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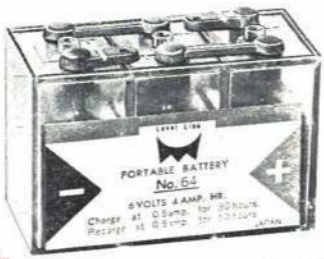

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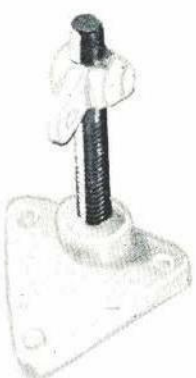

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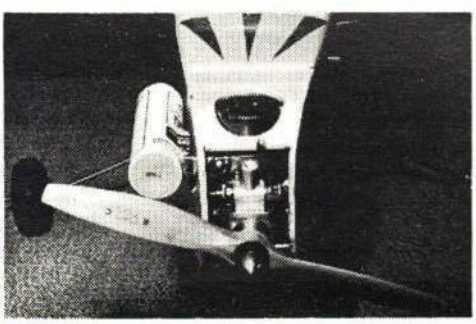
GROVER LOWERY FLIES HIS FOX 74 POWERED "NORTHWIND" 2,086 MILES DOWN ALCAN HIGHWAY

THE AIRPLANE – 8' Span, Home-built. Fox 74 Engine. Fox Glo-Plugs. Missile Mist Fuel with anti-freeze additive. Royal Classic Radio.

The model was flown from the right seat of Grover's bus, as his daughter, Regina, drove.



View of the power department. Fox 74 was unmodified in any way. What looks like a muffler was merely an exhaust deflector to prevent castor oil from freezing on surfaces.

Cold weather won't stop a model-builder...or a FOX engine. The 74 performed flawlessly through weather down to a minus 62 degrees.

Fuel economy – slightly under 10 gallons were used on the entire trip. This figures to over 200 miles per gallon.

Endurance – the second day's flight of 311 miles non-stop, taking 6 hours and 17 minutes in minus 45 degree weather, sets some sort of record, we think. About ½ gallon of fuel remained when he landed.

Equipment reliability – no needle adjustments were made. No Glo-Plug changes were made.

As his daughter, Regina, drove their small bus, Grover flew his "Northwind" from Beaver Creek, Canada, to Lethbridge, Canada...a distance of some 2,086 miles. The temperature – down to 62 degrees below zero. The altitude – an average of 2,500 feet above terrain. The flight was over a 10 day period with days 2 and 3 being flown non-stop...some 6 hours a day without refueling. Fuel stops after the third day were attributed to a fuel tank problem and human fatigue.

DATE	MILES FLOWN	STOPS FUEL	TEMP.	HRS.	MIN.
1/11	87	1	-54	2	10
1/12	311	0	-45	6	17
1/13	284	0	-37	6	0
1/14	203	4	-62	5	20
1/15	322	6	-48	7	55
1/16	80	4	-42	4	22
1/17	207	8	-14	5	30
1/18	200	7	-6	7	40
1/19	205	7	+18	7	25
1/20	187	4	+36	5	22
TOTALS					
10 DAYS	2,086 MILES		41 STOPS	58 HRS.	1 MIN.

Duke Fox congratulates Grover and his daughter, Regina, on their trip.

Grover says,..."I have never found a carburetor with the reliability at both low and high speeds, and one you could fly anywhere close to the amount of time this one has flown, without adjustments. Idle is excellent. Transition on this 74 from low to high speed, in my estimation, is as near perfect as you can get. One flip starts were the rule on our trip. No adjustment of needle valve was required, and not once did we have to change our Fox Glo-plugs."

AMERICAN aircraft modeler

COVER PHOTO: A group of enthusiastic Mod Pod flyers shows off the many ways to enjoy this craft. With or without an engine fly it FF, RC (single channel or multi), and also by tether. Transparency by Dan Brown.

WILLIAM J. WINTER — PUBLISHER
Kathryn Conover, Editorial Assistant

EDWARD C. SWEENEY, JR. — EDITOR
Eleanor Swavely, Editorial Assistant

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STRAIGHT...   ...AND LEVEL

There was once an engine called a G.H.Q. Remember? And while you are at it, Dick Korda is back in the news.

THERE are few issues these days for an editorialist to sink his teeth into. A sociologist could say something about this — for it is a phenomenon to most of us who remember years of chestbeating. Differences of opinion there may be, but they get ironed out peacefully or just get lost in the shuffle.

