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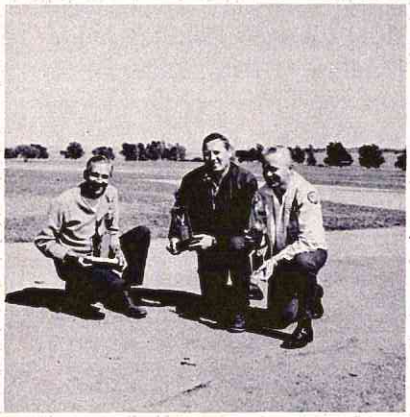
COVER: Chief Warrant Officer, USN, Gene Cantrall, President of the Hawaii R/C Club. Gene is shown with his Jack Stafford Chipmunk that took the Sweepstakes trophy and first place in Class C at the Ala Moana hobby fair as well as first place in scale at the 50th State R/C Championships. The plane is painted with Sherwin Williams Acrylic Enamel, features flaps and electric brakes. The Red and White stripes on the wing are 6 and 7 on each panel to match the stripes of the American Flag. Plane weighs 7 lbs. 2 oz., and is powered by an OS Max .60 with a Kraft 6 proportional system. Self portrait by Gene Cantrall using Ektachrome type B film. **FRONTSPIECE**: "The Varnished Clam", scale P-51 photographed by Chuck Borel.

VIEWPOINT

BY DON DEWEY



Ft. Worth Thunderbirds' Helmer Johnson (2nd); Chuck Cunningham (1st); Don Dewey (3rd). It's not out fault no on else showed up for the fly-offs on Tuesday. Photo by Pat Crews.

If there is any degree of coherence to this month's column, it is strictly accidental.

This month's epistle is being written only three days after returning from the second leg of a 4,000 mile automobile trip which covered four states and stretched from Turlock, California to Fort Worth, Texas. The first part of the journey began on September 19, as we traveled to Turlock in Northern California to watch the big irons and the Formula I and II midgets turning the pylons at the Western States Pylon Championships sponsored by the Pioneer RC Club of Sunnyvale. Accompanied by my wife, Sally, we enjoyed one of the largest pylon racing meets ever held in the world. Slightly under 100 aircraft competed for $430 in prize money as well as the usual trophies as the two day event provided five rounds for the Formula I's and II's and four rounds for the Open class.

The second part of the trip began two weeks later from California through Arizona, New Mexico, and into Texas for the Fort Worth Thunderbird sponsored Southwest Pylon Racing League Meet at Thunderbird Field at beautiful Benbrook Lake. Although we were treated to some excellent flying at one of the most beautiful sites in the country, as well as being given the warmest of Texas welcomes from my fellow Thunderbirds, I must admit, there are certain drawbacks to driving through parts of the Lone Star State.

As an example, one of the most frequently played songs on the various radio stations we heard during the trip, had an oft repeated line which had something to do with, "the Lord must be in New York City". We really didn't realize where this song was written, or what it referred to, until we began to drive from El Paso to Fort Worth through the desolate West Texas plains! This place is so barren, so flat, that, to quote an expression from our friend Dave Platt, it would be a real 'knicker wetter' if even a lone tumbleweed blew across the highway! (Which it didn't!) The excitement would become almost unbearable when we came within radio range of some small town and heard a real human voice reading the school luncheon menu for the day. At night, though, things really livened up. I mean you had your choice of watching the Maltese Falcon or the Farm Report until the local television station closed down at 9 pm, or you could do crossword puzzles. After all, what else is there to do?

No matter where you go in Texas, friendship and hospitality are extended by one and all. In fact, "Y'all come back" is the most oft repeated phrase. While we were driving through the Western plains, we understood the meaning of this plea - they were just hoping that somebody, someday, would come back! Despite the verbal ribbing we're giving our Texas friends, and overlooking the fact that they provided us with four seasons of weather in an equal number of days, including a tornado that hit a scant 20 miles away and a rain storm (called a 'gullywasher') which rained out the contest before its conclusion, Texas is, indeed, a beautiful and friendly state. The friendship, congeniality, and sportsmanship of the fliers from Fort Worth, Dallas, Houston, San Antonio, and from the surrounding areas has to be experienced to be believed. The Thunderbird flying site at Benbrook

RCM's Editor and a borrowed Sun Fli at Thunderbird Field. Beautiful Lake Benbrook in the background. Photo by Pat Crews.

Lake is, undoubtedly, one of the most beautiful RC fields in the entire country. We considered it a distinct privilege and pleasure to be the guests of Chuck Cunningham and the Fort Worth Thunderbirds for those few days. It was also an 'honor' for yours truly to be presented with a special award at the traditional banquet, which consisted of a statue of a packing crate with a steer's head sticking out of the top. A Texan is leaning against the crate and at the base of the statue is an inscription that reads 'Don Dewey - The World's Greatest Bull Shipper'. And, friend, when that kind of an award comes from a Texan, he's really trying to tell you something! In order to live up to that singular honor, we have interspersed a few photographs taken during our stay at Fort Worth. We'll let you figure out the rest.

Other highlights of the trip included a visit with Bob Elliot and Gerry Krause of E. K. Products in Hurst; a visit with congenial Ed Alexander, owner of one of the Southwest's largest and finest hobby shops; and a tour of the Galatron facilities in Albuquerque, New Mexico, conducted by that wildman, himself, Ted White and his wife Dorothy. We came home with the feeling that we had truly met and enjoyed the company of

some of RC's finest sportsmen.

We received a most interesting letter from Arthur M. Fressola of Stratford, Connecticut, concerning one of the most little known subjects in RC - liability and insurance. We'd like to pass on a few of the thoughts forwarded by Art, who is an insurance agent for Guastella Associates in Stratford.

Being an RC flyer, as well as an Independent Fire and Casualty Insurance agent, I thought it would be of interest to you and your readers to know that it is quite possible for one's Homeowner's policy to provide coverage in the event a flyer should accidentally 'shoot' another flyer's plane down by turning on his transmitter. The Comprehensive Personal Liability portions of the policy, in most cases, provides a minimum $25,000.00 coverage for damages caused through a flyer's negligence. When some sort of controlled frequency use system is employed, i.e.: colored clothes, flags, pins, etc., the fact that a flyer did not follow established procedure by obtaining the correct frequency designator before turning on his transmitter, for the most part, established his negligence. The point here is that if the culprit was negligent, there is an excellent chance that his policy will provide coverage for the damages that he caused. The final decision, naturally, is made by the negligent party's insurance carrier. Obviously, there is no harm in requesting the 'Red Baron' to submit a claim under his Homeowner's policy.

Another area where the Homeowner's policy can be used to atone for damages, occurs when a flyer destroys a borrowed airplane which he has been flying. Under the little used Coverage G - Physical Damage to Property - portion of one's Homeowner's policy, there is $250.00 coverage for any damage caused to the property of others vested in one's care, custody, or control. If one digs a hole with his friend's plane, the damage he caused should be payable up to this $250.00 limit by one's policy. Again, of course, the final determination of coverage is made by the insurance company.

Naturally, we would all feel badly if we were to wipe out a friend's plane due to a pilot error, or perhaps through a temporary lapse of sanity by disregarding the established frequency rules. However, there is more than sympathy that can be given to

our friend if we would submit a claim under our Homeowner's policy.

I certainly enjoy your magazine and hope that this information will be helpful to your readers.

Sincerely,
Arthur M. Fressola

—

It is with regret and sadness that we report the death of a very active RC'er, Mr. Frank 'Dick' Adams, who died October 12, 1969, following a stroke. Needless to say, this leaves many of us in a state of shock and sorrow. Model Aviation was Dick's life and his warmth and kindness will not be forgotten. An A and E mechanic and pilot with 1200 hours in all sorts of aircraft, he was also one of the really top rudder-only fliers. He could do things with a rudder-only ship that most modelers - no exaggeration - couldn't do with a multi. Dick's entire life was spent around planes, both big and little. Sixteen years were spent in developing the Adams' actuators which have started so many modelers on their RC way, and it was with real pride that he made his contribution to the sport. At the time of his death, Dick Adams was 48, and a resident of Janesville, Wisconsin for many years. The entire staff of R/C Modeler Magazine extends its sincerest sympathies and condolences to his family. He will be sorely missed by all of us in the RC industry, a life which was predicated on his devotion to modeling, and which will not soon be forgotten.

—

A warm welcome is extended to our newest Contributing Editors, Jerry Nelson, Jim Bonar, and Jim Simpson. Jerry will be writing a monthly soaring column, commencing with this issue of RCM, dedicated to R/C slope and thermal soaring enthusiasts. The monthly "Gems" by the two Jim's, Simpson and Bonar, will be written during their various duties as a B-52 flight engineer, and pilot, respectively, and will deal with all aspects of R/C. In fact, the title, "G.E.M.S" actually means "Generalizations Effecting Models".

We're sure that "y'all" will enjoy the monthly contributions of RCM's newest editors.

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See you next month. The way things are going, I may be in Cairo . . .

ENGINE CLINIC

BY CLARENCE LEE

Hardly a week goes by that I do not receive several letters or phone calls from RC'ers wanting to know how they can get just a little bit more out of their engines in the Formula I jobs. As I have tried to make clear in past columns, it is not just the engine, but the combination of engine, fuel, prop, glow plug, and how you run and maintain the engine. The hottest engine in the world would be useless in the hands of someone who did not know how to maintain and take care of it. We have talked about fuel, props, proper cooling, etc., in past columns, so this month let's go into the engine. There are no big speed secrets or radical reworking involved. Just a little common sense and a few minor refinements. The K & B .40 is by far the most popular engine, so our comments will deal with this engine in particular.

Years ago you could go through an engine and open up the ports, change the timing, raise the compression, and usually improve the performance of the engine. Your present day engines come to you with these things already done, so there is not much left to do other than to make sure the engine is absolutely free and set up properly. You must also remember that these engines have already been developed to their maximum power and any increase you come by is going to be very small. However, every little bit helps, and many times the difference between a good running engine and a real screamer is how it is set up.

These are production engines and must be built to specific tolerances. Although these tolerances are very close, it is possible, through a ganging of tolerances, for variances to occur between engines. For the manufacturer to spend hours trying to make every engine identical would make the cost prohibitive. So, some engines will be a little tighter than others, require a little more break-in time, etc. This month we are going to tell you how to check the engine out yourself, some of the things to look for, and how to keep it operating at top performance.

Let's start with the lower end. Remove the front housing from the case and soak it in a can of lacquer thinner or acetone to remove all castor oil from the bearings. Take hold of the prop end of the crankshaft and see if you can move it back and forth. There should be a slight bit of fore and aft play. Don't panic if you find quite a bit of play. This is good. Some fliers have thought they had bad bearings, but this is not the case. When the engine is running, and up to temperature, the aluminum housing will grow more than the steel crankshaft. If there is no end play to allow for this growth differential, the bearings will bind up. Ball bearings can be bought with different amounts of internal play: .0002" - .0005", .0005" - .0008", etc. K & B purposely uses the looser fit bearings. Even so, every once in a while an engine will come along with a lower end that is a little tighter than might be desirable for top performance. If it should be tight, because of the pinned prop drive washer, it would be best to return the unit to K & B rather than attempt to work on it yourself. Some of the old U-control speed men can loosen up the bearings by using some emery paper on the shaft and housing, but I do not recommend this unless you have had a lot of experience and know what you are doing. Most of the modelers flying R/C do not have the experience and would only end up making things worse.

You will also want to check the freedom of the shaft by making sure the counter-balance rocks to dead bottom with no drag. Don't let the round crank disc and lack of a cut-away counter-balance fool you. The crank IS counter-balanced. It is cut away internally at the pin end and then covered with the aluminum shell. This method of counter-balancing helps pack the case and increase base pressure. It was originally developed by Bill Wisniewski of K & B and is now being used by several other manufacturers, including Super Tigre and Rossi.

The counter-balance side of the crank should drop to dead bottom by its own weight and rock back and forth several times. If it does not rotate by its own weight, it is too tight. RC'ers who are running Super Tigre .40's should pay particular attention to this as many of your Tigre .40's have no shaft end play and are on the tight side. In the case of the Tigres, it is usually the front bearing and you can free everything up by replacing this bearing. (Of course you will sometimes have to purchase a couple bearings.)

While you have the front housing off of the engine, you will want to check the aluminum prop drive washer and threaded steel stud for run out. Hold the housing with your fingers, supported on the workbench, and spin the shaft. You may be surprised at the wobble at the end of the stud. This means your spinner also wobbles, which means vibration which, in turn, will knock several hundred rpm from the engine. The knurled face of the

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WIN OR LOSE

BY GERALD NELSON

The 1969 Internat's . . . commercialism, communication, cooperation.

The following editorial, by Jerry Nelson, RCM's newest Contributing Editor, is in rebuttal to a recent editorial appearing in Viewpoint, concerning the 1969 R/C World Championships. Several editorials by noted R/C personalities have been received by RCM concerning this subject, and have been equally divided, pro and con. RCM has selected Jerry's article for presentation as an excellent example of an opposing and most worthy viewpoint.

A great deal has been written recently, about the USA R/C team's efforts at the '69 International's. Phil Kraft placed second and Jim Kirkland and Jim Whitley, placed 9th and 10th. Our final team standings were 2nd place. I think our boys did a fine job and should be congratulated on their showing. Yet, a few of our expert contest fliers, and still many more 'self-styled experts', felt that we should have placed first, and the reason that we didn't place accordingly was because of the AMA rules we use. I say this is not the reason and here is why:

There are many factors that influence an individual victory as well as the team victory. First, let's mention our team selection procedure. I, personally, think we had the best team possible. The three men were selected in an open meet available to every AMA member where they flew in the same conditions with 'equal-as-possible' judging. Possibly, we could have selected a team at a separate team selection finals like we did in Oklahoma several years ago, but I think the results would have been the same, possibly in a different order, but the same fliers would have won. They were the best three fliers at the time.

I do have some doubt about future selections of the team managers. I am not positive how the '69 team manager was chosen, but he should be chosen by the team, itself, and not by some other committee or group. You need 100% cooperation between the team and the team manager. Did we have it this year?

An opinion expressed by many observers at the contest was that our team was obviously overconfident, with full expectations of winning first, second, and third. It appeared to the team, prior to the actual meet, that there was very little chance of anyone even coming close to beating us. Sure you need a self confident attitude, but you should not slack off your training and practice because of it.

Did our team manager have full knowledge of the ground rules of the meet? Many observers noted the fact that Jim Kirkland was not instructed, or informed, that all maneuvers started or ended into the wind regardless of the wind direction as compared to the crowd or runway. Also, Jim was erroneously led to believe that one of his flights was very close to running out of time because he was slow starting his engine, but actually the time started when he took off. He had a full time period to perform instead of rushing the maneuvers.

Did our team and team manager try and obtain the feeling of the judges on how they were judging the other contestants' maneuvers? Watching the flights of the competition and, noting the maneuvers as to how and where they were done, and then comparing the score with your own scoring of those maneuvers, can be of great assistance.

Did the team manager, and team, really have the exact description and manner in which way the maneuvers were to be done? Did our AMA-FAI committee inform our team as to the latest methods of European judging? I understand that this was not done. The question was asked of those AMA-FAI officials involved why they didn't tell the team these things, and the answer was simply that no one asked. Who was right? I, personally, don't know, but there was obviously a lack of communication among the AMA-FAI officials and our own team members.

Did our team suffer because of 'R/C Manufacturing Commercialism'? This is kind of a touchy subject, but maybe some thought should be given to it. Perhaps this actually HELPED our team because of the products

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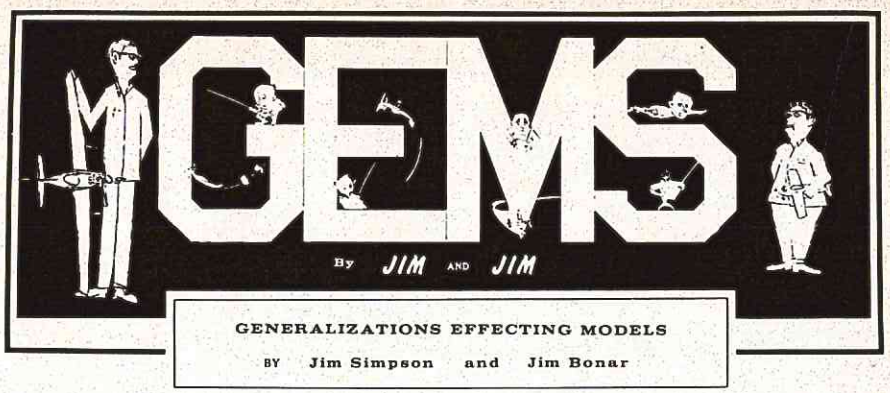

GENERALIZATIONS EFFECTING MODELS

BY Jim Simpson and Jim Bonar

This title reflects the degree of imagination, originality, and practicality we hope the contents of this text will achieve. To begin with, GEMS is an abbreviation for 'Generalizations Effecting Models'. These generalizations have been collected and recorded by Jim Simpson and Jim Bonar, both flying officers in the United States Air Force.

The generalizations themselves, will be collected from wherever they can be found, and presented to you in as simple and straightforward a manner as is possible. The primary application of these generalizations will be for all the various types of radio controlled miniature aircraft. That statement does not mean they won't also apply to other types of aircraft, and it DOES mean we consider our endeavors in behalf of our models every bit as important and detailed as is expended for a modern full size aircraft.

As much as we would like to present you with a coherent outline of the material to be covered, we cannot, for two reasons. Our writings will be on the most important things first, and secondly, some of what we will write about has not yet been invented! We also plan to use material from all known sources. Now, as it is, both authors are on active duty with the United States Air Force, and in pursuit of official duties will travel from time to time. Therefore, the possibility of our being where you are sometime is not as remote as you think. More importantly, though, is whether or not we ever get to see you, so please don't hesitate to write us about anything you may think important.

Now to the scope of our GEMS. We will write about miniature aircraft. What is a good idea for a rudder only single channel job is sometimes also a good idea for a proportional pylon racer. And vice versa. So, we may take ideas from U-control and free flight, if they have a possible use on Radio Controlled Miniature Aircraft (RCMA). (Look, Dewey, a new term!) The illustrations and article content will contain everything imaginable from dreams of your ideal plane, to how to win the World Championships. (If my pardner doesn't practice we may have a ghost writer for that last part!) However, unless there is some revolutionary breakthrough elsewhere in the field, the radio gear you will see for the most part will be the standard of the industry, and that is a 5 channel proportional rig. To begin with, there are proportional radios available today with one to seven channels. Generally speaking, though, the five channel will be used primarily because they're the most popular.

Way back in the '30's a very few people, in widely scattered areas did, indeed, fly radio controlled miniature aircraft to some degree of success. (We know because our Grampa told us and he showed us pictures, too!) By 1954, when we were first able to clearly see the trend away from U-control and free flight, there had been no significant improvement in the state of the art. For example, the planes were still huge! (Small ones had a 6 foot span.) Also, the planes were capable of sustained uncontrolled stable flight (free flight if you will) and had ample opportunity to demonstrate it! The radios were the reason why. They were something else! Let us give you an example: Our first successful flight was with a six foot span semi-scale Piper J-3 weighing 4.5 lbs., powered by a K & B .19! Needless to say it would NOT go straight up! Our radio (the standard of the day) consisted of a transmitter built in a box about the size of a bushel box of apples. It had a 135 volt battery and a car battery in it! The antenna was 9.5 feet tall and it had a power output of not less than 5

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CUNNINGHAM ON R/C

This column marks the beginning of my seventh year of contributing thoughts, ideas, articles, airplane designs, and what not, to you from the pages of R/C Modeler Magazine. Every time I sit down to the typewriter, I feel that it has been a long, long time, but looking back at the associations that have been built up with some very wonderful people, it really has been a short time after all.

The other evening I was helping my 10 year old son work on his 5th grade 'new math'. We were working along when suddenly one of the problems caught my thoughts and made me back up. The problem, stated more simply, was that a jet aircraft could fly 225 mph faster than twice the speed of the fastest bird, so how fast does the jet fly? FASTEST BIRD? I looked back at the preceeding page to see what was listed as the fastest bird. There, in big bold letters was the statement that the Eagle is the fastest bird, and that its top speed is 175 mph! Now, believe me, if I ever see an eagle screaming through the sky at a speed half again faster than a Formula I racer, I'm going to head for the nearest shelter because the birds are going to take over the world! I don't profess to be any type of an expert on birds, but 175 mph by any bird is way beyond the realm of reason. They might be able to clock an eagle or hawk in a dive at a pretty good clip, but, wow! The point of all this is not that the math book writer was out of his gourd (although if you've tried to help a small fry with New Math you may feel that he is) but that no matter what you read, the chances are that it is not always completely true. This is a terrible thing for a writer to say, but it's a FACT. I've read many, many construction articles and often timed I'm tempted to have a differing opinion from the writer. And I've received many letters from readers that disagree with me on many of the things that I've written. This really is great, since it points out that we, as model builders and fliers, are doing our own thinking and are not going to be sold a complete bill of goods by anyone. But, a 175 mph eagle?

"Who said R/C wasn't fun?" Chuck Cunningham 'instructs' RCM's Executive Editor, Pat Crews, on finer points of flying . . .

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Several months ago I had the pleasure of a visit from Jack Evans who hangs his hat in the Detroit area. Jack has been working on a line of R/C race cars, and I had hoped that, by this time, he would be ready to introduce them to you. As yet, I haven't heard if they are going to find their way to the market, but they have something different from the standard race car. These cars of Jack's are ELECTRIC POWERED. Sure, you've seen electric

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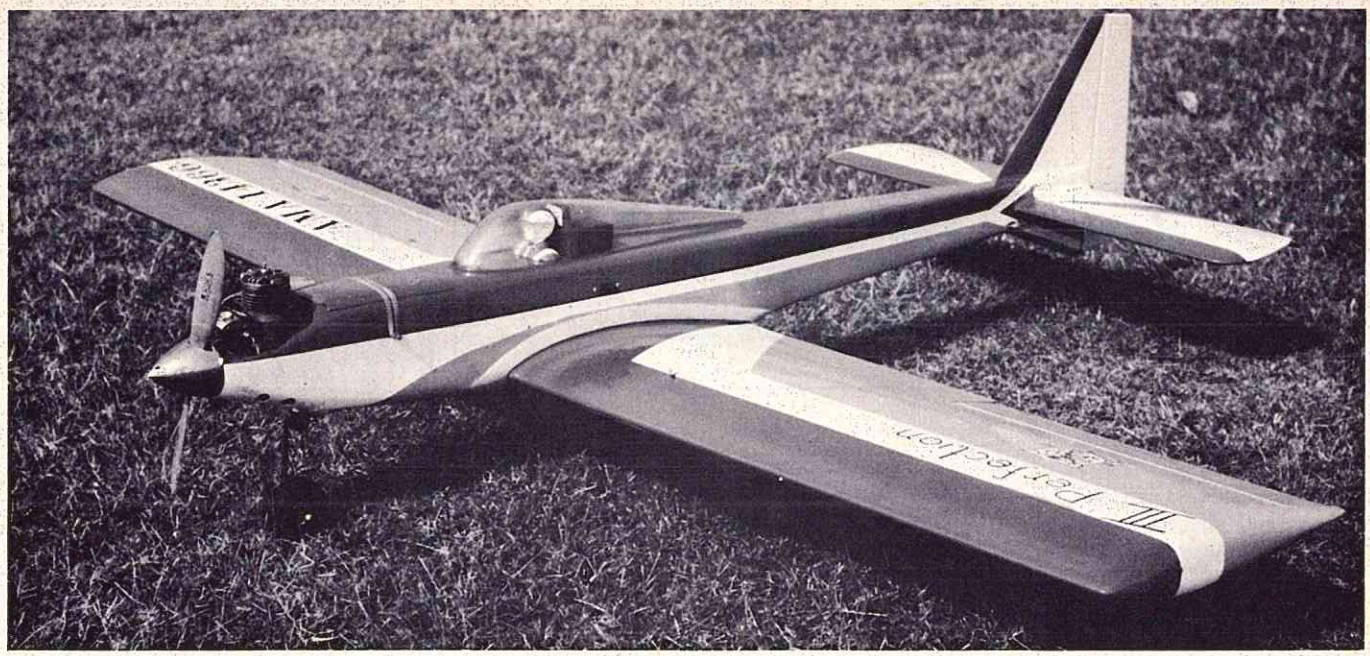


The human mind is undoubtedly God's greatest gift to man. From this relatively small area we are able to create visions of yesterday, the reality of today, and the dreams of tomorrow.

When I think of the visions of yesterday, I always remember my first contact with the beautiful machines that fly. I was a five year old; a bundle of energy looking for worlds to conquer; bugs, worms, grasshoppers or anything that walked, ran or flew, to examine, when out of the eastern horizon came a roar that scattered all the chickens on the small Kansas farm that was my home. As soon as I could gather myself together, I started pursuit of a beautiful red biplane. Since I could catch those pesky chickens, it shouldn't be too hard to catch that big red bird, and with all that noise I sure couldn't lose it, but the reality of today caught up with me about then, in the form of a barbed wire fence. That stopped my pursuit (temporarily). Oh well, I was about out of breath anyway, so over the horizon went my first contact with airplanes.

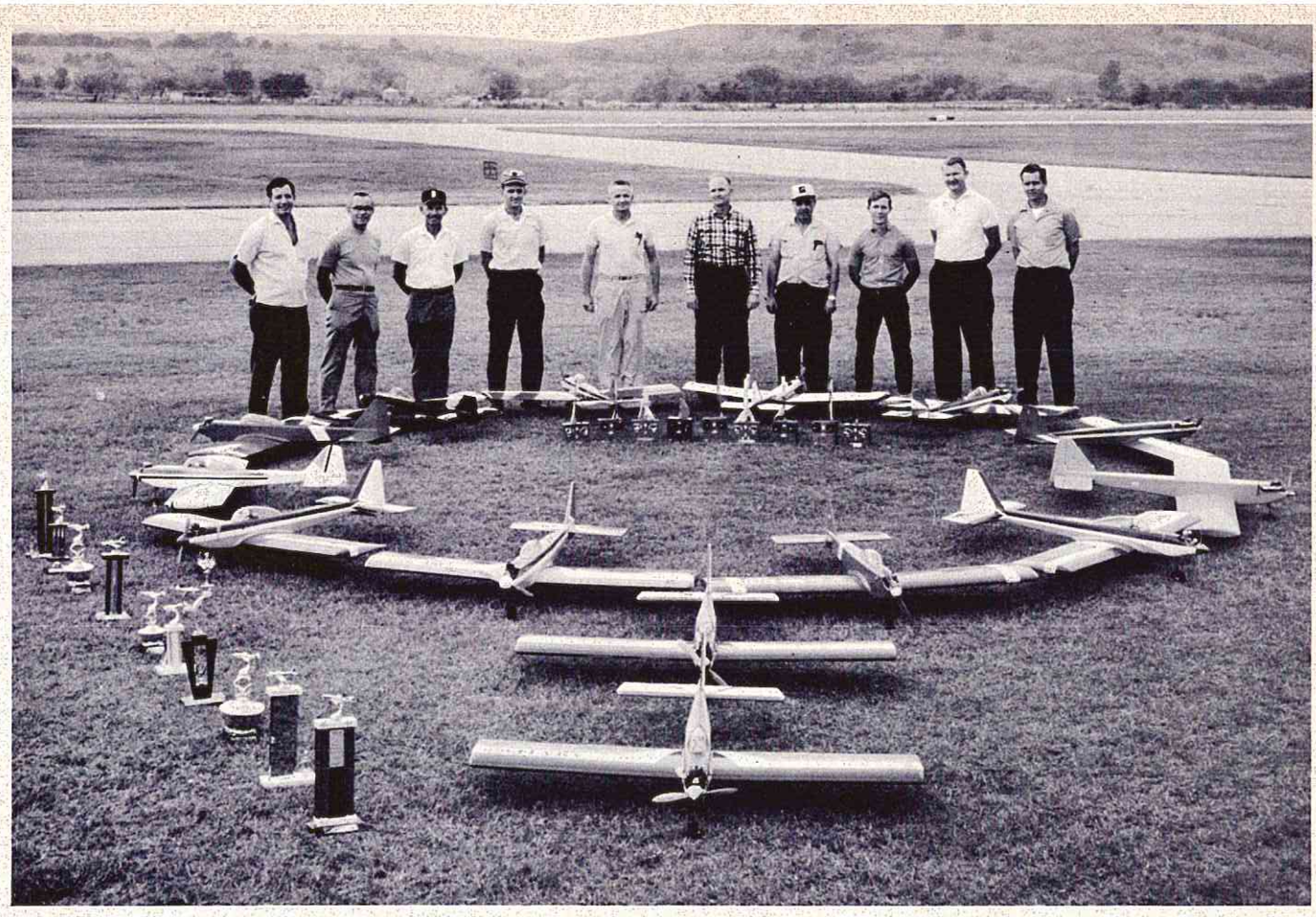
I immediately decided however, that I should be flying one of those, so construction material became the first order of business. A scrap of board for the fuselage . . . If I could only tear this old orange crate up, it would make dandy wings . . . that old hammer should help . . . ouch! I must remember to keep both hands on that hammer handle, I can't hit the other one if I do that! . . . Now a tin can lid to make that big silver disc that was on the front of that beautiful machine . . . now to assemble. Ouch! I can't keep

III PERFECTION

The III Perfection is not just another contest winning aircraft, but an extremely smooth, straight flying machine that was designed to fly the F.A.I. and A.M.A. pattern to perfection, and to exceed the best pilot's ability.

BY WILLIAM E. THOMAS

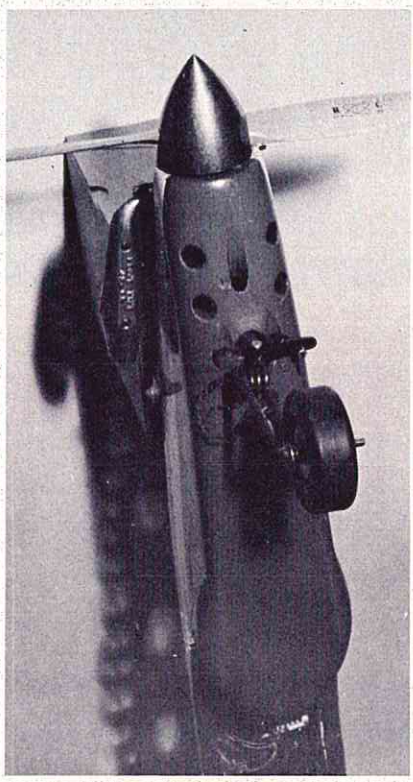
PHOTOS BY DALE WILLIAMS



This is an "Okie" balsa flower . . . very pretty and very expensive, and all III Perfections! L. to R: Jim French, Ed Spann, Bill Thomas, Delmar Mosher, Bill Hamilton, Larry Sartor, Bob Bretz, Ralph Thomas, Kent Rollmann, and Don Ness.

both hands on that hammer handle and start those nails through the wing . . . Now to get a nail through this tough tin can lid and nailed on to the front and, eureka! I have a beautiful flying machine all my own and tomorrow I will chase that biplane down.

Friends, I am still chasing that beautiful, noisy machine and in much the same way as when I first saw it, through models. So if the sight or sound of an airplane excites you, don't fight it, come along with me and we will gather up a few pieces of lumber, some orange crates, an old can lid, some rusty nails and build a flying machine that is capable of doing the AMA or FAI pattern to perfection. The name of this machine is III Perfection and, as the name implies it is an attempt to design, not just another contest winning airplane, but an airplane capable of exceeding the best pilot's ability. This is not a 90 or 100 mile an hour bomb, it is an extremely smooth, straight flying aircraft. The weight is extremely important and has ranged from 5¾ pounds to 7½ pounds, the lightest ones using Sig Contest Balsa and HobbyPoxy finish are the best fliers, but the heavier ones are very good windy weather airplanes.



Detail shot of electric nose gear brake and cooling holes.

I use the very fine K and B Veco 61 for power and the Log III Logictrol to put this machine through its paces, including a C Novice win at the 1968 Nat's.

I have not mentioned the three most important ingredients in winning contests, so here they are: practice, practice, practice. So before the weather gets too good, let's build two or three III Perfections and go practice.

Construction is very straightforward but I will attempt to pass along a few of the tricks I have picked up.

Fuselage:

After all parts have been cut out, draw the fuselage top view on the 1/4" x 4" x 48" contest grade balsa top block. Very carefully, lay this out using the centerline you have drawn down the center of the block. The straightness of your fuselage is dependent upon this layout. Next, pin the top block down and saw almost through at the tank compartment

bulkheads, and glue the 3/8" triangular stock to the top block. This completed, assemble the motor mounts and their bulkheads, but don't glue them. Cut out the 3/32" contest balsa sides and use contact cement to attach the doublers. Make sure you have drawn the reference line on the inside and outside of the fuselage and make doubly sure they are in TRUE ALIGNMENT. After gluing the doublers in place and thinning the motor mounts to 1/4" thickness through the tank compartment, glue the motor mounts to the fuselage sides aligning the top of the motor mounts with the reference lines. Clamp, and let them dry for a couple of days. I use Ambroid or Sigment throughout, because I think epoxy is too heavy. While the sides are drying, cut out and assemble the horizontal stabilizer. I use a 3/4" plywood building board on which I build the stabilizer. Do not put the elevator on until the stab is glued into the fuselage. Glue the fuselage sides and bulkheads to the top block, use a 4" triangle to align the sides with the top block. Pin and clamp this assembly and let dry. Leave the fuselage pinned down until the horizontal stabilizer has been inserted, aligned and glued in place.

You will notice that the III Perfection utilizes center hinged ailerons. This is Jack Capehart's and Ben Herman's suggestion from their design articles in R/C Modeler and you should try them. I think you will see the difference and like it.

The rest of the construction is as shown on the plans.

Finish:

I use Sig epoxy thinned 1/2 with alcohol for the sealer and filler (two coats), sand with 2-0 sandpaper between coats, and sand with 4-0 before the HobbyPoxy color is applied. You will have some wood grain showing with this method, but it is light and fast, and will not warp anything.

Flying:

Balance 3-5/8" to 3¾" from the leading edge of the wing. I use Midwest control horns with two extra holes drilled toward the inside. I use the inside holes for rudder and elevator.

