49¢¢ MAY 1977 $1.50

RCM radio control MODELER

THE WORLDS LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST

VOLUME 14 1977 NUMBER 5

RCM MODELER

FEATURES

MAY

THIS MONTH'S COVER

Dale Chorley of England with an Arrow Models' "Supermarine SV5" built by Paul Riley of Birmingham and powered by a Webra Speed .61! Takes off fast and is fully aerobatic. Photo by Tony Baker.

R/C MODELER MAGAZINE is published monthly by R C Modeler Corporation, Don Dewey, President. Editorial and Advertising offices at 120 West Sierra Madre Boulevard, Sierra Madre, California 91024. Telephone (213) 355-1476. Entered as second class matter at Sierra Madre, California, and additional offices.

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SUBSCRIPTION RATES: The United States $16.50 per year, $32.00 two years. Single copies $1.50 each. Add $2.50 per year for postage outside of the U.S. (except APO's and FPO's). Change of address notices, undelivered copies and orders for subscriptions are to be sent to P.O. Box 487, Sierra Madre, California 91024. Allow 6 weeks for new subscriptions and changes of address.

ADVERTISING: Send advertising copy and complete instructions to Advertising Department, R C Modeler Magazine, P.O. Box 487, Sierra Madre, California 91024. Telephone (213) 355-1476.

From The Shop

DON DEWEY

BY R.H. PHILLIPS

● The Ancient Modeler knew his time was growing short. He was, after all, past his eightieth year, his eyes were going bad on him, and the slight tremble in his fingers made it hard to adjust needle valves and the tremor was sometimes visible in a low fly-by, especially inverted.

He was sitting in front of the club house in the sun when the realization came to him that he would soon be leaving. It didn't frighten him at all, he had had a good, full life and had no regrets. Since his wife had gone on before him the previous year, some of the enjoyment had gone and he lived only for the building, the flying and the good companionship he shared at the club field.

The sun was warm on his face and the sounds of the few fliers kidding each other on the strip were good to hear. The occasional sound of an engine on take-off caused his eye lids to lift a bit just to watch someones bird lift off the grass and bank away in an arc that had never stopped delighting him, although he had watched it thousands of times before.

He stayed around for awhile, chatting with the fliers coming and going and, as the sun started toward the horizon and a slight breeze came up, he pulled his oil stained cardigan on and packed his gear up to go home.

Later that night he sorted all his gear, collected over many, many years and thought about how he'd dispose of it, a soft smile playing over his face as he contemplated what he intended doing.

Over the next few weeks, he invited club members to drop around his house and there, fondling engines and radios and assorted gear, he methodically gave away everything that could be used, taking pleasure in the feelings this largess aroused in his friends. He turned away their interested queries by saying he just thought he'd leave flying to the younger fellows and that he got a good deal of pleasure being around them and wanted to let them know how he valued their friendship. Radios, engines, jigs, fittings, tools and appliances gradually found their way to new owners and, one day, he found that it was all gone. All of the equipment carefully and lovingly gathered over the years was now assured of continued use, love and care, and he was satisfied with what he had done.

That night, he fell asleep in a warm glow over the enjoyment his hobby had always brought and especially over the feeling of satisfaction his disposal of his equipment had brought him. He did not waken from that sleep, at least not in worldly terms.

☆ ☆ ☆ ☆

He opened his eyes to warm sunlight and the greenest field he had ever seen. It was huge, dead level with short cropped grass and with a slightly spongy feeling underfoot. He stood up, experimentally and found that the grass was a delight to walk on, soft as a cloud underfoot. He took a pace or two and found his movement surprisingly quick for his age. He looked down to his feet and his right hand caught his eye. He spread the fingers of the hand and looked closely at the back of it. That's odd, he thought, the liver spots are gone, the skin is snug and the colour is good, it's the hand of a young man. He felt like a young man, his step was light and his eyes seemed to be seeing things much brighter than he remembered.

He looked around again and the field looked so green it almost hurt his eyes. The blue sky was a soft and gentle blue, and looking up into it didn't make him squint at all. The very few light fluffy clouds in view were just enough to add character to the sky without indicating bad weather. He turned and looked all around the sky and realized with a start that there was no sun visible. The light seemed to come from everywhere and nowhere, casting no shadows. Lord, he thought, what a fantastic place to fly. As the thought crossed his mind, he heard the faint mutter of an engine being started and, glancing across the field, he noted two figures kneeling on the grass beside a model. As he watched, they stood and the model rolled out and curved gracefully into the sky. He felt his heart beat a little bit faster at the sight of it.

"Ah, there you are, I'm sorry I seem to have missed your arrival."

The voice came from behind him and he turned to face it. There stood a tall figure, clothed from neck to ankle in a jump suit of a soft grey material. The man wore a full beard and longish hair and was of indeterminate age.

"Oh, were you to meet me?"

"Yes, we like to meet all newcomers and show them around."

"I like your field," the Ancient Modeler said, "it could hardly be better."

"We feel that way too," the stranger replied, "and by the way, it's rather refreshing not to be greeted with the usual question."

"What is the usual question?" asked the Ancient Modeler.

The stranger smiled a small smile and looked the Ancient Modeler over carefully before replying.

"Well, we most often are asked, where am I?"

The Ancient Modeler grinned and with a wink, said, "I'm pretty sure I know where I am."

"Do you, now?" said the stranger. "Well, we can get to that later. Come along, and I'll show you around."

Time didn't seem to mean much and they covered a great deal in what seemed like a short time. The stranger showed him the shop area and explained that while it wasn't necessary to build models in the conventional way, one could do so if one wished. The balsa, spruce, covering material, and fittings stock was the best the Ancient Modeler had ever seen, and apparently all there for the taking. Radios of every make and model were there as well and there seemed to be nothing lacking to make a modelers dream come true.

The Ancient Modeler queried the comment about conventional building not being necessary and found that all he need do was think of a model and it materialized at his feet, complete in every detail. He also found that thinking about a propeller change was enough to have the selected prop appear in it's rightful place without any effort on his part. He tried making subtle changes in the model he had created and the lines of the fuselage seemed to flow under his gaze and changed to what he had thought.

His guide watched him with that same slight smile on his face as he ex-

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Cunningham On RC

CHUCK CUNNINGHAM

● For what it's worth, an interesting thought struck me while attending the Southwest Modelers Trade Show in Dallas this past January. That thought, was that there sure are a lot of old guys in this hobby! Now, before any of you get on your broom about my slur about the "old guys", let me add that I'm one of them.

Sure, there were a lot of young people in the crowds, couples in their late twenties and early thirties, some with even younger kids in tow, but not many teenagers. I'm beginning to wonder just where the future modelers and leaders of the industry may be coming from. Of course, we all realize that the average age of the population in this country is getting older, and that if each of us is lucky, we each will gain that "older" state, but the question still remains, where are the youngsters? Most of the people in the model industry have their roots in modeling back in the thirties and forties. Perhaps even a few were pitching models into the sky in the twenties. But look around. If you are in your late forties or early fifties you can, no doubt, trace your modeling ancestry back to Free-Flight in the thirties, and U-Control in the forties and fifties, and then Radio in the late fifties and ever since. But, when we were modeling in the thirties, the other guys modeling in those years were about the same age. Once in a while a real old timer of twenty-five or so would be around, but the great predominance of modelers were all within an age span of ten years.

After WW II, when modeling began to come out of the age of "carve em yourself" solid models and pine and cardboard free flights, the same people, once again, turned to this great sport and, for the most part, got interested in the relatively new feature of U-Control building and flying. In the late forties and early fifties, the Plymouth Division of Chrysler Corporation sponsored competition for the young fliers and a lot of interest was generated by Plymouth's involvement. Then, modeling fell into somewhat of a limbo in the middle fifties, as did so many other things as I look back on it now. Radio control really has been the salvation of the modeling industry because the use of radio control opened up such tremendous thoughts in the minds of just about everyone that has tried it. Radio operation of a model is just about as close to the real thing as you can come. How many of us would ever in our lifetime have a chance to fly a full scale Fokker D VII, or a B-17? Or, for that matter, an F-16?

So, radio rekindled the interest in modeling as a sport and as a hobby and today the industry is vast and world wide. But, if you stop to look back over the years, you see a lot of the same faces. Older and grayer, but still the *same faces*. Have we, In our great enthusiasm and interest, tended to leave the young people behind with the idea that if they are interested, they will find *us*?

Who knows, but I believe that it is really time that each one of us does something in our own way to encourage the participation of younger people in this great hobby and sport. Frankly, I really believe that those of us who have been in modeling all of our lives are much richer in experience, logical thinking, determination, prior planning, and what have you, than are the average nonmodelers. Most modelers can fix their own lawnmowers, tune their own cars, experimentally fix their own TV sets, paint their own houses, and can do just about anything. We *don't* cause we're too busy building the next beautiful crate, but we *could*.

The point is that we owe a lot to this hobby, and I think that both for the future good of youngsters and for the future welfare of the sport and the hobby industry, we should collectively help the kids. Modeling is expensive. Long gone are the days of the Comet 10¢ balsa kits. Just think, for an investment of 30¢ (10¢ for the kit, 10¢ for the glue and 10¢ for the dope, or banana oil), you could spend a lot of time and have a lot of fun creating a masterpiece. But we need to find a way to attract the young people. If it is competition of a limited scale sponsored by someone in the hobby industry, or if it is some form of sponsorship at the local level, it needs to be done.

All of you other "old guys" give it some thought, and if you've got an idea, write us about it. It isn't an easy thing to do because the things for young people to do are numbered in the millions, but it is important both to them and to us.

◆

For the past several months, I have been writing about doing your own designing and also about the construction of Old Timers. All of this means that whether you design your own aircraft, or you build from magazine or Pond plans, you have to do everything yourself. And, quite frankly, this is a lot of fun. Sure, it's a bit harder than opening up a super kit with each part custom cut and sanded for you, but it really is a lot of fun to select your own balsa wood at the hobby shop, to figure out just how much wood that you're going to need, and then to cut out all of the parts and make them work. There are a lot of short-cuts to making your own "kit" and so, this month, we will take a look at some of these short-cuts. They apply to just about any do-it-yourself project.

Since I am currently at work on a large bipe and am designing and building it as I go along, let's use it for a background model for the problems that you will encounter.

First, if you are designing your own aircraft, you have already decided upon the size, type, number of wings, etc., so we'll have to assume that you've drawn the basic plans and are now ready to get to work. The plans need not be drawn on special paper (wrapping paper, butcher paper, just about anything will do), but you must make sure in your drawing that all of your lines are correct since the aircraft will be only as true as the plans from which they are built. As an example of this, RCM rarely ever runs a set of plans exactly as submitted by the author of a construction article, although this is common practice with most model magazines. Why? Simply because we have found that, in checking each part against the other, there are usually always discrepancies. Thus, while it is very time consuming and expensive, Dick Kidd carefully checks each segment of a set of plans, re-engineers them where necessary, then re-does the entire set of plans in ink. A lot of trouble? Sure, but at least we know you'll get an accurate set of plans from which you can build. Some errors are bound to slip by, but nowhere near the amount if we simply ran the original set of pencil drawings. The point we're trying to make, is simply that you should take the time to check each part as you draw it, so that you will end up with a properly built aircraft with "repeatability" — that is, more

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Engine Clinic

CLARENCE LEE

● This month we have another old timer to tell you about - - - the 6th engine in the series. Unlike the previous five engines which were all post WW II engines of the 1946-1947 era, this engine dates back to 1937 when "gas motors" for model airplanes were in their infancy. The name of the engine is the Willard which very few people — engine collectors included — have ever heard of. It was only recently that I obtained a Willard for my collection and, knowing nothing about the engine, set about learning something of its history. The engine had many unique features not common in engines of the early years and was actually ahead of its time in design and materials.

The Willard was designed and built by Willard Hungerford. Willard built several one-of-a-kind engines between 1934 and 1937. All engines were relatively small, being of .45 displacement or under. Some of these engines were given to friends who, in turn, flew them in model contests. One friend in particular, Frank Knapton, felt that money could be made by manufacturing one of the smaller designs. So Willard set about building several prototypes. The first of these was a side port design of .14 displacement. Frank Knapton put several into models and flew them throughout Southern California at contests and club flying sessions in 1937. These original engines were called Hungerford's.

While Frank Knapton was out promoting the engine, Willard was still experimenting, trying to develop something a bit more advanced than the more common Brown, Bunch, Baby Cyclone, etc. It was during this period that he came up with the rear rotary disc intake design. To my knowledge, this was the first model engine to use this method of intake. In later years, all of your more powerful racing engines such as the Hornet, McCoy, and Dooling used this method of fuel induction. This remains true to this day. The advantage of this type of induction being that for the same number of degrees of open time, the intake aperture is "wide open" for a longer period of time. In 1937-1938, the majority of your model engines were of the "side port" design. In this type of intake, the piston skirt uncovers the intake port on the up stroke and again covers on the down stroke. The intake timing is then symmetrical, i.e., if the piston uncovers the intake tube 45° before top center then it also closes 45° after top center for a total duration of 90°. Rotary valve crankshafts (front intake) or rotary disc (rear intake) can be timed to open and close at different degrees of rotation, i.e., the engine can be timed so that the intake opens 35° after bottom center and closed 55° after top center for a total duration of 200°. The more fuel mixture you can get into the engine, the more power it will develop. The advantage of rotary valve timing over the old side port type of induction is readily apparent. In turn, the advantage of the rear rotary disc type of induction over the front intake rotary valve crankshaft, is the size of the opening - - - a disc allowing for a larger opening or hole than can be drilled through the crankshaft.

The very first design that Hungerford/Knapton planned to produce was a .19 rear rotary with a number of unusual features. The cylinder was cast iron with the bypass and exhaust ports cored-in and the head integral. The cored bypass, in itself, was quite a feat in those days. This means that the hollow cavity for the bypass was cast-in during the casting of the cylinder, rather than being a separately bolted, or brazed-on, unit as used on other engines. The piston was also cast iron, hard chrome plated, and lapped to the cylinder. Another unusual feature of this first engine was a cast aluminum gas tank top that also included a down draft venturi as an integral part. This was, of course, to allow for easy choking with the tank mounted practically touching the firewall. However, casting problems arose and this feature was dropped. Other features included a machined aluminum bowl type gas tank, a cast aluminum exhaust stack, and a very complex and tricky timer assembly.

This initial engine was never produced other than possibly one handmade prototype before many design changes were made to improve the engine even more. First the integral head was replaced with a screw-in aluminum one to allow for through boring and honing of the cylinder. The venturi intake tube was changed to a straight piece of aluminum tubing and the cast tank top modified to fit. The timer assembly was also simplified, but still remained rather complex. A pre-production run of about a dozen engines were made and pictures of this engine appeared in several contest program ads, etc. Those who bought (or were given) these engines were very happy with them and plans were made to go into "mass production." Additional capital was scraped up and injection molds were made for a new plastic tank top and fuel bowl. This was to be the final configuration and is the engine we have pictured.

However, it was now the latter part of 1938, and the Ohlsson .23 was on the market. With their mass production and advertising capital, the Ohlsson .23 swept the field. The Hungerford/Knapton engine, now called the Willard, could not get its foot in the door and died a slow death. Lots of parts were on hand as production had been started, and both Willard and Frank assembled a few motors now and then and peddled them among friends, local modelers, and the like, up until WW II when the project was dropped. After the war, the parts changed hands several times with a few more engines being built by the individuals involved. For this reason, the exact number of engines built is not really known. Due to the rarity of the en-

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gine, I would guess that less than 100 are in existence.

Disassembly of my own engine revealed several features not mentioned previously, such as a fully machined aluminum connecting rod with bronze bushings at both the wrist pin and crankshaft end, and a phosphor bronze main bearing. Remember that this was back in the days when most con-rods were cast pot metal without bushings, and main bearings of plain aluminum or brass. The timing of the engine was also of more modern thinking. Both design-wise and metallurgically, the Willard was far ahead of its time. It is a real shame that Hungerford/Knapton did not have the facilities and capital to compete with Ohlsson & Rice. The Willard was more advanced in many ways. It wasn't until after WW II that the Ohlsson .23 and .19 dropped the side port type intake and went to the front rotary design.

I was intrigued enough with the design features of the Willard to run the engine and see how it stacked up against the Ohlsson .23. My own engine, although supposedly a .19, checked out to be of .21 displacement. Whether this was intentional or just a matter of the bore and stroke being out of specs, I do not know. The Willard proved to be a real little screamer. Using the old 3-to-1 gas/oil mix (Klotz synthetic substituted for SAE 70 oil) and an 8/6 prop, the Willard turned 800 stronger than a good running Ohlsson .23 side port I have. Although I would like to have run more extensive tests, I didn't want to take the chance of something letting go and damaging the engine. After 40 years, metals can deteriorate.

So that's the story on another lesser known old time engine. I would like to thank Joe Wagner, a friend of many years, for supplying the background information for this article. Joe was the founder of the Model Engine Collectors Assn. (MECA) and, at one time, did have the remaining parts and machine drawings for the Willard engines. These have, in turn, changed hands several times with the present owner wishing to remain anonymous. I imagine with the number of times that the remaining parts have changed hands, that there are a few parts scattered here and there throughout the country. No one person has enough parts to complete an engine; this being the case with many of your old timers.

■ ■ ■

Dear Mr. Lee,

I never had problems breaking-in and running Fox and Super Tigre combat engines like I am having with my new K & B, SR2, series 75, 6.5cc engine.

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Radio Spectrum

JIM ODDINO

● This is probably old news by now, but just in case no one else has passed the word, I want to make sure you hear something good about the Academy of Model Aeronautics (AMA). Most of the time, we hear people asking what the AMA does for them. Well, without the AMA you probably wouldn't be flying RC today unless you have an Amateur Radio License — because we probably wouldn't have the 72 MHz frequencies. The AMA had the foresight to see that the 27 MHz band would have problems way back in the mid-sixties and petitioned the FCC for five frequencies that would be safe for RC. Two more were added in 1971.

Recently, more and more interference has been reported on 72 MHz and the modelers have become aware that we share these frequencies with operators who are allowed to use high power transmitters, exactly on "our" frequencies.

The AMA is trying to head off a potential crisis in this regard and its frequency committee has prepared a plan for acquision of new frequencies.

Briefly, the plan calls for the following:

(1) **Interference-Free** channels in order to eliminate the catastrophic results that can occur due to interference, such as loss or damage of equipment and property and the chances of personal injury.

(2) **Simultaneous** use of a number of channels is required to allow races and other events where a number of transmitters can be operated in close proximity. Careful selection of frequencies is required to insure this.

(3) **Capability** to switch from one channel to another is desirable.

(4) **A Total** of 30 RC channels including the seven present 72 MHz channels will be requested.

There are several areas where we might add new frequencies:

(1) The 72 MHz band could be restructured to add new RC channels.

(2) There exist seven "guard band" spots at 31.995, 33.005, 33.995, 37.955, 39.005, 39.995, and 42.005 MHz which are not assigned to any service.

(3) The 222 to 224 MHz band has been offered for a projected citizen radio service. RC could be included.

(4) The 53-54 MHz amateur band could be opened to RC with a simplified license requirement.

(5) Frequencies from 250 to 1000 MHz might be investigated. The Germans are using 433 MHz now.

One other thing the frequency committee plans to ask the FCC for, is to allow any type of modulation providing the radiation bandwidth requirement is complied with. The Germans have been using a narrow band FM system that allows more frequencies in a given band. I have an idea this might overcome many of our present adjacent channel and dead spot problems. I suppose single side band is not entirely out of the question. I can remember when people didn't think superhets were feasible in models.

Anyway, the AMA is doing something for all RC modelers, not only those who belong to the AMA, and I might add they are doing it in a very professional and organized manner. This will take time of course so you might seriously consider getting that Amateur Radio License in the meantime.

•

After receiving the following letter, I want to emphasize that you need an amateur (Ham) license to use the 53 MHz frequencies.

Gentlemen;

I enjoy the magazine very much and one of the first columns I read is Radio Spectrum.

However, I think the way that Mr. Oddino refers to the 53 MHz RC frequencies does not make it clear to the average modeler that these ARE amateur frequencies, for use by only licensed radio amateurs (Hams).

If I was not a Ham, I could easily interpret his article to infer that the Hams are moving in on RC channels.

The 53 MHz RC frequencies were established by a volunteer effort of amateurs and are recognized by the American Radio Relay League as being reserved for this purpose.

So, anyone using the 53 MHz band (6 meters) must be a Ham, or operate the equipment only with a Ham present, and should be aware of the frequency assignment in the band.

Ken Spittler
Winona, Minn.

I sure didn't mean to infer that the Hams are moving in on RC, and I hope this sets the record straight. I do want to encourage more RC'ers to get their Ham licenses, though, because I think it is a good place to fly. Generally the guys with Ham tickets know a little more about what they are doing when they turn on the transmitter switch and you have a better chance of not getting shot down. It's not a sure thing, but you do have a better chance.

•

In the last few issues we've been catering to the non-technical readers. This month I'd like to move way over to the other end of the spectrum and get into something that I don't think has ever been presented in a model magazine, and, depending on how it is received, may never be done again. But if we don't try we'll never know what you guys want. So here goes. We're going to go through a design of a crystal controlled radio frequency (RF) oscillator suitable for an RC transmitter.

Before we look at the circuit, let's take a look at what it takes to make an oscillator. To generate alternating current (AC) with a transistor, we must take a portion of the output power and feed it back to the input in phase with the starting power. The power delivered to the load will be the transistor output power less the feedback power.

The oscillating frequency is determined by networks consisting of inductors and capacitors, a crystal or resistance and capacitance. In radio frequency work we use the inductance-capacitance network and for stability, quartz crystals.

There are a number of circuits that provide the amplification, feedback and tuning required to build our oscillator. Feedback may be obtained with a transformer (ticklor coil coupled to the output tuned circuit) or the output tuned circuit may be tapped similar to picking DC off of a resistive divider. This can be done by tapping the coil, or by building a capacitive voltage divider. A block diagram, ignoring the DC components might look like Figure 1.

An oscillator that uses this capacitive divider is called a Colpitts-type oscillator. C1 and C2 form a voltage divider with the voltage across C2 the feedback voltage.

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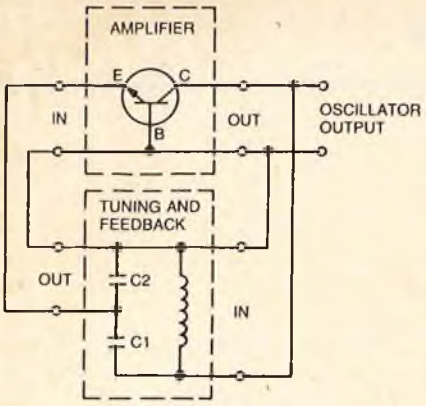

FIGURE 1

Notice that the transistor is used in the common base configuration with the input between the emitter and base and the output between the collector and the base. In the actual schematic (see Figure 2), this is not so apparent.

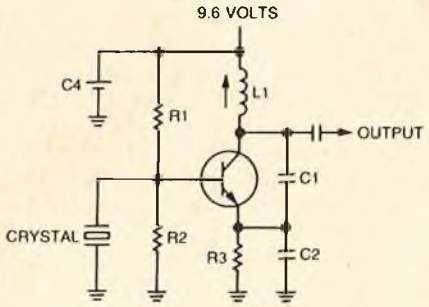

FIGURE 2

If you think of the crystal as a very low impedance to AC, which it is at the oscillating frequency, you can say the base is at AC ground. Likewise, capacitor C4 has a low impedance at RF frequencies so the top of L1 is at AC ground.

With this in mind you should be able to trace the same current loops in the schematic that you see in the block diagram. I might add that a similar circuit has been used sucessfully in many commercial RC systems such as EK and Proline.

Let's look at the design. R1, R2, and R3 are selected to produce a given current flow under a no signal condition. In actual operation, a feedback signal is always present and the transistor is always in a state of transition. The current will be set at a value to produce the required output power which will be about one third the input power with the correct bias-feedback relationship. The voltage drop across L1 is very small so the collector voltage is about the same as the supply voltage. To calculate the correct current, divide the desired output power by .333 giving the input power which we then divide by the supply voltage to find the current.

In an RC transmitter, we usually

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Northwest Pylon Racing 1977 CHAMPIONSHIP Formula 500

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RADIO SPECTRUM

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have two stages following the oscillator to get up to the desired 1 watt output, so something in the neighborhood of 50 milliwatts is a conservative goal for oscillator output. Dividing

$$\frac{50\ \text{MW}}{.333} = 150\ \text{MW, input power required}$$

$$\frac{150\ \text{MW}}{9.6\text{v}} = 15.6\ \text{ma}$$

If we let R3 equal 100 ohms, then we need about 1.6 volts across it. Assuming a .6 volt drop across the base-emitter junction of the transistor, we need 2.2 volts at the base. R2 should be ten times R3 or 1K, so R1 must be:

$$\frac{2.2\text{v}}{9.6\text{v}} = \frac{1\text{K}}{R1+1\text{K}}$$

R1 = 5.2K — use 5.1K

The bias circuit is complete. The feedback is determined by the ratio of C1 and C2. The output signal will be about 80 percent of the supply voltage or about 8 volts. As a starting point, make C2 three times the value of C1 (plus the transistor capacitance) which will give a feedback of 25% or .25 x 8 = 2 volts. The feedback should be in the range of 10 to 40% with 25% giving the best stability.

The frequency of the circuit is determined by the resonant frequency of L1, C1, and C2, and by the crystal frequency. C1 and C2 are in series so the total must be calculated, and the output capacitance of the transistor must be added to C1. At high frequency, the value of C1 is lower so the output capacitance becomes more important. In some circuits C1 is made up entirely of transistor capacitance. Any number of L and C combinations could be used. A good starting point is to let C1 equal 2 PF per meter. If we are designing a six meter transmitter (53 MHz), then C1 should equal:

$$6 \times 2 = 12\ \text{PF.}$$

The transistor output capacitance at 53 MHz is about 3 PF so the total of C1 and 3 PF is 15 PF. C2 is then:

$$3 \times 15 = 45\ \text{PF.}$$

The total capacitance is:

$$\frac{1}{1/15 + 1/45} \approx 12\ \text{PF}$$

L is then calculated using the following equation:

$$L(1W\mu H) = \frac{2.53 \times 10^4}{\text{freq. (in MHz)}^2 \times C(\text{in PF})}$$

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Soaring

AL KINDRICK

Dave Harvey, District XI V-P, NSS, of Kent, Washington, with his Superior Flying Models Bunny.

● Contest, oh contest, how shall we record the scores on this one?

This may seem a little sarcastic, but think back, all of you contest flyers, and look at all of the different ways your scores were recorded. I fly in about 18 contests a year, and I have seen C.D.'s leave out space to list your flying frequencies, space to record accumulative scores, and a column to list your final standing. This is just a few of the major items that are overlooked when setting up a contest.

What I am leading up to is a universal scoring sheet that can be used by flying clubs throughout the world to ease the burden on C.D.'s and helpers to put on a trouble-free contest.

Now this is no slam against new C.D.'s, because in more cases than not this club function is wished on to a person like a P.T.A. election!

What I would like to do is ask all of the flying clubs out there to send me a copy of your scoring sheet. I will read them, pick out the essential information, then lay out a scoring sheet that has all of the important information. Now comes the hard part. I will submit this to the Editor and sweet talk him into starting up his private printing press and make a contest scoring sheet available to flying clubs.

Now this type of recording sheet will not replace the large bulletin board standings, that are used at the larger contests where there are hundreds of flyers. But it *will* give the smaller contest a universal scoring sheet that can be kept for permanent year end records.

Let's hear from you on this one — I think it is needed.

☆

The recipient of this years "Big Sink Wand" was the one and only Tom Williams of Windrifter fame. This dubious honor is a yearly tradition of the SFVSF. It is passed from deserving member to deserving member. Each "Keeper of the Wand" has to add something to it. Last year Lorin Blewett added a red plastic hat with a flasher that emitted a noise like a thermal sniffer gone wild. If Tom wears it in competition, we all think he'll have a real edge. The other pilots will be so weak from laughing they won't be able to fly!

☆

Some very interesting and informative material for airfoil design by Professor Eppler is now available for the serious designer and builder.

The "Model Technique Counseling" or MTB-2, as we will refer to it, includes the Eppler 193, 195, 197, 201 and 203 airfoils. These designs are all laid out in detail with charts and graphs giving loading, and comparisons for plotting load distributions. Included in the papers are plans of some famous sailplanes such as the Kranich III, Reiher, Libelle, LS1, Phoenix, Phoebus A, Kestral and Bova.

The strength of wings and construction techniques are diagrammed and discussed in detail. D-tube, box and webbing are plotted to show strengths versus wing span. Also, the sizes of spars and leading edge sheeting are shown.

MTB 2 does contain loads of design information on high performance sailplanes. It is presented entirely in German. I had no problem getting it translated by a native with a technical background.

If you are interested in Dr. Eppler's papers, contact the American Institute of Aeronautics and Astronautics, 1290 Ave of the Americas, New York, New York 10019.

☆

Some contest dates are coming up, so mark your calendar and plan to attend.

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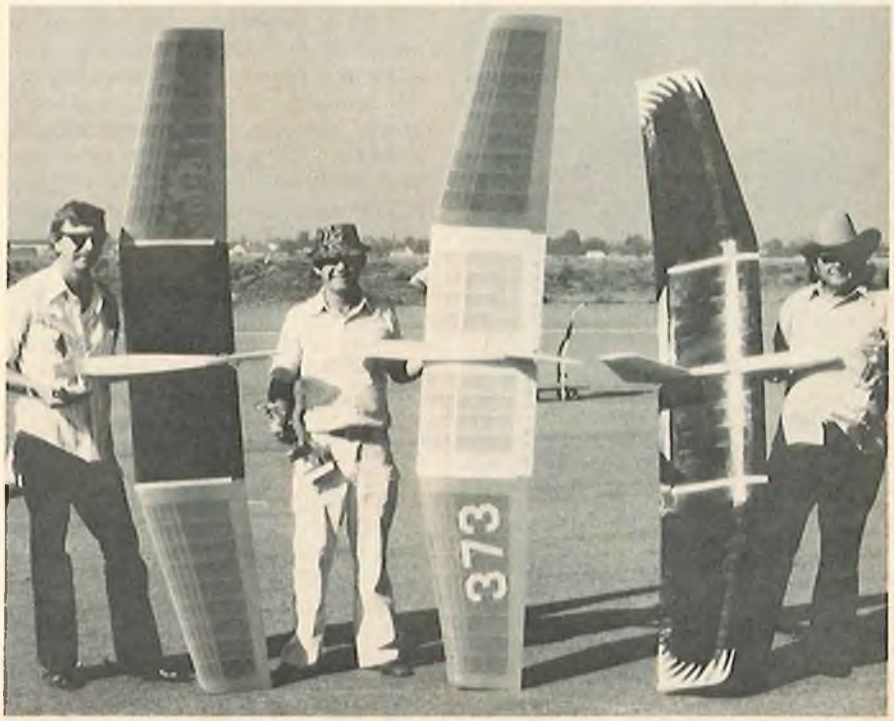
Northrop Flying Wing contest winners (L to R): Cecil Cutbirth (2nd); Pat Seale (1st); Roy Stowers (3rd). All flew Ravens.



For Old Time's Sake

RANDY CARMAN

Glow Conversions Approved!

Well, SAM is one step closer to allowing glow-to-ignition conversions. The membership has voted to allow them. An underwhelming 350-odd votes were received from a membership of close to 1500. That's some pitiful response! Granted, all the members may not be terribly interested in the conversion question (SAM does boast a large "rubber" faction), but that's no excuse for such a poor showing. After all the heated arguments and epithets, that's a lousy showing! That reminds me of the group who tried to form a combat apathy and no one cared enough to show up for the first meeting!

Al Hellman of California has been designated to chair the committee which will map out all the regulations. We certainly don't envy his position. Lord knows, there will be some conflicting opinions. Let's hope the committee give him as few headaches as possible.

We would like to offer a few suggestions for the engine committee to ponder. Please disallow Schneurle ported engines, thus making the glow conversions more like the real thing! That's what most fliers are after, and converting glow engines is the only way they can save those beautiful collector's items that are quickly becoming more and more scarce. Also transistorized, magnetic induction, and photo electric ignition systems should be allowed to be used in conjunction with either the glow conversions or the true ignition engines, especially where R/C is concerned. It really helps cut that ignition noise interference!

We've heard rumblings from a few factions about the way things are being handled by Mr. Hellman. It's about time you rabble rousers knocked it off. Some of you guys seem to forget that we are in this for fun, that this is a *hobby!* That's all we're going to say.

Update

Remember that snappy Robotaire powered by the GHQ that Gene Crim from Maryland built? Well, recently we ran into Gene at a MECA Collectogether on Long Island. Much to his chagrin and amazement, his beautiful baby flew away. He forgot to set the timer! Shame on your, Gene. Guess that proves, it could really fly.

Recipe Time

Thought you all might get a charge out of this little ditty gleaned from a local newsletter edited by Marianne Clark.

Deluxe Old-Timer Happiness Cake — Or Try It, You'll Like It!

1 cup of Good Friends
1 Cup of Good Fuel
2 cups of Superior Radio Signals
2 cups of Strong Thermals
3 cups of Soft Landings
1 Pinch of Good Thoughts

Mix thoroughly. Add tears of joy, sorrow and sympathy. Flavor with consideration for others. Fold in four cups of prayer and faith. Stir in three 10-minute maxes. Blend well. Bake well with the warmth of human kindness and serve with a smile, anytime. Guaranteed to satisfy *all* old timers.

We can't wait 'til spring to try it out!

Contest Time — Again!

The SAM chapters are fast and furiously planning their coming season's contests.

SAM 21 in California is going all out! Check out this rather full schedule (listed by Date, Type of Contest, and Location):

May 1, SAM 21 .020 Annual, Hill Country; June 5, PCC Ltd. Engine and Texaco, Half Moon Bay; Sept. 18, Fresno Annual, Schmidt Ranch; Oct. 15 and 16, Pond Commemorative, Santa Maria; November 13, Texaco Ltd. Engine Run, Schmidt Ranch or Santa Teresa; December 11, Texaco .020 Replica, Santa Teresa.

Also scheduled — don't forget!

June 12, OT with R/C Assist, Central Jersey R/C Club Field, Piscataway, New Jersey; July 31, OT with R/C Assist, Somerset Signal Senders, Bridgewater, New Jersey; August 28, OT with R/C Assist, S.P.O.T., Bridgewater, New Jersey.

Most importantly, don't forget the SAM Champs being held this year in Las Vegas, Nevada from June 27th through June 31st. The 27th is the bean fest, with flying from the 28th through the 31st, and hanky-panky on all days!

Parting Shots

It seems that we have been suffering from a terrible case of the "shorts",

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THE GREATEST INVENTION SINCE . . . .

BY ARTHUR J. SABIN
ASSOCIATE PROFESSOR OF LAW

Arthur J. Sabin specializes in the teaching of the Law of Product Liability, Tort Law, including Negligence and Property Law. An Associate Professor of Law at the John Marshall Law School, Chicago, Illinois, Professor Sabin has been an avid R/C pilot for four years. In addition, he was the principal author retained by Kraft Systems, Inc., to write their 1976 Bicentennial Instruction and Installation Manuals. The author has also been retained by Top Flite Models, Inc., in developing propeller standards in terms to instructions and directions with respect to same which, it is hoped, will become industry wide standards.

PART ONE

By its very nature, modeling involves creative people — people who constantly invent, improvise and modify. Put enough years on an active modeler and the chances are he is going to come up with the idea for a product or device that he believes is the greatest thing since the invention of the napkin!

Part of the greatness of this nation has undoubtedly been derived from its inventors and its inventiveness. The reputation of our country throughout the world is still that of a nation of "can do" people who invent, create and constantly improve on the material aspects of life through mechanical devices, new processes and new products. So important are inventors and their contributions to American life that no less than the Constitution of the United States itself specifically grants to Congress the power to enact laws relating to patents where, in Article I, Section 8, contain the words, "Congress shall have power . . . to promote the progress of science and useful arts, by securing for limited time to authors and inventors the exclusive right to their respective writings and discoveries."

The purpose of this article is to explain what is involved in reducing an idea to a patent and to methods of protecting inventor's rights, hopefully answering most of the important questions that come to mind. In a subsequent article, the methodology of handling your invention, with respect to potential manufacturers, will be discussed.

We have to begin with certain basics. The intent of the Constitution as carried out by laws first enacted in 1790 is, through the U.S. Department of Commerce, Patent and Trademark Office, to grant, in the name of the United States, "The right to exclude others from making, using or selling" the invention covered by the patent. What you have to understand is that the grant involved in a patent concerning the invention is not the right to use, sell or make the device or product, but the *right to exclude others* from making, using or selling the invention for a period of 17 years.

In effect, it gives you a limited monopoly as a reward for you inventiveness.

But before you go a step further on the road to patenting your invention, consider the fact that, like most areas of science and technology, the whole process of inventing and patenting inventions is a specialization pretty much confined to the research and development departments of manufacturing companies and a group that can be labeled "professional inventors". The day of the "basement" inventor is essentially over. That is not to say that an individual without scientific or technological training and experience can not make significant contributions by way of invention, but once again, considering where this nation is as it enters its third century, the realities are these: Almost *four million* patents have already been issued and the "state of the art" is such that the chances are your "invention" has already been invented! Furthermore, even if you do have a device or product that has not been patented and to which indeed you as the inventor are entitled to a patent, that literally comprises only the *first* step on the way to achieving anything more than the "ego trip" of having a patent. Most of your problems begin after you have patented your invention, such mundane matters as trying to get it onto the market by either engaging in its manufacture yourself (are you ready to quit your job, mortgage you home, etc. for the "Cause"?), or get a manufacturer to want to produce your product, device or use your process.

Talk to any patent attorney and he will take out the "weekly" *Official Gazette* put out by the U.S. Patent Office and with the heavy "thud" as it drops on the desk, point out that which is obvious; there are a lot of patents being completed every week, most of which go nowhere in terms of having patented a new product or device that anyone but the inventor, his wife, his attorney and a few intimate friends will ever see. As one patent attorney recently remarked to me, "What is disheartening is the fact that individual inventors think that manufacturers read the *Gazette* just looking for that new invention and are ready to make some grand offer with regard to same; just the opposite is true, most patents are born and die just like that."

Now, if you're not discouraged enough to have turned to the next article in this magazine, if you still feel you may have something that can overcome all of these obstacles (or maybe you're just curious), then it's time for more information.

Many people get the mistaken idea that an "idea" can be patented; just the opposite is true. As the statutes state, any person who "invents or discovers a new and useful *process, machine, manufacture,* or composition of matter or any new or useful improvements thereof may obtain a patent . . ." Thus, methods of doing business or a mere idea or suggestion can't be patented. It has to be basically a new machine, a new device or a new process and that "newness" applies not only to this country, but to anywhere in the world, so that if you've seen something in a foreign country and figure you can patent it here, forget it. It should, however, be mentioned that in the United States (and Canada) the one who *invents first* gets the patent *regardless* of who *applied first.* In other foreign countries, it's the other way around; regardless of who invents something first, the person who gets the patent is the one who first applies for it. Furthermore, if you, the inventor, use the invention publicly or write about it or place it on sale, you must apply for a patent within one year from any such act or your right to patent it will be lost.

Your idea must really be new, not just an improvement that would be obvious; there must be sufficient differences so that what you have invented is really an invention over that which exists or what is called "prior art".

Now let's say the idea has come to you, it's new, it's original (you think); where do you go from there? Basically, an invention is not considered complete until you have either filed a patent application *or* have completed a working model of the invention and successfully operated same. Actually, while this sounds like you have two methods of sustaining your invention as yours against the rest of the world (and you do), they kind of dovetail in terms of what you have to do because even if you follow the path of completing your entitlement to patent through the filing of a patent application, you are going to have

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THE GREATEST INVENTION

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to sustain the burden of reducing your idea to paper and frequently that will mean actually making the device or product.

Starting again with the idea, it is advisable that, as quickly as possible, you put together a log (a notebook) stating when the idea first came to you and then in writing, prepare a detailed description (type it or write it in ink) of exactly what your product or device is. The American Bar Association, Section of Patent, Trademark and Copyright Law, advises that in this initial description of your idea, "There should be no erasures, blotting out or blank spaces. Where a correction is necessary, draw a line through the incorrect portion and continue on with the description. Each such lining out should be initialed and dated. If possible, make detailed sketches to help you in your description. At the end of the description and on each sketch, sign your name and date."

Now you have reduced your idea to paper and then, advises the Bar Association, you should have at least two people, who did not participate in the development of the idea, read the description, examine the sketches and when they fully understand your idea and plan for accomplishing it, have each of them initial and date each application of the description. The Bar Association also recommends that each of your witnesses write the words "read and understood" followed by their full name and date.

All of this is directed to accomplishing the first necessary step under U.S. law; establishing that you developed this product or device or process *by a certain date*. That is your initial protection because if someone else comes up with the same idea dated after yours, even though they file for patent first, if you can establish that you were the first in point of time, you'll get the patent.

If instead of applying for a patent, you intend to develop your invention through making a working model (all of which again establishes you as the inventor regardless of anyone else's claim to patent), the Bar Association again recommends that you pursue that course with *diligence*. That means that you should use a log or notebook showing what you did on a day to day or week to week basis on the invention. You should sign and date each entry. The Bar Association also warns that if you stop working on the model for more than a couple of weeks, you should record the reason. As the Bar Association advises, "Delays caused in obtaining parts are acceptable. Delays caused by involvement in other projects are not."

Once you have completed the working model, again you should show its operation to at least two people who witness its operation and are shown all the parts of it. A statement should be written down in your notebook, signed and dated by the witnesses, that they saw the "thing" work or successfully operate.

All of the above constitutes one way of establishing yourself as the inventor without applying for a patent. As indicated, when you proceed with the path of applying for a patent, much of the same recording should be done, again in order to establish your time priority, as well as your right to the "new art" involved in your invention. Put another way, frequently a patent application, in order to really be complete, will involve your having to build a working model of your device or product, though rarely will you have to actually submit the device with the patent application.

Now, let's talk about applying for a patent. The first thing you should know is that the Patent & Trademark Office will *not* tell you whether your device, process or product is patentable nor tell you whether your invention infringes on anyone else's patent or ultimately advise you as to whether you ought to file an application for a patent. For this work,

you should get to a patent attorney. These are specialists in the preparation and application for patents and while it can be and has been done without the use of an attorney, the difficulties encountered can be monumental. The Patent and Trademark Office maintains a register of attorneys and those who are agents but not attorneys ("agents" are also qualified to assist in patent applications) and you can obtain that list from the Patent and Trademark Office. Perhaps your best bet, however, is to talk to your attorney and have him refer you to a patent attorney. Additionally, in most large cities, you will find a classified section called "Patent Attorneys" because this is a specialty which the Bar Association allows to be separately listed.

Now, let's assume that you, the inventor, want to pursue the path of applying for a patent for your invention, rather than develop the working model (pursuant to log, witnesses, etc., as described); what can you expect your attorney to advise? Basically, a determination must be made as to whether the "state of the art" reflects that this invention of yours is indeed such that a patent will potentially issue. In order to make that determination, the usual course is to order a *preliminary patent search.* Your patent attorney will probably forward a basic description of your invention to a specialist in search matters where, at the Scientific Library of the Patent and Trademark Office, located in Arlington, Virginia, a search will be conducted. The classification system of patent categories involves over three hundred subject classes and *64,000 sub classes.* This preliminary search will run in the neighborhood of between $40.00 and $200.00-$300.00, depending on how complex the search is, in turn reflecting the amount of time involved in searching through sub classes for prior patents. In terms of time, it usually takes about one month.

If you, the inventor and your attorney agree that the "state of the art" is encouraging enough, then the next step will be the formal filing of the patent application. The process can be quite complex, obviously entirely dependent on the complexity of the product, process or device. In addition, a patent draftsman must be retained for the drawing or drawings necessary for the application. In all, including government fees, you can figure that the cost of applying for a patent will be between $600.00-$900.00, assuming that the product, device or process is *reasonably simple.*

In a speech given before the American Bar Association, Patent Trademark and Copyright Section in August, 1976, Commissioner C. Marshall Dann, gave interesting statistics as to the amount of time it takes between the filing of an application for a patent and the granting of that patent or the abandonment of same, meaning in effect the denial or refusal to issue the patent. He indicated that currently, the average pendency time of an application for patent from filing until issuance or abandonment (rejection) is 19½ months, comparing favorably with 37 months in 1965. Further statistics provided were to the effect that 40% of all applications will be issued or will become abandoned in less than 16 months and over 80% are disposed of in less than two years.

Now that you've got your patent, Mr. Inventor, what are you going to do with it in terms of actualizing or marketing of your product, device or process? And, assuming that you took the route, Mr. Inventor, of not patenting the invention, but rather substantiating the invention through the process of completing a working model that successfully operates, disclosed to witnesses and thereby establishing your right as the inventor, once again the question is, "How will you actualize the marketing of that product, process or device?"

In the next part of this article, these questions will be taken up and alternatives suggested.

Meanwhile, what have you invented lately?

●

Power Boating

DAVID THOMAS

The Glo Bee Fireplug showing the ammeter and potentiometer lever.

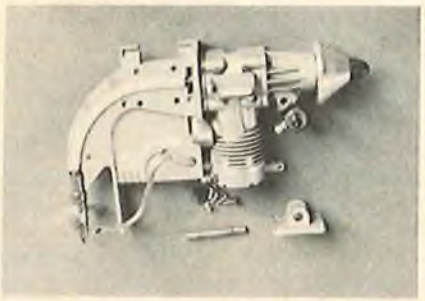
● One of the nice things about writing this column is that I get to see a lot of new products, because the manufacturers send them to me, so that I can tell you about them. I get a great kick out of trying them out and seeing if they really work according to the publicity blurb. Some of you may wonder what happens to the ones that don't. Well, to be perfectly honest, at the time of writing, I have only had one that didn't. I wrote to the manufacturer telling him what I thought, and he then sent me a modified version, which did work. So in a way we, on this side of the page, are defending your interests.

You will remember that I told you about the Glo Bee racing plugs some time ago. The firm sent me one of their Fireplugs a bit later, and I have been using it ever since. It's a pretty simple device, but someone had to think of it. All it is is a lead acid gel cell in a plastic housing, in the top of which is an ammeter and a big potentiometer. This means you can use it on any type and voltage of plug — you just set the lever to get the right degree of heating, by looking at the plug element. It's handy, small, light, and yet powerful enough to do the job. You can even buy a handy charger to go with it, and it takes very little room in the tool-box. I must admit that I have been lugging my big 45 a/h battery around as well, "just in case", but I haven't used it once, so I guess that will be a big weight to leave at home next time I go to the pond.

I also mentioned the Hydro that Ed Hughey sent us to try out. Well, I am well on the way with this one, as you can see.

The Hughey Hydro 50 with a Webra Speed .60 engine installed. The engine has a Stidwill Special cylinder head and an ED AMC carb.

The concept is novel — what it comes down to are two sponsons, left and right, moulded in high-density polyurethane foam. This process creates a very hard skin, which means that you can paint straight on it, with no further finishing necessary. The centre part of the hull is nothing more than a box, built up from plywood. I have to say here that the wood is excellent, and the parts are cut out with great accuracy — I built the whole hull without adjusting any sizes at all (and in all fairness, the Octura Wildcat, which is nearing completion, is just as accurate.) This seems to be a feature of American kits — I can only say I wish I found the same feature in some European ones! Anyway, that hydro is coming along fine and, any time at all, I shall be ready to scare myself to death with it!



The K & B Outboard, showing the flexible drive and the expansion chamber.

Finally, a new product I just received, and a really good one; the new K & B 21 Outboard. Now, if you stop to think about it, this is just about the most rational way of fitting a power-pack to a boat. Four big nuts and bolts, two servo linkages and a fuel line, and you are away. The concept may be considered a bit simplistic, a simple flexible shaft in a Teflon tube driven direct from the crankshaft through a special backplate; but then, the simplest approach is very often the best.

I wasn't expecting this engine, so when it arrived on a Tuesday morning, I thought — right, I'll have a go and see what happens. I fit it to an old steering hull that I had used with a .19 engine, and then had to leave it for a week. On the Saturday I found time to fit the radio and a tank, and took it out to the lake on Sunday morning. The electric starter soon had it spitting and barking into the water, and I quickly realized that even at low speed, it has a lot of power. The Perry carb gives a good idle. I let it go, and moved the stick to half-speed. Wow! Did I ever get a shock! That hull made like a Sputnick, nose up, just the last couple of inches in the water, heading for Spain at very high speed. (My lake points Southwest, OK?) This was not what I had expected at all, and I quickly revised my first guess, that it was a sports motor. That thing has power! Now I am looking around for another hull to try it on, because the original one is too small. Who knows, I may even design one especially for it. So if any of you have been wondering whether to buy an outboard, my own opinion, based on a short but exhilarating experience with it, says that the K & B is something new, different, and a good value for your money. How about a ski-boat, complete with outboard, driver, and a female skier to tow behind? I have the skiers, and I even take them over jumps; maybe I'll tell you how go do it sometime, it's quite easy.

The K & B Outboard mounted on my steering hull. Fast just isn't the word!

I've been testing a new hull I designed recently, and this one porpoises. Porpoising is a familiar phenomenon to anyone who plays around with high-speed boats, and a very annoying one. What happens is that the nose of the boat lifts, and then drops down onto the surface of the water, only to start all over again. I believe the full-size power boat drivers call it "slamming". It's a very bad thing, because it causes a loss of speed, for a variety of reasons that are just too complicated to go into here. But take my word for it, it slows the boat down. So, we

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have to do something about it. On the big boats they use two different methods - - - either power trim on the propeller unit, or what are called trim tabs. In our size of boat, it is hardly possible to use a power trim, although the A.M.P.S. Z-Drive does have such a possibility. So our best bet is the trim tab.

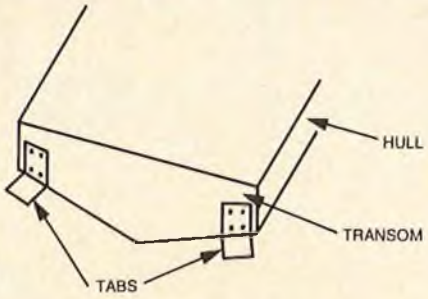

FIGURE 1
TRIM TABS

However, before going on, I must be careful, because there are, in fact, also two different kinds of drives. There is the flexible drive, used in conjunction with an adjustable strut, and there is the rigid shaft type, as used in Europe. With the adjustable strut type, it is possible to get some degree of control over the hull by playing around with the angle of the final drive shaft, relative to the hull bottom. However, this amount of control is not always sufficient, and I noticed on Ed Fisher's boats at the World Champs, that he had not only a flexible drive, but also a whole series of trim tabs stuck on the transom of his models. So while the adjustable strut is useful, it is not necessarily enough. (At this point I should mention that not only have I been playing around with the Octura parallel drive unit and the Hughey Hydro flexible, but I have built a number of flex set-ups myself, and even adapted a few of my boats to this system, and I learned a lot in the process. Some of the results have been pretty surprising, but we'll talk about that later.)

Right, back to the trim tabs. All they are are two metal plates, usually about twice the prop diameter in width and three times in length, fixed to the transom of the boat in such a way that they become extensions of the hull bottom. The best set-up is to have some system, such as a bottle-jack, so that by screwing the jack in or out, you can raise or lower the flap, relative to the hull bottom. The actual amount of trim does not need to be very large, about 7° negative and 6° positive. Any more than this is not necessary, and can actually prove to be dangerous, as we shall see.

