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AMERICAN aircraft modeler

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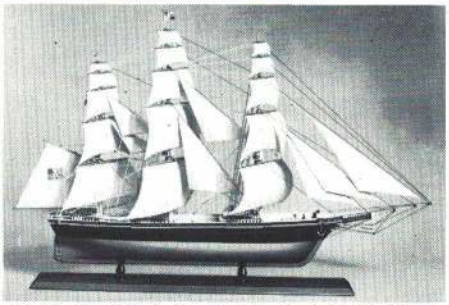

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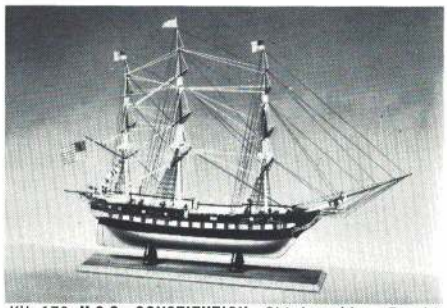

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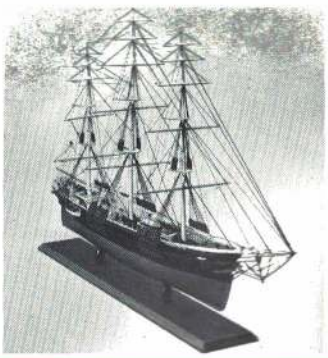

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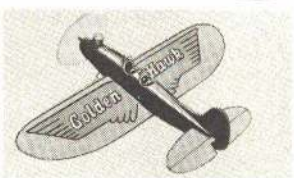

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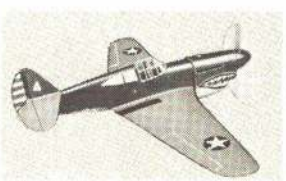

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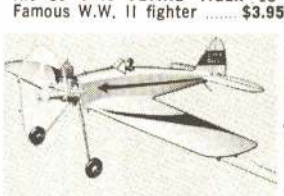

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AMERICAN aircraft modeler

COVER PHOTO: The rare P-63F Kingcobra. This once-active Air Force fighter has been in civilian use for many years. Imagine having one of your own. Alvin T. George, Atlanta, loves it. Photo by Jim Sullivan was taken at Gastonia, N.C., antique fly-in.

WILLIAM J. WINTER — PUBLISHER EDWARD C. SWEENEY, JR.—EDITOR
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Features:

Academy of Model Aeronautics:

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If it couldn't outclimb its opponent, the P-51 would outturn him. If it couldn't outturn him, it could outdive him. If it couldn't outdive him, it could outrun him. Result: a performance record so outstanding, the Mustang is still being made today!

IT WAS IN the CBI Theater, in 1944. This Mustang pilot (name unknown) was escorting a flight of B-25's to the target when he mixed it up in a dogfight and got hit in the tail. It was time to say goodbye to this P-51: the pilot jettisoned the canopy and started climbing out. He had one foot on the wing when he saw a Japanese Tojo coming head on. He leaned back into the Mustang Cockpit and squeezed off one last burst from his fifties — slid off the wing and parachuted to earth. The Tojo wasn't so lucky. It blew up. This is known as "a P-51 shooting from the hip."

In Europe the word was this: a Mustang could outturn, outclimb, outdive, and — if necessary — outrun just about anything the Axis powers could put into the sky.

For instance, on outturning: Captain Louis Norley caught an FW190 and chased him down to 3,000 feet. The German did a tight climbing turn to the left but Norley dumped 20 degrees of flaps and turned inside him. As the Focke-Wulf rolled over and headed for the deck, Norley jumped right on top of him. Two short blasts and the German was out and grabbing for his ripcord.

On outclimbing: Lt. Joe Lang found himself in the center of a gaggle of 25 FW190's at 2,500 feet. He pushed the throttle to the firewall and pulled back on the stick. At 18,000 feet he went through a cloud bank and that was where he lost the enemy.

On outdiving: Lt. Col. Glen Eagleston got into a dogfight at 23,000 feet. The German rolled over and dived in an effort to shake the P-51. Says Eagleston, "I salvoed my wing tanks and went after him. He kept diving, but I knew I had the best ship and stayed right after him. He tried to pull out at 6,000 feet, but his ship wouldn't take it and he spun into the ground. I pulled out at 8,000 and glanced down at the airspeed indicator. I saw the needle quivering around the 700-mile-per-hour mark. And about that time, the wing tanks I dropped at 23,000 feet whizzed past, missing me by a mere foot or two."

And . . . outrunning: Lt. Clayton Gross got his P-51 to really show its stuff, to get him home to England. Gross was over Frankfurt on February 8th, 1944 and got involved with more Luftwaffe than he could handle. With his wingman gone and four FW190's on his tail, he pushed the throttle through the gate into "war emergency" — an extreme throttle setting which allowed absolute full-engine power, but would wreck the engine after 5 minutes in this mode.

Needless to say, the Mustang got Gross back to Merry England.

Combat Stories . . . Performance Reports . . . Engineering Facts . . . Air Force Records . . . Over 100 Photographs . . . make this book THE Encyclopedia of the P-51 Mustang.

. . . you watch the Mustangs as they mix it up with the Luftwaffe Me109s . . . the FW190s . . . the Italian Macchi 202s . . . the German Me163 and Me262 jet fighters . . . shooting down V-1 doodlebugs . . . as the 51s peel off to meet the Japanese Zeros, Tonys, Oscars, Zekes, Tojos, Irvings . . . in Korea, tangling with the Russian built Yaks and Mig 15s. And compare the P-51 with the combat performances of the Spitfire, P-47 "Jug," the P-38 Lightning, many others. And you follow the Mustang into its postwar years as a sports and racing plane . . . as an indispensable weapon in Korea . . . as a military and general aviation plane still being manufactured today, with an order backlog that promises to keep the great Mustang in the air for many years to come!

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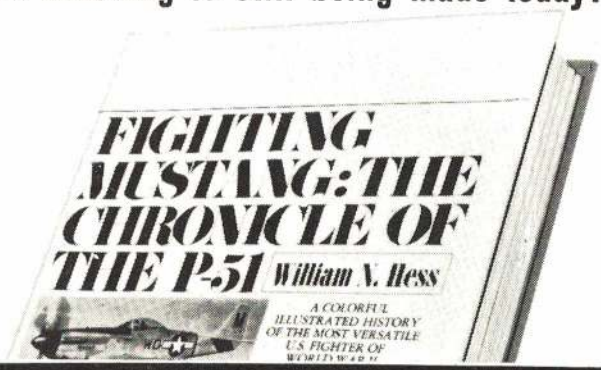

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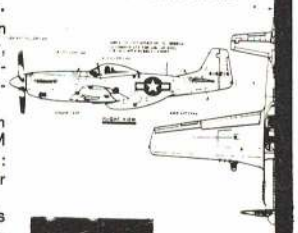

J. C. Meyer shot down the world's first (German) jet fighter.

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straight and level

INTRODUCING A NEW MODEL MAGAZINE FOR THE BEGINNER

AFTER YEARS and years of controversy over the so-called beginner problem, but no action, someone finally is doing something about the situation. On November 1, Potomac Aviation Publications, publishers of the **American Aircraft Modeler**, will release an entirely new magazine dedicated entirely to the beginning modeler, whatever his or her age, but focused primarily on the ten- to sixteen-year-old group. A wide range of interesting material and projects, as well as a pioneering, far-ranging policy, should also endear it to the inexperienced sport modeler, and even the expert who wishes to go along for the ride.

Why is a beginner magazine needed? Ever since model airplane magazines first became popular in the late 1920's after the Lindbergh flight to Paris made the world air-minded, published material steadily became more complex and restricted as the young modelers of that day grew up. Average age levels climbed from teenagers to today's average of more than thirty. All rivers now seem to flow into the sea of radio control which, for the most part, requires a fat wallet, a high order of building and operational skill, comparatively speaking, and handy transportation to distant flying sites.

Most magazines make a token demonstration to the beginner, but nothing substantial can ever be done by magazines whose life depends on radio control readers and advertising. Such things as indoor flying, free flight, radio control, plastic models cannot be covered adequately. With its "Where the Action Is" and other special-interest features, the **American Aircraft Modeler** is by far the widest read magazine of its type in the world. Yet, we too feel the tremendous pressure of trying to give a complete and adequate coverage of all aspects of modeling in order to keep all hobbyists happy. The brutal fact is that such a mission is impossible without a prohibitive number of pages and an astronomical cover price. Such a magazine would be beyond the reach of the beginner and would encounter, in the market place, a stern consumer resistance to "exorbitant" pricing.

Entitled the **Junior MODELER**, the new magazine will be a bi-monthly for first six issues, at which point it will go monthly. First issue is November-December 1971, on sale through subscriptions, hobby shops, and other easy-to-find sources. Price will be 60 cents, a subscription for the first six-issue year, $3.00. Contents will emphasize model airplane building and flying but will include appropriate boats, cars, and a variety of interesting projects with educational and scientific value. Special attention will be given to all aspects of how-to-do-it.

The **American Aircraft Modeler**--which has just added more pages for a total of 100 per issue--will continue under the editorship of Ed Sweeney. The **Junior MODELER** will be edited by your Publisher.

Credit should be given in passing to Glen Sigafoose, the "Sig" of the well-known model manufacturing and supply house, for his attempt to do something about this appalling lack of information and need of help for the beginner and younger modelers. His magazine, *Sig Air-Modeler*, did achieve a sale of about 10,000 copies an issue but, like all magazines, required advertising support to stay alive. Industry took a narrow view, unfortunately, which saw only that his magazine enhanced the position of a competitor.

For the **Junior MODELER**, we invite the submission of articles, drawings, projects, but mainly new ideas and concepts. Those who are interested should write to Bill Winter, **American Aircraft Modeler.** Projects suggested should involve attractive models with an overall concept which would appeal to the active imagination of **Junior MODELER's** readers. Simplicity, low cost, and reliable performance are paramount.

We are interested in articles on the ABC's of the various kinds of modeling--that is, control line, radio control, free flight, etc. It probably has been years since anyone described the art of covering with paper or silk, or where to put the bellcrank on a U-control plane, or the tow hook on a glider. Vast areas of such information are long overdue: from how to run an engine, carve a prop, make fittings, to the selection and use of tools, as well as sanding and working with balsa, simple soldering, dopes and finishing. Many a kid never heard of masking tape. So contributors are needed, both to suggest and to execute approved ideas, and to take on now-ready assignments. Contact us, won't you?

THE PASSING of Russ Nichols, suddenly on May 13, has been a profound shock to the literally thousands of people who knew him. Those of us who have been associated with magazines and the offical aspects of competition have a particular sense of loss. For Russ was not only a gentle, pleasant man, universally well liked, but for many years he also played a leading role in the growth of the hobby as we know it today.

Russ was Executive Director of the Academy of Model Aeronautics, immediately preceding the present regime of John Worth. He held that demanding post from roughly the mid-war years until the early sixties. Among his solid achievements was the development with Chrysler of the Plymouth program which saw local meets feeding finalists to a Plymouth Internationals held each year in Detroit. The Plymouth meets made more publicity by actual count than did the celebrated Chevrolet Soap Box Derby.

A New Englander transplanted to the Washington, D. C., area, Russ enjoyed free flight as a hobby. He was tapped by the National Aeronautics Association to replace Al Lewis (later editor of this magazine) who had been drafted. Russ steered AMA through the lean postwar years when air modeling took such a slump. His introduction of an insurance program boosted membership to a height surpassed only several years ago when Worth included the provision of **AAM** to members as part of their dues advantages.

His friends knew Russ as a man of quiet courage and inspiration. He was the kind of guy who, if ill, would cheer you up when you came to visit him. His was a rare understanding of people. The world is a poorer place without him.

--the Publisher.

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modeler mail

Television remote control

I have the interest, technology and resources to mount a vidicon pickup, transmitter, receiver, display, et cetera, for television remote control flying. It is surprisingly cheap. Total additional weight is about two pounds. Ultimately, I am interested in lifting 100 to 250 pounds dead weight in a large, slow, cheap TV RC aircraft.

I would be interested in communicating with anyone with experience or advice in this area; particularly, anyone who would be interested in this project with more or less standard airframe and RC.

Richard Seed, 258 East St., Lexington, Mass. 02173

An original Drone

I noted with interest "Saga of the OQ-2A Drone" by Jim White in the March issue. It was an informative and well-written story.

Perhaps you might be interested in the pictures of my OQ-2A which is all original

except for new covering on the tail surfaces and lacks the radio gear and parachute. Photo shows my five-month old son Karl; I have not flown it but intend to patch up some bullet holes in the fabric and generally restore it.

David Flinchbaugh, Orlando, Fla.

Blow-up

In reference to a letter from Charles McCullough in the March "You Said It" column, concerning plans for the Dewoitine 520: these plans may be found with cross sections in the June/July 1963 issue of *Air Progress*, the aircraft depicted being No. 140 of the G.C. 11/7 4th Escadrille. These plans are approximately 7/32" to 1'.

The same issue also has plans for the Me. Komet, Nakajima Ki-43-1, Polikarpou 1-16, Arado 196A-3, Bell P-39D, Bristol T-188 and Cessna 336.

Take these plans to your local newspaper's photoengraving department. They can enlarge or reduce them to any size you like, and while there, if you visit the composing room you can obtain acetate for canopies and onionskin for tracing. The Fiesler 167A-0 in the May 1969 AAM (page 46), makes a great flying model when blown up to a 30" wingspan. I did it as explained above.

Keep up the Karlstrom drawings, they are simple great in black and white. I hope you have plans for him to do an He 111 or Do 217 in the near future!

Name withheld (newspaper employee)

Porterfield plans

Just wanted to show you that your plans are put to good use! The enclosed photo is a 1939 Porterfield, scratch-built by myself from your plans, published in the June 1968 issue.

It has had many good flights, and looks extremely realistic. It is powered by an Enya 45; power enough to take off easily, plus keep the top flying speed down to a very scale-like flight.

C.J. Beck, Villa Park, Ill.

Addendum to the legend

As an ex-model builder from the mid-1930's, I was prompted to buy your March issue because of two articles—my old love, the Northrop Gamma, and the OQ-2A Drone.

I never did officially learn to fly, but did get a little experience with the OQ-2A during World War II when selected to attend the Radio Target Plane School at Fort Sill, Okla. There we learned to service and rebuild these venerable presagers of what was to come.

Crew 75 was known as one of the hottest around, since we could rebuild so fast and improvise to get more flying hours from these temperamental drones. It is my understanding the OQ-2A was the first series; OQ-3 was the second, sans landing gear. It utilized the Righter engine, and had three to four more horsepower because of the lack of gears, prop friction, and use of a slightly larger prop in both diameter and width.

The first six months of operation saw us wipe out all the landing gears after many attempts to land when the parachutes failed or the radio was rendered inoperable by bullet hits. One day I suggested that we take a wing strut and weld it in the bottom as a stiffener and belly pad for chuteless and skid landings. After we constructed a new launching carriage, it worked well, and in time we used larger gas tanks to give a two-hour flight time. At any rate, the OQ-3's and 4's came through beefed up for chute landings without landing gear.

In time, we built various other monstrosities; one looked like the Graf Zeppelin, with cabane cables and struts and a large monocoque fuselage, a total of 24 horsepower on an airframe weight of 165 pounds. All the brass at Fort Knox showed up to see this thing fly, and fly it did—straight up! It was five degrees below zero and, when we finally got the thing synchronized, it threatened to take the catapult off. After becoming airborne, it went into a lazy climb to an estimated 8000 feet. With full down elevator, it continued on its sputtering way until the carburetor started to ice up and the extreme vibration played tricks with various radio parts.

A wing tab finally crystallized off and you can imagine the screaming this baby did as it tried to ape some of the action from World War I movies. There was a tree in a meadow which quickly became a telegraph pole when the OQ sailed into it at 300 mph. My records indicate that the government paid on the average of $1043 each for these target drones, excluding transmitters, receivers, etc. I know that they were the most animated part of troop qualification, they're hard as hell to hit!

A new OQ-2A engine and spare parts may become available to a bona fide collector. Price will not be low!

E.J. Blend

Effort required

I'd like to offer a few personal thoughts in reference to the editorial by Bob Lopshire (Feb. 1971 AAM). First, I like the general thought of increasing the public's awareness of model aviation, the end result being beneficial to all modelers.

If all phases of aviation are brought to the Nats, I can see a tremendous amount of workers necessary to carry out the program, and wonder if one week is enough to cover it.

Some of the scale purists will no doubt have radio gear to simulate moving parts such as elevators, rudders, flaps and retract gear, on non-flying models. The sailplane enthusiasts are now in the picture, which cuts into the time slot for radio frequencies. We surely can't eliminate the RC Pattern, which is our standard event for picking the U.S.A. team and consumes most of the radio time at the Nats.

We also have the free flighters talking about using radio to "retrieve" their models—there again is time used in RC.

The "free style" event, commonly known as the "do your thing" event, is certainly a crowd pleaser and a contestant pleaser as well! I had an occasion to participate at one contest, given six minutes and calling your

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"shots" to the judges before you perform them.

At Rhinebeck, the team combat proved to be the crowd pleaser–and contestants seemed to forget the time and money invested in their models as they went after each other, engrossed in getting in their "kill."

So here we have it: all these events generate interest for both participants and the general public, but is there enough time at the Nats to include all the events using only our few radio frequencies?

It only takes a few paragraphs to suggest new ideas, but pages and books of rules and regulations to fulfill them. Once again it boils down to the number of individuals willing to give of their time and efforts in each of the new categories to be included at the Nats. It can be done if you have the workers.

Bill Antoine, Waldwick, N.J.

It is like arguing against motherhood and Christmas to disagree with Bill's true statements about frequency usage, Nats running time, etc. But we seem to borrow trouble. If it isn't practical to do all these new things which would hopelessly compromise the Nats, why do them? Anyway, we all already apparently have a full-time mission to play with rules changes in order to preserve years of agitation and aggravation. Isn't that enough? Can't we ever just have fun?

–Publisher.

'Wonder' of wonders

The Stringless Wonder for the Tenderfoot by Bill Hannan is a real winner! Seeing the full-size plans in the April AAM, a couple of friends and I decided to have a contest to see who could get the best time with one.

By the following Sunday, word had spread and we had 11 entries. Most of the planes had never flown, so we got a real surprise when we started flying. Everyone was getting flights of over one minute–then two- and three-minute spans. Finally, Russ Barrera won with four minutes, two seconds.

The model is an exceptionally good Tenderfoot project, construction is the ultimate in simplicity, and the flying characteristics are very forgiving. The Stringless Wonder will fly no matter what you do to it!

Bob Peck, San Diego, Calif.

Thirties revival?

I enjoy your magazine, particularly the articles on rubber-powered model airplanes. I started building these in 1933, and would like to correspond with other modelers who began in the 1930's, in regard to locating original plans, or copies, of models of this era.

I work for Heath Company as a technical manual writer; my activity in the hobby field has been of great help on this job.

My first model planes were George Waner kits from Dayton–sold by the "Hi Speed" gas stations which sponsored the Jimmy Allen radio program. I'd be willing to pay for a copy of any of these plans: the Blue Bird; the Monsoon 500; or Thunderbolt. I think a rerun of some of these 1930 planes, plus carefully

written instructions, might be popular in your magazine. With the materials we have now, the 1930 rubber-powered model would be easy to build and fly.

David H. Sayles, Benton Harbor, Mich.

Consistency would help

Is there any reason why the various manufacturers of engines could not develop some uniformity regarding the spacing for the mounting bolts? That way it would be possible to change various engines without having to build a new model.

It would seem relatively simple to set up a uniform spacing for all 15's to 30's; 35's to 40's; and 40's up. . . .

Dr. Elmer Schnitzer, Atlanta, Ga.

Since the second gas engine appeared on the market years ago, modelers have asked this same question. Sometimes standardization is not practical–as when one manufacturer produces a compact engine which would be penalized. But engine manufacturers often would sell more engines when a customer shops around for a replacement; and it is an inconvenience to the consumer when he is put through the torture of tearing up engine mounts or firewall. Bill Effinger, owner of the old Berkeley Models, once made up a radial mount plate for all 049's and the thing looked like a target hit with birdshot at close range. Oh well, no one will ever do anything about it.

–Publisher.

Flawless Harrier

I would like to offer a few notes on the aircraft now know as the Harrier (June 1971 AAM). I was stationed at Ft. Campbell, Ky., in 1966, as a member of the 101st Aviation Bn. The aircraft was known at that time as the KV-6A and was operated and maintained by a Tri-Service group consisting of Army, Navy and Air Force personnel.

The six aircraft you speak of were shipped from England in wooden crates and assembled at one end of our hangar. They were equipped with recon cameras in the nose. As an OV-1 Mohawk mechanic, I had ample opportunity to observe these aircraft operate in the field, as a series of parallel photo recon missions were run using the Mohawks and the XV-6As seemed to perform flawlessly.

I happened to be in the operations room at the time when the first craft had been assembled and was being flown. The pilot performed the necessary testing, then called the control tower for clearance to land–on the ramp in back of our hangar! The tower controller's confusion was priceless. He asked several times, "What type aircraft did you say you are?" Finally he gave up trying to understand the situation and allowed the landing, which was performed beautifully, flawlessly and vertically just outside the window of our operations room!

The only major problem of that early version of the Harrier was the fact that if a vertical takeoff was made when the ambient air temperature was above 80 degrees or so, there was only enough fuel left for about a 20-minute flight.

The airplane struck me as the most beautiful and most practical of all the VTOL designs then in existence.

Jack St. Lawrence, Clarksville, Tenn.

ON THE SCENE

WASHINGTON, D.C., SERIES 71, RC CAR RACE

THE SECOND RACE in the East Coast Series 71 was held at Tysons Corner Shopping Center, just outside Washington, D.C., May 9th. Since it was also Mothers Day, only 25 cars attended. Nevertheless, several drivers came down from New York and one entrant flew in from Boston. Most had attended the Series 71 opener at Syosset, N.Y.–especially those trying for points toward the East Coast Championships.

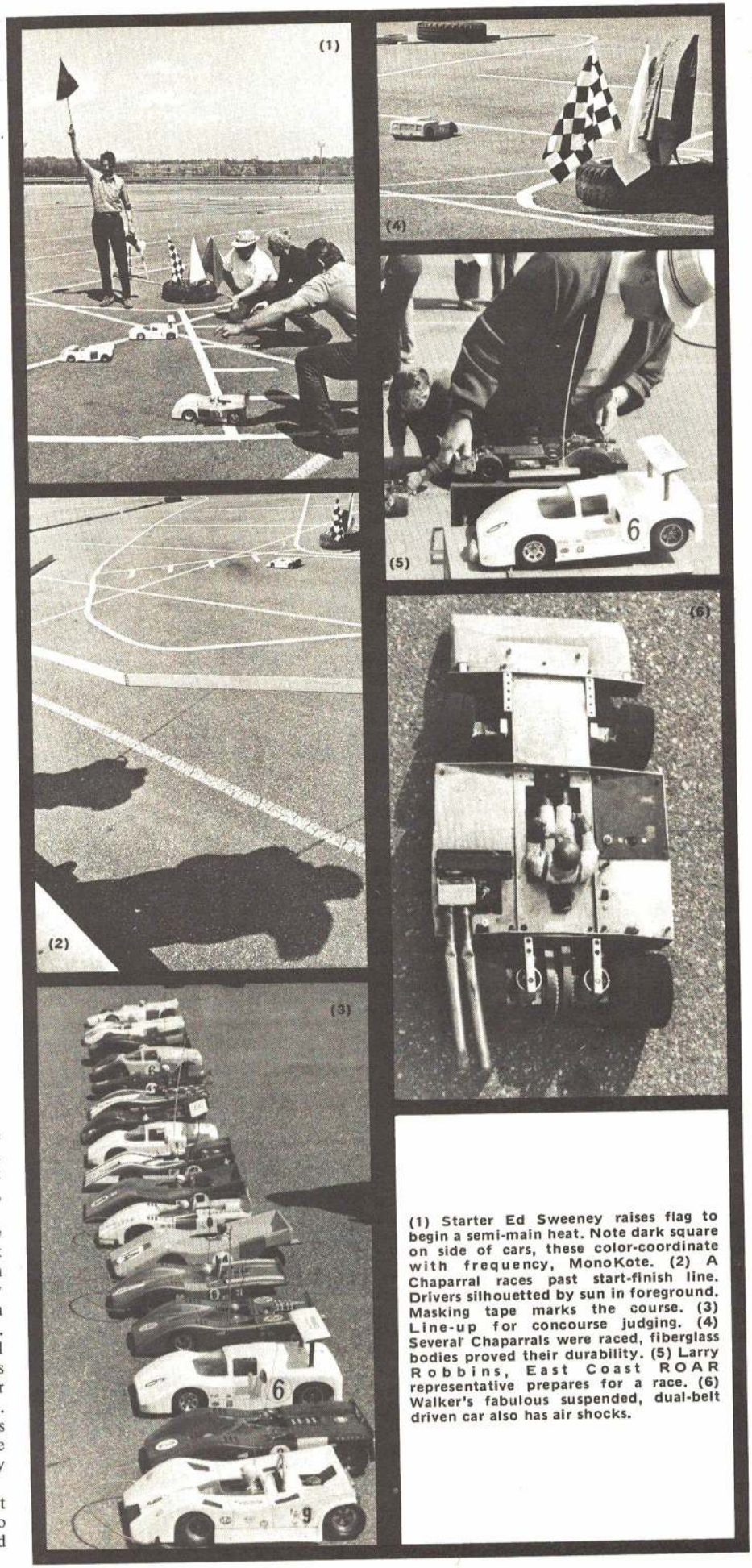
The event was run by the Washington RC Racing Association and directed by Wendel Green. The road course, approximately 700 feet long, demanded handling and driver skill, not just speed. The course might be described loosely as a right triangle, the long straight being the hypotenuse leading to a hairpin right turn then through a series of left, right, left turns, a sweeping turn into the last and short leg of the triangle, then back to the long straight. The hairpin turn demanded good brakes or a trip through the outer barriers (either over or under, depending on the car).

A 15-minute practice session for each car was followed by individual time trials (CD says never again). The best time was just over 19 seconds, the average was about 25 seconds per lap. Eight ten-lap heats were run to select drivers for the consolation and heat races. Eventual road course winner Len Sabato had to win the consolation race to earn a place on the grid for the main event. Two 15-lap semi-main heats determined the other three finalists. In the last four races, including the finals, the second-place car came in on the same lap as the winner. Racing was quite close at times. Without question the 25-lap main event had the four fastest, most consistent cars and drivers: Len Sabato, Bob Beckman, Bob Walker, and Ed Gamils.

Few of the drivers were accustomed to long road-type courses and all found the track challenging. At first, some thought it was an impossible course, then most began to enjoy it. Typical East Coast road courses have been modified ovals with a squiggle on one straight.

The winner drove a solid or unsuspended car, but it was followed to the finish by cars with either fully independent suspensions or at least a floating rear axle with belt drive. However, it was obvious that Sabato won his races on driver experience. With more experimentation, suspended cars probably will begin winning races later in the Series.

Bob Beckman won the overall meet championship. He accumulated points for two heat race wins, second in qualifications, and second in the finals.



(1) Starter Ed Sweeney raises flag to begin a semi-main heat. Note dark square on side of cars, these color-coordinate with frequency, MonoKote. (2) A Chaparral races past start-finish line. Drivers silhouetted by sun in foreground. Masking tape marks the course. (3) Line-up for concourse judging. (4) Several Chaparrals were raced, fiberglass bodies proved their durability. (5) Larry Robbins, East Coast ROAR representative prepares for a race. (6) Walker's fabulous suspended, dual-belt driven car also has air shocks.

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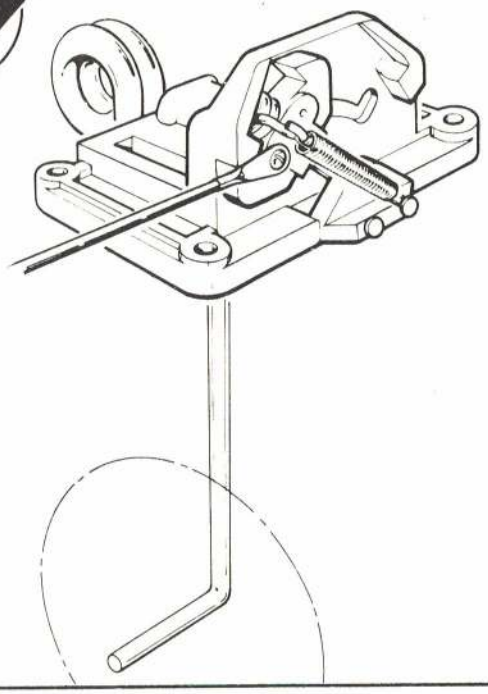

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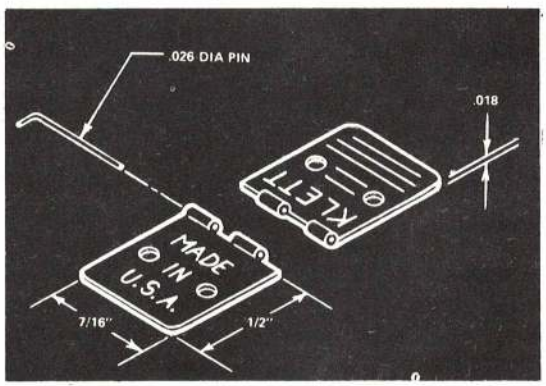

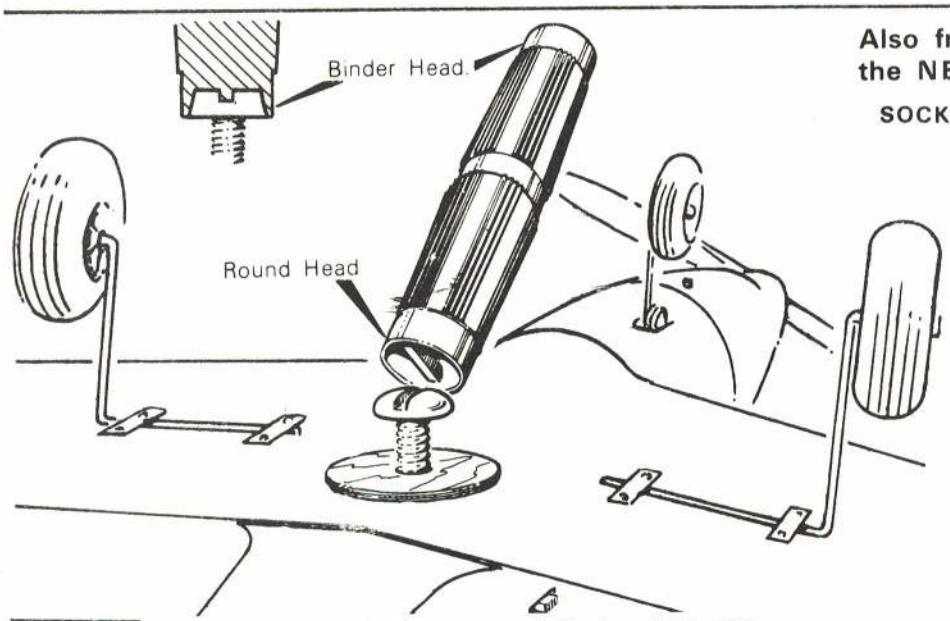

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THE DOUGLAS MAILPLANE

Man-sized free flight recalls the days of helmets and goggles and wind in the wires.

by GABRIEL A. BEDISH JR.

THE INAUGURATION of the Air Mail Service over 40 years ago was an epic event which foreshadowed commercial air transportation. Men and machines of the United States Postal Service began to fly hazardous schedules almost regardless of weather. Before the days of crude beacon lights, pilots were guided at night by bonfires. One of the first commercial carriers was Western Air Express; its initial airplane was the Douglas M2 Mailplane. (See p. 28, Dec. 1969 AAM, "The Douglas Mailplane," by Paul R. Matt, for detailed drawings.)

Since biplanes are outstanding performers, the balanced design of the M2 prototype makes for a fine-flying model. Fidelity to scale has been maintained, with several small exceptions. Power ranges from 09 to 12 displacement.

Construction

The model is designed in three assembly units: wing and main landing gear, fuselage, and tail unit. The ship can be disassembled for more sensitive adjustment, since slight incidence changes are needed for varying winds. A removal lid provides access to working gear inside the fuselage.

General building suggestions are as follows. For a strong and warp-resistant model, use only the balsa specified. Do not force oversize parts into the framework during assembly. When the assembled unit has been removed from the plan, go back over all joints with cement. (I find Duco cement produces strong joints.)

Fuselage: Assemble the simple box frame with its cut-out lower wing mount, then build both sides from hard balsa simultaneously over the plan. After the side panels are assembled and the joints dry, thoroughly moisten the curving longeron and allow it to dry. This prevents the straight upper longerons from taking on a slight bend. Remove the sides from the plan and put in the upper and lower horizontal crosspieces. Cement the rear uprights together and install the set of crosspieces to the rear. When that joint has dried, put in the next set and so on.

With the main frame finished, attach medium-grade sheet balsa formers and the adjoining stringers. Attach upper balsa covering panels and balsa planking as specified. The cockpit cover, which is built in two half-size pieces that meet lengthwise in the center, is moistened before it is attached.

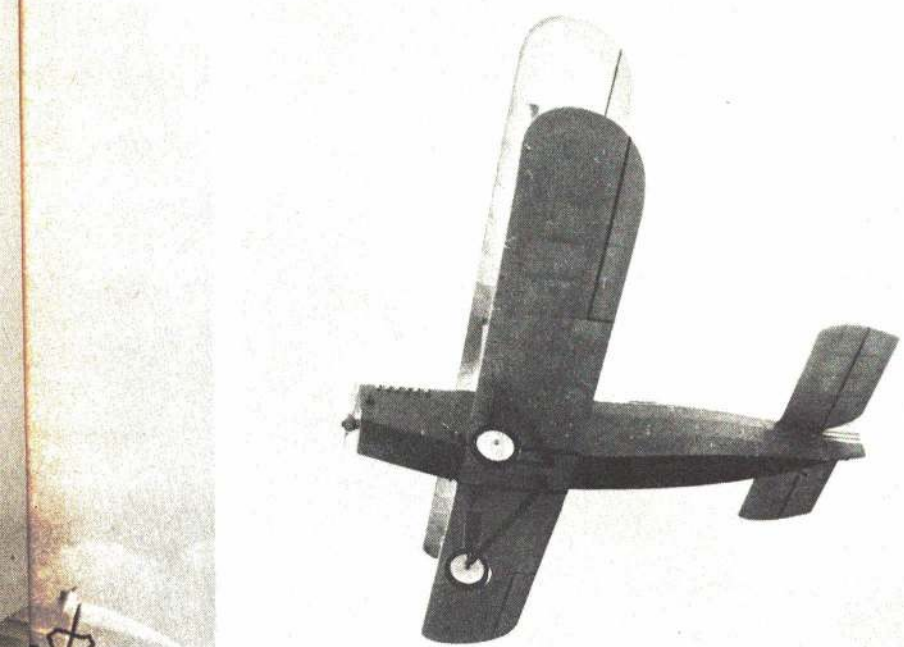
Lengths of dowel are securely cemented in place to anchor rubber bands for mounting the wing and tail units. A tail skid is bent to shape and then put into the fuselage with a strip of plywood to hold it in position.

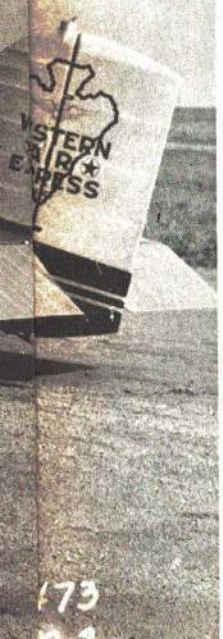
Insert the nose end pieces which carry the motor mounts and then cement them in place. Plan spacing is for an O.S. 09 engine, although this model will take up to a 12. Drill mounting bolt holes with a slightly undersized bit so that when the bolts are screwed into position they will be tight. Shape and attach the lower balsa block nose piece.

Put the upper access lid together and shape. Basswood ends and balsa retainers are added to insure a snug fit. The nose end assembly with its basswood side pieces and grill adds realism and beauty to the model.

Wing and Landing Gear: Wing units are built up directly over the plan. Use medium hard balsa for all pieces except the ribs, which are hard balsa.

Lay out the outline pieces one panel at a time. Then put the ribs into their positions. Remove the frame from the plan to insert the spars. Attach leading edge sheeting, working





Far left: 1926 photo of an early M-2 biplane. For more details of this great plane, see Paul Matt's article in Dec. 1969 AAM. Left: Not highly detailed but much flown, author's model glides overhead. For a big-winged bipe, it is quite steady in wind when adjusted for penetration.

from front to rear, trimming a section of the upper tip piece to facilitate tapering the wing tip assembly. When the sheeting is anchored at the tip, a nice upsweep will result.

When assembling the lower center panel, the entire panel is planked over with two pieces which meet at the center rib. The panel is strengthened by the upper planking of medium hard sheet balsa.

After dihedral gussets are put in place, cement the wing panels together at their various rib joinings. Put in the basswood dihedral bracing as illustrated. Be sure each wing tip has the amount of dihedral indicated.

Cement securely pieces to hold upper and lower ends of the outer wing struts. Shape outer struts to their symmetrical streamline cross section but do not mount them at this time.

To form the inner struts, bend the specified wire as shown in the plan. Wrap the bent pieces with thin copper wire at joints; then pin each strut in position on a board to insure proper alignment. Solder and fit in the proper lengths with two pieces each of medium sheet balsa cut to size and trimmed to take the wire pieces easily. Assemble the fairings and shape to streamlined cross sections.

Drill holes in the fuselage and underside of the wing to accommodate strut ends. Do not drill deeper than the length required for the plastic tubing insert, or the insert will slip its mount. Cement the tubing into the mount holes, taking care not to get cement in the openings.

Make and bend the landing gear struts, using the measurements given on the plan. The upper ends of the struts are mounted to the lower wing spars and backed up by basswood. Wrap the entire spar assembly wall with strong thread and cement it to the assembly on all sides. Fair in the front legs (except for the shock fairing pad) with neoprene tubing. Wrap strut leg ends with fine copper wire and solder them together, then fair in the remainder of the strut legs in a manner similar to that of the inner wing struts.

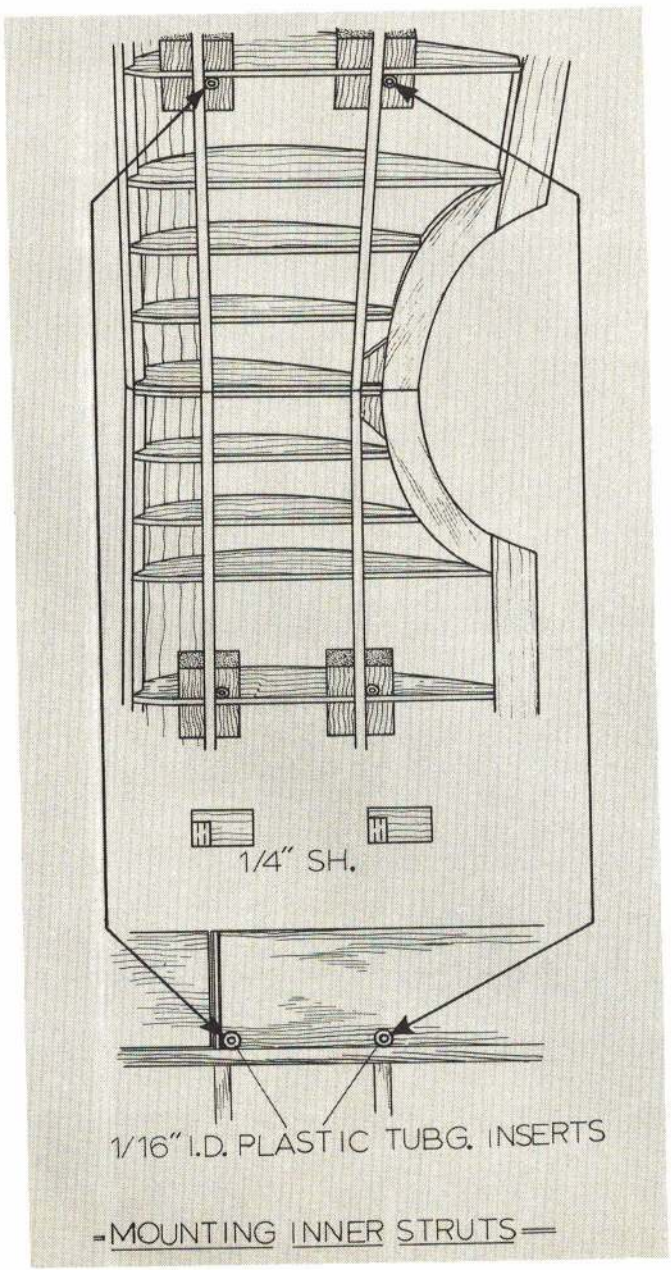
The wing and landing gear assembly is light, yet rugged, and to scale.

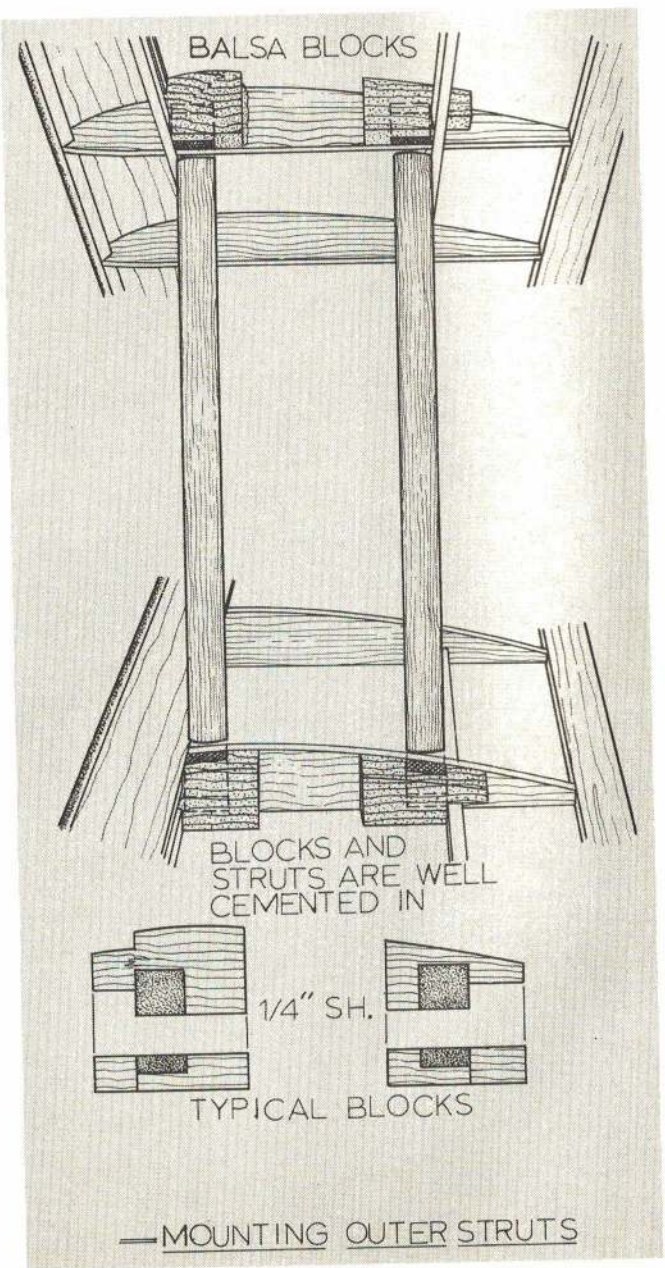
Empennage: Construct the rudder of medium hard balsa directly over the plan. The stabilizer and elevators, also of medium hard balsa, are built up as a single unit. Block up leading and trailing edges with pieces of scrap to a thickness which will provide clearance of the symmetrical airfoil. When the unit has dried, remove from the plan and plank upper and lower center sections.

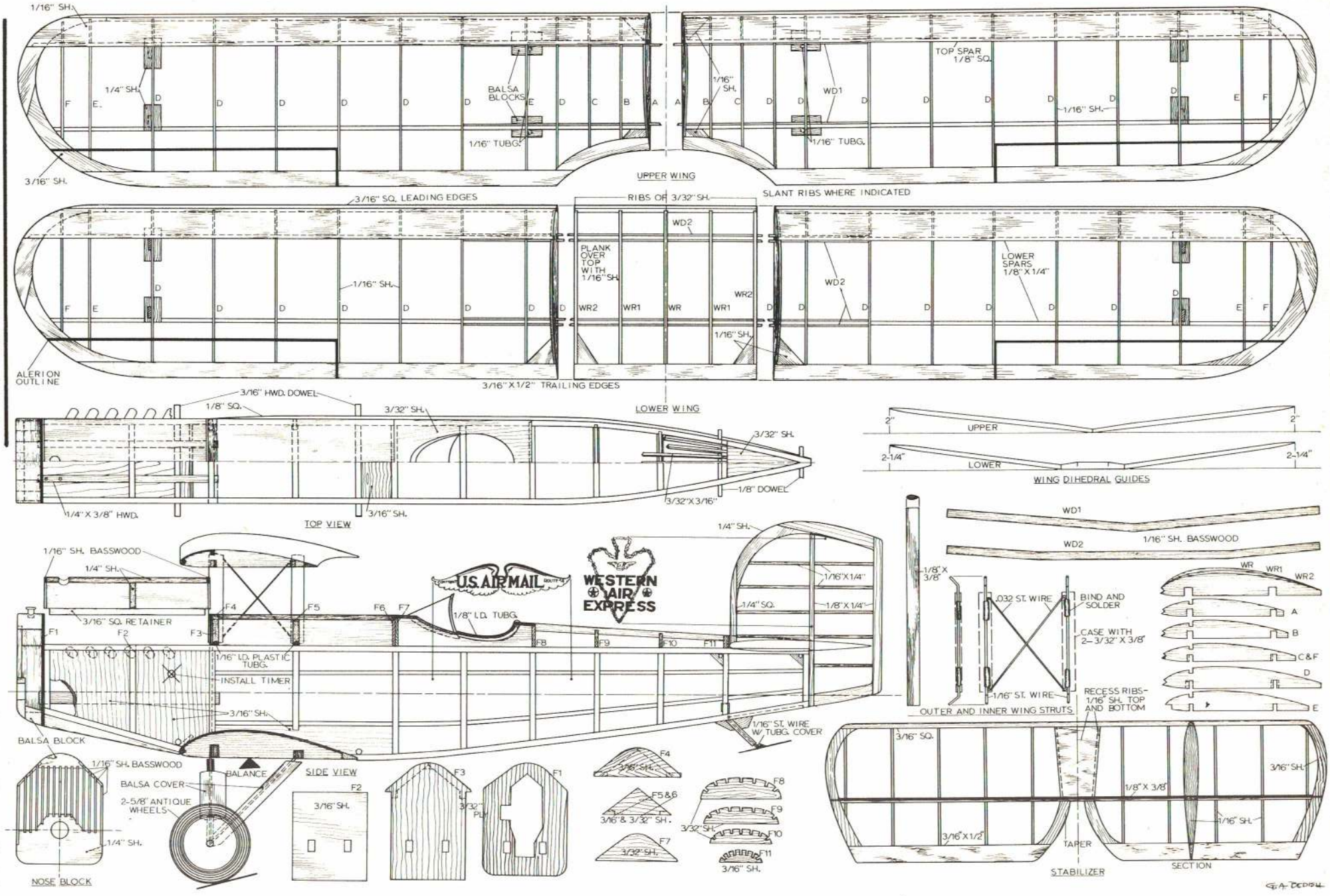
Glue-tack the rudder to the stabilizer, then fit and shape fillets from soft balsa blocks to streamline the upper rear fuselage into the rudder and stabilizer mounting.

Preparation for Covering: Slightly round

(Continued on page 56)






1/16" SH.
1/4" SH.
BALSA BLOCKS
1/16" TUBG.
3/16" SH.
UPPER WING
TOP SPAR 1/8" SQ.
WD1
1/16" SH.
1/16" TUBG.
3/16" SQ. LEADING EDGES
RIBS OF 3/32" SH.
SLANT RIBS WHERE INDICATED
WD2
PLANK OVER TOP WITH 1/16" SH.
WR2
WR1
WR
LOWER SPARS 1/8" X 1/4"
ALERON OUTLINE
3/16" X 1/2" TRAILING EDGES
3/16" HWD. DOWEL
1/8" SQ.
3/32" SH.
LOWER WING
1/8" DOWEL
3/32" X 3/16"
1/4" X 3/8" HWD.
TOP VIEW
2"
UPPER
2-1/4"
LOWER
WING DIHEDRAL GUIDES
1/16" SH. BASSWOOD
1/4" SH.
3/16" SQ. RETAINER
F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11
1/16" LD. PLASTIC TUBG.
INSTALL TIMER
3/16" SH.
BALSA BLOCK
U.S. AIRMAIL
WESTERN AIR EXPRESS
1/4" SH.
1/16" X 1/4"
1/4" SQ.
1/8" X 1/4"
1/8" LD. TUBG.
1/16" ST. WIRE W/ TUBG. COVER
1/16" SH. BASSWOOD
BALSA COVER
2-5/8" ANTIQUE WHEELS
BALANCE
1/4" SH.
NOSE BLOCK
SIDE VIEW
F2
3/16" SH.
F3
3/32" PLY
F1
F4
3/16" SH.
F5&6
3/16" & 3/32" SH.
F7
3/32" SH.
F8
F9
3/32" SH.
F10
F11
3/16" SH.
WD1
WD2
1/16" SH. BASSWOOD
1/8" X 3/8"
.032 ST. WIRE
BIND AND SOLDER
CASE WITH 2-3/32" X 3/8"
1/16" ST. WIRE
RECESS RIBS-1/16" SH. TOP AND BOTTOM
OUTER AND INNER WING STRUTS
WR
WR1
WR2
A
B
C&F
D
E
3/16" SQ.
1/8" X 3/8"
3/16" SH.
3/16" X 1/2"
TAPER
1/16" SH.
STABILIZER
SECTION

by BOB SEIGELKOFF

HOT CANARY

A pair of unique and well-designed racers for Formula I and Formula II/FAI NMPRA racing. These are just as competitive as the usual planes.