The most curious issue in a long while is whether or not a G.H.Q. engine ever ran. Johnnie Smith referred to those initials as meaning "Gosh, how quiet." During WW II when engines were not to be had, and magazines were showing us how to make airplanes out of cardboard because balsa was needed for rafts, you could buy a G.H.Q. by mail order. Complaints about their not running were endless. It has been commonly assumed ever since that no G.H.Q. ever ran. Occasional letters keep alive bitter memories.

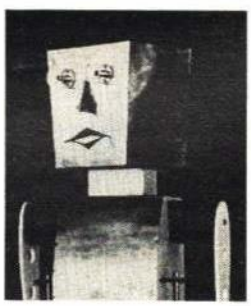
At this magazine many years ago, three engines were obtained, clamped to a table, and experts who visited the office were challenged to start one. Wet fuel in the stacks would slurpily ignite to cast sheet-lightning flashes on the walls. When the advertiser was pressed he pointed to the fine print which said the thing ran in the opposite direction, as he demonstrated. At a Detroit Nationals one flew overhead, prop going anti-clockwise, fine print or not. All of 50 feet up, but it was making noise. And there was a farm boy who, in the dead of the night, led us to a small tool shed where he'd clamped a gas engine to a huge bench with two by four legs. Knew nothing about models, just wanted us to see his new engine. A G.H.Q.! He flipped it and, by gosh, it was off to the races — and in the "right" direction. It turned up such a storm, and vibrated so badly, that the heavy bench danced around the room. An issue to argue? We say it ran — sometimes. . . .

HALL OF FAME selections have been announced for 1970. Nominations were made by present members, AMA district vice presidents, and magazine editors. Each submitted a list of ten nominees. Three nominees, who totalled at least eight votes for 1970, were Dick Korda, Al Lewis and another magazine type. Al Lewis was once Executive Director of AMA, editor of the *American Modeler* and is best known today for *Air Progress* and associated sport and home-built aircraft publications. But it is Dick we'd like to talk about.

In his time, he may have been the most famous modeler who ever lived. Dick literally exploded into an international fame. He held a hot hand, as had Maxwell Bassett who a few years earlier introduced the gas-powered model to national competition. Gas was on the scene, and free flight was escalating like radio of, say, five years ago. The rubber model "was still around," as it is today, but it was hanging on to its one-time kingship.

Dick was winning meets in the mid-thirties. Then, before the days of maxes, he put up a spectacular 54-minute winning flight with his traditional slab-sider. When this magazine published the plan in 1937, the title was simply "54 Minutes." Every kid in the land was Korda-crazy. One company kitted a cheap version which was around for many years. Dick then won the Wakefield finals in 1939 at Bendix, N. J., with a 44-minute flight. With Al Casano, the writer timed the flight which hit two successive thermals about 50 feet up. At the first Mirror Meet after the war in 1946, Korda appeared with his famous Powerhouse free-flight. Its flight pattern and dramatic performance were to influence national design.

Dick had one of the early "high" rpm post-war engines and put on a small prop — the distinctive howl was the sound of the future. The ship flew in a shallow climb at tremendous speed, making a wide, wide 180-degree turn. When the engine cut, the craft continued smoothly into the glide. Dick was a soft-spoken guy who make everything seem as simple as an ROG. But he had the appeal of a home-run hitter. Like Jim Walker he was a guy you couldn't forget. The Hall of Fame Nominating Committee didn't.



IN the Oct. issue on this page appeared a picture of a radio-controlled robot, along with a $5 prize offer for the cleverest caption sent in by a reader. When the dust settled, we wrote N. King, of Eureka, Cal., to advise "him" he'd won. In return came a nice note saying "N" stood for Natalie, and that she and husband Wayne operate King's Hobbies, in the Redwood Empire area of the state. They do a great R/C business. Wayne especially enjoys the discussion of new products, etc., in order to keep up with the latest for the store. Natalie likes to watch the flying. Now what was the winning caption? "Surely, doctor, there must be a cure for the seven-year glitch!"

Thanks for the memories

Every boy should have a hero and Jim Walker was mine.

You wonder what would prompt a statement like that? It was your article in a back issue of AAM (Nov. '68, Straight and Level). A friend had brought me that issue and wanted me to read an article. After reading it, I leafed through the issue and out pops the name Jim Walker.

I am a physical education instructor and coach at a local junior high school. I started making models in 1939 and in 1943 met Bob Smurthwaite in Oregon. He later worked for Jim and still later started A. J. Roberts Model Co.

