2 min.

OK	1	10	10
Take-off	6	30	18

OPTIONAL

Vertical upward
roll

9	1 1/2	15	13 1/2
---	-------	----	--------

Cuban 8	4	1 1/2	15	6
---------	---	-------	----	---

Bomb drop	9	1 1/2	15	13 1/2
-----------	---	-------	----	--------

Spin (3 turns)	3	1 1/2	15	4 1/2
----------------	---	-------	----	-------

Barrel Roll	7	1 1/2	15	10 1/2
-------------	---	-------	----	--------

Immelman	8	1 1/2	15	12
----------	---	-------	----	----

Touch & Go	10	1 1/2	15	15
------------	----	-------	----	----

Land within	OK	1	10	10
-------------	----	---	----	----

15 mins.	OK	1	10	10
----------	----	---	----	----

Landing Quality	10	3	30	30
-----------------	----	---	----	----

Landing precision	Spot = 15			
-------------------	-----------	--	--	--

Edge of field = 1				
-------------------	--	--	--	--

Pro-rate between)	8	1 1/2	15	12
-------------------	---	-------	----	----

TOTAL			200	155
-------	--	--	-----	-----

scorecard - his own choice of maneuvers.

4. Maneuvers need not be typical of aircraft type.

5. Judges shall mark flying maneuvers remembering that *realism* is more important than *precision*.

6. Three flights - best one to count.

7. Average out judges' scores (three judges, for example, add A + B + C and divide by 3).

8. STATIC JUDGING

(a) Model must be presented in *flying trim* (i.e., NO CHANGES of spinners, cowls, props, etc.)

(b) Static judges must be presented with a 3-view or tone drawing, preferably in color ('Profile' color painting or similar is ideal).

(c) Judging shall be done from 8-10 foot distance.

9. STATIC JUDGING SCORECARD

ITEM	Max. Score Possible
Overall impression	100
- realism	75

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Overall impression
- workmanship 50 45
Finish, color & markings 50 45
TOTAL 200 165

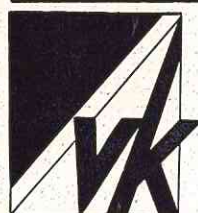
10. Static scores shall be averaged between judges, as flying scores.

11. Result shall be *SUM* of *FLYING*

points and *STATIC* points.

12. AMA numbers *must* be displayed on model but no minimum size or location rules, (i.e., in 1/8" figures, under stab is OK).

Note that the scorecards above are filled in with simulated scores to



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example the judging.

* * *

Sport of Sports

One of the greatest things enjoyed by those modelers who compete in Scale - and it doesn't matter if it's Radio, Ukie or Free Flight: it's the same in all of them - the friendliness of the rivalry. With the one possible exception of C/L Stunt, no other branch of modelling has such a spirit of comradeship as is found among scale fans.

Sure, when a guy takes a scale job to the Nats he's going to do his best to win. But the way in which this is done is unique. There is no cut-throat 'eliminate-the-opposition-at-any-price' atmosphere, and the confrontation of contestants on the flight-line, and around the judging cage; it's more like a reunion of old pals than a meeting of duelists.

Somehow, the winning of, or placing in, a Scale contest seems unimportant compared to just being part of it all. To walk about and see all those gorgeous creations; to chat with the builder and learn how he solved his problems; to find an understanding sympathy for one's own problems such as can only be provided by a kindred soul; is the essence of a scale contest. And so fierce is the scale modeler's pride in his sportsmanship that he will go beyond normally accepted lines in his endeavor to help a rival in trouble. This same pride provides the only means we know of getting a scale fan angry - and even then, we suspect that he isn't angry so much as hurt - and that is any display of poor sportsmanship by any man who calls himself a fellow-competitor - emphasis *fellow*.

The guy who raises a protest, refuses a helping hand, or tries to enter a model that he didn't build himself, seems so out-of-place among this bunch that they resent the intruder lest anyone think him typical.

This, then, is the spirit of scale. And any modeler about to embark on this boat needs to know how things are, so he can do his own personal best to maintain it.

* * *

One of the finest - but; don't let's be shy; let's just come right out and say THE finest - book on camouflage and markings ever to appear, now occupies a spot in the Platt library.

For any scale modeler who has any interest in Japanese aircraft at all, Donald W. Thorp's 'Japanese Army' (continued on page 64)



Ektachrome transparency and separation by Lanier Industries

RCM VISITS THE LAND OF LANIER

By JERRY KLEINBURG

The trip to Atlanta for the 1st Southern RC Trade Show and the Masters' Invitational Tournament offered an opportunity to visit Winny and Len Purdy in nearby Oakwood where they 'grow' those brightly colored plastic models seen just about everywhere. We can readily attest that Winny's kitchen turns out excellent food, and can also verify that Lanier Industries, located on the same property, turns out well-engineered and manufactured lines of ready-to-fly RC airplanes.

Len and his son Jim, an undergraduate of Georgia Tech, led a tour of the plant that houses all aspects of manufacture of the well-known lines of plastic planes. It's an amazing place, full of ingenious machinery especially designed and built by Len, himself, to do the specialized tasks of molding, forming, and processing all the parts needed for Lanier models. Don't get the idea this is a small one-man operation. Lanier is a multi-shift production

facility that takes many skilled people to create and assemble together the close tolerance parts making up a typical model - often called, affectionately, a 'spastic plastic'. Lanier Industries has long been noted in the plastics industry for its capacity and leadership as well as in the volume of its production. From steam-puffed foam granules to fused wing panels that are carefully weight matched in sets, it is obvious that care, precision, and quality are the watchwords in Lanier-Land.

Asked if he thought plastic ready-to-fly models would discourage traditional 'hobby' building methods, Len scoffed at the idea. "No one has seen the slightest reduction of the balsa and glue method of building," he said. "Our plastic model actually supplements existing modeling patterns and creates a new market to satisfy this additional facet of our growing hobby," he continued. "In fact, it actually stimulates building

activity," he concluded.

What's new and around the corner in ARF's? Len is working on a foam wing that eliminates the need for a separate high density covering such as the Air-O-Sheet currently used for Lanier planes, or the cardboard, balsa, or plywood seen on other foam cores. "The new method I'm experimenting with," Len said as he nodded to a locked door, "will bring about the high density tensile outer skin out of the foam material itself. And there are other ideas we're keeping under wraps for the present that'll benefit fliers everywhere," he added significantly.

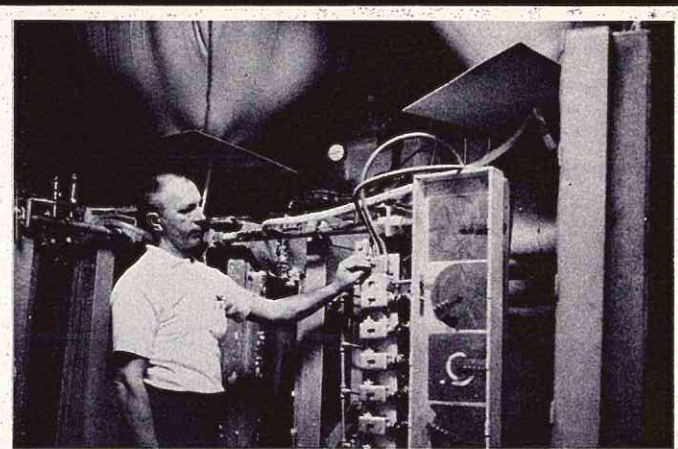
"Well, what else is new, then?" we asked. "Come into my own workshop and let's see what I do for my own RC flying . . ." Len invited. In back of the laundry room in a 6' x 8' area was a familiar looking clutter of the typical modeler, and in it a balsa framework of Len's 'latest' fun airplane. I swear it looked like a 1955 rudder-only! ●

PHOTOS CONTINUED ON PAGE 62

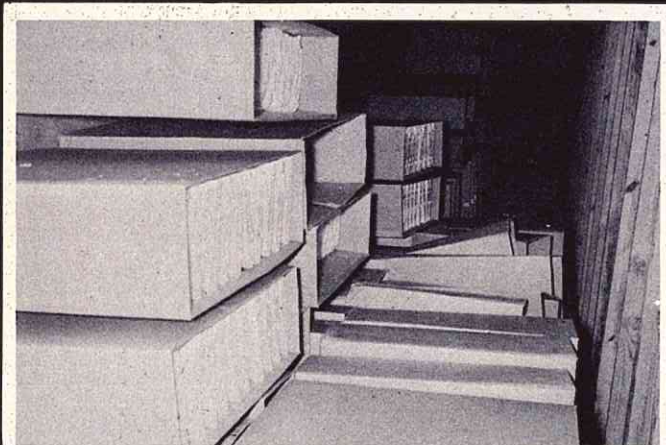
"THE PLASTIC MODEL ACTUALLY SUPPLEMENTS EXISTING MODELING PATTERNS AND CREATES A NEW MARKET TO SATISFY THIS ADDITIONAL FACET OF OUR GROWING HOBBY . . ."



Wings in the making . . . Automatic foam feeders overhead load wing molds for pressure and steam treatment. Lanier production unexcelled.



Len Purdy, Lanier head, adjusts automatic circuit timers that valve heat and materials into wing cores for all Lanier ready-to-fly models. Equipment designed and built by Len.



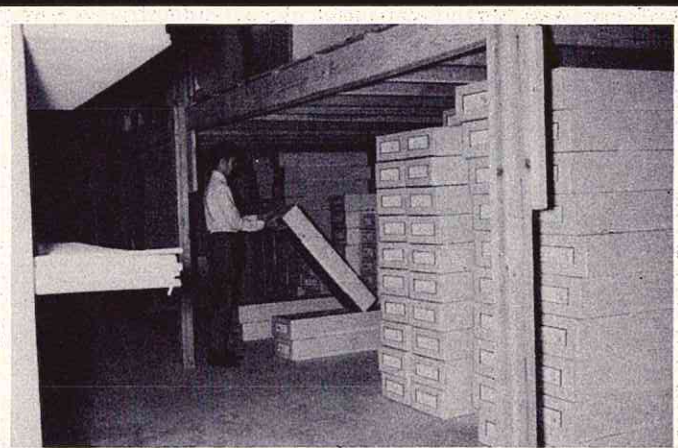
Boxed wing sets . . . Foam cores are weight matched and 'aged' prior to skinning with sheet plastic. Lanier process painstaking and precise.