OK, supposing you have a boat that

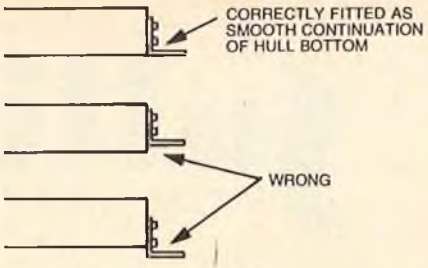

FIGURE 2
TRIM TAB FITTING

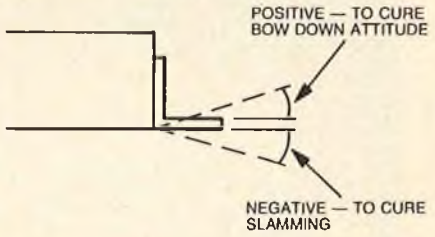

FIGURE 3
RUNNING ANGLES

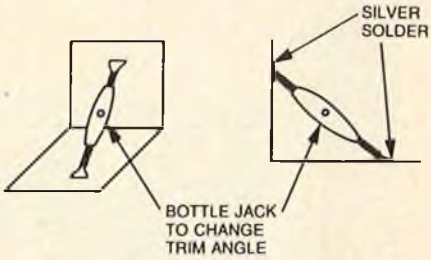

FIGURE 4
ADJUSTABLE TRIM TAB

porpoises; you fit the tabs, and then what? Well, it's pretty easy - - - look along the bottom of the hull, and adjust the flaps until they are sticking *down* about 3° (we call this negative angle). You can imagine now what happens — at speed these two flaps act a bit like the elevator on a plane, trying to lift the stern of the boat, and at the same time forcing down the nose, thus effectively stopping the porpoising. But be careful! Don't stick on about 8° negative, and then let the boat go at full throttle. I saw a guy do this once on a very fast Naviga speed boat with a tuned OPS 60. The ensuing crash dive would have turned any U-boat commander green with envy! No, give the flaps about 3° to start with, and accelerate smoothly, but if you think she is down too much at the bows, bring her in and set the flaps a bit higher. On the other hand, if you get up to full speed and she still slams, bring them down a bit more. Play around until you get the ride of the boat just right.

Since there are two flaps, you can also use them differentially. Remember the trick with the wooden wedge, to overcome torque troubles, like leaning to one side? Well, all you have to do is to give the starboard flap one or two degrees more negative angle than the port one, and you get exactly the same effect.

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WACO CG-4A GLIDER

STRICTLY A FUN MACHINE, THIS SPORT SCALE ELECTRIC POWERED MODEL OF THE WW II CARGO GLIDER IS DESIGNED FOR TWO OR THREE CHANNELS

BY STU RICHMOND

These Are The Good New Days.

But, in the good old days, we'd spend a dime and get a box that contained everything we needed to build a scale flying model of a real airplane. We'd get fuzzy, skinny sticks of balsa, a lead-like tube of smelly cement, wrinkled tissue paper, a set of wheels turned from hardwood, a hunk of rubber band and other miscellaneous needed parts.

In these good new days, we do spend more than a dime, but now we have radio control - - - we still build scale models, but we have precision-sanded balsa and spruce, resins and epoxies and miracle instant glues, plastic coverings in colors, molded nylon fancy parts, beautiful scale-like wheels, and the most modern substitute conceivable for the hunk of rubber . . . now we have *electric power!*

If we take the best of the products from these good new days and blend them with an interesting design from 35 years ago, we come up with a radio controlled scale-like, fun-flying, Waco CG4A Cargo Glider from the World War II days of history.

Our CG4A has been the center of much attention. It is super easy to build, requires very little from your pocketbook due to the relative absence of many sheets of balsa wood, and is just plain *fun to fly.* It ROG's (rises off ground) easily from a paved surface, will do consecutive loops, does fair barrel rolls and spins like a top . . . all this in virtual silence!

And, after eight or nine minutes, we grease it in for a landing at our feet instead of having to chase it downwind like in the olden days. After ten or fifteen minutes of recharging our electric motor batteries from our Astro Flight Rapid Charger (which hooks up to our car battery), we fly again.

The absence of engine noise is sure to open school yards and parking lots up as new flying fields for many of us.

The real Waco CG4A's were used to carry up to 32 field-equipped infantrymen into combat. Or they could carry a jeep and sixteen men. The jeep was used as a mobile command post for the infantrymen. As many as three of the CG4A's were towed at a time behind C-47 Gooneybirds, which we call DC-3's today. The CG4A's were big airplanes . . . 84 foot wingspan, built of spruce and plywood, fabric covered (with wrinkles), and a few of them used by the Marines were *powered* by two gasoline engines attached to the wing struts. The Marines tried to ferry some of these powered gliders from Texas across the country easterly to Georgia or South Carolina so they started the auxiliary strut-mounted engines on the ground, towed the gliders into the air, cut them loose and hoped for the best. Not a single CG4A completed the trip. Engines quit, engines vibrated off, wing struts broke off and, in general, the mission failed. One of our local modeling friends was a CG4A pilot in the Marines, and from him we learned that each flight was almost a controlled crash to earth. He made twelve such descents and none were over five minutes long. Our model apparently is much more successful. The CG4A program was completely abandoned before the war ended; operational losses were tragic.

TYPE AIRCRAFT
Stand-Off Scale Electric Powered
WINGSPAN
63 Inches
WING CHORD
7⅞ Inches
TOTAL WING AREA
490 Square Inches
WING LOCATION
High Wing
AIRFOIL
Experimental (read text)
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
4 Inches
O.A. FUSELAGE LENGTH
36¼ Inches
RADIO COMPARTMENT AREA
(L) 7" X (W) 2⅜" X (H) 4"
STABILIZER SPAN
16½ Inches
STABILIZER CHORD (Incl. elev.)
4½ Inches
STABILIZER AREA
70 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
5¼ Inches
VERTICAL FIN WIDTH (incl. rudder)
5¼" (Avg.)
REC. ENGINE SIZE
Astro 05 Electric
or 1/2A Glow Engine
FUEL TANK SIZE
NA
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
Minimum 2 (prototype 3)
CONTROL FUNCTIONS
Rudder, Elevator
(On-off switch for motor)
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa, Spruce & Ply
Wing ..... Balsa, Spruce & Ply
Empennage ..... Balsa & Spruce
Weight Ready-To-Fly ..... 42 Oz.
Wing Loading ..... 12.3 Oz/Sq. Ft.

Our model weighs 42 ounces and is flying at a bit over 12 ounces per square foot wing loading. The completed framework weighed 10 ounces, the landing gear weighs 2½ ounces, the covering added 2½ ounces, our radio system added 11 ounces and the Astro 05 power system weighs 16 ounces. You could probably substitute any Cox 1/2A engine and have success and fun, or you could omit all power, put a tow hook under the leading edge of the wing and hi-start or winch it up, and with the wing loading under 7 ounces per square foot, you'd certainly out-fly the full scale glider. Or you can hi-start the model to altitude and then turn on the electric power and continue to climb!

We chose to use three servos - - - rudder, elevator and an on-off micro switch to control our propeller. With some Yankee ingenuity, you could operate the prop at high throttle, drop the landing gear at middle throttle (the real one was designed to jettison the gear after take-off) and at low throttle, you could open a door and drop tissues, bubble gum, or parachutes.

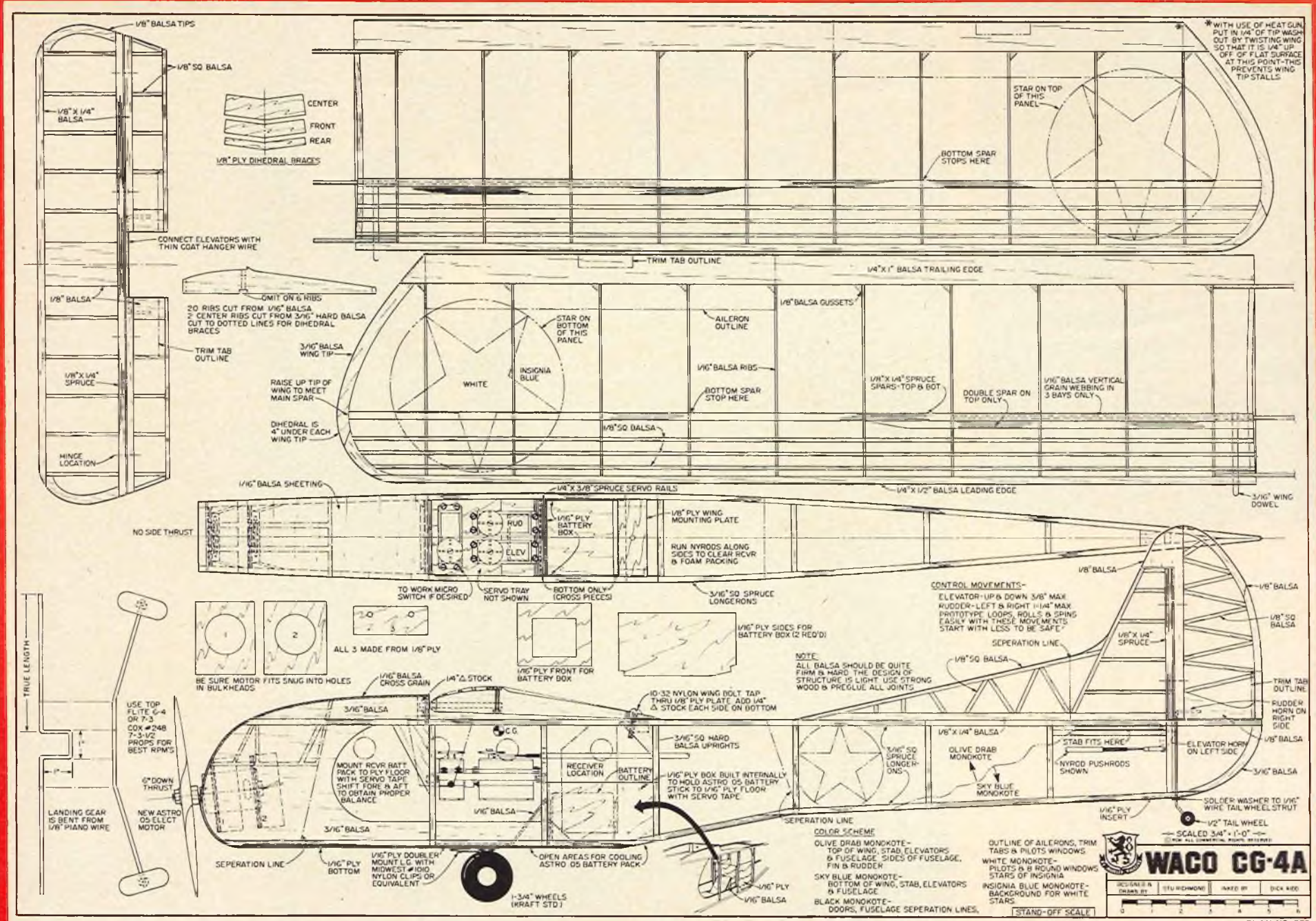
Construction is very conventional and simple and, if you'll study the plans and photographs, we think you'll agree. But a few extra paragraphs are worthwhile.

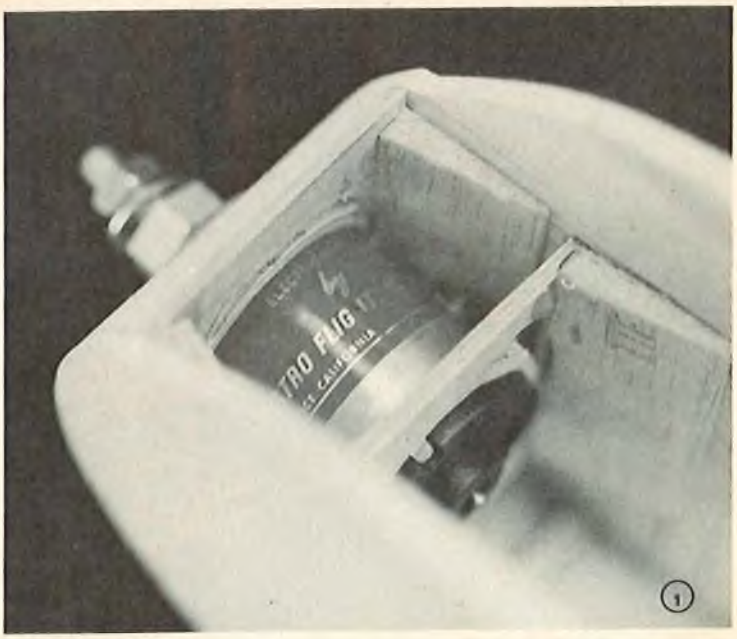
Our model mounts its Astro 05 motor through two pieces of plywood. The plastic end of the motor is slightly smaller than the outside diameter of the motor, and the plastic end nicely fits into, and is stopped by, the rear piece of plywood. If your motor is one of the newer ventilated ones as ours in the picture is — it has four cooling holes cut in the metal case, then the model

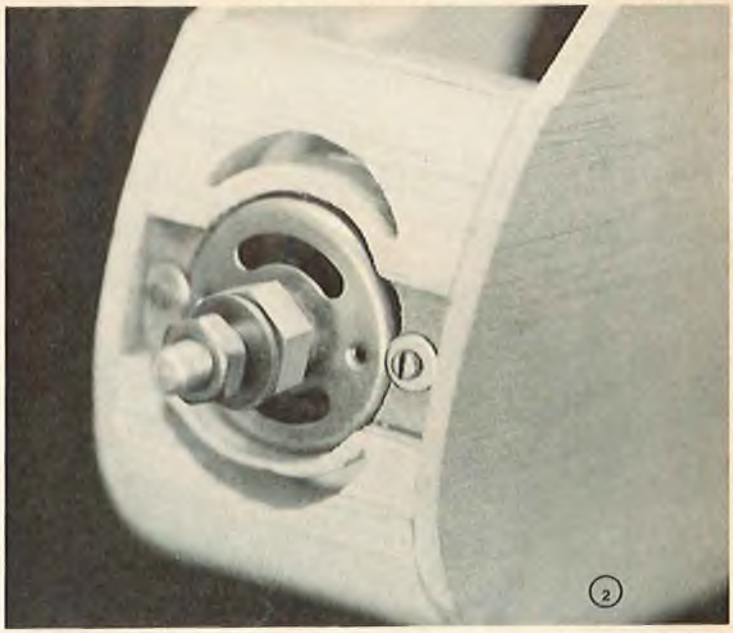
text to page 144

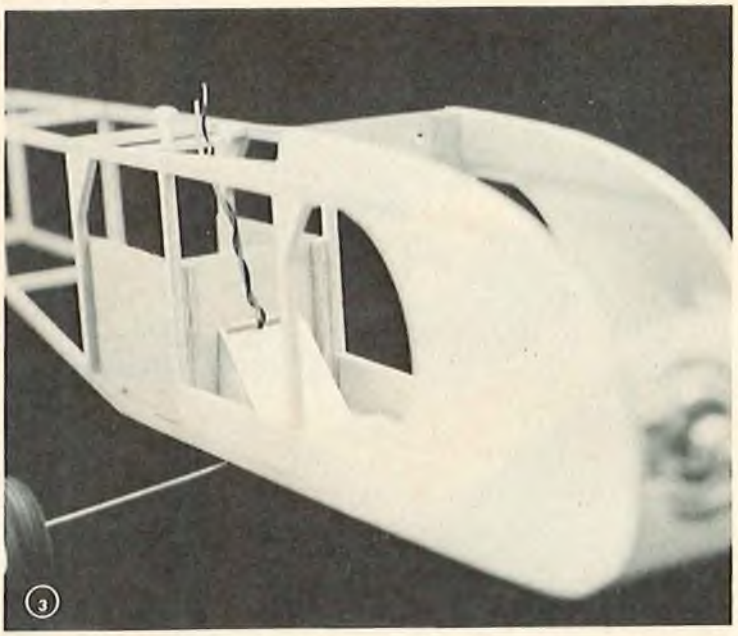
AT RIGHT: The designer of the Waco CG4A electric-powered sport scale model. Stu Richmond, 47 years old, is a resident of Cocoa Beach, Florida. Richmond used this same unusual airfoil on an original design glider called the Florida Flyer which was 3rd in Standard Class at the 1976 Nationals. He has two sons who actively race Formula I RC models.

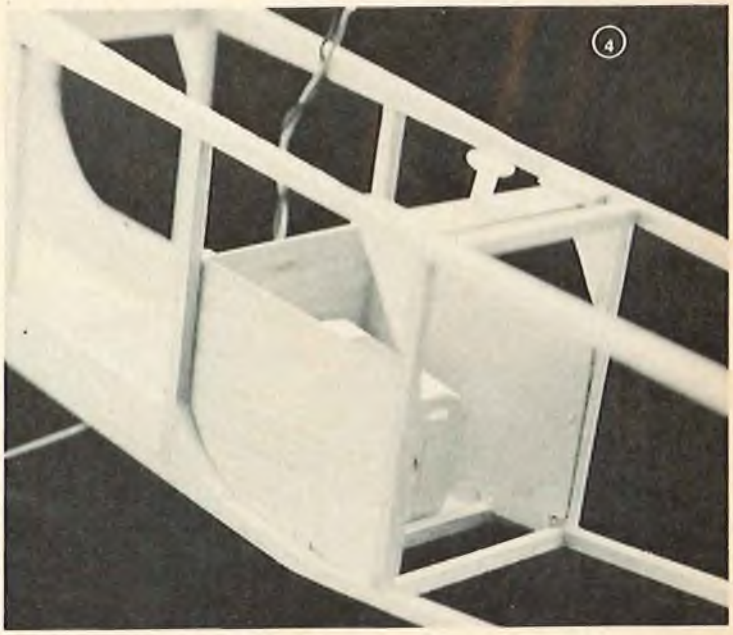
FULL SIZE PLANS AVAILABLE — SEE PAGE 190

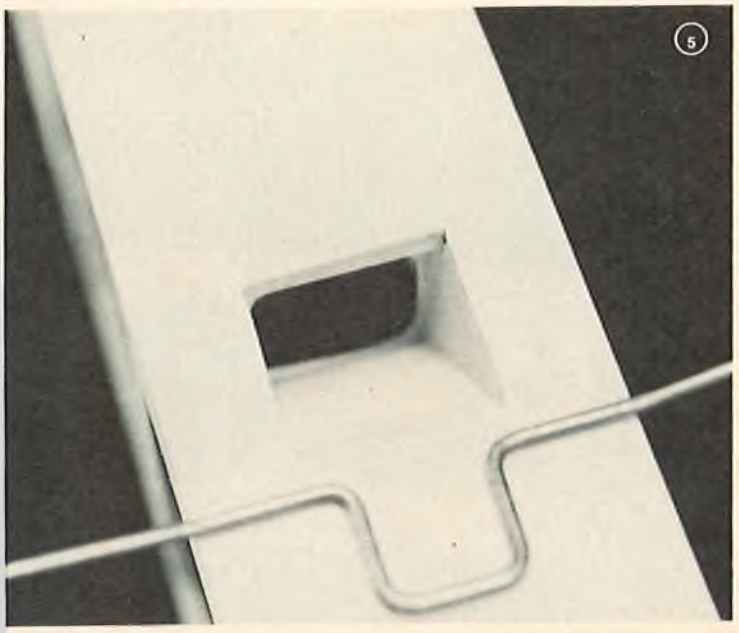


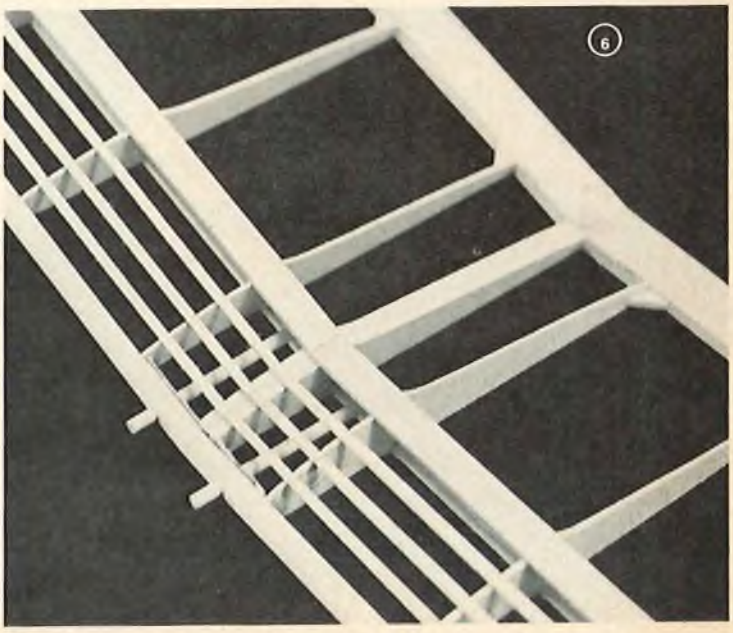


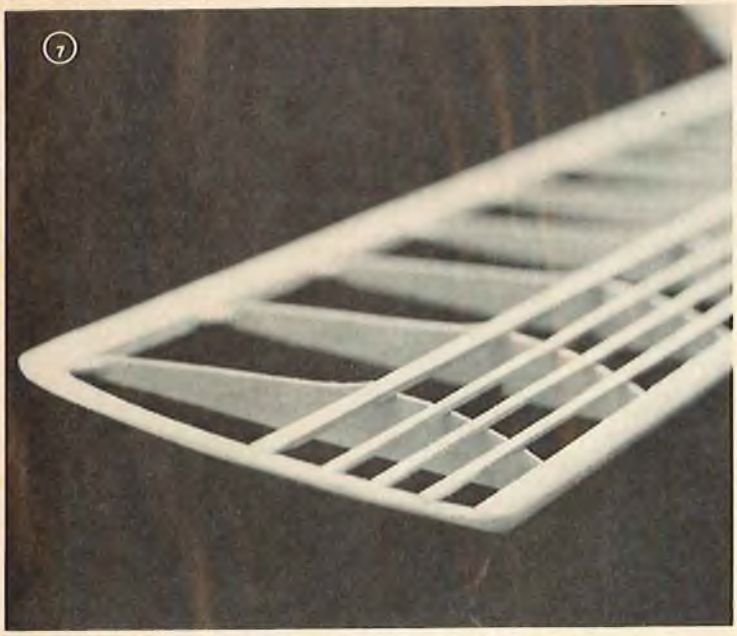


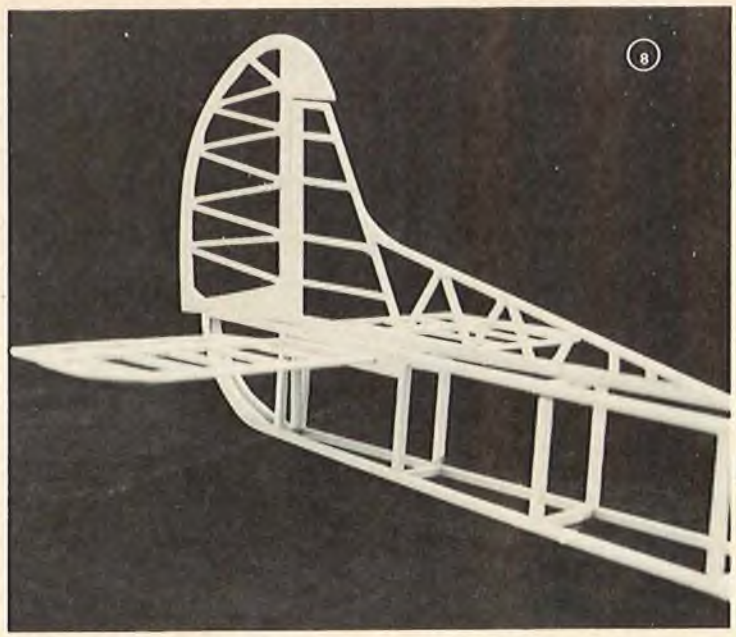


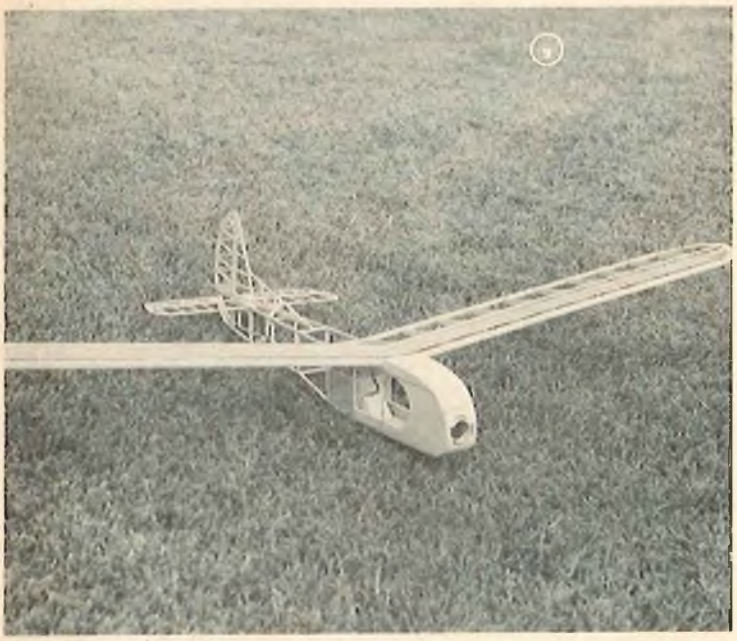


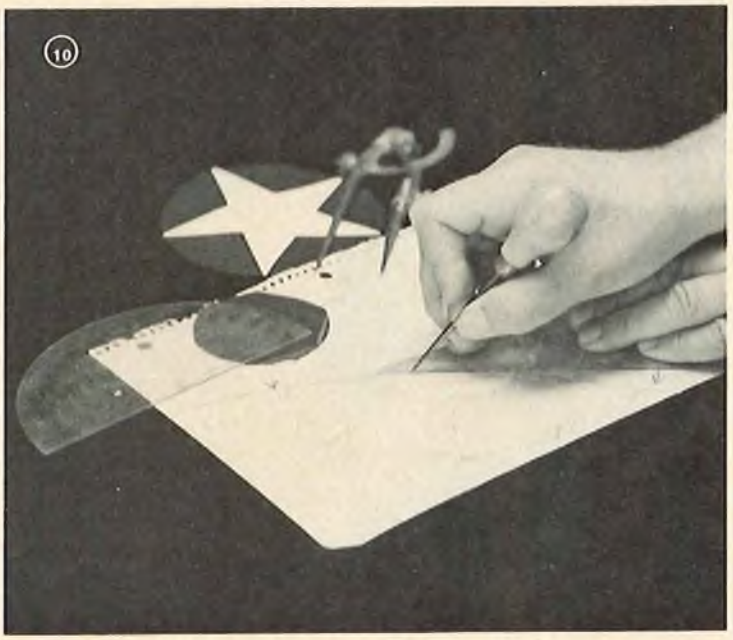






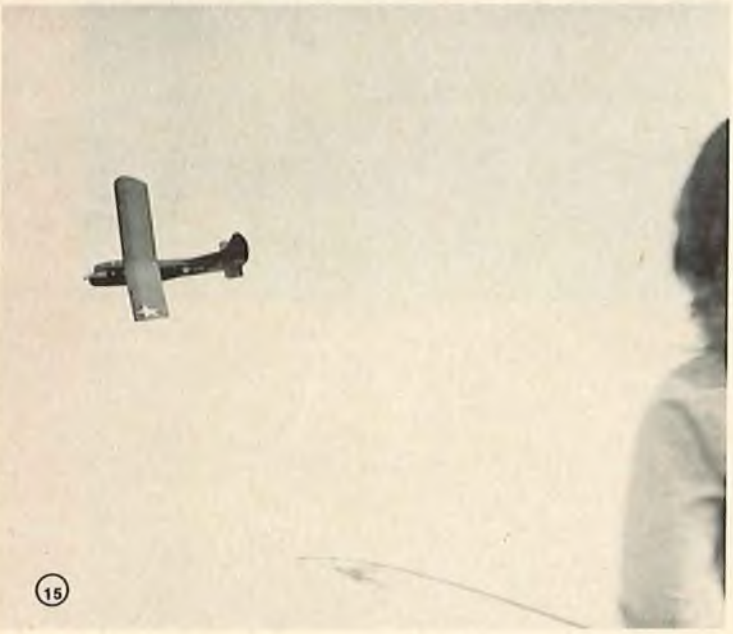




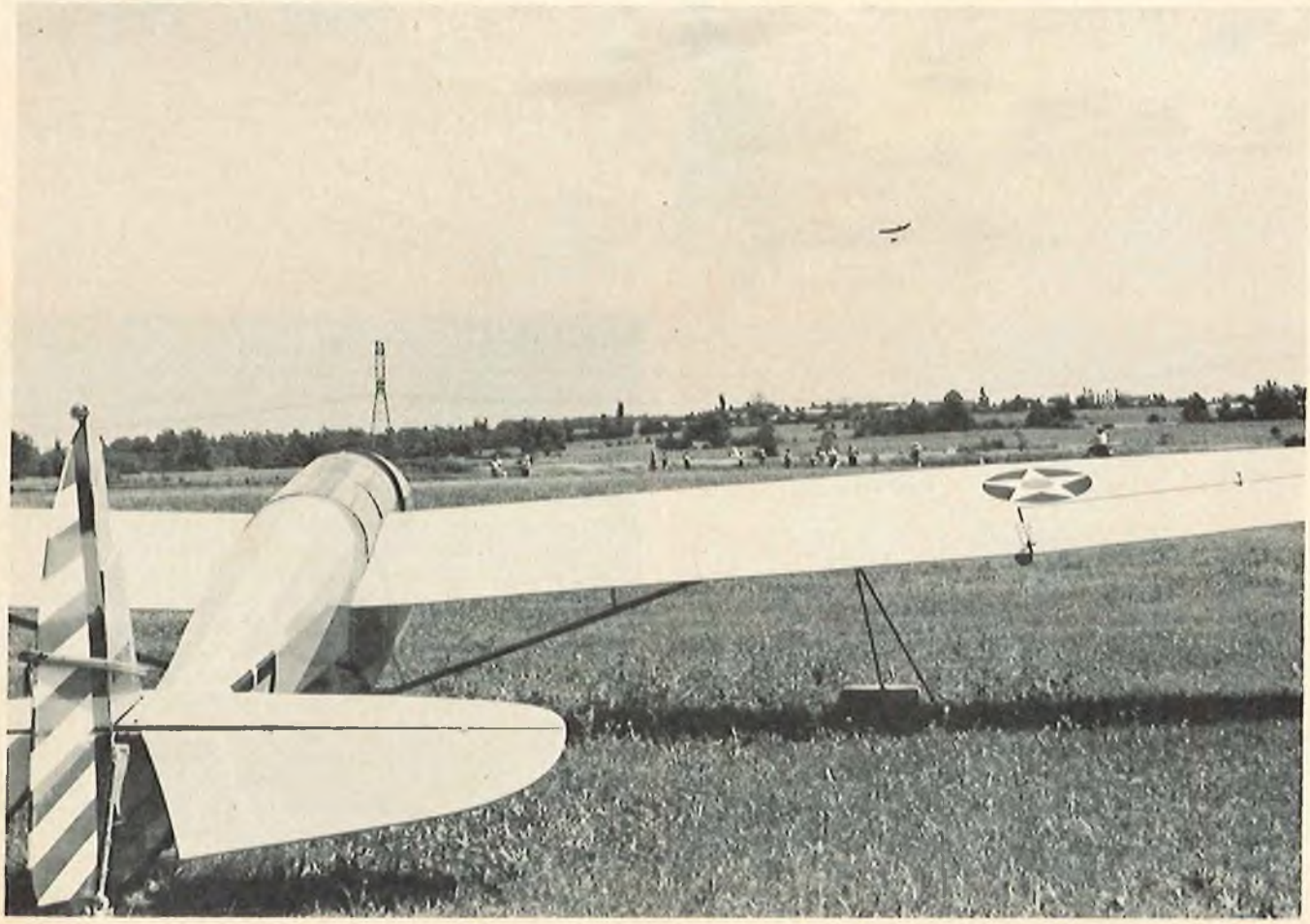



STENSO
144 1" letters & numbers
26 miscellaneous signs
VINYL LETTERS
for outdoor and indoor use
232


RAPID CHARGER
ASTRO FLIGHT, INC.



(1) Astro 05 electric motor mounts through plywood plates. (2) Two screws and washers hold motor in place. (3) 1/16" plywood box is built internally to hold Astro battery pack. (4) Servo mounting sticky tape holds battery pack in place. (5) Balsa inlet duct on bottom of fuselage allows cooling air to reach battery pack. (6) Main spruce spars are doubled in center top only. Strong! (7) Super-simple wing construction. Airfoil is unique - - - read text. (8) Spruce and balsa combine to yield high strength and low cost style of construction. (9) Ready for covering. (10) With protractor, draw five intersecting lines 72 degrees apart. Cut white circle of MonoKote of diameter equal to star. Connect intersection of each drawn line and edge of MonoKote circle to form star. Cut out star and put on insignia blue background of same diameter. (11) Vinyl letters bought at most stationery stores add a touch of class. (12) With the Rapid Charger, you're ready to fly in 10 to 15 minutes. (13) "Okay you men – grab your rifles and let's load up!" (14) "Off we go - - -" Only spinner nut, dihedral and trailing antenna tell you it's a model. (15) Author's son, Brian, pulls a tight left turn for the camera. (16) Silent fly-by. (17) Dead-stick approach to driver education track at local high school. Slow silent flight should open the door to many local flying sites.



SUDS CITY SOAR IN

IF YOU MISSED ONE OF THE MOST PRESTIGIOUS SOARING EVENTS OF 1976, HERE'S A PREVIEW OF WHAT TO EXPECT THIS YEAR.

BY DON CONDON

● The Second Annual Suds City Soar-In is now history for this year. The second year's event was held July 10 and 11.

The weatherman was kind this year, after Saturday's rain out last year, since he gave us two days of temperatures in the 90's with lots of sun and a bit more wind than was needed on Saturday, but Sunday was near perfect for a sailplane meet.

Attendance was up from last years event, but I saw a lot of familiar faces plus lots of new ones.

This meet has four power launches, with an attendant at each launch to wind the cable. They also used the open winch method which allows contestants to put in their flights any time there is a winch open or their frequency pin is available. The system seems to work well with everyone having plenty of time to put in all his required flights.

There seemed to be no one great choice of bird, but I did see quite a few Aquilas and Olympics with some Astro Jeffs and Legionairs, too. One could only surmise that the end result of any combination of man and machine is largely the result of the man on the sticks rather than a perfect flying machine.

Contestants came from most of the neighboring Mid-west states, with farthest recorded from Denver, Colorado.

The quality of flying seems to get better ever year, especially in the brisk winds we experienced on Saturday. I saw some great saves and fine flying as well during the two day contest.

Once again, Old Milwaukee Beer was the sponsor, but this year a new co-sponsor was added. The First Wisconsin Bank provided a beautiful traveling trophy for the Winconsin Soaring Champion. It was won this year, after a really hot battle among Wisconsin contestants, by John Czeszak of the host club. Next year, John will have to really "hang in there" to retain this beautiful trophy.

Allen Epps from Country Club Hills, Illinois, 12 years old, was the Meets Junior Champion, both days. He's good now, so when he adds a few more years on — look out guys!

Saturday's Grand Champion was Jack Hiner, while on Sunday, Paul Wilson took the honors.

The host club provided a contestant get-together on Saturday night with free Old Milwaukee for all. I don't have to add that everyone had a great time, and besides, when we used to fly rudder only, years ago, the standard statement on windy days was "have another beer and the wind will go down." It always seemed to work, too!

I believe that with the hard work of the host club and the generous backing by two fine sponsors, future Suds City Soar-In's can only get better and will, one day, be ranked as the finest sailplane meet in the country. □

Mr. Carl Liedtke, owner of Lake County Beverage, Schlitz and Old Milwaukee distributor for Waukesha County, looks at one of the trophies donated by parent company. Ron Kopp, one of host club's directors, looks on.

1976 SUD CITY SOAR-IN WINNERS
SATURDAY, JULY 10

Standard — 2 min.
1. Jack Hiner 1219
2. Paul Wilson 1214
3. Jim Porter 1177
4. Greg Seydel 1150
5. George Louthain 1149

Standard — 6 min.
1. Jack Hiner 1108
2. George Louthain 1046
3. Greg Seydel 969
4. Paul Wilson 839
5. J. Borowski 772

Open — 2 min.
1. John Czeszak 1194
2. Larry D'Attilio 1193
3. Chris Erkmann 1193
4. B. Stevensen 1164
5. J. Nelson 1097

Open — 6 min.
1. John Czeszak 976
2. Larry D'Attilio 949
3. John Nelson 838
4. Effrim Villa 797
5. Robert Catlin 769

Grand Champion
Jack Hiner 2327

Junior Grand Champion
Allen Epps 443

SUNDAY, JULY 11

Standard — 2 min.
1. Jack Hiner 1141
2. Ed Harris 1138
3. Ken Olson 1086
4. Paul Wilson 1084
5. Frank Spearman 1072

Standard — 15 min.
1. R. Burnowski 1132
2. George Louthain 1112
3. Paul Wilson 1109
4. Greg Seydel 1075
5. Helen Olson 907

Open — 2 min.
1. Chris Erkmann 1114
2. John Czeszak 1084
3. Larry D'Attilio 1018
4. Frank Spearman 956
5. Jim Porter 949

Open — 15 min.
1. Larry D'Attilio 1075
2. John Czeszak 1058
3. Chris Erkmann 1007
4. Frank Spearman 990
5. Jim Porter 941

Grand Champion
Paul Wilson 2193

Junior Grand Champion
Allen Epps 1270

Wisconsin Soaring Champion Trophy
John Czeszak

Roger Scher, launching Legionaire while Bill Rohring does the timing.

Effrin Villa flying as Greg Seydel launches his Maestro MK 3.

Walt McKee of Cedar Rapids Skyhawks and Lee Nelsen launching his Cirrus.

Ron Kopp of host club and Suds City Soaring Team with his Cumulus.

Bill Catlin flying while Jim Catlin launches Challenger, built from plans.

Greg Seydel of host club does some checking on his Olympic 2, built from plans.

Full scale Switzer SG-2 at meet site, used for instruction.

Jack Hiner of S.O.A.R. launching his Aquila. Look at the audience he draws!

Jim Porter of Cedar Falls, Iowa, with magnificent Shrike-S.

Jim Porter launches the Shrike-S, with 16 foot span.

John Czeszak of host club with Astro Jeff. Member of Suds team too.

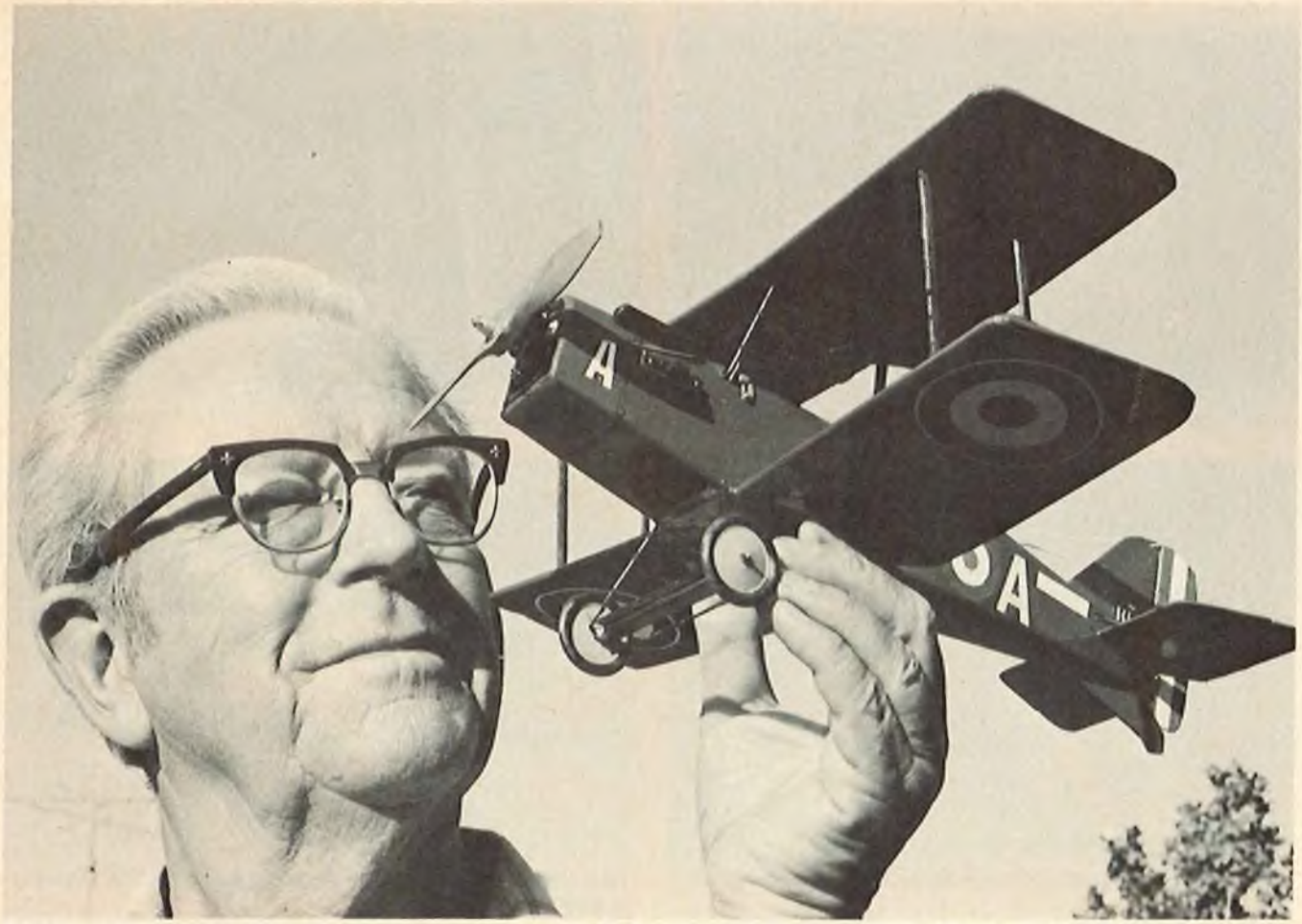
Two beautiful launch site scenes at the Suds City Soar-In, in beautiful Wisconsin.

NYPUM youth group from Milwaukee area did a fine job for 2 days retreiving tow lines for flyers.

Pretty trophies. This many awarded each day.

Line-up of Saturday's winners - - -

- - - and the champions on Sunday.



RCM's Chief Sunday Flier with his popular Peanut Scale SE-5 for RC. Leave it alone if you're a beginner!

FULL SIZE PLANS FOR KEN WILLARD'S

PEANUT SCALE SE-5

OK, fellows. We got the message. Last November we published some photos and a brief description of a Peanut Scale Se-5. At the time, it had been demonstrated at the Pioneers's Biplane Bash, and shortly thereafter it was flown at the WW I Jamboree at Hill Country Air Museum.

Because it really is a special purpose design, I didn't know whether enough of you would want to have plans, so I asked you to write if you wanted them. From the mail I received, it is evident that you'd like to try it too. So here are the plans and some hints on building and flying it. I can summarize very quickly, it's a helluva lot easier to build than it is to trim out and fly, but once it is trimmed out, it will amaze you with its stability, even though the response rate to the controls is very rapid under power, and has to be if you want any control at all when the engine quits. More about that later. Right now, let's get on with the building hints and kinks.

FUSELAGE

No problem. Two flat sides, a firewall, two formers, a tail post, with some 1/16" square longerons. The formers, or bulkheads if you prefer, are spaced so that the Cannon Super-Mini Block just fits in-between them, and there's room up forward for a Super-Mini servo, the switch, and a 100ma battery pack, which must be removed from the case and taped together because of the cramped space. Add to this basic structure a turtledeck and headrest aft of the cockpit (but don't Zap it in place before you've got the radio gear and pushrods aligned), and a removable hatch from the cockpit forward to the firewall, to which the cabane structure and the upper wing are permanently attached, and there's your fuselage. Add a cowl, carved from soft balsa, and the decorative cylinder head covers, and there you have it. Once you get the parts cut out and ready to assemble, a quick Zap job — with some microballoons at the corners of the firewall and sides for added strength, holds the whole thing together. The plans show wood sizes and placement. Please, if you're a beginner, don't write and tell me I didn't give enough detail. I know that, I also know that this plane is not for beginners — sometimes I wonder if it's really for experts — but I do know it's fun.

Note that the hatch has to be hollowed out to accommodate the servo arms — and tailoring the pushrods is also a chore. Since the forces are very light, I straightened out some small paper clips — they bend easily, but are strong enough for this purpose once they have been shaped. If you do this, you'll have to solder a couple together to have a piece long enough for each pushrod. When you've got them all lined up with the control surfaces — and some bends are needed — then you can Zap the turtledeck in place permanently.

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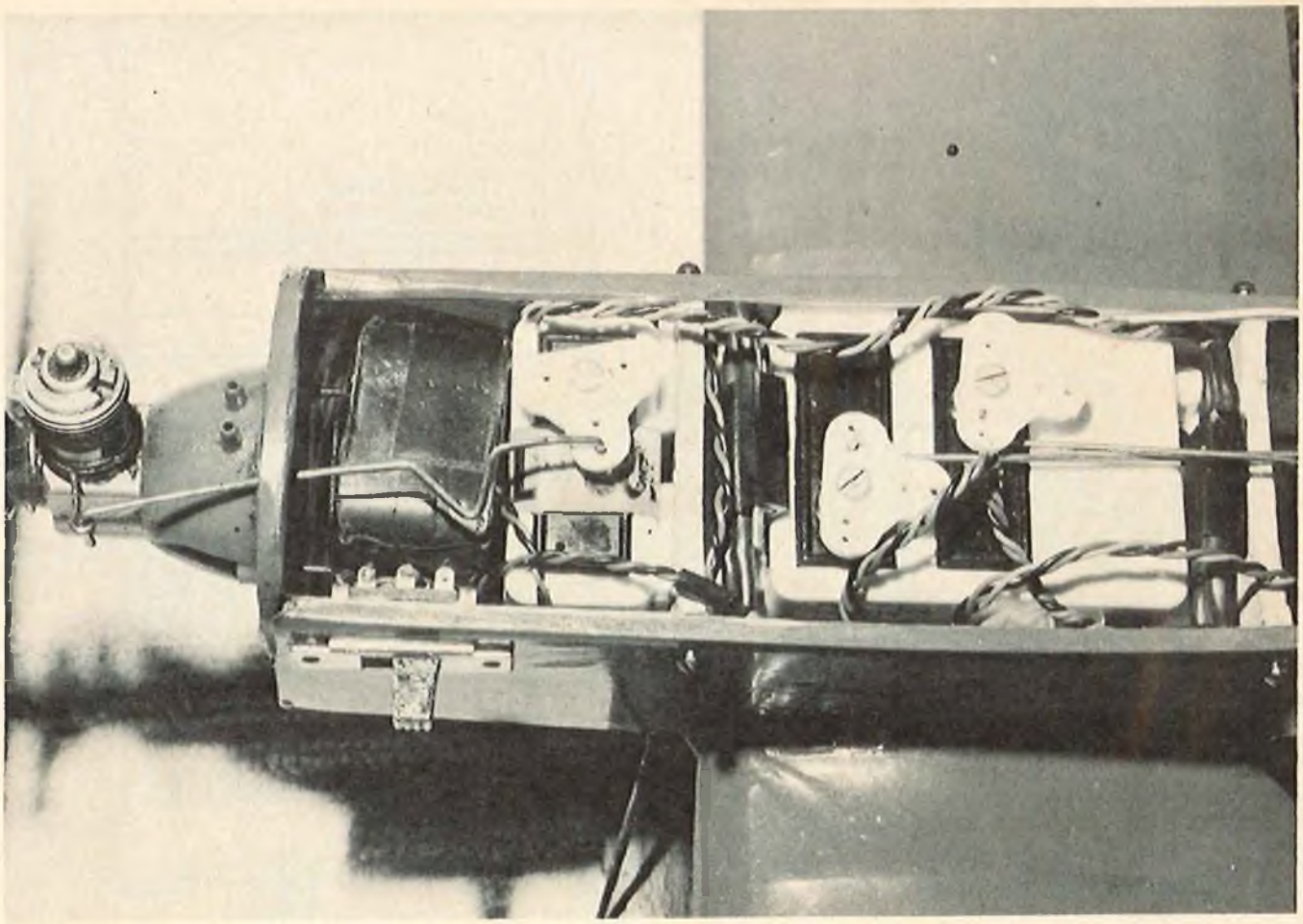
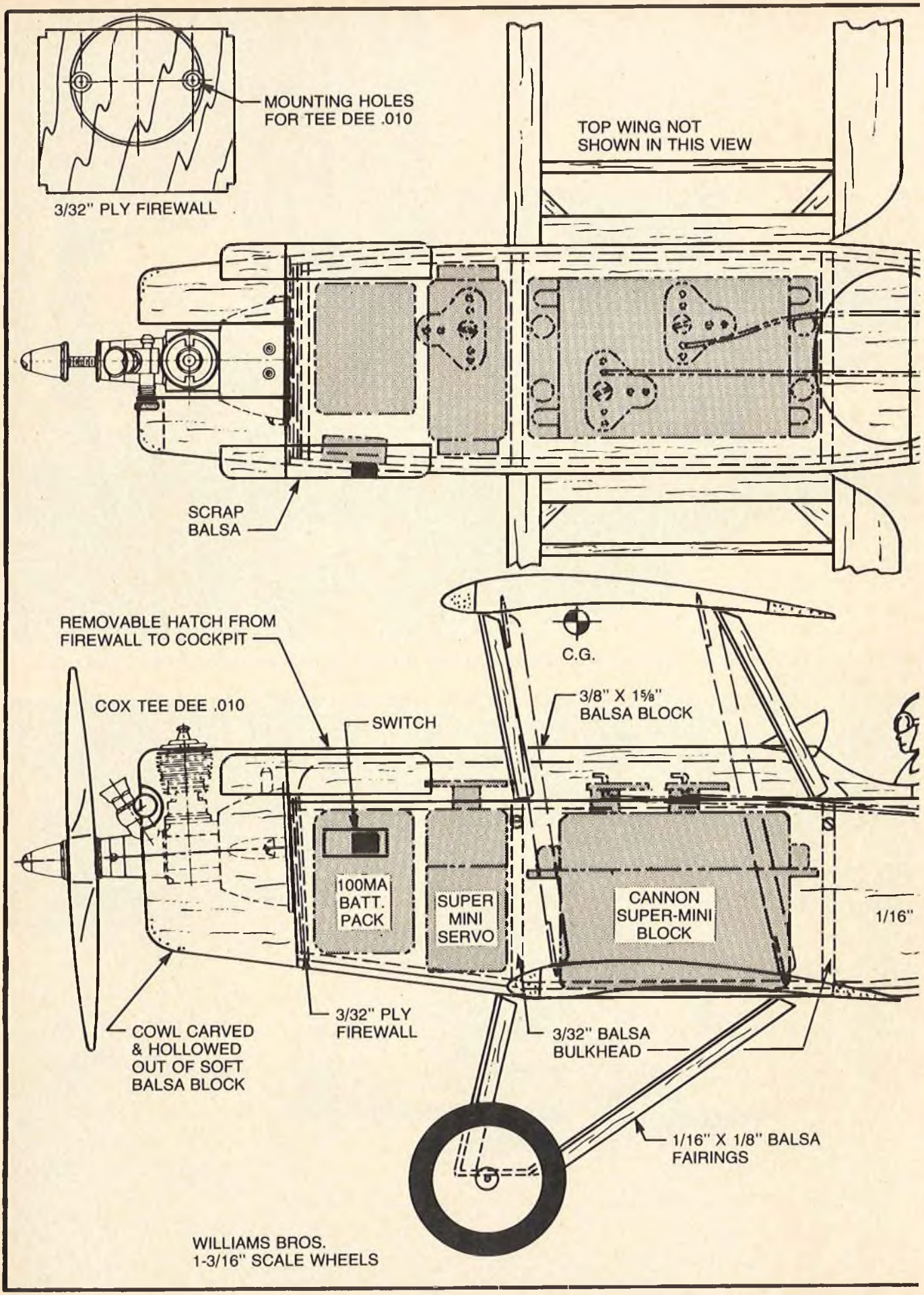
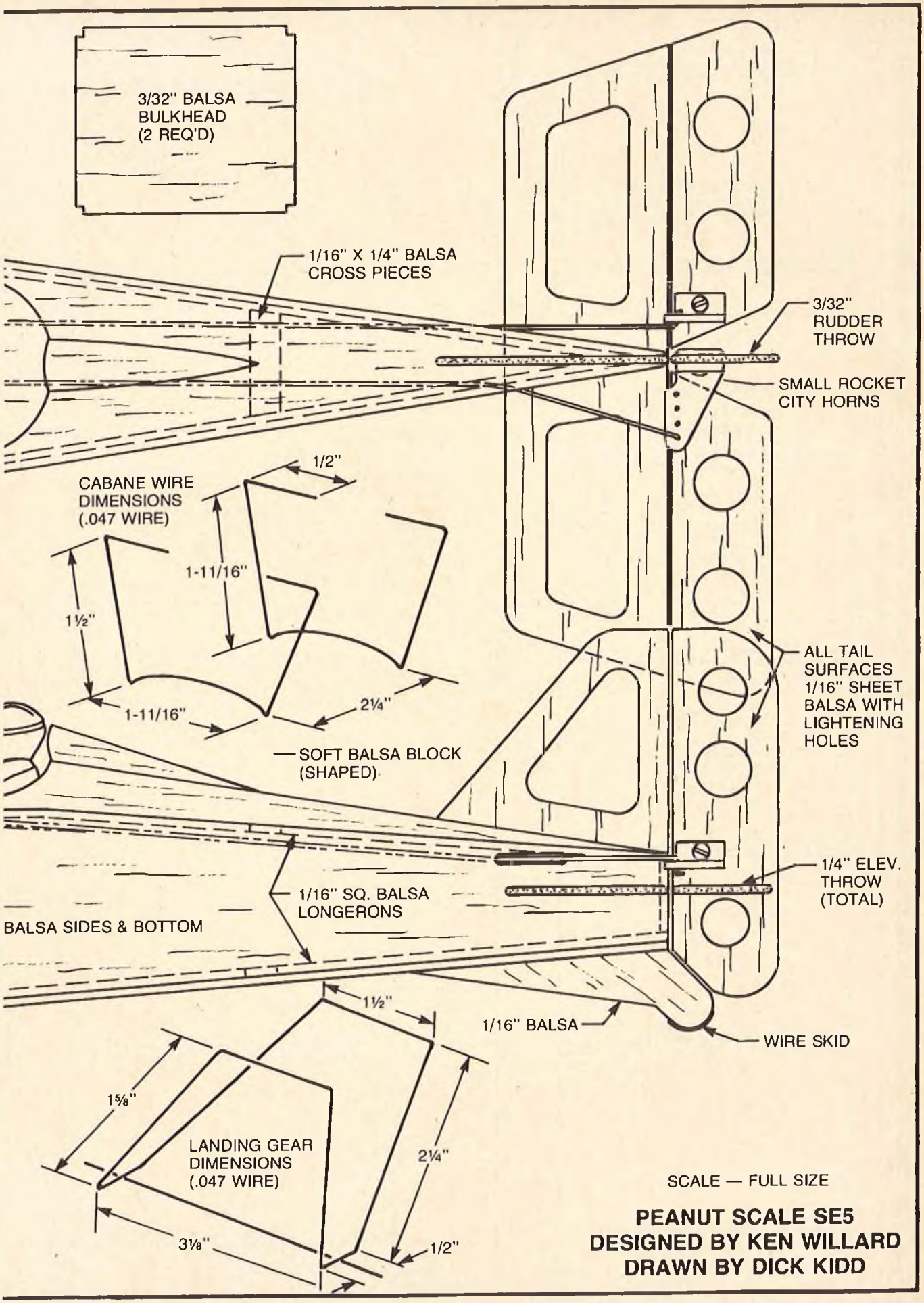
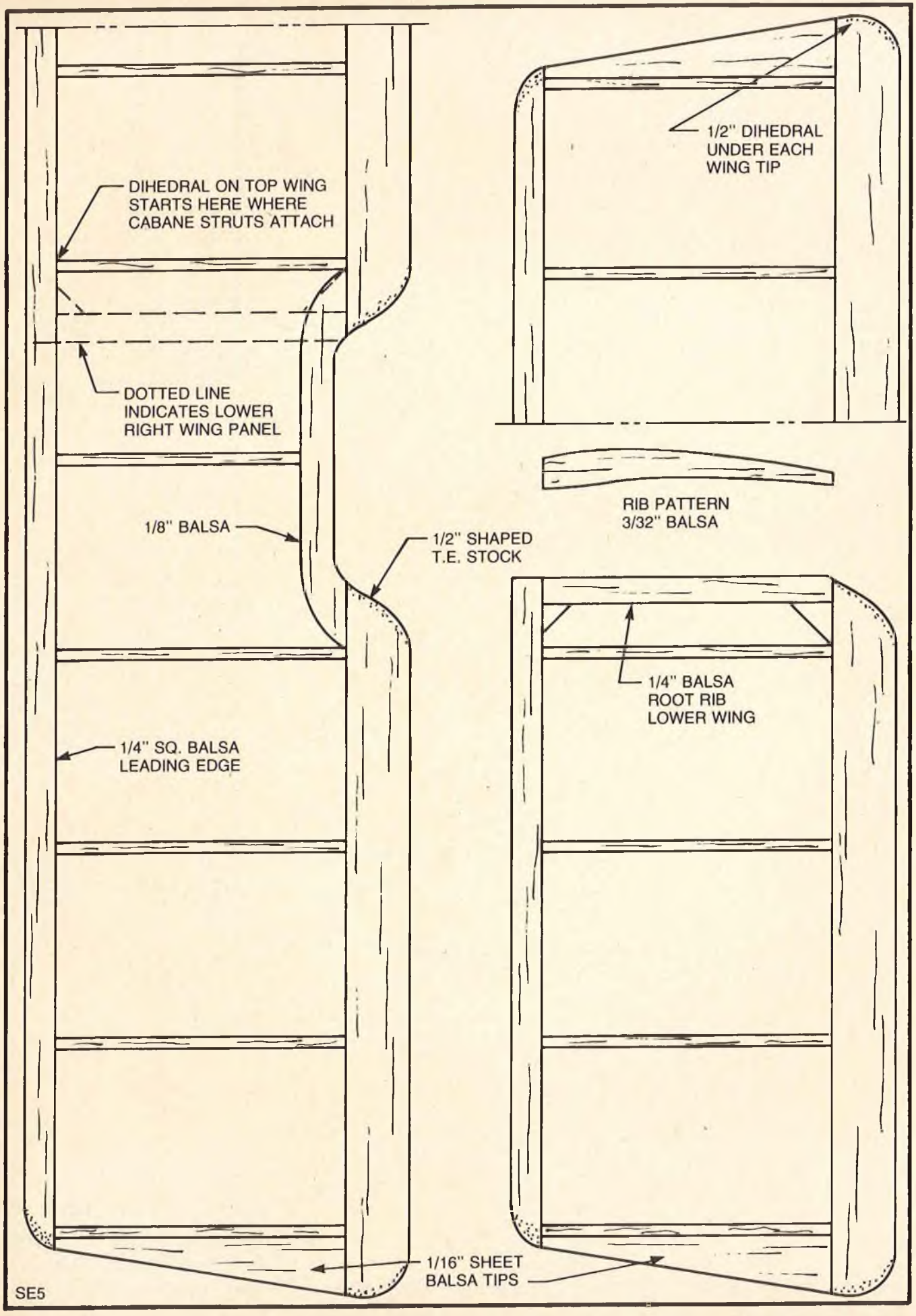


ABOVE: Now that's what's called putting the world's smallest radio in a really small aircraft! BELOW: Ken's Peanut Scale SE-5 ready for flight.