I moved to Portland and was awed on occasion by Jim and his R/C chewing up paper plates during half-time at some of the local gyms. I also watched him chase sea gulls. Thanks for bringing back some very fond memories of a grand guy and a wonderful period of my youth.

I still have some models in my garage with lots of dust, but I have two daughters and hope to get them turning in circles one of these times.

Clyde W. Warner, Oceanside, Ca.

Envies hobby/work combo

We get some of your magazines here in Rhodesia: *AAM*, *MAN* and *Aeromodeller*; but we take our chances as to when they come, and it's a matter of getting to the bookshop to grab 'em before someone else does! The bookstore won't accept subscriptions, so we just fight for the few copies.

Our nearest model shop is 180 miles away, but it's pretty good and stocks as much as the currency allocation permits. However, by U. S. standards it's a pretty expensive hobby here. A Logictrol 5, for instance, costs about £ 210, which is about two months salary for an artisan, so you can take it from there.

We still manage to have a lot of fun from our modeling whether it be R/C, C/L or F/F. I must confess I have little patience with those modelers who maintain that theirs is the only way to go, and all the other branches of the hobby are only for idiots — we even have 'em out here!

I expect you've heard this one before, too, but I want to place on record my envy of you, your staff and everyone else who earns a living from the hobby industry! It must be great to work at your hobby — or does it cease to be a hobby when it becomes one's work? The idea appeals to me, anyway!

Ron Rigby, Umtali, Rhodesia

Ron: We are as curious about that 180 miles to the nearest hobby shop as you are about our work here being a hobby. To answer your question, it isn't exactly fun, but we'd sure hate to work on any other type of magazine. — Publisher

A man to remember

I read with concerned interest your fine remarks about Christy Magrath of St. Louis (Feb. 1970, Straight and Level).

You see, Christy was my dear friend in those horrible depression days. Besides being at my home frequently, he was also with me the same day I set the new world twin-pusher record of 18:15 sec. back in 1930. Christy actually wept for joy . . .

Yep, I had beaten out Joe Earhardt for the free trip to the Nats that year. Considering, though, that I can still cover a five-day Nats on foot and also retrieve hot power ships going way out there, I don't feel as old as I am. Only wish old Chris was still around to watch, because back then Christy seemed old to me in his thirties and was always "out of breath."

I am also the instigator of the Christy Magrath Memorial Outdoor Trophy (started 1965) and awarded to the most outstanding outdoor St. Louis AMA member each year.

Carl W. Fries, Crestwood, Mo.

Ooops!

In the February 1970 *American Aircraft Modeler*, the article "Germany's Siamese Twin" was credited in its entirety to a single author. However, a look at the original manuscript will show that it was prepared by both myself and Jene Procknow. The published article deleted Mr. Procknow's name.

Considering the time and effort invested by Mr. Procknow, you can certainly understand how he must feel. Of course, failure to include his name as part of the byline was, almost certainly, an oversight. In light of this, I'm sure acknowlegement of the error would be satisfactory to all concerned.

Richard Marmo, Ft. Worth, Texas

Creativity dead?

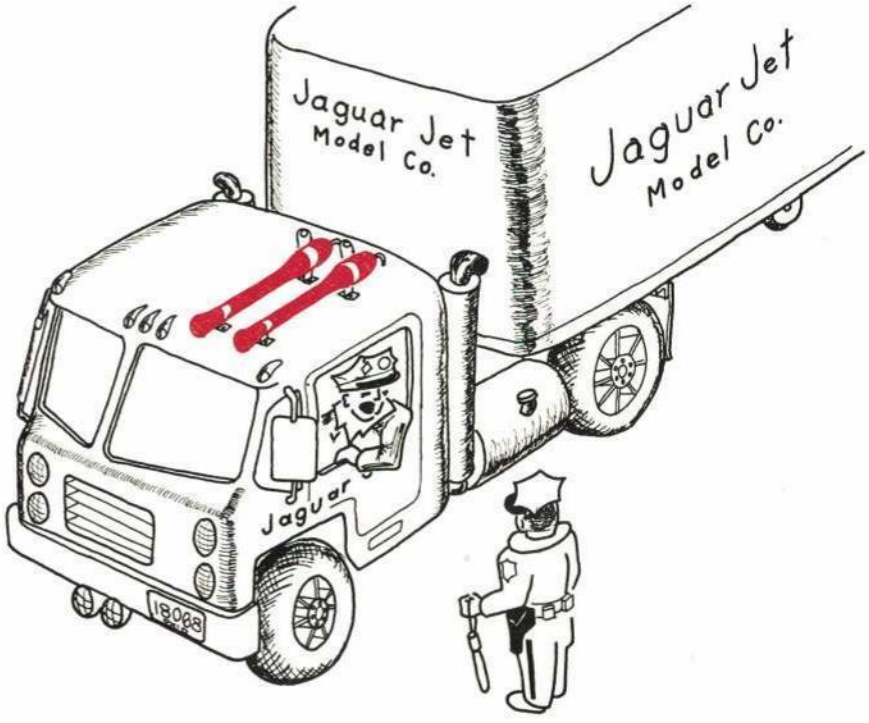
Since coming to Germany, I have been keeping my sanity only through the efforts of such magazines as yours. Reading about my favorite sport (and occasionally plying it) is one of the mainstays of keeping "straight and level" while serving in the U. S. Army.