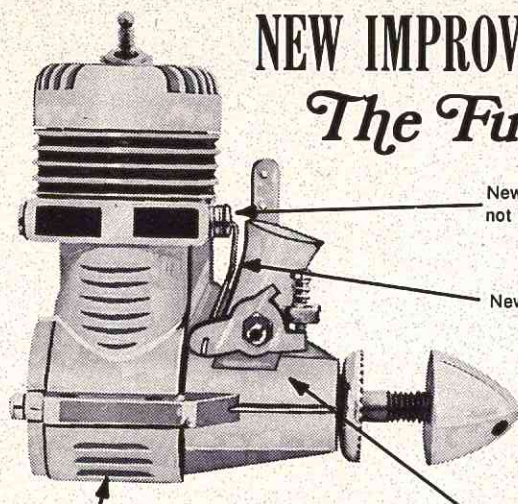
Front end framing . . . Jim Purdy assembles plywood front frame in one of many models manufactured by Lanier Industries. Alignment automatic, stiff . . .



More fuselage production. Colors are permanent and varied in Lanier model lines. Constant improvement and development key to Lanier success.



Ready to go . . . Lanier warehouse has rapid turnover of various models produced in Georgia plant. Demand high for quality product.



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SCALE IN HAND

(continued from page 60)

Air Force Camouflage and Markings, World War II' is the steal of this or any other year. Published by Aero Publishers of Fallbrook, California at \$5.95, this book is given away at the price.

Some 200 pages of information, photographs, color profiles, fin markings (there are even chapters on cockpit interior coloring, stencilled instruction markings, etc.) will clarify what has to be one of the least understood aspects of World War II aircraft.

Certainly the book will educate thoroughly anyone to whom *any* Japanese airplane is a 'Zero'! About our only serious complaint is that no such volume is available for the aircraft of every other nation.

Get a move on, Mr. Thorp! We're waiting to spend our money!

* * *

To finish up this month, a couple of additional sources of information on full-size aircraft.

W. C. Hannan, Graphics, P.O. Box A, Escondido, Calif. 92025, has a new catalogue of plans and things that is well worth asking for. Bill sent some samples of his plans and they look fine; he specializes in plans of obscure, hard-to-run-down airplanes as well as some well-known favorites. Get the list - it may have just the thing you are looking for.

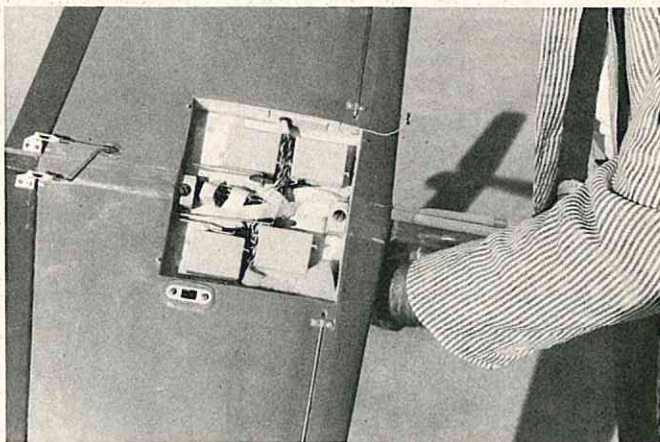
Model Airplane News puts out some priceless planbooks of Wylam, Nye, and Nieto drawings that no scale modeler should be short of in his library. Apart from aircraft, there are many drawings of aircraft engines and armaments, details which almost all drawings of aircraft lack, even the best.

Again from Superscale in Texas, a book which all WW II aircraft fans should have - 'Outstanding Military Aircraft of World War Two'. Cockpit photos, cutaways, drawings of bombs and long-range fuel tanks . . . truly a must-have item.

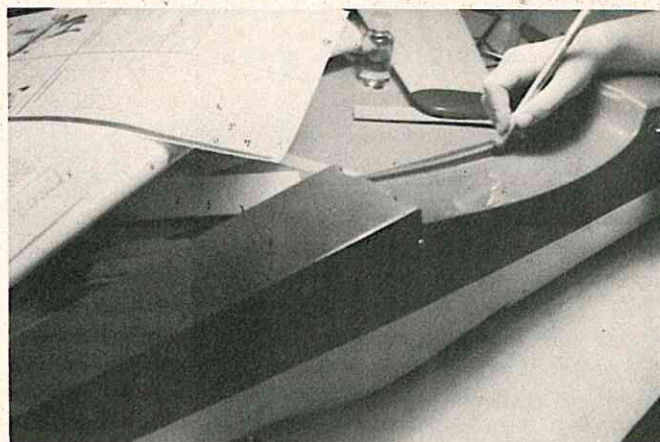
* * *

Tip of the Month

Surface (flush) rivets can be made by means of a small tube embossed into the paint after the color is all on the model. We found that brass tubing is no good though, because it wears too quickly. Use a good grade of steel and have it hardened. Such a tool will last forever. A bore of around .030" is good for 2"=1" scale.



Radio compartment in ME 109 is in center section of wing.



Cut out plastic in Citron fuselage bottom for wing opening.

KITS & PIECES

(continued from page 57)

tinues to amaze me how a company that has sold as many kits as Lanier has, still fails to supply a good set of instructions on how to build a model and install the radio equipment. With all the new people coming into this hobby, a great many of which are not model builders, a good set of instructions to follow is a must. In fact, I know of a number of top notch model builders who have run into problems building their first Lanier aircraft. I also feel that Lanier could put out a better kit if they would supply all of the necessary screws and sheet metal screws they talk about in their instruction sheet that most modelers do not have readily available to them.

For any of you who are now building a Citron Mark II, I recommend that you do not use the wire hinge for the rudder, as is briefly talked about in Lanier's instruction sheet. After only a few flights with this set-up, the

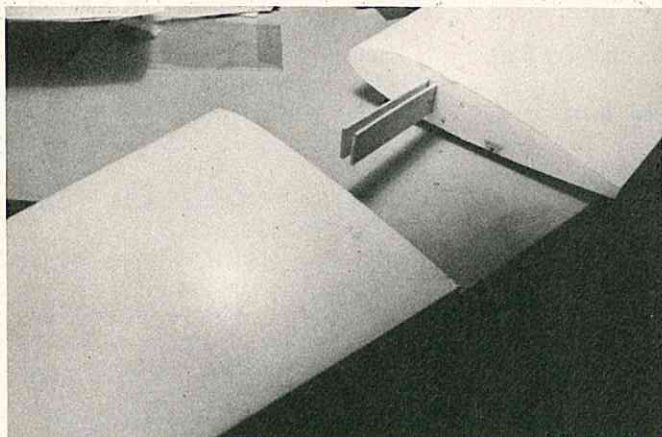
plastic will tear on the rudder and you'll just have to replace it with something better. A better method of attaching, or hinging, the rudder is to use the regular nylon hinge material and insert a piece of balsa wood in the leading edge of the rudder (which is hollow) to hold and pin the hinges. You should also shape a piece of balsa to fill in the bottom portion of the rudder on which to attach a control horn.

Lanier has made an attempt to strengthen the rear section of the fuselage by adding a sheet of plastic lengthwise down the center of the turtledeck. This was done to help correct the twisting tendencies of the tail of the plastic aircraft. During many of the maneuvers, such as loops and rolls, the plastic fuselage has a tendency to twist, causing the model to track very poorly. We strongly recommend filling the entire fuselage, aft of the wing, with liquid styrofoam. When you pour the foam into the fuselage, be sure you get an ample amount around the stabilizer where it passes through the fuselage. Not only

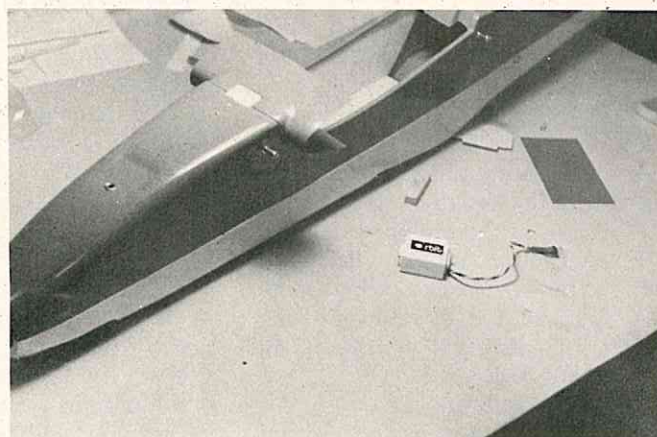
will this help the flying characteristics of the airplane, it will also greatly reduce the possibility of the plastic cracking around the tail section. Sig Mfg. Co. has sets of liquid styrofoam, as do other companies.

A number of the fliers also feel that the Lanier wing tips have given them a few problems. The wing tips are made of plastic, and, although they can take quite a beating, they are hollow, and therefore a little flimsy on the trailing edge. The section of the tip that extends beyond the trailing edge of the wing next to the ailerons can be twisted rather easily. It is recommended that you take a piece of the plastic material left over from cutting out the wing opening in the fuselage and glue it in over the opening. This will stiffen the tips considerably.


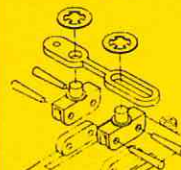
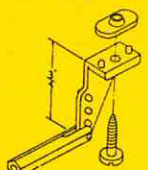







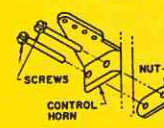
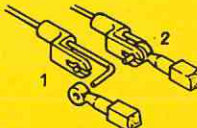




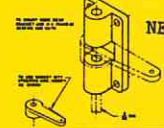


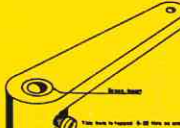
We are in the process of building a new kit from Joe Bridi that I predict will be even a more popular model than his famous Sun Fli. We will be giving you a complete report on it in the near future. Until then, see you in the pits . . .



Citron wings are easily joined together using epoxy.



Clever wing hold down in leading edge of wing.

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SUPER-FLEX NYLON HINGE .59¢ 5/pcs. 	SHOCK ABSORBING STEERING ARM .59¢ each NEW! 	CUSTOM NYLON WING MOUNT BOLTS .59¢ pair 	CONNECTOR LOCK 79¢ 4/pcs. 	NOSE GEAR BRACKET .59¢ each NEW! 	"THE MISSING LINK" .79¢ each 
<div style="text-align: center;">  <p>ROCKET CITY SPECIALTIES 1901 POLK DR. N.E., HUNTSVILLE, ALA. 35801</p> </div>			NEW FUEL TUBING 3/32" I.D. 3/16" O.D. This tubing will be available at your dealers ONLY on 30 foot spools, the price will be 30¢ per foot.	E-X-T-E-N-D-E-D STEERING ARM .59¢ each 	"MISSING LINK" W/O HARDWARE .79¢ pr. PUSH ROD EXITS .59¢ 4/pcs. These push rod exits will accept any wire size from 1/16" to .075 in diam.