THE HOT CANARY is a really different airplane. A biplane racer is unusual enough, but designer-builder and flier Bill Warwick wanted to see the pylons as he banked into the turns so he put the upper wing behind the pilot!

After seeing the Hot Canary at the 1970 Reno races, we felt the urge to build a miniature pylon racing version. The design fits both the FAI International racing rules and the AMA Formula II event. Total surface area is 705 sq. in. (698 required for FAI). It is an excellent flyer, but control surface movements must be minimized. An eighth of an inch up and down on both the elevators and ailerons should be more than sufficient for trial flights. Movements can then be adjusted after trimming and altitude adjusting flights.

The bane of any fast pylon racer is that too much elevator will induce a snap roll, and at racing altitudes this is an immediate disaster—a characteristic of any model turning pylons at over 100 mph. Consider the wing loading of a five-lb. plane at six or eight g's with 600 sq. in. wing area. That's asking the wings to support a 40-lb. weight (or 154 oz./sq. ft. wing loading)! Flying on the safe side of the elevator travel is essential.

It's hard to believe, but the first prototype, with a plain wood finish, had its wings an inch and a half farther aft than shown on the plans. What a goofball-looking thing that was, but it flew, and fast. In several match races against a competitive Formula I Ballerina, the Hot Canary held its own.

Because of too much elevator travel, the first prototype ended in a snap roll at about a ten-ft. altitude in the No. 2 pylon turn. The second prototype, with its wings moved forward, appears far less sensitive in this respect, but it is still important to keep all

(Continued on page 85)

This weird-looking bipe is a tough and winning plane in full-scale racing. Silvester pilot does not race but cockpit is open with long narrow windshield.

POGO

by BOB MORSE

THE OWL RACER, designed by George Owl and built by John Alford, was featured in the April 1971 AAM. This time we present a Formula I racing version of this most unusual aircraft. Its name is Pogo.

The nose cowl treatment makes the difference. The designer departed from the usual cheek cowls and employed a full-bodied wrap-around cowling which actually will contribute thrust in flight. The miniature racing version retains the full-bodied engine cowling shape of the original and the only deviations from scale are those required to meet the NMPRA Formula I racing rules.

The ship is very stable in flight, showing no tendency to mush or stall in high-speed pylon turns. It gets up on the step and grooves. If a good engine is up front, it won't be second best!

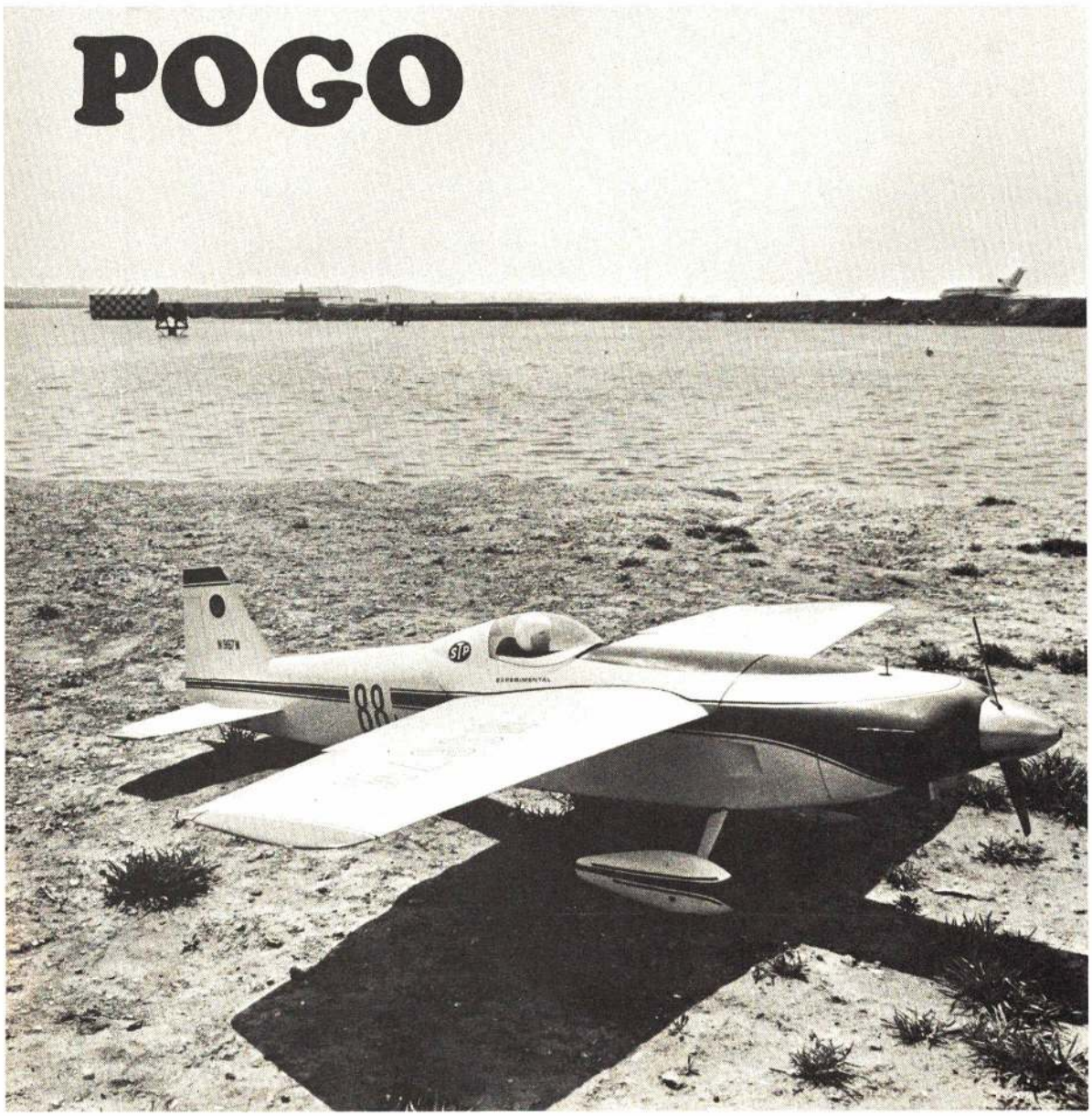
Construction

The fuselage is built on an inverted crutch, the lower half built up completely on the 1/4 x 1/2" crutch members, including the nose planking. When this has set up, remove the entire fuselage bottom half, and then add the top formers and planking. Begin construction with the ply frames, which are cut in separate bottom and top frames.

Cut the fuselage side panels and 1/32" ply doublers to the phantom outline shown. Cutting them to the finished fuselage shape will result in too shallow a fuselage. Assemble the sides by contact cementing the doublers to the balsa side panels, being sure to make a right hand and left hand. Next, glue the longitudinal and vertical stiffeners in place. Cut in the cooling exit hole in the right hand side plate and add the 1/32" ply air duct before fuselage assembly.

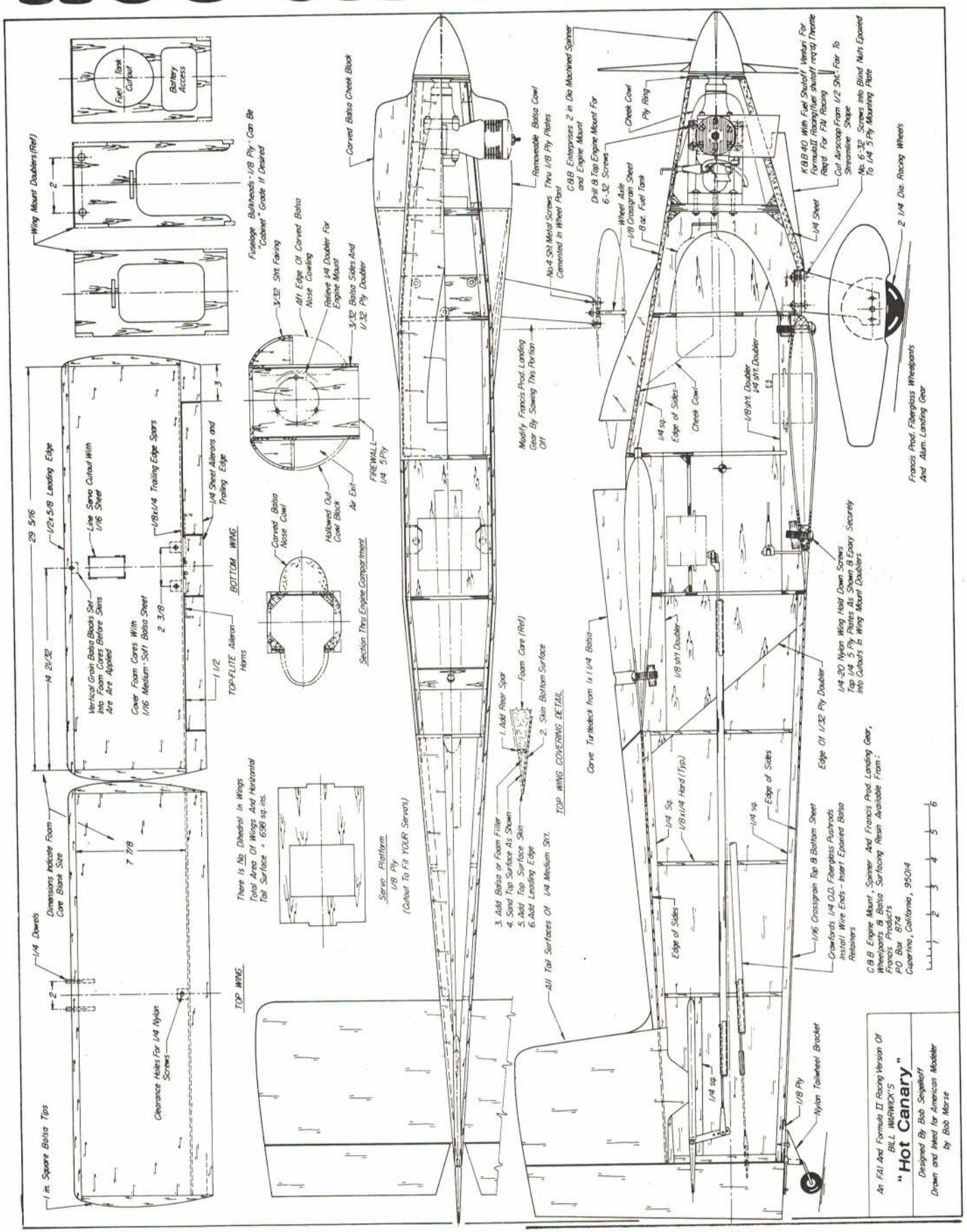
With all the frames cut to shape and the side assemblies completed, begin the fuselage assembly by pinning the 1/4 x 1/2" crutch

(Continued on page 69)



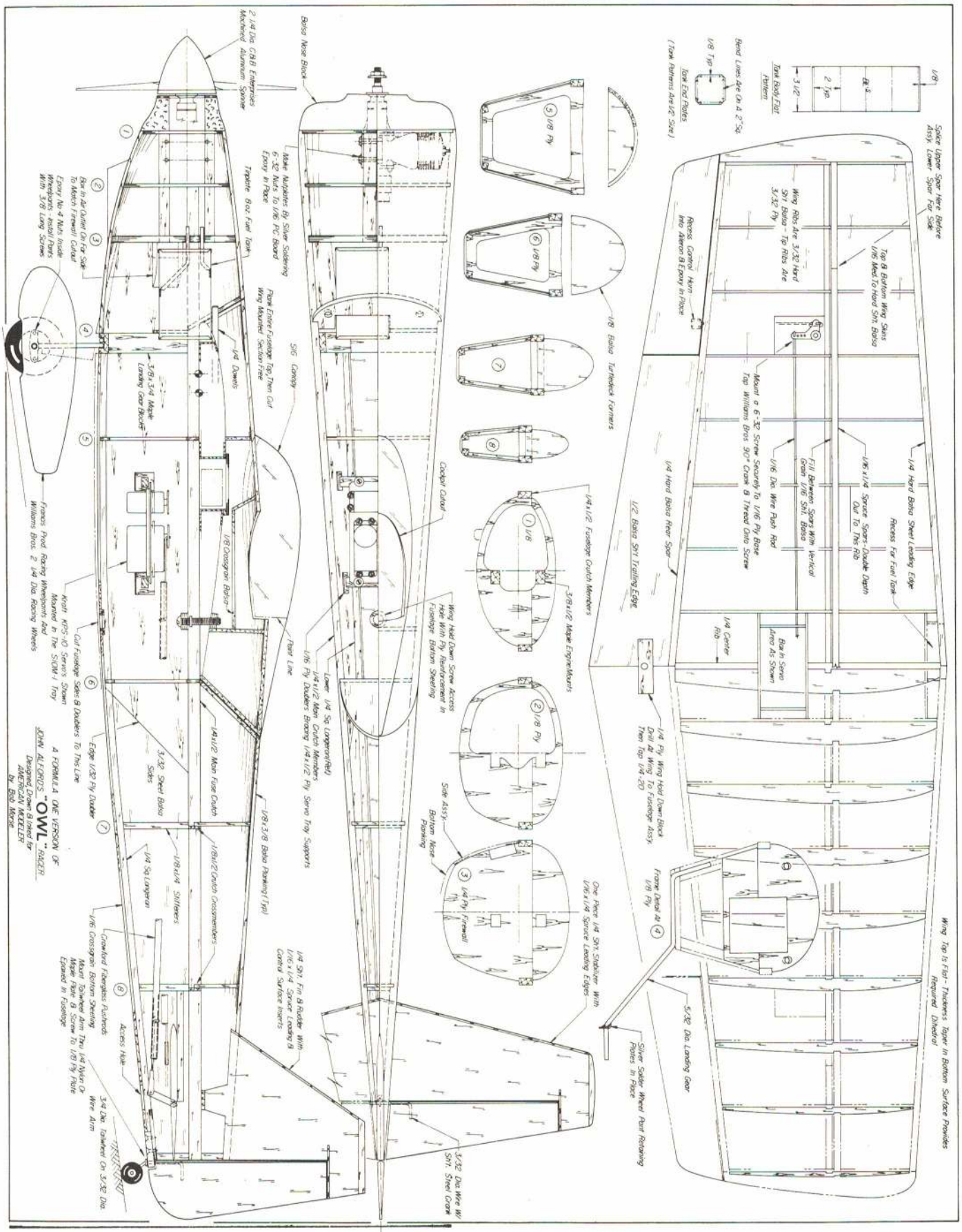
Pogo is unusual because of not using cheek cowls. Wing taper is compromise between area and aspect ratio requirements. Stabilizer is below wing turbulence.

HOT CANARY



FULL SIZE PLANS AVAILABLE—SEE PAGE 70

POGO



FULL SIZE PLANS AVAILABLE—SEE PAGE 70

COUPLED FLAPS AND ELEVATOR

by FRED MARKS

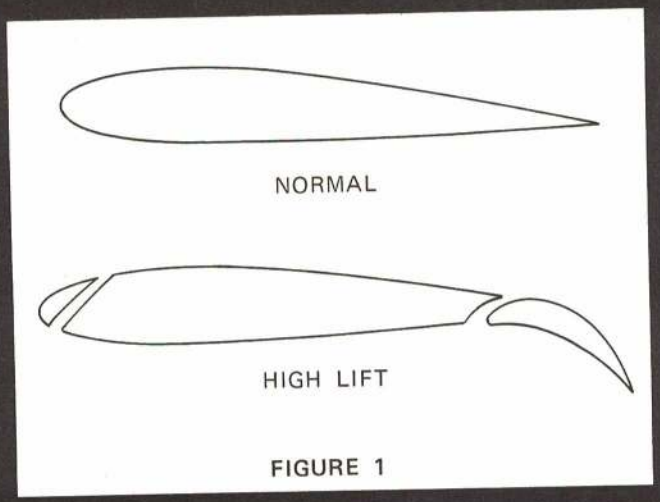


FIGURE 1

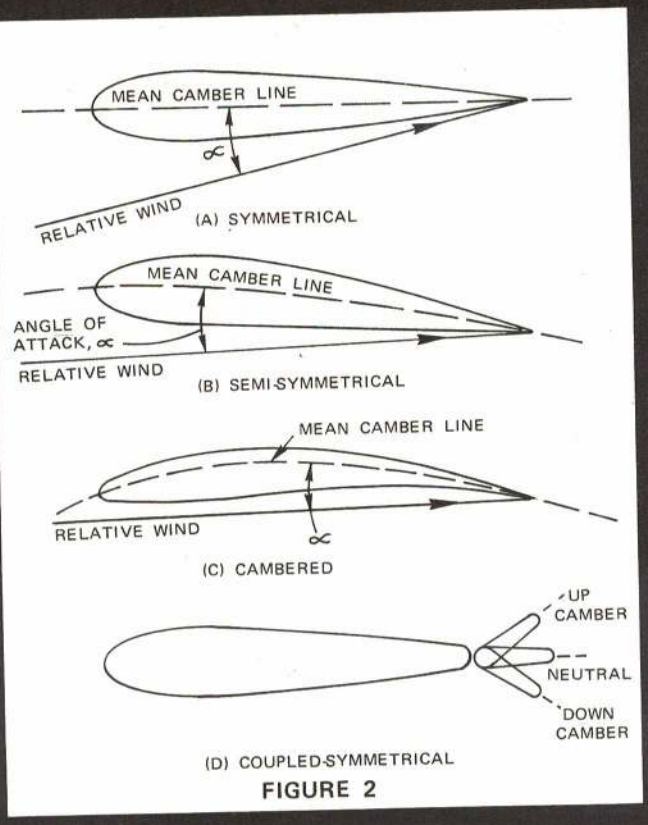


FIGURE 2

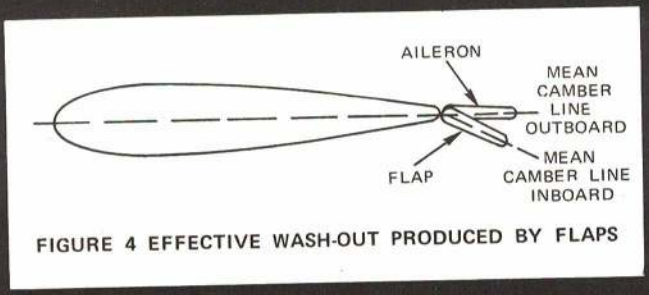


FIGURE 4 EFFECTIVE WASH-OUT PRODUCED BY FLAPS

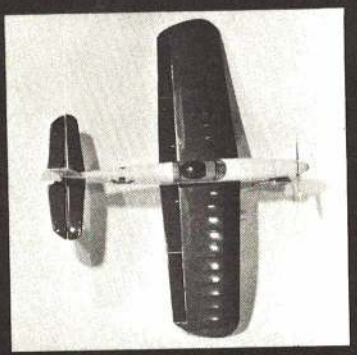


Fig 3. Top view of RC Nobler shows flap/aileron/elevator areas reasonably balanced. Small movements are quite effective on all surfaces.

ABOUT THREE YEARS AGO, we became interested in the application of coupled elevators and flaps for RC stunt models. The initial results were published in a limited manner as part of the 1969 DCRC/AMA Technical Symposium. Since that time, further work has been done and we felt that the results should be presented. The background and theory will be given, several mechanizations shown, and the flight characteristics achieved will be described.

Control line stunt models have employed coupled flaps and elevators since the early 1950's. Their use on such models as the Smoothie, Shark 45, Nobler, and the fantastic generation of stunters by Gierke and others brought a new era in control line aerobatic flying techniques, evidenced in larger models performing much smoother maneuvers with less effort. It was felt that the same technique might benefit the performance of radio control aerobatic models.

The first such attempt was the Scepter by Chuck Hayes which appeared in AAM. Ed Sweeney and I proceeded to investigate the use of control line design for RC and the application of coupled flaps to conventional RC stunt models. We first converted the Nobler, originally designed by George Aldrich, and this redesign is now kitted as the RC Nobler. I successfully converted the Shark 45 control line stunter to RC and hope that plans for this model can be presented shortly in AAM. In addition, we have utilized coupled flaps on the AAMCO Trainermaster, the Kwik Fli, and a six-foot version of the Goldberg Skylark (never kitted) which has a semi-symmetrical wing section.

Direct lift control, i.e., rapid actuation flaps, has been used in some full-scale aircraft. Notable among these were some of the Japanese fighters of World War II which had flaps stressed for extension at combat maneuver speeds. The following are quotes from *War Planes of the Second World War, Volume 3–Fighters*, by William Green, published by Doubleday. "Ki. 43-IIB Japanese Nakamima Hayabusha (Oscar)–...introduced the use of a combat or battle flap, which extended in action, provided additional lift, increased the turn rate and improved control response. By means of this innovation, the Ki 43 became one of the most maneuverable fighters extant. All controls were extremely sensitive and the fighter was completely devoid of any vicious characteristics...."

"Kawanishi Nike-1 Shiden (George II)–Flight trials soon revealed that the Shiden possessed outstanding maneuverability, a

The next generation of RC aerobatic models
probably will use this well-proven technique just as retracts are considered essential today.

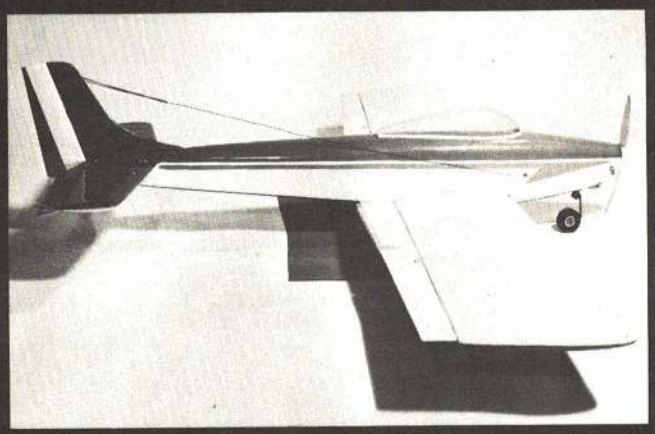


Fig. 5. Senior Skylark with semisymmetrical airfoil uses differential flap movement. Multiple exposure photo also shows flap/elevator differential movements. A delightful flying plane. Fig 6 below. AAMCO TrainerMaster converted for coupled flap movement became highly maneuverable yet much more stable. Flaps also aid in takeoff from DCRC's heavy grass field.

Ed Sweeney starts Kronk Twin-powered Kwik Fli which has reflex trailing edge flaps and ailerons. Not only do the flaps sharpen the plane's square maneuvers but also tamed the stall and significantly slowed the landings. Ailerons much smoother.

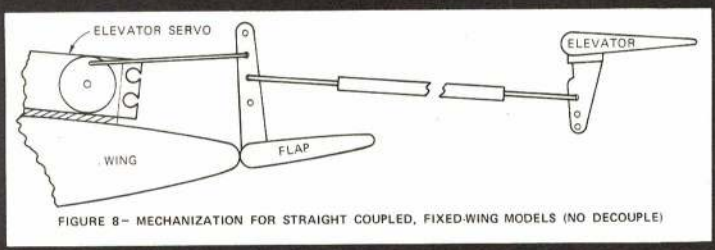


FIGURE 8– MECHANIZATION FOR STRAIGHT COUPLED, FIXED-WING MODELS (NO DECOUPLE)

feature due in no small part to its 'combat' flaps which changed their angle automatically during maneuvers, supplying additional surface when high lift coefficient was required."

"Mitsubishi 12 M 2 Raiden (Jack)–A laminar-flow airfoil section was selected for the wing, and so-called 'combat' flaps were fitted to increase lift with the minimum drag. . .excellent control and stability at all speeds."

The newest Sisu sailplane is a highly efficient design which uses flaps to provide both positive and negative (reflex) camber. The negative flap is used to permit high speed penetration for efficient flight between lift areas. Flaps are neutralized for operation at the optimum L/D ratio for soaring. Positive flap is used for slow speed flight and higher lift during descent and landing.

The most recent application to full-scale aircraft was reported in the 23 July 1970 issue of *Flight Internationl*. The Wagner Acrostar, the Swiss entry in the World Aerobatics Championship, was designed with interconnection between not only the elevator and flaps but also the ailerons. The idea is to boost the lift coefficient in various flight conditions. When the stick is fully back, both ailerons and flaps droop, the ailerons half the amount of the flaps. Similarly, when the stick is fully forward, ailerons and flaps "deflect up. . . . The idea was borrowed from the model aircraft world." This unusual aircraft is described in Don Berliner's story on the Acrostar in this issue.

Theory

The normal application for flaps in full-scale aircraft is to increase the maximum lift coefficient (C_L) for the wing from around 0.8 to 2.0 or greater. In general, the more sophisticated the flaps, the higher the maximum C_L. In addition, the use of leading edge slats and/or slots further increases the maximum C_L values around 2.8 and, under ideal conditions, 3.0 is achievable.

The mechanism whereby lift is created by the flap is the reshaping of the nominal airfoil to a highly cambered airfoil. Figure 1 presents the basic change including both flaps and leading edge slats. The additional lift is achieved at the penalty of drag, since drag coefficient, C_b, also increases as C_L increases, thus large flap movements are used only when high lift is required at slow speed with full flaps used only for landing. In addition, large excursions of flaps at high speed cause severe buffet and high structural loads.

The basic difference between normal landing flaps and the coupled flaps discussed

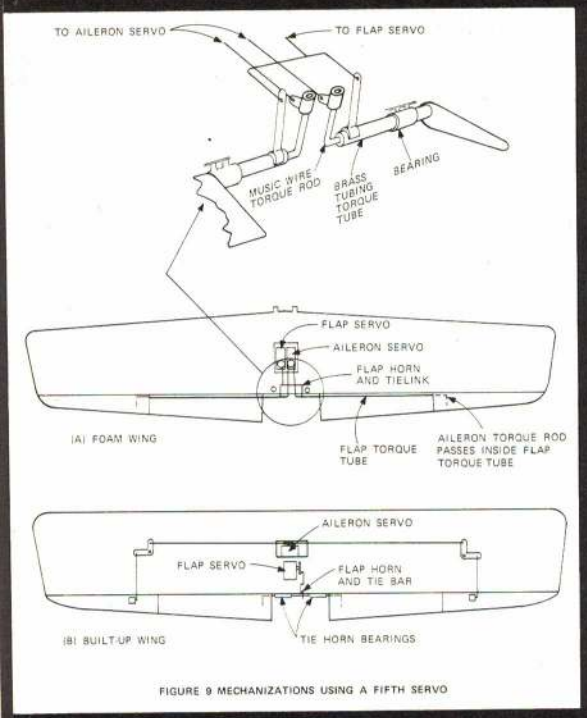


FIGURE 9 MECHANIZATIONS USING A FIFTH SERVO

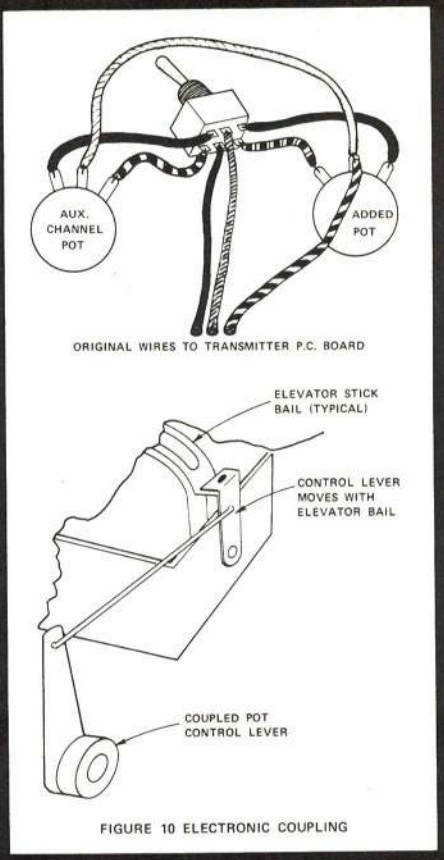
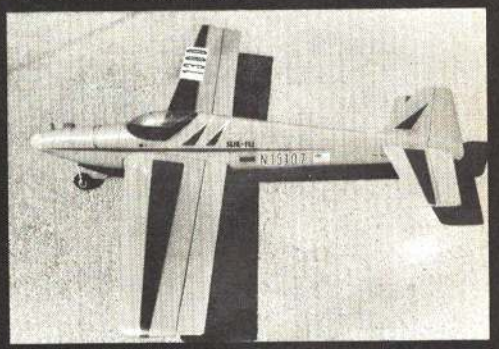


FIGURE 10 ELECTRONIC COUPLING

Photos by Frank Pierce



Phil Kraft's original Slik-Fli showed over-reaction to flaps until movement in coupled mode was reduced to only plus and minus 3 degrees. Small but highly effective. Again, note generous aileron/flap/ and elevators.

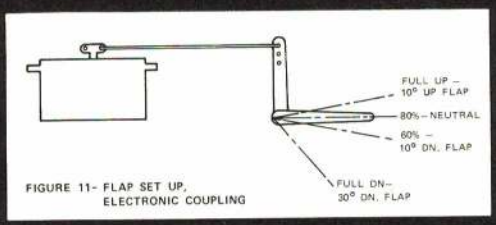


FIGURE 11- FLAP SET UP, ELECTRONIC COUPLING

Art by Kelly Mathews

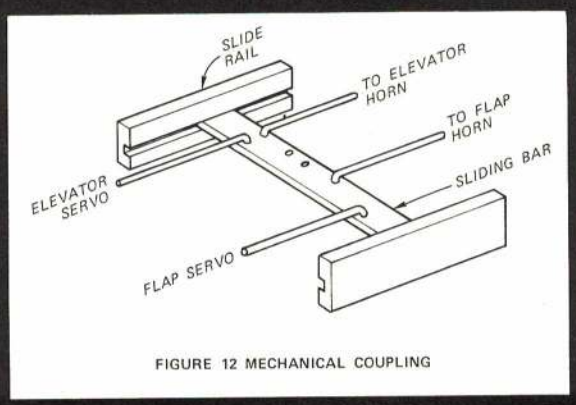


FIGURE 12 MECHANICAL COUPLING

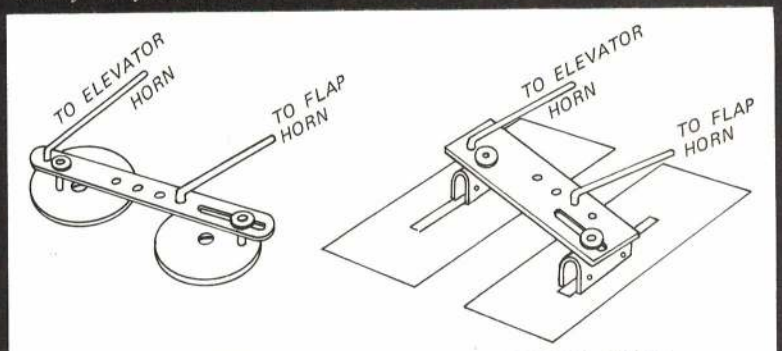


FIGURE 13 EXAMPLE MECHANIZATIONS' MECHANICAL COUPLING

here is in the amount of flap travel used and the use of both up and down deflection. The normal aerobatic model has a fully symmetric airfoil which requires that the model fly at a postive angle of attack to generate lift (see Figure 2). A flat-bottomed airfoil or a semi-symmetrical airfoil does not require as high an angle of attack (except during inverted flight). By introducing a small (10 to 15 degrees maximum) flap deflection, we have in effect created a semi-symmetrical airfoil for both inverted and upright maneuvers. The flap used here simply provides variable camber.

The end result is that considerable lift is generated at lower angles of attack with little increase in drag. In fact, the added drag will not become significant until flaps are extended well beyond the range indicated earlier. From this standpoint coupled flaps create unneeded lift during landing and need to be retracted or extended to the landing position.

In the models tested thus far, the flaps and ailerons have occupied, in approximately equal proportions, the inner and outer halves of the wing panel. This is shown most clearly in Figure 3. This relationship also produces a desirable effect on lateral stability at low speed: with the model trimmed for a relatively slow approach, the flaps are extended down a few degrees. This places the mean camber line of the outer wing panel at a relatively lower angle of attack than the inner panel as shown in Figure 4. Thus tip stall is delayed and lateral control is maintained to a significantly lower speed.

Mechanization and Operation With Coupled Flaps and Elevator

Figures 5, 6 and 7 illustrate three of the various types of models used for the experiments. The movement of the flaps and elevators is superimposed. The Nobler (Figure 5) is the converted control line stunt model; the converted Trainermaster (figure 6) is a low-winger with a fully symmetrical airfoil, and the Kwik Fli shown in Figure 7 has an NACA2415 semi-symmetrical airfoil. The latter is a large model and fairly heavy, representative of many contemporary designs. Note the width of the flaps and ailerons.

The three models pictured coincidentally are representative of three suggested types of mechanization. The first was a simple mechanical interconnect of elevator and flap quite similar to the control line arrangement. Figure 8 shows this arrangement. It has the advantage of minimum weight in the non-removable wing installation and can be

(Continued on page 82)

A fold-away workbench for two is eight feet long and two feet deep.

THE JUNIOR/OPEN BENCH

Young son Steve at his side of the bench.

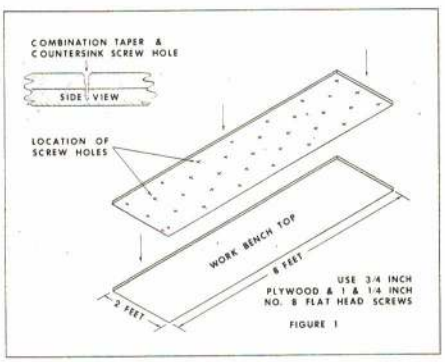


FIGURE 1

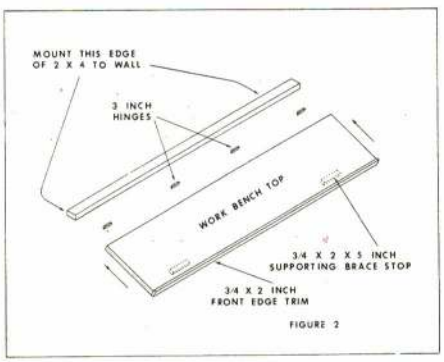


FIGURE 2

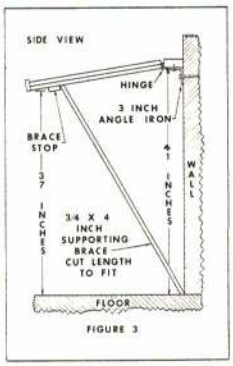


FIGURE 3

by JOE KLAUSE

DAD, HOW ABOUT that model-building workbench you may have promised to construct for yourself and your son? This project may provide just the needed incentive.

Son Steve and I gave thought to building such a workbench, when we recently moved into our present home. Specifications for the bench gradually evolved during four or five bull sessions. Together we decided that it had to be: (1) big enough for both of us, (2) comfortable, (3) solid and warp-free, (4) suited to the requirements of model building, and (5) economical. Some compromises were necessary to meet all these specs, but we think the results fill the bill. What's more, it was easy to build!

Plywood was selected as the basic material because of its inherent strength, its uniform, smooth surface, and the ease with which pins can be tapped into it. Plywood is most commonly available in 4 x 8' sheets, which determined that a bench eight feet long would be big enough for both of us. And two feet was wide enough. Two 3/4" thick sheets of 2 x 8' plywood fastened together would provide a solid, warp-free and nearly ideal working surface. Most lumberyards will cut the 4 x 8' sheet accurately either at no cost or for a nominal charge.

Fastening the two sheets together is the first and only critical part of the whole job. The sheets must be on a flat surface when the pilot holes are drilled and the screws driven; otherwise the bench's surface may end up with one great big warp. The side chosen to be the top of the workbench must face down during this step. Pilot holes are essential.

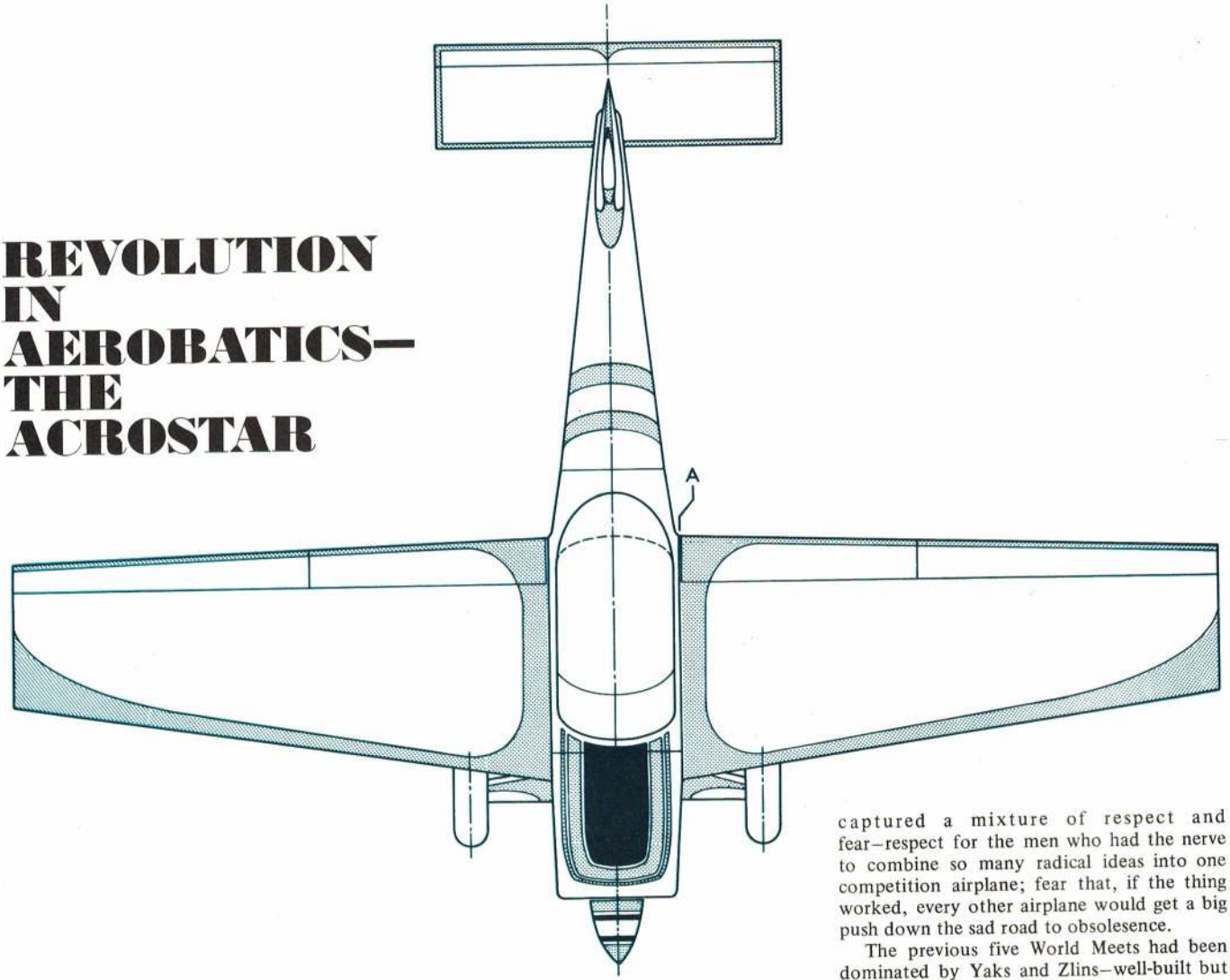
Thirty-three 1 1/4" No. 8 flat-head screws are inserted in a quilt pattern (see Fig. 1). The four corner screws are located three inches inboard of each edge; the remaining screws are spaced proportionately. When this is complete, three-inch hinges are installed and the 3/4 x 2" front edge trim fastened on with finishing nails (Figs. 2, 3). The trim is the most important part of the whole bench–it keeps X-acto knives from rolling onto the floor. Round its edges so that it won't cut or irritate the forearms.

Next, mount the workbench to a wall (Fig. 3). The supporting braces are conveniently held in place by the weight of the bench. They permit it to be folded away easily if necessary and also eliminate annoying table legs and shin bruises. In our basement, we fastened a piece of angle iron to the cinder block wall with four toggle bolts. The 8' length of 2 x 4" is held to the angle iron with four 1 1/4" No. 8 round-head screws. Use whatever mounting method is appropriate to the bench location; however, the mounting must be solid and level.

The given height and slope of bench, which were arrived at by that tried and true method, trial and error, seem quite comfortable to us. Supporting braces are approximately 44" long. Hold them in position, and then nail the brace stops in place. To change the slope, simply change the length of the braces or adjust the position of the stops. The stools (see photo) are 28" high and can be purchased at a reasonable price in almost any department or furniture store.

To complete the project, apply a protective coating to the plywood working surface. We used two coats of Valspar Polyurethane Liquid Plastic, No. 20, clear, high-gloss, and found it most satisfactory. Sand as necessary between the coats. Once the bench is completed, some surrounding peg board, shelves and tool hooks may be put up to suit individual needs. One final but important suggestion: be sure to install adequate lighting over the work area.

REVOLUTION IN AEROBATICS— THE ACROSTAR

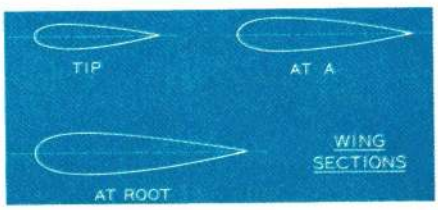


by DON BERLINER

IT TAKES A LOT OF COURAGE to enter the World Aerobatics Championships with a really novel design that has been flying for less than three months. And it takes even more courage if this airplane features a design innovation which its pilots freely admit was borrowed from aeromodeling!

The payment for such courageous action could easily be a large measure of embarrassment, or just as much respect, depending on the brainwork behind the seemingly rash move. In the case of Wagner and Hossl's Acrostar, the lack of testing time on their overgrown model plane was the result of simply being in a hurry, not of having failed to recognize the need.

When the slick little monoplane burst onto the aerobatic scene during the Sixth World Championships in the summer of 1970, it captured a mixture of respect and fear—respect for the men who had the nerve to combine so many radical ideas into one competition airplane; fear that, if the thing worked, every other airplane would get a big push down the sad road to obsolesence.



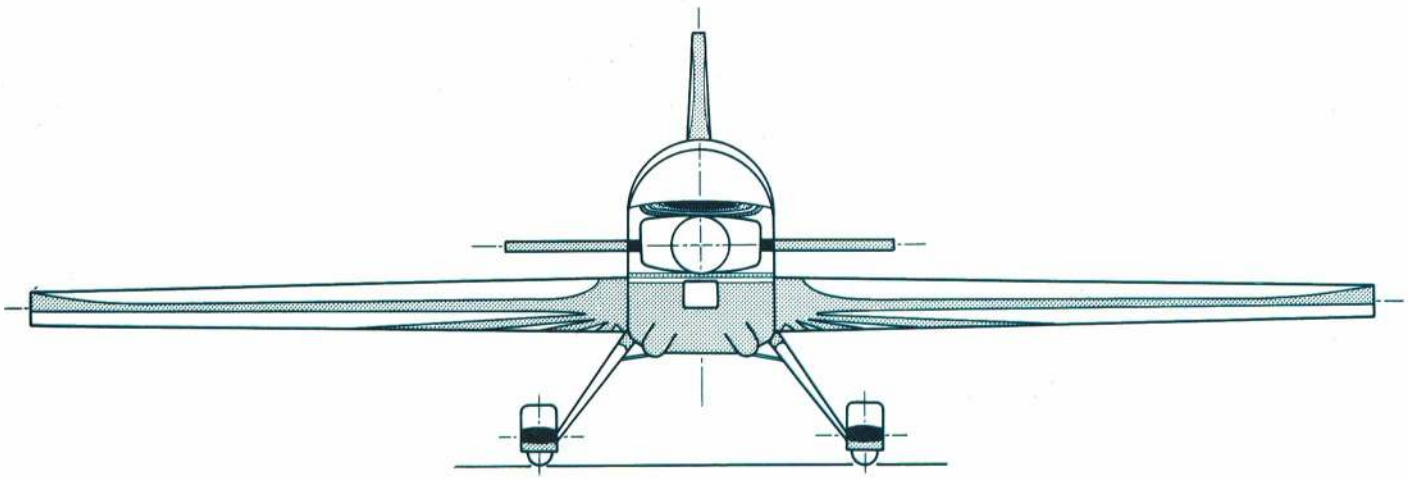
The previous five World Meets had been dominated by Yaks and Zlins—well-built but completely conventional airplanes with enough power and aerodynamics to meet the demands of the Aresti System of competitive aerobatics. This sixth Meet, at RAF Hullavington, England, would bring to the fore a new airplane which was more efficient but, if anything, less radical. Some might even call it reactionary, for the potent, nimble Pitts Special was a two-winger, of all old-fashioned things! But its two wings were highly effective, and its 180 hp was enough to pull it straight up. Flown by top-notch American pilots Bob Herendeen, Mary Gaffaney, Gene Soucy and Bob Schneurle, it took the measure of the European aircraft with a bit to spare.

But the future was still wide open for new ideas in design and construction, for the day of the biplane just has to be limited. If not, then why bother to study aerodynamics, anyway?

There is plenty of reason to study aerodynamics if you want to get ahead, because the people who created machines like the Pitts and the Zlin had done their hard work years ago, whether with computers or with their natural gifts for such things. The opportunity was there, as any serious student of aerobatics could see—if he looked.

Arnold Wagner is such a student—an active, practical kind of student, who isn't happy with the gradual perfecting of older types,

How a Swiss pilot adapted control line techniques
to achieve a new standard in World Championship competition.

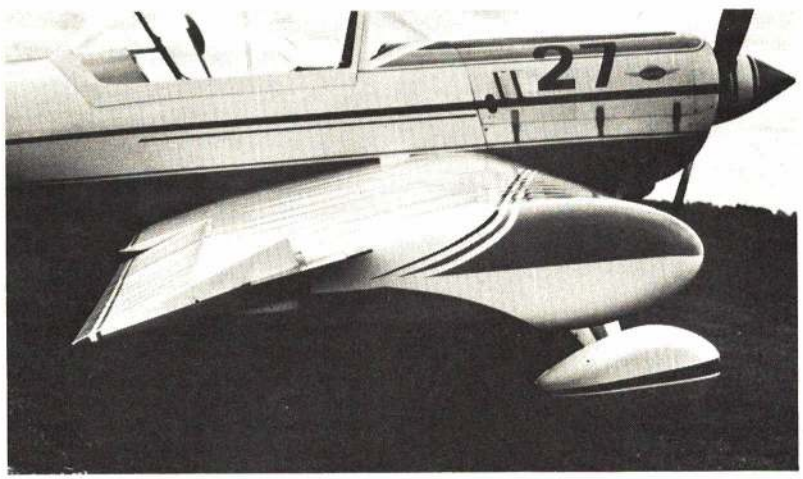


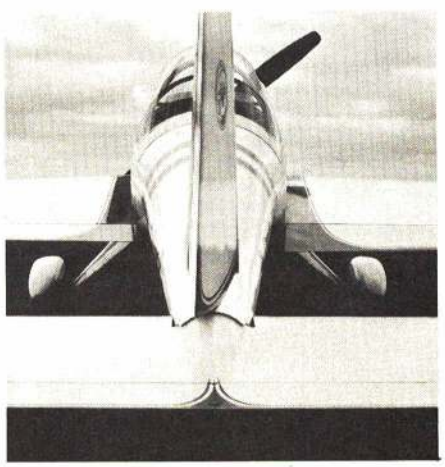
which was the way others had been attacking the problem. What he wanted was a major improvement, for he had seen enough slow progress. The first time the Swiss Air pilot got involved in big-time aerobatics was in the 1964 World Championships at Bilbao, Spain, where he placed an excellent eighth in a modified old Bucker Jungmann. Not wishing to go the same route as most of the others—meaning the popular Zlin Akrobat series from Czechoslovakia—he picked something different, the semi-homebuilt KZ-8, which looks something like a foreshortened deHavilland Chipmunk.

The new KZ-8 was his mount at Moscow in 1966 (he placed 27th) and again at Magdeburg, East Germany, in 1968 (9th place). It was a good airplane and it was different, but it wasn't good enough to get him to the top of the ladder. As a private individual from a country which doesn't subsidize its pilots, Arnold Wagner was at a disadvantage when up against the Eastern European professionals. But it looked as though they would stick with their slowly-improving Yaks and Zlins for a while longer, thus leaving the door open for an enterprising person.

Following the 1966 World Championships, Wagner began designing an improved version of the KZ-8 with a simple system of interconnected flaps and elevator. Little by little, the modified KZ-8 became an entirely new airplane.

