

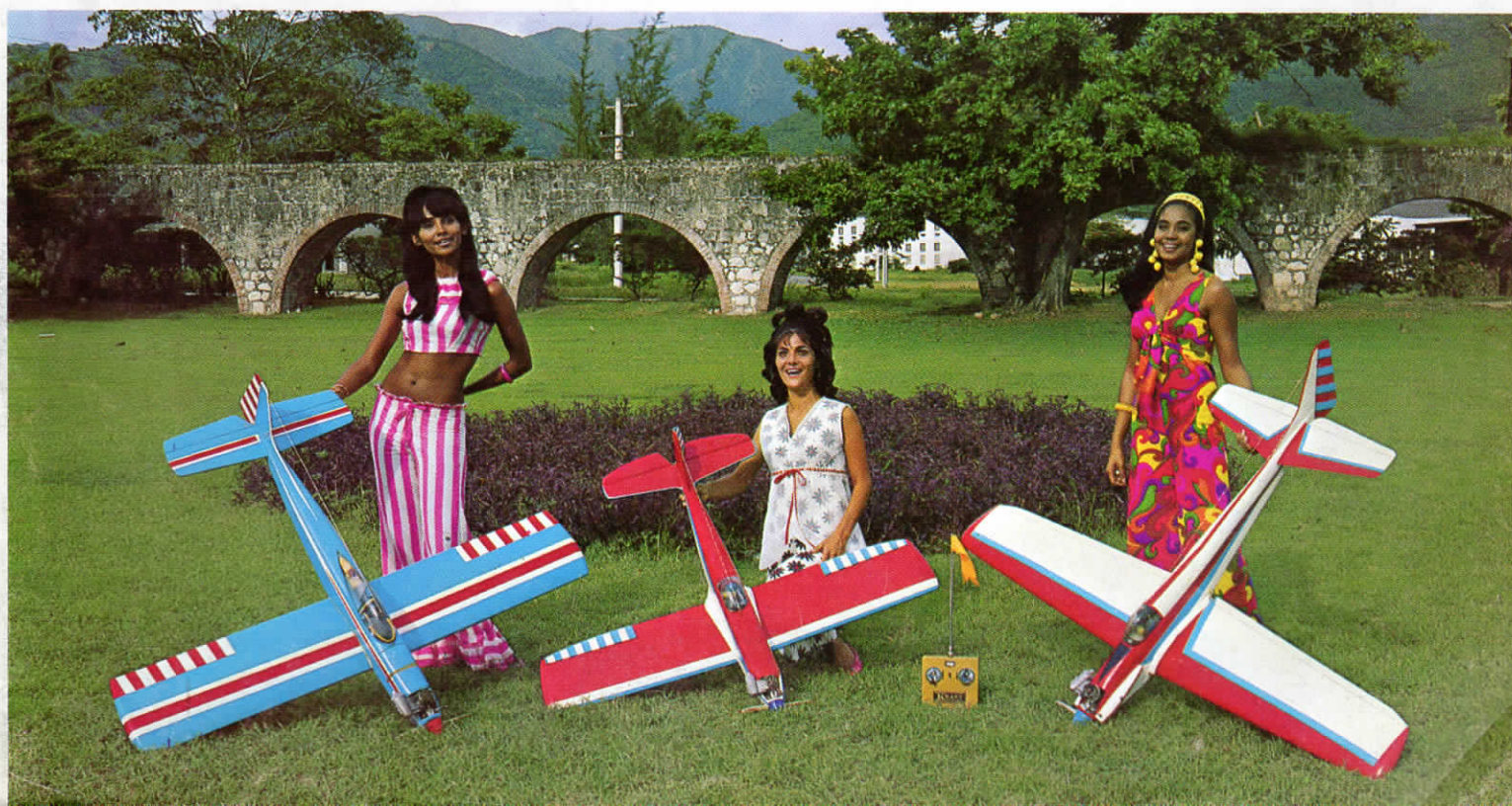
rc Modeler

NOVEMBER 1969 75c

The
Leading Magazine
For
Radio Control



Color Me Deadly! Focke Wulf 190 • Mock 15
• Ken Willard's Cliffmaster • R/C In Jamaica

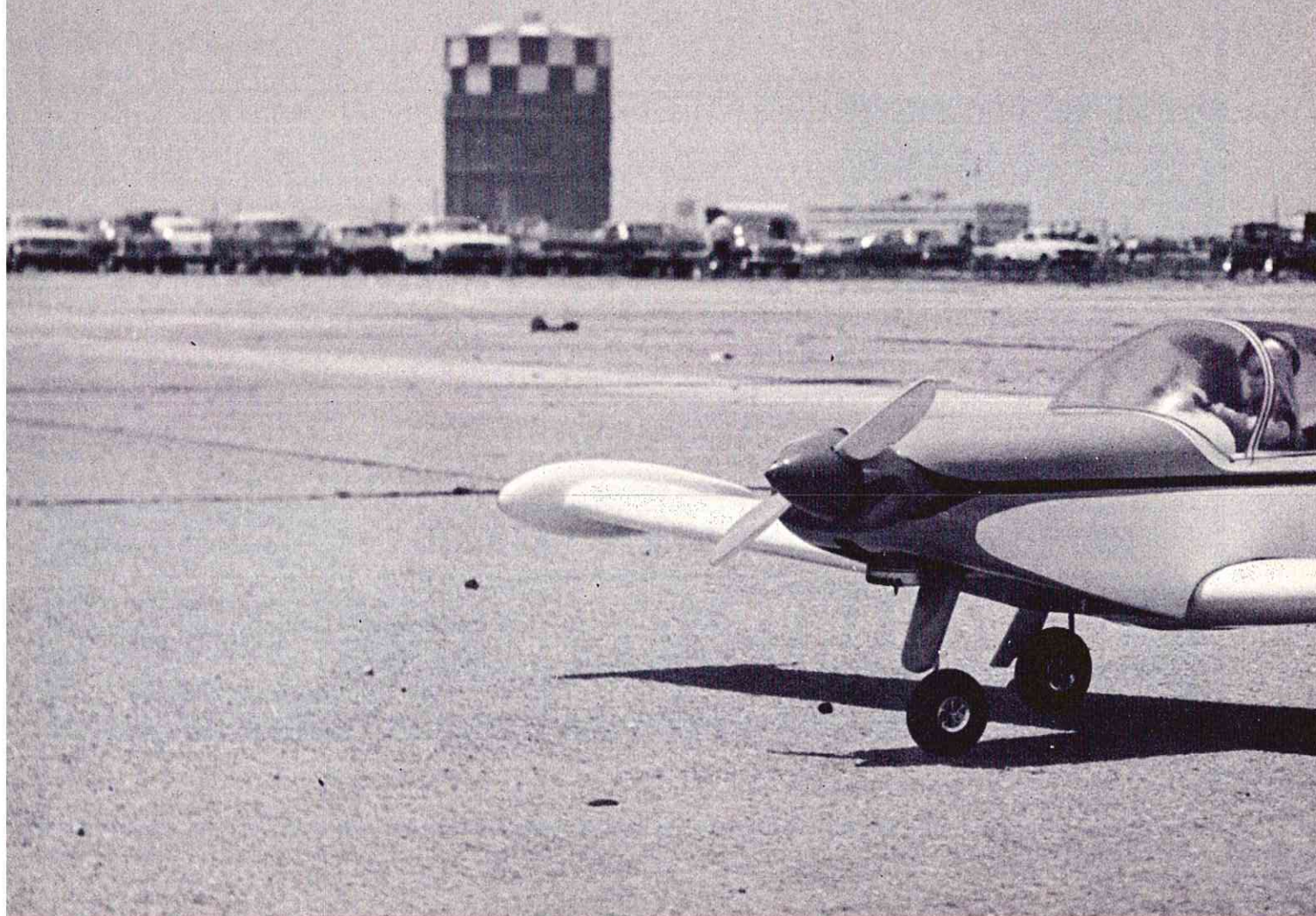


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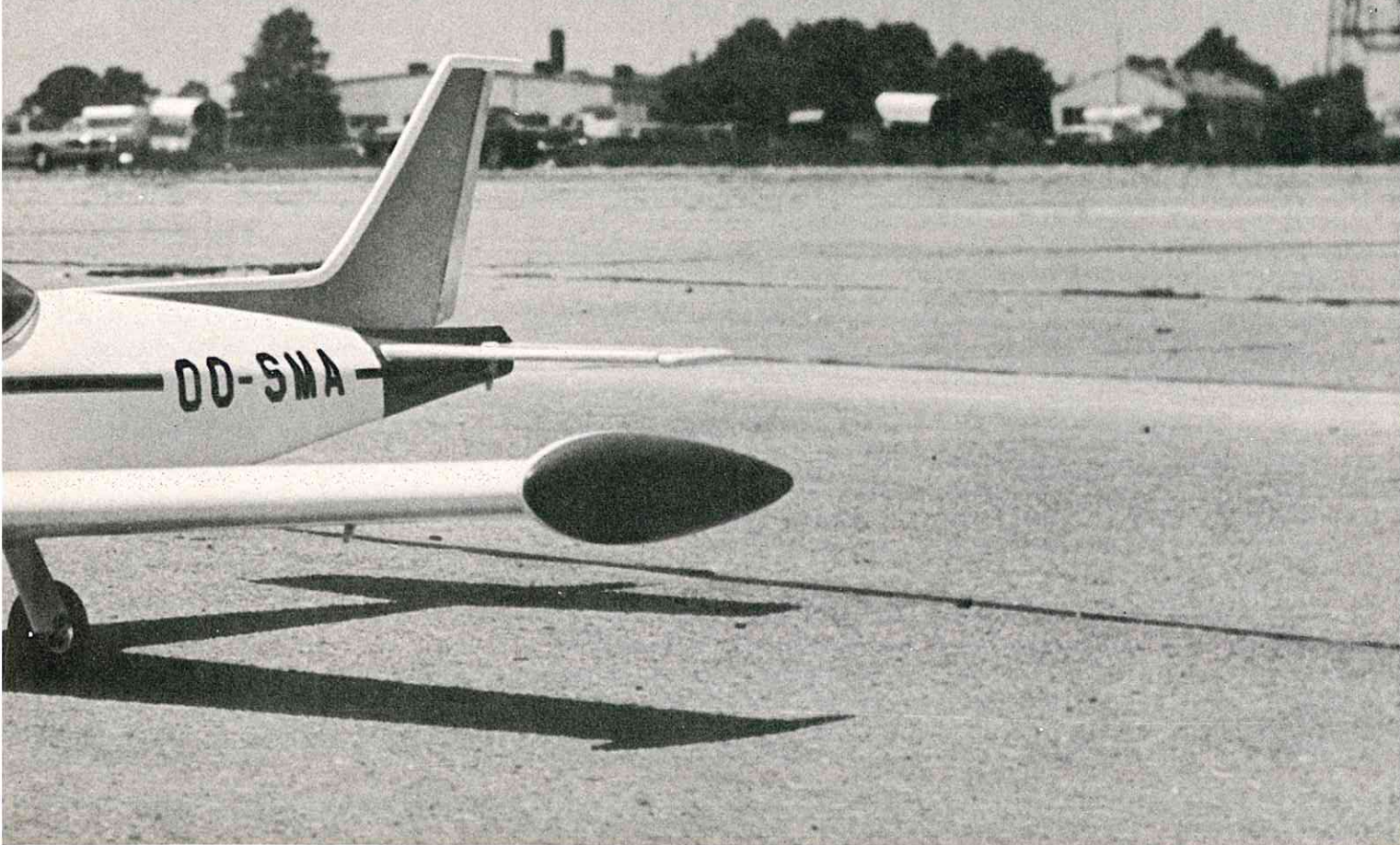
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COVER: Color me deadly! Finishing Touch's Paint-By-Number Kit of the FW-190. A construction article for the famous WW II German fighter appears in this issue. Paul Rhen, Satellite Beach, Florida captured the Bardot look of beautiful Carla Hoover as she poses with a Vic's Custom Taylorcraft built by George Jordan. Three 'pearls of the Caribbean' photographed in Jamaica by John Lopez. See page 42. **FRONTSPIECE:** Mel Carver's scale Waco 'Meteor' built from a Harco kit. Photographed at the LIDS meet by Bill Coons.



VIEWPOINT



BY DON DEWEY

The 1969 RC World Championships, held in Bremen, Germany, are now past history. With Switzerland's Bruno Giezendanner winning top individual honors over former World Champion, Phil Kraft, U.S. hopes for another Internats win were finally dashed at the end of the intense competition as the West German team emerged victorious in the pattern category. As was predicted by those familiar with European, as well as American, scale modeling Great Britain took home top honors in this event.

Since the conclusion of the Internats at Bremen, we have heard considerable speculation as to "what might have happened, if we had done so-and-so; or if our team had been flying different types of aircraft," etc. Unfortunately, most of this is based on hindsight and the fact that it is a little difficult to swallow our pride and admit that we were, quite simply, beaten fair and square.

While Jim Martin was covering the 1969 World Championships for us as our prime photo/journalist, R/C Modeler Magazine had several of its other U.S. and foreign editors in attendance at Bremen for additional specialized coverage as well as to provide an analysis of the event, itself. Reporting individually, the consensus

of opinion was unanimous in every respect. With regard to the new World Champion, Bruno Giezendanner, his was a demonstration of flying skill, grace, and precision that was unmatched by any flier at this, or any previous Internats. As an example, in the middle of the flight circle was a painted straight line. Giezendanner would taxi out and center his aircraft on that line and proceed with a take off that wouldn't vary even slightly from his starting position on the line. At the conclusion of each round of flying, he would bring his aircraft in and land on that same line keeping his model centered at all times. We have heard numerous comments to the effect that the U.S. team was handicapped by two of the team members using a 'plastic ready-to-fly' model 'manufactured' by Lanier Industries. Again, the consensus of opinion was that this simply was not true. All of the U.S. team members flew to the very best of their ability and demonstrated a caliber of flying that was excellent by U.S. standards.

And in that last sentence lies the key to our loss of the team trophy at Germany. We simply were NOT prepared. The AMA pattern is NOT the FAI pattern. And, while the rest of the world practices the FAI pattern in each and every contest during the two years preceeding each World Championships, the U.S. is schooling itself in an entirely different type of flying. There is certainly nothing wrong with the AMA pattern from a U.S. competition standpoint, but on an International competition level, the analogy would be one of preparing for the Indianapolis 500 by participating in the Jalopy Derby each Saturday night. They are simply not one and the same. The Europeans fly a precision pattern that is an all-risk, go-for-broke aerobatic presentation which is totally different from our domestic pattern concepts.

As an example, the FAI competitor flies a large, wide-open loop using a great number of throttle changes to maintain a constant speed, and where even the slightest mistake is noticeable to the judges. On the other hand, the

U.S. method is to fly a fast, tight, small loop where mistakes are less noticeable. From the judges' standpoint, the FAI flier, who does his maneuver perfectly, is going to receive a higher score for this risky, precision type of flying. It is our fervent recommendation to the Academy of Model Aeronautics that, if we are going to continue participating in International competition, the Class C Expert pattern be changed to the FAI pattern while all other categories remain the same. With the level of flying ability and equipment reliability leveling out in all parts of the world, it would be rather presumptuous to assume that we can practice one type of flying at home, and instantly switch over to another at the World Championships.

As previously mentioned, Great Britain's win in the scale category was not unexpected. The contrast between the European scale models and our own is quite striking. If you were to inter-mix the typical U.S. scale models with their European counterparts, the average spectator would probably pick out the U.S. versions as his favorites. To the true scale buff, however, the European scale model would win hands down. Here, basically, are the differences:

The typical American scale model is a beautiful piece of craftsmanship by a devoted scale model builder. It is a labor of love and a work of art. For the most part he is a highly skilled and

competent flier whose aircraft's flight performance can equal or exceed that of any scale aircraft built anywhere in the world. As was demonstrated at the Internationals, the U.S. scale models could out-fly their European counterparts, but they were in effect, a 'different breed of cat'.

The typical European scale model, epitomized by the magnificent British entries, is a model that looks, for all intents and purposes, as if someone had sprinkled some form of magical powder over a battered and worn full scale aircraft and shrunk it down to a miniature size. That model aircraft might even appear ugly to the eye, and from ten or fifteen feet away, would not even be noticed by the casual spectator who would be admiring the glossy, mirror-like finishes on the American entries. But, unfortunately, the majority of our scale models look like vintage aircraft that have been restored by an antique aircraft enthusiast for display purposes.

The British model of a World War I Nieuport, for example, might literally have been lifted from the flight line in some 1917 airdrome in France. All of the wear and tear, all of the battle marks, all of the blemishes and faded paint of the original full scale aircraft will be incorporated into that one magnificent model. Ours, on the other hand, look as if they came right off the showroom floor.

Another striking difference is the close attention to absolute infinite detail on the European scale models. There, the emphasis is not so much on the flight performance of the aircraft as on the scale fidelity of the model, itself. Whereas we use a flight multiplier and a great emphasis is placed on the flying ability of both pilot and model, the European scale model depends more on craftsmanship and closer attention to even the most minuscule detail. And realism is the order of the day. There are arguments in favor of both types of scale modeling, but one need only walk down the flight line of any local airport and look at the actual condition of the aircraft you will find there. And, if you were to somehow reach back to 1944 and pull a P-51 Mustang off a battlefield flight line, it would bear very little resemblance to the models of that aircraft you will find entered in U.S. scale competition.

So, again, the United States left the 1969 World R/C Championships with a lesson that, hopefully, was well

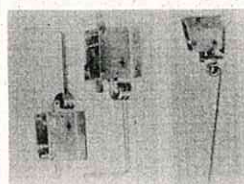


Several people who've seen this picture accused me of trying to break Bruno Giezendanner's flying hand to help assure a 1971 USA victory. This is not true!! I'm just congratulating this 23 year old fellow who is not only the winner of the 1969 Internats, but, possibly the greatest flyer EVER in RC!



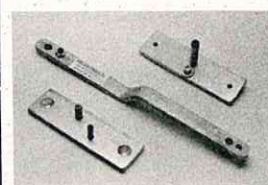
WEBRA
"BLACKHEAD"
.61
ENGINE

Bruno Giezendanner got beautiful performance out of his Webra "Blackhead" .61. It was so darn good that I had to have one for myself. Boy, this thing is BRUTE screaming power! We're hoping to have a good stock of these engines by the time you read this ad. You might want to write or call us for delivery info and our price quote as these WILL be in short supply.



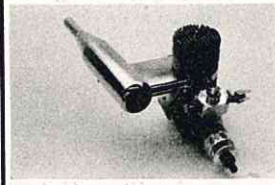
KDH MAIN
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Pair \$35.95
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GEAR \$23.95

Giezendanner used KDH retract gears on his "Marabu" model. Part (not all) of the smoothness of his flying was due to the greatly improved performance when his landing gear was retracted. This KDH system is worth the price, both because of the clever engineering that permits one servo to operate all three gears to prompt up-and-locked, and down-and-locked.



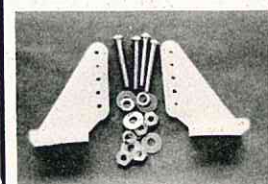
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This heavily constructed device easily bends perfect coils or right angles in 5/32" diameter wire. A must item for scratch builders, this well-engineered tool set will repay its modest first cost in only four or five uses.



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LOSS
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SEALECTOR DELUXE
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If you haven't tried applying Super Monokote with our Sealector iron, you are missing out on the greatest advance in modeling in years. Dick and I recently covered a 12 foot wingspan Curtis Robin with 7 rolls of Super Monokote in three hours. Naturally, we used the Sealector iron. Because of the almost INSTANT HEAT CONTROL we could work from a sheeted area to an open area very easily. And the fillet areas were a snap with the Sealector iron. Applying pressure on the Monokote to squeeze out bubbles over sheeted areas was no problem because no matter how hard you press down the TEFLON heat head of the Sealector iron CAN'T scratch the Monokote.

Try us out ----- D.R. did:

"Recently I filled out an order that contained a lot of little items. I am used to getting the following results (from other suppliers): 'Sorry we're out of stock, please wait two or three months. I got everything from you within seven days, and one item that was back ordered actually got here before the (original) package. Great service! Keep up the good work.' D.R. New York"

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STRATEGY

By NOEL FALCONER

CONCLUSION OF A SIX PART SERIES ON WHAT IS NEEDED TO SECURE THE FUTURE OF AEROMODELLING.

Conclusion

By 1980 aeromodeling could be as popular as baseball.

Or it could be dead.

It depends on us. Change is certain. We can coast along and accept whatever happens - and the only thing that happens naturally is a catastrophe - or we can plan and work for our future.

Well, what should we try to do? Stay as we are? No. We cannot hope to answer the many and repeated challenges that will face us, with only a resistance to change. Grow? Better, but still not good enough.

I want to go for the big one. **Total reversal of the general official attitude to model aircraft.**

We CAN do it. We CAN turn grudging, conditional tolerance into encouragement, support; even pressure to grow. We CAN become a

source of national pride. We CAN!

Easily.

Whatever is difficult is already essential for other reasons. To hold the respect of our local communities we have to behave considerately and decently, by flying safely without causing noise nuisance. Irresponsibility and accidents could defeat us, but they must be wiped out just to keep our flying fields.

Organization is necessary, but organization is inevitable in anything as big as aeromodeling. They only choice is whether it is good or bad. Join your national model aircraft association. **CHANGE** whatever you think is wrong, but **JOIN**. And **SUPPORT** it. Scream about its rulings, but abide by the commitments it makes on your behalf. Buy that radio license. Take an interest. Vote.

This is the way to achieve an alert administration that has the maximum authority and yet uses it well.

So our house is in order and we have good people to speak for us. What magic wand now grants us success without effort?

The merit of aeromodeling. We need only document it and tell the right people.

The first man on the moon was an aeromodeler. What a gift for our public relations! **Only it was no gift, nor accident either!** Nearly nine out of every ten astronauts have built model aeroplanes. So have most test pilots, and very many military and civil flying men. A vast proportion of the people who build and maintain the rockets and aircraft, the systems and electronics, have had some connection with our hobby. A. V. Roe, whose firm built the World War II Lancaster, as well as the Shackleton sub-hunter and the Vulcan jet bomber, was once a national contest winning aeromodeler. I myself have slapped the back of an old friend, a contest flier and a tough opponent - and smartly found myself on the mat with the base commander asking why I had assaulted the deputy chief designer of a major British warplane!

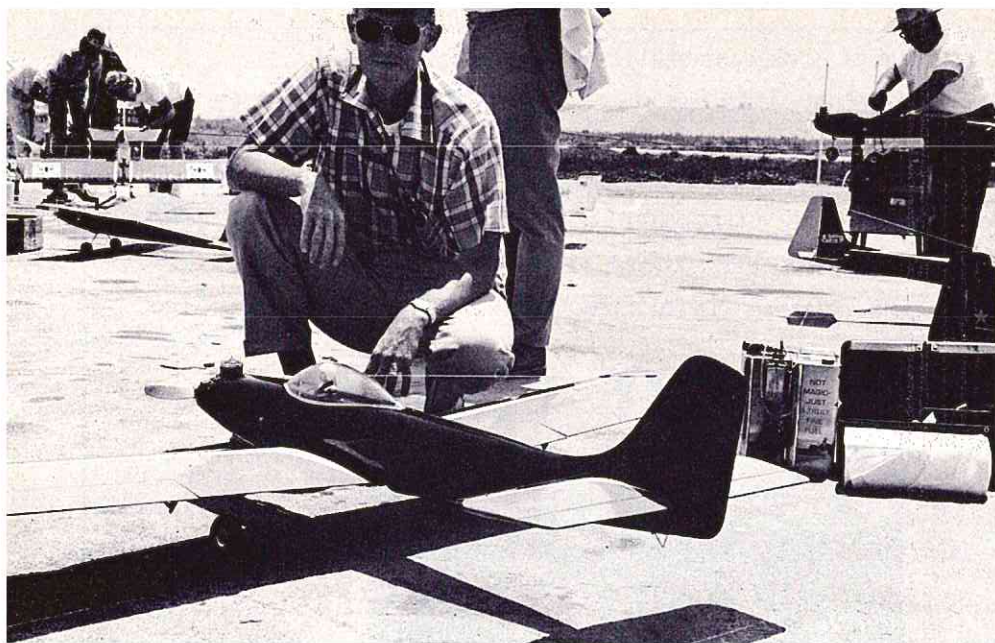
It is a general rule. You find aeromodelers in the decision areas of aerospace, and indeed throughout the techni-

cal segments of our culture. We achieve successes out of all proportion to our number. **People who have built model airplanes are of great value to modern society.**

Is this because high-potential men fly models as part of a general interest in aviation? I cannot believe our role is so passive. My fingers are more skilled because of the planes I have built; my mind is sharper because I have diagnosed their faults and made them fly well; my curiosity and imagination and patience and persistence are all augmented by aeromodeling. Our birds demand and develop the gift of putting complicated things together and making the whole work. What abilities are more needed in an astronaut, or anywhere else in this complex technological civilization?

Our leaders are not fools. Show them an activity with our record of developing useful people, and there will be abundant encouragement and support, at every level, right to the very top.

Let us make up a giant list of every aeromodeler and ex-modeler we can trace. Track down all the old fliers from your area, ask all the local people who have been prominent in aviation if they ever flew models, and send off their names and what they achieved to a collector who will assemble



CLARENCE LEE

ENGINE CLINIC

As I write the column this month the results of the Nat's have just come in. By the time you read this it will all be old stuff but, at the risk of sounding like I am tooting my own horn, I would like to tell you why I am personally extremely happy with the results. As the majority of you already know by now, Larry Leonard won both C Expert and Formula I. Aside from being happy for my good friend Larry, my own happiness comes from the fact that Larry was using one of my Custom Veco .61's, as were Ron Chidgey who placed 3rd, and Dr. Jim Edwards who placed 5th. The high point junior, Whit Stockwell, and high point senior, Bob Smith, were likewise using Custom .61's. All three fellows are members of our local Valley Flyers club, so needless to say, the Valley Flyers are also very proud of Larry, Bob, and Whit. Whit Stockwell also placed 3rd in Formula I.

Bob, who is the 'S' of the 'BS' racing team, would have done better but it is pretty hard to win races when your mother drives off in the car with the transmitter and you lose out for two heats. This could almost break up a mother-son relationship! More personal satisfaction comes from the fact that Larry, Whit, and Bob were using K & B .40's that I had set up. This should add a little credence to some of the things I have been telling you from time to time about getting a little

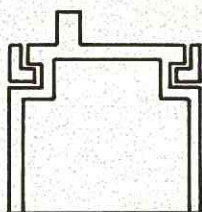
more go from your .40's. These engines were not factory specials, but standard hobby shop engines. There was no radical reworking. They were just set up properly, had the proper cooling, the right prop, glow plug, fuel, etc. Most of these things have been covered in past columns. The engine, itself, will be covered in an upcoming column. The engines were also in clean airplanes (Stafford Minnows) with good pilots and CALLERS. If you don't think turning in times of 1:55 or less depends a great deal on the caller, you had better take up another event! When the flag man drops the flag at the far pylon the airplane is even with the pylon and traveling 120 mph. By the time your caller responds, and the pilot, in turn, responds to the caller, the airplane can be several hundred feet PAST the pylon. Good callers are LEADING the flag man so that the turn occurs AT the pylon. This can make for a lot of cuts if your caller misjudges very often! The next time one of you ace pilots turns in a 1:55 or better, you had better buy your caller a beer, because he has had a lot to do with the time.

For our technical bit this month let's talk about piston rings. I know some of you couldn't care less about the internal workings of your engine, as long as the fan on the nose keeps

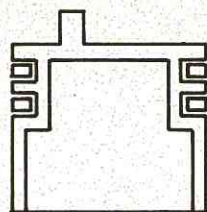
turning, but there are many fliers that are interested in what makes these little engines go.

Some R/C modelers think that 'ringed engines' are a fairly recent development brought about by the popular swing to the .60 size power plants. However, this is not the case. Ringed engines have been in use as far back as I can remember, and that goes back a lot farther than I care to admit! Many of the very first production engines in the 1935 and '36 era were ringed, with Brown Jr. and Bunch Mighty Midget to name only two that I can recall. Most of your racing engines of later years, such as the McCoy, Hornet, and Dooling, were also ringed engines.

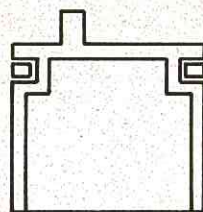
Until the recent introduction of K & B's 'no tension' ring, all of the ringed engines used a regular expansion type ring, the same as the compression ring in your automobile. These rings have to be compressed to be installed, and then exert pressure on the cylinder wall of the engine. In the case of a .60 size engine this wall pressure is between 1¼ to 1½ lbs. per ring. This is the pressure required to close the ring to the specified bore size. This pressure is necessary in order for the rings to seal the combustion pressure. Most of your engines use two rings which means up to 3 lbs. of pure drag. Some of the manufacturers went to one single ring in order to eliminate some of this drag. As an example, some of Bill Atwood's early Triumph .49's in the 1950 era had such a single ring. Recent engines that employ the single ring method are the Webra .60, Rossi .60, and some models of the Super Tigre. These rings are of the regular expansion type. They are not to be confused with the Dykes type as used by K & B. The Dykes type is a single ring, but not all single rings are of the Dykes type, and there has been some confusion over this point. The Dykes ring has been used for some years in motorcycles, Indianapolis cars, and drag racers. Many of the Go-cart buffs are using this ring in



DYKES



CONVENTIONAL
TWO RING



CONVENTIONAL
SINGLE RING

CLARENCE LEE

their engines. The first person, to my knowledge, to use it in a model engine was Bill Wisniewski in his U-control speed engines. K & B was the first manufacturer to use the Dykes ring in a production engine, and that was in their .40. With the acquisition of Veco Products by K & B, the Dykes ring was incorporated in the Veco .61 and .50. The Merco .61 now also uses the Dykes ring and I imagine other manufacturers will be following suit as they become aware of its advantages. The Dykes ring requires no wall tension for compression seal, so this means you eliminate the greatest source of drag in your engine. If you eliminate the drag, you immediately increase the power output. The power the engine was taking to run itself can now be used to turn the propeller instead. The Dykes ring also has the advantage of sitting right at the top edge of the piston. This results in a 'cleaner' opening and closing of the exhaust and bypass ports.

A cross section of a Dykes ring would be in the shape of the letter 'L'. Combustion pressure expands the ring and makes the wall seal. The sketches will make this a little easier to understand.

Your conventional expansion type rings are cam ground out of round larger than the bore size during manufacture. They become round upon compressing to fit the bore. Because of the spring pressure they can be used in cylinders that are slightly out of round, tapered, etc. The Dykes type ring is machined dead round to start with, and must be held to a very close tolerance. The sleeve, itself, must also be held to a much closer tolerance. A ring that has an outside diameter of .940 will not fit too well in a sleeve with an inside diameter of .941, as would the old expansion type of ring. Many of you have tried to update your older model Veco .61's with the new single Dykes ring and piston and had less than satisfactory results. Most likely the problem was caused by the sleeve just being a little too big for the ring, causing it to seal improperly.

Also, because of the lack of wall tension, the sleeve bore should be roughed up to seat the ring. If you leave the high glaze on the sleeve wall when you install the new ring, it will not seat properly. This is also true with conventional rings.

Any owners of the older model Veco .61 should return the engine to K & B if they wish to update it to the new single ring, rather than attempting to do the job themselves. If the old sleeve can be used, it will be. If it is too large, or does not clean up during honing, it will be replaced. You will save yourself some trouble and money in the long run. A lot of fliers are goofing up their engines by trying to do work that should be done by the factory. Many times a sleeve that looks fine will actually be badly worn out of round as well as tapered. Unless it is trued up by honing, it is useless. The misconception that an 'over the hill' ringed engine could be made as good as new just by installing a new set of rings has been with us since the days of the Brown Jr. and Mighty Midget. Occasionally this will be true, but the majority of the time the sleeve will need to be rehone and the piston and rod replaced.

Several of you have wanted to know what is meant by a 'pinned ring'. This simply means that the ring is kept from rotating in its groove by a small pin. This is quite common in high speed racing engines where large intake and exhaust ports are used. If the ring should rotate, and the ring gap line up with one of the port windows, the edges of the ring would catch. This is eliminated by pinning the ring so that it cannot rotate. Some people feel that pinning the ring so that it cannot rotate will make for a better compression seal, and sometimes it does.

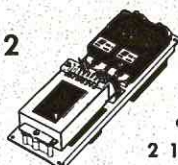
However, I have never found pinned rings to be of any real advantage other than in racing engines.

Currently both the H.P. .61 and Rossi .60 utilize the pinned ring. The first Fox .60's did also, but this has now been eliminated from current production models.

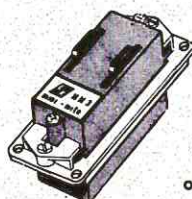
By now most of you have heard of the engine templates that Nelson Model Products imports. These work well as hole locators, but are not true drill jigs. How would you like to have an accurate drill jig that would actually guide the drill? No more wandering drills that break out of the side of the mounts or come through the bottom of the mounts at odd angles. Bill Johnson - 6328 Jackson, Berkeley, Missouri 63134, can make such a drill jig for you, but you must supply Bill with an old crankcase. Bill cuts the case off below the exhaust, drills out the mounting holes and installs hardened drill bushings in the holes. The charge for this service is \$4.00 including postage. This is very reasonable for the work involved. The mounting holes in the case you send must be in good condition. They cannot have been filed egg shape to match mismatched mounting holes in the motor mounts, etc. Few of you have old cases lying around so you will have to buy a new crankcase from the manufacturer. Several modelers can go together and split the cost. This could even be worked out as a club project with the club charging a small fee for use of the jig, and having jigs made for all of the more popular engines that the club members use. I think all of us, at some time, have experienced the frustration of trying to drill straight mounting holes through the motor mounts, and ending up with less than

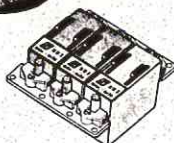
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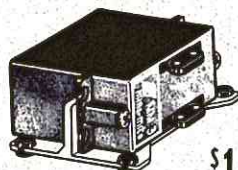
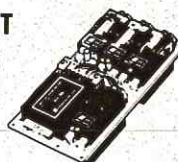
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Mounts one servo horizontally

CUNNINGHAM ON R/C



The real backbone of the R/C movement in this country, and probably most other countries, is not its national organizations; not its manufacturers; not its publications; although these have done more than anything else to bring R/C to its popularity today, but rather, the local clubs.