TOP OUT

(continued from page 50)

by the Air National Guard of the State of Washington, modeling was associated with the astronauts, and commercial advertising also indicated the thrust of the idea of RC and adults. The DCRS Symposium continued to also improve the professional basis of modeling.

All these factors and facets of RC will be expressed during 1970 in a multitude of events, happenings, contests, shows, decisions, business ventures, and in the modeling media. There's no doubt it'll be another year of growth and expansion tied together with a good measure of our own brand of frustration and problems that make RC the full-bodied challenging sport/hobby/business it is! And we'll look forward to sharing all of it here with you in these pages.

CONTEST RESULTS

Contests filled every weekend and were all over the countryside during 1969. As space will allow, here are the winners in a spectrum of meets that

show how broad RC has grown.

Canadian RC Nationals

(Host: RC Flying Club of Toronto)

Class A (AMA) - Frank Evans, Ted

Hignell, L. Sanuido

Class B (AMA) - Ivan Kristensen, Alex

McLeod, Ron Russell

Class C (FAI) - Len Klebanoff, Bob

Stevens, Bill Burnham

Class D (FAI) - Warren Hitchcock,

Ron Chapman, Dick Grieve

Scale - Tom Dietrich, Don McTaggart,

Frank Knowles

McDonnell RC Club 1st Annual WW I

Meet - St. Louis, Mo.

Bomb Drop - Larry Killian, Dave Burt,

Trav McGinnis

Spot Landing - Dave Burt, Larry

Killian, Don Casper

Team Combat - Wischer/Burt, Signo-

rino/Casper, Lanterman/McGinnis

Meet Champion - Dave Burt of Evan-

ston, Ill.

East Coast RC Scale Championships

(Host: Penn. Ave. RC Soc. of

Brooklyn)

WW I - Walt Moucha, Leon Shulman,

Bill Antoine

Post WW I - John Gravini, N. Eisman,

N. Tirol

Civilian - George Peterson, B. Boufard,

Jack Roth

7th Annual Wright Bros. Memorial

(Host: W. Ohio RC Club - WORKS)

Class A Jr-Sr - Chas. Stone, Jim Carl-

son, Paul Siegel Jr.

Class A Open - Hal Van Diver, Bill

Campbell, George Gordon

Class B - George Estes, Gary Deem,

Don Snapp

Class C Novice - Tom Tylor, Bill

Denson, Gary Villard

Class C Expert - Norm Page, Tony

Bonetti, Don Ballreich

Scale - R. Miller, R. Johnson, Jim

Hiller

Pylon I - Ed Keck, Jim Goad, Pete

Reed

Open Pylon - Bob Renther, Dave

Keates, Bill Denson

Grand Champion - Ed Keck of Buf-

falo, N.Y.

Mississippi Modeling Assn. Annual

Meet - Clarksdale, Miss.

Class A - Mike Donovan, Marshall

Robillio, Dr. Gary Prim

Class B - Frank Jackson, Bob Gardner,

Dr. Bill Adams

Class CN - Bill Dowdle, Keith

McClure, Bill Payne

Class CX - Ron Chidgey, Jim Kirkland,

Dr. Jim Edwards

Mississippi Model Airplane Champion-

ships - Greenville, Miss.

Class A - Bill Davidson, Marshal Robillio, Dr. Burson
 Class B - Frank Jackson, Ernie Cawby, Bob Gardner
 Class CN - Keith McClure, Paul Azlin, Bill Payne
 Class CX - Dr. Jim Edwards, John Dougherty
 Scale - Alex Wilson, Bob Gardner, Carl Von Seuter
YORKS 7th Annual Meet - Yorkston, Saskatchewan
 Scale - Gerry Fingler, Art York, Ray Lievre
 Nov. Pattern - Dr. Olaf, Ed Hardy, Terry Pepler
 E.T.A. - Val Ure, Chuck Cook, Doug Copeland
 Measured Fuel - Doug Goddard, Ian MacDougall, Ed Hardy
 Spot Landing - Val Ure, Doug Goddard, Dan Pethrick
 Egg Drop - Bruce Pultz, Marcel Page, Ken Buckner
 Open Pylon - Ed Hardy; Most Flights - Doug Copeland
13 Annual Twin City RCers Meet - Shakopee, Minn.
 Class A - Jim Duda, Ray Drey, Howard Wayne
 Class B - Ted Berman, Mike Kuller, Virgil Lindstrom
 Class CN - Ken Duncan, Doug Brueshaber, Dr. Ray Fulks
 Class CX - Fred Sheplavy, Larry Welldiver, George Eide
 Scale - Dr. Ray Fulks, Bud Nossen, John Klassen
Cleveland RCers 7th Annual RC Contest - also 'Moonliter' Endurance Tourney
 Class A - Ed Heston, John Werne, John Pettit
 Class B - Dick Garmhausen, George Weigle, Jim Slater
 Class CN - Miles Reed, Brian Wheeler, Bob Oestering
 Class CX - Austin Leftwich, Alex Lekon, Al Dupler
 Moonliter - Dick Kowalsky, Bill Carrick, Brian Wheeler
ARKS 9th Annual Contest - Amarillo, Texas
 Class A - Randy Wright, Ken Crawford, Willie King
 Class B - Jerry Martin, George Reis Jr, Joe Wood
 Class CN - Ed Rankin, Phil Seeburger, Clete Brow
 Class CX - Ted White, Steve Helms, Lloyd Nicholson
 Pylon I - Ted White, Ed Rankin, Gale Helms
 Scale - Jim Zeleny, Fred Warming, J. R. Cox
Spanish RC Championships - Madrid,

Spain
FAI Pattern - Fernando Achiago, Claude Levin, Jose Avellan
N. Connecticut RC Club 5th Annual Contest
 Class A - Al Schindler, R. Prile, Dick Barron
 Class B - S. Griswold, L. Haley, J. Giadino
 Class C - G. Geissinger, L. Lucente, Phil D' Ostillio
 Scale - Pete Reed, Walt Zaltner, Dick Tanis
 Pylon I - Pete Reed, Hal deBolt, J. Selondo
 Pylon II - Hal deBolt, Satler/Zaltner, Reed/Goldenberg
Garden Grove 1st WW II Fly-In
 Bomb Drop/Spot Landing - Don Barton, Carl Weyl, Mark Smith
 Bomb Drop/Multi Engine - Harry Apoian - proxy flown by Lou Zein-neker
 Glider Pick-up - Bill Halpin, Jim McManus, A. Brink
 Glider Pick-up Multi Engine - Apoian/-Zeinneker
 Scale - Dale Cook, Bill Halpin, Carl Weyl
 Scale Multi Engine - Riggs/Johnson
 Sportsmanship - Kent Thomas
RARC 9th Annual RC Contest
 Class A - Otto Dieffenbach Jr., F. Perdue, W. Lippencott
 Class B - Dave Robelen, Otto Dieffenbach, Brad Reinhart
 Class C - Paul Ennis, George Hill, Austin Leftwich
 Scale - Dick Tanis, Otto Dieffenbach
 Pylon I - Mike Helsel, Bob Fulwider, Vern Smith
 Open Pylon - Austin Leftwich, Mike Helsel, Vern Smith
Aero Guidance Society Contests - Endwell, N.Y.
 Pylon I - Ed Keck, N. Smith, Austin Leftwich
 Pylon II - Hal deBolt, R. Dean, Ralph Jackson
 Class A - K. Fisher, R. Buzzeo, C. Young
 Class B - W. Wardlow, T. DiEdwardo, B. Bouffard
 Class CN - F. Vanderwilt, G. Buso, J. Lucente
 Class CX - Tony Bonetti, Jim Martin, Ed Izzo
 Scale - Walt Moucha, R. Jones, Hale Wallace
East Coast RC Soaring Contests
 Columbia, MD. - Walt Good, Howard McEntee, Maynard Hill, Dick Sarpolus
 Lakehurst, NJ. - Carl Maroney, Bruce Hagerman, Joe Roslyn, Dick Sarpolus
 Dover, Del. - Joe Roslyn, Dick Sarpolus, Carl Lorber ●

WAGGER

(continued from page 6)

have not succeeded. My problems are compounded by the extreme amounts of rain (over 200 inches a year) here in the panhandle, preventing any kind of active flying program. Under these conditions a simulator seemed to be the solution I was looking for. I feel, however, that in order for the simulator to be effective, it must rotate through all three axes simultaneously so reflexes can be trained for 'panic' situations. To make a long story short, I have started construction of a simulator. It uses three . . .

I'm going to stop quoting Dick's letter right there because he's promised to share the solution with us in a future article, and I don't want to affect anyone else's thinking in the meantime. How about some of you inventive people giving another thought to this problem? Dick's not the only RC'er with problems learning to fly, so let's pitch in and come up with some ideas to help these newcomers. Who knows, maybe even Walt can learn to stop littering the landscape . . .

BOATS: Albert Winters of Philadelphia sent the following cry for help:

Dear Sir: (Good Heavens! Reminds me of the time someone called me 'Mister Waggoner'!) I am interested in building model boats, and I would like to know if there is a publication on model boats. I am really trying to find someone who has plans for a submarine for R/C, or a PT boat or a sub chaser.

Well, Al, I haven't been very involved with boats ever since Walt decided to row out into the lake for deep water tests of his 'Soggy Seadog' seaplane. They tell me I was fastened to the bottom of the overturned hull tighter than a barnacle; since then, I've been on a straight milk diet. Anyway, we did a little research in the local hobby shop and found models were made by Hegi and Dumas for the ships you specify. If you can't pick them up locally, try Eastman's Hobby Shop in Fresno, California. (Since that's a rather long walk from Philadelphia, I suggest you drop him a note first.)

JUNIOR PROBLEM: O.K., brace yourselves. Bill Howard up in Anchorage, Alaska, has a medium-size

blockbuster for you.

Dear Domicile of Fleas: (I resent that! -Wagger) Enjoy the RC Playboy and the outspoken comments that often hit a vibrant chord, and would like to put my oar in. Have a thought which runs counter to the thesis put forth by the non-RC pussycats: 'The Junior Problem'.

This summer I had occasion to observe two boys just out of high school who became interested in the sport, joined the club, attended meetings, flew, then dropped out completely. Looking back, I wondered whether the older members had responded and accepted them. We started them right with proportional gear and good flyable aircraft. Experienced hand performed take-offs and landings. They were anxious to solo, did so, crashed, made repairs, and were back the next weekend. They were impatient with the instructor who recommended practice with figure-eights and landing patterns. They soloed early, perhaps too early, and were unhappy about time and tedious detail required for repair. They were looking for instant experience, instant repair, and instant expertise - an image of the TV dinner era in which they were raised.