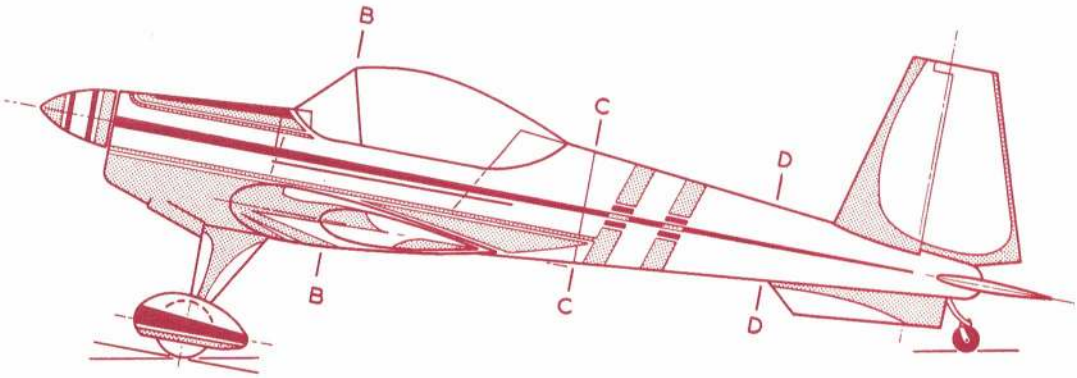
By January, 1969, Arnold Wagner was ready to move. With financial support from West German aerobatic champ Joe Hossl and from Walter Wolfrum of the West German Aero Club, he completed arrangements with the very progressive glider firm of Wolf Hirth,





The sensational features of the "stunt model" Acrostar are revealed in these two pictures. The movable all-flying tail (stabilator) is linked with ailerons and flaps. Back stick produces down flap, ailerons moving half as far as flaps and vice versa. With stabilator in neutral, aileron action produces half as much movement in the flaps—as shown in photo above. Note thickness and shape of Eppler airfoil, also usable on models. Right: The flying tail and flaps.

ACROSTAR



in Nabern, West Germany. Under the supervision of world-famous glider aerodynamicist, Dr. Richard Eppler, the detail drawings were produced. Prof. Eppler proposed but one major change in Wagner's airplane: a different airfoil, the 18 percent Eppler 467 for the wing and the 15 percent Eppler 467 for the tail.

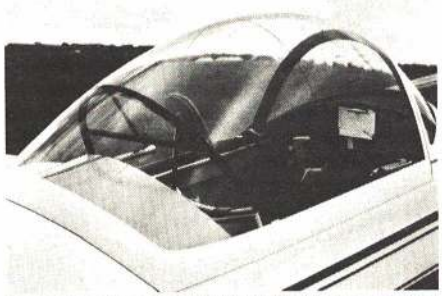
Actual construction began in late December, 1969. During the following months there were numerous technical meetings as the drawings were completed and the first airplane built. The prototype was rolled out on April 15, 1970, less than four months after it had been started. Wagner made an uneventful (his word) first flight on April 16 and flew the plane intensively for the next three weeks, incorporating scores of minor changes and adjustments.

Early in May, after 25 hours of test flying, certification trials were run in a mere three days. With the World Championships coming up in July, there was no time to waste, and so far things had been going very well. In the middle of May, Wagner won the Swiss Aerobatics Championships, and Joe Hossl took second—quite a beginning for the Acrostar. By this time, Wagner had flown it 42 hours and Hossl less than 10!

At the end of the 500-mile ferry flight to the site of the World Championships in the west of England, the little craft had all of 93 hours of test and practice flying time in its log book. Since the Swiss Championships had received almost no publicity, this was really the debut of the Acrostar, and it shared the spotlight with the four nearly-identical little Pitts Specials on the ramp of the old RAF base. The Zlins (all 23 of them) and the Russian Yaks had been seen many times before, and even the Pitts was familiar to many of the aerobatics enthusiasts.

But the cream-and-orange airplane with the odd combination Swiss/German insignia on its tail was clearly something new. It might even be something worth taking seriously. The single feature which attracted the most attention was the coordinated control system, linking the full-flying horizontal tail (stabilator) with the flaps and ailerons. When the stick is pulled all the way back, the stabilator leading edge goes down 15 degrees, the flaps go down 15 degrees and the ailerons go down 7 1/2 degrees. For aileron control with the stabilator neutral, the flaps move half as far as the ailerons, up or down. This, indeed, was a radical innovation for airplanes of any category, although it is an established technique in control line stunt flying, where Wagner got his inspiration.

The control system may have been the most sensational new idea in the Acrostar, but it was far from the only one. Construction, while not as obviously novel, was the result of a great deal of thought. The wings had a box spar of glass fibers imbedded in epoxy, with

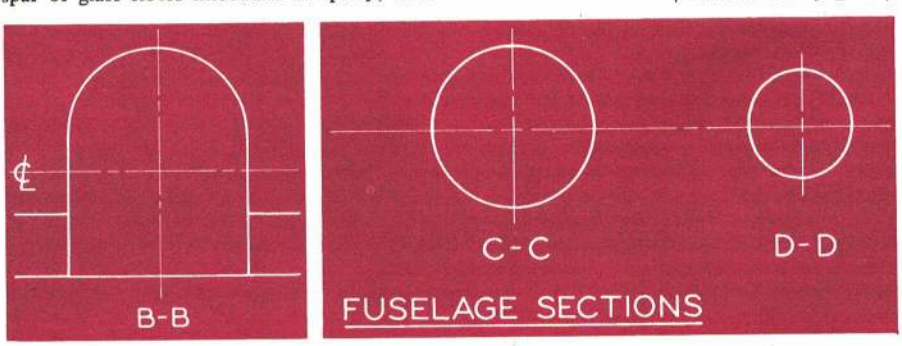


Canopy and cockpit design afford a maximum of visibility. Aresti maneuvers on panel.

sponge-type epoxy inside; the ribs also were of sponge epoxy, while covering was stressed plywood. All this was bonded with Araldit epoxy glue. Integral fuel tanks were located between the first and second ribs of either wing. The fuselage was stressed plywood, with an easily detached tail section.

The entire airplane was stressed to 12 g ultimate. Oil and fuel systems were fully aerobatic. The excellent visibility of the big

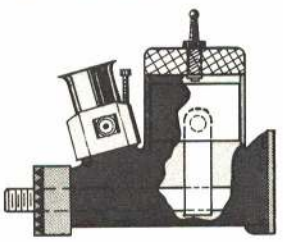
(Continued on page 88)



Secret of this amazing technological breakthrough
is an entirely new principle—zero stroke. Performance may be in the 55,000-65,000 rpm range!

THE ZERO DISPLACEMENT ENGINE

by JOHN G. BURDICK



Cutaway view of ZDE engine shows low engine height possible only with Zero Stroke design. Low compression ratio (0.00 to 1) permits use of No-Lead fuels.

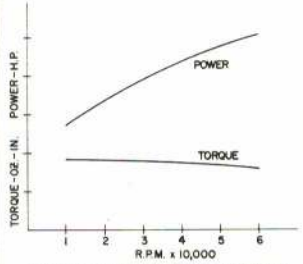


FIGURE 2 – Predicted performance curves of ZDE. Torque is essentially constant throughout RPM Range. Power does not peak as with conventional engines. For convenience in representation, Torque and Power scales shown have been multiplied by a factor of $\sqrt{-1}$.

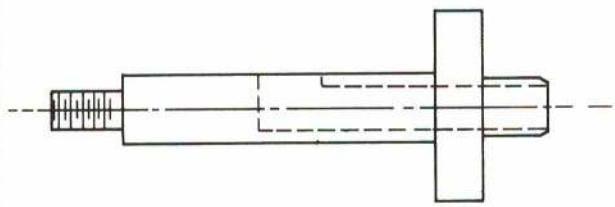


FIGURE 3 – Crankshaft Design for ZDE. Shaft proper and Crankpin are coaxial, yielding zero stroke. Fuel induction is conventional shaft-rotor with hollow crankpin; Large crankpin reduces crankcase volume.

THE SPECIFIC POWER OUTPUT of miniature aircraft engines has shown a remarkable increase since the days of the Browns and Baby Cyclones. Probably the invention of the replaceable glow plug was the most important of several technological factors contributing to this increase, but advances in metallurgy, fuel chemistry and engine design have also been contributory.

The author of this paper recently had occasion to plot from published data the relationship between engine displacement and power output. Interestingly enough, this turned out to be a non-linear plot; that is, engine output was not a simple multiple of engine displacement. There was, rather, a definite tendency for the smaller engines to have a higher specific power output than the larger engines. Curve-fitting techniques, using the least-squares criterion, were applied to this data, using a regression equation of the form:

Power=Ad + Bd + C (where d equals displacement). A startling result emerged—C was not equal to zero! In non-mathematical terms, this simply means that it should be possible to construct a miniature engine having zero displacement but greater than zero power output. This conclusion, while certainly suprising, is not altogether so; only a few years ago the present 01 and 02 engines would have been regarded as impossible.

Given that a ZDE is theoretically possible, the remainder of this paper will concern itself with the possible configurations and applications of such an engine.

Design of the ZDE: Since the product of two numbers is zero if either is zero, zero displacement might be obtained through the choice either of zero stroke or zero bore. Practical considerations, primarily the production problems inherent in manufacturing a piston of zero diameter, suggest the choice of zero stroke rather than zero bore for the ZDE. While this would definitely be counter to the current practice of square or over-square design (that is, the bore-stroke ratio would be considerably smaller than usual), it is felt that the advantages to be gained would outweigh this disadvantage.

Specifically, some of the advantages would be as follows. (1) Existing small engine designs could be easily modified into the ZDE by proper crankshaft design: that is, with the crankpin coaxial with the shaft proper. Provision for fuel induction would be similar to current practice, except that the crankpin itself would be hollow. (2) Engine life should be relatively great since even at high rpm's linear piston speed would be low. (3) Very little dynamic crankshaft counterbalancing would be required. Note that factors (2) and (3) taken together suggest that a very high operating rpm would be feasible, perhaps in the 55,000-65,000 range.

Application of the ZDE: A reasonable estimate of the power output of the ZDE may be obtained, if proper units are chosen, from the value of the constant C mentioned above. This turns out to be about 0.025 hp, although the high operating rpm mentioned earlier might lead to a somewhat greater power output. Since power outputs of this order would seem ideal for indoor RC, discussion will be confined to this application.

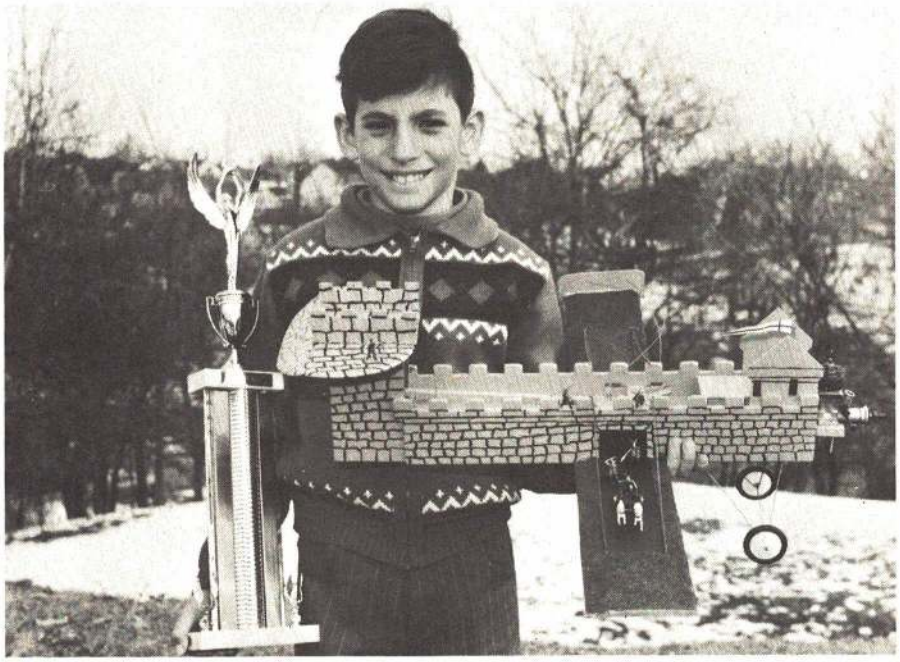
Current RC power loading parameters suggest a weight of about six ounces as optimum for an aircraft utilizing the ZDE. The recent development of extremely light radios suggest that this is a practical figure and one which could be attained, or only slightly exceeded, by careful construction technique. Certainly, the requirement for high-lift surfaces which would lead to good low-speed performance, a primary requirement in indoor RC, would also lead to the ability to tolerate a considerably higher power loading than usual.

A hypothetical design suitable for indoor ZDE-powered RC includes these design features: a scale-like jet fuselage, necessary since the very high operating rpm of the ZDE, plus its predictably low torque, would seem to dictate a shrouded propeller or ducted fan design. The canopy provides room for the radio gear, since the cone necessary for ducted fan operation would occupy most of the fuselage interior. The biplane design, utilizing a high camber airfoil, would provide lift enough for good low-speed flight as well as compensate for the possible high power loading. Finally, the counterbalanced control surfaces were chosen to reduce actuator loads.

Conclusion: Several useful purposes would be served by the development of the ZDE, primarily as a power unit for indoor RC and perhaps for indoor free-flight as well. It is hoped that some manufacturer will, in the near future, consider making such an engine available to model builders.

Historic proof that anything will fly.

FLYING FORTRESS



by ROBERT BUENZLY

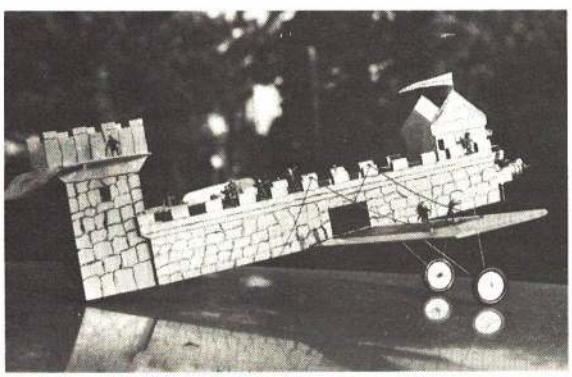
THE FLYING FORTRESS is a sport ship that is really different! Originally designed as a Sunday fun ship, it was entered in a Novelty event at a Northern New Jersey contest. Despite a heavy rain storm, it flew well and added another trophy to my collection. Needless to say, this ship attracts attention wherever it is displayed and flown.

Construction is simple and uses standard size readily available balsa. The fuselage sides and upper and lower decks are cut from 1/4" balsa. Glue the motor mounts to the underside of the upper deck, applying the glue liberally. Glue formers F1 through F7 in place. This assembly is then glued to the left fuselage side. (A 90-degree triangle can be used to keep the top deck perpendicular to the fuselage side.) Let dry, then glue the right side in place.

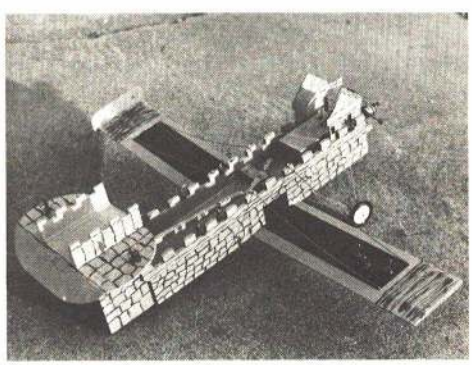
Form the landing gear from 1/32" wire and solder the front and rear pieces to the axle. This assembly is fastened to the motor mounts with J bolts, then the hardwood bellcrank mount is glued and bolted to the motor mounts. The bellcrank mount nestles in the slot provided in the top deck and must be bolted securely in place. Then glue the bottom deck into position.

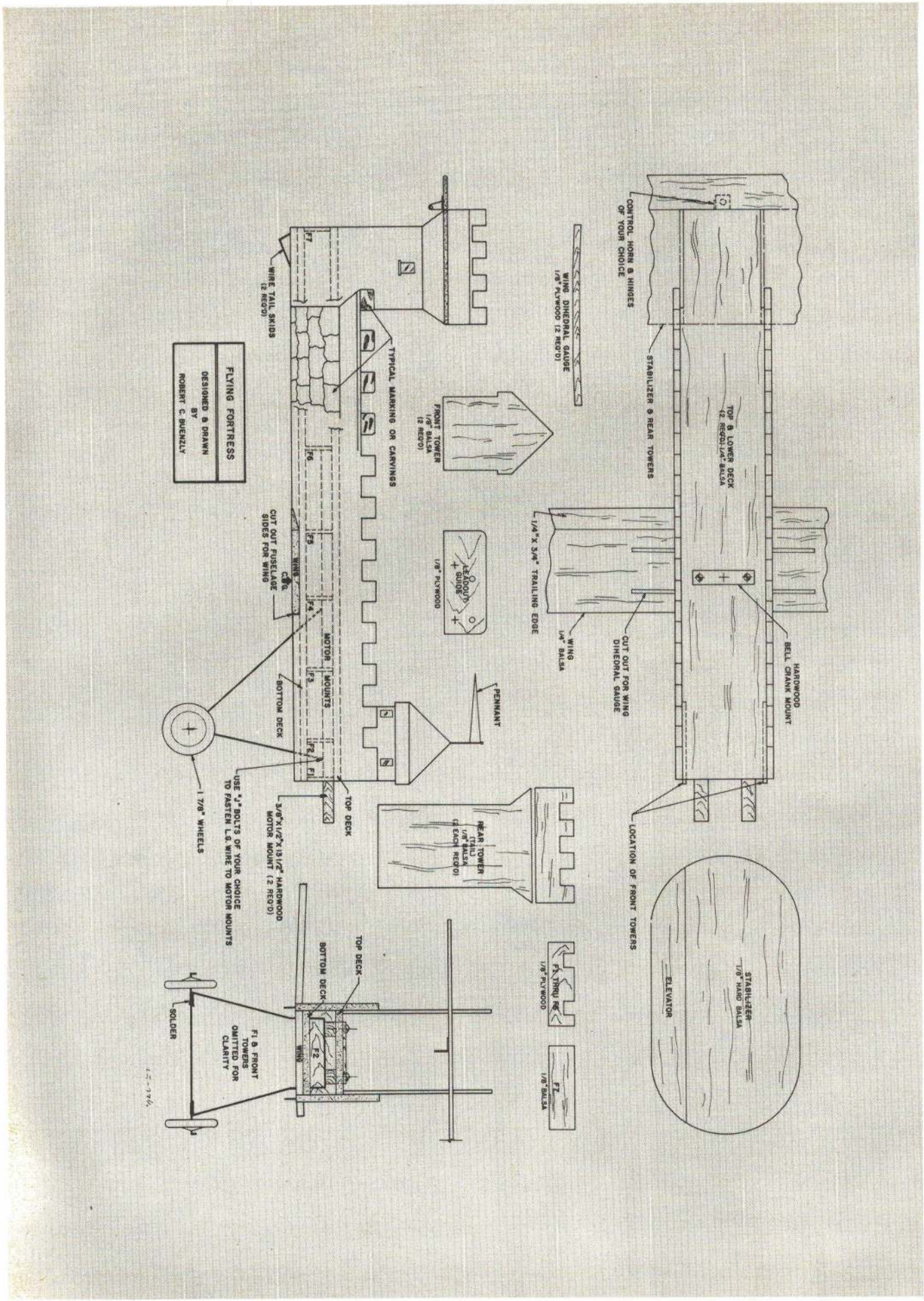
While waiting for the completed fuselage to dry, cut the wing from a 1/4 x 3 x 27 1/2" piece of hard balsa. In the wing, cut out the slots which will provide for the plywood dihedral gauges. Then crack the wing in two places and pin the center section to the work board. The outboard panels are raised to the correct dihedral position and braced. Glue the plywood dihedral gauges in place. Also coat the wing cracks with cement. Then the 1/4 x 3/4" trailing edge is glued to the rear edge of the wing. When the wing assembly is dry, it is

(Continued on page 69)



Despite its looks, the Fortress flies quite well even in the hands of a novice. Just be sure it is properly balanced. The little men are removed before flight.





FULL SIZE PLANS AVAILABLE—SEE PAGE 70

THE
COUSIN

by DON BERLINER

The Army Air Corps first monoplane trainer
did yeoman service in World War II and is still a keen sport plane.

WHAT DID THEY DO to the pretty little Ryan?

Why, they removed its graceful wheel fairings, stuck stringers on the outside of the fuselage, and clamped on a radial engine with all its cylinders poking out through the cowl. The pretty little Ryan wasn't pretty any more.

But it certainly was a dependable, honest airplane which stood the U.S. in good stead when World War II burst upon us and a primary training plane was badly needed. Well over a thousand of the Ryans introduced many times that number of eager young Army Air Corps Cadets to the joys of winging over Randolph Field, in preparation for the more serious business to come.

And when the fighting was over, hundreds of the Ryan PT-21's and PT-22's were discharged from the Army to become civilian sportplanes, and eventually prized vintage aircraft. For more than three decades, the low-wing, open-cockpit trainer has been an airplane of significance.

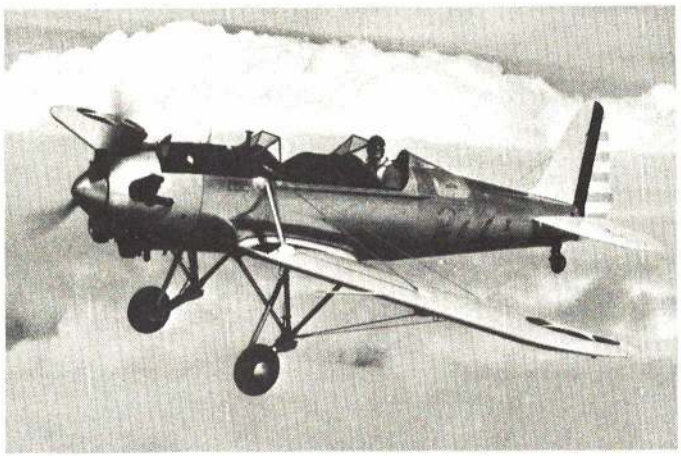
It all began back in June 1934, when Ryan Chief Pilot John Fornasero test-hopped the first 95-hp Menasco-powered model ST. The trim lines of its slim cowl, its neatly faired-in landing gear, and its twin cockpits with low-drag windshields made it one of the most attractive light airplanes of that or any other period. A combination of good performance, excellent handling characteristics, easy maintenance and low cost ($4000) made it very appealing to sportsman pilots and to flying instructors.

Only a few ST's were produced, for Ryan soon developed the STA with a 125-hp Menasco Pirate engine which boosted the top speed from 140 mph to 150 mph. More than 50 of these were sold to private owners in the late 1930's, along with 11 STA Specials having a 150-hp supercharged Super Pirate engine which added another 10 mph to the top speed. Quite a few Specials were exported, under the designation of STM, to Mexico, Honduras, South Africa, China and elesewhere. Some of these were classed as "light fighters," for they had a single .30-cal. machine gun mounted outboard of either main landing gear strut.

Army interest began to develop in 1939, when a war in Europe appeared to be inescapable. One STA was ordered at the XPT-16, and then 15 more for service tests as YPT-16's. They were evaluated, accepted and then pressed into duty as primary trainers by the Ryan School of Aeronautics, in San Diego, in what became the first of many civilian-operated military flying schools of the CPTP (Civilian Pilot Training Program).

In 1940, 30 PT-20's were ordered, and the gradual de-glamorizing of the attractive little airplane began. In order to give it a roomier cockpit, a longeron just below the cockpit opening on either side was moved to the outside of the airplane. This upset the graceful curves of the Ryan, but training planes are to teach with, not to look at.

And then they really did it! The Menasco engine, while easy to cowl in and offering reasonably good power for its size, was not known for reliability or long life. With pilots of widely varying skills flying the same airplane on any given day, a tough engine was necessity. Out came the Menasco and in its place went a five-cylinder Kinner radial. For some reason, it was given a pointed cowl with the cylinders sticking out in the breeze, instead of the more conventional full ring cowl. But it worked, and it also gave the later Ryans a most distinctive shape.

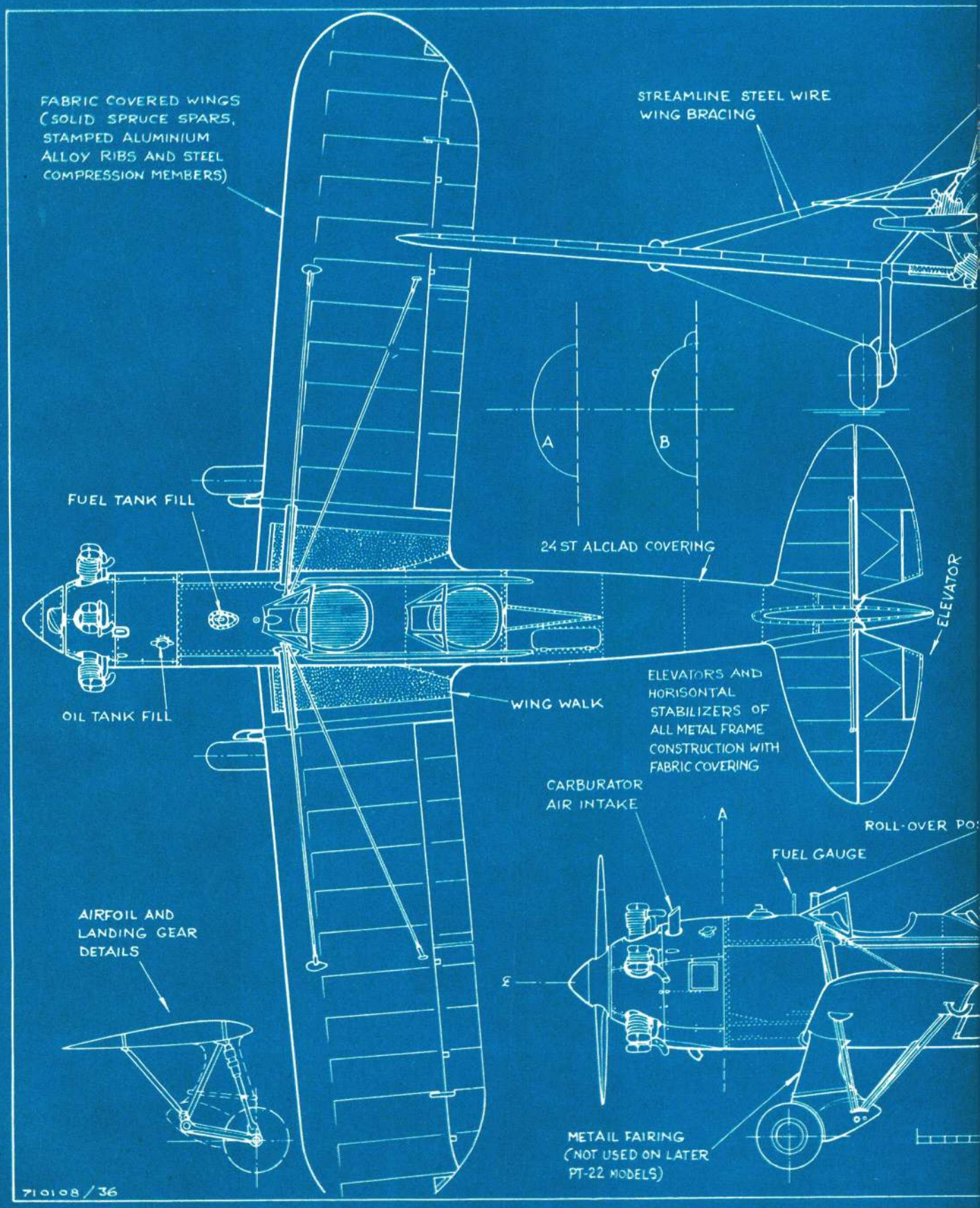


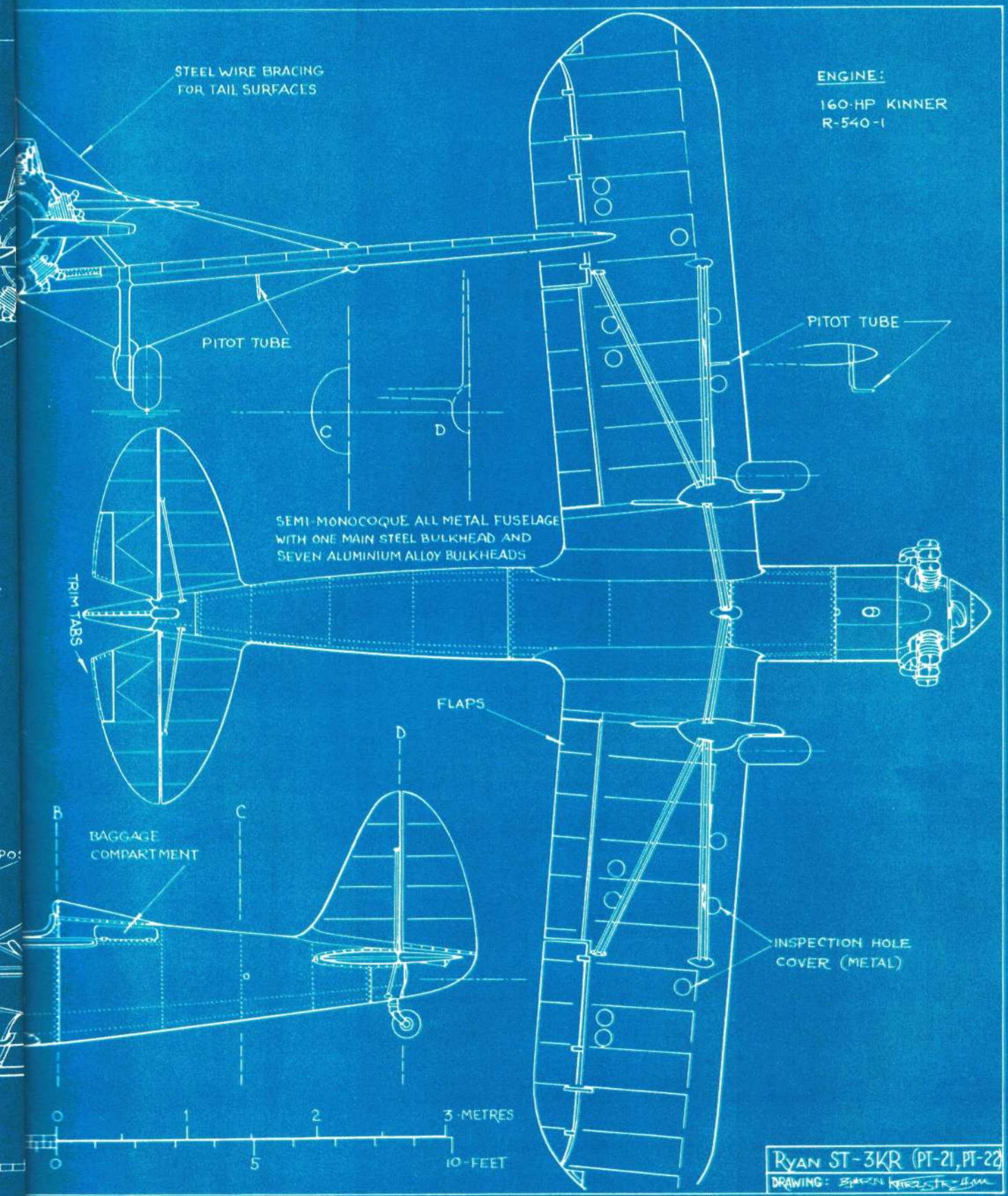
Numerous Army Air Corps Cadets earned their wings at Randolph Field, Texas, during WW II (opposite page). Top: On Edo floats, an experimental PT goes dead-stick on way to mooring. Above: Wheel fairings were dispensed with for practical reasons as students dished out the rough treatment.

This was obviously what the Army Air Corps wanted, and all the earlier versions of the PT-16 and PT-20 had their Menascos replaced by Kinners. Starting with the PT-21, everything coming off the assembly lines had the radial engine. As if this weren't enough of a blow to the beauty of the Ryan trainer, its classic GeeBee landing gear fairings were removed during the production run of the PT–22 as an aid to maintenance. Speed was reduced by this change but, with a flood of rookie pilots bashing the airplanes around, ease of repair was more important.

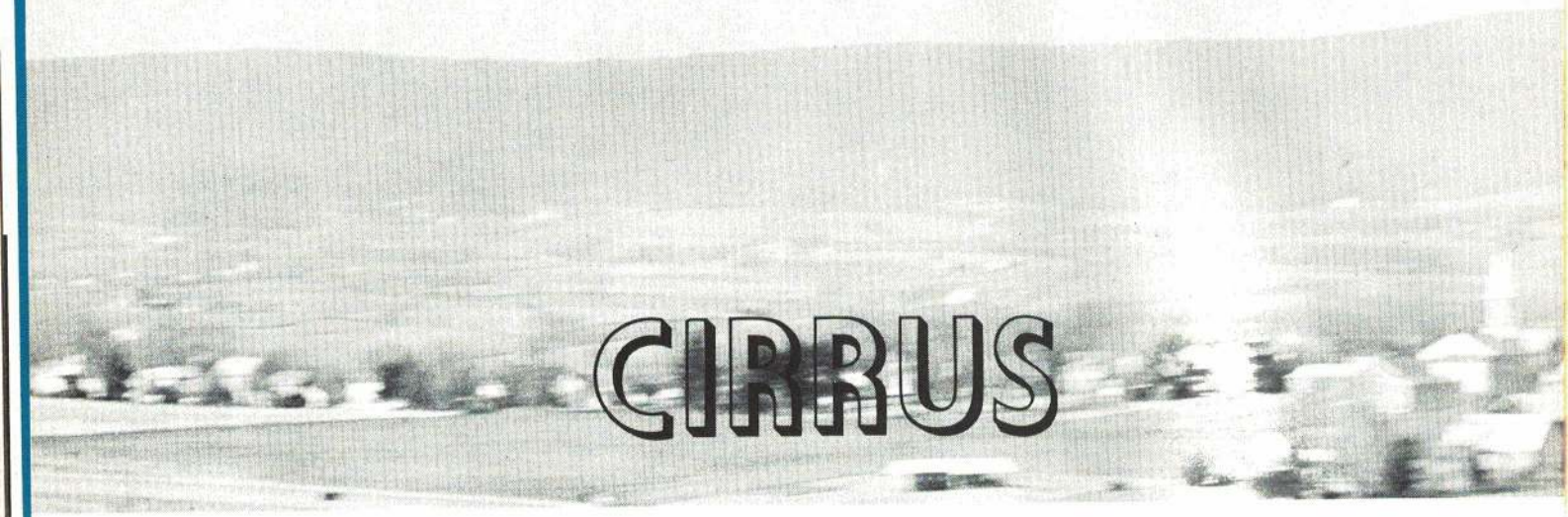
The "wild blue yonder" was an exhilarating place to be in the early 1940's, for America was at war and an awful lot of guys figured it was better to be up in the sky, even if people were shooting at you, than it was to be slogging through the mud with a heavy pack on your back. Recruiting posters featured long lines of Ryan PT's ready for the next batch of happy Aviation Cadets, or striking pictures of a stack of them in echelon formation, high above pretty clouds. Even though the Ryan was only a primary trainer and there were far more exciting airplanes to

(Continued on page 72)


FABRIC COVERED WINGS (SOLID SPRUCE SPARS, STAMPED ALUMINIUM ALLOY RIBS AND STEEL COMPRESSION MEMBERS)
STREAMLINE STEEL WIRE WING BRACING
A
B
FUEL TANK FILL
24 ST ALCLAD COVERING
ELEVATOR
OIL TANK FILL
WING WALK
ELEVATORS AND HORISONTAL STABILIZERS OF ALL METAL FRAME CONSTRUCTION WITH FABRIC COVERING
CARBURATOR AIR INTAKE
A
ROLL-OVER PO
FUEL GAUGE
AIRFOIL AND LANDING GEAR DETAILS
METAIL FAIRING (NOT USED ON LATER PT-22 MODELS)
710108/36


STEEL WIRE BRACING
FOR TAIL SURFACES
ENGINE:
160-HP KINNER
R-540-1
PITOT TUBE
PITOT TUBE
C
D
SEMI-MONOCOQUE ALL METAL FUSELAGE
WITH ONE MAIN STEEL BULKHEAD AND
SEVEN ALUMINIUM ALLOY BULKHEADS
TRIM TABS
FLAPS
D
B
C
BAGGAGE
COMPARTMENT
INSPECTION HOLE
COVER (METAL)
0
1
2
3 METRES
0
5
10 FEET
RYAN ST-3KR (PT-21, PT-22)
DRAWING:

This German sailplane has proved to be a classic in the field of RC glider competition.



CIRRUS

FOR THOSE WITH AN URGE to join the RC glider crowd but who can't quite decide on which glider to build, the search is ended. Try the Cirrus, with its ten-foot span. Its shapely plastic body is injection-molded from the ABS plastic family, known for its high impact resistance. Germany's Graupner Co. has gone to considerable expense to develop the heavy steel molds for this injection process.

Plug-in wings with an aspect ratio of 17:1 and a simple flat-bottomed airfoil are surprisingly stiff because of their D-shaped box structure. The elevator is an all-moving tail which is small (15%) and light. Rudder size is amply large to make up for the short body and long wing span and has been found to be quite effective. Plans show how to add aileron control, however, the writer feels this is unnecessary for slope and thermal soaring—the primary intent of this design. Don't expect this one to be a stunter, except for a few loops, but do expect a very flat clean glide, which is characteristic of this modern RC sailplane.

The best building advice is to follow the ultra-complete step-by-step procedures outlined in the multi-language instruction manual. Construction is almost like building a Heathkit, since very little is left to the imagination. A heap of information, in German, is added to the detailed plans. Note, however, that each German annotation on the plan is translated into English on pages 21 and 22 of the manual. I didn't discover this until I was halfway through the second wing panel!

A few pointers on the construction will save some time and trouble. The plywood root-ribs come undrilled and need holes for receiving the brass tubes for the wing pins. Drill these plywood ribs before gluing them into the wing—it's easier. The instructions missed this item.

Delay final cementing of the body shells until installation of the RC gear is all worked out. Most American gear is installed in a manner similar to the Kraft shown in the photos here, and not like the German equipment arrangement indicated in the plans.

The plastic body was not painted because the wrong paint, including most normal dopes, will wrinkle and greatly weaken the plastic. It is understood that the polyurethane and alkyd-based paints are okay, but we didn't chance it.

The covering of Super MonoKote on wing and tail added only 3.5 oz. to the model's weight and gave no worry about warping the long thin wings, which can be a problem if silk and dope are used. Our observations and recent tests by Dale Willoughby have shown that the smoothness of the MonoKote improves the glide performance over that of fabric-type surfaces.

Two small construction changes were made. The first was simply to add more diagonal braces in the root sections of the tail panels for more ruggedness. The second change was to hinge the rudder along its left edge, instead of along its centerline. This allows the rudder crank-arm and pushrod to be brought inside the body contour for a

Editor's Epiloque: After a season of flying the Cirrus, Walt Good turned in a sizable list of contest accomplishments in the thermal flying department. Thus predictions of the Cirrus performance have been borne out. These accomplishments include:

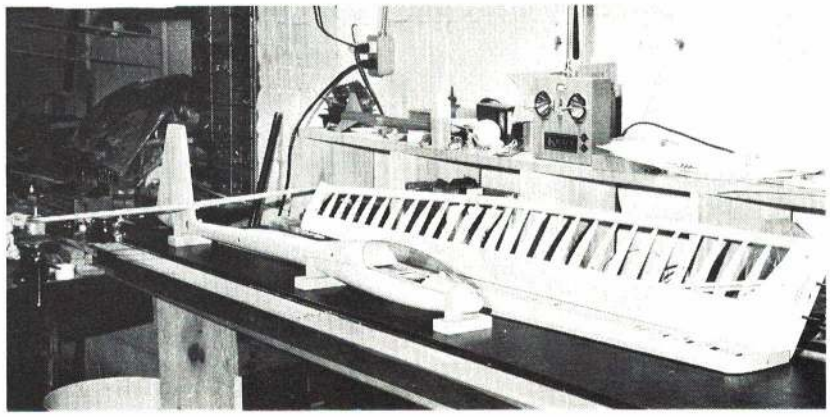
(1) First place in the Nats first glider contest for wing areas over 750 sq. in.

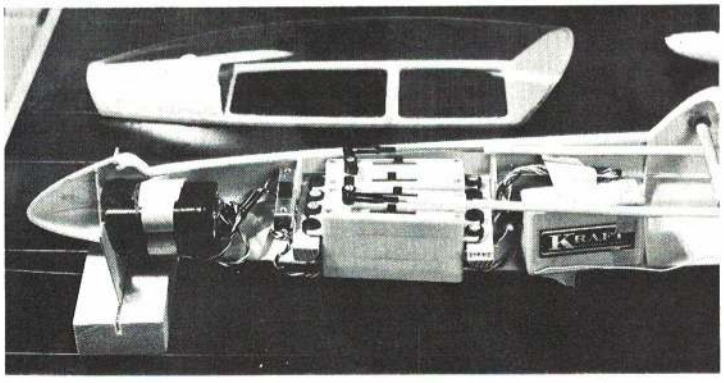
(2) Grand Champion, 1970 season, for the East Coast Soaring Society program. The four contests had two events each: one for 150-meter lines and one for 300-meter lines. The results for Walt's Cirrus were as follows:

	Long Lines	*Short Lines*
Wilmington	*3rd*	*5th*
DC/RC	*1st*	*6th*
Monmouth	*8th*	*3rd*
Dover	*3rd*	*4th*
OVERALL RESULTS	*1st*	*5th*

(3) World Record Attempt: Walt's Cirrus went to 5090 ft. in altitude on a thermal but was lost from the telescope and crashed about a mile away. A thermal sniffer in the Cirrus was used to identify thermal lift and to find the crashed model in the woods. This possible new record for glider altitude didn't count because the glider must return to the starting point.

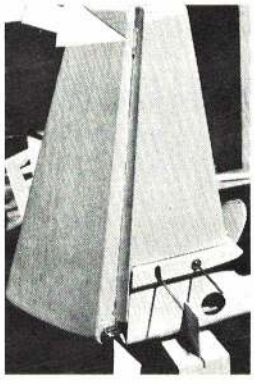
The Cirrus has earned for itself a place as a classic in the new field of RC glider competition.





Left: Author holds the streamlined Cirrus against a strong, cold wind. Right: Three-piece plastic fuselage is joined easily and accurately on three jigs as shown.

Left: Mock-up of servo/radio positions recommended. Fit is tight unless carefully planned. Right: Author's innovation hides the control horn by hingeing the rudder on its left edge.



by DR. WALTER A. GOOD

sleek-looking installation. Hence, the external rudder linkage and the slotted body are avoided. It probably doesn't lower the drag by a detectable amount, but it does look better. No flying problems have been noticed with the uncentered rudder hinge. Two plastic hinges were used, and the air-gap between fin and rudder was sealed with a strip of folded MonoKote.

A four-channel Kraft proportional receiver was installed in this project, although only two servos are needed. Since most gliders (this one is no exception) need nose weight, the KPS-9 servos were mounted as far forward as space permitted. From nose to tail, the lineup of parts is: batteries, servos, receiver. This arrangement gives excellent balance, is good for impact (the receiver doesn't get squashed by a flying servo), and is electrically efficient since the receiver antenna is well-removed from the noise effects of servos and wires. The antenna may be stretched inside the body and leading back to the tail. It then is completely concealed. This antenna location has given good radio performance out to ranges near the visual limit of the pilot.

Plastic tube pushrods of the Sullivan type were secured along the sides of the body at several stations: namely, the two main bulkheads (the ones with brass tubes), the station where the small hole is in the body about halfway to the tail, and at the large access hole by the elevator bellcrank. The plastic casing tube was roughened with coarse sandpaper and GE Silicone Clear-Seal adhesive was used.

Rudder displacement should be large, about 30 degrees each way from neutral. Use the outside hole on the Kraft servo arm. The elevator motion should just match that permitted by the slotted hole for the rear tail pin. Use the inside hole of the Kraft servo arm for the elevator and the most outward hole of the elevator bellcrank.

A few points must be checked before that first glide. The CG must fall between 3 1/16" and 3 1/2" from the leading edge of the wing. My Cirrus required 2 oz. of lead in the ballast box, making the total weight 3 lb., 1 oz.—pretty light for a ten-foot span! That's a wing loading of 8.8 oz. per square foot. Be sure the dihedral of each wing panel is 6 degrees. If necessary, persuade the steel wing pins with a vise and hammer until the six degrees is reached. A smaller dihedral will make for a weak turn, so use the full amount.

My first Cirrus flight was on the DC/RC slope at Jefferson, Md., with a cold wind blowing at a measured 20 to 30 mph—hardly ideal! It was a two-handed effort just to restrain the anxious glider in the face of such a wind. When Don Clark launched the ship by unclutching his hands, the Cirrus sprang vertically for twenty feet, then began to penetrate upwind as sone down elevator was eased in. We were pleased to see such good penetration for such a light glider. It was judged to be slightly faster than the well-known Kurwi 33, which has a good reputation on the Jefferson slope.

After the glider gained several hundred feet of altitude, turns, dives and loops were tried with smooth results and no surprises. A slight time delay on the entry into a turn is probably due to the roll damping of the long wing. The slow flying speed is considered to be normal. Usually a touch of down elevator will increase the flying speed and pep up the rudder response. Even a tight spiral with full up and full left seemed rather safe, although the wings were almost vertical.

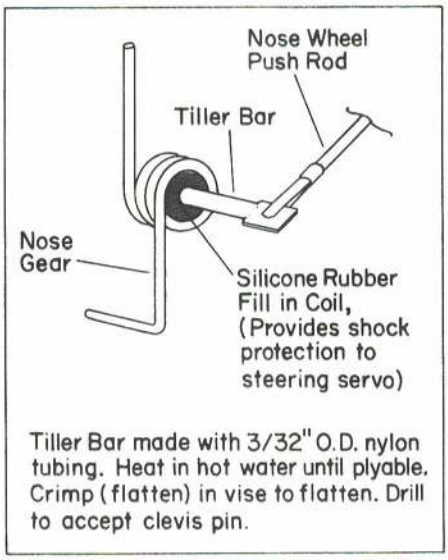
One by one, the DC/RC panel of glider pilots took the stick and gingerly became acquainted with the new bird. Don Clark and Don Rothbaum, both Kurwi bugs, admitted the Cirrus was faster. Ben Givens soon eased in full up elevator to test the stall characteristics. It stalled straight ahead in that wind without dropping a wing tip into a quarter turn spin, as some long-spanned gliders do. Carl Lorber gave it his okay too. The new bird was landed after a flight of an hour and a quarter with the resolve to wait for a little less wind and cold.

A week later, thermal flying was tried over the valley in front of the slope. The Cirrus design proved to be excellent in this department too, since it stayed right up there with the Kurwis. Now, with over four hours of flight time, the Cirrus can be considered as tried and proved.

All in all, this bird is fun to build, fun to fly and really pretty too. Join the lazy loafers with their slowing responses and find out where all the quiet fun is at.

WHERE THE ACTION IS

Jerry Garlish enlarged and altered slightly for RC the 10-Hi, a free flight flying wing presented in Dec. 1970 AAM. Hasn't flown yet, but should do fine. Jerry needs information on Northrop XB-35. Can you help? Write him at 972 Mitchell Ave., Elmhurst, Ill. 60126.



Tiller Bar made with 3/32" O.D. nylon tubing. Heat in hot water until plyable. Crimp (flatten) in vise to flatten. Drill to accept clevis pin.

RADIO CONTROL

DON LOWE
GENERAL CORRESPONDENT

SPORT AND PATTERN

Old Lessons Relearned: Recently, I was trying to trim out a new Phoenix and was getting no place fast. For some reason, I had to trim in a lot of left rudder or differential elevator (left elevator up) to prevent a right turn when pulling up for loops or other maneuvers. Everything looked perfectly straight and no warps, so what was the problem? The wing was balanced, but I hadn't checked on the airplane balance with a sidewinder engine and muffler. Who'd think a little unbalance of a side-mounted engine could cause trouble!

But, the sidewinder was the problem. After weight was added to the wing to balance the engine, the airplane tracked fine—insides and outsides. When moving 90 to 100 mph, every little thing is important, so check that lateral balance for a heavy wing.

Free Style Aerobatics: Bill Zantner, in the March Northern Connecticut R/C Club Newsletter, rekindles an old spark. A lot of us pattern fliers like the idea of an aerobatic program analagous to full-scale aerobatics in which a flier must formulate and fly his own program. The "grab bag" AMA Class C pattern was an attempt to add variety to the aerobatic program but was dropped for various reasons. The major difficulty is fairness in judging free style, particularly where new and novel maneuvers are selected. Bill proposes a program of 15 scored maneuvers, with each maneuver worth a maximum of 10 points. The maneuver score would be broken down as follows:

(1) Presentation	0-3 points	
(2) Perfection	0-5 points	
(3) Originality	0-2 points	
(a) Common		0 points
(b) Not usually performed		1 point
(c) New or rarely seen		2 points

In addition, he would add 0-5 points for Continuity, 0-5 points for Smoothness and 0-10 points for Impressiveness. The maximum possible total score would be 170 points. Bill further suggests that the standard patterns or school figures be used for Classes A,B and C novice and that the free style be reserved for Class C expert fliers. I like the idea of free style, how about you?

Lomcovak: The Radio Control Club (Rochester, N.Y.) newsletter "Airflow" describes the famous Lomcovak aerobatic maneuver, which might interest modelers looking for something super tough to try.