May you have as many happy hours flying the III Perfection as I have enjoyed. ●

FULL SIZE PLANS AVAILABLE
SEE PAGE 70

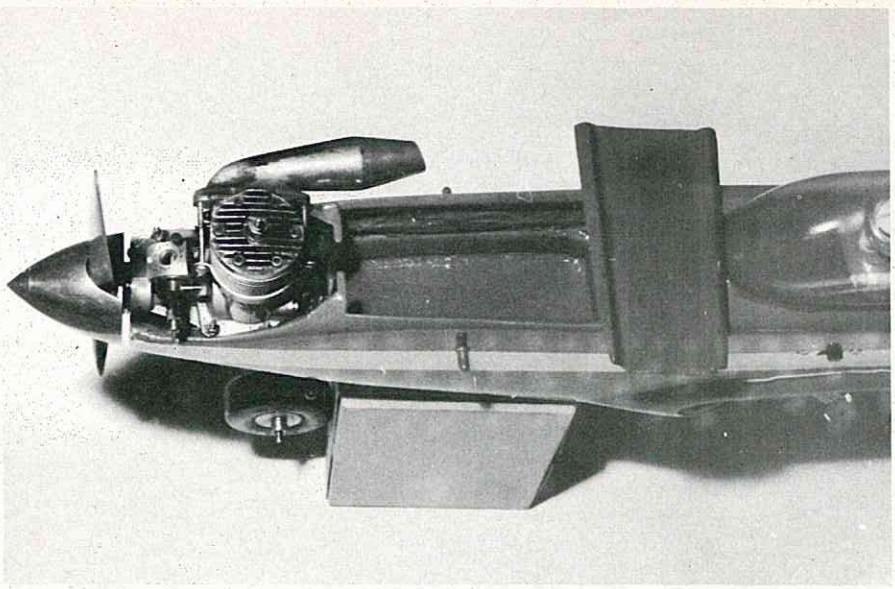
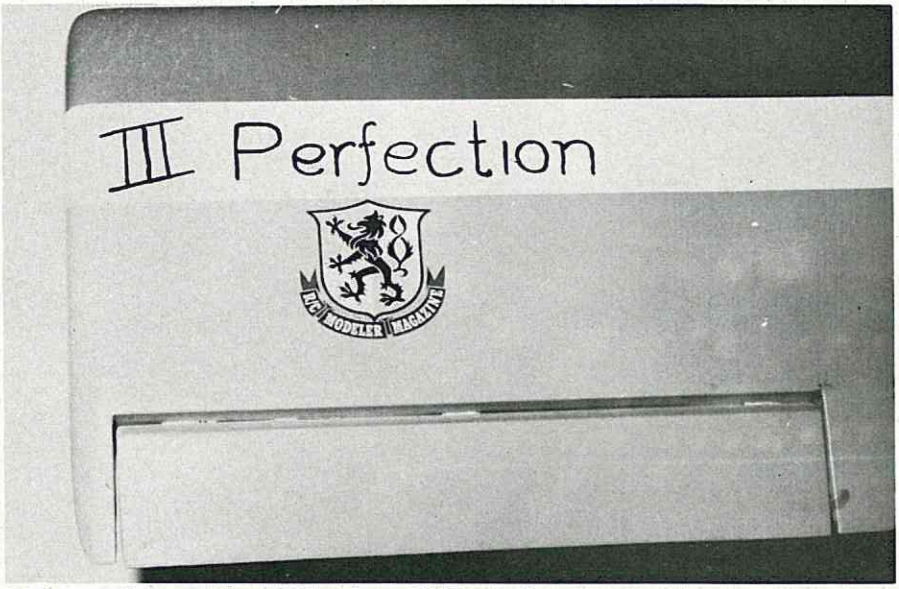
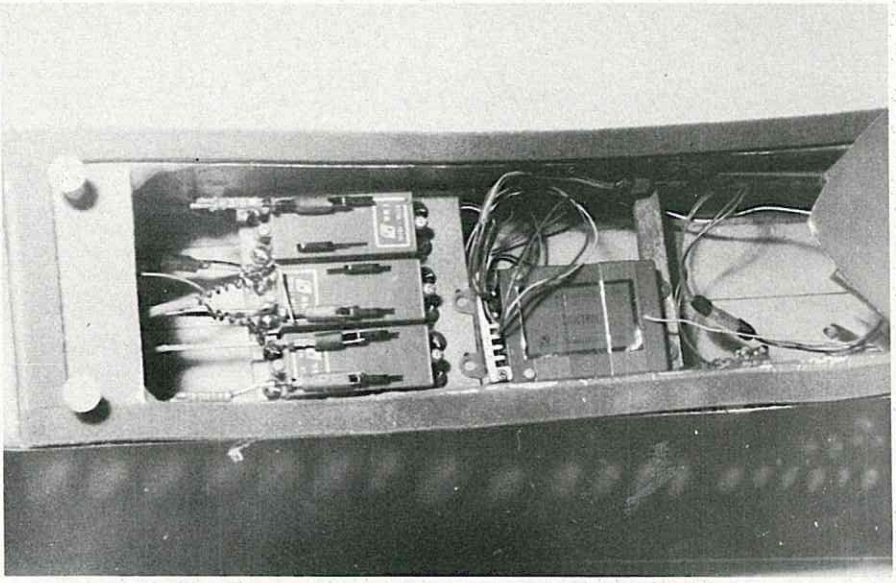


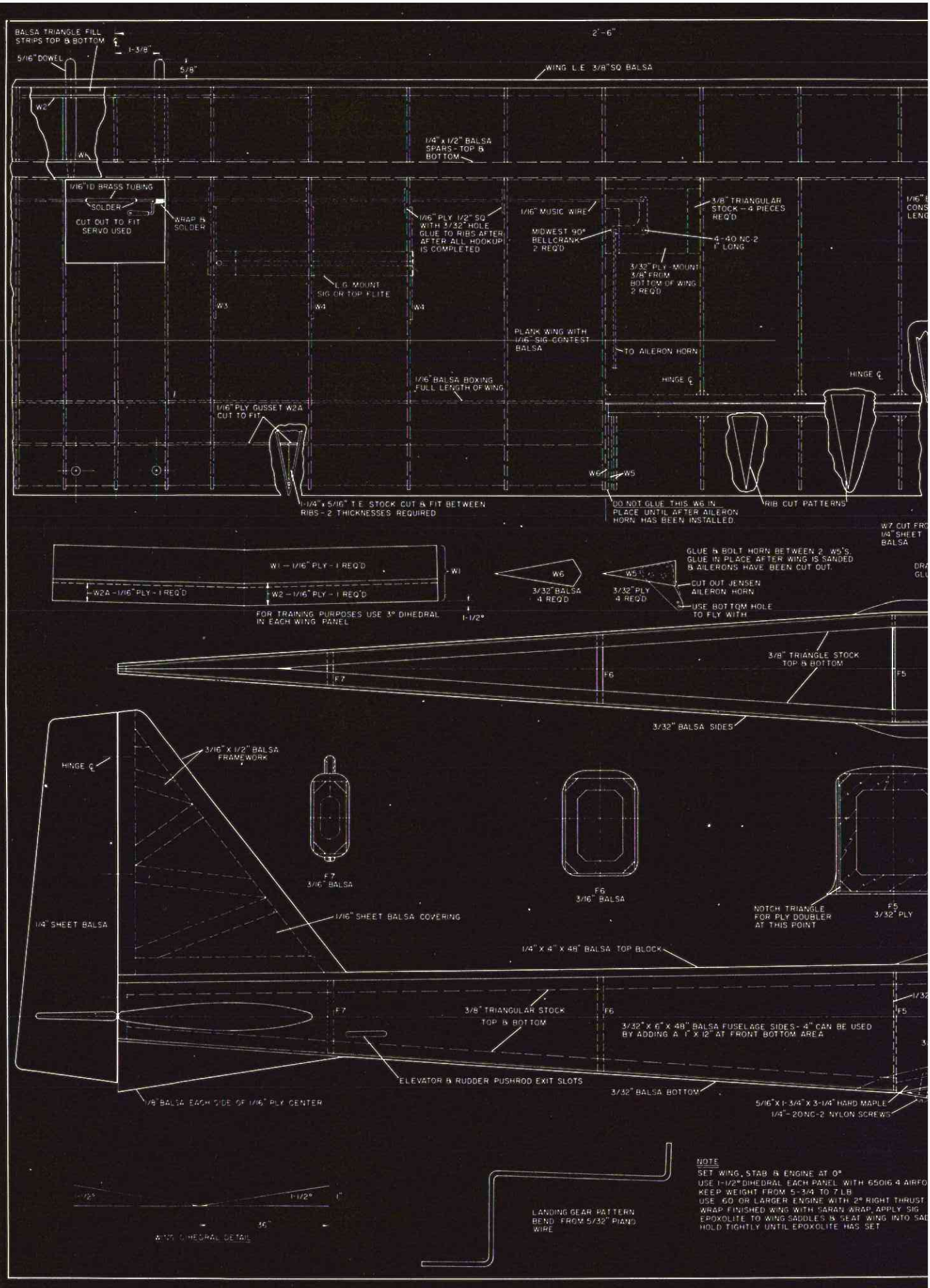
Photo of engine installation and isolated tank compartment.

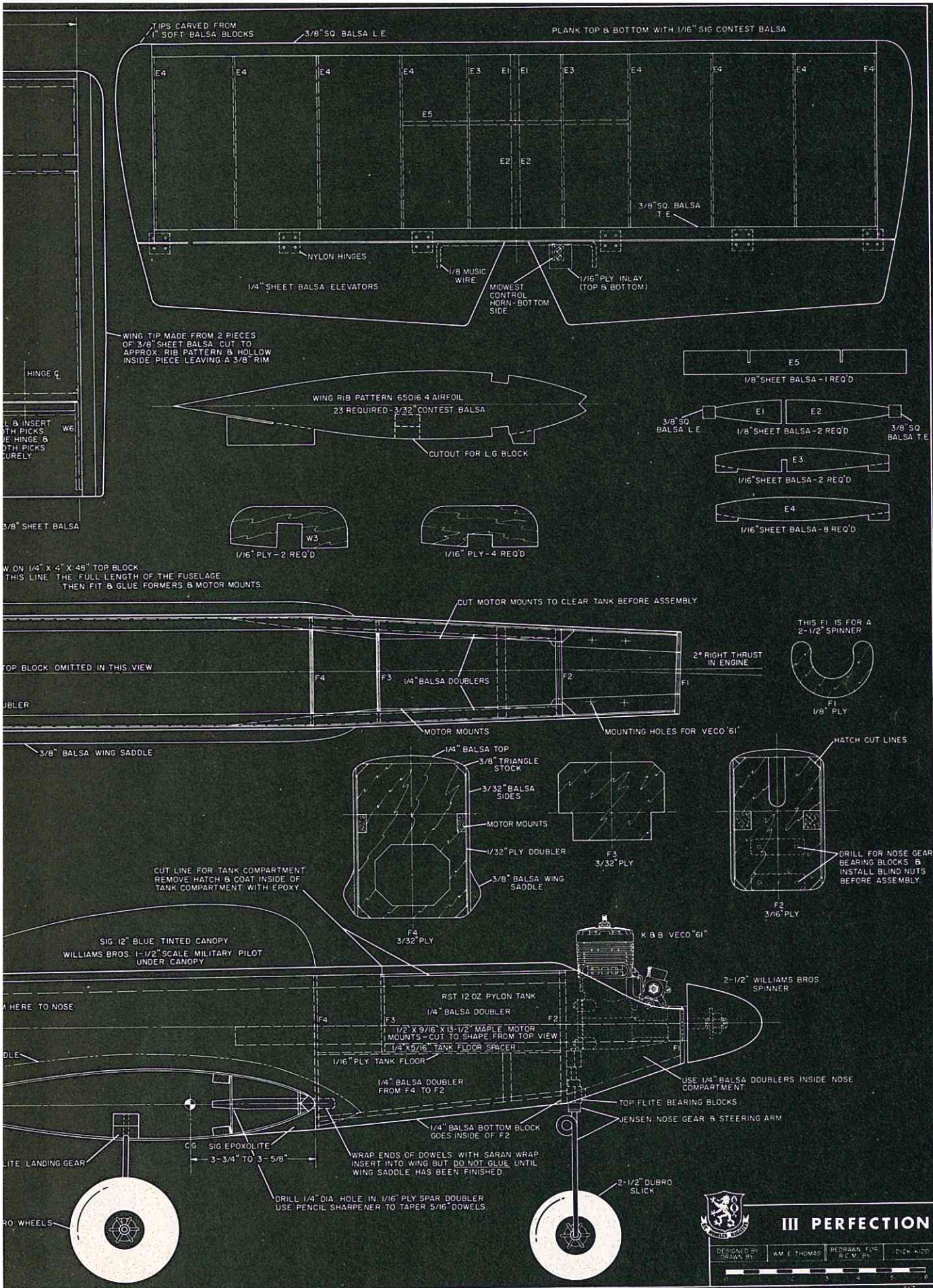


Note use of center hinged ailerons on III Perfection.



E. K. Logictrol III mini system is almost lost in large radio area.


BALSA TRIANGLE FILL STRIPS TOP & BOTTOM
5/16" DOWEL
1-3/8"
5/8"
2'-6"
WING L.E. 3/8" SQ BALSA
W2
W1
1/4" x 1/2" BALSA SPARS - TOP & BOTTOM
1/16" ID BRASS TUBING
SOLDER
CUT OUT TO FIT SERVO USED
WRAP & SOLDER
1/16" PLY 1/2" SQ WITH 3/32" HOLE GLUE TO RIBS AFTER AFTER ALL HOOKUP IS COMPLETED
1/16" MUSIC WIRE
MIDWEST 90° BELLCRANK 2 REQ'D
3/8" TRIANGULAR STOCK - 4 PIECES REQ'D
4-40 NC-2 1" LONG
3/32" PLY - MOUNT 3/8" FROM BOTTOM OF WING 2 REQ'D
L.G. MOUNT SIG OR TOP FLITE
W3
W4
W4
W4
PLANK WING WITH 1/16" SIG CONTEST BALSA
TO AILERON HORN
HINGE ℄
HINGE ℄
1/16" BALSA BOXING FULL LENGTH OF WING
1/16" PLY GUSSET W2A CUT TO FIT
W6
W5
1/4" x 5/16" T.E. STOCK CUT & FIT BETWEEN RIBS - 2 THICKNESSES REQUIRED
DO NOT GLUE THIS W6 IN PLACE UNTIL AFTER AILERON HORN HAS BEEN INSTALLED
RIB CUT PATTERNS
W1 - 1/16" PLY - 1 REQ'D
W1
W2A - 1/16" PLY - 1 REQ'D
W2 - 1/16" PLY - 1 REQ'D
FOR TRAINING PURPOSES USE 3° DIHEDRAL IN EACH WING PANEL
1-1/2"
W6
3/32" BALSA 4 REQ'D
W5
3/32" PLY 4 REQ'D
GLUE & BOLT HORN BETWEEN 2 W5'S. GLUE IN PLACE AFTER WING IS SANDED & AILERONS HAVE BEEN CUT OUT.
CUT OUT JENSEN AILERON HORN
USE BOTTOM HOLE TO FLY WITH
3/8" TRIANGLE STOCK TOP & BOTTOM
F7
F6
F5
3/32" BALSA SIDES
HINGE ℄
3/16" x 1/2" BALSA FRAMEWORK
F7
3/16" BALSA
F6
3/16" BALSA
NOTCH TRIANGLE FOR PLY DOUBLER AT THIS POINT
F5
3/32" PLY
1/4" SHEET BALSA
1/16" SHEET BALSA COVERING
1/4" x 4" x 48" BALSA TOP BLOCK
F7
3/8" TRIANGULAR STOCK TOP & BOTTOM
F6
3/32" x 6" x 48" BALSA FUSELAGE SIDES - 4" CAN BE USED BY ADDING A 1" x 12" AT FRONT BOTTOM AREA
F5
ELEVATOR & RUDDER PUSHROD EXIT SLOTS
1/8" BALSA EACH SIDE OF 1/16" PLY CENTER
3/32" BALSA BOTTOM
5/16" x 1-3/4" x 3-1/4" HARD MAPLE
1/4-20 NC-2 NYLON SCREWS
1/2"
1-1/2"
1"
36"
W6 DIHEDRAL DETAIL
LANDING GEAR PATTERN BEND FROM 5/32" PIANO WIRE
NOTE
SET WING, STAB & ENGINE AT 0°
USE 1-1/2" DIHEDRAL EACH PANEL WITH 6501G 4 AIRFO
KEEP WEIGHT FROM 5-3/4 TO 7 LB
USE .60 OR LARGER ENGINE WITH 2° RIGHT THRUST
WRAP FINISHED WING WITH SARAN WRAP, APPLY SIG EPOXOLITE TO WING SADDLES & SEAT WING INTO SAD
HOLD TIGHTLY UNTIL EPOXOLITE HAS SET



FULL SIZE PLANS AVAILABLE – SEE PAGE 71

RHINEBECK '69

PHOTOS & TEXT BY
BERNIE MURPHY

The Third Annual World War I R/C Jamboree, hosted by the IBM R/C Model Club of Poughkeepsie, N.Y., was, and is, one of the greatest success stories in R/C. Two weeks have elapsed at this writing, and still the tremendous enthusiasm and congenial spirit are difficult to comprehend, much less describe. We have been to many contests and 'fly for funs', including most of the 'best', but, in our estimation, none the equal of Rhinebeck '69.

From a concept two years ago, with seventeen entrants, the Jamboree grew to forty-two entrants last year. This year saw sixty-five entries! A rather amazing number, considering that entries were limited to scale models of aircraft built and flown prior to 1919! In general, this type of aircraft is more difficult to construct, and the majority were scratch built. Add to this the fact that Rhinebeck, N.Y. is miles from anywhere, the closest city being Albany.

A glance at the entry sheets showed entrants from such distant places as Wisconsin, Buffalo, N.Y., Washington, D.C., California and even London, England.

Why do R/C'ers put so much effort into building these ships, then traveling vast distances to Rhinebeck? One can only guess, but we consider the cooperative spirit of all the entrants, and the smooth perfection of the IBM club's operation, coupled with the romance of World War I aviation, and Cole Palen's full scale vintage aircraft as the primary factors.

The sharp edge of hard-nosed competition does not exist at Rhinebeck. Even the circuit competitive flyers who were entered seemed to be there primarily for a good time. Assistance was but a call away for anyone who needed it, be it for a part or a major repair. Everyone was willing to lend aid to another so that all could have an enjoyable weekend.

The IBM R/C Model Club's efforts in organizing and directing the meet must be recognized, for, from all aspects, this was the smoothest operation we have ever witnessed. Throughout the two days of flying, there was no time when there was a lull in activities, much to the delight of the spectators. Seldom was there a moment when there wasn't at least one ship in the air. This smooth control was also appreciated by the contestants, as everyone had ample flying time. Adequate briefing of the judges provided unusually consistent judging – so consistent in fact, that NO griping was heard from the sidelines – most unusual!

The transmitter impound was also handled with precise control. Each transmitter as surrendered, was assigned a space number and entered in a log book under the contestant's number. Frequencies were checked at this time. A log board, with a frequency disc for each frequency, was used to keep track of frequencies in use. A contestant on the ready line sent either his mechanic or a runner to the impound area for his transmitter. The contestant's number was checked in the log book for the storage position of the transmitter, which was promptly produced. The frequency was then checked with the discs on the log board to assure that it was clear, and the appropriate disc removed from the board to indicate the frequency was in use. No other transmitter could then be logged out on the same frequency. When returned, the disc was replaced, and the transmitter impounded in the same numbered location. The entire operation took less than a minute, and eliminated searching for transmitters. Frequencies were constantly monitored on a spectrum analyser. Throughout the meet, not one call of interference was heard - a tribute to a fine impound system.

Four events were scheduled in the Jamboree; Scale, Maneuvers, Mission, and Combat.

SCALE was judged on modified AMA rules, adding points for drop message or flare, and firing guns or rockets. The flight plan consisted of ten maneuvers for a total of 100 points. Flight score was multitpled by Scale points plus operations. Realism and scale speed were a significant consideration in judging flight score.

1st Frank Knowles – Guelph, Ontario – Nieuport 17
2nd Josh Titus – Paramus, N.J. – SE 5A
3rd Bob Wisher – Delafield, Wisc. – Sopwith 1½ Strutter

MANEUVERS was based on the AMA pattern event with changes consistent with the capabilities of pre-1919 aircraft. The nineteen 'maneuvers' included; Chandells, Vrille, Reversement, and Strafing run, plus points for scale speed and realistic appearance of flight. A scale handicap of 1/6 Scale Points was added to arrive at the total score.

1st Vern Krehbiel – Williamsville, N.Y. – Nieuport 17
2nd Frank Knowles – Guelph, Ontario – Nieuport 17
3rd Arnold Lipschutz – Wilmington, Del. – Bristol Bullet

The MISSION category was really a multiple event, the object being to drop a bomb accurately on a target, to burst an observation balloon, and finally to land as close to the designated landing area as possible. A perfect score would mean dropping the bomb within a 50 foot circle, bursting the balloon on the first pass and then landing in a 50 foot circle – a tough job! Tom Wenzel, winner of the event managed just that – a perfect score – the hard way! Tom's bomb run was dead on target for max points. A swing around the field for a pass at that evasive balloon. A direct hit! The balloon burst, and Tom's engine died – dead stick, he managed to swing around and set his Moraine on the spot! A well earned win!

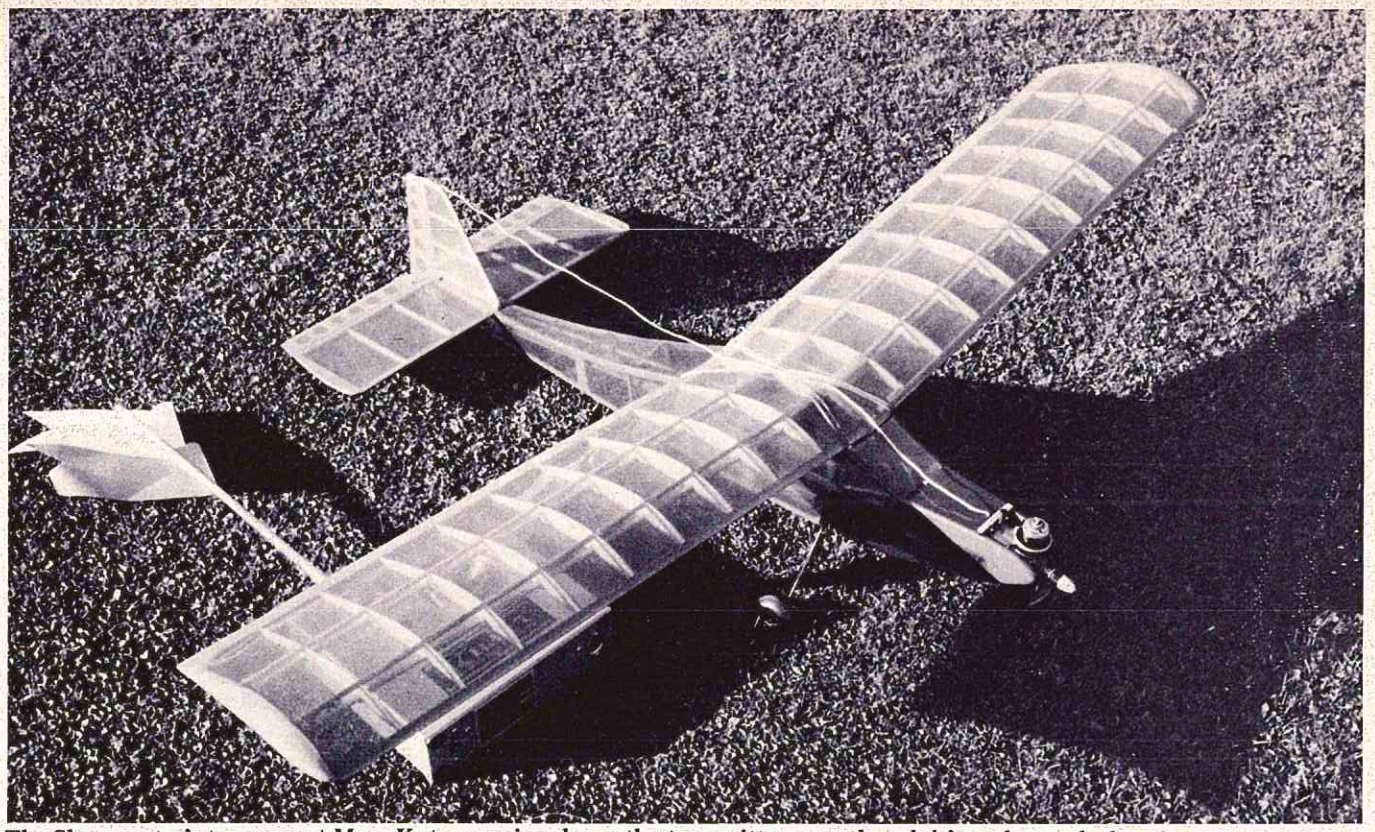
1st Tom Wenzel – Syosset, L.I., N.Y. – Moraine Saulnier
2nd Nick Ziroli – Smithtown, N.Y. – Eindecker
3rd Bob Dean – Waverly, N.Y. – Fokker D7

TEAM COMBAT is a cooperative demonstration between two aircraft, the object of which is to create a realistic simulation of aerial combat. A total of six minutes is allowed, with three minutes of actual 'combat' time. The scoring is based on realism and scale speed, evasive action, firing passes, presentation and content of format and aircraft proximity. A tough one to judge, but a real fun event for the flyers and a sure crowd pleaser! A total of thirty-four ships were flown in this event alone – and a good time was had by all.

1st Dick Allen – Endicott, N.Y. – Sopwith Pup
Bob Wisher – Delafield, Wisc. – Bristol Bullet
2nd Vern Krehbiel – Williamsville, N.Y. – Fokker Tripe DRI
Bernie Murphy – Linthicum, Md. – Nieuport 17
3rd Frank Knowles – Guelph, Ontario – Nieuport 17
Tom Dietrich – Kitchener, Ontario – Eindecker

In addition to presenting one of the most efficient and problem-free contests from the contestant's point of view, the IBM Club, by choice of

(continued on page 74)

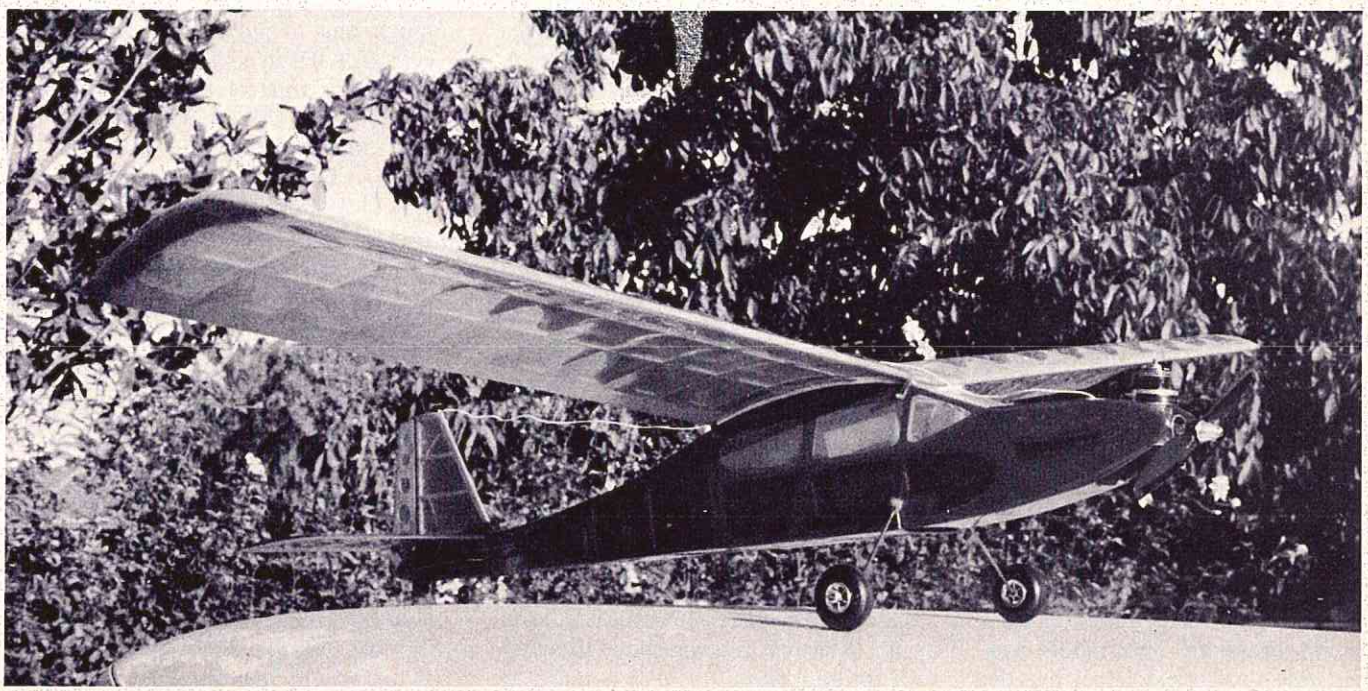


The Showmaster's transparent MonoKote covering shows the transmitter even though it's underneath the wing.

SHOWMASTER

BY KEN WILLARD

Note undercamber on Showmaster wing. Despite appearances, it's no free-flighter!



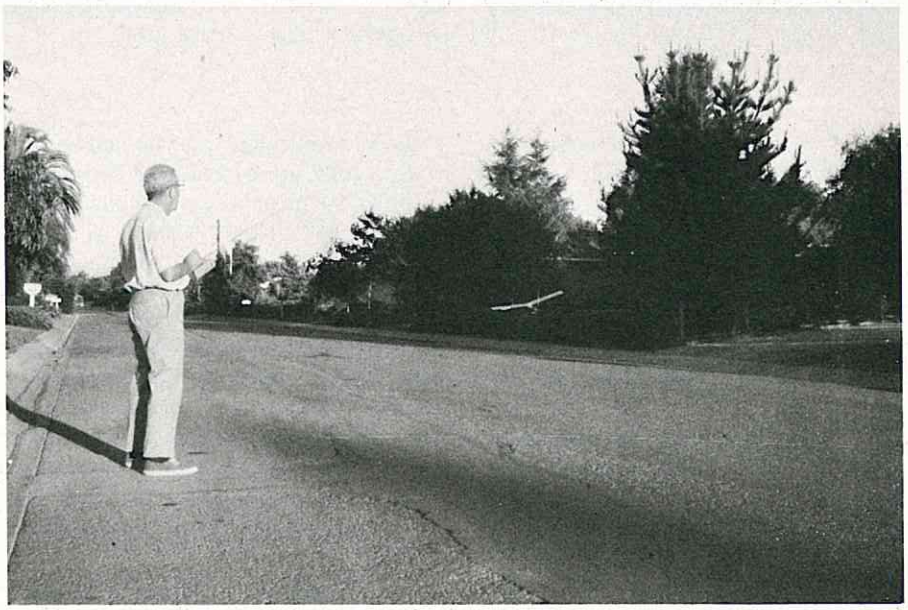
The Showmaster is a conversation piece. No matter where you fly it – at the field, with all of the big screamers, or at home in the street – the spectators are fascinated both with the performance and the construction. With the muffler of the QZ engine turned full on, the engine can just be heard when running by itself, and if the airplane is in the air with another plane, you'd swear it was running on rubber bands!

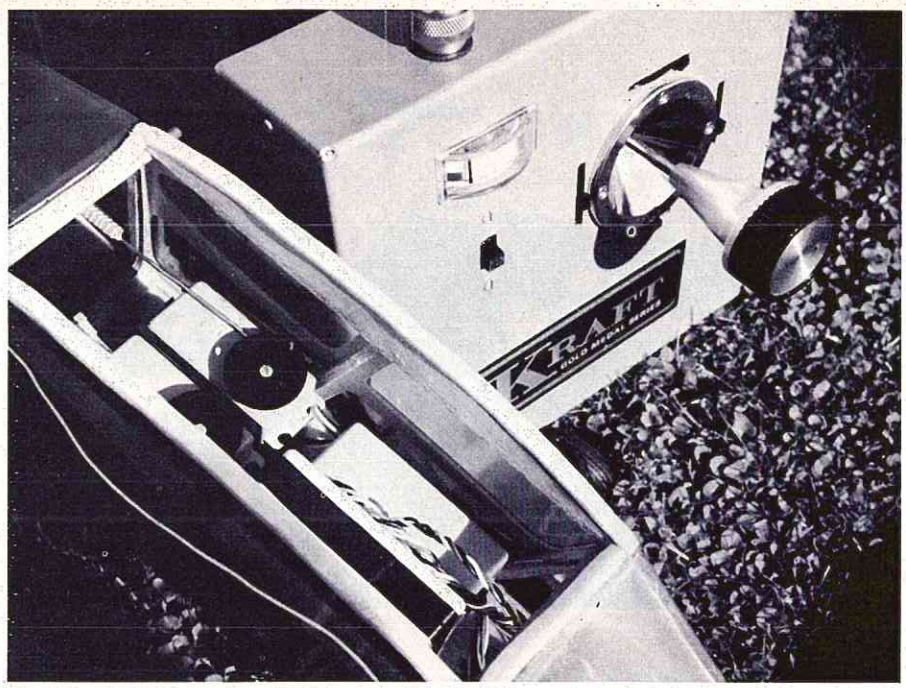
It also intrigues beginners, because it 'flies by itself'. From a hand launch, it will free flight up to altitude, and there I can turn it over to any beginner, let him try anything he wants to, and tell him that if he gets confused or disoriented, just let it alone, and the Showmaster will recover from any attitude – inverted, vertical, or what have you – and resume a normal flight attitude. Then, when the engine quits, in order to land it, just head it in the direction you want it to land, and let it alone.

All of this assumes, of course, that you are not trying these things in a strong wind. It was not designed to fly under these conditions, even though it will take a wind of ten to twelve miles an hour after you learn to fly it and keep the nose trimmed down.

Now, even though any beginner can fly it, it isn't exactly what I would call a beginner's airplane, unless he is a good builder. The structure is strong enough to withstand any air load that you can put on it, but it's pretty fragile when compared to the usual R/C job. And in building it, you have to be careful that you don't get any warps in the wing, stab, or fin.

My Showmaster is now well over a year old, and has so many flights on it that I couldn't begin to count them. Originally, I had a Bonner 4RS in it, then I put in a Kraft with the KPS-10 servos and the 225 battery pack. Next, I tested a Micro Avionics XL-IC, with the tiny servos and their small battery pack - you may recall my reporting that after about an hour and a half of total flying time, without recharging the batteries, I decided the drain of the Micro Avionics receiver and the two servos would never cause a battery problem in normal usage. As a result, I now have the Micro Avionics installed in a light-weight slope soarer, and I'm flying the Showmaster with the Kraft, but with two changes. I found that the model would easily carry the added weight of the 500MA battery. (In fact, I believe it will carry the KPS-9 servos also, if that's the size





The "works". Note that the heavier 500 MAH battery pack is being used.

you have, but that might make it a little bit sluggish. Certainly it will if you use the 225 pack, because the weight differences offset each other.) The other change is in the transmitter - I'm using the new single stick version - locally the fliers call them the 'Cyclops', because it looks like a big eye with that single gimbal and the polished knob sticking out, but I'll tell you this; as far as I'm concerned, it's the only way to fly! But then, I've always flown the mode with the engine and rudder control on the left stick, and aileron and elevator on the right. The big advantage, as I see it, of the big knob, is that it prevents 'thumbing' and gives you a better feeling for small control movements.

However, if you use this mode, but don't have ailerons, as in the case of the Showmaster, then connect the rudder to the aileron outlet. You'll THINK it has ailerons, the way it responds.

Well, enough about the gear. Let's talk a little about the construction. The plans will tell you all that you need to know regarding the details, so all I need to add is that all the cutouts in the sides, and the lightening holes in the rudder and elevators are really for effect. The weight of the balsa that's removed is about half an ounce at most – but it is the transparent MonoKote over the open framework that really attracts the attention. You can see the gear operate even though the airplane is completely assembled. It shows everything - so you had better do a good job of building, because it shows the mistakes just as much as the good work! That's where it gets the name, Showmaster – it shows everything.

There is only one phase of the construction that needs explaining, and that is how to get the Super MonoKote to stick to the underside of the wing, which is highly undercambered. The undercamber, of course, is to keep the speed of the model down so that it can be flown in confined areas.

Each sheet of MonoKote has a set of instructions included, so follow them precisely for best results. And to attach the material to the underside of the wing, you begin by cutting a piece slightly larger – about a half inch all around – and laying it gently in place on the wing, which you have upside down for ease of covering.