Most of us were raised during the depression, or at least before World War II. The reason we labored for hours over a ten cent kit was because aviation had captured the imagination of the nation. While the glue was drying, our noses were buried in 'G-8 and His Battle Aces' or 'Tom Swift and His Electric Something or Other'. My recreation time was divided by a pile of dirt in the backyard, model airplanes, Tinker Toys, Little Orphan Annie, and Amos and Andy. The modern junior has been spoon-fed by TV, Little Leagues, tons of toys, and group therapy. He simply is not interested in a time-consuming hobby where he is alone and not entertained. A second insight can be gained from watching children watching the walk on the moon. They watched with the same aplomb as shows whose main character performs miracles with blinks or twitches.

Can you see your children absorbed in Frank Merrywell, Dawn Patrol, or the Falcons of France longer than the short period between commercials?

Let's forget the juniors and future spoon-feeding to gain a passing interest into this sport. Those with the true spirit will emerge. If the sport dies with us, so be it. Maybe the next sport for the modern boy will be a contest to see who is the fastest with a curling iron.

OK, Bill, now we're getting down to the nitty-gritty with the kind of gutsy and outspoken soul-searching we need. However, before you young spark plugs start blasting off at Bill, let me say a few words on the subject.

Please note that Bill is not just a 'do nothing' griper. His club honestly tried to help a couple of fellows who wanted to break into the sport. If the Juniors weren't interested, they wouldn't have been there. If Bill's group didn't want to help, they wouldn't have bothered. Yet, the effort failed and two potential RC'ers

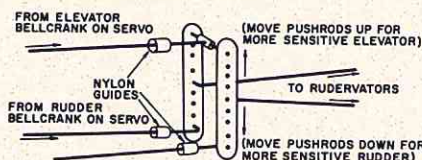
were lost. Bill is disturbed and disgusted and has the honesty to tell you so. That's the end of my sermon, and the old mail chute is cleared and ready; juniors and duffers, fire away!

BUTTERFLY TAILS: Mike Wieland in Newark, Delaware, passes along some compliments (which I'll pass along to you, darn betcha'...) and also some interesting problems:

Dear Walt and Wagger: I'm a two year RC novice, a graduate student in physics, and have never had the pleasure of coming down with an empty tank. Disregarding the fact that birds have hollow bones, I built two Rebels whose weight in ounces equalled or exceeded their wingspans in inches... despite my numerous failures I have retained my interest in RC modeling. I am impressed with your 'try this, try that, modify and remodify' approach as opposed to the old 'glue part one to part two'. I intend to improve my next plane with a couple of your ideas, so keep up the good work.

Wagger, I asked myself, is it possible to modify or augment a Control-air galloping ghost actuator for a Vee-tail plane without having to fasten the elevator control to the fuselage and then have the whole servo oscillate? (This is the way I interpreted how it was done in the 'Li'l Toad'.)

Mike then went on to sketch his ideas for a linkage to accomplish GG on a Vee-tail. Mike's solution was ingenious and would definitely work, although I'm afraid he would have problems with looseness and clatter in the joints. Although Walt and I have never built a proto model to check out solutions for this, I suggested the following linkage to Mike:



In addition, it occurred to me that a guy could also accomplish GG on a Vee-tail with only two pushrods if he were to spring-load the elevators to the 'Down' position; this would be something similar to the old 'Tee Dee Bee' linkage in the March '66 issue of RCM. If anybody's interested in pursuing this, drop me a line through RCM.

Mike also went on to share this idea:

In discussing the shape of the airfoil (October, '69 RCM) you pointed out that tip stall could be reduced by tapering the wing while retaining the same thickness at the wing tip as at the wing root. Hence, would you recommend the following?



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EFFORT IN ALL PHASES OF RADIO CONTROL

OFFICIAL RULES

1. Contest is open to any individual except employees of R/C Modeler Magazine or their immediate families.

2. Competition is officially open November 1, 1969 and closes midnight, April 1, 1970. Entries postmarked later than midnight, April 1, 1970 will not be eligible.

3. All manuscripts must be typewritten, double-spaced on standard 8½"x11" white paper. Photographs must be black and white glossies, measuring 5"x7" or larger. Special consideration in judging will be given to those articles which include, in addition to black and white photographs, one or more color transparencies, 35mm or larger. Artwork accompanying manuscripts must be original work (no blue lines), and neatly drawn in pencil or ink. Entrants must include their name and address in upper right hand corner of each page of typewritten manuscript, on the back (or otherwise affixed to) each photograph, and on all artwork. A mailing envelope, self-addressed, with sufficient return postage must accompany each submission if the entrant desires return of his material. No entry blank is necessary.

4. Entries must be mailed to: R/C Modeler Magazine, Design Contest Editors, P.O. Box 487, Sierra Madre, Ca. 91024.

5. Entrants must submit an aircraft design, consisting of (A) full size construction plans (pencil or ink); (B) manuscript of no less than 2,000 words; (C) black and white photographs consisting of at least two photographs taken during construction of the aircraft as well as at least two photographs of the completed aircraft, said design to conform to the following design parameters:

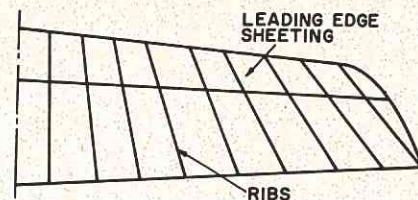
Aircraft must be an original design of a radio controlled model aircraft intended for competition under existing (a) Academy of Model Aeronautics, or (b) National Miniature Pylon Racing Association, or (c) F.A.I. classes of competition, or under rules established by the League of Silent Flight or other national associations for slope and thermal soaring; or an original design of a radio controlled model aircraft intended for sport flying; or an original electronic design of a radio control system for operating model aircraft, boats, or cars; or electronic design of shop and/or field equipment designed for use by radio control hobbyists; or design of individual electronic accessories to be used by the R/C hobbyist; or an original design of a specialized radio control project such as a radio controlled helicopter, race cars, boats, etc.

6. Entries will not be judged in separate categories, but equal consideration will be given to each class. Emphasis will be given, in judging, to creative design, originality of design, technical and mechanical accuracy, and neatness and extent of presentation.

7. Winners will be selected by the Editors of R/C Modeler Magazine and all decisions are final. Winners will be notified by mail of the judges' decisions and their names published in R/C Modeler Magazine in the August 1970 issue. All entries remain the property of R/C Modeler Magazine unless return has been specifically taken care of as mentioned in paragraph 3. Any entry that has been previously published, or is published in any publication during the period of the contest will be disqualified. The Editors of R/C Modeler Magazine reserve the right to purchase any entry for publication in R/C Modeler Magazine at the rates in existence at the time of publication.

8. The R/C Modeler Magazine 3rd Annual Design Contest is void wherever prohibited, taxed, or restricted by federal, state, or local regulations. Any state, federal, or other taxes imposed on a prize winner in this competition will be the sole responsibility of the prize winner.

1. Cut all ribs to the same size - blunt and symmetrical as desired for the root section.
2. Instead of aligning them parallel on the spar, spread them at a slight angle as follows:



3. The cutouts for the spar might have to be varied slightly, and the leading edge should be sheet-covered for smoothness. The idea would also be extendable to swept-wing design.

Yes, Mike, it certainly is practical. I suspect that the only real objection anyone would have would be the fact that we expect wing ribs to be parallel because they have always been parallel. Sounds like a heck of a clever way to avoid having to come up with all those different size ribs. Anybody want to give this one a try, and then send us a picture and report? We'll pass the results on to Mike.

Oh, oh. Here comes Walt for slope soaring. Time to put on the old Vietnam weed-proof boots for a slog up the hill. Well, as Great Uncle Balderdash Bassett used to say, "What goes up, must save a stitch in nine." I never did understand what he meant.

WHAT DO YOU THINK?

ENGINE CLINIC

(continued from page 12)

Keep those lines as short as you can get them and avoid any sharp bends or kinks. The fuel line, itself, should be the regular black, or the pink "Tuflin". Do not use thin wall surgical tubing. Even if it comes with the tank you purchase, throw it away. This surgical tubing deteriorates rapidly and will suck shut when fuel starts passing through it. The thin wall surgical tubing will also allow the clunk to fall forward and remain there. I've even had the stuff tie itself in a knot during violent maneuvers, and for some of you, even a take-off is a violent maneuver!

The clunk in your tank should clear the bottom of the tank by about 1/4" when held in the vertical position. Be sure and check this from time to time, as the nitro methane in the fuel causes the fuel tubing to grow. Most likely you will have to end up shortening it after a while. Do not let

the clunk bottom up against the end of the tank. You should also tie the tubing inside the tank at both ends, or make up a couple of the little 'C' rings we mentioned several columns back. The nitro methane also swells the fuel line and it can draw air where it slips over the brass tube in the neck of the tank.

The tank itself, should never be mounted solidly, but surrounded with plastic foam, the same as your battery pack. If it is mounted solidly, you may run into foaming problems. Many of you have had this problem without ever realizing it. The symptoms of fuel foaming are as follows:

As you lean the engine in, rather than a gradual transition from a four to a two cycle, the engine jumps right into a screaming two cycle. This is caused by a sudden foaming of the fuel brought about by vibration. As you back the needle out to richen, the engine continues to two cycle. After at least a half turn it finally drops back into an extremely rich four cycle again and you find that you are unable to get an 'in-between' setting. Many times an out-of-balance nylon propeller will also cause this problem. Not all ships with the tank mounted solidly will have foaming trouble, but if you are experiencing trouble obtaining a constant needle setting, you had better give some thought to this idea.

Keeping the fuel clean cannot be emphasized enough. The most minute particle of dirt or foreign matter can cause trouble. And yet how many of you bother to filter your fuel? There isn't a fuel on the market that does not contain impurities. No matter how carefully the fuel manufacturer filters his fuel, it still has to go into a container. These containers have not been manufactured under sterile conditions, and foreign matter is going to get in. Many of you will use a filter in your fuel can and then suck the fuel into a fuel bulb that should have been thrown away a year ago. I get engines back all the time for repair with the inside of the crankshaft plastered with specks of decomposed fuel bulb. The owner has been having needle valve trouble, always filters his fuel, and cannot understand it. Run your fuel through a filter as you fill the tank in the airplane and especially if you use a fuel bulb. Don't just depend upon a line filter in the fuel line itself. Why fill your tank full of garbage and then expect the line filter to solve all the problems? Make sure CLEAN fuel goes into the tank.

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How many of you are using a filter as a clunk in your tank, and then filling the tank through the fuel feed tube. What in the world good is the filter doing? You are trapping the dirt before it ever gets into the tank, so that the first time you start the engine it is drawn right into the carburetor. If you are going to use a clunk filter, then you will have to have an extra fill tube in your tank. It is really surprising the number of fellows that are making this mistake. Not just beginners, but experienced fliers that should know better. In fact I'll bet a few faces are turning red about now!