MOUNTING HOLES FOR TEE DEE .010
3/32" PLY FIREWALL
TOP WING NOT SHOWN IN THIS VIEW
SCRAP BALSA
REMOVABLE HATCH FROM FIREWALL TO COCKPIT
C.G.
COX TEE DEE .010
SWITCH
3/8" X 1⅝" BALSA BLOCK
100MA BATT. PACK
SUPER MINI SERVO
CANNON SUPER-MINI BLOCK
1/16"
3/32" PLY FIREWALL
3/32" BALSA BULKHEAD
COWL CARVED & HOLLOWED OUT OF SOFT BALSA BLOCK
1/16" X 1/8" BALSA FAIRINGS
WILLIAMS BROS. 1-3/16" SCALE WHEELS



DETACH PAGE 44 AND 45 AND JOIN AT BORDER LINES


DIHEDRAL ON TOP WING STARTS HERE WHERE CABANE STRUTS ATTACH
DOTTED LINE INDICATES LOWER RIGHT WING PANEL
1/8" BALSA
1/2" SHAPED T.E. STOCK
1/4" SQ. BALSA LEADING EDGE
1/16" SHEET BALSA TIPS
1/2" DIHEDRAL UNDER EACH WING TIP
RIB PATTERN 3/32" BALSA
1/4" BALSA ROOT RIB LOWER WING
SE5

CLOUD BOUND 4

A RADIO CONTROLLED DURATION SAILPLANE OF TWELVE FOOT WING SPAN FEATURING A VARIABLE CAMBER WING WITH COUPLED DRAG BRAKES AND SPOILERS

BY DON DRURY

Thirty five years of modeling, mostly in free-flight categories, had led to a wealth of knowledge and instinct into what makes a winning competition airplane. All the theory and claims about design, airfoil, glide ratio, etc., is important, and a logical approach to modeling, but does not necessarily create winners. If it did, all models would be identical. If we look over the designs of the top ten models at any large contest, we find that wing spans will vary from 7' to 13', wing loadings of 6.5 oz. to 12 oz., high or low aspect ratios, with or without spoilers, fiberglass or built-up construction, V-tail or conventional, etc.

So what makes a winning model? First, of course, a good clean design free of problems like warped wings, loose couplings, a ship with good responses, positive reactions and consistency. In other words, a carefully constructed airplane. Second, and probably the most important, is the pilot. Luck can be a dominant factor in competition flying, however, the experienced flyer who knows his ship like the back of his hand is the one who's at the top of the heap consistently.

Last season my competition flying was disastrous, yet the three models I flew are all capable of winning contests and my flying ability is adequate. We could say the year was one of bad luck. Even though I feel luck is a big factor in competition, I can't accept bad luck for a bad showing.

I spent some time thinking of all the factors that contributed to last year's flying and made a problem and possible solution list to see what I could come up with in the way of a sailplane with greater potential. Here is a summary of that thinking:

(1) Problem: Sloppy flying.

Solution: Practice, practice, practice. Know your ships' capability. Test fly in all conditions.

(2) Problem: Not enough altitude off tow.

Solution: Tow hook position is critical. Test fly under all conditions and move the hook accordingly. An electric winch will take a large ship higher than a small ship.

(3) Problem: Cross wind launch.

Solution: Again, a larger ship will work better in a cross wind than a small ship.

(4) Problem: Light to no wind.

Solution: Light loading, a large ship, tow hook position, high lift wing (undercambered).

(5) Problem: Windy day.

Solution: Faster ship on the tow. One that will penetrate to the top of the tow into the wind. Add ballast. Sharp leading edge for penetration, strong wing, clean ship, flat bottom wing, added ballast for penetration in the glide. Spoilers and/or flaps needed for landing.

The author with his magnificent Cloud Bound 4, a highly competitive Open Class sailplane.

If you want an Open Class machine that is the ultimate in sophistication, versatility and performance, the Cloud Bound 4 is for you.

(6) Problem: Variable winds or gusty winds.

Solution: Spoilers and possible drag brakes are necessary for spot landing. Variable camber wing to penetrate at maximum wind condition. Added ballast also needed for penetration.

(7) Problem: Rolling terrain.

Solution: Spoilers for landing, low level ground thermals of a rolling terrain can be used for lift if penetration speed balances the wind velocity closely. This can be achieved with variable camber.

(8) Problem: Tight, clean turns in a thermal and on landing approach.

Solution: Polyhedral wing. If a large ship, the approach turn must be made with enough altitude.

(9) Problem: Airplane velocity in relation to thermal.

Solution: Bubble thermal: Should fly tight and slow circles. Wave type or stationary thermal: Fly a bit faster than wind speed and drift back and forth across the face of the lift. The Solution is ballast and/or variable camber to maintain proper speed relative to wind velocity.

(10) Problem: Getting back to spot landing after downwind thermal ride.

Solution: Ballast, variable camber, clean design, sharp leading edge.

(11) Problem: Getting to a thermal in a hurry. Sometimes you come off the hook in lift, but usually it is on the other side of the field.

Solution: Fast ship, variable camber wing so that you can pick up velocity so you can get there in a hurry.

(12) Problem: Structure.

Solution: Strong but light; give

TYPE AIRCRAFT
Competition & Sport Sailplane
WINGSPAN
144 Inches
WING CHORD
11¼" (Root) 6⅝" (Tip)
TOTAL WING AREA
1278 Square Inches
WING LOCATION
Shoulder Wing
AIRFOIL
Variable Camber
WING PLANFORM
Double Taper
DIHEDRAL, EACH TIP
2½°
POLYHEDRAL, EACH TIP
3½°

O.A. FUSELAGE LENGTH
51 Inches
RADIO COMPARTMENT AREA
(L) 15" X (W) 2⅜" X (H) 2¼"
STABILIZER SPAN
36 Inches
STABILIZER CHORD (incl. elevons)
5-7/16" (Avg.)
STABILIZER AREA
193 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
V-Tail, Top of Fuselage
VERTICAL FIN HEIGHT
NA
VERTICAL FIN WIDTH (incl. rudder)
NA

REC. ENGINE SIZE
NA
FUEL TANK SIZE
NA

LANDING GEAR
NA
REC. NO. OF CHANNELS
3 (Using 4 servos)
CONTROL FUNCTIONS
Elevons, Flaps
Brake Flaps & Spoilers
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa, Spruce & Ply
Wing ..... Balsa, Spruce & Ply
Empennage ..... Balsa, Spruce & Ply
Wt. Ready-To-Fly ..... 80 Oz.
Wing Loading ..... 9 Oz/Sq. Ft.

special thought to wing spar construction, fiberglass fuselage, etc.

(13) Problem: Variable wing camber.

Solution: Slight increase in drag at hinges, possible over-control.

(14) Problem: Ballast.

Solution: Can't change ballast during flight. If ballast is used — locate ballast in wing, not in fuselage.

The conclusion I have arrived at in going over this list is the "Cloud Bound 4". A 12' span sailplane with a 9 ounce wing loading should be the best answer to calm conditions and bubble thermals. I have also opted for variable camber wings to increase or decrease the speed of the plane as wind conditions vary and I also use some ballast additions where I feel it will help. As long as I'm using a variable camber design, drag brakes coupled to fence spoilers become logical.

The wing structure is based on Lee Renaud's Grand Esprit. I feel the spar structure he used is the strongest possible considering the weight factor. The front section of the fuselage is fiberglassed for strength and the after structure is of spar construction for lightness. A V-tail is lighter than a conventional stabilizer and rudder. Only 4 ounces of nose weight was needed to balance at the Center of Gravity. This is my answer to the variable conditions that plague contest flying and if you agree, let's start building.

CONSTRUCTION

Fuselage: The fuselage sides are 1/4" spruce longerons with 1/4" square hard balsa cross members and 1/4" soft balsa sheet inserted from the nose to the rear of the wing. Build two sides, one over the other. Add the top and bottom cross braces and add 1/4" triangular stock inside the cabin area as a base for the 1/2" sheet top. The bottom of the fuselage is 3/8" sheet balsa. The tail section of the fuselage is shown in the exploded drawing including a simple method of changing the incidence.

The tongues for the elevons are 1/16" aluminum sheet. Add scrap blocks where needed at the tail mounts and add the nose block. 1/8" square spruce stringers are used to flow the top and bottom sheet balsa into the rear section of the fuselage. Install a plate of 1/8" plywood to receive the Airtronics tow hook. Install the wing rods in the fuselage and temporarily fasten in place with 5-minute epoxy.

Use the lightest fiberglass cloth you can find and glass the inside of the fuselage in the cabin area. Use a liberal amount of resin around the wing rods. Fiberglass the entire balsa area of the fuselage with light weight glass cloth. Two coats of resin should be enough.

The Cloud Bound 4 fuselage, minus wings. Note Vee-tail.

Before fiberglassing, be sure to carve and sandpaper the ship to the proper cross section.

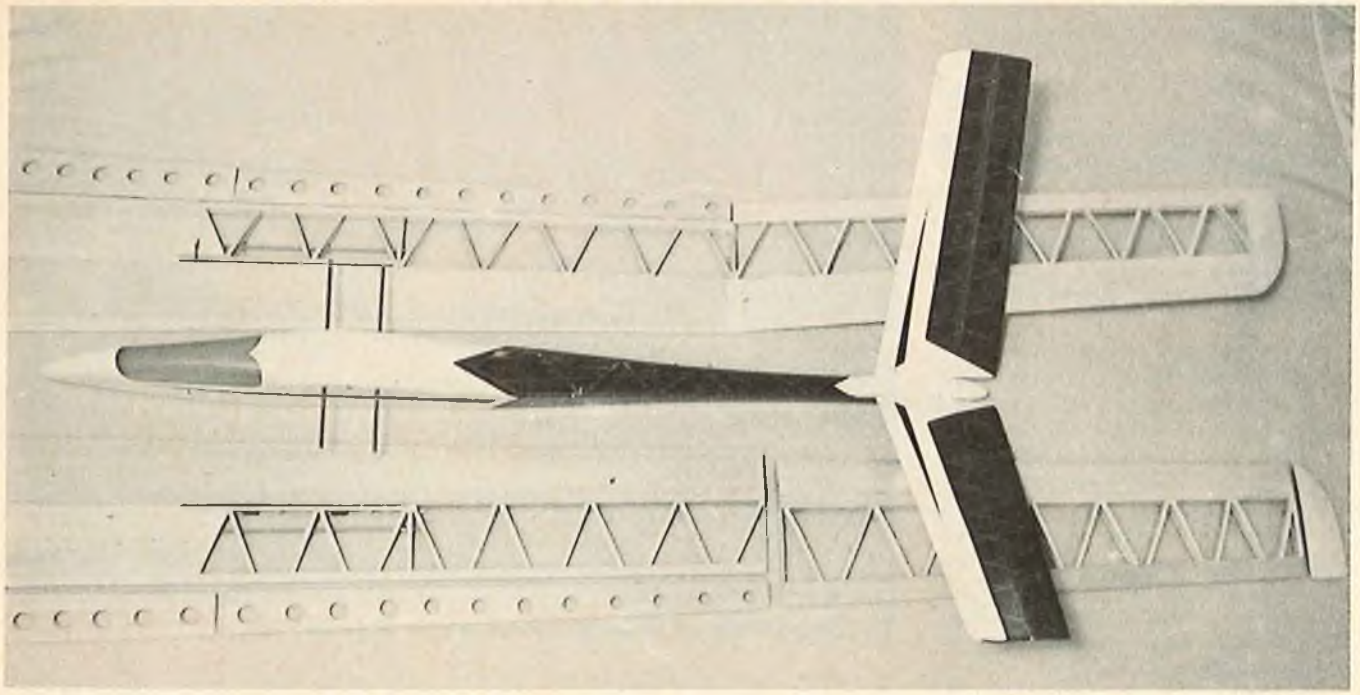
Now that the fuselage is constructed, build the canopy to fit. A commercial canopy may be used although an acetate sheet does a good job. Install the NyRods in the fuselage and cover the open area with Solarfilm. Hobbypoxy or K & B Superpoxy should be used over the tail mount and glassed part of the fuselage.

Elevons: The hinge area spars and leading edge are a sandwich type construction with 1/4" x 1/16" spruce strips between two 3/16" x 1/16" balsa strips. The ribs are 1/8" x 1/16" balsa over and under the 1/16" x 1/4" spruce spar. The trailing edge is 1/8" x 3/4" T.E. stock. The top and bottom of the root section is 1/16" ply filled with 1/16" scrap to receive the aluminum tongue. The root rib is added last and shaped to fit the tail mount. Sand to airfoil shape and bevel at the hinge area. Cover with Solarfilm and make a Solarfilm hinge. When the finished elevons are mounted in place, drill 1/16" holes through the plywood and aluminum tongue and lock in place with a toothpick or hard wood dowel.

Radio Installation: Your radio can now be installed with the batteries placed as far forward as possible. I used a Kraft four channel system with Kraft mixer for elevon control. I also used two KPS-12 servos in the wings connected to a "Y"-yoke and plugged into the motor control system of the receiver.

Wing: Construct the center section spars from four 1/4" x 1/8" spruce longerons stacked on top of each other with the top spar tapered from 3/16" to

Close-up view of the cockpit area and wing rods.



The Cloud Bound 4 with a new set of wings under construction.

0". Add the 1/4" x 1/8" spruce spar to the face of the stacked spars. Build the entire bottom of the wing including the front planking, 1/16" plywood triangular section, cap strips, and hinge line planking. Add the balsa shear spar on to the front planking and main spar and hinge line spars. The ribs are made in the sandwich method with the diagonal ribs slightly oversized. The first four plywood ribs are pre-drilled with oversized holes to receive the brass wing rod tubes.

Add all ribs. Bevel the leading edge shear spar and hinge line trailing edge spar and sand the oversized diagonal ribs to the proper airfoil. Now the 1/16" plywood fence spoiler can be installed. (See detail for construction.) The spoilers and inside of the wing in this area should be doped to prevent warpage due to rain and heavy dew. Be sure that the spoilers operate freely. Install balsa fences around the wing rod area and install the brass wing tubes, but do not glue them in place at this time.

When both center wing panels are completed this far, mount them on the wing rods and check out the dihedral and incidence angles, block the wing in this position, and fill the fenced areas around the brass tubes with fiberglass resin. Remove the wing from the rods and finish the top planking and add the cap strips. Add the tip dihedral braces. Trim the top planking at the leading edge flush with the face of the shear spar and add the 1/4" spruce leading edge. Brake flaps and flaps are now constructed and beveled for proper deflection. The flaps should be allowed to droop about 10° and the brake flap 90°.

With the servos installed in the wings and the flaps taped on, check the movement carefully. The 1/32" ply plate is mounted on the bottom of the drag flap to couple with the main flap. When the drag flap is pulled to full down, the main flap remains at 10° droop. Install a line from the trailing edge of the drag flap to the fence spoilers and check out this action. Get all this engineering worked out perfectly, then finish sanding and prepare for covering.

The tip sections are made the same way, except that only two 1/4" x 1/8" spruce spars are used. Taper from 3/4" to 1/2" at the tip. Use a few webs to space this taper. The front main spar is 1/4" balsa instead of spruce. Connect to the center panel, being careful to maintain the proper incidence angle and dihedral. Sand to finish shape and cover with Solarfilm. No wash-out is needed in the wing tips. The flaps in the droop position give a wash effect to the wing tips and are prevelant at faster speeds.

Now we are ready to fly the big bird. Check the C.G., incidence angles, and radio action. The flap action should give a flat bottom wing when the trim tab on the motor stick is in neutral and the throttle stick all the way up. This provides about 5° up with up trim and 7° down in slow trim. When the stick is pulled all the way down, the drag flaps are at 90° and the spoiler is fully extended. Make the first dozen flights with the trim in neutral and stay away from the spoilers until you really know how the ship reacts. Work in the drag flaps and spoilers when you are high enough, so you are not too surprised with the change of flight attitude. The nose will drop quite severely and the elevator action is less sensitive, causing the plane to slow down quite a bit.

Again, learn these characteristics before you start working on spot landings. Now start experimenting with flap changes. Your flying speed will increase about 10 mph from droop position to up position. Slight trim changes

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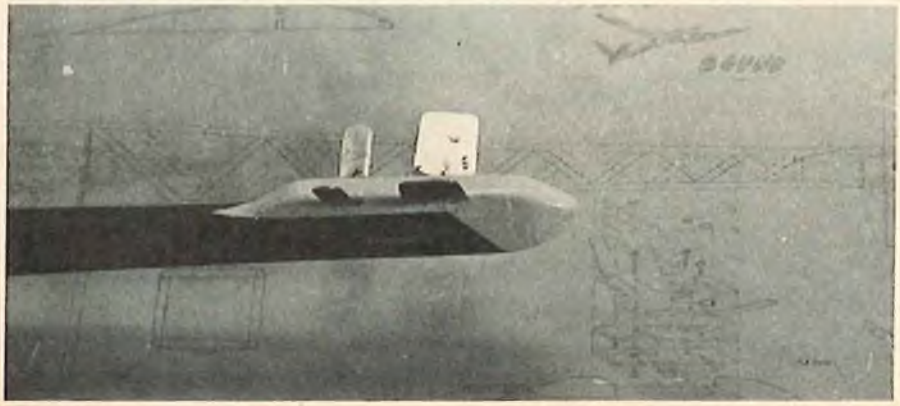
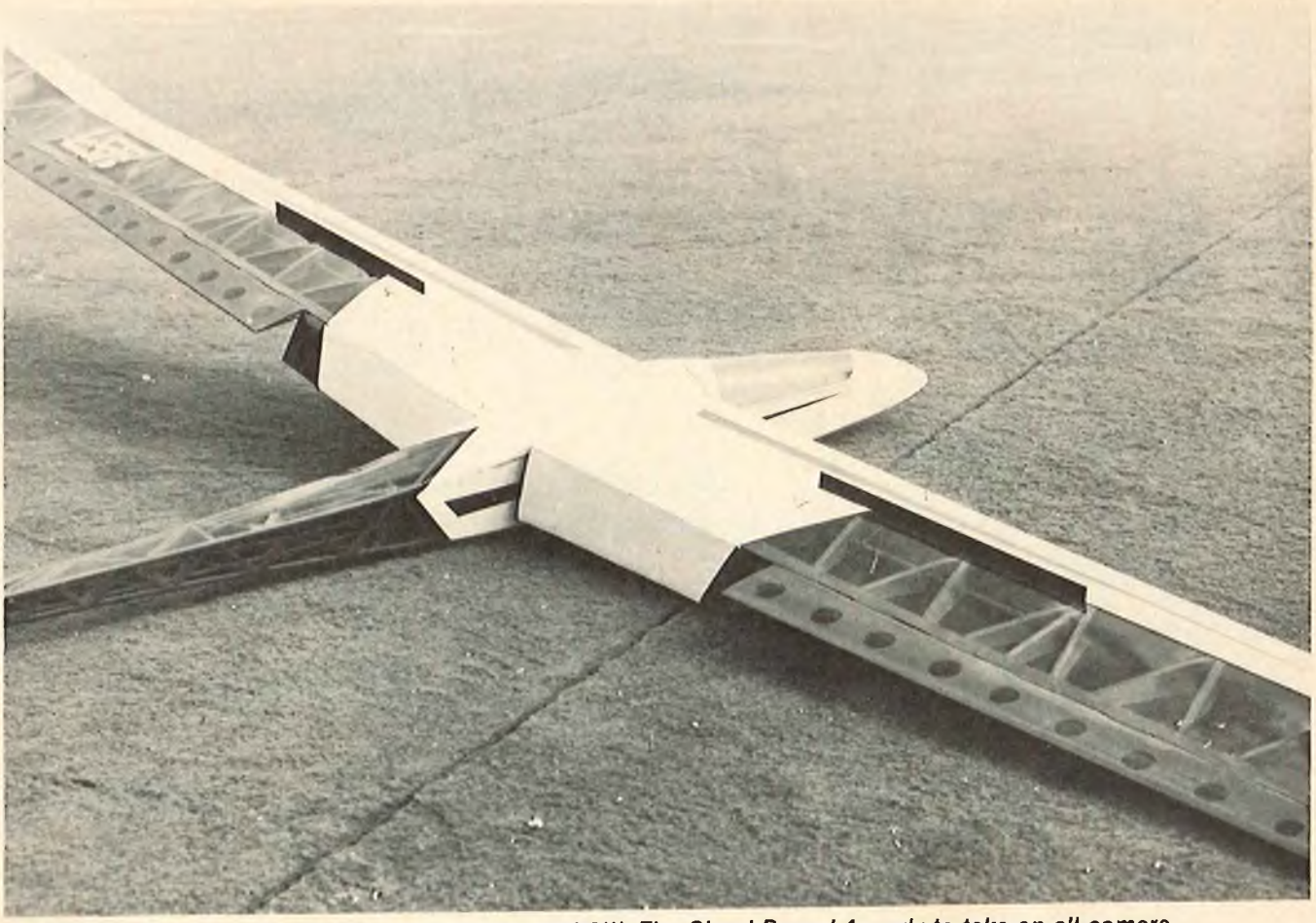
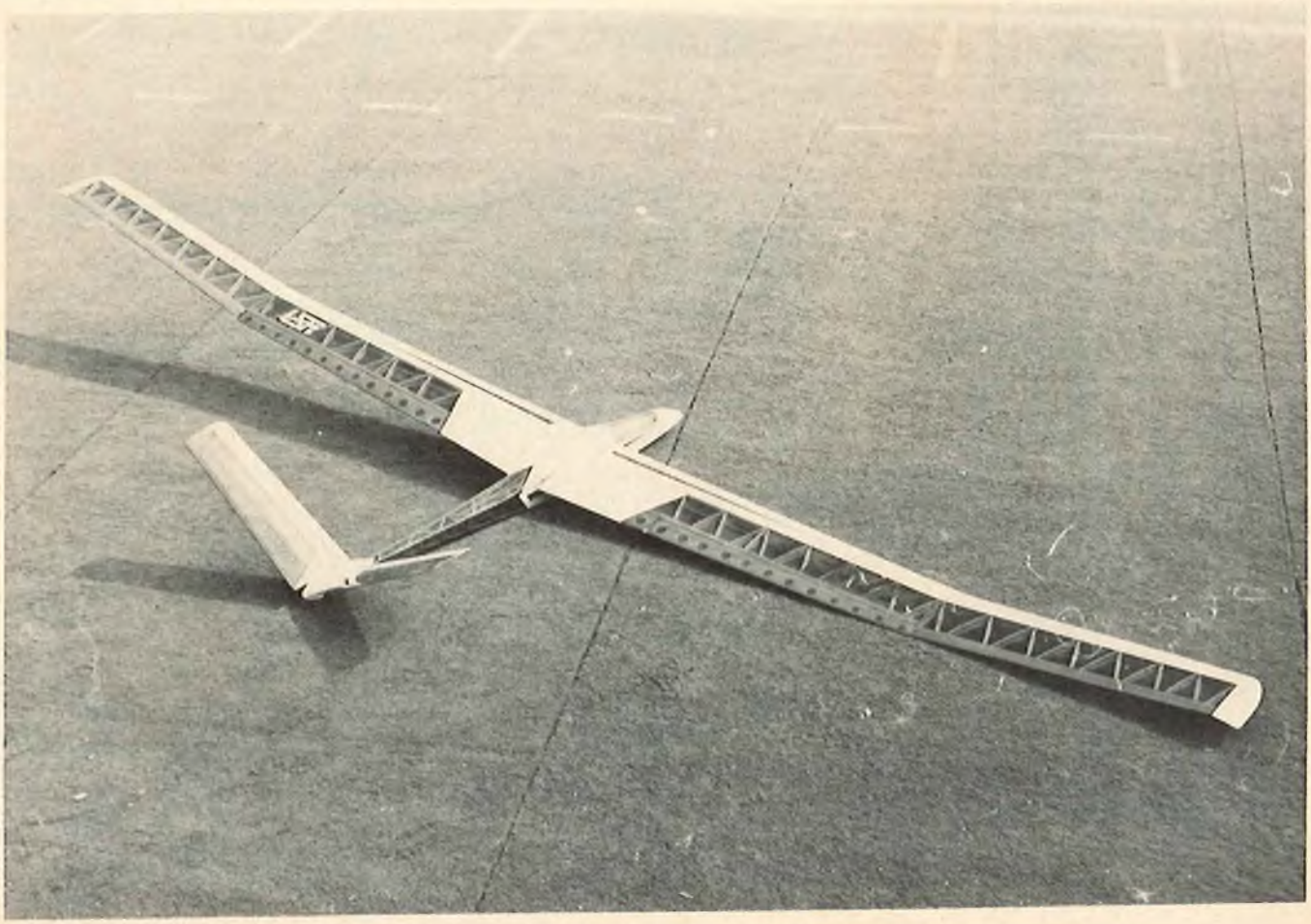
Close-up of Vee-tail mount.





ABOVE: The coupled drag brakes and spoilers. BELOW: The Cloud Bound 4 ready to take on all comers.



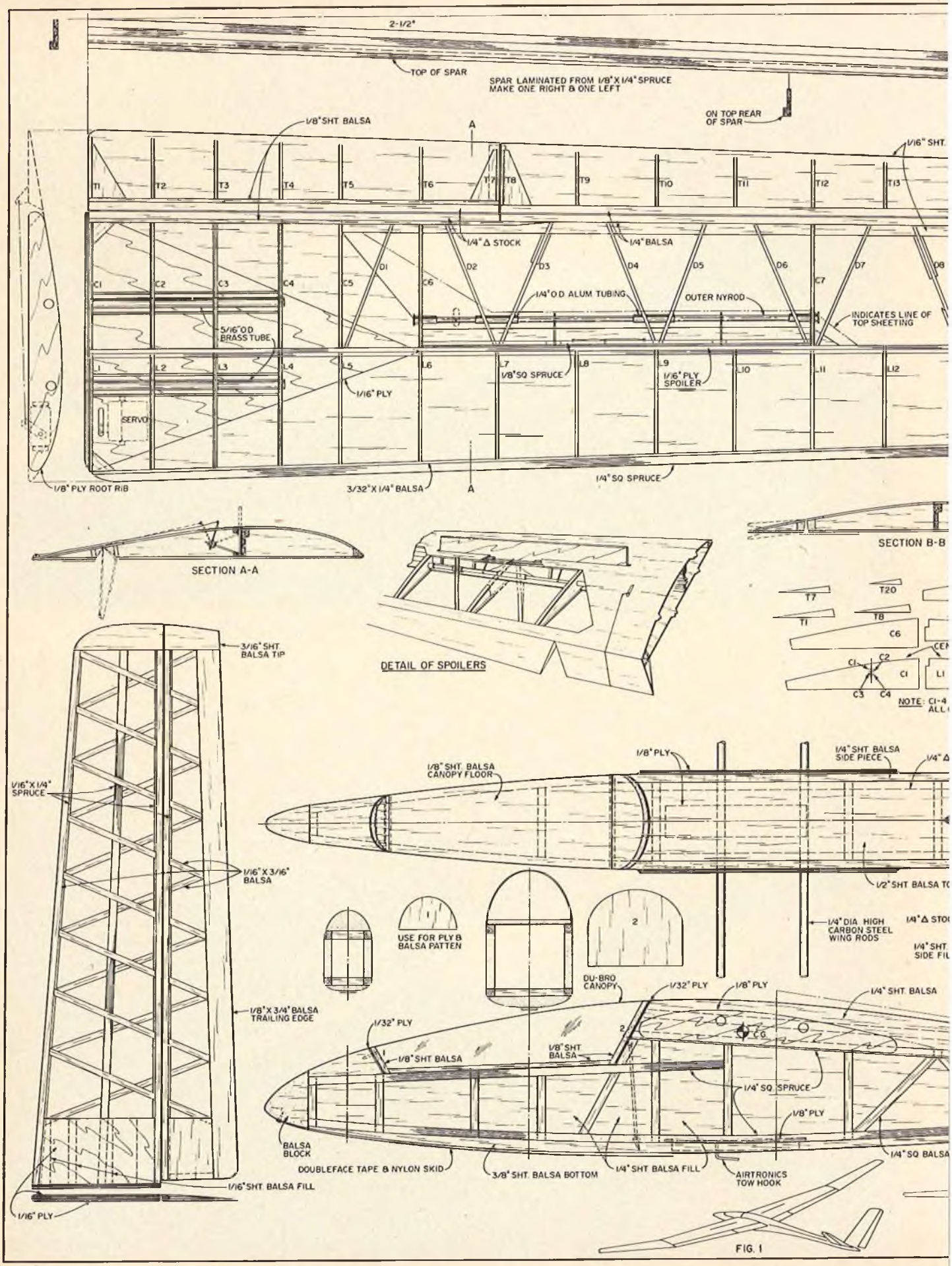

2-1/2"
TOP OF SPAR
SPAR LAMINATED FROM 1/8"X1/4" SPRUCE
MAKE ONE RIGHT & ONE LEFT
ON TOP REAR OF SPAR
1/8" SHT BALSA
1/16" SHT
T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12 T13
1/4" Δ STOCK
1/4" BALSA
C1 C2 C3 C4 C5 C6 D1 D2 D3 D4 D5 D6 D7 D8
1/4" OD ALUM TUBING
OUTER NYROD
INDICATES LINE OF TOP SHEETING
5/16" OD BRASS TUBE
L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 L11 L12
1/8" SQ SPRUCE
1/16" PLY SPOILER
1/16" PLY
SERVO
1/8" PLY ROOT RIB
3/32"X 1/4" BALSA
1/4" SQ SPRUCE
A
SECTION A-A
DETAIL OF SPOILERS
SECTION B-B
T7 T20 T1 T8 C6
C1 C2 C3 C4
NOTE: C1-4 ALL
3/16" SHT BALSA TIP
1/16"X1/4" SPRUCE
1/16"X 3/16" BALSA
1/8"X 3/4" BALSA TRAILING EDGE
1/16" SHT BALSA FILL
1/16" PLY
1/8" SHT BALSA CANOPY FLOOR
1/8" PLY
1/4" SHT BALSA SIDE PIECE
1/2" SHT BALSA TO
USE FOR PLY & BALSA PATTEN
1/4" DIA HIGH CARBON STEEL WING RODS
1/4" Δ STOC
1/4" SHT SIDE FIL
DU-BRO CANOPY
1/32" PLY
1/8" PLY
1/4" SHT BALSA
1/8" SHT BALSA
1/4" SQ SPRUCE
1/8" PLY
BALSA BLOCK
DOUBLEFACE TAPE & NYLON SKID
3/8" SHT BALSA BOTTOM
1/4" SHT BALSA FILL
AIRTRONICS TOW HOOK
1/4" SQ BALSA

FIG. 1

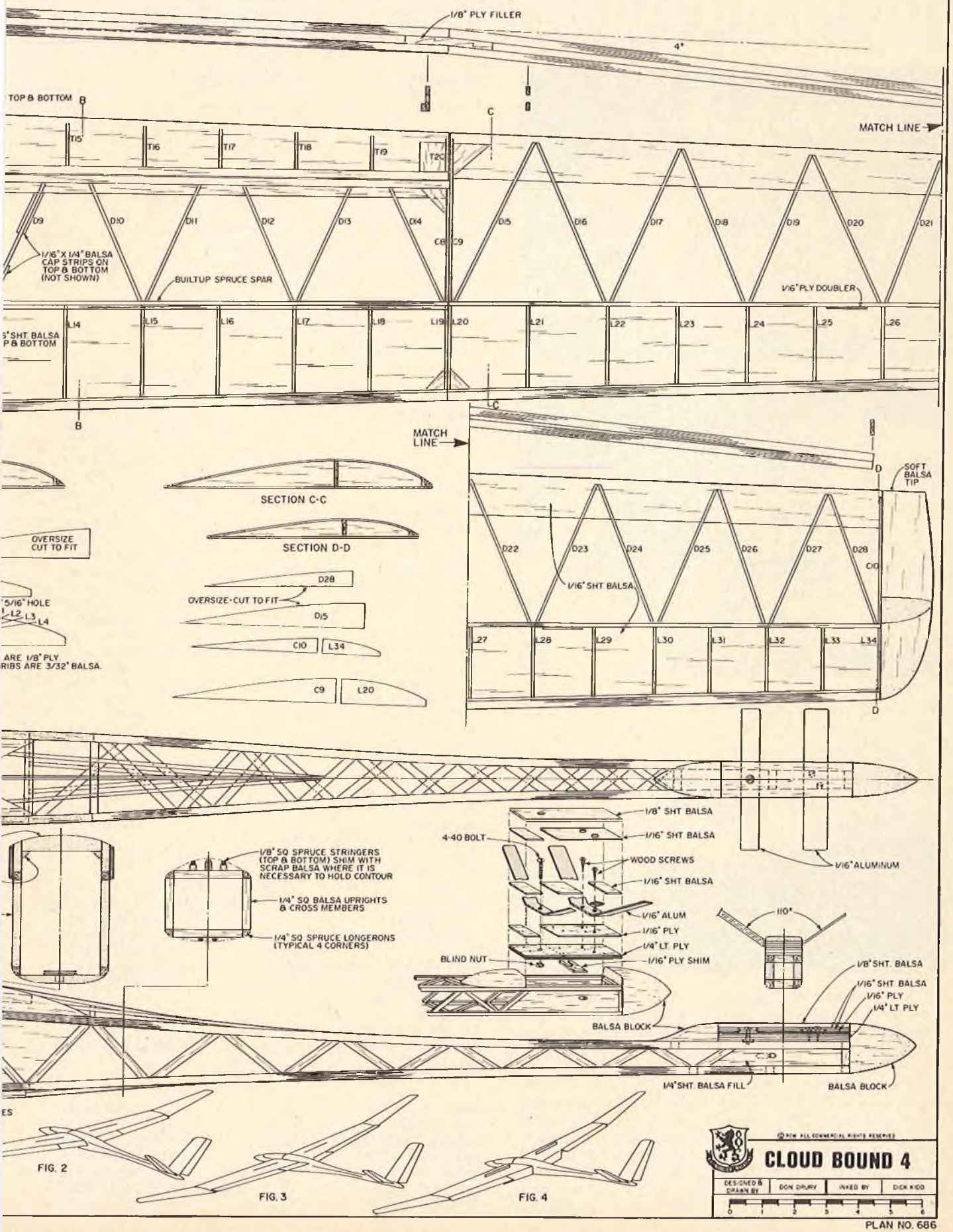


FIG. 2

FIG. 3

FIG. 4

CLOUD BOUND 4

DESIGNED & DRAWN BY	DON DRURY	INKED BY	DICK KOO

PLAN NO. 686

RCM PRODUCT TEST

PRACTICAL SCALE D.H. 82a TIGERMOTH

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging		●				Pre-Shaped Parts	●				
Plans	●					Parts Match to Plans	●				
Written Instructions	●					Overall Parts Fit	●				
Quality of Hardwood	●					Ease of Assembly			NA		
Quality of Fiberglass		●				Fidelity to Scale	●				
Other Materials	●					Flight Performance	●				
Accessories	●					Overall Appeal	●				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The Dehavilland 82a Tiger Moth is a scale biplane manufactured by Practical Scale of West Germany, and imported exclusively by Technisales. This kit is $184.95, freight prepaid in the continental United States. Balsa, spruce, plywood, plastic, and fiberglass are used in construction. The hardware and accessory package is almost impossible to conceive unless you see it. The landing gear and cabane struts are completely pre-formed, assembled and silver soldered by the manufacturer. The scale tail skid is also factory pre-built. An aluminum muffler, scale wheels, spinners, tank, hinges, horns, bellcranks, flying wires, control wires, turnbuckles, and dozens of pre-formed fittings in aluminum, steel, brass, Tufnol, and nylon

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SPECIFICATIONS

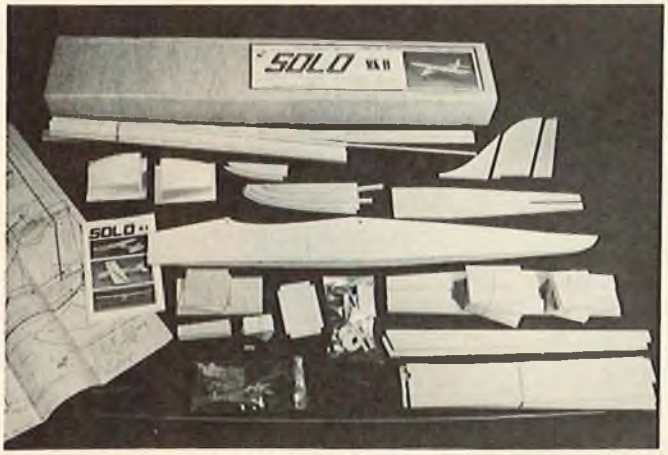
Name ..... D.H. 82a TIGERMOTH
Aircraft Type ..... Scale Biplane
Manufactured By ..... Practical Scale — W. Germany
Imported By ..... Technisales
P.O. Box 822
San Gabriel, California 91775
Mfg. Suggested Retail Price $184.95
Available From ..... Direct from Technisales
Mfg. Recommended Usage ..... Competition Scale
Wing Span ..... 72 Inches
Wing Chord ..... 11 Inches
Total Wing Area ..... 1584 Square Inches
Fuselage Length ..... 60 Inches
Radio Compartment Dimensions ..... (L) 12" x (W) 4" x (H) 3"
Wing Location ..... Biplane
Airfoil ..... Undercamber
Wing Planform ..... Constant Chord
(Swept back 3" at tips upper & lower)
Dihedral (each tip) ..... 2¼ Inches
Stabilizer Span ..... 24½ Inches
Stabilizer Chord (incl. elev.) ..... 10 Inches
Total Stab Area ..... 175 Square Inches
Stab Airfoil Section ..... Symmetrical
Stabilizer Location ..... Top of Fuselage
Vertical Fin Height ..... 11½ Inches
Vertical Fin Width (incl. rud.) ..... 11 Inches
Mfg. Rec. Engine Range ..... .60-.61
Mfg. Rec. Fuel Tank Size ..... 12 Oz.
Landing Gear ..... Conventional
Recommended No. Of Channels 4
Recommended Control Functions ..... Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:
Fuselage ..... Balsa, Spruce, Ply, Plastic & Fiberglass
Wing ..... Balsa, Spruce, Ply, Fiberglass
Tail Surfaces ..... Balsa, Spruce & Ply
Hardware Included In Kit ..... Very Complete
Plan Size ..... 30" x 63" (2 sheets)
Building Instructions on Plan Sheets ..... No (all parts pre-numbered
Instruction Manual ..... Yes (22 pages)
Construction Photos ..... No
Kit Includes ..... Shaped Parts
Mfg. Rec. Flying Weight ..... 144-208 Oz.
Wing loading based on rec. flying wt. ..... 13.09/18.90 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly ..... 168 Ounces
Wing Loading ..... 15.27 oz./sq. ft.
Covering & finishing materials used ..... Super Coverite, Superpoxy
Engine Make & Disp. ..... K & B .61 RC
Muffler Used ..... Included In Kit
Radio Used ..... Mathes Series 7500-S
Tank Size Used ..... 12 Oz.

RCM PRODUCT TEST

SOLUTION AEROMODEL SOLO MK II



IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts		●			
Plans	●					Parts Match to Plans		●			
Written Instructions	●					Overall Parts Fit	●				
Quality of Hardwood	●					Ease of Assembly	●				
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials	●					Flight Performance	●				
Accessories	●					Overall Appeal	●				
Die-Cutting	●										

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The Solo Mk II is a powered sport aircraft with a 51" wing span and 523 square inches of wing area, manufacturered by Solution Aeromodel Company. With regards to the kit, all materials were of high quality and the accessory package was very complete. All wood parts were band sawn or die-cut to shape and neatly assembled in groups. The plans were clear and concise and loaded with additional construction notes. The instruction manual was quite good and contained step-by-step instructions. Also included was a large sheet of construction photos showing the major assembly steps. The fuselage construction was quite simple. The sides were cut from Lite Ply and only one former was used in addition to the firewall. With a shaped top nose block and turtle deck glued in place, the bottom sheeting and landing gear mount is then fitted. The end result is an extremely strong structure that is light and very fast building. The wing on this aircraft is similar to that of any powered RC model. However, it does differ somewhat in that the wing is built as an assembly. That is, the main spars are first joined in the center at the dihedral brace. The ribs for the right side are then slipped over the spars and located at their correct position by placing the assembly over the plans and aligning the spars and ribs. With this accomplished, the ribs are then glued to the bottom trailing edge sheeting and main spars. The leading edge and top trailing edge sheeting are then added along with the shear webs. We caution you to make sure that the main spars, leading edge, and trailing edge are all aligned at their correct positions. A small square or triangle will help in this operation. Once the assembly is completely dry, you can remove it from the plans

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SPECIFICATIONS

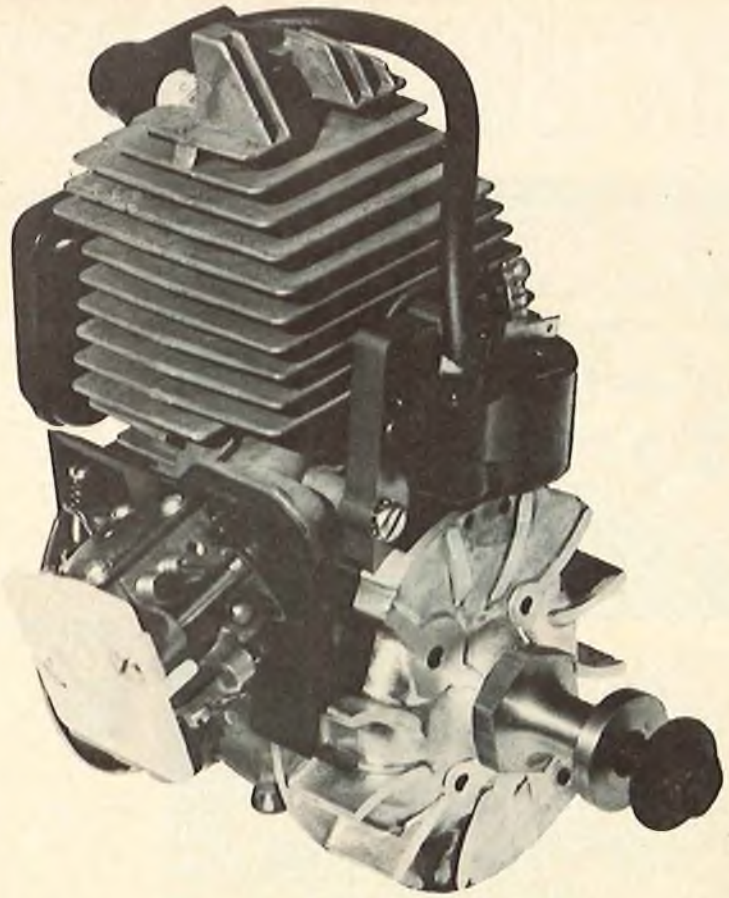
Name ..... SOLO MK II
Aircraft Type ..... Sport
Manufactured By ..... Solution Aeromodel Co.
2258 Wyoming N.E.
Albuquerque, New Mexico 87112
Mfg. Suggested Retail Price $41.95
Available From ..... Both Mfg. & Retail
Mfg. Recommended Usage ..... Basic Powered Trainer & General Sport
Wing Span ..... 51 Inches
Wing Chord ..... 10½" (Avg.)
Total Wing Area ..... 523 Square Inches
Fuselage Length ..... 41 Inches
Radio Compartment Dimensions ..... (L) 10" x (W) 2⅝" x (H) 3¼"
Wing Location ..... High Wing
Airfoil ..... Symmetrical
Wing Planform ..... Swept T.E.
Dihedral ..... 1" (2" total)
Stabilizer Span ..... 20 Inches
Stabilizer Chord (incl. elev.) ..... 5½" (Avg.)
Total Stab Area ..... 110 Square Inches
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Top of Fuselage
Vertical Fin Height ..... 6¼ Inches
Vertical Fin Width (incl. rud.) ..... 8½ Inches
Mfg. Rec. Engine Range ..... .20-.40
Recommended Fuel Tank Size ..... 4-6-8 Ounce
Landing Gear ..... Tricycle
Recommended No. Of Channels 4
Recommended Control Functions ..... Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:
Fuselage ..... Balsa & Plywood
Wing ..... Balsa, Spruce & Ply
Tail Surfaces ..... Balsa
Hardware Included In Kit ..... Very complete
Plan Size ..... 42" x 30" (1 sheet)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... Yes (7 pages)
Construction Photos ..... Yes
Kit Includes ..... Shaped & Die-Cut parts
Mfg. Rec. Flying Weight ..... 3½-4½ Pounds
Wing loading based on rec. flying wt. ..... Not Given

RCM PROTOTYPE

Weight, Ready To Fly ..... 4 Pounds
Wing Loading ..... 17.7 oz./sq. ft.
Covering & finishing materials used ..... Flite Cote, Solarfilm
Engine Make & Disp. ..... O.S. .40
Muffler Used ..... O.S.
Radio Used ..... Orbit 5 channel
Tank Size Used ..... SS 6

BIG
IS BEAUTIFUL

BY R.H. 'DICK' PHILLIPS



R.H. 'Dick' Phillips started modeling in the 1930's with rubber powered free flight. He had his first ride in an open cockpit biplane during that period in his life which accounts for his interest in biplanes of that era. In fact, Dick's modeling centers around big, scale, and biplane --- in that order, or even better, all together. Dick has been involved in RC club affairs since the Prince George Club was formed seven years ago. He served a term as secretary, now edits the club newsletter, as well as serving as the M.A.A.C. Zone Director for British Columbia. Dick is currently 50 years old, advancing 1 per year, and still crazy about flying after all these years. In fact, he operates and manages a hobby shop which has to be similar to the drunk operating a bar!