First, run your iron, or Sealector, if you have one, (and if you're going to do a lot of covering with these heat activated materials, I recommend that you get a Sealector) along the forward bottom spar, sealing the MonoKote to it. Try to keep the MonoKote lying straight as you seal it to the spar. Next, seal the MonoKote to the rear spar, then the leading edge, then the trailing edge. Finally, seal it individually to each rib bottom.

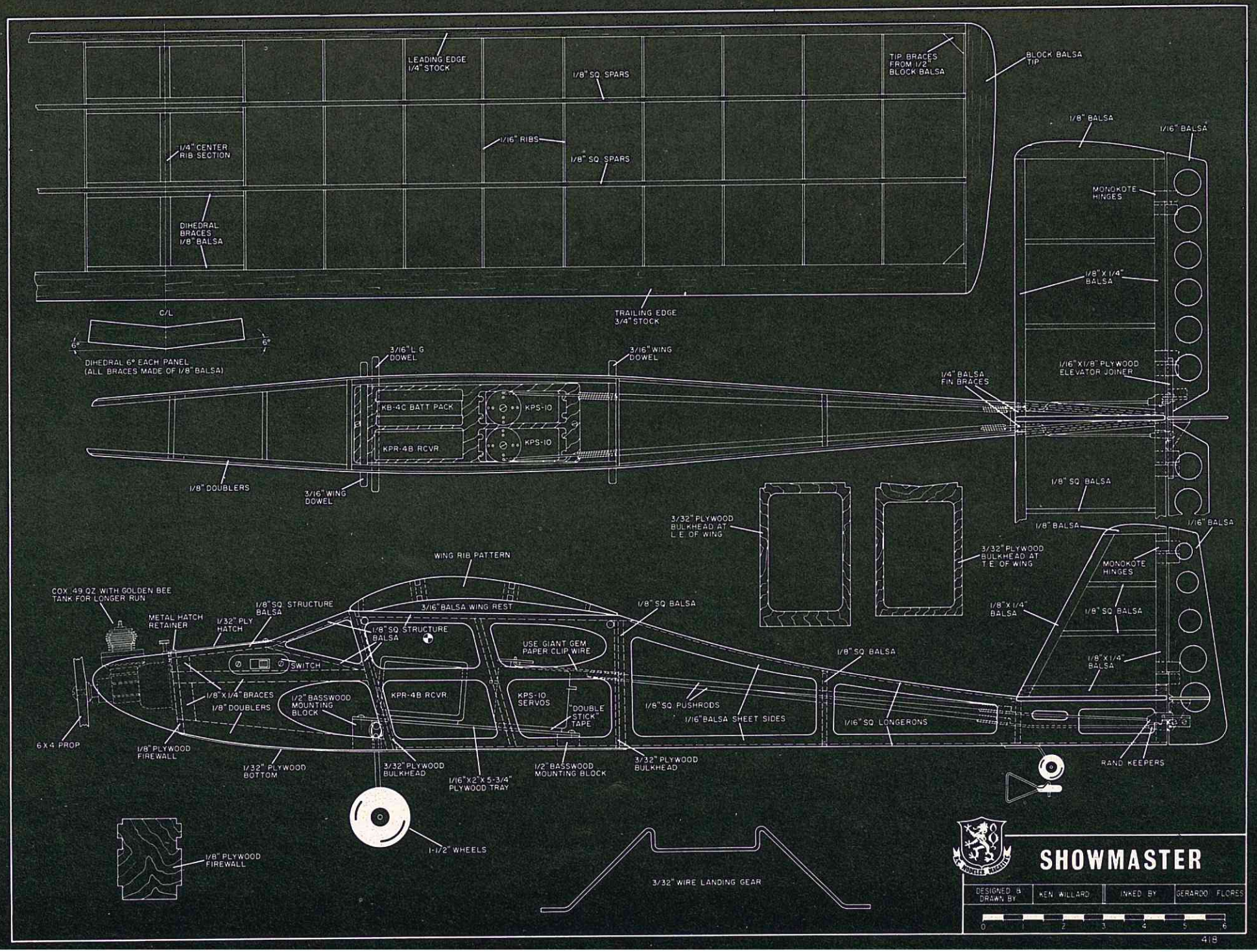
You now have the bottom of the wing sealed, with the MonoKote attached to the ribs, spars, leading and trailing edge. Now you can safely shrink the MonoKote in each square bounded by the spars and the ribs, and the bottom is completed.

One other detail that might be a little hard to figure out is the metal retaining plate for the hatch. It's just a piece of thin aluminum sheet, about 1/2" by 1¼", which is bent so that 3/8" by 1¼" is pressed against the firewall by the mounting plate of the engine (drill holes to fit the engine mounting bolts) and 1/8" by 1¼" overhangs the top of the fuselage. Mount it to the firewall so the overhang clears the top of the fuselage by 1/32" and the 1/32" plywood hatch then slides underneath it.

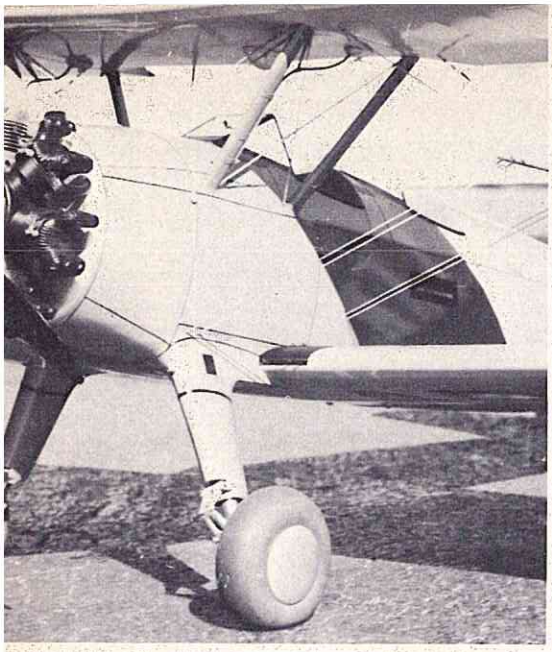
I don't think you'll have any trouble flying it. The built in downthrust and right thrust, shown on the plans, should be just about right for nearly all versions, but if not, it's close enough so that minor adjustments can be made using the trim controls. You'll find it very responsive, and before you try flying in a confined area, practice in an open area until you know exactly what will happen when you give the model full control. Once you've learned that, then any vacant lot, or open street, is large enough for flying, since it will turn with about a ten foot radius.

The Showmaster may not win any contests for you – unless you enter a loop contest. It will do about 60 loops in three minutes. But if you build it carefully, it will win a lot of compliments for you – and those are always good for a Sunday Flier's morale.

Ken Willard with early prototype, originally called the "Showcase".



FULL SIZE PLANS AVAILABLE — SEE PAGE 71



STEARMAN PT-17

A MAGNIFICENT 2″ = 1′ MODEL OF THE VENERABLE LADY OF YESTERYEAR, CHARLES LITZAU'S SCALE VERSION OF THE FAMOUS WW II TRAINER — FLIES EXACTLY LIKE IT'S FULL-SIZE COUNTERPART

BY
CHARLES J. LITZAU

During the winter of 1964, I was bitten by the bug to build a scale PT-17 for R/C, since this has always been one of my favorite airplanes. I will not go into detail about the history of the PT-17 as there has already been much written on this subject. I will only say that a great many WW II pilots were trained in the Stearman and, today, it is a much sought after collector's item.

In order to get started on my project, I sent away for some of the existing plans on the PT-17 that were designed for U-control, having considered enlarging a set of plans to a scale of 2"=1'. However, after I obtained several different sets of these plans, I noticed that they did not agree in many major respects. The question was, "who was right?"

Since there was little information available on how to design and fly an R/C biplane, I had to find a method of determining proper C.G., incidence, dihedral, airfoil, etc. I searched back through the model magazines to see what the average non-scale R/C biplane utilized. As a result of this study, I evolved a pretty good average of the statistics I needed to know. At least, it was a place to start!

The next step was to lay out the plans. I was able to obtain a set of AIR PROGRESS plans of the PT-13. These plans are of the real aircraft and it is from these that I worked. In order to blow them up to 2"=1', I took my 35mm camera with a telephoto lens and took colored slides of the plans. I then projected them onto the wall to where the scale was 2"=1'.

It was at this point that I decided to build a test model to make sure that everything worked before going 'all-out scale'. Since strength was of prime importance to me, I decided to experiment with styrofoam wings and elevator. On this first model, I did not bother to duplicate the wing ribs. Also, I held the wings in place with rubber bands, while the 'N' struts were secured with toothpicks acting as shear pins.

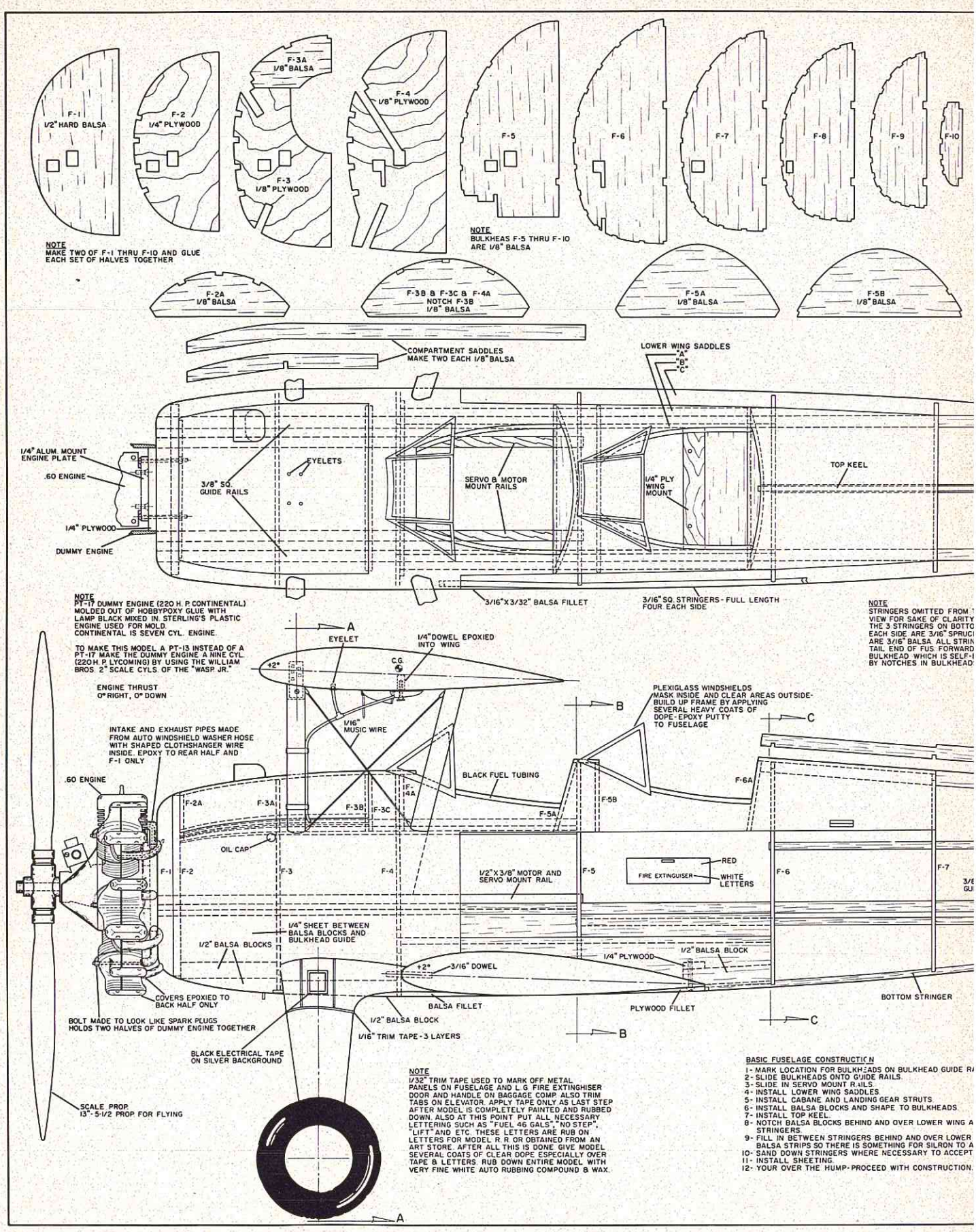
Then came the day for the first flight and I was suddenly quite happy that I had proportional radio! The plane took off by itself and started into a stalling attitude. (By the way, I was flying the plane with a Veco 45.) After managing to get it back for a reasonably good landing, I made adjustments to the elevator and added weight to the nose. This corrected the situation, but it was still a little underpowered. At this point I changed to a .60 engine.

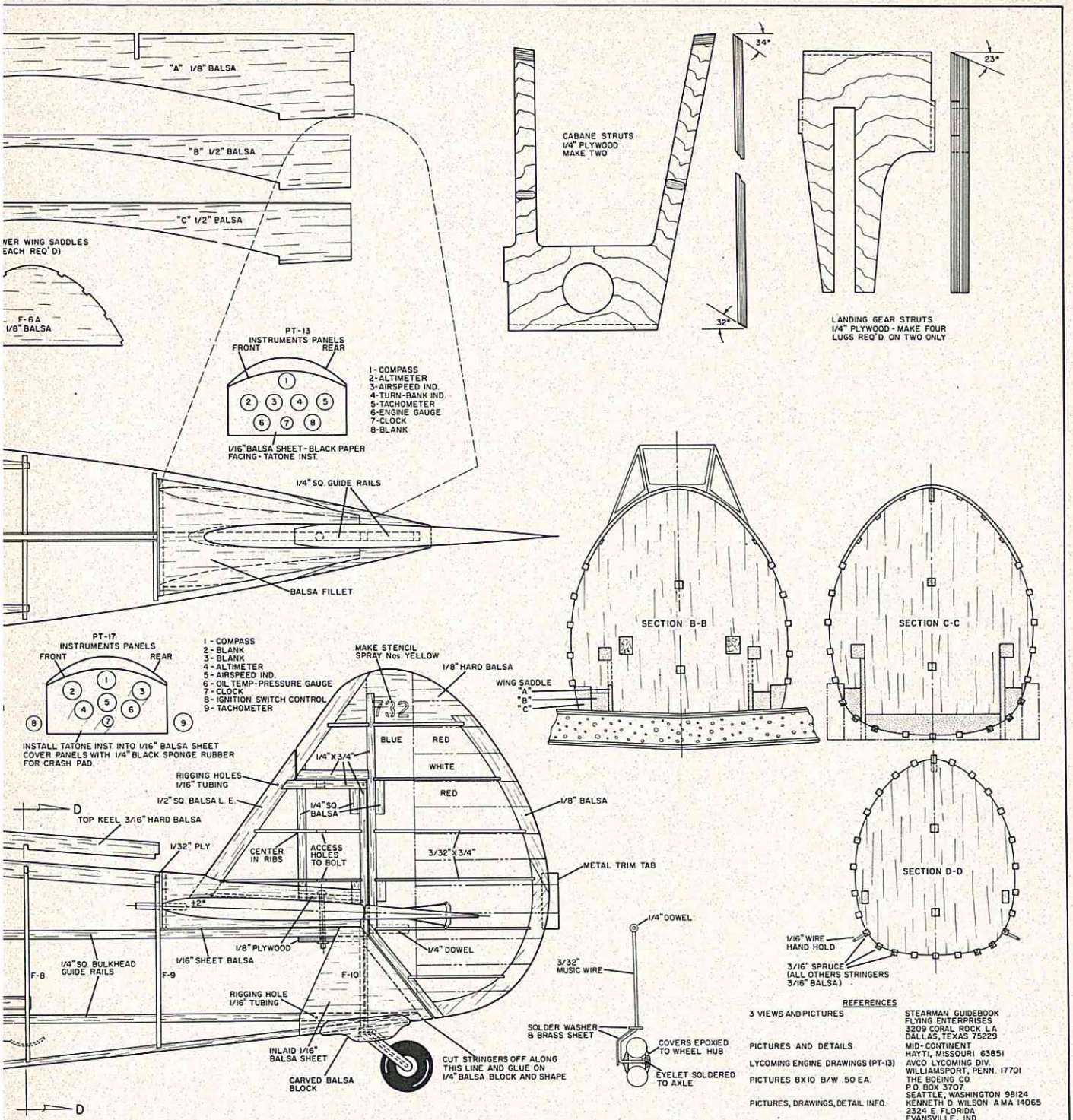
To date I have over 400 flights on the prototype model with only four major crashes – all four occurring during gusty winds, dead stick, and going down-wind. From these crashes, I was able to locate the weak points in the fuselage and correct them in the final design. In all these major crashes, neither the wing nor elevator was even damaged or broken. There were only a few dents even though the wings were torn from the fuselage!

I was now satisfied with the design and quite happy about the way the styrofoam wings worked out, so I decided to get started on my 'all-out scale' PT-17. The question was, "how scale is scale and how far did I want to go?" The main objectives for this design were:

1. Strength – be able to take bad landings, ground loops, and minor mishaps and still be able to fly.
2. Styrofoam wings – but still be able to duplicate all ribs and details.
3. Solid landing struts with workable shocks.
4. Scale 4" tires – made from two sets of Trexler (4½") tires, giving tire and tube, and inflating them to 4" for scale.
5. Wings to be fastened on exactly like the real aircraft.
6. Model was to be built without having to have a machine shop.

With these points in mind, I began to build. I finished it (other than interior detail) in the summer of 1967 and you can imagine what a blow it was when I read that Sterling Models was coming out with a kit of the PT-17 in the same scale! I thought to myself, "If they had come out with it a few years earlier, it would have saved me all this work!" After thinking it over, however, I was glad they came out when they did with their kit for two


F-1
1/2" HARD BALSA
F-2
1/4" PLYWOOD
F-3A
1/8" BALSA
F-3
1/8" PLYWOOD
F-4
1/8" PLYWOOD
F-5
F-6
F-7
F-8
F-9
F-10
NOTE
MAKE TWO OF F-1 THRU F-10 AND GLUE EACH SET OF HALVES TOGETHER
NOTE
BULKHEAS F-5 THRU F-10 ARE 1/8" BALSA
F-2A
1/8" BALSA
F-3B & F-3C & F-4A
NOTCH F-3B
1/8" BALSA
F-5A
1/8" BALSA
F-5B
1/8" BALSA
COMPARTMENT SADDLES
MAKE TWO EACH 1/8" BALSA
LOWER WING SADDLES
"A"
"B"
"C"
1/4" ALUM. MOUNT ENGINE PLATE
.60 ENGINE
1/4" PLYWOOD
DUMMY ENGINE
3/8" SQ. GUIDE RAILS
EYELETS
SERVO & MOTOR MOUNT RAILS
1/4" PLY WING MOUNT
TOP KEEL
3/16"X3/32" BALSA FILLET
3/16" SQ. STRINGERS - FULL LENGTH FOUR EACH SIDE
NOTE
PT-17 DUMMY ENGINE (220 H. P. CONTINENTAL) MOLDED OUT OF HOBBYPOXY GLUE WITH LAMP BLACK MIXED IN. STERLING'S PLASTIC ENGINE USED FOR MOLD. CONTINENTAL IS SEVEN CYL. ENGINE.
TO MAKE THIS MODEL A PT-13 INSTEAD OF A PT-17 MAKE THE DUMMY ENGINE A NINE CYL. (220 H. P. LYCOMING) BY USING THE WILLIAM BROS. 2" SCALE CYLS. OF THE "WASP JR."
NOTE
STRINGERS OMITTED FROM
VIEW FOR SAKE OF CLARITY
THE 3 STRINGERS ON BOTTO
EACH SIDE ARE 3/16" SPRUC
ARE 3/16" BALSA. ALL STRIN
TAIL END OF FUS. FORWARD
BULKHEAD WHICH IS SELF-I
BY NOTCHES IN BULKHEAD
ENGINE THRUST
0° RIGHT, 0° DOWN
INTAKE AND EXHAUST PIPES MADE FROM AUTO WINDSHIELD WASHER HOSE WITH SHAPED CLOTHSHANGER WIRE INSIDE. EPOXY TO REAR HALF AND F-1 ONLY
.60 ENGINE
OIL CAP
EYELET
1/4" DOWEL EPOXIED INTO WING
C.G.
+2°
1/16" MUSIC WIRE
PLEXIGLASS WINDSHIELDS MASK INSIDE AND CLEAR AREAS OUTSIDE- BUILD UP FRAME BY APPLYING SEVERAL HEAVY COATS OF DOPE-EPOXY PUTTY TO FUSELAGE
BLACK FUEL TUBING
F-1
F-2
F-2A
F-3
F-3A
F-3B
F-3C
F-4
F-4A
F-5
F-5A
F-5B
F-6
F-6A
F-7
1/2"X3/8" MOTOR AND SERVO MOUNT RAIL
FIRE EXTINGUISHER
RED
WHITE LETTERS
1/4" SHEET BETWEEN BALSA BLOCKS AND BULKHEAD GUIDE
1/2" BALSA BLOCKS
1/4" PLYWOOD
1/2" BALSA BLOCK
+2°
3/16" DOWEL
BOTTOM STRINGER
COVERS EPOXIED TO BACK HALF ONLY
BOLT MADE TO LOOK LIKE SPARK PLUGS HOLDS TWO HALVES OF DUMMY ENGINE TOGETHER
BALSA FILLET
PLYWOOD FILLET
1/2" BALSA BLOCK
1/16" TRIM TAPE - 3 LAYERS
BLACK ELECTRICAL TAPE ON SILVER BACKGROUND
SCALE PROP 13"-5-1/2 PROP FOR FLYING
NOTE
1/32" TRIM TAPE USED TO MARK OFF METAL PANELS ON FUSELAGE AND L.G. FIRE EXTINGHISER DOOR AND HANDLE ON BAGGAGE COMP. ALSO TRIM TABS ON ELEVATOR. APPLY TAPE ONLY AS LAST STEP AFTER MODEL IS COMPLETELY PAINTED AND RUBBED DOWN. ALSO AT THIS POINT PUT ALL NECESSARY LETTERING SUCH AS "FUEL 46 GALS.", "NO STEP", "LIFT" AND ETC. THESE LETTERS ARE RUB ON LETTERS FOR MODEL R.R. OR OBTAINED FROM AN ART STORE. AFTER ALL THIS IS DONE GIVE MODEL SEVERAL COATS OF CLEAR DOPE ESPECIALLY OVER TAPE & LETTERS. RUB DOWN ENTIRE MODEL WITH VERY FINE WHITE AUTO RUBBING COMPOUND & WAX.
BASIC FUSELAGE CONSTRUCTION
1- MARK LOCATION FOR BULKHEADS ON BULKHEAD GUIDE RA
2- SLIDE BULKHEADS ONTO GUIDE RAILS.
3- SLIDE IN SERVO MOUNT RAILS.
4- INSTALL LOWER WING SADDLES.
5- INSTALL CABANE AND LANDING GEAR STRUTS.
6- INSTALL BALSA BLOCKS AND SHAPE TO BULKHEADS.
7- INSTALL TOP KEEL.
8- NOTCH BALSA BLOCKS BEHIND AND OVER LOWER WING A STRINGERS.
9- FILL IN BETWEEN STRINGERS BEHIND AND OVER LOWER BALSA STRIPS SO THERE IS SOMETHING FOR SILRON TO A
10- SAND DOWN STRINGERS WHERE NECESSARY TO ACCEPT
11- INSTALL SHEETING.
12- YOUR OVER THE HUMP- PROCEED WITH CONSTRUCTION.



REFERENCES

3 VIEWS AND PICTURES	STEARMAN GUIDEBOOK FLYING ENTERPRISES 3209 CORAL ROCK L.A. DALLAS, TEXAS 75229
PICTURES AND DETAILS	MID-CONTINENT HAYTI, MISSOURI 63851
LYCOMING ENGINE DRAWINGS (PT-13)	AVCO LYCOMING DIV. WILLIAMSPORT, PENN. 17701
PICTURES 8X10 B/W .50 EA.	THE BOEING CO. P.O. BOX 3707 SEATTLE, WASHINGTON 98124
PICTURES, DRAWINGS, DETAIL INFO.	KENNETH D. WILSON AMA 14065 2324 E. FLORIDA EVANSVILLE, IND.
3 VIEWS AND DETAILS	AMERICAN MODELER OCT. 1961 AIR PROGRESS WINTER 61-62' AERO MODELER FEB. 1962
PICTURES AND DETAILS	PLANE AND PILOT JULY 1967 SPORT FLYING OCT. 1967
HISTORY AND PICTURES	BOEING AIRCRAFT SINCE 1916 BY PETER M. POWERS
EXCEPTIONAL PICTURES AND ALL AROUND INFO	SRA (STEARMAN RESTORERS ASSOC.) "OUTFIT" NEWSLETTER WALTERS PUBLICATIONS P.O. BOX 947 HESPERIA, CALIF. 92345

COLOR SCHEME FOR PT-17 AND PT-13D

LIGHT BLUE
1- FUSELAGE
2- ALL STRUTS
3- LANDING GEAR
4- WINDSHIELD FRAMES
5- CENTER SECTION LOWER WING BOTTOM

ORANGE/YELLOW
1- RUDDER
2- ELEVATOR
3- TRIM TABS
4- WINGS
5- FUEL TANK AND COMPRESSION BOW
6- REAR VIEW MIRROR
7- GAS SUMPS

GLOSS BLACK
1- WING WALKS (EXCEPT FOR ANTI-SLIP COATING-SANDPAPER)
2- PROP. BLADES (HOWEVER IN SOME CASES IT IS SILVER)
3- ALL LETTERING IS BLACK ON YELLOW SURFACES
4- HANDLES
5- COCKPIT EDGE PADDING
6- TAILWHEEL CUFF
7- GAS CAP

ALUMINUM
1- WHEEL DISCS
2- ENGINE FIREWALL (F-1)
3- PROP HUB
4- GUY WIRES
5- GAS LINES
6- LANDING GEAR LINKAGE

FULLER SPECIFICATIONS FOR BUTYRATE DOPE FINISHES

ORANGE/YELLOW	A/N 506FE	ORIGINAL TL-9038
LIGHT BLUE	A/N 501	ORIGINAL TL-9035A
RED INSIGNIA	A/N 509	ORIGINAL TL-9024
BLUE INSIGNIA	A/N 502	ORIGINAL TL-9026A
WHITE INSIGNIA	A/N 511	ORIGINAL TL-9025A

PLATE 1 OF 2

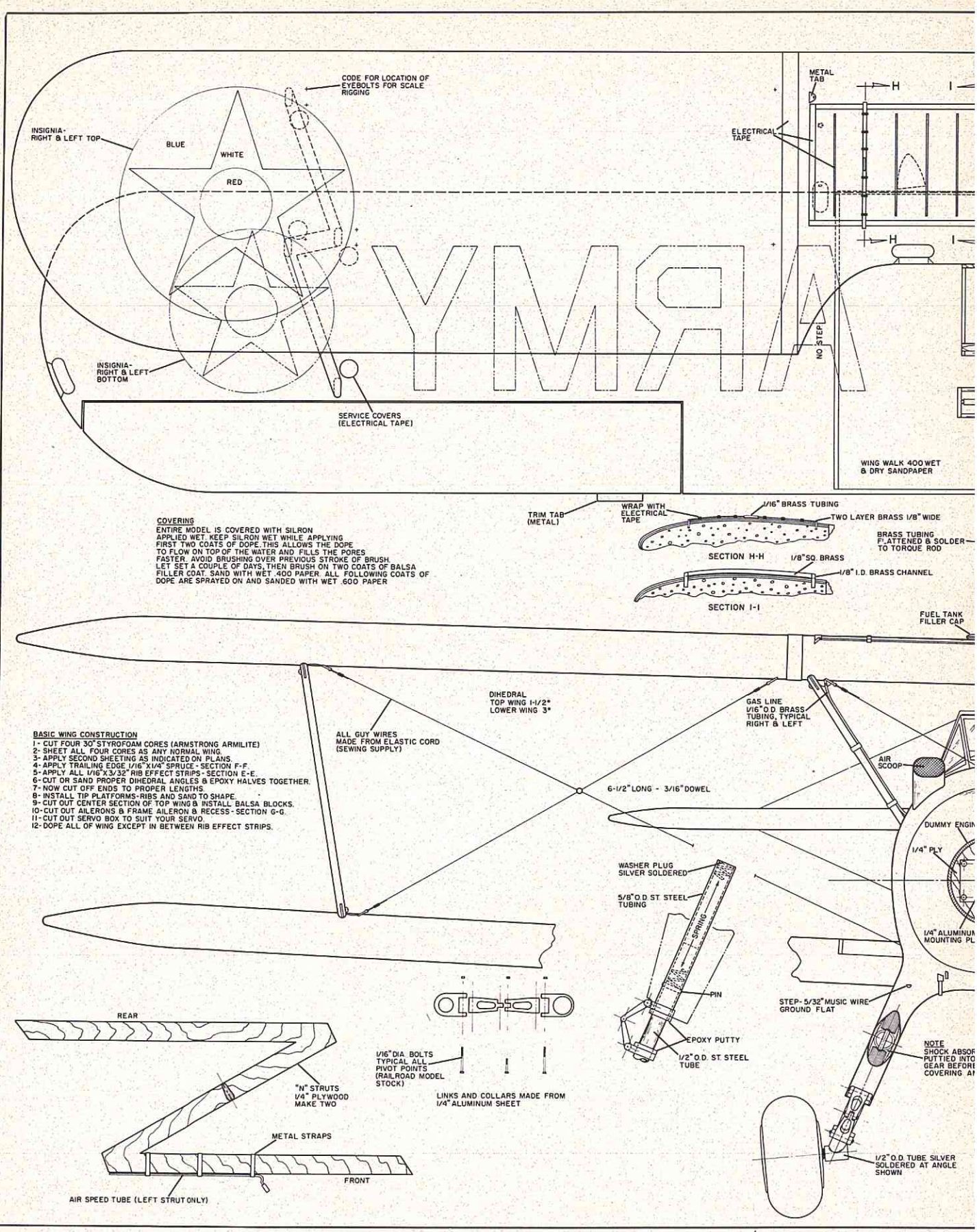
BOEING-STEARMAN PT-17

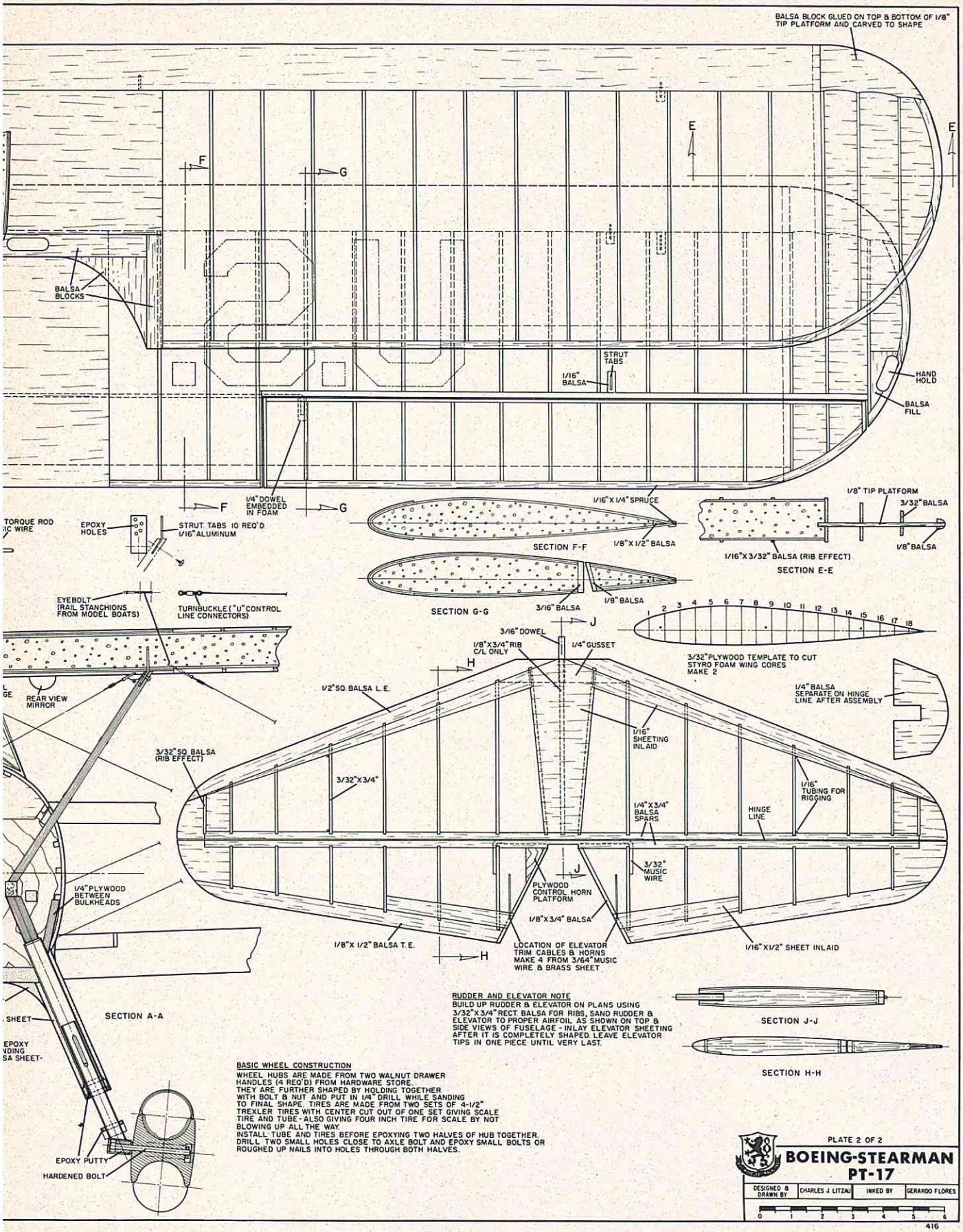
DESIGNED & DRAWN BY	CHARLES J. LITZAU	INKED BY	GERARDO FLORES

0 1 2 3 4 5 6

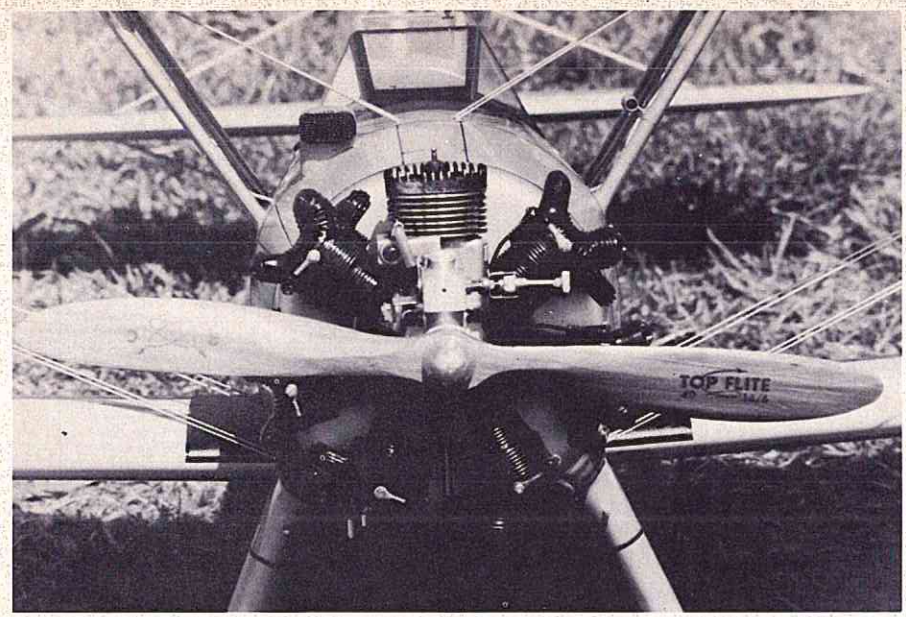
416

FULL SIZE PLANS AVAILABLE — SEE PAGE 71


CODE FOR LOCATION OF EYEBOLTS FOR SCALE RIGGING
INSIGNIA- RIGHT & LEFT TOP
BLUE
WHITE
RED
INSIGNIA- RIGHT & LEFT BOTTOM
SERVICE COVERS (ELECTRICAL TAPE)
METAL TAB
ELECTRICAL TAPE
NO STEP
WING WALK 400 WET & DRY SANDPAPER
TRIM TAB (METAL)
WRAP WITH ELECTRICAL TAPE
1/16" BRASS TUBING
TWO LAYER BRASS 1/8" WIDE
BRASS TUBING FLATTENED & SOLDER TO TORQUE ROD
SECTION H-H
1/8" SQ. BRASS
1/8" I.D. BRASS CHANNEL
SECTION I-I
FUEL TANK FILLER CAP
DIHEDRAL TOP WING 1-1/2" LOWER WING 3"
GAS LINE 1/16" O.D. BRASS TUBING, TYPICAL RIGHT & LEFT
ALL GUY WIRES MADE FROM ELASTIC CORD (SEWING SUPPLY)
AIR SCOOP
6-1/2" LONG - 3/16" DOWEL
DUMMY ENGIN
1/4" PLY
1/4" ALUMINUM MOUNTING PL
WASHER PLUG SILVER SOLDERED
5/8" O.D. ST. STEEL TUBING
SPRING
PIN
EPOXY PUTTY
1/2" O.D. ST. STEEL TUBE
STEP- 5/32" MUSIC WIRE GROUND FLAT
NOTE SHOCK ABSOR PUTTIED INTO GEAR BEFORE COVERING AI
1/2" O.D. TUBE SILVER SOLDERED AT ANGLE SHOWN
BASIC WING CONSTRUCTION
1- CUT FOUR 30" STYROFOAM CORES (ARMSTRONG ARMILITE)
2- SHEET ALL FOUR CORES AS ANY NORMAL WING.
3- APPLY SECOND SHEETING AS INDICATED ON PLANS.
4- APPLY TRAILING EDGE 1/16" X 1/4" SPRUCE - SECTION F-F.
5- APPLY ALL 1/16" X 3/32" RIB EFFECT STRIPS - SECTION E-E.
6- CUT OR SAND PROPER DIHEDRAL ANGLES & EPOXY HALVES TOGETHER.
7- NOW CUT OFF ENDS TO PROPER LENGTHS.
8- INSTALL TIP PLATFORMS-RIBS AND SAND TO SHAPE.
9- CUT OUT CENTER SECTION OF TOP WING & INSTALL BALSA BLOCKS.
10- CUT OUT AILERONS & FRAME AILERON & RECESS - SECTION G-G.
11- CUT OUT SERVO BOX TO SUIT YOUR SERVO.
12- DOPE ALL OF WING EXCEPT IN BETWEEN RIB EFFECT STRIPS.
COVERING
ENTIRE MODEL IS COVERED WITH SILRON APPLIED WET. KEEP SILRON WET WHILE APPLYING FIRST TWO COATS OF DOPE. THIS ALLOWS THE DOPE TO FLOW ON TOP OF THE WATER AND FILLS THE PORES FASTER. AVOID BRUSHING OVER PREVIOUS STROKE OF BRUSH. LET SET A COUPLE OF DAYS, THEN BRUSH ON TWO COATS OF BALSA FILLER COAT. SAND WITH WET 400 PAPER. ALL FOLLOWING COATS OF DOPE ARE SPRAYED ON AND SANDED WITH WET 600 PAPER
REAR
"N" STRUTS 1/4" PLYWOOD MAKE TWO
METAL STRAPS
FRONT
AIR SPEED TUBE (LEFT STRUT ONLY)
1/16" DIA. BOLTS TYPICAL ALL PIVOT POINTS (RAILROAD MODEL STOCK)
LINKS AND COLLARS MADE FROM 1/4" ALUMINUM SHEET



FULL SIZE PLANS AVAILABLE — SEE PAGE 71



reasons: (1) Their dummy engine of the Continental solved a big problem for me since I could use it as a mold; (2) I would never have had the experience and opportunity to really know what a great and wonderful sport and hobby this really is. This project would have been impossible without the aid, encouragement, and advice of the people involved in this sport/-hobby. I've yet to meet a scale modeler who had a secret way of doing something that he wouldn't share, or one who wouldn't help with all the information and encouragement he could give. It has been a great experience and I want to thank everyone who has aided me in this project, especially the informal U-control Scale Club in the St. Louis and East St. Louis area. They set a fine example that's hard to beat!