In this maneuver, the airplane is rolled on its back and pushed into a vertical climb at full power. At this point an inverted flick roll (snap roll) is initiated with full forward elevators, full left rudder, and full right aileron. Upward motion ceases and the nose tracks rapidly around the horizon through 360 degrees while the aircraft hovers. The nose then drops, gyroscopic forces come into play changing the axis of rotation and the aircraft tumbles tail over nose. The axis of rotation then changes once more and if left alone the airplane starts an inverted spin. At this point one usually recovers into a straight dive. Got that?

Over the years, I've seen only several models able to perform this extremely difficult maneuver. What is required is a lot of control movement—and plenty of luck in catching the airplane at just the right attitude and airspeed. A short coupled airplane like a bipe seems to do better at the maneuver.

Jack Perry's sport and open pylon racer seen at Toledo. Uses Aldrich S.T. 35 engine.

Southeast Asia: S. Sgt. Roger O. Little writes that RC flying is not permitted at DaNang in South Vietnam, apparently because of the military operations. He passes along this information to any modelers who may be headed there. He had the sad experience of hauling over all of his equipment and not being able to fly. This apparently is not universal policy, however, because activity at Phan Rang AB in Vietnam has been reported previously.

The military does not have a universal policy on model operations at military bases. It appears to be local option as a function of the nature of the operation, availability of unused runways, etc. For example, Wright-Patterson AFB, Ohio, has a base RC Club which flies on an unused runway. Conversely, Andrews AFB in the Washington, D.C., area previously permitted RC operations but shut them down for local reasons. With the cutback in military operations, closing of some bases, and the apparent increased interest of the military to promote good public relations, this may be a good time to reapproach the local Air Base for permission to use that big unused runway.

Steven Root tests RC gear on air car. Uses deflector for downforce, has full suspension.

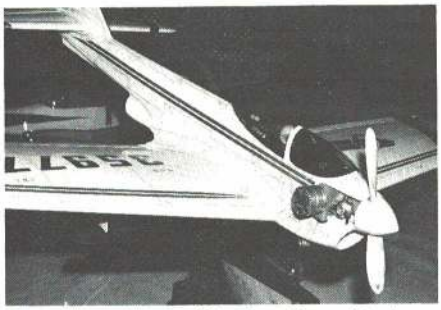
FCC Licenses: My opinions on the FCC Club Licensing Procedure have been expressed. Now, to give equal time to the opposition. Club newsletters indicate that a majority of the groups are taking advantage of this licensing opportunity. An item in the March AMA monthly mailing indicates that the FCC is happy with the Club Licensing Procedure, which provides evidence that RC activity is on a highly organized basis rather than simply a large assortment of individuals. AMA states "It is safe to say that club licenses are recommended for AMA Clubs."

For clubs who wish to apply to the FCC, Fred Adkins of the Mid Altantic Radio Kontrol Society (MARKS) has forwarded the following information for filling out the FCC Form 505 blanks. (1) Club name, in care of one member. (2) Leave blank (3) Mailing address of member specified in Blank 1. (4) Check "Association." (5) Check "Class C."

(6) No. (7) No. (8) Number of transmitters in club allowing for new members and other additions. (9) Yes. (10) (A) No. (B) Chartered members per 95.13 (C) Yes.

(11) Yes. (12) Yes. (13) Yes. (14) No. (15) No. (16) No. (17) No. (18) Leave blank. (19) Leave blank. (20) (A) No (B) No (C) No.

In the space for additional information write: "This station will be used by club members of the (club name)." At the bottom of the last page the club member whose name appears in block one must sign the form.



Dave Gierke's magnificent pattern ship has a fantastic finish. Will he fly it in contests?

Racers are Dangerous?: The March issue of "Top o' the News" (Top o' New Jersey R/C Club newsletter) indicates that some thought should be given to banning pylon-type flying because of safety problems. No doubt, pylon racing can be dangerous, so can any flying, for that matter. However, the prime danger lies in the nature of the activity and how it is conducted. Insuring safe separation from spectators and insisting on proficient fliers and sound airplanes go a long way toward insuring safety. A quick session with the slide rule reveals the following comparison of various models' destructive potential. (1) A pattern ship weighing seven lb. and moving at

Dale Root doesn't compete much any more, but sure flies up a storm with this original.

90 mph has a kinetic energy of 189 ft. lb. An eight lb. ship at the same speed has 216 ft. lb. (2) A pylon ship weighing five lb. and moving at an average speed of 95 mph (which would be phenomenal speed around the pylons) has 150 ft. lb. of energy; flat out at 130 mph it has 280 ft. lb.

Both formula racers and pattern ships can be similarly destructive. The essence of the problem is in how the beasts are operated. Care is essential!

Engine Trouble at Full Speed?: Tom Jarick reports in the Feb. "Hear Ye" (Valley Forge Signal Seekers R/C Club newsletter) that engine cutout at high speed was traced to deposits of matter on the clunk fuel filter which could be removed only by burning off with a match. This gunk could be seen only with the aid of magnifying glass, so keep those filters clean!

FRED MARKS

ELECTRONICS, AERODYNAMICS

Coupled Flaps for Pylon Racers: Walter Clark writes, "I would like to run flaps coupled with elevator, but I would like separate servos for each because of the tremendous airloads on wing flaps for a 600-sq. in. pylon racer. Can it be done by simply putting a double plug into the elevator socket? If it makes a difference, I have a two-year-old Kraft."

This is one of the applications of flaps that has intrigued us. The sharp turn at the pylons demands high lift coefficients, introduces the possibility of a high speed stall, and definitely is the crucial point of racing. By utilizing a simple coupled flap arrangement such as those described in the article on coupled flaps and elevators in this issue of **AAM**, the desired lift coefficient could be achieved within the limits of increased drag because of flaps without the normal high angles of attack encountered.

The actual surface loads distributed between flaps and elevators probably could be handled by one good servo having a full three- to four-lb. thrust, however, servo speed is reduced. Thus, it is desirable to have a second servo for flaps, if the weight is acceptable. Most sets will tolerate a second servo in parallel; the only way to find out is to try it. If wired properly, no harm will result to the decoder because almost all servo comparator circuits have around 4700 ohms in the signal input leg. Simply add a paralleling plug to the elevator channel. If a second servo is used, it might also be desirable to have positionable, or decoupled, flaps to permit extension for landing and to slow up those hot landings.

On Removing Solder from PC Boards: R.G. Bolick submitted this simple idea. "While removing defective parts from a receiver, I found a "solder sucker" was needed to remove the molten solder so that the parts could be removed without damage. I fashioned an effective "solder sucker" as follows: Take a standard rubber fuel bulb and add about one inch of neoprene fuel tubing to the brass tube. Melt the solder, squeeze the bulb and release, the molten solder is pulled up into the neoprene where it cools and can be blown back out or the tubing removed." (I don't recommend using the same bulb for fueling and solder removal! F.M.)

In place of the brass tubing, those with access to a lathe and a small amount of Teflon (as Bob Young does) can quickly turn a simple arrangement to fit the bulb. This is quite effective and the run can be kept short so that the solder actually ends up in the bulb and can be emptied out periodically by removing the Teflon fitting. This arrangement is shown in Fig. 1.

Laminar Airfoils for Pylon Racers?: During review of plans for Bob Root's pylon racer, Firecracker, Ed Sweeney was puzzled by the airfoil used. Bob stated that NACA 66-000 series airfoils were used and that the only deviation was in trailing edge radius. The full scale airfoil has a sharp trailing edge, while balsa construction requires a finite thickness at the trailing edge. The coordinates for the 66-000 series were taken from **Theory of Wing Sections**, by Abbot Von Doenhoff, a Dover Publication.

The 66-000 series is a laminar airfoil. Laminar airfoils were developed in the early days of World War II, although they existed in theory earlier. However, wind tunnels with sufficiently low turbulence to distinguish the special characteristics of laminar airfoils were not available until around 1940. One of the first aircraft to use the laminar airfoil operationally was the famous P-51 Mustang.

Physically, the laminar flow airfoil is characterized by having the maximum thickness well aft, the leading edge radius is quite sharp (this necessitated frequent clean-up to remove nicks in operational aircraft), and the trailing edge is sharp. The latter is not nearly as important as maintaining the leading edge shape. Aerodynamically, laminar airfoils are characterized by the "bucket" in the curve of

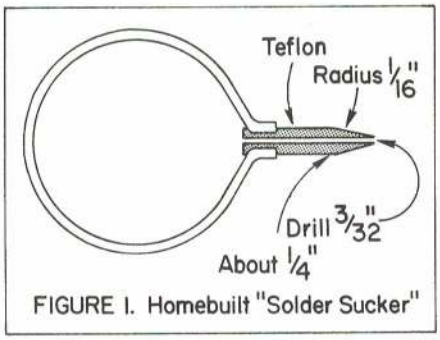


FIGURE I. Homebuilt "Solder Sucker"

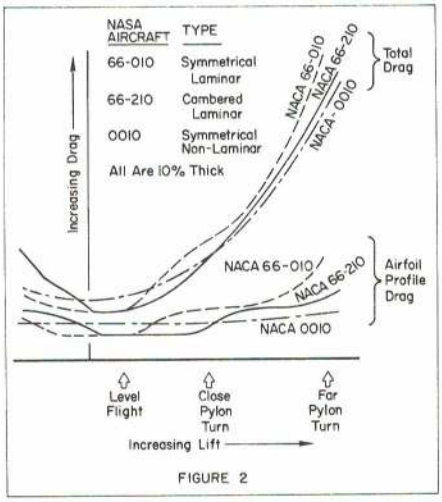


FIGURE 2

lift coefficient, versus drag coefficient. Design of the airfoil determines the position at which the "bucket" occurs. Normally, it is desirable to have it occur at the lift coefficient associated with cruise speeds, hence its use on the P-51 which was a long-range fighter escort. The 66-000 series is designed for minimum drag at low lift coefficients (for cruise) at the expense of increased drag at higher lift coefficient.

The 66-000 is the basic series. A 66-000 is a symmetrical foil. Since a pylon racer is not designed for outside maneuvers, a symmetrical airfoil is not required, and the Firecracker uses a 66-210.4 airfoil at the root. The 66-210.4 means that it is 10.4 percent thick with a two percent camber. The thickness was chosen to give 1 1/2 in. thickness outside the wing fillet. The camber chosen gives minimum drag over as much of the flight regime as possible. Thickness is reduced for the tip section, hence a 66-106 was used, i.e., 6 percent thick. Camber was reduced because the airfoil characteristics change with thickness. Fig. 2 presents the lift and drag characteristics for the symmetrical 66-010 laminar airfoil, the 66-210.4 cambered laminar airfoil, and, for reference, a symmetrical non-laminar airfoil, the NACA 0010.

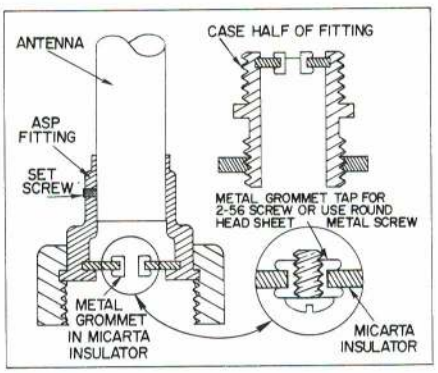
The "bucket" is clearly shown. Since total wing drag at pylon racer speeds (i.e., fully compressible flow) consists of airfoil profile drag (which the laminar airfoil helps reduce) and induced drag, the effect of the laminar airfoil is diluted somewhat. Induced drag during pylon turns is extremely high. The 66-000 series produces a slightly higher drag coefficient than its non-laminar counterpart at high lift coefficients. This means more drag in the turns, as shown. Bob points out, "This type airfoil isn't going to cause a large jump in speed. On the other hand, it doesn't hurt and does have very good stall and handling characteristics."

It seems to me that laminar airfoils may yield some performance advantage in pylon racers on the straight-away but with a sacrifice during high-g turns. The application

of the laminar airfoil in combination with coupled flaps might very well spell a significant edge for a given pilot and airplane. Nonetheless, it seems that pilot skill, engine performance, and the ability to achieve reliability for the entire aircraft are still the predominant factors. If anyone gives it a try, please let us know your results.

A Couple of Goodies: From Jim Watson come two helpful ideas. "Silicone rubber compounds (e.g., G.E. Silastic, Dow-Corning RTV, etc., F.M.) are useful in modeling for a number of purposes as fuel tank seals, to seal small openings around fuel lines coming through the firewall, for wing-fuselage seals, etc. The major problem has been to form the silicones and make them smooth and professional-looking. The solution is to use ice as the working tool. It has several advantages. (1) It allows a longer time to work the compound; (2) it doesn't stick to the silicone; and (3) it leaves a perfectly smooth surface. A variety of odd-shaped plastic containers can be used to freeze the ice to obtain various fillet shapes.

To join several pieces of tubing together in an emergency (brass fuel lines, thick-wall surgical tubing, outside tubing of a Nyrod, the broken earpiece on sunglasses), use a short length of heat-shrink tubing. This tubing, in the appropriate diameter, will shrink down and provide a good seal as well as maintain alignment.



More Simple Tips: From one of the most interesting newsletters, the Isthmian Buzzer (Isthmus of Panama), come several snappy ideas. For sealing MonoKote trim and decals, try clear spar varnish (also polyurethane varnish or acrylic lacquer, in spray cans—F.M.). For a handy tool, try push pins. They have aluminum heads, are long and very sharp, and can be pushed through plywood with ease. These should be available from an office supply store. If not, order from Moore Push-Pin Co., Philadelphia, Penna. 19144. Ask for No. 5's, which are 5/8" long.

Want to add a lot of strength to an epoxy bond? Mix cotton with it to make an almost indestructable joint. Chuck a regular pencil eraser in an electric drill to "burnish" aluminum parts. (If a deeper burnish is desired, use a bit of rubbing compound on the eraser—F.M.). Use the spring from a ball point pen inside brass tubing when making sharp bends. This prevents the line from crimping shut. The spring is removable.

From the same newsletter comes a tip on the Heathkit transmitter antenna. Everyone who has a GD-47 series has the problem of the antenna sliding down into the transmitter, the spring clip coming off, etc. The job of replacing the spring clip is frustrating and can be prevented by carefully soldering the spring to one of the fingers after properly scraping both surfaces. Use a small amount of solder and keep it from the inner parts of the bushing.

HOWARD McENTEE

GLIDERS AND FAI

Where Can I Get Lead?: This query comes from several newcomers to the RC glider field. There are lots of sources, if you know where to look! Used to be that you went to a plumber for lead (that's where they got their name). However, a local plumber says he hasn't used lead pipe for years! We did pick up a piece of salvaged drainpipe free.

Auto body shops often have bars of "body solder" used in sheet metal repair work. Here again, lead has gone out of style (epoxy fillers are used now). Some body men do keep a supply on hand. This material comes in bars about 14 x 1/2 x 1/4", which weigh about ten oz.

Lead fishing sinkers are available in a wide variety of shapes, sizes and weights. Most are not too handy for modeling purposes, but they can be melted down, even cast to a suitable shape for a nose weight. Little ball sinkers of about 3/16 to 1/4" dia. can be packed into a nose compartment. The exact required weight is easy to achieve by adding or removing a few of these balls.

Another lead source is shops that do auto wheel balancing. When a tire is rebalanced, all weights are removed and are not reused. A good stock would cost a few cents at most. One other possibility might be shops where auto batteries are repaired. Lead bars were used to fasten the intercell connectors. However, we haven't checked this source lately.

Jansson Thermal Sensor: In April, we mentioned a unit developed by Dick Jansson. It is now in stock at Willoughby Enterprises (which handles all sales) for $95, including a receiver. The plane unit may be had without a receiver for $75. The required receiver is an FM unit which covers the VHF band of approximately 147 to 174 MHz. The Sensor actually operates in the lower two MHz of this range—the upper end of the 2-meter amateur band. A Technician Class amateur license is required for such operation.

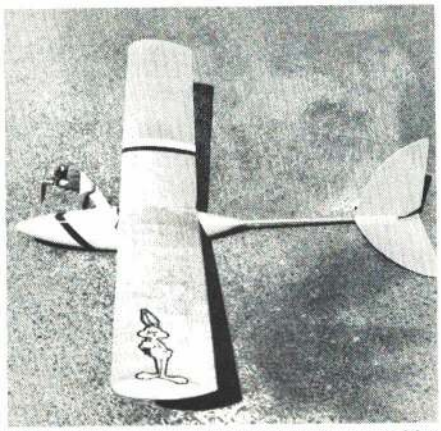
Previous information on this unit was in error on size. The complete Sensor is in a sealed plastic tube 1 5/8" in dia. and 1 1/2" long. It weighs 1.5 oz. Current drain is 35 ma and the RC receiver battery is normally utilized. We have heard of few interference problems between the thermal units and plane equipment, when operated from a common battery. A separate NiCad pack of 225 maH cells could also drive the Sensor for long periods.

These units operate by sending a steady audio tone to the ground receiver. When rising air is encountered, the tone rises; when in a downdraft, the tone drops. Not only are these units fine for checking thermal activity, they also can help locate lost gliders. We know of at least one case where a glider which had crashed into the woods was found by homing in on the audio tone!

RC World Championships Progress: By mid-April, 210 overseas individuals had signed up to make the trip under AMA auspices, and 14 teams were certain. Word has gotten around that there will be an RC glider meet in connection with the meet, as well as Pylon races. At this time, nothing firm has been worked out as far as glider and pylon competition flying goes; however, demonstration flying in both RC categories, sandwiched in as time allows, seems certain. For overseas modelers, the problem is that AMA cannot handle extra model boxes for gliders and pylon planes—it's tough enough to arrange for transportation of the aerobatic planes which must be brought to the States. Extra boxes must be sent over at the flier's expense.

Try Plastostruct: Bob Lopshire noticed this material in a hobby shop and has found several uses for it. First he used it to make a skid for his newly-completed Cirrus glider. He chose a rectangular strip about 1/4 x 3/8", sliced off the end of the strip at an angle that matches the ply towhook brace on the Cirrus (see sketch). The strip was sanded to match the contour of the fuselage underside and notched at the extreme rear end to fit over the ply brace.

Bob tried some of the cement which is sold to join Plastostruct but it didn't work on the ABS fuselage at all. He found the UHU Hart cement that came with the kit did a fine job. The little piece originally sliced from the strip was cemented to the front end of the skid, cut away and sanded to a smooth shape. Bob later found half-round Plastostruct about 5/16" wide which might have done an even better job. It has a 1/16" wide groove and might make good pushrod guides, etc.



Kit-built Mod Pod with MonoKote on rudder and elevator is fine beginner trainer.

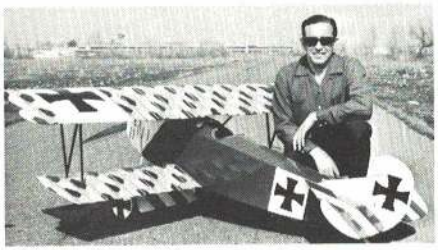
A final glider note from this busy builder. He and a buddy both built Windspiel kit gliders but found the aileron linkage at wing center would not stand either high-start or winch launches. This glider apparently was designed strictly for slope flying. The extra upward wing flexing on launch immediately disengages the aileron linkage! This happened on first launch of one of the planes—instant rekitting! The other was checked by simply running with it into the wind, and in ten feet the linkage came loose. No amount of fiddling could make it grip any better. Those who build this craft should omit the ailerons and add more dihedral so the rudder will give effective turn action.

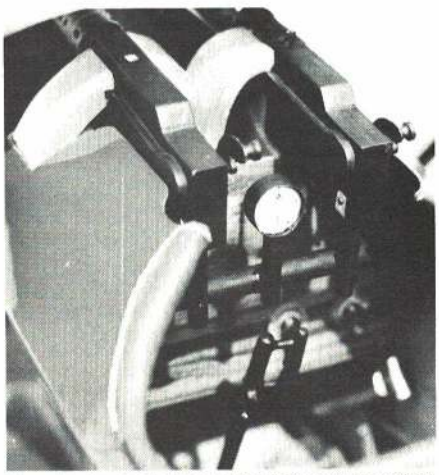
LSF Soaring Tournement: Plans are well under way for the 1971 version of what turned out to be the largest glider meet ever held in the U.S. Dates are Aug. 28-29; place is Hummingbird Haven in Livermore, Calif. (same as last year). The meet will be co-hosted by North Bay and South Bay Soaring Societies. In order to provide plenty of flying time for all, entrance may be limited to 100, plus the top 10 Scale event contenders, and official guests. Scale gliders which get highest static judging points will be eligible to fly in the daily competition tasks.

CLAUDE McCULLOUGH

SCALE

Big and Beautiful: Tom Mahon's 89" Fokker D-7 features a realistic reproduction of the colorful, but difficult to model, WW I dyed lozenge camouflage. The silk screen printing method, for which supplies may be obtained in craft and artist supplies stores, was used to apply dye coloring to Super Shrinktite material before covering the plane. Clear nitrate dope was given a final fuel proofing with a coat of clear DuPont Dulux. Tom says this enamel really bonds to the nitrate. unlike the usual results when it is put over butyrate dope.

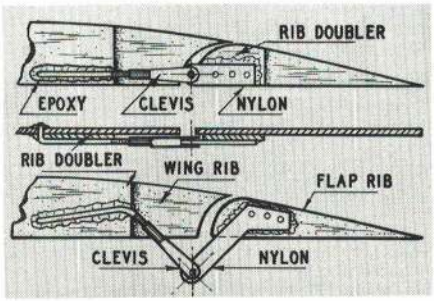




Tom Mahon's Fokker D-7 is big and beautiful. Ship took 13 months to build and is scaled 3" to foot. 27" prop pulls it along at a very realistic speed. 17 1/2 pounds!

The 7 1/2" wheels, cowling and louvered side panels are all molded from fiberglass. The ship is based on Bill Bertrand's design with detail added from the Smithsonian D-7 plans. (See last month's column for information on Smithsonian drawings.) Power plant is a glo-version of the Ohlsson and Rice Compact industrial engine of 1.30 cu. in. displacement. This has the torque and porting to properly turn the big prop a model of this size and flying characteristics demands. While not designed for model use, it is not difficult to adapt. Bill reworked his to bring the displacement under the AMA scale limit of 1.25 cu. in., and it works so well that few at last year's Nationals realized he was no longer flying with the O.S. 80 originally installed.

Link Kink: Peter Burkeljc (Ljubljana, Yugoslavia) submitted the flap hookup shown. The clevis allows fine adjustment of the hinge point and the surface can be unhinged easily and removed for painting or



repair. No reason why this arrangement could not be used to duplicate in a practical manner some of the sticky scale aileron hinging setups.

Plastic Group: An RC'er join the International Plastic Modeling Society, the AMA of display scalers? Sure thing, it's just the organization for authenticity fiends. Their quarterly and monthly magazines present great coverage of paint schemes, detailing, insignia, markings—even such hard to come by information as colors inside wheel wells and cockpits. Dues are $8.00 a year. IPMS/U.S.A., P.O. Box 163, Ben Franklin Station, Washington, D.C. 20044.

Scale Racing On Water: Granger Williams, a leading member of the F.A.S.T. Club when they were flying CL Schneider Cup racers, is one of the sparkplugs for a group of West Coast RC fliers which is organizing the same type of event for radio. Russ Barrera of the Russ-Craft Model Museum is digging out reference material, and construction drawings are underway. Lake Elsinore (Calif.) looks like an ideal spot for racing tryouts, the Flightmasters having had two successful ROW scale meets there. Should be a fantastic sight.

Sanding Sticks: Seen on Maxey Hester's workbench, an assortment of spruce sticks, strips and dowels in various sizes with sandpaper glued to their sides or ends. Amazingly handy for enlarging spar holes in ribs or stringer slots in a former, reaching through structure into tight places, or working on scale details buried in a cockpit.

Man From Glad: Greg Malinowski, editor of the Monmouth Model Airplane Club Newsletter, has a handy kink for keeping a spray gun clean. Line it with a sandwich baggie turned over the rim. After spraying remove the baggie and replace it with a clean one.

To The Point: Mike Stott uses a standard artist's pencil, a very soft lead affair used for sketching, to stimulate panel lines on metal-covered fuselages. The point cuts into the surface and leaves enough lead in the line to provide an accent. Using the side of the pencil point, a blackened area may be laid on behind exhaust pipes. Smudge with a finger tip or eraser to give the right effect.

For detailing in ink, he suggests special types made for drafting on mylar and other plastic films, rather than using common india ink. This will minimize beading and skipping on glossy doped airplanes. For really slick surfaces, it may be necessary to buff the surface with very fine sandpaper to get ink to take. Or, if killing even a little of the gloss is not appealing, try dusting with talcum powder before drawing lines. Use a clear dope overspray to protect pencil and ink details.

Really Hot Airplane: Take it easy when priming a tightly enclosed engine with raw fuel and allowing it to accumulate inside the cowling. One good backfire and presto—instant ashes. Take it from one who tried, dirt and lemonade don't do much good in stopping a dope-fed conflagration. All the hours of labor in a scale model are worth protecting. In your flight line kit, carry a small fire extinguisher ready for use. Available at auto supply stores is a compact ten-in. cylinder of CO2 made mainly for emergency tire inflation but also very effective at putting out a blaze in front of the firewall before it can spread behind. Cheap insurance!

Scale Data Sources: The Journal of the American Aviation Historical Society reports that photos of Canadian aircraft formerly in the files of the Canadian Forces Photo Unit have been transferred to the Public Archives. Upon receipt of a request for photos, a researcher will check the files and return a memorandum listing pertinent negative numbers. Costs are $1.00 per 8 x 10" glossy. Address: Public Archives of Canada, 395 Wellington St., Ottawa 4, Ontario, Canada.

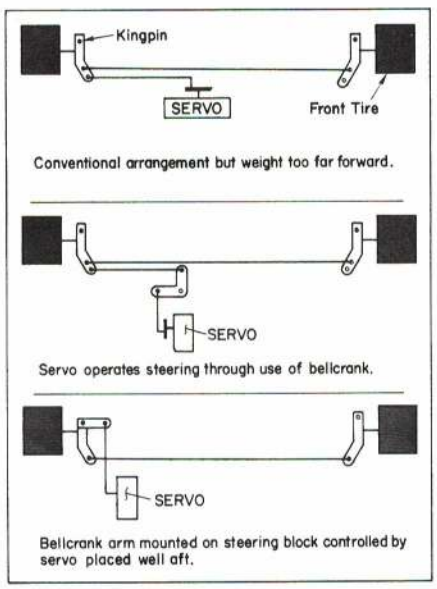
GEORGE SIPOSS

RC CAR RACING

Latest Techniques and Trends: When painting butyrate bodies, do not use fuelproof dope because it will curl up the body. Instead, use Testor's PLA enamel (and only the last coat should be dope). The silver adhesive tape which is used by airconditioning mechanics can be placed on the inside of the body at areas of high stress. It really adds strength and localizes any blows or cracks which may happen during a hotly contested race.

The new Dynamic bodies are made from a secret material called "Dylan" which is almost as strong as Lexan but not nearly as expensive.

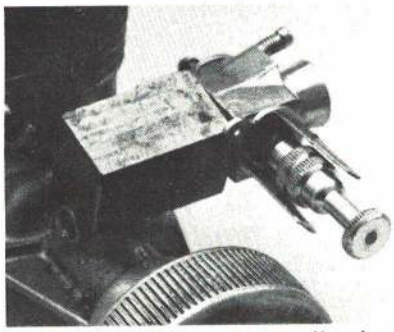
The Hobby House sells a fantastic new liquid which is used as a masking medium during painting. It is ideal for complicated masking jobs (such as camouflage for model airplanes) because it is water soluble and can be cut razor sharp with a hobby knife. It is only 50 cents, from Hobby House, 1312 N. 18th St., Monroe, La. 71201.



Nor-Kar (13556 Chase St., Arleta, Calif.), has new exhaust headers for Veco engines, with or without exhaust butterflies. They also have roll bars for sports car bodies.

Dow Engines has an adapter kit for $3.98 which converts a carburetor into a side-draft model. It allows the throttle linkage to be connected directly to the carburetor without

the use of a bellcrank even in sidewinder cars. For literature write Dow Engines, Box 5253, Orange, Calif. 92667. Enclose a self-addressed, stamped envelope.



Side-draft carb mounting greatly simplifies linkages to throttle arm with sidewinders.

Delta Systems has reduced their car prices to $69.95. In addition to the standard kit, a dragster chassis modification or a side pan arrangement for sports bodies are available. The new cars are going faster than ever thanks

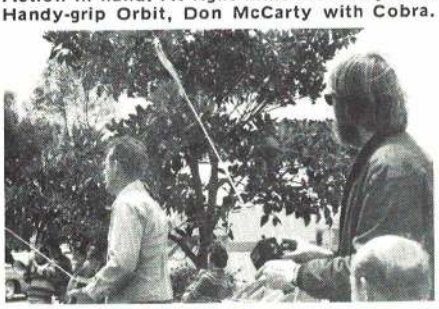
Ed Sweeney and Leon Shulman with proto original and proto production 049 racers coming from Jerobee. Small, simple, fast, and inexpensive. Available this summer.

to the rubber compounds being used on the rear tires. Delta has an adapter kit for Heathkit cars which contains this rubber. Delta, P.O. Box 754, Bridgeton, Mo. 63044.

Most modern cars simplify the radio and linkage arrangements so that a minimum of backlash will be evident and bellcranks are not needed. The sketch shows how a fore-and-aft servo movement can be utilized to actuate the steering system. The steering arm can be made from 1/16" thick cold-rolled steel or similar material.

From Sweden come reports about some RC cars being equipped with tiny steel pins which are driven into the rear tires as well as the front ones. The pins protrude 1/16" from the surface and the cars reportedly are being raced on frozen lakes—just like full-size cars.

Action in hand. At right Mike Morrissey with Handy-grip Orbit, Don McCarty with Cobra.



And Morrissey wins the final race at fast, smooth Briggs Cunningham track.

Race and Club News: The St. Louis R/C Club is in operation and meets monthly. A full racing schedule is being planned for this summer. Write Frank Broach, 463 S. Harrison, St. Louis, Mo. 63122, for further information.

Series 71 is a group of races being organized by midwest RC clubs. After the April 18 opener in Fort Wayne, Ind., races will be as follows: May 16, Flossmoore, Ill.; June 13, Benton Harbor, Mich.; August 8, Indianapolis, Ind.; Sept 12, Jackson, Mich, and Oct 10, St. Louis, Mo.

The Nationals will be held in July and at all of these events ROAR membership will be required. Write to ROAR, enclosing 25 cents for handling, 2855 Velasco Lane, Costa Mesa, Calif. 92626, for racing rules.

The Columbus Auto Racing Society is forging ahead with its membership topping the 32 mark at the latest report. Write to Dean Schulman, 16 E. Broad St. Columbus, Ohio, for further information.

CONTROL LINE

BILL BOSS

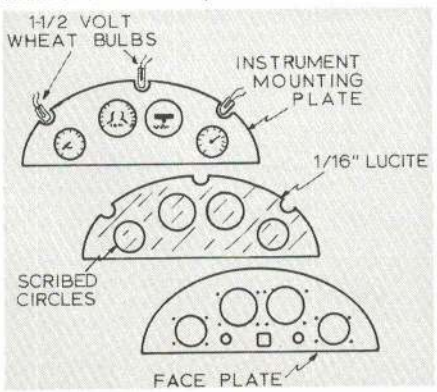
SPORT AND SCALE

Light Up Scale Model Instrument Panels: Scale modelers may wonder how to light up scale plane instrument panels. It can be done quite effectively with a piece of 1/16" Lucite sheet and 1 1/2V grain-of-wheat bulbs. Instead of making instrument panels in the usual manner (one flat piece of metal or cardboard on which the instruments, rings and plastic glass are mounted) make the panel in three pieces (see sketch).

Start construction of the panel by cutting out the instrument mounting back plate and panel face plate to the size and shape needed for a particular plane. The material used for these two pieces of the panel can vary from very thin but stiff carboard to thin aluminum sheet. The choice of material is up to the indivuidual. Punch or cut out holes for the instruments in the face plate.

Next, cut out a piece of Lucite (1/16" sheet) or similar light-transmitting material to the shape of the instrument panel. Using the face plate as a template, place it on top of the Lucite and with an awl scribe a circle on the Lucite at each instrument location. Be careful not to score the Lucite where the instruments will show through. Now, as shown in the sketch, notch the back plate and Lucite sheet to accept the grain-of-wheat bulbs.

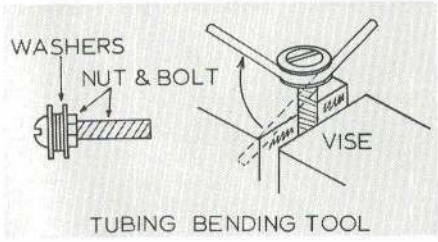
Lighted cockpit instrument panel? Why not? Grain of wheat bulbs provide the light.



Assemble the panel by mounting all the required instruments on the back plate and then make a sandwich of the three panel pieces. A small amount of glue or epoxy at appropriate places will hold the assembly together. The wheat bulbs are glued in place and are powered by penlite cells or some of the newer and smaller NiCad batteries. The light produced by the bulbs is transmitted through the Lucite to the scribed circles, which in turn will cause a halo of light to be produced at each instrument. In addition to lighting up the instruments, the Lucite sheet adds depth to the instruments and enhances the realism of the panel. The batteries, depending on the type used, can be mounted in the plane or made up as an external power source to be plugged in the plane while on static display.

Pressure Fuel Pump: The Lake Erie Gas Model Club Newsletter suggests the use of the tank and pump portion of a Coleman stove or lantern for a pressure fuel pump. The tank of the lantern is fitted with an outlet tube and a quick shut-off valve at its end. The tank is filled with fuel and pumped to pressure. When hooked up to the model airplane tank, open the shut-off valve, and a quick pressure fuel feed into the model is provided.

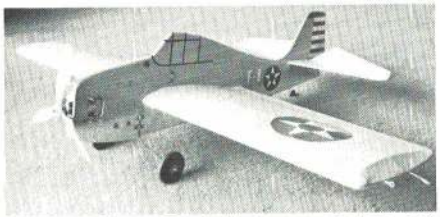
Bending Brass Tubing: When a piece of small brass tubing must be bent for a fuel tank, all too easily it kinks or collapses. Heating with a torch permits bending, but after cooling the brass is soft and has very little strength. A simple tool for bending brass tubing can be made from a miscellaneous nut, bolt, and washers. Here's how it is done.



Start with a 1/4" or 5/16" screw that is at least 1 1/2" long and threaded all the way. Slide a thick flat washer of about one-in. outside diameter or larger onto the bolt. Then select some small washers of equal size and place them on the bolt. The smaller washers should be about four or five times the diameter of the tubing to be bent. Add enough of these washers to the bolt so that their total thickness is equal to diameter of the tubing. Add one more large washer. Clamp all the washers together with a heavy nut. It is important that the space between the two large washers makes a snug fit for the tubing.

All small size tubings up to 5/32" can be bent using this device. This idea was reported in the "Tom-Tom," Indian City (Michigan) RC Club newsletter.

Custom-Fitted Engines: Larry Scarinzi sends a newsletter telling of the many wins his custom-fitted engines have garnered over the past several months. Larry does custom-fitting work on all engines, but his specialty is the Fox line of engines used for Combat, Stunt and general sport flying. A demonstration of these engines showed them to start well, run smooth, and to have plenty of power. For specific details on this custom-fitting service, write Larry at 191 Parsippany Road, Whippany, New Jersey 07891.



Military Slow Combat is appropriate but seldom tried. This one is a WW II Wildcat.

New Club: This month the Ohio Flying Aces MAC, Youngstown, Ohio, are welcomed to the model club fraternity. The club engages in free flight and control line activities, with Slow Combat (profile-type planes) as one of their specialties. Jim Alexander, club activity director, points out that the club stresses realism in profile-built planes. Many are originals and most sport military paint schemes. One such plane is an F4F-3 Wildcat from the Feb. 1967 **AAM**. Realism in structure and paint schemes is advantageous both for showing off the planes as well as for making the events colorful for the spectators—good ideas for all who fly the Slow Combat and Dive Bombing and Strafing event.

Jerry Farr's 1"-1' Mustang has working flaps, throttle, and K&B 35 power.

Air Camera: The idea is to take movies from the air with a model airplane. The camera is Super 8mm and is cartridge-loaded, providing about one minute of film. The unit is 1 1/2 x 4 1/2", weighs approximately three oz., can be assembled in one hour and can be attached to the outside of the plane. The camera is operated by 1.5 to 2.4V and is turned off and on via throttle control.

While the camera is being advertised for use with RC planes, nothing prevents control liners from using it too. The flier can film himself in the center of the circle, film some Combat flying or going after the balloons in Dive Bombing. The unit has great possibilities for fun filming and is available from Air Camera, P.O. Box 74282, Los Angeles, Calif. 90004, at a cost of $39.93 for camera, accessories, and a film cartridge.

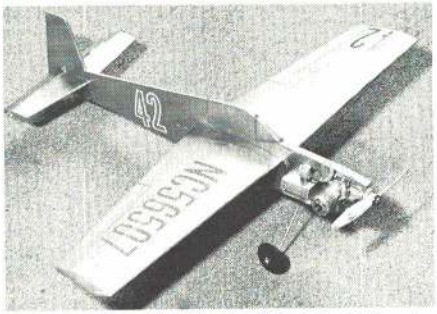
JOHN SMITH

SPEED AND RACING

Rat Racers Ask For Rules Modifications: Dick Kosby, a Rat Racer, says the Arizona gang would like to go to 70-ft. lines to cut down the turn rate, laps per min., and airplane pull. His figures show that at 130 mph the line pull is 38.5 lb. and 30.7 laps per min. This is on 60-ft. lines. Going to 70-ft., the pull drops to 30 lb. and the laps to 28 per min. Above figures on pull are for a two-lb. airplane. His figure of 130 mph is 13.84 sec. for seven laps. This figures to 1.98 sec./lap. This is pretty swift, especially when flying in traffic! Dick has a Shaker design turning 145 mph, honest speed, no helping, using an Aldrich modified ST 40.

These ideas have some merit. If any of you are interested in them, drop me a line, either in care of **AAM**, or to 960 Brenner Ave. N.W., Massillon, Ohio 44646.

More On A NCLS: The Southern California Control-Line Association Newsletter carries an editorial by Luck Pyatt. "A National



Mark Bauer, age 12, races this S.T. 15 Lanier Special Goodyear plane.

Control Line Society? Why not? It worked for FF, it worked for Pylon Racing in RC, it could work for us. . . .The Society could submit realistic recommendations to the CL Board of AMA. . . .There could be a specialized agency to accurately test and analyse old as well as new products for CL. Ther could be associations within the Society that would act much like committees: Speed, Stunt, Carrier, Scale, Racing, Combat. They could, each in their own way, test and develop methods for improvements in each particular field."

He finishes by adding, "NCLS along with AMA would help in gaining new flying fields and improving existing sites by giving a professional, positive, set of conditions which could be used when talking to city, county or parks and recreational departments for flying sites."

Okay gang, the Nats are coming, lets get together. I'm sure we have the blessings of the AMA. Check the bulletin board in the work hanger for meeting sites.

Speaking Of the Nats: July 26 to Aug. 1 will find many of us at the Nats, where all troubles of everyday life are forgotten. We forget we're married and have a house full of kids: the only problem we do have is wondering how we're going to fly a Rat Race heat at the same time we are scheduled for a Combat match! Such is the life of a happy modeler.

But while you are enjoying your week of fun, look around. Those guys in the dress whites, the guard at the gate, all the officers and men at Glenview NAS, are the ones to thank. You are being hosted by the United States Navy, and the base, the timers, everything, is provided for the contestants.

These guys have families, and kids, and maybe even problems, at home. But they are there to make your week a happy one. Many have "been volunteered," (If you don't know what that means, ask anyone who has been in the service.) So give them a smile, a pat on the back, and a big "Thanks!" when you leave. They will still have to clean up after you. Let's make July 26 to Aug. 1 Be Kind To Navy Week. I'm sure they will appreciate it.

Letters, I Get Letters: Now that contest season is in full swing, send in your pictures and ideas. We still have a five spot ready for your contributions.

The last few months have found my mail box bulging. Many letters indicate beginners' growing interest in the go-fast part of our hobby. Some ask about Goodyear and Rat Racing. So to them, and to any other interested modeling types—RC, FF, etc.—come on in, the competition's fine. And for you old-timers, remember, a mistake made at seventy feet means taking the longest walk to pick up the wreckage!

Building Tips: Some of the equipment available for the RC crowd can be put to excellent use by the Speed, Rat Race, and Goodyear fliers. Check out the nylon horns which come in many sizes and make great elevator horns for Rat Race and Goodyear type models. Nylon landing gear clamps can be used to tie gear to profile fuselages.

Check the local pattern shop for leather fillet material. It comes in many sizes, the smallest about 3/32" up to 1/2" or larger. This makes a great fillet for wing-fuselage joints and it strengthens the joint. To apply it, soak it in water until it becomes flexible, remove as much moisture as possible by pulling it through a rag and then fasten with white glue. Use a dowel, round the end, and rub down tight. By getting dowels that match the radius of the fillet, a beautiful joint will result every time. After drying, trim the leather with a very sharp knife or razor blade. This material really adds to the appearance of Goodyear and Proto ships.

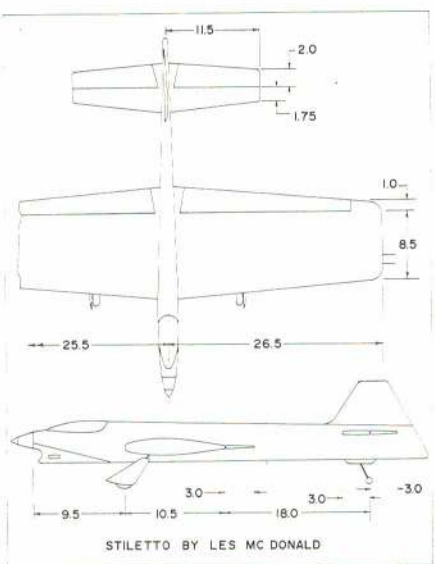
JOHN BLUM

CARRIER AND STUNT

King Orange Stunter: The photos and two-view show the First Place Open Stunt winner at the last King Orange meet. The builder-pilot is Les McDonald.

Using a Fox 35 for power, the model has 595 sq. in. of wing area and uses a three-blade 10-6 prop. Design objectives for the Stiletto were: (1) simple construction for lightness and ease of alignment; (2) desirable flying characteristics to produce crisp turns without yaw and a slow flying-speed; (3) appearance and impression points. Les emphasizes impression points and feels they are needed to win. That should bring comments from the advocates of dropping appearance points.

Les McDonald's pretty Stiletto uses the traditional Fox 35 power. Weighs 49 oz.



Twin-Engine Carrier: The twin-engine model always has been of interest in any event and Carrier has had its share. Among them were Robert Randall's Tigre-Cat with two 35's and Bob Williams' popular Grumman Skyrocket using two O.S. Max 35's. At the time these two were flying, the two-class entry system had not been devised and all competed together.

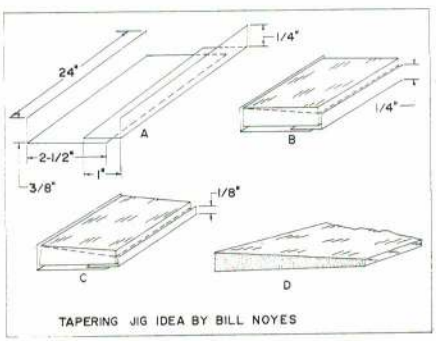
Jim LaBarge's twin 049-powered OV-10A Bronco may serve as a proto model for bigger things to come. He plans a larger model at 1"-1' scale featuring interchangeable motor mounts of the Tatone variety. The model can then be used in both classes by changing engines. This represents a challenging project, since the Bronco was not equipped with an arresting hook.

The dedicated Navy Carrier types will quote rule 20.3 which says the model must be equipped with an arresting hook. Yet, the Bronco is used on Carriers and does not need a hook because it is capable of short takeoffs and landings. Twenty-four feet of deck free of arresting cables is available and should make the flight interesting.

To determine the class, the total engine displacement is used. For the Bronco, this means two 19's in Class I, and two 29's or a 35 and a 29 in Class II.

Making the plane fit the rules and be competitive is an interesting and challenging project. Plans are forthcoming in **AAM**.

Jig For Tapering: Bill Noyes handles precision tapering of long balsa planks by using three 24-gauge steel angles. The dimensions given in the sketch may vary depending on the size of the piece to be tapered. Bill's example shows a size typical for flaps, trailing edges, etc.



TAPERING JIG IDEA BY BILL NOYES

Fig. A represents the two angles used in the initial cut. The one with a 3/8" flange is used throughout the sequence; and the other, with a 1/4" flange, is used for the first cut. This assembly (Fig. B) aids in the removal of a tapered volume from 0 to 1/8". Fig. C shows the use of an angle with a 1/8" flange. The final cut is made by inverting the piece as shown in Fig. C and again removing a tapered volume of 0 to 1/8". Thus, by using the top edges of the flanges to form a plane for a flat reference and cut, a perfect 3/8" to 1/8" taper for the full length of the piece is accomplished.

Inverting the subject piece between steps B and C permits parallel leading and trailing edges requiring only rounding and final sanding of the taper.

Back at the Carrier Deck: The questions continue, and this month's topic is weight versus materials. For the Novice, design weight is simply the sum total of the parts. The average Class I falls in the 26- to 32-oz. category, while the Class II model goes 36 to 40 oz. average. This means an average difference of only 9 oz. A top contender in 1970 used the same size model in both classes with a K & B 40 in one and a Rossi 60 in the other, with the relative weight difference in engine weights. Since engine weight, including throttle and tank, is constant, the difference is in selection of wood and materials, plus the choice of control systems and hardware for the model's operating features.

Since everything has its price, the builder must decide "what price control?" In order of consideration, the three-line system is heavier than the two-line, and both are heavier than the one-line, pre-load throttle system. In the same order, line-drag decreases, which is an advantage, but problems of dependability increase. Since the weight differential is minimal and the recent rules changes attempt to balance the drag differences, the three-line system is worth the weight.

In comparison, the more operating features the more hardware in hinges, glue, linkage, hooks, solder, etc., is required. Consequently, use only the necessary size wire, such as 1/8" landing gear, 1/16" flap linkage, 3/32" hook, 1/16" pushrod, etc., and minimize the solder and control weight.

The selective use of wood is important, not only in choice of balsa, but in discrete use of reinforced areas such as 1/16" ply ribs and gear mounting platforms, 3/32" hook platform, etc. For Class II, plywood thickness can be increased by 1/32".

Four or five oz. saved in these areas can mean the difference between a heavy model and one that is satisfactory. The relative size of the carrier model by today's standards is not affected as much by dope weight and epoxies or fiberglass cloth and resins as were the past models.

How does weight affect performance? High-speed points are effected by proto launch, with the lighter model reaching its ultimate speed much sooner than the heavier model. The lighter model, properly trimmed and balanced, enhances the slow speed phase, thus permitting a slower flight and less abrupt landing. Yet, the slightly heavier model, within the weight ranges mentioned earlier, offers a better controlled slow-speed flight in windy weather and enhances the landings for the Novice because of a faster rate of descent for the landing.

Thus, model weight is influenced by a number of factors, many of them related to the modeler's experience.

FREE FLIGHT

BOB MEUSER

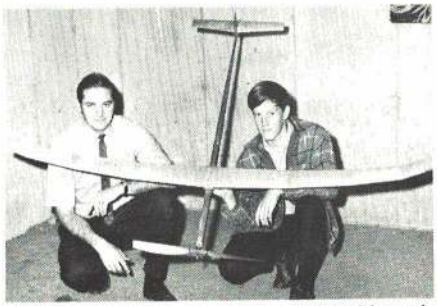
SPORT

Sympo 71 Preview: The report of the fourth annual symposium of the National Free Flight Society is expected to be available in mid-July. Among the topics covered are Rubber Motor Tests, Propellers, and Airfoils.

Rubber Motor Tests: Jon Davis reports the results of 35 tests covering break-in procedures, the effect of holding a motor fully wound for various lengths of time, and winding techniques. George Xenakis tells about two methods for measuring the energy output of a motor without plotting torque-turns graphs. Walter Erbach discusses his apparatus for automatically plotting torque-turns graphs, and gives some of the results.

Propellers: W. Hewitt Phillips discusses potential advantages of one-bladed props and tells how to balance both the aerodynamic and inertial forces. Dave Mendel tells of the advantages of gearing the prop to turn slower than the engine. Sherman Ovelmen and Bob Meuser describe the results of 200 test flights using 13 Wakefield props and four mofor lengths.

Airfoils: Bill Bogart presents ordinate tables and large drawings of 81 new airfoils—one for every occasion. John Krouse tells how thickness and the position of the high point affect duration. Don Monson covers low-speed air flow, suggests


Sherman Ovelmen and Mark Weber (r) made over 200 flight test on model for Sympo 71.

improvements in airfoil design, and shows how to plot your own.

Other Features: Bill McCombs talks about flying scale problems and suggests rules changes to make the event more fun. Peter Soule tells where to put the dihedral breaks to get the most stability with the least loss of lift. Ralph Vescera describes his experiences using a streamer as a thermal detector. Frank Perkins discusses the use of radio as an aid to finding lost models. Denmark Wakefielder, Christian Schwartzbach, tells about a week-end group-think in Sweden designing the Ultimate Wakefield. Tom Patrick describes the work of the Low Speed Aerodynamic Research Association of England in the 40's and 50's.