Throughout the past five years most clubs have grown at an astounding rate, paralleling, of course, the growth of people coming into R/C. The club newsletters that come my way are chock full of doings and happenings from North to South, and from East to West. The interest of clubs varies, as do the interests of each of their individual members, but several things stand out as unifying forces to the clubs, and to the club members. First is the need to band together to secure a flying site. In many parts of the land this is a pretty tough proposition. But most clubs have overcome these problems and have flying sites. Most cities and counties don't provide our type facilities, so it's up to private groups to do this. If we didn't have clubs, we darn sure wouldn't have flying fields. Next, the club needs to have muscle to maintain the flying site once it has been secured. This is a continuing project, and one that goes a long way toward keeping the members together.

In the earlier days of R/C one of the prime needs of a club was a place to go to get help with its problems. Such as, why your last aircraft hung up in right rudder and crashed; why the blankety-blank thing decided to make a flyaway just on the day you took your mother-in-law out to see you fly; why 'almost anything' in those days!

Now, a prime reason for the existence of clubs is to provide competition - competition in many forms. The competition may spring up between rival clubs, or between club members, or other groups. But, competition is

really the main unifying force behind R/C flying, or behind any other sport that you can think of. Or, any other form of life, for that matter.

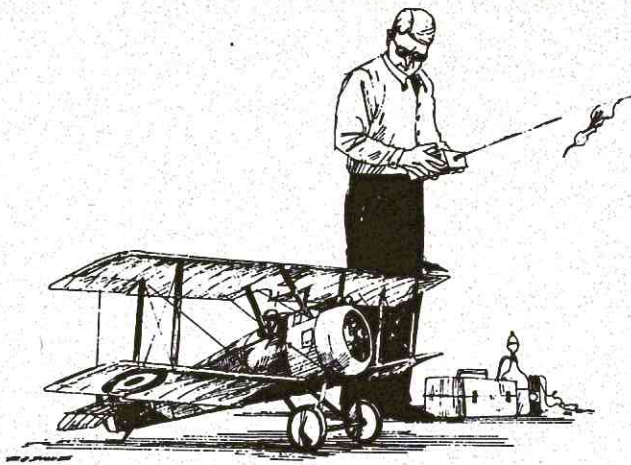
Competition can and does take many forms. We are all aware of the competition at the Nationals. There, we have three main radio events, Pattern, Racing, and Scale. Many clubs concentrate on one or the other of these groups, with the result that fliers from these organizations do very well at each Nationals. The rules for these events can be found in the AMA rule book, and these categories are pretty clearly defined.

Competition at the local level can take on all of the earmarks of big time competition, and even though the total number of entries is not as great, the class of flier is often as good, with the total results almost as satisfying.

But how about the rank and file club member, or the beginner who hasn't any business trying to compete in a Nationals, or in a large local meet? What can he do to get into some form of competition? This is where the local 'fun-fly' contests come in. These events can be enjoyed by both the old pro and the beginner. And they can be enjoyed by the Sunday flier who simply doesn't have either the time, or desire to get into the racing game, or to spend hours of practice in order to become a top pattern flier.

Even the rank beginner can enjoy a fun-fly contest if there are events included for his experience level. Too often, however, the contest is dominated by more experienced pilots, and those with very little experience are simply too shy to show off their beginning form in front of the others. Hog wash! Everyone had to get started someplace, and if you can overcome your reluctance, you will find that any type of competition will sharpen up your flying, and make you a better pilot in just one meet.

The events that can be held are
(continued on page 69)



by DAVE PLATT

(Designer — Top Flite Models)

SCALE IN HAND...



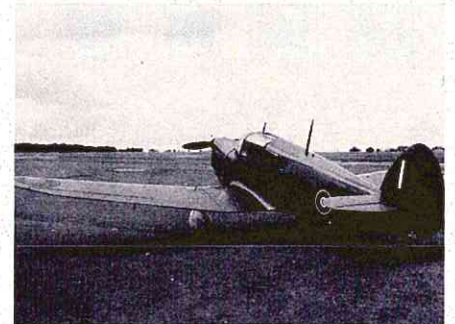
For some time past, observers of the changing tides of modeling opinion have noted a swing in interest toward scale, within the broad radio-control branch of the aeromodeling hobby. Of course, it is common for those most interested in any one aspect of the hobby to point to their own and claim that everyone is swinging toward it. Your columnist has his feeling for scale, it's true. But there is solid evidence, undeniable *facts*, which support the statement.

Consider this: Only four years ago, two manufacturers offered Scale R/C models as kits. Today, there are well over a dozen. In the same period of time, magazine articles and coverage concerning Scale R/C has increased tenfold. Then again, take the Nat's as another example. Three years ago, entries in Scale R/C were so low, that anyone who didn't realize the potential growth of this class would



have deleted it from the following year's list. It wasn't deleted. The next year entries had doubled. Last year we had 25, *and mark this well*, of those, 23 qualified by flying a judgeable flight! This year (at the present time of writing) there were 38 entries before the deadline was up, not even considering last-minute entries.

More facts: *All* of the major R/C magazines now have a special scale column. A new magazine, concerned only with scale, will appear soon. We refer here to the publication 'Scale Models' due in October of this year



from Model Aeronautical Press, English publisher of the 'Aeromodeler' magazine.

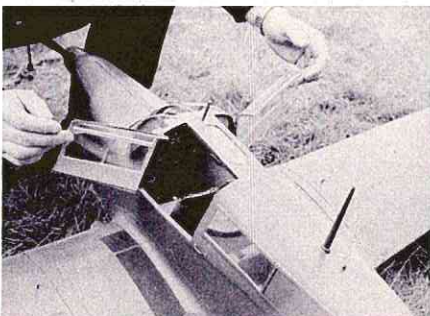
Is this trend purely American? Certainly not! The exact same thing has happened in Japan, Germany, England and France to a *proveable* extent, and evidently the writing is on the wall in New Zealand, South Africa and Australia, as well.

Pilot Figures

We have had numerous requests concerning pilots for scale models. One manufacturer is about to release such an item in two sizes: $1\frac{1}{2}''=1'$ and $2''=1'$. Until they are actually released for sale they will *not* be available in any quantity or at any price.

From our Postbag . . . Dear Dave,

As a scale judge at a local contest yesterday, I saw a sad scene that will
(continued on page 56)





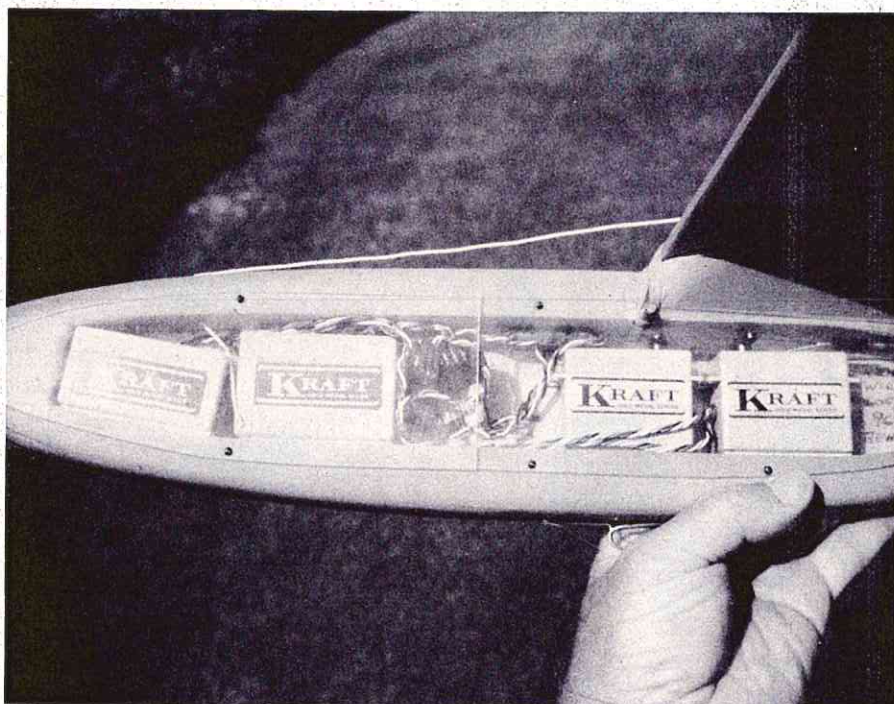
Ken Willard and unique Cliffmaster.

CLIFFMASTER

By KEN WILLARD

A TOP SLOPE MACHINE, WITH UNIQUE PROFILE FUSELAGE, THE QUICK-BUILDING CLIFFMASTER IS ADAPTABLE TO THERMAL SOARING.

Equipment section of profile glider receives lots of comments.



The Cliffmaster is not so much a design as it is a design concept. The reason I say that is because, since the original prototype was built, there have been four variations constructed. And all four of the designs have at one time or another won an event in which they were entered.

The idea behind the Cliffmaster evolved from a desire to have a small, but fast, entrant in RCM's annual slope soaring pylon races at Sunset Beach. And, at the time the idea hit, there were only a few days before the races, so the construction had to be simple and fast. And it is.

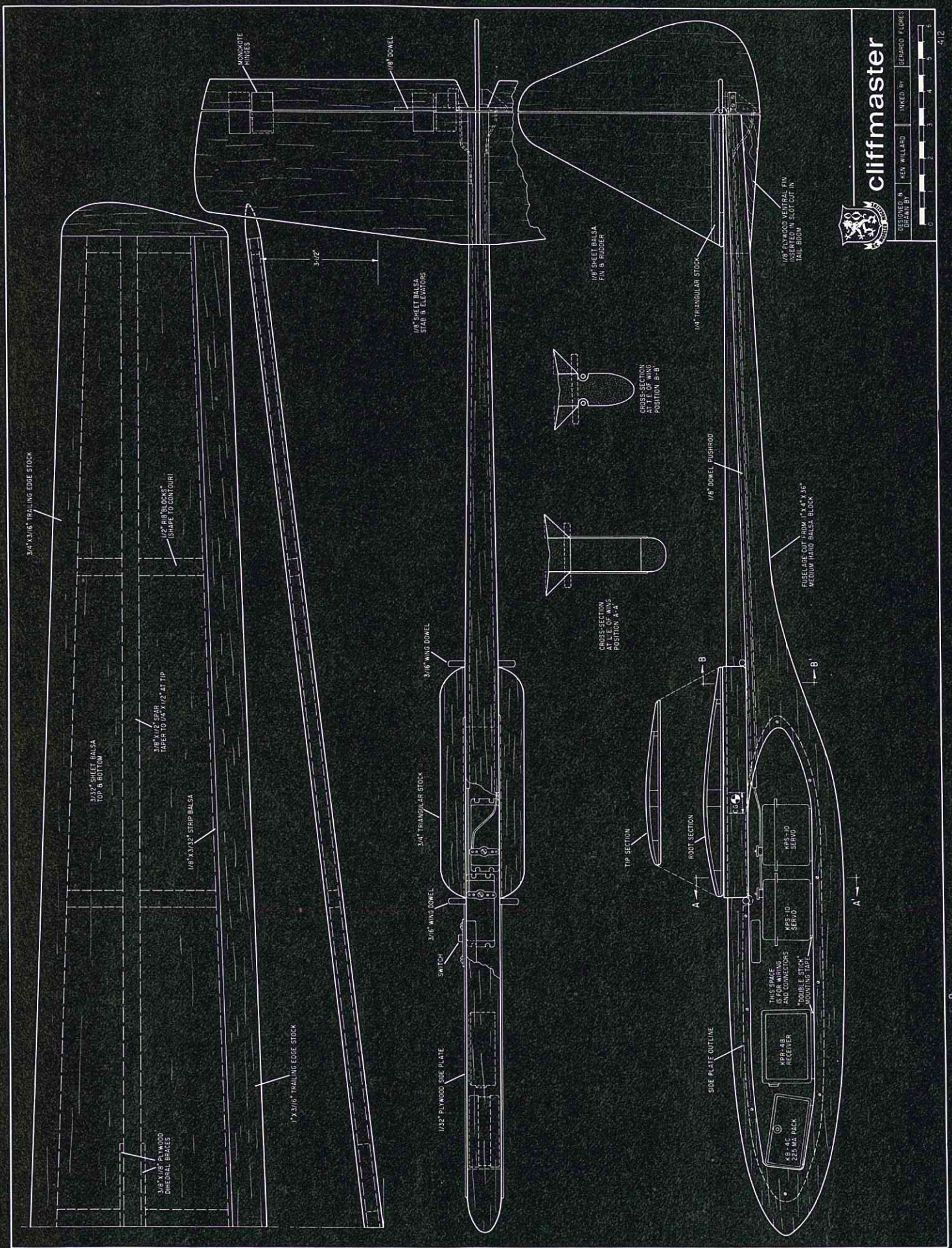
The best thing about the design is its adaptability to various wings. In fact, I had planned to include the drawings for a thermal wing along with the racing wing, but time didn't permit. However, for those of you who want to experiment, you can draw up your own version. I would suggest a wing with 74" span, root chord 7", just like the racing wing, and taper to a 4" chord at the tip, with the leading edge to be kept straight and the trailing edge tapering forward. As for the section, a 9% thickness, with maximum camber at the 40% point, and a flat bottom, should do a reasonable job. That's what I plan to try, anyway. Keep it light, too.

But back to the racing version. The wing is ultra simple to build, although I did complicate it slightly for you by tapering the spar thickness from 3/8" at the root to 1/4" at the tip. The original wing did not have this taper, and thus the thickness ratio, which is ten percent at the root, increased to about 15% at the tip - and this slowed the model down.

There are better wing sections than the one I used - but I doubt if there are any that are faster to build. The bottom and top sheeting is 3/32" sheet, and when you pin the bottom sheet to a flat surface, add the trailing edge stock to the leading and trailing edge positions as shown, glue the spar in place, and then bend the top sheeting over the spar; the top sheeting takes a natural curve from leading edge to trailing edge and only needs a couple of aligning ribs between the root and the tip. The 1/8" x 3/32" strip just ahead of the trailing edge stock at the rear of the wing gives you a good gluing surface.

Admittedly, it's rather unusual to use trailing edge stock at the leading edge of a wing, but if you'll note that the width of the stock is 3/4" at the

(continued on page 66)





WALT AND WAGGER BUILD THE MOCK 15

LOREN DIETRICH PRESENTS A COMBINATION OF DESIGN IDEAS THAT ADD UP TO THE YEAR'S MOST REMARKABLE .19-.23 SIZE AIRCRAFT.

"Wait up a minute, Wagger!" puffed Walt as he wobbled along behind the Bassett. "Since I've taken up the controlled crashing of model airplanes I'm not in the shape I used to be!"

"You never were," sniffed the feisty talking dog. He nosed the door of the shack open and pawed on the light so his master could see his latest creation. Walt finally came wheezing into the hobby house and then gave one large grunt as he spied the 'Mock 15'.

"You blockhead!" said Walt woodenly. "That will never fly!"

"Give me credit," said Wagger takingly. "It already has."

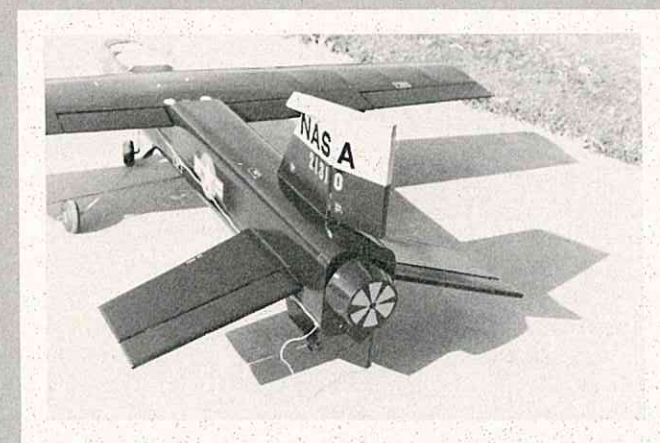
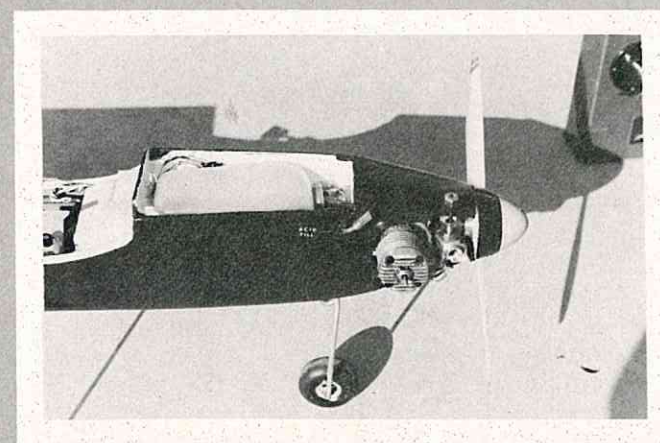
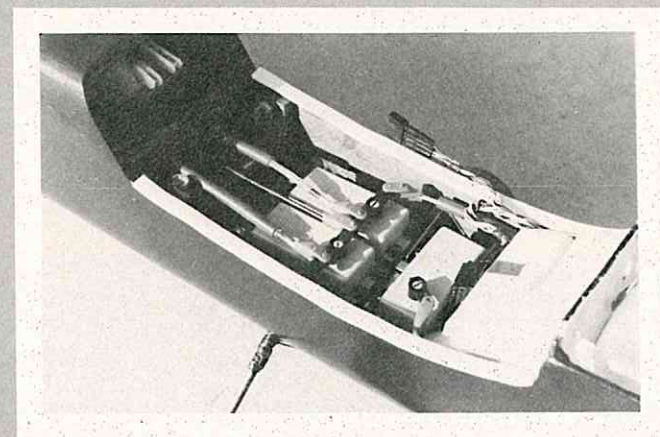
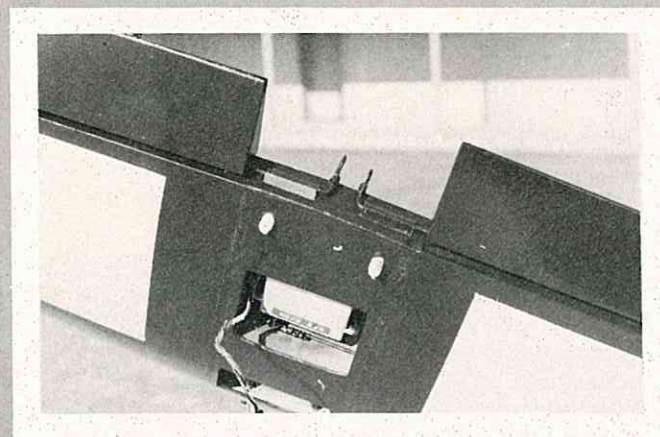
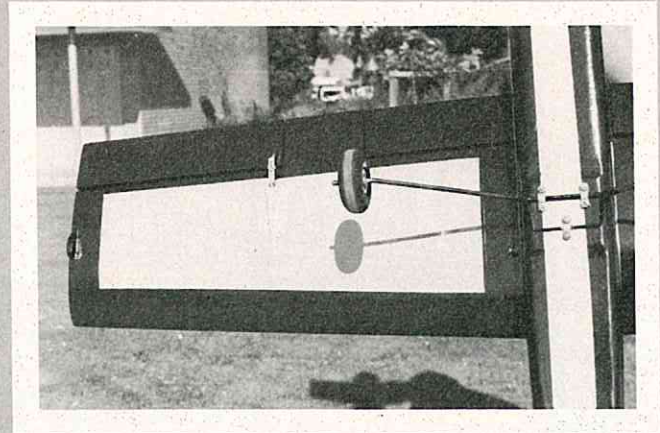
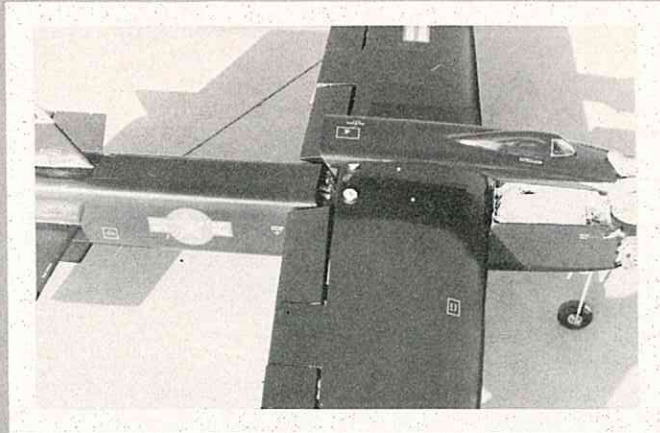
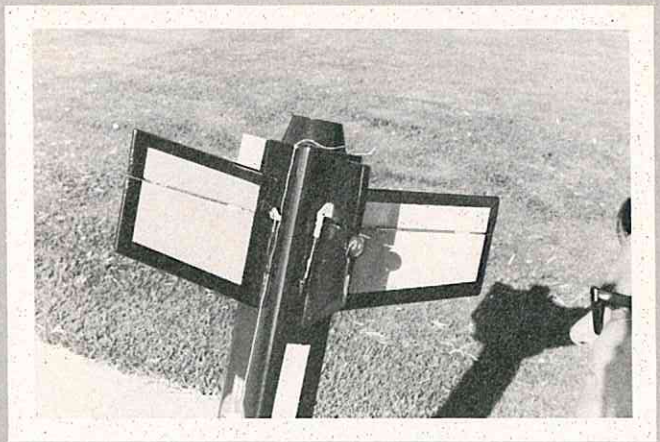
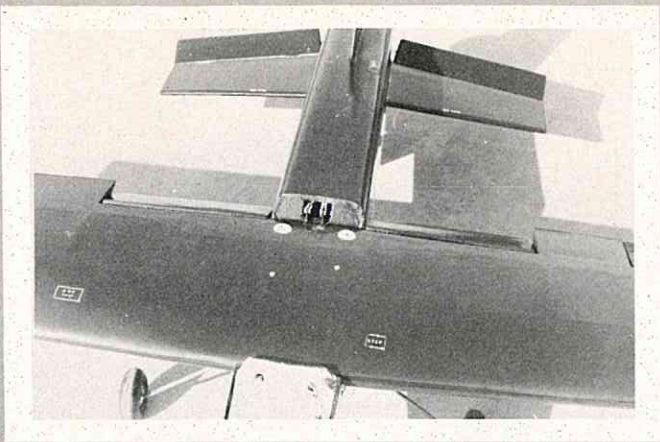
"Not much wingspan," Walt said shortly. "The fuselage is good sized though," he added longingly. "How's the weight?" Walt asked lightly.

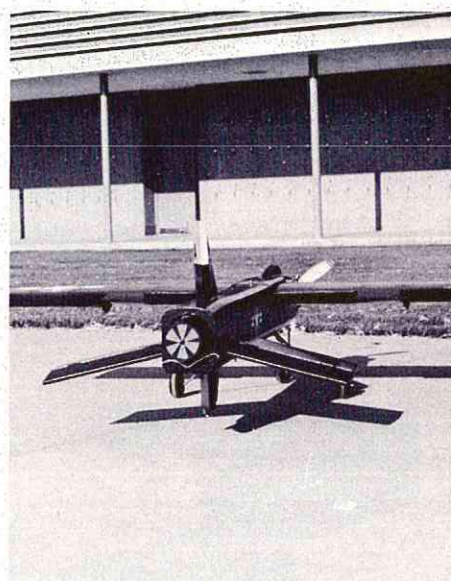
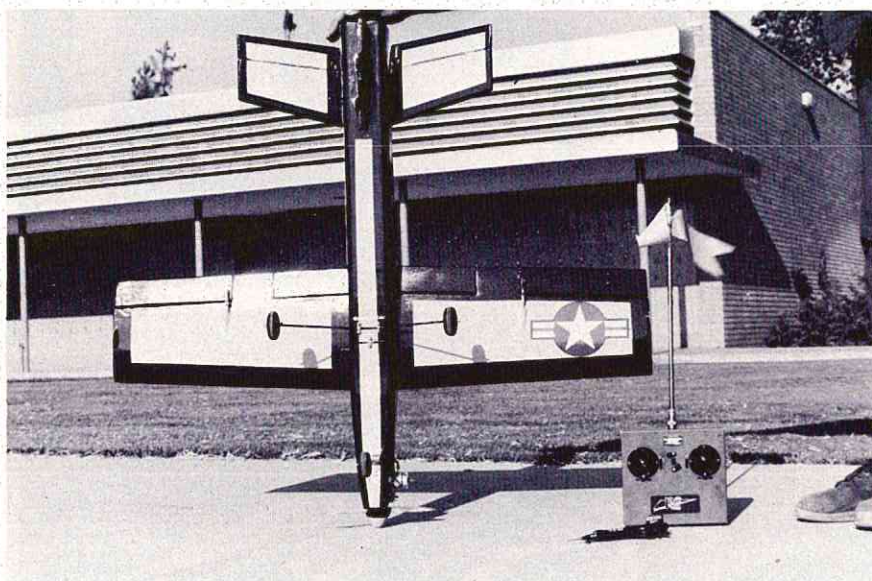
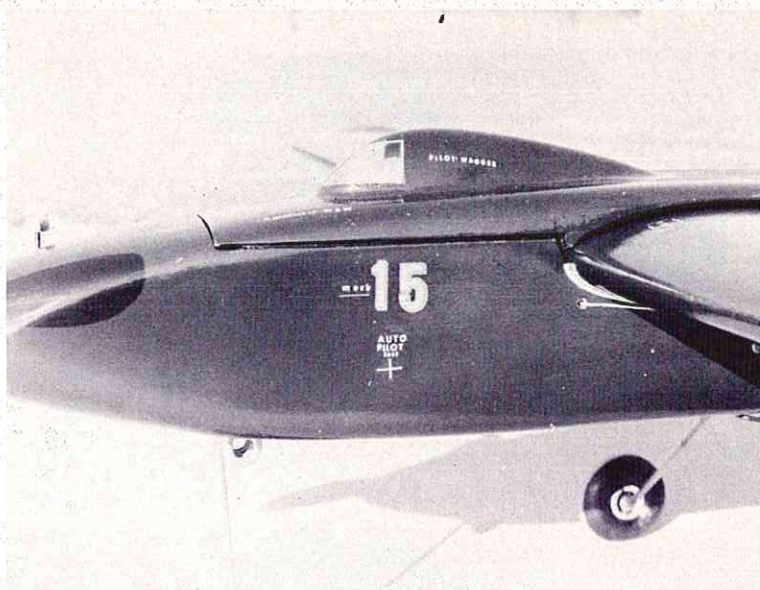
"Not as light as it could be," replied Wagger heavily. "It gained some weight after I hit a hangar on landing," he added crushingly.

"Oh, KNOCK IT OFF!" shouted Walt, "and let's get on with it. Now, the last time we got together (see WAGGER column in October issue) you explained why you thought that such features as the split rudder and coupled flaps would be desirable. I'm

sure you're aware that aircraft like Chuck Hayes' 'Sceptre' have used many of the features in combination before this, although I'm interested in they way you've opened the door to using jet and rocket type appearance. How about letting me take some pictures of your 'Mock 15' for reference while I build mine?"

"Happy to oblige," murmured Wagger. "I'll pose it in different views for you. Then, after the pictures, I'll give you a detailed construction sequence; it's built from the tail forward and COULD give you some trouble even though many of the techniques are very conventional."





CONSTRUCTION SEQUENCE

1. Take the 1/16" x 3" x 36" sheets. Draw lines on both edges the full length, 1/4" from the edge. Glue a 36" x 1/2" triangle stock to each edge, with its inner edge flush with thy line. (Check cross-sectional views for clarity.) When dry, turn one side over; this gives a right and left side. (Triangle stock is toward the inside.)

2. Cut sides to shape by removing wing cutout, stabilizer slots, and so on.

3. Laminate 1/16" plywood doublers to insides of fuselage sides using contact cement with a little Titebond around the edges.

4. Add diagonal 1/8" square braces to inside rear.

5. Assemble sides using bulkheads at front of stabilizer, rear of fuselage, and rear of wing. Use cross-sectional views for bulkhead shapes.

6. Insert ply crossbrace at rear of stabilizer slot, slide 3/16" dowel into place and glue. This assembly will determine the zero incidence of the stabilizer, so work carefully.

7. Build two stabilizers and elevators over the plan. Turn one set over to obtain a right and left set. (Very handy.) Fit and insert hinges but don't epoxy them in at this time. Mount the horns temporarily. (See photos for horn size, type, and location.)

8. Use sandpaper over a dowel to round out the inside edges of stabilizers for a neat fit over the dowel in the fuselage. Insert stabilizers, check for equal and symmetrical 'droop' with the fuselage. Glue in firmly.

9. Install 1/16" balsa sheeting to bottom of fuselage, with grain running crossways. LEAVE OFF the segment from forward stabilizer bulkhead to

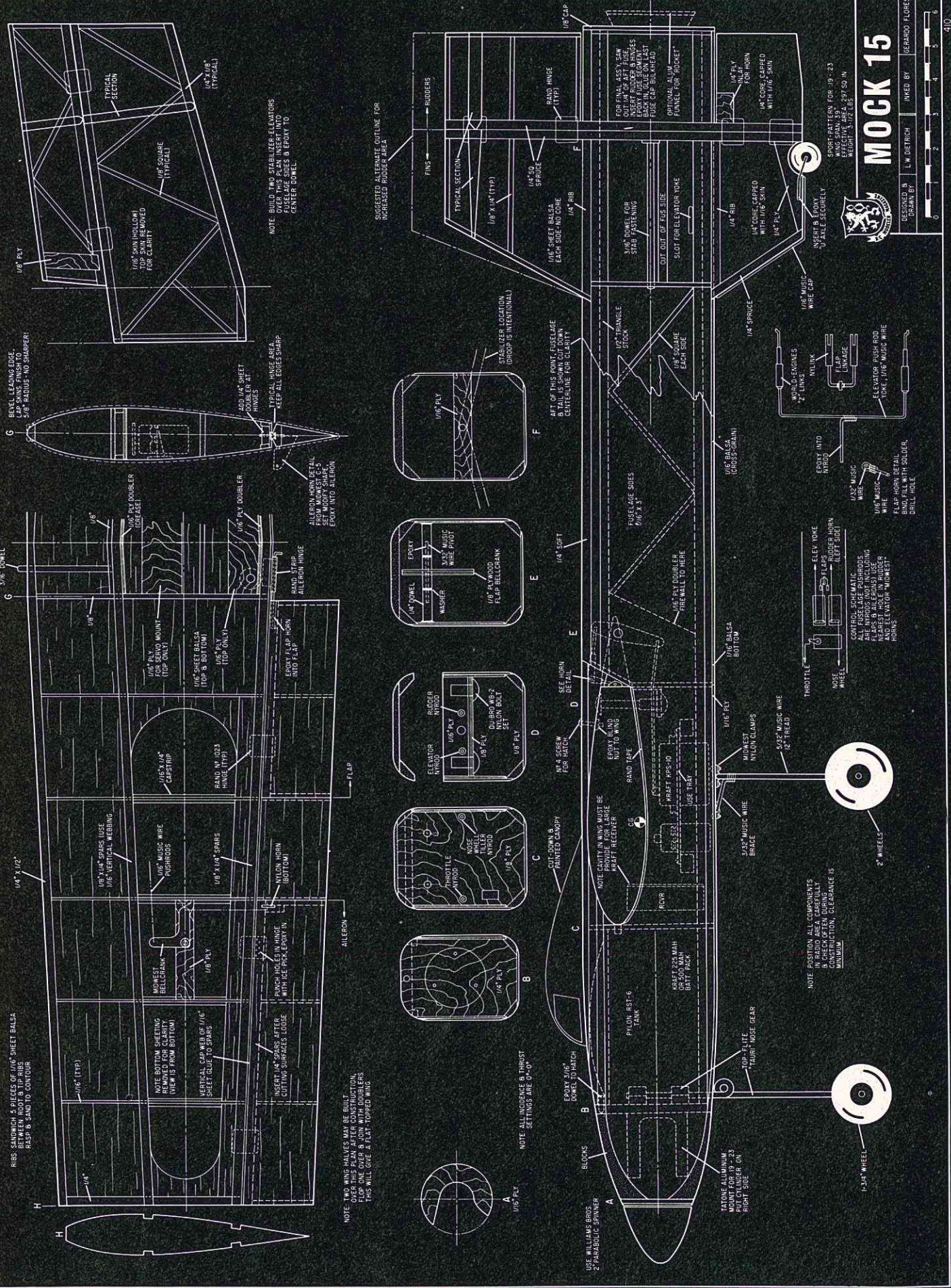
the butt-end of fuselage for now. (You have to install the fin and elevator yoke yet, you see, and that yoke is ornery.) Note also that the 1/16" ply on the forward bottom is NOT installed at this time.

10. Install a segment of the top 1/4" sheet, from the butt-end bulkhead to where the FRONT edge of the fin spar will be. Make a 1/4" notch in the sheet for that fin spar.

11. Cut the 1/4" spruce fin spar and insert and EPOXY it against the notch. Epoxy it also to the plywood crossbrace holding the stabilizer dowel. Make sure this spar is vertical while it is setting-up.

12. Build both upper and lower fins over the plans, simply eliminating the fin spar. Remove from plans, then slide them over the fin spar and glue to spar and fuselage bulkhead. (When

(continued on page 61)



MOCK 15

SPORT PLATION FOR 19-23
EFFECTIVE AREA 287 SQ. IN.
WEIGHT 3.12-3.05



DESIGNED BY	W. DETRICH
ENGINEERED BY	GERARDO FLORES
INVENTED BY	



By WALT MITCHELL

PHOTOS BY ART HEIL

FOCKE WULF 190

The Focke-Wulf 190 series, designed by Professor Kurt Tank, was the best *Jaeger* the German Luftwaffe had to offer during World War II. This trim little fighter saw action on all fronts and may well have been the best of the entire war, with the possible exception of the P51D 'Mustang'.