CONSTRUCTION

This plane can be made either as a PT-17 or PT-13, for both are basically the same except for instrument panel and dummy motor, as explained on the plans. I've tried to make the plans as simple and as detailed as possible and still be scale. It is not as hard as it looks at first glance. Why don't you try it? The following are some of the high points of construction:

Fuselage

The fuselage is designed to go together somewhat like a jigsaw puzzle. It can be almost completely assembled (with the exception of a few stringers and sheeting) without a drop of glue. It is held together by a few pins and rubber bands. In fact I would strongly recommend fitting it together in this fashion as far as you can go, to make sure everything is properly aligned.

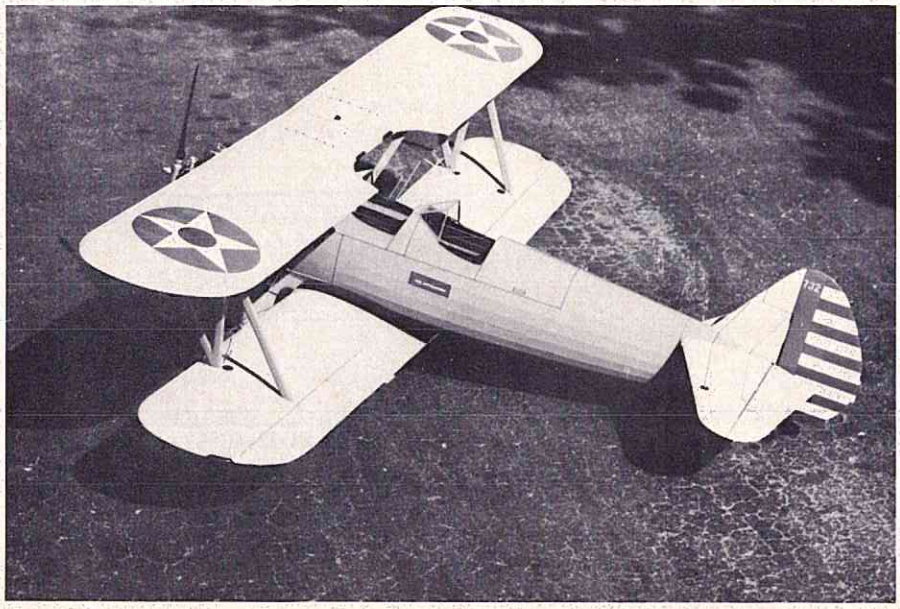
Cut out all bulkheads and glue the halves together. The best way to do this is to spot glue two thicknesses of the proper sheets of balsa (or plywood) together with rubber cement. Cut out the bulkhead halves giving you the symmetrical halves with one single cut. Glue the halves together. Slide the bulkheads onto the guide rails for proper position. Fit the top keel, lower wing saddle, cabane struts, landing gear, compartment saddle rails, and servo/motor rails in place. Install the necessary balsa blocks and some of the stringers at this time. If everything looks good, glue it all together. Carve the proper balsa blocks to the shape of the bulkheads. Groove the wing saddles and lower balsa block behind the wing to accept the lower sides and bottom stringers, leaving the stringers 1/8" higher than the balsa blocks. Sand down the stringers where necessary to accept the sheeting. Install the cockpit bulkheads and apply sheeting, with the exception of the compartment cover. Build up the compartment cover by installing the compartment bulkheads and the shorter compartment saddle rails and then sheet.

Shock Gear & Wheels

The shock gear is made from stainless steel tubing silver soldered together using a borox flux. The links are made from 1/4" sheet aluminum and are sawed, drilled, and filed to shape. The 1/16" bolts and nuts holding the linkage together are obtained at your local hobby shop in the train department. I would strongly recommend using the shock gear as they really work and aid greatly in making smoother landings.

After the shock gears are made according to the plans, they are fitted and epoxy puttied into the 1/2" (two 1/4" plywood epoxied together) landing gear strut, making certain to keep the epoxy out of the slot for the pin. After the epoxy is dry, sheet both sides of the gear with 1/8" sheet balsa and carve and sand to shape.

The wheels are made from walnut drawer knobs from the hardware store. Drill and bolt two knobs together with the bolt long enough to fit in a 1/4" drill. Mount in the drill and sand to shape while the drill is running. The tires are made by using two sets of 4½" Trexler tires. Cut the center out of one set which then becomes the tire. The other set becomes the tube. The tire and tube sets are installed on the wheel hubs



before fastening the two halves together.

Wing

'Styrofoam for scale' – to me that sounded great with all its apparent advantages, and it really proved itself out on my test model. However, now came the time to use it for scale, and the problem involved was the duplication of the ribs and all the other pertinent details. After some thought, I decided to cut the cores 1/8" smaller than the full wing rib. This would allow me to sheet the wing with 1/16" balsa sheeting and double sheet it in the 'solid areas' and duplicate the ribs with 1/16" x 3/32" strips.

The steps of construction are as follows:

1. Cut four 30" styrofoam panels (Armstrong Armalite) using the templates shown on the plans. There have been several good articles on how to cut styrofoam wings in past issues of model magazines. For one of the most recent and one of the best, see R/C Limited, Summer 1968, published by R/C Modeler Magazine. Also, you can trace the template and send it to several firms that will furnish the material and cut the cores for you at a very nominal cost.

2. Sheet all four cores with the first layer of sheeting. Be careful when wrapping around the leading edge so that it does not crack. This can be prevented by wetting the outside of the sheeting as you come around the leading edge.

3. Install the second leading edge sheeting, taking the same precautions.

4. Install the center section, sheeting, trailing edges, and rib effect strips.

5. Cut the proper dihedral angles and epoxy the halves together.

6. Cut the wing tips off to their proper length and groove each tip to accept the wing tip platform.

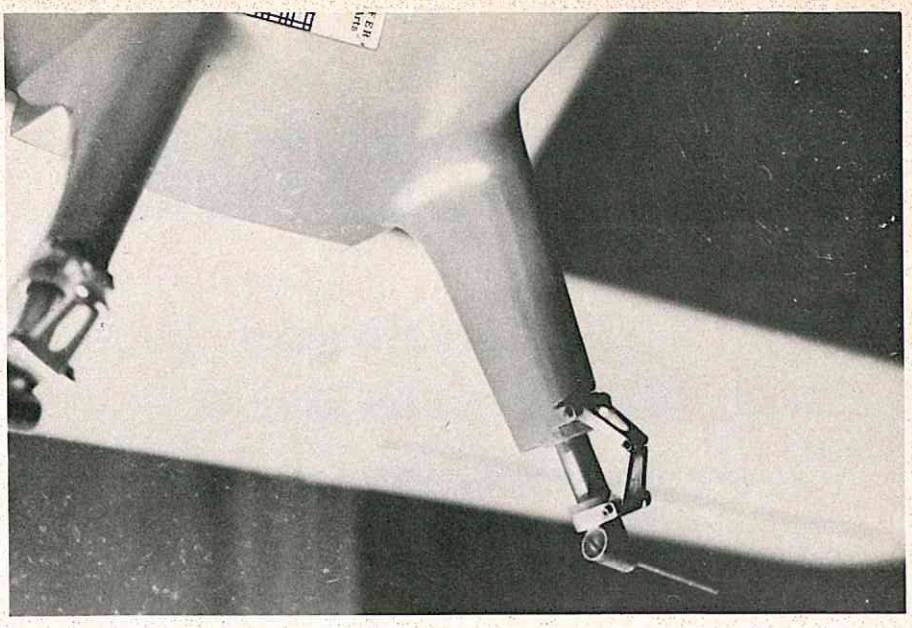
7. Install the wing tip platforms. Build up and sand to shape, making certain not to go below the level of the rib effect strips.

8. Cut out the rear center section of the top wing and build up and shape according to plans.

9. Cut out the ailerons on the lower wing. Frame the recess sections and ailerons as indicated on the plans.

10. Cut out the servo box to fit your servo and fit the aileron hinges and torque rods. There are so many types of hinges that I am leaving this up to you.

11. Caution – when doping the wood areas of the wing before covering, be careful not to dope the areas between the rib effect strips. Remember, you have only 1/16" between the silron covering material and the balsa sheeting. You do not want the silron to get stuck in these areas when doping!



Elevator and Rudder

Build the rudder and elevator on the plans as usual; however, keep the fin and rudder pinned together and the stabilizer and elevator pinned together as individual units. The tips of the elevator are not cut until the very last. The ribs are rectangular pieces of balsa that are sanded to proper airfoil, after these units are dried and taken from the plans. After the airfoil is sanded, apply sheeting on the elevator by recessing into the ribs. The fin is then mounted onto the stabilizer and is built up as a removable tail section.

RADIO GEAR

At this point I would recommend that you install your radio gear - keeping everything as far forward as possible. Make sure that everything works freely. Remove the radio gear and prepare the model for covering.

COVERING

Clear dope all the areas with which the silron will come into contact, using two coats, then sanding lightly. When you are satisfied that all the nicks are filled and there are no rough spots, give it all another coat of clear dope. Check once more for rough spots, but try not to sand this coat unless absolutely necessary. This final coat, before covering, is to seal the balsa from the moisture in wet covering.

I used SILRON because of its cost,

(continued on page 67)

MOLDING WITH SILICONE

STEP-BY-STEP TECHNIQUE FOR EASY-TO-MAKE SILICONE MOLDS FOR YOUR FIBREGLASS PARTS.

BY CHARLES BROCKMAN

My original intention was to write a short paragraph or two describing my method for R/C model part molding, but the more I worked with it, the more I could see how it would appeal to most modelers with limited facilities and patience, so I decided to outline the complete process.

The method, as described here, is really a combination of many ideas learned from the past five years of experimentation. First of all, we will consider just what qualities we want in a good molding process.

(1.) In any process using the female mold, a male mold or plug must be made first. In most cases, this part must be highly polished, which is very time consuming and, let's face it, some guys can't put a good finish on a billiard ball, so they never even start! Our ideal male mold should require very little finishing.

(2.) Our female mold should be easily cast over the male plug without elaborate waxing, mold release, etc.

(3.) The finished mold should be flexible to allow for easy removal of the molded part.

(4.) It should need no release agent.

(5.) It should be able to withstand the high temperatures of some of today's thermal curing resins.

(6.) It should be indestructible if we make a mistake. There are probably other considerations but the above are the most common. The following meets these requirements.

MALE PLUG

There are many methods for making a male plug and the determining factor is size. Small parts can be made from balsa. For larger parts, such as fuselages, balsa becomes too costly. For this discussion, we'll stick to balsa and figure that we will make cowls, cheek cowls, wheel pants, etc. For anything larger, you're on your own as to the choice of materials, although the female mold process to be described remains the same.

To start with, make an exact replica of your finished part from balsa. (Medium hard or hard is best.) Using contact cement, secure this to a flat piece of material used as a base, such as a scrap piece of formica, micarta or anything smooth. Leave about a two inch excess all around. Finish the balsa with about four coats of dope, or your favorite finishing method, keeping in mind that it doesn't have to be such that if a fly landed on it, he would slip and fall on his fanny. In other words, just an average finish is required. O.K., for you purists the better the finish here, the more it will reflect in the finished part. I am only giving you the minimum requirements, so you can go as far as you desire. When you are satisfied with your male plug, proceed as follows:

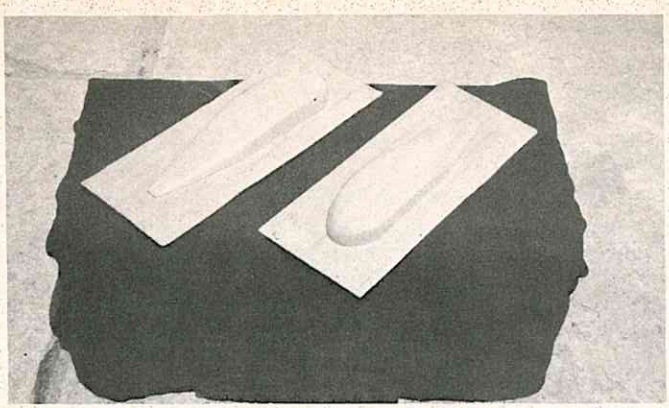
Spray any good dry lubricant, such as Cadco or Silicone, etc. This only has to dry 5-10 minutes. Now, depending on the size of the job, obtain as many tubes of Dow Corning Silastic white silicone or any of the similar products now available. These products are probably also available in larger quantities such as quarts or gallons if necessary. Figure on enough material to build about 3/16" thickness over the entire plug, including about a one inch flange all around. For most jobs, a couple of tubes is sufficient. Squeeze the material, or pour, and then, with a water dampened finger, do the best you can to keep a uniform coating. This is not really critical as long as there are no really thin spots.

After the silicone has cured 3 or 4 hours, DO NOT remove from male plug. Take a box in which you can set the entire mold and still have a little space left all around. Make it a little deeper than the mold, such as a cigar box, or any cardboard box. If it fits in a matchbox, forget this part! Mix a batch of patching plaster sufficient to fill the box so as to be able to sink the mold to its flange and still have a little left at the bottom. (Of course open side up! Gee whiz!! Boy, some guys!) Place the Silastic mold in the plaster and use something as a weight to hold it down to the mold flange. After sinking the mold to the flange, if the mold is larger than two inches, pour additional plaster inside the mold to the top in order to equalize the pressure and prevent distortion. At this time, I would like to say that Silastic clear seal will not stick to anything, so it's not necessary to protect it with another material. When the plaster sets, you simply lift out the material on the inside and throw it away and remove the Silastic shell. It would probably be best to stick an old piece of dowel or something into the wet plaster on the inside material before it sets, to make it easier to remove when it is set.

Now place the shell in the base and have at it with anything your heart desires, Epoxy, Polyester, Liquid Steel, you name it . . . It won't stick!! When cured, simply remove the shell from the base and peel away the 'flexible' mold. Now we have a mold that requires no release agent, wax, etc. It's stiff when it's supposed to be stiff during the molding process, flexible when necessary to remove, not affected by heat generated by the curing process, and practically indestructible by the very nature of silicone rubber. In addition, the plaster base makes it very easy to work in, since it's heavy enough to stay put.

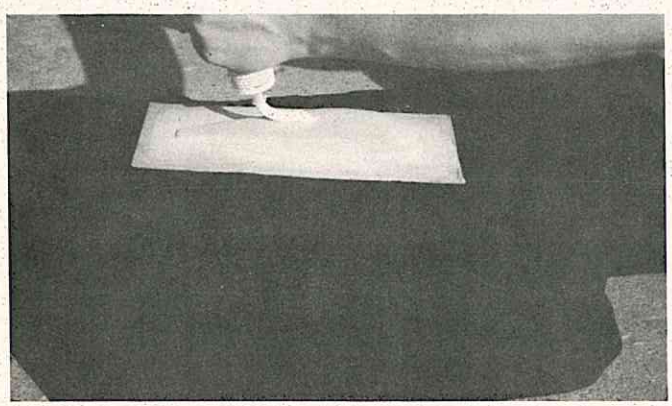
This may sound like a lot of work, but I made the male plug, silicone mold, and plastic base in one evening due to the short curing times of all the materials used. If you enjoy making your own parts, give this a try and if you do well anywhere along the line, the material cost is very low.

Good luck, and feel free to drop me a line or two if you run into anything unusual. I'll be glad to help, if I can. ●

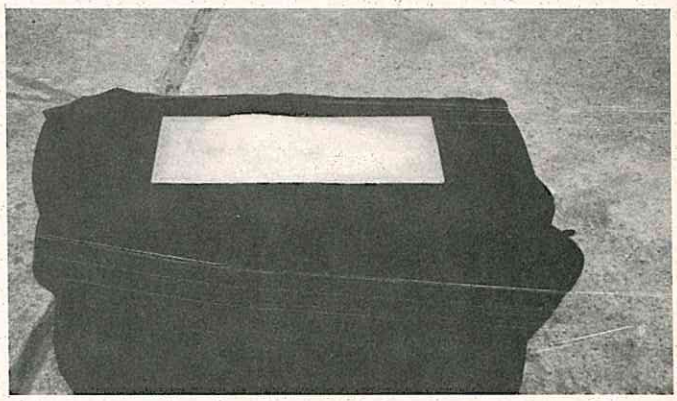


Finished balsa male plugs. Finished with Hobby Poxy II and scraped.

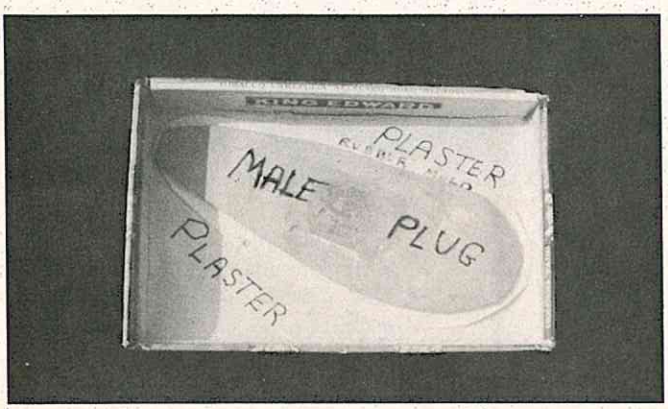
Spraying the male wheel pant plug.



Squeezing on the silicone.



The silicone during curing period.



The mold box with plug inside.

Peeling mold from plug. Next, trim with scissors.

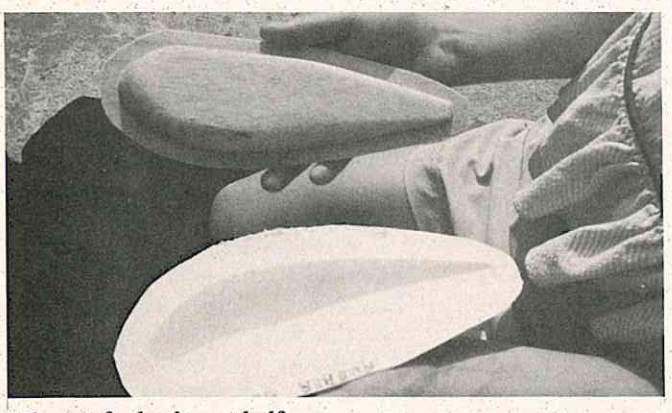
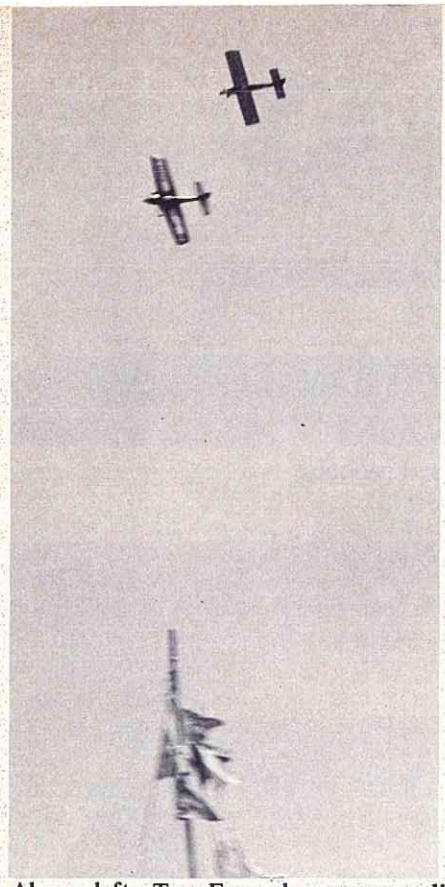


Photo of wheel pant half and silicone mold.

Finished wheel pant made from 3 layers of fibreglass cloth.



TEXT AND PHOTOS BY

DON DEWEY & PAT CREWS

ADDITIONAL PHOTOGRAPHS BY

J. ALEXANDER • BUD ANDERS • CHUCK CUNNINGHAM

Above, left: Two Formula racers rounding a pylon at Turlock. Above, rt: A portion of the pit area.

TURLOCK

R/C Modeler Magazine's four thousand mile trek through the West and Southwest had, as its first stop, the Western States Pylon Championships, sponsored by the Pioneer RC Club at Turlock, California. Although held during the weekend of the full scale Air Races at nearby Reno, Nevada, a total of 85 RC aircraft competed for $430.00 in prize money as the two day event in Northern California provided five rounds of flying for the Formula I's and II's and four rounds for the Open category. At the second annual offering of the Western States Championships, fifty-two Formula I's, ten Formula II's and twenty-three Open class aircraft were entered as fliers from California, Oregon, Washington, and Texas competed with times that turned out to be the fastest ever recorded to that date.

The two day event began with the Formula II heats where Texan Don Yockey's sport biplane, the Li'l Toot, Roger Grigsby's P-40, and Dick Riggs' Schoenfeldt Firecracker, added variety to the line-up of more conventional Goodyear type racers. At the conclusion of the five rounds of flying, Garry Korpi ended up in first place with a scorching 1:53.3 as his S.T. powered Ballerina nudged out Bud Phillips, whose SuperTigre/Rivets combo turned the pylons in 1:56.6 seconds. Whit Stockwell was third with a time of 2:01.2.

The virtually unbeatable Jim Jensen, renowned for his kits of the Kwik-Fli and the Ugly Stik, showed his winning form in the Open Pylon class by turning a 1:47.4 time with his SuperTigre powered Kwik Fli. Following closely for a second place win was Jimmy Witt with a 1:49.0, while third place went to Robert Palithorp with a 1:58.2.

Although the official AMA Rule Book categorizes the Open Pylon event as one for aerobatic type aircraft, the twenty-three entries in this category were specialized racing machines of the highest calibre. Although currently dominated on the West Coast by the .60 powered machines, there were several aircraft with engines in the .29 and .40 displacement categories, which evidenced little difficulty in posting times close to the larger six pound aircraft. The use of the smaller aircraft with the racing .40's may well become a definite trend in Open during 1970.

With fifty Formula I racers scheduled to fly during the two days at Turlock, it seemed virtually impossible that all fliers would have a chance to compete. It is indeed a tribute to the Pioneer RC Club, and to individuals such as Sam Crawford, Glenn Spickler, Warren and Simone Olsen, Fran Strickland and Charlotte Brink, and the many others who made it possible for the record number of entrants to each have an opportunity to compete. As it turned out, with thirteen races to a round, two heats were run Saturday afternoon and two

It's only a short distance from the pits to the ready line, but a long way from the starter's flag to the winner's trophy. Below, rt: The winning team of Faber/Nupen at Turlock.

TO TEXAS

more completed by mid-afternoon on Sunday. By the completion of the fourth heat, eleven fliers were separated by a four point spread, and by the fifth run, only Bror Fabor and Joe Bridi remained with perfect records of twenty points each. Since both were on the same frequency, the tie was decided by the fastest heat time, with Bror Fabor ending up pocketing the $100 first place money with a time of 1:45.8 and Joe Bridi second with a 1:47.4 time. Third and fourth places in Formula I were decided by a fly-off between Bob Smith, of the B/S Racing Associates, and Mike Bridges, with Smith securing the third place slot on a time of 1:49.2.

A three way tie developed in fifth place between George Killeen, Gary Korpi and Jimmy Witt, with Killeen recording the fastest time ever posted in Formula I at 1:43.6.

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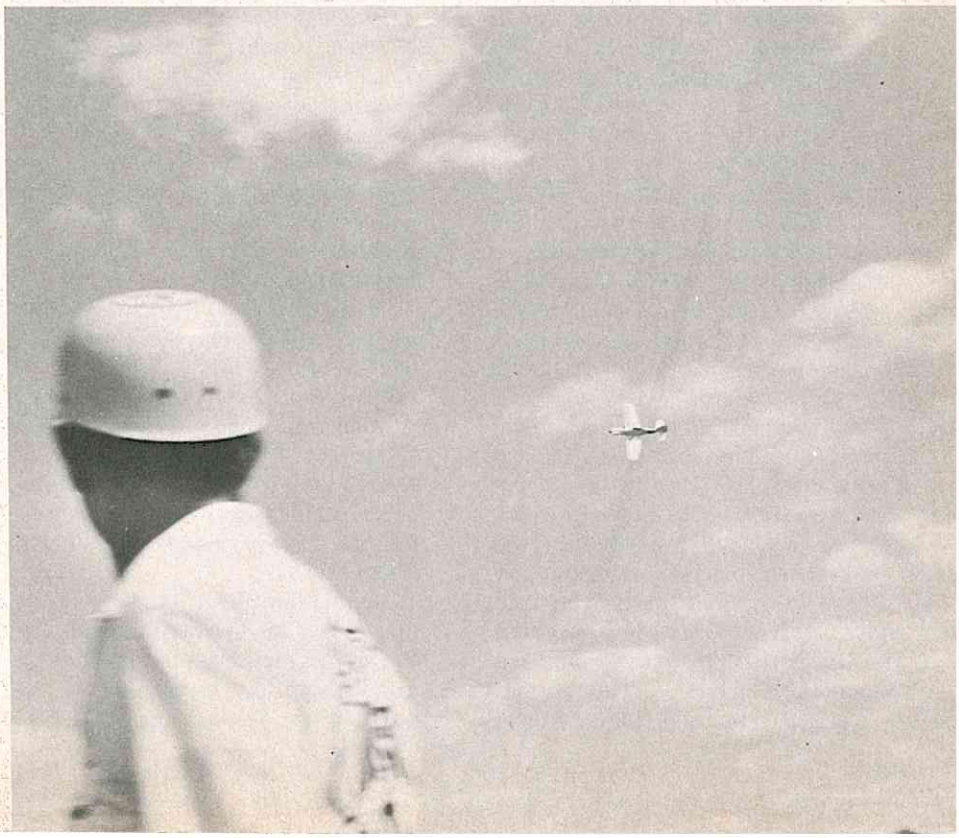
The second leg of our journey took us through the deserts of California,

The lead aircraft rounds the pylon at Thunderbird Field, Texas.



Top: Tom Protheroe and beautiful Brigand at Turlock. Above: M.A.N.'s man in the N.M.P.R.A., Ed Shipe.

Top: The start of a Goodyear heat at Thunderbird Field, Ft. Worth. Above, lt: Bud Anders and Larry Leonard, A/L Racing Team with Stafford Minnow. Rt: Ted White, Albuquerque, N.M., one of nation's top fliers.

Nevada, and Arizona, and through the great plains of West Texas to Thunderbird Field at Lake Benbrook, site of the Southwest Pylon Racing League Championships, sponsored by the Fort Worth Thunderbirds. No spot in the country could be more beautiful for the two day racing event than the Thunderbirds' paved runways located amidst the lush greenery that borders Lake Benbrook. A spectacular contrast to the miniature pylon racers is provided by the F-111's, the aerial tankers, and the B-52's which pass at low level over the field as they make their way down ILR slot to nearby Carswell AFB.

Competing in the West Texas racing meet were entrants from virtually every part of the Lone Star State, and from as far away as Wichita, Kansas. The first day of the event was marked by 85 degree temperatures, clear skies, and steady winds up to 15 knots. Heat times were high, although falling short of the record and near-record times recorded at Turlock.

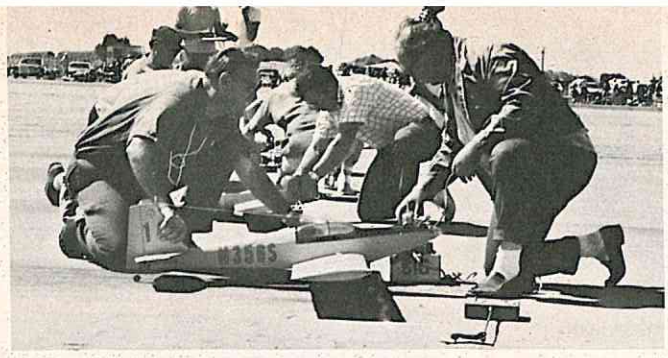
At the conclusion of Saturday's racing, the enthusiasm and excitement of the competitors were matched by the congeniality and friendly welcome extended by the hosting Thunderbirds at their banquet. Presided over by Thunderbird president Ed Rankin, and emceed by the well-known modeler Bob Lutker, the Fort Worth Club provided all of the contestants and their families with an evening of fun and good fellowship that would be hard to top even in a state whose motto is friendship.

Following a drastic weather change, which even included a tornado strike in Dallas, less than 30 miles away, Sunday morning saw extreme cloudiness and high wind conditions for the second day of racing. After several disasterous crashes, a sudden torrential downpour brought the pylon races to an incontinent end.

And, although we'll have to take a rain check on the Southwest Pylon Racing League's meet for 1969, there was little, if any, dampening of the spirits of the Texas racing pilots. The Southwest has, indeed, made its mark in racing circles, and promises to be a formidable challenge when the Formula racers turn the pylons again in 1970. The keen competition and skill of the Texas pylon fraternity is exceeded only by their truly outstanding sportsmanship and hospitality.

"Y'all come back . . ."

No visit to the Lone Star State would be complete without stopping by EK Products, Inc., the home of the famous Logictrol Proportional Systems. In the latter part of 1966, Bob Elliott, President of EK, and Gerry Krause, Vice President, moved their operation from Southern California to Euless, Texas, just outside of central Fort Worth. After a few minutes at the home of the famous 'Red Box' you cannot help but be impressed by Bob and Gerry's pride in their precision manufacturing techniques and demanding standards of quality control. Although design research is a continuing process at EK, there is a complete absence of the malefic tech-

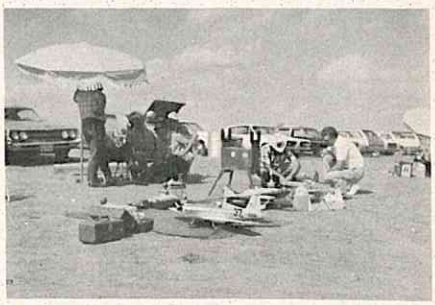


Joe Bridi holds as Lou Stanley starts his engine for Goodyear heat at Turlock.

'Elliott's Ecstacy', an ancient Smog Hog. L. to R: Bob Elliott, Gerry Krause, Don Dewey, Chuck Cunningham.

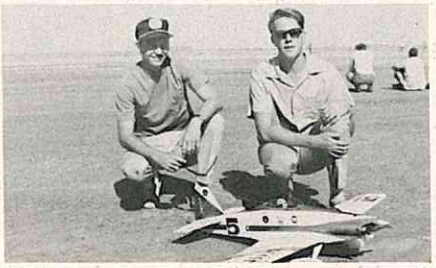
Ed Rankin, Thunderbird prexy, addresses fliers and guests.

Ft. Worth spark plug, Bob Lutker, at traditional banquet.



Early morning arrivals at Thunderbird Field.

Judging line-up at Turlock.



A Formula I 3rd for Smith/Bertken.