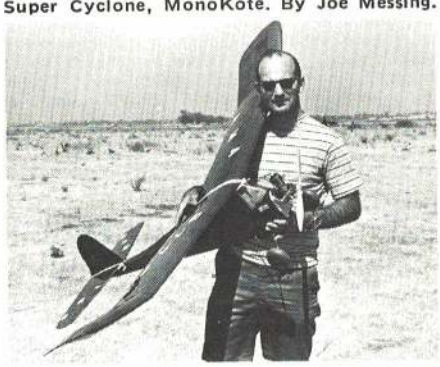
Ten Models of the Year: Introduced at the 1970 Sympo, this feature proved extremely popular. A committee headed by Bill Hartill made the selections, and Hardy Brodersen wrote a story about each one. A three-view drawing of each is presented, and full-size plans of some will be available from the NFFS.

The Symposium Report can be ordered from NFFS, 1333 S. Franklin St., Denver, Colo. 80210. Price: $3.50 for members of both AMA and NFFS, $4.50 for non-U.S. residents and all others. 50 cents extra for First Class handling in the U.S., Canada, Mexico. $1.00 extra for foreign airmail. For both the 70 and 71 reports: members $6, others $8, double price of special handling.

RC for FF?: A year ago the FF Contest Board (in reaction to the very successful use of radio control of dethermalizer and engine cut by Wes Morris) interpreted the then-existing rules to prohibit the use of radio for any control of FF models, and a statement to that effect appears in the 1971 rulebook. Dick Lyons, president to the renowned Chicago Aeronuts, has made a formal proposal to the FFCB to permit the use of radio for dethermalizer actuation, and Frank Perkins has proposed the inclusion of engine cut. Opinions seem strongly divided on this issue, and the FFCB meeting at the Nats should be rather entertaining.

Opponents say: "It makes FF more complicated, more expensive." Well, there was a time when the dethermalizer itself might have been outlawed. If so, why not also

Buzzard Bombshell, old-timer from a kit, uses Super Cyclone, MonoKote. By Joe Messing.



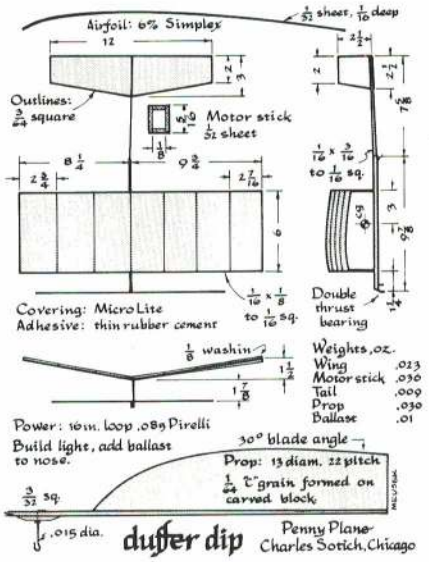
outlaw folding props, mechanical timers, thermal detectors, hot MonoKote, undercamber, over-forty-dollar engines, and balsa wood? "What if the RC fails?" So, back up the system with mechanical timers. "What is to stop someone else from blipping me out of the sky?" "What about interference between RC'ers and FF'ers?"

Sure, these are problems, but it is a cinch these problems will not be solved, by either individuals or manufacturers, if radio continues to be flatly prohibited. There seem to be an infinite number of channels not used for regular RC and which, in fact, would be quite unsuitable for that use. However, they might be entirely adequate for radio control of engine cut and DT, and no $20 FCC license is required!

The advantages of this limited use of RC are many. It would, to quote from the Aeronuts proposal, "Increase the number of flying sites available by permitting flying at sites presently considered too small or unsuitable for FF; design; and stimulate development of RC devices by individuals and industry." the flight immediately if it was in an unsafe situation that could cause property damage or personal injury; increase interest in FF without changes in model design, and; stimulate development of RC devices by individuals and industry."

Whatever your feelings on the matter, we urge you to communicate them immediately to your Free-Flight Contest Board representative or to AMA Headquarters.

Pennyplane at the Nats: Challenging enough for an expert, simple enough for a beginner, rewarding in terms of flying time vs building time—that's Pennyplane. Popular at the 1970 Nats, this unofficial event again will be



sponsored by the National Free Flight Society. Slow flying, yet rugged, these models are virtually indestructible under normal flying conditions. Nobody can say that a five-minute indoor flight isn't real flying. Detailed rules were presented by Bud Tenny in Where The Action Is, Sept. 1970 **AAM**. Build Charlie Sotich's Duffer Dip and start living again.

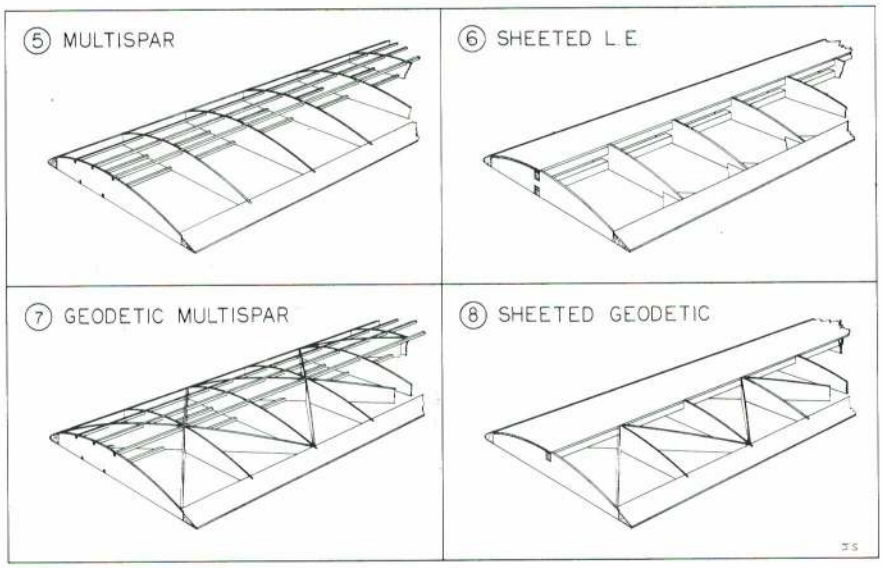
BOB STALICK

GLIDER AND RUBBER

Do Your Bit for the Beginner: Recently, at the Toledo RC Conference, the late Chuck Broadhurst and I discussed projects for NFFS. One of the real needs for all phases of modeling is an inexpensive (preferably free) basic aeromodeling booklet for the rank beginner. What is needed is a brochure crammed with sketches, descriptions and answers to such questions as: What is a gusset? What do you mean by 50/50 dope? What are the DT's?

In a moment of weakness, I volunteered to head such a project. Now, I ask your help. Suggestions as to what the beginner—young or old, who lives away from a model club—should know for basic free flighting are needed. This is a project which welcomes the person who doesn't know anything about free flight. You are not alone—let me know what you don't know. And for you experts who have tutored beginners, let me know where you need the help. There is no payment but the knowledge that you have helped promote a great hobby should be ample reward. Please send suggestions and questions to me in care of **AAM**.

Construction Techniques: Last month, some of the more basic and simple structural wing and stab construction methods were reviewed and presented in this column. To continue, four more styles and variations are presented.



Multispar (Fig. 5) was originally popularized by Dick Korda on his Wakefields of the late 1930's. It is a very light and generally warp-free style which relies on proper placement of small surface spars for rigidity, strength and airfoil shape. It is particularly good for stabs in all model classes and for rubber-powered model wings. For gliders and larger power models, it usually features larger spars than indicated; and for most wing applications triangular trailing edges gussets are added. Surface spars along the top leading edge area have the advantage of adding to the induced turbulation of the airfoil. Current popular designs by Frank Heeb and Sal Taibi's Starduster 350 use this construction.

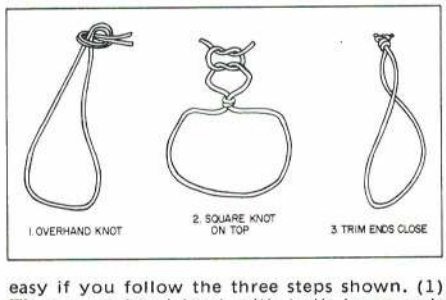
Sheeted Leading Edge (Fig. 6) is primarily a wing structure style. This is a particularly strong structural method, especially when accompanied by a vertical spar web connecting the upper and lower spars. Heavier than the multi-spar, it is nonetheless preferred by many for A-2 glider wings since it has good airfoil maintenance qualities. Trailing edge triangular gussets (as indicated in the drawing) improve its generally average warp resistance.

Geodetic Multispar (Fig. 7) is an extremely strong and warp-free style which relies on diagonal full-depth ribs set at approximately 45 degrees to the straight (or compression) ribs for both rigidity and span-wise strength. This style, with variations, is excellent for stabilizer construction, using only one or two top spars and lightweight 1/32" or 1/16" rib wood. It is a good technique for wing structure as well as providing generally good airfoil shape retention. Its main drawback is that once warps are built into the structure, they are very difficult to remove. Currently used by Ralph Prey's popular Dragstar power model design, it is a style which I personally favor and use extensively.

Sheeted Geodetic (Fig. 8) is a combination of numbers 6 and 7 and features the strengths of both designs at some penalty for added weight. It is used more often on larger power model wings than probably any other application. Usually the addition of a bottom spar or additional spars other than indicated on the drawing makes it ideal for Class C power wings such as Al Vela's Mexi-Boy series. This is also the basic technique used on the Aldrich-Timlin Univers-All and the Galbreath Eros FAI power models. (More next month.)

INDOOR **BUD TENNY**

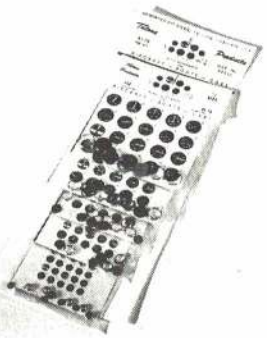
Knot Trouble?: Rubber motors get pretty slippery when good rubber lube is used, and many indoor fliers have trouble making knots hold under full turns. A comment sometimes heard is, "If you don't lose a knot once in a while, you're not winding them tight enough!" Actually, good indoor knots are



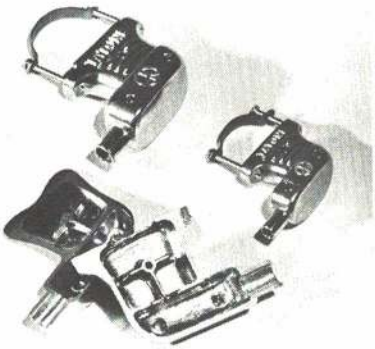
easy if you follow the three steps shown. (1) Tie an overhand knot with both loose ends together; moisten the knot with saliva and pull it tight, checking to be sure the loop is the intended length. (2) Tie a square knot on top of the overhand knot; moisten and tighten as before. (3) Trim the ends close to the knot—rubber outside the knot only adds weight! The reason for moistening the knots is for temporary lubrication to let the knots pull tight without scuffing the rubber. After the knots dry out, the dry rubber helps hold the knot together.

new products check list

Nelson Model Products/Two new engines. HP40F and HP61-R-RC now available. HP40F, designed especially for more compact, high-performance aircraft, uses Schnuerle-type scavenging system, drop-forged and hardened crankshaft in two ball journal bearings, 0.9 hp at 16,00 rpm. HP61-R-RC uses hardened steel rear valve induction, Schnuerle-type scavenging, delivers maximum performance with low fuel consumption, low vibration. 1.5 hp at 15,000 rpm. Nelson Model Products, Inc., 6929 W. 59th St., Chicago, Ill. 60638

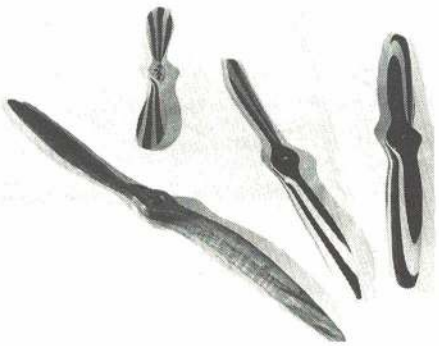


Tatone/Dummy aircraft instruments. Six dummy instruments with separate transparent bezels in 1/2", 7/16", 3/8", 5/16", and 1/4" diameters. Ready for mounting. $1.75. Tatone Products, 4719 Mission St., San Francisco, Calif. 94112

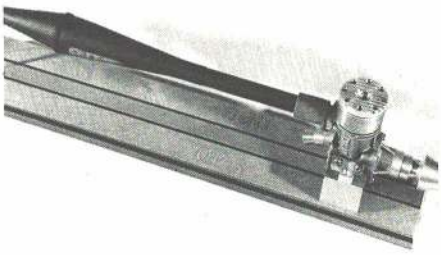


Tatone/Exhaust manifolds. Cast with internal baffling, manifolds come in three sizes for 09 to 19, 29 to 35, and 45 to 74 engines. Prices in $5 to $6 range. Tatone Products, 4719 Mission St., San Francisco, Calif. 94112

Tatone/Propellers. 9" through 12" cedar propellers in 6 or 8 pitch. 9" and 10", $ .75; 11" and 12", $ .85. Also smooth, polished prop nuts, metal, in several sizes. Tatone Products, 4719 Mission St., San Francisco, Calif. 94112



Wood Craft Model Products/Propellers. Shown are four representative models, 11" 6 pitch, $2.25; Nieuport and Fokker DR-1 scale props (scaled to VK kit), $5.95; Avion 20" reproduction, $7.95. Laminated veneers or solid hardwood. Props also made to specs. Write Wood Craft Model Products, Box 119, Big Rapids, Mich. 49307

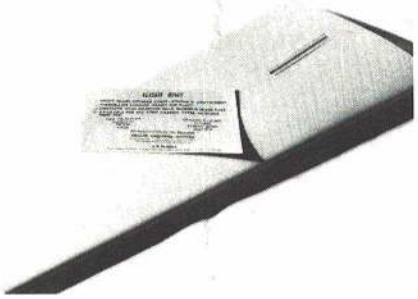


Shamrock Competition Imports/OPS 60 engine. From Italy, OPS 60 engine and tuned pipe turn out 2.5 hp at 22,000 rpm. Disc rotary valve induction, weight 16 1/2 oz. $89. Write for data on complete line of OPS 60 engines. Shamrock Competition Imports, Box 26247, New Orleans, La. 70126

by FRANK PIERCE

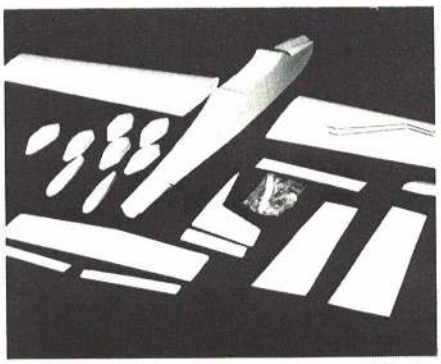
Randy's Model Aeronautics/Aero fuel. Custom Blend is available for ten different applications, in quarts and half-gallons as shown. Randy's Model Aeronautics, 340 Diana Dr., West Carrolton, Ohio 45449

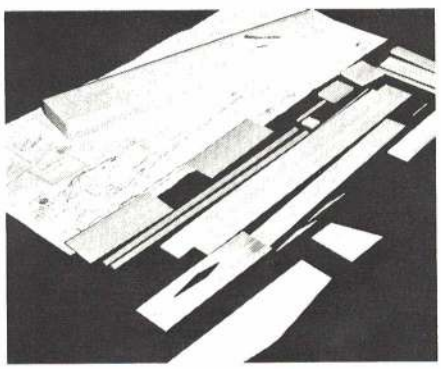
C.B. Enterprises/Wheel pant unit. Precision machined aluminum axle assembly and associated fiberglass pant core can be securely fastened to any suitable solid metal landing gear strut. Provides extra strength for finished wheel pant assembly. Designed for use with Williams Bros. 2 1/4" wheel. Easy to install. $2.50 per pair. C.B. Enterprises, 21590 Cloud Way, Hayward, Calif. 94545



AR Flight/Glaskin Wings. Mirror-like surface of epoxy glass provides beautiful cover for foam cores. Strong but lightweight. Ready for paint. Available for several of the more popular high-performance aircraft. $28 per set. AR Flight, 23326 Ladrillo St., Woodland Hills, Calif. 91364

L.M. Cox Mfg. Co./049 Rivets. Pre-assembled model of famous Formula I air race champion uses Cox 049 power. Scale details include hand-painted pilot figure, clear canopy, rubber-tired nylon wheels with pants. Racing red fuselage, electric yellow wings, tail. "Insta-lock" construction protects plane during rough landings. $16. L.M. Cox Manufacturing Co., Inc., 1505 E. Warner Ave., Santa Ana, Calif. 92705





Dee Bee/Cessna Cardinal. Near-scale model is designed for 3-channel operation on 15 to 20 power. 49" span foam-core plastic-covered wings and ABS plastic fuselage. Approximate flying weight, about 3 1/2 lb. Dee Bee Models, W. Lambs Rd., Pitman, N.J. 08071

Astro Flight, Inc./El Mirage. Outstanding, quick and easy to build, kit uses prefab construction with most parts die-cut. All-balsa, monocoque construction wings, easily adjusted for rapid climb and long-range thermal glides. 1/2A, 049 to 051 power, 48" span. $3. Astro Flight, Inc., 2301 Cheryl Place, Los Angeles, Calif. 90049

TENDERFORD TRIMOTOR

This flying pitchfork climbs like a jet fighter.

by BILL HANNAN

HUNGERFORD HAS a better idea! Fulton Hungerford, who created so much interest during last year's Nationals with his flying scale Ford trimotor, also amazed the experts with his unlimited rubber-power entry. Created on-the-spot at the Nats, the Flying Pitchfork proved to be an excellent performer.

The basic design has been reworked slightly and reduced so that full-size plans could be included in this magazine.

Construction

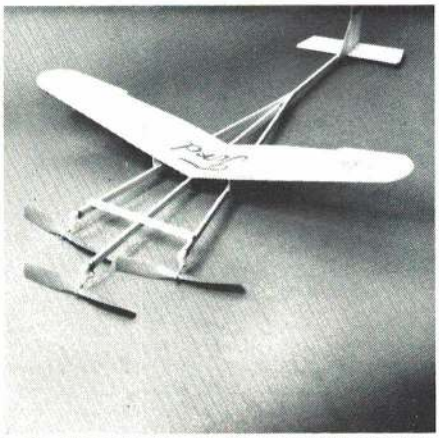
The fuselage frame is made from 1/4 x 1/8" balsa, which should be carefully selected for lightness and stiffness (take time to find straight, unwarped pieces). The center stick is 21" long, and the shallow angle at the lower rear should be carefully cut to provide an angle of incidence for the stabilizer. Pin or tape the center stick to hold it in place on the plans while the side members are cut to size and glued on. Next, trim the crosspiece to length, and glue it atop the motor sticks. Allow the assembly to dry thoroughly and, after removing it from the building board, add a small fillet of glue to each joint for extra strength.

Once queen of the airways, the fabled Ford trimotor inspired this Tenderfoot version.

Wings: Select a light and unwarped sheet of 1/16" balsa for the wings. Trace their outlines onto paper which, when cut out, can be used as a pattern. After cutting the wing panels to shape, sandpaper them to remove surface roughness, and round the edges to streamline them. Slightly bevel the wing roots for a better fit at the dihedral joint. Cut the two wing mounts to shape and bevel their top sides slightly to accommodate the dihedral angle of the wings. Glue the mounts to the outer fuselage stick sides. They must be correctly located and with the high ends to the front.

Tailplanes: Cut the fin, rudder and stabilizer to shape from lightweight 1/32" sheet balsa and sand all edges. The fin and rudder are made separately for greater strength and so that 2" wide sheet balsa may be used instead of the more costly 3" stock.

Decor: Aileron markings, Ford emblems, etc., if desired, are easier to add before the model is assembled, while the parts are still flat on the work table. Felt pen or colored tissue may be used for the markings, and the little Tenderfoot emblem is available for 15 cents from **AAM.**



Left: Three North Pacific Skeeter props (see plans) grab the sky. Above: Job well done.

Assembly

Place the wing panels in position and check the fit. Note that the dihedral angle is automatically formed by the wing mounts. However, tape or pins will be needed to hold the panels in position until the glue dries. Glue the stabilizer in place, and check for alignment, both from the rear and top view. The fin/rudder is then glued alongside the motor stick.

Bend the large rear rubber hook from 1/32" diameter music wire and bind in place with sewing thread and glue. This hook must withstand the pull of three fully-wound motors, so it must be fastened securely. The motors tend to become somewhat tangled

(Continued on page 86)

rd

WING
1/16" SHEET BALSA

FRONT VIEW
(NOT TO SCALE)
SHOWING DIHEDRAL

BIND REAR HOOK WITH
THREAD AND GLUE

STABILIZER

LEADING EDGE

RUDDER

1/32"
SHEET
BALSA

Ford

FIN

STAB

IMPORTANT: CUT REAR OF STICK AT
THIS ANGLE TO provide
STABILIZER INCIDENCE

1/16" SHEET BALSA

ATE BALANCE POINT

MUSIC WIRE REAR HOOK

"SUPER DELUXE" PILOT ARF'S

There are various degrees of almost-ready-to-fly airplanes. Some are finished to a higher degree of almost ready to fly-ability than others. If you look at some of these Pilot airplanes, I am sure you will agree they have added an extra dimension into the art of preparing an almost-ready-to-fly model. To get a real nice job on the Cavalier, which is the flagship of the Pilot line, you should spend two evenings. This includes radio and engine installation. The other planes should finish up in an evening. Wherever possible, the aileron and rudder are on and hinged. The Cavalier and the Shell Fly "B" are superb low wing, high performance, airplanes. The high wing symmetrical section Sky Wagon with its long tail moment is an especially fine acrobatic trainer. The Olympia and the Cessna Cardinal are excellent 3 channel beginner's models. The little Piper Cherokee, being a low winger, might frighten some beginners but, with the dihedral that this model has, it is a beautiful and docile 3 channel airplane. We would recommend a 60 size engine for the Cavalier, a 40 for the Shell Fly "B" and the Sky Wagon (or maybe a 35), and a 15 to 19 for the Olympia, Cherokee and Cardinal. Because of the extra effort that has gone into these Pilot kits they are a little more expensive, inch for inch, than many almost ready to fly models. For somebody who highly values his time, we think that even at the slightly increased price the extra finish is well worth the effort.

CAVALIER

Wing Span	63.78"
Length	49.60"
Wing Area	635 sq."
Engine	60
R/C Mech.	4 Ch

$69.98

CESSNA CARDINAL

Wing Span	63.78"
Length	35.43"
Wing Area	397 sq."
Engine	15 to 19
R/C Mech	1-3 Ch

$34.98

SHELL FLY B

Wing Span	51.21"
Length	39.4"
Wing Area	480.5 sq."
Engine	30 to 40
R/C Mech.	4 Ch

$49.98

CHEROKEE

Wing Span	46.48"
Length	35.23"
Wing Area	387 sq."
Engine	15 to 19
R/C Mech.	1-3 Ch

$34.98

SKYWAGON

Wing Span	52.75"
Length	40.55"
Wing Area	485 sq."
Engine	30 to 40
R/C Mech.	3-4 Ch

$49.98

OLYMPIA

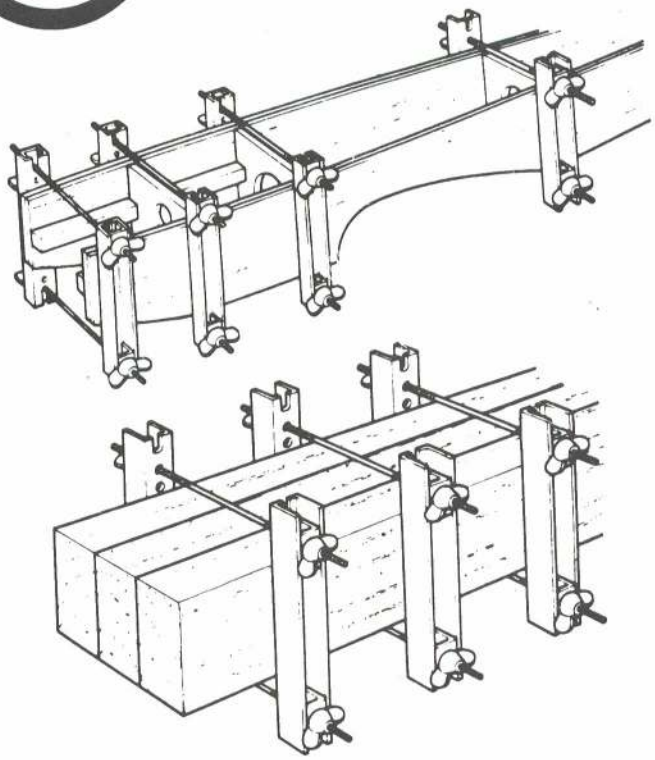
Wing Span	46.06"
Length	34.25"
Wing Area	379 sq."
Engine	09 to 19
R/C Mech	1-3 Ch

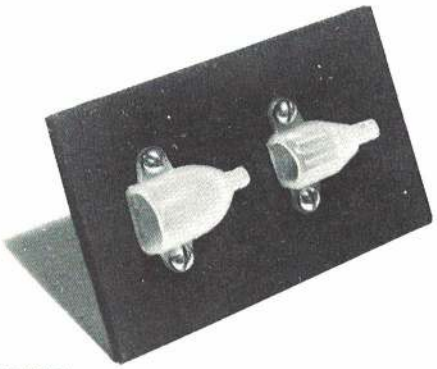
$34.98

WORLD ENGINES INCORP

8960 Rossash Avenue, 45236

I. M. PRODUCTS ACCESSORY LINE





RAM AIR FITTING

This is an air scoop package, contains two scoops to a package and comes complete with the wood screws necessary to mount them to the side of your fuselage. These air scoops act like a supercharger and the air rams into the scoop and then on into your fuel tank. You connect the vent line from your fuel tank to the back of the scoop. Our tests indicate that the real payoff on these air scoops is in the idle. They just seem to make the engine run a lot more solid than without them. It is something we have needed for a long time. Incidentally, there are two different sizes in each package, one large and one small.

.50 Catalog No. IM0065

"H" CLAMPS

These clamps can be used in fuselage construction or many other ways in the workshop. This is something we have needed for a long time to keep fuselages square, etc. These are packed two in each package.

2.50 Catalog No. IM0068

GRIP TUBING

This large heat treat tubing is used to hold a push rod wire into a push rod dowel. The small size works very well with ¼ inch dowel. The large size is recommended for use with 5/16 inch square balsa push rods. Another very clever idea from IM Products.

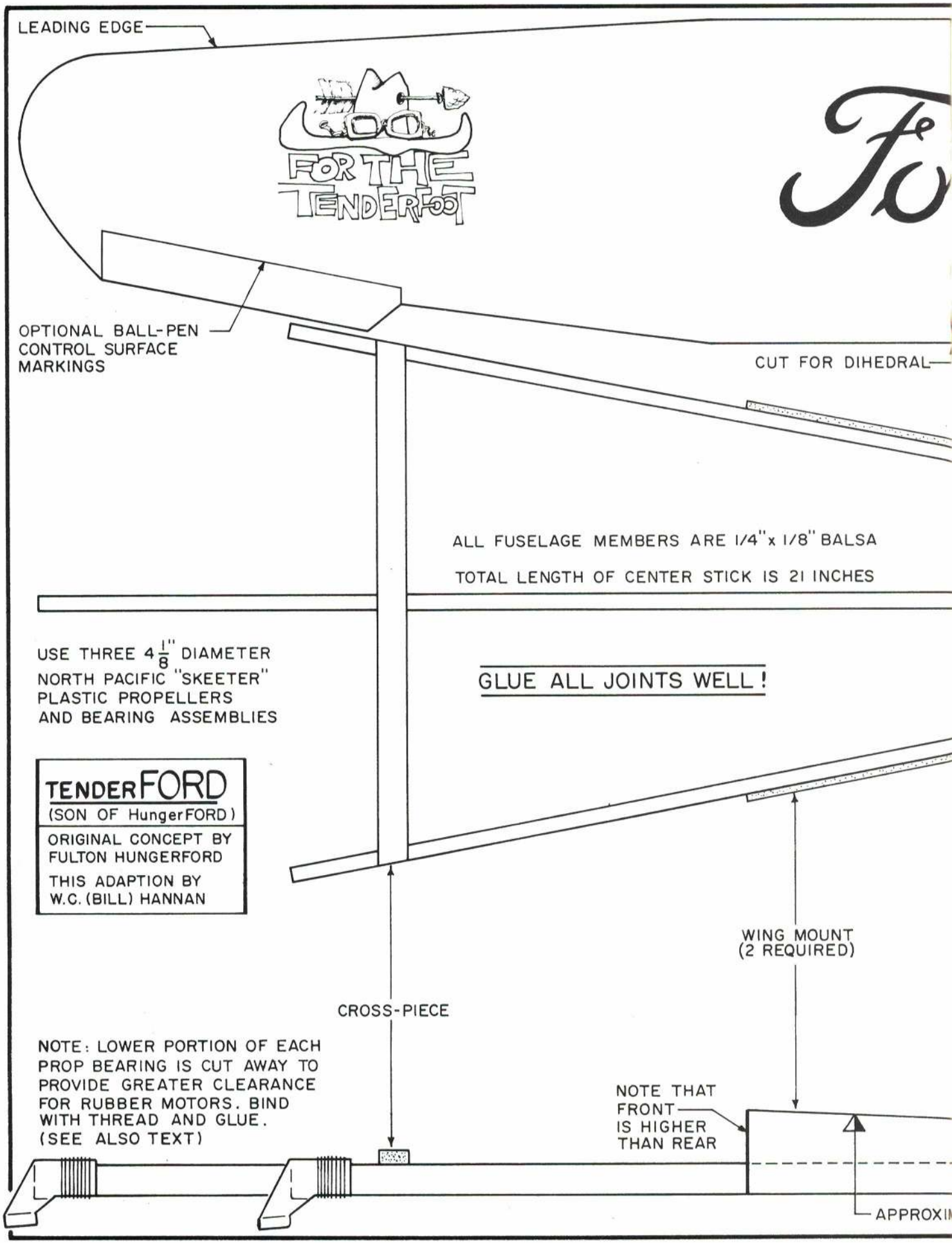
Push Rod Keeper Tubing, Small .99 Catalog No. IM0066
Push Rod Keeper Tubing, Large .99 Catalog No. IM0067

PILOTS

One of these pilots is 2 inch scale, the other is 1½ inch scale. These pilots come in white plastic. We recommend that you use some sort of enamel to paint the pilots. The pilots seem to be made of a material similar to that which tanks are blow molded from. These are really sharp for open cockpit type aircraft. In order to form these pilots it was necessary to make them so that the legs come off. These can be put on permanently with a little plastic cement.

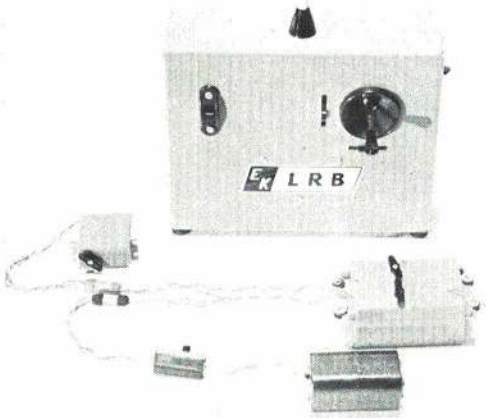
1½ inch scale IM Pilot	2.50	Catalog No. IM0069
2 inch scale IM Pilot	2.95	Catalog No. IM0070

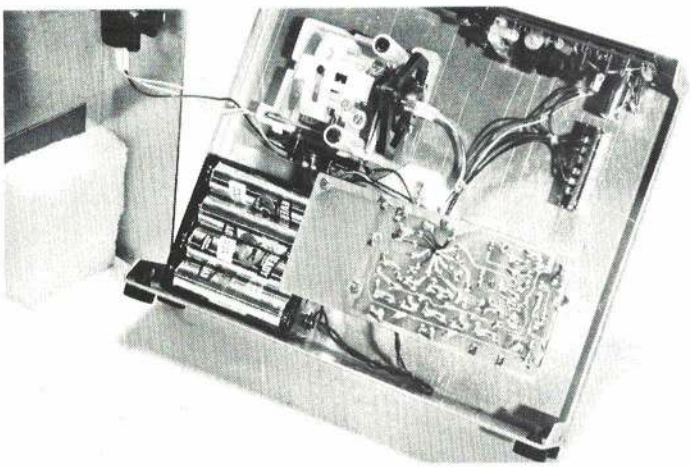
PORATED, CINCINNATI, OHIO
Telephone 513-793-5900


LEADING EDGE
FOR THE TENDERFOOT
OPTIONAL BALL-PEN CONTROL SURFACE MARKINGS
CUT FOR DIHEDRAL
ALL FUSELAGE MEMBERS ARE 1/4" x 1/8" BALSA
TOTAL LENGTH OF CENTER STICK IS 21 INCHES
USE THREE 4 1/8" DIAMETER NORTH PACIFIC "SKEETER" PLASTIC PROPELLERS AND BEARING ASSEMBLIES
GLUE ALL JOINTS WELL!
TENDERFORD
(SON OF HungerFORD)
ORIGINAL CONCEPT BY FULTON HUNGERFORD
THIS ADAPTION BY W.C. (BILL) HANNAN
WING MOUNT (2 REQUIRED)
CROSS-PIECE
NOTE: LOWER PORTION OF EACH PROP BEARING IS CUT AWAY TO PROVIDE GREATER CLEARANCE FOR RUBBER MOTORS. BIND WITH THREAD AND GLUE. (SEE ALSO TEXT)
NOTE THAT FRONT IS HIGHER THAN REAR
APPROXI

Blue Ribbon Review

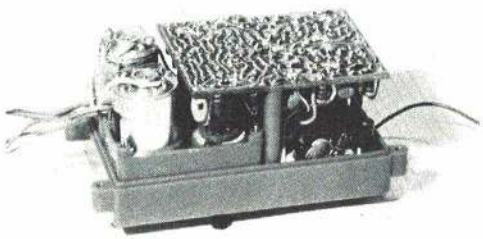
EK'S LITTLE RED BRICK THREE-CHANNEL FLIES DON BROWN'S CARDINAL





Upper left: LRB is well-suited to the 15- to 19-powered Cardinal, even with heavy alkaline batteries. Can be quite responsive with lots of control movement, or very docile. Above: With two servos and receiver in the brick, the radio is compact. Throttle lever visible at right edge of transmitter.

Above: Neat, simple transmitter with separate RF board, Upper right: Tiny separate servo has two-deck amp. Note pot element retainer. Right: Decoder and two amps quite compact. Two complete tiny servo mechanics in there.



by FRED MARKS

LOGICTROL OR KEK–EK to most Radio Controllers–is recognized as the manufacturer of the famous "red box." I first became acquainted with Bob Elliott, the E of EK, at a DCRC/AMA technical symposium. At that time, he had designed and presented a paper on the relayless reed servo amplifier manufactured for years by Bonner. He has been one of our most active RC designers and it was logical that he would become one of the first to design digital equipment. He formed Logictrol and produced the Logictrol II with the box-car servo, then the Logictrol III with its companion mini-servo, which is still used in the Pro-Series set.

EK has recently expanded its production line significantly and now carries the EK Logictrol; Pro-Series; Champion series; a car system, and most recently, a "brick" system–the LRB (Little Red Brick). The brick is a modular system available in a two-, three-, or four-channel version. The first two servos are integral to the brick which contains the receiver, decoder, and servo amplifiers for those two servos. Added channels are introduced via separate connectors and added servomechanisms with the amplifiers mounted within the servo.

For testing, we chose the LRB-3 three-channel set because the airplane it was to be used in, the Dee Bee Cardinal, is ideally suited to a three-channel set for elevator, rudder, and throttle. Our set was on 27.095 MHz; however, all frequencies–27 MHz, 50 MHz, and 72 MHz–are available. Dry batteries were used, although nickel cadmium battery packs are available at extra cost.

The transmitter is housed in the familiar red vinyl-clad aluminum case measuring 7 x 5 3/4 x 1 7/8". With dry batteries, the transmitter is quite light, approximately one pound. A 54-in. base-loaded antenna is used. The troublesome antenna connector, such as that on the Log 3 set I've used for years, has been replaced on all sets by a convenient new molded plastic receptacle. The two primary controls are positioned by a two-axis, single stick with electromechanical trim adjacent. The third control is positioned by a lever located high on the right-hand side of the case where it can be reached with the index finger of the left hand when the transmitter is cradled in the left arm. The third control is normally continuously positionable; however, a plastic detent-type device is provided for installation by those who wish to have positive detent positions. No meter is provided.

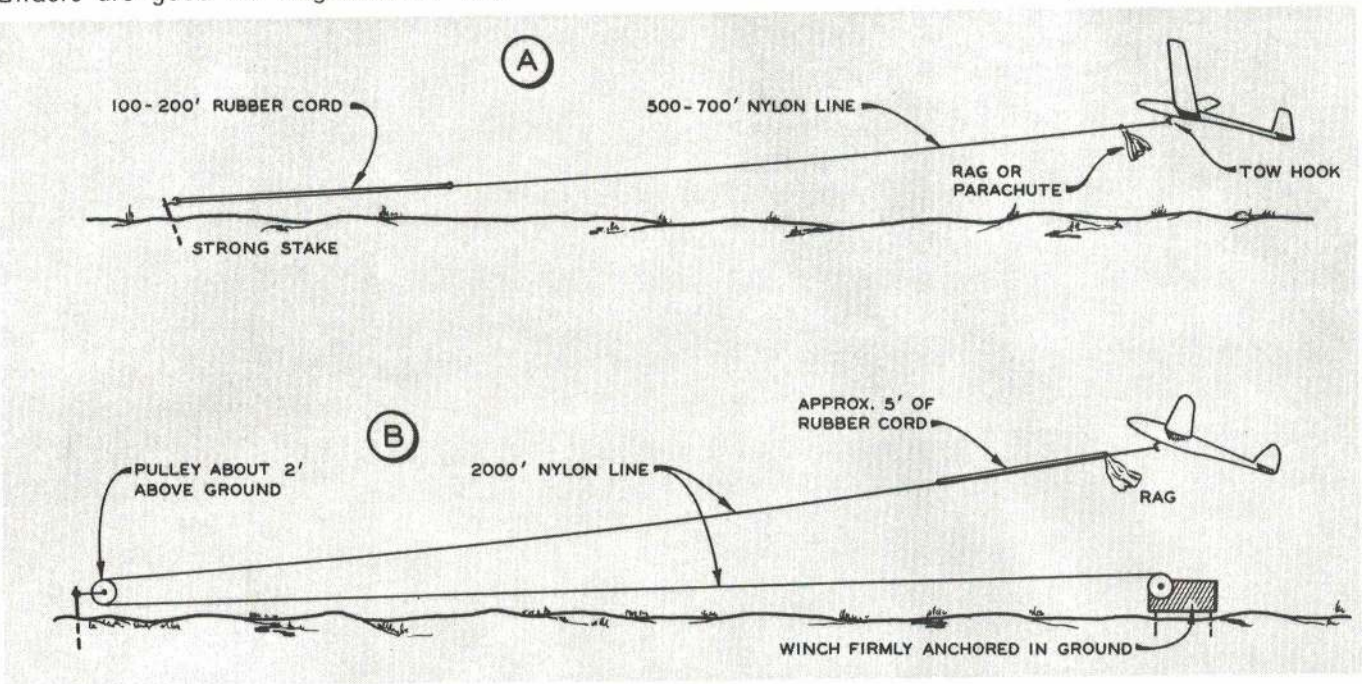
All joints throughout the set are hand-soldered; flux has been completely

(Continued on page 89)

getting started in RC

Gliders are good for beginners in RC.

by HOWARD McENTEE



RC GLIDERS, besides being a lot of fun, might be a fine way for a newcomer to get some radio control skills. At least that's the stated opinion of several experienced RC'ers. They note that gliders generally fly slower, are simpler to build (the very large competition thermal types which generally are tough construction projects should not be considered!) and can use very simple control equipment. Both kit and radio costs thus can be quite low.

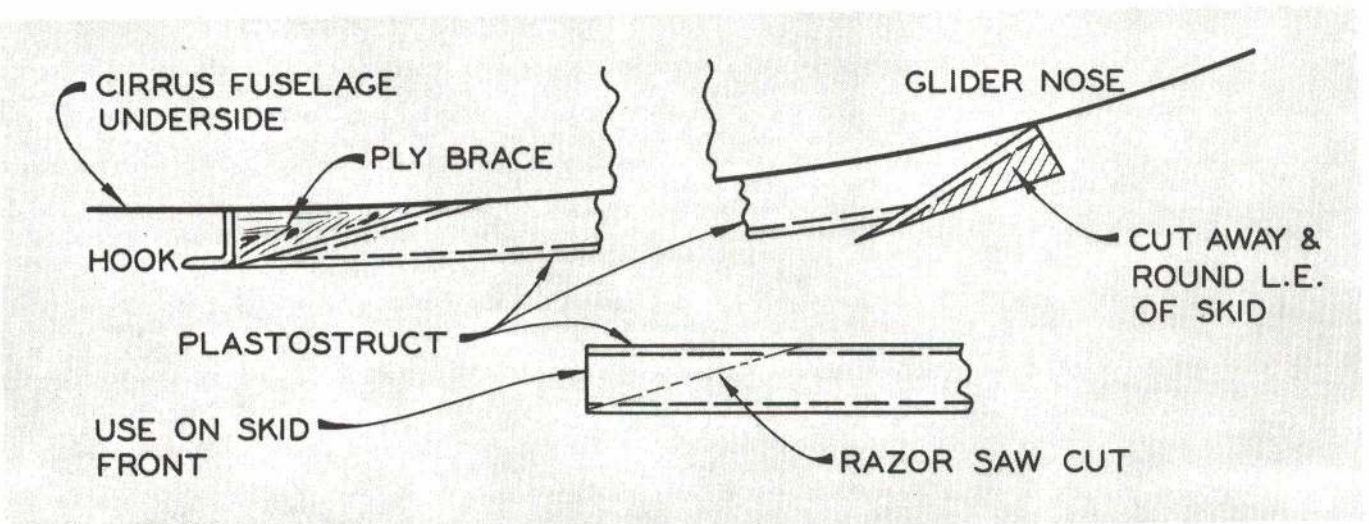
Gliders are split into two general categories–thermal and slope soarers. The types overlap to some extent, but it probably is true that any one glider design can't give top performance in both types of flying. Thermal gliders are designed to soar on relatively light lift; therefore, they have very long narrow wings, often have undercambered airfoils, are reasonably light in weight and fly at low to moderate speeds. Slope soarers often fly in rather high winds and very strong lift, thus they have shorter wings and can be heavy and fast-moving.

Thermals are rising bubbles of warm air (warmer than the surrounding air, thus they tend to rise) which the flier must search out in order to keep his glider aloft. They "break loose" from the ground over surfaces that normally would be hotter than surrounding surfaces. Blacktop roads and runways, plowed fields, parking lots, roofs of large buildings are likely thermal launching places. Conversely, nearby woods and green fields are less likely places.

Gliders are launched by several methods. On slopes, the craft is heaved out into the uprising air current on the windward side of the slope. Launching is more complex on flat areas. The usual methods are hand towing, high-start, winch, and small engine. Hand towing is not used by RC glider fliers to any great extent; although when properly done, it can gain the glider real altitude.

High-start utilizes a length of elastic cord (generally what is known as "exerciser cord") tied to a much longer length of strong nylon

(Continued on page 80)



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Snap-Link, Regular, with rod
Mini-Snap-Link, with rod } **. . . 29¢ each**

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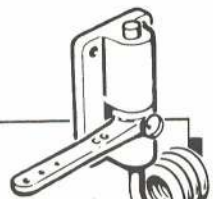
STEERABLE NOSE GEAR



Versatile — steering arm can be to either side, or slightly up or down, or mounted on bottom with extra collar in slot. Steering arm is nylon, stiff enough for good control, yet can flex under shock to protect servo. Collar is hardened steel — won't strip like brass. Screw is hardened steel, too. You can really torque it and get good grip on music wire strut without a flat. Try it, you won't get it to strip out easily.

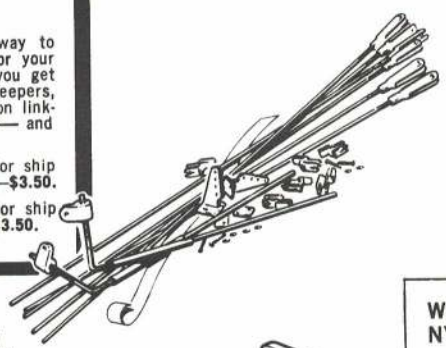
Complete steerable nose gear, with nylon bearing, 5/32" plated music wire strut, extra collar, blind nuts, screws and washers—**$2.50.**

NEW—MAJOR R/C FITTINGS SETS

Here's the economical way to buy the major fittings for your multi ship. In one set, you get all the horns, links, keepers, bellcranks, or strip aileron linkage, and hinge material — and at a saving.

R/C Fittings Set No. 1 for ship with standard ailerons—**$3.50.**

R/C Fittings Set No. 2 for ship with strip ailerons—**$3.50.**



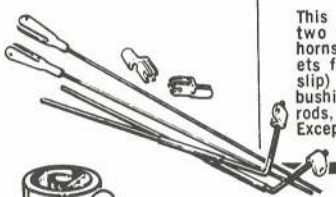
CONTROL HORNS

Our new horns have the upright part rising from the center of the base for maximum stability. Holes are right size for 1/16" wire; nut plate for simplest mounting. Long horns or short horns, with screws — **50¢ for 2.**

WIDE NYLON TAPE

This nylon reinforcing tape is extremely tough when applied with epoxy around the center when joining wing halves. 2½" wide x 5 ft. — **50¢**

STRIP AILERON LINKAGE

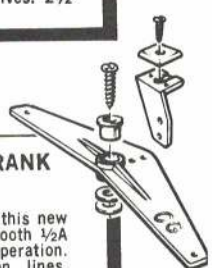


This complete set has two threaded aileron horns; two nylon brackets for fine, safe (can't slip) adjustment; brass bushings; Snap-Links and rods, and Snap'R Keepers. Exceptional value—**$1.50**

NYLON BEARING

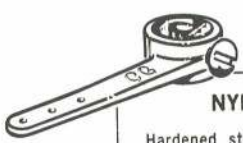
One-piece design mounts to firewall without alignment problems. Includes blind nuts, screws and washers — **75¢**

½A BELLCRANK and HORN



Made of nylon, this new set provides smooth ½A control line operation. Easy on dacron lines, too. **25¢.**

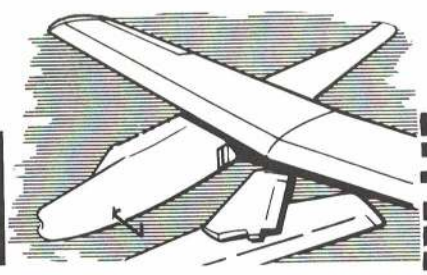
NYLON STEERING ARM



Hardened steel collar and screw — **75¢**

REPLACEMENT FOAM WINGS, ETC.

To go with your own design fuselage. Proven efficient Ranger 42 foam wing gets you in the air quickly, $3.95. Stab and vertical fin, set $1.95. Assembled Ranger 42 fuselage, plus bearers, nosegear, etc., **$8.95.**



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I am sending 20 cents for 8 pg. Illustrated Catalog with "Recommendations on Starting in R/C," Basic Explanation of R/C Equipment, and Radio Control Definitions.

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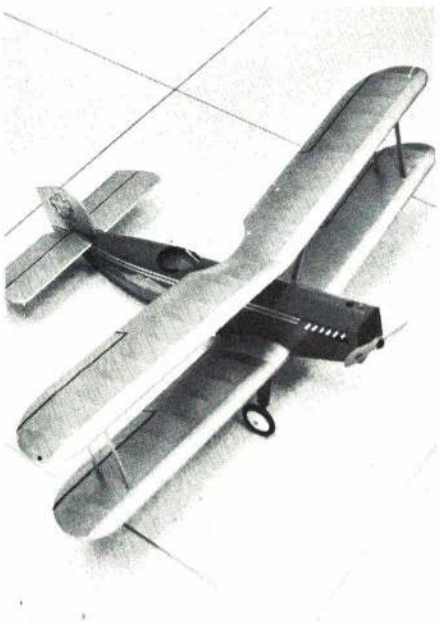
2545 WEST CERMAK ROAD • CHICAGO, ILLINOIS 60608

Douglas Mailplane

(continued from page 16)

the upper fuselage pieces at the top and sides as shown. Wing leading edges and tips, as well as tail surface extremities, are shaped to carry out the streamlining. Lightly sand all exposed surfaces to the desired finish with 2/0 garnet paper. Remove all cement knots and other obstructions which would detract from a smooth appearance.

Assembling and Balancing Framework: Fit the components together but do not cement. Attach the wings as a complete unit by mounting the outer wing struts into their respective positions. Loop rubber bands around the lower wing mounting, then put the center struts in place. Flex the upper wing up slightly to ease this mounting. Add the engine, wheels, timer, and tail as a temporary assembly.



Deviations from scale are increased dihedral and stabilizer area. Makes trimming easier.

Balance the model around its lateral axis by holding it up in line with the balance point marked on the plan. Add tail weight until the model is resting just less than level, with the nose down a few degrees. Cement the necessary weight to the filled-in section at the rear of the tailskid.