SUNDAY FLIER

(continued from page 14)

1. What size model would you prefer to have to learn on?

a. Five to six foot span _____

b. Four to five foot span _____

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- c. Three to four foot span _____
2. Assuming the model is marketed as an 'almost-ready-to-fly' type, such as Lanier, Angel, Airtrol, DuBro, etc., would you prefer that the model be fabricated of:
 - a. Foam plastic _____
 - b. Vacuum formed plastic _____
 - c. Balsa and plywood _____
 - d. Other _____
 - e. No preference _____
3. If the model were to be marketed as a kit, or a 'partially assembled' kit, or an ARF (almost-ready-to-fly, requiring only the joining of wings,

assembling of tail, installation of landing gear, engine and radio), which would you buy?

- a. Kit (\$15-30) _____
- b. Partially assembled (\$25-40) _____
- c. ARF (\$45-65) _____
4. What would be your design preference? Assume all are stable.
 - a. High wing monoplane _____
 - b. Midwing monoplane _____
 - c. Low wing monoplane _____
 - d. Biplane _____
 - e. Amphibian _____
 - f. Other? _____
 - g. No preference - just the MOST stable design, that can fly 'hands off' if

necessary _____

5. What radio system will you use?
 - a. Single channel, rudder only (\$75-100) _____
 - b. Pulse proportional (Galloping Ghost) (\$120-180) _____
 - c. Digital proportional (\$220-450) _____

Maybe that's an oversimplification of the questions. If you think so, then add your own. At least it will give some indication of what you, the beginner, think you'd like to have, and we can go from there.

Just to start the ball rolling, I've been giving a lot of thought to the question, "What really is the best type of model for a beginner in radio control in today's world of ARF's, plastics, mylar and sophisticated radio gear?"

It is interesting to note that as of now, it seems that I do more flying of other guys' airplanes than I do of my own - mainly because every time I go out to the field, somebody, usually a relative newcomer to the sport of R/C, shows up with his first model and wants help in flying it. At least they've gotten the message - get help on your first flight.

I am delighted to help them, for two reasons - one, it keeps me in tune with the viewpoint of the beginner, and two, the appreciation they show, when their airplane goes up, flies, and comes down in one piece, is worth all the time and trouble (and some of them do give trouble - out of balance, warped, surfaces hooked up backwards, balky engines, binding servo linkages, etc.) of helping them get the job into flying trim.

From those experiences, I've reached certain conclusions. Not everybody agrees with me; that's their prerogative. But I think I know what type of airplane is best for the raw beginners we are seeing today - not former control line or free flight modelers, but guys who have seen the models flying, and want to buy one and fly it. They have no knowledge of aerodynamics, structures, or electronics - they just want to fly. For those guys, there is NO completely satisfactory model on the market today. Some come close, and if the guy is lucky enough to latch onto an instructor, he does all right - as evidenced by the success of some of Lanier's models, DuBro's, and lately, Carl Goldberg's 'Ranger'. But there's still room for improvement.

Were it not for the fact that the models have to be built, there are

several kit jobs that, properly constructed, are good beginners' airplanes - but beginners generally can't construct them properly, so that eliminates them except for former U/C pilots and free fliers.

So what's the answer? Well, first you establish the requirements, and then try to figure out something that will meet them - and that ain't easy, or someone would have done it before this.

Let me enumerate what I consider to be the foremost essentials for a true beginner's R/C model, and briefly discuss each.

One. The model must be prebuilt, with an absolute minimum of assembly. It is essential that the wing and stab production method assures that each model will have a true surface, free of warps.

Two. The model must have completely built-in stability. It should be capable of taking off from the ground, free flight, and flying all by itself, then, when the engine quits, gliding to earth without any help in the way of trim or control. Thus, we come back to the early type of R/C, which Don Mathes once described as "free flight with occasional R/C interference." And that's exactly what we need - an airplane that will fly all by itself, but the beginner can gingerly give it a control command, and then, if he gets confused, can just leave the model alone and it will recover from any attitude and resume normal free flight. Sound impossible? Not at all. The Showmaster will do just that, and I've demonstrated it hundreds of times to disbelievers - but it is satisfactory only for former free fliers because of its construction.

For unassisted take-off, a tricycle gear is best - and it should not be steerable for the beginner, because he'll over-correct and blow it every time. All that is necessary is that the gear be properly aligned so the takeoff run will be straight. Later on the steerable feature can be added.

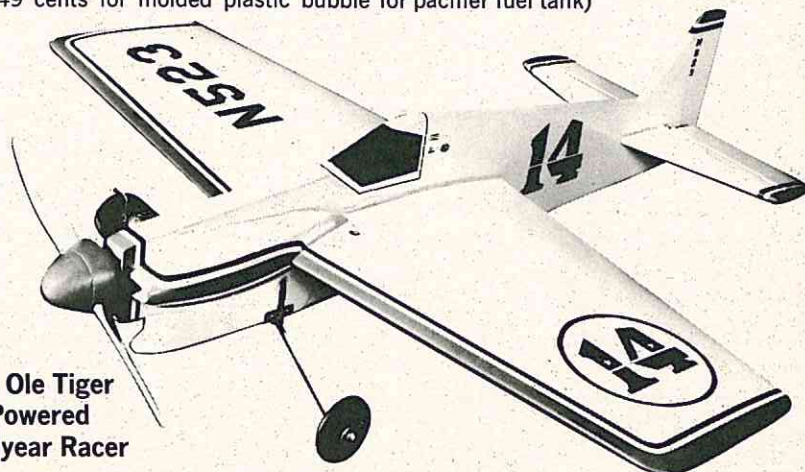
Three. The model must be rugged - yet light in weight. This is the toughie, and so far, nothing I've seen will equal balsa. But balsa has so many variations in density that it tends to be unreliable when you go to mass production. Foam, with balsa skin, is slightly heavier, but more uniform when hundreds - or thousands - of production kits are involved. Formed plastic is only as good as the workmanship in forming it, but it also tends to be heavy - and a heavy model has to be

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planes

fast, and that's no good for a beginner.

Four. The model must be easy to fly. That means that it must also be able to fly even though it is not perfectly adjusted. In other words, C.G. location shouldn't be critical. And the only way to be sure of that requirement is to use a well proven force setup.

Five. The model must be good looking. It must not be a 'look-a-like' and yet it has to have the aerodynamic qualities which look-a-likes have, and which is basically why they do look the same. But you can disguise the look, if you try. (Perhaps an exception

to this requirement is the 'Ugly Stik', which is so ugly that it has its own special appeal.)

Six. It should provide easy access to the equipment. Beginners are likely to be 'ham-handed,' so this should be taken into consideration.

Seven. The engine should be easily accessible also - and upright mounted for easy starting.

Eight. The model should have growth possibilities - like for the addition of a steerable nose gear, or perhaps a provision for 'taildragger' gear with a steerable tail wheel. And maybe a different wing, with provision for



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RETAIL CUSTOMERS IF YOUR DEALER DOES NOT STOCK CANNON EQUIPMENT, ORDER DIRECT
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aileron, and semi-symmetrical section for inverted flight might be available as an accessory.

There probably are other features that would be desirable, but if most of the above are attained, it would be further along than present day 'beginner' ARF models.

Now I'll probably get a lot of nasty letters from manufacturers telling me that their products fulfill all of the above requirements. Oh well - like I said at the start, not everybody will agree with me. So what else is new?

* * *

Since it will be midwinter when you read this, I thought it might be a good time to show you some rather unusual

midsummer flying. Noland Adams, of Kerman, Calif., writes:

I saw your excellent checklist in the July issue of RCM. I then realized you might be interested in my special additions to your checklist.

You must understand, that, although I am a member of the Fresno Radio Modelers, I am almost 30 miles from the club flying field. Also, I fly a lot on weekdays, when no one is around the club field anyway. So I go 5 miles out in the desert and fly. Actually, this is an undeveloped alkalai flat 20 miles west of Fresno. I fly a 3 year old (it looks it) Tauri with an Orbit 3 + 1.

Last year a 3 to 3½ foot long rattlesnake was killed 100 yards away from where I fly. I've carried my pistol since. So my changes to your checklist:

Before Departing to Field

2 f. Pistol & Ammo

Preflight Check

Clear area of undesirable animals

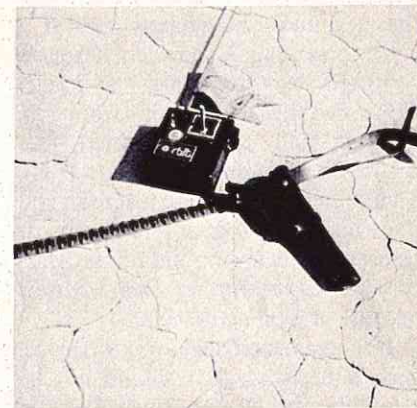
In Flight Check

Glance at ground occasionally for approaching undesirables.

Actually, though, this has been a good year, haven't seen a rattler yet. The pistol stays in the car but I'm not about to leave it home.

Incidentally, the nearest house is almost one mile away. They don't know I use this area, and they are not likely to find out, because I use a muffler. I'm not about to chance losing my free private flying field.

Sincerely,
Noland Adams
Kerman, Calif. 93630



Can you imagine what a predicament could develop? There you are, with your high performance model, that has to be flown every second of the time, scooting through the sky, when suddenly there's an ominous rattle behind you. If you take your eyes off the model, it'll cream itself; if you don't, you may be in urgent need of some snakebite serum!

The odds are that you'd let the model buy the farm while you shot the rattler - then you'd go take a few shots of your own brand of snakebite cure anyway!

I tell you, this Sunday R/C flying always has a way of coming up with some new way to give a guy a thrill! ●

MESSERSCHMITT ME 109

PROFILE R/C AND IT'S ALMOST READY TO FLY

Pride of the Luftwaffe in World War II! Now Sterling recreates the ME 109 in profile R/C that's almost ready to fly. Get the ME 109 this Friday, fly it on Sunday!