. . . and the inevitable.

nique of 'planned obsolescence', a merchandising idea that, unfortunately, seems to have become a cancerous part of our 20th century industrial technology. Among the new developments at Euless, are some extremely outstanding products from their molding department. Among these is a complete line of the finest servo trays we have seen to date. We obtained a production sample of each of these units, which include a tray for the mounting of four servos and the receiver on one board; two servos behind the receiver on a single tray, with the motor control servo mounted on the tray, but underneath the receiver; side by side servo mounting tray; individual servo mounting units; and the conventional single aileron mount. The idea of mounting the receiver on the same tray as the servos has worked out extremely well, with more than adequate shock mounting, and eliminates the cumbersome foam wrapping of the receiver-decoder. The only application where we might have some doubt as to its advisability, would be in the case of a Goodyear racer. Each of these trays enables the individual to mount his servos in such a way that it is impossible to over compress the servo mounting grommets. Yet, each servo can be individually removed from the tray with complete ease, and without the necessity for removing the tray from the fuselage, or dismounting the other servos adjacent to it. In addition to these needed accessories, E. K. has developed further refinements to their other molded parts, such as the stick yoke assemblies, etc. Although they may go unnoticed by the individual purchaser of a Logictrol system, the continuing development of these 'hidden' items are a 'must' to E. K. in their continuing research and development toward an even more outstanding product.

There was only one area in which we felt somewhat puzzled. Since it is a well-known fact that Bob Elliott was, to a large degree responsible for the micro miniaturization of our current day proportional system, we were somewhat surprised to see his 'test ship' for the lightweight E. K. systems - an ancient, battered, fuel-soaked, dog-eared, and completely disreputable Smog Hog! Although Gerry Krause apologized profusely (in private) for this somewhat unexpected return to nostalgia, we left the plant rather quickly, since I had the inexplicable feeling that Bob was going to try to sell us a construction article for his pride and joy. I just didn't have the heart to tell him . . .

Before leaving on our return trip, we spent a most enjoyable day at Lake Benbrook with Chuck Cunningham and Helmer 'Gate-Mouth' Johnson burning up a gallon or two of Tiger fuel in Chuck's $7.50 Ply-Fli, a '3-evening' pattern ship that features a 1/32", one piece plywood fuselage, with cardboard covered foam wings. One evening is required for the fuselage, another for the foam wings, and a third for painting the entire ship. Total finish used was two coats of Ditzler acrylic enamel sealer and two brush coats of orange acrylic enamel

Left: Bob Francis doubled on microphone at Turlock. Above: Gary Korpi (center) reacts to Larry Leonard's (R) posted 1:46 as RCM's editor listens. Above, R: Don Yockey flew from Texas to attend California meet. Right: Hard working Sam Crawford and officials at Turlock.

Larry Williams and 'Miss San Bernardino' at Turlock.

International Models' unique open entry.

. . . and a bit of horsing around at Benbrook before leaving for home.

automotive finish. The results are more than acceptable, and the five and ½ pound, Enya .60 powered airplane is a true performer. The wing cores are Sun Fli 3 panels while the fuselage is the same one for which templates were laid out in the October 1969 issue of RCM. If you want a fast building, durable, high performance sport or stunt ship, we can do no better than to recommend this one to you. Helmer was flying a 'Wet-Fli', a stock Sun Fli on which the epoxy paint had never quite dried! To most modelers this would, indeed, be a frustrating problem, but not so with Helmer, since his airplanes never last very long anyway!

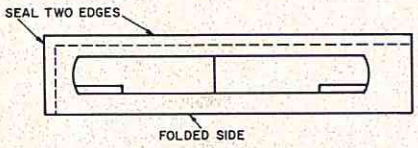
A couple of days later we arrived in Albuquerque, New Mexico and contacted Ted White, one of the nation's top fliers, owner of Galatron, Inc., and an old friend of many years standing. Although Galatron is one of the smaller proportional manufacturers, their radio system makes up in quality for what it may lack in sales volume. The Galaxy 5 system is designed for the true flier - no unnecessary frills or gimmicks, but an advanced electronic circuitry and 'built-in' reliability that makes it hard to beat on any flying field. Whether it be in the construction of the Galatron systems, or in his repair work of the older F & M proportional rigs, Ted is a technician whose regard for the individual modeler makes him an absolute perfectionist. Both the new Galatron system and repair units of other manufacture, are test flown and must meet Ted's standards of performance before they are returned to the individual RC'er. In fact, this procedure resulted in an accident during a test flight, several months ago, in which Ted flew a .60 powered multi into himself at full power and lived to tell about it! As Ted told it, he was lying on the ground covered with blood from prop cuts across his stomach and he locked around and could see the entire airplane – except the engine! Although it turned out to the contrary, he knew that the .60 and 11-7 prop was embedded somewhere in his stomach.

One of the most interesting aspects of the visit in Albuquerque, was the receipt of a forthcoming article (Feb. 1970) from Ted White and Dan Parsons concerning their application of RC aircraft to engineering research with the Sandia Corporation and the Atomic Energy Commission. This is one of the most fascinating projects we have seen, and illustrates the fact that we have barely scratched the surface of RC's potential as an engineering and research tool.

And thus, the highlights of a 4,000 mile journey that took us from Turlock, California to Fort Worth, Texas and back again. And, no matter where it is in the world that you go, whether Texas or Tasmania, radio control enthusiasts are a group of individualists who speak the same language, hold the same high ideals, and share a common fraternal bond with their fellow modelers everywhere. ●

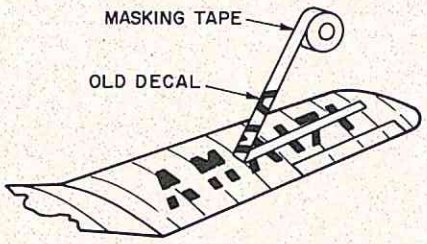
FOR WHAT IT'S WORTH

Howard McHenry of Wheelersburg, Ohio, uses the following method for protecting the finish on his aircraft. First, he purchases four mil plastic film from his local building dealer from which he makes plastic covering bags for both the wing and the fuselage. For the wing bag, Howard uses a sheet of plastic 6" longer than the wing, itself, and a little more than twice as wide after folding lengthwise. He then seals one end inside of the plastic by running a hot iron over a cloth placed over the edge of the plastic, leaving one end open. This same method can be used for the fuselage bag as well, providing excellent protection fo; your newly finished model.



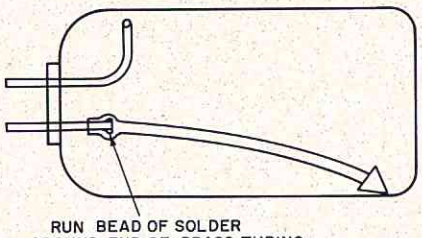
PLASTIC WING AND FUSELAGE BAG

If you have ever had the necessity for removing decals, in order to facilitate repairs or repainting of your aircraft, you will agree that it is definitely a problem. Charles Baley of Fremont, California, found a solution for this situation which consists of placing masking tape over the decals and pressing down firmly. Then, simply by removing the tape briskly, the decal is also removed. Bear in mind that some decals have a clear film between the letters which will have to be removed in the same manner with a second application of tape.

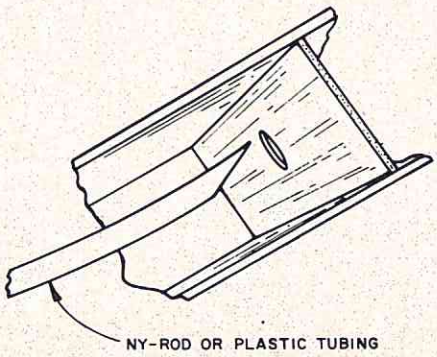


The new S-4A servos may easily be made to work with the Digitrio/-Digiquad system, contrary to preliminary statements by the manufacturer. Build the servo up for Orbit modifications as shown on the instructions with the kit, making the following changes: substitute 2.7K for the 3.9K timing resistor; substitute two 1.2K for the two 470 ohm resistors on the feedback potentiometer circuit board. This arrangement gives about 110% throw to the originator, Douglas Sticht of Tucson, Arizona, since he is using the Bonner sticks on the transmitter. Wire the servo plug as follows: black (ground) from servo to orange (1.2V) from the decoder; red (plus 4.8V) from servo to red (plus 6V) from the decoder; white (plus 2.4V) from servo to yellow (plus 3.6V) from the decoder; yellow (signal) from servo to blue (signal) from the Digitrio decoder. Doug is currently using this arrangement and it works quite well and should allow many modelers to obtain a second airborne system with good servos at low cost.

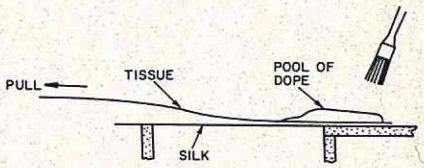
How many times have you had the fuel pick-up line slip off inside your gas tank? Noble Hider, of Greve Coeur, Mo., simply runs a bead of solder around the end of the brass tubing to form a lip and the tubing has yet to come off.


RUN BEAD OF SOLDER AROUND END OF BRASS TUBING

Phil Johnson of South Bend, Indiana, writing in the Tri-Valley RC Club Newsletter, wonders if you have ever tried to insert a long piece of NyRod tubing into the same diameter hole in an inaccessible place in the fuselage? Next time, try cutting the end of the tubing at a long slant, creating a point which can be readily inserted into the hole, facilitating an easy installation of your NyRod.



Although we haven't tried this method ourselves, Capt. Will Mitchell of Oklahoma City, Okla., suggests the following as the easiest, quickest, and lightest method of doping silk; it also covers completely with one thin coat! Will's method is to tear off approximately 8" of toilet tissue of the single ply, cheap variety. Lay it on the silk so that the torn edge extends just beyond the edge of the silk towards the wing root. Using unthinned dope, brush a heavy pool of dope onto the last 1" of the tissue right up to the edge near the wing root. Now, gently start pulling the tissue forward toward the wing tips, leaving a trail of dope behind. Replenish the pool of dope as it is depleted, being most careful not to let the brush touch the silk or the dope will run through the silk at that point. The idea is not to brush the dope through the paper but rather to let the tissue paper work as a brush. According to Will, you'll find you can even repair 1/4" wide splits in silk this way without using a silk patch! The weight is about 1/3 of a barely filled piece of silk that was simply brush doped in the conventional manner.



Hal Humphrey of Illinois, suggests a simple and efficient means of weighting down the sheeting on a wing, stab, or fin. First, lay the wing panel to be sheeted on a flat surface. Next, using balsa strips, support the front and rear of the ribs, placing them so that the wing is true. Now you are ready to put your pre-cut sheet in position. You can use masking tape along the entire leading edge to hold the panel in position. Then apply glue to all the ribs, etc., with the panel folded back. Now lay the panel down over the ribs and pin along the entire leading edge. Lastly, lay piles of old RCM's on top of the entire section. The magazines conform to the rib shape and a sufficient number of them will hold down the panel in the proper position until the glue sets up hard.

CONTINUOUS SPEED CONTROL FOR MODEL BOATS

BY ROBERT A. SULLIVAN

RCM Digitrio used by author.

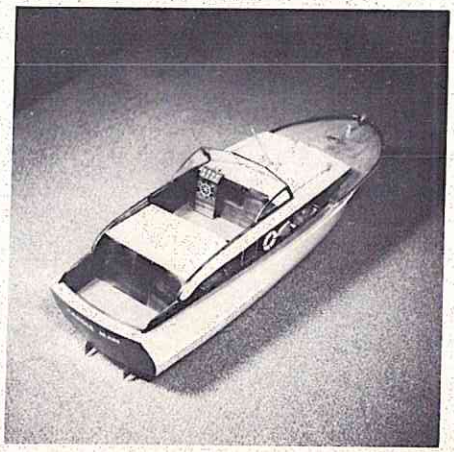
The control circuits that are used in your remote control model determine, to a large extent, how successful and how versatile your model will be. The following description of the control circuit I used in my model boat to provide continuous speed control should prove informative. Modification of the basic ideas presented should be useful for many types of model boats powered by small electric DC motors.

The model was built from a Sterling kit number B-15; a 1/10 scale model of the 42 foot Chris Craft Corvette. The interior of the model was modified to make room for my motors, control equipment, and batteries. Remote control is by RCM DIGITRIO modified for 6 channel operation. The transmitter operates in the 6 meter Amateur Radio band. I use only three channels for this model. The following paragraphs describe the control circuit I used to obtain speed control for the twin 28 VDC electric motors which were obtained surplus for approximately $3.00 each. The motors are rated at 1/20 HP at 3900 RPM each. Both field and armature connections were external on these motors which made reversing them much easier. (The popular PM motors are even easier.)

When small DC motors are subjected to a fairly constant load (as in turning a small propeller under water) their speed will be approximately proportional to applied voltage. Speed control, therefore, may be obtained by merely applying different voltages across the motor. In a model we are interested in conserving space and weight as much as possible and, therefore, usually turn to semi-conductors for control devices. The above requirement precludes the use of a simple variable resistor in series with the motor since a variable resistor of adequate power capacity is large and HARD to rotate. This is an important point when the motive force is a small servo. Since continuous speed control is desirable, any switching arrangement utilizing rotary switches or relays is eliminated. To meet the above requirements the circuit of Figure 1 was developed.

Utilizing a useful characteristic of the transistor - current amplification - Q1 determines the amount of current through and hence the voltage across the motor. The setting of R2 determines base current of Q1 and therefore the amount of collector (i.e. motor) current that may flow. Recall that in a transistor the current that will flow in the collector is approximately the current gain of the transistor times the base current. The transistor selected for this application has a minimum current gain of 20. Since the motors I used required approximately 2 amperes for operation, a base current of roughly 100 ma maximum is necessary. R2, the speed control potentiometer which varies the base current of Q1 is driven through a gearing arrangement from one of the DIGITRIO servos through an angle of approximately 210 degrees.

Scale speed (flank) app. 35 knots.



When the servo drives the arm of R2 to point A, Q1 is biased such that it is saturated. In other words, a base current of approximately 100 ma is allowed to flow and the motor will draw 2 amperes and run at full speed. When the arm of R2 is near point B, Q1 is biased at cut-off. This is, base current is zero, collector current is zero, and the motor does not run. As the arm of R2 is moved by the servo from point B to point A, the action of Q1 will gradually allow the current through the motor to increase (and, of course, the voltage across it) and the motor will run progressively faster.

Microswitch S2 is shown in its normal position. It is positioned such that when the arm of R2 is slightly past point A, it is switched by the servo and applies a higher voltage across the motor for FLANK speed operation. (NOTE: Most small motors will operate at 150% of their design voltage for short periods without damage.) Notice that in this condition the collector and base currents are zero and therefore no power is being wasted during FLANK speed operation. It is for this reason the motor is placed between emitter and battery rather than between collector and battery which is more conventional. A step by step procedure for determining the values of R1 and R2 for most small motors is included as an Appendix.

Microswitch S1 serves two functions. It is shown in its normal

position. It is closed by the servo when the arm of R2 is positioned slightly past point B. The 'A' contact reverses the motor. In my application a relay is used to reverse current flow through the field winding of the motor. The 'B' contact effectively 'moves' the arm of R2 to the A position to allow Q1 to be biased to saturation. Thus, in REVERSE the motor runs at fast speed. This is useful for effective backing down. I found a variable reverse speed to be of limited value.

Diode D1 was included in an earlier version of Figure 1 for protection. It prevented a short across B2 when R2 was positioned at point A and S1 was closed. It may be omitted if desired.

The 'throttle' on my transmitter is a lever that moves through an arc of approximately 100 degrees. As this lever is advanced from bottom to top of its travel the motor is in the following states: REVERSE - NEUTRAL - SLOW to FAST - FLANK. Each motor has a similar arrangement. The two throttles allow excellent maneuverability.

A word of caution. Be sure to mount Q1 on an adequate heat sink. I used a 3 x 4 x 3/16 inch piece of aluminum to mount 2 2N441's. Commercial heat sinks are available. Sustained operation at speeds midway between NEUTRAL and FAST will cause Q1 to become fairly warm since this is the condition where Q1 must dissipate the most power. It is no need for concern. You might try mounting Q1 under the hull and water cool it!

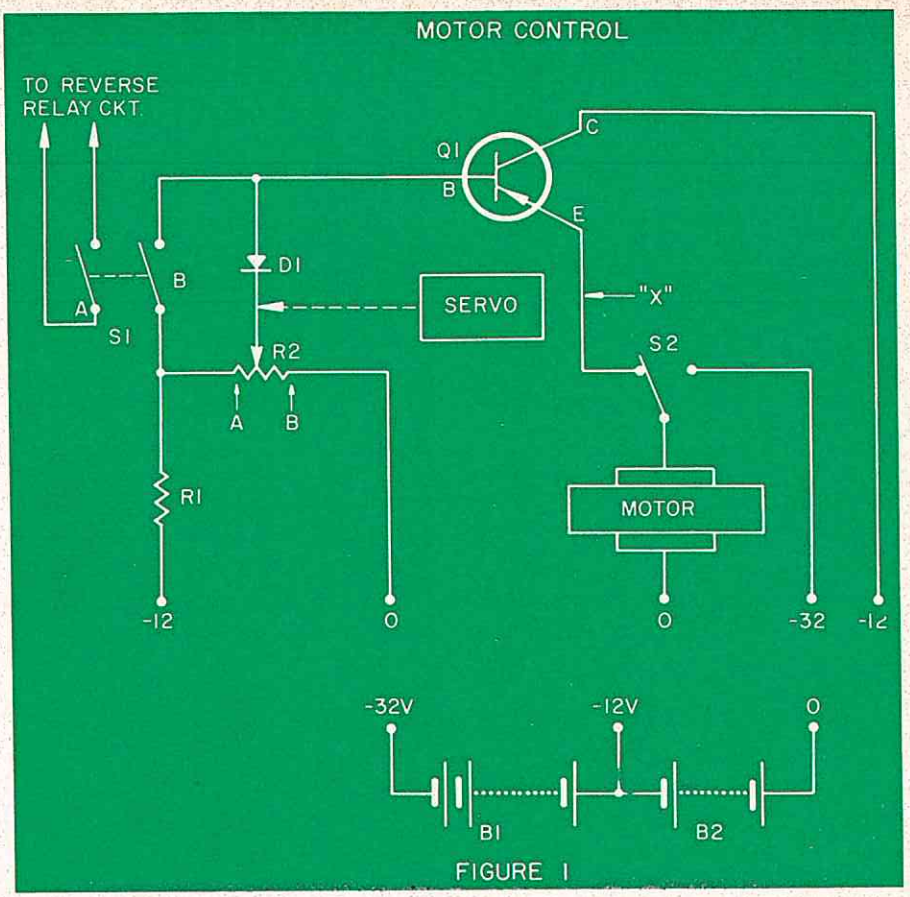


FIGURE 1

APPENDIX

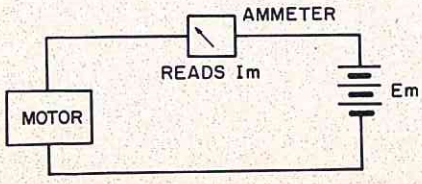
A method for determining values for R1 and R2 given the motor that will be used.

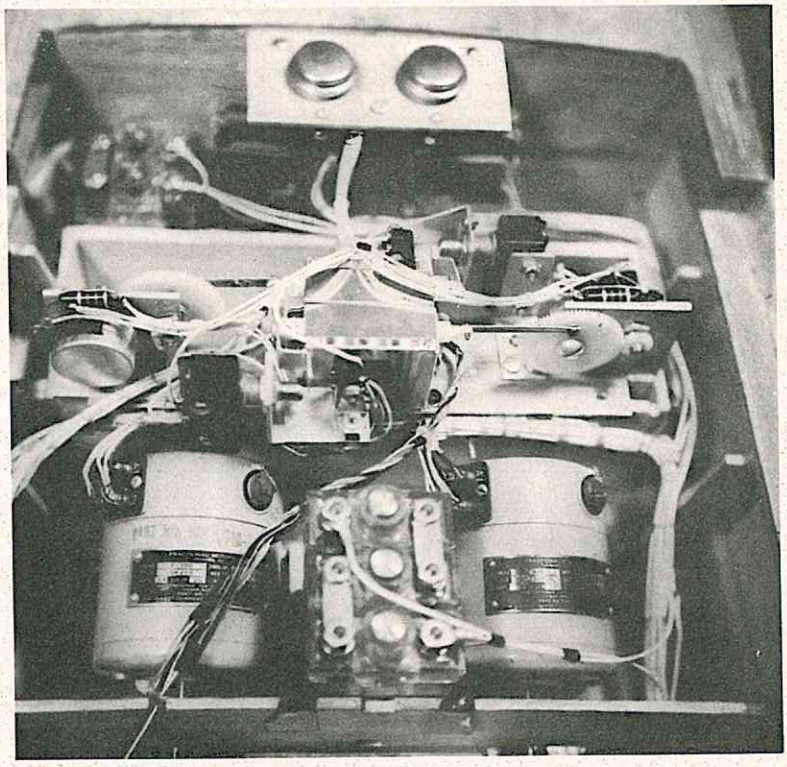
1. Choose a transistor that will meet your power requirements. The 2N441 is adequate for most all applications and is inexpensive. I will assume the transistor used has a current gain of 20.
2. Determine the resistance (Rm) and operating current (Im) of the motor to be used using figure 2 and Rm = Em/Im where Em is the normal operating voltage of the motor.
3. Calculate an approximate value of R1 from the following formula;

$$R1 = \frac{20Em}{Im} - 20Rm$$

Pick the closest standard resistance value for R1.

4. R2 is chosen to give good control through its range of rotation. A value of 500 ohms should be suitable for most





This photo shows two complete assemblies for the port and starboard drive motors and 5 of the nickel cadmium cells. Transistor Q1 (two) and heat sinks at top of photo. R2 and S2 on left. Reverse relays are located just behind the heat sink. S1 is just to the front of the servo.

applications. Mechanical considerations usually limit potentiometer rotation to 210 degrees. To insure Q1 will completely cut off when motors are in the NEUTRAL position, set point B on R2 such that it is at the extreme end of its rotation. This will leave some resistance between point A and the other end of R2 since most potentiometers will rotate through an angle greater than 210 degrees.

5. Connect an ammeter at point X as in Figure 1. With the servo positioned for NEUTRAL and with point B set as described in STEP 4 above a current of less than Im/20 amperes should be read. If the current is much greater than this, Q1 is defective or a wiring error has been made.
6. If the motor runs too slowly when the servo is positioned to FAST, the value of R2 will have to be effectively decreased. In other words, point A must be moved closer to the end of the potentiometer. This can be done by increasing the total rotation angle of R2. This will decrease the resistance between point A and the end of the potentiometer as desired.

EXAMPLE:

Assume Im = 1/3 ampere, Rm = 6 ohm, and Em = 6 volts.
Let R2 be 500 ohms as previously suggested.

Calculate R1;

$$R1 = \frac{(20)\ (6)}{1/3} - (3)\ (20)\ (6) = 240 \text{ ohms}$$

Choose R1 = 220 ohms (nearest standard value)

Connect ammeter per step 5. Assume a reading of 45 ma.
This is less than Im/20 = 50 ma.

Assume motor runs at half speed when servo is positioned to FAST. Increase the rotation angle of R2 until motor runs at FAST speed.

Remember: Each application will be unique - let your ingenuity be your guide.

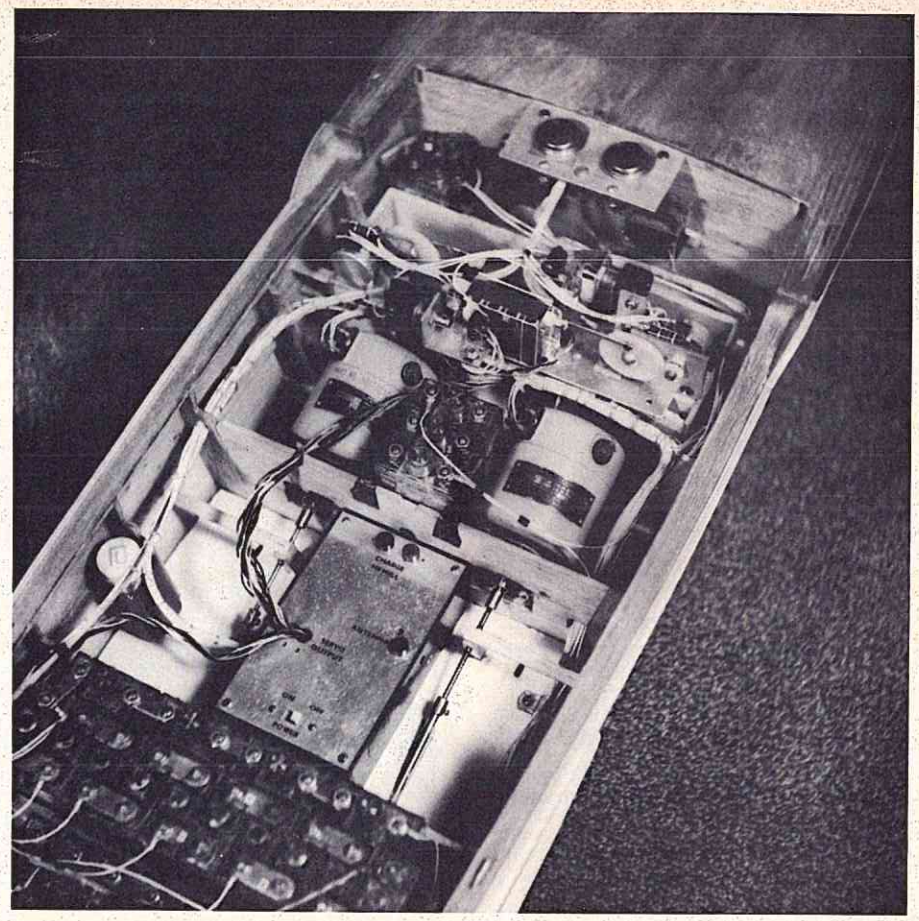
PARTS LIST

Q1 Power transistor; 2N441 or equivalent
R1 Resistor; 10 ohm, 2 watt
R2 Wire Wound Potentiometer; 500 ohm, 2 watt
D1 Diode; 1 amp, 50 volts
S1 Microswitch; Double pole/Single Throw (see note)
S2 Microswitch; Single pole /Double throw
B1 Nickel cadmium cells 5 amp-hour capacity
B2 Nickel cadmium cells 5 amp-hour capacity (see note)

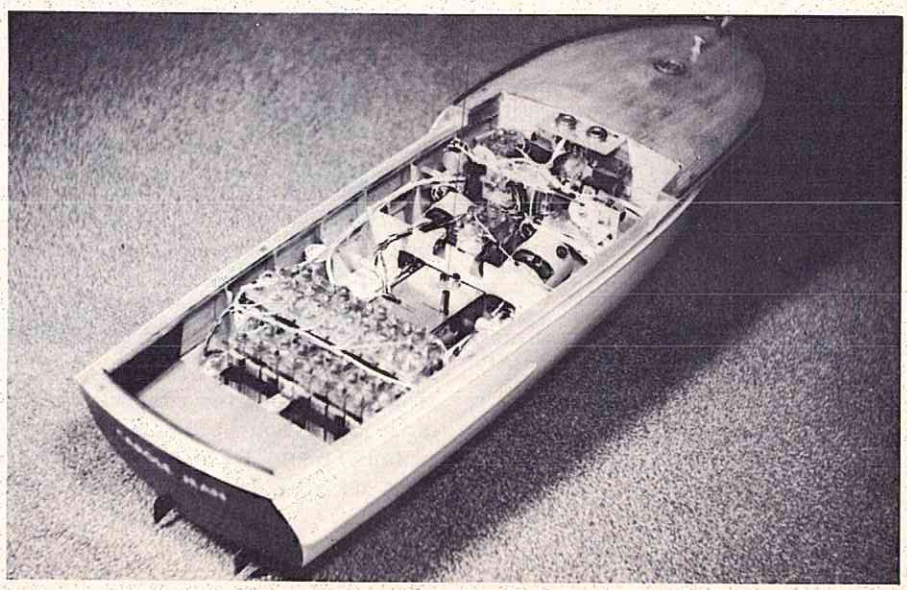
NOTES:

1. For S1 I used two small SPDT microswitches mounted side by side.
2. In my installation, taps on B2 served to power the DIGITRIO servos, decoder, and receiver.

INTERESTED IN BOATING?
RCM WILL RUN ADDITIONAL BOATING MATERIAL IF THE INTEREST WARRANTS IT. DROP A NOTE TO THE EDITOR.



Hole just behind antenna jack is for peaking the antenna. Small bottle to left of center holds grease for universals. Note the drive arrangements for R2. Author used small nylon gears. Speed control transistors can be seen upper right. Digitrio electronics and more nickel cadmium cells on left. Below: View of entire hull. Note the 28 5ah nickel cadmium cells.



RCM VISITS THE HAWAII R/C CLUB

Hawaii has held its first radio control championships contest, the first of its kind in Hawaii, and sponsored by the Parks and Recreation Department of the City and County of Honolulu. This contest is now slated to be an annual affair to be held in June of each year beginning in 1970.

In addition to the six different events (all designed for spectator interest) there was a winning Club and a State Champion. This contest was designed for two purposes; for the public acceptance of R/C airplanes and to try to obtain City and County assistance in obtaining land for modeling purposes. The contest was a huge success with 25,000 spectators attending the two day affair. The site used was in the heart of Waikiki beach on the old polo field, a beautiful and spectacular background for any meet.

As a result of their efforts, the HRCC now has the support of the Parks and Recreation Department with over $100,000.00 now being slated for the first model aero-park in Hawaii. Construction on the project is already underway and should be completed by the early part of next year, with the Parks Department ready to consider another aero-park after the completion of the first.

At present there are three R/C airplane clubs in Hawaii, all on the island of Oahu. These are the Hawaii R/C Club, now 15 years old with over 60 members; the Aloha R/C Club, now in its second year; and the Kapoline R/C Club in its first year. By the early part of 1970, the Aloha and the Kapoline groups will be AMA chartered clubs. All of the fliers are using proportional rigs with almost a complete absence of any other type of unit. The Hawaii Club is 90% Kraft Gold Medal Series fliers.

The Hawaii R/C Club is now in the process of show and tell. Working with the Board of Education and the Parks and Recreation Department of the City and County of Honolulu, Hawaii, they are fostering a program to educate the non-modeling community about the R/C hobby/sport in order to promote better relationships and understanding support. Six members of the Hawaii R/C Club and two members of the Parks Department, started this program by going out to the tip of the Island of Oahu (considered by mainland standards as 'the boon docks'), where a flight demonstration was put on for approximately 1500 small school children with close-up inspection of the flight controls. Mr. Harry Borian, a H.R.C.C. member, provided a running commentary and explained all of the facets of modeling from free flight through U-control and R/C and explained the organization of the A.M.A.

The response and excitement of the school children was overwhelming, as many of these youngsters had never seen a model airplane of any type, let alone a full house R/C rig. This program is now in full swing and the H.R.C.C. is looking forward to extending it to the other schools on the Island. The program pilots were; Bob Barnes, Gene Cantrall, Bill Fuchsberger, George Duerksen and Dick Smith, all who thoroughly enjoyed the flying demonstrations in the small and difficult school yards. ●

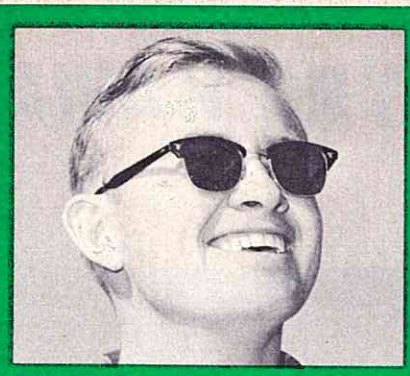
Some of the winners at the 50th State R/C Championships. L. to R: Currie Lee, President of the Aloha R/C Club; Gene Cantrall, Hawaii R/C Club president; George Duerksen, State Champ; Larry Deshayes.

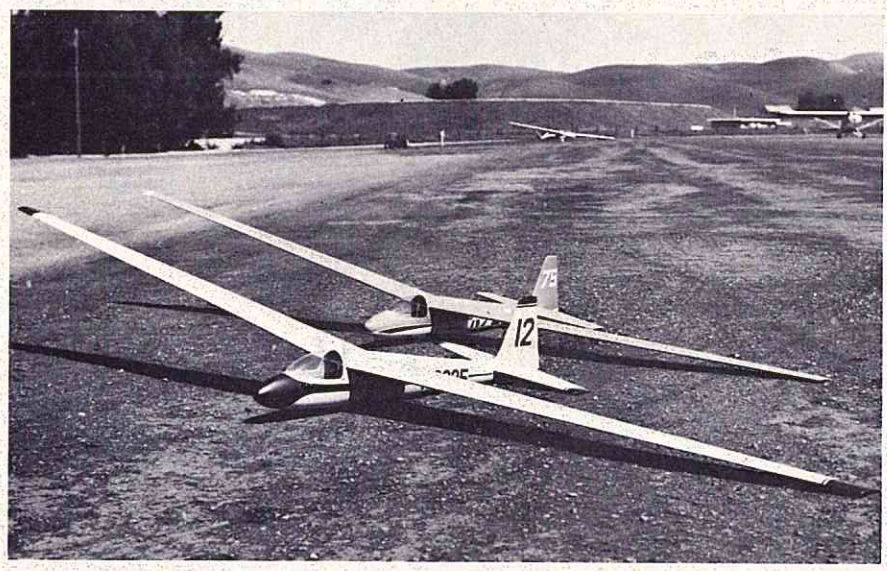
Dick Smith holding a Trainer Master, while Bill Fuchsberger gives controls to his plane and an explanation to the interested school children. The mountain and fence in background required a steep approach.

SOARING

WITH

JERRY NELSON





Two 12' span, scale KA6E's between flights. All-fibreglass gliders from Nelson Model Products.

This is the first in a series of monthly articles on what is probably the fastest growing and most rewarding phase in modeling, RC Soaring. You may ask, how a modeler, active in stunt and pylon racing, ever got involved in RC Soaring? To be honest with you, I didn't have the time to keep up with the rat race of stunt flying practice sessions. RC Pylon, the most exciting RC category, also seemed to take too much time in order to keep up with the winners. With gliders you can have your cake and eat it too. Not only is the basic flying much less nerve racking, it is also just as competitive, if not more so, than power flying. I could probably go on and on with reasons why RC soaring is the ultimate RC sport, but we just don't have time and space to do it all at one time.

My goals for these articles are to inform modelers on what's going on with the RC sailplane activity in the USA and elsewhere. The articles will be informal in nature with bits of information on the following subjects; proposed national soaring rules via the NATIONAL RADIO CONTROL SOARING SOCIETY, new products, contest results, new designs, how-to-do type articles, and a question and answer section. From time to time, I will also feature information on some of the new full size sailplanes with photos, three views, and other information. As most of the sailplane enthusiasts know, there is very little information on full scale soaring except in the Soaring Society of America's *Soaring* magazine.

So, let's start out with a status report on the National Radio Control Soaring Society. The concept of this society, the NRCSS, was formulated by myself and a few friends from Northern and Southern California. The primary goal of the NRCSS is to set up rules and procedures for RC sailplanes for possible introduction into the AMA RC rule book. At this time, we do not have any official rules for RC sailplanes. With thousands of modelers already active in soaring, it is only logical to develop rules and procedures so that we may stimulate the growth of soaring even more. More and more organized activities will create new modelers, kits, special equipment, etc., thus creating more enjoyment for ourselves.

Developing airframe specifications will tend to steer everyone's development of model designs towards more of a common goal, thereby increasing the growth of the sport. What has been proposed are a few basic specifications so that we may have two classes, Open and Standard. The Open Class is any sailplane with a wingspan 100 inches and over but less than an upper limit of 16 feet. The Standard Class glider is, of course, one with a wingspan of less than 100 inches. The Standard Class machine can also compete against the Open Class ships if so desired. No other specification rules have been proposed regarding weights, wing loadings, etc., other than the standard AMA rules, if applicable. The actual flying rules have purposely NOT been defined. Most of the glider orientated groups around the country are still experimenting with contest rules and procedures. Hopefully, next year we can consolidate many of the successful contest procedures into a workable set of rules.