Though not as well known as the infamous Messerschmitt Me 109, it was far superior to the 109 in all respects. Various configurations of wing cannon and machine guns gave it tremendous fire power. "The bloody Fockes," the British pilots said, "come at you blinking like bloody neon signs." A 14 cylinder aircooled radial engine with a supercharger produced a top speed of 408 mph at 20,600 feet, enabling the 190 to hit and run without fear of pursuit. It had an effective range of 500 miles, a wing span of 34'-6", and weighed 9,750 lbs.

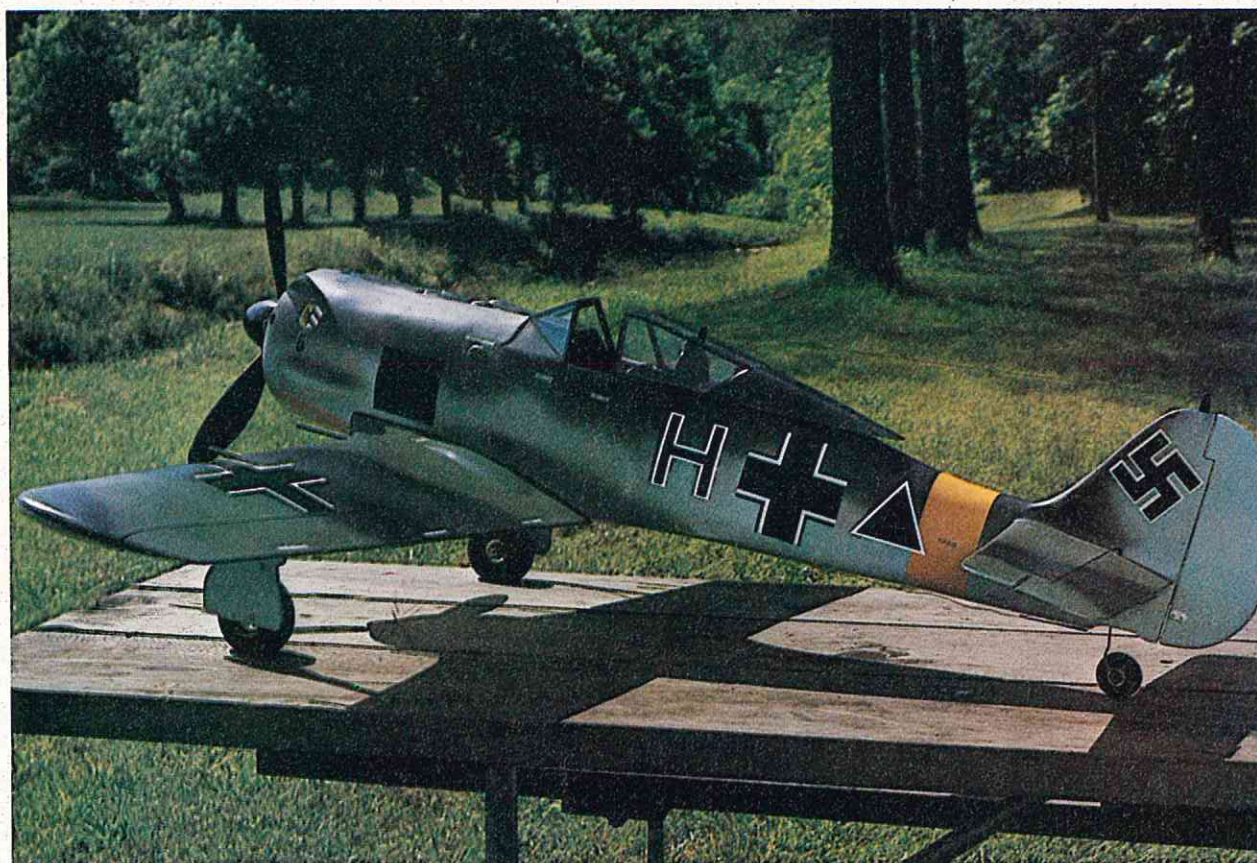
Professor Tank continually modified the FW 190 series throughout the war, evolving the FW 190D, or 'long-nosed 190', and eventually the Focke-Wulf TA 152 which saw only limited production toward the end of the war. The prefix TA, incidentally, was for the designer's name, a signal honor awarded Tank by the German High Command.

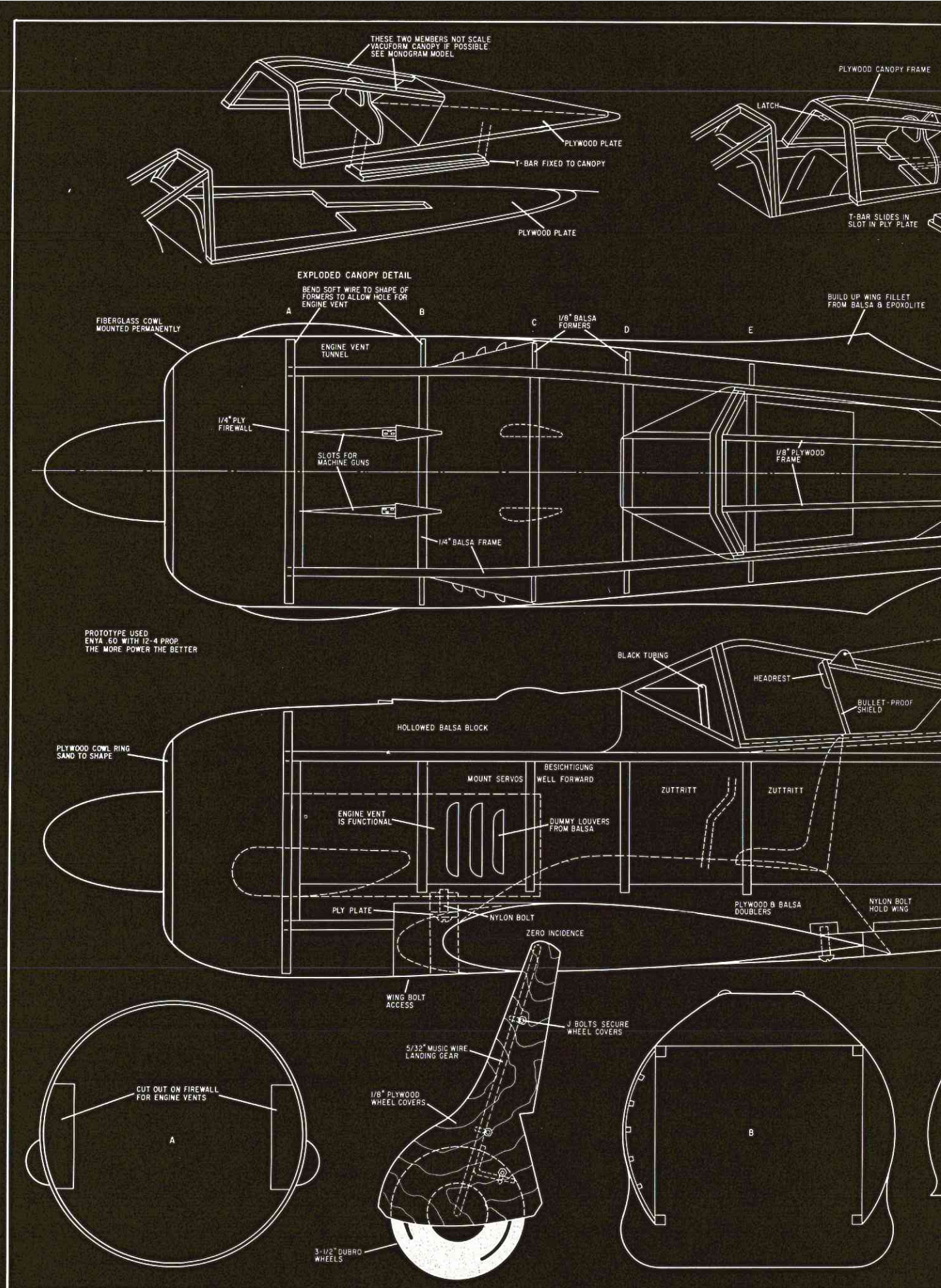
The R/C version of this great war-bird is definitely not a beginner's project . . . but it can win that scale contest for you, as it did for me in the 1968 Atlanta Nats . . . and thereby hangs an interesting tale, fraught with pathos and desire. This was my first big contest, even though at 39 I am the oldest boy on my block who builds model planes. I finished the FW just in time for the qualifying trials on Saturday, the finals being on Sunday. To qualify for scale judging, your entry must prove that it can take off, fly around and land all in one piece.

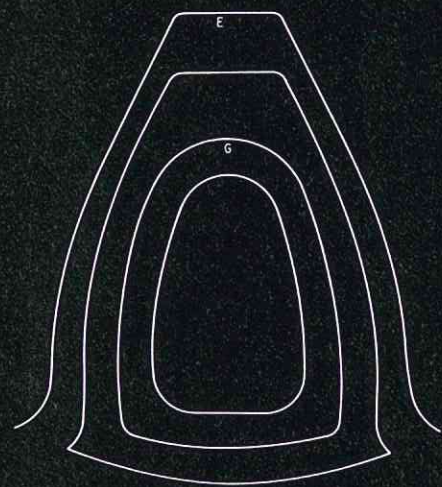
I arrived at the Atlanta Model Airport at 8:00 a.m., just like the Contest Director suggested, and fidgeted through seven interminable hours of pattern flying until they finally got around to scale. O didn't they fill the air with Kwik-Fli, Son of Kwik-Fli and I was a Teen-age Kwik-Fli? But at last the big moment had come, and the Focke-Wulf taxied out onto the Tarmac with the Kraft transmitter in the skillful hands of one Bob Roberts, fearless test pilot. After taxing it around for the crowd to admire, Bob turned the little fighter into the wind, urged the Enya .60 to full bore, and blasted off down the runway. Beautiful!

I was just beginning to have a deep goody shiver, when suddenly the flying fickle finger of fate pointed our way. With the end of the runway disappearing beneath his wings, 'Ace' Roberts lifted off without sufficient airspeed. The little bird staggered drunkenly for a brief moment, then . . . **STALL! SNAP! THUD!** and *Gott in Himmel* - what a mess. Tail assembly broken off, wheels ripped away, servos scrambled . . . ugh! Test pilot Roberts was in shock, babbling profuse apologies. Being a Great Sport, I absolved him of all blame, cutting off only the very tip of his little finger with my trusty X-Acto as a stern reminder of the day. Tears welling in my eyes, I placed the gaily colored bits of balsa in a sack and departed the field a beaten man, leaving first prize to my arch scale enemy, Bob Lamb, and his beautiful Ford Tri-Motor. O bitter gall!

Back home again, I mixed a tall, cool one and sat staring vacantly at the wreckage. Then I mixed another . . . and another. And gradually the lion-hearted courage (for which I am renowned from Opp, Alabama to Ludowici, Georgia) returned. Had anyone observed, they would have seen a look of great inner strength and determination







BALSA BLOCK

BALSA BLOCK

SHEET

TRIM TAB

SHEET AND CUT OUT THEN FABRIC

G

H

ANTENNA

SHEET

ENTIRE FUSELAGE
SHEETED WITH 3/32"

UPPER PLYWOOD PLATE

LOWER PLYWOOD PLATE

1/4" BALSA
FRAME

FIN FAIRS INTO FUSE
SEE MONOGRAM MODEL

AUFZUG

1/4" BALSA

BOLT HORN
TO WIRE

HARDWOOD
BEARING

TRIM TAB

FABRIC

TO SERVO
TO RUDDER

CUT OUT
AFTER SHEETING



2" DUBRO
TAIL WHEEL

BUILD VERTICAL
FIN AS PART OF
FUSELAGE

IMPORTANT:
ALL CROSS SECTIONS SHOWN
OUTSIDE OUTLINE OF FUSELAGE
CUT FORMERS TO ALLOW FOR
THICKNESS OF 3/32" SHEET



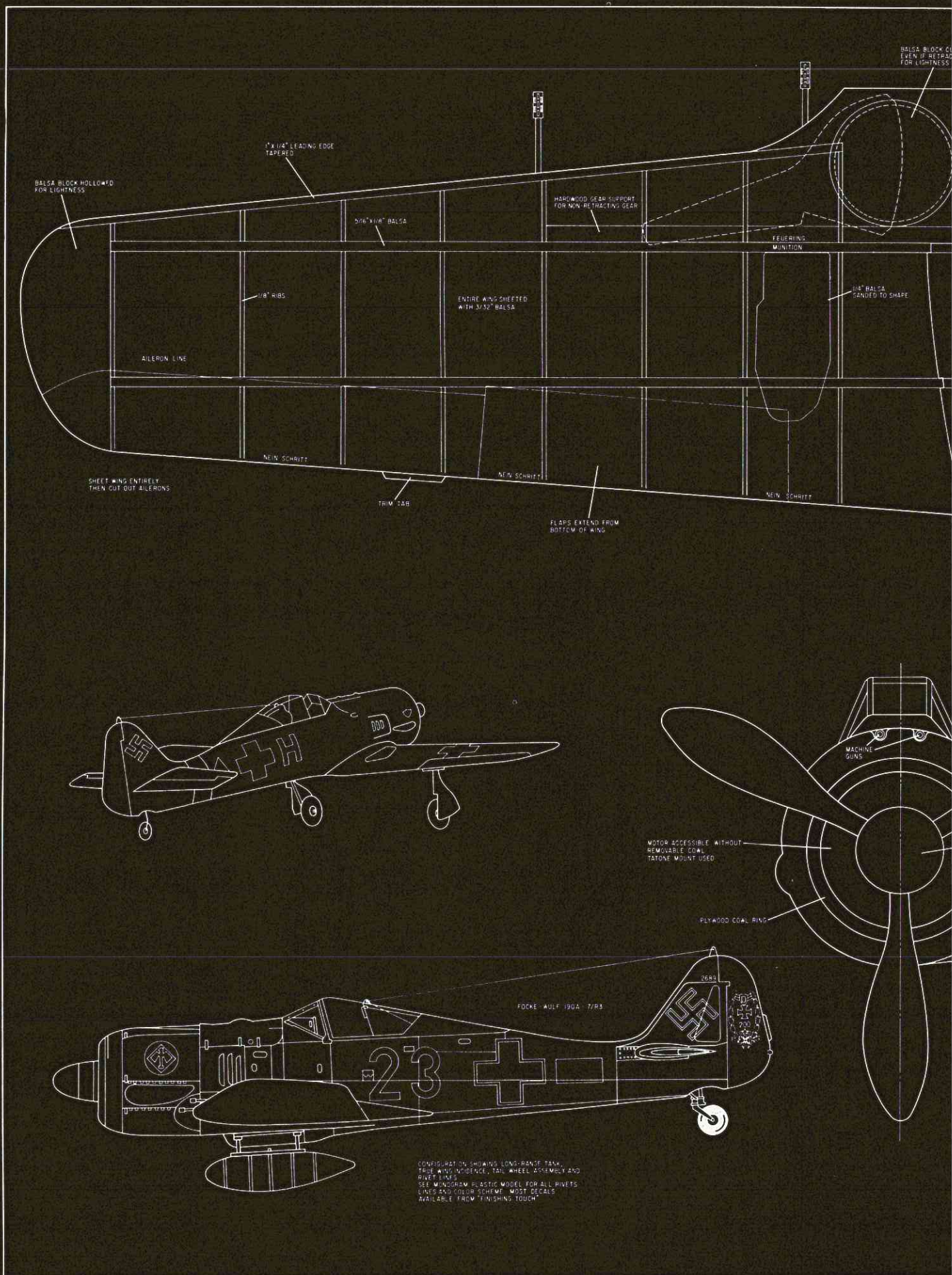
PLATE 1 OF 2

FOCKE-WULF 190

DESIGNED &
DRAWN BY WALTER MITCHELL INKED BY GERARDO FLORES



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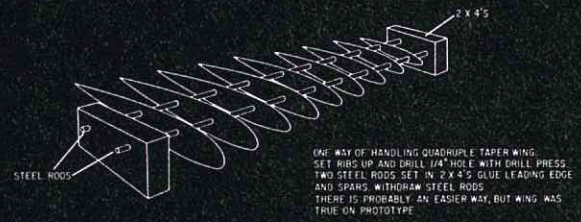
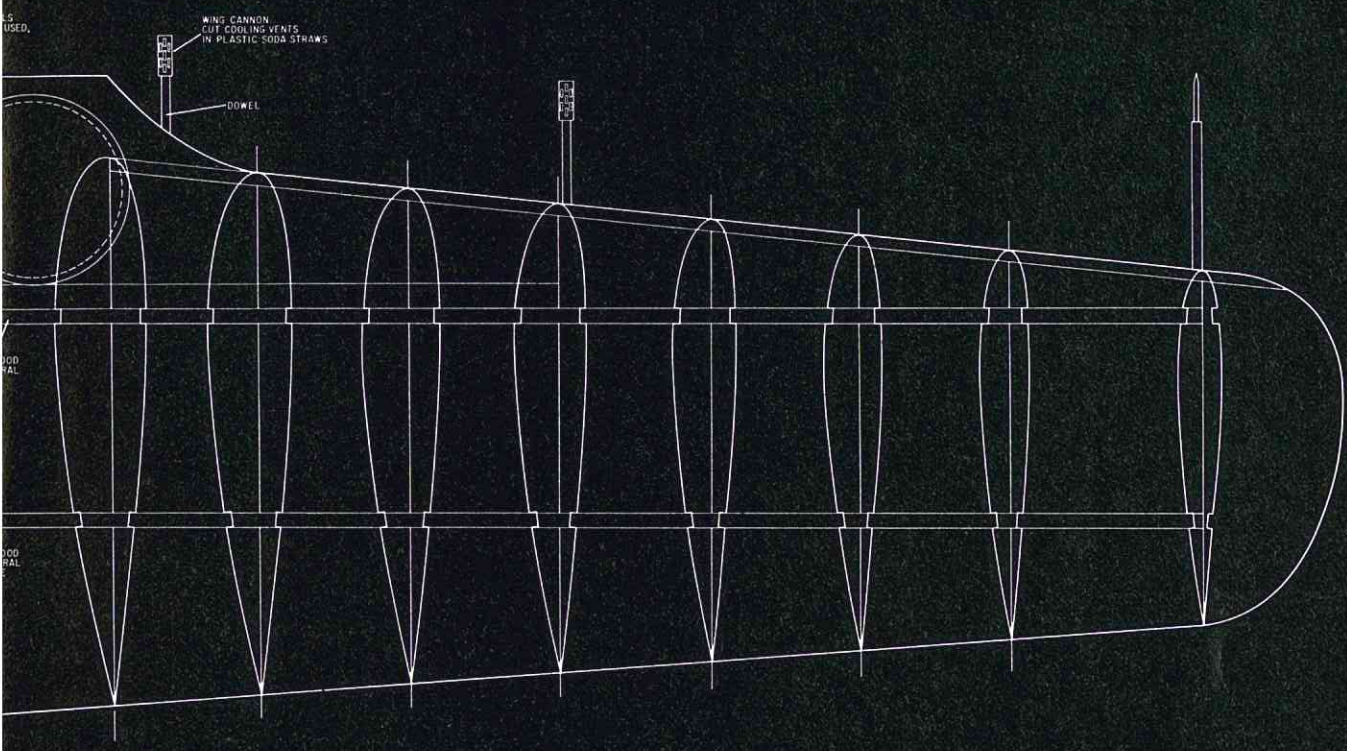


PLATE 2 OF 2

FOCKE-WULF 190

DESIGNED BY: WALTER MITCHELL INKED BY: GERARDO FLORES

0 1 2 3 4 5 6

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FULL SIZE PLANS AVAILABLE - SEE PAGE 70

steal slowly over my boyish features. My firm jaw set in a rock-like outline . . . NO, BY NED! I would not squat down in defeat and leave the coveted silver goblet to that furshlinger Tri-Motor. Smiling my funny little crooked grin, my keen gray eyes aglitter, I repaired to my workshop armed with Tite-Bond, Epoxy, and a considerable quantity of Johnny Walker Red. Later, much later, when the first rosy fingers of dawn caressed the eastern sky, the Focke-Wulf was ready again. Not in mint condition, but good enough to compete, given some luck and nearsighted judges.

On this, the final day of the contest, Test Pilot Herr Roberts was ready, too. Having diagnosed the problem in his troubled sleep as lack of power, he recommended the 13-4 prop be replaced with a 12-4 to allow the .60 to wind up. We secured permission to qualify again and fired the 190 up O.M.T. This time, as I watched through a slowly lifting Scotch mist, the Focke-Wulf did good like a Focke-Wulf should, and qualified handily. I still hear the throaty huzzahs of the crowd.

In the finals, after scale judging, Roberts flew like his mother was Eva Braun, and wrested the first prize silver away from the greedy clutches of assorted Tri-Motors, Chipmunks, Bipes, Goodyears and what have you. When the going gets toughest, the

toughest get going . . . Bob and the Focke were tough that day. For my part, I fell to the ground in a catatonic state and received the silver goblet somewhat posthumously. Believe me (and Vince Lombardi) . . . that second effort always pays off!

CONSTRUCTION

The plans are available for a few Beutchemarks from our beloved Fuehrer of modeldom, Herr Dewey. But before beginning construction, go first to your friendly local hobby shop and purchase the plastic model of the FW 190 by Monogram. Be sure you get the Monogram kit. Build the plastic model carefully . . . you will need to refer to it in constructing the R/C version. Save the instruction sheet. It will give you authentic coloring and marking and will serve as the required 3-view in a scale contest. Your wife will think you have suffered a terminal age regression when she sees you fiddling with a plastic model and will probably give you some lip. But if you will strike her smartly on the flank with the 36" length of 5/32 wire, she will retire and leave you to your various devices.

The fuselage begins, as in the olden, golden days, with the construction of two frames of 1/4" square balsa along the dark outline shown on the plans. After these are properly joined, add formers cut from 1/8" sheet, being sure to cut them smaller

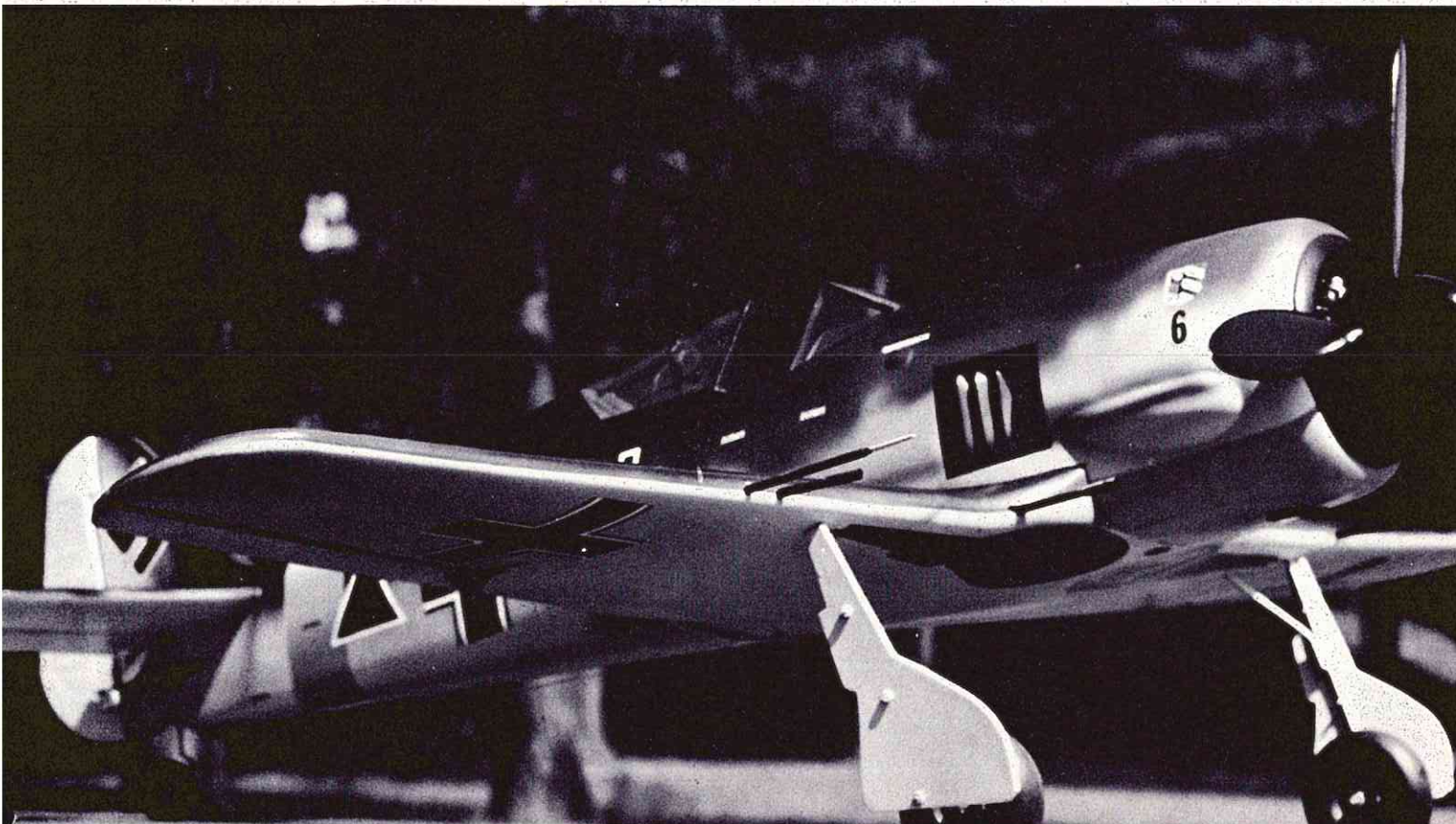
than the cross-sections to allow for the skin of 3/32" sheet. Stringers come next to give support, and the entire fuselage is then sheeted with 3/32" balsa.

The sliding canopy will give you some trouble, but it will also get you some scale points when you slide it back and reach inside the cockpit to flip on the switch. Essentially, it involves two plywood plates, the bottom one fixed to the fuselage and slotted to accept a T-bar as described on the plans. Build the canopy as if it were not to slide; after sheeting the fuse, cut it loose, add the plywood plates and T-bar. Then slip the assembly together. It's hard to draw or put down in writing, but you will dig when you get involved.

The engine exhaust vents are functional and are necessary to dissipate heat from the fully cowled engine. Each vent is a tunnel down the side of the airframe and the exhaust exit is formed by soft wire bent in the shape of a former and sheeted over. Take care to fuel proof the inside of each tunnel so that fuel and other corruption does not enter the servo compartment.

The cowl is of fiberglass and permanently attached, which solves a lot of problems. There is ample room to service the engine through the front, and the mill may be removed completely by unbolting the Tatone

Blunt-nosed, bow-legged FW-190 was, perhaps, the best fighter of WW II. Note exhaust ports, which are functional.



mount from the firewall. Blind nuts receive the Tatone mount bolts through the firewall. The cowl was made by cementing a goodly number of balsa blocks together, tack gluing to the firewall, and carving to the proper shape. Be sure and allow for the thickness of the fiberglass. Remove the mold from the fuse, fiberglass it, gouge the balsa mold out, and you've got your fiberglass cowl shell. Attach permanently to the airplane and fair the joint smooth with 'Stuff', Epoxo-lite or what-have-you. The cowl ring is jig-sawed from 1/4" plywood and sanded to shape.

The real 190 mounted a huge paddle bladed prop with a large spinner. On the model, these were dummied from balsa and used for scale viewing only, which is permissible under the rules. A commercial plastic spinner with a 12-4 prop was used for actual flight.

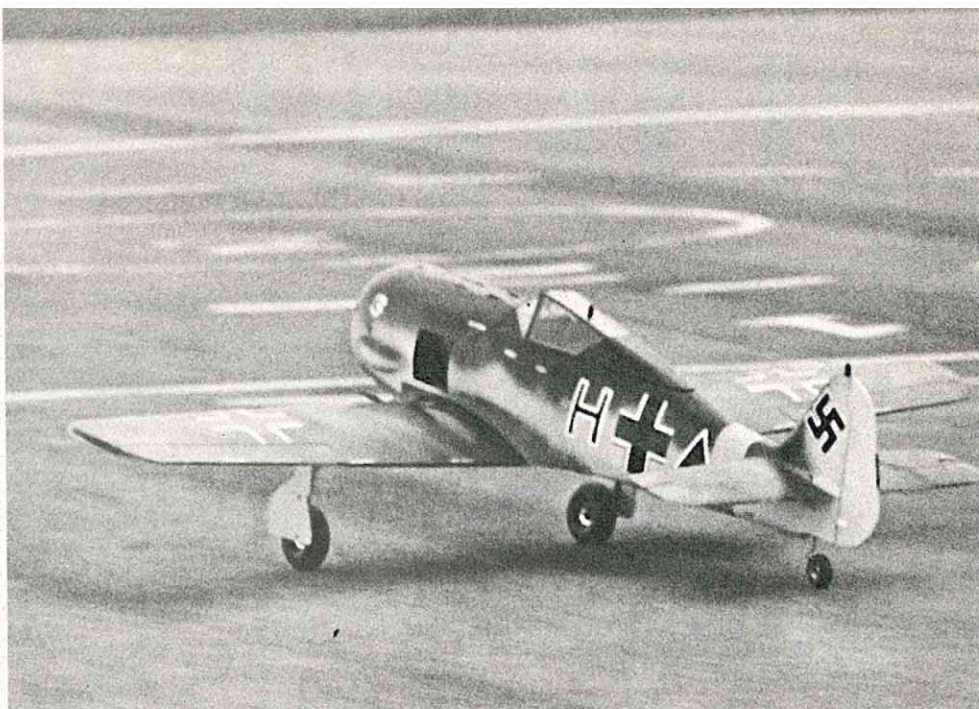
Note from your Monogram model that the vertical fin is very thick at the base and fairs directly into the shape of the fuselage. I built the fin 'standing up' on the fuse, starting with the sculptured leading edge and working carefully to avoid misalignment. The rudder is also thicker than you would expect, but can be built flat and sanded to shape.

The wing... ah, the wing. This was my first go at a quadruple taper, and after many false starts, I solved it as shown on the plan. This may not be the easiest way, but it works. The secret, of course, is getting the ribs properly set up before drilling the holes for the aligning rods. If this is done correctly, you can't go wrong. The entire wing is sheeted with 3/32" balsa and results in a tremendously strong structure. The balsa block at the leading edge which houses the wheel wells is sculptured into the fuselage shape, again using your plastic FW 190 as reference. The wing is secured to the fuselage with nylon bolts.

Retracting gear was not used on the prototype because I am not familiar with it; also, I had no guarantee the 190 would even fly. But fly it does, and if you could work out retracting gear, this airplane would look so good flying that you couldn't stand it. You could even get nose-to-nose with the great Lou Proctor at a scale contest if you had a Focke-Wulf with hide-away wheels.

FINISHING

Brush three heavy coats of talcum powder and dope mixture on all surfaces, sanding out imperfections



Focke Wulf heads down the runway, seconds away from snap-roll and crash.

between each coat... then cover with silk. Apply talcum powder and dope mixture four more times, sanding down almost to the silk each time. Spray with clear dope to seal, sand again and you're ready for color. Spray on the base coat (light blue, mainly on the underportions), then begin spraying on camouflage colors, the lightest first. Use a piece of cardboard cut to the outline of the colors shown on the Monogram instruction sheet. Hold the cardboard four inches away from the surface and spray past it to avoid hard outlines. After your FW 190 is suitably and faithfully camouflaged you will probably have a

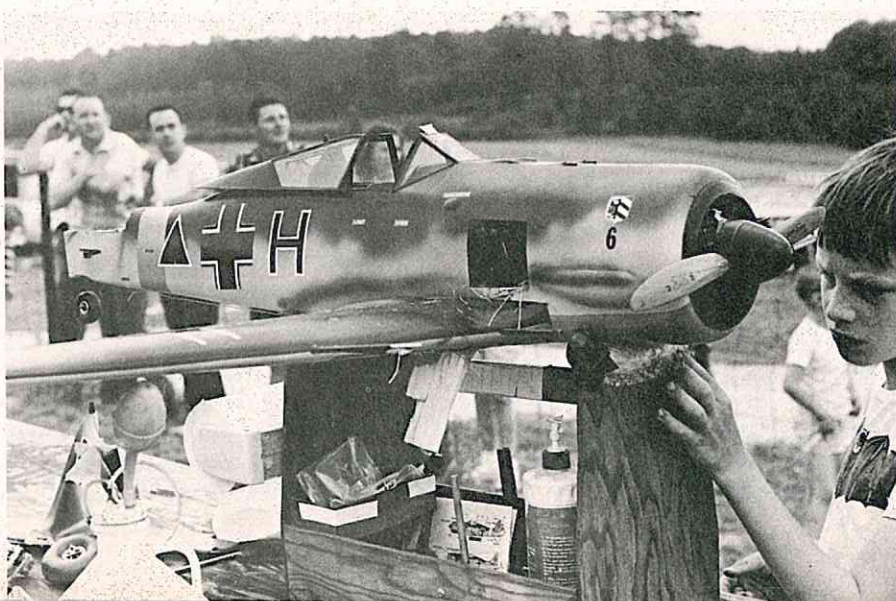
shinier finish than you want. The FW 190 should have a matte finish. To achieve this, load your spray gun with 40%-60% clear dope and thinner, step well back and dust the entire aircraft with a light mist. Decals of the proper size are available from 'Finishing Touch'.