To comment on the oft-repeated problem of juniors. I realize that everyone has an answer — all of which are partially correct and at the same time in error. As a one-time (hope to return) school teacher of art, I have often watched my students at both work and play and tried to identify with their ever-changing values and morals, a task which is discouraging and sometimes impossible. What I have observed (at the time related to art and the creation of it or lack of) was that the young people of today usually find themselves in their teens emerging from the mold that Mom and Dad and society in general have fashioned for them.

Those things stressed the most tend to be: 1) athletics and, 2) music. Creativity of any sort seems to place low (if at all) on the list. Pushing one's child to be original and creative instead of a fast runner or outstanding pass receiver doesn't even enter the mind of most parents and sadly, most educators. It is always easier and less painful to give junior a detailed kit or preplanned project which upon completion gives him only a nice reproduction of the original.

It's an easy rut to fall into and once in it a tough one to get out of. Life becomes a ritual of doing things in a "ready built" manner. A time consuming, thought provoking project is just not in the scheme of things. Buy it and fly it and if it isn't your "thing," when you discard it you don't really lose anything that means much.

I don't have a solution — only an opinion. It is my belief that the lack of interest of juniors in modeling cannot be placed en-



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YOU said it!

Continued from page 6

tirely on the modelers. Some (most) must be placed on those who usually bear the brunt of all our mistakes — the parents. As soon as the American parent wakes up and takes an avid interest in his own offspring the model hobby will again prosper — whether the modelers themselves help or not. It's just a natural for any creative individual.

Again let me say that these are just a few thoughts of an old man who occasionally gets a bit disgusted with the "ready made" state of things and hopes for a change. Lest any coaches or musicians assail me, I state only two of those things which are endeavors of rote memorization and, unless pursued in depth, produce no creation — only a reproduction.

Steve Walker, APO N.Y.

We've stopped talking about that "junior problem," but the Mississippi just keeps rolling along. Steve seems to be speaking about all of us, old and young, modelers and non-modelers, and what he seems to be saying is that there is still satisfaction and reward in sometimes digging a little more deeply into things. Personally, we wish someone would do something about those cold days at the flying field; maybe even proxy-fly for us. Horrors! — Publisher.

A rose by any other name . . .

Thank you for printing my picture in the January 1970 issue! ("Rhinebeck 1969") It was a first for me after 12 years in the hobby and proved to my wife where I was that weekend.

You did, however, cut me deep when you called my Fokker D-7 a Sterling kit! This model is *100% scratch-built* and credit for the design should go to Ray Rinker from around Maine, N. Y.

All the members of my club (over 30 of them) are really kidding me on this one.

Thanking you in advance for a correction on this —

Bob Dean, Waverly, N. Y.

Caviar appetite, hamburger budget

Howdy! I am 14 years of age and have a four-channel digital proportional system in a Senior Falcon which I purchased from an individual. Take in mind I had never seen an R/C fly! But a few weeks later I visited a field and watched a man fly his plane; knowing that I had never flown one, he allowed me to fly his — after gaining altitude, of course. And boy, was I amazed! I didn't think such a groovy thing existed.

Then I got to thinking: fuel, parts, glow plugs, batteries, you name it — I realized I had a million-dollar appetite and a soda pop income.

But by reading AAM for about 16 months, I now find I am capable of repairing and flying my own wings with least expense!

Paul Linney, Houston, Texas

All our yesterdays . . .

First, let me say that the format in *American Aircraft Modeler* is the finest ever in an American magazine. Your last three editorials are classics. If they don't touch anyone who reads them that person has to be dead.