Information on the NRCSS will be available in this magazine and officially in Radio Control News. No doubt the other magazines will have information too. The NRCSS is an unpaid 100% volunteer group trying to promote soaring the best way they can. Unfortunately, with this type of organization, things cannot happen overnight. For more direct information on the NRCSS, write to Mr. Hans Weiss, 1304 Wilshire Blvd., Santa Monica, Ca. 90400. Hans is the temporary secretary of the NRCSS. Membership fees are $5.00. A separate bank account in the name of the NRCSS is established. Upon receipt of $5.00, you will receive a membership card, competition number to be placed on each side of the rudder and lower right wing panel of your sailplanes, and a subscription to the Radio Control News, which is acting, presently, as the official newspaper for the NRCSS. I am currently the chairman for the NRCSS. As more and more people become interested in the NRCSS, a formal election will be made to vote in permanent officers and constitution and by-laws.

Another group of soaring enthusiasts led by Lee Gray, Scott Christensen, and Keith Brewster successfully trying to promote soaring in another way, is the League of Silent Flight, the

LSF. The LSF's primary goal is to promote soaring via a flying achievement program. Different skill levels are established. As you become more proficient in skill and can successfully perform the different requirements, such as duration, altitude, flying accuracy, distance, etc., you move upwards to different levels. A merit badge system is employed so that you display your achievement via shirt patches, decals, etc. This program has a tremendous amount of merit and I endorse it 100%. Hopefully, in the near future, we can combine the LSF achievement program into the national organization, the NRCSS. Possibly the NRCSS can set up a separate committee to take care of the achievement program. The members of the NRCSS can have the immediate use of the LSF achievement program while the contest committee is working out the complex details of contest procedures for organized contests. There is no reason for the two unofficial and possibly more RC soaring associations to go their separate ways. They can, and I am sure that they will, be working together as a team. This brings up a point. There has been some thought that the NRCSS is only a West Coast type organization. This is hardly the case. The NRCSS is open to anvone in the AMA. Working volunteers throughout the USA are needed. If you are interested in helping out with the growing pains of the NRCSS, please write to either Hans Weiss or myself.

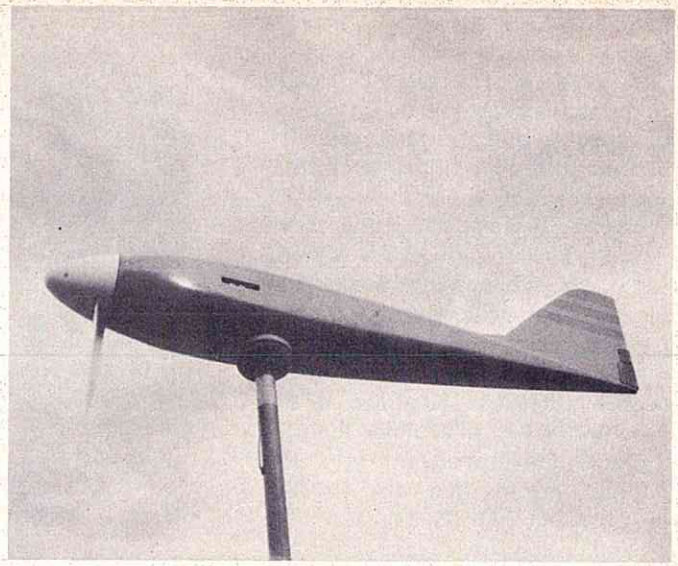
Any group that has had contests or is planning contests for gliders, please put me on your mailing list. Also, I need photos of your sailplanes, contest results, new sailplane designs, and anything related to soaring RC gliders.

Next month, I will have some information on the newly proposed FAI soaring rules, new products, and reader questions and answers. Please write me for answers to your questions. I can't answer all of them, but I will do my best. Send the questions to Jerry Nelson, 1414 W. Winton Avenue, Hayward, California 94545.

YOU ARE INVITED
TO SEND YOUR QUESTIONS, PHOTOS, AND IDEAS ON SOARING TO JERRY NELSON, 1414 W. WINTON AVE., HAYWARD, CAL. 94545

L. to R: Bob Siegelkoff, Jerry Nelson, Stan Powell, Morris McKenna with their KA6E's. Below Stan Powell (l) and Morris McKenna adjust rudder linkage on scale glider.

YOU CAN BUILD AN ANEMOMETER AND WIND DIRECTION INDICATOR



Anemometer body mounted on conduit.

By L. JACK WEIRHAUSER

This is what happens when I talk to myself.

It happened one Sunday during a soaring contest at Coyote Hills Park in California. There was practically no wind coming off of the Bay. Many were holding up wet fingers and several of the would-be pilots were comparing the readings of their plastic pitot tubes. All over the hill you could hear words like, "I need at least an 8 mph wind to fly. I wonder what it is now?" or "I could probably fly if I knew for sure what the wind direction was." It must have been at this point when I said, half out loud, "What we need up here is a good anemometer. I think I'll build one."

Now there were several people standing around who heard me I'm sure, but the only one who even acted like it, was Ken Willard, and his taunting reply was a challenge that I couldn't ignore. The result is presented here, quite proudly I must admit. Even Ken showed some small amount of admiration when I showed it to him.

I have built, and have seen, several anemometers that used a small DC electric motor as the voltage source or generator, but to my way of thinking, those were very unsatisfactory because of the mechanical loading of the propeller, and because these little motors are very inefficient and noisy (electrically) when they are used as a generator.

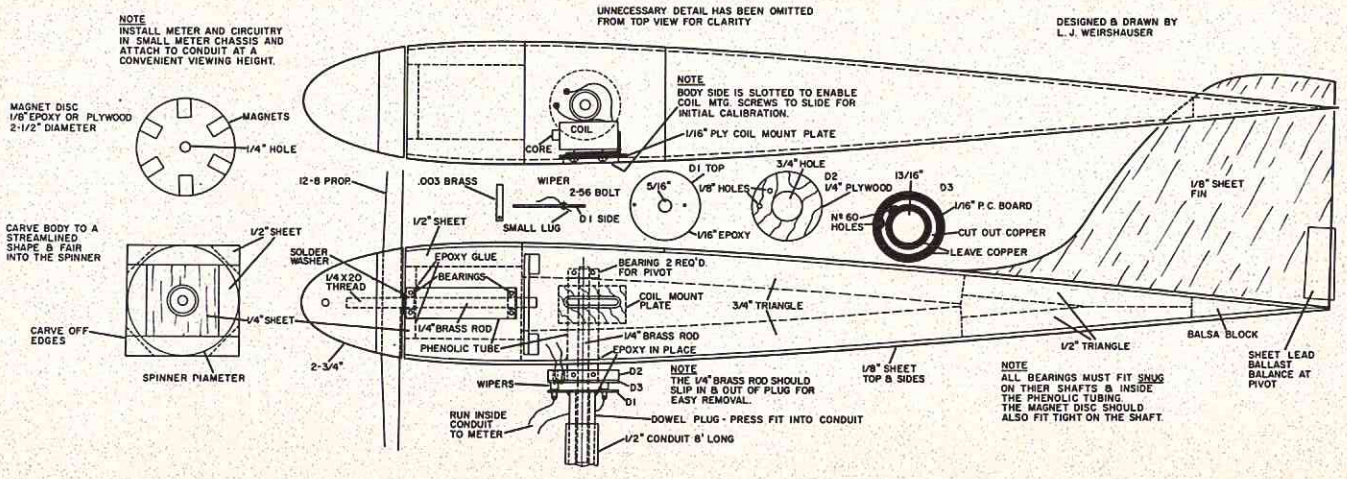
I also wanted a device that would give some indication of the wind direction, hence the airplane-type fuselage and large fin.

My early experiments also showed that an extremely free-running propeller-type was just as sensitive as a cup-type anemometer to low wind velocities, and is certainly easier to build.

There are those of you, I'm sure, who will recognize the principal involved as being almost the same as that used in a magneto. The basic theory states that if you cut the field of a magnet with a coil, a voltage will be induced in the coil. To be sure, either the coil or the magnet must be kept moving, but that suits us just fine.

You will see from Figure 1 and the plans that there are six magnets attached to a disc. There is no magic in the number six; more would have been superflous, and fewer would have given less output, but would have still worked. The coil is nothing more than a plate relay coil from a junk relay and should be between 5,000 and 10,000 ohms. The proximity of the coil to the magnets should be variable initially for calibrating. The closer the coil is to the magnets, the more output you will get. But get too close and the magnets are too strongly attracted to the coil's core and you will cut down your sensitivity to low wind velocities. In any event, with reasonably good magnets, this device will drive a 1 ma meter with no trouble.

I've had a lot of fun playing with this thing. Some years ago I designed a very small airborne telemetry transmitter to fly in an airplane and telemeter back the AGC voltage of my receiver. I found that I could connect



this to the diode detector of the anemometer and by listening to the telemetry transmitter through a receiver, tell what the wind velocity was. This means if you have a remote but secure and private flying field, you could erect an anemometer and transmit back the wind velocity to your home, and by merely tuning in a receiver, decide whether the wind is suitable for soaring. Neat, huh?

CONSTRUCTION

No details will be given on how to mount the generator. My drawings are self-explanatory and what you put it in is not critical. How about a profile fuselage?

The whole secret to this device is a free-turning propeller. Mine is mounted on two ball-bearing assemblies and a 1/4" BRASS shaft, which is inserted inside a short piece of 3/4" O.D. phenolic tubing. That way the whole thing can be assembled and checked out before installing it in whatever you are going to install it in.

The pivot for wind direction is constructed in exactly the same way as the propeller, with the shaft slipped into a hole drilled in a plug which, in turn, is forced into the 1/2" conduit. (See the drawing.)

The printed circuit board is used in a slip-ring arrangement to enable the voltage to get from the coil to the meter circuit and also to permit the removal of the unit from the conduit for transporting.

When installing the magnets on the disc, use an epoxy cement as the centrifugal force is considerable, and the magnets will fly off if not mounted securely. Also, install the magnets so that all of the poles are the same for each magnet. You can check this if you remember that like poles repel and opposite poles attract. Hold one magnet securely and then check each magnet and mark them so that all the attract OR repel poles will be on the top side of the disc. It makes no difference which pole is on the top as long as they are all the same. It will probably be best if you have seven magnets so you won't get confused about which pole is where on the magnet you have in your hand; you can throw it away.

The magnets I recommend are the flexible type used by the phone company to hold terminal boxes on metal walls. They are very cheap and are unique in that the poles appear on the largest flat surface rather than at the ends.

There certainly is nothing sacred in

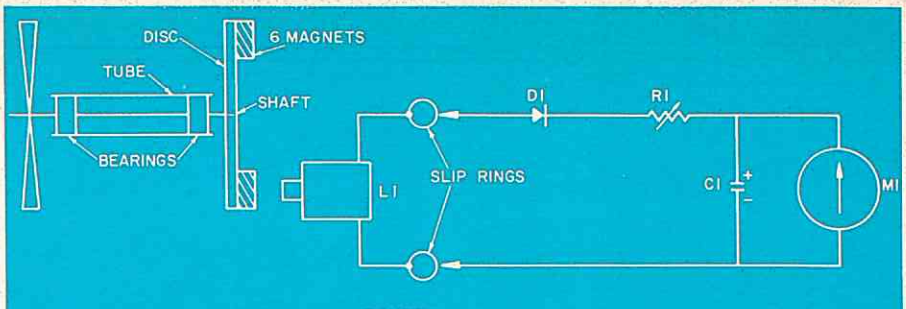


FIGURE 1
SCHEMATIC DIAGRAM ANEMOMETER AND DIRECTION INDICATOR

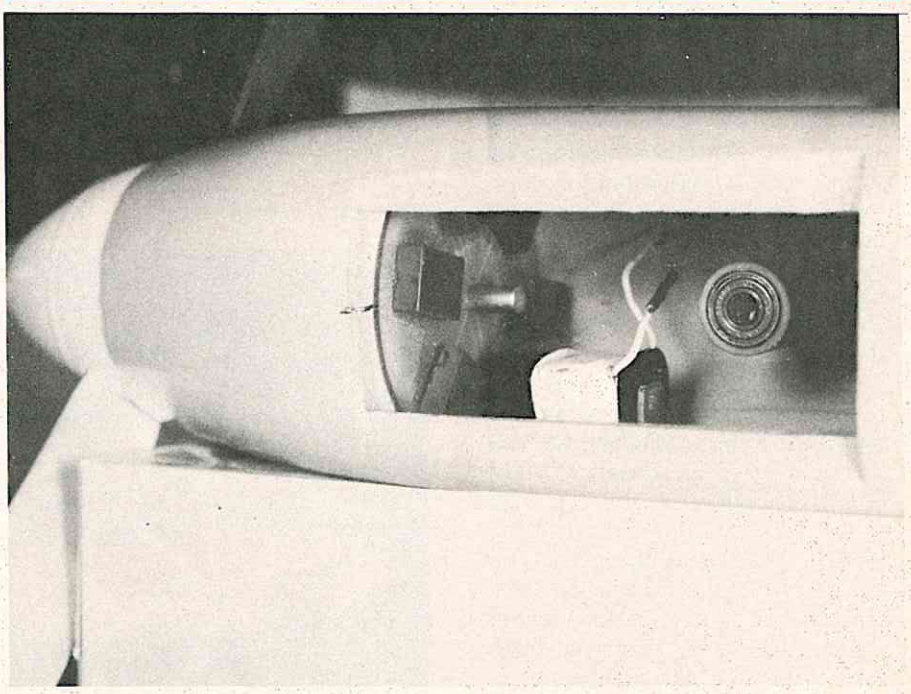
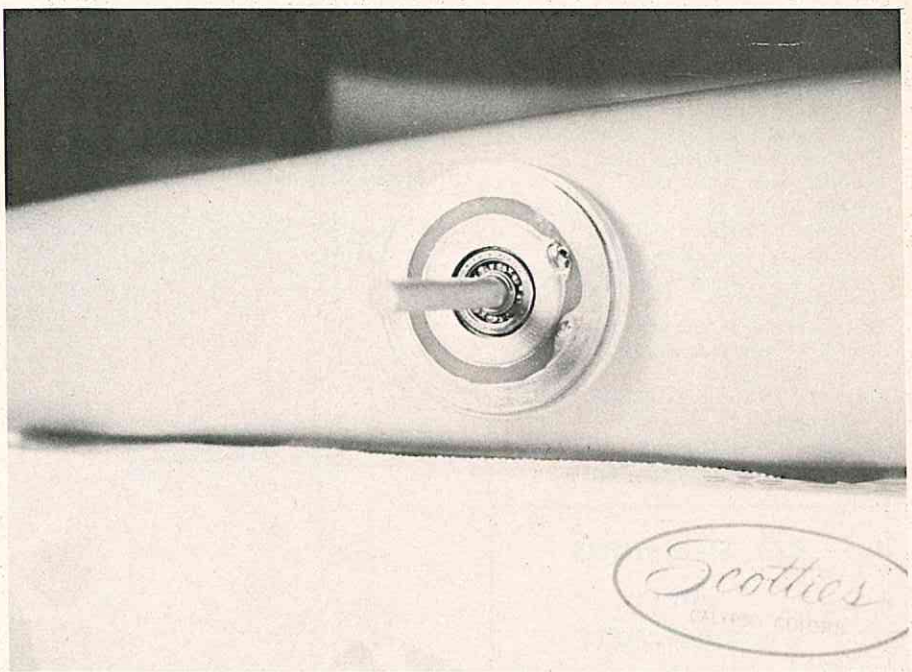


Photo of inside of anemometer body, showing disc, coil, and top pivot bearings.



Detail shot of D3, printed circuit board,epoxied to D2, plywood disc.

the construction of this device, as long as you understand the principal, let your imagination and ingenuity run wild.

CALIBRATION

An easy and probably accurate enough way to calibrate the anemometer, is to use a car and driver, and to make one run into the wind at about 10 or 15 mph and to record the wind speed. Then make a run downwind at the same speed and again note the wind speed. Try and pick a fairly calm day. The difference between the two recorded speeds is a close approximation of the actual wind velocity. Now erect the anemometer in the same area as the runs were made and set the meter to this speed by adjusting the proximity of the coil to the magnets. I should have mentioned that the 1 meg pot should have been adjusted OUT of the circuit when making the runs, and that the runs should have been made on a road as free from obstruction as possible, so as to get an air flow relatively free of turbulence. When adjusting the coil position, get the meter to read SLIGHTLY HIGHER than you think it should be, and then bring it down with the pot. I also suggest that you use a pot with a shaft locking device to foil any knob twisters you may have in your soaring society. Of course if you have access to a calibrated anemometer, let me know and I'll send you mine for calibration.

PARTS LIST

L1-5000 to 10,000 ohm plate relay coil.
C1-150 mfd. 10 volt nominal, make larger for 1 ma. meter.
D1-any good quality germanium diode.
R1-1 meg. ohm variable resistor.
M1-0-50 u amp preferable.
Magnets-flexible type with the pole pieces on the flat surfaces preferred.
Bearings-any reasonable size to fit your method of assembly. Good quality 1/4 x 5/8 preferred.
Disc-1/8 epoxy or clear plywood.
Tube-3/4" O.D. phenolic or similar, to fit your bearings.
Shaft-1/4" brass or whatever fits your bearings.
Propeller-12/8 broad blade.
Spinner-2¾ Williams Bros. or similar.

FULL SIZE PLANS
FOR
L. JACK WEIRHAUSER'S
ANEMOMETER AND WIND DIRECTION INDICATOR ARE AVAILABLE. SEE PAGE 70.

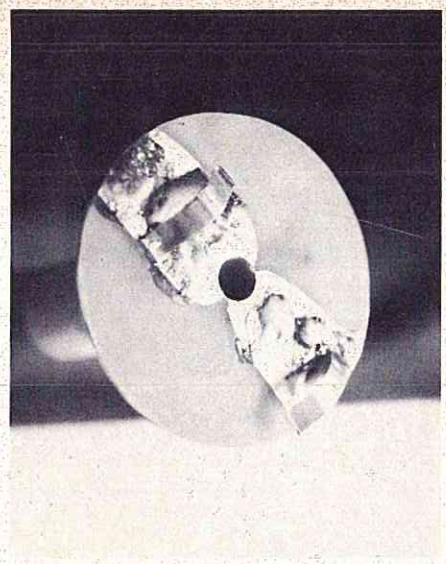
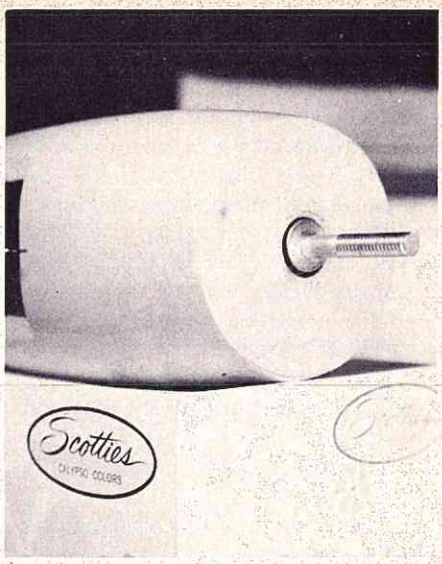


Photo of D1, Wiper Disc.



Propeller shaft and washer.

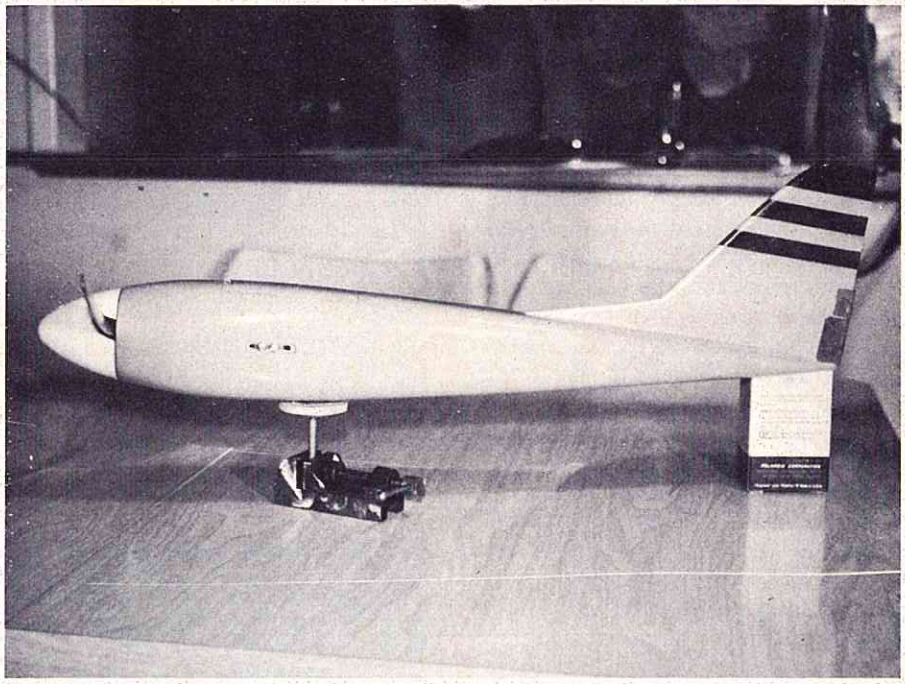
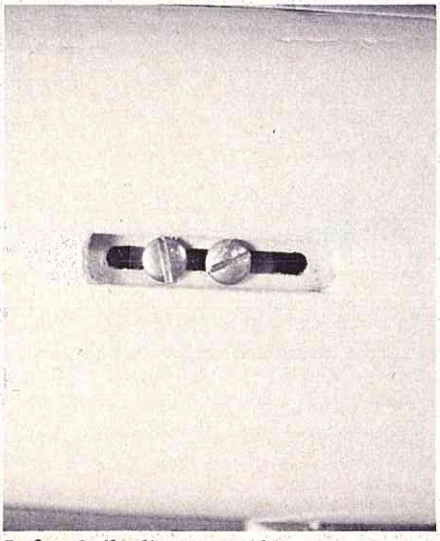
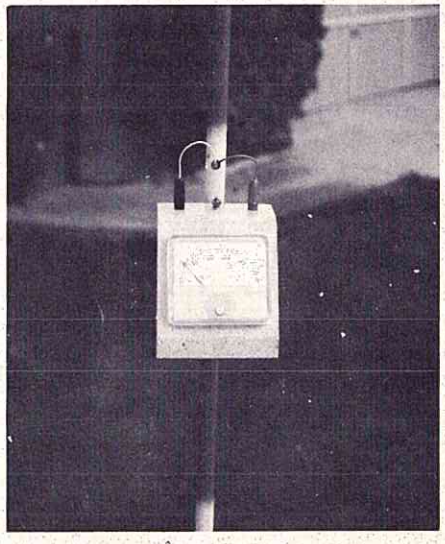


Photo showing profile of anemometer body.

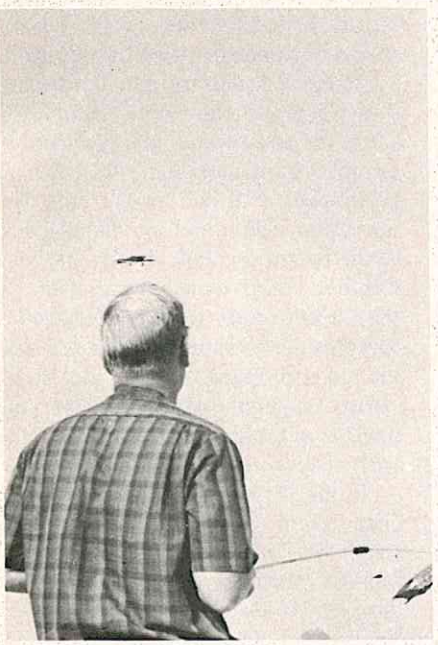




Left: Coil adjustment slot.
Right: Meter mounted on conduit and indicating 4 m.p.h.

KITS & PIECES

DICK SONHEIM



Today's new miniature servos are nice but I fly .60 powered multi stunt ships, or fly Formula I pylon racers. One of the most frequently asked questions of radio manufacturers is, "Are the new miniature servos capable of handling these types of aircraft?"

Back in the May 1968 issue of R/C Modeler, we made mention of a new miniature servo that we were testing that would be available from Orbit Electronics within a year. Even though we tested these servos in a hot little .40 powered airplane, we made the statement, "start building your mini-models for the new era of micro-miniature radios." There are a few RC kits designed specifically for the miniature servos, such as Midwest's Flea Fli +10, however, the majority of the RC models built today are the larger, high performance stunt ships.

The severest test for any piece of radio equipment is in a Formula I pylon racer. After watching fliers like Bror Fabor turning some fantastic times with their racers using the Orbit PS 4 servos, there certainly isn't any question that they work, and work well. The new Orbit transmitter, receiver, and servo electronics, use all silicone transistors and semiconductors which guarantees excellent temperature stability in extreme weather conditions. The newly redesigned transmitter case seems to balance very nicely in the flier's hands. The precision aircraft end bearings used on the sticks work quite smoothly.

The Orbit receiver is one of the smallest 6 channel units on the market. For added strength, a heavy printed circuit board is used. Orbit feels that a metal can for the receiver case gives much better shielding against any possible outside noises. Integrated circuits are used, not only because they are lighter in weight and take less space, but because they are more reliable. At the time of this writing, the Orbit PS 4 servo is the smallest and lightest servo available. This is one of the few units on the market using all silicone semiconductors and Schmidt trigger drivers for the output stages, thus eliminating the mushy response in shallow increments around neutral. The PS 4 servo is now standard equipment with Orbit radios, and any other servo previously manufactured, may be obtained on special order.

I recall reading in one of the very early issues of RCM, a discussion by Don Dewey about reed sets with his comment to the effect that if it's a black box, it works. Using top quality components and high quality control standards, Orbit should continue to live up to this reputation.

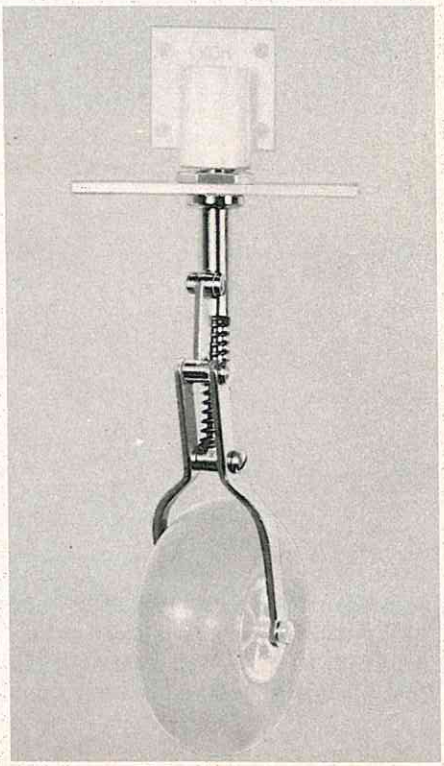
—

I, for one, have heard some unpleasant remarks from some of the RC fliers in regard to the Chinese Junk construction article that was run several months ago. But to everyone's surprise, including our Fearless Leader, the requests for plans for the Big One have been fantastic! For those interested in building a Chinese Junk, it will be available in kit form with a fiberglass hull from Fibo Craft Models, 142 E. Main Street, Bay Shore, New York 11706. Also available from Fibo Craft Models, is their new Scat Kat outboard catamaran cruiser for an .060 Fuju outboard motor. The Scat Kit is 25 inches long and has an 11 inch beam. The parts are all pre-cut with a built-up balsa hull and a plywood cabin. The price will be $19.95. If you are interested in model boating, we suggest you send for Fibo Craft's 75c catalog listing virtually every hard-to-get item for the R/C boating enthusiast.

The Williams Bros. have added a new machine gun to their line of scale aircraft machine guns. The Spandau model of the famous German machine gun, (the gun that helped make the Red Baron their top ace) is available in 2 inch scale only, for $1.25. A 1½ inch scale, as well as a 1 inch scale model of this same gun will be ready at a later date.

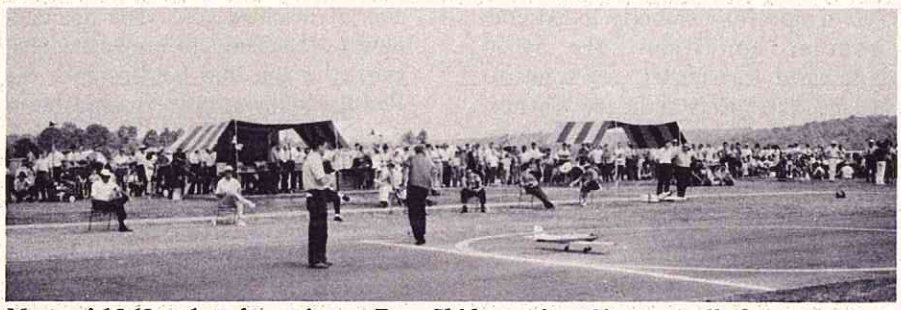
The latest goody from Tatone Products is their Sticka-tube tank kits. John Tatone has solved the exasperating problem of having your fuel line come out of the polyethylene bottle and jam against the firewall, as well as the fancy bends needed to get your fuel line through the firewall and around the motor. With the Sticka-tube, you can place your fuel line anywhere on the fuel tank. All that is necessary is to simply punch a hole wherever you want your fuel line to enter the tank, using a special punch which is provided, then insert the fuel tube into a rubber plug and into the hole. The tank is leak-proof and pressure proof. I tried it and it works very

(continued on page 59)



TOP OUT

BY JERRY KLEINBURG



Masters' 1969 – 1st place winner, Ron Chidgey, gives Citron needle for take-off on winning flight. Neat flight line of Cobb Co. RC Club, site of classic meet.

Winners and loot. Chidgey, Kirkland, Kraft, Bonetti. 1st, 4th, 3rd, and 2nd. Contestants enjoyed themselves.

"What maneuver was I supposed to be doing?" "Don't ask me." – Kraft-Bonetti dialogue during preliminary round. Many fliers gave relaxed performances at season closing meet.

Atlanta - 1969

The RC Industry Association Masters Invitational Tournament and the 1st Southern RC Trade Show held in Atlanta, Georgia could certainly be called an RC Fair. Competition flying by the best Pattern pilots across the country, equipment exhibits by many of the top manufacturers, and a plush banquet and awards ceremony at the Marriott Motel - these were the elements of a precedent-setting occasion.

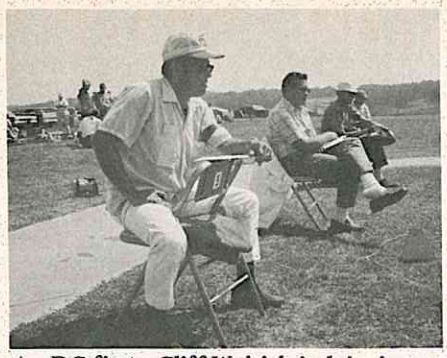
Master-minded by Len Purdy and Joel Harper of the Cobb County RC Club, the ambitious undertaking turned into a memorable event for all participants and visitors who came for the action, sights, and sounds staged in ideal locations and during perfect weather. Hard working members of the Cobb County RC Club made sure everything was ready and in order for the twin-pronged show, and their efforts resulted in an efficient and smooth running affair on the 13th and 14th of September.

In the Pattern flying, Ron Chidgey once again showed typical flying steadiness by topping the field of finalists and besting Tony Bonetti, Phil Kraft, Jim Kirkland, Ed Keck, George Hill, and Jim Whitley in that order in a hot 7-way competition. Flying the Pro Line radio equipment he used to place 3rd at the 1969 Nationals in Philadelphia, the 'Citron' responded to Ron's urgings and his come-from-behind contest pacing. Watching from the sidelines were Jack Dunn, Jim Martin, Norm Page, Paul Ennis, Don Lowe, Jim Edwards, Hank Walker, Don Coleman, Neil Kilby, and Bob Roberts who had qualified for the invitational meet but who had not made the cut for the final money round.

Selection of contestants for the meet resulted from the naming of the top 15 C Expert fliers at the Nats, along with 15 others who earned a berth for the exclusive Masters by gathering win points in AMA sanctioned contests during 1969 from the 5th of April through the 17th of August. This selection process saw invitations go to fliers in 14 states. Of these only 3 states were not represented in Atlanta: Texas, Oklahoma, and Washington. Among the fliers competing was the entire 1969 U.S. FAI RC team, recently returned from the Internats in Germany.

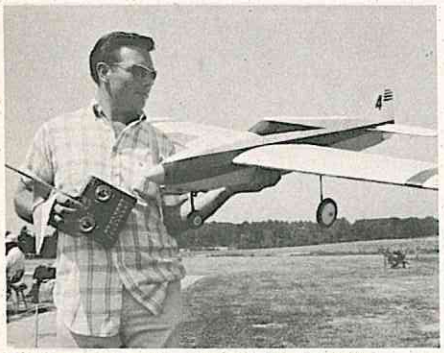
Aircraft and equipment prefer-

(continued on page 62)



An RC first - Cliff Weirick judging! Genial RC vet strained with each pattern performer. Chair position indicates suppressed competition desires. Art Schroeder, Paul Bynum, and Walt Schroder also on line. Welker, Schoonard, Meyers, May, and Gabler also served.

Left: Don Lowe and 12° sweep Phoenix relax between rounds. Popular Dayton, Ohio, competitor placed 12th. CitizenShip radio and ST 60 engine. Above: Good looking front end of Hank Walker's entry. NVRC Club member 14th.

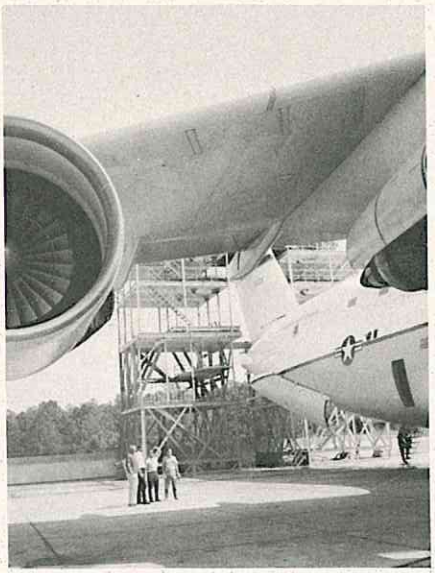


W. Jersey Radio Flyer, Jim Martin, and "Eye Ball". 6½ lb. ship had Webra B/H 60, Micro-Avionics radio. Lateral area helped on slow rolls, knife edge. Great side-slip ability.

"Thing" by Byrom Trent was re-do of Lanier ARF. Won re-design event at 1st Southern Trade Show. Flew well, too.

Magazine editors relax too! Don McGovern, FM, shows way to create exciting RC literature. Masters' meet drew full editor complement: Schroeder and Schroder of MAN, Winter and Sweeney of AAM.

Gary Covert of Heath Co. checks Goldberg Ranger. Carl supplies details at 1st Southern RC Trade Show in Atlanta, Ga. Right: Masters' Tournament offered chance to visit nearby C-5A production line. George Wells, Ed Sweeney and Don McGovern join Lockheed's Van Highers for close-up of new AF giant. Far right: Jim Fosgate shows inards of solid Pro Line radio. New gear had impressive record at Nationals, Internats, and Masters'. Fred Moore, Paul Worrell and Bill Warren, interested customers.