FLYING

The prototype flew well (finally) with an Enya .60 and a 12-4 prop. But it could use as much power as you can cram under the cowl. Keep it on the runway as long as possible and lift off gently. When landing, remember the

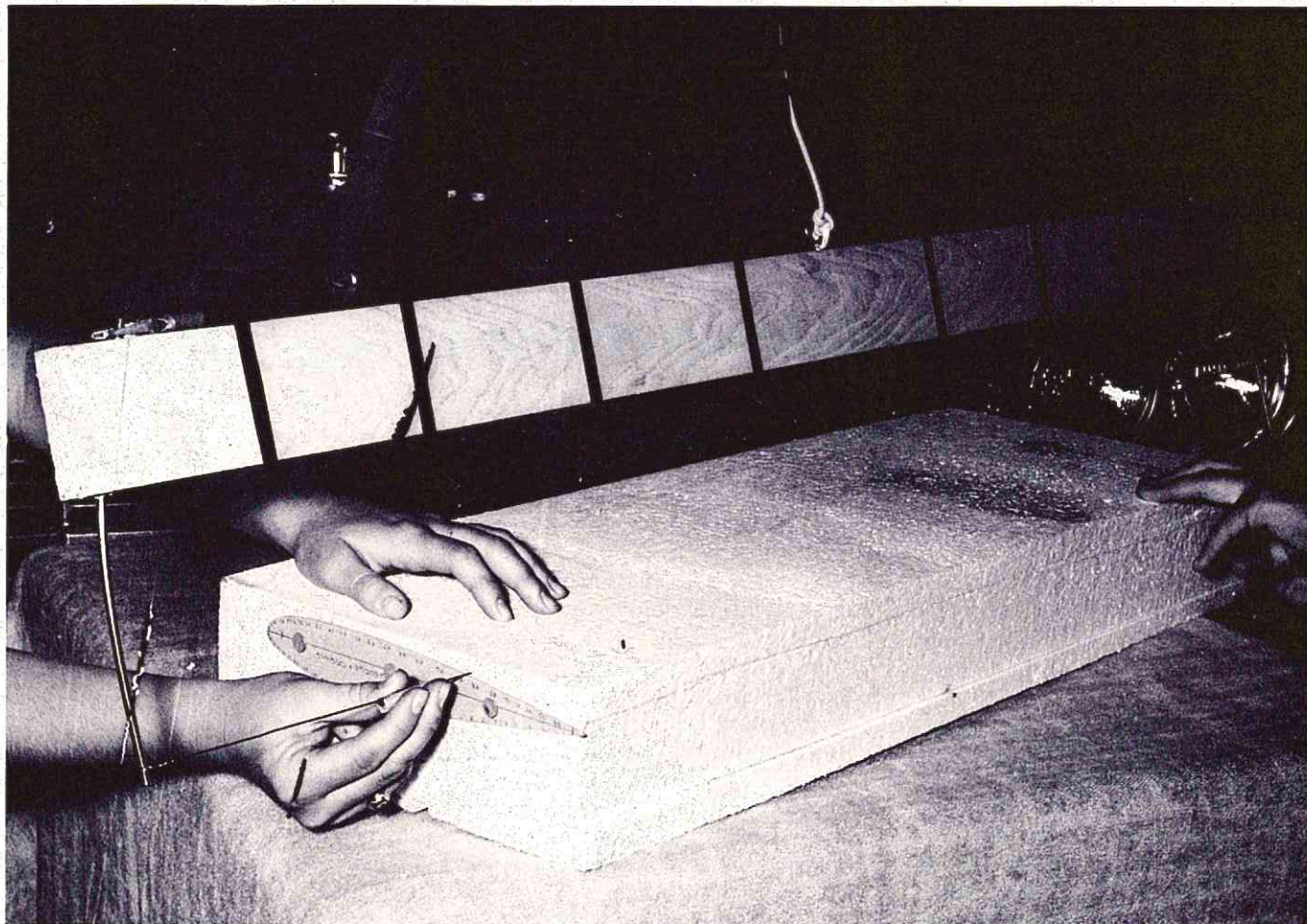
(For the exciting conclusion, turn to page 56!)

Author's son gives Focke Wulf tender sympathy.
"Who killed the bright-headed bird?"



JUNKBOX SPECIAL

J. Alexander, RCM's Roving Maniac-at-Large, out of his abiding love of humanity, presents a technical expertise of the highest level of excellence(?).



1 Coring a foam wing with the completed 'Junkbox Special'.

There are two essentials for home production of foam wing cores - a good cutter and the skill to use it. While skill may be acquired through practice, learning is much quicker and less painful if the cutting system reduces or eliminates problems - such as wire lag - for the operator.

Since foam cutters are not readily available commercially, the home craftsman must build his own. The ideal unit for his purpose should be economical, efficient, and quickly assembled with basic hand tools from easily obtainable parts.

The unit described here not only meets these requirements, but is capable of turning out top quality wings with less frustration, cussin' and scrap than most. Assuming well sanded templates are properly placed on the foam block, even the most ham-handed individual should produce a very serviceable wing on the first try.

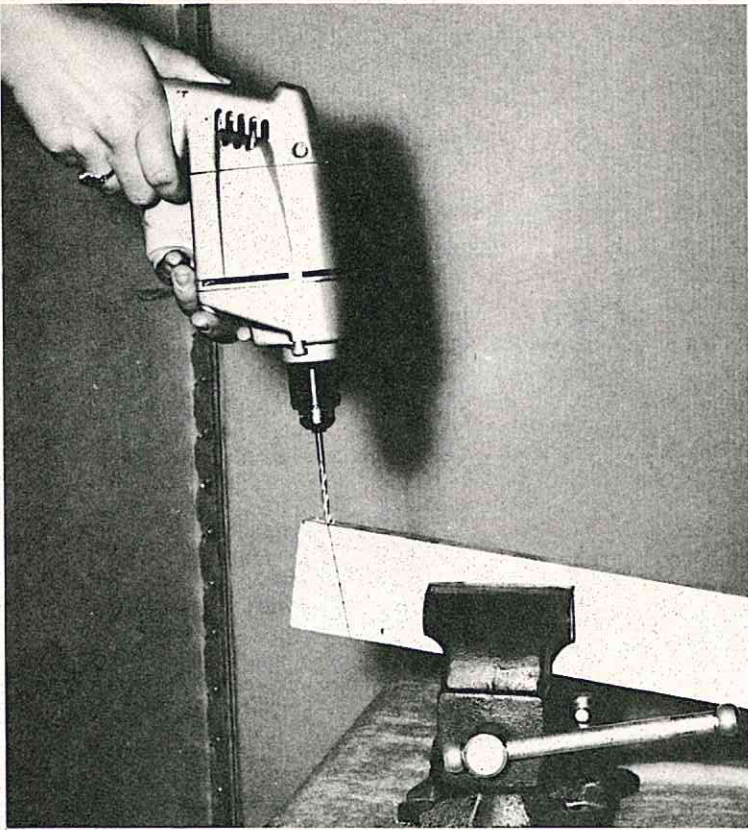
Dubbed the "Junkbox" because that's where most parts came from, the entire system was assembled in about two hours with a quarter inch drill, screwdriver, file and hammer. The reader could probably duplicate it in less.

Though any right-thinking person would applaud the author's ingenuity in devising this cutter - justice demands honors be shared. Dewey would fink-out anyway!

The cutter frame and suspension system are based on a commercial unit of a few years ago. Extremely simple in design and fabrication, its easy, trouble-free operation make it a natural for the home shop.

The idea of music wire as a substitute for sometimes hard to find nichrome apparently originated simultaneously with a number of RC'ers. It was brought to the writer's attention by a "For What It's Worth" article in the July '69 issue of RCM. Now that the blind lady's happy, let's get on with it.

Reference to the sketch and photos should make the whole project quite painless. The shop-wise RC'er can quit reading and go build. For the already confused newcomer and those of us bewildered by materials and tools of any sort, the following step



2 Drilling a hole for the 3/16 cutting wire support.



3 Filing a notch in the wire support for the cutting wire.

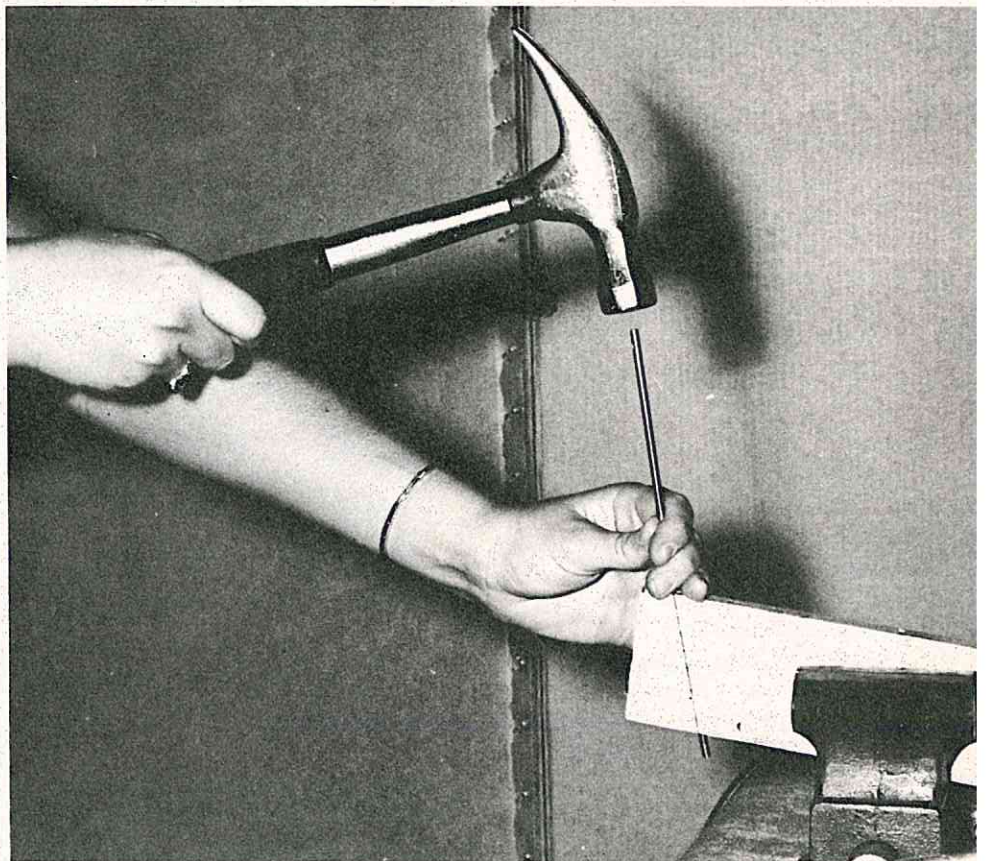
4 Installing the 3/16 wire support.

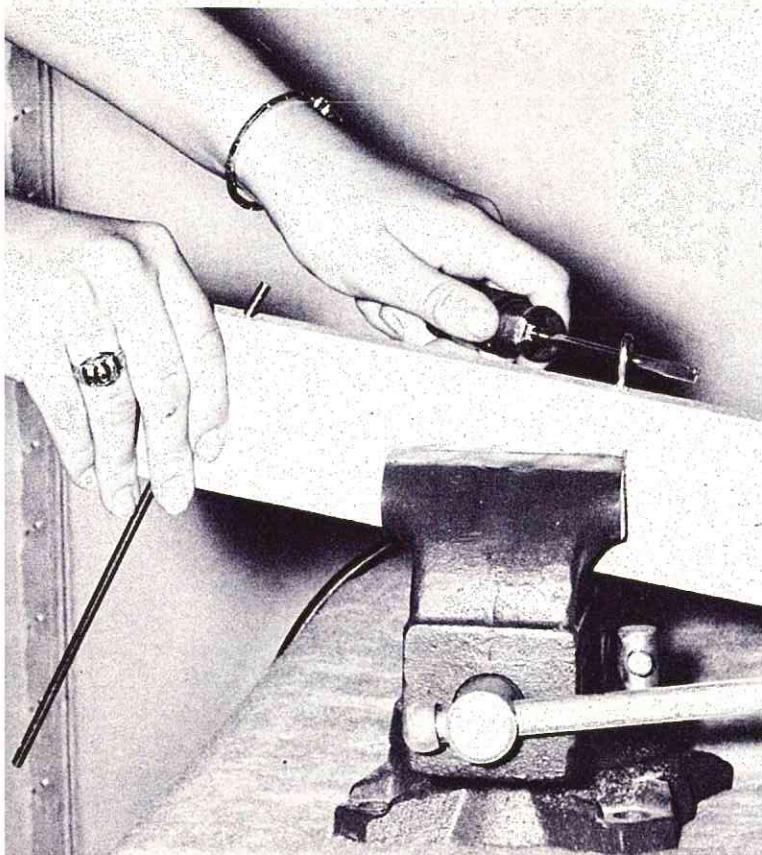
-by-step instructions are provided.

The first, and most difficult step, is drilling holes in the hardwood frame piece to receive the 3/16" cutting wire supports. If you have the eye of a marksman, skill of a master, and long enough drill bits - no sweat. If you have an adjustable drill press, set it to 70 degrees and you're in business. If you've none of these - botch it up, like so:

Measure in 1/2 inch from each end and mark. This becomes the bottom side. Now measure in 1 1/2 inch from the top side. The measurements indicate where the drill will enter and exit to make what will be a 70 degree 3/16" hole. Hopefully.

Draw lines down each side from one hole mark to its mate. This will serve as a visual guide for drilling. Clamp one end of the board in a vise,





5

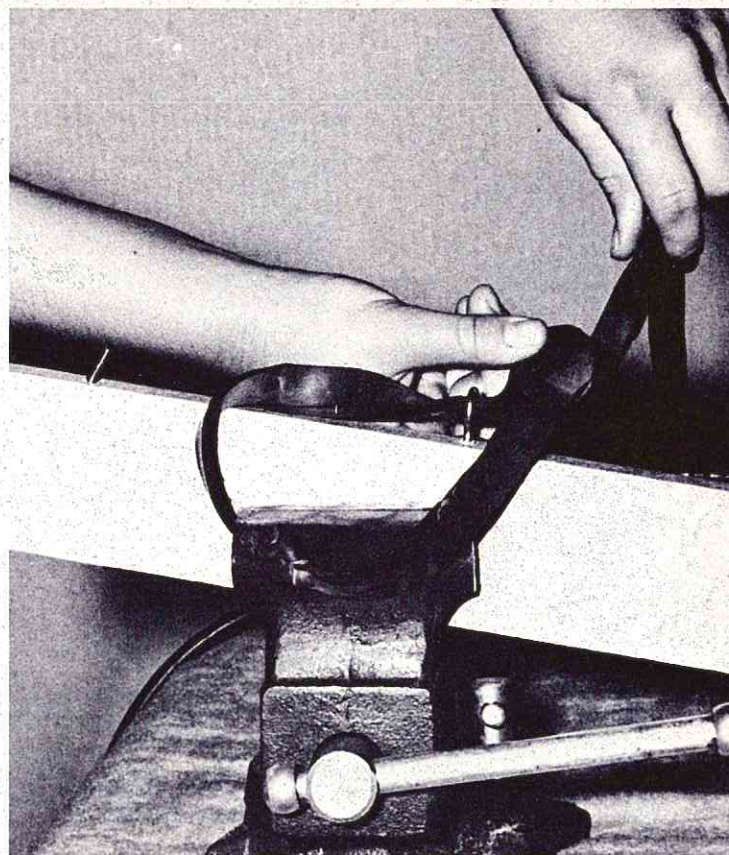
Installing the eye-hooks.

either side up. Where you start is immaterial. It's as easy to drill off-center one place as another.

Chuck a bit - $1/16$ " or thereabouts - in a drill and, using the guideline for reference, align the bit and bore. Do not force the drilling because the bit is likely to "walk". Turn the board over and drill from the other side (assuming a short bit is used). Now chuck a $3/16$ " bit in the drill and repeat. You should now have a 70 degree hole into which $3/16$ " music wire will be a tight fit. Do the other side in like manner. If you goofed - do it over. Better still, find somebody with a drill press and con him into drilling the holes for you.

Before stowing the drill, rummage around the scrap pile and rustle up some half-inch hardwood doweling. A broom handle will do. Saw off a hunk when the wife's not around. You want two pieces two inches long. Clamp these in a vise and bore a $1/16$ " hole the long way through them. Here, too, a drill press is handy. These are insulators which fit over the cutting wire to prevent burning the pinkies.

Clamp a piece of $3/16 \times 9$ " music wire in the vise and file a notch about

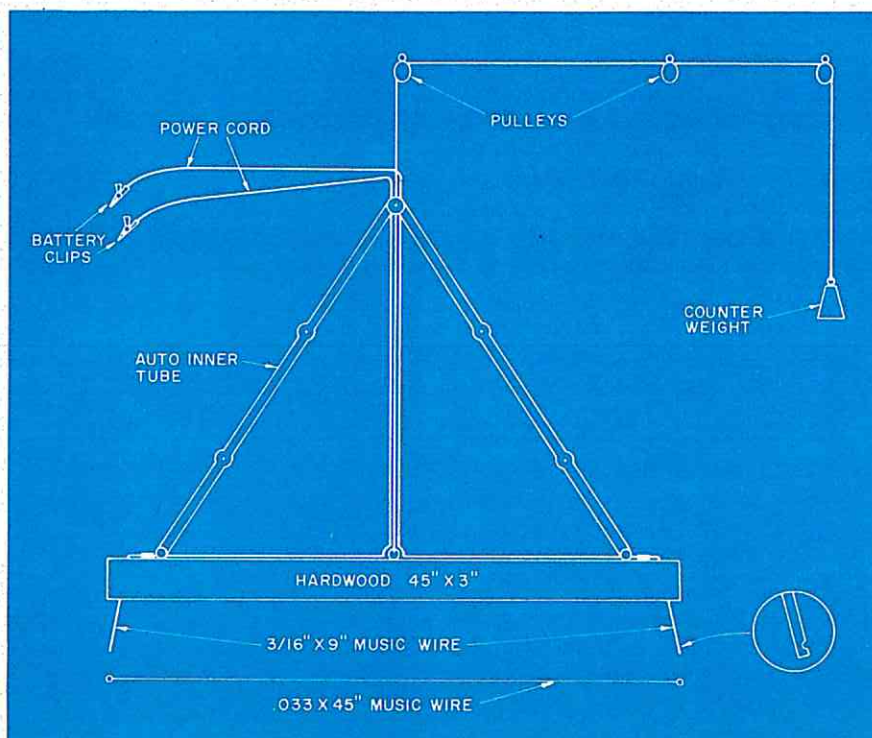


6

Attaching the rubber bands to the eye-hook.

$1/4$ " in from one end. Make the notch deep enough to retain whatever size music wire you intend using (.033 recommended) as a cutting wire. Be

sure to smooth the notch surfaces. Sharp edges will nick, and weaken, the cutting wire under tension. Repeat for the second piece of wire.



7 Attaching alligator clip to wire support.

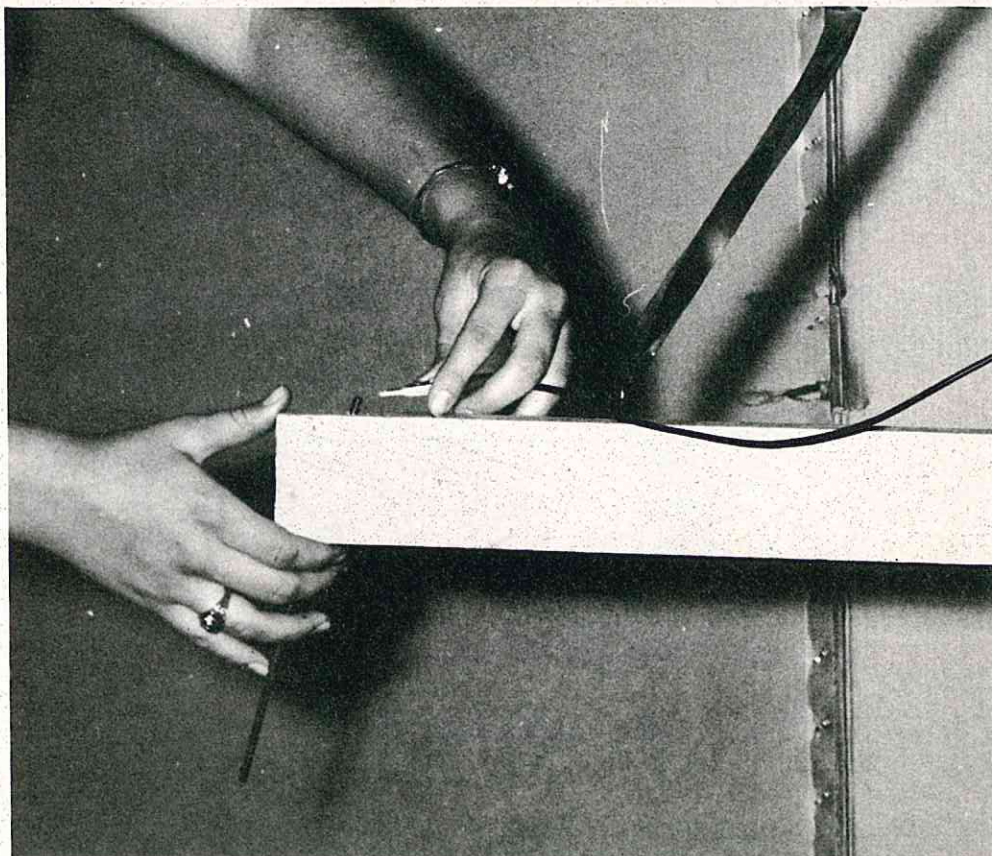
Insert the two pieces, notched ends down and facing out from each end of the hardwood, into their respective holes and tap into place. Leave around $\frac{1}{4}$ " protruding from the top of the board for later attachment of an alligator clip.

Measure in 5 inches from each end of the board and install to half-inch eye-hooks in the top side. Install another in the center.

From an old auto inner tube cut six rubber bands about a half-inch wide. Loop these together so that two long bands result. Loop one end of each of these through the outer eye-hooks.

Snap the metal notebook ring through each of the other band ends. Tie a length of clothesline or equivalent rope to the notebook ring, then to the center eye-hook. Be sure to leave slack between the eye-hook and ring so the rubber bands support all cutter weight.

The advantage of this suspension system is greater flexibility in operation and freedom from counter-weight drag. The slack rope between center eye-hook and notebook ring

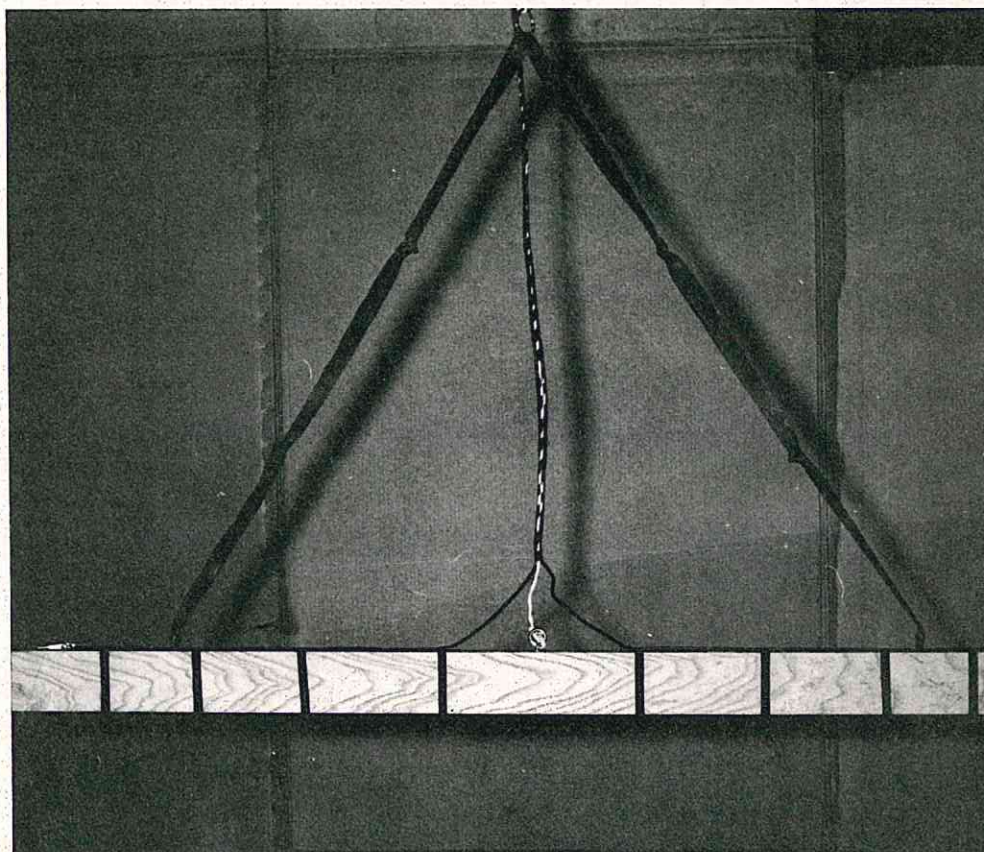


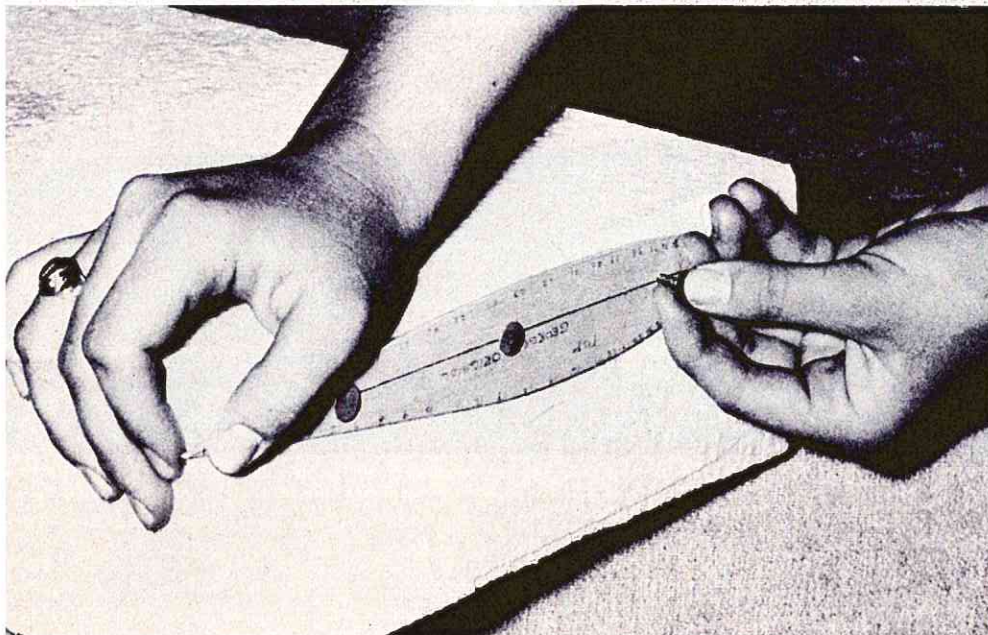
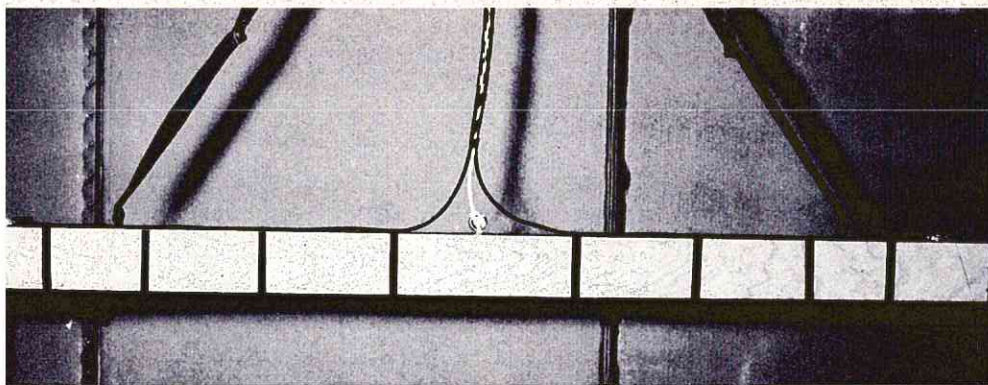
8 Finished cutter and suspension system.

acts as a safety feature. Should the rubber break during coring, the cutter cannot fall. This has happened and could result in core damage, operator burns, or both.

With the hard labor part completed we turn our attention to the power cord. That used in the photos is single lead 16 gauge flexible insulated material, or heavy lamp cord, used because a large roll with umpty-ump feet was on hand. This made the job somewhat tedious as a substantial length had to be twisted together to avoid great tangled gobs of waving wire while coring. Twin lead, of the type simply pulled apart to make connections, would be ideal.

Length is optional and will vary with each installation. Be sure to allow sufficient length for the cord to run along the suspension rope to a break-away point a few inches above the





notebook ring. The prototype required fifteen feet.

Begin installation by attaching an auto battery spring clip to the end of one lead and an alligator clip of the type used with electronic test equipment to the other end. Repeat for the second lead.

Attach the alligator clip to the 3/16" cutting wire support, route the cord along the top of the board, and secure with tape or clamps. Black electrician's tape was used on the prototype. Ordinary paint masking tape will do as well. Repeat the connection and routing of the opposite lead. Run the power cord up along the suspension rope and secure it with tape, lacing cord, or what-have-you so the end product resembles that shown in the photos. This completes the frame and suspension.

Now to the counterweight. There are two advantages to its incorporation in the coring system. First, it allows the cutter to remain at any desired height without operator effort, which permits full attention to coring. Second, the cutter is quickly

10 Attaching wing template to foam block.

pushed up out of the way when coring is completed. This is desirable because, immediately after coring the wire is still hot. Should it accidentally contact either core or operator unhappiness will result.

The first step in counterweight installation is to decide where coring is to be done. The next is to pick an out-of-the-way spot for the weight to hang, preferably a corner or along the wall. The counterweight is more or less a permanent installation - so pick a spot where it need not be taken down after each coring session. Wing coring will probably not be done often, but set-up and tear down each time is a nuisance.

With location selected, install a pulley suitable for whatever suspension rope is used directly above the center point of the cutter. Install

9 Finished cutter with cutting wire installed - ready to core.

another about midway between the cutter and counterweight and a third directly over the spot where the counterweight is to hang. Three pulleys are usually sufficient, but use whatever number are required. Make certain the pulleys operate without binding. Oil them if necessary.

The actual weight can be as simple or elaborate as taste dictates. That used with the prototype consists of nuts, bolts, lead fishing weights, etc., contained in an old sock tied to the suspension rope.

Correct adjustment is dependent on the rope and pulley system operating freely. Binding will cause drag which, should it occur at operating level, may cause problems while coring. Add or subtract weight until a very slight push or pull will change cutter height and it remains there of its own accord. This, together with the elasticity of the rubber, makes elevation changes almost automatic during coring.

The last assembly step is the preparation of the cutting wire. Here the builder is faced with alternate choices as to wire type and size. That most widely used for foam coring is probably nichrome. Though it works well in this application, there are disadvantages. Nichrome is expensive, sometimes hard to locate, and because of the small diameter commonly used, practice is required to prevent wire lag. Ordinary music wire, of .033 to .063 (1/32" to 1/16") diameter reduces lag, is relatively cheap, and readily available.

After experimenting with various sizes a 45 inch length of .033 diameter was found to yield best results on the prototype. Used with a 12 volt auto battery or battery charger, current draw stabilized at just under 9 amps. Current draw with the battery charger at 6 volts settled in at 6.5 amps but coring was considered too slow. However, the individual duplicating this unit who will be coring for the first time may find the 6 volt supply preferable. Power requirements may vary somewhat with material or dimensional changes, should the reader desire to make them, but should remain comparable with the prototype barring drastic changes.

To prepare the cutting wire, begin by forming a loop in one end sized to slip over the 3/16" wire support and seat in its notch. Slide the two dowel pieces onto the wire and form a loop on the remaining end. To install, slip one end of the wire over a support making sure it is seated in the notch. Force the two wire supports toward each other and slip the free cutting wire end over the other support and into its notch. That completes the cutter assembly. If you've cored before all that remains is to hook up the power and go. For those new to foam working the following brief description may be of help.

In essence, a wing is cored by running a heated wire around templates of the desired shape fastened to a foam block. The wire melts the foam reproducing template shape. The process sounds, and is, simple. But there are problems one must be aware of.

As the templates determine core shape, they must be accurate. They must also be smooth and well sanded. Nicks or gouges will show up on the core. A rough surface will impede easy movement of the wire and probably produce ridges.

Cutting wire temperature is also important. A cool wire will either not work at all or be too slow. A too hot-wire makes it virtually impossible to produce a good core. If a choice must be made, use a cooler wire. It may seemingly take forever to core a wing but you will have a wing - not scrap.

Another common trouble, wire lag, may be caused by any of the above plus non-linearity of the wire moving through the foam. The wire must remain straight, spanwise, while coring. Ends moving faster than the middle, or one end moving faster than the other will usually result in scrap panels. The "Junkbox" goes a long way in solving these problems.

The first step in coring is template preparation. Trace the outline of the airfoil on 1/16" or 3/32" plywood. Be sure to allow for sheeting. Cut and sand two templates - root and tip - being careful not to alter airfoil shape.

Tape, clamp, or otherwise hold the templates together for numbering. Make numbered marks, about 1/4" apart, all around each template. Be sure marks are in the same place on both. These marks will aid in keeping the wire straight while coring.

Some method must be employed to secure templates to the foam block. Large head roofing nails are ideal for

this. Drill about three holes along the middle of each template for nail insertion.

Cut two pieces of about 1" x 6" from plywood and number and drill as with templates. These are for block trimming and squaring.

Accurate cores require that the block from which they are cut be square. This is accomplished by careful measurements and, if necessary, trimming to make it so. The easiest way to do this is to draw lines indicating cuts to be made, aligning the trim templates with them, and running the heated wire along the numbered surfaces. This is also the time to cut the block to length. For example, a sixty inch wing requires two panels thirty inches long. Again, draw lines to indicate the cut, attach trim templates, and run the wire along them. These block trimming operations also furnish some idea of the speed which will be used for coring.