I started flying "penny" gliders in New York about 1935. I just received a letter from my dad reminding me of getting them stuck on fire escapes and to quote a line from his letter, "Somehow they were fascinating, especially when the glide angle was scientifically controlled by a blade of grass attached to the stabilizer." I used two straight pins for landing gear to add realism. (Realism to a 5-year-old!)

By the age of eight I had graduated to hand-launched gliders which I flew in Van Cortlandt Park (Bronx) while dreaming of the day I could have a real engine and fly models like the giants of that era flew there. It wasn't until after WW II that my dream came true. I bought a used Ohlsson 19 (very used) and built an American Ace for it. That was a most beautiful gliding free flight. To fly, a few staunch modelers (me too!) would get to Van Cortlandt Park at dawn and sneak in a few precious flights before the horse-mounted cops would chase us out.

Then there was lots of C/L flying until the Army got me. After the service it was marriage and family and what seemed an eternity of night school. Had my own business a couple of years and nearly starved.

Finally in 1961, living in California, I found Sepulveda Basin. Big, flat, hot — but a beautiful free-flight field. So I went to a hobby shop, bought a plane by a familiar designer, Carl Goldberg. A nice Viking and a Holland Hornet to pull it. Since I had only flown a few HL gliders in the previous 12 years I was very careful to build it and balance it exactly to plans. The only adjustments the plane needed were stab tilt and (after trying down-thrust) up-thrust.

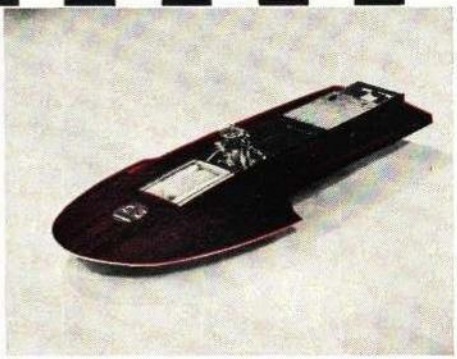
My new-found "friends" at the basin gave me a hard time about building a Viking, "which wasn't as good as a Satellite by Bob Hunter" (It looked like a skinny Sailplane to me, and was.). Using a Holland Hornet instead of the new T.D., I took them to task and won the San Valeers annual the following week at Taft, Calif.

However, the sound of these new screaming glow engines somehow wasn't what I wanted. So I scrounged through my plans and came up with an old "Buzzard Bombshell." I built it strong and heavy, fiberglassed the nose and mounted an Ohlsson 60. That plane was graceful and realistic, and the glide wasn't half bad considering it weighed 72 oz.! It did 24 minutes in the Basin one day when I forgot to light the fuse. Then I found out about Old Timers and, oh boy, I've been living ever since. You printed a picture of the Buzzard taking off at an Old Timers meet (October, 1965). By this time the model was about three years old and had proven itself a consistent loser because of a weak Ohlsson and its weight. But I built a Zipper, Brigadier, Ranger, Rocketeer, Zombie, Wedgie, Canadian Wasp, a Cloud King and some I can't remember right now. They had two things in common: sweet sounding and smelling (gas and oil) engines, and beautiful, graceful gliding. Amen to your article about Soaring.

We (Southern California Ignition Flyers) found a great new event for limited-size fields this year, and it really drags out the contestants! We call it the SCIF .020 event.

Take any free-flight designed prior to Dec. 1942. Scale it if you wish (there were many "Atom" jobs that fit the event as is) and power it with any engine up to .020 displacement. We had a scaled down Sadler low-wing, a scaled KG-1, scaled Eastern States Gas Champ, and many Atom types. (36" Buzzards, "A" Zippers, et al.) Because of a good crop of corn in all directions, we flew 13 seconds ROG and two minutes max. Six attempts for three max's. In case of tie include fourth, fifth, and if necessary sixth flight time. Only one plane had three straight max's. It was a beautifully trimmed 36" Buzzard with a TD .020. You would have to see how marginal the power