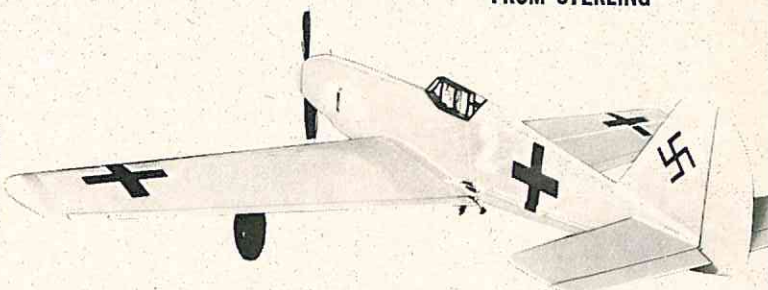
Kit features brilliantly high gloss red plastic covered foam wing panels, ready to join; assembled ready-to-go factory-built fuselage in which the maple motor mounts, maple nut blocks, birch plywood sides, birch wing saddle, etc., have been factory installed. Two sheets of giant authentic decals; plastic canopy, wing tips and hatch; formed wire gear, a Sullivan fuel tank, all required hardware, nylon horns, nylon push rods; etc.

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IT'S NEW!

FROM STERLING

CUNNINGHAM

(continued from page 10)

number of flights. Limbo and other type of events were not included since we felt that with a large entry it might wind up with someone getting hurt holding a limbo pole, or an aircraft going out of control after making this type of pass. We have held many of these events, and from all sides, it seems that the 'pattern' that we have developed will give the best competition for all fliers. The spins, rolls, loops, and landing points will all be weighed so that no one event will offer an excess of points over another.

Try it out next Sunday when you go flying, and see what you can do; remember, if you can do 15 spins, 10

loops, and 12 rolls, then you had better get to work, because the winning aircraft will probably stack at least 30 or more spins in that thirty second climb out, perhaps more. The first set of figures is about average for the normal pattern ship, such as the Kwik-Fli.

Which, by the way, brings me to my next point; just what type of aircraft is best suited for this type of competition? We hope that this event will breed a new type of aircraft just as the Goodyear Races spawned an entirely different brand of airplane - the Formula I racers that we have today. We have been somewhat stuck into a rut of 'sameness' with pattern aircraft, so perhaps some really inventive fliers will work out a new type of ship. Of course, the National Fun Fly will probably be won by a Sun Fli IV, and toss all of my ideas out the window, but perhaps not.

But let's examine what we need in the way of an aircraft in this type of competition. First, we must have a good, reliable, and powerful engine. The engine also depends upon the size of aircraft that we choose to fly. Just think, a Little Ugly Stik, either from RCM plans, or from Midwest, with a

40 on the nose will grab a lot of sky in a hurry and be hard to beat, but will it slow down enough to land with the precision needed for the tight, dead stick, spot landing? How about a full size Ugly Stick with a good .60 in the front end? Good choice. Or, any other shoulder wing design, or even a cabin wing aircraft. I personally feel that this type is more suited for this event than is a hot, low wing aircraft with a high wing loading where you simply have a harder time on some portions of the 'pattern'. Another thing to work for is overall lightness. A light aircraft will climb up from the ground faster giving you just that much more altitude for those spins. A lifting airfoil again is a big help here. Also, a ship that will loop quickly, is reasonably short coupled for tight loops, has a fast, smooth roll rate, and yet can slow down for a landing 'right now' is a must.

Maximum control movements are also a must. A lot of aileron, rudder, and elevator is needed. Think it over, if you plan to come to Fort Worth in June, then you'd better begin working on that aircraft now! One other rule that we haven't mentioned, is that the entire flight from engine start to touch

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down must be flown within the five minute limit. If you run out of time, they you will not receive any points for the remainder of the flight, no matter what type of landing you make. Therefore, it's important to get a fast engine start. But, no electric starters will be allowed, you must start by hand.

These then are the rules as they now stand. We will publish them in full in the next issue so that everyone will have a number of months to get ready. Perhaps a Biplane would be a good project, or a Delta, if you can get it to spin. Anyway, get out the balsa wood and get busy, and we'll be looking for you in Fort Worth in June.

Last month you read, I'm sure, about the trip by old Dewey from the semi-civilized area of California across the vast uncharted areas of the Great Southwest, finally coming to rest in the hospitable lap of Fort Worth. Well, let me be the first to tell you that he didn't tell you ALL of the story. And, I'm not going to tell the entire bit here either, but, ole' 'Fearless' would not have made one of the better pioneers. Trailblazer, yes, because he found several different routes to take that

were not on the map, but hardy pioneer, never! I really didn't think that he would ever even leave home, much less get here, so I followed him by telephone all across the country just to see if he had turned back. We took lots of pictures just to prove that he really did make it. The AAA and I both planned out his trip, told him where to stop, and what roads to take.

Great! In the middle of a given night I was awakened by the phone ringing, and it was Don calling from someplace in El Paso. He had taken a wrong turn, drifted into Mexico, been accosted by the Border Patrol, (who finally figured out with all that blonde hair he wasn't a wetback) and turned back to Texas again. When he called he was speaking from a motel that he claimed was lodged in the middle of an oil refinery, and the refinery was located just at the end of the international airport runway. The stink of the oil, and the noise of the aircraft wheels bouncing off of his motel roof were beginning to unsettle him. That night I heard a lot of rather colorful language concerning the entire Southwest. The next day wasn't much better as he got a late start, and finally stopped halfway between El Paso and

Fort Worth (only 600 miles), got another motel room, called up and announced that he had been driving through Texas for an entire day, and was still 300 miles away, and he wasn't going to budge another inch. By this time he had figured out that all of the business about the U.S. getting overcrowded was a lot of malarky since he had been traveling a billion miles without seeing more than a stray tumbleweed or two.

But, old 'Fearless Leader' finally made it after taking four days to navigate a two and one half day leisurely drive. (Next time, he plans to fly!) An almost perfect visit was marred only slightly when old fumble thumbs got twisted around, flew my original Bikini into the sun, and made a landing in high grass. At the time, he didn't know it was high weeds, so after setting the bird down, he turned off the transmitter, handed it to me, and mumbled something about it was a long way to go to pick it up. What he didn't know, (and I did) was that his landing was made just at the top of a small gully, and when he turned off the transmitter, the aircraft was still about six feet up in the air. Scratch one Bikini!

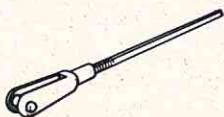


CARL GOLDBERG

THIS MONTH
IN THE SPOTLIGHT

CG MINI-LINK

I think a lot of modelers are going to like our new MINI-LINK. It's strong enough to hang 3 big 7 lb. ships from it. But it's small enough to look right on the new small models. Made of tough nylon, so you can use it anywhere because it makes no electrical noise. MINI-LINK comes with a long, strong rod (needs no connector) and has a mini-price—29¢. See your dealer for it.

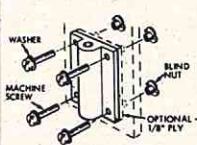


Send 10¢ for 4-pg. Illustrated Catalog, with recommendations on "Getting Started in R/C."

P.S. For best service, see your dealer for kits you want. If not available, write direct; add 35¢ per kit in U.S., 75¢ outside U.S. Minimum order \$1.

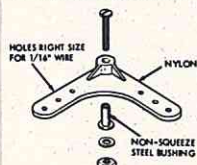
FITTINGS and ACCESSORIES

NOSE GEAR BEARING



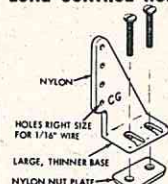
One-piece Nosegear Bearing mounts easily to firewall without alignment problems. If extra steering angle is desired, use 1/8" fly stand-off. Includes blind nuts, screws, etc.60¢

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Bellcrank has steel bushing of proper size, so crank can be screwed firmly in place without binding. No electrical noise—all metal parts are screwed tightly together. 50¢ for 2

LONG CONTROL HORN



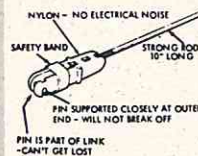
Control Horn has right size holes for 1/16" wire, and nut plate for simplest mounting to control surface. Horn is long for maximum range of throw; can be cut down. 50¢ for 2

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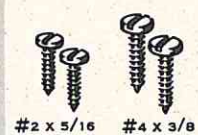
Extremely tough. When applied with heavy coats of cement, it approaches fiberglass. Excellent hinge material. 3/4" wide x 5 ft.25¢

NYLON AJUSTO-LINK



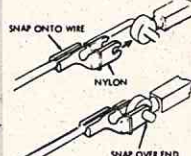
Ajusto-Link is used for adjusting linkage to control surfaces, throttle, steerable nose gear, etc. Nylon-tough and no electrical noise. Takes heavy load.29¢

SHEET METAL SCREWS



Sheet metal screws—like wood screws, but better. Sharp, clean, full-depth threads, hard and strong. Excellent for mounting servos, etc. Includes washers. #2x5/16 20¢ for 10, #4x3/8 20¢ for 8

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Steerable nose gear with shock absorbing steering arm, molded one-piece nylon bearing. Includes blind nuts, screws, etc.\$1.95

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Shoestring 54 Canopy 75¢

Falcon 56 Nose Gear .. 50¢
Jr. Falcon Nose Gear .. 25¢
Shoestring Land. Gear \$1.50

Falcon-Skylark Wing . 7.95
Sr. Falcon Wing 14.95
Skylark 62 Wing 14.95

CARL GOLDBERG MODELS INC.

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Give some thought to the type of aircraft you are going to need for the National Fun Fly, NFF for short, and make your plans to be here. Uncle Don even says he's going to practice up for this one, and now if Jerry Kleinburg can get his rudder only ship working, and Ken Willard can teach his glider how to spin, we'll have a full house.

So, "Yew awl come, ya heah?"

PERSPECTIVE

(continued from page 8)

ping their responsibilities completely. A company can play a vital role by allowing and, perhaps, encouraging the use of the acreage surrounding their facilities for model aviation. If there isn't enough acreage they could assist the community by helping fund a model site.

AMA

The AMA is purported to be the voice of model aviation. It should be the prime mover in community, industrial, and government relations. The AMA, however, has no posters or public relations packages, and indeed

seems helpless in this vital and sensitive area. True, the local clubs should bear the brunt of the work in this area. However, few, if any, have a public relations man. Thus, without the help of the AMA these clubs are, to a large extent, helpless against the onslaught of town councils. The AMA should, and could, have technical help, posters, and public relations packages available to those clubs or individuals that are willing to put forth the effort. Further, it should not be sitting back watching the situation deteriorate, but should be acting as the leaders of our hobby that they are supposed to be.

Hobby Industry

To initiate community and industrial relations takes money, and much more. Just where these things are to come from poses a problem. The National Association of Manufacturers is a logical source. These are the good people that are always ready to sell us their merchandise. They make their living from the modeler, and should recognize that they, too, have a vested interest in the local modelers. If a town outlaws model airplanes, the sales of same will decline in direct proportion to the modelers. With no

facilities available the youngsters will soon lose interest. This, then, is a part of the junior problem. The unfortunate thing is that with no juniors there ultimately will be a decline of seniors, no new blood for aviation, etc. Some very real contributions can be made by the various manufacturers, such as having display material, posters, prizes, and technical help available to clubs willing to put forth the effort at the local level. I know of two such manufacturers that seem to be willing to go all out to help. What about the rest, are they ready to accept their share of the burden? It would be interesting to find out, wouldn't it?