Templates must be placed on the foam accurately. This is accomplished by careful measurements so neither is above, below, ahead, or behind the other. The beginner will find it somewhat easier to extend the rear of the templates a short distance behind the block for a wire rest as coring is begun and a supported exit. This is done by cutting the template to the full airfoil, figuring the size trailing edge strip to be used, and extending the template that distance from the block.

Two people are required for coring. One counts the marks as his wire passes them and the other adjusts his speed to match. Decide in advance who will count. In fact, make sure each operator knows exactly what he is to do. Once the wire enters the foam it's too late for explanations.

Pull the cutter down so the cutting

wire rests lightly on the protruding template edges. Apply power and allow a couple of seconds for the wire to come to temperature. Whoever is to count says, "To the foam - now." At the word "now" both operators begin and keep moving as indicated by the counter. Go on around the template, slowing a bit just before rounding the leading edge, resume speed when past it and exit when the cut is complete.

When the wire is clear, immediately push the cutter up out of the way to prevent inadvertent damage and cut power. Remove the core and sight along the leading edge. It should, of course, be straight. If not, the wire was probably not linear as the leading edge was formed providing the cutter was assembled as per sketch.

Keep in mind that all metal parts of this unit, with the exception of the notebook ring and eye-hooks, make up the electrical circuit. Changing size and dimensions, especially of the 3/16" or 3/32" wire will also change resistance values which will, in turn, change temperature.

And that, briefly, is a recommended method for coring foam wings. There are, of course, others. But the newcomer using this procedure should experience little or no difficulty. As a point of interest, the "Junkbox" was tested using two girls, 12 and 13 years old, who'd never seen a wing cored. With only the instructions included here, they turned out an excellent panel on their first attempt with no assistance other than having templates placed on the foam block. If they could - you can!

And that about does it for the "Junkbox Special". When assembled as described and used with an auto battery or charger, it performs very well. An interesting feature of the unit - portability - could be an asset to the racing or pattern flyer who piles up a wing some distance from home. Simply pull out the "Junkbox", clip it to the car battery, and rip out a wing.

There are, of course, any number of modifications possible with the unit. It could be lighter, shorter, longer, more ornate, or used with an exotic variable voltage power supply. But, as presented here with no springs to spring, tubing to bend, knobs to adjust or meters to watch, it's about the easiest, quickest way to begin coring wings around.

So, if you've wanted to try your hand at foam wings, give the "Junkbox Special" a go. It's performance belies the name!

11

Attaching power cord clips to auto battery.





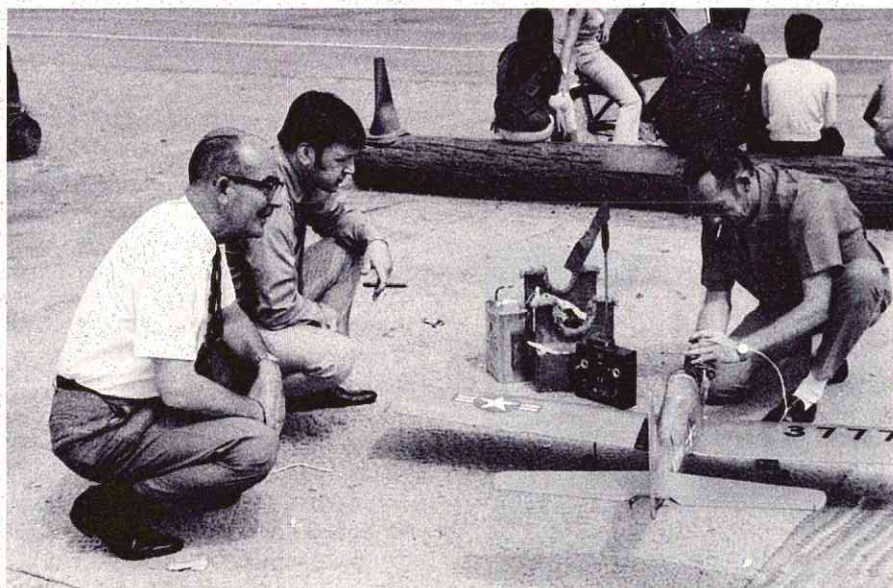
A segment of the Orbit production facility in Garden Grove, California. Modern production stations, assembly techniques, and high quality control standards, are all in keeping with the traditions of the Orbit name.

RCM VISITS

ORBIT ELECTRONICS

Following their merger with Datatron, Inc., noted Southern California space firm, Bob Dunham takes RCM on a tour of the newly reorganized electronics facility that bears one of the most famous names in the R/C industry.

L. to R., Bill Semple, president of Orbit, Datatron president Art Purcilly, Bob Dunham at BIRDS field flying session.



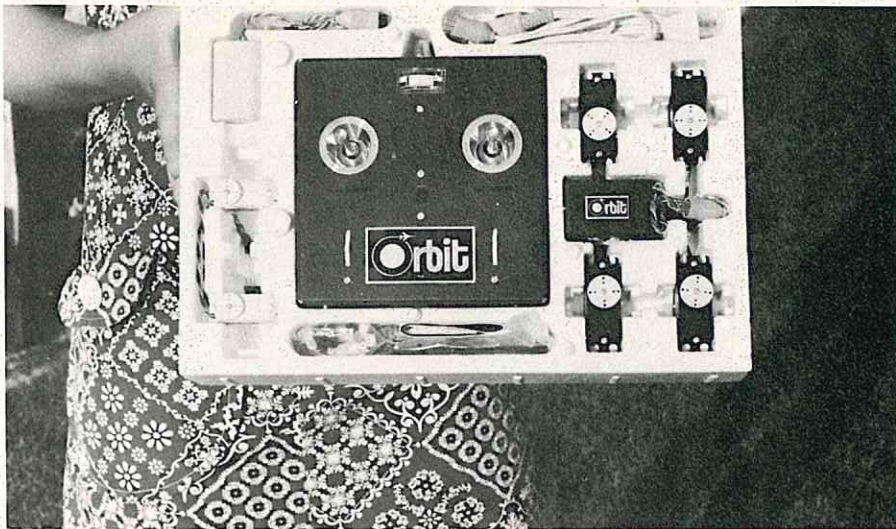
Installation photos reprinted courtesy of Orbit Electronics.

For several months we have been hearing numerous rumors concerning major changes at Orbit Electronics. Then, the other day, we received a call from Bob Dunham, inviting us to come and visit their plant and take a look at one of the most sophisticated production line facilities in the electronics field.

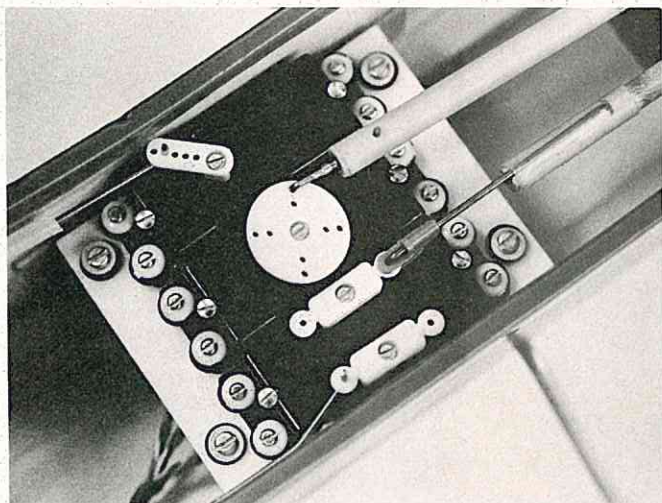
Upon arriving at Orbit Electronics, Bob took us in to meet the new President of Orbit, Bill Semple, and the President of Datatron Inc., Arthur Purcilly. Bill and Art told us of the recent merger of Orbit and Datatron, and that Orbit is now applying in-depth technical skills and R&D capabilities gained from Datatron through their contributions to the Apollo, Mariner, Saturn, and other



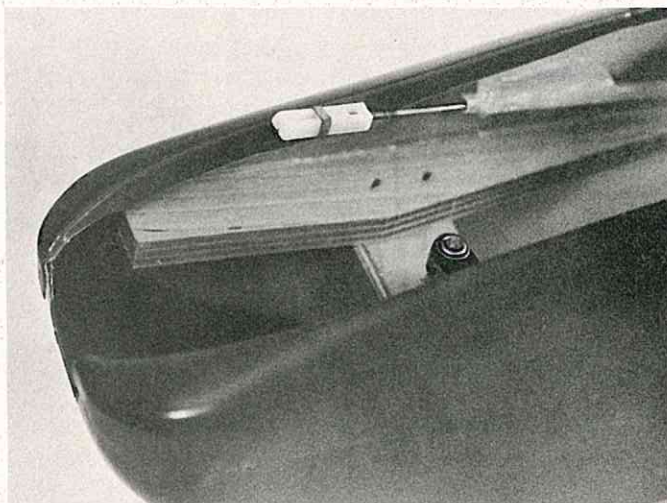
Bob Dunham, r., gives R/C flight instruction to Datatron, Inc. President Art Purcilly.



The technical skills evidenced at Orbit extended even into the packaging of the all-new Orbit proportional systems.



Orbit servo installation illustrating rotary arm, disc, and dual linear/rack outputs. Orbit photo.



Throttle control arm and linkage installation. Straight runs without binding insure proper control.

government as well as commercial projects. Bob Dunham told us that the financial strength of Datatron Inc., a publically held corporation, has allowed Orbit to expand with the installation of efficient new production facilities and quality control methods.

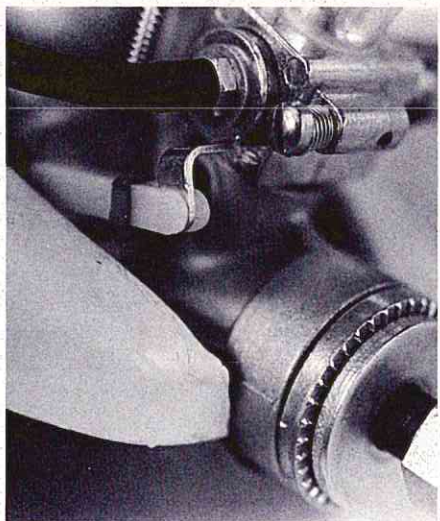
Having seen many radio control equipment manufacturing facilities over the years, including Orbit, it was very evident, even at first glance, that things have changed! Milt Boone, the General Manager, told us they brought in some of the top industrial engineers and quality control experts in Southern California to develop the new techniques being used to produce Orbit proportional systems. Phil Hatch, Orbit's new Production Superintendent, showed us the different

assembly lines for building transmitters, receivers, and servos, and demonstrated how the components are tested and checked during the various stages of building proportional systems.

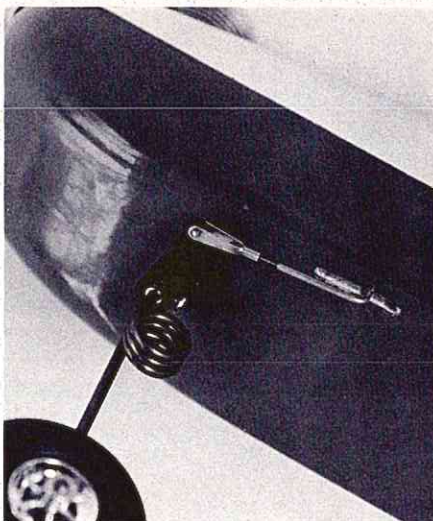
Bob Dunham then handed us a press proof of a new handbook that will be sent out with every new radio system. The handbook not only describes the Orbit radio, but it goes into quite a bit of detail, complete

The Orbit shirt, rag in pocket, and easy stance — a familiar sight around the world. Bob Dunham, 'Mr. R/C', demonstrates an ease and skill of flying that is hard to match.





Engine throttle control linkage. Note elastic keeper around nylon fork.



Nosewheel steering linkage. Note slot in fuselage clears pushrod.

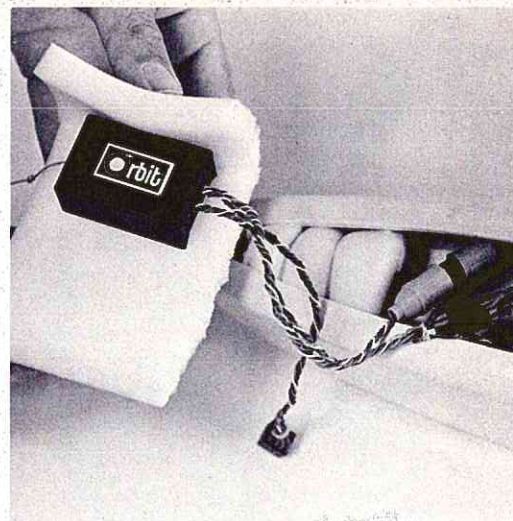
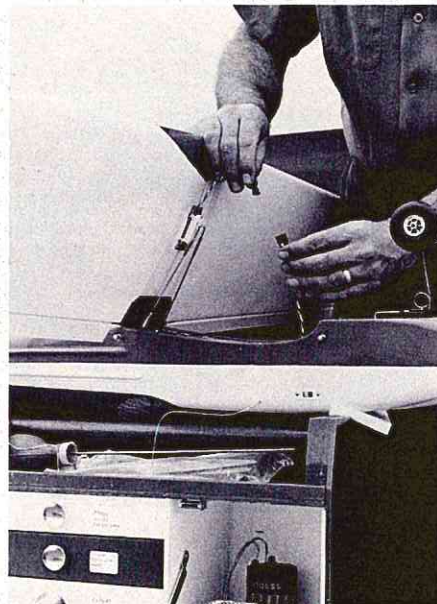
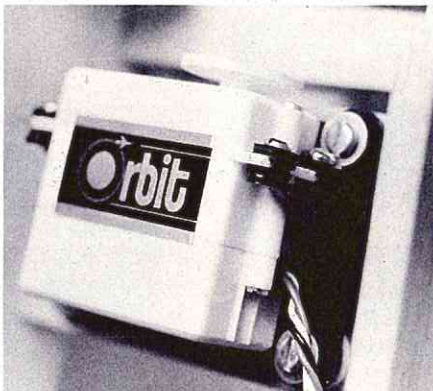


Photo of glider installation shows battery pack and receiver are foam wrapped.



Above, Lt: The antenna is attached to fin with small rubber band and knot in wire. Above, Rt: PS4-D servo installed on side mount in aileron compartment. Rt: A field box is a helpful convenience for holding the aircraft, as during wing mounting. Below, Lt: The wing is installed using ample rubber bands or mechanical wing hold down devices such as nylon bolts, Dzus fasteners, etc.



with excellent pictures of how to install the radio in your airplane. The book also shows how to install the various types of linkages, including the throttle and the steerable nosewheel. An instruction booklet of this type will certainly be of great value to every new modeler, whether or not he buys an Orbit system. This type of a handbook will answer most of the questions asked by the numerous RC'ers who write to RCM and the other model magazines. This type of manual is long overdue, and RCM is glad to see that at least one of the manufacturers is doing something to help the many new fliers coming into this sport. The handbook, along with schematics, can be ordered from Orbit Electronics for only \$1.00 to cover mailing and handling costs.

After our visit at the plant, we went

over to the BIRD's field in Long Beach, and were given the opportunity to fly some of Orbit's new equipment. In addition to giving some flying instructions to Datatron's Art Purcilly, Bob Dunham put on quite a show with his spectacular flying skill.

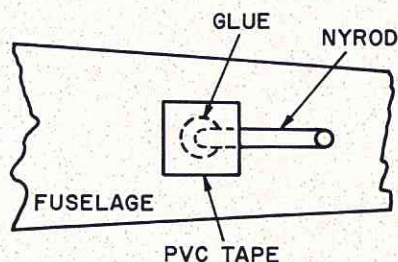
Orbit Electronics, Inc., with its aggressive and enthusiastic team of dedicated people, will be a big factor in the years to come in expanding and promoting the fastest growing sport in the world.



FOR WHAT IT'S WORTH

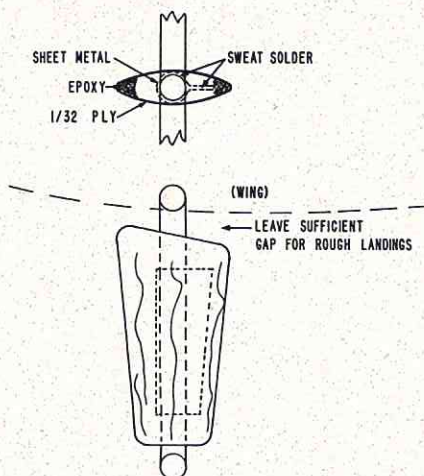
According to Dick Franco, newsletter editor for the Southern Alameda County Radio Controllers, fillets can be made easily by purchasing a new sculpting material called Celluclay, which is readily available at most hobby shops. Follow directions and you will get a papier-mache mixture that resembles clay. This material can be worked into any area and smoothed with a little water and the tip of your finger. Finishing is conventional... it can be sanded, doped, silked, etc. One word of caution, however, since it is a water base material, be sure to allow sufficient time for drying. You can easily recognize a dried state since Celluclay will then turn a light gray.

If you are tired of epoxy, or other types of glue, dripping while you attempt to affix your NyRod to the fuselage side, simply stick a piece of PVC tape on top of the glue and form to the shape you want. After having dried, simply peel the tape off and you will have a nice and neat fitting, with no glue dripping down the sides of your fuselage. This idea was submitted by Mr. C. K. Tse of Kowloon, Hong Kong.

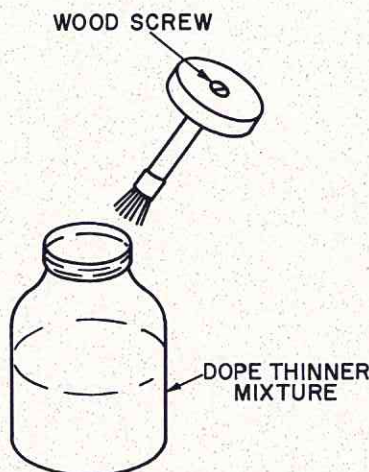


Bror Faber of Westminster, Calif., has tried most types of landing gear fairings on his Goodyear racers, and has become thoroughly disgusted with them! The ideal solution, he found, consists of first tinning the strut with acid core solder, then washing to prevent corrosion. Next, bend a piece of sheet metal from an old fuel can into a U-shape and tin it on the inside. Using regular pliers, form it around the strut with the excess metal forming a tab on the back of the strut. When it is perfectly aligned, fore and aft, sweat solder the strut and tab together. Cut two identical pieces of 1/32" plywood

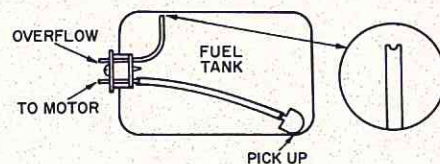
to the shape of your fairing and bend around the strut and tab after liberally coating the inside of both pieces with epoxy. Wrap tightly with a long rubber band until it is dry. You will find that this is one fairing that won't rotate or come loose, even on the hardest landings.



Tom Francis of Aurora, Colorado, uses a paint jar, such as a standard mayonnaise jar, and screws to it a dope brush that has been cut to fit the lid. When covering airplanes with silk, Siron, etc., it's almost like having a third hand. You can set the brush back in the jar and your mixture doesn't dry out while you are trying to smooth out the material. By using a pint jar you can fill it about 1/3 full and it doesn't drip off the brush handle. Another advantage of this method is that the dope brush does not touch the bottom of the jar and cause a semi-permanent curvature of the bristles.

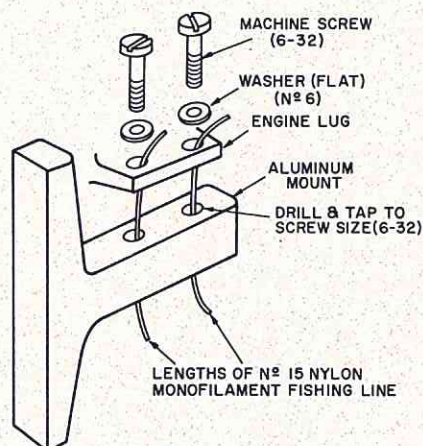


If you've been worried about the curved overflow vent in your fuel tank becoming sealed off by press fitting against the top of the tank, Q.T. Hickman of Raytown, Missouri, suggests filing a notch across the end of the tubing that is nearest to the top of the tank. This is much simpler than cutting the overflow vent to a shorter dimension.



A. Walker of Derby, England, suggests this method of preventing glass cloth from fraying, and all of those annoying strands sticking to the resin brush, fingers, etc., after being cut. First, mask off the area to be cut out, then simply rub a bead of model airplane cement into the edges. Wait a couple of minutes before cutting out with scissors. This gives a perfectly clean edge that will not fray.

Having experienced difficulties in keeping his .60 size engine bolts tight, and not having any stop nuts on hand, Dave Katagiri of Seattle, Washington, used short lengths of nylon monofilament fishing line to create sufficient friction to retain the torqued engine mount screws. Pre-tapped 4-40 or 6-32 holes allow enough clearance to permit the nylon lines to bind just enough to retain the screw and not be cut off by the threads.





L to R: Judy Willoughby, 'Miss Jamaica 1966'; Lorraine Shagoury, former 'Miss Lebanon'; Laurel Williams, 'Miss Jamaica 1967'. If anybody cares, the models are a Kwik Fli III, Firefly, and a modified Taurus.

RADIO CONTROL AT THE "PEARL OF THE CARIBBEAN"

JAMAICA, ENDOWED WITH MAGNIFICENT SCENERY, BEAUTIFUL GIRLS, AND A ROMANTIC HISTORY, IS THE HOME OF A GROUP OF RC'ERS WHO WOULDN'T TRADE PLACES WITH ANYONE IN THE WORLD!

Photographs by John Lopez

"Dear Don:

With radio control enthusiasts practicing their sport over virtually the length and breadth of the globe, I'm sure it will be no surprise to you to learn that modeling has extended to Jamaica, the 'Pearl of the Caribbean'. In fact, we have a very active club here, the 'Jamaica Aero-Modellers', which, although small in number, could be rated at the top if enthusiasm was a criterion.

In a recent conversation with Phil

Kraft, among the many marathon telephone calls which we make from time to time here in Kingston Town, I mentioned that I would like modelers around the world to know about our activities. He suggested that I send some pictures to you and added that the 'great and guiding light' of R/C **MODELER MAGAZINE** really prefers beautiful girls to model planes. Therefore, since we are endowed with gorgeous girls in Jamaica, and the fact that if you liked one girl you would be

still more enamoured with three, I am enclosing some pictures of some of my models with three gorgeous-looking girls holding them. You can see from the photographs that each of us has our own 'hang-ups'; yours is sitting up nights studying editorials, mine is beautiful girls and airplanes covered in red, white and blue.

Incidentally, if for any reason you're interested in the types of planes shown in the photographs, from left to right they are; A Kwik-Fli

III, Firefly built from RCM plans, and a modified Taurus. The little gold boxes on the ground I'm sure you have seen before. All three aircraft are veterans of several flights, and in fact, the Taurus has about 50 flights to its credit. Strangely enough, the modifications seemed to make it fly even better than before, and details of these are as follows: 1. Shorten the wings 1½" in each panel and take out 1/2 of the dihedral; 2. shorten the tail moment 2"; 3. drop the thrustline 1" and mount the engine approximately 1" lower. I do not imagine that the other part of the modification made it fly any better, but I did add a cabin over the turtledeck and put in a pilot made from a Barbie Doll, which I cut in two despite the screams of my nine-year-old daughter! The front of the model was finished off with two cheek cowl and a spinner.

The three models (the feminine ones) consist of two former Miss Jamaica's and one of our country's top models. On the left is Miss Judy Willoughby, 'Miss Jamaica 1966', while on the far right is Miss Laurel Williams, 'Miss Jamaica 1967'. In the center is Miss Lorraine Shagoury, one of Jamaica's top models who was also a Beauty Queen, being voted 'Miss Lebanon' of the New England States while she was attending college in the United States in 1966. I was unable to make any modifications on any of the girls, so their various wingspreads and body sizes are approximately 36-24-36; 35-23-37; and 37-24-36. The scenery in the background is the campus of the University College of the West Indies, which, compared to some of the city colleges I attended in the States, would make anyone long to return to undergraduate status!

The most popular Sunday flying in Jamaica is with the Taurus, followed closely by the Kwik-Fli III's and Senior Falcons, with a few Chipmunks and Lanier plastics thrown in for good measure. Kraft and Micro Avionics are the two most popular brands of radio equipment used here in the Caribbean with, of course, a sample of the others to be found at the field.

Speaking of the flying field, ours is located at the Camp of the Jamaica Defense Force, which has a short strip for its internal reconnaissance and service aircraft, so we occasionally compete with the 'real McCoy'. Needless to say, our best fliers are the private pilots in our club, who, although not up to the standards of Cliff Weirick or Phil Kraft, at least

thoroughly enjoy their Sunday variety of flying. As secretary of the Jamaica Aero-Modellers, I have visited RCers in the Miami, Florida area and found that modelers are not too different anywhere in the world.

Incidentally, the lure of seaplanes and sea air is becoming harder to resist, except that the sea water, of course, is all salt water, which is particularly good for engines. In fact, large doses of salt water, when mixed with methanol and castor oil, make an excellent gum that will keep little airplanes out of business for a long time to come, leaving more time for drinking the local brews!

Maybe someday R/C MODELER MAGAZINE will bring the whole publication down here and publish it in their 'home-away-from-home'. We can promise you such interesting delights as the best Playboy Club in the world, magnificent scenery, great water skiing, and last but not least, a great deal of pulchritude of the oppo-

site sex. Most of us get semi-divorced from our wives with our models being names as 'correspondents', since most bull sessions go on way into the night, with every modeler accomplishing nothing other than the drinking of our 'Brut' which has its own delightful flavor.

I sincerely hope that RCM's readers will be pleased to see that, 4,000 miles away, there are active modelers not much different than the ones around them, although our next club project is putting a Kwik-Fli on the moon. I am sure this will not take too long, except that Phil Kraft informs us that he does not guarantee the range of his equipment after we go out of orbit around the earth. Just the same, we are trying other manufacturers who have more faith in their own equipment!

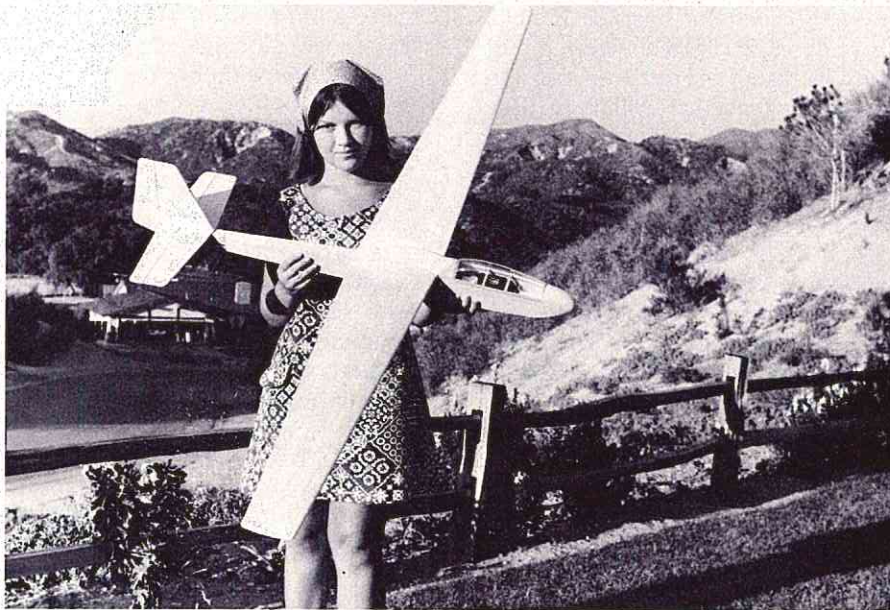
Best regards from all the boys in the Jamaica Aero-Modellers Club.

Sincerely,
David E. Lyons"



KITS & PIECES

DICK SONHEIM



The Malibu glider, ready for finishing.

● During the summer months, new kits seem to come few and far between. I guess the kit manufacturers figure everyone is flying the kits they built last winter. Speaking about building and flying, we finally heard from Bernie Murphy. It seems that Bernie was promoted to a supervisor and now he works twice as many hours for the same pay, however, I still think he spends his free time during the summer months flying all those airplanes the kit manufacturers sent him last winter! We did however, get a commitment from Bernie to do a column or two this fall so that this old hacker can have a few days off for flying.

This month we will get into one of the fastest growing areas of this hobby and cover a fast building glider that has just come on the market.

Before we get into this kit, however, I would like to discuss the use of a few building techniques and tools that will make the R/C craftsman's job much easier. In spending a good deal of time helping new fliers get into the air, as well as helping them with their building problems, I have had the opportunity to visit many homes and observe different building techniques-

some good and some bad. More than once, for example, I have seen a builder spend hours sanding and shaping balsa blocks to remove 1/4" and as much as 1/2" of wood with fine sandpaper. Or how about the guy trying to build a straight wing on a warped board?

Now I'm not saying that all these ideas that I'm going to expound on are new and different. On the contrary, they are all old ideas used by the old time builders. My only intentions are to make building a little easier and less frustrating to some of our newer friends coming into this hobby.

The first group of good handy tools you will need is an assortment of sanding blocks. Go down to your local lumber dealer and buy a 3 or 4 foot long piece of maple, or any other good hardwood, 1/2" thick and between 2 1/4" to 2 1/2" wide. If you get the strip too wide, it will be difficult to hold in your hand. If you do not have a good saw at home, ask the lumber dealer to cut this long strip of wood into 11" lengths. (Most sandpaper comes in 11" long sheets.) While at your local lumber dealer, pick up an assortment of various grades and weights of sandpaper. Buy a garnet cabinet paper

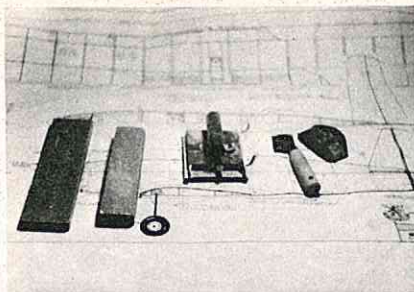
starting with a coarse 15D weight on up to about a 100 or 150 weight. Another grade of sandpaper, that is almost a must, is put out by Minnesota Mining and Manufacturing Company, under the name of carborundum oxide, and also goes under the trade name of Aloxite as manufactured by the Carborundum Company. These papers are a fast cutting, nonfilling type of sandpaper, and the two recommended weights for our usage are 100 C and 150 C grades. Also, while buying paper, buy a few sheets of 400 and 600 wet-or-dry paper, for use in finishing your airplane. We will not discuss the use of the latter at this particular time.

From the various weights of sandpaper cut 11" long strips to the width of the blocks that you brought home. Using Pliobond, glue the sandpaper strips to both sides of the blocks. I will guarantee that these will be the handiest tools you ever will make use of in your shop.

In the photograph you will also notice a commercial type sander manufactured by the Red Devil Company. This sander clamps the sheet of sandpaper around the edges with a foam rubber pad between the sander and the paper. This is an excellent tool for sanding fuselages and sheeted wings. A good paper to use in this sander is a silicon carbide paper put out by 3M Manufacturing Co. Use the very coarse grades for sanding fiberglass and epoxy surfaces to smooth down the rough edges, then progress down to your finer grades for the smoother surfaces.

Let's take the job of shaping a nose block, turtledeck, or wingtips. There are two methods you can use to quickly get these blocks to the approximate shape that you desire. The first, of course, is to use a knife and whittle the rough shape out very quickly. Then, using a medium coarse sandpaper, bring it down to the final shape desired and then to a fine finish with a finer grade of sandpaper. The other method is to use a very coarse sandpaper, such as 50 D weight and literally cut the balsa blocks down to your desired shape, then use the finer grades to finish the blocks to the desired smoothness. You will find it rather easy to smooth a surface with a finer sandpaper than with the coarser grades.

The little razor plane you see in the photo was purchased for about 89 cents in a discount store. This amazing little tool not only does an excellent



A handy assortment of shop tools.

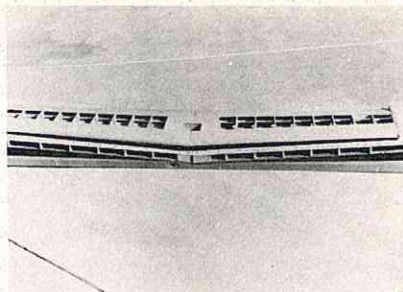
job of trimming off the edges of sheets and strips but will do an excellent job of planing large flat surfaces. I recommend this little tool very highly to every model builder.

You have all heard, at one time or another, the remark that "if you take the extra care to build a good straight wing, the rest of your plane can look like a pretzel and you still will have licked 90% of your problems." I have seen many top contest fliers, such as Bill Salkowski of the Valley Fliers, spend many hours trying all the adjustments in the book in an attempt to compensate for a very slightly warped wing. In the end there is only one way of really solving the problem and that is to build a new wing. And this little discussion leads us into the next project - wing jigs.

There are a number of wing jigs on the market, some more expensive than others and, of course, they all have their advantages and disadvantages. The wing jig shown in the drawing can be built for just a few dollars and has many of the advantages of the more expensive type jigs, in that the wing can be built in one complete unit, including the dihedral.

In recent years many modelers have been using a double set of rods and building one panel at a time. Then, they find themselves in trouble when it comes to joining the wings, discovering they have one tip a little higher than the other. Or worse yet, they find that in joining the wings they have inadvertently built in some washout. Building the wing in one piece, on the type of jig shown, should completely eliminate these problems.

As you can see from the pictures and the drawing, our jig was built from a hollow core door. Now we all know that hollow core doors cost 15 to 20 dollars, so you're probably wondering how I can say this can be built for only a couple of bucks. Take a tour around to all your local lumber and hardware dealers and ask them if they have hollow core doors that are damaged



A simple wing jig you can build.