● Over the years in this hobby/sport of ours, we each choose that area of interest which appeals most to us personally. For me, that area of interest has been large models and especially bi-planes out of the 1930's. Until recently, big has meant a model of about 6' wingspan. The reasons for this size limitation include, of course, the higher cost of larger models. The more balsa wood used, the higher the cost. Power is also a consideration as some of the larger models currently available have been sluggish performers due to a poor power-to-weight ratio. I don't think there is anything worse than a beautiful model which flies like a ten pound brick or one that wallows all over the sky barely under control.

Many of the larger models around today are of necessity, built very lightly, especially around the tail feathers in order to minimize weight and balance problems in relation to the power available from modern glow engines. This light construction, naturally, leads to airframes which are a bit tender and which are susceptible to severe damage in even minor crunches. I've had serious reservations about the really large models I've always wanted to build because of these problems.

These reservations changed for me recently when I saw my first Quadra engine and the problems of larger model aircraft began to take on a somewhat different aspect. The Quadra's power potential makes large models much more feasible than has been the case in the past. Now, if it could be possible to cut the construction cost of such a model down to more rasonable levels by substituting other material than those traditionally used, without sacrificing strength or the convenience of building, well . . . it might make an interesting experiment.

The Engine

The Quadra is pretty straightforward — it's a single cylinder, 2 cycle, 2 cubic inch chain saw engine that produces two horsepower. The engine has been adapted to our use by the manufacturer. The modifications consist of balancing the flywheel/magneto to higher tolerances than necessary for a chain saw, the installation of a thrust bearing, the design and addition of an engine mount convenient to our use, and the addition of a propeller mounting hub. The engine burns a gas/oil mix at 20:1 ratio, which is especially economical as fuel cost is reduced to less than $1.00 per gallon. In addition, the engine will run longer than a .60 on an equal amount of fuel.

The engine swings an 18/6 prop (Oak-Punctilio from England at less than $3.00 each) at 8000 rpm and it idles back to under 1000. The torque is unreal in that the effect on a large aircraft is negligible in twisting it off course, but the power torque really gets things moving! One local modeler flies a 20 pound DH Beaver with a 10' 4" wingspan which gets off at half throttle in about 100 feet. At full throttle, the Beaver climbs at about 20 degrees, admittedly not scale performance for the aircraft. But that's another story!

The Quadra has a chromed steel liner, aluminum piston with a single ring, and has been tested to destruction which occurred at around 200 hours. At that point, the thrust bearing failed and it can be replaced for about 80 cents and the investment of a little time.

As the Quadra is an ignition engine, there was some concern that the magneto might interfere with radio signals; but this has not been the case as it has been flown with several of the more popular radios without any problems. However, I add a sheet metal facing to the firewall just to be on the safe side and to prevent any possible interference from reaching the receiver.

The carburetor incorporates a Tillotson pump; so fuel tank location is up to the builder. The tank could be placed anywhere within reason and the engine will still draw fuel.

The muffler backplate on the chain saw is a standard louvered type and can be replaced with a blank plate for flying. When this is done, it is necessary to provide at least a 1/2" I.D. pipe to lead the exhaust out of the muffler and the

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ABOVE: Not a midget EK radio, just a large J-3. Cowl was completed & added following flight testing and engine set-up. BELOW: Taxiing into position for initial take-off.

ABOVE: 1st Take-off. Tail comes up almost as soon as throttle is advanced. BELOW: 16 lb. bird in the air. It looks, sounds, and even smells, full scale.

The source of all that performance, the Quadra engine. Note the fuel draw height in the mounted engine and the inverted mounting. It runs best this way and is easier to start.

GRAPHITE COMPOSITE WING SPARS

HERE'S HOW TO CONSTRUCT SAILPLANE WING SPARS WITH UNPARALLELED STRENGTH

BY HEINZ G. STRUCK

● The rising popularity of FAI-R/C glider contests will undoubtedly generate a new flood of R/C glider kits advertised as designed for this contest. A typical FAI glider should have certain features which makes it distinctly different from most of the kits presently on the market.

The FAI Speed Event requires a wing section with high penetration capability and a high wing loading. Thin low cambered sections of, say 9% thickness or less have, in general, these characteristics. The Distance Event, however, requires a high lift to drag ratio at medium speeds. A high lift to drag ratio is obtained, generally, by a fairly high aspect ratio, say 17 to 20, and a section of medium to high camber. The Duration Event prefers gliders with low wing loading trimmed for minimum sink. A highly cambered section and a high aspect ratio is again preferred. We see that the three different events impose contradicting requirements on the wing. Consequently, the FAI glider must be a compromise. To reconcile the speed and duration requirements, it is important to build the glider, and especially the wing, as light as possible and, on the other hand, as strong as possible. The capability of wooden wing spars to take the bending loads of thin high aspect ratio wings during the speed run is definitely limited, so, to a lesser extent, is the capability of aluminum spars.

For some time a small group of the Huntsville (Alabama) model glider pilots discussed other possibilities of building gliders which could endure the rigors of a flying season and, in particular, the FAI contests. We all kept abreast with the modern techniques in full scale glider construction, consequently we came to the conclusion that the modern composites with graphite, Boron and Kevlar are excellent for building strong and light wing spars. Let us, for a moment, compare again the ultimate strength capabilities of the common building materials. Sitka spruce with a moisture content of 12 percent has an ultimate tensile strength of 10,000 to 15,000 psi. Aluminum tubes (6062-T6) have an ultimate tensile strength of 42,000 psi. Several glider kits use this material for wing spars. Tempered extruded aluminum tubes (7075-T6) obtain values of 78,000 psi. Graphite fibers, however, have an ultimate tensile strength of about 410,000 psi! The fiber itself is of course useless, unless it is stabilized by a polyester or epoxy resin matrix, which will reduce the ultimate tensile strength in the ratio of fiber to matrix volume.

The graphite fiber type AS 2 that I experimented with was purchased from Hercules Incorporated, Bacchus Works, Magna, Utah, for $38.00 per pound. The fiber comes in a continuous tow on a spool with about 10,000 filaments per tow. The diameter of one filament is about 8 microns. As a matrix, I preferred epoxy and especially the slow curing Hobbypoxy Formula II kind. Polyester resin, however, completely does the job, too, and is also substantially cheaper. The best strength results were obtained with a graphite composite of 60% fiber and 40% matrix material by volume.

I intended to build a typical box spar with two graphite fiber cap strips and plywood shear webs. Bending moment and stress calculations indicated that a cap strip of 1/16" x 1/4" was adequate for the 9% thick wing with an 8" root chord. I constructed a mold from aluminum extrusions which were purchased from a hardware store. It is shown in Figure 1. Two angles are

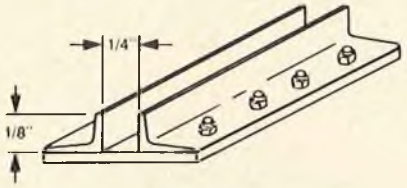

FIGURE 1

bolted to a flat strip. The space between the angular shapes is 1/4" wide. It is the width of the future wing spar. The vertical legs of the angles are cut to 1/8" length. The entire length of the mold is about half the wing span. Commercially available extrusion length is usually 6 feet. This is long enough for the mold even for a glider of 14' span, since the last foot of the spar at the wing tip can be constructed from wood.

After completion of the mold, and having applied a good measure of mold release (silicone, etc.) to those parts which will be used for the lay-up, we can start with the procedure. First of all we have to figure out how many fibers we need in order to obtain 60% graphite volume. In my case I needed 120,000 fibers or, in other words, I had to string the fiber bundle 12 times from one end to the other end of the mold. A nail at each end of the mold as shown in Figure 2 provided the turnaround

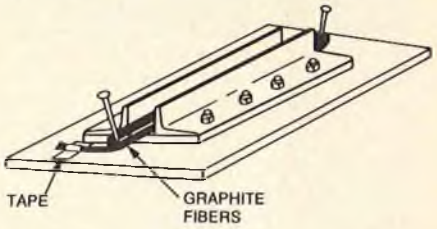

FIGURE 2

points and the proper tension to the fibers. It is highly advisable to tape the ends of the fiber bundle to the board. In the next step we mix the epoxy. I needed about half a cubic inch of epoxy to fill the mold to the desired 1/16" thickness. I was generous and prepared 10 to 20 percent more, since I expected a certain amount of waste. It is very important to wet the fibers (and all hundred twenty thousand of them) thoroughly with epoxy. Twenty to thirty minutes were spent to accomplish the job. A very stiff brush is probably the best tool or, some kind of wooden squeegee to squeeze the epoxy through the layers of the fiber. Several procedures are possible at this point in time. One can, for instance, wet each tow separately. This probably will lead to better end results.

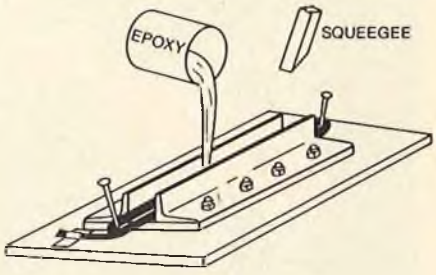

FIGURE 3

After all the fibers were wetted, I placed a hardwood strip with the dimensions of 1/16" x 1/4" on top of the graphite composite as shown in Figure 4. The spruce provides a larger surface later on to glue the shear webs to the cap strips; it also presses down the graphite-epoxy to the proper size. Plastic foil covered the top of the mold and clamps were used to press the spruce strip down and flush with the cut-down

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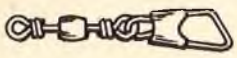
HERE'S HOW

BY JERRY SMITH

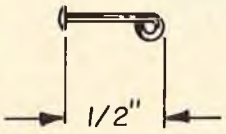
EVERY TRANSMITTER SHALL DISPLAY AN APPROPRIATE FREQUENCY FLAG. THE FOREGOING STATEMENT IS, WITHOUT DOUBT, WRITTEN INTO EVERY R/C CLUB BY-LAWS THROUGHOUT THESE UNITED STATES YET, MANY OF US ARE GUILTY OF NOT CONFORMING TO THIS SIMPLE REQUIRE-MENT. SOME TIME AGO, AT THE SUGGESTION OF THE R/C FLYERS, THE AMA ADOPTED A COLOR FLAG SYSTEM BASED ON THE RETMA COLOR CODE SYSTEM USED ON ELECTRONIC COMPONENTS. (RESISTORS, CAPACITORS, ETC.) FOR EXAMPLE: BROWN IS ONE, RED IS TWO, ORANGE IS THREE, ETC.. APPLYING THIS TO THE 27Mhz CHANNELS, THE FIRST R/C CHANNEL (26.995 Mhz) WAS DES-SIGNATED BROWN, AND SO ON. TO DISTINGUISH THE SIX METER FLYERS FROM 27 Mhz A SECOND FLAG (COLOR BLACK) WAS ADDED. FOR EXAMPLE: THE FIRST SPOT ON SIX METERS (53.1 Mhz) HAS TWO FLAGS, BLACK AND BROWN. AND FINALLY WHEN THE 72 TO 75 Mhz FREQUENCIES WERE AD-DED ANOTHER SECOND FLAG (COLOR WHITE) WAS ADDED. THESE FLAGS ARE SUPPOSED TO BE RIBBONS OF APPROX. 1" WIDTH AND 16" IN LENGTH. MOST R/C MANUFACTURERS SUPPLY THE APPROPRIATE FLAG(S) WITH THEIR RADIO GEAR.

MIKE SAPONARA OF FLUSHING, NEW YORK SHARES WITH US A CHEAP AND SIMPLE METHOD OF CONSTRUCTING A FREQUENCY FLAG. COULD BE THAT YOU HAVE MOST OF THE MATERIAL ON HAND HOWEVER, A WORD OF CAUTION WHEN BUILDING YOURS. MAKE SURE THE FLAG COLORS ARE VIVID. DO NOT USE FADED COLORS WHICH COULD EASILY BE MISTAKEN. THE TOTAL COST OF A FREQ. FLAG CONSTRUCTED AS SHOWN SHOULD COST NO MORE THAN 30¢. CHEAP HUH? MIKES SUGGESTION INCORPORATES ALL THE BEST FEATURES OF COMMERCIAL FLAGS AND IS PROFESSIONAL LOOKING AS WELL. BUILD SEVERAL AND KEEP'EM IN YOUR FLIGHT BOX!

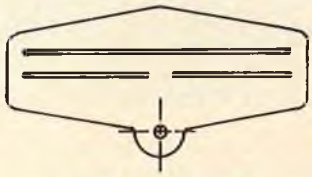
FISHING SWIVEL (NO. 10) .06¢ EACH



LARGE STRAIGHT PIN

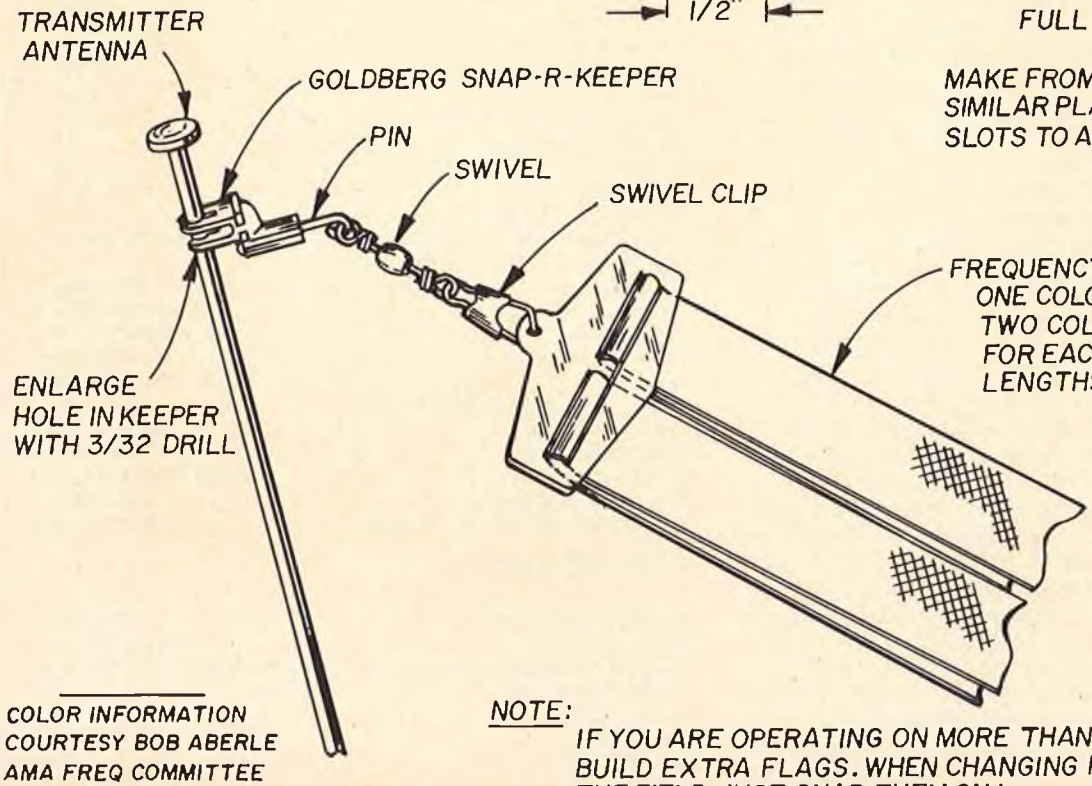


RIBBON CLIP



FULL SIZE

MAKE FROM COFFEE CAN TOP OR SIMILAR PLASTIC MATERIAL. CUT SLOTS TO ACCOMMODATE RIBBON.

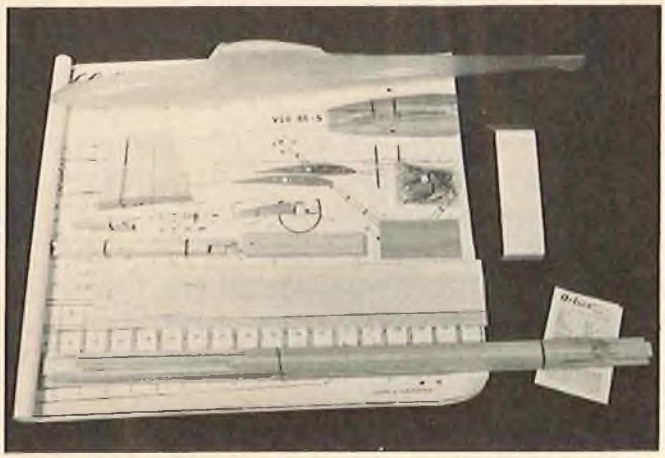


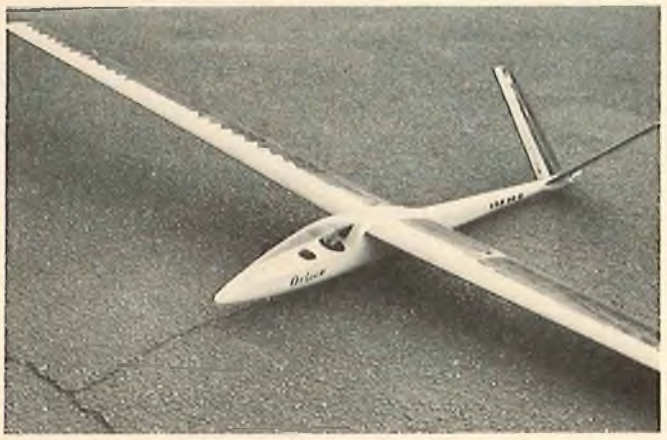
COLOR INFORMATION COURTESY BOB ABERLE AMA FREQ COMMITTEE

NOTE: IF YOU ARE OPERATING ON MORE THAN ONE FREQUENCY BUILD EXTRA FLAGS. WHEN CHANGING FREQUENCIES AT THE FIELD JUST SNAP THEM ON!

RCM PRODUCT TEST

WANITSCHEK MODELS ORLICE





IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging		●				Pre-Shaped Parts	●				
Plans			●			Parts Match to Plans	●				
Written Instructions				●		Overall Parts Fit	●				
Quality of Hardwood	●					Ease of Assembly		●			
Quality of Fiberglass	●					Fidelity to Scale		●			
Other Materials	●					Flight Performance	●				
Accessories	●					Overall Appeal	●				
Die-Cutting	●										

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The Orlice is a high performance slope and thermal sailplane in the Open Class manufactured by Wanitschek Models. This 134" span sailplane has a joined fiberglass fuselage with wing and tail surfaces of plywood, spruce and balsa. With regards to the kit itself, major pre-cut pieces are numbered with the exception of the ribs. All cap strip material is supplied in bulk which must be stripped by the builder. The leading edge must also be tapered by the builder. Spars are spruce with balsa shear webs. The most noticeable feature of this sailplane is that a fuselage of this size would be able to take any size radio, mixer, or sliding servo arrangement that you may decide upon. The hardware and accessory package consists of a formed and tinted canopy, decal sheet, wing and elevon wires and tubes, plastic canopy base, towhook, canopy hold-down hook, pre-cut fuselage formers, control horns, and cut and sanded wing ribs. A full decal sheet is included in addition to the two plan sheets and building instructions which are included on the latter. We found no split wood in the kit and all wood was of good quality. The seam on the fiberglass fuselage was very clean and a minimum of sanding and filling was needed. While most of the pre-cut pieces were numbered, the ribs were not and should be numbered before construction is started, since some of them are very close to being the same size. We would also recommend taking the plans to a blueprint house or drafting service and duplicating the plans in reverse as the plans only show one wing panel and the original plans are on heavy stock which does not allow the usual method of building from the reverse side for the second panel. Before starting your Orlice, determine whether you intend to use landing spoilers or ailerons. On a sailplane of this size and

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SPECIFICATIONS

Name ..... ORLICE
Aircraft Type ..... Sailplane
Manufactured By ..... Wanitschek Models
Imported by ..... Windspiel Models
Route 3, Box 457
Coeur D'Alene, Idaho 83814
Mfg. Suggested Retail Price $95.00
Available From ..... Both Mfg. & Retail
Mfg. Recommended Usage ..... Competition Sailplane — Open Class
Wing Span ..... 134 Inches
Wing Chord ..... 7.2" (Avg.)
Total Wing Area ..... 992 Square Inches
Fuselage Length ..... 52.5 Inches
Radio Compartment Dimensions ..... (L) 11" x (W) 3" x (H) 3"
Wing Location ..... Shoulder Wing
Airfoil ..... Undercamber No. E392
Wing Planform ..... Swept L.E. & T.E.
Dihedral ..... 6 Degrees
Stabilizer Span ..... 21½ Inches
Stabilizer Chord (incl. elev.) ..... 5" (Avg.)
Total Stab Area ..... 140 Square Inches
Stab Airfoil Section ..... Symmetrical
Stabilizer Location ..... V-Tail
Vertical Fin Height ..... 10 Inches
Vertical Fin Width (incl. rud.) ..... 5" (Avg.)
Mfg. Rec. Engine Range ..... NA
Recommended Fuel Tank Size ..... NA
Landing Gear ..... Belly Skid
Rec. Number of Channels 3
Recommended Control Functions ... Aileron, Elevon, Landing Spoilers
Basic Materials Used In Construction:
Fuselage ..... Fiberglass
Wing ..... Spruce, Balsa & Ply
Tail Surfaces ..... Balsa, Spruce & Ply
Hardware Included In Kit ..... Complete
Plan Size ..... 32" x 50" & 18" x 34" (2 sheets)
Building Instructions on Plan Sheets ..... No
Instruction Manual ..... Yes (8 pages)
Construction Photos ..... No
Kit Includes ..... Shaped & Die-Cut Parts
Mfg. Rec. Flying Weight ..... 56 Ounces
Wing loading based on rec. flying wt. ..... 8.13 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly ..... 83 Ounces
Wing Loading ..... 12.06 oz./sq. ft.
Covering & finishing materials used ..... MonoKote & Superpoxy
Engine Make & Disp. ..... NA
Muffler Used ..... NA
Radio Used ..... EK-Logictrol
Tank Size Used ..... NA

RCM PRODUCT TEST

PROCTOR ENTERPRISES MINI-ANTIC

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts	●				
Plans	●					Parts Match to Plans	●				
Written Instructions	●					Overall Parts Fit	●				
Quality of Hardwood	●					Ease of Assembly	●				
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials		●				Flight Performance	●				
Accessories		●				Overall Appeal	●				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The Mini-Antic kit produced by Proctor Enterprises is exceptional in all respects, however, there are a few points that you might want to consider during construction that will make the finishing easier. In the instructions, it is suggested that you stain the stringer material before you start construction. We would suggest that you also fuel-proof them with an acetate base product at the same time. In addition, the bamboo used for the cross bracing could be painted black before it is installed, since this leaves only a small amount of touch-up instead of a more difficult chore. You will also note that, when rigging the flying wires, you are told to "safety" the turnbuckles. It must be assumed that you know how to do that - - - if you don't, get in contact with an E.A.A. member who has a copy of the manual on full-size aircraft rigging. Be sure that you do "safety" your turnbuckles, whatever method you may use. Lou Proctor has another beautiful kit in the Mini-Antic. This reviewer had been reluctant to build a kit from this company because we thought it would take too long and would be too much work, although their reputation for quality is unsurpassed. We were completely wrong in this respect - - - this kit went together better than most we have built and it was completed in no more time than it takes to complete a good Formula I aircraft. The best part of the kit is the feeling of having built a fine miniature aircraft. The plane is intended to be flown as a full house model. There are instructions included with the kit for flying it with only three channels. We have tried this and have had good results. The Mini-Antic is a docile aircraft that is truly a joy to fly and certainly draws a lot of attention when it is brought out to the field. Almost everyone watches when this aircraft takes to the air. We would also feel safe in helping a new modeler learn to fly with the Mini-Antic, since it has no bad habits and it is pure satisfaction to fly. The K & B .19 used in our prototype provides realistic power. If you wanted a more agile performer, the designer suggests up to a .29 engine

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SPECIFICATIONS

Name ..... MINI-ANTIC
Aircraft Type ..... Sport Trainer
Manufactured By ..... Proctor Enterprises
P.O. Box 9641
San Diego, California 92109
Mfg. Suggested Retail Price $55.50
Available From ..... Both Mfg. and Retail Outlets
Mfg. Recommended Usage ..... Int. Powered Trainer & General Sport
Wing Span ..... 56 Inches
Wing Chord ..... 9¾ Inches
Total Wing Area ..... 546 Square Inches
Fuselage Length ..... 44½ Inches
Radio Compartment Dimensions ..... (L) 8½" x (W) 3½" x (H) 3½"
Wing Location ..... Shoulder Wing
Airfoil ..... Undercamber
Wing Planform ..... Constant Chord
Dihedral ..... 2 Inches
Stabilizer Span ..... 18 Inches
Stabilizer Chord (incl. elev.) ..... 7" (Avg.)
Total Stab Area ..... 126 Square Inches
Stab Airfoil Section ..... Flat Bottom
Stabilizer Location ..... Top of Fuselage
Vertical Fin Height (incl. rud.) ..... 7½"
Vertical Fin Width (incl. rud.) ..... 8 Inches
Mfg. Rec. Engine Range ..... .19-.29
Recommended Fuel Tank Size ..... 6 Oz.
Landing Gear ..... Conventional
Recommended No. Of Channels 4
Recommended Control Functions ..... Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:
Fuselage ..... Spruce, Ply & Bamboo
Wing ..... Ply, Spruce, Balsa, Bamboo, Reed
Tail Surfaces ..... Balsa, Ply & Bamboo
Hardware Included In Kit ..... Very Complete
Plan Size ..... 70" x 30" (1 sheet)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... Yes (19 pages)
Construction Photos ..... Yes
Kit Includes ..... Shaped Parts
Mfg. Rec. Flying Weight ..... 72 Ounces
Wing loading based on rec. flying wt. ..... 19 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly ..... 64 Ounces
Wing Loading ..... 16.8 oz./sq. ft.
Covering & finishing materials used K & B Superpoxy, Randolph dope
Engine Make & Disp. ..... K & B .19 RC
Muffler Used ..... No
Radio Used ..... Cox Sanwa 4 channel
Tank Size Used ..... 6 Ounce

HALF & HALF

A FAST RESPONSIVE HALF-A SHIP DESIGNED FOR PATTERN AND PYLON

BY JACK SAMMARCO AND FRANK DE CICCO

● At one of those "meetings after the club meeting" in a diner in Union, N.J., Pete Morris (current UMAC'er President) threw down the gauntlet for some "one design" Half-A pylon racing. Half-A pylon ships started to take shape on UMAC'er building boards and so started an epidemic of Half-A fever within the ranks of the UMAC'ers. Frank and I decided to "make a few sketches" of a ship to compete with in an Unlimited Half-A race which was starting to shape up.

Well, the few sketches mushroomed completely out of control. Over the ensuing days, we ended up in the cellar consuming great quantities of coffee (by the gallons according to my wife, Carol), paper, pencil lead, time, etc. The adrenalin was really flowing. With X-Acto blades in hand, and balsa shavings and chips all over the floor, the nights flew by, and it was on to the sandpaper and covering. Along about this time the "Half & Half" name cropped up and we decided to christen the ship with it.

By now some of the UMAC'ers were stopping in "to see how things were going." I think every club is favored with a couple of these fellows, UMAC being no exception. We have our technical experts, too. UMAC'ers "technical branch" are the fellows who, because of their trade or inclination, can come up with parts that are not commercially available or maybe just currently "out of stock" in the local hobby shops. Roman Bittel (D & B Whirlybird — MAN, June '74) stopped in to check on the progress of "Half & Half" while Frank and I were discussing some of the small parts needed for Half-A stuff. When you have been building .60 size ships, you just don't have stuff that small laying around the shop! Without a word, out came Ro's 6" steel scale (I think he was born with it!), and 2 days later some stainless steel landing gear straps and screws; one piece blind motor mount plates, etc., showed up. Later on Henry Orzech (H & R Products) became involved in a discussion about the strength of some hardwood stock sizes for landing gear mounts and also — how do you get those gizmos for 1/16" wire strip aileron rigs? H.O. said, "Wait a while and I'll see what I can do." (He doesn't carry a steel ruler.) A couple of days later, the prototypes for H & R Products strip aileron connectors showed up with H & R Half-A spinner and miscellaneous other goodies. Steve West decided to brew up some special "Zipp" Half-A fuel for one .051 to guzzle. This kind of cooperation and exchange of information is something a "by himself" modeler misses.

Finally, after the dust all settled and one of our 10:30 rounds of coffee was finished off, "Half & Half" was completed and ready for testing. Well, any of you who are familiar with March in

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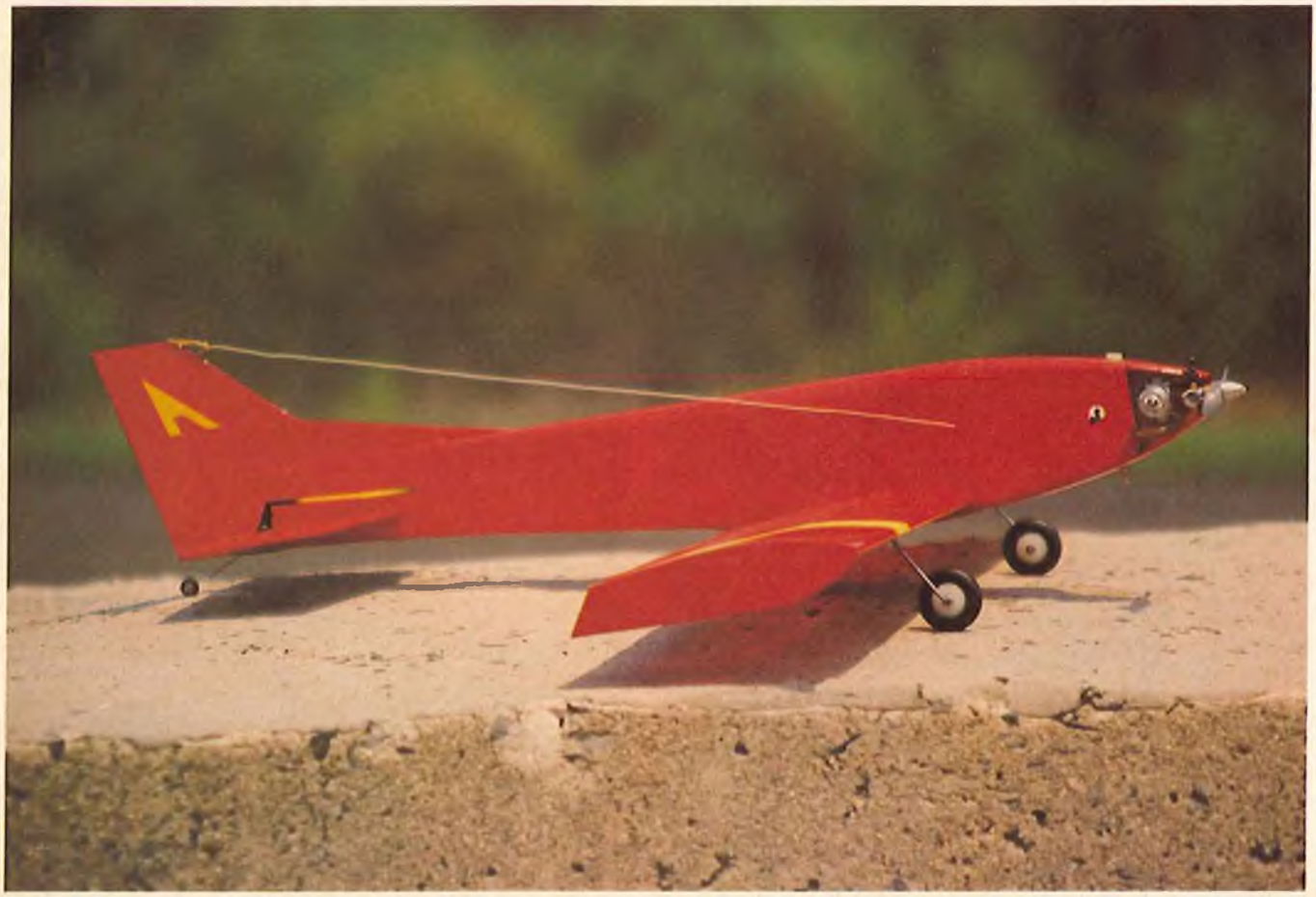
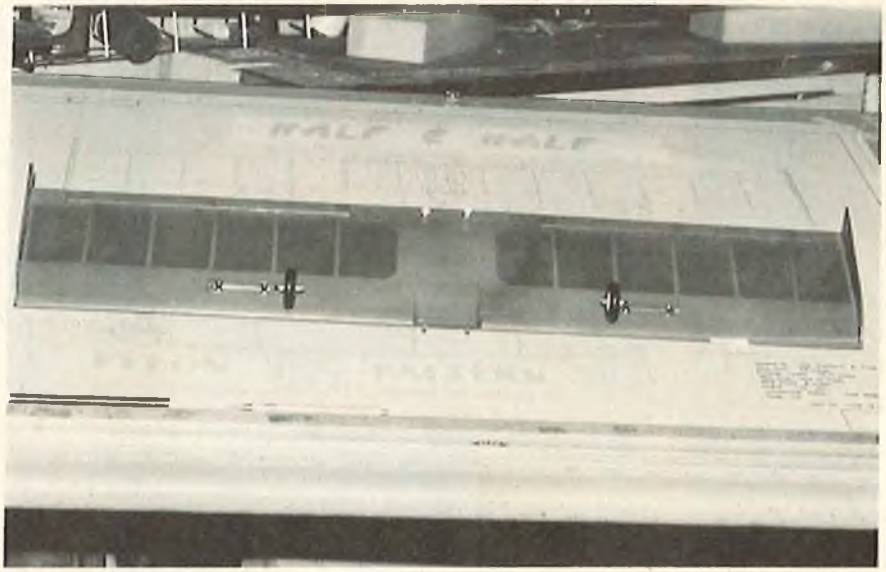
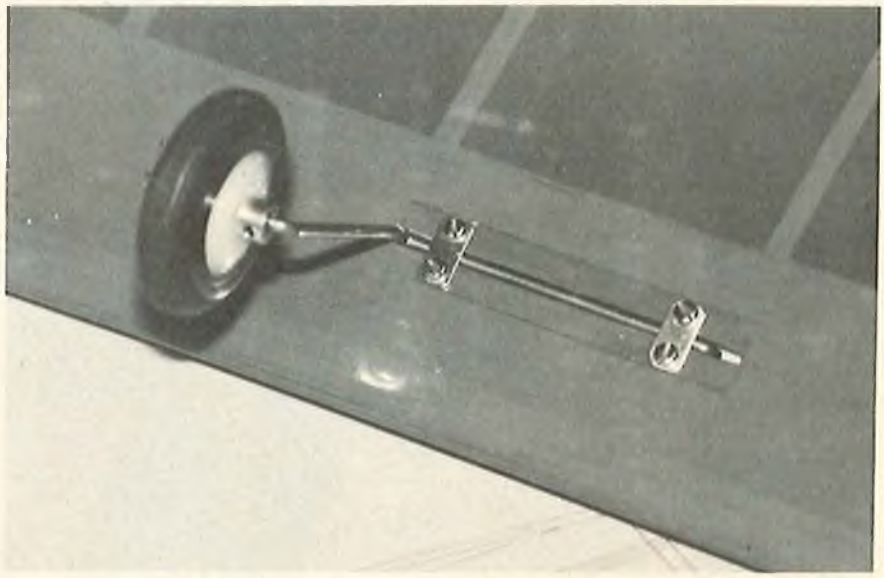
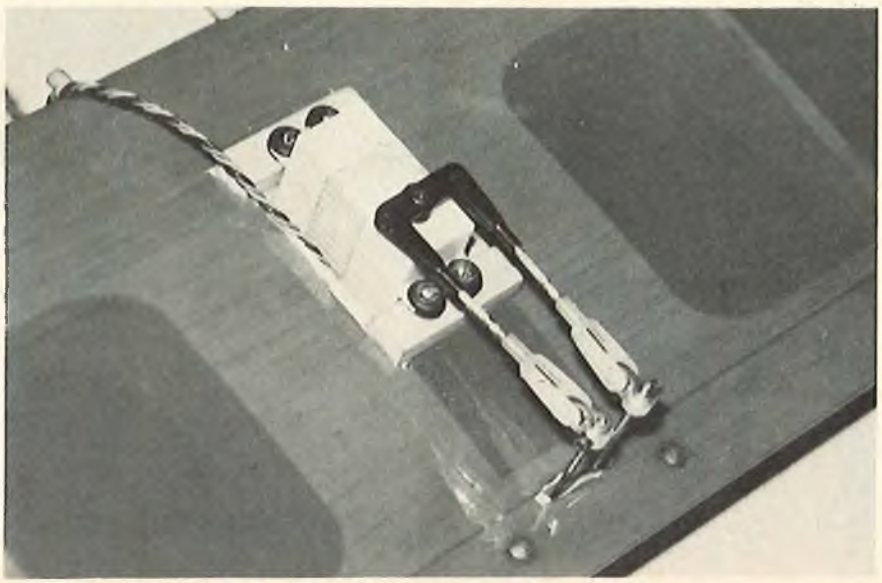




ABOVE: The completed Half & Half wing with landing gear installed. BELOW: A close-up of the gear mount.



View of aileron linkage below. Heathkit servo installed.



A Half-A ship does not have to be erratic, nor does it have to be an underpowered ship that barely staggers through the air. The Half & Half is designed to groove like its big brothers in the pattern circles, yet round the pylons with the best of the Half-A racers.

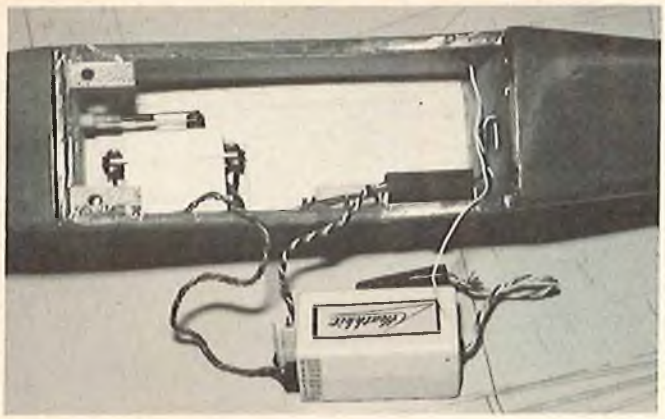
HALF & HALF

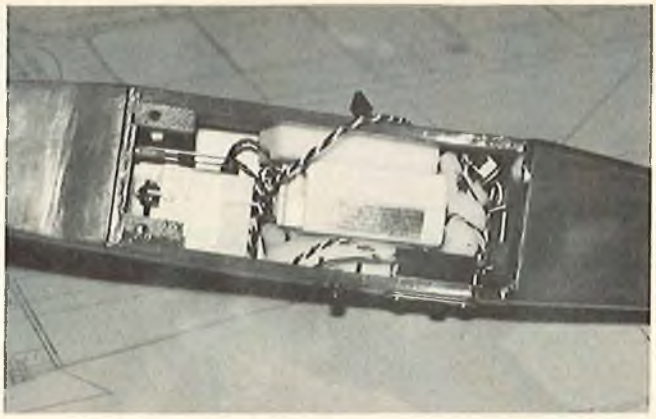
Designed By: Jack Sammarco & Frank DeCicco

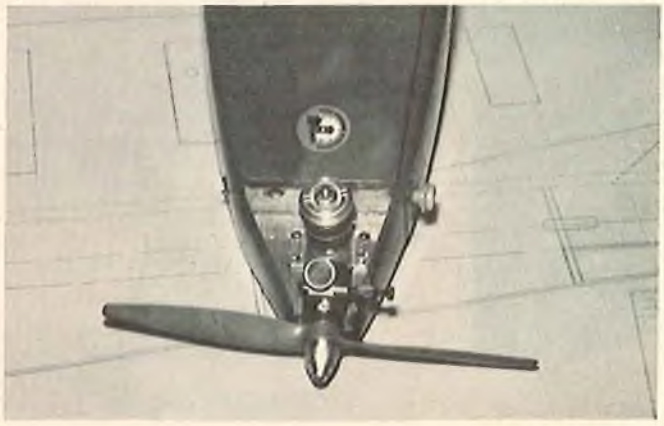
TYPE AIRCRAFT
1/2A Pylon & Pattern
WINGSPAN
34 Inches
WING CHORD
6 Inches
TOTAL WING AREA
204 Square Inches
WING LOCATION
Low Wing
AIRFOIL
Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
None
O.A. FUSELAGE LENGTH
28¾ Inches
RADIO COMPARTMENT AREA
(L) 6" X (W) 2⅛" X (H) 2½"
STABILIZER SPAN
11⅛ Inches
STABILIZER CHORD (Incl. elev.)
4½ Inches (Avg.)
STABILIZER AREA
50 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
3¾ Inches
VERTICAL FIN WIDTH (Incl. rudder)
4" (Avg.)
REC. ENGINE SIZE
.049-.051 Cu. In.
FUEL TANK SIZE
1 Ounce
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
2
CONTROL FUNCTIONS
Aileron & Elevator

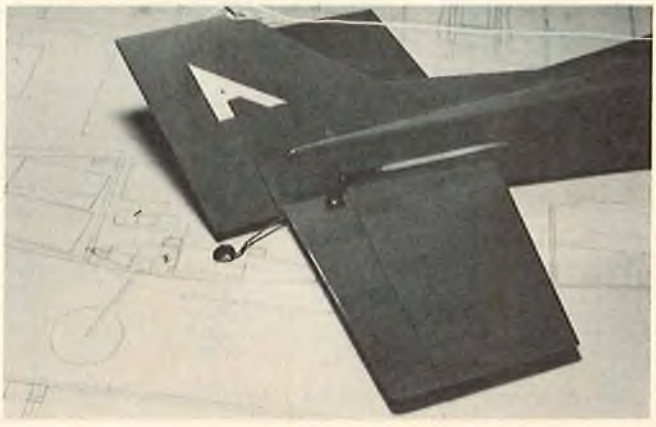
BASIC MATERIALS USED IN CONSTRUCTION

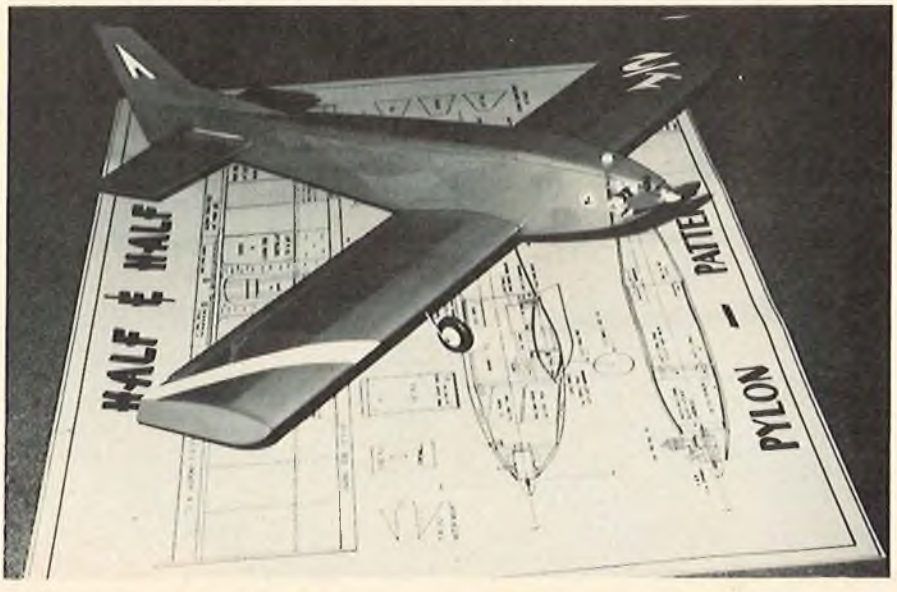
Fuselage	Balsa and Ply
Wing	Balsa, Spruce & Ply
Empennage	Balsa
Weight Ready-To-Fly	20-25 Oz.
Wing Loading	14.1-17.7 Oz/Sq. Ft.





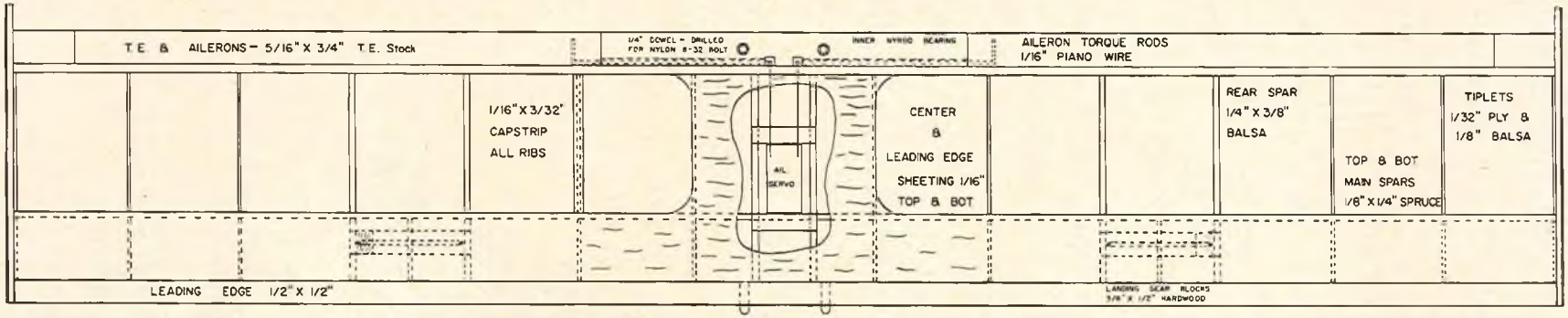


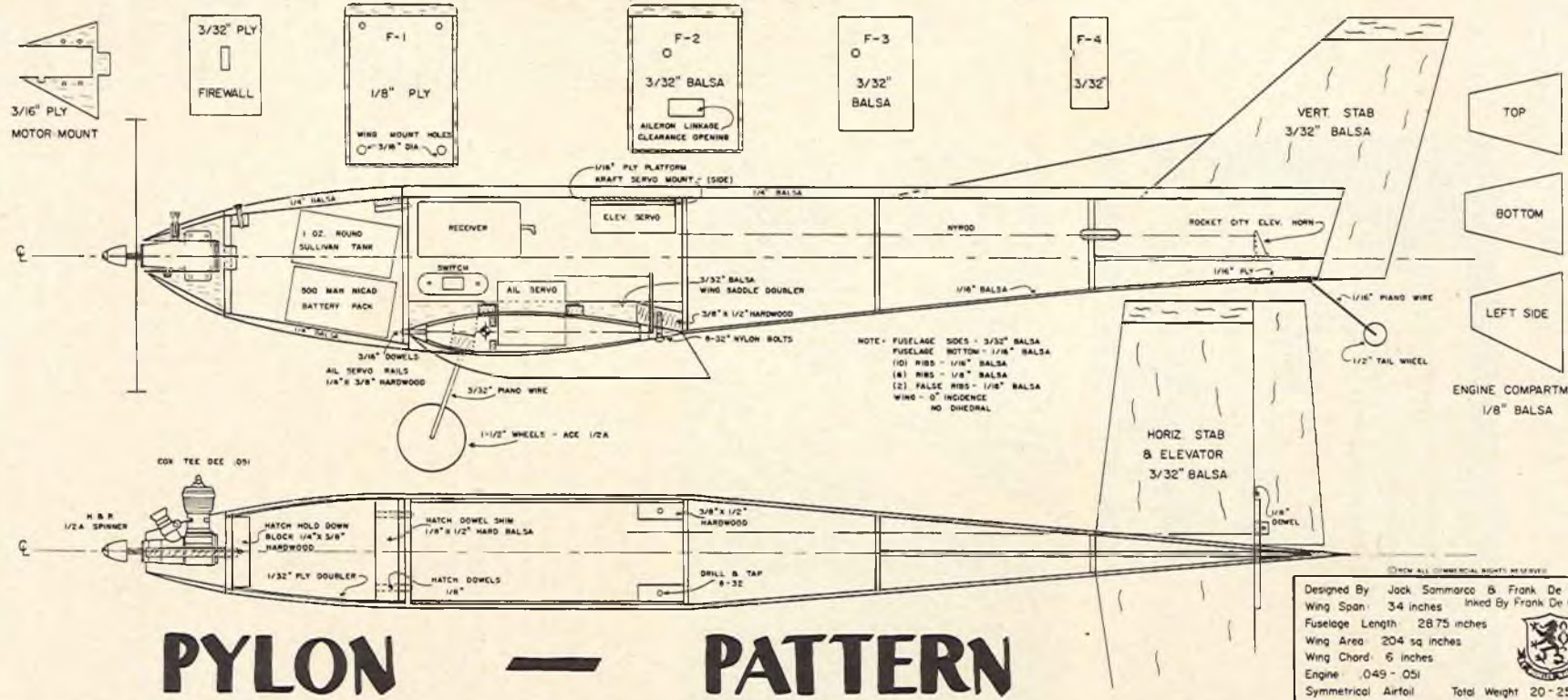




1ST ROW, LEFT: View of the radio compartment with the Heathkit receiver removed. RIGHT: The receiver in place, surrounded by foam. Note wing hold-down screw blocks. 2ND ROW, LEFT: Battery pack wrapped in a Baggie to prevent fuel seepage damage. RIGHT: Fuel tank in place with foam packed around it. 3RD ROW, LEFT: The Cox Tee Dee engine with plenty of access room. RIGHT: The elevator linkage, vertical fin and tail wheel. At right: The completed Half & Half, ready for sport pattern flying or pylon racing.