Right: ¼A RC growing. Paul Runge and the late Dick Adams unveiled new miniature line. Jim Loftin checks "Akro Sport" .020 powered rudder only. Glider will also be marketed by ACE RC. Features Adams Baby actuators.

cars before, and they are slow and steady. Not these cars of Jack's! They move out at speeds up to twenty mph, which is about the same as the glow powered R/C cars run. These little beauties sport twin electric engines, one for each rear wheel. With different gear ratios they can be calmed down to a top speed of ten mph. This could be great for tougher events such as hill climbing, etc. Jack has another innovation in that he has designed a radio set-up that uses one master transmitter with two slave transmitters. It is a 6 channel proportional, and two channels operate one car; so the net effect is that with the master transmitter and two slaves, three cars can be operated at the same time on the same frequency. Certainly saves crowding the air. The braking system is accomplished by reversing the electric motors, and the little cars begin to stop right now. We ran the test cars in a large parking lot which was bordered on two sides by houses. No one complained for the simple reason that, with these cars, we didn't make any noise. This has been one of the big problems with the glow-engine powered cars; they make a LOT of noise, and it IS hard to secure a decent race track. The same problem exists for airplanes in many places. Several of the Thunderbirds joined in with me to test out these cars. We set up a track outlined by paper cups, and then Helmer Johnson, Bob Lutker, Dan Carey and myself challenged each other for the World Championship of Electric Car Racing! It looked more like a destruct derby as we suddenly found out that these things were fast and quick on the steering. We settled down after a bit and were really having a fine time. Then we turned the cars over to Helmer's two young sons. They handled them better than did their father. Next, my wife and my middle daughter had a turn. Each of us were able to run the cars with very little instruction, and little fear of damage if we made a wrong turn. It was nice to start by simply cramming the throttle forward – no muss, no fuel soaked clothes, and NO NOISE. This could be a worthy addition to the great sport of R/C and I hope that Jack keeps on with his work.

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We received a thought provoking letter from Norm Wright of Highland Lakes, N. J. Norm wrote:

"Have just been thumbing through some back issues, searching for some

(continued on page 76)

KITS & PIECES

(continued from page 55)

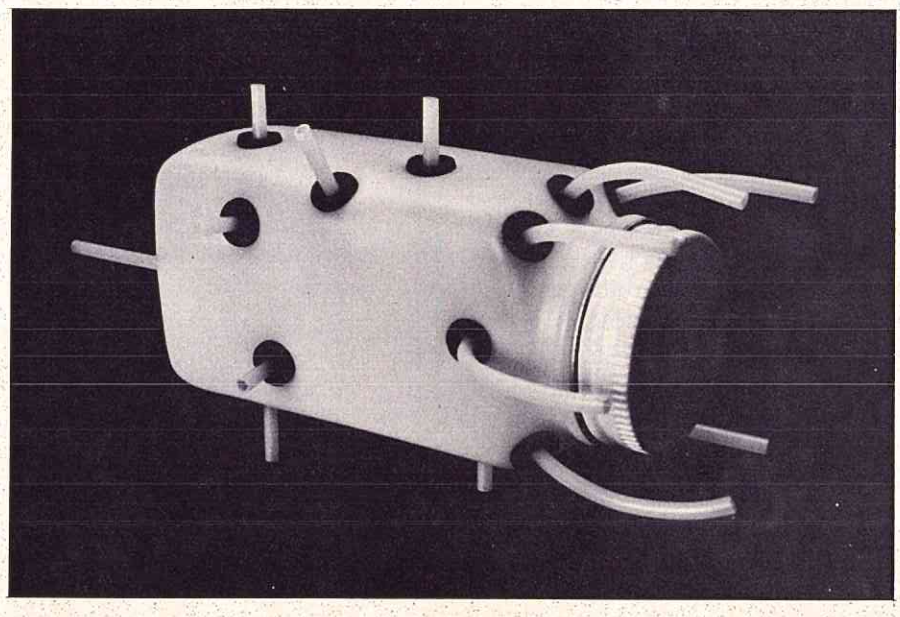
well. It is so simple that I wonder why I never thought of it before! The price of the Sticka-tube kit is $1.29 per package. The Sticka-tube tank kit will also be available with tanks ranging in sizes from 3 to 6 ounces at $2.25 each and 8 oz. to 14 oz. at $2.50 each.

I received a press release from the advertising agency for the Harper Corporation, introducing a new accessory called the Transmitted Minder. This is a stand to keep your transmitter off the ground and prevent it from being blown over at the field. The unit folds up flat and will fit in most field boxes. No additional information is available since the agency failed to give the address of the Harper Corporation, as well as to tell us the price of the unit.

I would like to take a moment out, at this point, and direct my comments to the many manufacturers in the RC industry. I often wonder how many new and good ideas we have passed over because the only thing we receive

is a brief letter or note telling about their new product. It is certainly much easier for myself, or anyone else doing a column such as this, to tell the modeler about your products if we not only had a complete description and photos but the actual product itself. Many of the notices and press releases that come in the mail are virtually the same as describing a cork screw without using your hands!

We just received one of Wing Manufacturing's new Olympic Retract Units for retractable landing gears. The Posi-Tract retractable landing gear is completely self-contained, in that each unit contains its own motor and electronics. These units have entirely new electronics which enable the flier to carry half the battery weight along with a built-in noise suppression system. Wing Mfg. has also designed new strut configurations which now make it possible to build a scale P-51, or similar scale airplanes, and have the landing gear strut retract at the leading edge of the wing where it's supposed to be. Since they sent only one gear unit, our only tests were on the bench. The noise from the electric motor did not, in any way, interfere with the radio performance and the system worked very smoothly. Wing asks to please note their new address; P. O. Box 265, Elmwood Park, Illinois 60635.

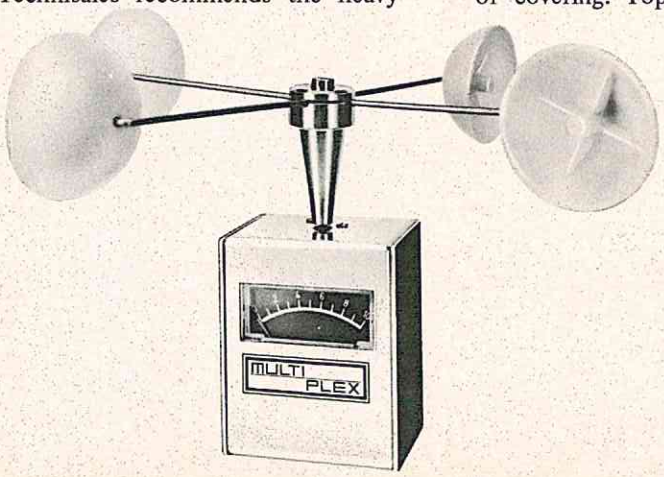


Two new items from Technisales, P. O. Box 2233, Alhambra, California 91803, included a multiplex wind meter which should be just the thing for the glider and the sail boat enthusiasts. The meter can be hand held, or set on the ground, and will give instant wind speed readings. The second item is the imported Cushion-Aire knee-action steerable nose gear which was displayed in our new products column a number of months ago. The Cushion-Aire nose gear now comes with both a standard and heavy duty spring so the modeler can control the amount of shock absorption required. Technisales recommends the heavy duty springs for models weighing over 8 pounds. The unit will accept standard 2½" or 2¾" wheels.

Another new item from Jet Line Products, Box 22, Bellevue, Tennessee 37021, is their Positrol heavy-duty control horn designed specifically for the large full-house multi RC aircraft. They come molded in a mirror image complete with all bolts and washers. The price is 79c a pair.

A new covering material from Quick-N-Easy Products, P. O. Box 441, Wausau, Wisconsin 54401, is TopCotE which comes in clear and chrome, and is of the heat shrink type of covering. TopCotE clear can be painted or left clear, the latter leaving your construction visible. The manufacturer recommends that you spray TopCotE chrome with HobbyPoxy clear or a polyurethane varnish to bring out a mirror finish and fill over any scratches incurred while covering. RCM has tested, approved and recommended this product.

Next month we will review and give you some construction tips on two completely different types of almost-ready-to-fly airplanes. Coming in future months for you scale builders is a construction article on Sig's Yak 18 – for our small aircraft fans, Midwest's Flea Fli+10. ●



Left: Imported Multi Plex anemometer from Technisales. Below: Spandau machine gun ala Williams Bros.

Another new radio - "Pattern Master" by Champion Electronics. Neil Kilby gives details to Florida RCers, Aubrey Radford, John Lane and Ed DeMeritte.

RC classic - P6-E by John Matthews of Atlanta RC Club. Van Highers, Cobb Co. RC Club member, gets close look at historic Curtiss fighter design.

ences for this meet were much the same as seen at the Nats and in many parts of the country during the past contest season. Most popular radio status saw a tie between Kraft and the new Whitley Pro Line radio. Champion's 'Pattern Master' - a new one - along with Micro and CitizenShip were the other radios used by the elite RC group. Engine choice was clearly in favor of Lee-Veco 61's with the Webra blackhead coming up fast. Airplanes were standard 600 plus square inch size ranging in weight from 6½ to 8 lbs. The main duscussion topics among the fliers were design requirements for FAI competition stemming from experience at the recent Internats in which the German team out-paced U.S. efforts. Most pilots also favored adoption of the full FAI pattern for expert competition. The planes of Jim Martin and Norm Page were especially of interest to the competing fliers. Jim's ship - the 'Eye Ball' designed by Art Schroeder, the new RC editor of MAN - features high lateral area which increased its ability to do slow rolls and knife-edge flight maneuvers. Jim also convincingly demonstrated the ship's side-slip capabilities by executing landing approaches starting 150 feet too high and dropping the Eye Ball in at a steep

Ed Keck, Rochester, N.Y. was 5th. Final round effort shows concentration necessary for winning results. Pro Line radio, Veco 61 in Starfire original. Best airplane finish a trademark.

angle with controls fully crossed and without gaining speed. Norm's Avenger showed the advantages of a clean ship resulting from its retractable landing gear. Despite his original being one of the heaviest planes at the meet, it showed a lot of zip, helped along by the well-running Webra blackhead up front.

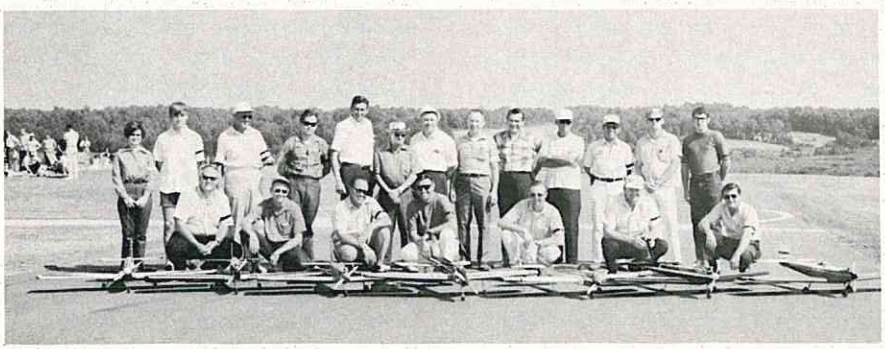
Handling the tough judging chore were a host of top RC pilots and personalities. Heading the list was Mr. RC himself, Cliff Weirick who was joined by Walt Schroder, Gerry Meyers, Walt Schoonard, Paul Bynum, Bill Welker, Art Schroeder, Dalton May, and Phil Gabler. CD of the meet was Len Purdy, ably assisted by Wayne Voyles who held forth at the microphone at the flying field as well as at the banquet. Jim Purdy handled tabulations.

Results of the static competition at the 1st Southern RC Trade Show: Best Finish - Pattern - Juette Forehand, 1st; Tom Atkins, 2nd; Sport - Ron Moss. Goodyear - Juette Forehand, 1st; Carter Pounders, 2nd. RC Car - Ed Lewis. RC Boat - Reed & Doug Hurley, 1st; Lon Turner, 2nd. Most Original Design - Brayton Paul. Most Original ARF - Byrom Trent. Scale - Doss Steed (Fokker D-VII), 1st; Bob Cooper (Nieuport 11), 2nd.

THE NEWSLETTER ROUTE

As the year draws to a close, we wish to acknowledge appreciation to all the patient and dedicated newsletter editors everywhere. Keeping up with the rapidly growing RC 'picture' would be impossible - and certainly not as much fun - without these vital communication links. Rank and file RC'ers naturally tend to focus on the building and flying of planes. A few souls perceive the need for tying this individual activity together so as to discover the larger patterns of our association and to thereby feed nourishment back to the individual. A small percentage of the perceptive few actually put desire to the test of action and gather the record together on

1969 Masters' finalists and officials. Setting for meet was beautiful Cobb County RC Club field near Merrietta, Ga. Perfect weather graced well-run meet.



C5-A line-up. New AF giant cargo planes being built at Merrietta plant of Lockheed Aircraft Co. Lockheed, booster of RC flying, participated in Southern Trade Show in Atlanta, Ga.

paper. These are called editors. And it is these we salute and wish well in their chosen task for the coming year. To the rest, we suggest, "Support your editor, he needs you, and you need him!"

. . . And a few newsletter quotes as space permits:

Valley Flyers - Don Butman: "The film fixer that comes with black and white Polaroid film is perfect for fuel-proofing decals. Dries clear, will not lift decals, and is REALLY fuel-proof." (It is, but get it on heavy and let it set well. Ed.)

Torks Talks - Royland Freeland. Curtis Brownlee on engines:

"As some of you know, we've spent hundreds of hours testing about 100 engines on different fuels and props. After all this, I'm still confused on many of them. One that has been fairly simple from the beginning has been the K&B 40 RR. There isn't much that needs to be done to improve it outside of a proper break-in and matching of props, fuels and carburetor setting. Max Kincaid bushed a connecting rod for me which seems to make the upper end almost indestructible. However, it should be noted that two 1/16th inch holes drilled at 45 degrees from vertical will do almost as well - and you can do this yourself. The problem here (quoting from Bill Wisniewski of K&B) is that a lean run anytime will cause overheating of the piston with annealing (softening) of the piston bosses that hold the piston pin - so the bosses wear out fast. After 3 or 4 races you're out of the picture this way. Such excessive wear is transferred to the upper end of the conrod - and vice versa - until you have a worn out conrod and piston. These mods - bushing or better lubrication - will extend engine life ten-fold. Another 'trick' for extending engine life is to vent the top of the piston to the by-pass at BDC (bottom dead center). This allows stagnant vapors trapped under the piston to move out to the by-pass and to thus allow cooling of the underside with fresh gasses. So far only a slight RPM increase has been noted after this mod, but connecting rods really last longer this way. The idea came from the Merco 61.

"A major 'trick' is in selecting your engines. Some of them come from the factory having 'pre-loaded' crankshaft bearings. To check this, grab the engine in one hand, the drive bushing in the other and push and pull back and forth while watching the gap between the case and bushing. If there's NO play DON'T use it because you'll be handicapped by this 'pre-loading'. In order for the engine to be free and to wrap out fully, there should be a small but noticeable fore and aft movement on a new engine. K&B fits German bearings into the racing 40's which are quite good. However, I have had two of them give trouble when the outer race got too hot and started flaking off. New Departure makes an equivalent bearing in size and specification which I have used and believe to be as good or better than the original bearings. Of course, if you allow dirt or grit to get in, you can forget about having an exceptional engine . . ."

(Curt is 'Mr. Super Chief Fuels' and gained much of the engine testing experience noted here in developing the fuels he now is marketing. Ed.)

GLITCH - E. Nino Campana. (Nino translated an article by Leopoldo Pergher which appeared in the Italian publication, Modelli e Sport that commented on the newsletter custom as seen through Italian eyes.) **"I was directly able to glean other interesting news regarding the American Nationals by reading numerous newsletters received from various sections of the U.S.A. The newsletter 'phenomenon' is a typically American product. For the most part, they are mimeographed sheets, but occasionally containing photographs and sometimes printed with color. Every club of a certain status sees to the monthly publication of a little journal concerning activities within the club, with articles from members dealing with all sorts of problems. In most cases newsletter publication is a somewhat thankless and irksome chore, but is very useful despite that aspect. Generally, the editors constitute a tiny minority of persons who defy analysis, and who are not happy unless they are up to their necks in a sea of wildcats, in a world where everyone works willingly and heartily. Certainly, reading these newsletters from various groups is like having one's finger on the pulse of aeromodeling in a most immediate and direct manner. They are an inexhaustible fountain of ideas - some good, some bad, some so-so - and a constant source of re-juvenation for the sport."**

ADVISOR - Jim Mowrey. A recent 'ad' in the ADVISOR went this way: *"Announcing the OMNIMOUNT. From Arnett's Prevarication Parlor, the first omnidirectional, adjustable tension nose gear for the builder who can't decide what nose gear tension to use. One fantastic advantage - you can stop worrying which way the nose wheel is turned on final approach! Flexing will occur at all points of the compass! For further info contact Bob Arnett, Great Bend, Kansas."*

A month later the ADVISOR carried this letter:

"It is with extreme pleasure and humility that I sent this check for $7.50 for my dues and charter fee. (Sorry, no beer allowance this year.) I had been at loose ends for the last few months trying to figure just how I might be able to pay my dues after having been turned down by my banker

when I tried to finance the loan for 36 months. He tried to explain that I'd be losing ground doing this each year. I figured he wasn't too bright since we have three other banks here. But this wasn't necessary since out of the darkness came a ray of sunshine - the Hi-Plains RC ADVISOR! In it, before all the world, was the latest engineering triumph of Arnett's Prevarication Parlor - the OMNIMOUNT! Until this hit the national newsstands I was able to take care of all production demands, but now I found it necessary to get the help of my kids and also of my dog (got that idea from reading Wagger in a magazine I can't think of right now). So you can see what kind of need there was for an item of true quality. All this brought me financial security and peace of mind but brought up a new problem - it put me in the next higher income tax bracket . . . the one where you file a tax return! Now, not being the kind to look a gift horse in the mouth, one small word of criticism of your product report: The prime feature of the OMNIMOUNT is the fact that when it comes time to put it in a plane, the darn modelers don't have to set for hours trying to figure out which way it goes in simply because it don't make no never mind which way he puts 'er in! So be on the lookout for bigger and better ideas from A.P.P. Sincerely, Pop Top, Pres. & Bar Tender."

WAGGER

A dog,'s EYE VIEW . . .

"Hey, Wagger," Walt began as he entered the shack door, "where did you put the . . . what the heck!" The last phrase slid down the musical scale to follow Walt's progress as he toppled into a huge pile of envelopes stacked just inside the door.

When he finally clawed his way to the surface, his own eye caught the whimsical look of Wagger's bloodshot orb. Before Walt could break into a sputter, Wagger broke the silence.

"Sorry, dear old master of mine. I was preparing to answer the weekly mail when you came in. Don't apologize for scattering the envelopes; I've already removed the letters and sorted them into 'pro' and 'con'." Wagger bestowed a kindly smirk upon his master who then set a national record for blood pressure.

"Wagger, you beasty Bassett, the day I apologize to you will be . . . hey! 'Pro' and 'con' **what**?"

"Making radio outfits with easily changeable crystals to allow frequency changes at the flying field," replied Wagger. "You may remember that we discussed it back in August. Apparently Don Dewlap (the editor who works like a dog) overheard our tussle and put it in the magazine. **Now** I'm getting letters from the readers in addition to the squabbles I have with you. Anyway, **that**'s what I was sorting into 'pro' and 'con'."

"Hey, wonderful!" yipped Walt. "Which is the biggest pile: readers who agree with me that we **need** this flexibility, or readers who agree with you that it would be too expensive and

would place a burden on the manufacturers?"

"Well," admitted the dog ruefully, "I have to admit that most of the writers **do** feel that crystal switching will be a necessity as the skies get more crowded. As a matter of fact, all the racing groups maintain that they need this flexibility **now** to allow proper events."

Walt settled his bulk onto a creaking stool and then allowed himself the luxury of a beautific smile. "Well, old burger hound, so I finally got the best of you in a debate! **Now** can I call Phil Kraft and tell him to get on the stick, since all the problems have been resolved?"

Wagger raised a cautious paw. "Keep your haunches planted, oh boss. The problems still exist. Oscillator circuits are no less critical, the F.C.C. is still tough, and money is still hard to find. However, some of the writers put forth some dang good suggestions. Here, take a look at this letter from Noland Adams in Kerman, California."

Walt took the letter and read these comments aloud: "Dear Wagger: I am sure that there are those who feel the cost of such a feature would be prohibitive. Personally, I feel the manufacturers should offer this as an extra-cost option. The guy that doesn't want it - or can't afford it - doesn't have to pay for it. The contest flier, or just a Sunday flier that has frequency problems, can't afford to be without it. I'd have to take a close look at the price, and the advantages and disadvantages. Right now, if I had my choice today, I'm not sure which I'd buy."

"Noland has a good point there," admitted Wagger. "The manufacturer would still have to cover the cost of development; however, the cost **could** be recovered in this way without danger of pricing his gear out of the market."

Walt nodded soberly. "Actually, Wagger, I think most modelers are sympathetic to the manufacturer's problems. Certainly, we don't gain when we drive him off the market. Hey, here's another letter with a possible solution from Bill Rivers in Columbia, South Carolina:

"Dear Wagger: I think my Controlaire transmitter would need no tuning (and very little for the receiver) on 27 mHz. There would probably be complications on 72 mHz; probably, switching **circuits** would be required rather than just plug-in crystals. Also, since it wouldn't always be necessary to cover the complete **band** of frequencies, how about just having one or two alternates? I think the slight cost difference would be worth the expense. Having to share flying time with a couple or three other people can convince anyone."

"Good points there too," nodded Wagger. "Since Bill has a TV shop, I'm sure he has a good idea of the technology involved. Well, Walt, you can see that there are a lot of good letters and ideas here from the readers. I wish we had time to discuss each one, but my policy of answering each one personally means I have to get to work. I don't know how much longer I can keep doing it, but I haven't met so many people from other states since the ham set started gathering dust."

Walt nodded and started to leave, then looked at a picture on the desk. "Hey, whose dog is that?"

"Oh, that's Bill Rivers' dog 'Old Shorty'," replied Wagger. "She always goes to the field with Bill and worries about 'Snoopy' in the cockpit. I must remember to ask her what a 'Snoopy' is . . ." ●

STEARMAN PT–17

(continued from page 35)

close weave, and strength. Also, this makes it possible to have a fabric type material effect as the real airplane.

Cut out a section of Silron about 2" wider all around than is actually needed to cover a particular area. Lay this dry on the area to be covered. Spray it wet with a window spray bottle filled with water. Don't make it too dry or too wet - just wet enough so the material will stick to the areas to be covered. Stretch it and pull it by the edges until the material is smooth and taut over the entire surface. The water will allow it to stick. If it starts to dry, spray again with water as you want to keep the whole piece moist, but not "drippy wet". When it is as taut as you can get it, with only water holding it in place, dope the outer edges. Brush this on and rub it in with your fingers. Brush on another coat around the edges, keeping the whole piece wet while doing all this. Now, as soon as this is done, follow up at once, using a good 1" brush, and dope over the whole area just covered. Make sure that the material is wet enough so that the weave of the material is filled with water. Flow the dope on the Silron being careful not to brush over the previous stroke. Work fast, as you will want to flow the dope on top of the water. Give it another coat using the same process, wetting and flowing the dope on fast so it does not dissolve the first coat. All following coats of dope should be sprayed on. Follow up now with two coats of balsa filler coat. Then, set it aside and let it dry for a couple days.

After this drying period, wet sand it with 400 paper, being careful not to go through the Silron on the raised areas such as stringers and ribs. Take it slow and easy! It is a good idea to put a few drops of dishwashing detergent in the water for sanding.

The next coat of clear should be tinted with the color with which you are going to paint the model. The next two coats of clear should be mixed with white. Now, let this dry. Sand again with 400 paper and when you cut through the two white coats of dope and you see the color, you know you are cutting too deep.

From here on out, apply the color finish coat, rubbing as needed with wet 600 paper. The number of finish coats you apply depends upon the finish you want to achieve. I never count the coats; I simply quit when I have the finish I want. Rub the final coat down with white automotive rubbing compound.

STENCIL & LETTERING

Cut the stencil from manila folder grade cardboard. Fasten these to the model using rubber cement, keeping it about 1/8" away from the borders to be sprayed. It is best to spray on several light coats of color dope, rather than rush it by spraying a couple of wet, heavy coats. The light coats will not run under the stencil, and the slight over-spray is easily rubbed out with rubbing compound.

The very small lettering is done with rub on letters obtained at your hobby shop (train department) or your local art supply store. (Letraset, Prestype, etc.) They are rubbed on

and sprayed over lightly with clear dope. Do not brush over them with dope as they will smear.

The metal panel separation lines are accomplished with 1/16" and 1/32" black trim tape, also available from your art dealer. Make sure the surfaces are clean, and then install the trim tape and seal with several coats of sprayed on clear dope.

After the model is completed and all the details are added, spray the whole model with two coats of clear dope and give it a final rubbing out. Now apply several coats of good wax.

DUMMY ENGINE PT-17 (7 CYLINDER)

This I left to last because I was going to have to take some time to form a mold from which to make my Continental engine. However, at this point Sterling came out with their kit and their plastic engine of the Continental. I looked this over and saw that the sharpness of the cylinders was on the inside of the plastic engine. (You can get this plastic engine through your hobby shop or by writing to Sterling.) I decided to use this as a mold and make my engine out of epoxy mixed with lamp black. This is how to do it:

1. Block up the entire sheet in which the engine comes.
2. Take a frozen orange juice can and stand it in the center back part of the engine.
3. Make a cone out of metal, or heavy cardboard, and put this in the center front part of the engine, leaving 3/16" clearance between the cone and mold.
4. Use a release agent, or wax, and coat the interior of the whole mold, as you will make all the parts.
5. Mix about 2 sets of the large tubes of HobbyPoxy Epoxy with lamp black.
6. Pour a small amount into molds and work into all corners, etc., making sure there are no air bubbles.
7. Now slowly pour in the balance of the epoxy.
8. After it has set overnight, remove from the mold. This must be done with time and patience. Holding it over a lamp will help. Of course, if you are in a hurry you can destroy the mold by cutting.
9. Cut out the back part of the crank case and epoxy the 1/4" plywood disc in place as shown on the plans.
10. Sand the inside halves of the engine flat and fit them together. You will notice, here, that some of the cylinders do not line up perfectly. Line them up the best you can and, later on, you can file in the cooling fins where needed.
11. Anchor the two halves together by drilling a hole all the way through the cylinder heads at the point where the spark plug is to be located. Thread the holes and bolt the halves together. These bolts will also act as the spark plugs.
12. Sand the top of each cylinder flat where the valve covers are to go. Sand the front half 1/64" lower.
13. Epoxy the valve covers onto the rear half only. This now will allow you to remove the front half and fit the .60 engine. Cut out the top cylinder and fit the engine as needed. My best performance was achieved with the Enya .60.
14. The back half of the engine is epoxied to the firewall at the very last after all detail work on the engine is completed. The intake pipes are epoxied to the back half of the engine and firewall but the exhaust pipes are epoxied to the firewall only. This allows the front half of the dummy engine to be removed so you can get to

the Enya .60 for service.

DUMMY ENGINE PT-13 (9 CYLINDER)

To make this model into a PT-13, it is necessary to make a 9 cylinder Lycombing engine. I recommend using the Williams Bros. 2" scale cylinders of the Pratt & Whitney "Wasp Jr." and modify these for the 220 HP Lycombing.

FLYING

Ever since I completed my proto model of the PT-17, early in 1966, and started to fly it, the biggest thrill I get is from the reaction of the men who have flown the real one. It is surprising how many men say they trained in it for World War II, remarking that the model flies so scale-like, that it really brings back memories.

In order to do rolls and loops, I have to dive the model to pick up speed, and that is exactly what the real aircraft had to do with the 220 HP engine. In order to get this effect, it is necessary to power the model with a .60 engine. If you power it with a .80 engine you will no longer have the flying characteristics of the PT-17 or 13, but the flying characteristics of a crop duster or stunt plane which uses the 400 to 450 HP engine.

I fly the model in wind conditions as if I were going to be in it. Therefore, I do not fly it in 20 to 30 MPH or gusty winds. Not only is it no fun to fly with these conditions, but, also, your heart is in your throat, as you are risking many hours of work and endangering the spectators.

The plane is a real pleasure to fly in 0 to 15 MPH wind and can do everything the real PT-17 can do in a scale-like manner. The ground handling is good - just hold slight right rudder on take-off and it will lift its tail and take-off by itself. Before take-off, trim the elevator down to where the bottom of the stabilizer and elevator look flat. With slight right aileron trim it should fly perfectly.

Three-point landings are easy to accomplish. Come in with about 1/3 power, gradually feeding in up-elevator. At about 3 feet from the ground, cut the engine and let it sink in while pulling back on the stick. In a wind of 12 MPH and up, it is best to fly it in for a two-wheel landing.

Lots of luck and good flying! Warning: When you go flying, bring along some rope to keep the spectators away from your model. You'll need it! ●

WIN OR LOSE

(continued from page 12)

they were promoting, or were there, on the other hand, many outside financial interests affecting their individual flying? The higher their score, the more products they sell. The team members' attitude toward their own flying brings up another point.

Should an Internats' team be allowed to fly in a Nationals just prior to attending an Internats? It IS a free country and ANYONE is entitled to attend our Nats. Take a look at what happens when you attend a Nationals (this year for example) and don't do too well, such as in Jim Kirkland's case, where he didn't qualify in an easy FAI type schedule of maneuvers. The emotional letdown was a serious handicap to Jim's flying ability. This also applies to Jim Whitley's efforts at

the Nationals. Jim and Larry Leonard were in a very close competition with Larry winning out. Here, again, there is an emotional problem as with Jim Whitley losing to Larry. Both Jim's went to the Internats only a few days later with a built-in 'disadvantage' of losing out at the Nationals.

Phil Kraft was the smartest of the group. He didn't enter the Nats, choosing to 'give his all' for the Internats. His second place showing was, possibly, the result of going into the meet with the best possible mental attitude. Ask any competition minded R/C'er and he will tell you that your mental attitude is a very important factor in winning.

It is also possible that Jim Whitley and Jim Kirkland were forced to attend the Nationals because of the promotion of the products they manufacture and/or represent. This may have helped the sales of their products, but what about the chances of our team winning the Internats? The mixing of commercialism into our team efforts should be kept to a minimum. We will always have some form of commercialism, but let's keep it to a minimum.

Did our team have time to practice together? I am positive that our team had the financial ability to travel to a common spot and actually try to help each other out in their individual flying. This can be of great benefit towards a team victory. I understand that this was not accomplished and due, possibly, to a professional interest.

Did the individual team members have TIME to practice? They had, in fact, a whole year to practice. I hardly think that the team members had to practice in actual FAI type contests in order to be prepared. Each member of the team has had years of high level competitive flying and each has been a USA Nationals Champion. Competition in local AMA type contests is more than satisfactory to keep up the contest type practice.

The previously mentioned factors have not been expressed by anyone at the time of this writing. Are they important? You're — right they are! Most people are avoiding this issue. Stop and consider that it may be possible that there are better fliers besides the three members on our team. The actual rules and maneuvers the 'experts' (?) say need changing are only minor factors in our future efforts at the Internats. What is the difference between the AMA rules and

FAI rules? The AMA pattern is a much more difficult pattern than its FAI counterpart. Is this good or bad? In my opinion, it is good. With a more difficult pattern to select and train team members, we will have even more skillful pilots for international competition.

Does the AMA pattern require a different type of airplane than one used for the FAI pattern? I say NO. There IS a difference in trimming the model with the AMA maneuvers requiring more elevator travel. To convert to FAI type flying all one needs to do is to change the location of the elevator pushrod on the elevator horn. The FAI rolling maneuvers require the same design standards as the AMA pattern. The model must track equally well in FAI or AMA loops. Moments and side area requirements are the same. The aircraft used at the Internats by the top 10 back up this point. Out of the 10, only three were the so-called 'European' designed ships (3rd, 5th, and 6th). The rest of the ships would feel right at home on any flight line in the USA. The first place ship from Switzerland is a very nice ship, and very, very typical of a U.S. design. Its only difference was the use of a retractable landing gear (retractable gears are available in the USA) and the flying skill of a heck of a good pilot.

Our AMA pattern now has every FAI maneuver in it with the exception of the inverted straight flight. This hardly requires a special airplane. We are currently practicing FAI maneuvers. Why do we have to change to the FAI pattern when we are already doing all the maneuvers? Just because we may not do the entire FAI pattern in one flight does not mean we don't get the practice. If we adopt the FAI pattern as proposed by 'the local experts', several problems come up. First of all, the complexity of the various K factors in judging is a real time consuming problem in running a meet. If the K factor is used, you have destroyed the full meaning of a FAI contest. We have a hard enough time now getting clubs and people to run contests. Why add to the complexity of doing this?

What about the highly successful ABC Novice/Expert program? Some talk has been made about combining the FAI and AMA with FAI for C Experts. Now you really have a mess, with two sets of score sheets, two ways of adding scores, limiting to only 4 FAI flights, without even mention-

ing the wing loading requirements for FAI. If you are going to an FAI meet, then you have to go all the way or not at all.

Another factor to be considered is that the FAI pattern is a very boring schedule that almost puts you to sleep watching it. It is to be sure, a very difficult pattern to do perfectly. We have to maintain the interest of both the competition fliers and the spectators. The ABC 'grab bag' type schedule certainly has created favorable interest. We have a very strong chance of losing the pattern interest if this is altered.

You may ask, if you are so smart, why don't you propose something to assist our future FAI team efforts. This then, is my suggestion for you and the R/C Contest Board to consider. Obviously, there is an interest in doing something different. I will agree with that. I am willing to make changes if their is a valid reason for those changes, but to change our rules because our team didn't win is simply nonsense. The following proposal is for the good of the sport and for future team victories.

1. The FAI team shall not be permitted to fly at a Nationals just prior to an Internats.

2. The Team manager shall be chosen by the team members.

3. The AMA will organize a minimum of two days of practice sessions 30 days prior to the team members' Internats date of departure so that they may practice together as a team with the team manager. All necessary AMA-FAI officials will also be at this practice session.

4. Pattern rules for general AMA stunt flying.

a. Basic AMA pattern rules and procedures will remain the same with the following exceptions.

1. Order of maneuvers to be changed as follows
Take-off
Touch and Go.
Entire FAI pattern up to landing approach
5 grab bag maneuvers
Landing approach and landing.

2. Class A and B shall be the same maneuvers as agreed upon by the contest board at their Nats meeting in 1969. Order of maneuvers to be modified to fit into the FAI sequence.

3. All maneuvers shall be graded on 0-10.

5. Team selection shall be made at a separate contest held after the Nats,

one year prior to the Internats. This meet will be organized in a 100% FAI manner. No AMA rules at all. With this modification we will have the sequence practice of the FAI pattern which appears so very important to many. It will also have included the interesting maneuvers and will have an orderly listing of maneuvers with a minimum of contest paper work.

A point I would like to interject, in closing, is the importance of the FAI program. Most of the modelers who are familiar with the FAI inner workings, know that the actual set of FAI rules are way behind the modeling activity in the USA. In actual competition events, and complexity of maneuvers, we have been, and are still, way out in front of the rest of the world. If we change the very successful AMA-ABAC stunt program used by thousands of satisfied contestants to the archaic FAI schedule to please the 20 fliers in the USA who might have a chance at our team, then we are in trouble. We (the AMA) are pledged to please the majority of the contest fliers. The primary purpose of the rules is to provide a means so that thousands of R/C'ers will enjoy the sport of competitive flying. Changing our program so that only a few will have a possible direct benefit of actual FAI practice is foolish. We can't lose the interest of thousands of contest fliers. We will lose this interest by adopting the FAI pattern, one of which was similar to one used for years by the AMA. Our older pattern saw more and more people dropping out of competition. The new pattern schedules brought them back. If we adopt the FAI pattern we have a chance of increasing the possibility of winning the Internats, but we also run the chance of losing out in our own RC contest activity.