With one finger against the front of the engine crankshaft and a finger of the opposite hand at the base of the fuselage rear of the tailskid, hold the model to see if there is any roll about the longitudinal axis. Correct such a roll by cementing small weights inside the wing tips. This balance is important.

Covering and Finishing: Choice of covering material is up to the builder. I recommend lightweight Japanese silk, which is durable yet takes the dope finish well. Cover the model, using one piece of material on each plane surface or component. Dope the silk covering around all the struts to strengthen their surfaces.

When the covering has been water shrunk and dried thoroughly, put on two coats of clear nitrate dope with brush or spray applicator. Where the silk is joined to balsa, go over all surfaces lightly with 2/0 garnet paper to remove rough spots and edges.

For the color scheme, study photographs of the model and the photographs and drawings which accompany the Paul R. Matt article. Apply two coats or more of the appropriate dark red and silver. If silver dope is not available, buy ground aluminum powder from a paint store and add it to clear dope. Fuselage striping starts immediately behind the engine exhausts. Two silver stripes 1/8" wide and 1/8" apart extend out to rudder tip. Full-size insignia patterns are on the plan. Aileron, rudder and elevator outlines are masked out and doped with black dope.

Dummy exhaust stacks are of aluminum tubing lengths inserted and cemented into the fuselage sides. They also can be made up of dowel lengths or balsa.

Assembly: Put the engine system with timer in position. (To provide slight downthrust, place a standard washer for an engine mounting bolt between the rear engine crankcase mount and motor bearer.) Snap on the engine unit access cover to complete this unit. Mount a celluloid windshield to the front of the cockpit opening, then split a length of neoprene tubing lengthwise through one thickness and roll this over the remaining edge of the opening.

When mounting the antique wheels with soldered washer retainers, temporarily put a layer of thin cardstock between the wheel and the washer to prevent scorching the wheel.

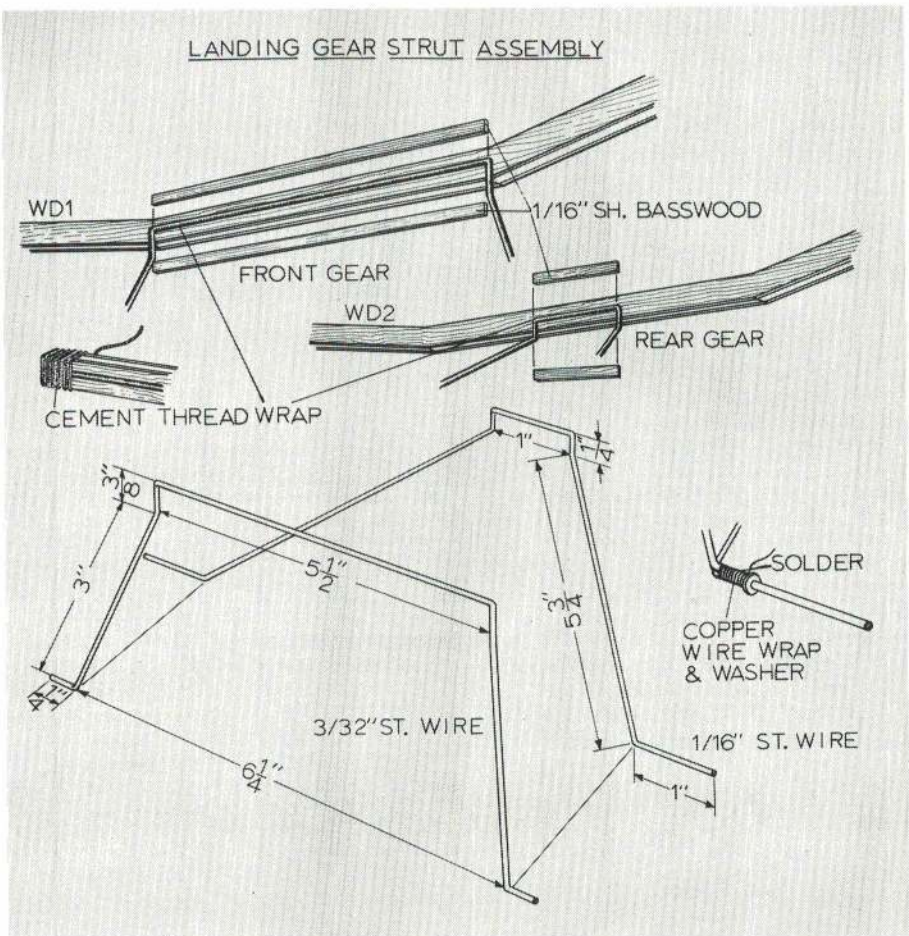
Assemble the wing panels by first cementing into position the lower ends of the outer struts, accurately aligning them vertically upwards. Then open up the opposite (above) receiving socket holes. Put cement in the socket holes, not on the struts and attach the upper wing. Immediately measure at intervals to be sure the wings are at equal distances from each other, on both right and left sides. Let the assembly dry thoroughly. Use .032 steel wire for the simulated X bracing. Cement the rudder into the groove atop the stabilizer.

Flying: Rebalance the model for final lateral and longitudinal trim. Take plenty of time in test flying to insure a longer life for the model. Biplanes are sensitive to wind. Under power they will zoom, so be prepared by having the model fully adjusted before tackling a windy day.

Select a calm day and, if possible, find a field that has grass to cushion hard landings. For a calm day, incidence usually is 1/16" positive placed between wing trailing edge and fuselage.

To test glide, trot forward, then give the model a slight downward inclination and release it with a medium force throw. Aim for a landing about 25 feet ahead. Get an even glide path into prevailing wind. For rudder trim, shift the tail section slightly. I turn my model to go right, I leave the rudder straight.

Propeller for flight is an 8-3, preferably wooden. In the first power flights, have the engine running about half-speed and launch model from a slow trot directly into any breeze. The ship should climb slightly to the right and gain altitude. A left turn is permissible, provided it is not a tight spiral. As power is increased, a slight spiral will develop, so offset rudder to take any tight spiral out of low-power flights.



★ RC CAPITOL OF UNITED STATES ★

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EK Champion 4 channel 2 stick on 27MC–Sale–$199.00 with very small servos.

EK Champion 4 channel 2 stick on 72MC–Sale–$209.00 with very small servos.

EK Regular 5 channel 2 stick, 27MC or 72MC–Sale–$265.00. Extra servo–$32.00.

OS or Blue Max 5 channel single stick on 27MC–Sale–$205.00.

Blue Max 4 channel 2 stick with 4 s4a servos–Sale–$195.00.

Kraft KP4sX, 4 ch., 2 stick with 4 s4a servos —Sale $350.00. Kraft KP6sX, 6 ch., single stick dual frequency—Sale $388.00.

OS 40RC–$29.95. Sale–$21.00. OS 35RC–$22.98. Sale–$16.00.

ALL OF THE ABOVE NEW* ITEMS ARE IN STOCK NOW** PLEASE INCLUDE IN YOUR ORDER SOME ALLOWANCE FOR POSTAGE & INSURANCE IF YOUR ORDER IS UNDER $100.00.

ORBIT 4 channel single stick buddy system, 72MC, very small servos–$300.00–this is below wholesale****

SPECIAL VK CHEROKEE BABE, $27.50 net. Sale–$18.00.

J. STAFFORD MINNOW, $39.95 net. Sale–$29.50.

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USED PROPORTIONAL SETS – AS OF MAY 15, 1971. MOST OF 4 servos on 53.3MC working, complete. $150.00

10–Bonner 4RS/ 4 servos, on 72MC, excellent working set, clean. $160.00

11–C'Aire MAN 2-3-4 with 4 servos, working, complete. $140.00

12–C'Aire 4 Ch-on 27.145MC with 4 small s4A servos, very clean, like new. $160.00

13–Orbit 6 channel single stick with 4 servos on 27.145MC, working. $160.00

Multi-channel reed sets–mostly relayless–some of these old reliable and proven sets will work better than some of the new sets that are on the market today.

14–Kraft 10 channel, tx, on 27.095MC. $15.00

15–Orbit complete working 10 channel set, tx, rec, 5 transmites, pak & ch, the Cadillac on 27.145MC. $95.00

16–Min-X Powermite 12-Tx, Rec. 3 transmites, battery pak all wired superhet. $60.00

17–C'Aire 10 Ch, rec. Tx, 5 servos, on 27.045MC, pak & Ch Complete for $75.00

18–Brand new F&M 10 Ch Matador Tx, rec. 3 transmites, pak & Ch. $80.00

19–C'Aire 10 Ch, tx, rec, 5 Annco Servos (small) pak & Ch–working. $85.00

OUR USED SETS ARE LIKE USED CARS, THEY WILL WORK BETTER THAN SOME OF THE NEW SETS ON THE MARKET TODAY.

20–Quadruplex CL5, single stick, with 4 servos, working, complete & clean. $99.99

MORE USED MULTI CHANNEL REED SETS –

21–Brand new C&X Eagle Tx 10 Ch, rec, 1 C'Aire RL Servo, nicad pak, charger. $55.00

22–Brand new C'Aire 10 Ch Tx, rec, 5 transmites Pak & ch all wired & working. $100.00

23–Brand new F&M Hercules Tx, Midas Rec on 27.195MC, 10 channel-1P, Sale. $25.00

24–Kraft 4 Ch TX & Rec, custom TAIL. $99.95
OUR PRICE NET. $64.95

NO ONE AS YET HAS MET THIS PRICE ANYWHERE.

31–OS 35RC finally in stock, net–again $15.00

32–MRC 710 - 5 channel 2 stick, 1971 series retail $320.00 net. Always in stock. $240.00

33–Wing Mfg. Co. Field Box, very strong, $18.00, your price. $14.00

42" Toot RC Scale Pylon with FR-K&B 40 RC mounted in plane, very deluxe. $175.00

BUILT UP AND READY TO FLY - CG Shoestring, with Johnson Combat Special 35 RC, a New EK Logictrol 5-2 on 72.96MC, all rods installed, just gas it up. Sale $350.00

Superb, immaculate Spitfire, with RMK retractable gear, scale, micro, precision, dashboard, bucket seat, stick controls, levers, sliding canopy, cockpit door, all scale markings, details, its finish is *like* dave platt–JUST $500.00

A FEW ITEMS JUST RECEIVED.

22–Built-up CG Skylark with OS 19RC, two sets of wings, one with ailerons, a very good trainer, silked, painted all white with orange trim. $100.00

23–Excellent Deluxe scale 65" Bird-Dog, army colors with ailerons. $200.00

24–Deluxe K&K Balerina-scale pylon racer–worth a lot more. $95.00

25–J-3 Cub, silked, all yellow, new very clean. $75.00

1–Built up Midwest Shysquire silked, steerable nose gear, good trainer. $65.00

2–Nelson Quick Silver, low wing, steerable nose gear, a good small stunt. $75.00

3–We have 4 nice built up C:-Goldberg Skylane 62, with Ailerons, steerable nose gear, silk covered; a good scale, top wing trainer, from $95.00 to $145.00

4–Beautiful, deluxe, professionally built Aeromaster Bipe painted true sunburst. $145.00

13–Original scale Reber Racer, os 15 RC engine installed, all new, very sharp. $50.00

14–Very nicely built scale Berkeley Bird-dog-62" for os 35RC, ailerons, clean. $200.00

15–Midwest Aristocat, all new and a very stable top wing trainer. $75.00

16–CG Skylane 62" for 35-45 engine, no ailerons; all yellow with red trim. $75.00

17–Very clean, custom built, professional finish Sun Fli 4, Kaos, Quick Fli III, CG Shoestring scale pylon racer, VK Cherokee (for 60RC) Skylane 62–EACH $150.00

18–Beautiful original built Fokker D-8, 60" wing span, camoflauge and detail. $200.00

19–Shoestring Pylon Scale Racer with merco 35 RC mt on side, very clean. $115.00

Sig Citabria, rods installed, all red with white trim, deluxe custom finish. $175.00

Sterling P-51, flaps, racing yellow color, inverted new enya 45RC, deluxe clean professional workmanship, built light and strong, a scale finish, no motor. $200.00

Tri-Squire with Enya 15 RC, a good trainer. $65.00

Fleet Bipe for 60-71 RC, yellow wings, blue fuselage. $150.00

Fokker D-7, clean. $200.00

CG Goodyear Racer, KB 40 RC FR installed deluxe, satin finish, very clean. $175.00

Jungmeister semi-scale stunt bipe, WE planes, Deluxe custom finish, very clean, silked. $175.00

Topflite Scale 53" - Se5A Bipe, all new and very clean, deluxe, silked. $200.00

Topflite Qwik Fli III, super deluxe, satin smooth professional workmanship, silked, all new. $145.00

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Scale 72" J-3 Cub from Sig Kit, clean, silked. $80.00

Sterling P-51, silked. $175.00

Deluxe Aeromast Bipe, silked with true Sunburst design sprayed–NEW. $145.00

Beautiful Sig clipped wing J-3 Cub, has mts for Fox 36x, sunburst trim, silked. $125.00

RCM Miss Bikini built up, new. $77.00

Monocoupe and Trike gear. $80.00

Fleet Bipe with 5 cly Dummy engine, all silked, new. $150.00

Tripacer/Steerable nose gear with ailerons. $70.00

Deluxe Spinks Aeromaster from Morgan Planes, silked all over, new $225.00

Skylark with ailerons. $60.00

Sr. Falcon, silked, clean. $75.00

Sportsmaster, new silked. $85.00

VK - Cherokee, silked. $100.00

Qwik Fli III with retractable gear, tapered wing. $125.00

Wing Mfg. Co., Zero with Retract Gear, New. $175.00

Mini Aero Bipe for OS - 35RC $50.00

Sterling Profile, P-51. $25.00

DELUXE HAND BUILT P-51 for retractable landing gear, with Dave Platt finish PERFECT SCALE MOUNTS FOR 60RC engine. $300.00

NEW for 1970 Gold Medal Series Kraft KP4B retail $399.95 net. Sale $280.00

JUST CLIP OUT ANY AD IN ANY MAGAZINE AND MAIL IT IN WITH YOUR REMITTANCE AND WITH YOUR ORDER AND WE WILL TRY TO GET IT TO YOU IN 24 HOURS. REMEMBER, WE ARE CENTRALLY LOCATED TO ALL MANUFACTURERS AND TO YOU. WE NEED YOUR BUSINESS. AS MANY REASONS AS THERE ARE RC FLYERS IS WHY WE ARE KNOWN AS THE **RC CAPITOL OF THE UNITED STATES**

Enya 60RC L11, $59.95 net. $42.00

THESE SETS HAVE POWERFUL SERVOS AND THEIR DESIGNS HAVE BEEN WELL PROVEN.

1–Citizenship DP-5, with 4 servos on 27.145MC, clean working set. $145.00

2–Citizenship DP-5, with 4 servos on 72.400MC, very clean working set. $160.00

3–Heathkit GDA, with 4K PS-9 plastic type servos, working and complete. $165.00

4–Kraft KP4B, 4 servos, on 26.995MC complete working set. $155.00

5–Citizenship DP-1, like new with 1 servo working. $50.00

6–PCS 5 channel Transmitter only, complete with charging cord. $50.00

7–Airborne Pak for Orbit 7-14, receiver, 4 servos, pak and charger. $65.00

8–Micro 5 channel on 26.995MC 2-stick complete, working, excellent set. $155.00

9–Bonner 8 channel Digimite with SH Reed, Sale. $20.00

25–C'Aire 9 volt UTT–10 Channel Tx & rec, Sale on 17.145MC. $22.00

26–Orbit 4 Ch Tx, Rec. 1 duramite battery boxes, if you want to tinker. $12.00

27–Multi channel transmitters assorted brands, our choice $10.00–this will help pay postage.

RED HOT SPECIALS ON NEW ITEMS.

28–K&B 40 RC front rotary 1971 series, in stock, $35.00 net–cost to you $23.95

29–FINAL NEW PRICES ON DUBRO SEABIRD & SPORTSMAN 600 AS OF MAY 16, 1971. $40.00
THIS IS THE LOWEST PRICE IN THE COUNTRY. WE CHALLENGE ANY AND ALL TO MEET THIS PRICE.

30–ALSO THE LOWEST PRICE IN THE UNITED STATES ON TESTOR'S SKYHAWK, RE-

5–VK Navaho, top wing trainer, side mount scale Fox 36RC, all new, deluxe. $170.00

6–C-Goldberg Shoestring scale pylon racer for K8 40 side mount, very deluxe. $160.00

7–Deluxe C-Goldberg Skylane 62, airerons, Enya 45 RC scale shock steerable nose gear, a very stable flyer. $200.00

AK – ALL BUILT UP READY TO FLY PLANES ARE SENT FOB COLLECT.

8–Fleet Pipe for 60 to 71 RC engine, orange wings, all rest white, very clean. $125.00

9–64" Scale Jungmeister Bipe, rods installed, perfect scale, will fly. $95.00

10–Topflite Scale SE5A Bipe very clean, professional workmanship. $175.00

11–Fokker D-7, all new sterling, white, scale wheels. $200.00

12–Very clean and sharp Semi-Scale Jungmeister Bipe, all yellow and sunburst trim. $140.00

Cessna Skylane 62, silked. $95.00

Breezy Sr., very clean. $60.00

DeBolt Cub 54". $45.00

DeBolt Rebel with KB 09. $35.00

72" Scale Skylane from RCM plans, has flaps, steerable nose gear. $175.00

Berkley Rudderbug 62" for 19. $40.00

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DeBolt Jenny. $35.00

Veco White Cloud, cabin trainer. $35.00

I-1/2A Skylark low wing. $25.00

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Graupner Middle Stik, $46.95 net. $35.00

Graupner Kwik Fli III, $58.50. $44.44 net

BOX UP THOSE OLD IGNITION MOTORS AND MAIL THEM IN TO US FOR APPRAISAL. THEY MAY BE WORTH A NEW PROPORTIONAL OR READY CASH. $$$ ANY PLANE BUILT TO ORDER FOR YOU OR WE MAY HAVE THE ONE YOU WANT IN STOCK IN TIME AS YOU GET THIS BULLETIN AS WE HAVE A STEADY FLOW OF PLANES COMING IN PLUS THE MANY PLANES OUR BUILDERS HAVE UNDER CONSTRUCTION.

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COX

AUGUST 1971

MODEL AVIATION

Official magazine

A.M.A. NEWS

Academy of Model Aeronautics • 806 Fifteenth Street N.W., Washington, DC 20005

Seventh World RC Aerobatic Championships

Excitement is mounting as the time approaches for this most important contest next September. Over two hundred participants from Europe and other parts of the world have already registered with AMA HQ for accommodations. Year after year American world championship teams, not only in Radio Control but in Free Flight, Control Line and Indoor, have been guests of European nations which have had the honor and responsibility of putting on a technically correct competition. Hosting a world championship also is an obligation to provide the proper setting for good will and fellowship among many nationalities, and for using the occasion to bolster increased respect and support for model aviation.

This is a heavy responsibility, but it also is a wonderful opportunity to gather and focus the resources of a country's air modeling interests on a single project for the benefit of all. The opportunity is infrequent—the last time for the U.S. was seventeen years ago when the Free Flight World Championships was held in New York—and there never has been a Radio Control event of this kind outside of Europe. Because of this, AMA's elected and appointed officers, volunteer helpers and salaried HQ staff members are all harnessing their energies to reap maximum benefits for the competitors, AMA members and modeling in general. Here's what's happening on several fronts.

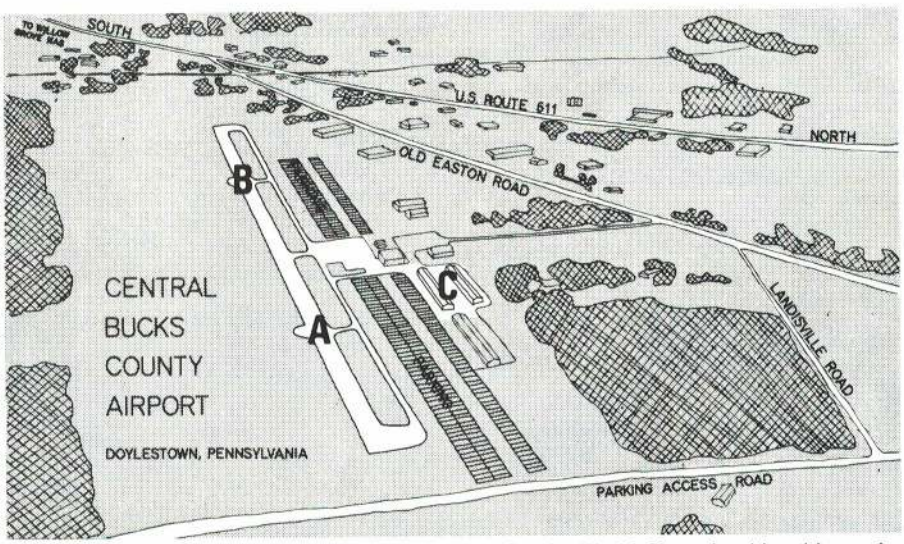
TEAMS. Individual and Team RC Aerobatic World Champions will be named from the competition at Central Bucks County Airport, Doylestown, Pa., September 15-19. Each of the approximately 50 member nations affiliated with the Federation Aeronautique Interationale may enter a team of three competitors and one team manager; entries from approximately 20 nations are anticipated. As this was written in early May, the following team members and team managers (the latter indicated by asterisks) had registered.

AUSTRIA—Hanno Prettner, Ferdinand Schaden, Konrad Weixelbaumer, Wilhelm Brand*. CANADA—Ronald Chapman, Warren Hitchcox, Ivan Kristensen. DENMARK—Jens Jorgensen, Carl Mollercup, Erik Toft, Axel Mortensen*. ENGLAND—Michael Birch, Terry Cooper, David Hardaker, Roger Hargreaves*. FRANCE—Denis Chabert, Guy Hardy, Pierre Marrot, Jean Claude Lavigne*. WEST GERMANY—Gunter Hoppe, Wolfgang Kosche, Josef Wester, Adolf Brand*. LIECHTENSTEIN—Wolfgang Matt, Arthur Buchel*. IRELAND—Frederick J. Buick, William H. M. Menary, John J. L. Blair*. NETHERLANDS—Krijn Sliedrecht, Koos Tromp, Jan Van Vliet, Claude R. DeVries*. NORWAY—Knut Aker, Tore Paulsen, Poju Stephansen, Scott Foien*. SWEDEN—Christer Gillgren, Goran Ridderstrom, Bert-Erik Stovling, John Lyrsell*. U.S.A.—Ron Chidgey, Phil Kraft, Jim Whitley, Jim Edwards*. Other teams are known to be coming from South Africa, Japan, Finland, Italy, Luxembourg, Switzerland (the latter to include current World Champion Bruno Giezendanner). The top four flyers from the 1969 RC World Championships (Giezendanner, Phil Kraft, Josef Wester and Pierre Marrot) all will be vieing for the 1971 title.

CONTEST DETAILS. Contest Director is Maynard Hill, former AMA president, former FAI RC Sub-committee chairman, AMA-FAI Coordinator, instructor at International RC Judges School, chief judge and Jury member of previous RC World Championships. Judging of flights will be accomplished by two five-man teams approved by the FAI officers meeting in May, comprised of individuals of different nationalities most of whom attended the RC Judges School. At the head of the technical organization is a three-man FAI Jury, composed of FAI officers, which has the duty to supervise the correctness of the procedures and to settle any disputes which may arise. English and French will be the official world championships languages, but other languages will be used as much as possible to help in communications.

The schedule provides for competitors to check into the headquarters motel (already fully booked for team members, team managers, a maximum of four supporters per country and a limited number of officials) at New Hope, Pa., after 1 pm on Tuesday, September 14. Teams will have their morning and evening meals at the headquarters motel during the competition; vouchers will be provided for lunch on the field at food concessions.

Practice flying takes place at the airport starting at 8 am on Wednesday, and the competition is expected to get underway at 1 pm on Thursday and continue each day until 1 pm on Sunday, the 19th. The objective of the schedule is to provide at least four flights



Sketch shows basic arrangement of the field layout for the World Championships this coming September. The two flight circles are marked A and B, while the International Exposition will be housed in the two rows of T-hangars marked C. The static display model competition area is between the T-hangars—protection to be provided by large tents installed for this purpose. Special bargain RC/WC Booster Package (see text) is recommended for all AMA members who expect to attend for more than a day—or for souvenirs if you can't come.

for each competitor, with the highest three scores to determine placing.

Simultaneous competition flying will take place from two flight circles separated by about 1,500 feet on the field's 3,000-ft. runway. Patterns will be flown parallel to the runway regardless of wind direction, providing a unique challenge of piloting ability if cross winds occur. This requirement is a result of the field layout which fixes the spectator location on one side of the runways in the vicinity of the hangars. Flying must, therefore, be done on the opposite side of the runway over the clear grass area of the field.

FOR AMA MEMBERS. Special arrangements are being made to accommodate as many AMA members as possible. The word received with numerous and generous donations to the RC/WC Fund is that many thousands of AMA members are planning to attend the world championships and witness the world's best RC modelers in action. It was this enthusiasm that originally led AMA officers to seek being RC/WC host and in organizing Operation Friendlift, a charter jet flight to bring teams, officials and supporters from Europe at low cost.

AMA members who attend the world championships as spectators won't be disappointed, for there will be continous action, accompanied by quick reporting of scores. AMA members will have a "front row seat" in the thick of it, apart from the general public, and they will have their own static display competition and special prizes in such categories as best military scale model, best non-military scale model, most outstanding finish, best RC sailplane, best pattern design, best sport flying design, best pylon racer, etc. This world championships is one event where an AMA membership will be especially valuable–showing it will obtain preferential treatment and cost savings.

It isn't exactly "Y'all come" for the world championships, because fees from admission, parking, program sales, etc., plus donations, are needed if AMA is to break even financially. There's no charge to AMA for the use of the Central Bucks County Airport, and AMA member officials have donated their time for no charge, but there are many supplies, services and facilities which must be bought or rented during the contest period. Also team entry fees, the maximum for which is fixed by FAI, do not cover the team member housing and food costs. Furthermore, the travel, food and lodging costs for about 15 officials from outside the U.S., including judges, must be covered with any off-setting fees. So it is impossible to avoid charges for attending the world championships. The cost, however, can be minimized for those AMA members who expect to attend several days, or the whole period, by taking advantage of a special bargain RC/WC Booster Package, as follows.

BOOSTER PACKAGE. For only $5.00 AMA members may obtain a set of items which, separately, add up to a value of at least $7.00 and as much as $15.00:

One Special Booster Identification Badge for addmission to flying site, worth $1 for each of the five days of the meet. $1.00 to $5.00

One admission to International RC Exposition (exhibitor and model display area), worth $1 for each day of the meet. $1.00 to $5.00

One official RC/WC poster, 17" x 22", full color. $1.00

One official cloth RC/WC emblem. $1.00

One set of 5 official self-stick RC/WC emblems. $1.00

One ticket for RC/WC original painting used for official poster, full color, framed, nearly 3 ft. x 4 ft. $1.00

One official souvenir program booklet, with RC/WC details, photos, background of competitors and officials–full color cover, a big magazine size collector's item. $1.00

TOTAL VALUE $7.00 to $15.00

To obtain your Booster Package, send your $5 check now to AMA HQ (made payable to AMA–RC/WC), 806 Fifteenth St., N.W., Washington, D.C. 20005.

WHERE TO STAY. The headquarters motel is already fully booked. A secondary headquarters where most will be housed is the George Washington Motor Lodge at the Willow Grove exit of the Pennsylvania Turnpike. AMA HQ has special reservation post cards for anyone requesting them. If the card is not used, reservations can be made by calling or writing the George Washington Motor Lodge, Exit 27, Pennsylvania Turnpike, Willow Grove, Pa. 19090. Telephone (215) 659-7200. Rates quoted for September: $16 single, $21 double. Note: The GW will also book through other motels nearby–the GW is part of a seven-motel group in the area, including Howard Johnson's.

Many modelers have indicated an interest in camping during the World Championships. According to the Pennsylvania Bureau of Travel Development, nearby private campsites are Ringing Rocks (on Rt. 611, 16 miles north of Doylestown) and Huckey Puck Camp Grounds (also about 16 miles north of Doylestown, but east of Rt. 611). Both have facilities for tents and trailers plus flush toilets, water, sewer, electricity, showers, store. Huckey Puck also has swimming, fishing and boating while Ringing Rocks does not. Both campsites have the same mailing address: Upper Black Eddy, Pa. 18972. Some AMA members have advised that they will be at another nearby camp which they used during previous Nats at Willow Grove; this is known as the Oak Ridge Camp, also north of Doylestown.

Bruno Giezendanner, at right after starting engine in his Marabu, will be defending his RC World Champion title. Photo with mountains in background is from Swiss team trials. Brother Emil Giezendanner, left, is also a team member. Mechanic, holding model, center, is Albert Frei.

WHAT ELSE IS GOING ON? Competitions for FAI Pylon Racing and FAI Thermal Soaring are planned on a basis to not conflict with the aerobatic competition. Tentatively it is expected that entries will be limited to three contestants per country. If this turns out to be the case, U.S. competitors likely will come from Nats FAI Pylon Race winners and Unofficial Nats Soaring Contest winners. If time permits, pylon and sailplane flying will take place during each day of the world championships, during breaks between rounds of aerobatic flying or after aerobatic flying ends each day. Also, pylon and sailplane flying is planned for the Sunday afternoon air show which will end RC/WC Week; hopefully, pylon and soaring finals will be held during this period. The Sunday air show will take place at the end of aerobatic flying, about 1 pm. The show will include such crowd pleasers as Snoopy's Doghouse, World War I dogfights, special demonstrations, pylon and soaring events. The aim is to produce a spectacular two-hour air show for general public as well as modeler enjoyment. The schedule is not fixed, however, as some flexibility is required in case weather problems should cause the aerobatic flying to continue past the desired 1 pm cutoff time.

AWARDS CEREMONY. Thought is being given to a prize presentation ceremony at the airport following the competition so that all present may participate. This would enable spectators and news media to get pictures, share in the ceremonies and head for home or work by early evening. A followup banquet is planned for Sunday evening, but it was unknown at press time if this would be open to more than competitors, officials and sponsors. Some flexibility is also necessary in planning for this event in case weather or other factors force the awards ceremony indoors or if the flying schedule goes later than intended.

LOTS MORE is happening to make RC/WC week the greatest modeling event of the century–magazine deadlines prevent complete reporting at this time. The basic message to all, however, is that Doylestown will be the place to be during September 15-19. If you haven't already made plans to come, don't delay as accommodations are getting scarce. If you can't come, get the Booster Package anyway–it will provide most of the collector items from the event.

CL STUNT INTERPRETATION

The AMA Control Line Contest Board, Jean Pailet, chairman, has issued an interpretation, effective immediately, that the new requirement in Control Line Aerobatics rule sec. 21.13 for at least two laps of level flight to precede each maneuver shall be interpreted nominally, thus allowing the starting point of one maneuver to begin slightly less than a full two laps after the exit point of the prior maneuver (due to maneuver "width").

The Contest Board was in agreement, also, that the word, "one", in the next to the last line of the first paragraph of sec. 21.15.4 is in error. The sentence should be concluded with: ". . .flying two laps before being judged for Inverted Flight." This correction should be applied immediately.

PRESIDENT'S MEMO

You should know your AMA officers. To help you, here is the second group of a series of short biographies of our leaders.

These biographic descriptions of these fine officer-type people should be of special interest to you because, as your district vice-presidents, they are YOUR OWN personal contact with the direction and destinies of the Academy of Model Aeronautics. These are the ones who see that your dues money is used properly and wisely, and that your own personal interests in modeling are protected and promoted. And, of course, your wishes will never be known if these representatives don't hear from you.

We at the top level of AMA are making the greatest effort in AMA history to offer you a voice in the directions your hobby takes.

Since you are being offered a real voice in AMA affairs, why don't you take advantage

AMA President John Clemens

of this "power" and let AMA hear from you if you have something constructive to offer. And please don't just tell us what is wrong! We have had a bunch of "experts" feeding us this information for years. What we need are answers! If you see things we can improve and can give us thoughtful suggestions and advice, please do so through your district vice-presidents or Contest Board members or simply write to AMA HQ.

And if you think we are doing something right, p-l-e-a-s-e send us word on this! Compliments are the only "pay" that we volunteer workers will get, and it just might inspire our continued efforts in your behalf.

WE MUST HAVE A FINE ORGANIZATION–because our membership is growing at a great rate. At this writing we already have surpassed our biggest membership year (we are already over 33,000 members) and we have most of the year yet to go. We gotta be doing something right! Be a part of it! Start by knowing who your officers are.

John E. Clemens
AMA President

JIM PERDUE

AMA District V Vice-President (Tennessee, Mississippi, Alabama, Georgia, South Carolina, Florida)

James H. Perdue is a very enthusiastic 39-year-old "Southern Gentleman" with a big hospitable grin that would be hard to ignore. Home for Jim and his wife, Bobbie Sue (Suzy), and 10-year-old son, Bob, is in Athens, Ala. Athens is near the Tennessee River in North Central Alabama, about 90 miles above Birmingham.

Perdue is an electrical engineer employed by the Tennessee Valley Authority, Division of Construction, at the Brown's Ferry Nuclear Plant, Athens-Decatur, Ala. Jim is group leader and principal assistant to the chief engineer for construction on this, the world's largest, nuclear power plant. His main duties are in quality control and general supervision for proper electrical installation.

Thirty-one years of modeling have resulted in Jim's being an AMA Contest Director since 1961 and a Nats event director in 1969 and '70. His personal modeling interests have been Free Flight and Control Line, but Jim has very ably represented all modeling interests as AMA's District V vice-president for 1970 and 1971.

As hobby activities secondary to model building, Jim relates by expressing himself through drawing, cartooning and newsletter writing. A great amount of Jim's personality has filtered into his spirited editing of newsletters for the Coffee Airfoilers (Tullahoma, Tenn.) from 1965 through 1969 and MACH (Model Airplane Club of Huntsville, Ala.), 1970 to the present. He gives credit to his newsletter writing for aiding him to improve his ability to express himself on paper relative to his job.

Perdue was president of the Tennessee Model Airplane Association from 1966 to 1968, after having been the organizer of that group. He is well known through his entire district, attending all AMA contests that his time and personal finances will allow. Jim feels deeply indebted to the hobby for helping to mold his own strengths of character such as morals, sportsmanship and his spirit of competition and fair play. When a man realizes these truths he will certainly give back to the hobby at least as much as he draws from it. And what a wonderful exchange!

JACK JOSAITIS

AMA District VII Vice-President (Michigan, Wisconsin, Iowa, Minnesota)

John R. Josaitis, like most top AMA officials, has been involved with model airplanes a great part of his life. He has been active in this hobby for 37 of his 44 years. Modeling serves as Jack's means of livelihood; he is co-owner of two hobby stores–in Dearborn and East Detroit, Mich. The Josaitis home, peopled by Jack, his wife Marilyn, two daughters age 17 and 14, and a son, 13, is in Dearborn.

Jack serves modeling far beyond his primary obligation of simply being a good hobby dealer. Since 1967 he has been AMA District VII vice-president, actively participating in the AMA Executive Council. He also is a local area AMA Contest Director, has served five times as an RC judge at the Nationals, as an FAI RC judge in 1966, and at the RC Masters Team Selection Tournament in Memphis in 1970. He is a good "joiner", having belonged to the Detroit Balsa Bugs, Midwest Radio Control Society, Indian City RC Club, and the Greater Detroit Hiking and Soaring Society (RC sailplanes).

In spite of his 60 to 70 hours per week spent working as a hobby dealer, he takes the traditional "busman's holiday" by entering enthusiastically into building and flying model airplanes. He is an accomplished Jack-(no pun intended!)-of-all-trades, but his main modeling interests for the past 16 years have been in Radio Control. His present "love affair" is with RC sailplanes. He feels that they combine the best of the challenges of both Free Flight and Radio Control. Even his secondary hobby, photography, leads him right back to model planes, as he enjoys making model airplane type movies.

Josaitis feels he is a blessed person, as he tremendously enjoys his job (store), and it keeps him in daily contact with the modelers–which in turn makes him highly qualified to serve the membership of the Academy of Model Aeronautics as one of its outstanding leaders.

Jim Perdue, Dist. V V.P.

Jack Josaitis, Dist. VII V.P.

Stan Chilton, Dist. IX V.P.

STAN CHILTON

AMA District IX Vice-President (Kansas, Nebraska, South Dakota, North Dakota, Montana, Wyoming, Colorado)

Stan Chilton started modeling airplanes at the age of 10 and has enthusiastically followed the hobby through the years to his present age of 45. Stan and Judy, his wife, have three children: a girl 20, a boy 12 and another boy of 16 who is state golf champion. Their home is in Wichita, Kans., where Chilton is the owner and president of the Music Services Company. His company owns, operates, and places about 500 coin-operated phonographs, vending and amusement machines in business establishments. The 25th anniversary of Stan's company is upcoming on September 28th. Stan is a member of the Music Operators of America and of the Wichita Chamber of Commerce.

Stan's hobbies other than modeling are golf and basketball coaching. He works in junior programs in basketball and model airplaning.

Stan's modeling accomplishments include the holding of the FAI Category I Indoor World Record, set May, 1968. He is a member of the Wichihawks Model Club and was one of the organizers of the Wichita Modelers Council, a group of all the model clubs in the area which banded together to obtain the Wichita Model Flying Field through the cooperation of Beechcraft.

Stan is very knowledgeable in all phases of aeromodeling and understands each modeler's particular viewpoint and needs, whether it be that of a contest or sport flyer; or RC, CL, FF, or Scale.

In his service to airplane modeling through AMA, Chilton has been an AMA Contest Director since 1960, District IX Contest Coordinator 1961-64, Central Area FAI Free Flight Committeeman 1964-65, District IX Free Flight Contest Board member 1964-66.

Stan Chilton has served as District IX vice-president from 1967 to the present time, adding his enthusiasm for modeling and his solid successful businessman's experience to his Executive Council activities. Stan is a tall handsome fellow who travels to many contests, getting acquainted with many folks, and adds a quiet, intelligent dignity to the image of airplane modeling.

NOMINATION REMINDER

AMA members have until the time of the meeting of the Nominating Committee at the National Contest, tentatively the evening of July 28, to submit nominations in writing (procedures detailed in the May AAM, page 59) for the important AMA officer posts which will be filled by AMA officer posts which will be filled by AMA member vote late this year. Of course, it is preferable for nominations to be submitted earlier. Approximately half of the elective officers have terms expiring at the end of 1971.

Currently up for nomination is the national position of AMA secretary-treasurer and regional vice-president positions for Districts I, III, V, VII, IX and XI. Current officers are listed in the July AAM. Note that if a member wishes a current officer to continue serving, he should submit a nomination for that officer, as re-nomination is not automatic.

AMA News Bits

Happy Birthday

The April issue of Fresno Model News marked the 30th anniversary of publishing this monthly paper by the AMA chartered Fresno (Calif.) Gas Model Club. It's hard to imagine churning out an interesting, timely paper month after month during all the years since its inception in 1940, but that's exactly what has been done.

Even more amazing is that Ocie Randall has been at the newsletter's helm for just over 30 of those years–doing writing, editing, typing stencils, mailing, etc. Ocie estimates that he has used over 500 mimeograph stencils, over 3,000 sheets of paper, 40 cans of mimeo ink, 30 packages of staples and untold hours of typing and hand stenciling. It's an example of devotion and dedication that is unparalleled.

Flying Carpets

The AMA chartered Aero Telemechanics Club (Ill.) isn't seeking the legendary Arabian type, only worn room or area types for laying in the pit area at the club flying field to replace the badly weathered ones. It's a great idea to make working in the pits more enjoyable. The club newsletter, Servo Chatter, indicates that padding isn't wanted. Most of the backings won't withstand the elements for very long, and the fibre types cause no end of problems, when they begin to disentigrate, with engine carburetors.

Sterling Scale Award

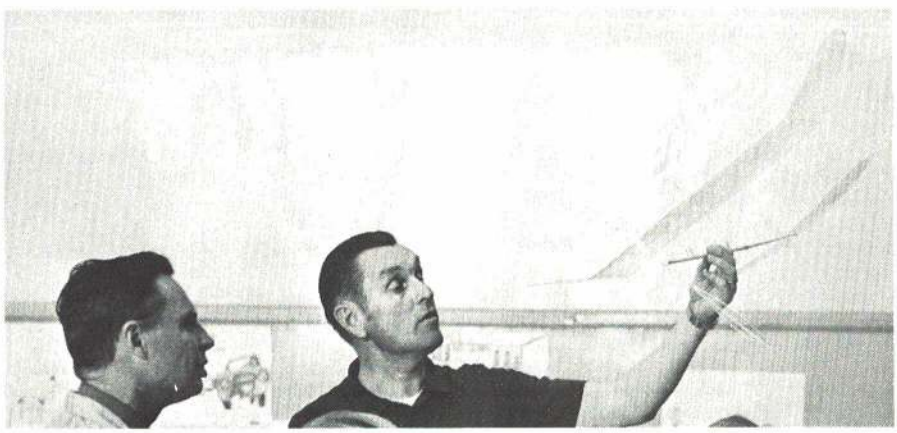
Entrants in the Scale events of the National Model Airplane Championships (Glenview Naval Air Station, Ill., July 26-August 1) have the opportunity to take home a magnificent plaque and a check for $100–courtesy of Sterling Models. The winner will be the Nats entrant whose model achieves the most static scale points under the AMA Unified Judging Rules, providing that the model makes an official flight and that it has not previously won the Sterling award. Note that Outdoor Free Flight, Control Line and Radio Control Scale models all are eligible. Previous winners: 1969, Linton Keith, CL Avro Lancaster; 1970, Edward Ellis, RC Spirit of St. Louis.

RC Warm-Up

Getting first-timers into the act was the purpose of the 1st Dallas (Tex.) Warm-Up contest last April. According to the report by Contest Director Bill Aaker, the goal of the sponsoring Dallas RC Club, AMA chartered, was ably achieved. Of the 16 flyers registered for Class A Pattern, nine had never competed previously, and for three of them it was only their second try. The contest also had events for Class B and Class D Novice Pattern and for Sport Pylon.

CL Goodyear Racing Twist

A variation on a theme was the Goodyear (Scale Racing) Proto event of the Phoenix Goodyear Race at Glendale, Ariz., last April. In this event the profile racers were timed from takeoff, one flight at a time, for a half mile (instead of being flown in multiple pilot races, with pit stops, as is normal for these models by AMA rules). The AMA Goodyear event was also flown, and it is interesting that the fastest proto Goodyears mostly didn't finish at the top of the regular races with pit stops. The contest was sponsored by the AMA



NASA assisted AMA last April by officiating in an informal awards ceremony during which several record certificates were presented, including one for FAI world record to Hal Crane. Representing NASA was Oran Nicks, Deputy Director of NASA's Langley Research Center, left in photo above, inspecting Crane's record model. Photo by Pat Gainer.

Carefully built and finely detailed is Carl Cumbow's Lanier Caprice, right. Photo by Roy Stephens is a regular feature of the Tri-Cities Aeromodelers (Tenn.) newsletter.

chartered Air-Zona Model Airplane Club and directed by Joseph Valenta.

Nice Letter

"I am thanking you on behalf of Boy Scouts of American Troop 375 of Harvey, Ill.

"The Chicago Model Masters presented a program to our troop based on material from your organization. We were very busy through the whole program assembling and flying the Hlaa FLYers. We were also entertained by movies of models in action. We were able to examine models in detail and discuss them with members of the CMM.

"The program was fun and educational. It has stimulated interest in model airplane building in some of the Scouts."

Mark Kramer, Senior Patrol Leader

RC Power-Glide Ratio

An idea for a fun contest being kicked around by the AMA chartered Palm Beach (Fla.) Aeronauts would base scoring on engine run time divided into glide time, plus spot landing, for all types of RC aircraft. Engine run time would start at takeoff release and continue while the model was climbing as high as possible. The engine would then be completely stopped, whereupon the glide time would begin. According to the club's newsletter, this ratio system gives a chance to all types of models. Noted was a New York contest of this type in which a Kwik Fli placed first, a Taurus second and a glider type third.

AMA No. 76148 had an importance you wouldn't believe to a blonde, blue-eyed 10-year-old girl named Jamie Lynne Davidson. She had discovered the fascination of flight when she was about eight and the fun and excitement of flying competition shortly thereafter. However, she developed leukemia at this same time and was never physically able to participate in outdoor meets. The requirements of indoor flying being considerably easier did allow some flying, and she won her age category for AMA Racers twice and had the top AMA Racer time for all classes once. She was very proud of the photo of the 1970 winners which appeared in the May 1970 "AMA News".

She never gave up hope and the desire to fly models. When the effects of the disease stopped school attendance and curtailed most other activities, she still found great joy in model airplanes. With a gentle touch and skill beyond her years she built models—saying that doing things with her hands made the pain go away. Her last effort was the model shown in the photo, a Goldberg Shoestring. It was her desire to win the "wings" offered by Goldberg for successfully flying one of his kits. However, the attempt was never made for on January 29, 1971, Jamie Lynne Davidson, AMA 76148, left this world of tears and sorrow for a better place, a place of golden sunshine and warm breezes, where soaring flight can keep a young heart happy forever.

So—just a note to those dads who sometimes become impatient with repeated young questioners, clumsy fingers and exasperating slowness. Be kind, be gentle, for sometimes there are no tomorrows and yesterdays can never be returned.

Jim Davidson, Huntsville, Ala.

RCWC Sidelight

The upcoming Radio Control Aerobatic World Championships at Doylestown, Pa., may prove to be beneficial in many more ways than just the obvious ones. For instance, a report in Hear Ye, newsletter of the AMA chartered Valley Forge Signal Seekers (Pa.), tells of a discussion VFSS President Jack Salmon had with Dick Levitt, from another Pa. club, about area clubs cooperating in sponsoring and judging contests. The point, according to Salmon's report, is that the different clubs may have differing primary interests (aerobatics, pylon, glider, etc.) so that it could be beneficial for an aerobatic club to judge contests for a pylon club, and so on. The opportunity for this encounter took place at a meeting called by AMA last March to inform area clubs of the World Championship planning and how members might assist in the operation.

Last Los Al Flight?

According to Birds Eye Views, newsletter of the AMA chartered B.I.R.D. Club (Calif.), an Ugly Stik RC flight was featured on NBC

Left: Winners of the RC Bees "Soar In" RC Glider Pylon Races last April in Watsonville, Calif., were (L-R) 1st, John Baxter, Nelson KA6; 2nd, Sam Crawford, Jalapeno; 3rd, Joe Corr, Cirrus. Lower Left: The Garden State Circle Burners Dinner Dance last April provided the setting for the Assn. of MAC's of Greater New York to present outstanding service awards to Joe Radle (L) and Tony Schettino (R). Association President Bill Boss (also AMA Dist. II V.P.), center, presented the awards. Below: Mr. Sterling Models, Ed Manaulkin (L), posed during the Toledo RC Conference with the Sterling Models Award plaque and Ed Ellis, last year's winner chosen from among Nats Scale entrants. A $100 check also goes with plaque. Bill Conkling photo.

News as the last operational flight from Los Alamitos Naval Air Station. Many will recall previous National Meets at this fine naval facility which, unfortunately, became unavailable due to its closing.

Filming of the Ugly Stik was somewhat of an accident. Joe Stream was at Los Al to assist in getting permission for a new Control Line club to use a small area on the field (reported to have been approved). A NBC News crew was also on hand to film the closing of the station. Lo and behold, a television star was born—not Joe, but the Ugly Stik.

RC Team Manager

Dr. Jim Edwards, New Albany, Miss., has been named by AMA's FAI Executive Team Program Committee to the important post of manager of the 1971 U.S. RC Aerobatic Team. Selected last September at the Masters RC Team Selection Tournament at Memphis, Tenn., the U.S. Team is comprised of Jim Whitley, Decatur, Ala., Phil Kraft, Oceanside, Calif., and Ron Chidgey, Pensacola, Fla. Altogether about 20 national teams are expected to compete for the titles of Individual and Team World Champions at Doylestown, Pa., September 15-19. This will be the first RC World Championships ever held in America. Modelers from all over the country are planning to converge on the Central Bucks County Airport to witness the world's best model flying.

Team Manager Edwards is himself a top RC Pattern competitor. He was second runner-up in the team selection program. Normally the team program administrator (Tom Rankin for the selection program just ended) is named team manager, but with this year's World Championships being located fairly close to Rankin's home, he has indicated preference to take a bye, enabling him to concentrate on organizational aspects of the contest.

Class D Free Flight

The quest for a really big Free Flight competition model by several westerners has resulted in the California Free Flight Association including a special Class D (engines from .401 to .650 cu. in.) in the West Coast FF Nats at Taft on Memorial Day weekend. Foremost among those urging Class D was Ralph Prey, editor of the AMA chartered San Valeers newsletter, Satellite. Actually he wanted the upper limit greater than .650 cu. in., but this would have conflicted with AMA liability insurance requirements. The lower limit for Class D was put at .401, just above the popular "40" engines, to encourage as many new big ships as possible. Anyone familiar with AMA rules will recognize that this special Class D also complies with specifications for the present AMA Class C. According to the Satellite, Class D entrants will have a bonus in that they may also enter the same models in Class C.

National Aeronautics Magazine

You've likely seen an ad for this magazine in AAM or possibly you have seen the magazine on newsstands. If you're among the more than 10,000 members belonging to AMA chartered clubs, you may have seen the copy received by your club officer.