Continued on page 88



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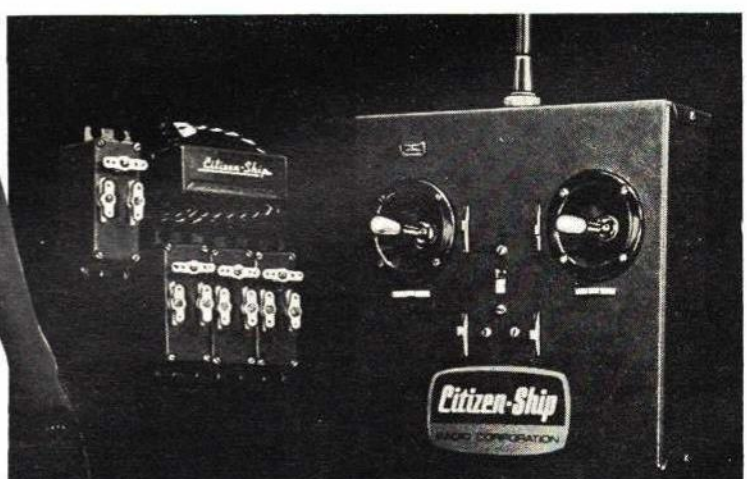

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Tornado wood prop
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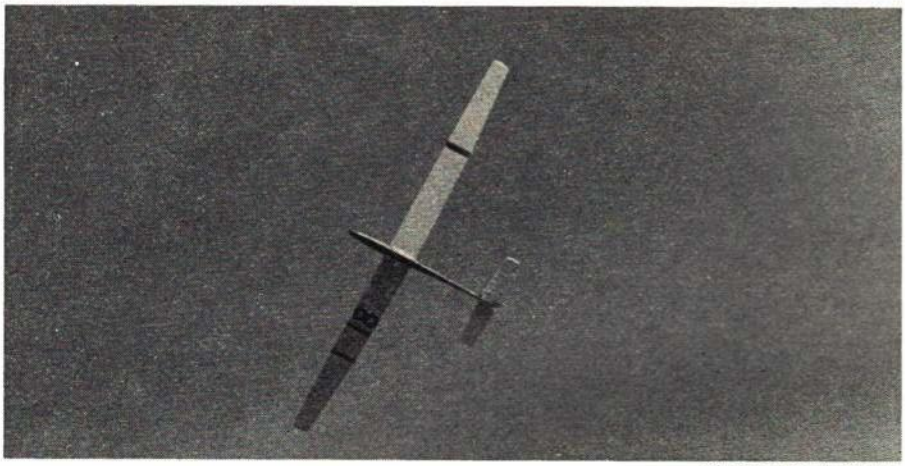
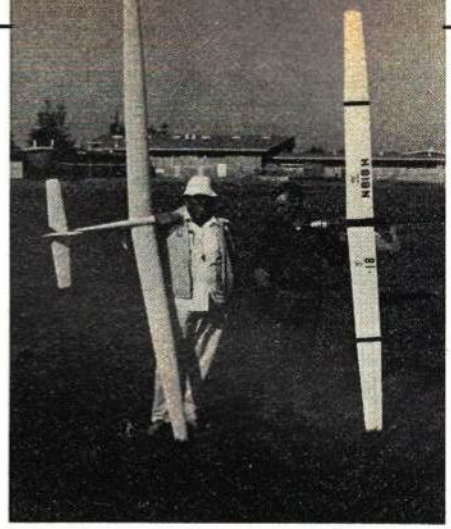


All photos Monty Groves.

The pylon event starts with the tow and requires a two-lap solo race around a very large closed course. Here Hebner's Cirrus makes swishing pass. Last lap is often a near-landing.



Roger Hebner (right) telling Crawford, "You made the wings too long."

ON THE SCENE

The League of Silent Flight

Contest by South Bay Soaring Society proves meets can be held on a baseball diamond right in the middle of town.

PATRICIA GROVES

NORTHERN California's *South Bay Soaring Society* held last year its First Annual Christmas Soaring Contest. Sanctioned by the *League of Silent Flight*, the meet featured two events.

The tasks called for two rounds of five-minute precision flight (ROG) with spot landings within ten feet either side of the target, followed by two rounds of cross-country pylon racing. Under the able handling of CD Bob Andris, all 21 contestants completed the four rounds in four hours.

Using two electrically operated winches, the first sailplanes rose off the ground promptly at 10 a.m. on a rare cold day which featured the usual capricious breezes and illusive thermals (except when the other fellow was flying).

First Place was captured by Rick Walters. Flying a 10-footer of his own design, Rick scored a total of 3130 points for the two events. Ken Willard (2774) came in Second with a prototype Airtrol ST-1 glider, Jerry Youngstrom (2748) and his "T" Halfback settling in the Third spot.

Following the presentation of awards to the meet winners, 1970 President, Bob Andris, of the League of Silent Flight awarded the *League's* annual perpetual trophies to those members accumulating the highest total contest points during the 1969 season.