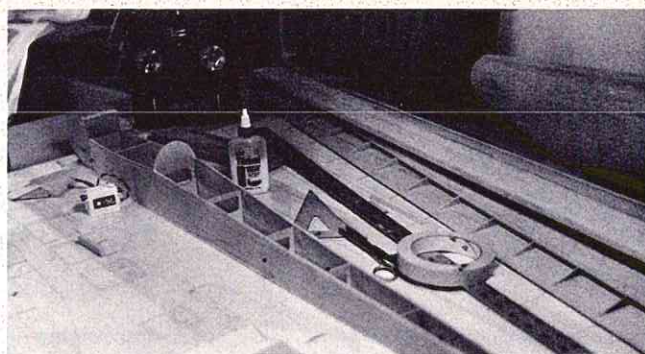
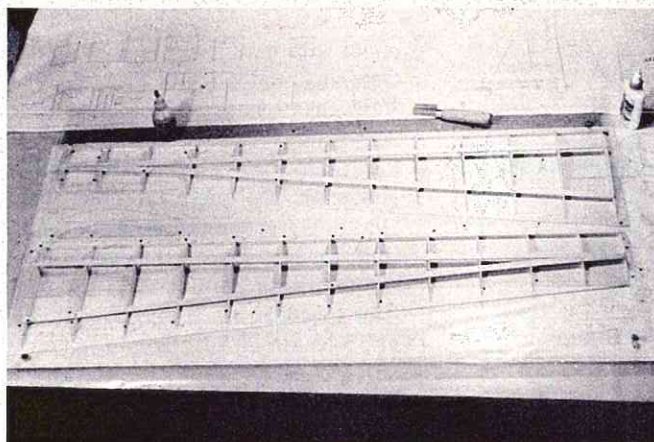
on one side. Many times, in shipment, a door will get a hole punched in one side and they no longer become usable as doors, but they DO make good wing jigs. Be sure to find one that has a wood or mahogany sheeting on the outside, since the doors made of the pressed hardboard are not too practical inasmuch as they do not take pins very readily. When you get the door home, cut the door in half, the long way. The half with the most damage will be used for the base. Take the other half and cut it in half the short way. Take the outside edges of these two pieces, which would be the top and the bottom of the door, and turn them around so that they face each other laying on top of the long base of the jig. Drill a hole as near to the center or edge of the top piece down through the whole thickness of both halves. Run a bolt up from the bottom through the sections and put a nut on the top to hold the top half in place. Do the same for the other half. This will hold the two pieces of the jig in place on the base. Do not tighten the bolts too tight as each panel must be raised for the required dihedral. To measure the dihedral for a wing, put a mark out where the tip of each wing would come on the jig. At this point, measure the distance between the top of the base and the bottom of the dihedral, or building platform, of the jig which will then be the dihedral of your wing. Paint the top of the jig with one coat of white undercoat paint. When it is dry you can draw in lines for your spars as well as crosslines for the ribs. The Beatnik wing, shown on the jig was built in one evening with the exception of the leading edge sheeting and bottom capstrips.

● Gliders are probably the most rapidly expanding segment of this hobby. One reason for the big growth in sailplane activities has been largely due to efforts of people like Jerry Nelson, in attempting to organize the sport and arrange for various types of competition.

Over the last few years most of the glider kits have been imported from Germany, and being of the scale type, took many hours of building time. Astroflite, Inc., now has on the market their high aspect ratio Malibu glider kit. The one great thing about this glider, is the fast building time. I built the glider, with the exception of the finish, in about 4 or 5 evenings. This machine has a wing span of 76" and a length of 42". The balsa die cut parts were about what you find in most kits today, the plywood die cut parts however, were very well cut. Several sheets of balsa had to be replaced in this kit due to being badly cracked, or one piece had most of the center section missing. The one thing that I find very difficult to understand is that a company like Astroflite is capable of designing and producing such an excellent glider kit, and then supply some unusable balsa sheets. An example, the wingtip blocks were almost a half inch shorter than shown on the drawings. I can imagine this would be frustrating to the builder who does not have a spare supply of balsa wood or a scrap box to help him out!

The construction of the glider is very simple and straightforward. Since the wing has a flat bottom, the wing frame is built directly on top of the bottom sheeting. The leading edge, wing ribs, and spars are glued in place directly over the bottom sheeting as shown in the wing outline. When the framework is dry, sand, or plane with your razor plane, the top of the leading edge to the proper angle to accept the upper wing skin. In this case, the wing is to be built with built-in washout. This is often necessary in a glider of this type in order to reduce its tendency to spin. The washout is built into the wing by placing the wing on a flat surface and placing washout blocks under the leading edge in the locations shown on the plan. Glue the top sheeting in place while the wing framework is in this blocked-up position. Be sure to use plenty of pins and, if necessary, lead weights to hold the top wing skin in position. It is usually a good idea to let the wings dry in this position overnight.

After the wing panels are thoroughly dry completely sand each wing panel. You will find it much easier to sand the panels before they are joined together. Join both wing panels to the center section, blocking the wingtips up 6" to form the wing dihedral. Next, glue the center section ribs and spars



Left: Wing is built on bottom sheeting.

Above: Fuselage is constructed on bottom sheet.

in place and allow this assembly to completely dry before proceeding. Finish the top of the center section with the 1/16" sheet turtledeck and fairing block. The center section of the wing should be reinforced with seam tape or, better yet, fiberglass.

The fuselage is built in the same manner as the wing. The balsa fuselage sheet bottom is pinned down over the plane and the fuselage formers are glued in place on top of this sheet. The 1/4" x 3/8" servo mounting rails are glued directly to the formers. Here, again, you will have to go to your scrap box for this material, since the blocks supplied with our kit look like scraps from wooden molding that was rounded on one side, and in no way was anywhere near the size that was required. Position the forward former holding one of the servo mounting rails to fit the type of servos you are using. Our glider was set up to use the Orbit PS 4 servos. When gluing the formers in place, be sure they are perpendicular to the bottom sheeting. This can be easily accomplished by using a drafting triangle. The fuselage sides can be glued in place against the formers.

The tail section is built of simple all-sheet design and needs only be sanded to the airfoil shape. The eleva-

tor torsion bar and nylon hinges are supplied with the kit. Mount and align the elevator and rudder on the nylon hinges. Drill a 1/16" hole through the balsa and the hinge and pin the hinge with a toothpick.

Before installing the top sheeting on the fuselage, install the pushrods and pushrod exit guides supplied with the kit.

The canopy frame is constructed in place on the fuselage. Use wax paper to separate the two sections to prevent them from being glued together. While this is drying, the elevator and rudder tail section can be glued in place on top of the fuselage. Here, again, it is very important that the tail section be assembled straight and square. Your right angle triangle will come in handy at this point.

The plastic canopy is cut to fit over the canopy frame. Pactra C-77 glue can be used to glue the canopy in place.

One thing not mentioned in the instruction book, or on the plans, is how to fasten the canopy in place on the fuselage. The radio receiver and the battery pack are carried under the canopy, therefore it is very important that the canopy be securely fastened to the fuselage before flying. If the canopy is not securely fastened, you

may have a free flight glider! The canopy can be held in place with screws or rubber bands. (I prefer screws.)

The material for the skid shown on the plans was not supplied in the kit. The skid can be made from a piece of 1/4" sq. spruce and sanded to the shape shown on the drawings and glued in position on the bottom of the fuselage. It is a good idea to fiberglass the nose and the bottom front section of the glider, to give added protection on rough landings.

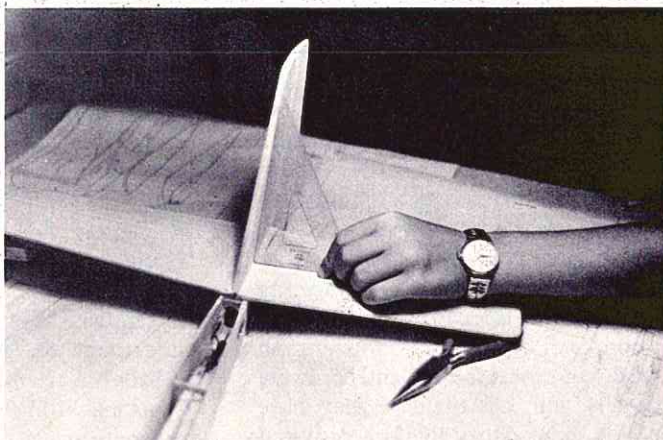
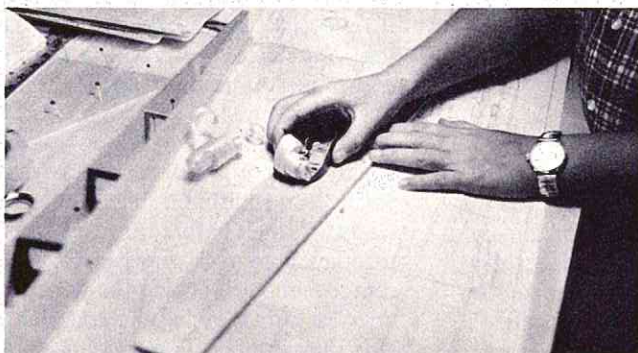
The glider can be finished in dope and silk or MonoKote whichever you prefer. The Malibu is a rather fast glider and it is recommended that for your first test flights the CG be no more than 25% back from the leading edge of the wing.

The Malibu has been winning many contests on the West Coast, not only because it is light and fast, but it makes very quick turns. The kit is very quick and easy to build and can get you into the air in a very short period of time. The instruction book is better than supplied with most kits of this type. A little more care could be taken by the manufacturer to be sure all the material is the right size and that all of the sheeting is usable.

See you next month.

Below: Use a razor plane to shape tail surfaces.

Right: Draftsman's triangle can be used to align empennage.





JERRY KLEINBURG



RCM Associate Editor, Jerry Kleinburg, left, chats with Capt. Thomas Walker of Malstrom AFB, Montana, during All Air Force Model Airplane Championships held at Lackland MTC.

BALSA CHIPS . . .

Hot - is the word for newlines coming from all RC flyways as 1969's year-round flying session moved along to the cool of Autumn. Let's take a jaunt around and see how much we can cover in the next few minutes.

THE TROOPS OVERSEAS.

RCers abroad include Ron Goodrich who used to operate Ron's Hobbies in Brainerd, Minnesota, who now finds himself in Uijongbu, Korea, for a tour with the U.S. Army. It didn't take Ron long to find modeling action; he rounded up some RC gear and, in short order, took first place in multi at the Camp Carrol contest up near Taegu. This was followed up by a 2nd place at the annual ROK-U.S. meet staged regularly at the Korean AF Academy near Seoul. Most of Ron's



Rock gang. Korean youngsters help clear rocks so that Ron Goodrich can fire up his Flea-Fli for a show. Controlaire rig keeps Ron and the kids happy.



Sandbagged. But still flying is Lt. Terry Rollins of the 1st Military Bn. in Vietnam. Radio is Digiace 4 channel propo.

free time is spent building a wide range of models including some RC boats for competition. Sport flying sessions are conducted wherever a clear spot may be found, and the Korean youngsters who gather quickly at the sight of Ron's Jeep help him clear rocks and other debris to show appreciation for his RC shows. As a member of the Seoul Korean Flying Club, Ron joins Korean RCers at the Air College for once-a-month meeting and flying sessions. Names of Koreans pose somewhat of a problem, Ron relates, since many are named Kim. "There is Kim Dae Sik, the Korean champ, who is really good in any league - he treated the Korean President to a demonstration flight off the lawn of the capital building despite an amazing set of building and telephone pole obstacles. Then there's 'Taurus' Kim (that's what he always flies) who won the 1968 ROK-U.S. meet; Kim Son Kil (he's known as Digitrio Kim due to his radio preference) who is possibly the most knowledgeable modeler and has a hobby shop in Seoul; and finally Papason Kim, the oldest RCer of all,



TSgt Gerry Berkheimer checks his Kwik-Fli III for practice session at Nakhon Phanom AFB in Thailand. RC eases overseas tours.

who flies an original with a PCS . . ." Ron enjoys overseas life; hopes his next tour is in Germany.

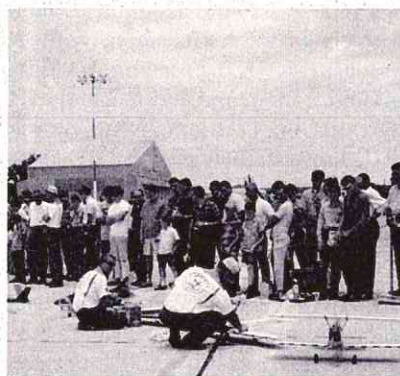
And from Vietnam, Lt. Terry Rollins sends word of his RC activity in that war-torn country. Despite a language barrier, Terry says he finds no trouble in getting help from the many children who come to see his RC demonstrations with his planes and boats. Starting with a Logictrol II and a Lanier, Terry has acquired 10 more Laniers and 22 kits along with 26 engines, a K.O. Digiace propo, a Micro Avionics DP-6, and a Min-X in the last 18 months! "Although I'm new to RC, I'm obviously enthusiastic about it," Terry says. Terry's latest project is a 96" Phoenix glider.

In Thailand, TSgt Gerry Berkheimer, who took a second place trophy in the 1968 West Coast Championships, is filling spare time with a Kwik-Fli III at Nakhon Phanom AFB during his military tour. Competition is limited - nil, actually - but a regular pattern workout keeps Gerry in practice for the state-side contest action soon.

● **TEXAS.** Members of the Alamo RC Society believe in promoting the hobby whenever the opportunity arises. And the chances have come frequently to do so under the energetic leadership of the current president Jack Malchoff. This long term policy saw the club perform at the Air Force 50th Anniversary at Kelly Air Force Base before an audience of over 300,000 in 1967. Such activity has continued and a long string of events were logged into the club's record in 1969 so far. Demonstrations at three military installations, Lackland AFB, Ft. Sam Houston, and Randolph AFB were major shows for the ARCS this year. A thrilling stunt show at the Pan American Speedway saw Rex O'Connor (Mr. Randolph Hobbies), Jim Albers, and Bill Morgan brought 5000 stock car fans to their feet as the trio showed how exciting hot RC flying can be. The club, now 70 strong, has a broad assortment of outstanding models and features an active segment of juniors

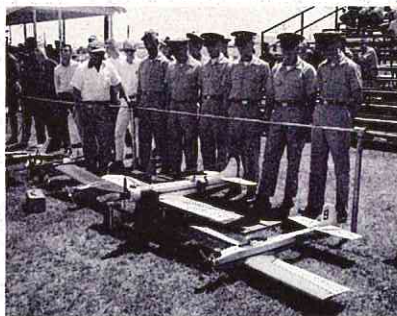


Rex O'Connor, Bill Morgan, and Jim Albers check out their planes with Bud Williams, a top notch race driver, and Ricky Ware, well-known disc jockey, prior to thrilling Pan-Am Speedway show. Performance rivaled stock car excitement.



San Antonio ARCS and large Randolph AFB open house audience. Club regularly stages public shows each year. 70 member club still growing.

who have been attracted by the ARCS flying shows. Last club outing was a picnic fly-in at the new Lady Bird State Park in Fredericksburg, Texas. The club is featured regularly on all three San Antonio TV stations and is a favorite topic of disc jockeys on many stations. As a club the ARCS have become a very visible part of the San Antonio community and RC action is looked for by many fans throughout the area.



Dr. Dan Kendrick and his model of Cavalier P-51D Farnoff conversion. Fliteglas fuselage, Enya 60, Logictrol. Sun gold acrylic lacquer - beautiful.



Lackland AFB trainees were treated to 30 plane RC show by Alamo RC Society fliers to promote AF World Wide model meet. Jack Malchoff, club prexy, does honors.



Cockpit detail of Dan Kendrick's P-51D. Alamo RCer went 'all out' to create RC masterpiece.



Hustle and bustle of a successful trade show is visible at 1st Eastern States R/C Jamboree. Joe D'Amico gives details of his B-26 to Don McGovern of Flying Models. 1970 show set for March 14-15 in White Plains, N.Y. Bill Coons photo.

Dallas RC action increased in tempo with the 4th Dallas RC Club Annual. A jump from 49 contestants in 1968 to 60 in 1969's affair reflects growing RC interest and the club's reputation for staging a top notch contest at an outstanding location on North Lake. The Pattern event had 43 entries and there were 25 in Pylon I, while Scale drew 8 entrants, mainly of WW I vintage ships which are popular this year. Class A had 15 fliers and was won by Tommy Dodgen, the 13 year old RC veteran readers will recall from our April 1969 column (page 63). Ivan Munninghoff left his flying students at Laughlin AFB in their T-38's long enough to top 11 B pilots who vied for honors. C Novice went to Sam Fly (who was really warming up for the Philadelphia Nats where he cut quite a swath in winning an impressive 2nd in Pylon I). Bill Thomas - yesteryear's undisputed Class II Champ - gave Dan Carey and Gerry Krause of Logictrol a real battle in C Expert and made them wish Class II was still around, and Bill flying in it. The Fokker D-VII shown and flown by Justin Shumway topped the field in Scale. Pylon I - helped by the zeal of the Ft. Worth Thunderbirds - saw Bill Anderson lead the way around most pylons for 1st in a hotly contested race. Bob Langley was 2nd with young John Jennings of the Dallas club 3rd. Eight states were represented in the contest which seems to reach further out each year in attracting fliers. Free bump hats went to all contestants this year as well as to officials, helpers, and pit crews. And Bill Aaker, the DRCC pep squad, even whipped up a contest to see who could

decorate their bump hat best with the AMA decal sheets everyone received. The first weekend in May is the DRCC's regular contest spot on the calendar, so come join in the fun in 1970 - Bill's buying the drinks!



Sam Fly and hard luck T-Tail Rivets at Dallas 4th Annual. Delta Airlines pilot placed 1st in C Novice - a warmup for the Nats.

● **WISCONSIN.** From Ken Sparr of the Wausau R/C Sportsmen, an interesting letter:

"Two years ago we formed a model airplane club, called ourselves the MARATHON MODELERS, invited kids to join, and were of multiple interest, R/C, Uki, etc. When we called the newspaper to report our activities we were usually referred to the Needlework and Knitting editor. Our club was getting nowhere fast.

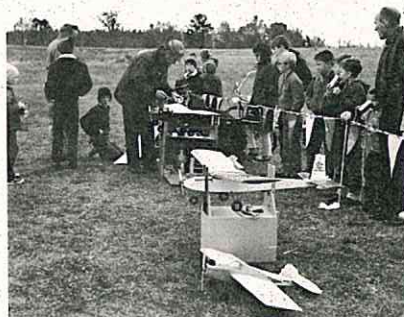
"Since the main interest of our club was R/C and after assessing the situation last year, we changed our image to one of an ADULT club devoted to the SPORT of R/C modeling. To get things going we quickly organized a 'fun-type' contest. We made circulars using our new name of Wausau R/C Sportsmen, Inc., sent them to neighborhood clubs, and distributed them around town. Things began to happen. The local TV stations did a spot on their news programs using a couple of our models as 'the first planes to land at the new central Wisconsin Valley Airport' and gave us a great plug for our contest. One evening a week before the contest we picked up the paper and there on the front page of the sport section was an article headlined 'Remote Control Airplanes to Compete'. All of this unsolicited!

"The weather the day of the contest was lousy, cold and wet. But we did have about 20 planes out. The big surprise was spectators! Between 300 and 400 people showed up to watch. So we flew and put on a good show. Even had a ukie demonstration and fired a rocket. The TV station and the newspaper sent photographers to cover the event. The TV station ran a couple of spots on their sports program and the paper ran a full page which I'm enclosing. We sincerely believe the success enjoyed was due to the change in our name and approach. And we even picked up a few new members.

"Our point is this: R/C is a sport, and mainly an adult sport. It should be promoted as such. We all support and are

members of the AMA, but let's face it, the name 'Academy of Model Aeronautics' sounds too much like a boys' prep school. Perhaps a different name and a separate division of the AMA for R/C would be of benefit to us all in a public relations way. As for juniors, this is our thinking: 1) Kids have been over-organized; 2) it's hard to hold the interest of a boy under 16 for any length of time, so what are we to do? Demonstrate - not organize. With the help of the Chamber of Commerce we are planning a U-control clinic. We feel we can attract at least 100 kids and teach them how to start engines, fly, etc. We will often repeat the 'clinics' and in time we will help them form a club, but it will be their club with their officers and dedicated to their interests. We will merely advise and help. In this way the really interested boys will continue with their modeling activity. In the meantime, we will continue to enjoy our sport with our new found status, for fun and relaxation, which, after all, is the reason we do it!

Sincerely,
Kenneth Sparr
Wausau R/C Sportsmen, Inc."



Wausau RC Club demonstration drew large audience despite unseasonable cold. Tom Moore explains details to interested juniors. Club encourages jr.s via 'clinics'.

● **NEW JERSEY.** The West Jersey RC Club tried something different at their last contest - they divided contestants into 'Pro' and 'Amateur' groups and paired a Pro with an Amateur at a flight-line drawing. Gene Karrol says it all "worked out very well" and furthered the club's goal of encouraging beginners and providing meaningful competition to all members. The W. Jersey club is based at Haddenfield and has been in existence for 20 years now. Frank Dougherty is the current president and incidentally, won first place among the Pro's flying a T-34 Mentor in the recent contest. Following Frank were John Moscariello with a Nieuport 17, and Pepe Limantour whose original plane is known as the 'Check-mate'. First place among Amateurs is this contest that stressed craftsmanship as well as flying ability, was Joe Prus and a VECO 61 powered Orion. Al Langberg and a Cherokee, and Tom

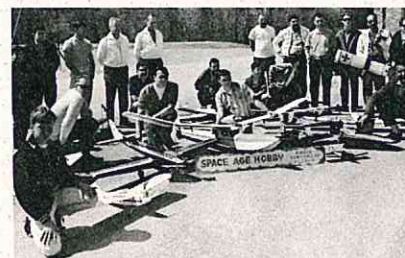
Dyl with a Sr. Falcon were also winners. Bringing craftsmanship back into Pattern events - a growing notion in many places, it seems.

The Mercer Co. RC Society staged the finals of their 2nd Annual Joseph Pasquito Memorial Award competition on the weekend before their Nats at their new flying field near Trenton. This site was obtained from the State of New Jersey under 'Project Greenacres', (the State's version of 'Project 70' that was described in the April 1969 RCM), a tax funded project to develop recreational facilities. The Joseph Pasquito Memorial Award is a combined craftsmanship and flying competition and is awarded to the club member whose plane meets flying criteria in actual demonstration after being judged for craftsmanship. Finalists this year were Bob Scott, Mike Winter, Dr. Harold Harger, Bob Hamer, and Ray Slifko. Bob Scott got the final nod with his neatly silked Pattern ship.



Mercer Co. RC Society finalists in the 2nd Joseph Pasquito Memorial Award for craftsmanship and flying. Slifko, Winter, Hamer, and Scott show well done entries.

The South Jersey Fly-Aways RC Club recently helped a Cub Scout group raise funds through a fly-in project where club members taught ukie fundamentals to juniors and sold flights to spectators. In addition an



Good scouts. South Jersey Fly-Aways RC Club gather for an equipment check. Club project helped Cub Scouts raise funds through club members talents.

RC static display was provided along with a flying demonstration. Dick Hill reports the effort was a "smashing success, and a good time had by all who donated their time and talent for a good cause."



Dick Hill, South Jersey
Fly-Aways spark plug, checks with Snoopy in 20 months 'labor of love' privateer. 114" span, 9½ lbs. Simul Logic propo.

● **JAPAN.** In Tokyo, Larry Hoffman sends details of RC'ing in his section of Japan. A member of the Tokyo Fliers Club, Larry also flies with the Nitto Blue Star Club who devote themselves to fun-flying on weekends, similar to many U.S. groups. Larry flies an Enya .09 powered Japanese Skylark biplane designed by F. Arigaya which uses 3 channels of Larry's Logictrol 7. The plane is a gentle slow-flying bird and this affords Larry the chance to give many of the ever-present youngsters some time on the stick while the little mill ticks off a 20 minute flight. As in most places, Japanese modelers are a helpful group.



Larry Hoffman travels light in Japan. Nip Skylark biplane makes neat bundle, airline bag for fuel and tools. Larry member of Tokyo Fliers Club.

● **MISSOURI.** Meyer Gutman - now Duke Fox's representative to RCers in

the field - headed the list of winners at the 3rd Annual Spirits of St. Louis contest. Gary Leonard and Brian Lakin were also C Expert finalists who received those distinctive and original St. Louis Arch trophies the Spirits feature in their yearly bash. Bob Underwood headed C Novice ranks along with Jim House and Herm Haynes. Bill Adams, Al Signorino (flying something more conventional than his Snoopy doghouse this time), and Trav McGinnis took care of B Pattern hardware, while Bob Williams took Scale honors along with Bob Underwood who rounded up two of those neat trophies for the weekend's flying effort. Bill Butters CD'd the affair which saw a free style addition to the regular C Pattern event. Fliers pre-selected maneuvers which were 'leveled' with value factors depending upon their difficulty to fly. Bill reports the free style feature was "well received by contestants and shows promise of being a means of creating added interest in the current AMA pattern event."



3rd Annual Spirits of St. Louis contest featured free style pattern event. Kim Signorino helps winners show distinctive St. Louis Arch trophies.

● **ONTARIO.** The Soo Modellers RC Club feature one of the earliest Canadian contests each year and one of the requirements for competition is the willingness to fly under almost any circumstances. Wet grounds and chilling wind were the 1969 handicaps and didn't stop the determined Canadians (and a few U.S. fliers) who gathered for Pattern and Fly-for-Fun (?) events that were featured in the 1969 Upper Great Lakes R/C contest in May. Winners included MAAC president Dave Henshaw (Class A), MAAC RC Chairman Cliff Moll (Class C), and Warren Hitchcock (Class D) the current Canadian National Champ and FAI team member. Other winners were George Estes (Class B), John Klassen, Jim Elgie, Jean Nadeau, and Leonard Roe, the fuel man. Perc

Grondin, who edits MAAC's monthly newsletter also managed a fun-fly event win. Lloyd Aemissinger was awarded the Modeller of the Meet Trophy while the high point Perpetual Trophy went back to Port Arthur with John Klassen.



Newsletter Editor-of-the-Year, Dr. E. Nmo Campana received the TOP OUT 'trophy' during ceremonies at Upper Great Lakes Contest. Jack Mertes, SoMoRaCC prexy does honors.



Winners circle at Upper Great Lakes meet. Winners include Dave Henshaw, Warren Hitchcock, Len Roe, Jim Elgie, John Klassen, Perc Grondin, George Estes, and Jean Nadeau.

● **WINNIPEG.** The principal RC plane of interest these days in the Winnipeg area is a 9¼ foot span 'Eye in the Sky' which the RC club employs as a 'crowd stopper' at contests and exhibits. With an 18" chord, the flying overcast weighs in at 11 to 13 pounds depending upon which bar it's weighed in, and swings a 22x4 wood prop (or a 4 bladed 14x6) on a 4 cycle Gannet .90 overhead valve engine. The Canadian CRC propo handles controls which include engine, rudder, elevator, and the Kodak Auto 8 electric movie camera. The plane is the result of a group effort (and a long winter) using a design by Val Ure. Val also did the initial framing of the bird and was joined by Cliff Swartz and his wife, Bernie Michalski, Ray Lievre, Dr. Bill Dutka, and Dr. Derryl Green in finish-

ing the job of covering which used 5 yards of Silron. Doping consisted of clear nitrate over the Silron followed by two coats of red Hobbypoxy. The Gannet engine runs about 10 minutes per ounce of gasoline and is equipped with a magneto to deliver spark. RPM's go to about 5000 with either prop arrangement, Cliff Swartz estimates, and full power hasn't been reached so far although the plane has been test flown. A figure of Dishonest John serves as a pilot and reflects the fun spirit the club project represents.



Knife-edge! Knife-edge!
Advice of Harold Goldclank didn't help Phil Cushman miss pylon at N. Connecticut RC Club meet. A poignant moment in RChistory by J. P. Stakun.

● In closing, a word about the flying at the 1969 Nats. "The big excitement for the spectators is definitely Formula I - the planes were finished like polished gems, and went like lightning bolts. Pilots were all skilled - some lucky, some unlucky. To me however, the skill and grace of the pattern flying was still the epitome of flying RC models. The fact that Larry Leonard's unquestioned mastery won all the marbles in both categories using two completely different styles of flying, is so much extra deserved icing on his cake. That RC cake we all enjoy definitely has two layers, delicious, Pattern and Pylon: Pylon, more exciting and flashy, Pattern, by far more graceful and much harder - perhaps impossible - to achieve perfection, and therefore more subject to subtle appreciation of fine points of skill - in my opinion much more the basic part of the hobby. I love 'em both!" Loving words by Art Byers in the WRAM'S HORN. ●

PRODUCT NEWS

Jerry Nelson, Nelson Model Products, Inc., Box 2027, Dublin, California 94566, has officially taken the wraps off his KA6E sailplane, fiberglass quarter-scale model of the German Schleicher Sailplane Company's glider bearing the same numerical designation. Specially designed for winch towing, the KA6E is a sweet performer in thermal lifts. Its great strength, large size and inordinately high wing loading provides dynamic stability which allows the aircraft to be flown into the core of a thermal with little difficulty. With a construction concept based on a unique combination of modern plastics, the KA6E offers structural features found in full-scale aircraft. An isophthallic polyester resin and a polyvinyl chloride plastic foam are used for the primary shell structure in the flight surfaces... a thin layer of fiberglass cloth covers each side of a 1/8" layer of foam plastic. The cloth provides the tensile strength; the foam gives the craft extreme rigidity with minimum weight. The fuselage is structured of multi-layer glass cloth with reinforcing bulkheads. This construction process - an exclusive with Nelson Model Products Company - is conducted under rigid quality control procedures. The fiberglass surface minimizes damage in rough landings, provides a functional low-maintenance finish and permits production in a brilliant yellow color for outstanding visibility under any conditions. The Schleicher Company's KA6E has become the standard for sailplanes throughout the world, and Nelson has adhered quite closely to its scale. The wing configuration is a bit different, the model bearing a slightly oversize wing in proportion to the original ship. This is the only TRULY ready-to-fly R/C model ever offered. Three servos, the receiver and battery pack are all installed in less than an hour. All linkages are assembled and adjusted. The KA6E is large enough to carry extra payload; i.e., telemetering equipment for measuring altitude and rate of climb. A payload weight of one pound does not seriously effect the performance of the ship. Nelson Model Products, Inc. is distributing the KA6E direct from their plant at 6053 Dougherty Road, Dublin, California 94566. The price is

\$259.50, with an extra charge for packaging and shipping. Additional information is available from the manufacturer.



Magnetronics, P.O. Box 266, Clawson, Michigan 48017, after seven years of developing and producing magnetic memory recording paint for the computer industry, believe they are the first to make such a product line available to the general public, and are now in the process of determining the markets for their products among experimenters, hobbyists, and students. Their MRP-27 Memory Paint is a magnetic paint for use with computer memory and other magnetic recording devices. Nominal color coercivity is 270 oersteds. The paint is an air-dry system which cures to a durable finish. It may be applied to a variety of substrates including metal, plastic, ceramic, glass, wood and paper. The requirement for undercoating substrates with a primer paint has been eliminated. Adhesion and abrasion resistance are outstanding. Shelf life is one year at room temperature. Pigment settling is very slow and extremely soft. Gellation, as exhibited by similar products, has been eliminated. MRP-27 is compatible with a large number of individual solvents (active and latent), diluents and solvent blends. Viscosity and dry rate are easily adjusted for spraying, spin coating, brushing, roller coating, dipping and other methods of application to the substrate. It may also be used in place of other magnetic paints with a coercivity ranging from 260 to 280 oersteds. MRP-27 is the first general purpose memory coating to be placed on the open market. It is also the first to be made available to experimenters, students and hobbyists.



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Basically for Push & Tork Rods, Wing Spars & Struts

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NEW: Slant Style Fuel Tanks in 7 Sizes
2 oz., 3 oz., 4 oz., 6 oz., 8 oz., 10 oz., 12 oz.

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Sullivan Products

535 DAVISVILLE RD.
WILLOW GROVE, PA. 19090
PHONE (215) OL 9-3900

Kraft-Hayes Products, 450 W. California St., Vista, California 92083, has entered the RC accessory field with a line of polyethylene fuel tanks that are quite unique. Currently available in 11 and 13 ounce capacity sizes, they are somewhat revolutionary in design compared to the tanks we currently use. Although difficult to describe accurately, they are, basically, a square polyethylene tank with a 180 degree rounded base in the front. This base prevents the tank from jamming up against the firewall and kinking the fuel line. The vent nipples are molded integrally, eliminating the use of copper or brass tubing, while the engine fuel line is held in place by a knurled fitting and collar which are a press fit into a molded ring on the front of the tank. The ease of installation of the tank and its attendant fuel lines was excellent. Price is \$2.49 each.

Technisales, P.O. Box 2233, Alhambra, California 91803, importers of the famous KDH retractable landing gear, and the Silence-Aire mufflers, are proud to announce that Larry Leonard, 1969 Nationals winner, chose Silence-Aire for his Nats' winning entry. Bruno Gienzen-danner, new World RC Champion, was using the KDH retractable landing gear on his Internat's winning model. For further information on both of these items, as well as forthcoming new items such as a variable pitch prop, operated by a 5th channel for in-flight pitch changes (coming soon) write directly to Technisales.