The spring issue of National Aeronautics, the one to which we refer, is the first of what is hoped to be a regularly produced magazine by AMA's parent body, the National Aeronautic Association. It was published for NAA by the publishers of AAM magazine, and it deals with all aspects of sporting aviation.

Why this magazine is so important to us is that air modeling is presented in the well known, respected context of Air Racing, Aerobatics, Home-Builts, Antique Planes, Parchuting, Soaring, World War I Aircraft, Air Transport and Military Aircraft. And the article on RC modeling, "Greater than Golf!" by AMA Executive Director John Worth, fits in very nicely.

Here's what Gene Fuller said in a recent Printed Circuit newsletter of the AMA chartered North Jersey RC Club. The article "promotes RC flying in a manner to indicate that model aviation is not merely for kids—that it is also a significant adult activity with many professional people involved." Going on, he said, "This magazine and the article can be used locally as a promotion piece to upgrade public thinking concerning model airplanes—a copy in the hands of a civic official could well make the difference between indifference or cooperation on flying site problems."

Look for National Aeronautics on your local newsstand, $1.25. If sold out, AMA members may purchase a copy from AMA HQ at the bargain price of $1.00. Also, reprints of the four-page "Greater than Golf!" are available to members and clubs from AMA HQ—$ .50 per dozen, $2.00 per hundred.

R.O.W. Tough

The initials stand for rise-off-water, a method of launching Free Flight models for which there are special national AMA duration records. Several R.O.W. records were applied for as a result of the AMA sanctioned Thunderbugs R.O.W. Cat. II Meet at Lake Elsinore, Calif., last March, but Contest Director John Bonang reports that getting airborne from the water is still a major problem. It always has been a tricky thing, as most FF'ers will attest, but now it is compounded by the V.T.O. (vertical takeoff) practiced by many in ordinary contest flying. The guys just aren't used to taking off horizontally as is required for R.O.W., Bonang said.

How Fast?

Ever wonder how fast your favorite RC model tools around? Having set up a measured course, members of the Raleigh-Durham RC Club (N.C.) can now have their flights timed for determining speed. Here are the results obtained a while back: Gunter, flying a Kwik Fli with O.S. 60 Gold Head, 79 mph; Isaacks, Trainer Master, Enya 60, 70 mph; Hubbard, Pink Fink, K & B 35 Green Head, 74 mph; Haddock, Lanier Comet, O.S. 58, 80 mph. How slow? Marshall Sanderson was flying Haddock's Comet right on the edge of a stall to record a slow speed of 28 mph.

Extreme!

When the Southern California Antique Model Plane Society calls for old-timer models for their competitions, they really mean it! Here are some examples of "flagrant violations" cited in SCAMPS newsletter, Hot Leads: using an RC-type battery box to solve a spark ignition "sputtering motor" problem; using pencell batteries dated 1954, obviously not old-timer. And the age of the modeler's wing-retaining rubber bands was suspect and so was whether his Forster 29 prop nut was the original, or whether it came from a glow 35. Of course the naming of all of these "violations" was in jest, but the group does take seriously the old-timer rules which require designs, kit or magazine plan, to be (usually) from the 1941 era, and gas engines to be of the spark ignition type.

The old-timer bug seems to be spreading to RC—see another item farther on.

FF Event Popularity

Letting members of the AMA chartered Minneapolis Model Aero Club (Minn.) know just how popular various Free Flight events have been during the club's four major 1970 contests was the way Dell Marchant chose to respond in the newsletter, Minneapolis Modeler, to members' grumbling about their pet events not being included in certain contests. It's a study that many of us might well make to chart the possible change of modeler interest. Figures obtained by Marchant for average number of entries per contest: Junior Event, 11.3; 1/2A FF Gas, 10.5; HL Glider, 8.3; Wakefield, 8; FAI Power, 7.5; ABC Gas, 7; Unlimited Rubber, 6.7; Nordic A-2, 5.5; Nordic A-1, 3; and Payload, 1.

Trophy Design Contest

The February meeting of the AMA chartered Willamette Modelers Club (Oregon) was the deadline for members to submit proposed designs which the club might adopt as its standard for contest trophies. Design contest entrants were required to submit a full side sketch or mock-up and to estimate the cost of production. Judging was to be based on economy of construction (weighted 30%), attractiveness (30%) and ease of construction (40%). Hope the club will favor us with a photo or sketch of the winning design.

Old-Time RC

Newest bug to hit members of the AMA chartered North Jersey RC Club is the building and RC flying of old-time models (either Free Flight or Radio Control, designed prior to December 7, 1941). According to Printed Circuit, the club's newsletter, more than a dozen old-timers are under construction: Buccaneers by Woody Woodman, Bill Antoine and Bill Iurate, Flying Quaker by Dave Jaggie, Comet Clippers by Michael Woodman and Vince Bonnema, Quaker Flash by Roger Keay, Buzzard Bombshells by Gene Fuller and Joe Beshar, Scientific Mercurys by Ray Thielman and Morm Medge.

With this high interest the club plans a contest for old-time models, radio-controlled, in July. Three events are slated, the first of which is scored for duration with a 15-second max engine run, then adjusted by factors of actual engine run and engine displacement; radio may be used to stop the engine, but duration ceases afterwards if transmitter is used. The second event, with no prohibited radio use, is scored for duration (15-second max engine run) and spot landing. The third event is a Pylon Race for the old-time RC models.

AMA News Extra .....

COMPETITION RULES REVIEW

Among the various "happenings" of the National Model Airplane Championships (Glenview Naval Air Station, Illinois, July 26-August 1) will be meetings of the AMA Contest Boards for Radio Control, Scale, Control Line and Free Flight. Previous to the Nats meetings the boards will have taken Preliminary Votes by mail on all of the rule-change proposals which were submitted by AMA members up to approximately April 1. The Nats meetings will be the first opportunity for in-person discussion of those proposals which were deemed "tentatively acceptable" in the Preliminary Vote, and the occasion also will be used to narrow down the number of "cross proposals" (variations or modifications suggested to amend the original proposal). Following the Nats by about a month the boards are expected to conduct a Final Vote by mail to determine acceptability of the proposals as 1972 AMA rules.

By means of the AMA Competition Newsletter provided to over 600 AMA chartered clubs and approximately 3,500 subscribers, many AMA members will already have seen detailed outlines of the proposals and, hopefully, will have been in touch with their district CB members to express their opinions, pro or con. Since space does not permit printing the detailed proposals here, it is suggested that interested modelers contact the nearest AMA chartered club for details (see listing in February AAM), then correspond with the Contest Board member for the modeler's category and district--listing on page 60 of the July AAM. A brief summary of the rule-change proposals expected to be considered:

Radio Control

Pylon. To consider adoption of a Quarter Midget (.15 cu. in.) class; also a composite FAI/Formula II class.

Soaring. To consider adoption of rules proposed by the League of Silent Flight employing the task concept in which a Contest Director could blend together several tasks in arriving at a single sailplane event best suited to local conditions (but the contest could also consist of a single task). Proposed tasks: Duration (three options), Precision, Distance and Speed for thermal competitions; Closed Circuit Distance/Speed, Pylon Speed and Aerobatics for slope soaring.

Control Line

General. To not allow lines which have a permanent curl of less than 2" dia. and more than one loop. To not allow a tuned pipe (or intake/exhaust extensions) for many classes. To define allowable types of line connectors. To provide a smaller 2-line stranded wire size for 1/2A models (not Speed).

Carrier. To revise minimum diameters of control wires; various proposals provide for solid wire only (not stranded), for regulating the wire sizes of the elevation control lines of one and two-line systems only (leaving any other auxiliary line control to the flyer's option), and for not allowing line-length-adjustment-type control handles. Other proposals provide for reducing the maximum weight for Profile and Class I models to three pounds, and for determining pull-test by aircraft weight and maximum speed (indicated in advance of flight).

Speed. To subdivide events into proficiency classes instead of by age. To limit fuel to the two FAI formulas (which consist only of alcohol and castor oil). To increase the Class A line length to 60' (recommended by the proposer only if both the proposals--tuned pipe ban and FAI fuel--should fail). To eliminate (or revise) the required methods for holding the model parts together. Also to pull-test safety thongs separately.

Stunt. To provide special wire size minimums for small-engine models, reduce spread between minimum and maximum appearance scores, eliminate safety thong requirement (alternate--pull-test separately), establish proficiency classes (instead of age classes) with special maneuvers for lowest level classes (alternate--establish Novice CL Aerobatics as a supplementary event).

Scale Racing, Rat Racing. To revise the minimum wire diameters, and to allow only lines of multi-strand wire.

Free Flight

Outdoor Rubber. To establish a category for Sig Cub models (not AMA Cub). To reduce the performance of Unlimited Rubber models (several alternate proposals), particularly in flyoffs.

Gas. To change the procedure of flyoffs to reducing engine runs (instead of increasing flight maxes), and to consider allowing only hand-launch for flyoffs.

Scale

General. To adopt a complexity factor to more equally award static points for a given amount of effort and competence whether the subject aircraft be very simple or highly complex (and complexities in between).

Non-Flying. To establish a category and rules for models which would be static-judged only--no flight required.

Indoor. To realign scoring to more equally distribute emphasis between flight and static scoring; also, to require a minimum static score to determine entry eligibility.

Radio Control. To establish a scale gliding category and also rules for Sport Scale (the latter variously known as Stand-Off Scale, Dirty Scale, California Scale, etc.). To revise the criteria for use of flaps and to require only one each of certain aerobatic maneuvers (instead of three each).

Control Line. To provide for flight scoring to precede static judging, and to de-emphasize fidelity static scoring for Jrs., Srs. To provide smaller wire sizes for light small-engine models.

By special arrangement with the publisher this page is produced at the very last minute, just before the magazine is printed, to bring you the latest news concerning current Academy of Model Aeronautics events of national significance.

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

JULY 3—BISHOP, CALIF. RC Bees, Inc. Meet for Demonstration Flying. Site: Bishop. R.Stephens CD, 514 Pinehurst Ave., Placentia, Calif. 92670. Sponsor: Radio Control Bees, Inc.

JULY 3-4—TULLAHOMA, TENN. (AA) TMAA FF Championships. Site: Arnold Center. O. Stewart CD, 2541 Stinson Rd., Nashville, Tenn. 37214.

JULY 3-4—CORPUS CHRISTI, TEX. (AA) 3rd Annual AA RC Contest. Site: Waldron Field. G. Stephens CD, 705 John Lee, Corpus Christi, Tex. 78412. Sponsor: Corpus Christi Bees.

JULY 3-4—LEXINGTON, KY. (AAA) Mid-America CL & RC Championships. Site: Kearny Field. L. McFarland CD, P.O. Box 8177, Lexington, Ky. 40503. Sponsor: Lexington Model Airplane Club.

JULY 3-4—ORANGE, MASS. (AA) 1971 Yankee FF Championships. Site: Ft. Devens. R. Harlan CD, 15 Happy Hollow Rd., Wayland, Mass. 01778.

JULY 3-4—MOBILE, ALA. (AA) 7th Annual Gulf Coast RC Contest. Site: Plum Forty. J. Sabine CD, 10 Maury Dr., Mobile, Ala.36606. Sponsor: Gulf Coast RC Club, Inc.

JULY 3-4—SPRINGFIELD, MO. (AA) Springfield RC Club Contest. Site: Springfield RC Club Flying Field. G.Langston CD, 1300 W. Locust, Springfield, Mo. 65803. Sponsor: Springfield RC Club.

JULY 3-4—BATON ROUGE, LA. (AA) Bayou State CL Championships. Site: F.S.U. Forestery Bldg. G. Cleveland CD, 540 Gebelin St., Baton Rouge, La. 70802.

JULY 4—WASHINGTON, D.C. (AA) & FAI Team Selection—CL. Site: Bolling Air Force Base. J. Dent CD, 9932 Clearfield Ave., Vienna, Va. 22180. Sponsor: Fairfax Model Associates.

JULY 4—MENTOR, OHIO (AA) Fourth of July RC Races. Site: Club Field, Tyler Blvd. B. Penko CD, 21151 Westport Ave., Euclid, Ohio 44123.

JULY 9-10-11—SPOKANE, WASH. (AAA) Spokane CL & RC Internats. Site: Spokane Int'l. Airport. R. Hepker CD, 142 ADW, Spokane Int'l. Airport, Spokane, Wash. 99219.

JULY 10-11—OKLAHOMA CITY, OKLA. (AA) TORKS 12th American RC Annual Meet. Site: To be announced. C. Brownlee CD, 3033 Rolling Stone, Oklahoma City, Okla. 73120. Sponsor: TORKS.

JULY 10-11—TULLAHOMA, TENN. (AA) 12th Annual Airfoiler RC Meet. Site: Airfoiler Field. L. Webster CD, 1000 Sycamore, Manchester, Tenn. 37355. Sponsor: Airfoiler Club.

JULY 10-11—CHESAPEAKE, VA. (AA) TRC 5th Annual AA RC Meet. Site: Fentress Air Field. M. Woolard CD, 301 Haledon Rd., Chesapeake, Va. 23320. Sponsor: Tidewater RC Club.

JULY 10-11—OKLAHOMA CITY, OKLA. (AAA) Sooner State Model Aviation FF & CL Championships. Site: 128th & N. Western. M. McGee CD, 1805 N. Tulsa, Oklahoma City, Okla. 73107. Sponsor: Oklahoma City Exchange Club.

JULY 10-11—OAKS CORNERS, N.Y. Sky-Rovers RC Hobo Meet. Site: Club Field, Hayes Road. H. Ford CD, 11 Stephans St., Clifton Springs, N.Y. 14432. Sponsor: Sky-Rovers Finger Lakes RC Club.

JULY 10-11—DAVENPORT, IOWA (AA) Davenport RC Society 3rd Annual RC Meet. Site: Scott County Park. C. Fox CD, 1841 W. 4th St., Davenport, Iowa 52802.

JULY 11—BROOKLYN CENTER, MINN. (AAA) 10,000 Lakes CL Championships. Site: North Hennepin Junior College. R. Kampmann CD, 18525 26th Ave., N., Wayzata, Minn. 55391. Sponsor: Minneapolis Piston Poppers, Inc.

JULY 11—COLUMBUS, OHIO (AA) 6th Annual Buckeye CL Championships. Site: Lockborne Air Force Base. C. Hemmerly CD, 5607 Sandalwood Blvd., Columbus, Ohio 43229. Sponsor: Capital City Controlliners.

JULY 11—PHILADELPHIA, PENNA. (AA) Pure Speed "M.K.Z." CL Meet. Site: Navy Yard. J. VanSant CD, 337 Parkview Ave., Penndel, Penna. 19047. Sponsor: Flying Bucks of Levittown, Penna.

JULY 11—HASTINGS, MINN. FAI FF Qualifying Trials. Site: Webers Air Strip. D. Monson CD, 131 W. Wentworth, W. St. Paul, Minn. 55118. Sponsor: Minneapolis Model Aero Club.

JULY 11—LAKEHURST, N.J. (A) NJRCC Old Timer FF & RC Meet. Site: Lakehurst N.A.S. E. Woodman CD, 389 Floral Ln., Saddlebrook, N.J. 07622. Sponsor: North Jersey Radio Control Club.

JULY 11—WESTMINSTER, MD. (A) Westminster Aero Modelers CL Meet. Site: Westminster Shopping Center. R. Pease CD, 65 E. Main St., Westminster, Md. 21157. Sponsor: Westminster Aero Modelers.

JULY 11—AURORA, COLO. MMM FF Qualifying Trials. Site: E. Colfax Air Park. G. Batiuk, Jr. CD, 3066 So. Upham St., Denver, Colo. 80227. Sponsor: Magnificent Mountain Men.

JULY 11—URBANA, ILL. (AA) "Aeronauts" 9th Annual Model Plane RC Meet. Site: Illini Airport. J. Fasimpaur CD, 310 E. Benham St., Tolono, Ill. 61880. Sponsor: Champaign-Urbana Aeronauts.

JULY 11—VAN NUYS, CALIF. (AA) Valley Circle Burners FAI CL Meet. Site: L.A. Model Airport. W. Netzeband, Jr. CD, 580 N. Holliston, Pasadena, Calif. 91106.

JULY 11—HASTINGS, MINN. (AA) Annual Summer FF Meet for Cat. II. Site: Webers Air Strip. D. Monson CD, 131 W. Wentworth, W. St. Paul, Minn. 55118. Sponsor: Minneapolis Model Aero Club.

JULY 11—BUFFALO, N.Y. (A) United Pylon RC Racing Circuit. Site: Buffalo. H. DeBolt CD, 49 Colden Ct., Cheektowaga, N.Y. 14225. Sponsor: Erie County Model Aircraft Assn.

JULY 11—CANTON, OHIO (AA) 11th Annual Canton RC Meet. Site: Canton Club Field. J. Yarger CD, 1100 Browning Ave., North Canton, Ohio 44720.

JULY 11—ELSINORE, CALIF. (A) San Valeers Sun & Fun FF Meet for Cat. I. Site: Lake Elsinore. T. Hutchinson CD, 880 A Magnolia, Pasadena, Calif. 91106. Sponsor: San Valeers.

JULY 11—VALLEY PARK, MO. All Model Airplane Air Show for Demonstration Flights. Site: Buder Park. A. Signorino CD, 11959 Glenvalley Dr., Bridgeton, Mo. 63043. Sponsor: Greater St. Louis Modeling Assn.

JULY 17-18—OILVILLE, VA. (AA) RARC 11th Annual RC Contest. Site: RARC Field. C. Foreman, Jr. CD, RFD 4, Box 683, Mechanicsville, Va. 23111. Sponsor: Richmond Area Radio Control Club, Inc.

JULY 17-18—ABILENE, TEX. (AA) Prop Twisters 3rd Annual CL Contest. Site: City Airport. E. Thomas CD, 5349 Harwood, Abilene, Tex. 79605. Sponsor: Key City Prop Twisters.

JULY 17-18—SALT LAKE CITY, UTAH (AA) 12th Annual Model Air FF & CL Show. Site: Salt Lake City. F. Haslam CD, 3731 So. 5450 W., Salt Lake City, Utah 84120. Sponsor: Utah State Aeromodelers.

JULY 17-18—MENOMENEE FALLS, WISC. (AA) 1st Annual Pre-Nats RC Warmup. Site: Aero Park Airport. F. Morrissey CD, 14100 West Park Ave., New Berlin, Wisc. 53151. Sponsor: Milwaukee Flying Electrons, Inc.

JULY 18—ELSINORE, CALIF. (A) SCAMPS Old Ruler Meet. Site: Elsinore. J. Adams CD, 2538 N. Spurgeon, Santa Ana, Calif. 92706. Sponsor: Southern California Antique Model Plane Society.

JULY 18—OHIO CITY, OHIO (A) SHOO Flyers RC Club Contest. Site: Club Field. D. Kraner CD, RR 1, Ohio City, Ohio 45874. Sponsor: SHOO Flyers MAC, Inc.

JULY 18—NEWARK, OHIO Licking County 5th Annual RC Club Meet. Site: Nethers Farm. A. Dupler CD, Box 186, Millersport, Ohio 43046.

JULY 18—W. SUFFIELD, CONN. (AA) Nor-East RC Air Races '71. Site: Club Field. G. Sawn CD, 6 Audrey Ln., Enfield, Conn. 06082. Sponsor: Northern Connecticut Radio Control Club.

JULY 18—DAVENPORT, IOWA (AA) 14th Annual Model Airplane CL Meet. Site: Davenport Airport. D. Mairet CD, 3009 Westmar, Bettendorf, Iowa 52722.

JULY 24-25—ABBEVILLE, S.C. Piedmont Fun-Fly. Site: Abbeville Co. Airport. L. Nash CD, 722 Greenville St., Pendleton, S.C. 29670. Sponsor: Greenwood Radio Aircraft Modelers.

JULY 25—MILPITAS, CALIF. WAFFC Third Annual FF Meet. Site: Milpitas. R. Douglas CD, 5303 Calderwood Ln., San Jose, Calif. 95118. Sponsor: Oakland Cloud Dusters.

JULY 25—ODESSA, TEX. (A) Odessa Prop Busters RC Club Pattern Meet. Site: Prop Busters RC Airport. S. Hood CD, 4110 E. 37th, Odessa, Tex. 79760. Sponsor: Odessa Prop Busters RC Club.

JULY 25—JAMESTOWN, N.Y. (A) Flying Aces, Inc. RC Meet. Site: Jamestown. W. Johnson CD, 62 Widrig Ave., Jamestown, N.Y. 14701.

JULY 25—KERMAN, CALIF. (A) Fresno Monthly FF Meet for Cat. I. Site: Near Kerman. F. Gallo CD, 1725 Kenmore Dr., W., Fresno, Calif. 93703. Sponsor: Fresno Gas Model Club.

JULY 25—AURORA, COLO. (A) MMM July Club FF Meet for Cat. II. Site: East Colfax Flying Site. W. Baldridge CD, 1464 So. Lafayette St., Denver, Colo. 80210. Sponsor: Magnificent Mountain Men.

JULY 25-26-27—NEAR GLENVIEW, ILL. (A) NATS Week RC Glider Event. Site: Pending. D. Burt CD, 3048 Central St., Evanston, Ill. 60201.

JULY 26-AUG. 1—GLENVIEW NAVAL AIR STATION, ILL. (AAA) National Model Airplane Championships. Traditional Events. For Nats entry blank send pre-addressed and stamped envelope to: Academy of Model Aeronautics, 806 Fifteenth Street, N.W., Washington, D.C. 20005.

JULY 31-AUG. 1—POCATELLO, IDAHO (AA) Pocatello Glue Angels Invitational FF & CL Meet. Site: Pocatello. E. Culver CD, 231 Fairbanks, Pocatello, Idaho 83201.

AUG. 1—MENTOR, OHIO August Quarter Midget RC Races. Site: Club Field, Tyler Blvd. R. Penko, CD, 21151 Westport Ave., Euclid, Ohio 44123.

AUG. 7-8—FLOSSMORE, ILL. (A) 4th Annual S.A.C. RC Meet. Site: Flossmoor Rd. Central Ave. J. Grier CD, 8001 South Morgan, Chicago, Ill. 60620. Sponsor: Suburban Aero Club of Chicago.

AUG. 7-8—WHITTIER, CALIF. Formula I Beginners RC Race. Site: Whittier Narrows. J. Bridi CD, 23625 Pineforest Ln., Harbor City, Calif. 90710. Sponsor: F.A.S.T. Club.

AUG. 8—LOCKPORT, N.Y. (A) United Pylon RC Racing Circuit. Site: Lockport. H. DeBolt CD, 49 Colden Ct., Cheektowaga, N.Y. 14225. Sponsor: Niagara County Model RC Club.

AUG. 8—HADLEY, MASS. (A) Hampshire Showdown RC Air Races. Site: H.C.R.C. Flying Field. B. Sparrow CD, 418 Meadow St., Agawam, Mass. 01001. Sponsor: Hampshire County RC'ers.

AUG. 8—VAN NUYS, CALIF. (AA) Valley Circle Burners FAI CL Meet. Site: L.A. Model Airport. W. Netzeband, Jr. CD, 580 N. Holliston, Pasadena, Calif. 91106.

AUG. 8—PIKE, N.Y. (AA) Western N.Y. FF Society FF Meet. Site: Pike. D. Evans CD, 175½ S. First, Bolivar, N.Y. 14715.

AUG. 8—SAGNIAW, MICH. (B) AMRCC Fun Fly Meet. Site: SVRCC Field. G. Gill CD, 2020 Lone Rd., Saginaw, Mich. 48623. Sponsor: Saginaw Valley RC Club.

AUG. 8—FORT WORTH, TEX. (A) Fort Worth Thunderbirds Pylon RC Races. Site: T-Bird Field. J. Simpson CD, 5709 Wharton, Fort Worth, Tex. 76133.

AUG. 8—CALDWELL, IDAHO (AA) 6th Annual Idaho State FF Championships for Cat. I. Site: Caldwell. D. Walton CD, Rt. 2, Caldwell, Idaho. 83605.

AUG 8—LANCASTER, OHIO (AA) F.O.R.K.S. Annual RC Pattern Meet. Site: F.O.R.K.S. Field. J. Slater Cd, 809 Forest Rose Ave., Lancaster, Ohio 43130. Sponsor: Fairfield Ohio Kontrol Society.

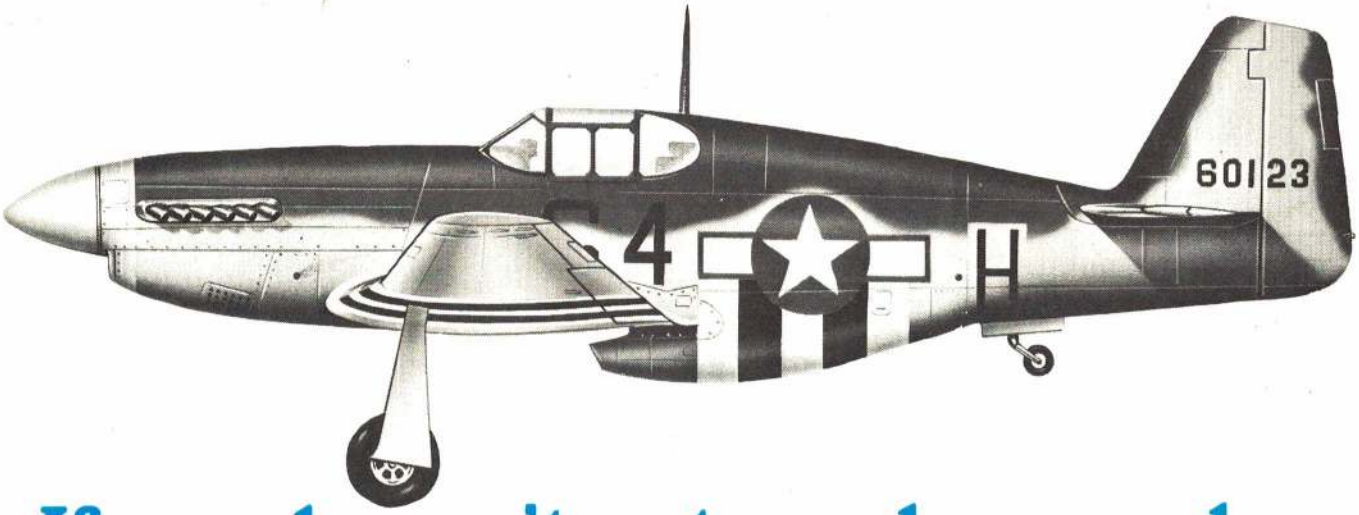
AUG. 10-11-12—DENVER, COLO. (A) 5th Annual Old Timer Championships. Site: E. Colfax Airport. R. Combs, Jr. CD, RR 1, Box 712, Morrison, Colo. 80462. Sponsor: Model Museum Club.

AUG. 14—WARREN,OHIO (AA) TCRC Pattern RC Contest. Site: Club Field. B. Waterman CD, 812 Kenilworth, S.E., Warren, Ohio 44484.

continued on page 96

AMA OFFICER DIRECTORY

The most recent complete directory was published in the July AAM, page 60.



If you haven't yet made a scale model, there's no excuse—Now!

Our new Radio Controlled P-51 Mustang is a *Standoff Scale* model. You can build it in about the same time a Kwik-Fli takes, but when you're through, you've got a model that only a ruler can tell from a true scale plane.

This means that in the same building time of your next sport or pattern R'C, you could have instead *this Mustang* . . . an authentic looking plane that flies like a sport model — no tricky handling.

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Take a step UP—to a real-looking airplane!

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SOME SPECIAL KIT FEATURES:—

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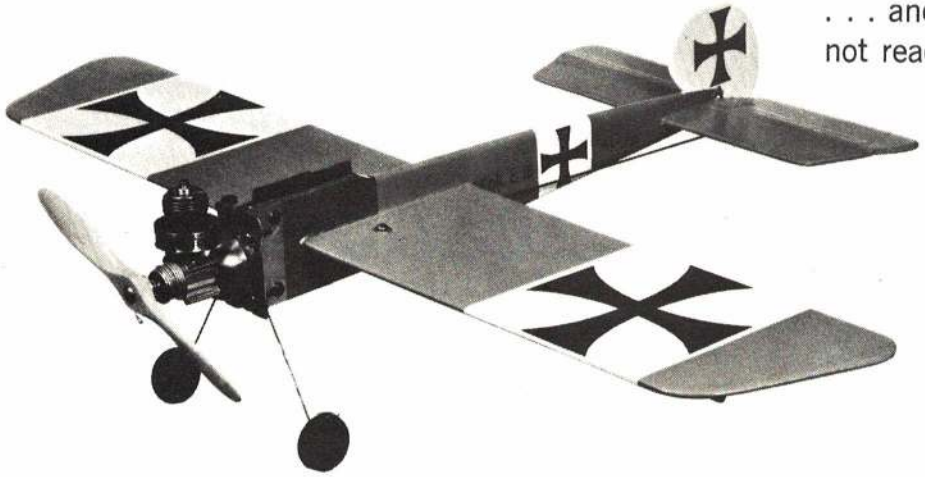
. . . then go out and get yourself one or more of these nifty little Control Line models. And are they simple! Kits contain from 6 to 9 die-cut Balsa parts as well as the metal engine mounts, complete Control System (less lines and handle), Landing Gear, Wheels, authentic Decals, etc., all ready to use, which makes assembly a cinch IN ONLY MINUTES!

KIT S-35 BEGINNERS THUNDERJET 2.95

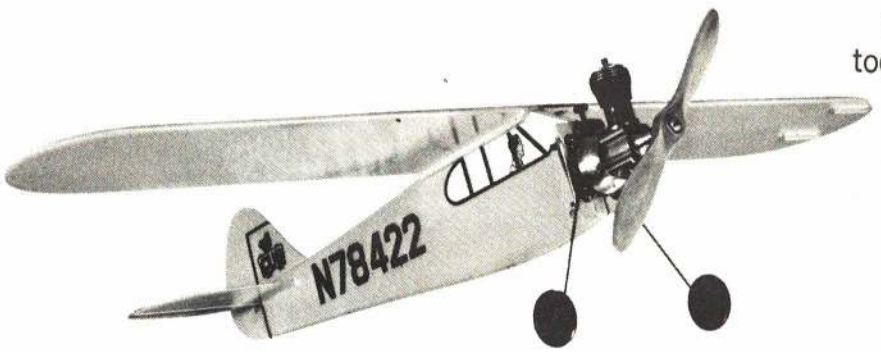
Almost any .049 Engine can be used and the flight performance is just great. . . . and if you bash the ground "when you're not ready to land," they're so light and strong that they're practically damage-free. By the way, Engines from most ready-to-fly plastic models can be used, so if you have one, don't waste it. It might require a little modification to install, tho.



KIT S-37 BEGINNERS EINDECKER 2.95

Plans are easy to read and complete. They even have a run-down on beginners' first time flights. There are six models at $2.95 and one Bipe (double winger) at $3.50, all about 21″ wing span; and all the tools you need are generally found around the house.

. . . so get over to your dealer's and take a look . . . at $2.95, you'll find they're the MOST . . . for your fun . . . for your money.



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Flying Fortress

(continued from page 30)

glued to the bottom of the fuselage in the notch provided. Mount the wing (drawbridge) leadout in place, using glue and small wood screws.

The front and rear towers (rudders) are cut from 1/8" balsa and glued in place. The stabilizer is made from 1/8" hard balsa and glued to the top of the rear towers. Using hinges and a control horn of your choice, mount the elevator to the rear of the stabilizer. Then add the top pieces of the rear towers to the stabilizer.

A small building-like structure is built to enclose the fuel tank behind the engine. Williams Brothers Wheels are used. I made the pushrod from very hard balsa with the control rods mounted securely in each end.

The castle is painted grey and is trimmed with black dope or, if time permits, the walls may be sculptured. The drawbridge chain was obtained from the model ship department in a local hobby shop. The bottom deck is hinged to allow a miniature basket of bowmen to parachute to the earth while the Fortress is in flight. I used Robin Hood figures made by Airfix to guard the Fort. For safety, remove them before flying.

A McCoy 19 supplies ample power, and the use of throttle control is recommended. Once the engine quits, the glide isn't exactly the best you'll ever see. Aside from this, the Fortress is a smooth-flying, stable airplane.

Pogo

(continued from page 19)

members in place on the plan. Glue all frames in position and, after the glue has set, cement the sides in place, leaving about 1/32" of the crutch exposed. Next, add the 1/8 x 3/8" soft balsa planking in the nose area. Then add the landing gear blocks and the 1/16" cross grain bottom sheeting back to the rudder post. This should complete the entire lower half of the fuselage. Let this set for at least a day before picking it up.

Next, add all top formers and proceed with the top planking. We planked ours back to the rear cockpit frame and used 3/32" sheet for this. Add the cowling nose blocks, rough the spinner area down to size and then mount the engine and spinner in place to assist in positioning the 1/16" ply spinner plate on the nose blocks. When this is done, remove the engine and shape the nose blocks into the spinner plate. We used the small drum sander on our Dremel tool, which did this job quickly.

By now, the fuselage is just about completed so, after a good smooth sanding job, paint on the first coat of sealer.

The flat bottom airfoil doesn't have a pat technical explanation, but we have had a lot of experience with it. Jim Kirkland's Shoestring of 1965 was the first Formula I ship to use it. Joe Foster used it on his Rivets, National Champion in 1967 and 1968. We were hooked on the wing section after flying two of Joe's Rivets and decided to continue with it on our Ole Tiger. We've built up a lot of flying time with this section and can recommend it without reservation, both in high and low speed characteristics. Full elevator turns can be made at high speed with no tendency to stall or mush and lateral

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No. 0794, Skimmer Airboat — Sled-type fun watercraft by Paul Hook. .09 engine, R/C rudder, throttle. $2

No. 0991, Flashby I — Rakish-looking all-balsa ROG by Wayne Brown. For the Tenderfoot. Tricycle gear. $1

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No. 0892, Taylor Cub F-2 — Sport, F/F, scale, .020. Stick-and-tissue. By Schreyer. $1.75

No. 0893, Martin MO-1 — Rare WW-1 era monoplane, carrier fighter ideal for Class 1 Carrier. Ailerons keep lines tight at low speed. By Reeves. $1.50

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No. 0192, Skyraider — Mottin's Navy Carrier, fast, light, .40's or .60's. Easy construction. $2.50

No. 0193, Cutie Coupe — Coupe d' Hiver F/F by Dave Linstrum. Quick to build with all-sheet surfaces. Your first rubber contest model. $1.75

No. 0291, R/C Nobler — Ed Sweeney's conversion of famous C/L stunt ship. A highly maneuverable R/C. Only .40 for all AMA/FAI stunts. $2.50

No. 0491, Emeraude — Duke Crow reduced famous home-built to R/C size (65"). .40 to .60, does stunt pattern. Gentle. Two sheets. $3.75

No. 0591, Small Fry Special — Mottin's C/L trainer for Tenderfoot. Easy to build. An .049. $.75

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No. 0692, ½A Sky Squire — Small version famous Sky Squire. 1 ch. rudder-only, or rudder, elevator and motor on Galloping Ghost. Only 22-28 oz. $2

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No. A697, Dwarf Dip III — Easy to fly, rubber Coupe de Hiver by Charles Sotich, a winner! For small fields. Warp-resistant. $1.50

No. A691, E A A Biplane — Nick Ziroli's scale R/C uses .40 engine, full house gear. 38" wings, semi-symmetrical foil, box-and-stringer fuselage. Two sheets. $2.50

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No. 0801, Winnie Mae — Spectacular RC Vega for strong 60 engine in 2"-1' scale, foam and balsa, lots of details. By Monty Groves. Two big sheets. $4.50

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No. 0213, Guillotine—Modified from CL for RC combat. Maneuverable, fast, responsive, and fun. Glides well. For two servos and 19 engine. For new event. **$2.75.**

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No. 0611, Phantom Stunter—Very realistic jet-like model of Blue Angels plane with typical stunt moments and airfoil. For 35-45 engines. **$2.75**

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THIS MONTH'S PLANS

No. 0811, Douglas Mailplane—Large FF scale of Western Air Lines M-2 bipe. For 09 power. Could fly with light radio. **$3.00**

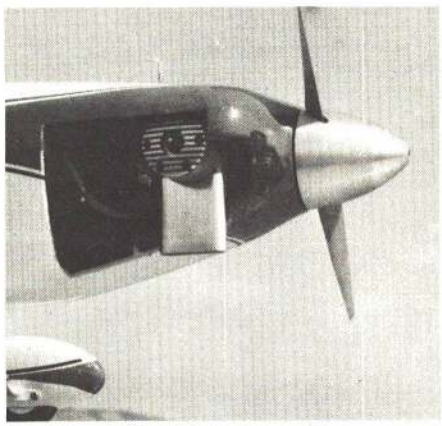
No. 0812, Hot Canary—Unique Formula II/FAI racing biplane by Bob Sigelkoff. Although unusual-looking, it is fast and quickly built. **$3.25**

No. 0813, Pogo—Model of Owl Racer for Formula I features midwing, low stab, non-cheeked cowl. Very stable and plenty fast. By Bob Morse. **$3.50.**

No. 0814, Flying Fortress—Not a scale plane, but a novelty CL flying medieval castle for a 19. **$2.75**

control is excellent in a fully flared landing attitude.

Another welcome characteristic is ease of building. The first step is to preglue and sand the 1/16" medium balsa skins. We recommend taping the 4" sheets together, then reversing the taped assembly. Open each joint and lay a bead of coating resin in place. Spread the skin out flat and wipe the excess



Not having cheek cowls, engine is lost in fuselage. Exhaust extension is essential.

from each joint. The taped side will be the finished side and will require very little sanding to finish.

Cut all ribs and put together the right and left hand aileron bellcrank assemblies.

Pin the lower skins to two building boards butted together at the wing center line. With the center and two tip ribs in place, jack up the end of one board until a straight edge just touches the top of each of the ribs. This will provide all the dihedral in the bottom surface and the top surface will be flat from tip to tip. Remove the ribs and begin final assembly by gluing the lower 1/16 x 1/4" spruce spars in place, adding the half-span 1/16 x 1/4" spruce doublers. (Do not break the spars at the center line; let them run straight through, tip to tip.) Add all the ribs and then the top spar with its half-span doubler. Install the aileron bellcranks with their pushrods in place. Addition of the rear spar, top skins, leading edge and the sheet trailing edge will complete the basic wing structure.

Wing construction to this point takes four hours, and it is basically finished. (Another strong point for this airfoil.) All that remains is shaping the trailing edge, adding the tips and sanding everything to shape. Add the fiberglass cloth strip all around at the center section joint and the wing is ready for final finish.

The tail surfaces are rather straightforward and need no description. At the leading edges, we added 1/16 x 1/4" spruce strips which seem to stop the nicks and gouges caused by gravel thrown back by propwash.

Now to paint the Owl. We have used the coating resin system for a long time now and recommend trying it. We use Starcast or Francis Products Surfacing and Coating resins.

Begin by applying a brushed coat over the entire ship. After this has set up, go over it lightly with coarse sandpaper to take the humps out. Brush on a second coat, flowing it carefully, avoiding runs. If this coat is added with care, the ship is ready for an attractive color coat. However, for one of those fantastic elbow-power super finishes, sand this coat well with 320 wet or dry paper, then spray on a coat of DuPont gray lacquer

primer. Then sand the primer coat completely off the ship.

With very little effort, the surfaces are, or should be, glass smooth and ready for the Hobbypoxy colors. We masked and sprayed the basic red trim with Hobbypoxy Bright Red. For the pinstriping, we used a vinyl tape which seems to stick with a vengeance. Forty feet of 3/32" wide taped (marked 1/16" wide) was 57 cents at the local discount department store. The material is called Trim-Brite pinstriping tape and should be in auto supply stores. Contact Spartan Plastics, P.O. Box 67, Holt, Mich. 48842, for a local dealer. It's worth trying.

Fly Safely!

Follow AMA Rules

The Ryan ST

(continued from page 33)

be flown after it, it was the Army's first monoplane trainer and a very sporty machine.

Along with hundreds of PT-22's came Fairchild PT-19's, also low-winged, but powered by four-cylinder, in-line Ranger engines. Both trainers came on the scene at about the same time and both stayed in production until 1942, but the Fairchild was preferred, and almost 5000 were built. When those two ended their runs, they were replaced by an improved PT-19, called the PT-23, which was powered by a seven-cylinder Continental radial engine. After that came the PT-26, which was a PT-19 with a long canopy covering the two previously open cockpits. Almost 3000 PT-23's and PT-26's were built, and they finished out the war as the standard primary trainer.

After the war, the primary trainer was an entirely different animal. No longer was it a sprightly, low-powered, enjoyable little airplane, designed to ease a groundling into the air. When the PT's were retired, so was the designation PT, as the new U.S. Air Force lumped all its trainers under the T heading. The 600-hp, 200-mph AT-6 became the new primary trainer, in order to cut down the growing number of steps up to the much faster new jet fighters and bombers. Gone was the PT, and with it went an era.

In its glory in early WW II days, the Ryan soon was made obsolete by the robust AT-6.

The wonderful little Ryans served out their time in the war and then became surplus to the nation's needs. Returning bomber and fighter jockeys remembered the airplane with great warmth, and bought them for a few pennies on the dollar. These became known as the ST-3KR when they became civilians. Most of the 100 or more still flying are ST-3KR's, and are easily and frequently spotted at fly-ins and less formal gatherings of enthusiasts. Most have been kept in their original form, with shiny aluminum and often the nostalgic old Army tail stripes and star-and-balls insignia to remind all of the last days of glamorous military flying.

Yet, while the PT-20/21/22 and ST-3KR accounted for the great bulk of Ryan trainers, there were others which made up part of the picture. The STM, a peppy trainer version of the STA Special, attracted the attention of numerous foreign air forces and found its way into many an odd corner of the world. Quite a few were ordered by the Dutch East Indies Air Force, and one Ryan with their unique red triangle insignia can be seen at fly-ins today.

In the days before World War II, it wasn't at all unusual to try an airplane on floats, and several models of the Ryan got that treatment, although the idea didn't offer enough to warrant development. One early version that looks like a different airplane was the STW, two of which were built with seven-cylinder Warner radial engines and provided with extremely clean cowlings.

The final effort was the ST-4 or YPT-25, an attempt to build the basic Ryan trainer out of materials which were not in such great demand for other military purposes. The result was an airplane of plastic-bonded wood which bore only limited similarity to the PT-22. Five were built, but this version never

Continued on page 76

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9½"	8-8½-9	90¢

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9"	6	75¢
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11"	6-7-8	85¢
12"	6	95¢
14"	6	$1.25

POWER PROPS		
11"	6-7-7½-8	85¢

NYLON PROPS

DIAM.	PITCH	PRICE
5¼"	3-4	30¢
6"	3-4	35¢
7"	4-6	50¢
8"	4-6	65¢
9"	4-6-7	85¢
10"	3½-6	85¢
11"	4-6-7-8	$1.00
12"	6	$1.50

POWER PROPS

5¼"	3-4	30¢
6"	3-4	30¢
7"	4-6	40¢
8"	4-5-6	45¢
9"	6-8	50¢
10"	6-8	55¢
11"	4-6-8	65¢
12"	4-5-6-8	70¢

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DIAM.	PITCH	PRICE
6"	3-4-5	30¢
7"	3-4-6	40¢
8"	3½-5-6-8	45¢
9"	4-5-6-7-8	50¢
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11"	4-5-6-7¾-8-8¼	65¢
12"	4-5-6-8	70¢
13"	5½	80¢
14"	4-6	90¢

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6"	7-7½-8	60¢
7"	7½-8-9½-10-10½	65¢
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ACE R/C INC.

HIGGINSVILLE, MO. 64037

Above picture shows Harley Michaelis and his 12 foot Miskeet Mark I. In addition to the big stuff, Harley flies and designs the little stuff. We invite you to read his comments below:

"Installed the Commander R/O Stomper unit in Mod-Pod today and tried it on the electric winch I use to haul up my 12 foot Miskeet, running wide open. There was ample power in the Stomper to provide full control during the speedy ascent--no blow-back noted in the airstream.

"After one tow I rode a thermal to a 19:45 flight to near limits of visibility, making my Level 2 thermal flight requirement of the LSF Soaring Accomplishments Program quite unexpectedly.

"Am truly impressed with the power, range and reliability of this outfit. The Commander series have been great friends in my soaring work. Many pleasurable hours have been spent at the slope and with power assist, flying rudder only, and now there will be many more knowing the electric winch can be adequately handled, too."

Sincerely,

Harley Michaelis
LSFO23

The Miskeet is being kitted by Fliteglas Models, Box 98851, Des Moines, Washington, 98188. The Mod-Pod is being kitted by Dumas Products, Tucson, Arizona, 85716.

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The Upstart by Owen Kampen is the first in a series of 1/2 A Midget Race-for Fun Airplanes! Featured in RCM, this event is catching on like wild fire.

Upstart has 34" span, 6" chord, 200+ sq. in., an overall weight of 20 to 26 oz., designed specifically for two channel R/C systems or two servos of any digital set. For use with rudder and elevator only. Rudder response is so effective that ailerons are not required! Motor control is not used.

The Ace kit contains our constant chord foam wing, and is a deluxe Custom kit with all of the balsa and ply-wood parts band-sawed and precision-sanded from prime Micro-Cut.

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Does not contain wheels, linkage, covering material, optional spinner, or other accessories.

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Ideal For New 1/2 A Racers!

Special 17% semi-symmetrical airfoil expanded foam developed by Owen Kampen for the small planes.

The constant chord measures 35" span, width is 5½". Area is 192.5. Weight about 3 oz.

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For the Beginner or Expert!

(Designed especially for pulse)

NOW! A Mini Foam Wing Airplane Kit. This is a first! DESIGNED FOR PULSE!

This kit of the Dick's Dream, designed by Owen Kampen, has been extensively test flown in various parts of the country. It has several innovations which are for the small breed of airplane specifically, and with the foam wing the beginner is assured of overcoming a big drawback to success. Features crutch type fuselage construction to assure line-up and accuracy.

Full step by step instructions to assist in building this gem of a kit, AND ultra simple installation shown for the Commander R/O Baby or Baby Twin!

Span is 32" (cut from the Ace taper wing foam sections), 5½" chord, length is 25 inches. Weight with R/C gear is 12 to 14 ounces.

With a Pee Wee .020 and a Commander R/O Baby you have a docile performer and excellent trainer. If you want something hot, Tee Dee .020 with the Commander R/O Baby Twin will do the job--it'll do everything in the Rudder Only book!

No. 13L100—Dick's Dream Foam Wing Airplane Kit $5.95

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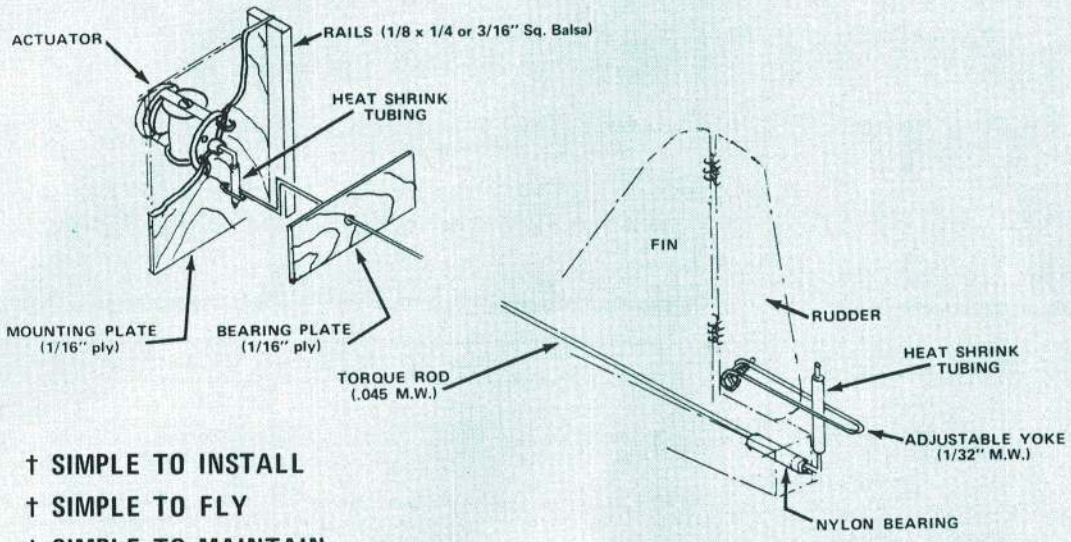

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* FULLY PROPORTIONAL

* LIGHTEST WEIGHT--2.5 oz. for the Baby w/225 ma nicads.

* LOWEST COST--begin at $59.95! (less batteries and charger).

* SIMPLEST--only one moving part, easily serviced and maintained; noise free.

* VERSATILE--Arrange to suit your particular installation. You can go up or down in size without obsoleting your receiver or transmitter. Simple changes of battery packs and actuators allow change at will. Or add Motor Control to Standard or Stomper--using same battery pack.

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Our Commander R/O Pulse Combos are available in 4 sizes for most sporting needs from the smallest to the larger aircraft--or boats.

The Baby is for .010 to .020 jobs. Has two 225 ma Nickel Cadmiums and the regular Baby Adams. Airborne weight is 2.5 oz.

The Twin Baby is for hot .010 to .020 jobs. As above, except uses Twin Baby actuator. Airborne weight is 2.9 ounces.

The Standard uses the Single Adams for more power for .049 to .07 size. Uses larger capacity nickel cads. Airborne weight is 4.5 oz.