HALF & HALF





PYLON — PATTERN

Designed By: Jack Sammarco & Frank De Cicco
Wing Span: 34 inches
Inked By Frank De Cicco
Fuselage Length: 28.75 inches
Wing Area: 204 sq inches
Wing Chord: 6 inches
Engine: .049 - .051
Symmetrical Airfoil
Total Weight: 20 - 25 ozs.
Scale - Full

PLAN NO. 687

RCM PRODUCT TEST

PIERCE AERO CO. PARAGON

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging		●				Pre-Shaped Parts		●			
Plans	●					Parts Match to Plans	●				
Written Instructions	●					Overall Parts Fit		●			
Quality of Hardwood	●					Ease of Assembly	●				
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials		●				Flight Performance	●				
Accessories		●				Overall Appeal	●				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The Paragon is a 118" span Open Class sailplane manufactured by the Pierce Aero Company. This machine is of conventional balsa and hardwood construction with a hardware package that contains a towhook, pushrods, clevises, control horns, wing seating tape, a unique hatch and canopy hold-down, and all the necessary hardware items. It is a complete kit that builds quickly. Follow the instructions and you'll find that the building goes along without a hitch. In fact, during the construction of our prototype, we also saw a 14 year old who constructed the Paragon with little difficulty. With regards to modifications, we recommend glassing the sheeted areas where the tip panels join the center section to keep from breaking the sheeting when joining the wing tips. And, while not an essential modification, we carved the canopy from balsa blocks to house the Soaring Products Thermal Sniffler. The flying of the Paragon can only be described as fantastic. Although wash-out is suggested as optional, we put it in. We added spoilers and, as previously mentioned, one of Walt Good's Thermal Snifflers. The test flights of the Paragon did not even require any trim at the transmitter. After the initial test flights, another pilot recently flew the Paragon in a speed and endurance contest sponsored by the Pasadena Soaring Society and, for the speed event, loaded the Paragon with three pounds of ballast! Our prototype had its wings covered with white MonoKote on the top and orange on the bottom for visibility. The fuselage was finished with 3/4 ounce glass cloth and resin and painted with K & B blue Superpoxy. The Paragon was trimmed with orange and blue striping. Our prototype weighed 64 ounces complete with thermal sniffler and spoilers for a wing loading of 8.5 ounces per square foot. An excellent open class sailplane and a good bargain at $59.95. □

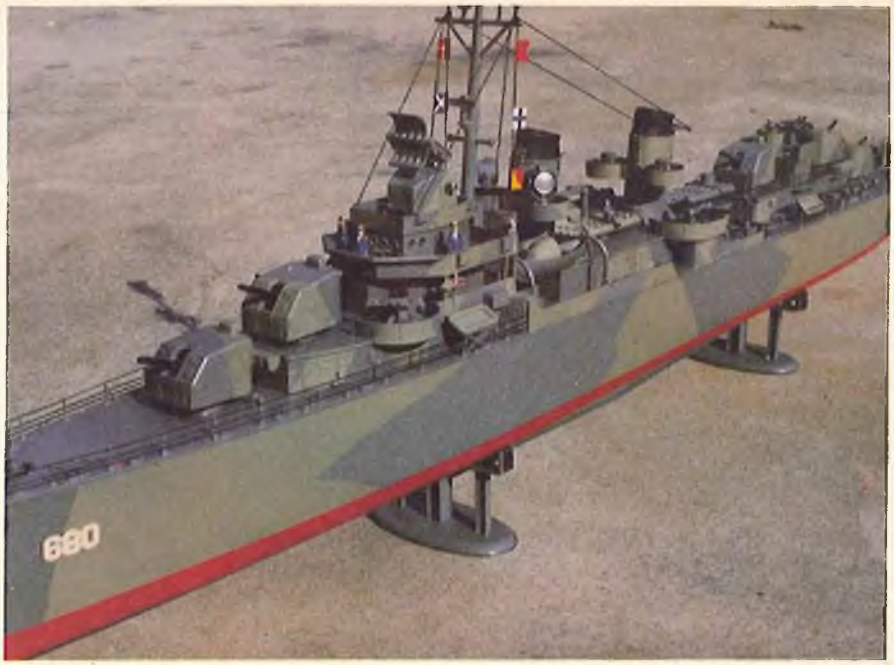
SPECIFICATIONS

Name ..... PARAGON
Aircraft Type ..... Sailplane
Manufactured By ..... Pierce Aero Co.
9626 Jellico
Northridge, California 91324
Mfg. Suggested Retail Price $59.95
Available From ..... Both Mfg. & Outlets
Mfg. Recommended Usage ..... Sport & Competition — Open Class
Wing Span ..... 118 Inches
Wing Chord ..... 10" w/tapered tips
Total Wing Area ..... 1080 Square Inches
Fuselage Length ..... 50½ Inches
Radio Compartment Dimensions ..... (L) 9" x (W) 2½" x (H) 2¼"
Wing Location ..... High Wing
Airfoil ..... Flat Bottom
Wing Planform ..... Constant Chord Center w/tapered tips
Dihedral ..... 8¼" — Center Panel 2⅜"
Polyhedral ..... NA
Stabilizer Span ..... 28 Inches
Stabilizer Chord (incl. elev.) ..... 5¼" (Avg.)
Total Stab Area ..... 144 Square Inches
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Top of Fuselage
Vertical Fin Height ..... 11⅝ Inches
Vertical Fin Width (incl. rud.) ..... 6½ Inches
Mfg. Rec. Engine Range ..... NA
Recommended Fuel Tank Size ..... NA
Landing Gear ..... NA
Recommended No. Of Channels 2
Recommended Control Functions ..... Rudder and Elevator
Basic Materials Used In Construction:
Fuselage ..... Balsa & Ply
Wing ..... Balsa, Ply & Spruce
Tail Surfaces ..... Balsa & Spruce
Hardware Included In Kit ..... Very complete
Plan Size ..... 54" x 35" (2 sheets)
Building Instructions on Plan Sheets ..... No
Instruction Manual ..... Yes (4 pages)
Construction Photos ..... No
Kit Includes ..... Shaped Parts
Mfg. Rec. Flying Weight ..... 48 Ounces
Wing loading based on rec. flying wt. ..... 6.4 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly ..... 64 Oz. w/Thermal Sniffler
Wing Loading ..... 8.5 oz./sq. ft.
Covering & finishing materials .... Superpoxy, MonoKote, Bridi Stripe
Engine Make & Disp. ..... NA
Muffler Used ..... NA
Radio Used ..... Proline
Tank Size Used ..... NA

BY GEOFF WATKINSON



U.S.S. MELVIN

A LOW COST PROJECT WITH EXPENSIVE LOOKING RESULTS

● Sure, I'm a perfectly normal RC model airplane builder and flyer which means that, like the rest of us, I am usually maimed, messy, muttering, modifying and mending. However the "Naval Engagement" all started when I happened to see an incredibly detailed 3-foot long destroyer displayed in a glass case at a scale-model shop. Being a destroyer, the fuselage (er hull--sorry about that!) was very narrow and even shallower (only 1½" to 1¾" usable). What a challenge it would be to build one and try to RC it! The upshot was my exit from the store with a box of goodies under my arm and fear and trepidation in my heart. And I didn't even know, then, that the ugly specter of divorce (grounds - - - *physical* cruelty) would loom on the horizon as a result!

This Lindberg kit is an outstanding value at $23.95. Everything is there, even a small electric motor. All you add is cement, paint, fishing line and patience to produce a terrific display model. There is little modeling work on the hull. In fact, most everything is done on the deck which starts out as a completely flat surface. You have to de-flash and glue in place what seem to be about 5000 parts (every winch, hatch, cleat, bollard and all the superstructures are built up piece by piece and level by level). Twelve twin-barreled cannons are assembled from individual components as are the five heavy-gun turrets.

Finally, came the day I had been kind of avoiding. The major work on the deck was done and there was now no alternative but to start the RC installation. However the first pass (yes, "first pass") turned out to be not all that difficult. I installed a gear-box for the twin props (screws, pardon me), the motor from the kit, the battery-case for the six "D" carbon batteries, modified slot-car speed control, and the radio and servos. I had checked this set-up running close to my old Blue Max radio (usually reserved for gliders) without any radio interference but, to my dismay, I found that when I had made the complete installation inside the hull, the servos went wild when the motor was running. Five days later all I had proved was that interference evaporated when the radio equipment was moved to a range of 18" but I was unable to squelch it any closer than that. (There must be a moral there somewhere for future *close* pre-check of RC/electric projects.) I even made a steel case for the battery pack and motor and tried most every capacitor owned by neighbors and Radio Shack. Bob Boucher of Astro Flight made many helpful suggestions but nothing worked. This called for a delicate disassembly, unscrewing and ungluing all of the equipment in the hull (I almost came unglued myself!).

A fresh start was made with an Astro 05 and 6 volt nicad pack. A new problem was what gear ratios to use with the much higher power of the A5? Space limited the scale props to 1" diameter so two would not be a big load for this kind of motor. I had gears which would give ratios of 5:1, 2½:1 and 1¼:1. The 1¼:1 was used for a very simple reason — my wife! (No, she's not simple, the reason was.) I fit each motor gear, in turn, to the A5 with a flexible coupling. I then tried to hold the motor in one hand up against the shaft-gears in the hull which I was holding in the other hand, then lowered the whole mess into the bathtub. Having now run out of hands I had to get my "dearly-beloved" to throw a temporary switch wired in the circuit. Well, the A5 starts up with such terrific torque and instant full power that it almost jumps right out of your hand and after I had sent three drive-gears and couplings ricocheting all around the bathroom walls (not to mention blowing half the water out of the tub) wifey left for a much safer occupation in the kitchen - - - end of experiment and end of sociable conversation for a week! So by a process of elimination (I almost eliminated both of us) the 1¼:1 was the final selection and, after building a new gear-box, has worked just fine.

The A5 draws far too much juice to use a slot-car speed-control and after much inquiry I found that Leisure Electronics has a small cheap variable-resistor controller for their electric race cars. A drive down to Irvine (I was in a hurry) secured one from these charming people and it works great.

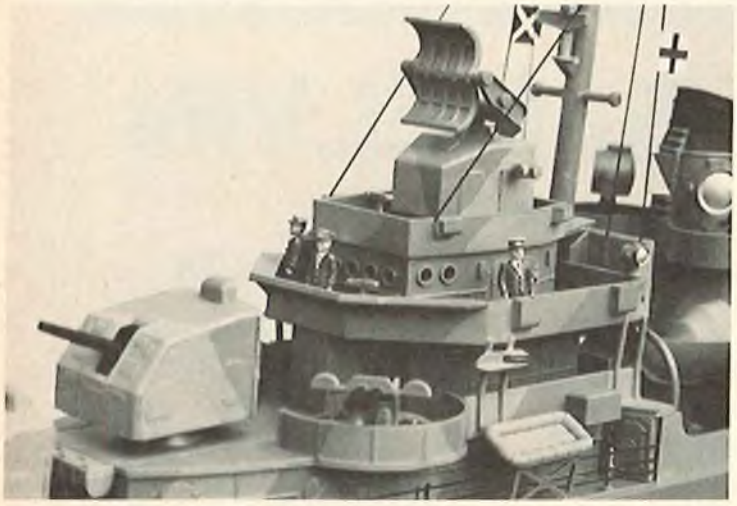
The second installation has been completely trouble and interference free. Solder all connections, keep all wiring as short as possible and twist leads together to minimize "loop" transmitting. Install an in-line 5 amp automotive fuse to protect the motor against floating "baggies", etc., around the props. With this kind of reliability, I decided that the deck only rarely would have to come off and went ahead to complete all the scale detail. It seemed like several hundred stanchions were glued all around the main deck and aft gun-deck. Three braided nylon life-lines were glued around all these, then all the rigging and battle flags were added. Three H.O. railroad conductors were dressed with gold buttons and epaulets and fitted with Navy dress caps, then they became the bridge officers. A couple more H.O. figures were given dungaree paint jobs, suitable headgear and placed in other strategic locations. The ship was now looking so good that I camouflage painted it and detailed out in black all the gun barrels (29 of them), breeches, magazines and funnel tops, all of which would have been much easier had it been done before assembly.

The kit props were now discovered to run too far out of true for comfort at the higher shaft speeds the A5 was giving,

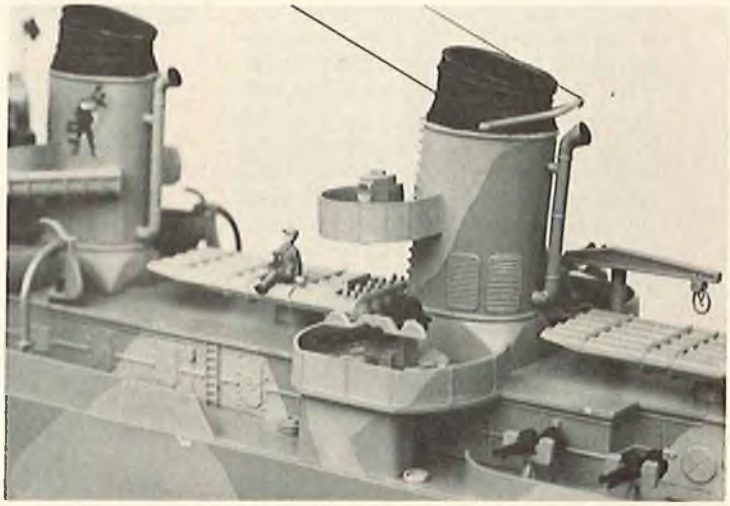
text to page 110

The completed radio controlled version of the Lindberg plastic kit, ready for its maiden voyage. Accompanying photographs show conversion details.

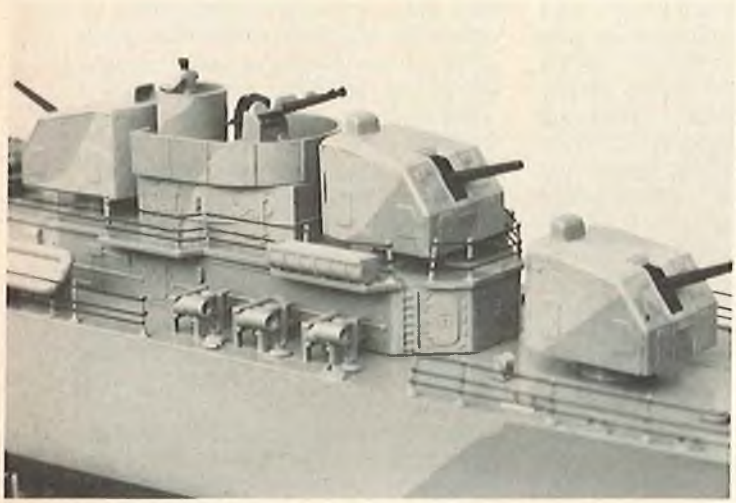
A view of the foredeck. Note bow hold-down screw, anchor chain painted and glued; seal off original switch slot with scrap plastic and cement.



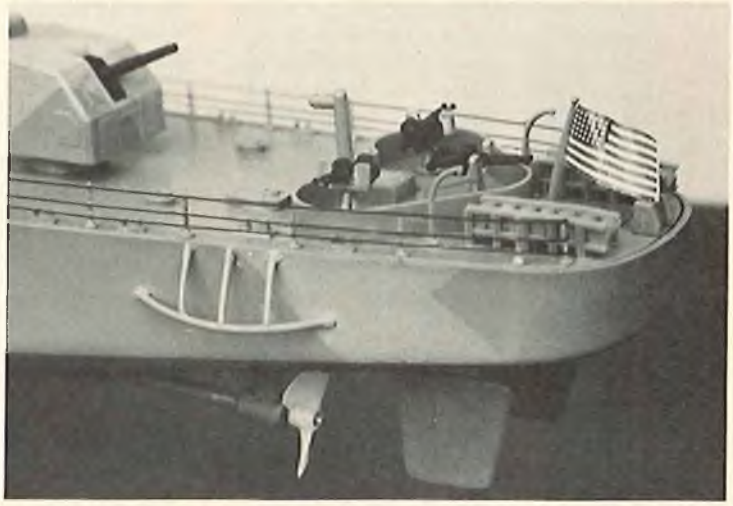
A close-up of the bridge of the U.S.S. Melvin. Detail of "officers" and lower rigging. The former are HO railroad figures painted up in Navy uniforms.



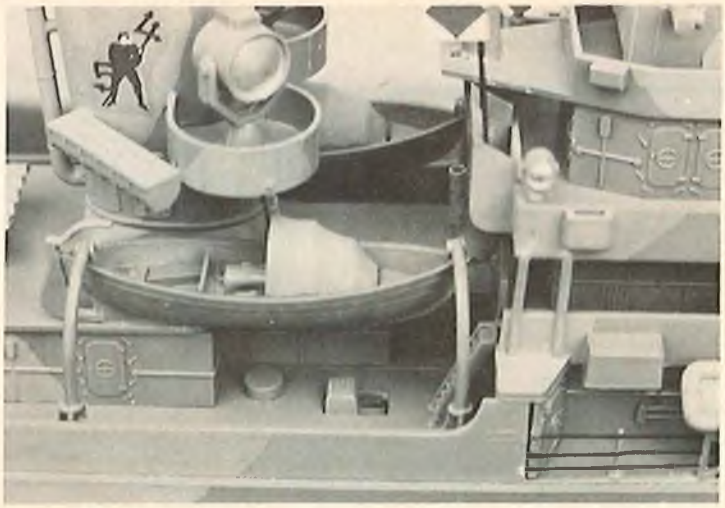
Midships. "George Goofoff", torpedo tubes, and one of two center hold-down screws under the 40mm cannons. The detail of this kit is excellent.



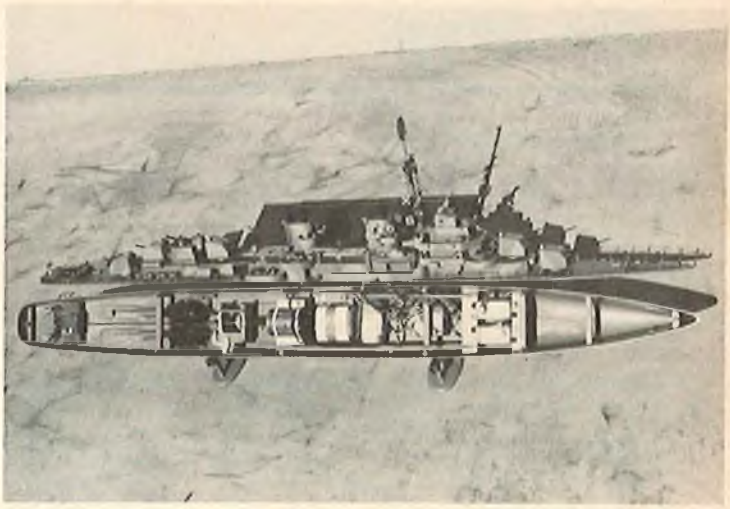
Looking at the aft gun-deck. "Lenny Lookout", guns, life-lines, and depth charge throwers, are part of the details in this area.



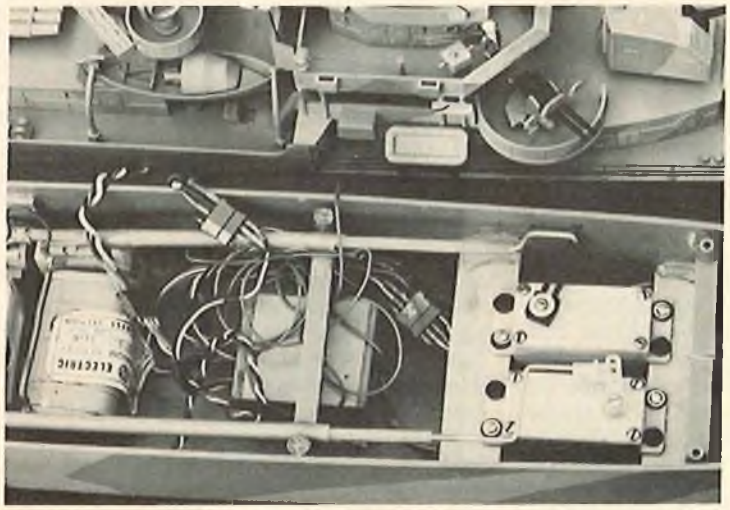
The stern deck. Note 20mm cannons, depth charge racks, rudders, props, and prop guards. Stern hold-down screw is located under Old Glory.



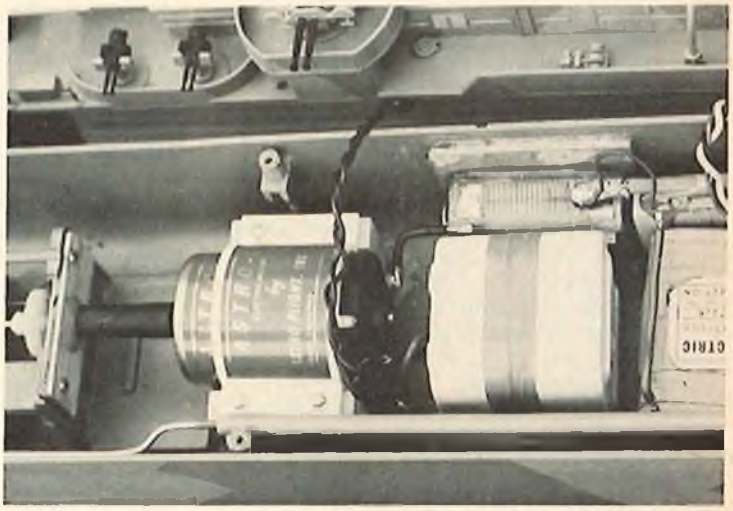
The receiver switch is located under the whale-boat; note whip antenna socket at the rear base of the scale mast.



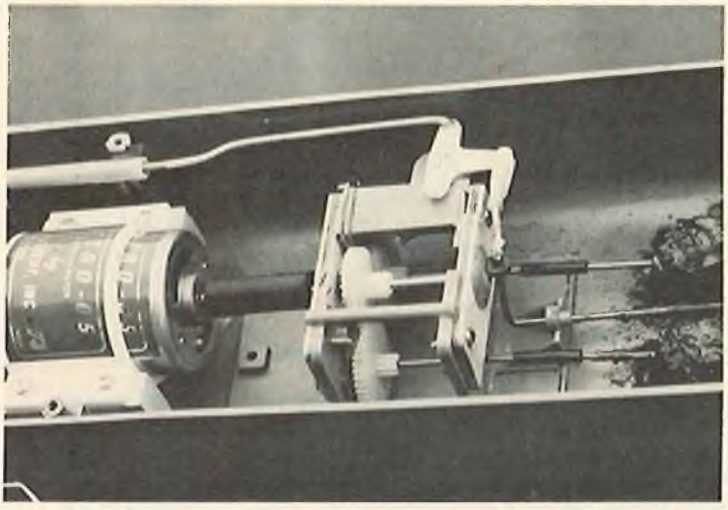
Overall view of the hull. The location of the RC equipment, control linkages, propulsion unit and steering gear are clearly shown in this photograph.



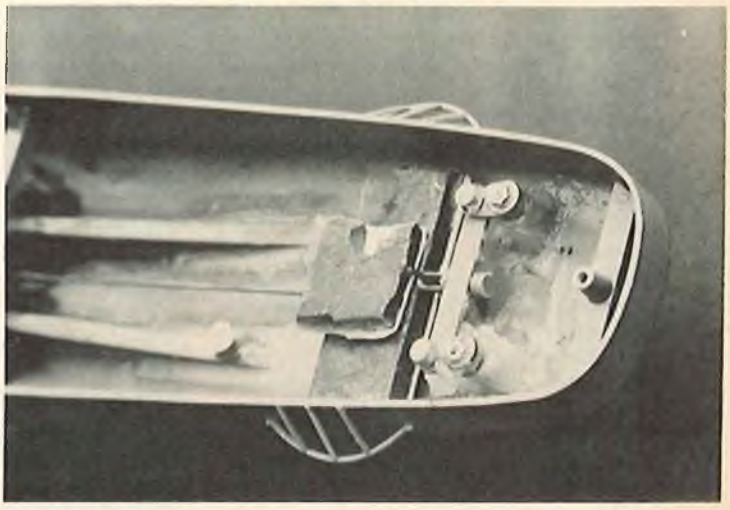
R. to L: Motor and rudder servos (mounts) are 1/8" plywood epoxied to the hull); receiver foam taped to the hull and the antenna soldered to a socket above the decks; receiver battery (tape mounted).



R. (top to bottom): Speed control epoxied to hardwood block and 1/8" ply heat shield against side; motor battery (tape mount); in-line fuse just visible opposite speed control. Center: Motor & flexible coupling to gear box.



The gear-box. 1/8" ply sides, scrap plastic braces. Nylon gears and bearings from kit epoxied in position. Flexible couplings to drive-shafts. Bell crank and clevis to rudder rod. Heavy grease round drive-shaft entry to repel water seepage.



Lead ballast (tape mounted) shown in this photo. Rudder shafts beefed up by threaded rod and nuts and washers for higher speeds being obtained. It is also greased to inhibit water entry.

Pit Stop

GENE HUSTING

● The old expression "feast or famine", sure applies to our R/C car engines. Seven years ago, 98% of the R/C car engines being used in this country were the Veco .19. Three years later, the Veco-McCoy conversion became the most popular. Last year, the K & B 3.5 Schneurle engine joined the ranks and won most of the races. The K & B 3.5 and Veco .19 were in such great demand that, as soon as they were released, they were sold and the factory has been out of these engines for over seven months.

Enter 1977. The days of famine are over. It looks like our only problem in 1977 will be in deciding which engine we want to run! Besides the Veco, Veco-McCoy, and K &B 3.5, there are some new engines out, and they're all Schneurles; the Super Tigre X21 Car, O.P.S. 3.5 Speed Car, Webra 1019 RC Speed 20 and Enya 19X. Incidentally, 3.5cc and 21 cu. in. are the same size and ROAR legal.

Which engine do I recommend you use? I'm not going to recommend any one particular engine to you, because each of you has different requirements. I'll simply tell you what I feel are the good and bad features about these engines, and you can make your own decision to suit you.

VECO .19

After all these years, The Veco .19 is still considered one of the most popular R/C car engines. The K & B factory was hesitant to make another run of these engines right after releasing their new K & B 3.5, but, nevertheless, they made a normal one year's run — which was gone in two months! For most beginners, this is the ideal engine. There is enough power to go 35 to 40 mph, and enough torque to make it challenging. The carb that comes with this engine is not very good for R/C car use and should be replaced with a Perry carb. The Perry carb will make an easier starting engine, better idling, better mid-range, more horsepower and, if that isn't enough, also better fuel mileage! For R/C car use, a good air filter is a must on any engine. The foam types are good, but the pleated paper type are the best. The paper type will make your engine last 5 times longer. A good one is a Fram #CG7 or AC GF149 available in auto parts stores. There are many good head heatsinks available, and a large heatsink is a must. The most popular mufflers are made by McCoy and Thorp. You should be able to get all of these parts from your local hobby shop that handles R/C cars; if not, you can order direct from Associated.

VECO-MCCOY

Dick McCoy, of engine fame for over the last 35 years, developed a conversion kit for the Veco .19 engine, which consisted of a chromed steel sleeve, with an aluminum piston and ring, and a wrist pin and very strong rod.

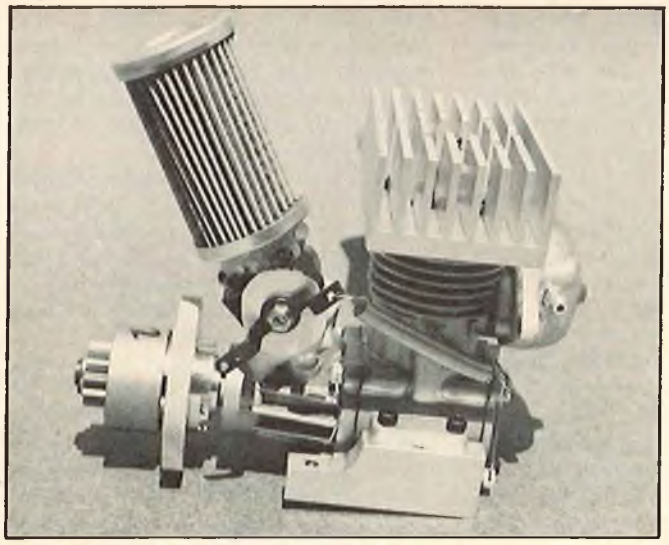
There are a few things that make the Veco-McCoy set-up popular. The reliability factor is 99-9/10%! You've got to be able to finish a race to win. It's almost impossible to blow up one of these engines. The engine runs smoother, so you can apply more power in the corners without losing traction from vibration. In addition, parts are readily available. The bad features are the expense and you must install the parts. It costs more to build a Veco-McCoy than to buy a new Schneurle. There is a new ROAR class called "Super Stock", which outlaws the Schneurle type engine, thereby making the Veco-McCoy an ideal engine for this class. The Super Stock class also limits the fuel to 10% nitro and the carb to a Perry 19 size, or Delta or Thorp. I feel the Super Stock class is the ideal class for most beginners.

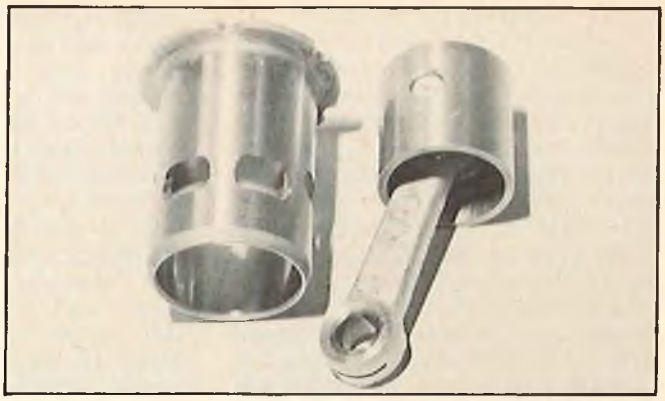
During the winter of '74, I worked on trying to get more horsepower out of the Veco-McCoy, as there were no Schneurles available in the 21 size. So I worked on what I called a "Semi-Schneurle". I added 2 more intake ports in the sleeve, one on each side between the intake and exhaust ports. I wasn't too sure how this was going to work, because I was afraid it was going to blow the intake charge right out the exhaust. But this didn't happen! I was able to get the same number of laps on the track as with the conventional Veco-McCoy. The horsepower was up a noticeable amount, but not as much as I had hoped for. Using a Dremel tool, I had ground a new passage inside the crankcase port area, on either side, for more breathing. I then used up numerous cases trying different shapes until I found the right set-up. The engine was fantastic!! (See test #7.) The torque increase was unreal! I could also run smaller gears without running out of rpm! I won a few races with it and some guys thought I must be cheating to be running that much faster than all the other Veco-McCoys, so I had the dubious honor of having been the first one in Southern California to have his engine checked. The bore and stroke was checked without revealing the porting. Naturally it was legal. It was only .20 cu. in. and we're allowed .21. I wanted to keep it a secret as long as possible, but I just had to tell someone, so I showed Butch Kroells what I had done. Butch does beautiful engine work and duplicated my engine. Using these engines I then won the 1975 Southern California Summer Series with Butch taking 3rd and I followed up winning the Southern California Winter Series and Butch took 2nd. Obviously these engines were working. For the benefit of the Long Island Club in New York who wanted to know what we were running at the 1975 Nationals in Boston, now you know. Sorry it took so long.

But now Dick McCoy has come out with a new "L" port kit (Part #MC 2L) which is very similar to what we were running, so you, too, can have the same horsepower with reliability. It's a very good choice for all the guys who are thinking of rebuilding their present Veco-McCoy engines, or who are ready to add more horsepower to their Veco .19.

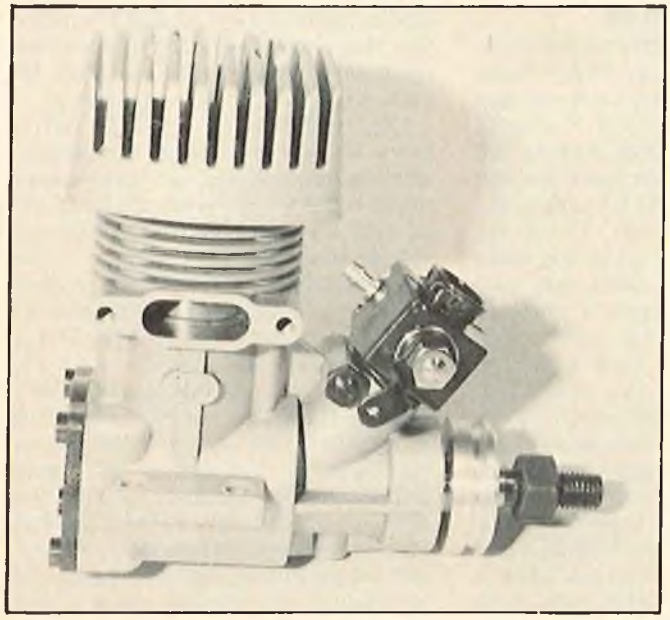
(text continued on page 78)

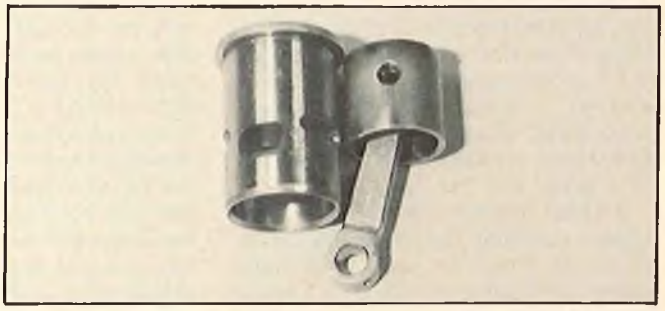
Engine	Carb	Fuel	9-4 Prop	8-4 Prop	7-4 Prop	Shaft OD	Thread
1. OPS 3.5	Perry 40	10%	13,000	17,800	21,000	7 MM	1/4-28
2. Super Tigre 3.5	Perry 40	10%	13,000	16,800	20,500	7 MM	1/4-28
3. Webra 3.5	Perry 40	10%	13,000	18,100	20,000	7 MM	6 MM
4. K & B 3.5	Perry 19	10%	13,800	18,800	21,600	1/4"	1/4-28
5. K & B 3.5	Pumper 60	10%	14,500	19,500	23,600	1/4"	1/4-28
6. Veco-McCoy	Pumper 60	30%	14,400	19,100	21,000	1/4"	1/4-28
7. Semi-Schneurle	Pumper 60	30%	14,700	—	23,400	1/4"	1/4-28
8. K & B 3.5	Pumper 60	30%	16,500	21,700	25,200	1/4"	1/4-28

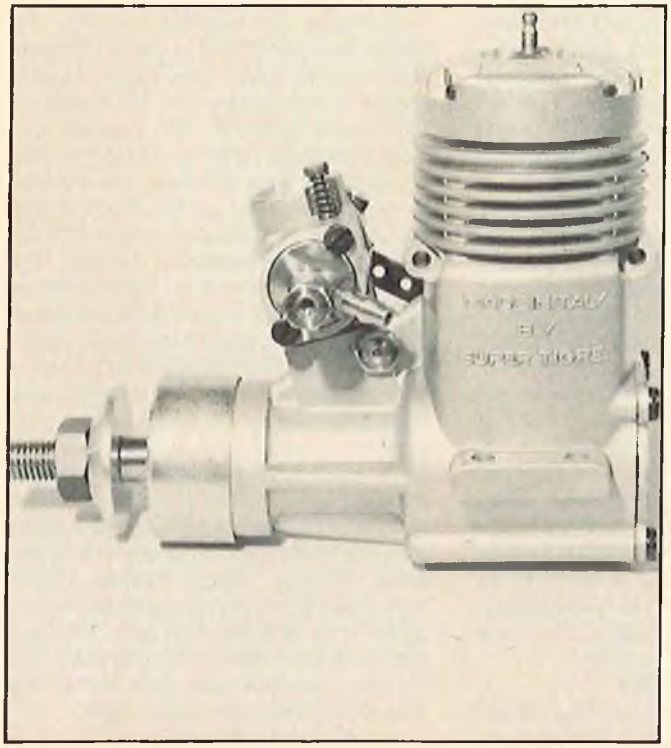


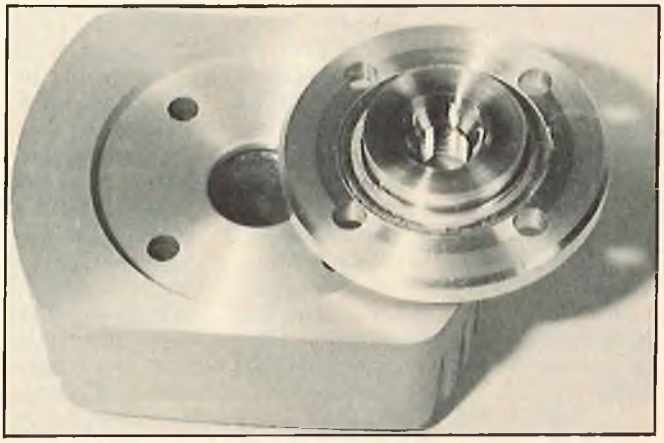


LEFT: "King of the Hill" in 1976 was K & B's 3.5 Schneurle engine. Shown is the K & B 3.5 set up for RC car use with Perry carb, air filter, R & A head-heatsink, McCoy muffler. Motor mounts, flywheel and ball bearing clutch assembly are also installed. ABOVE: K & B has a unique Schneurle 4 port system with 2 cross flow ports and 2 Schneurle ports. Typical ABC set-up with Aluminum piston, Brass sleeve – Chrome plated. Wrist pin is located with a Teflon button. Rod is bushed on the big end and the 1977 rods will have an oil hole instead of a slot. BELOW, LEFT: One of the new challengers for "1977 King of the Hill" is the OPS 3.5 Car engine. OPS is world famous for their speed records in 60 size boats and tether cars. The OPS 3.5 should become very popular in RC cars. The engine comes with a large heatsink and different size Perry carbs are offered. BELOW: OPS piston and sleeve are ABC 3 port Schneurle type. Pin is retained in piston with 2 wire clips. Rod is not bushed.









ABOVE: OPS heatsink clamps over top of head for effective heat transfer. At left: One of the most beautifully machined Schneurle engines is the Super Tigre X.21 car. Super Tigre is another engine famous for its speed reputation throughout the world. This engine also includes a clamp on head-heatsink for cars. LEFT: Super Tigre is also ABC design but with 5 intake ports. Two small intake ports, 1/16" wide, are added near the exhaust port. The pin is retained in the piston with two wire clips. The piston is notched for the intake ports. The big end of the rod is bushed. ABOVE: The Super Tigre crank is fully machined. The counterweight is balanced and uses a full circle aluminum ring around its circumference for stuffing. An aluminum spacer is used to adjust crank end play. The crank is an easy slide fit into the ball bearings.

K & B 3.5 (21 cu. in.)

K &B's 3.5 Schneurle engine, featuring ABC design (aluminum piston, brass liner-chromed) was an immediate sensation. It was released about April 1976, and the factory's year supply was sold out in 2 weeks!! It's a truly fantastic engine in regards to torque and horsepower! But it's only fair to tell the advantages as well as disadvantages. What I tell you is from personal experience as well as observing hundreds of these engines in use. This pertains to R/C car use only — I am not qualified to comment on airplane or boat usage. This engine was definitely "King of the Hill" in 1976. It won most of the races in the last half of 1976 and was used by all 8 contestants in the Sports Car Main Event at the 1976 Nationals. There was a lot of thought put into its design, with the Schneurle ports angled back away from the exhaust ports and two, instead of one, cross flow ports and the exhaust port that flows downward. As in any brand-new product, problems arise. The crankpin end of the rod was much too weak for this much horsepower and piston weight. The wrist pin fit was too loose. Consequently, the engine earned the nickname "The Grenade", due to broken rods. For the 1977 engines, which are scheduled to be released in March 1977, K & B has strengthened the big end of the rod. For those of you who want an even stronger rod, I recommend the R & A rod, part #SP 40 — $12.00, available through Associated, which also includes a hardened wrist pin with a slightly larger O.D. for a better fit in the piston.

Another problem area for cars is the muffler mounting flange on the crankcase. It's much too weak and many cases have broken at this point. It would be a simple die change to increase the strength of this area. The two piece crankcase presents another problem for cars, in that the side pressure loosens up the four attaching screws to the point the screws fall out. Make sure you either safety wire these screws in or glue them in. The sleeve bore is on a very large taper, which must account for a difficult uniform piston fit, which also accounts for differences in performance between engines, but I believe this has been changed somewhat for 1977. The one last problem was parts availability. It was very limited in 1976, so it can only get better in 1977.

SUPER TIGRE X.21 CAR

If you like things mechanical, as I do, you'll fall in love with this engine. The workmanship is just fabulous! I received a couple of samples of this engine from a friend in Switzerland, before they were released in the U.S.A. They put an awful lot of thought into designing this engine. The two ball bearing case is one piece with the exhaust coming out the R.H. side, just right for cars. The carb intake area in the crankcase, is offset to the R.H. side, in an effort to give the incoming charge a swirling effect. The crankcase is relieved so a larger rod big end can be used. The case has one crossflow port, and two Schneurle ports which flair out wider at the upper end.

The rod looks strong enough to do the job and is bushed on the big end. The crankshaft is full circle on the counterweight for stuffing, but is balanced. The ABC sleeve is interesting in that it has a small intake port 1/16" wide, next to the exhaust port, evidently to make sure none of the incoming charge goes straight out the exhaust. The sleeve is on a very slight taper which should make a uniform piston fit easier. The aluminum piston is also notched on the bottom of the skirts for the Schneurle port openings. The carb is a Super Tigre 21 size. The engine comes with a very good clamp on heatsink.

OPS 3.5 CAR

OPS engines are world renowned for holding speed records in .60 size boats and tether cars. Now they have released a new OPS 3.5 car engine. Thanks to Bob Murphy of Shamrock Imports, we managed to received the first one available in this country. The 3.5 engine design is very similar to their .60 size engine. Nothing trick - - - just a very basic Schneurle design that works very well.

The two ball bearing case is one piece with the exhaust coming out the R.H. side, ideally suited for cars. It has one cross flow port and two straight-up Schneurle ports. The ABC piston sleeve is very conventional. The sleeve has a very slight taper for a good piston fit. The rod big end does not have a bushing. The high compression head-heatsink is two piece with the heatsink being a perfect size and shape. The back cover is plastic which has a special boss in the center for a pressure tap. The engine comes with a Perry carb and Bob thinks it might be available with different size carbs, which will really help. Although the prices were not available at this time for any of the new engines, the OPS with a large Perry carb and its included excellent heatsink would be a good buy.

WEBRA 1019 RC SPEED 20 (3.5cc)

Thanks to Mr. Frank Ritota of Model Rectifier Corp., we received one of the first new Webra 3.5 Schneurle engines to show you. The two ball bearing case is one piece and is finned from top to bottom. The exhaust comes out the R.H. side. It, also, has one cross flow port and two Schneurle ports. Its main difference is that it has a steel sleeve, which is not plated, and a steel piston. The steel piston does make it vibrate more, which does hurt an R/C car's handling in the corners. The carb is by Webra and the engine does not have a heatsink for cars. MRC is also ready to release a new Enya 19X Schneurle engine, but it was not yet available at this time.

SUMMARY

These new engines will also require new motor mounts and flywheels, so make sure these are available for the engine you choose. R/C car kits normally are made for the Veco .19 engine, but other engines can usually be installed with the correct motor mounts and flywheel.

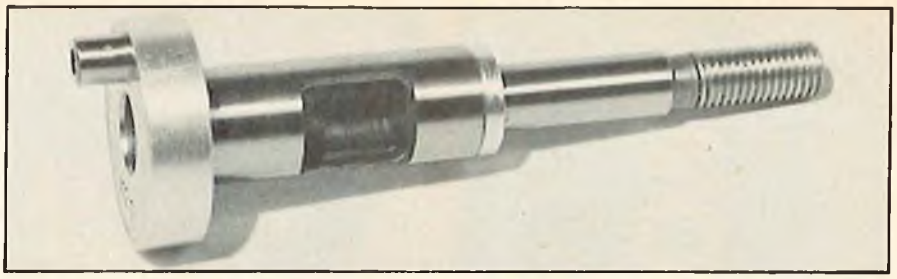
Engines in R/C cars always run hotter than engines in planes or boats, so make sure you run a fuel containing castor oil and not synthetic oil. K & B 3.5 and Veco .19 engines run good on 10% to 20% nitro and the Veco-McCoy engines run good on 25% to 40% nitro.

We ran the engines at Rich Lee's house. Rich is one of the top R/C car engine builders in Southern California. Tests #1 through #5 were all run on the same day, using the same Top Flite props. The K & B 100 fuel (with castor oil) came out of the same can. Fox Short or Long R/C Idle Bar plugs were used. McCoy mufflers were used and, in addition, they were blowing through another one quart size muffler. We used Perry 40 carbs to get a uniform comparison.

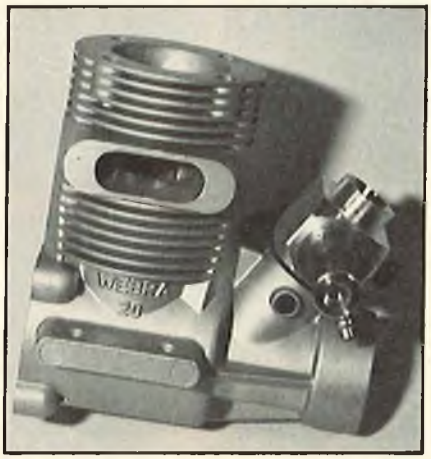
I did want to run a K & B 3.5 with a Perry 40 carb for a better comparison with the new engines, but there wasn't any K & B 3.5's left in the whole world, so I did the next best thing. I had two K & B's which we were going to run in our next Series races. These already had the carbs epoxied in and were basically stock except they had the R & A rods and heatsinks installed — #4 & #5. #6 was Rich's Veco-McCoy with a Perry pumper 61 carb (without the pump). This is definitely one of the better Veco-McCoy's. #7 was one of the Semi-Schneurle Veco-McCoys, and this one was built by Rich. #8 was the K & B that Rich ran at the 1976 Nationals. #6, #7, and #8 were run with the same props as #1 through #5, but were run at a prior time.

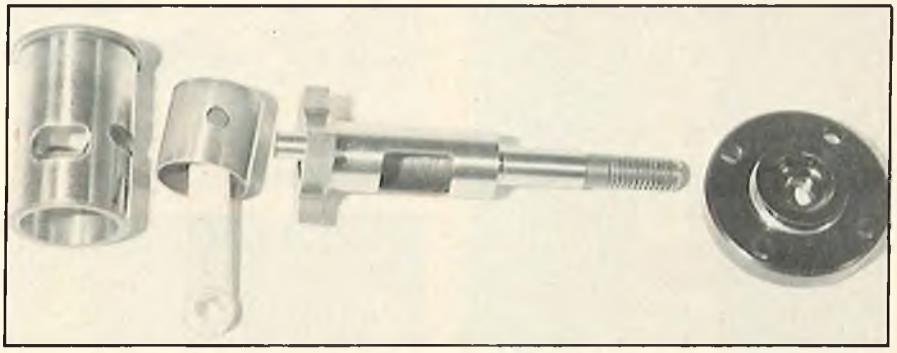
We have just started running the Robart fuel pump. For a very complete report on this pump see Clarence Lee's Engine Clinic column in the February 1977 issue of RCM. The best performance has been with the Perry Pumper 60 carbs. The regular Perry 19, 40 and 60 size carbs load up too much in the mid-range with the pump, which is to be expected. The performance with the Perry Pumper 60 carb on the top end in the car, is about the same with or without the pump. The biggest noticeable difference so far is that the idling is fantastic. You can idle for a minute or longer and then have full punch acceleration without the engine loading up. The other plus feature is that we get better fuel mileage, by about 20%. It looks like pumps will be popular this year. We'll keep you up to date as these new engines are being used. Oh yes, Harold McCoy, Dick's son, has been running a Schneurle engine in his dragster that has "McCoy" cast on it. We tried to get some more info for you, but Dick said he's just in the experimenting stages right now.

Good luck in your racing. □

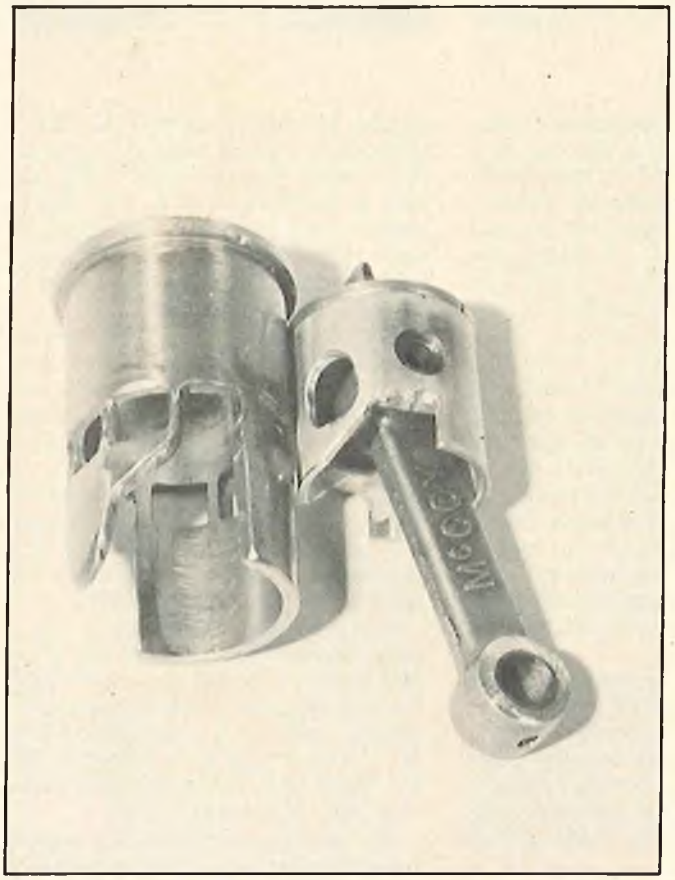


LEFT: Super Tigre is also ABC design but with 5 intake ports. 2 small intake ports, 1/16" wide, are added near exhaust port. Pin is retained in piston with 2 wire clips. Piston notched for intake ports. Big end of rod is bushed. ABOVE: S.T. crank is fully machined. Counterweight is balanced and uses a full circle aluminum ring around its circumference for stuffing. Aluminum spacer used to adjust crank end play. Crank is an easy slide fit into ball bearings.

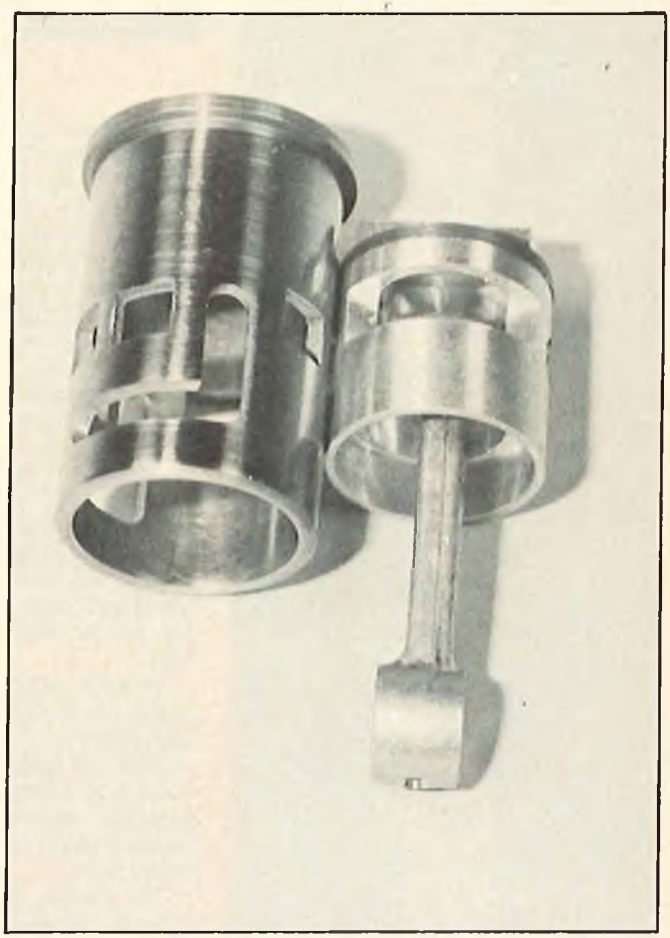




LEFT: Webra 1019 RC Speed 20 (3.5cc) is another new engine available for RC car use. The 1 piece case has Schneurle porting w/exhaust coming out R.H. side. ABOVE: Webra uses a steel unplated sleeve w/steel piston. The rod is not bushed; crankshaft has a 6mm thread; the head is black anodized.



"Semi-Schneurle" Veco-McCoy type engine used by Gene Husting to win both Summer and Winter 1975 So. Calif. Series. Intake port has been added between original intake and exhaust ports. You can tell the conversion was all done by hand with a Dremel, but it sure worked!



Latest Veco-McCoy conversion kit features new 'L' porting. 'L' ports added between original intake & exhaust ports. Piston is notched to feed 'L' ports.