Finishing Touch Products, Inc., 5940 East Paisano, El Paso, Texas 79925, announces the release of a complete new line of Paint-By-Number kits, the 'Classic Aircraft Series', and the 'Classic Automobile Series'. These kits are priced at \$3.98 retail, and are the first paint-by-number kits aimed primarily at men and boys. Each kit contains two 12" x 16" numbered panels and are unique in that they contain 'detailing decals' of the very difficult areas (spoke wheels, insignias, etc.), that are applied after the actual painting is done, to give a professional result. Acrylic paints are packed in individual 'paint packs' of clear, completely sealed plastic to insure unlimited shelf life and ease of use. Other features include a plastic paint mixing tray with extra cups for water and mixing,



**NEW
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4 CH.
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5 Ch. Delux. 4 Ser.	315.00	255.00	225.00
4 Ch. Delux. System	300.00	239.98	214.98
4 Ch. Tx w/PowerPak	139.98	114.98	99.98
4 Ch. Tx less P/Pak	110.75	88.50	77.50
Add-A-Ch. Tx (5-6)	—	—	6.98
6 Ch. Decoder + Rx	80.00	64.00	54.00
5 Ch. Decoder + Rx	76.00	61.00	51.50
4 Ch. Decoder + Rx	72.00	58.00	49.00
Add-A-Ch. Decoder	—	—	3.98
Rx Pak Charger	7.98	—	5.98
6 Ch. Flite Pak 4 Ser.	210.00	160.00	141.00
5 Ch. Flite Pak 4 Ser.	205.00	155.00	138.00
4 Ch. Flite Pak Delux.	199.98	149.98	134.98
Servo—S-3 or S-4	30.00	21.98	19.98
Servo Tester	14.98	—	9.98
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Brick—deluxe	165.00	—	115.00

When available.

GENERAL NOTES

When ordering specify 250 mah or 500 mah Rx batteries. Incidentally, if you would want an extra 250 mah battery pack for your system, you can purchase one for an extra of \$7.00. This is a special. Specify S-3 or S-4 servos (it is O.K. to mix them) and frequency. Flite Paks include nickel cadmium batteries, Rx plus servos.

We sell M.A.N. semi-kits and kits less batteries and chargers on request. For this subtract \$35.00 from retail prices. On assembled Controlaire propo add \$35.00 for 72 mc. Add \$15.00 for 72mc Flite Pak.

The word "Deluxe" means with nickel cadmium batteries and chargers. All 4 & 5 channel Decoders expandable to 6 channel.

OS R/C EQUIPMENT

2 Ch. Digital Propo w/2 servos and Rx nickel cadmium + Charger (assem.) 139.98

OS 3 Ch. Digital Propo w/3 servos and Tx and Rx nickel cadmium + Charger (assem.) 199.98

1 Ch. Combo. Pixie Tx, Superhet Rx + 1 Ch. servo (assem.) 49.98

SERVICE EXPERTS

The service experts listed in this advertisement are, for the most part, people who have been working with Digitrio and other kit systems in the various areas mentioned. They have all put together an M.A.N. System from a raw kit and have agreed to stock parts that are compatible with World Engines Systems. They have been given schematics of World Engines Systems and current OS Digital Proportional systems. Many of these service experts service other makes of equipment besides our equipment. Consider these people for repair work or for help in matching up our flight packs or the coming bricks.

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W. Area: 500 Sq."
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Moulded A B S Fuselage, (assembled) Foam Wings, Moulded Tips, Covering Materials, Illust. Inst. (Rapidly growing in popularity for its inherent STABILITY and its EXCEPTIONALLY impact resistant construction. STANDARD KIT: \$19.95 DELUXE KIT: with factory covered wings, \$22.95

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gold mylar name plates for each picture, and complete, easy-to-follow instructions on the back of each box. One of the 'Classic Aircraft Series', the Focke Wulf 190, appears on the November cover of R/C MODELER MAGAZINE.



The new 1970 edition of the Heathkit catalog, featuring the world's largest selection of electronic kits, is now available free from the Heath Company, Benton Harbor,

Michigan 49022. The new catalog illustrates over three hundred kits for every budget and interest... 116 pages - 66 in full color. Both confirmed kit-builders and those about to begin this enjoyable, money-saving hobby will discover something to interest them... stereo/hi-fi components, ham radio equipment, marine gear, test, service and lab equipment, citizen's band radio, shortwave listener's receivers, photographic aids, educational kits, electric guitar amplifiers and accessories... plus a wide range of home and hobby items, including color and black and white TV's, electronic organs, AM & FM portable table model and clock radios, home protection systems, garage door openers, intercoms, stereo compacts, automotive kits and R/C equipment. All are available at up to 50% savings over comparable factory-wired models. Model Radio Control hobbyists will welcome the addition of the

all-new GD-19 5-channel R/C System, with a wide range of performance features. And the new GD-69 'Thumb Tach' R/C Tachometer will prove to be a popular accessory. For your free copy, write: Heath Company, Benton Harbor, Michigan 49022.



Hobby Lobby International, 2604 Franklin Road, Nashville, Tenn., has introduced a new product in their Checkerboard Silkspan, a medium weight covering material with 1½" squares imprinted in a choice of three colors; red, blue, or yellow. The size of the Silkspan is 24" x 36". Price is 49 cents per sheet. Since Silkspan has less tendency to stretch than silk, it becomes quite easy to apply a checkerboard design, and at the same time, keep the checkers lined up. Silkspan is also an excellent final covering for balsa sheeted foam wing cores. The checkerboard pattern will be particularly attractive on Goodyear racers, and will help increase the visibility of any model. Tested, approved, and recommended by RCM.

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Designed to serve the needs of technicians in various industries, a new line of high-quality stainless-steel blades in specialized shapes has been made available by Uber Grafic Instruments, P.O. Box 4, Palo Alto, California 94302, makers of the Uber Skiver, the rear-clutching technicians' knife. The new blades are a formulation of the 400 Series Stainless Steel with a special cobalt additive. Heat-treat includes a deep-frozen quench to -100 F. Blades fit not only the Uber Skiver, but other types of collet knives as well. Blades are processed to surgical standards, providing useful life in industrial applications as much as 10 times that of carbon-steel blades. Types available (illustrated) are as follows: Type 10 - a broad, rigid, general-purpose blade with a curved edge for clean cuts in soft materials and mats. Type 11 - a thin blade, pointed to 22 degrees with axial tip for tracing and detail cutting, fine trimming, and low-power microscope work. Identified as Type 11S, the same blade configuration is available in a special version for higher-power microscope work, with hand-stoned points sharp beyond 60-times magnification. Type 12 - a 15-degree pointed undercutting blade for such special purposes as re-entrant mold and cavity applications. Type 15 - a small general-purpose blade for cutting, carving, and correcting. Type 20 - a miniature high-chrome blade with a rigid high-density forged point for small, heavy detailing. For further information and prices contact Donald Kroener, General Manager of UBER GRAFIC INSTRUMENTS.

What's new from dmeco Models, 3833 Harlem Road, Buffalo 15, N.Y., is a semi-scale P-51, following in the tradition of outstanding Live Wire kits. Although we do not have any price details at the time of this writing, Hal deBolt's P-51 placed first and second in Formula II racing at the 1969 Nationals - which has got to be one of the best introductions for a forthcoming kit that we can think of. Watch your local hobby dealer for additional information on this new item. Hal deBolt and Paul Carlson are also serving as the Orbit Northeast Sales and Service Center and will soon have a representative inventory of Orbit systems, servos, etc., on hand and should, in the very near future, be able to fill anyone's needs immediately.

The only thing better than an X-acto knife is an X-acto Set.

We have sets for everything from whittling to model railroading. Just so you don't get halfway through your project and discover you'd be working better and faster if you had more than one X-acto.

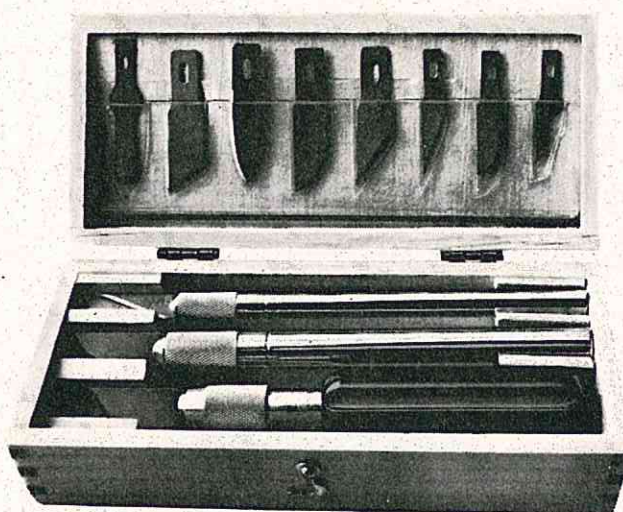
X-acto makes 28 different blades and a variety of handles to cut through all sorts of hobby problems. You can pick the set with exactly the right combination of knives and blades for your hobby.

Shown here is the #82 knife chest. It contains three knives and nine blades in a handy wood chest so you'll never have to hunt around for the right tool. The #82 is just \$4.95. Other X-acto tool sets from \$2.75 to \$60.00.

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FOR .15 TO .19
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ACCESSORY PACKAGE FOR AERO COMMANDER 100

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Complete Wing Kit at \$14.95, Fuse less Cowl \$16.95, Cowl \$1.25, Fin 95¢, Rudder 50¢, Stab \$1.50, Elevator 50¢, Wheel Pants set of 3 \$1.50.

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FOCKE-WULF 190

(continued from page 29)

high wing loading and fly it in under pretty good power, chopping throttle only just before touchdown. Like the real airplane, if you lose flying speed, it just quits flying and drops. Ground handling, because of the wide landing gear stance, presents no problem and there is no tendency to ground loop on take off. Flaps would be great, if you can arrange them.

Achtung, Seig Heil, and Mit Freundlichen Gruessen. Wear your Focke-Wulf 190 in health and keep your nose down. I'll answer any questions I can if you'll write me at: 1921 Walthall Drive NW, Atlanta, Georgia 30318. I would also like to see photos of your completed model, and would appreciate your comments in general, provided they are complimentary. ●

SCALE IN HAND

(continued from page 14)

be repeated many times this year, now that scale has become popular. This was the spectacle of a sincere, skilled model builder discovering, AFTER investing many dollars and hours, that his airplane isn't nearly as scale as the ads and the box blurbs told him and that it won't be the 'winner' he expected it to be.

At the very least, selling a semi-scale airplane as scale is a mild form of fraud. For many modelers it means taking their money under false pretenses. Of all the scale kits available I know of only one that is CERTAINLY accurate, two I suspect are accurate and a couple of others that may be accurate. The vast majority of kits I KNOW to be markedly inaccurate and none of these are advertised as semi-scale. Most, in fact, are specifically referred to as 'scale' in ads and on the box.

Something should be done to prevent widespread disillusionment. At the very least, all future reviews of scale kits should include a KNOWLEDGEABLE assessment of their scale accuracy and/or deviations from scale. It would be useful if a list could be published that would bring the readers up to date on this aspect of the

scale kits already on the market. Probably you will have some good ideas. Let's see what we can do.

Yours sincerely,
Clark Macomber

You are right, of course, Clark, but the trouble is that there are now so many 'scale' kits that it would take ages to check them all out. However, this column thinks your point about checking the 'scale' claim of any new kit as an integral part of the kit's review is an excellent suggestion. After all, if a kit appears as a Class C pattern job, for example, some assessment of its aerobatic capability would be in order, wouldn't it? If we place the facts before the modeler, he may then decide for himself if any errors are important to him.

The Editor and I will try to get together on this, OK?

Dear Mr. Platt-

I have a number of Wylam drawings and have considered making models from some of them. However, after examining his drawing of the SE-5a, I have my doubts about their accuracy. According to Profile Publications, the serial number of the plane in Wylam's drawing was one sent to the U.S. for assembly here. However, it looks different from any other SE-5a I ever saw, in that the bottom of the nose seems to slope upward too sharply, the wing ribs are evenly spaced, and there are no false ribs in the leading edge of the stab. Did Wylam make a mistake or were the SE-5a's sent to this country different?

I would have written to Wylam himself, but some friends of mine have tried writing to him directly, with no luck.

Please let me know your opinion of Wylam's drawings in general, and particularly his SE-5a. Thank you very much.

Sincerely,
Harry M. Stephen, Jr.

My reply to Harry was to the effect that under no circumstances would I use a Wylam drawing as information or for scaling for a model. I also put Willis Nye in the same category and, rather than give detailed reasons (if you can't say something good about a guy, say nothing) I will let the reader draw his own conclusions.

Gallery

Last month we took time out to finish some urgent business; specifically, a 2" scale F.W. 190 A-7 for the Nationals. This meant that our discussion on wing sections had to be

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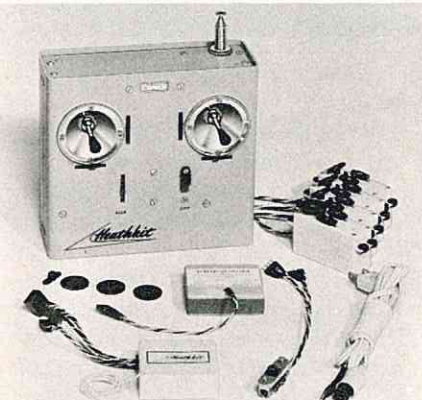
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Wing Sections for R/C Scale (and related matters)

One of our most frequent queries that arrive by letter goes something like this — "I am planning to build a Curtiss Hawk P-6E. The wing section on the Hawk is Clark Y, which seems OK; but the wings are set at 2 degrees NEGATIVE incidence. Help! What do I do?"

Let's examine this question in detail. The section Clark Y, as we all know, is a flat bottomed airfoil about 12% thick. For decades a favorite with modelers, it is easy to build, cover, and can easily be made quite strong due to its adequate thickness. Our advice in this case would be to stay with it. It's doubtful if any change would be beneficial to a Hawk.

Now, about that negative incidence. We would stay with this, too. Here's why — due to the shape at the L.E. of the Clark Y, when the section is set at -2 degrees it resembles a regular semi-symmetrical airfoil at 0 degrees. Won't the negative incidence give negative lift? No! It didn't on the real one and it won't on a model, because the Clark Y is still giving positive lift to an even greater degree.

The actual angle of zero lift on a wing section varies according to its shape. For a full-symmetrical section the zero-lift angle is 0 degrees, but most any other shape will lift strongly down to quite surprising negative angles of attack - reaching as high as 8 degrees or more in the case of an undercambered section typical of RC gliders.

All of the foregoing may give the impression that there is no need to change a wing-section for a successful model. By and large, this is true. We can think of only *one* WW2 fighter whose section was so radical as to give some concern about the wisdom of using it on a model, and that was the P-51. The P-51 used a laminar-flow section of such unusual shape that so far, to our knowledge, no one has used it on any 'scale' model Mustang.

Even so, it might be an interesting exercise to build a correct P-51 some day, if only to find out if that crazy wing *would* work! Our own guess is that it would be perfectly all right so long as one kept his landing approach speeds fairly comfortable, never letting the model get too close to the stall point. Laminar-flow sections have the reputation of a vicious stall characteristic. Perhaps one of our readers could throw some light on this?

But, to return to the point! There seems little or nothing to be gained from changing the section on any model if the real airplane used a 'conventional' semi-symmetrical airfoil. Indeed, there is much to be lost. Any decent judge in a contest will severely penalize a model for an incorrect wing section, during the fidelity judging.

All of which leads us nicely into the question of wing sections for WWI-type scale R/C models. The early airplanes (except the Fokkers) characteristically used a rather thin, undercambered airfoil. Will a model fly stably using this type of section? Yes, it will. Can they be made strong? Again, yes. Some use of hardwoods for spars, etc., may be called for. Will the model be aerobatic? For all *practical* purposes, yes. Just a few of the maneuvers unaffected by wing sections like this would be loops, Immelman, Split S, rolls, Cuban 8, spin. There are plenty more. The stunts affected would be outside loops (never performed by *any* WWI aircraft to our knowledge), and inverted flight (rare in WWI, and anyway, feasible with a model, though angle of attack would be high). Most fellows probably would agree that the list we gave would be more than adequate to keep

the interest going. Final question: So why do most designers put a symmetrical airfoil on a WWI model? Heaven only knows! There are few things more guaranteed to ruin the appearance of an antique biplane than a 15% symmetrical section. *And*, it didn't help anything, anyway.

It is the hope of this column that more designers will give thought to this question and re-examine the correct section to see if it can be used on the model.

Wing Incidence

Since our models fly relatively fast in order to gain sufficient lift, we cannot use the longitudinal-dihedral (difference between incidence of wing and stab) setups that the full-size boys use. We have to zero-out the angle, or, at most, use a difference of only 1 degree or so. We *must* make changes here if the difference on the real plane was over 1 degree. This was a common occurrence on early vintage aircraft. By WW2, flying speeds had risen to where a 1 degree difference was quite common, so these airplanes can be made with scale incidences and be OK.

But for pre-1930 aircraft, a quite usual setup would be around +3 degrees —5 degrees on the wing, with the stabilizer at zero. As we said, we can't get away with this. Nevertheless, we do have a choice. Either we can lessen the wing incidence, so that it lines up with the stab, *or* we can increase the stab incidence to line up with the wing. The former course is the usual one taken by scale designers, but the latter is, in our view, much more preferable. What's the difference? Simply this: the incidence on the wings of, say, the S.E. 5a, is 5 degrees. This has a noticeable effect on the appearance of the ship. Rather than zero-out the wing to 0 degrees or +1 degrees and spoil this appearance, it would be better to rig the tail to +5 degrees and leave the wing alone. The change in this case is barely noticeable. Furthermore, if we have a 0 degree thrustline on the engine and +5 degrees on the wing and stab, we have, effectively, 5 degrees of downthrust. This saves us putting out-of-scale downthrust on the engine and further affecting the appearance of the model.

Before we get to the promised discussion on 'Choosing a Subject', let's take a look at our Gallery.

Described as 'hairy to fly' by its builder Norman Butcher, (editor of our contemporary 'Radio Modeller' from whom all our pics this month came) the Fokker Triplane Dr. 1 is

seen at the International R/C Scale contest at Metz. Norman goes on - "flits around like a mosquito. Too small at 2" = 1'. Weighs 7½ lbs., powered by Merco 61 III."

* * *

One of the hardest luck stories of the year . . . while safely in the lead in Scale in the World R/C Champs and all set to win (or at the least, place 2nd) Mick Charles' Zurca Sirrocco crashed due to interference. Pic 2 shows the pair in happier times. Retract-gear, Skylader R/C gear and again a Merco 61 III engine.

This left Mick's teammates, Roy Yates and Dennis Bryant (long time RCM contributor) to place 1st and 2nd. Our own Maxey Hester was 4th, and Joe Bridi 5th. Yates' and Bryant's models are shown in our other photos. Looking every inch the real thing, Roy's Percival Proctor rests between flights. The detail shot shows the cabin doors being held open to reveal a very polished (not literally!) interior.

* * *

Dennis Bryant has always been an innovator. His models show a love of building that few modelers can claim. Take a look at the detail shot and you'll see what we mean. The wings fold; the interior structure is brazed steel tubing; again, a lovely cockpit. Oh yes . . . the airplane is a Polish lightplane, RWD-8. O.S. 60 engine, Sprengbrook radio. Weight is 10½ lbs. . . which reminds us of an amusing tale about Dennis and his models' weights.

Way back when, we'd go into Dennis' South London model shop where he'd be completing a new scale R/C job. "How much does it weigh, Den?" we'd ask.

"7 pounds," sez he.

"Oh yeah? You're going to have to prove that!" we'd reply, kidding him along.

"Watch, then!" he'd say, bringing out a rusty old fishing spring-balance graduated up to 7 pounds. He hangs the model on the hook. Clunk! Right to the bottom. "There you are, you disbelieving so-and-so! 7 pounds!"

* * *

Choosing a Subject.

Bearing in mind our earlier assumption that this series is written for the newcomer to scale, let's see what help we can give him to choose a suitable subject-airplane upon which to make a start in this branch of RC'ing.

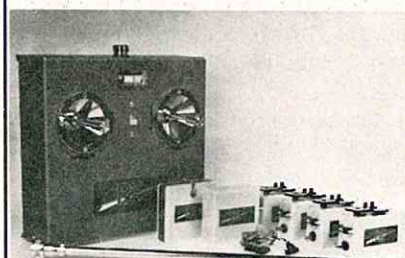
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tail area of about 15% or more, a tail moment and nose moment which appears to be a good setup for getting the CG correct without nose or tail weight, and, if possible, a fairly simple design.

To these considerations we will add one more: fixed LG. We could go to some length to explain the importance of this last requirement, but we're not going to. The plain truth is that, regardless of the rest of the design, a retracting landing gear *alone* lifts a model into the 'expert' category. In fact, to our certain knowledge, even the experts who use it have to be prepared for endless landing gear troubles. Nobody has yet come up with a truly debugged system, though some people are getting close.

The beginner to RC scale does not need bother with *any* part of his model. Everything should be as reliable as possible.

At this point we are faced with a decision. Does fixed LG mean choosing an aeroplane that *had* fixed gear, or simply fixing the gear regardless of whether the real one had it or not?

The choice is yours. For our part, we find something offensive about the

sight of, say, a Corsair or a Skyraider flying around with its wheels down; while a PT19 looks perfectly OK... because we know, ourselves, that one is wrong and the other is right. May we, therefore, suggest that you leave the retract-gear aircraft for awhile, at least until you want to take on the job with the gear - and choose a fixed gear subject. There are plenty of them, to be sure. It wasn't until the 30's that planes folded up their wheels, so anything prior to this will be OK. Many World War I aircraft make excellent beginners' subjects. To name a few: *Sopwith 1 1/2 Strutter*, *Bristol Bullet*, *D.H. 9*, *Junkers D.1.*, *Armstrong Whitworth F.K. 3 and 8* and the *R.E. 8*. Keep away from the short nose birds so common in the First War, like the *Sopwith Camel* and *Pup*. They will give you problems with balance and, as we said before, you don't need problems!

Among the between-war period airplanes, a few stand out as ideal subjects for the newcomer. How about the *Curtiss Hawk P.1*? Many of the *Ryans* make good subjects - probably the *P.T. 25* is about the best, as it doesn't have wheel-pants to cause trouble. Almost all of the *Miles* air-

craft make fine R/C jobs. The *Magister*, *Sparrowhawk* and *Hawk Speed Six* are all as perfect as can be found.

World War II finds few fixed-gear planes, for obvious reasons. But there are *some*. The *Stuka* is one, of course. The *Miles M.20* and *Percival Prentice*, *Vought Kingfisher*, *Curtiss Seamen* and *Seahawk*, *Arado 196*, *De Havilland Tiger Moth*, *Fairey Swordfish*, *Gloster Gladiator*, *Blackburn Shark* and *Vultee BT-13* also spring to mind.

The *Short Seamen*, *Percival Proctor* and *Provost*, *Piper Cherokee*, and many of the Cessna/Piper high-wings are examples of post-war fixed-gear aircraft.

This is already quite a list, and yet it only scratches the surface of ideal beginners' R/C scale subjects.

Whatever you do, *don't* try to take on some extra-difficult and challenging subject the first time out! To be sure, the fighters of WW II and the twins and 4-engine bombers are super-glamorous subjects. And, we know from the letters we receive, that the *B-17* and *Lancaster* etc., still rank as some of the first-choices of many R/C fliers who never made a scale job before. Please - forget it, at least for awhile!

MESSERSCHMITT ME 109

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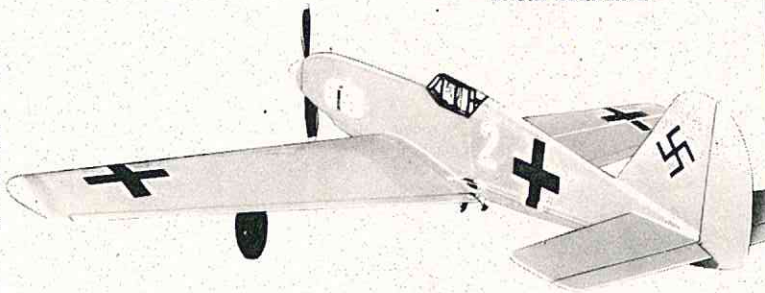
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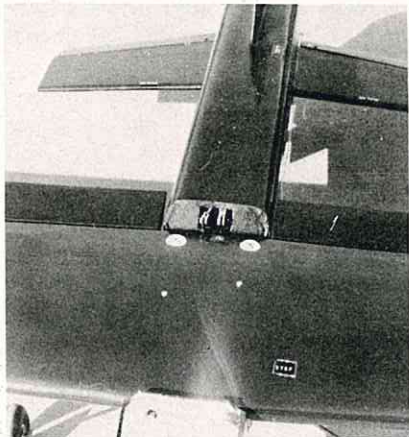
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MOCK 15

(continued from page 20)

you fit the rest of the top and bottom sheeting around them they will be plenty strong.)

13. Build rudder assembly and lay to one side for later. (Note that top and bottom rudder are built on a one-piece spar which is also spruce.)

14. Epoxy-in the firewall and forward wing bulkhead. When set, add 1/2" triangle stock in all four corners

of the tank compartment. In addition, I later added a piece of 1/8" x 3/8" spruce to each side of the tank compartment. Epoxy them flat to the sides, about 1/8" down from the top edge. They will add a little rigidity when you hit a hangar on landing. Dumb, dumb, dumb.


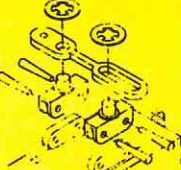
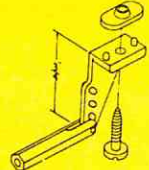

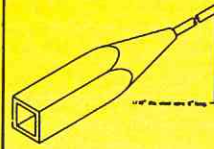




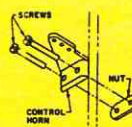
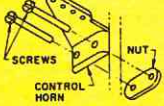
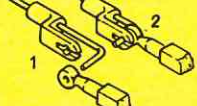








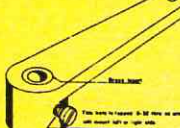

15. Fit Top Flite nose gear and Tatone .19 mount, epoxying under them before the last tightening. Use planning here, because some screws interfere. Also, use the short Tatone mount, since the ship tends to be nose-heavy. (Scout's honor.) Either the O.S. .19 or the ST .23 will fit the mount AND the same holes, but the different shaft length will change the nose length; make up your mind before proceeding farther. If you build LIGHT as you are supposed to, either one will perform well.

16. Install your RST-6 tank for a trial fit, and bore a hole in the firewall for fuel line if necessary. This might vary depending upon engine, since OS and ST have their outlets on opposite sides. Incidentally, for the OS I had the battery pack on the bottom and tank on top which CAN lead to fuel-soaked batteries. After the first flights with the ST .23 (after the pictures

were taken) I moved the tank to the bottom and the pack to top. (I prefer this.) Also incidentally, I preferred the Kavan carburetor on the .19 as a modification. Fuel draw and idle are just marvey-poo. I couldn't get a Kavan for the ST, but I can GUARANTEE I would prefer that, too.

17. Install the 1/16" ply on the forward fuselage bottom, face grain crossways again. I added an additional small doubler with grain lengthwise to the outside of this, right where the gear bolts on. Helps keep the gear from tearing off when you plop in while swerving to miss a car. Dumb, dumb, dumb.

18. Cut the servo tray mounting crossbraces from hardwood engine mount stock. Make them rather snug fitting. Put them approximately in place, then put in servos and servo tray; adjust the crossbraces for position before you epoxy them firmly to ply doublers. NOTE: Position of servo tray is VERY CRITICAL, as there is minimum clearance above and below! Have the servos clear the bottom floor by 1/16" maximum or you'll have trouble with the pushrod keepers hitting the wing. Also, make sure you have adequate clearance forward of

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SUPER-FLEX NYLON HINGE .59¢ 5/pcs. 	THROTTLE-EZE .98¢ each 	CUSTOM NYLON WING MOUNT BOLTS .59¢ pair 	CONNECTOR LOCK 79¢ 4/pcs. 	DUAL HOOKUP SERVO SCREW .59¢ 3/pcs. 	"THE MISSING LINK" .79¢ each 
<div style="text-align: center;">  <h1>ROCKET CITY</h1> <h2>SPECIALTIES</h2> <p>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. 

the servos for the padded receiver.

19. Fit and epoxy-in the plywood crossmounts and doublers for the DuBro nylon wing bolts. Epoxy the female parts of the bolts in at this time.

20. Install the servo tray and servos with a couple of metal screws, then install the two Nyrods for the tail. NOTE: Make the elevator push-rod yoke of 1/16" wire, using World Engines' 'Z links' to allow for field adjustment due to temperature growth of the Nyrods in warm weather. Wiggle this into place, hooking to elevator horns. Make sure it moves fore and aft freely, then use the front end of the yoke to determine the position of the aft end of the Nyrod. Epoxy the yoke into the inner Nyrod, roughing-up both surfaces first for adhesion. See the photo for position of the rudder Nyrod; make sure it comes out close to fin, since the rudder horn will be short. When everything is as set-up as a bride's first wedding, add the rest of the bottom 1/16" sheet.

21. Install the engine temporarily, then epoxy-in the Nyrods for nose-wheel and throttle. (Same location for OS or ST.)

22. Make the flap bellcrank from 1/8" ply, then epoxy it to that short center piece of dowel. This whole thing pivots on the center piece of wire which is epoxied into the two outside pieces of dowel. Those, in turn, are epoxied into holes in the fuselage sides. Ah, well, look at the drawings; they show it. We had pictures during construction but they didn't come out since there was no film in it at the time. Dumb, dumb, dumb.

23. Remove the engine, add top and bottom blocks to fuselage and carve to shape. Save the final forming until you can knock the knobs off the whole fuselage at once.

WING CONSTRUCTION SEQUENCE

24. Build two panels over the plan, then flop one of them over. I hate to draw plans, and besides the other part never comes out symmetrical. Join with doublers. The TOP side of the wing is now lying down on the workbench. It will be flat, you see, with the BOTTOM tapering slightly for a dihedral effect. If your workbench is not flat, you are now designing your own airplane.

25. Remove from bench, add lead-

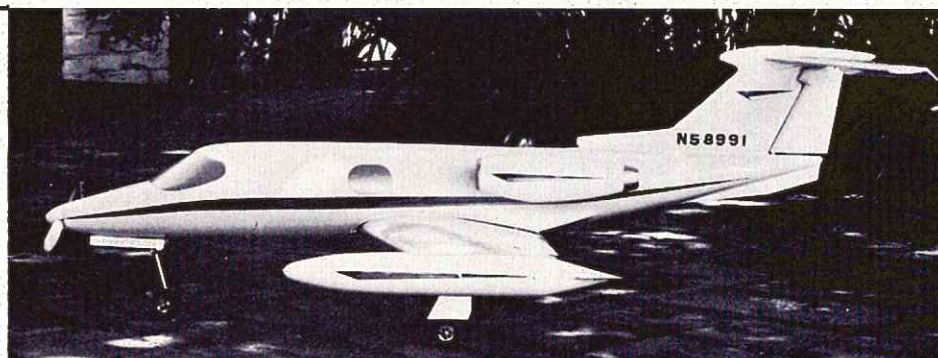
ing edge sheeting after tapering leading edge strip to accept it. Notice that the sheeting goes OVER the leading edge strip to allow a big radius later.

26. Add the 1/16" ply crossbrace on top near the rear spar. The nylon bolts will seat on this later, so make it at right angles to the centerline of the bolts. Now add the top centersection sheeting.

27. Turn over to bottom, and add crossbraces for servo opening and dowels. Add dowels. Add blocks for nylon screw to tighten down on. Sheet the bottom of the centersection and sand smooth. Cut out for servo and receiver if it is going to stick up. (Mine did.)

28. Cut loose the ailerons and flaps, add spars and ribs to them where necessary, then shape their leading edges as shown on the butt rib template. Make these sharp corners; don't just round them. Fit the Rand hinges to the wing and ailerons (don't epoxy yet) and fit ailerons to the wing. Same with flaps, except you have to make torque rods here that DO epoxy to the flaps after fitting. Be sure to install the Rand special bearing before bending; again, refer to plans and photos for clarity. In case you're wondering why

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I left that small section of trailing edge between the ailerons and flaps, it is for ease of rigging the controls to neutral. Just line them up with this little fixed segment. Otherwise, the whole stupid trailing edge moves and who knows where neutral is?

29. Put masking tape over trailing edges to secure ailerons and flaps in neutral.

30. Put short, pointed pieces of dowel in the female nylon bolt halves and then engage the wing dowels in the fuselage bulkhead. Press down on the trailing edge, which will cause the position of the nylon bolt holes to be neatly marked on the centersection skin. (CERTAINLY the pointed dowels have to be the right length, Percy.)

31. Remove the wing, drill holes for the nylon bolts, and then remove the 1/16" top skin around the bolt heads. This will allow the bolt heads to seat firmly against that plywood cross-brace. Assemble and check fit.

32. Remove wing. Install servos and tray, receiver and batteries. Make and install the pushrod from elevator servo to flap bellcrank. Hook up all Nyrods, being sure to stick the pushrods into the servo arms from

BELOW, which takes less vertical space. I used Rand keepers, also upside-down of course. Make a small wire to stick through the fuselage side for switch actuation.

33. Add a strip of foam tape to the wing saddles, then install wing and bolt down. Make the pushrods from the bellcrank (flap) to the horns on the flap torque rods. As shown on the drawing, the angle of the horns and the bellcrank must be the same with everything in neutral. Also, be sure to use Nylinks where shown since we don't want to draw and quarter the fuselage when the wing knocks off.

34. Hook up flaps. Now, operate all controls. If any evidence of dragging on wing is noticed, you may have to shim the wing saddles to raise the wing slightly. At any rate, check for zero incidence when you are satisfied.

35. Now remove the wing and install the aileron bellcranks, horns, and pushrods. I installed the servo with a Kraft aileron servo mount, screwing it to a 1/16" ply inlay in the top sheeting.

36. Now remove all radio gear. Apply 1/4" top sheeting to fuselage. Re-install the wing.

37. Laminate balsa sheets for fuse-

lage hatch, using contact cement. Add blocks and strips where necessary, carve to fit wing so the whole mess will lie flat on tank compartment and be flush with aft fuselage top also.

38. Remove wing again, reinstall hatch and spot-cement it to fuselage. You've been dying to knock all the corners off, so have at it. Remove hatch, add ply and dowel to front. Add 1/16" ply inlay for top screw. Install wing and hatch, adjust for final fit. Drill hole for attach screw through hatch and top wing skin. Enlarge hole in wing skin and epoxy a blind nut in the hole.

39. Now disassemble things and then sand smooth. Just remember that water will flow AROUND a round corner and cause drag, when it would just break off and LEAVE a sharp corner. I suspect that air is the same, so leave the edges sharp at such places as the butt end of the fuselage, wing rear spars, leading edges of controls, trailing edge of rudder.