The Stomper uses the Twin Adams actuator for up to .15. Airborne weight is 4.9 oz.

No. 10G15—R/O Baby Combo	$69.95
No. 10G15T—R/O Twin Baby Combo	72.95
No. 10G16—R/O Standard Combo	71.95
No. 10G17—R/O Stomper Combo	74.95

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Continued from page 72

entered production.

As a military trainer, the Ryan has seen its day, but it was a good day. As a civilian sportplane, and as a rare bird, it is very much in demand. And as an aerobatic airplane, which every Army primary trainer had to be, it can still hold its own. Not against the Pitts Specials and that sort of machine, of course. But as recently as the 1969 U.S. National Aerobatics Championships, a Ryan STA flown by John Gosney placed second in the Advanced Category. Not bad for a 30-year-old airplane.

ST—prototype flew June 8,1934; 3 built 1934-36; 95-hp Menasco B4.

STA—56 built 1935-39; 125-hp Menasco C4.

STA Special—11 built 1937-39; 150-hp Menasco C4S.

STB—1 built 1935.

STK—1 built 1940; 125-hp Menasco B5.

STM—2 civil built 1939; export version of STA Special; 150-hp Menasco C4S.

STM-S2—STM on floats; 150-hp Menasco C4S.

STW—2 built 1939; one with 125-hp Warner Scarab, one with 160-hp Warner Super Scarab.

ST-3—25 ordered by Netherlands became PT-22A in 1942.

ST-3KR—civilianized ex-military PT-21 and PT-22; 160-hp Kinner R-540.

ST-3S—first PT-21 with Edo floats; 160-hp Kinner.

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Propylene Oxide	2 %
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Methanol Alcohol	67½%

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FORMULA FOR CONTEST

Baker's AA Castor Oil	22½%
Lubricin N-1	2%
Varfree Oil	1%
Propylene Oxide	2%
Nitromethane	25%
Methanol Alcohol	47½%

R C SPECIAL
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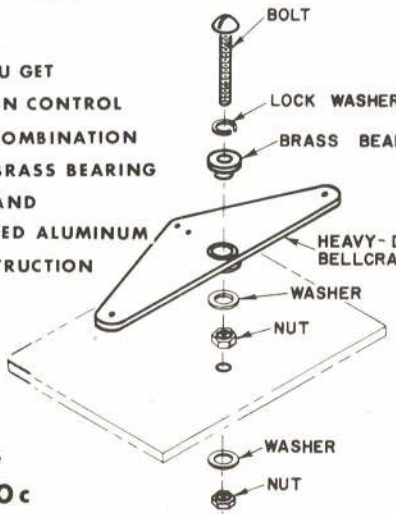

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St-4—civil designation of YPT-25.

XPT-16—one STA for USAAC in 1939; 125-hp Menasco C4.

YPT-16—15 built for USAAC in 1939; 125-hp Menasco C4.

PT-16A—all YPT-16s modified to 132-hp Kinner R-440-1 engine in 1940.

PT-20—30 built in 1941; like YPT-16 with bigger cockpit;125-hp Menasco C4. PT-20A—27 PT-20s modified in 1941 to 132-hp Kinner R-440-1.

PT-20B—3 PT-20s modified in 1941 to 125-hp Menasco D4.

PT-21—100 built in 1941; 132-hp Kinner R-440-3.

PT-22—1023 built in 1941; like PT-21 with 160-hp Kinner R-540-1 and no landing gear fairings.

PT-22A—25 ST-3s ordered by Netherlands; 160-hp Kinner R-540-1.

PT-22C—250 PT-22s modified to Kinner R-540-3.

YPT-25—5 built 1942-43; 185-hp Lycoming 0-435-1.

NR-1—100 PT-22s for USN; 125-hp Kinner R-440-B5.

Specifications: Ryan

Dimensions:

Length	21' 5 3/8"	22' 5"
Wingspan	29' 11'	30' 1"
Height	6' 11"	7' 2"
Wing Area	124 sq. ft.	134 sq. ft.
Empty Weight	1023 lb.	1308 lb.
Gross Weight	1575 lb.	1860 lb.

Performance

Maximum Speed	150 mph	128 mph
Cruising Speed	127 mph	116 mph
Stalling Speed	42 mph	62 mph
Service Ceiling	17,500'	14,800'
Rate of Climb	1200 fpm	860 fpm
Range	350 mi.	325 mi.

INVITATION TO THE BLAST

American Aircraft Modeler will "rap" with the beginner on November 1. You 10- to 16-year-olds will flip over the all-new **Junior MODELER**, with its flying circus contents—great plans and wild crates, how-to-do-it articles, all sorts of goodies. We're putting the fun back in modeling. It's a blast. (See September AAM for more hints and stuff.)

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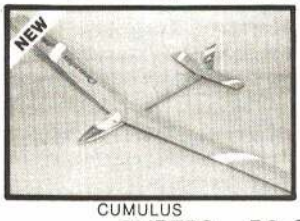

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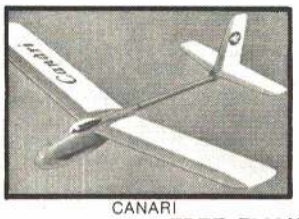
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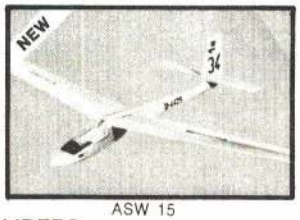

ASW 15

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Getting Started in RC

(continued from page 54)

cord. The usual setup is shown in the sketch. With the rubber cord stretched, total length is often 1000 ft.; ratio of rubber to nylon cord is varied depending upon the amount of wind present. With a reasonable breeze to launch against, the glider goes up like a kite and not as much rubber is required. A complete kit of the essentials for high-start launching can be purchased.

Winches are versatile and can give good results with very light wind. They can be either electric-motor or gas-engine driven. The electric units utilize an auto starter motor with a cord drum attached to its shaft, and a car battery for power. Lawnmower engines power most gas winches, which require speed reduction drive and a clutch, making them more complex. Gas winches usually are more powerful as was demonstrated when the DC/RC fliers launched five large gliders simultaneously from a single winch! When using a winch, it is usual to run the cord out to the far end of the field, over a special pulley, then back to the vicinity of the winch, where the glider is hooked on. This allows the glider pilot and winch operator to converse easily; power can be cut instantly if the glider gets into trouble during the launch. (See sketch B.)

Where fields are too small to utilize either high-start or winch launch, a small engine can be utilized on the glider. A four-lb., ten-ft. span glider can be taken to considerable heights by an 09 engine, running only one to two min. Throttles are seldom used; fuel tanks are small and the engine runs until the fuel is exhausted. Engines are mounted either on the fuselage nose (nylon propellers prevent breakage in most landings) or on a pylon over the wing. Both mountings have advantages and drawbacks. A nose-mounted engine takes the place of considerable lead weight which most gliders must carry, but the location makes starting more inconvenient and gets the glider dirtier. An engine mounted over the wing probably produces more drag. The real glider purists wouldn't deign to use an engine!

Most gliders today utilize only two controls—rudder and elevator. Rudders generally must be large and have wide movement each side of neutral. Elevator control, on the other hand, is often quite sensitive. Stunting gliders (usually flown on slopes) may have ailerons in addition. And some thermal soarers have flaps or spoilers.

With the many two- and three-control systems sold at quite reasonable cost today, equipment choice is wide. The so-called "brick" two-control systems (having a receiver and two servos in one small package) are ideal for glider uses. Before getting one, check the size of the fuselage compartment into which the equipment must fit. Many gliders—even some of those with ten-ft. wingspans—have very slender fuselages, and the new tiny individual servos may be needed.

The battery pack is always placed in the fuselage nose. Since this area often won't accommodate the popular "flatpack" of 500 maH nickel-cad cells, try to get a square pack or a round pack of 450 maH button cells. With only two servos in use, packs of 225 maH cells will often suffice for hours of flight; however, almost all gliders need lots of nose weight, and the larger and heavier battery packs might as well be used. Some fliers prefer to put the receiver in the compartment back of the battery, with the servos still farther back. However, two servos usually weigh more than a receiver, so the servos probably should go to the rear of the battery. Rearward receiver placement also affords more protection for this costly unit.

RC beginners, even those with some powered radio flying experience who want to try RC gliding, should not start out with a high performance glider like a Cirrus, Kurwi or the like. Choose a smaller, simpler kit job such as the Midwest Products Lil' T, Midwest Models E-Z-Juan, Graupner Amigo II or Dumas Evolution. All are in the 75-in. span area, a size that will give good performance at reasonable cost and expenditure of building time. There are many other good choices in this size category.

RC glider flying is quite different from power plane operation. Unlike the latter, limitless power is not available. Power in the form of rising air currents must be hunted for. This branch of RC modeling is attracting more and more attention, both from beginners and from experienced RC power plane pilots.

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_____paks of white	_____paks of white	
_____paks of yellow	_____paks of yellow	
_____paks of blue	_____paks of blue	
_____paks of orange	_____paks of orange	

Here is my favorite dealer's name so Coverite can credit his account

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Coupled Flaps

(continued from page 28)

used with four-channel systems. This can also be achieved in aircraft with removable wings by paralleling a flap servo with the elevator servo, as initially done in the Trainermaster. A strictly mechanical arrangement for a removable wing is difficult and, although a fifth servo is required, wing removal and installation is simplified. The flap servo in Figure 9 is mounted on the wing and the elevator servo is mounted in the fuselage.

A third method provides greater flexibility but requires at least a five-channel system and a slight modification to the transmitter. Figure 10 shows the modification made to the transmitters. This modification is quite simple in that only the addition of a trim potentiometer, a switch, and linkage to actuate the added potentiometer is required. This modification was performed on a Logictrol transmitter, an F&M transmitter, and an Orbit transmitter. Since transmitter layouts and arrangements vary so widely, there is little point in describing the detailed mechanization for these transmitters. Instead, the general arrangement shown in Figure 10 should be followed. This consists of the following steps:

(1) Attach a linkage to the bail of the elevator stick such that it can be used to move a control lever attached to the shaft of a good quality potentiometer to be used for the coupled flap function. The ratio of elevator-pot shaft rotation to rotation of the shaft of the added pot should be 4 to 1. This is achieved by making the radius to the link connection attached to the bail equal to one-fourth the radius of the lever controlling the added pot.

(2) Connect the leads from the added pot and the existing fifth channel pot to the end terminals of a DPDT switch (Figure 10) and connect the common terminals of this switch to the printed circuit points to which the fifth channel control pot wires originally connected.

With the above completed, one may select positionable flaps, controlled by the fifth channel control lever or coupled flaps controlled by movement of the elevator stick in ratio of one-fourth of the movement of the elevator servo. The reason for this will become apparent a little later.

Set-up of the flap servo is illustrated in Figure 11. It is desired to have flap travel plus and minus 10 to 15 degrees about neutral for

coupled operation and travel from neutral to around 40 degrees down for landing flaps. This is achieved as follows:

(1) With coupled flaps selected, rotate the shaft of the added potentiometer until the servo is positioned one-fourth of the way from one end of full travel. With the elevator stick at neutral, lock the lever to the shaft of the added pot. Now move the elevator stick; the fifth channel servo should follow, reaching the end of full travel (but not overrunning) when full down elevator is given. Travel from this new neutral on the fifth channel servo should be plus and minus one-fourth of full travel. If this presents an awkward linkage requirement in the transmitter, a lower value pot may be substituted and resistors used in series with the end terminals of the new pot to bring the total series value to 5000 ohms.

(2) Select "positionable" flaps and set the servo position at the same neutral point as under (1), using the fifth channel lever. Add a stop to the fifth channel lever to prevent the servo from going any further in the "up flaps" direction, i.e., toward the one-fourth end. Full movement of the auxiliary lever the other way will put the servo to full travel at the three-fourths end for full down flaps.

If it is not desirable to modify the transmitter, satisfactory coupling may be achieved mechanically in the airplane, although with certain limitations. Figure 12 illustrates the arrangement schematically and Figure 13 shows two mechanizations used. The limitation mentioned is the difficulty encountered in getting the proper relationship of throw when rotary output servos are used. This can be overcome easily if the trouble is

taken to construct a sliding connecting bar as shown in Figure 12.

Irrespective of the mechanization used, a number of ground rules which apply to the operation of coupled flaps and elevators were determined empirically. The optimum ratio of elevator/flap travel will differ for each airplane design. One plane may use equal travel, another a ratio of four to one (always more elevator). The optimum ratio will depend on CG location, moment arms, surface area, weight, etc. It has been our experience that flap area should be equal to and not more than 10 percent greater than elevator area. Flap chord should be 20 to 25 percent of the total wing chord including flap chord. It is suggested that the proper travel ratio be determined as follows.

Start with a ratio of four to one or perhaps six to one (e.g. five degrees of flap, 30 degrees elevator) and decrease the ratio in increments to as low as one to one, if necessary (i.e., 30 degrees flaps and 30 degrees elevator). The limitation will be the point at which non-linear response is met and/or there is failure to obtain clean spin entry. Remember, the amount of flap travel does not have to be maximized and any small amount is an asset!

The center of gravity is located at essentially the same point as for a conventional configuration, that is, at about 25 to 30 percent of the portion of the wing chord exluding flaps. This means that it will be at about 20 to 25 percent of total chord. This insures a stable model with minimum floating tendency and permits the model to be spun more readily with the longer rudder moment arm.

The flap cross section on the models tested was simply sheet balsa with no taper. Only slight rounding of the trailing edge was used. Thus the entire airfoil cross section, while still symmetrical, is reflexed both top and bottom. For best results, it is recommended that the gap on the elevator, flaps, and ailerons be sealed to prevent leakage. Strips of dry MonoKote were used on the models tested.

Results

The use of coupled elevators was successfully demonstrated on a number of models. The mechanization used permitted performance to be investigated during a given flight with and without flaps at the flick of the coupling switch. Based on these tests, it was found that the use of coupled elevators and flaps provides (1) smoother pitch maneuvering, (2) enhanced lateral stability, thus a bit more difficulty in achieving spins while coupled, (3) significantly enhanced landing characteristics, and (4) no noticeable cross-coupling into lateral or directional control.

Pitch maneuvers are performed with considerably greater ease using flaps. Square loops and the Top Hat maneuver are significantly enhanced. The application of flaps to a semi-symmetrrical airfoil permitted outside maneuvers otherwise unachievable. In this installation, a slight differential in flap movement may be desirable, for example, ten degrees up flap and five degrees down to equalize the lift from the airfoil for both inside and outside maneuvers.

Two negative results were encountered which were easily overcome by introducing the ability to position the flaps as well as coupling them. Landings with the flaps coupled for flight maneuvering (i.e., ± 10-15 degrees deflection) causes floating during landing which is overcome by extending the

flaps to 30 to 40 degrees for landing. As mentioned earlier, stall and spin entry is a bit more difficult and this is overcome by neutralizing flaps for spin or using more rudder deflection.

The question not yet fully answered is the effect of flaps on the high-powered, high wing loading stunt ships of today. Our tests of the Kwik Fli and some more recent tests on a Dragon Fli indicate that flaps are beneficial in permitting smoother pitch maneuvers without the 100-mph speeds which require powerful, expensive engines. In addition, positionable flaps definitely take the "hairiness" out of landing on this type model. Bear in mind that landing approaches are close to 40 mph for these seven- to eight-lb. models instead of a more comfortable 20-25 mph for models of three years ago, and that damage on impact is a function of kinetic energy. Since kinetic energy is a function of velocity squared, reducing speed by one-half reduces kinetic energy to one-fourth for a given model weight.

Power is dictated, however, by the requirements for the vertical maneuvers and the weight (seven to eight lbs, typically) of current models. The latter is the result of the desire for stability during windy weather.

At the earliest practical time, it is intended to continue investigations into performance of high-wing-loading models, perhaps with the help of some simple instrumentation such as a tiny model rocket movie camera, etc.

This summarizes the results of three years of experimentation. Participation is invited; try the coupled elevators and flaps and let us know the results. One final reminder: when the elevator goes down, the flaps must go up and vice-versa!

Hot Canary

(continued from page 18)

control throws down. Do not fly with a CG aft of that shown on the plans.

Construction

Building the Hot Canary poses no problem. The fuselage is a square box with no "fancies." Begin with the fuselage side assemblies, adding the ply doubler to the balsa sides with contact cement. Then add the 1/4" sq. longerons and 1/8" x 1/4" uprights with Titebond, making right- and left-hand panels. Lightly score the ply doublers at the bend points (shown in the plan view) and, with a straightedge over the scored line, gently crack the side assemblies so that a sharp bend point results.

Begin fuselage assembly by gluing the sides to the intermediate cabin area bulkheads. Add several temporary diagonal braces top and bottom to keep things square, then add the firewall, top and bottom sheeting, landing gear mount, etc.

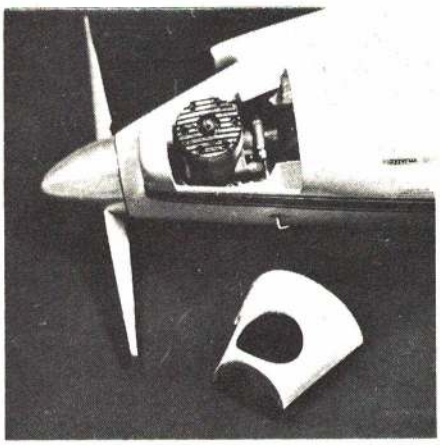
The 1/8" wing doublers should have the wing hold-down block cutouts cut right through, serving as doublers for the anchor blocks.

The wing and tail construction is straightforward. Both the upper and lower wings are made from the same foam cores, but are finished a little differently. Notch out the cores and add the vertical grain blocks where the hold-down screws go through. Add the trailing edge spar to each core and then the 1/16" lower skin. The top wing should have enough lower skin to reach the trailing edge; the lower wing stops at the spar.

On the top wing, fill in the trailing edge

area with foam or soft balsa. Then sand this down to the wing contour, leaving a feather edge at the trailing edge. Add on the upper wing), the balsa tips and finally the leading edges.

Finish the basic undercoat on the fuselage and tail before the tail surfaces are installed in the fuselage. At this point, it is a lot easier to put on the two coats of surfacing resin and sand them.



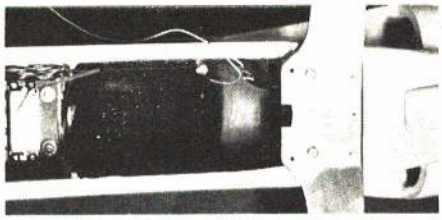
Lots of room in the engine compartment for easy, quick servicing. Needle is quite handy.

When this is done, place the elevator horn assembly, with its pushrod hooked up, in the fuselage, then slide the stabilizer in place and cement securely. Install the elevator onto the horn and hinges. Then cement the vertical fin in position and install the rudder. This method provides a neat tail end with only a rudder pushrod hanging out in the wind.

"Surfacing" resin is suggested as a basic undercoat for Hobbypoxy finish colors. We prefer this system of finishing primarily because we are lazy and like to get flying sooner. It involves one quickly brushed-on coat of resin, lightly sanded after drying about two hours. A second coat is flowed on carefully so that runs do not develop. After this has set up in about two hours, it is ready to accept a color coat. For a superb muscle-power finish, a third coat of DuPont gray lacquer primer can be sprayed on. This is sanded off as completely as possible.

The K&B rear-rotor engine with its new fuel shut-off racing venturi installed for NMPRA racing is shown, rather than the barrel throttle required for FAI. However, there is room for the throttle for FAI.

We flew the first ship with an inverted engine and fixed cheek cowls; the second,



Bottom wing leading edge notched to fit under aluminum landing gear blank.

side-mounted as shown with a removable cheek cowl. We prefer the clear-running side mount, but the inverted mount requires less work. Before any pylon turns are tried, take the ship up quite high and, after everything is trimmed for level flight, try a vertical full elevator turn. If the elevator throw is correct, a smooth tight turn will result with no sign of snapping. If it does snap, level out, land the ship and cut down the throw. Conversely, if the turn is too wide, increase the throw until full stick deflection gets the plane around quickly.

Tenderford

(continued from page 48)

occasionally so, if desired, three separate hooks can be used. We prefer the simplicity of the single unit, but Fulton Hungerford used three hooks on his original Nats model.

Propeller Assemblies: Obtain three North Pacific Skeeter ready-to-fly models. (locally, they are 15 cents each: also obtainable under the Toy House label through Montgomery Ward department stores). Might as well fly the Skeeters for a while before confiscating their props. Then put a wad of clay on each nose and give them to neighborhood kids to use as gliders!

Take a few moments to balance the props by sanding or scraping the heavy blades. This will reduce vibration and improve performance.

Using extreme caution, trim the lower portion of the plastic from each prop bearing hanger, as indicated on the plans. A molded-in groove located at the right place will serve as a guide for trimming. Do not trim away too much material or the bearing will be weakened. The excess plastic is removed for two reasons. First, greater clearance is provided for fully-wound rubber motors; second, the thread binding will close down the opening to create a snug fit over the motor sticks, which are smaller than the original Skeeter fuselage stick size. Coat the

thread with glue to hold it in position. Caution: use a type of glue that will not dissolve the plastic. Finally, add a drop of oil to each prop shaft to reduce friction.

Flying

Preparation: Make three single-loop rubber motors, allowing some slack in each. The center one should be slightly longer than the outer loops. With the motors in place, the model should balance close to the point shown on the plan. If necessary, add clay ballast to the front or rear of the model. A few gentle test glides should establish the need for addition or subtraction, but power flights will be required to determine final adjustments.

Winding and Flying: A man with four hands could do it alone! Seriously, obtain the services of a dependable helper and a mechanical winder. Winding three motors by hand seems to take forever. If you don't have a winder, send $2.98 plus 25 cents postage to: Whiting Products, Box 176, Wall Street Station, New York, N.Y. 10005. A winder is a good investment for use on any small rubber-powered model, and with care it will last for years.

The helper must hold the model by all three props, while winding, which in itself takes some doing! We have had good results by holding the model upside down and winding from the rear. Fairly low power is suggested until you get the hang of launching the model. All props should be released and spinning before launching the model.

At first, the launch angle should be in the 30 to 45 degree range. By watching the flight and particularly the glide, the need for more

or less ballast can be determined. The power circle can be adjusted by winding one of the outboard motors more than the other. The glide turn can be regulated by slight rudder bending or by means of a small amount of clay on the appropriate wing tip. If the model tends to stall under power but glides okay, tighten up the turn or increase power or both.

It is fun to experiment with this model's power. Two Pirelli or 1/8" brown rubber is a good choice for early flights. After the model has been adjusted, try moving up to 1/8" Pirelli. With that size, the model can be flown on a single prop or any combination of props. With 1/8" Pirelli on all props, the Tenderford Trimotor has vertical takeoff capability.

Acrostar

(continued from page 28)

bubble canopy was augmented by a window in the floor. With a 220-hp six-cylinder Franklin 6A-350-C1 engine, and competition weight of about 1325 lb., the Acrostar has one of the best power/weight ratios.

All of this should add up to an exciting aerobatic machine, but it was very new, and winning the Swiss title doesn't get any points in the World Meet, However, Arnold Wagner and Joe Hossl were convinced they had a potential winner, and they showed it at Hullavington. Wagner started out in third

U.S. team member Art Scholl prepares to fly Acrostar at World Aerobatics Championships.

place (of 50), then dropped to fourth at the end of the second and third rounds. He scored the highest of those who flew the fourth and final round, but bad weather forced cancellation of that round before it could be completed, and scores reverted to the end of the third. Thus Arnold Wagner, a Swiss DC-9 captain, placed fourth behind Russian champion Egorov and American aces Bob Herendeen and Charlie Hillard. Joe Hossl started out well, being ranked 11th at the end of the second round, but had a poor third flight and dropped way down.

And so, with a fourth-place finish among half a hundred of the world's best, the Acrostar made itself known in a hurry. That more is going to be seen and heard of it is a certainty. Wolf Hirth has gone into limited production of the airplane, turning out three during the 1970-71 winter season when things are a bit slow at the glider works. The first of these goes to French aerobat Andre Delcroix whose country will host the next World Championships in 1972; the second goes to a Swiss owner and the third to someone in West Germany. Plans call for a further five to be built during the winter of 1971-72 at a price somewhat above the current $23,500.

Sophistication has come to international aerobatics, and not even the most sour-faced Russian team "advisor" can ignore it.

Specifications: Acrostar

Dimensions:
Length—20' 8 13/16" (6.320 m)
Wingspan—26' 3" (8.000 m)
Wing area—111.4 sq. ft. (10.35 sq. m)
Root chord—5' 3" (1.600 m)
Tip chord—3' 5/16" (.925 m)
Aileron span—6' 6 3/4" (2.000 m)
Flap span—5' 2 13/64" (1.580 m)
Stabilator span—7' 6 9/16" (2.300 m)
Stabilator chord—2' 1 13/16" (.656 m)
Fuselage width—2' 9 1/16" (.840 m)
Landing gear tread—6' 9 3/32" (2.060 m)

Weights:
Empty weight—1073.8 lb. (487 kg)
Competition weight—1325 lb. (600 kg)
Fuel capacity—25 1/3 U.S. gal. (96 l)

Blue Ribbon Review

(Continued from page 53)

removed and all wiring is carefully laced and sleeving used where appropriate. Because of the compact layout of printed circuits and the minimal number of components required, there is quite a lot of empty space in the transmitter. As is usual with EK, the RF section and encoder are on separate boards.

The stick assembly is unique in the centering arrangement. Rather than the usual scissors spring or spring-loaded centering scissors plates, a new arrangement is used. This may be seen in the transmitter photo. A metal plate extends across the body of the stick assembly and is pivoted at one end. The other end is engaged by a spring. A flat molded plastic piece is attached to the bail and mates precisely with the metal plate. As the stick bail is moved, the corners of this flat plastic piece move against the metal plate to force it upward against the spring. Thus, neutral is achieved when the plate and plastic

piece are flat against each other. The net result is that there is absolutely no slop in the neutral of the stick. Stick force may be tailored to the individual flier by adjusting the spring tensioning screw in the appropriate post. Also unique in the stick assembly is the use of fired ceramic pot elements as used in servos.

A battery holder is provided for eight dry cells (12V total). Battery drain was measured at 150 mils–a little high for long use with carbon-zinc cells. I recommend the use of alkaline energizers instead, or better yet, nickel cadmium batteries.

Electronically, the transmitter is quite straightforward. The encoder board contains the timing circuit, set for approximately 30 frames per second, followed by three control pulse generators (half-shot multis). The train of four output pulses is wired to the RF board which also contains the modulator. A non-tunable RF oscillator is found there along with compact but sophisticated amplification and antenna matching circuitry. Don't be fooled by the small size of the RF board; the necessary RF filtering is achieved using subminiature molded RF chokes as inductive elements. There are six of these on the RF board.

The "brick" contains the receiver, decoder, two servo amplifiers and essentially the mechanics from the new Super-Mini servo developed by EK. As seen in the photo, the board mounted on stand-offs is the decoder/servo-amp board. The receiver is the smaller board with the IF cans apparent. A double-tuned front end is used. Discrete components are used throughout, including some extremely small capacitors–less than the size of a grain of wheat. The brick is 1 5/8" wide, 3 5/16" long (including the mounting lugs), and 1 5/8" high (including output arms).

The power and servo connection are via ITT subminiature connectors having gold-plated pins. A three-pin connector is used for power because this system does not use the bridge amplifier which permits two-wire packs. It will not be compatible with the old Logictrol pack! The switch potting arrangement was rather clever; all wires are soldered and restrained, then clear silastic is placed on the terminals and the back cover is put in place to form a neat potted connection not likely to come loose.

Electronically, the receiver accepts the incoming RF signal via a double-tuned front end and follows with the characteristic three-stage IF strip at 455 KHz. The receiver output is squared and decoded on the decoder/servo amp board. Components are rather densely packed on both boards and a material, presumed to be a polyurethane compound, applied to alleviate vibration effects.

The separate servo provided is the Super-Mini, measuring 11/16" wide, 1 3/4" long (including mounting lugs), and 1 11/16" high (including output arm). The servo amplifier is a two-deck design and requires center-tapped batteries. You may wonder what the difference is and why one or the other is used. The bridge amplifier, used in the EK Mini III servo, eliminates the center tap, and full battery voltage is used across the motor. The advantages are the elimination of one wire from the entire harness and, if the diode backup (described in a previous review) is used, a single cell failure in the airborne battery pack can be tolerated until landing.

However, the bridge amplifier is considerably more complex, with about twice as many transistors required. Thus, the Super Mini servo does not afford the space for such an amplifier. Little is lost in servo performance, although all center-tap type servos suffer from the thresholding effect of operating silicon transistors below three volts. This effect results in slight step-wise motion of servos in the direction of drive below center tap (i.e., with 2.4V) and is universal to all I have tested and to those I have designed.

A four-cell Du-Bro battery holder is provided for dry cells. It is absolutely necessary that alkaline energizers be used as the dry battery here. Do not expect to put standard 600 mah nickel cadmium cells in this holder; it isn't quite large enough. The battery holder and switch harness complete the airborne pack. All up weight with alkaline energizers, the brick, and one servo is approximately eight oz.

Bench Tests: Servo thrust at a radius of 7/16" averaged 2.5 lb., equal to a torque of 1.1 in.-lb. Outputs are rotary only and the end-to-end rate is approximately 0.7 sec., a moderately fast servo. Dead band is ten percent of trim travel or about plus or minus 0.5 degrees of rotary travel. This means that the Super-Mini is as good as all the center-tapped types but not quite as good as the EK Mini III bridge amplifier servo.

Transmitter current drain is 150 mils, airborne pack drain with servos quiet is 70-80 mils and can reach 300 to 350 mils with all servos moving moderately loaded.

Temperature tests were satisfactory from 20 degrees F to 150 degrees F.

Flight Tests: The Dee Bee Cardinal requires the following steps to ready for flight:

(1) Join the two wing halves, using plenty of epoxy and the plywood dihedral brace provided. The wing is not set up for ailerons; however, it could be adapted readily since the trailing edge is blunt and about 3/16" thick. After the epoxy sets, clean off any which has stuck to the outer wing skin and bond a 3/4" wide band of the plastic provided all the way around the joint. Bond on the wing tips, trim with decals and/or sticky MonoKote, and the wing is ready.

(2) Install the hold-down dowels for the wing, install the main and nose gear. Dee Bee recommends plywood cleats to hold the main gear to the plywood internal structure. Taking no chances, I sawed oak cleats and epoxied well.

(3) The engine may be mounted now (a 15 is recommended). Dee Bee states that "the nose compartment may be sealed but it isn't mandatory." I definitely recommend that the entire engine compartment be sealed with balsa scrap, epoxy and/or silastic bathtub sealant.

(4) Bond the vertical and horizontal stabilizers in place, and hinge the control surfaces to them. One point; a dowel extends through the stabilizer and fuselage and protrudes to support the vertical stab. Smear silastic on the dowel, top and bottom, to strengthen.

(5) Install the tank, add equipment and pushrods. Finally, if desired, install the wheel pants, using Williams or Fox flanged wheel pant retainers.

Flight Tests: The Cardinal is designed as an advanced trainer. While a 15 is recommended, I installed an O.S. 19 to operate from a grass field. The wheel pants were installed for initial flights, although Dee Bee states that they aren't too good in grass. Their advice proved to be exactly right!

Because of the wheel pants, the first flights were from a hand launch. What a surprise! I had expected a rather slow-flying, low-response model. Further, I had assumed that the rather small surface deflections recommended by Dee Bee wouldn't be enough so I used more. The CG was at the most aft point recommended. The bird really moved and controls were tremendously responsive. Everything was so smooth, responsive, and well-trimmed that we proceeded to "wring it out" the first flight. Inside loops, rolls, snap rolls, and spins. It wouldn't do a proper outside loop because of the aft CG. Several of the veteran fliers took a

turn at the stick and were quite impressed.

Next, my ten-year-old son, Jamie, was called into action to see if this thing could really be called a trainer. His experience has been with the very docile S-Ray which he has learned to take off, fly, and land. His first comment was that he didn't like the throttle lever around on the side but he quickly became used to that. Because of the responsiveness, initial turns were pylon-type. He concluded he didn't really like it. We then added weight to the nose to bring the CG to 2 1/2 inches from the leading edge of the wing at the juncture to the cabin. Surface throws were reduced to about plus or minus 1/4 in. for the elevator and plus or minus 3/8 in. for the rudder. Then the wheel pants were removed to test the bird as a trainer.

Ground takeoff became easy. It proved to be quite docile, still responsive but easy enough for the trainee, especially at reduced throttle. All the maneuvers were still practical and an outside loop could now be performed.

At the next flying session, serious radio interference was reported. (This is the year of the "active sun" and more interference must be expected because of "skip" from the ionosphere.) This was the time to check the immunity of the LRB! On the third flight, suddenly—a wild, screaming, unexpected spiral into the ground from about 150 ft. We expected to pick up a plastic bag full of parts. Not so! But for the pound or so of dirt in the nose, the airplane survived with virtually no damage, only a very slight wrinkle near one wing tip, not enough to ground the airplane. The nagging question: did our LRB "crap out," was it interference, or what?

Home for a careful check of everything, then turn on the set. Everything worked fine—initially. But after several minutes, the elevator servo began to drift toward down. The batteries were checked. The alkaline energizers in the airborne pack were fine, but the transmitter batteries showed 9.0V instead of 12, Carbon-zinc cells had been installed and two of them simply had died prematurely.

Out of all this came two valuable, if inadvertent, pieces of data. First, the Dee Bee Cardinal is really rugged. Second, don't trust carbon-zinc pen cells for any RC equipment used with an airplane. In fact, one of the alkaline cells purchased for the receiver was found bad when we went to install them. Check all batteries carefully and check them periodically when flying.

In summary, the LRB system is an excellent set, with no real quirks. Only one criticism: the Du-Bro battery holder is not marked for polarity; therefore, caution must be exercised when installing the batteries. Use

the following approach. The green wire is minus; use it as the starting point and place the minus end of the first battery there. Hold the bottom half of the holder so that the alignment pins are correctly positioned and observe the connector wire which contacts the top of the first battery installed. Place the second cell so that its negative end is under that wire. The positive end will now contact the white (center top) wire connection. Note that the white wire is connected to two terminal points. Set the negative end of the fourth cell over the red (+6.0V) connection. Now check back through. Starting at green, the cells should be connected in series for 6V with the white center top at 3.0V. Join the battery holder halves with the screw provided and check for proper voltage with a voltmeter. Turn on the set, check for proper operation and recheck battery voltages after at least ten minutes operation.

The Cardinal performs outstandingly as an advanced trainer, and is quite responsive and durable. Assembly is quick and easy. The wheel pants are a nuisance. Performance is really surprising with a 19, and a 15 should suffice nicely for training. I do not recommend the airplane for anyone who has not yet flown unless he has someone to help him. This is a key point. Most people can learn to fly on anything at reduced throttle, provided someone is willing to spend several hours helping them. But the flier who has no one to help him must have a first airplane which practically flys itself.

AEROBATIC TEAM—Welcoming competition aviators Howie Keefe (left) and Art Scholl to the L.M. Cox Racing and Aerobatic Team is Cox president Bill Selzer. Ceremony, held at Santa Monica airport, marked formation of the team. Keefe will fly his P-51D Mustang, Miss America, in pylon and distance air races. Scholl will maneuver the Super Chipmunk in aerobatic competitions and exhibitions.

AMA Contest Calendar

(continued from page 66)

AUG. 14-15—MINNEAPOLIS, MINN. (AA) TCRC 15th Annual RC Meet. Site: Club Field. T. Berman CD, 5620 Edgewater Blvd., Minneapolis, Minn. 55417. Sponsor: Twin City Radio Controllers.

AUG. 14-15—ENDICOTT, N.Y. (AA) 16th Annual Aeroguidance Society RC Contest. Site: Tri-Cities Airport. R. Noll CD, 96 Pine Knoll Rd., Endicott, N.Y. 13760. Sponsor: Aeroguidance Society, Inc.

AUG. 14-15—WYANDOTTE, MICH. (AA) Indian City 18th Annual RC Meet. Site: Penns. & Allan Rds. E. LYNN CD, 3167 22nd, Wyandotte, Mich. 48192. Sponsor: Indian City Radio Control Club, Inc.

AUG. 14-15—CLEVELAND, OHIO (AAA) 36th Annual Jr. CL Air Races and CL FAI Team Selection. Site: Cleveland Model Flying Field. B. Sargent CD, 1694 Wright Ave., Rocky River, Ohio 44116.

AUG. 14-15—WICHITA, KANS. (AA) 4th Annual Wichihawks Fall FF & CL Rally. Site: 13th & Webb Rd. L. Woolard CD, 1558 N. Battin, Wichita, Kans. 67208. Sponsor: Wichihawks Model Airplane Club.

AUG. 14-15—TULLAHOMA, TENN. (AA) 12th Annual Air Foiler FF Meet for Cat. II. Site: AEDC Field. A. Mansfield CD, 621 Glendale Pl., Tullahoma, Tenn. 37388. Sponsor: Coffee Airfoilers.

AUG. 15—ST. LOUIS, MO. (AAA) Midwestern CL Championships. Site: Buder Model Park. A. Schaefer CD, 4206 Virginia Ave., St. Louis, Mo. 63111. Sponsor: St. Louis Yellow Jackets, Inc.

AUG. 15—HASTINGS, MINN. (AA) Silent FF Meet for Cat. II. Site: Webers Air Strip. H. Langevin CD, 4854 Aldrich Ave. S., Minneapolis, Minn. 55407. Sponsor: Minneapolis Model Aero Club.

AUG. 15—LEVANT, N.Y. Flying Rebels RC Fun-Fly Meet for Auction. Site: Blanchard Rd. E. Ecklund CD, 75 Benson St., Jamestown, N.Y. 14701. Sponsor: Flying Rebels.

AUG. 15—WESTFIELD, IND. Fly for Fun Special Meet. Site: Westfield. H. Vandiver CD, 28 Wilson Dr., Carmel, Ind. 46032. Sponsor: Hamilton County RC Modelers.

AUG. 15—GREEN BAY, WISC. Summer Invitational RC Meet. Site: 2600 S. Gross Ave. R. Cowles, Jr. CD, 2424 Ducharme Ln., Green Bay, Wisc. 54301. Sponsor: Green Bay R.U.F. Club.

AUG. 15—EASTON, PENNA. (AA) BAM FF Bash for Cat. II. Site: Easton. R. Gutai CD, 334 West St., Bethlehem, Pa. 18018. Sponsor: Bath Area Modelaires.

AUG. 15—FLUSHING, N.Y. (AA) Assoc. of M.A.C. of Greater N.Y. CL Meet. Site: Flushing Meadow Park. W. Boss CD, 145-24 223 St., Laurelton, N.Y. 11413.

AUG. 15—OHIO CITY, OHIO (B) SHOO Flyers Club RC Contest. Site: Club Field. D. Kraner CD, RR 1, Ohio City, Ohio 45874. Sponsor: SHOO Flyers MAC, Inc.

AUG. 15—MOUNDSVILLE, W. VA. (A) Valley IFO's 4th Annual RC Fun Fly. Site: Fallen Timber Ln. S. Sturm CD, Box 5234, Vienna, W. Va. 26101. Sponsor: Valley IFO's Model Airplane Club.

AUG. 15—CEDAR RAPIDS, IOWA Skyhawks Fun Fair Meet. Site: Cedar Rapids.

J. Finn, Jr. CD, 368 Hampden Dr., N.E., Cedar Rapids, Iowa 52402.

AUG. 21-22—CLOVERDALE, ILL. (AA) 9th Annual AMA RC Contest. Site: Cloverdale. H Mosquera CD, 361 N. Arrowhead Trail, Carol Stream, Ill. 60187. Sponsor: West Suburban RC'ers, Inc.

AUG. 21-22—ORANGE, MASS. (AA) 18th Annual New England RC Championships. Site: Orange Municipal Airport. C. Piper CD, Highland Rd., Atkinson, N.H. 03811. Sponsor: New England RC Modelers, Inc.

AUG. 21-22—OMAHA, NEB. (AA) Omahawks 17th Annual RC Contest. Site: Omahawks RC Field. O. Olson CD, 1120 Loveland Dr., Omaha, Neb. 68124.

AUG. 21-22—FARGO, N.D. (AA) Red River Valley CL Championships. Site: FM Skylarks Flying Site. M. Olson CD, 305 27th Ave., N., Fargo, N.D. 58102. Sponsor: F.M. Skylarks.

AUG. 21-22—COURTLAND, ALA. (AA) Decatur 6th Annual RC Meet. Site: Old Courtland Air Base. J. Ray CD, 1304 Fletcher Ave., S.W., Decatur, Ala. 35601.

AUG. 21-22—NEDROW, N.Y. Aero Radio Control Club of Syracuse Fly for Fun. Site: A.R.C.S. Field. E. Izzo Cd, 3950 Highland Ave., Skaneateles, N.Y. 13152.

AUG. 21-22—SALT LAKE CITY, UTAH (AA) 9th Summer RC Fiesta. Site: Saltair Modelport. C. Pannier CD, 1781 Mountain View Dr., Salt Lake City, Utah. 84106.

AUG. 22—MIDLAND, TEX. (AA) Second Annual Midland Model Airplane CL Meet. Site: Air Park. F. Morgan CD, 4613 Thomason Dr., Midland, Tex, 79701. Sponsor: Flying Chaparrals.

AUG. 22—WHEELING, ILL. (AA) Red Baron's 1st Annual CL Meet. Site: Wolf & Palatine Rds. H. Cain CD. 525 Weidner Rd., Buffalo Grove, Ill. 60090. Sponsor: Red Barons Model Airplane Club.

AUG. 22—W. SUFFIELD, CONN. (AA) Nor-East RC Air Races. Site: NCRCC Field. R. Bernier CD, 761 Mather St., Suffield, Conn. 06078. Sponsor: Northern Connecticut Radio Control Club.

AUG 22—MANSFIELD, OHIO (AA) Electronic Flyers RC Meet. Site: Mt. Zion Road. M. Kalish CD, 235 Cline Ave., Mansfield, Ohio 44907.

AUG. 22—FAYETTEVILLE, ARK. Fayetteville Aeromodelers RC Fun Fly. Site: Younkin Fly Service. R. Hall CD, 1830 Old Wire Rd., Fayetteville, Ark. 72701. Sponsor: Fayetteville Aeromodelers RC Club.

AUG. 22—ALBANY, ORE. (AA) Northwest FF Championships for Cat. II. Site: Parker Field. B. Stalick CD, 1120 Shady Ln., Albany, Ore. 97321. Sponsor: Willamette Modelers Club, Inc.

AUG. 28-29—TULSA, OKLA. (AAA) Tulsa Glue Dobbers 22nd Annual FF, CL & RC Meet. Site: Glue Dobbers Field. W. Salnikov CD, Rt. 1, Box 130-C, Coweta, Okla. 74429. Sponsor: Tulsa Glue Dobbers, Inc.

AUG. 28-29—EUGENE, ORE. (AAA) Eugene Model Aero CL Meet. Site: Mahlon Sweet Field. R. VanDell CD, 869 Armstrong Ave., Eugene, Ore. 97402. Sponsor: Eugene Prop Spinners.

AUG. 28-29—SO. EL MONTE, CALIF. (AA) San Gabriel Annual RC Pattern Contest. Site: Whittier Narrows. J. Garabidian CD, 909 N. 3rd St., Montebello, Calif. 90640. Sponsor: San Gabriel Valley RC Club.

AUG. 28-29—LIVERMORE, CALIF. (AA) LSF 1971 RC Soaring Tournament. Site: Hummingbird Haven Glider Port. R. Andris CD, LSF-Box 2606 Mission Sta., Santa Clara, Calif. 95051. Sponsor: South Bay Soaring Society.

AUG. 28-29—JAMESTOWN, N.Y. (A) Flying Aces Inc. Annual RC Pylon Races. Site: Jamestown. W. Johnson CD, 62 Widrig Ave., Jamestown, N.Y. 14701.

AUG. 28-29—ST. CHARLES, MO. (AA) McDonnell Fourteenth Annual RC Meet. Site: McDonnell Douglas Conductron Plant. W. Feldmeier CD, 2955 Clearview Dr., Normandy, Mo. 63121. Sponsor: McDonnell RC Club.

AUG. 28-29—BENTON HARBOR, MICH. (AA) Whirlwinds Second Annual RC Meet. Site: CLub Field. C. Ellis CD, 3383 Valley View Dr., St. Joseph, Mich. 49085. Sponsor: Whirlwinds of Southwestern Michigan, Inc.

AUG. 29—GARDEN CITY, N.Y. (AA) LIDS Annual RC Meet. Site: Mitchel Field. Dr. W. Furori CD, 28 Fernwood Dr., Commack, N.Y. 11725.

AUG. 29—VALLEY PARK, MO (AA) 15th Annual AA CL Model Contest. Site: Buder Park. G. Frost CD, 22 Glynn Dr., Florissant, Mo. 63031. Sponsor: Hot Heads Model Airplane Club.

AUG. 29—RIALTO, CALIF. (AA) T-Bird Annual CL Meet. Site: Rialto Park. R. Seale CD, 214 So. Riverside Ave., Rialto, Calif. 92376.

AUG. 29—CHARDON, OHIO (AA) C.R.C. 9th Annual RC Pattern Contest. Site: Club Field. F. Vidmar CD, 26500 Zeman Ave., Euclid, Ohio 44132.

AUG. 29—HUNTSVILLE, ALA. (AA) Heart of Dixie CL Meet. Site: Old Huntsville Airport. L. Baker CD, 701 Esslinger Rd., S.E., Huntsville, Ala. Sponsor: Model Airplane Club of Huntsville.

AUG. 29—DAVENPORT, IOWA (AA) Fall Annual CL Model Airplane Meet. Site: Davenport Airport. J. Kroeger CD, 1218 So. Zenith, Davenport, Iowa 52802.

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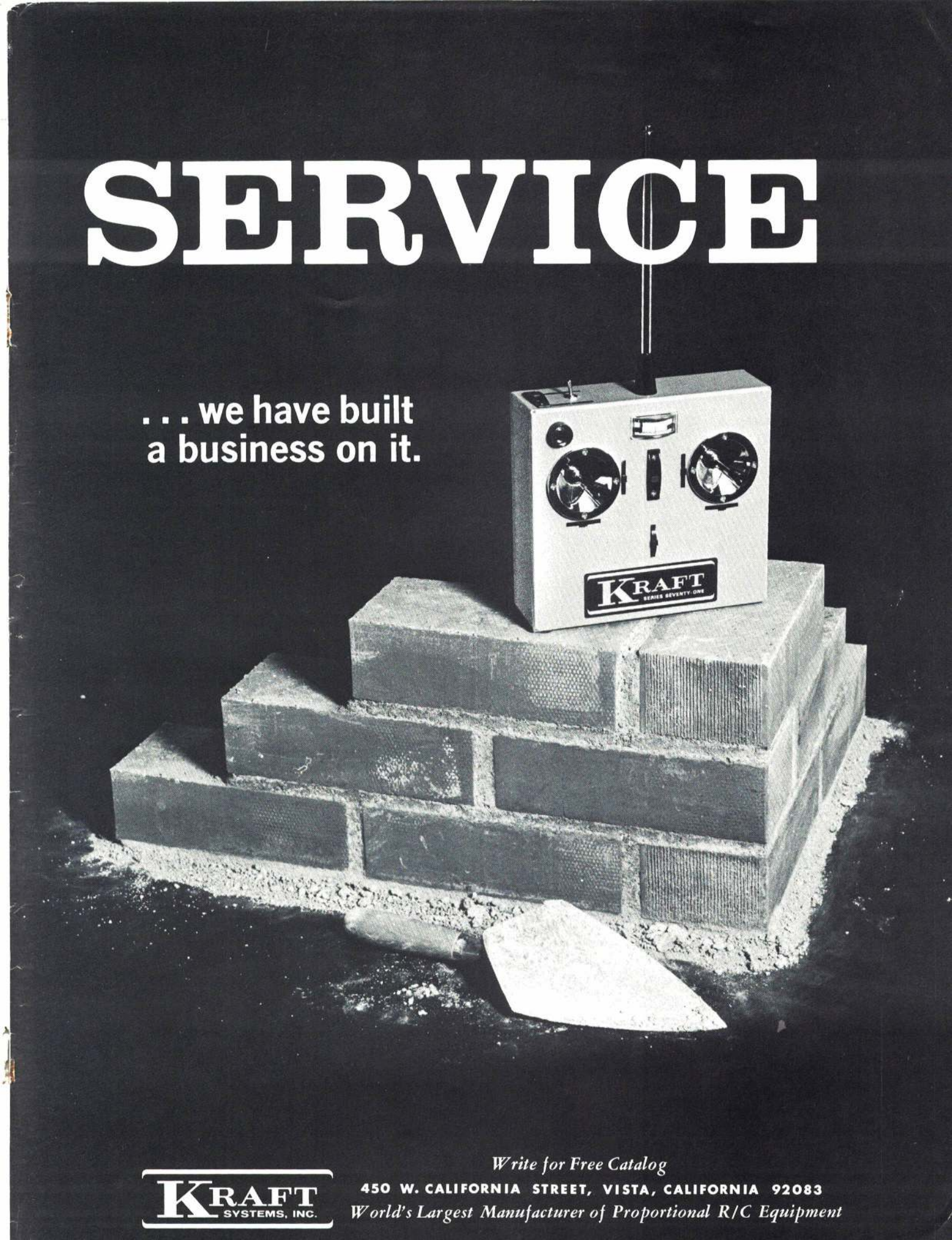

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