FIRST ANNUAL SOUTHWEST MODELERS SHOW

BY CHUCK CUNNINGHAM

METROPLEX MODELERS HOST FIRST SOUTHWEST TRADE SHOW

JANUARY 15-16, 1977

● The First Annual Southwest Modelers Show was a roaring success, and brought to the Dallas-Fort Worth Metroplex area, manufacturers and associations from all over the country. Sixty-four booths were on display for the more than 15,000 people who jammed the Women's building on the State Fair Grounds in Dallas, Texas. Extensive prior planning made this show a success, and Jim Simpson is to be given much of the credit for enlisting help from model clubs all over the central Texas area, as well as recruiting companies to occupy the many varied booths. Even the weather, which had been miserable for two weeks prior to the show, cooperated and provided two days of sunshine, although the second day was a bit on the cold side.

Outside, displays rivaled the inside show as a sight of RC craft flying through the clear Texas sky in and around the fairground's beautiful buildings, was enough to bring a thrill to anyone in the crowd of on-lookers. RC boats and RC cars also made a great impression.

The static displays inside were enough to encourage many in the crowds to have one of two thoughts. Either, "Boy, I wish that I had entered my ship", or, "I wonder if I could get started building something like that." Magnificent models were on every table, ranging from all types of RC aircraft to helicopters, ukies, free flights, peanut scale, power and sail boats and race cars. Just about the only thing that I couldn't locate was any type of model railroad equipment.

A great many of the spectators attending were drawn to the show from the ranks of former modelers or "would like to be modelers" who had found out about this great display from vast amounts of advertising. This is a great way to bring new interest into the market, and I cannot believe that at least half of those in this group will find themselves in a local hobby shop this week jumping in with both feet.

For everyone concerned, it was a real pleasure to see such a fine show presented in excellent surroundings. For example, the tables containing the display models were separated from the milling throng by a railing so that the spectators could see everything very well, but couldn't touch.

All Metroplex modelers are eagerly awaiting next year's Second Annual Southwest Modelers Show, as this one is destined to take its place alongside of the well established trade shows in other parts of the country.

●



NEW!









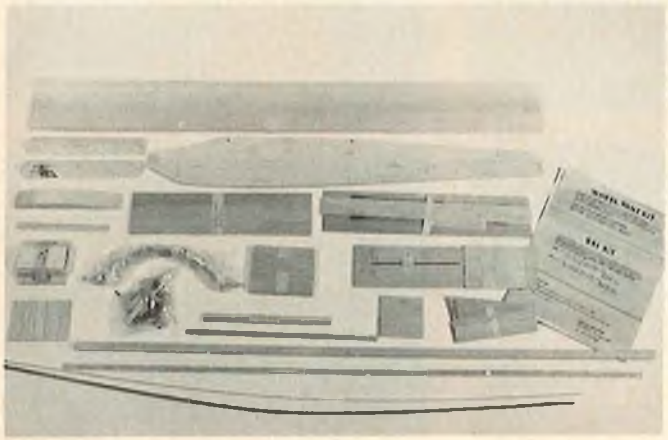

MODEL SUPPLIES



A Enterprises


RCM PRODUCT TEST

MICHIGAN HOBBY HANGAR QUICKIE



IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging		●				Pre-Shaped Parts	●				
Plans			●			Parts Match to Plans			NA		
Written Instructions	●					Overall Parts Fit	●				
Quality of Hardwood	●					Ease of Assembly	●				
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials	●					Flight Performance	●				
Accessories			●			Overall Appeal	●				
Die-Cutting	●										

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The Quickie is a .09 to .15 powered basic trainer and general sport aircraft produced by Michigan Hobby Hangar. It was designed by Fred Reese and first appeared as a construction article in RCM. The kit is of conventional balsa and hardwood construction with a hardware package that includes blind nuts and screws, formed dural landing gear, hinge material, pushrod material, control horns, and clevises, and the wire for the tail wheel as well as the hardwood dowels for the wing holddown. The kit is very complete and can be assembled by most novice builders. Although the plans are very small, they are only required for occasional reference in building. The instruction booklet is very thorough and every step of construction is detailed and then checked off in a special check list at the left. Materials used throughout the kit are of the highest quality and all parts fit perfectly. Building time was approximately 12 hours using 5-minute epoxy and Wilhold Aliphatic Resin for all phases of construction. Flight characteristics of this little airplane are really great. It will loop, snap roll, spin, and even flies well inverted — and all of this with muffled .10 up front. Take-offs and landings are very smooth, but care must be taken not to over-control since the Quickie is quite responsive to the controls. However, with the flying surfaces set at minimum throw, nearly any novice can handle the Quickie with ease. All and all, this is a very enjoyable little aircraft which, after several very hard landings, the only damage was a slight crack in the aft left side of the fuselage near the horizontal stabilizer and a slightly bent landing gear. An excellent testimony to the durability of Michigan Hobby Hangar's Quickie. □

SPECIFICATIONS

Name ..... QUICKIE
Aircraft Type ..... Sport Flyer
Manufactured By ..... Michigan Hobby Hangar
460 W. Broomfield Road
Mt. Pleasent, Michigan 48058
Mfg. Suggested Retail Price $27.95
Available From ..... Both Mfg. & Retail Outlets
Mfg. Recommended Usage ..... Basic Powered Trainer & General Sport
Wing Span ..... 38 Inches
Wing Chord ..... 8 Inches)
Total Wing Area ..... 300 Square Inches
Fuselage Length ..... 28 Inches
Radio Compartment Dimensions ..... (L) 8" x (W) 2½" x (H) 3¾"
Wing Location ..... High Wing
Airfoil ..... Flat Bottom
Wing Planform ..... Constant Chord
Dihedral ..... 1½ Inches
Stabilizer Span ..... 14 Inches
Stabilizer Chord (Incl. elev.) ..... 4½ Inches
Total Stab Area ..... 59½ Square Inches
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Top of Fuselage
Vertical Fin Height ..... 5¼ Inches
Vertical Fin Width (incl. rud.) ..... 4" (Avg.)
Mfg. Rec. Engine Range ..... .09-.15
Mfg. Rec. Fuel Tank Size ..... 4 Oz.
Landing Gear ..... Conventional
Recommended No. Of Channels 2-3
Recommended Control Functions ..... Rudder, Elevator, Throttle
Basic Materials Used In Construction:
Fuselage ..... Balsa & Ply
Wing ..... Balsa
Tail Surfaces ..... Balsa
Hardware Included In Kit ..... Very Complete
Plan Size ..... 7" x 10"
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... Yes (6 pages)
Construction Photos ..... Yes
Kit Includes ..... Die-Cut & Shaped Parts
Mfg. Rec. Flying Weight ..... 36-40 Oz.
Wing loading based on rec. flying wt. ..... Not Given

RCM PROTOTYPE

Weight, Ready To Fly ..... 36 Ounces
Wing Loading ..... 18 oz./sq. ft.
Covering & finishing materials used ..... Flite Cote, MonoKote trim
Engine Make & Disp. ..... O.S. .10 RC
Muffler Used ..... O.S.
Radio Used ..... Micro Avionics
Tank Size Used ..... SS 4

I WANT TO GET STARTED

THIS ARTICLE IS ADDRESSED TO THE INTERESTED NEWCOMER TO THE SPORT AND HOBBY OF RC AND ANSWERS MOST OF THE QUESTIONS ASKED AT TRADE SHOWS AND CLUB DEMONSTRATIONS.

BY JERRY FESTA

● "Where do I start? How do I start? I know absolutely nothing about this hobby — so HELP ME!!!" To answer your first two questions: 1) "Right here!", and 2) "You already have" (by reading this article). Seriously, your decision to start the hobby of Radio Control airplanes will be followed by many more decisions. The purpose of this article is to be an aid for you in making many of these decisions. There is no *one* correct way of getting started in this fabulous hobby/sport, but we will simplify all this for you by breaking this pastime into three general areas: a) gliders; b) small gas powered aircraft (.049-.099); and c) .20-.60 powered aircraft. There are advantages and disadvantages for each choice and we will try to show you both sides as briefly as possible for each of the choices. Then you decide which "route" you wish to follow!

GLIDERS

Kits: There are many fine kits on the market that retail anywhere from $15.00 to over $50.00. Except for the "competition" type sailplane, most kits are easy to build. There are only a few "almost built" gliders available.

Engines: None needed! But some form of "power" is required and this can be a "Hi-Start" (which is really a jumbo 'rubber band'); a "winch" (which is usally home-made); or a "Power Pod" (a small .049 engine mounted on the wing/fuselage). Usually the purchase of one of these forms of power can be delayed, if you learn to fly with the guidance of a glider club member (or fellow modeler), for you can use theirs! Slope gliding is another alternative if you live near a cliff or steep hill. In this form of gliding you just throw your plane off the side of the cliff and fly into the updraft created by the cliff!

Radio: Gliders require a 1, 2 or 3 channel radio. This will cost anywhere from $60.00-$150.00 and will do an excellent job of training you in the basics of flying. The vast majority of gliders use only 2 channels (for rudder and elevator control). Some smaller gliders use only 1 channel, while the larger competition gliders use a 3rd channel; but for right now, that is pretty far down the road as far as you are concerned. We recommend, therefore, a 3 channel radio with 2 servos.

Advantages: Gliders fly slower and are more "forgiving", therefore giving the fledgling pilot a longer time to react to various situations. Crash damage is usually less because of the slower airspeeds. There are no "extras" to purchase like props, fuel, engines, etc., once you buy the plane, radio and covering material. (We recommend the plastic-type coverings like MonoKote, Solarfilm, etc.)

Disadvantages: Flight time can be quite short until your lack of expertise has been overcome. The wing construction is usually more critical (but not more difficult) than other types of planes.

Total Cost: Everything new: from $75.00 and up!

1/2A TYPE PLANES

Kits: These easy-to-build kits cost from $10.00-$30.00. We recommend a *high wing* airplane for your first project. Some kits (which are quicker to build) use as a building material, styrofoam, which is surprisingly strong. We advocate a wing made of this material, as it is less susceptible to warps. The all-balsa kits are straightforward in construction and reasonably easy to build, although somewhat on the small size. Wingspans range from around the 30" or 40" area.

Engine: Most of these kits use engines (.049-.099) costing from $8.00 to $25.00, depending on the size and quality you wish to purchase. A growing 'new' phase of the hobby are planes powered by .049 engines (also known as 1/2A). This is the same type engine as found on the Cox plastic U-control airplanes. The fuel consumption is quite low for these aircraft. You will also need a small battery (1.5 volt dry cell) to start the engine and extra propellers (which are a break-resistant type of plastic).

Radio: A 1, 2 or 3 channel outfit will do an excellent job ($60.00-$150.00). If you think you will progress into larger aircraft, a 3 channel radio (with 2 servos) would be the *minimum* investment recommended. Because of the size of the plane, be sure you purchase "small" sized servos, receiver and battery packs.

Advantages: The smaller size makes the plane somewhat easier to build and is less complex to finish. There is less investment for paint, glue, etc., as well as less time to complete the model as compared to most larger aircraft.

Disadvantages: Most flying sites have grass fields which would require a "hand-launch" due to the small wheels; therefore, an experienced pilot for the first flights is a necessity! (Not bad advice for all newcomers!) Most 1/2A type engines do not have a throttle and, therefore, your flight usually flown at one speed. The planes (depending on choice) can be "touchy" in the air, so we recommend some discussion with a dealer or competent flier before investing in a kit. Remember: purchase a *high wing* type aircraft.

Total Cost: Everything new: $100.00 and up.

.20-.60 POWERED AIRCRAFT

Kits: Prices range from $20.00-$45.00 for most trainer type aircraft. Again we recommend a high wing airplane with a wingspan around 50"-60". Some kits are all-balsa construction which means all the parts of the plane are made from balsa and/or plywood. Other kits have a "foam" wing which requires less building than a "built-up" balsa wing. There are also Almost Ready To Fly (ARF) kits on the market which you can build very fast (less than 12 hours) and are made of a strong plastic-type material or made entirely of styrofoam. These planes have less parts than balsa kits because most of the components of the plane are pre-formed (but these kits usually cost more). Resist the urge to purchase a "scale", "racing" or "bi-plane" at first because these planes require extra skill in building and flying which you, the beginner, do not have yet.

Engines: A reliable .20 engine costs around $30.00 and, if taken care of properly, can last many flying seasons. This engine should be a "T-V" type (Throttle Valve), which permits you to control the speed of the engine while flying. A .60 costs in the neighborhood of $60.00-$65.00, and will put out over 1 horsepower! Most kits are ideally suited for either a .20, .35, or .60. Most experts recommend you purchase an engine that is the larger of the recommended sizes. For example: a "Falcon 56" suggests engines from .19 to .35. We would recommend a .30 or .35, as you can always throttle back once in the air! But don't worry, a .19 *will* fly the airplane! The smaller engines will consume less fuel than the larger ones. A muffler is usually recommended (or *required,* depending on *where* you fly) to quiet some of the noise from the engine, and will cost an additional $8.00-$12.00.

Wood propellers cost around a dollar. On engines smaller than .40, you may wish to use "plastic" props, which also cost around a dollar. To start the engine, you will need fuel and a battery (1.5 volt

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Racing At Random

FRED REESE & DON DOMBROWSKI

Activity in the pits, 20 entries and a lot of interest from spectators.

Three outboards headed for the start line during the Modeleer's First Annual Outboard Race at Legg Lake.

● As we have mentioned in a couple of previous articles, R/C boating is becoming more and more popular. On January 30, the "Modeleers" of The San Fernando Valley sponsored the first annual outboard race at Legg Lake which is located at Whittier Narrows Recreation Area, Whittier, California. R/C boat racing has been going on for many years, but with the introduction of the new K & B .21 outboard, we feel that this could be one of the most popular events in the history of R/C boating. The rules at the present time are very simple:

(1) Stock K & B .21 outboard, no modifications allowed.

(2) No restrictions on fuel.

(3) No restrictions on props.

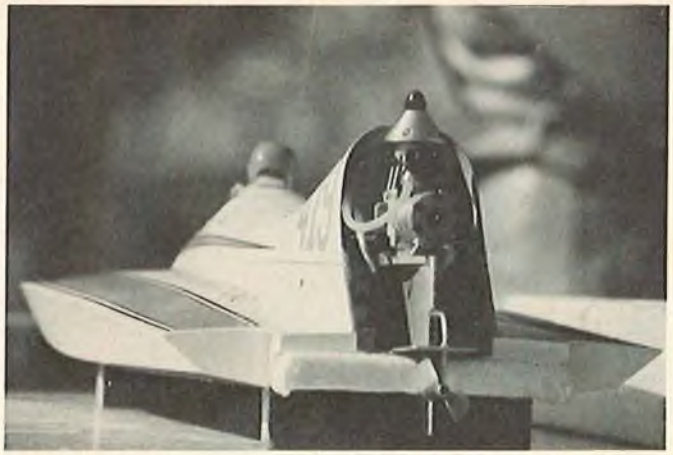
(4) Any type hull can be used; most popular are the tunnel hulls which are Stand-Off Scale replicas of the real outboard racers.

There were 20 entries at this first Southern California outboard race which is an excellent turn out for a brand new class. The reason why this class has so much going for it is that it is simple. You bolt on an outboard to the back of a hull of your choice and go race. You don't have to worry about drive shaft, stuffing boxes, U-joints, cooling and plumbing, and many other things commonly associated with inboard type set-ups. Some people think that $95.00 is a lot of money for an outboard unit, but when you add up the cost of a basic .21 marine engine, then add the cost of drive and steering assemblies, engine mounts, props, U-joints, etc., you find out that an outboard, which is a complete self-contained unit, is actually less expensive with a lot less aggravation in the installation department. All you do with an outboard is bolt it on with 4 bolts, hook up a fuel tank, throttle, servo and steering servo and that's it.

Starting one of these beauties is a dream. Hook up the glow plug and use a standard airplane starter motor on the starting cone located at the top of the engine and turn it like you do a spinner on an airplane. There are no ropes to pull or rubber drive belts or recoil starters to fool with. The other incentive is that

Glen Toma's smooth running winning Lil Lightning.

Typical radio installation showing receiver, battery, switch, throttle, and steering servos in a watertight compartment.



Outboards are easy – bolt it on and hook up the linkage and go.

Glen Toma took top honors with his Lil Lightning - - - a Steve Muck Kit.

Glen Spickler with his Rascal - - - a new kit from Glen Spickler Radiomodels.

Ken Reilly and his Mongoose #1 - - - plans available for $5.00 (see text).

George Campbell and his prototype Lil Lightning took second place - - - says outboards are here to stay and is excellent as an novice class.

Jeff Schmidt of J.V.S. Model Boats and his Claim Jumper 20 tunnel hull all fiberglass kit.

the level of sophistication to be competitive in this class is not like in the hydro or mono class. The name of the game in this event is consistency.

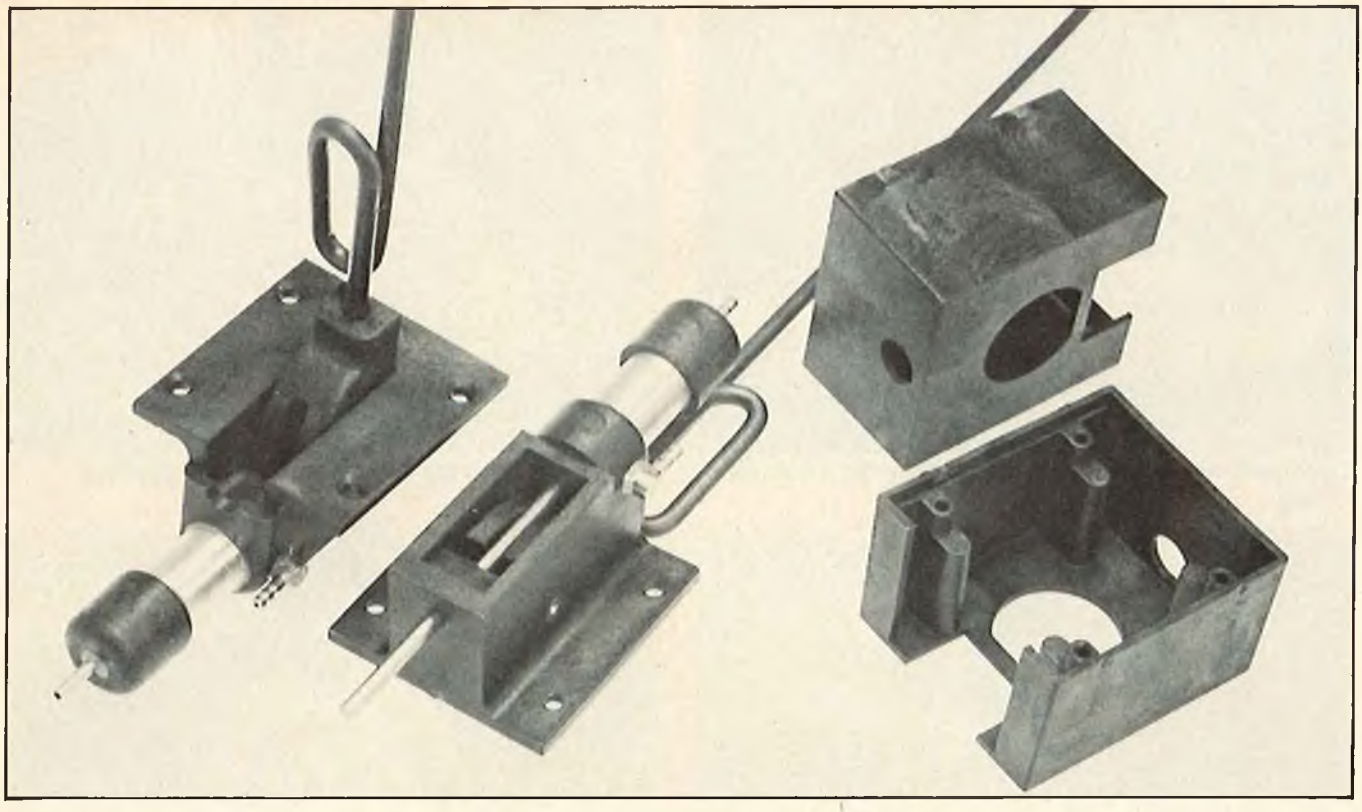
Glen Toma took top honors by doing just that. This was Glen's first race and he showed some of the old timers in boating how it should be done. He had a smooth running Lil' Lightning (Steve Muck's R/C model boat kit) that wasn't the fastest boat there but he did finish every race he was in. Glen was using a stock J.G. E-20 prop nitrotane 15% fuel and a K & B R/C short glow plug. George Campbell took second honors with his Proto Lil' Lightning. George is the Secretary of the Modeleers and, talking with him, his feeling is that there will be more outboard races this year and that it was an excellent event for the novice to start in boat racing.

We roamed around trying to find out what kits or plans were available for this new class and came up with the following:

Lil' Lightning — a tunnel outboard hull designed for the K & B 3.5cc outboard engine by George Campbell. The length is 30", width 12", for 2 channel and K & B outboard, kitted by Steve Muck available at your local dealer or from Steve Muck's R/C Model Boats, 3422 Greenwood Ave., L.A., Calif. 90066 — price $48.95.

Claim Jumper 20 — an all fiberglass

to page 102



THE LATEST IN

BY DICK TICHENOR

PNEUMATIC RETRACTABLE LANDING GEAR

● In keeping with RCM's continuing effort to stay abreast of RC product developments, we feel that the new pneumatic retractable landing gear being marketed by B & D Enterprises has noteworthy features that should be presented to our readers.

The B & D retracts are a durable, resonably priced system designed to withstand the vibrations and abusive loads associated with modern pattern and scale RC models. A patented "Roto-Lock" movement provides a positive lock in the up or down positions. This feature eliminates the problem of wheels sagging out of their wells from high "G" maneuvers, aerodynamic loads or low ambient temperature. It is also valuable in preventing the gear from collapsing on those harder than planned landings. The molded components are made of a tough wear-resistant glass filled nylon composite.

The system was designed and extensively tested by Bob Violett and developed by B & D Enterprises. The retracts can be obtained in sets for either tricycle or tail dragger arrangements and are available through the usual distributor/hobby shop outlets.

Our experience with the B & D retracts has found them to be a reliable, high quality system. ❑

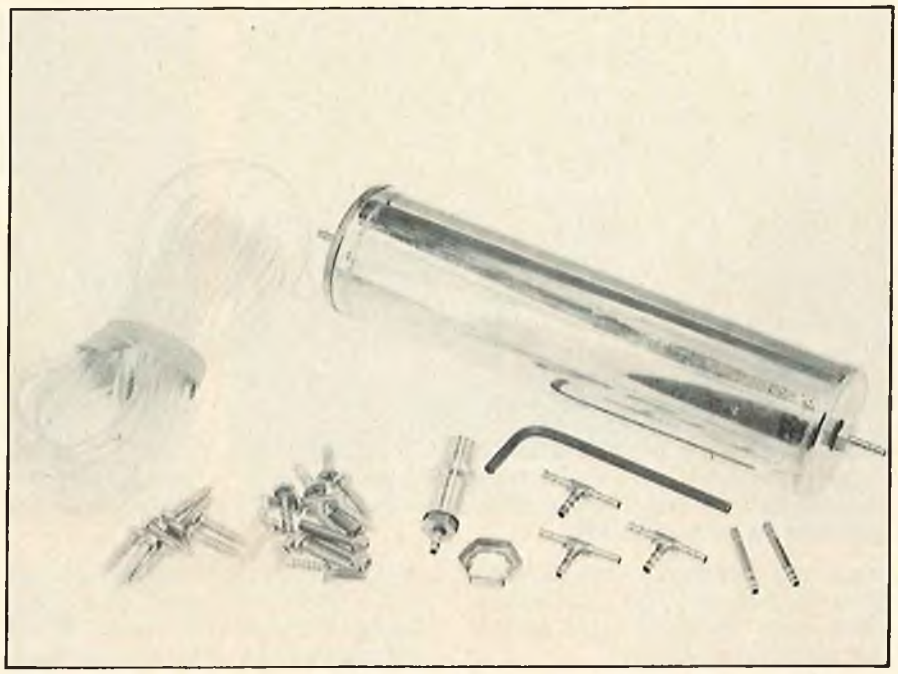
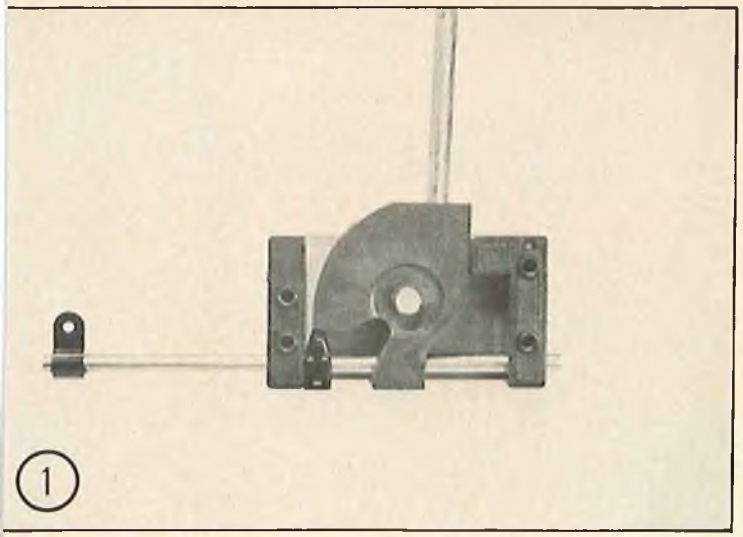
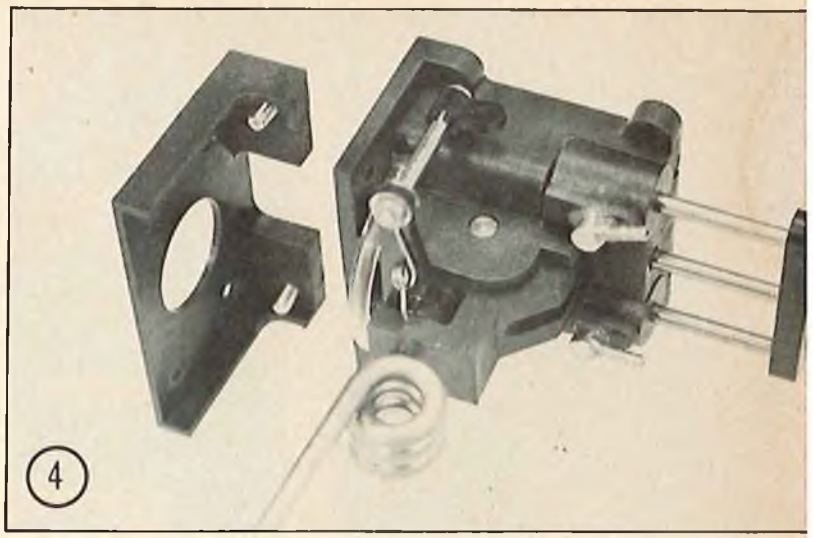
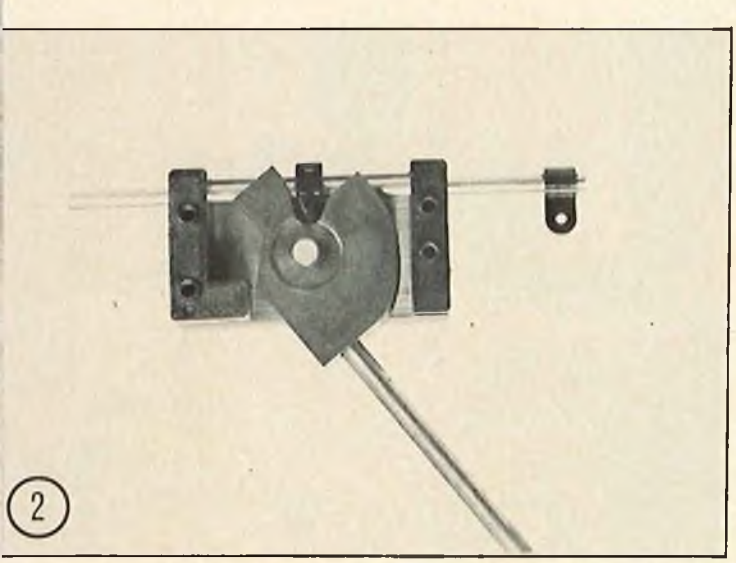
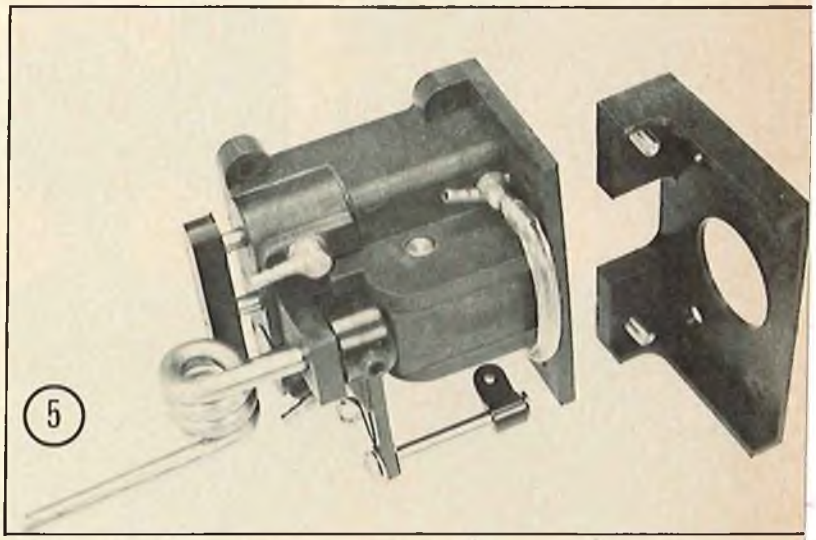


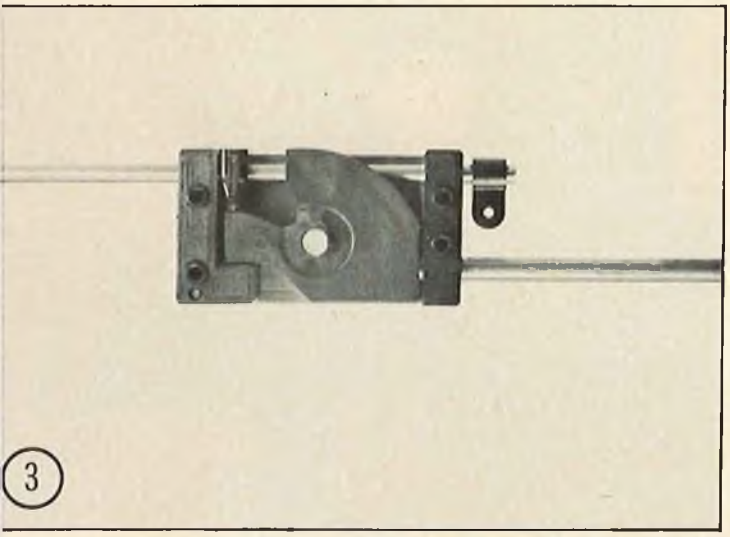
Photo at top of page: Two views of main gear in up and down positions. Mounting boxes are accessory items that are especially convenient for installations in foam wings. ABOVE: The system also includes the tank, hose, and fittings shown as well as complete installation and operating instructions. A reliable system that takes the mystery out of retract gear systems.

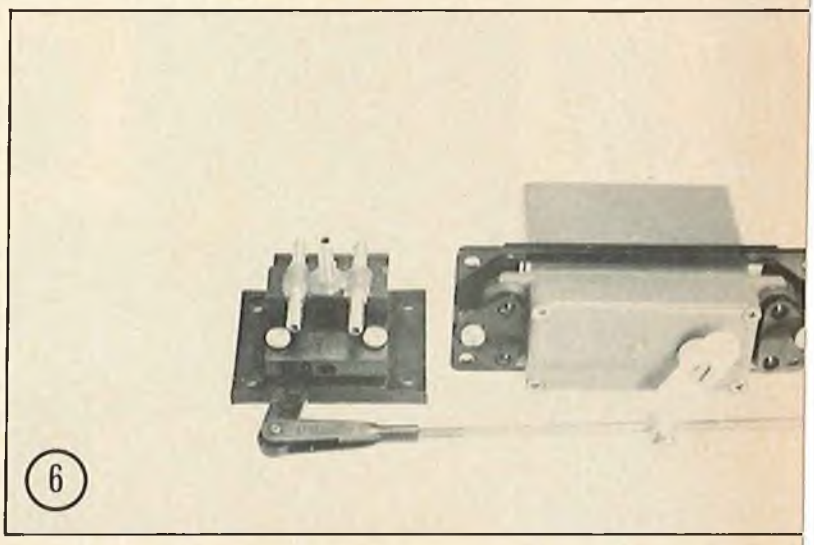












Photos one through three, above, are a sequence series showing how the patented 'Roto-Lock' provides positive down and up capability. Unit shown is the mechanically actuated gear with one side panel removed. Photos four and five show two views of the nose gear unit in the down and up positions. Twin actuating cylinders provide fail-safe operation. Unit may be firewall or floor mounted. The bracket is an aid for mounting in limited access areas. Photo six: Flow control selector valve is designed for simple, yet positive, installation, as shown. (Servo and connections are not supplied with retracts.)

FOURTH ANNUAL CHICAGO EXPO

BY BILL COONS

● The 4th Annual Chicago Expo was held on October 30th and 31st, 1976, at the DuPage County Fairgrounds in Wheaton, Illinois. Two days of well planned activities were, as usual, carried out to perfection. At the helm was Kurt Rothsisberger, with a staff made up of members of the Greater Chicago Radio Control Association. Two members from each club in the Chicago area are appointed to the Association and included in their duties is the task of presenting Expo.

Manufacturers exhibits hugged the walls as well as the center sections. In the areas between the booths were the static display areas, well stocked with every imaginable type of aircraft: speed boats, sailboats, helicopters, gliders, cars, Scale, Stand-Off Scale, military, Sport, Pattern — you name it. If you wanted a good look at anything, you had to get there quite early because, after lunch, there were so many people that you literally had to wait in line to view the goodies. Trophies were awarded in all of these categories.

Bob McVickers of Sure Flite Models presented an all-foam J3 Cub as an ARF, with optional floats. The elevator and rubber tubing is already installed. Just mount the motor, glue and hinge the elevator and rudder, hinge the ailerons, install the radio, and fly. It is not really necessary to paint it, but it does look good in Cub yellow with stick-on black windows.

The Robart booth was well stocked with new items. These fellows, Bart Furey and Bob Walker, turn out these much needed items with a "you should have had these a long time ago" attitude. Basic ideas with good engineering, and another accessory is born. This time, a sliding tube arrangement that will fit over the elevator and rudder sticks on a 2 channel transmitter and it is turned into a neat single stick transmitter.

In an adjoining building the Gran Prix was underway with Electric R.C. cars in competition; while in the next room, the swap shop was doing a thriving business. That is, I think they were — we couldn't get anywhere near it until very late in the afternoon!

The Expo show team provided plenty of thrills and laughs on both days. Beautiful flying weather brought out crowds of over two thousand for the air and water shows.

Smoke bombs and bipes with Joe Antounes and Don Richels — a thrilling sight to see the airplane climb nearly out of sight and then plummet down, first in a slow, and then in a high speed spin, with the smoke looking just like a corkscrew in the sky. Bill Schultz, Jack Burns, and Joe Fanille, demonstrated their RC parachutes by dropping them on command from their oversize airplane. This takes three radios, one in the airplane and one in each parachutist.

Among the manufacturer's demonstrations were Dave Gray from Du-Bro with the Shark 300 and John Simone flying his "Rev-olution". Many flights by well-known modelers rounded out this portion of the show.

Meanwhile . . . . over at the pond . . . (and Chicago is fortunate in the fact that the facilities at the Fairgrounds can be adapted to fit any type of flying or boating exhibition). Boat racing in late October can be as much fun as in June providing you don't run out of gas or battery power in the middle of the lake. This water is definitely not for swimming!

A mock boat race was staged for the benefit of those who had never seen an RC boat before. Bob Cline demonstrated his RC submarine by submerging and then popping up in the middle of the lake. He also did the same thing going in reverse.

The Monitor and the Merrimac repeated their famous battle; two sailboats raced each other across the lake; while the outboard KB 21 screamed away on Gary Pruesse's "Lightning Bolt".

After the boat show, from a small hill overlooking the lake, I stood watching the crowd making their way back to the main exhibition hall. It was apparent that there was no way that they could all fit inside the building, but the doors opened and somehow they all disappeared . . .

●

Dan Santich, Top Flite Models, and the latest in military Stand-Off Scale F8F Bearcat.

Bob McVicker and his new Sure Flite J-3 ARF kit designed for land and water operation.

John Simone flying his "Rev-olution" copter during manufacturer's demonstrations.

Herb Lindsay – 1st Place non-military scale "Turbulent".

Don Richels bipe on bottom end of smokey spin airshow demonstration.

Jonn Borscha's "Talon" turntable display – 1st Place Formula 5000. Car racing increasing in popularity at phenomenal rate.

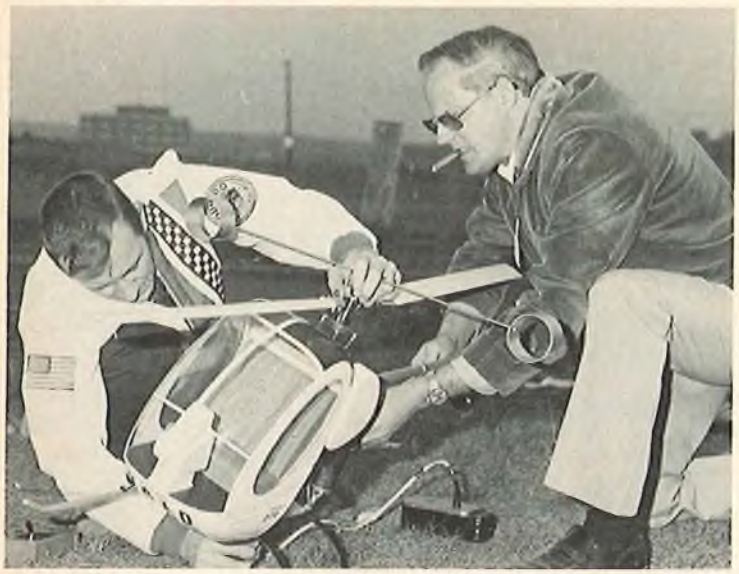
Airplane covered with nothing but cardboard. Designed by Dave Gray, these big machines fly beautifully - - - use gear reduction.

Don Selas, 1st in Pattern and 3rd in Best Finish – Larry Ott presents awards.

Don Richels ducted fan Heinkel 162 – modified version of Nick Ziroli design.

Ginette Rothlisberger with David Blackwell's "Dirty Birdy" – 1st, Jr., 1st Best Finish, and Best of Show.

Military scale exhibit at Chicago Expo '76.

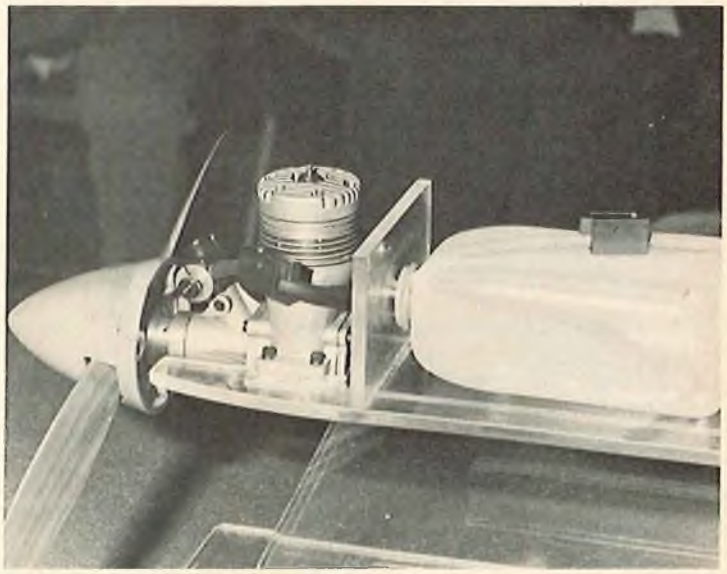


Dave Gray and Bob Bentley from Du-Bro with the Hughes 300 hellcopter during manufacturer's demonstration.

Gary Pruesse of G & M Models "Lightning Bolt" – outboard KB-21 demonstration – Expo site in background.

ABOVE: Dave Blackwell, 1st in Junior, 1st Best Finish, 1st Best of Show. RIGHT: John Benavides Stage II won 1st Place in Hydro.

JCM new battery packs – mufflers and starting battery.



New fuel tube shut off by BACA.

Submarine demonstration – submerging during forward and reverse travel – German U-505 – Bob Cline.

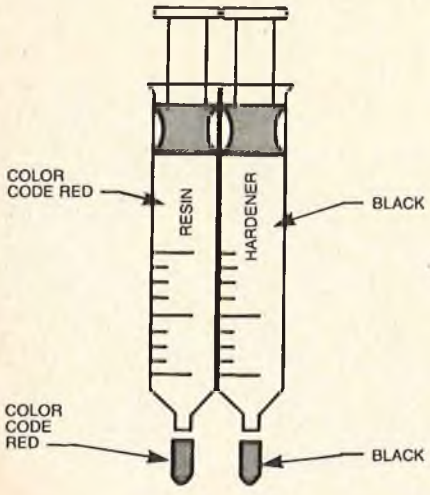
Bob Talchik with REV Models Cassutt Aerobatic racer designed by Bob .40 Sport (first showing.)

FOR WHAT IT'S WORTH

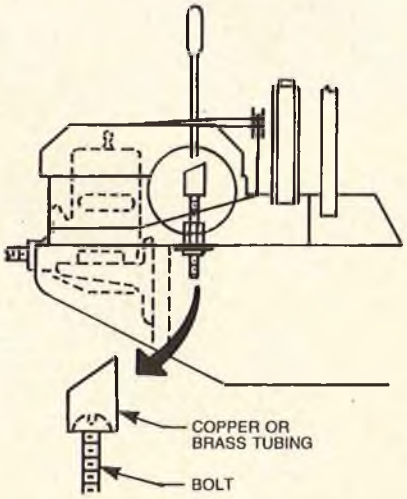
With balsa being the "wooden gold" it is today, Jackie B. Johnson, of Oak Hill, Florida, tries to get as much use out of it as possible. Every time he does some sanding, especially on solid blocks, slab sides, and the like, he sands over a newspaper, wax paper, or other material on which he can collect the balsa dust. Jackie keeps a baby food jar around full of the dust, since it makes an excellent filler for filling in those wide joints in conjunction with Hot Stuff or Zap. Just push a little of the dust into the joint, add a drop or two of Hot Stuff or Zap, and you have a joint that almost requires a file to sand down. So don't over-do it - - - also don't waste that balsa dust!

While on the subject of Hot Stuff or Zap, Daniel Gralla of Van Nuys, California, points out the frustration of the glue drying up in the applicator tube. You usually cut the tube down until the clog is gone, or the tube is gone - - - whichever occurs first. Dan found that a piece of nichrome wire, such as used in the model rocket field, is great to clean out the applicator tube. It sure beats cutting the tube down after each use or having to buy extra tubes since the initial one has been cut down to virtually nothing.

A fast and efficient method of dispensing epoxy glues is to buy two 100c.c. syringes without needles. Glue them together and fill with hardener and resin, respectively. Mark out the tubes and color code the labels and tips. Now you can squeeze equal portions of the glue one-handed and they won't dry out in the tubes. Replace the tips properly after use. If it is necessary to replace the syringes, they are very inexpensive, costing only a few cents a piece. This suggestion was submitted by Richard D. Quon of Quebec, Canada.

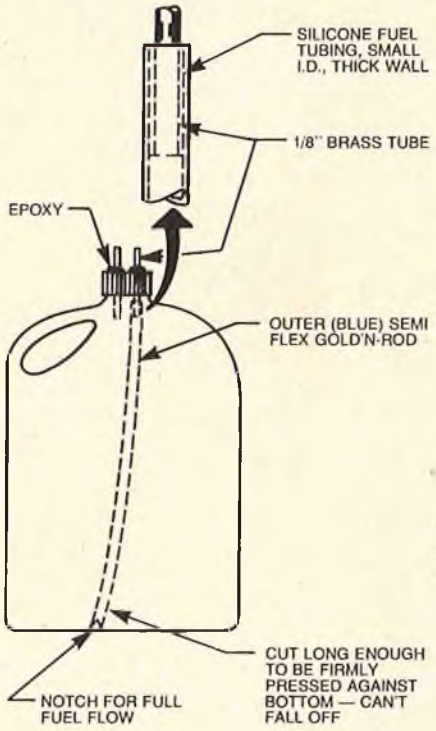


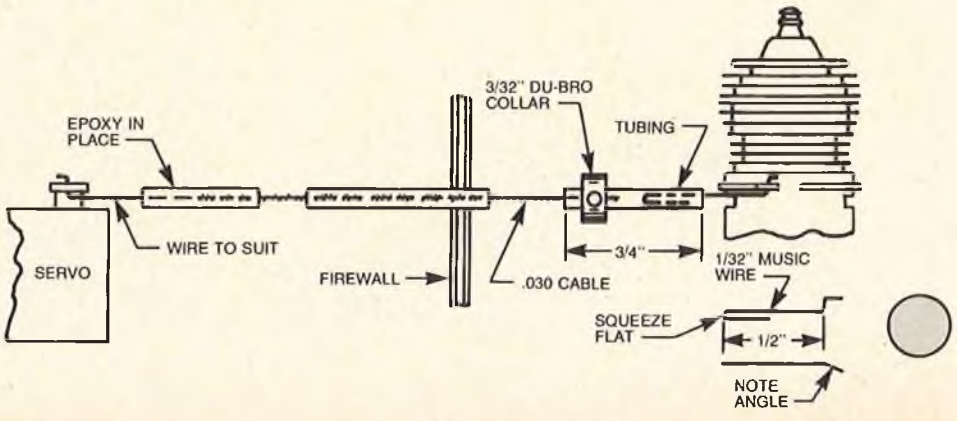
When using scale engines for aircraft, such as House of Balsa's Pietenpol, drill a hole through the drive shaft of the dummy engine wide enough for a screwdriver and solder a length of tubing in which a slanted cut has been made on one end. This tubing is soldered on the bolt flush with the head. This will make it easy to remove the hatch without fishing around inside with a screwdriver to try and locate the bolt head. This idea was submitted by Darrin Covington of Las Vegas, Nevada.



For a throttle linkage for Cox .049 or .051 throttles, this arrangement has worked well for R.H. Pearson of Falconer, New York. Use Sullivan .030 cable and matching plastic tubing. Use two pairs of pliers to "force fit" the wire into the tubing. For the servo end, rough-up the wire and clean the cable with lacquer thinner for a better bond. There is no need to worry about servo direction as the ring can be moved on the sleeve to suit either direction. Minute adjustments can be made at the wheel collar. The latter can be a 1/16" unit if drilled out slightly oversize.

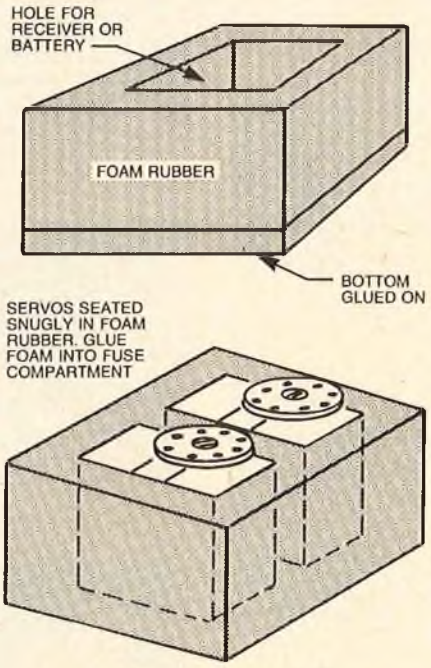
James Cooper of Huntingdon Valley, Pennsylvania, points out that we all know what model fuel does to fuel tubing - - - some types swell, some shrink, and most all rot in time. After the third week of fishing the fuel line out of his gallon fuel bottle after it slipped off the brass tubing soldered into the cap, Jim decided to try something else. The sketch shows what he came up with. Essentially, what he did was to use thick wall, small inside diameter silicone fuel line as a bushing between the outer tube from semi-flexible Gold'N-Rod and the 1/8" brass tube in the cap. Jim cut the outer tube just long enough so that it pressed firmly against the bottom of the bottle. The notch allows full fuel flow. The silicone "bushing" prevents leakage. Jim uses a Sullivan pumping bulb to pressurize the tank and near the bottom of the bottle, the pressure has to get pretty high to push the fuel up and out. He has found this system the best he has used to date.





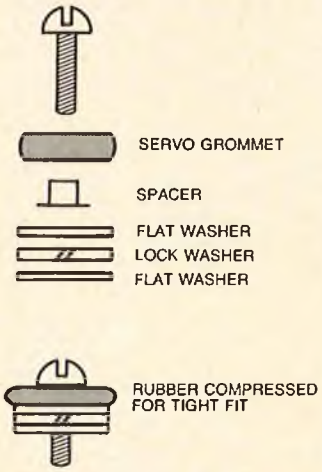
FOR WHAT IT'S WORTH

Edward Baltera of Absecon, New Jersey, says that anyone with a band saw can saw foam rubber for receiver and battery packs or wherever else foam rubber may be needed. It can be cut as thin as the cells in the foam allow. Remember, it can only be cut with a band saw, not a jig saw. Ed has sawn a square hole in a thick piece of foam for his receiver and has never had a vibration problem. Servos can also be set in stiff foam rubber for 1/2A ships that vibrate a lot, as shown in the accompanying sketch.



Ident-A-Key, manufactured by Ideal Security Hardware Corporation of St. Paul, Minnesota 55101, is an item available at all hardware stores. It is a card of self-sticking, weather resistant color coded dots which is designed for identifying the keys on your key ring to their respective locks. Luther C. Wertz of Allison Park, Pennsylvania, has found Ident-A-Key quite handy in identifying the respective receptacle on receiver blocks when mating to the correct servo plugs during radio installation. In other words, the various colors can be substituted for aileron, elevator, auxiliary 1, etc., on those receivers not otherwise identified by moldings in the receiver case or in writing on a manufacturers installed "stick-on". There are, very conveniently, seven colors on the card and while only six half discs will fit on most receiver blocks, this provided an added bonus when utilized on Luther's Kraft Series 75 purchased late last year. Owing to the fact that one extra receiver and two extra servos were included with the deal, the ultimate in utility was achieved in that two receivers could be color coded with but one card of discs. For anyone with the need to change airborne packages a number of times during the course of a season, this 25¢ Ident-A-Key card will alleviate constant references to the manufacturers instruction manual and are probably the easiest to apply and long lasting marking system found to date.

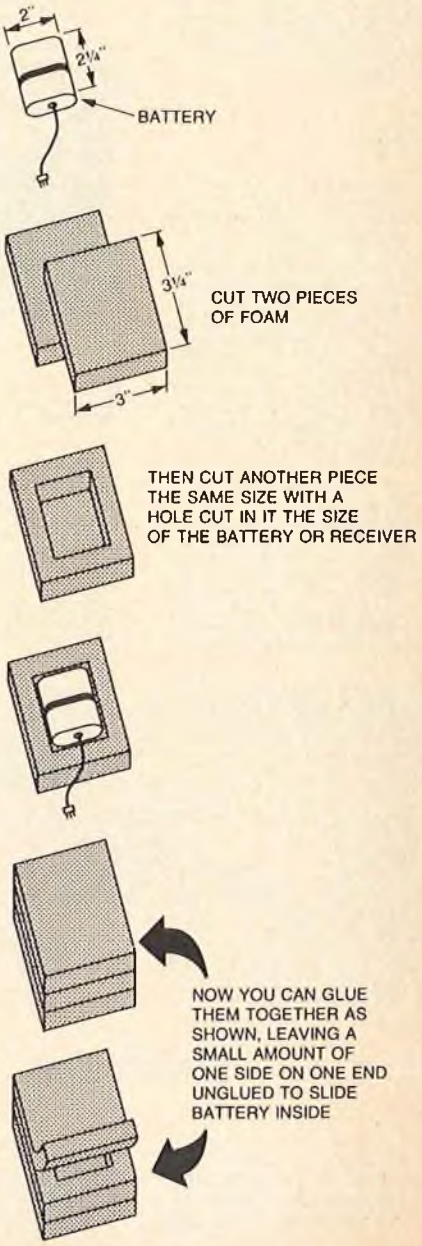
Here is an idea from Matt Fisher of Fresno, California, to cure those engine mounting bolts that vibrate loose after a few flights. Take a rubber servo grommet and spacer and file off half the spacer so the rubber will be compressed when tightened. Next, add the washers and then tighten until the lockwasher is compressed. For larger bolts, use eyelets that can be obtained at a local sewing or hardware store and some rubber tubing. The sketch will show you how Matt puts his idea to use.