Undisputed championship was awarded to 15-year-old (and unbeatable!) Rick Walters with Paul Forratte and Les Anderson achieving the second and third slots. The League is a recently formed national (fast becoming world-wide) organization of sailplane enthusiasts interested in promoting RC soaring in general and in rewarding outstanding performances.

Levels of achievement (on the order of proficiency open to the 1:1 scale pilots) allow League members to gain five levels of membership with specific tasks required of the various levels. For further information send self-addressed stamped envelope and inquiry to: Scott Christensen, 545 Shawnee Lane, San Jose, Calif. 95123.

Yankee Wench, an original design by Le Gray, starts aloft from an ROG at home base.

Bob Francis' Del Gavilan starts off when Sam Crawford steps on electric winch switch.

League of Silent Flight's National Champ for 1969 is pace-setting 15-year-old Rick Walters.

Many different designs appeared but the versatile Graupner Cirrus proved most popular.

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Sr. Falcon Shown

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Skylark 56 Shown

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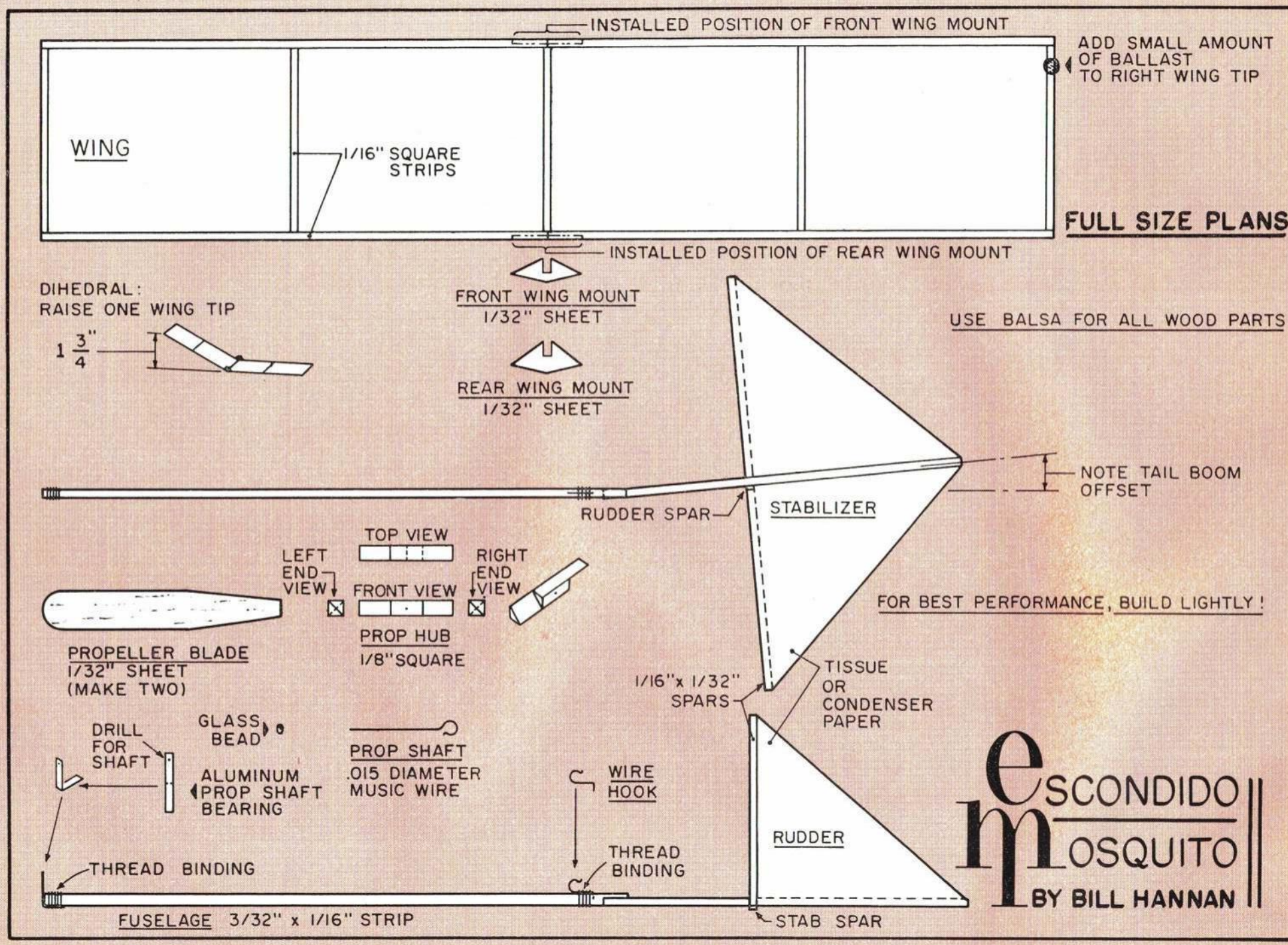
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1 3/4"
FRONT WING MOUNT 1/32" SHEET
REAR WING MOUNT 1/32" SHEET
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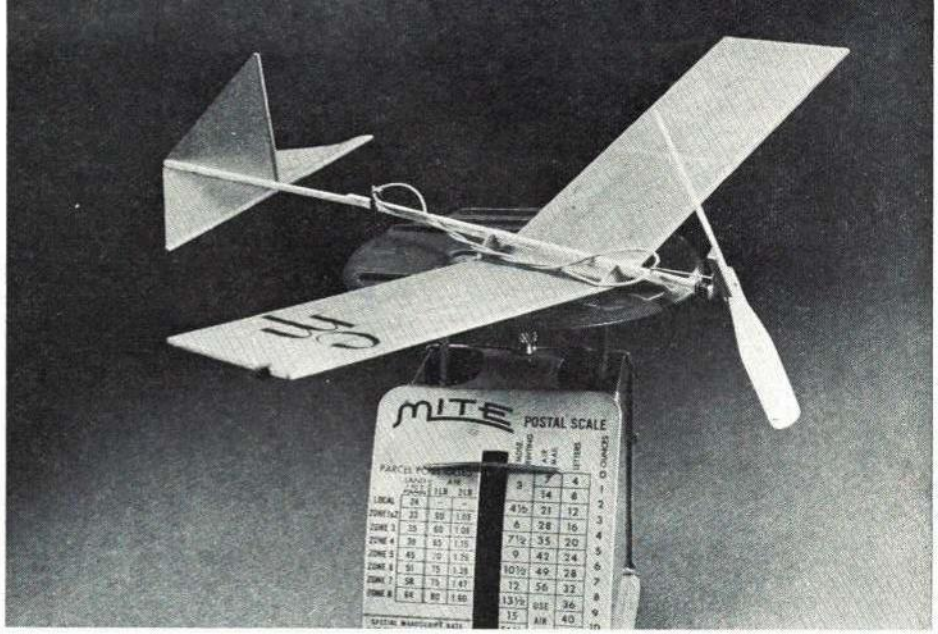
THREAD BINDING
FUSELAGE 3/32" x 1/16" STRIP
STAB SPAR
ESCONDIDO MOSQUITO
BY BILL HANNAN