40. Coat the inside of the engine and tank compartment with epoxy, followed by a coat of white Hobby-poxy.

41. Give all structures a coat of clear dope, then cover everything

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except the wing with one layer of silkspan. Cover the wing with a first layer of silkspan spanwise, give one coat of dope, then add a second layer of silkspan chordwise. Now fill and apply color. Keep it light!

42. Now saw the slot out of the rear of the fuselage, insert the rudder, and glue the piece back into the slot. Install all controls and hinges at this time. NOTE: I punch about 4 holes in the flat web of each hinge with an icepick and then smear it with epoxy before inserting into surface. No toothpicks necessary; you have to destroy the surface to remove them.

43. Now you can dupe it up with decals, tape, 'press-on lettering', and so on. I protect tape and lettering with a thin smear of epoxy, then the decals and everything else with Aero Gloss Fuel Proofer. The X-15 had signs all over it for every conceivable purpose, so have a ball.

44. Add the main landing gear with nylon u-straps from the Midwest C-5 kit. Make from 5/32" wire as shown for minimum bending, and put screw heads inside so you don't jam up against a servo. Countersink a little bit, if you used the outside doubler like I did. I haven't added brakes yet, but they will be drag brakes operated from down elevator, as usual.

FLIGHT

Needless to say, (so I will), the flying of this machine gives you a chance to check-out the operation of all these strange features. I could write a book, (so I won't), but I will, instead, list several points of interest to get you over the rough spots.

"The large sub-tail restricts takeoff angle so you must get off by speed and flaps."

1. Which ever engine you use, have it reasonably well broken-in and reliable in all attitudes BEFORE testing! The large sub-tail obviously restricts takeoff angle so you must get off by speed and flaps. I HAVE staggered off (no, no, the AIRPLANE has!) with a sick .23 and full 'up' elevator with full aileron control and no sign of snap rolls, but it shortens the life of your lower intestine by 4½ years. Normally, just get good speed and then slowly give full 'up'. When it comes off, reduce the angle of attack.

2. Practice stalls at altitude first. It will not spin unless you have full elevator and rudder; rather, it simply mushes with full aileron control. Add a little power, and you're ready for landings. Don't try for full stall landings, just a real nice flare. When the tailwheel touches, it will knock the nosewheel down for bounceless landings.

"Well, Walt," gurgled Waggoner as he guzzled his Gator Ade to relieve his dry throat after the long tirade, "that's about it. I'm sure it seems complicated, but the TELLING is really much more work than the building. Just keep thinking 'light but strong' while you build it and I'm sure you'll find that the .19 or .23 is adequate power here at sea level. The ship is not the LAST word in anything, but it DOES check-out a lot of ideas we'll be able to use in future aircraft. After all, that's supposed to be the name of the game, isn't it?"

"Waggoner, I agree with you and I have enjoyed your tale," Walt said foxily.

"That takes away the sting," nodded Waggoner waspishly.

"Oh NUTS!" cracked Walt. ●

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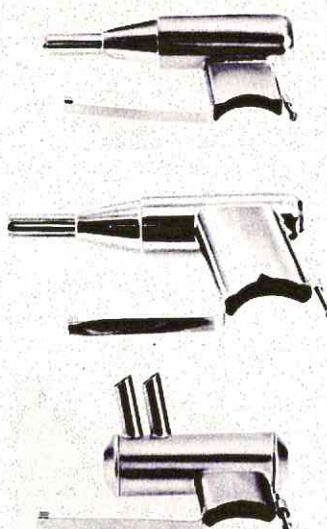
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THE CLIFFMASTER

(continued from page 16)

about 7 degrees in each panel, and old time free flighters will recognize that as a fairly standard amount.

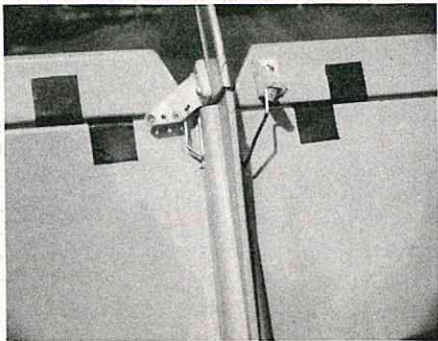
For added strength at the center section, a one inch wide strip of celastic is used along with the plywood dihedral braces. The celastic fairs into the fuselage and does not detract from the appearance.

So much for the wing. Now we come to the "unusual" fuselage. Just before building the Cliffmaster, I built a profile fuselage glider, using 1/4" hard balsa, and attaching the radio units to the side with double stick tape. It worked all right, but the appearance left something to be desired, and the 1/4" boom was always breaking on hard landings - which are fairly standard occurrences in slope soaring.

Then came the idea of using a one inch wide block of balsa, with a cutout to house the receiver, battery pack, leading edge, and that used at the trailing edge is 1" wide, you can see how it fits the natural curve of the wing, with just a little sanding required.

You may think the dihedral appears to be excessive, but it isn't. Since you will be making rudder only turns, this amount of dihedral works out best with the vertical fin and rudder area, and you can make very tight pylon turns with a minimum of skidding and subsequent loss of speed. Also, the dihedral works out to be





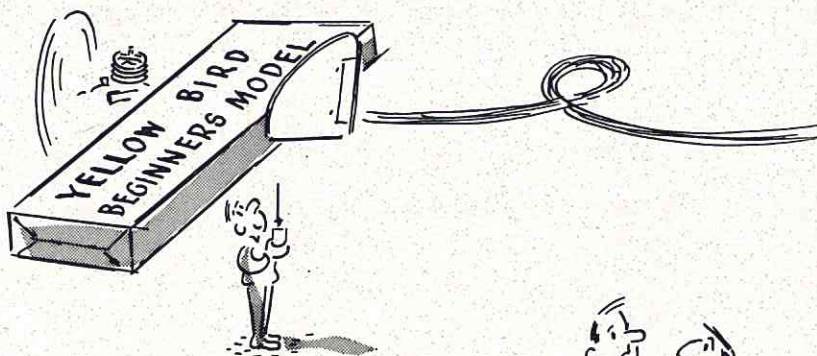
Rudder & elevator control horns. Note extra hole to increase rudder throw.

and servos. The Kraft units are all less than one inch wide, so they could be internally mounted, and then have side plates to cover them. Originally I had planned to run the pushrods along the outside of the fuselage back to the tail, then Jim Nelson, a neighbor and modeling enthusiast, suggested the hollowed out 'race' to accommodate the pushrods, and it worked out fine. The only problem I had was fitting the connections to the two servos, the problem being that the take off from the servos had to be on the same side. This was solved by mounting one servo flush to one side, and the other flush to the opposite side. It's a close fit, but works.

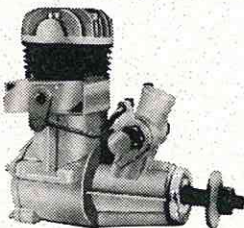
The switch is mounted to one of the side plates as shown. The other side plate doesn't have anything mounted on it and is removable for the purpose of battery charging. I also made it out of clear plastic rather than plywood - for two reasons. One, it displays the equipment and makes a great conversation piece. The other is for a more practical purpose - you can make a visual inspection of the equipment after a hard landing without having to remove the cover.

Back at the tail, a slot is cut in the tail boom to insert the ventral fin, which is made of 1/8" plywood for

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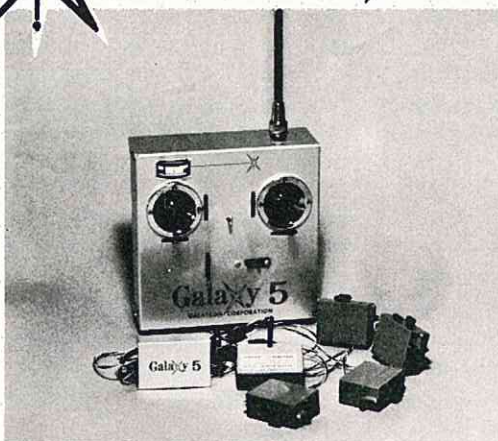
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strength. The top of the plywood piece is fitted flush with the top of the boom, and this makes a very strong assembly.

The wing cradle is made from two strips of 3/4" triangular stock. Note that they are glued to the sides about 1/8" up from the top of the fuselage, and then cut away at an angle so that the center of the wing will lie snugly in place. I also have shown a slight cutout at the center of the fuselage which I had to make to allow for the slight additional thickness created by the elastic reinforcement of the center section of the wing.

Round the corners of the fuselage (except at the wing cradle and at the tail where the stab is glued on), add the wing dowels, sand smooth, and you're ready to apply the finish.

Tail surfaces are cut from 1/8" sheet stock, and the fin is reinforced at the base with 1/4" triangular strips.

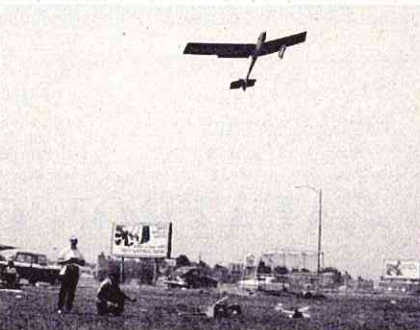
Finish is a matter of choice. I chose MonoKote because it goes on so fast, and gives a professional appearing job in a minimum of time.

I also used MonoKote for the hinges on the rudder and elevator. They stand up to all normal use, and in the event of a landing which puts a strain on the hinge, they let go with-

out ripping up the wood, and are easily replaced. Incidentally, the hinges are made from the old style 'wet' MonoKote, which is available now for trimming purposes.

The Cliffmaster is very easy to fly. It responds quickly to elevator, so keep the travel down by using the end position of the control horn. It needs a lot of rudder action, so use the inner hole for connecting the pushrod.

For those of you who have equipment that is wider than 1" there is the alternative of using wider stock - or two pieces of 3/4" stock glued together - or you can make a 'Pregnant Cliffmaster' like Marshall Watson did - Marshall Watson's 'Pregnant Cliffmaster' going up on tow. Note flaps - very effective for spot landings.



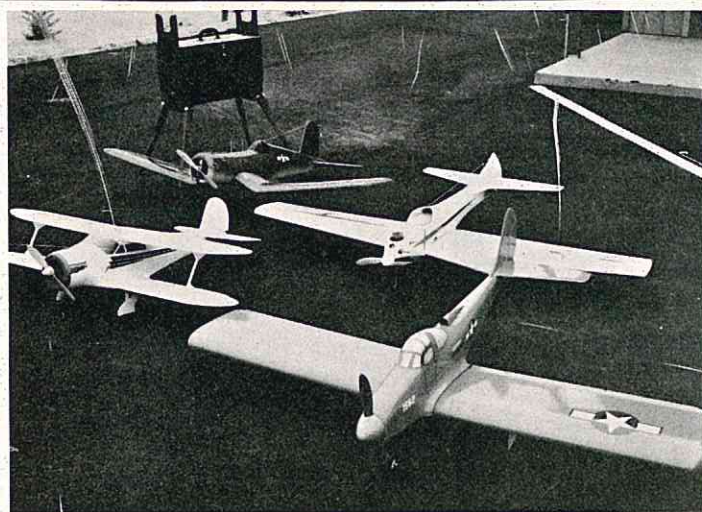
added two half inch doublers up at the equipment section, cut out to match the main block. He did it so he could put two servos side by side; he wanted an additional servo to operate flaps which he added to the wing.

Ballasting for various wind conditions is done by taping flat fishing weights right to the sides of the wing cradle. This keeps the weights close to the CG, thus increasing the sink rate and the forward speed at the same time.

The C.G. location doesn't seem to be critical. I've shown the range through which I've flown the prototype, and the location where I seem to get the best results. Try all of them and find the one which suits you best - in fact, you'll probably use various locations, just like I do, depending on the wind conditions.

I think you'll like the Cliffmaster. It's a real crowd pleaser. At first glance, everyone looks at it and wonders "Where's the equipment buried?" Then, if you have one side plate transparent, you turn it and show them - and darned if they aren't off to build one of their own!

So tell them where to get the plans, will you? And let me know how yours turns out.



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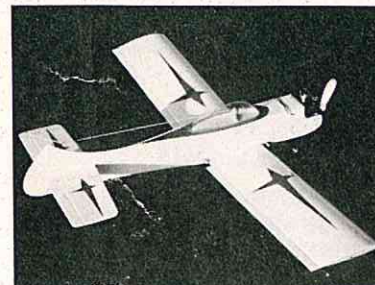
Left Front: Staggerwing Beechcraft, scale multi 610 sq. in. stunter. Kit includes fiberglass fuselage with all stringer details. All other parts pre-cut. Complete kit includes: plans, step by step picture instructions. Left rear: Chance Vought Corsair, fiberglass fuselage and gull wing center section, and foam wing cores only, plans and picture instructions. Right rear: Cobla, fiberglass fuselage, foam wing cores with covering, spar & landing gear, all balsa stab & rudder, all hardware & plans. Front right: Airacobia, fiberglass fuselage, foam wing cores with covering, balsa stab & fin, all hardware and step by step picture instructions. All of the above ships will fly the AMA pattern and will perform exceptionally well.

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CUNNINGHAM ON R/C

(continued from page 12)

limited only by the inventiveness of the club members. Newsletters are full of sport events that have been fun to fly. Some of these events are widespread in usage, and some are so new that perhaps only one or two clubs have tried them. We'll try and set forth some of the more interesting events in the following paragraphs, so that the word can be passed around.

LANDING EVENTS:

These can take several forms, from the Spot Landing contest to the more difficult Carrier Landing type. In Spot Landing the best flier is the one who touches down nearest to a pre-selected and marked spot. In Carrier Landing a grid system is marked out on the runway and points assigned to each section of the grid. Which ever grid your aircraft's wheels touch is the number of points you received for that landing. Other variations of this include dead stick landings, and a mystery grid, pre-selected but known only to the contest director. This type of competition

is easy to run, and does go a long way toward sharpening up beginning pilots.

TAKEOFF EVENTS:

These are usually based upon a short field run, the distance being measured from where the aircraft was released to where the main gear left the ground. This type event can be dangerous to newer fliers since you have a tendency to haul the aircraft off the ground too soon. Another variation of this is to take off over a barrier, made of crepe paper streamers. As the rounds go on, the barrier gets higher, and the nerves more frayed.

FLYING EVENTS:

Almost too many to consider, but we will try and run through as many as possible.

A flying event that seems to have been started in Southern California and imported to Texas by Dick Barnard is the musical chairs type event. It is fun to fly, and not nearly so dangerous as the description sounds. Both beginning pilots and those with long experience can reap a lot of fun from it, and the by-product of this type event is that the participants get their feet wet in racing. This event is flown around pylons, and in heats, but

speed is not important. Pylons are placed at any convenient distance, and only two are needed. A reasonable spacing is about four hundred feet apart. The starting point on the runway should be about a hundred feet from the downwind pylon. Three or four aircraft may be entered in each heat. The type of aircraft can be anything from small to large ships, from fast to slow, although a pylon racer would be too hard to handle in this particular event. With the aircraft lined up at the starting line, and engines running, each is flagged off by the started, with about two seconds between each plane. The models begin to circle the pylons in a counter-clockwise circle. The speed of the aircraft can be either fast or slow. At some point after takeoff a horn is blown. It is best to have the horn blowing done by the contest director, or some other official that has his back to the flying and does not know where any aircraft is at any given time. When the horn blows all of the aircraft have to make a touch and go, and the last one to touch down is eliminated. Also all of the planes that wind up with killed engines are eliminated. The last aircraft left in the air is the winner. The horn should be sounded at least

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every thirty seconds, but not on a regular basis. When the horn has sounded, each aircraft must continue to fly around the pylons until it is in landing position. It cannot cut across the pylons, turn around and land, or get out of normal position in any way. It really isn't dangerous and is a lot of fun.

Another flying event is the standard spin, loop, roll type of contest. In this one a certain amount of time is given for each segment. Normally, a 30 second climb-out before spinning down, then 30 seconds to see how many loops can be done, and 30 seconds to see how many rolls. If a point is given for each spin turn, one point for each loop, and one point for each roll, the best spinning plane will walk off with this event. A handicap system works even better. Each spin turn counts for one point, each loop for three points, and each roll for two points. This will even out each event.

The Limbo is another event that really takes more flying skill than most beginners possess, but can be thrown into a contest to test the skill of the better pilots. In this event a crepe paper streamer is stretched between two poles, at least forty feet apart, and the aircraft flown under the streamer. Each round the streamer is lowered until one lucky (?) pilot makes it under the streamer, yet still above ground. This can be run with aircraft flying at any speed, either fast or slow. (I'll take slow.) A derivative of the Limbo is the ribbon cutting event. Again the streamer is stretched between two poles and the object is to cut this streamer with an aircraft flying through it.

Balloon busting is another popular sport flying event. It can be accomplished in several ways. The balloon can be tied to a 1/4" square balsa stick stuck in the ground with the balloon dancing around it approximately 30 inches above the ground, or the balloon can be fastened to the ground and the aircraft must land right on the balloon to break it. No taxi passes allowed. Not many balloons are broken, but a high toll of props can be taken in this event!

Fast and Slow timed speed is another event that takes very little skill. Each flier makes a high speed timed pass between two marking poles, and a slow speed timed pass between these poles, and his times can be either converted to miles per hour or kept in seconds. The low time is subtracted from the high time and the

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winner is the pilot with the greatest difference between his high and low time.

A non-flying event can be had by lining up all of the aircraft in one line, then picking a spectator from the crowd to be a judge. He makes his selection from the aircraft on the basis of what 'looks' the best to him. The competing aircraft can be grouped according to type if you have a sufficient number, otherwise, just leave it up to the 'judge'. Be sure and pick a complete stranger for this judging job.

There are many, many other events that I haven't mentioned. Some, such as bomb dropping, seem to have fallen from favor in the past few years, others I haven't mentioned simply because I haven't heard of them. But,

the main purpose for having any type of competition is to encourage all club members to participate, to have a good time, and to sharpen their flying skills. Perhaps the spur of a fun-fly event will get one flier started on the road to pattern flying or racing.

I've just spent the past five days, five hours each day, watching an outstanding professional tennis tournament. Between matches many of the pros have been wandering in and out of the crowd. Two things have impressed me about these men. They are dedicated to their sport, and they enjoy talking to people who are interested in it. The really great ones, Laver, Rosewall, Stolle, and so on, are no different from other people, except in their dedication to a sport

that demands constant practice and constant play. If we, as miniature aircraft pilots, put in one tenth of the practice time that they do, any one of us could be a really top notch pilot. Last night I watched Ken Rosewall warm up for over thirty minutes in 100 plus weather just to get ready to play — to get that extra bit of sharpness. And he won his match in a big way.

It's the same in any sport; practice and a desire to win can go a long way to put you on top. So, if it's a club fun-fly, or a pattern event, or a race, get your club moving in this direction with the pilots trying to win, and you will have a better club with better pilots, while getting a lot more fun out of your flying.

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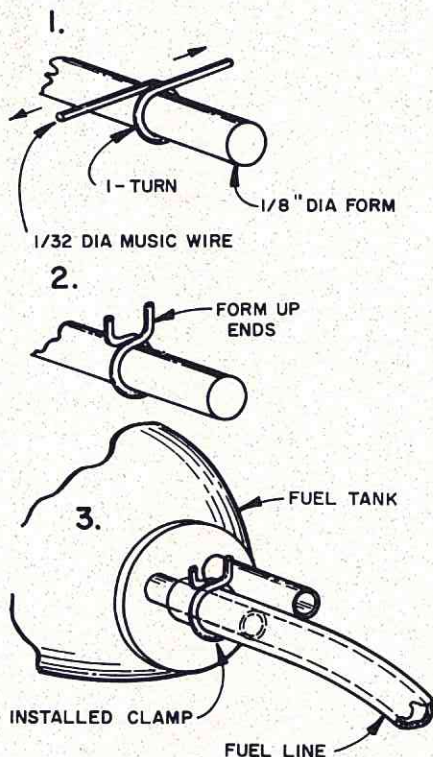
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satisfactory results. I'll admit to having goofed a few times over the years myself. With Bill's jig you get exact hole sizes, exact location, and holes 90 degrees to the mounts. No more guesswork or goofed up mounts. When you order your jig, be sure and let Bill know what size mounting screws you will be using.

The following idea was taken from the Tri-Valley R/C Club newsletter, in Mishawaka, Indiana, and submitted by Loren Pratt, also of Mishawaka. I thought this little clamp was a real good idea, and one of those things that makes you wonder why you didn't think of it yourself. For years I have tied a couple of turns of nylon thread around the pick-up tube in my tank where it slips over the brass tube, and also the clunk at the end of the pick-up tube. I prefer the black fuel line myself and the nitro methane in our fuels will cause it to swell. This, in turn, will make for a loose fit on the brass tube. A lot of you have had fuel draw problems because this was happening and air was being drawn into the line. This little clamp will end that and is easier to use and change than tying with cord.



Mr. Lee,

You asked for a few ideas for your column. How about a few words concerning the air bleed on our carbs. I have found that quite a few of our modelers have no idea just how much difference the air bleed can make on the idle. The one thing I hear quite a lot is "Why doesn't my engine idle as low and reliably as yours?" But then, if you ask, "Do you ever play with your engine just to

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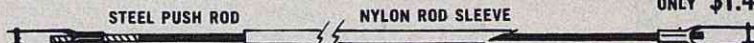
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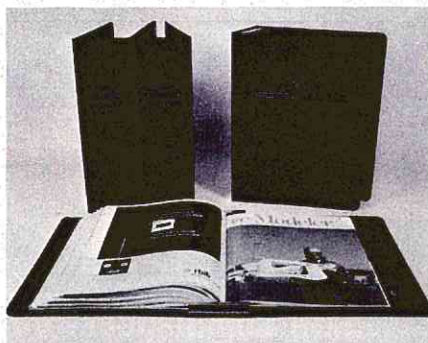
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see how low it will idle reliably?"

"Oh no, I thought they did that at the factory."

I have 4 .60's, 1 Veco .61, 2 OS's and 1 Enya. All idle extremely well and reliably; I can turn the air bleed as little as 1/4 turn and it will make the difference between idling reliably or not. But what most guys don't do is spend hours with their respective motors in their own airplanes idling; then running up and down just to see if it is too rich or lean and adjusting the idle stop and air bleed.

Maybe I have spent more time than necessary, but I know that any of my engines will start at full idle at any time and then be able to taxi out and take off without the engine quitting.

Some people can't even adjust the standard carb that comes on their engines and then they go out and buy a Perry or some other carb and expect all their problems to be solved. If they didn't read the instructions to enable them to adjust the original carb; they aren't going to read the instructions to adjust the Perry or what have you.

I do think that a few words from you might open some people's eyes. If to nothing else at least to "If all else fails, read the instructions."

Thank you for your time and trouble.

Sincerely,
Harvey Helmke

You have said it as well as I could, Harvey. A lot of engine problems could be solved if modelers would only take the time to read the instructions that accompany the engines.

I have enjoyed your monthly columns in R/C Modeler very much, and learned a great deal from them. I have found particularly useful the piece on fuels. There are, however, one or two questions which were left unanswered in my mind, and in which I am very interested.

1. Is Castor c.p. (chemically pure) a degummed form of oil? If not, would the analytic reagent grade be degummed?

2. On page 74 where you specify, e.g., 10% nitro methane for a sport fuel, does this mean: (a) 10% of pure nitro, or (b) 10% nitro in the 70-30 ratio which Federal law specifies?

3. I am particularly interested in any reactions you have — casual or otherwise — regarding the addition of iso-octane to fuels. As you know, this was written up on page 83 of the February 1969 MAN, and is now being marketed by Hobby Lobby in Tennessee. What proportions would you use, and do you have any suspicions that it is detrimental to engines?

4. Do you have any views regarding the use of oil of merbane as a substitute for nitro, and in what proportions should it be used?

Thank you very much for your advice, and the earliest possible reply your busy schedule permits.

Sincerely,
Phil Hinson
Secretary, Treasurer
Precision Modelers Assoc.

Chemically pure castor oil is considered 'degummed', and okay for model engine fuel. Both Baker AA

standard and U.S.P. are chemically pure oils. Do not let this 'degummed' bit mislead you. This has to do with the processing of the oil. Under combustion, gum and varnish will still be formed. However, not as much as with some of the lower grades of castor oil. I do not know what this analytic reagent grade you speak of is, since there is no mention of it in the Baker catalog.

The 10% nitro methane in the sport fuel was based on pure nitro methane (98%). Iso-octane was pretty well covered several columns back.

Oil of merbane (nitro benzene) is not a substitute for nitro methane. By itself it has no power increasing ability. It does have a little lubrication value but is mainly used when the nitro methane content of the fuel is over 50%. Nitro methane will not mix with castor oil in percentages much over 50%. With the addition of oil of merbane, it will. Depending on the amount of nitro methane, 5 to 10% is usually used.

After reading your column in the June R/C Modeler, I thought perhaps you might like to know there are some who read the instruction pamphlets included with the new engines. The only instructions I've found so far which do not suggest a prop size have been those included with K & B engines. Those instructions REFER to a suggested prop size, but nowhere have I been able to find WHAT size prop the instructions refer to. I have a Veco 19 which had Veco 61 instructions with it — as did the other 19's.

My question has to do with the K & B 40. I have one I have been using on a heavy CG Skylane with a reasonable amount of success. I installed a modified (the restrictor was removed and the exhaust outlet enlarged) Tatone Peace Pipe to improve the idle. Recently, I disassembled the engine to clean it out after nosing into the dirt. The sleeve was badly scored by the wrist pin because the brass end pads were worn-out. The wrist pin holes in the piston and connecting rod were greatly enlarged, as was the fit on the crank pin. The engine has something like 10 hours running on it of which about 8 were with the muffler on it. Could this amount of wear be due to overheating because of the muffler? I have a number of engines with as much or more time on them which are in better shape than the 40. I have been using 11-4 Top Flites and Power Props when I can find them. These props don't seem to lug the engine down, and I get the best performance from the Skylane with that engine-prop combination.

Just one comment on plastic vs. wood props. Being a Sunday flier who occasionally bangs one in on its nose, it seems to be breaking a wood prop on a nose-over is less likely to damage an engine than a plastic prop. Also, wood props are generally easier to balance. One fellow I heard about only takes one wood prop to the field with him

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and when it gets broken he quits flying.
Yours truly,
Robert Chanslor

I guess somebody goofed with the instruction pamphlets. I don't believe three out of four RC'ers would have known the difference anyhow.

Your K & B .40 is a high performance engine and as such is intended to develop its maximum horsepower at a fairly high rpm. To lug it down with too much prop, or restrict its breathing with a high back pressure muffler, will only result in overheating and shortened engine life. However, I doubt that the Tatone Peace Pipe is entirely to blame. From the amount and severity of the wear, I would also guess that you are running the engine too lean or using a fuel that does not contain enough lubrication. A fuel that lacks lubrication also loses some of its cooling ability. K & B .40's did have a tendency to go through the brass wrist pin pads rather rapidly. This was corrected about a year ago and teflon pads are now being used. The 11-4 should not be too much prop for the .40, so I would suggest running your engine a little richer, and being sure your fuel contains at least 22% castor oil for lubrication.

... I bought a new Merco 45 several months ago. I disassembled it and polished all the internal surfaces. I had a lot of trouble removing the crankshaft. I applied all kinds of heat but I was still unable to dislodge the main ball bearing. I worked around it as best I could. I put a marking over the bearing to avoid contaminating it. Now, when I put the engine on the test block, it runs like a charm but it puts out a fine spray of raw fuel from around the drive plate. Is this fuel discharge normal for this engine or should I return it to the manufacturer? I have never used the engine in a model because it throws fuel. I build mostly scale and they are hard enough to keep clean anyhow.

I am flying a Proctor Nieuport now with a Webra 61. I like to fly with a big 20"x8" propeller. The fuel consumption seems to be VERY high. Is there any logical explanation for this?

I note in the picture of you this month in RCM that you are holding a Morton or Burgess M-5. Will this engine make a suitable powerplant for R/C Scale? Is it possible to operate a four cycle engine of their type on glow ignition?

Cordially,
Robert S. Cooper

A little leakage of fuel out of the front bearing is normal and actually desirable. This assures ample lubrication for the front bearing and also keeps the fine silt flushed out. However, if fuel blows out like a spray gun, the fit between the crankshaft and case is too loose and the engine should

be returned to the manufacturer. It is quite possible that you applied too much heat while trying to remove the crankshaft and rear ballbearing. If overheated, aluminum will expand and then not contract back to its original size when cool. This may have happened to the crankshaft hole in your crankcase. I have welded broken crankcases many times in the past, and one of the major problems is enlarging of the crankshaft hole, bearing bores, etc. The heat level has to be extreme to do this, however.

A 20" x 8" prop is expecting a lot of your Webra .61. Why are you expecting a .60 to do the job of a larger engine? You need a chain saw engine for that size of prop! The engine is most likely overheating badly and this results in having to run the needle valve farther out (richer) than is normal. This, in turn, increases the fuel consumption. Use a smaller prop, about a 13-4, and you will notice an improvement in your fuel economy.

The Morton and later Burgess M-5 would not make a very suitable powerplant for a scale model other than from the appearance angle. I am afraid they were not too reliable. Very few ran well, and those that did required quite a bit of reworking and a heck of a lot of maintenance. Something in the valve train was always breaking or coming apart. As these are four cycle engines, they cannot be operated on glow plug. The ignition system would play real havoc with our present digital systems unless fully shielded.

I have a Super Tigre 71 in a FliteGlas P-51D. I would be very appreciative of your time if you would answer some questions.

1. What size and pitch prop should I use for break-in?
2. Size and pitch for flying?
3. What about using 4 bladed props?
4. What problems will I have with the engine completely closed in?

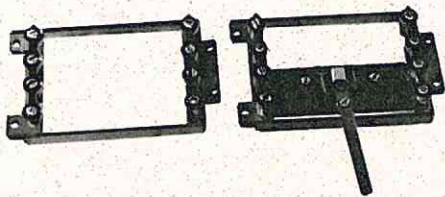
Do you have any suggestions and advice on this? Thank you very much.

Bob Milano
Dixon, Illinois

Even though your Super Tigre .71 is of larger displacement, it still can use the same prop sizes as the .60's. The difference in displacement only gives a small power increase. With the P-51 I would recommend the 11-8 Top Flite. The .71's vary in power output. If you have a real healthy one, you can use the 11-8 1/4. The same prop can be used both during the break-in and for regular flying. If you have any overheating problems, you can drop down one pitch, but this should not be

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If your engine is properly cowed you will not have any problems. Be sure you have an ample air entrance, AND EXIT. Also be sure the exhaust exits outside the cowl.

I am interested in purchasing a timing wheel.

At present I am machining a spark ignition engine and am not sure of the choice of material to use. The pistons, cylinder and cylinder head, I am machining out of aluminum (20-24) and crankshaft out of chrome moly 4140. The cylinder liner is being machined out of hydraulic tubing. For the liners I have used leaded steel, 4140 and mild steel.

Would appreciate your setting me straight on some of these materials. Which are best to use?

I have no grinding or heat treating facilities, but do have access to a Sunner hone machine.

Sincerely,
John J. Nuono
Pittsburgh, Calif.

There are no commercially made timing wheels for model engines. Your best bet would be to find a 360 degree protractor at a stationery store or drafting supply dealer. This could easily be converted into a timing wheel.

Quite a few RC'ers have written asking about materials to use in making their own parts. Chrome moly is okay for a crankshaft, but is miserable to work with. If you do not intend to harden your shaft, 'Stress-proof' is an ideal material. However, remember that the crank pin will wear much faster than one that has been hardened. K & B use this material in their .40's but then press-in a hardened and ground crank pin. If you decide to harden your crankshaft, C 1117 Leaded machines very nicely and can be case hardened. The cranks in the Veco .61 and .50 are made of this material. Aluminum pistons, heads, and con-rods can be made of either 20-24 T4 or 70-75 T6. Lapped pistons should be made of Meehanite grade GC. This material can be used as is, or heat treated and hardened. Sleeve material can be any mild steel such as B 1113 or Ledloy. Ledloy sleeves and Meehanite pistons are used by Fox, Veco, etc. If the engine is to be of the ring type, you should have the sleeve hard chromed for longer wear. The webs in the port windows will wear rapidly if you don't.

That does it for another month gang. Keep those letters coming in. ●

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VIEWPOINT

(continued on page 79)

learned — if we wish to compete on a world championship level, in a gathering of nations, and under the jurisdiction of the FAI, then we will have to adjust our thinking along those lines. We can ill afford to wait until the 1971 World Championships to start preparing for that event. The time to prepare for it is now — and the way to prepare for it, if we wish to continue our participation in the World Championships, is to replace the Class C Expert category with the FAI pattern in all sanctioned contests; and for the serious scale builder who intends to earn himself a place on the U.S. Scale team, to plan now to construct a model that will be on an equal footing with his future European competitors.

It is no easy task to be one of three men competing on a team representing all of the modelers of an entire nation. It is equally difficult to compete under the intense pressure and keen competition found at the World Championships, wherever it may be held. Let us not handicap our next U.S. team by forcing them to fly for the next two years under a set of standards, and in a pattern formulation, that poorly equips them to compete under international rules. ●

PERSPECTIVE

(continued from page 6)

and analyze a national list.

Then we put this information in the right hands. There are active fliers who have access to the key men, high service officers who can arrange that the proportion of their best-qualified people who have built models is made known at top level (with a hint about recruiting), and distinguished modelers who can reach senior levels of government. Add a few articles in the major national magazines and we have won our future.

Great! How can people fail to see this is the answer? They ought to start right away!

Friend, if this series has said anything of value, it is this. There is no "They". The future may be glory, it may be disaster, but one thing it undoubtedly is:

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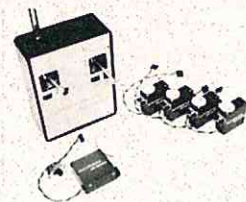
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