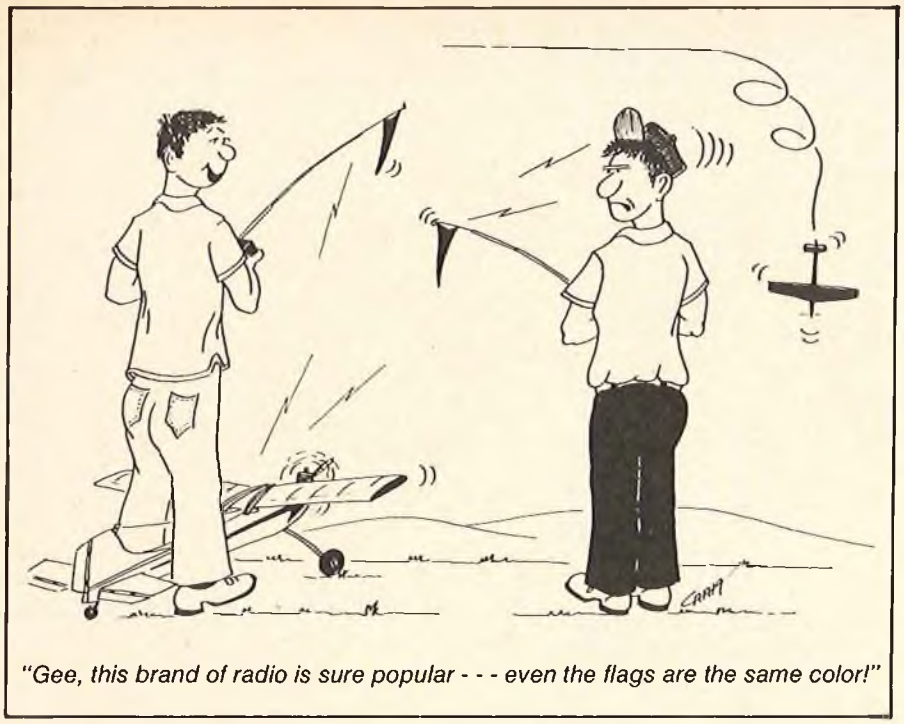


For the many RC pilots who have loose hinges on their planes after a flight or two, Terry Tedesco of Omaha, Nebraska, has been using a dentists drill to drill a small hole through the MonoKote, balsa, and hinge. Put one or two drops of Hot Stuff or Zap in the hole rapidly, or a sufficient amount to fill the hole. The drill will leave a small lip on the bottom of the hinge to help retain the hinge. If the small holes are bothersome, a leather punch can be used to cut small circles of MonoKote to cover the holes.

Richard Droust of Mechanic Falls, Maine, uses aluminum tubing for bearings on plastic hub wheels. Select a tubing that has an inside diameter the same as your wire gear size. Drill the plastic hub to accept the outside diameter of the aluminum tube, then cut the tubing to the proper width and epoxy into the hub. This makes a long wearing hub that will actually outlast the tires themselves, rather than wearing out the plastic axle holes.

Like most of us, Kerry Coyle of Louisville, Kentucky, had, until recently, wrapped foam around his receiver and battery pack and held it in place with some form of tape. However, Kerry discovered an alternate method that doesn't take very long and, when finished, the foam is not already compressed down from the tape. First, take a piece of foam the same width as your battery and cut it out in a square 1/2" larger on all sides. Next, cut a hole the same size of the battery in the middle of the piece of foam. Finally, take two more pieces and glue them on each side leaving just enough unglued on one side to slide the battery in when the glue dries. Now, wrap the battery in Saran Wrap and place inside the foam, then place the entire unit in a small plastic bag to keep the fuel away from the electronics.





"Gee, this brand of radio is sure popular - - - even the flags are the same color!"

In this first of a series of Armchair Ace columns, Hobie gets the "Recognition" some say he deserves — read why. And, next month, our stalwart hero from Cambridge, Maryland, stops to smell the roses . . . if the snow has melted!

ART BY CRAIG WILLIAMS

ARMCHAIR ACE

BY HOBIE STEELE

● For years my skill and talent went unrecognized. But as time passed, people began to notice. Murmurs became rumblings. Whispers developed into open conversation. Suggestions grew to overt face-to-face confrontation of the facts.

In all modesty, however (with just a touch of arrogant humility), I must publicly say, I *earned* the recognition bestowed on me by the Winston-Salem RC Club.

I have finally received formal recognition as a Perfect A.S.S.!

It's been suggested by friends and former friends for years. Behind my back and to my face. But this is the first time my skill and talent has been publicly recognized — substantiated by a certificate signed by Chief A.S.S., Doug Holland. Now, I must admit my certification as a Perfect A.S.S. is honorary, but a Perfect A.S.S. I am, none the less!

Lest you misconstrue the true meaning of Perfect A.S.S. as it applies to me — especially if you know me well — let me definitively explain that A.S.S. stands for: "Aeronautically Skilled Specialist."

The award is normally earned by deserving participants in the W-SRC Annual Follies, a two-day fun fly event begun some years ago to keep the "sport" in Sport Modeling. Three certificates are awarded in the A.S.S. Degree: Half, Big, and Perfect.

To earn the preliminary degree, a flyer must R.O.G., circle the area and make a safe landing somewhere on the flying field. The subsequent two degrees are progressively more involved. The Perfect A.S.S. maneuvers certificate is awarded for a combination of maneuvers including inside and outside loops plus spins and stuff.

The Aeronautically Skilled Specialist Certificates are only a part of one of the biggest fun-flies in the South. Jim Thrift, stalwart of the Winston-Salem RC Club (as well as RC/NC — an ancient and honorable statewide league of RC enthusiasts) originally planned the two-day follies to put some spice into club fun-flies. Last year, over 50 fliers were in attendance.

Awards in several categories are based on points achieved over the duration of the Follies although it isn't necessary to compete for them at all if a flier doesn't care to. If, in the course of flying around, a pilot decides to try for "Wind-Unwind" (5 true and 5 reverse spins) or Si-88888 (5 Cuban Eights) or a variety of other maneuvers, he can, at will. All he has to do is call for a scorekeeper who tallies his success in B.P's (Brownie Points). So many total B.P.'s qualifies a flier for one or more awards which are presented on Sunday afternoon.

One may accumulate B.P.'s by doing several maneuvers in one flight, during subsequent flights, or he may simply fly for fun. The awards encourage practice and increasing proficiency although it's all in fun. Many of the trophies are hand-made by club members and are of the fun variety. I remember one I won in a similar event some years ago — the Bullslinger Award. It consisted of a fat, golden steer on a walnut base. I'm not sure why they selected me for that particular trophy, but it's the sort of thing which truly keeps the fun in Fun-Flies and the sport in model aviation.

Anything your club does to make Fun-Flies *fun* is a big plus for any event you may be planning. There are always those who feel any organized activity obstructs their right to unorganized (disorganized?) pot-twitching on a given Sunday is a violation of their civil rights, so events in which even the most inexperienced fliers can successfully compete are terribly important. There are also those who believe that *all* activites at the club field should be totally organized and those who are competition oriented who must be appeased. Fun-fly events should be carefully planned in order to allow both the fairly new (but safe) flier and the seasoned competitor to enjoy the meet and compete on a more-or-less equal basis. Remember the for P's: Prior Planning Prevents Poor Performance.

Try to keep the *fun* (for everyone) in Fun-Flies because I believe that's what this whole wonderful world of aeromodeling is all about — fun. And I ought to know: I'm officially recognized as a Perfect A.S.S. □

RACING AT RANDOM

from page 85/84

tunnel outboard hull designed by Jeff Schmidt and is available from J.U.S. Boats, Box 452, Anza, Calif. 92306 — price is $85.00.

Rascal — a tunnel outboard hull made of foam and plywood with a length of 35½" and a beam of 12" — available from your local dealer or from Glen Spickler Radio Models, 4208 Santa Cruz St., Bakersfield, Calif. 93307 — price $49.95.

Mongoose #1 — a tunnel hull outboard designed by Ken Reilly — length is 30", beam 13", total weight 4½ lbs. This boat is not available in kit form, but plans can be obtained from Pat's House of Hobbies, 5791 Mission St., San Francisco, Calif. 94112 — price of complete set of plans is $5.00.

We are looking forward to attending more of these outboard races. If you guys out there plan on having some races, let us know what your schedule is for 1977 and we will put it in our column.

And, watch for one of the simplest and fastest building outboard hulls you'll ever see, soon to be presented in RCM. Would you believe one or two evenings work for under $10.00? And it's fast! □

I WANT TO GET STARTED

from page 83

dry cell). All new engines should be "broken-in" and we recommend discussing this with a fellow modeler for hints and procedure concerning this aspect of the hobby — nothing to be overly concerned about, but important however.

Radio: You need *at least* 3 channels for elevator, rudder and motor control. Maybe your *first* trainer will only require these controls. Most people quickly progress to a 4 channel aircraft which uses ailerons and elevator, rudder and motor control. Some instructors feel it is easier to train you with an aircraft using these 4 channels! Therefore, we recommend you purchase *at least* a 4 channel outfit. Most 4 channel systems cost between $200.00-$350.00. For only a slightly larger investment ($10.00-$40.00, depending on the make), you can purchase a 5 channel set. The resale value of the 5 channel makes resale of your set at a future time more desirable — even if you only have 4 servos!

Any set with more than 5 channels is,

to page 106

I WANT TO GET STARTED

from page 102/83

in our opinion, strictly "extra" and is only dependent on your financial status and your prediction as to your future involvement in this hobby. Yes, you can spend up to a thousand dollars for a set if you wish!

The best advice as to which *brand* to buy is this: go to a local flying site and ask which brand is most common in that area and what that person would recommend. Do this to everyone there and after your 'survey', purchase that *name* brand at the local hobby shop carrying that brand. This brand will probably have a convenient service center nearby. There are at least three reasons for purchasing your set in this fashion: 1) Spare parts and accessories will be easily obtainable at nearby hobby shops; 2) This set gives confidence to those who help you when they see a familiar and reliable brand installed in your trainer; 3) You *know* the brand will work because you have seen it at work!

Advantages: These larger planes are easier to work with (building) and usually are more stable in the air than the smaller ones. They are less affected by the wind, and the landings and take-offs are more realistic. By using throttle control, you have the ability to slow down the plane while airborne and, thereby, increasing your reaction time, but still maintaining stability. There are many fine kits to choose from.

Disadvantages: Probably the greatest hindrance is financial. The average all-new 4 channel (complete outfit) costs anywhere from $300.00 to $500.00 depending on your choice of radio. Like most "sports", you can invest in the necessities or you can purchase some of the "luxuries" which you really do not need, but they make life more pleasurable. The luxuries list for our hobby is very long — but you do not need an electric starter, fuel pump, retractable landing gears, etc. These things you may wish to add at a later time (wonderful); but start out with the basics — remember most of the equipment you purchase *will be used* in the future — so make careful, sound investments now and you will have nothing to regret later.

Another consideration for building a larger aircraft is that you need a larger building space (for that 60" wingspan). Also it will require more paint (or covering material), larger wheels, bigger tank, etc.

Total Cost: Everything new — $300.00 and up.

HOW DO I BUY?

By now we hope you see a plan of action for yourself. That is, which method or route you wish to take. Remember, there is no one "best" way. So here are the first steps:

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I WANT TO GET STARTED

from page 106/83

1) Go to a hobby shop and find the nearest R/C club.

2) Go to that club's meeting (they're free and you *are* welcomed) and tell everyone that you want to get started in R/C and which route you wish to take. Listen for their advice and suggestions.

3) Go to a local flying field and watch, ask, learn, ask, listen, ask, etc.

4) Buy your kit at the local hobby shop!

5) Build that kit to the best of your ability. If you have any problems — seek help — from your dealer, club, or new found friends! Just get that plane done!

6) Purchase an engine (unless you're building a glider).

6a) Take your wife out to dinner!

7) Purchase your radio (by now you ought to know enough to make a good decision).

7a) Take your wife out for dinner again!

8) Get some help and guidance installing the engine and radio.

9) Ask for an experienced pilot to test fly your plane and teach you to fly. **Note:** Experience has shown newcomers who enlist the aid of experienced modelers have less trouble and, therefore, enjoy the hobby more! This aid can come from any modeling friend, a club, or an active hobby dealer.

10) Read a lot from the fine selection of magazines and publications on sale at your hobby store. Read all you can — for you'll never stop learning!

11) Help start another "newcomer" into this great hobby. It's too great *not* to share it with everyone — besides there's more than enough to go around!!! □

U.S.S. MELVIN

from page 73

so a trip was made to see the expert Al Wood, of Model Engineering. He had perfect props but they were bored 1/8" so he bushed them to fit my 1/16" shafts already installed (a really helpful and knowledgeable gentleman). All that remained was careful ballasting in the bathtub again (oh place of evil memories). About 4 ozs. of lead were positioned (and later taped in place) in the stern to get down to around 1/2" freeboard there and, at the same time, get about 2 degrees port list to offset the prop torque as the props are not contra-rotating. Finally!! I was ready for the lake!

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U.S.S. MELVIN

from page 110/73

Dead slow on the A5 moves the ship at about 1½ mph and half speed pushes it along about 4½ mph which is approximately 45 mph scale speed. At this speed the bow wave comes up to foredeck level and there is quite a mound of water in the stern wake. Any-more power and the stern starts to lift and the bow starts to bury (I am very conscious of the bow submerging as there is so much equipment in there that no room is left for flotation foam). This speed gives 35-40 minutes of sailing time then, 12 minutes on the Astro rapid charger in the car cigaret lighter puts the ship back in the water for another 40 minutes.

The radio and motor charging jacks are concealed in each funnel (funnely enough) and the radio switch is hidden below decks under the starboard whale boat. All gun turrets, torpedo tubes, and gun director will rotate 120 degrees but they proved to be too much load for a servo so a future project is to figure out how to reduce the friction and get them operating freely. There also are ideas for installing model railroad smokers in the funnels. With its speed and running time, a big lake is no problem but binoculars help as it is capable of travelling 2½ miles on one battery charge. Without the radio, rapid charger, and model crew, the total cost can be kept under $60.00 but it looks like a million! And only basic modeling tools and glues are required.

After 5 weeks, averaging 6 hours a day, it is a lot of fun and looks extremely realistic in the water at the park. But on the first trip out there, after a couple of minutes, a guy walked up and said, "How much did it cost?" - - - I almost threw the transmitter at him. □

HALF & HALF

from page 64

the Garden State (New Jersey for you Californians), know how rainy and/or windy it gets. It seemed that March '76 weekends had 100% more than their share of both, so it was wait and wait, etc. Well, any red blooded modeler has only so much "wait" in his system when there is a new ship ready for the air. Luckily, by some quirk of high and low pressure, one Sunday morning presented itself complete with quiet air and tolerable temperatures (in spite of a sour prediction by the weatherman). A telephone call and a "let's do it now before Ms. Nature realizes what happened," we were at the UMAC'ers Watchung flying site. We started the Tee Dee and "pointed it at the weeds" and "Half & Half" took to the air. Well,

somebody must have squealed on us because Ms. Nature corrected and we suspended operations, but not before a lot of grinning and back slapping took place. The next weekend it was back to 15 to 25 mph and higher gusts. It was a plot! Again the internal pressure was too high and, under the guise of, "lets see what it will do in the wind," some more flying and grinning took place.

Our ship, ready to fly weighed 23 ounces without any real special effort. A wingspan of 34" with a symmetrically airfoiled chord of 6" gave 204 square inches. The radio was an 8 channel Heathkit with two sub-miniature servos, receiver, and 500 MAH battery pack with a Ralvin Industries "Early Warning Detector" watching over the milliamps. The engine was a Cox Tee Dee .051 turning a 6/3 prop.

We have put "Half & Half" through its paces and the design has proven to be a worthy one. Flying it is loads of fun, whether hacking around on a Sunday afternoon or turning pylons. It is capable of doing all maneuvers that an aileron/elevator ship can perform. Pylon turns are very tight and smooth with the aircraft exiting only to eat up space before the next turn. All who have witnessed this aircraft in flight are amazed at its speed and agility. It is very fast and, for this reason, we do not recommend it for beginners. Take-offs have been mainly the normal hand launch type, although R.O.G.'s have taken place with no difficulty. (The construction of a new flying field dictates the hand launch approach at this time.) Landings are no problem at all as, once the engine cuts, this ship has a very respectable glide (not like the common Crow-Bar effect many Half-A's exhibit). Construction is relatively simple and builds quite quickly.

At the end of it all, it seems to us that if you like Half-A aircraft you should enjoy "Half & Half". It fits RCM's 1976 specifications for Half-A pylon racing and does those pattern maneuvers not requiring throttle with surprising smoothness and responsiveness. If you give a little concern to light construction techniques, the result will be a ship that is very competitive, highly maneuverable, yet stable. It's a real pleasure to fly.

Again we really can't recommend this model for a beginner, so if you are a novice, try something milder and more understanding so you'll enjoy the fruits of your labor more and *longer.*

So down to the nitty gritty and let's build!

"HALF & HALF"
MATERIAL LIST

Balsa Sheet
(2) 1/16 x 2 x 36
(1) 1/16 x 3 x 36
(1) 1/8 x 3 x 36
(1) 1/4 x 3 x 36

(2) 3/32 x 4 x 36 & scrap
Balsa
(1) 1/2 x 1/2 x 36
(1) 1/4 x 1/8 x 38
Spruce
(2) 1/8 x 1/4 x 36
T.E. Stock
(1) 5/16 x 3/4 x 36
Hardwood
(1) 3/8 x 1/2 x 13"
(1) 3/8 x 1/4 x 4"
Dowel
(1) 1/8 5"
(1) 3/16 3"
(1) 1/4 1"
Plywood
(1) 1/32" 4" x 15"
(1) 1/16" 1¼" x 2¼"
(1) 3/32" 1½" x 2½"
(1) 1/8" 2¼" x 3¼"
(1) 3/16" 2½" x 2½"

WING ASSEMBLY

(1) Stack the following sizes of balsa rib blanks (10) 1/16" and (6) 1/8" between templates (cut from your choice of material) and sand to the contours of the templates.

(2) Notch (4) 1/8" ribs to mount hardwood landing gear blocks.

(3) Cut and notch (2) 1/16" balsa false ribs for landing gear mounts.

(4) Cut (2) 1/8" balsa tiplets and (2) 1/32" ply tiplets.

(5) Pin plans (covered with mylar or wax paper) to your building surface.

(6) Cut 1/8" x 1/4" spruce spars to length and pin lower spar over plans.

(7) Slide ribs into place on lower spar.

(8) Place upper spar into rib notches and align ribs properly.

(9) Pin 1/2" square balsa leading edge into place and check rib alignment (vertical and horizontal).

(10) Pin 1/4" x 3/8" balsa spar to ribs and glue wing assembly as constructed to this point.

(11) Sheet and cap strip (1/16" balsa) top and bottom of wing (cut out for L.G. blocks and servo rails).

(12) Cut 5/16" x 3/4" T.E. stock to length and cut out ailerons.

(13) Groove and notch T.E. for "inner NyRod" aileron wire bearings.

(14) Holes for nylon wing bolt dowels should be drilled and support dowels drilled and installed during final assembly and trammeling (before covering).

(15) Cut to size, install in NyRod bearings and bend 1/16" aileron.

(16) Epoxy T.E. and aileron control wire assemblies to 1/4" x 3/8" balsa spar.

(17) Shape aileron leading edge to allow for 1/4" total aileron throw.

(18) Install 1/8" balsa and 1/32" ply tiplets.

(19) Install 3/16" wing dowels.

(20) Shape L.E. to contour of tiplets.

(21) Install aileron servo (mount to suit) original design used Heathkit sub-mins.

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PATTERN

Annual Pioneer R/C Club Open

AA Sanctioned Events—Novice, Advanced, Expert, Master

Sponsored by Pioneer R/C Club, Inc., Sunnyvale, California

When:	May 14-15, 1977	**Fees:**	Pre-registration, $8.00 (Specify class, AMA#, Freq.) At the field, $10.00
Where:	Santa Clara P.A.L. Skyport Santa Clara, California *(located approximately 1 mile from U.S. Hwy 101 on Great America Parkway)*	**Trophies:**	Trophies to fifth place
		Contest Manager:	Geoff Nelson 1594 Kathy Lane Los Altos, California 94022 Telephone: 415/965-1921
Registration:	Saturday, 8:00 A.M.		
Flying:	Saturday, 9:30 A.M.-5:00 P.M. Sunday, 9:00 A.M.-Conclusion		

The Pioneers are again sponsoring their third consecutive annual pattern contest, with the emphasis on *flying*. We aim for at least six rounds of the full AMA pattern at one of the finest R/C locations in the west. There will be four lines sharing two circles on the P.A.L. Skyport's fully-paved, 125' × 400' runway, which was designed especially for R/C use. Contact contest manager for additional information.

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(22) Roughly shape fuse-wing fairing and glue in place. This is finish sanded with fuselage.

(23) Bend L.G. from 3/32" wire and install after wing is covered.

(24) Install ailerons after wing has been completed and covered (original used MonoKote covering and hinges).

FUSELAGE AND EMPENNAGE

(1) Make required templates from plans for fuselage sides, top, bottom, hatches, formers, etc., and cut parts from sheet balsa, sizes called for on plans.

(2) Select some *light* "C" grain balsa for the top of the fuselage, cut to shape. Mark former stations and centerline on fuselage top. Mark center lines on all formers.

(3) Mount F-1 through 4 on fuselage top using centerlines and a right triangle for horizontal and vertical alignment.

(4) Glue on *matched* fuselage sides (butt joint on fuselage top) taking care to align properly with fuselage centerline.

(5) Install bottom of battery compartment.

(6) If plans and templates were followed properly, the firewall should drop into place. Epoxy should be used to secure the firewall.

(7) Glue battery hatch hold-down dowels and 1/8" balsa shims to hatch.

(8) Drill, top and install hardwood block for 8-32 nylon hatch hold-down screw.

(9) Battery compartment hatch is tack glued in place for shaping.

(10) Slide plywood motor mount into firewall notch and check alignment. Drill holes for mounting engine and install blind nuts or other mounting hardware. Any fuel proofing should be applied to the back of the plywood motor mount since access to this area will be difficult after further assembly. Drill hole in firewall for fuel tubing.

(11) Epoxy motor mount in place.

(12) Fuel proof firewall and motor compartment side, top, bottom. When dry, glue compartment side, top and bottom in place. Blind mount a Kraft (side mount) servo mount to 1/16" ply platform and install in fuselage.

(13) Install outer NyRod (to elevator) and sand flush to side of fuselage.

(14) Install 1/16" balsa fuselage bottom and plywood tail wheel mount.

(15) Sand fuselage to shape, contour fairings and hatches.

(16) Cut and install vertical stabilizer from 3/32" balsa.

(17) Join two halves of elevator with birch dowel.

(18) Cut and shape horizontal stabi-

lizer from 3/32" balsa.

(19) Cut and install 1/32" plywood doublers in fuel tank compartment.

(20) Cut and install 3/32" balsa wing saddle doublers.

(21) Install hardwood blocks for 8-32 nylon wing hold-down bolts (to be drilled and tapped after wing is trammeled).

(22) Install elevator and horizontal stabilizer (slide elevator in first, Mono-Kote hinges were used on original); if nylon hinges are used, modify fuselage slots to suit.

(23) Bend tailwheel wire, install wheel and epoxy assembly in place.□

MINI-ANTIC

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. . . . . which we feel might be excessive for this type of aircraft. The forward fuselage was finished with K & B Superpoxy - - - the checkerboard being silkspan with Randolph butyrate dope finish. The kit is complete in every respect and is truly another masterpiece from Proctor Enterprises. □

ORLICE

from page 60

weight, we elected to go with the landing spoilers on our prototype. Also, before gluing the plywood root ribs on the wing and elevons, use these ribs as drilling templates for drilling the mounting wire holes. The flying of the Orlice is something to behold! Utilizing a 90 degree "V" tail, the control surfaces are very effective so a maximum of 5/8" travel in both directions is ample if you stay within 6 to 7 degrees wing dihedral angle. For dihedral angles of less than 6 degrees, the Orlice is slow and skittish in the turns and somewhat unstable on the winch. In the flight performance category, the transition is good and the speed is excellent. A sailplane of this size and weight can build up speed very quickly which makes the controls that much more responsive and, for the inexperienced sailplane flier, there is a tendency to over-control at this point. The thermalling capability of the Orlice is very good with only a slight tendency to slip off in too tight of a turn. Control surfaces have to be held in command condition for a longer duration in the thermal. When used on the slopes, the Orlice is excellent in 8 to 10 knot winds and above. Again, speed has to be governed with care, although the controls are not quite as crisp on the slopes, but, if you let the speed build up, you will again find yourself in an over-control conditions. The Orlice is a competition model all the way, has flown at all times, and is not a forgiv-

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GRAPHITE COMPOSITE WING SPARS

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flanges of the two angles, as shown in Figure 5. The excess epoxy was allowed to squeeze out at both ends and along the sides. Sometimes, when too much epoxy was used, graphite fibers appeared between the wood and the mold flanges. In this case, lift up the hardwood strip, wipe off the excess epoxy, and put the strip back in place. If necessary, repeat several times. Some good advice from someone who suffered: wear rubber gloves for protection of your hands!

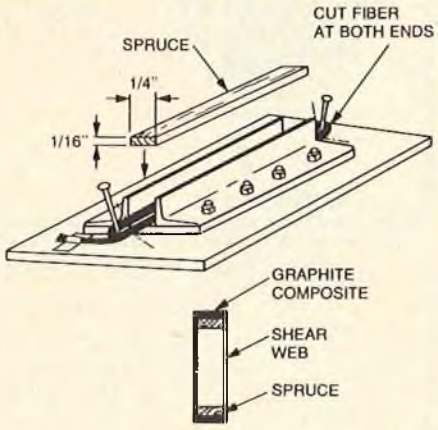

FIGURE 4

After 24 hours of drying, the clamps were taken off and one angle was removed. The graphite-epoxy-wood composite could easily be pried loose from the mold. The mold was cleaned, assembled again, treated with mold release and the next cap strip could be started.

Several gliders have been built in the Huntsville area which used graphite fiber wing spars and graphite fiber reinforced fuselages. The first, to my knowledge, graphite fiber reinforced 8% thick wing was built by Greg Smith for

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ORLICE

from page 117/60

ing type trainer sailplane and should not be considered as a first sailplane for the new soaring enthusiasts. The landing spoilers are extremely efficient and care has to be given, and a lot of practice made, in order to synchronize the responsiveness of the V-tail while applying the spoilers. The latter really slows this big machine down. Once you have tried the spoilers on the Orlice, and if you have never used them before, you will not want to fly a big fast machine without them. The wings and elevons were covered with transparent blue MonoKote, while the fuselage was painted with white K & B Superpoxy. This is one of the best high performance machines around, ideally suited for the experienced sailplane enthusiast, and one that entails some of the best design engineering that we have seen. □

GRAPHITE COMPOSITE WING SPARS

from page 118/58

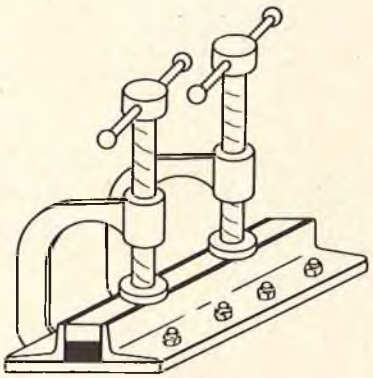

FIGURE 5

his FAI ship which met with an accident — a mid-air collision — at the finals in Denver. The wing spar survived the crash. I built two gliders with graphite composite wing spars. Both wings have a thickness of 9% and an aspect ratio of about 20 to 22 to 1. Conventionally built wings started to flutter in a shallow dive and broke easily during a somewhat less than gentle winch tow. The new graphite composite wings hardly flex even in high G maneuvers. The gliders are by no means heavy. Their wing loadings are still a reasonable 8.5 ounces per square foot of wing which, incidentally, have a span of 14 and 13 feet respectively.

Now, my dear friend, you know the secret! Why don't you try it. I bet you will like it too! □

cowl if desired. The flexibility of doing this yourself can provide a very realistic scale appearance to suit the particular installation.

The engine mounts to the firewall with a flat mounting plate bolted to the rear of the engine and it runs best on its side or inverted. The engine can be a bit harder to start if mounted upright. In most cases, in our use of the engine, side or inverted mounting is best for cowling purposes.

The Quadra has a drive shaft both front and rear, which means mounting must provide clearance for the rear shaft which projects about 2½" from the mounting plate. This rear shaft can be removed if desired; but I chose to leave it on mine as somewhere down the road I can see a Cessna Skymaster with both front and rear props driven from the same engine. As mentioned earlier, the distance from the center line of thrust to the cylinder top is 5", so cowling the engine completely is not a difficult feat on large aircraft.

Available in the near future will be a fitting which replaces one of the crankcase bolts; this will provide 3 to 5 pounds pressure for whatever purpose you like. It will certainly make the problem of producing smoke somewhat simpler than with a glow engine.

The engine is used in seven different chain saws, so parts should be pretty readily available anywhere and service should not be hard to find if you can't, or don't choose to do it yourself; although anyone who has changed a liner and piston in a glow engine shouldn't have any trouble working on the Quadra. The cost of the engine in Canada is under $120.00 and with props at under $3.00, the capital costs are in the normal ballpark in modeling.

The real plus of the engine are its economy both in fuel cost and in fuel consumption, combined with its fantastic power. Large models can now be built very strongly with little concern for weight or balance problems. The Quadra weighs in at 3 pounds, but you could shave this by about 8 ounces with some careful trimming. My Cub came out at 16 pounds total weight and it balanced right on the money fore and aft and required a one ounce weight in the left wing tip for lateral balance.

The engine is a proven performer as tens of thousands of them have been built and used all over the world.

Our local flying site is almost 400 miles north of the US/Canada Boundary, and we try to fly all winter long whenever the weather permits. Traditionally, we have a New Years Day 'Fun Freeze' and fly almost without regard to the weather. Our experience with the Quadra in cold weather is a real treat, as it starts on the second or third flip (yes, Virginia, it hand starts) even in cold weather after a shot of prime in the carb. It's the envy of the glow engine fraternity in low tempera-

tures. Having a mag switch is pretty nice when you're ready to shut down and not having to hook up a glow plug battery to start it is another plus.

The thought has occurred to some of those using the Quadra that it should be possible to install a self-starter aboard a large model by using a motorcycle, or similar starter, coupled to an external 12 volt source through a jack or by installing a small 12 volt nicad pack in the model.

As you can see, the possibilities are pretty wide ranging.

The Model

There aren't too many plans which suited my requirements for a large airframe for the Quadra and I wanted something which would have a reasonable chance of flying well, so I chose the Sid Morgan 9' J-3 Cub as a first vehicle for the Quadra.

Those of you who have seen the plan know that it utilizes very straightforward construction with nothing at all complicated about it. After taking a good long look at the construction and the way the J-3 is planned, I decided to go ahead with it, keeping in mind the use of materials that would be readily available and less costly than conventional model materials. For the bulk of the strip wood, I used Western White Spruce in place of

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BIG IS BEAUTIFUL

from page 122/56

the Balsa longerons, stringers, etc., and Sig's Lite Ply poplar plywood for formers, wing ribs, and the like.

The spruce available locally in my area (Central British Columbia) must be chosen carefully for clear straight grain. After kiln drying, it is quite light and, although it does not have quite the strength of Sitka or Engelman spruce, it handles and works about the same. I cut my own from 2 x 4's on a radial arm saw using a planer blade and it comes off the saw ready to use with no further working necessary.

The Cub has no really odd sizes, using mainly quarter square, along with some half by quarter, three-eights by quarter and a couple of husky five eights square pieces for the leading edge.

Once the straight stock was cut, it was a simple 'pin it on the plan and glue' routine, just as in building a conventional model. The pins are a bit harder to set through the spruce, but aliphatic resin and 5-minute epoxy work as well as they do on balsa.

The wings on this particular J-3 come off separately for ease of transportation. The method used is quite strong, being a tongue built into the cabin top mating with a slot built into the wing and secured with two 6-32 bolts and blind nuts.

The main wing struts are working items in a ship this size and are secured to the plywood mounts in the wing with 6-32 blind nuts and bolts. The piano wire strut mounts, at the fuselage end of the struts, did not appeal to me so they were eventually replaced with a strip of heavy gauge aluminum running right through the fuselage and bent up at the appropriate angle on each side. In this way, the struts are connected straight through to the opposite wing quite solidly for good support and strength. The method of attaching the struts to the plate was by slotting the strut over the plate and using 4-40 blind nuts and screws. The strut end should carry away in a crunch and minimize wing and fuselage damage.

The upper part of the cabin, including the wing attach tongues, was made from aircraft grade plywood as called for in the plans for strength as this area bears all the weight of the model in the air.

Speaking of weight, I paid no attention to any weight considerations while building, except to go a bit heavy aft on purpose. The reason for this was the 3 pound weight of the engine up front which permitted much stronger construction of the tail feathers.

The firewall was doubled up quarter inch aircraft grade plywood to permit really sturdy mounting of the additional weight and to transfer the thrust to the rest of the fuselage through a strong bond.

Balsa was used for the wing sheeting, trailing edge, wing tips and for the perimeter of the tail surfaces simply for ease of working. They could just as well have been spruce if I had taken the time to cut the necessary material.

The forward sheeting of the fuselage was quarter inch balsa sheet, part of which came out of the scrap box, but other materials have since occurred to me for this use. Artists board, plastic sheet stock, or even Lite-Ply could have been used in this area with little, if any, changes in balance or strength. The Lite-Ply is particularly strong and relatively inexpensive, so a wide choice is available as alternatives to costly balsa wood.

I use EK radios and a Champion was installed in the Cub. I feel it is a good idea to use cable controls working both ways on these large models except for throttle. The control surfaces are large and the slip stream is powerful, so blow down of a control surface were a distinct possibility if double acting controls weren't used. Double sided horns for the stab and rudder were made from 1/8" plywood and the rudder horn was spring coupled to the steerable tail wheel to keep shock away from the servo.

The ailerons are driven by separate servos in each wing, using a "Y" connector in the aileron plug on the receiver. The ailerons are fairly large and the load being divided in this way probably helps a lot. It makes for much easier assembly at the field as it's a great deal easier to hook up two connectors than to assemble and adjust a mechanical connection every time you fly.

The radio was installed aft of the cabin area in order to leave the cabin area completely clear for subsequent detailing if desired. I sheeted the radio compartment in with Lite-Ply although this was not really necessary. It did, however, assure alignment and squaring of the fuselage aft and added a bit more strength.

I use Super Coverite because I like working with it and it gives the J-3 a very realistic appearance. I used yellow Super Coverite and striped the fuselage with the traditional black thunderbolt.

A polyurethane block was made up on the firewall, conforming to the shape of the fuselage and allowing room for airflow out underneath the rear edge for cooling purposes. This was then removed from the firewall and a fiberglass cowl was formed on the plug using three layers of cloth and resin. K & B finishing resin on top and some sanding produced quite a presentable cowl. It had to be a bit fuller than scale in order to accomodate the size of the engine, and although unfortunate, this slight deviation from scale is not readily noticeable in flight and does not detract significantly from the Cub's appearance.

Painting is a breeze as the exhaust

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from page 125/56

from this gasoline powered engine is not nearly as good a paint remover as glow fuel exhaust. I used ordinary automobile enamel on the Cub and the exhaust has yet to affect it.

This big yellow bird is a bit awe inspiring in comparison to the usual 'big' model, so I took mine out for some taxi testing before flying it. As with most tail draggers, there is some tendency to ground loop, although the Cub is not nearly as touchy as my .60 powered Acro Star. The gear on the Cub is almost 24" between the wheels so, even in a real whip of a ground loop, it stays on its wheels, and has yet to dig in a wing tip.

The tail comes up almost immediately as the throttle is advanced. That 18 x 6 club thrashing around up front creates quite a draft and the Cub accelerates very smartly even at half throttle.

My engine is mounted on four bolts projecting out of the firewall with rubber grommets under the mounting plate and hex nuts with lock washers over the plate. This permits alteration of the thrust line by simply taking up on the appropriate nut. To date, I have cranked in a degree or a bit better of down (it's hard to measure) and about one degree right. The Cub takes off straight out with only very minor corrections ever necessary for straight tracking. I have put in quite a bit of extra toe-in on the main gear as this ground drag helps slow it down on landing. The wings have good lift and there is a lot of mass moving at 16 pounds so it tends to take a long while to land. Brakes may well be necessary on some of the bigger birds, even on grass strips. The thing is so big that it is hard to get used to landing it properly. Due to its size, if you get it down in the landing pattern where it should be on final, it looks as if it has its wheels in the rhubarb and you end up touching down halfway down the strip and running out of room!

Flying the big bird was almost anti-climactic as it is extremely stable. Slight rudder and aileron trim to the right was needed, oddly enough, and the right thrust had to be added at the engine mounting. The trims required were well within the limits of the trim levers on the transmitter.

It gets to look a little smaller in the air and is very scale-like in flight as it doesn't have to fly fast to stay in the air, until you advance the throttle that is! At full throttle, the Cub takes its 16 pounds upstairs in a hurry, climbing at nearly 30 degrees to the horizontal. This is the kind of performance full scale Cub owners dream about!

I must admit I am hooked on the big birds now and currently have a 1/3 full scale Pitts S2-A on the building board

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(there are two under construction in our club). I also have several plans I intend to scale up for the engine, including a Waco Taperwing and RCM's PT 17 which will probably come out looking like Joe Hughes' Super Stearman. I had a ride with Joe some years ago and I'm sure the Quadra will make a Scale Super Stearman perform as the 650 Wasp up front does in the full scale version.

The 10' 4" Beaver mentioned earlier in this article is a spectacular performer with a Quadra up front. You may never see a Beaver looped, but this one does! With its flaps down, it lands at approximately 15 miles an hour with excellent control and no pitch down from the flaps. Full scale Beaver pilots in the area admit that it is hard to tell the model from the full size aircraft in the air.

Having all that power available is a pretty comfortable feeling that inspires great confidence even if you never use it. The big birds using this engine are capable of getting themselves out of harms way in a hurry when necessary!

To sum up, there are both good and bad points in the big birds. On the minus side, they are large and, therefore, a bit awkward to transport. If you drive a VW Beetle, maybe you better stay with Peanut scale! Putting them together at the field requires a bit more than "snapping on a couple of rubber bands and away we go!" A little forethought and ingenuity while building will minimize such negative attributes of the biggies, however.

Power demands on your flight pack battery are likely higher than normal as control surfaces are large and prop wash is substantial. It's a good idea to keep the flight pack up to par and increasing the flight battery capacity (even to adding a second pack in parallel) may be a good idea. The extra weight of even doubling or tripling the battery will never even be noticed.

On the plus side, economy has to be right up there at the top. The airframe for the Cub was built for under $25.00, not counting scrap box material. Covering was four rolls of Super Coverite which means it cost almost twice as much to cover as it did to build. Even so, it was less costly to build and fly than my Super Kaos .60.

The big birds are a dream to fly. At 16 pounds gross, the wing loading on the Cub is just under 20 oz./sq. foot. The chord is 16⅜" which gets me into favorable Reynolds numbers and nice flying characteristics.

Big birds with big engines have extremely impressive carrying capacity. For example, that aging movie camera you didn't bother to trade in on your new

Wizzard Super 8 Zoomer will ride your big bird without appreciably affecting its performance — and think of the picture possibilities! As examples, your field from the air, local points of interest from the air, the nudist colony, etc. Anyway, the possibilities are there and endurance flights would be a piece of cake with the Quadra, it's fuel economy and carrying capacity make it a natural.

Do, however, keep the additional weight close to the C.G., since there is no sense trifling with the fates (or Murphy's Law) by getting the C.G. *too* far aft.

Fuel capacity at around a quart, should run the Quadra for somewhere between 1 and 2 hours (we've never run it out of fuel yet!), depending on throttle setting. Can you imagine having to land from your first flight of the day because you were concerned you might be running out of radio battery? And imagine, if you will, how those on your frequency are going to hate your Quadra? Just remember the emphasis there is on the word 'sharing'.

For the budding scale enthusiast, detailing a large aircraft is a delight, since there is lots of room in which to work and, if you're as butter-fingered as I am, that's got to be a big plus!

Last, but by no means least, the big birds are real crowd pleasers, and not just for Joe Public either. Take your big bird out to the strip and see how many of the guys in the club gather around to have a closer look at your giant. On a recent day here, there was a 36" span J-3 sitting next to my big one and the number of comments about my Cub having pups were unbelievable.

Hopefully, we will eventually see some sort of event for the big birds. Ed Morgan in Reno has some ideas on the subject as regular readers of RCM will know from a recent article on his idea. I hope to be able to work through the Model Aeronautics Association of Canada (our equivalent to the AMA) to try to have an event set up for quarter scale and larger or for 2 cubic inch engines or something of that sort.

If anyone else has any ideas, I'd like to hear of them and if anyone has or knows of plans for models of 9' span and larger, I'd be delighted to hear about them as well. Dick Phillips, 853 Reid Crescent, Prince George, B.C. Canada V2M 3W6.

Good luck, good flying, and remember, Big is Beautiful! □

SOLO MK II

from page 55

and then repeat the process for the other half, starting by slipping the ribs over the spars. After the glue is completely dry on the second half, the wing can be removed from the plans and the center ribs, trailing edge caps, wing tips, and

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SOLO MK II

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the center wing sheeting are added. With this accomplished, you have the wing well on the way to completion. The tail structure is of sheet balsa which is pre-shaped and requires only joining the parts together and sanding to an airfoil section. Wilhold Aliphatic Resin and Pacer Industries Zip 5-Minute Epoxy was used throughout construction. The hardware package included a formed cowl, formed wire landing gear, steering arm, landing gear clips, wing dowels, NyRods, NyRod studs, threaded rods, control horns and clevises, blind nuts, screws, hinges, and servo tray mounting rails. No modifications were found necessary to the construction. In the flight performance category, the ground handling and air performance of the Solo Mk II are extremely good. The ample ground clearance and widely spaced main gear make it a natural for grass field flying. Since the recommended engine size was from a .20 to .40, we decided to go for the maximum and installed an OS .40 engine and muffler. With this size engine, the aircraft will roll about 10 to 15 yards on take-off on a

grass field and then break ground — a total time of about 3 to 4 seconds! Once in the air, you immediately feel the stability and control and the abundance of power at hand. The control response is very good at all speeds and, with the control surfaces set at medium throw, it will loop, roll, spin, and fly inverted. With the power brought back to an idle, the flight can be slowed down to an extremely slow speed with no loss of control whatsoever. The glide is quite good and the landing can be made at a very reasonable speed with just a little up elevator for the final flare-out. Transparent green Flite Kote was used on the wings and horizontal stabilizer, while yellow Solarfilm was used on the fuselage and vertical fin. Our Solo was trimmed with white trim tape on the wing while the cowling was painted with Sig yellow Plastinamel. □

TIGER MOTH

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. . . . . are included in the most comprehensive accessory package we have ever seen in any kit. Not only is the kit dimensionally and visually scaled, but the construction is also scale — even the wing spars are spliced in the same manner as the full size aircraft. Profile Publi-

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TIGER MOTH

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cation #132 is included for documentation, modifications, color schemes, etc. Also included are vacuum formed instrument panels with card stock instruments for a scale three dimensional effect. The fiberglass wing tank is even scale corrugated. As previously mentioned, each part is numbered on both the part, itself, and the plans referencing into 22 pages of comprehensively detailed instructions. This is, without question, the most completely detailed kit we have ever seen at RCM. It is entirely hand crafted with over 200 separate items not including the hardware. The only materials required to complete this kit are the adhesives, covering, paint, engine, and radio system. The only adjustments required are those in your home life once you open this kit box in your workshop - - - we can honestly say that things are never going to be the same again! Our prototype was built with Wilhold Aliphatic Resin and Hot Stuff and covered with Super Coverite. Finishing used was K & B Superpoxy. With regards to the flight performance, it can be summed up in one word — scale! Like the full size aircraft, the model is docile, yet aerobatic. The wing planform, with its swept back wings and dihedral, gives great stability and makes it quite difficult to stall inadvertently. The undercambered wing section employed is very close to scale, making the model very slow flying and safe. Loops and stall turns are a cinch, but rolls, like the full size aircraft, are a different matter. You must use top rudder both ways plus a healthy amount of down elevator as she goes over on to her back. With a little practice the rolls are unbelievably smooth and slow. Spins are reasonably slow and beautifully scale-like. Be sure to have a lot of altitude on the first few practices because recovery from a spin takes a full turn. All-in-all, this is one of the most impressive kits it has been our pleasure to see and a most relaxing and satisfying scale model to fly. You only have to see the kit to realize it is not over-priced at $184.95. □

CLOUD BOUND 4

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may be needed to maintain level flight. Remember that in the droop position you are usually circling, or in a thermal, so trim changes should not be made at this time. Now that you are completely confident of yourself and the ship, go up on the tow with flaps in the droop

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CLOUD BOUND 4

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position for extra lift. Release and change to the flat bottom mode and go after a thermal. When you're in the greatest lift, droop the flaps and ride the thermal and, at about 8 minutes time, reduce to the flat bottom mode again and head for the spot. If you're too far out, lift the flaps and drop the nose slightly and *move*. Make your approach from down wind toward the spot at about 9½ minutes. When you're 100 feet down wind, the 50' spot is coming up fast. Pop your spoilers and brakes about 20' out and 10' up and fly into the spot. Practice over and over again, and you'll find the Cloud Bound 4 has everything you want in a high performance sailplane - - - for competition or just plain soaring fun.□

PEANUT SCALE SE-5

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TAIL SURFACES

These are cut from 1/16" sheet balsa stock. To tell you the truth, I'm not sure that the lightening holes are really needed, the weight saving is virtually zilch, but I did it more for the psychological effect than anything else. They just *look* lighter, and I was concerned about weight.

The stab fits in a slot which you cut in the fuselage after it's all completed. Just make sure that the slot is uniform on both sides so the stab is properly lined up with the wings.

The fin is butt joined to the turtledeck, and the sub-fin similarly to the bottom of the fuselage. The whole process, with Zap, takes about a half a minute.

WINGS

These are about s simple as you can get. Since the air loads are small, no spars are required; the leading edge and trailing edge gives all the bending strength needed. To get the dihedral break in the upper wing, just crack the leading edge and trailing edge at the rib location, prop the wing tips up the indicated 1/2" as shown, and then either use Zap and a few microballoons to fill the gap in the crack, or 5-minute epoxy. The center section cut-out in the top wing is achieved by the shaped piece of 1/8" balsa while the tips are pieces of 1/16" sheet balsa inserted between the ends of the leading and trailing edges. The ribs are cut from 3/32" sheet to give a little better adhering surface on the undercambered surface when the covering is applied.

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PEANUT SCALE SE-5

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The root of the lower wings butts right up against the side of the fuselage. The root rib is made from 1/4" stock to give added strength, and if you carefully tailor the edge of the rib to fit snugly against the side of the fuselage at the proper dihedral angle, and affix it firmly using 5-minute epoxy, the wing will have plenty of strength to take the air loads. Of course, you don't attach the wing until after it has been covered, as well as the fuselage, so when you're ready to attach it, hold it against the fuselage side, trace around the rib contour, and cut away the fuselage covering so that the joint will be wood to wood. This, of course, assumes the use of MonoKote. If you use dope, just join and glue in place.

CABANE STRUCTURE

This is a bit of a job in wire bending, and requires some care to get the right alignment. The best way is to bend the curved section which is epoxied to the top of the hatch, and be sure it fits the hatch curve, then the struts, and the attachment ends which are epoxied to the rear of the leading edge and the forward edge of the trailing edge. Once you get the bends fairly well aligned, epoxy the wires to the hatch, lay the wing upside down and attach the cabane wires and hatch to the wing. Again, this has to be done *after* the wing is covered, so little slits have to be cut in the covering to provide direct attachment to the wood. The epoxy will keep the slits closed after the assembly is dry.

LANDING GEAR

Another somewhat tedious wire bending job. However, .047 wire isn't too hard to handle. The axle is soldered to the landing gear wire, and this has to be a good joint — it takes a beating. I wrapped mine with a small length of fine copper wire, finally, after breaking it loose a few times.

Fairings, both for the cabane wires and the landing gear, can be made simply by cutting lengths of 1/16" by 1/8" balsa, sanding, then Zapping them to the wire and painting. They're great for appearance, but do keep coming off on rough landings — which are the rule rather than the exception.

INTERPLANE STRUTS

These are optional, and mainly for appearance. Cut them from 3/32" wood, shape, and then insert a short length of pin right in the end, with the point sticking out. Stick the end of the pins in the ribs, (the end of the pin should only stick out of the strut about 1/8") first on one side, then bring the wings together on the other side with

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the struts in place. Then when you pull the hatch down snugly on the fuselage with the rubber bands, the pressure of the wings holds the struts in place. Here again, if you plan to fly a lot, it's better to fly with the struts removed, otherwise they tend to tear holes in the covering during hard landings.

COVERING

Top Flite has an olive drab MonoKote that looks fairly authentic. True, it is darker than the green color which the RFC (Royal Flying Corps) used, but your're not really going for scale points anyway. And, the MonoKote can be ironed right to the ribs to maintain the undercamber, and that's important.

RADIO INSTALLATION

The plans show the Cannon Super-Mini brick plus one Super-Mini servo added for motor control. However, the .010 motor control is not readily available, so you can use the 100ma battery pack as it comes from the manufacturer, if you omit the third servo. Threading the pushrods from the brick to back to the control surfaces requires a few bends, one of which is for adjustments. Note that no Kwik Links are shown; I just made the bends carefully, and then with slight changes was able to make any surface adjustments as required. Loads are light, and the wires won't flex, even though there are bends in them. And, since the loads are light, I also used clear MonoKote to make the hinges with.

FLYING

If I had a dime for each time I've written, "Find a nice field of tall grass for testing," I'd be a rich man. But I've gotta' say it again. This little Se-5 is very touchy, and just so you won't feel bad, I crashed mine about eight times before I got it trimmed. However, I found that field of tall grass (weeds, actually) so the crashes were not serious.

First off, use the hottest fuel you can get for the .010 because you'll need every ounce of thrust. The model only weighs about seven ounces, but the wing loading is very high, as is the power loading. Don't launch unless the engine is turning up at full power. A little headwind is also a help.

Rudder throw should be kept to about 3/32" at the most. That means the innermost hole at the servo, and the outermost hole on the control horn. Even so, be gentle on the stick.

Launch the model straight ahead and level — not up. Hold it by the landing gear, and watch out for the sub-fin hitting your hand on release, or that's the end of that flight before it gets started.

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PEANUT SCALE SE-5

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When it leaves your hand it will fly straight out and then slowly start to climb. As long a it does not get into a violent turn, let it free flight up to altitude before touching the rudder. Of course, if it tends to dive, give it a touch of up elevator (elevator travel should be about 1/4" up and down). And, if it should go into a sharp turn, give it opposite rudder, *gently*. The first time I tried mine it went into a turn, I gave it opposite rudder and it snap rolled before I knew what happened. But then, I had too much throw on the rudder too.

Once the model establishes a slow climbing turn and gets some altitude, test the controls. It will surprise you, once you get it trimmed, how well it does fly.

Since the .010 tank is small, short flights are all you can get — unless you want to make an auxiliary tank. But the flights will last about a minute and a half with the standard tank, and that's enough to give you a conversation piece for a long time.