Does the average guy flying contests care about the problems of flying the actual FAI pattern? Let's face it; there are only 10 or 20 guys in the USA who actually have a chance of winning the Internats. These 10 or 20 usually are the top guys at the Nats each year. Why not have a separate contest that is an FAI team selection competition, separate from the Nationals? Let those 20 guys fight it out for the honor of being a team member, and believe me, there is a distinct honor to representing the USA as a team member. I know, because I had that honor in 1963 as a team member and again in 1967 as team manager. ●

ENGINE CLINIC

(continued from page 10)

drive washer was intended to bite into a wood prop. Quite often this knurling is not even and, when used with a spinner back plate, will tip it slightly. Again, more spinner wobble. Now is the time to make friends with someone that has a lathe, or access to one, because you are going to have to take a light facing cut across this knurled face. You do not need to disassemble the unit to do this. Hold the front housing by the part that slips into the case, (the o.d. of the rear bearing housing) in a three jaw chuck. It is very important that an accurate three jaw chuck be used that will hold the housing true. The crankshaft is still free to spin, so wedge a piece of cardboard between one chuck jaw and the edge of the counter-balance to stop it from rotating. Take a light cut across the knurled face. Also take a

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RHINEBECK '69

(continued from page 23)

location, also managed another staggering fete – spectators! On Saturday, with only model flying, close to 1200 PAID spectators came out to watch. On Sunday, when Cole Palen put on his full scale air show following the R/C activities, another 4800 spectators PAID admission. Can anyone match that for paid attendance at a contest? Needless to say, crowd control was no small task, but was carried out with the same smoothness as the rest.

The Saturday evening banquet, which we have attended each year, began with ten or twenty people meeting at a restaurant two short years ago, finally retiring to Dick Allen's basement. This year saw 222 people enjoying a pleasant evening of food, films and fun.

1970 TOLEDO CONFERENCE

- **Plan now to attend the 16th annual Toledo Weak Signals Mid-Winter R/C Conference and Exposition. Saturday and Sunday, February 28th and March 1st 1970. Lucas County Recreation Center, Maumee, Ohio.**
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One of the highlights (and there were many) of our trip was the opportunity to fly with Dave Fox in the rear seat of a Fleet Bipe, being followed closely by Dick King in his Sopwith Pup, and Cole Palen in his Fokker Triplane. If Fearless Leader gets the color separations done, photos from this flight should appear. What a thrill to look over your shoulder and down the barrels of a pair of Spandau machine guns mounted on a Tripe. Needless to say, not many can remember such an experience! At least not with pleasure!

We are certain that the efforts of George Buso, the contest director, and his many dedicated helpers, and the IBM R/C Club are and will be appreciated by R/C'ers everywhere, whether WWI oriented or not. For surely their originality has borne fruit, and their concepts in running a contest will find their way, via the contestants, into other competitions. The IBM Club is to be commended for a job exceptionally well done, and we hereby acknowledge our thanks with - **RCM TESTED, APPROVED, AND HIGHLY RECOMMENDED!**

We hope to see YOU at Rhinebeck next September 12-13! ●

Chuck Cunningham with his Mustang red "Ply-Fli" a modified Sun Fli with one piece "folded" plywood fuselage and cardboard covered foam wings.

CUNNINGHAM ON R/C

(continued from page 58)

ideas to incorporate in my next 'original' design, when I noticed a strange little thing. Please refer to the picture of New Era I, June 69, now to Firefly, Feb 68. Refer to drawings of same.

"How come the hinge line of the elevator in the pictures of both ships is forward of the rudder hinge and in the same place in both sets of drawings? Have I discovered why the work of the designers always performs better than the ones we build from your plans?"

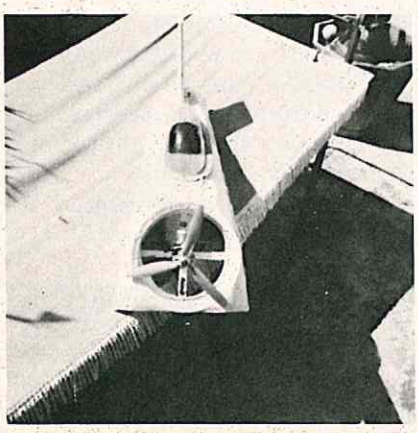
I don't know if the aircraft that you built from the plans flies as well as the originals or not, Norm, since I haven't flown your aircraft, nor have I flown the originals of any but the ones that I design. But, perhaps I can shed some light on your question, at least for the New Era. The same may be true of the Firefly and other aircraft. When designing a new plane, many things are taken into consideration, and some things are forgotten. The New Era was a joint project by Don and myself, although spread about fifteen hundred miles apart by geographical location. Our first thought was that an aircraft this size should have a .15 for power, and that it should be able to fly in a very tight space. The first was built with that in mind. Then we realized that a swing to smaller aircraft was taking place, and that most fliers would probably stick a .19 in the nose. This would make it a bit nose heavier, as well as make it a faster flying aircraft. So, in the final version, we moved the elevator back an inch to compensate for the heavier nose, and the added speed. This didn't hurt the flying with a .15, in fact, it improved it somewhat. But, the pictures were taken of the original .15 model.

The reasons that one aircraft may fly somewhat better than a duplicate of it are many. Perhaps it is caused by an untrue structure. If the fuselage is built crooked, then no amount of trimming will ever get the aircraft to fly correctly. A warped wing, or stabilizer, can give you the same type of problems. The balance point of the model is probably the place where most builders differ from the original, whether it be in a kit model, or one built from magazine plans. Thrust settings, engine performance, and last, but by no means least, the flying skill of the pilot, all have a strong influence on how the aircraft flies. And, of course, sometimes the designer's enthusiasm makes the aircraft seem, to him, to fly better than all others. The aircraft that has been trimmed out by a top competition pilot usually flies a heck of a lot better than one that has been trimmed out by an

average Sunday flier. Everything makes a difference.

Fred Hammond from North Highlands, California, sent in some pictures of his hovercraft, powered by an ST .35. It uses two channels of a digital system, one channel controlling the throttle, and the other servo controlling both the movement of the rear fin, and the location of the engine. The engine swings through an arc of 12 degrees right or left. The engine is located with a 45 degree tilt to the plane of the ground, thereby providing both lift and forward motion to the craft. Fred says that this 2'-9" hovercraft will skip along over land or water at speeds up to 40 mph. This is another example of the wonderful features of this sport. By the wonder of radio control we can investigate many of the new methods of travel without raising our necks. I'm still hoping that someone will come up with a really good working autogyro. Several years ago I tried making one, but never really got it to work to any degree of proficiency. One of the things that I discovered was that I had the pitch of the rotor blades going negative rather than positive. This, no doubt, accounted for the fact that the blamed thing wouldn't do anything but sink to the ground from a hand launch. All of you winter-locked experimenters might take a crack at trying Fred's hovercraft, or at making a working autogyro. There are several books that have been written years ago about autogyros, and this form of craft will be making a comeback in the future. You may recall that great craft that James Bond flew in "You Only Live Twice". That was a working autogyro, made in England, and the flying shots were for real! Speaking of movies, tonight is the TV showing of

Fred Hammond's hover craft.



'Those Magnificent Men and Their Flying Machines', and I'm sure that in the next few months we will be seeing a rash of scale models of the 1913 era. If the TV run hits me as hard as did the movie did when it first came out, I'll be gluing sticks in front of the TV trying to duplicate those great aircraft.

Which reminds me, did you know that the flying shots of some of the aircraft in this picture were of airplanes made from the original plans, and that the little open framework parasol plane, the Demoiselle, would not fly when it was first reconstructed? The test pilot weighed about 150 pounds and only after further research was it determined that the pilot of the original weighed in at 90 pounds. A woman test pilot was found that weighed only 90 pounds and the aircraft was then successfully flown. It's the same idea as expressed earlier, why an aircraft doesn't fly as well as the original. This is another reason: Often a super paint job will add a great amount of weight to the aircraft, thus raising the wing loading and decreasing the flyability of the aircraft. Another factor is the altitude at which both the designer and the duplicator live. If you live in Albuquerque, New Mexico, and are building an aircraft designed by a flier that lives in New Orleans, you're simply not going to have the same flying aircraft. 5000 feet of elevation makes for quite a bit of difference!

—

Several people have written in about ideas triggered by my Puddle Jumper from the October 69 issue. A lot of fliers have older radio sets sitting around in work shops and this type of craft is a logical use for these rigs. One of these days, I'm going to work on a radio controlled robot, just the perfect use for an older radio set. Can't you see the fun you can have guiding a full size robot down the street with your proportional transmitter hidden from view. This is a thought that has been bugging me for a long time. If any of you readers have tried this, or have had any success with it, please write in and let me know. Who knows, in some future issue of RCM we may be featuring construction plans for a scale R/C Raquel Welch. Hurry up and write, you guys. (Then I'll probably get a letter from some builder asking why his Raquel Welch didn't work as good as MY Raquel Welch. Now, can I get plans for the original, or do I have to make my own measurements?) ●

GEMS

(continued from page 14)

watts! (We used to holler about range problems, too!) The receiver case was a tiny thing about 2" x 3" x 4" or so, but it also had a requirement for a 45 volt battery and a smaller battery. All of this gave control of the rudder, in sequence only, and with full deflection at that!

As much as I hate to say it, there are still some people satisfied with only that mode of control today! This is not 'looking down' on them any more than you would 'look down' on someone riding a horse as you drove by in a car! It is just a fact. One thing you, the consumer, must be careful of, is getting the facts. If it so happens that you are about to start out in this fast growing sport, then one of these above mentioned 'characters' might tell you that equipment like that is still popular today. 'Tain't so, McGee!

Well, let's get on with it. We have, and are anxious to give to you, many, many GEMs. So, let's begin on the assumption that you know absolutely nothing about this field of endeavor, and that you are out driving around a large lake on the Southwestern edge of a large Texas city and you come upon a group of people gathered at the edge of what appears to be a very busy miniature airport complete with lots of miniature planes in various stages of flight. You pull into the parking lot and get out of your car, keenly interested in the 'goings on'.

After some period of time you get up enough nerve to walk over to a pair of enthusiastic friendly young men busily working over a miniature aircraft that flew quite well, has rakish lines, but appears to be completely coated with oil over an otherwise beautiful green paint job. "Say, that's a nice plane you fellows have there," you exclaim, more loudly than you intended due to your nervousness.

They both turn their heads towards you, one smiles a "thank you," and the other laughs gleefully, though you're not aware of it, at a private joke.

"How much does something like this cost?" you ask and gesture at the mess that surrounds them. Right there you're hooked or you'll never pay 'em any mind again. It's one or the other! Believe it or not.

"Oh, about four or five hundred," comes the reply in unison, and they both smile again, first toward each other as about something that's a great secret, and then toward you. You, of course, realize it is a truly friendly smile that greets you, not one of a salesman or a preacher, but a good buddy . . . but 4 or 5 hundred! That's not chicken feed! Still, you know that if you really want it badly enough, you can get anything. So you ask more questions and they give more answers. Then one starts the plane engine and taxis it out for a take-off. More questions, and too soon the flight is over. More questions . . . by now they realize your interest is genuine and the larger of the two shakes hands with you and says, "By the way, I'm Jim Simpson and this is my 'ole pard Jim Bonar." Some time later, after the introductions, and the questions and the demonstrations, you bid your new friends "adios." On the way home you stop at the drugstore and buy a copy of R/C Modeler Magazine that they had recommended.

It's after supper now, and the last three hours you've spent pouring over the pages of that magazine which has multiplied your questions. Of this much you can be sure . . . you want to do it! But how? Where do you start? Which radio? Which engine? Plane? Box? Gear? Fuel? Prop? Golly, how do I learn to fly? Millions of questions! A restless night at best, and the next morning you call the base and locate your new friends and agree to meet them for lunch and vow to start then and there!

Well, friend, this is how we start. As we go on here you'll see how it comes to be. First, and if possible, the very best thing to do would be to find the local flying site. Once there, find one of the more proficient fliers, introduce yourself, and ask his help and advice. This will be the best single step you will ever take. In lieu of that step we hope to be able to do the same for you via this series of articles!

One of the first things necessary for the enjoyable pursuit of this hobby/sport is the radio equipment. Even if you don't plan to buy it just yet, you must know what kind to have in order to plan an airplane/engine combination. If at all possible we would advise that you buy a brand new 'fresh-from-the-factory' radio of the same type as is most popular at your selected flying field. Here are the important reasons why: The outstanding reason why something is popular is because it is reliable. RELIABILITY is the key word, period. As time goes by, first one manufacturer then another enjoys popularity, but what that really means is that his particular radio is the most reliable. Another way to say it is 'radios that cause airplanes to crash are not long popular'!

Next reason: If you buy a new radio from a reliable manufacturer, you get a reliable guarantee. That doesn't mean your radio won't be a lemon but it does leave you a recourse. Which brings up the next important consideration. **It makes no difference what color a rig is or where it was made.** The single most important consideration is **does it work?** Or where can I get one and be sure it does work? The best way we have ever heard is to buy a radio from the manufacturer, his designated representative, or an established dealer. We say this because these people have the capability to fly the radio, then deliver it with a new warranty.

Next, you may want to consider buying a 'used' radio, but in this case we advise that you buy it from someone you trust, and who is presently flying it (so you can have confidence that it works). Be careful here too; to be sure you can get it repaired if required. Some fairly late model radios no longer have a home, and with few notable exceptions, radio manufacturers are loathe to disclose their secrets (to you) although well known to each other.

As a last resort you may consider buying an even older radio for some $100 - $150, but we recommend this only to those to whom money is NO object. We say this because more than likely it will fail, or HAS already, or worst of all, it is intermittent, that is it sometimes works and sometimes doesn't! No matter how you look at it you'll likely wind up junking it and then buying a new one. So, let its present owner 'junk' it and save your 150 bucks.

There are an increasing number of manufacturers offering kits for their radios. **Do Not Buy These Solely To Save Money!** This is not to say they are not good radios but rather that you may not be a good builder. We're not trying to 'put you down' but rather to be truthful and to help you. If you are a ham radio operator, radio or TV technician, electronic repairman, electrical engineering major, etc., or a compulsory gambler, you might consider a kit! ●

(continued from page 74)

very light cut on the short aluminum section that your prop slips over. Now screw in the threaded steel stud and note if it wobbles or oscillates as you screw it in. If it does, throw it away and get another. Face off both ends of this stud, and be sure and do this with a lathe, not a file. When you tighten the stud, the square face will butt against the square end of the crankshaft and lock everything up straight. Even though the threads in the aluminum drive washer may be loose, or even off slightly, this will bring things into fairly true alignment. When you are done the end of the threaded steel stud should have no more than .002" total run out.

Now that you have gone to this trouble, be sure that the hole in the spinner back plate is centered and not just hacked out with a hand reamer or file. That about takes care of the front end. Be sure and lubricate the bearings with a light oil. Don't let them set dry for any length of time.

The fit of the rear rotor is very important for proper engine performance, and yet overlooked by 90% of the fliers. The pilots that are turning in the top times are also keeping a close eye on the fit of their rotors. This, in itself, can add or take away as much as a thousand rpm if incorrectly set by only a few thousandths. First of all, the plastic rotor is not nylon as many of you think, but according to the Williams Brothers who mould them, molybdenum disulfide impregnated polypropylene. Say that to yourself a couple of times if you want a tongue twister. Being moulded plastic, the rotors have a small amount of fuzz and irregularities. These will wear in with time, but let's speed things up by carefully driving out the rotor pin and removing the rotor from the backplate. Some of the fellas have been boiling the rotors in water to remove the moulding stresses but I have not found this to be necessary. If you do this, place the rotor in a plastic bag upon removal from the water so that it will not be exposed to cool air. The idea of the boiling is to keep the rotor

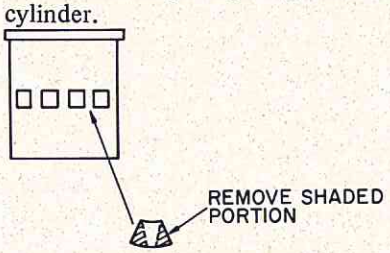
from warping the first time it gets hot. Maybe I have just been lucky, but I have not had any trouble with the rotors warping. I do soak the rotors in a can of hot fuel overnight, because the hot fuel will cause them to swell very slightly. Possibly, this also removes the moulding stresses.

Place a piece of 360 wet or dry on a dead flat surface and, with an oscillating motion, lightly face the back of the rotor. Do the same thing to the face of the backplate on which the rotor rides. Use a light oil with the wet or dry. Do not try to get rid of all of the low spots on the back plate as it has been hard chromed and you will be working for many hours. Just get rid of the rough fuzz and any rough spots. Check to be sure no low spots run into the edge of the port opening. Clean any fuzzy edges off of the plastic rotor and you are ready to reassemble the unit. Head for your local auto parts store and get two strips of .004" steel feeler gauge stock. These come in strips about 1/2" wide and 3" long. If you can find some wide .004" shim stock in which you can cut a slot to slip over the pin, all the better. Brass shim stock only comes in .002", .003", and .005". No .004" for some reason. Place a strip of the feeler gauge stock on BOTH sides of the pin and tap it back into place. Be sure and support the back of the back plate while doing this so that you do not bend the casting. You want the fit to be a snug .004". This means you can pull the shims out with your fingers, but they come out with resistance. If you have to use pliers, the fit is too tight. Now this setting will not last forever and must be checked quite frequently, especially if much of the flying is off of dirt fields. The rotors wear and will wear more towards the outer edge than in the center which results in a very slight cone shape. This will mean resurfacing from time to time, but a considerable amount of running can be done before this is necessary. Do not check the clearance by slipping a feeler gauge into one side. This way you tip the rotor and get an incorrect setting. With the unit assembled, push the plastic rotor against the back plate, as you rotate it, and check for any catches or bumps as the opening in the rotor passes the opening in the back plate. If so, find out why. This must be dead smooth. Now assemble the front housing and rear rotor unit to the case without the piston, sleeve, or rod. The crank counter-balance

should still rock to the bottom. Any binds must be removed. Also remember that once you have the lower end dead free, the engine must be bolted to a true mounting surface. The slightest twist in the mounting lugs can bind everything up again. If you use wooden beams, be sure they are true. If you use a Tatone mount be sure and check this out as well. Quite often these will need surfacing on a piece of 320 wet or dry.

Next, we have the piston and sleeve. Not much can be done to the piston, other than to remove any sharp edges or burrs from the baffle or wherever you may find them. Do not remove the ring from the piston unless you intend to replace it. If you remove it, it cannot be used again. If the engine has had any amount of running, look at the ring gap with a magnifying glass. If the edges appear to be beveled slightly and the top edge rounded off, the gap is not sufficient and the ring needs replacing. Insufficient gap causes the edges to butt together. If this occurs when they are lined up with one of the port windows, they will have a tendency to push out and catch on the edges of the ports. This results in the beveled edges. Don't mistake shiny edges for beveled. For this reason, be sure and use a magnifying glass. If you find it necessary to replace the ring, slip it into the sleeve first and square it using the bottom of the piston. Check the gap with a feeler gauge. You want no less than .006" nor more than .008". Anything less will cause the ring edges to butt together if you should get a lean run with hot fuel. Anything more will make for soft compression when starting. If the gap is less than .006" you are going to have to open it up by filing. Get a contact point file that is used for automobile voltage regulators, from your friendly auto parts dealer. An ordinary ignition point file is too thick. Carefully file the edges, being sure to keep them square and not distort the ring. This is not easy to do, so if you have ever been accused of being a hacker, this job is not for you. The easiest way to go about this is to cut yourself two 1/8" plywood washers about 1½" in diameter. Cut a slot in each piece about 1/4" long by 3/32" wide. Drill a hole in the middle for a nut and bolt and use these to hold the ring when filing. Don't try to hold the ring by hand or you will end up bending it. Also be very careful when installing the ring on the piston to not distort or bend it. These rings are made of ductile iron and will bend very easily. Most of you are used to the conventional expansion type of ring that is much harder and springy.

The webs in the bypass port windows can be narrowed slightly. The webs are actually wedge shaped. They are wider on the outside of the sleeve than on the inside. Do not change the inside width, but you can narrow the outside down so that the wedge shape is reversed. Also bevel the lower edge of the windows. This makes it easier for the incoming charge to get into the cylinder.

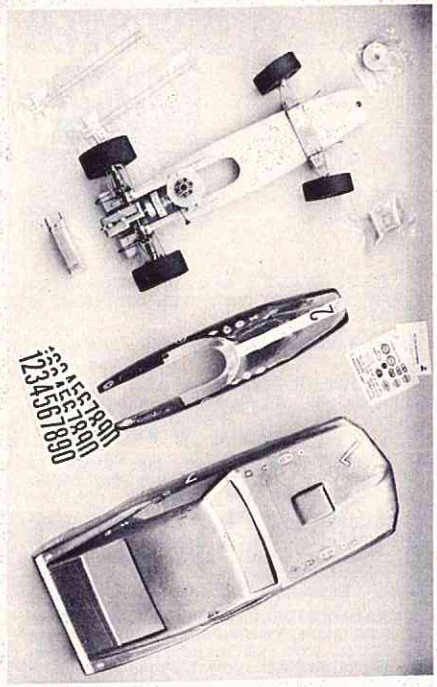


ENLARGED X SECTION OF WEB

You can also taper the exhaust port webs, but there seems to be little advantage in doing this. The exhaust gas is coming from the inside out rather than from the outside in, as in the case of the bypass ports. Some of the fliers are going as far as to remove every other web to increase the size of the window. The ring must then, in turn, be pinned so that the ring gap cannot line up with one of the port windows. I do not recommend doing this as the remaining web will wear extremely fast and the engine will be very short lived. To compensate for the increased wear, you can hard chrome the sleeve, but this is getting into work that should be left to a professional and is really not of that much benefit.

Quite a few fellows have wanted to know if chroming the sleeve will increase the power of the engine. Chroming only increases the life of the engine. It does not increase the power. In fact, an engine with a chrome sleeve will run hotter than one with the regular iron sleeve.

The last thing we are going to check is the head. No gasket is used, depending entirely upon the machined surfaces for the seal. Occasionally there will be a slight irregularity and the head will leak. Especially after some of you have replaced the regular screws with Allen screws and over tightened them, warping the head. With the head in place, hold the engine up to a bright light. You should see light between the bottom of the head and the top of the case. If you do not, it is time to get a



new head. The head should be lapped to the top of the sleeve. Get yourself some ordinary BonAmi at the grocery store. With the sleeve out of the engine, put a few drops of light oil on the top or flange. Sprinkle some BonAmi on a piece of paper and touch the top of the sleeve to this. Set the head on the sleeve and rotate it back and forth with a light pressure. Every five or six motions, rotate the head a quarter turn, and keep up the lapping motion. Replenish the oil and BonAmi occasionally. Keep this up until there is an even grey ring around the seating surface of the head. Check the top of the sleeve for any low spots. If any are present, the sleeve should be surfaced on a piece of 360 wet-or-dry rather than trying to lap them out. The aluminum head wears considerably faster than the iron sleeve and you would wear away too much of the head. If it is necessary to surface the top of the sleeve, it will have to be lapped to the head again. You should get into the habit of checking the head occasionally to see if it has been leaking. You can easily tell, because there will be a dark spot where the leakage has occurred. Over tightening or running too lean can warp the head and cause it to leak. It is a good idea to carry an extra head along in your tool box just for this reason.

Some RC'ers have wanted to know about polishing out the bypass. Don't waste your time. The only advantage to polishing is through the metal removed. If the area is adequate to begin with, as it is in the K & B .40, then there is no advantage and actually a disadvantage. Most of you have seen the water bead on your car after a wax job. The same thing will occur on a polished surface in your engine. This beading of fuel can actually work as an obstruction and slow down fuel flow. As these blobs of fuel break loose they will affect the mixture, resulting in surging, difficulty in setting the needle, etc. A smooth surface is fine, but a high polish, NO!

That about covers the refinements to the .40. I am sure I will think of other points the day after this is turned in to Don. If so, we'll cover them in a future column.

Since the article on fuels many months back, I have received many letters from modelers having trouble locating Baker Castor Oil and Lubricin. Don't you guys ever look in a phone book? I can understand a fellow out in west Montana having a problem, but when I get letters from Chicago, New York, etc., I begin to wonder. There is one problem, however, and that is Baker's policy of a five gallon minimum order. If you buy five gallons of castor oil, they will sell you one gallon of Lubricin. They will not sell one gallon of Lubricin separately, because of the paper work involved. With Baker's approval, other companies have been purchasing the oil and reselling it in smaller quantities. If any of you know of outlets such as this in your particular area, let me know and we will run the addresses for the rest of the gang.

I know of three to start with! In the Los Angeles area Hot Rod City, 2930 Sepulveda Blvd., Torrance, Calif., has Baker AA, Lubricin N1, and all the other necessary fuel ingredients for 'home brew'. In the San Francisco area they may be had from Enterprise Checmical Co., 350 Townsend St., San Francisco, Calif. E. T. Enterprises, 74 Dickinson, Mount Clemens, Michigan, is the third.

With winter almost here the cold weather starting problems will be with us again. The following letter from Lt. Col. Dave Hatfield will tell you how he solves the problem.

Thought that I'd better get this off to you and your readers before winter besets us and so many fliers start having all of those engine starting problems that they ask you to solve.

It's really quite simple and you touched so closely to it in your September '69 column. I was also shocked to read Lt. Col. John Harris' story on Alaskan flying (an old buddy and flying pal of mine), (RCM story) in which he and his buddies had so much trouble starting. The use of blow torches, car exhausts, expensive electric starters, extra hot plugs, 2½ volt batteries, etc., is not the answer.

The answer was solved by us some years back when I was at Lockbourne AFB, Ohio, and used to fly with the base gang and the CORKS club in the dead of winter. It was not unusual to fly in zero to six degrees and on up to maybe 20 degrees with very little starting trouble. This included 'cold soak' engines that sat out in the low temps for hours.

I had forgotten this solution until last winter while flying here at Tinker AFB and my reliable O.S. .60 Max RC started acting up in the cold. Got so bad that I had to jam the spinner against a spinning bicycle wheel to start it. Then I remembered the solution.

Now, I wasn't the only one of us Tinker (and some TORKS members) fliers having this problem. The temperature was down in the low twenties and we all were suffering from lots of sore arms and popping engines which refused to start. The solution cost me 31.9 cents and it kept the fliers going all winter.

Stop at your friendly gas station and get some white gas. If your readers read your

column on additives they found out as we did years ago that adding white gas to your fuel in limited quantities increased economy but did not damage engines nor help rpm. I'm not advocating adding the white gas to the fuel either, but it is a tremendous prime assist!

To the point now, simply fill your old empty nose spray plastic bottle about 2/3 full of fuel and add 1/2 white gas. Shake well and serve about 5 or 6 drops into the carburetor intake. If your engine is stiff from the castor oil thickening in the cold weather, spray some in the exhaust port with the piston in the down position. Flip it several times to dilute the residue and then connect the starter battery. The nose spray bottle is better because it does not send a stream of cold prime into the cylinder to saturate the plug but rather just a mist, which is the answer to plug problems.

We've used this method all winter with standard Fox long and short reach RC plugs and a single 1.25 volt nickel cadmium battery. I can assure you that a gallon of white gas goes a long way and that about six ounces of it will last one flier all winter. As a matter of fact, we Tinker AFB RC jocks held small unofficial contests to see who flipped his engine the least number of times to get started in the idle position on the coldest days. For those who don't like the smell of white gas, they can use Coleman lantern fuel or outboard motorboat fuel. We found that for 31.9 cents a guy couldn't go wrong.

One more thing, once the engine is started on the prime, it will run normally on undiluted fuel. For those interested, we use nothing but K & B 100 fuel. While this is not exactly a plug for K & B, we have never burnt up an engine, although we've worn out quite a few flying close to 3 gallons a month each in those big .60 engines. . .

Very sincerely,
David (Dave) Hatfield
Lt. Col. USAF Ret.

I get lots of letters from modelers with engine problems, but very seldom does anyone bother to let me know if my answer was of any help. Some of you may remember Mr. Blouin's letter and my answer in the June 'Engine Clinic'. My day is a little brighter, thanks to Mr. Blouin.

You will probably not remember me, but just the same I wanted to drop you a line of thanks for your letter dated January 28 '69 and also the additional info in RCM June 1969.

Well, you were right, there was varnish on the sleeve of that Merco, the gap on the rings was less than 1 thou, and the top of the piston was at 4 thou. The engine is now running very well.

P.S. I also reversed the carb, as per Maynard Hill's article last year or so, and it really inproved the already good Merco idle. It can now be made to quit lean on idle with air bleed screw.

Yours truly,
J. C. Blouin

Another letter from my old friend Darrell Yonker up in Anchorage, Alaska.

Another 'just for the heck of it' letter.

You once told me that most of the guys who read your articles are not interested in theory and after reading some of their letters it becomes painfully obvious that some of them don't even read the practical stuff.

Anyway, about theory. In your last article you mentioned something about the power peak of an engine being more or less unimportant. (I'm writing from memory.) Since we normally find that if we fit an engine with a prop that lets it run at its power peak, the airplane's performance is usually miserable. This doesn't prove that the engine's power output is unimportant, but that a propeller that moves a small mass of air at a relatively high speed is inherently less efficient than one that moves a large mass at low speed. If we geared the propeller drive and then experimented with various gear ratios and propeller sizes, we would find that in actual fact the airplane would attain peak performance when the engine was running exactly at its power peak.

What it boils down to is that thrust equals mass times velocity while power required equals mass times velocity squared. That's why fan jets are useful. They move a larger mass at a lower velocity and so, for a given power output, provide more thrust.

Did you ever give any thought to why a 300 horse engine can lift a helicopter straight up while a conventional plane with a conventional propeller wouldn't even come close to rising straight up, assuming equal weight.

Racing airplanes must use relatively small diameter high rpm props because they must provide high velocity slip streams, since the speed of the plane can never exceed the slip stream velocity in level flight. For a given engine power, one can only get the high velocity by handling less air mass per unit time. (Small diameter)

I don't know why I write all this junk, but I would really like to see more theory in your articles myself. At least every 5 or 6 articles. I've been reading beginners articles for 15 years, and for the most part they aren't too interesting anymore.

Darrell Yonker

I didn't say the power peak was unimportant, Darrell. What I said was that there was too much emphasis placed on this and not enough on the maximum torque. Sure I know why a 300 horse engine can lift a helicopter straight up, but the blade area has a part in it also. How about it gang, do you dig this theory bit or not?

As long as we are talking about horsepower, torque, and theory, the following letter was sent in to RCM and forwarded to me. Pull up a chair and grab a cold one as it is rather lengthy and requires some thought. In fact, I'm still not sure I follow the whole thing.

. . . Regarding statements made by both (Dave Platt and Clarence Lee) of them in their articles in the August issue, there

appears to be a misconception of what torque is and its effects on aircraft (models or full size). The torque developed by an engine is simply function of the engine's displacement and its brake mean effective pressure. This brake mean effective pressure is the integral of the pressure in the cylinder over one cycle of the engine, i.e., two revolutions for a four stroke engine and one revolution for a two stroke engine; that is, it is the average pressure that would be required to act on the piston over one cycle to produce the work generated by the engine at a given operating condition (effectively throttle setting) and engine speed, this latter dependence being due only to the efficiency of the intake and exhaust ducting and to the valve timing (or part timing) which reduce the charge that can be taken in on the intake stroke. In aircraft application, two considerations must be given when considering torque; for a motor running at constant speed, the torque developed by the motor must equal the drag acting on the propeller multiplied by the distance from the center of the crankshaft to the point on the blades where the resultant drag force acts and secondly at any time, the torque generated by the motor is transmitted to the airframe but in a direction opposite to that of the motor's rotation.

What effects will torque have on the aircraft? It will cause the aircraft to rotate in a direction opposite to that of the propeller so that one must somehow increase the lift generated over one wing, this being done in various ways: ailerons, rudder, motor offset. These last two causing a yaw which results in a higher lift over one wing. Thus if one changes the operating conditions of his engine without retrimming the aircraft, it will start rolling until a new equilibrium point is met in the aircraft attitude where the torque is compensated by the moment created by the greater lift over one wing. For an aircraft model with a tractor engine, opening the throttle would result in a turn to the left whereas closing the throttle would result in a turn to the right. During maneuvers, which are usually done at fixed throttle settings, resulting in a constant torque generation, the only reason an aircraft changes direction as in a loop, take-off, etc., is because of gyroscopic precession which generates forces acting in directions opposite to those given by Dave Platt; turning right pushes the nose down unless the engine is rotating counterclockwise when viewed from behind the propeller. The force which causes an aircraft to veer left on take-off (not considering the period during which a tail dragger raises its tail) . . . is due to an aerodynamic force caused by the prop wash causing a high pressure over the left face of the rudder and a low pressure over the right side resulting in a net force to the right applied at the tail. Aircraft with tricycle undercarriage are affected as tail draggers are by this effect but are not affected so noticeably because of the much greater stability of a tricycle undercarriage.

What about using a nylon or a wooden propeller? The weight of a propeller has nothing to do with the torque generated by a motor at a given operating condition and the airframe should not know how heavy the propeller is. However, a heavier propeller will have to be stronger and will require

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I certify that the statements made by me above are correct and complete.
Patricia E. Crews

possibly a larger cross-section and blade shape although the pitch and diameter of two propellers of different weight are the same. This would result in a larger coefficient of drag for the heavier propeller making the engine at a given throttle setting run slower thus allowing the engine to generate a higher torque. Thus the greater tendency for an aircraft to turn left with a nylon propeller is not caused by the additional weight over a wooden propeller but by its larger coefficient of drag.

I hope this may help clarify some points but one should remember that it is simply a question of equilibrium of forces and moments and that for an aircraft flying in a fixed attitude, forces and moments must be in equilibrium. . . .

Yours truly,
G. Lemieux
Major C.A.F.

I think Major Lemieux had better get hold of an engineering handbook and look up torque, work, and horsepower. Torque is a simple twisting motion. You apply torque when you unscrew a jar lid. It has nothing to do with displacement, efficiency of the intake and exhaust ducting, or other points Major Lemieux has brought out. If this were true, how would you check the horsepower of an electric motor?

However, I believe the main point Major Lemieux is trying to put across is in reference to my statement that torque was the cause of your airplane veering to the left on take-off and getting off heading in loops.

I'm an ex-Air Force pilot myself, and spent a little over two thousand hours flying the big ones during WW II. From the first day I stepped into a PT 19, some instructor was screaming about torque and to get on the right rudder. After a year of pilot training you begin to accept the fact that it is torque that is pulling the nose off heading. With a P 51 it requires full right rudder, right brake, and easy hand on the throttle during take-off. This is gyroscopic precession?? I'm afraid I don't buy that. I'll grant you part of this was prop blast on the rudder, but the major part was plain old twisting TORQUE. I wonder if Major Lemieux ever gunned the motor in his car and noticed it rock. If Major Lemieux had ever tested an engine on a torque stand, he would realize what I am talking about.

How about it out there in R/C land? Anyone have anything to say that would back up or dispute Major Lemieux?

And with that we will end the column for this month. I have to think about this some more.

Gyroscopic precession, hmmm. ●