Model Magazines

Model magazines can be a terrific help. These publications are well-equipped to furnish a package of articles which could be distributed to local newspapers by a club in the area. These should be general interest articles, written in such a way that a club could get the credit for writing the material. Also, part of the package can be an outline of a typical press release or article, so that a club can generate its own articles and press releases. R/C Modeler recently collaborated with a small South Jersey Club, with some

Involve the Community

It cannot be stressed too strongly that every effort must be made to involve your community. Invite the mayor and town council to the field. Show them what you are doing, and above all, have a gentle model handy for them to fly after it is at a safe altitude. We have tried this with excellent results. It would be interesting to see what would happen if this were tried with a casual visitor to the field.

Combining the Effort

Ideally, a club should be able to have assistance available from the AMA, manufacturers, and magazines. Let's take a look at a typical project: fund-raising for a local group. Posters and press release material should be available from the AMA to publicize the event. Beginners' models to be used for instruction and fund raising should be available from the manufacturers at cost, or, for free. A series of educational articles, to be used in conjunction with the press releases, could be provided by the magazines along with some photographs depicting a cross-section of our hobby. Trophies could come from a centrally-funded pool, and be provided at low, or no cost from a single source, thus cutting the expense to all concerned. The same could hold true for a basic display.

A typical event should include the following: U-control circles with beginners' models can be very effective as a fund raiser. You can get 25 cents per tank while an instructor teaches a child to fly. An added bonus can be obtained by farming out the building of the models to the Boy Scouts for their Aviation Merit Badge, a boy's club, or what-have-you, and giving a prize for the best model. This is one way to get community support from the start.

Displays are an integral part of an educational process. Set up an attractive static display of your models. Don't forget to include the other phases such as U-control, etc.

R/C flight demonstrations are a crowd pleaser. Be sure to provide adequate crowd control. If possible, let some guests try their hand at flying. You could charge for this, too.

U-control demonstrations such as slow combat, rat racing, etc., are thrillers too, so don't overlook this as a winner. If your club doesn't have any ex-ukie men, enlist the aid of a local club. After all, they stand to gain too.

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them, or Delta Darts can be sold and used as a basis of a beginners' contest. There should be prizes given to the winners. Be sure to have a hobby shop, refreshments, and if at all possible, a manufacturer's or distributor's display, too. If possible, let a local group run the stands, man the first aid station, and provide crowd control.

Educate

Keep your hobby and its benefits before the public as much as possible. Have displays available to be used for grand openings, advertising, and other purposes. Start sending short articles to your local newspapers. Keep these general in nature. Offer to give lectures to Scouts, schools, indeed, anyone that desires your help. Be sure to bring a model for the people to see and TOUCH.

April is national hobby month. Why not join forces with the local hobby shop, distributor, or manufacturer to have a display at a local shopping center, community center, or store? Above all don't be afraid to try new ideas.

Go ahead, innovate, do your thing!

VIEWPOINT

(continued from page 4)

Colonel Borman will be in good company, for already the list of those coming to Spokane next year reads like the 'who's who' in modeling. Coming back in 1970 to defend titles won in the 1969 Spokane Internats will be: Grand Champion and winner of the Governor's Trophy, Whit Stockwell (Calif.); Pattern, Larry Leonard (Calif.); Formula I, Roger Hooper (Ore.); Scale, Simon Dreese (Mont.).

So far, major events shape up like this: Flying Scale; FAI Pattern; Formula I and Formula II.

We'd like to call your attention to a typographical error in the December issue of RCM. With apologies to our friends at Orbit Electronics, the price of the Orbit 6-12 I.C. MK II was incorrectly listed as \$499.95. The correct prices of the Orbit systems are as follows: 4-8 IC MK II, \$399.95; 6-12 IC MK II, \$449.95.

Some days are like that . . .

The WRAM's Second Annual RC Jamboree will be held on March 14th and 15th at the Westchester County Center, White Plains, New York. At

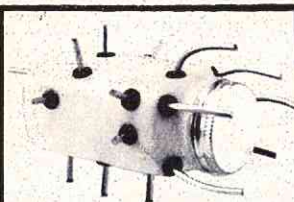


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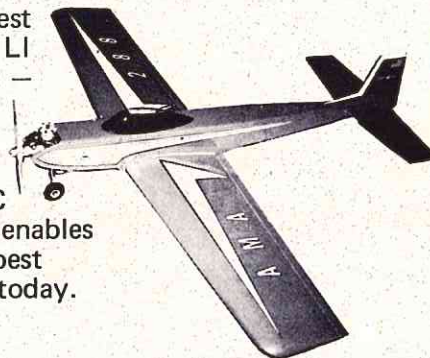
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the present time, indications are that at least 50 manufacturers will be exhibiting. The entire ground level floor of the County Center will be utilized for exhibitions and booths on both days of the show. This is approximately four times the space available for last year's show. Lots of static events will be staged for all types of models including best of show, best WW I, best pattern, etc. Merchandise and trophies will be awarded through 3rd place in all events. The 'Swap Shop' will be vastly expanded since it proved to be one of last year's more popular events. More than 100 models of all types were on display at their first show, and, and it's expected that the WRAMs will be swamped this year. Just about everyone in the Northeast is building something to put on display.

MR. ED

(continued from page 21)

thinking about writing to see if we didn't make a mistake on the C.G. location shown on the plans. I know it looks like a long way back there, but believe me, that's where it is, and there are absolutely no snap-rolling tendencies, even on slow, tight turn, dragged in, power-off landings. As a matter of fact, after the canal incident, we discovered that we flew two contests with the C.G. one inch BEHIND the rearward point shown on the plans with no ill effects!

DOWN TO THE NITTY-GRITTY

In the process of making Ed IV the contest winner that the first two were, it was found useful to clip the wingtips to the position shown on the plans. This seems to be the optimum for the weight when flying our present AMA 'Snap-Dragon' pattern. If I read the portents correctly, 1970 will see a return to the smoother, more open type pattern, possibly even a full FAI pattern, with big, graceful maneuvers, and no snap or reverse maneuvers required. For this type of pattern, the longer wing is strongly recommended. Not that Ed cannot compete adequately in either pattern with either wing, but its just that these are the optimum configurations for each type of pattern.

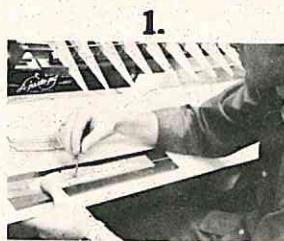
While the Ed I and II weighed between 7 lbs. and 8¼ lbs., Ed IV weighs in at 5½ lbs. dry, but complete with two wheel electric brakes and a separate battery for them. If you like

them heavy, go ahead, but at 5½ lbs. Ed is absolutely stable and gusty winds have no noticeable effect on the flying characteristics. My theory is that bounciness in gusty winds is strictly a function of basic aerodynamic cleanness and power loading. Clean it up and shove the hosses to it and the wind won't bug it. Ed II is about as clean as you could want it, but if you like 'em heavy, go ahead, but remember, it takes more hosses to pull the extra weight.

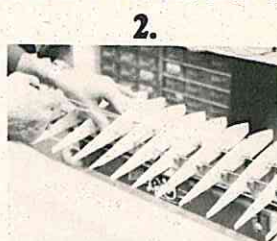
How do you get a thing like this down to 5½ lbs? Two secrets. First, use nothing but old fashioned model airplane cement everywhere you can, saving the epoxies and resins for only the essential portions, such as the firewall, engine mounts, wing hold-downs, etc. Second, balsa selection. Use only contest grade balsa, and I don't mean the lead sheets stamped 'Contest Balsa' they are putting out today. Try this test to see if balsa is light enough to use. Get a piece of what you think is light 1/8" sheet or 1/4" square balsa. Take the end between your thumb and forefinger and squeeze about as hard as you would have to to cut off the fuel line to your engine if it was of light wall surgical tubing - a moderately light squeeze. If the end of the balsa didn't go to at least one half of its original thickness, get rid of that lead and find something lighter!

Now let's get back to what our down 'Under Boid', Colin Cliff, calls the 'screwdriver' department. All of the Ed's have used at one time or another most of the popular large engines - Merco, Super Tigre, Fox, Enya .60 and Veco .61. Most of the earlier contest wins, with the heavier models were with the Enya .60, but recently, engine genius, Dick Scully reworked a Veco .61 - I should say he took 3 Veco .61's and made one real good one out of it, and it "do put out the hosses and the rp&m's!" The Kavan Carb helped the idle and Dick took care of the top end. This is just the thing for the new larger open type maneuvers which require constant engine correction to maintain constant speed and smoothness - you can't add any more power if you're already wide open when you started. Now I'm not saying that you have to have a super hot engine to fly Ed with - the one I'm building will have my old reliable Enya in it, but if yo DO have a warm mill, this is the machine to take the most advantage of its excess power.

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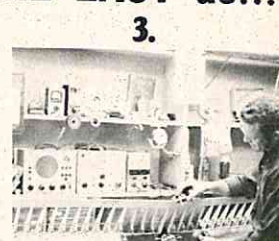


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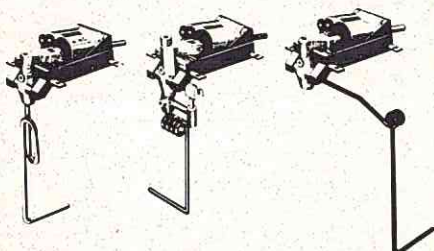
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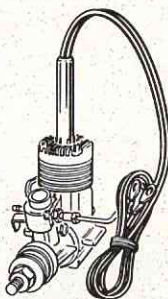
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FLYING

The flying characteristics of Mr. Ed are hard to put into words without resorting to too many superlatives. Tracking is literally perfect through all maneuvers. The only way I can accurately describe it is by comparing it to a ball bearing up in the air - a frictionless three dimensional gimbal, with your thumbs on the axis, the control sticks. Cal once described it to me thus: "It's like writing your name with a very high quality ball point pen - it goes where you want it to go, exactly when you want it to, and nowhere else." After flying Ed II for six months and getting a bit of time on Ed IV, I can think of nothing better to add to this. This is a perfect description of how it flies.