When the engine quits, the model goes into a glide which is fast and steep. Don't try to flatten it out, because it won't work for more than a second. Just let it glide, and then, just before it touches down, give it a slight flair with the elevator. Even though you make a three point landing, it probably will go tail over teakettle, since even a dandelion is a major landing hazard. But the inertia is small, and even though it winds up in a ball, damage will be slight.

And you will be one of the very few R/C peanut scale pilots in the country. In good company, too.

After all, President Carter did a lot of flying in Peanut One! □

WACO CG-4A

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does not need cooling vents we cut to allow air to pass over the *outside* of the motor. An alternate method of mounting the newer ventilated motor is to drill a 1⅜" diameter hole through a block of balsa and push the motor through the hole and then build the block into the

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front of the fuselage in place of the two plywood plates we chose to use. Just be sure none of the four ventilating holes are obstructed. The model needs the six degrees of downthrust; don't forget it.

All the curved pieces of sheet balsa are made this way: slide the right thickness of balsa under the plans - - - observe the grain. When in position, use a pin and prick through the plans into the balsa along the outlines. Remove the balsa and cut out the piece with a razor blade or Dremel saw.

The Astro battery pack does get quite warm. Ours is mounted to the 1/16" plywood floor with sticky double-sided servo mounting tape. The air cooling duct and exhaust opening are needed. The wiring schematic should be followed exactly. We have made many flights without using the servo operated on-off micro switch in flight, so don't hesitate to use the simple manual on-off switch that comes with the Astro 05 system . . . the third servo and micro switch is not needed, but is just extra fun!

The wing's airfoil is non-conventional. If you choose to fly with the electric powered system, your plastic covering *should not be stuck down to the top of the ribs behind the main spar.* But if you fly with a Cox engine (and the lighter wing loading), or as a non-powered glider, you may want to experiment. The author has determined that, at very light wing loadings, if the coverng is stuck down to the top of the wing ribs to form a reflex or reverse curve on the top of the wing behind the main spar, that flight performance can be significantly *improved.* We used this airfoil on a standard class glider at the 1976 Nationals and placed third.

The radio system's battery pack was positioned to achieve the final balance point of under the main wing spars . . . it is sticky-tape mounted to the 1/16" plywood floor. Three clamps also mount to the plywood floor to hold the landing gear in place.

Be sure to put in 1/4" of wing washout as is shown on the plans. At the wing tips, the trailing edge of the wing *must* be at least 1/4" higher than the leading edge. This slight twist makes any stall become a gentle stall. Our prototype needed a slight amount of *up* elevator with the electric power system. It will need a slight amount of *down* trim if Cox powered or non-powered.

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WACO CG-4A

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The ideal propeller seems to be a Top Flite 7/3 or a Cox #248 7/3½ — these will turn at about 12,000 revolutions per minute. Don't forget to carefully balance your props.

We offer many thanks to the Air Force Museum at Wright-Patterson Air Force Base for answering our request for data and three-view drawings of the CG4A from which we did our plans and also many thanks to Mr. Bob Boucher at Astro Flight for his guidance and suggestions in how we go about joining his highly successful Quiet Revolution.

MATERIALS LIST

4 pieces of spruce 3/16" x 3/16" x 36".
5 pieces of spruce 1/8" x 1/4" x 36".
2 pieces of balsa 3/16" x 2" x 36".
2 pieces of balsa 1" trailing edge stock.
3 pieces of balsa 3/16" x 3/16" x 36".
2 pieces of balsa 1/8" x 1/4" x 36".
10 pieces of balsa 1/8" x 1/8" x 36".
1 piece of balsa 1/8" x 2" x 36".
1 sheet of plywood 1/16" x 6" x 12".
1 piece 1/8" diameter music wire x 36".
2 pkgs. of Midwest #1010 landing gear clips.
1 pair of 1¾" wheels.
1 roll of Olive Drab MonoKote (6' long).
1/2 roll of Sky Blue MonoKote (3' long).
1 small bottle of Wilhold Aliphatic resin glue.

The above items cost us just under $25.00. The following items came from our scrap box:

Scraps of 1/8" plywood.
Scraps of balsa.
1/16" music wire.
Small tailwheel.
White, black and insignia blue MonoKote.
Stenso brand Vinyl Letters. □

POWER BOATING

from page 30/28

There is yet another advantage with these things; you can now trim the ride of the boat for any kind of water conditions. Go out on a fine day and trim the hull at

top speed on really calm water. Mark very carefully the exact position of the flaps. Now wait for some really bad weather, with a lot of wind. Go out to the lake again, and re-trim the boat so that it is at the same time fast and stable in the waves. You will find that the trim angle will be different. Mark it again. You can now go anywhere, anytime, and, by simply adjusting your flaps for the prevailing conditions, be quite sure that your boat will be suitable for the state of the water at any given time.

On full-size boats the trim tabs are power-adjusted, and the pilot will change the trim of the hull according to the conditions. For instance, running into waves, he will usually put on some negative angle, to stop the bows lifting too much when they hit the waves. If he is running in a following sea, he will set them positive, to keep the bows up, and prevent broaching. This is hardly applicable in model boats, with the exception of off-shore racing, where the course may be two or three miles long, both ways. In fact, a firm called S.H.G. Marine in England does manufacture a set of trimmable tabs, driven by a third servo, and they do work. But for circuit endurance racing, it's bad enough trying to stay out of the way of thirteen or fourteen other boats, steering a good course and watching but for dead boats on the circuit, not to mention throttle mixture trim, without having to think about trimming the flaps every couple of seconds. In fact, I've tried it, and it's a bit like flying a helicopter. (Yep, I've got one, and every time I get paid, I go out and break it again; does anyone know of an easy-to-fly, unbreakable chopper?)

Of course, there are disadvantages to trim tabs, as with everything. In endurance racing, where hard knocks are practically inevitable, they can get damaged or mis-adjusted. Plus they are an extra complication and, personally, I always try to make my boats as foolproof and uncomplicated as possible. (I don't always succeed, but I try! Boy, how I try!) We have evolved another system for trimming, one which can't get knocked about, and once it is set, it is there for the life of the boat. Quite simply, with an electric drill and a flexible grinding disc, we make a couple of big hollows in the bottom of the hull, just forward of the transom. Then, by carefully trying out the boat, and filling in these hollows the right amount, we can get the ride just right. They can't get knocked around, and they don't cause any drag, but, of course, they have the disadvantage that you can't adjust them to suit different conditions. What we do, in fact, is to set up an average ride that is good for any sort of water. Again, the differential effect to offset torque can be used.

So now you know how to cure porpoising, or slamming. But there is another bad habit that boats sometimes have,

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and it is just the opposite — the hull rides with the bows too far down in the water, thus increasing wetted area and drag, and slowing the model down. A logically-minded guy will think straight away that the cure for this one is to set the flaps at a positive angle — but he will be wrong, I'm afraid. It just doesn't work. Or at least, not really. If the bows are only slightly down, then it will give some improvement, but not much, and what there is will be more than offset by the additional drag caused. Remember, if those flaps are set positive, they will drag the stern down into the water — at the same time they may or may not lift the bows — and this will increase the wetted area considerably.

Well, it's no good just telling you what won't work to get those bows up, so here's the solution, but you aren't going to like it. A bows-down attitude, nine times out of ten, is caused by the Center of Gravity being too far forward. You can try moving the receiver batteries to the extreme stern of the boat, but because their weight, relative to the overall weight, is so small, it is doubtful if this will do any good. No, the only real solution is to take the engine mounting out, and relocate it further towards the stern. I told you you wouldnt like it! However, it's the only real cure I have found. Of course, if someone knows a better one, I shall be only too pleased to hear about it, and so, I imagine, will all our readers.

Of course, there are those who will say that trim-tabs are a cure for an inefficient hull, and to some extent, this is true. A really efficient hull will ride correctly without the need for them, but this type of hull is very, very rare, and the tabs allow the use of the 90% of hulls around that are not fully efficient.

I have come across another argument for trim tabs, and this is the one concerning a forced state of equilibrium. (Don't worry, I'm not going to do an Einstein number on you!) All it means is this: supposing you are running a hull which needs trim tabs, because the bow has a tendency to lift. With negative angle tabs, the bow is being held forcibly in a nose-down attitude. Now suppose that this hull is run in fairly big waves. When the bows hit a big one, they will tend to lift. This will make the tabs dig in, and create more lift than usual, thus keeping the nose held down. In other words, in these conditions, the boat with tabs has a stability advantage over the boat which doesn't have them. I must say that from the experience gained in having run boats both with and without tabs, there is not a lot to choose between the two. If you need them, don't hesitate to fit them; if they're not really and truly necessary,

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then don't clutter your model up with them.

The tabs, themselves, can be made very simply from sheet dural or brass, and the adjuster made from the big bottle-jacks the yacht boys use for tensioning the shrouds on their models, or you can use a Kwik-Link. Alternatively, just bend up the tab, bolt it on the transom and adjust it by bending it with a pair of pliers. But if you use the latter system, beware of dropping your boat, or banging it, especially in the trunk of the car. It is all too easy for those tabs to get knocked three or four degrees out, with sometimes disastrous results.

Drill four holes in the upright part of the tab, hold it against the transom so that the horizontal part forms a *smooth* continuation of the hull bottom, and drill four holes in the transom to match. Then simply bolt it on. On a flat section hull, the tabs can go right out at the two extremities of the transom, but on a V-hull, they should be fitted just inside the effective water line when the hull is at speed. And do make sure that they really are in line with the floor of the hull. A few years ago I had a really fast hull, and I was all set to win the National Speed Championship. In an attempt to get an even better ride, I fitted tabs and, oh boy, did I have troubles! Up to three-quarters speed, the boat was fine, but as soon as the tuned pipe came in, she immediately rolled over. And I just couldn't figure out why. Finally, after the Championships, which I *didn't* win, I worked it out. The outside edge of the port flap was slightly lower than the hull bottom, thus making a small step. At medium speed, this had no detrimental effect, but at high speed it created so much extra lift that, combined with the prop torque, the boat just rolled every time I opened it up. So be really careful, make sure that they are well in line. Don't get them too high up, either, or they will produce drag.

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Turning to less serious matters, a lot of modelers suffer from family troubles. By this, I mean that the rest of the family just doesn't understand why it is necessary to play with "toy" boats! Well, I have found a cure for this one, and I thought I might pass it on to you. First of all, buy yourself a 2-channel radio outfit — you can pick this up pretty cheaply on the second-hand market. Then get hold of a plastic toy boat about 16" long. I chose a model of a tug, called the Libeccio, made in Italy. Fit half-a-dozen big, rechargeable nicads, and install the servos with servo tape, well up off the hull floor. Use two micro switches to give ahead and reverse, and the job is done. Now hand it

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POWER BOATING

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over to the wife and kids. It looks pretty, it won't get damaged, because it is slow, it's clean and there are no starting problems. Put two planks on the edge of the lake, sticking out into the water, make a harbour, and a buoy about 30' from the port. Put the boat in the port, facing out, and ask them to steer it around the buoy, come back to the entrance to the harbour, turn it around, and bring it in backwards. Lend them the stop-watch, let them see who can do it fastest. I can only add that my wife and daughter spent the whole afternoon fighting over whose turn it was, while I went off to the other end of the lake to get on with more serious matters.

One last thought: make sure they are not on the same frqeuency as you, or you will never get on the water! The alternative is to fit very, very small capacity nicads! □

The Libeccio Tug filled with 2 channel radio. This will keep the rest of the family happy while you play with the big one!

FOR OLD TIME'S SAKE

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that writer's disease caused by lack of input. We hope to have a cure for this scourge by next month. There will be a meet on skiis that may be of interest to you, a report on some beautiful conversions by Otto Bernhardt; and a project for the flying season.

Until that time, keep forwarding any and all information you might have to us at 20 Maple Avenue, Hightstown, New Jersey 08520.

Happy Landings! □

SOARING

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April 9-10: First R/C Sailplane World Competition. Thermalling tasks — South Africa.

April 23-24: Slope races hosted by the South Bay Soaring Society and RCM.

May 14-15: North/South Challenge, a thermal affair hosted by Central Valley R/C Soaring.

August 27-28: Thermal tasks of L.S.F. to be held at eight sites around the country.

I would like to publish more dates and places so, when your club contests are firmed up, please send me a copy. (We need three months advance notice due to the printing lead time.)

☆

Pacer Industries sends this tip on the application of ZAP: When picking up the container, apply a slight pressure with the fingers before inverting. Invert the container, applying additional pressure forcing the adhesive through the tube to apply the bond. Maintaining the initial slight pressure, return the bottle to the upright position and release all pressure. This method should insure that any remaining fluid in the applicator tube will be pulled back into the container, eliminating plugging the tube.

A band of 3/4" wide masking tape around the middle of the ZAP bottle will prevent your fingers from being bonded to the sides of the bottle. By the way, cyanoacrylates may be removed from hands and fingers with acetone if used before polymerization is complete.

☆

With Coast Catamaran selling out to Coleman Inc., and the discontinuance of the "Hobie Hawk" sailplane, Coast Catamaran has assured us that they will maintain an inventory of parts and accessory items for future orders.

☆

Here's a good idea from the South Bay Soaring Society: When renewing memberships for 1977, they are asking everybody to list the sailplanes that they have built and flown. This way, any member who has a building problem, can contact the club secretary, find out who built the sailplane, and get together and clear up the problem.

☆

A word of warning about spraying epoxy paint — don't do it in an enclosed garage! Keep it outdoors or in a spray booth. There is no antitoxin or reversing chemical to render the effects of the epoxy formula harmless. The effects are cumulative over a period of time and, when your tolerance is reached, there can be no reversing the damage. Protect your lungs!

☆

Pete Bechtel of Windspiel Models has moved his operation from Santa Rosa, California, to Idaho. We all hope his Real Estate adventures are rewarding to a most deserving and hard working guy. Pete's address is Windspiel Models, Route 3, Box 457, Cour d' Alene, Idaho 83814. Phone: (208) 664-6894.

☆

The "Raven" did its thing by scooping

to page 163

RCM PUZZLE

We would like to acknowledge Mrs. Robyn Bowman of Ottawa, Kansas, as the originator of this month's puzzle.

You work the puzzle by answering the questions 1 thru 28. The last letter of each word is the first letter of the following word. It starts in the center, working out.

All correct puzzles are put into a hopper and drawn at random — there is one winner picked for each sponsor. These winner's names are then listed in the magazine. If you do not want to cut up your magazine, you may send photocopies or write your answers on a separate piece of paper.

Puzzle must be postmarked on or before May 1, 1977. It is impossible for us to extend this deadline any further. Void in states where prohibited by law.

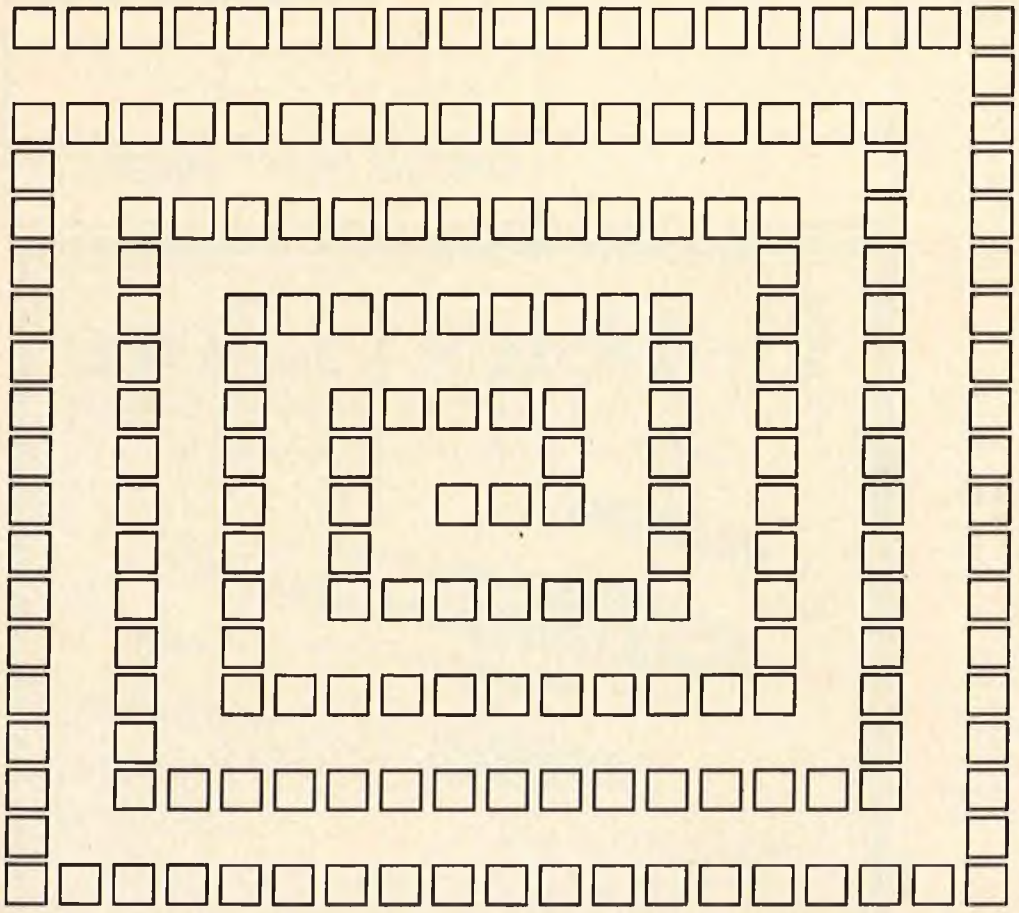
1. A complete radio has at least one.
2. A lubricant.
3. Scale liner, powered by twin .60's.
4. Perfect air for sailplanes.
5. Without this, coming in would be rough!
6. Do this to see that radio and control surfaces are working properly.
7. RCM editor.
8. A simulated jet system.
9. This can be fixed or steerable.
10. A system to hide the wheels in flight.
11. .049 1/2A Midget by Jerry Cole.
12. Semi-scale Nieuport for R/O pulse proportional.
13. The total of wing from tip to tip.
14. These may be used to attach control surfaces.
15. Ken Willard's monthly piece in RCM.
16. It's hard to fly R/C without one of these!
17. No canopy.
18. Used to store fuel.
19. Not "scratch".
20. A maneuver that you fly, taxi & take-off again.
21. J.W. Headley's slope & thermal glider.
22. Not full scale.
23. Used for fuel to travel through.
24. This needs to light before you can fly.
25. Unable to fly.
26. What does a a wing have for built-in stability?
27. A manufacturer of sailplanes.
28. Transmit signals to this.

Clip along dotted line & send to: RCM Puzzle, P.O. Box 487, Sierra Madre, Ca. 91024

Name _____

Address _____

City _____ State _____ Zip _____



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Slim Line Mufflers
Solent Sailplanes
Sonic Tronics
Southern R/C Products
Space Age Fuels
Superior Flying Models
VK Model Aircraft
Wilhold Glues

SOARING

from page 161/21

the recently held Northrop Flying Wing Contest, by taking the first three places. My first introduction to the "Raven" was at the 1976 LSF Tourney in Santa Rosa. I was *very* impressed. Plans for the "Raven" are available from Western Plan Service, 5621 Michelle Drive, Torrence, California 90503.

☆

Trade and Hobby shows for 1977 are going to be better than ever if all of the information I have been receiving is correct.

These shows are the place to see that new sailplane, exchange ideas and talk to the designer, kit builder or distributor. They want your impressions. Men like Lee Renaud, Paul Parzik, Tom Williams, Don Burt, Pete Bechtel, Ed Slobod and many more men of the world of soaring, are more than willing to hear what you have to say. Attend these trade shows eagerly.

☆

Dave Harvey, area V.P. for the National Soaring Society and a popular C.D. in the Northwest area, is showing off his new Bunny. Beautifully done, Dave. Keep the Northwest area going great guns - - - you have a real winner in Barbara Barker who edits a super newsletter.

Good Lift □

RADIO SPECTRUM

from page 18/15

$$L = \frac{2.53 \times 10^4}{(53)^2 \times 12} = .75\mu h$$

For convenience make L1 tunable from .5 to 1.5μh.

The bypass capacitor C4 should have a reactance of 5 ohms or less at the operating frequency.

$$C = \frac{1}{2 \Pi (53 \times 10^6) \times 5} = 600 \text{ PF}$$

A slightly larger value, say 1000 PF, will insure low reactance.

The output coupling capacitor should be about equal to the combined output capacitance of the transistor and C1.

Use the Motorola MPS 2369, a very popular transistor in RF oscillators and make sure you order a series mode crystal. The oscillator should oscillate close to the right frequency with a 1000 PF capacitor in place of the crystal if you've done everything right. Then put the crystal in for desired stability.

You may have to cut and try with the

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APRIL PUZZLE ANSWERS

(1) Chuck Cunningham

(2) Clarence Lee

(3) Ken Willard

MARCH PUZZLE WINNERS

Toby J. Ahnert
Larry Brady
Robert L. Bremm
Paul Browinski
R.D. Buran
Don L. Campbell
Jim Chitwood
William N. Coursey
David Cullum
Warren E. Decker
Kim DeYoung
Vic Dubrowski
Bill Finney
W. Stephen Ford
Lloyd A. Green
Andy Hanson
John P. Hogan
Fred Holz
Tim Hums
John R. Jurgensen
Genaro Layreano
R.W. Loewe
Anthony N. Lombari
Mark Lovrich
Mike Malone
Donald Martin
Larry E. McCann
Norman McKinstry
Thomas M. McPherson
FTCS J.R. McVay
H. Craig Miller
Michael E. Moffa
Lucille Morgan
Don Muddiman
Ralph Nolan
Andrea Oertle
Alonzo H. Parker
Scott Pick
Ron Potter
Mark Pryor
O. Zeller Robertson, Jr.
Anthony J. Romano
Tzvi Rubinstein
William Schlabach
Tully Simoni
Theodore P. Smith
J.C. Unger
Brian Walker
Curtis Walters
David Webberking
Craig Woodward

RADIO SPECTRUM

from page 163/15

L and C after you connect the oscillator to the next stage because its input capacitance is reflected back into the tuned circuit.

That's all there is to it. Now all you have to do is put it together with short leads and you'll have an oscillator that will be quite reliable.

I know I'm going to get a lot of complaints about this sort of article, so if you want more, you better let us know.

•

I've had some interesting new inputs on batteries recently. Ken Hall of Fallbrook, California, was monitoring his transmitter with an S & O expanded scale voltmeter battery tester. He noticed that the transmitter dropped down to the 9.3-9.4 volt range after a very short operating time. Yet, he would put it on his Super Cycle and would get close to two hours of operation. It turns out he had a bad cell which the Super Cycle didn't catch. It wouldn't have been disastrous because he could have flown for two hours even with the bad cell, but he would have had reduced power out of his transmitter which could have got him in trouble.

I also use the ESV battery tester and I noticed my flight pack down to 4.6 volts after four flights plus a lot of fooling around with my engine. I decided it was time to fast charge which I did, but that evening I decided to run some tests on that battery. I might say I've been using this battery since some time in 1974 for sure, and maybe longer than that. I fast charge it most of the time, but periodically I charge it for 3 to 5 hours at 125 ma. I tested it that night and determined that I probably had at least twenty minutes of flying left after I got down to 4.6 volts. Figure 3 is a plot of the voltage versus time.

The interesting thing is that the battery never did go over the hill, even though it was off scale and probably less than 4.2 volts. The radio never quit working either.

The data is plotted in Figure 3 along with a curve on a new battery and a curve on the old battery after it stood by for six days. There is all kinds of interesting information in Figure 3.

A battery engineer might say my battery had some kind of memory. Whatever has happened it is great from the standpoint of predicting remaining capacity. It has a fairly constant drop in voltage versus time. The best thing is that it doesn't drop dead. For instance,

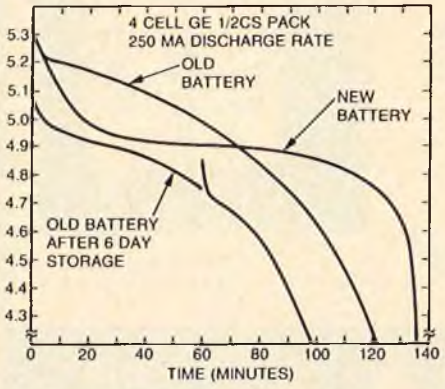

FIGURE 3

you would only get about three minutes of flying out of the new battery after it hit the 4.6 volt mark. In fact, with a new battery you better not take off with it below 4.7 volts.

The second thing to note is the battery does lose some capacity through self discharge so if you want to get in a lot of flying without recharging, be sure and charge the night before, otherwise take your fast charger to the field.

The hitch in the middle of the bottom curve is where I let the battery rest for about one half hour. Notice that it took three to four minutes to get back on the curve. For this reason it would be better to check your batteries when you

land if you want to get an accurate picture of where you are on the curve.

Well I really like the curve on this battery and wish they were all like this and I think we would have fewer crashes due to battery failure, that is if guys monitored the voltage after each flight. I would never go up with only 4.6 volts but even if I did I would be plenty safe.

I don't know, maybe fast charging creates this characteristic. Let me know if you've had similar results out there in RC-land and if you agree that this is a desirable characteristic.

•

I've been working on the problem I mentioned in the NE 544 servo amplifier. It is obvious why the minimum pulse gets shorter at low temperature if you use a general purpose ceramic capacitor. We can see in Figure 4 that a general purpose

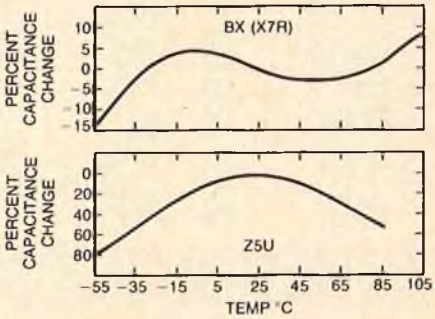

FIGURE 4

ceramic cap (Z5μ) will lose about 30% of its capacitance at 0°F (−17°C). If we start with .22μf at ambient, then we only have .154 at 0°F.

The servo I measured was even worse with the minimum pulse only about one fourth of what it was at ambient. The solution is to get a capacitor with a BX or X7R dielectric. You can see from its curve that the capacitance actually increases at low temperatures in which you might consider flying, which is exactly what you want. At low temp, the battery, motor, gear train,

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RADIO SPECTRUM

from page 168/15

etc., all go in a direction to make the servos sluggish. A slightly longer minimum pulse will help overcome this sluggishness while a shorter one would result in very poor performance.

'Til next month, keep 'em flying. □

ENGINE CLINIC

from page 12/10

Although it is pointed out that the piston will be tight at TDC, I could not turn over the engine when it was new-in-the-box. Should I have returned the engine at this point?

Speed fuel is recommended for break-in! I did try high nitro fuel, but primarily use Supersonic 100, and finished with a high nitro fuel. Even after quite a bit of running, it would bind at TDC. I finally did get it broken-in, but I ended up with two nicks and a scratch. Why were these all confined to the exhaust port portion of the piston? The nicks are on the top outer edge of the piston; the larger one creates a gap almost 1/64 with the liner. The scratch groove is about 1/4" long. There was no other significant damage. Will this damage affect performance very much, especially considering that it will be used for brief runs in F/F?

What I really feel discouraged about is that for the life of me I can't get the engine to run forward! I have the engine mounted inverted and on pacifier. (I never had any problems with Fox 36X used in the same fashion.) The engine will start without too much trouble, but always backwards! Perhaps it is hyper-sensitive to flooding. But I don't know how I can be more careful not to flood the engine (some prime seems to be necessary). I have the same problem

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when I turn the engine upright. I didn't notice, but the engine may have been running backwards during the break-in. Could the engine run clockwise for any length of time, and is this harmful? I never heard of a front rotary doing this.

Could you please explain what is going on and what I can do about it? Is the porting of the engine a factor? Could I expect the same problems with the Super Tigre RR 6.5cc? Would an electric starter be the way to go?

Another thing that surprises me is the use of a short reach plug, whereas all my .35's use long reach plugs. Would an RC plug help (and not rob too much rpm)?

The huge prop shaft diameter causes endless problems. I don't know about RC size props, but none of the props I use for F/F will fit without extensive hole enlarging, and I don't have a drill press. Is there any way around this?

I know you may want to shorten this letter for publication, but I thought it best to give you enough information.

I never used the mini-pipe or adaptor.

Sincerely,
Paul Skelley
Dubuque, Iowa

Paul, first off, the ABC engines are a whole new ball game when it comes to break-in and you should have paid more attention to the break-in instructions that accompanied the engine. ABC piston/sleeves have to be fit quite tight when cold. The amount of tightness depending on the amount of nitro to be used in the fuel. The more nitro, the tighter the fit, generally. This varies with the different makes and sizes of engines. The brass sleeve will grow more than the aluminum piston and the tight fit is to compensate for this differential expansion. The hotter an ABC engine gets, the more the sleeve expands and herein lies a big advantage. The sleeve expanding more than the piston, eliminates seizing of the engine - - - it just loses power and slows down. Although the engine is fit tight when cold, when up to operating temperature, the proper clearance is achieved. This is the reason K & B tells you in the instructions to use K & B speed fuel for the break-in. By running a low nitro fuel rich, the engine does not come up to operating temperature and the fit of the piston/sleeve remains tight. This, in turn, puts extra stresses on the con-rod and wrist pin bosses. Many fellows have permanently damaged new ABC racing engines by running them slobbering rich on the bench for break-in without the engine coming up to temperature. This can result in a broken rod or piston as many fellows have found out the hard way. So, normal break-in pro-

cedures of the past have to be forgotten with an ABC racing engine. You break them in with racing fuel running in rich two cycle. You do not want to let them four cycle any longer than necessary. A couple of slightly rich flights in the air is all that is required for break-in.

Some of the first 6.5 K & B's were fit pretty tight. They could not be turned over by hand without a propeller and, even then, only with difficulty. However, remember that this is a high performance engine and was intended to be started using an electric starter. After a few initial runs, it will loosen up enough for hand starting. However, after break-in, the engine should still feel sticky across top center. Trying to break your engine in until this stickiness disappeared was wrong.

The nick in your piston and accompanying groove can only be caused by two things: Something stuck in the exhaust, or something passed through the engine. Possibly a wrist pin boss or part of the rod let go and passed out the exhaust. The engine should be disassembled and checked for this possibility. Chances are also pretty good that the piston/sleeve have been damaged enough to affect performance.

Running backwards is a pretty common occurrance with high performance engines due to the late closing timing of the intake. This, coupled with high compression and a slightly flooded condition, will let them take off running backwards. However, the solution is very simple - - - you simply flip the prop very smartly backwards. This technique is used for re-starts in U-control FAI racing, rat racing, etc. It is also pretty much the standard starting for many of the Cox 1/2A's. Many guys start their Formula I engines with the "spinner snap", i.e., snapping the spinner backwards with the fingers. However, until you do get your starting procedure perfected, I recommend you use an electric starter.

You would not want to use a long reach glow plug in the K & B 6.5. The engine head was designed for a short reach. To use a long reach would allow too much of the plug to extend into the combustion chamber. Short reach plugs have proven to hold up better with high nitro than long reach ones, due to the shorter depth of the element cavity, among other things.

There are several hand reamers on the market for enlarging the propeller hole without using a drill press. The one I like the best is the Hobby Products Ream'R.

Paul, your last question is the real shocker. Why in the world did you remove the mini-pipe and adapter? This engine was designed to be run only with the mini-pipe. Exhaust porting is such that the engine will not develop anywhere near its power potential without the mini-pipe. This could also account for some of your starting problems. Put

the pipe and adapter back on the engine.

Dear Mr. Lee:

I just received my first O.S. Wankel engine. No directions were included, but referring back to you past articles (the few that I have), I see you recommended a 10/5 or 10/6. Can a 9/6 be used satisfactorily? Bench breaking recommended? Time rich-run?

Has the Wankel been used in a ducted fan installation to you knowledge? If so, how was fan constructed and what were its dimensions?

To whom would I write for directions on this engine and I.P.B.'s?

Do you feel the stock carb is satisfactory or would you recommend a particular replacement? I have been thinking Perry since one can utilize an air filter with it.

What are the shortcomings of this engine (aside from radial bulk and weight)? What should a person look for as one runs the engine time after time – are certain parts prone to premature failure or need frequent cleaning? What is this I have read about front bearing lack of lubrication? What remedy if needed?

I haven't run this engine yet, and want to do so properly, first rattle out of the box.

Many thanks for your help.

Dennis Kelsey
Lind, Washington

Break-in and maintenance of the O.S. Wankel is pretty much the same as with any conventional two cycle engine. There are no special precautions other than the Wankel is more susceptible to dust and dirt ingestion. A little dirt can destroy the seal of the rotors, making the engine lose considerable performance. I would recommend using an air filter on all Wankels at all times. There has been some front bearing problems so it would be a good idea to shoot some 3-in-1, or equivalent, between the prop drive spool and housing after every flying session, as well as down the intake and in the exhaust. This is something that should

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be done with any model engine to stop rust formation, etc.

The Wankel likes to turn up so it would be okay to use a 9/6 wide blade prop (Top Flite Super M or Rev-Up).

Ducted fan installations require high rpm engines such as the K & B 6.5 and Super Tigre X-40. The Wankel does not have the rpm capacity.

World Engines, as the importer of the engine, would be the only source I know of outside of the factory in Japan for instruction sheets.

The stock carburetor does leave a lot to be desired, but does seem to work okay. The carburetor being right next to the exhaust outlet allows this area of the engine to be considerably hotter than the carburetor intake on conventional engines. Some of the fellows have experienced melting of the plastic bodies on the Perry carburetors when the engine was run too lean. Both a Kavan or Tarno can be used.

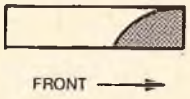
Dear Mr. Lee;

I have a Super Tigre G 15/19 R/C engine that I purchased about 5 years ago. The piston skirt front on this engine is cut away to clear the crankshaft counter-weight when the piston is at the bottom of its stroke. See drawing (A).

PISTON FRONT VIEW PISTON RIGHTSIDE VIEW

DRAWING (A)

This cut-away on the piston is exposed in the exhaust port at the top of piston travel as shown in drawing (B).



SHADED AREA IS OPEN TO THE CRANKCASE

FRONT →

DRAWING (B)

This cut-away on the piston skirt and its relationship to the exhaust port comprises an example of sub-piston-porting. This is probably very beneficial when used in an all-out racing engine, but this engine was marketed as an R/C engine complete with a MAG II type throttle.

The engine demonstrates the following operational problems which I believe to be cause by the sub-porting:

(1) The ratio of raw air (from the sub-porting) to air fuel mixture (from the carburetor) changes as the throttle position is changed, so that the carburetor mix-

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R/C MODELER MAGAZINE'S
MODEL OF THE MONTH CONTEST

The Model of the Month Award Program is designed to encourage the sport and novice competition flier to submit details of his most recent kit or scratch-built model to RCM in order to encourage general model craftsmanship and the overall promotion of R/C flying.

Each month Dremel will award a 371 Variable Speed Moto-Tool as illustrated in the photograph. The second and third place winners each month will receive a one year subscription to R/C Modeler Magazine or, if they are a subscriber, an extension of their current subscription.

See the Jan. 1977 Issue of RCM for rules and prizes!

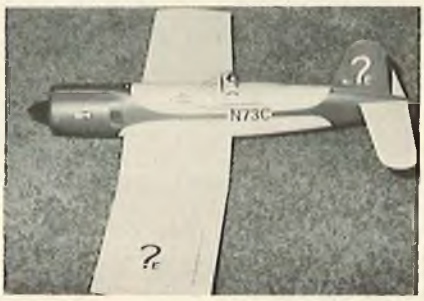
MAY WINNERS

1ST PLACE
Joe McCollum
N. Ireland

Ryan S.T.A built from Sig kit. Construction time: 1500 hours. The model is fully detailed and is finished with K & B paints. It is powered by an Enya .60 and Futaba radio. The model weighs in at 9 pounds all-up weight.

2ND PLACE
Claude W. Stafford
Hickory, North Carolina

RCM Sun-Ray scaled down and modified. Wingspan — upper 43½" — lower 32½". Length: 42½". Weight: 87 ounces. Engine: K & B .40 F.R. Radio: Pro-Line Challenger. Covered with Fiberglass Cloth & Boat Resin. Finished with K & B Superpoxy.



3RD PLACE
Edward Al Culver
Pocatello, Idaho

A scratch-built configuration of an F2G. The model is a semi-scale 1/A Pylon racer. Wingspan: 80 cm. Wing Area: 1350 sq. cm. Weight: 850 grams. Radio: Cirrus. Finish: Dope. Kirn Kraft .051.

ENGINE CLINIC

from page 178/10

ture cannot be adjusted to run correctly at all throttle openings. If the engine is adjusted to run properly at full throttle, then at idle, the engine dies lean because the sub-porting keeps drawing raw air (no fuel) into the crankcase.

(2) I also have adapted a Super Tigre ST-8399 muffler to use on this engine which leads to another problem. The sub-porting then draws into the crankcase the engine's own exhaust rather than fresh air. This results additionally in a considerable loss of power and a tendency for the engine to run hotter than might be expected, because the hot exhaust is being dumped back into the crankcase.

Do I have a white elephant on my hands? Is there some way this engine can be made to run properly with throttle and muffler? World Engines has suggested eliminating the sub-porting by brazing closed a portion of the exhaust port to cover the area which sub-ports. Could this be done successfully? Would the heat of brazing warp the cylinder? How would the inner surface of the brazing be machined to match the cylinder wall without destroying the fit of the piston?

Is there an easy answer that I have overlooked?

Thank you very much for any help you can supply.

Sincerely,
Bill Apt
Ferndale, Washington

The old G 15/19 Super Tigres were never noted for their idle ability and the free porting was a part of the problem. The carburetor left something to be desired as well. I think this was a case of Super Tigre taking an engine originally designed for U-control, etc., and converting it to R/C. Actually, the free porting shouldn't hurt the top end too much,

as long as you are not using too restrictive a muffler. If an exhaust baffle is used, the free porting will have considerable effect on the idle. The closing of the baffle allows the exhaust gasses and extra oil to be drawn right back into the engine. If the baffle is removed and a muffler used, this effect is reduced.

As far as brazing up the sleeve — there is no way you can do this without distorting the sleeve, let alone end up with a usable one. After brazing, the sleeve would have to be re-bored and honed. This gets pretty complicated. It would be easier to make a new sleeve. I think somebody unfamiliar with model engines must have answered your letter.

It would be best to sell the engine off to someone flying U-control and purchase a later model. There is no practical way to eliminate the free porting.

Dear Mr. Lee:

In the December 1975 issue of R/C Modeler Magazine, there was an article about the Beechcraft Staggerwing, whereby the designer determined the proper propeller size relative to a large diameter cowl by tethering the aircraft and measuring the thrust with various propeller sizes.

After studying the designer's method do you believe that his procedure was correct? He selected the propeller with the maximum static thrust. Should he not have actually selected a propeller with the next higher pitch setting?

I have a Beechcraft Staggerwing which I am readying for a Spring flight. It has a 7" cowling with a light weight Super Tigre .60, equipped with a large bore Perry carburetor and fuel pump. The plane weighs 8¼ pounds with 1000 square inches of wing area. What propeller would you use?

Best regards,
Robert G. Watkins, Jr.
Coatesville, Pennsylvania

Measuring static thrust on the ground has little bearing on what the engine/propeller is going to do in the air. A low

ENGINE CLINIC

from page 181/10

pitch, wide blade propeller will show a tremendous static thrust reading, but yet in the air not have sufficient air speed to keep the model airborne. A higher pitch propeller, in turn, would show less static thrust on the ground but 100% better performance in the air.

With a 7" cowl, you will have to use a 12/6 propeller — about the maximum that the S.T. can swing. You might try a 13/5, but watch for overheating due to lugging the engine down, as well as being cowled.

Dear Clarence,

I have a problem with my pair of new Fox Schneurle .40's-P.B. I bought them new, gave them an hours bench time, then installed them in a Dave Brown "Twin Tub". From there on they have refused to run properly –the engines die at part throttle and run erratically at full throttle. The tanks are in the nacelles on the C/L of the carbs. Fuel is FAI – no nitro (80%-20%). I suspect the trouble is in the carbs – maybe they have the wrong carbs on them. They appear to have exceptionally wide throats on them (almost the same as my new Fox 78). I ordered the standard engines – two. How can I tell the difference? Is there anything else I can do?

Eric Sutton
Sao Paulo, Brazil

Eric, I believe you have a combination of things causing your problems. First off, I would suspect that, being in Brazil, you have gotten hold of a low grade of alcohol and your fuel is causing the erratic running at high speed. This, of course, assuming that there are no holes in your fuel lines, dirt or foreign matter in the carburetor, etc. Until you get the engines running properly at full throttle, you can not expect good acceleration and idle.

The Fox Schneurle .40 does not use

an exhaust restrictor. The main function of an exhaust restrictor is to improve the idle and acceleration. Without an exhaust restrictor or muffler, you can expect to have sputtering through the mid-range, especially when using FAI fuel with no nitro methane. A little nitro would make a marked improvement, but I realize it is not available in Brazil. You are going to have to fabricate something in the way of an exhaust baffle, or adapt a muffler to the engines, in order to get a reasonable idle and acceleration. I do not know of anyone making a muffler specifically for the Fox Schneurle .40, so you will have to purchase one intended for another make of engine, such as K & B, Super Tigre, etc. Fox does market his new tuned pipe/muffler for the engine, but you would have problems with mounting these on your twin.

There is also the possibility that the venturi size of the carburetors is a bit large for the engine. If you have means of fabricating an adapter, I would recommend installing Perry carburetors on the engines. The .40 Perry carburetors are all the same except for the neck size, so it doesn't matter which you obtain. Fox did advertise Perry adapters for the engine a while back, but do not know if they are still available or not.

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This past month I received a note from Ray Johnson, Box 169, St. Michael, Minnesota 55375. Ray is looking for a set of fuselage plans for the old Veco Beachcomber designed by the late Jim Kirkland. If anyone out there has a set, Ray would appreciate same. He does have the wing plans.

That wraps it up for another month. Keep the letters coming in. □

CUNNINGHAM ON RC

from page 7

than one can be built from your plans with predictable performance akin to the original prototype. Be as careful in the drawing as you are going to be in the construction.

Now, if you have drawn bulkheads, fuselage sides, formers or what have you, that you need to transfer to balsa, you can do it one of three ways. You can either re-draw the piece on the balsa wood directly, or you can cut out the plans with a razor or scissors and trace around it on the balsa, or you can use a piece of tracing paper, or light typing paper, over the original drawing and make a tracing of the drawing and transfer this to the balsa. The most simple method is to make a tracing over the original plans with another sheet of light paper. This keeps your plans intact rather than cutting them up like paper dolls. When you have made these tracings, cut them out with scissors. Next,

wander down to the local office supply store and purchase a can of Carters rubber cement. It will keep forever, and you will find lots of uses for it. Paint a coat of rubber cement on the back of the templates that you have cut out, and then stick these templates to the balsa wood that you're going to cut. Smooth out the template and let it dry for a few minutes. Then you can go ahead and cut out the balsa with either a razor blade, a razor knife, or a Dremel Jig Saw. If you have small notches in the template for stringers, etc., the template will help keep the balsa from splitting. When you have all of the pieces cut out that you are going to need, then peel off the paper template, use a marking pen and number, or letter, the template so that you can locate it easily, then go on to some of the other parts. In building my monster bipe (76" wing span and 1850 square inches of wing area), I have lots of formers and lots of ribs to cut out, and the "template rubber cement" method makes this a relatively easy task. Relative because it is still a lot more work than taking the parts out of a kit, but a lot more rewarding if you're so inclined.

While on the subject of cutting out parts; the same basic method is used in cutting out wing ribs. Make a transfer template of the rib, or ribs, if a tapered wing, and glue it to a medium hard piece of balsa. Don't plan to use this rib in construction — use it only for a template. This way, if you have a small altercation with the ground and you need to re-build the wing, you will have a rib template already available. Anyhow, cut out the rib template and lightly sand it to the finished outline. Next, use a ballpoint pen and trace around this template on enough pieces of balsa sheets to give you the number of ribs that you require. With a little experimentation, you can get a lot of ribs on a sheet of balsa. Cut out the ribs with your favorite cutting method, but don't cut any spar slots. Save this until later. Now, set aside the template rib and stack all of the other ribs

into a nice neat bundle. Get them all lined up as carefully as you can, then pin the bundle together with four long pins, two from each side of the bundle. The purpose of this stacked bunch of ribs is so that you can sand them all to the same outline. You will be a bit surprised to find that, even though you traced all of the ribs from the same template, each one is a bit different from the other. But, because you marked around the outside of the template rib, you will have a little sanding space. Use 120 grit sandpaper wrapped around a block of wood and lightly sand the ribs to the correct shape. Use the template rib to check each side of the bundle to see how close you're coming to the correct outline. This is the reason for using a pretty light grade of sandpaper. You could use a rougher grade, but then you might sand down too much, too quickly.

Once you are satisfied with the sanding, you can mark off the location of the spar slots. Again, use the template rib to mark each side of the stack, then draw lines across the top and bottom of the full stack of ribs to give you the spar location on each rib. Now, take a razor saw blade and stick it into your X-Acto knife and carefully saw a cut for the full depth of each spar line. Then you can take a knife point and "pop" out each piece in each rib to clear away for the spar.

To even off the bottom of the spar slot, take the razor saw blade and make little cutting motions across the bottom of the slot. Now, fit in a spar and see if it fits. If the slot is too narrow, or not quite deep enough, work on it a little more until the spar fits correctly. By building the ribs in this manner, you insure that each will be a perfect likeness of the other; and the wing, when constructed, will have a true airfoil.

Selecting balsa wood is very important to the finished aircraft. Balsa can normally be categorized as soft, medium, hard, and extra hard. Most of the time, if you use medium and hard, you will have the best luck. Soft may

often be light in weight, but structurally so weak that it is almost worthless for anything but in blocks of wood. Generally, though, when you go to look for balsa, it seems that all of the sheets are soft, and all of the blocks are as hard as maple!

If you're building a slab-sided fuselage, then make sure that the side pieces that you select are of comparable grain and firmness. You can tell by looking carefully at each piece. You can make a pretty good judgement of the relative weight of each piece of balsa sheet by grasping a piece with thumb and forefinger and letting the piece droop in your grip. If you extend your arm to full length, you really can feel the difference in weight. Grain structure is very important in sheet selection because some sheets are cut with the grain running one way, while others are cut with the grain in a different plane. For sheets to use for similar pieces, make sure that the sheets are similar. Check also for brittleness of the balsa. Some balsa is so brittle that it almost shatters in your grip, and will almost surely break just when you're cutting an important piece from it.

Warped sheets and warped sticks are another problem. Check them all over and try and select only the best pieces for your use. It may take a little time, but it is time well spent.

Back in the days when we used solvent type glues or "model airplane cements", it was a problem to use waxed paper to protect the plans, because the solvent in the glue tended to dissolve the wax on the paper and let the wax impregnate the glue joint. But with the use of white glues and the super glues, this problem has been pretty well eliminated. If you're going to build directly on the plans, then cover them over with waxed paper or plastic wrap, and if you're going to make identical pieces such as two sides, build them one on top of the other, separating them with a sheet of waxed paper or plastic wrap.

If you have used your best judgement in designing your bird, and have followed the best practices in building your new creation, then you will really gain a lot of enjoyment from doing it yourself. Don't forget, whether you like to build from kits, magazine plans, or design it yourself, *Do It!* □

FROM THE SHOP

from page 2

perimented with the model. He changed it to a biplane, to a pattern ship, and to a scale Chipmunk at least as good as Bob Nelitz's and possibly a bit better. He asked if he might fly it and his guide nodded assent and started toward the field which looked to be a good two miles away. As they walked leisurely toward the strip - - - although as far as the Ancient Modeler could see, it was all strip - - - the flying area seemed to approach them as they moved toward it.

With the plane resting on the grass at the edge of the strip, the Ancient Modeler looked at his guide, with a quizzical glance, placed his hands in front of him and imagined an EK Super Pro in his grasp. By the time his guide had completed a nod, the red EK box was in his hands, open gimbals and all.

He did a range check while his guide indicated it wasn't necessary with a

shake of his head. Quite enjoying himself by now the Ancient Modeler imagined the Blue Head running and it was, purring contentedly into it's muffler with no trace of oil spewing out the end of it.

The Ancient Modeler checked the controls, ran the flaps out and in again, advanced the throttle, and taxied to the end of the strip. There was no wind so he eased the throttle forward and made the best scale take-off of his life. The gear folded neatly away as he climbed gently out to his procedural turn. A grin crinkled the corners of his eyes and mouth as the Chip performed flawlessly. He realized he hadn't checked the fuel and then thought of a full tank in the realization that the tank was, indeed, now full.

Just for fun he dropped the transmitter to his side, watching the model slip through the clear soft light. He imagined a perfectly round loop and the Chip performed it. He imagined three consecutive rolls and the Chip went through them as if on rails. With a delighted smile he turned and handed the transmitter to his guide who accepted it without comment.

He flew the lovely Chipmunk through maneuver after maneuver for what seemed both a long time and yet did not take very much time at all. He even tried a few maneuvers that he made up as he went along and the Chipmunk flew them all without a hesitation, or any deviation from the course he imagined for it.

Finally, he turned into the landing pattern, dropped the flaps and some speed on downwind, made his turn to base leg and onto final, cutting the throttle to bottom as he came over the end of the strip four feet off the grass, the Chip flared just right, eased it's now lowered gear, which he had forgotten, onto the grass and rolled to a perfectly straight stop. He turned it and taxied back to his feet, shut the engine down and realized he had just had the best single flight he had ever experienced. He was filled with a feeling of extreme joy - - - he had never experienced anything so great in all his life.

Turning to his guide, he said, "That was great, never enjoyed anything so much in my life!"

"That's what this place is all about," his guide replied, "whatever you want is here for you, you can build, or fly, or watch or design or just create, if you choose. You can make it as easy or difficult as you want. Probably a bit different than you thought Hell might be, I guess?"

"This is Hell?" asked the incredulous Ancient Modeler.

"Not for you," replied his guide, "come with me for a minute."

The stranger led him toward a row of trees as the other two fliers started their engine to take another flight. The Ancient Modeler and his guide walked to and through the row of trees surrounding the field. On the far side were row upon row of hard concrete benches. Shackled to the benches were literally millions of people most of those he could see looking quite miserable and uncomfortable.

They stopped just clear of the trees and he looked over this mass upon mass of people. As he stood there, the model cleared the trees from behind them and executed a series of maneuvers right overhead. The snarl of its engine was much more severe than it had been on the other side of the trees, grating on the nerves and cutting right through to the marrow in his bones. As he looked around, he could see literally thousands

of models clearing the trees surrounding the area encompassing the throng on the benches. As the noise increased, he found it almost unbearable and shrank back. His guide took his arm and they moved back through the screen of trees to the perfect field again.

"It's Hell for them," his guide explained, "they were modelers too, but they were the type who hogged frequency pins, helped no one, shot others down, and generally made themselves pretty unpopular. They will remain where they are for all eternity."

The Ancient Modeler shivered at the prospect and realized how glad he was that he had fallen on this side of the trees.

"But why have I come here, to this place, I felt I had lived a good life and might have gone to Heaven at my death?"

"You might well have done so," his guide explained, "but, you must admit that your share of Hell is not so bad. What happens is this: those who pass from life are neither all bad, nor all good - - - there must be a dividing place to separate those who go there and those who come here. In your case, you may well have been close to that line, but still destined to come here. In such cases, the result is much as you have seen. For those we know as Evil, they go to the other side of the trees. Those who lie and cheat their friends or sell shoddy merchandise or hog frequencies, or who give poor advice or none at all, those who fly dangerously or carelessly, or who fly others planes less carefully than they fly their own - - - in short, the modelers we'd all be better off without - - - for them, it's the other side of the trees, for you, it's this side, and enjoy yourself."

The Ancient Modeler turned back to the Chipmunk, thought the engine running and turned toward the strip. He remembered the warm feeling when he had given all his equipment away, and he smiled softly to himself as he watched the Chipmunk slide straight down the middle of the strip and ease into the clear liquid air. □