One thing I have to add in closing. There are many expert R/C fliers who never quite reach the fullest extent of their capabilities and I believe I know why - they are 'design hoppers'. It's a Citron this month, a New Orleanian next month, and a Kwik-Fli the month after. These are all good designs, but the design hopper never settles down on one type long enough to really learn that model to the hilt. Look at all your top name fliers - they have been flying the same basic design for at least two years or longer. They know precisely what that model will do in ANY given circumstance. All models have to be 'learned' like this, and Mr. Ed IV is no different.

It's just that Mr. Ed is one whole heck of a lot easier to learn than any of the other designs I've seen or flown. Try Ed - stick with Ed, and learn Ed, and you'll win with Ed!!

RC MODEL PLANS AS AN
ENGINEERING TOOL

(continued from page 37)

with the 12 lb. unit aboard.

A few words about the engines and props. Takeoff and climb tests with different props showed a 12-8 was, by far, the best prop for the OS 80. As to the OS 80, I have never operated a better all around engine. On the trimotor, all three engines start on the first flip at least 50% of the time which continues to amaze everyone. We set the three engines in sync by ear and often fly all morning or all afternoon without touching a needle valve. And to round out a perfect engine, we have had absolutely no trouble with idle. Often, we reload another test unit leaving the engines at idle and simply

tip the plane up on one wing to load the unit. I can honestly say that we have less trouble running three OS 80 engines than most people have with one, typical 60, including 'your's truly'.

A few technical details of interest: air foil used, NACA 23015. Span 9 ft., chord 18", wing area 13 1/2 sq. ft. Maximum drop load carried aloft, 16 lbs. Radio, modified Galaxy 5 by Galatron. Maximum level speed, approximately 70 MPH; stall speed approximately 28 MPH; average rate of climb, (at 500 ft., 37 lbs. full gross), 1000 f.p.m.

Additional development projects underway but not completed at this writing are: a parachute recovery system; catapult launch; telemetered altitude and air speed; and a 12 ft. span, 4 or 5 engined (convertible) plane with a design load carrying capacity of 30 lbs.

In conclusion, here are some of the advantages we have realized in using model-like R/C drones at Sandia Laboratories.

1. Ability of the R/C plane to realistically perform any type of aerobatic and tactical maneuver.
2. Ability to operate from and fly in a relatively small area and conduct several passes in the time required for one pass by a full size aircraft.
3. Ability to operate without a regular air field. Often, a road will suffice as the operating strip.
4. Improved control and placement of the tracked target because the pilot has the same line of sight as the tracking mount.
5. Excellent communications since the pilot is usually standing next to the test director.
6. Versatility in the capabilities of the R/C model planes and ease of making changes to the model to fit different test requirements.
7. Provides the test director with a completely self-contained and controlled operation, requiring a minimum of coordination between separate groups.

In all cases, the R/C planes have substituted for full scale aircraft or military drones. The Phase I activities have resulted in significant financial savings, both direct and indirect, with the indirect savings perhaps even more significant because of the flexibility inherent in working with R/C planes. Phase II, being developmental, is attempting to provide Sandia Labs with further money and time saving uses of the R/C planes.

(continued from page 7)

the servos. But it beats us as to why! We generally always gang the servos together so they weigh more than the battery pack, then put the receiver in front of them so in the event of a crash the repair bill will be 'proportionally' greater! Actually, this practice became popular back when the receiver was the largest piece of airborne equipment and it wouldn't fit behind the servos. So, anyway, let's get it mounted. The best, cleanest, neatest, easiest installation we've ever seen is produced by E. K. Products and it enables one to attach the receiver to a molded plastic bracket, along with the servos, and all of this is then mounted in the airplane with wood screws. If you do not use this type of equipment, here are a few GEMS for your individual installation.

There are two major requirements for mounting receivers. (1) Crash protection and (2) vibration protection. As of this writing no one material does both jobs best. But we're close! The best crash protection available today is a material called 'G' Pad manufactured by R/C Engineering Company of 356 W. Roma, Phoenix, Arizona 85013. (We hope hints like this will result in our getting free lifetime supplies as well as to calling the competitive attention to who's best etc., etc.) The thing to do is make a box out of this material, contact cementing the pieces together, then mounting the box in foam rubber for vibration protection. In lieu of this idea you may take your chances with 'real foam rubber'. You know, the dense stuff, not polyurethane foam plastic.

OK, now servos. (Let me see you English Majors diagram that sentence!) Again, there is much to be said for servo 'trays'. However, the same protection requirements exist as for the receiver. Unfortunately, the servo must be relatively firm in order that the control surface stays in neutral, so

vibration protection is all that we can plan for. To our knowledge there is no servo made which does not call for mounting by rubber grommets. In our many years of travel we have seen all too many installations where this simple vibration protection feature was negated by poor, or thoughtless, planning. In the first place, most of the grommets in use today call for a four wood screw hold down. If in doubt, though, just use screws or bolts which fit the hole in the rubber grommet when the grommet is on the servo. But DON'T tighten it down until the rubber grommet oozes out from under the head! Just tighten it down enough to be snug. If your servo won't wiggle at least 1/16 inch when you're done, it's too tight! Now connect the servos to the surfaces. The most common method is with pushrods. The most common pushrod is made with a short length of 1/16 inch music wire, a larger piece of material (balsa, fiberglass rod, spruce, dowel, etc.) and another piece of music wire. On one or both ends may be attached any one of the many connectors of metal or nylon. At any rate, the important things to remember are, keep pushrods as straight as possible, and try to avoid 'metal to metal' contacts even though today's better radios are not susceptible to the 'noise', or interference, generated by such a connection.

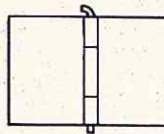
Once the equipment installation is complete, the first thing to do is set all control trim functions on the transmitter to neutral, turn on the radio system, set all flight control surfaces to neutral, and then operate the controls to the extreme limits and make sure they are free and that there is no binding anywhere. Then run in full down elevator with full down trim and listen to the servo. If it is 'clicking, humming' or making any noise at all, that's bad, and something must be adjusted. If the servo is at its limit (that is, it makes the noise without being hooked up), adjust it, or have it adjusted. If it only makes the noise when hooked up to the linkage then adjust the linkage. Do the same with the remainder of the servos. Once you are absolutely sure all servos and controls are properly installed and free of excess play or binding, you can go on to the next step.

With all the radio gear hooked up and operational, assemble the entire airplane just as if ready for flight and again check for the 'pitch axis' balance point. If your plane was built from

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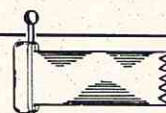
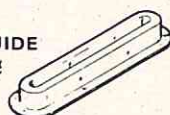
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plans, or a kit, use small weights (that's all that's necessary if you did what we said earlier) to balance it where shown. In the absence of a pre-determined CG a GEM is '1/3 back with fuel tank empty' for most conventional aircraft.

Next, place the plane on a large table (ping pong, dining room, or picnic table, that is reasonably flat and level. Go around behind the plane ('abaft the fantail' for you old salts!) and sight down the plane's horizontal axis. What do you see? What do you mean, you don't know what to look for? Well, OK, look for the following;

1) Insure that the stab and elevator are horizontal and are parallel to the wing. You can do this by aligning them as closely as possible along the same line and checking to see if the stab tips are in the same relative position to the wing when viewed from a point directly behind the centerline of the fuselage.

2) Insure that the fin and rudder are perpendicular to the wing and stab. Use a right triangle to check this. Lay one edge along the stab and the other should be parallel to the fin. Do this on both sides (especially if you have a tapered stab).

3) Insure that the moveable surfaces (ailerons, elevators, rudder, etc.) are perfectly neutral with the radio system on and that all trim buttons on the transmitter are positioned in neutral.

4) Finally, and most important, insure that all surfaces are TRUE and NOT WARPED, BOWED, or TWISTED. (If you find something amiss here and your plane is doped, apply lots of steam, put in a reverse twist, hold until cool, and recheck frequently until it is straight. If Mono-Koted, as on a sheet balsa covered foam core wing, remove the tip, apply heat till almost too hot to touch, put in a reverse twist and when cool, if it is now straight, replace the tip and iron out the stress wrinkles in the wing.) We don't know how to straighten HobbyPox or resin finishes, so write if you have a solution! SUMMARY: The plane balances, controls free and aligned in neutral, and the plane has no warps.

The next step is to fill the fuel tank and enlist the aid of a friend. Put some rubber bands around the wing toward the tip so as not to interfere with the controls. Start the engine and adjust the needle valve and/or carburetor linkage in order to obtain good full power and idle performance. Once

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that is accomplished, throttle back to idle and have your friend hold the plane up off the surface solely by the rubber bands. This is the best way we know to simulate full flight. Now, while he is holding it up slowly, advance the throttle and keep your eye on the elevator. Do not run the elevator servo to its limit rapidly because the plane is free to move in the pitch axis and it might loop and mess up your friend's nose with the prop (in which case we bet your friend will mess up your whole face!) If you can achieve full throttle from idle and back again with no movement of any flight surface you have a good radio and probably have achieved good vibration protection as well! Now, you may repeat the procedure and exercise the controls this time (but slowly on the elevator) to boost your own confidence if necessary.

Let the engine run out the entire tank of fuel. This will insure that the fuel system feeds properly (we've seen as much tank trouble on test hops as anything) and, also, once the tank is run out, you can check every bolt, nut, screw, etc., in the plane for security in addition to removing the wing and shaking out all the shavings, fibreglass bits, etc., from the fuselage if it is a new model.

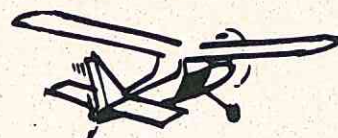
The last item on the checkout agenda is to take the plane out in the garage, driveway, or street and taxi it around, or push it, and check the nose steering alignment, and sensitivity (sure have seen some ground loops from overly sensitive steering and sheer tragedy from steering being hooked up backwards and not aligned properly!)

Well, sir, that completes the well organized, orderly, checkout phase which we have found by other people's experience to be the most appropriate thing to do. Yes, of course, you read between the lines correctly! We are indeed guilty of not doing all that the above verbage extolls you to do. But, you must remember our motto which is, "Don't do as we do, do as we say!" Although we hate to admit it, most of the funnies you read of in this column actually occurred to us at one time or another. By virtue of that fact, we are qualified to say what to do and what not to do.

That, son, is the meaning of the word 'experience'. We've seen it happen, when not to us, then to someone else! So heed the advice and profit by the mistakes of others.

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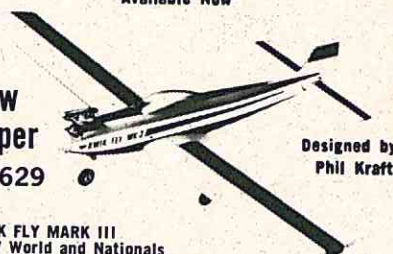
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