ESCONDIDO MOSQUITO

This silly little thing is great for living room or office. You can build it in one hour.

BILL HANNAN

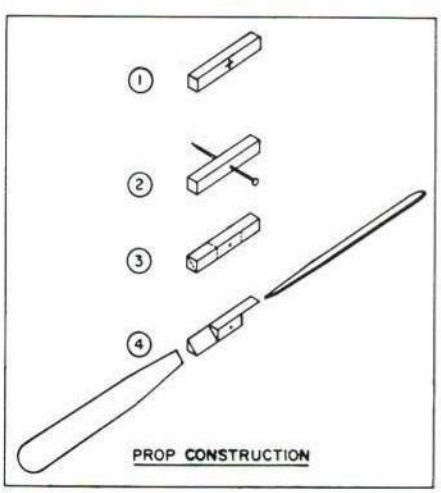
THIS simple model, if correctly constructed, can be made to perform in the average-size living room or office. It makes a fine conversation piece that will capture the attention of even non-aviation-minded visitors. The design is intended to be rugged enough to withstand the rigors of bouncing off walls and furniture that inevitably occurs when flying in restricted spaces. While the duration cannot be expected to compare with "serious" indoor models, it is quite possible to achieve several laps of the room, and contests between two or more of these tiny terrors are great fun!

Models of this general type have been popular for many years, and in fact, some of the earliest published plans were for flyers of this breed. Of the variety of interesting names which have been bestowed upon them, such as "Parlor Pursuits," "Midgets," etc., the name that seems to have turned up most frequently is "mosquito" or variations thereof. For example, an advertisement appeared in the Dec., 1910 issue of *Aeronautics* magazine, which offered for sale a tiny machine called the "Jersey Skeeter." During the late 20's, a small model named the "Baby Mosquito Flyer" was marketed by a firm called the "Mosquito Flyer Co."

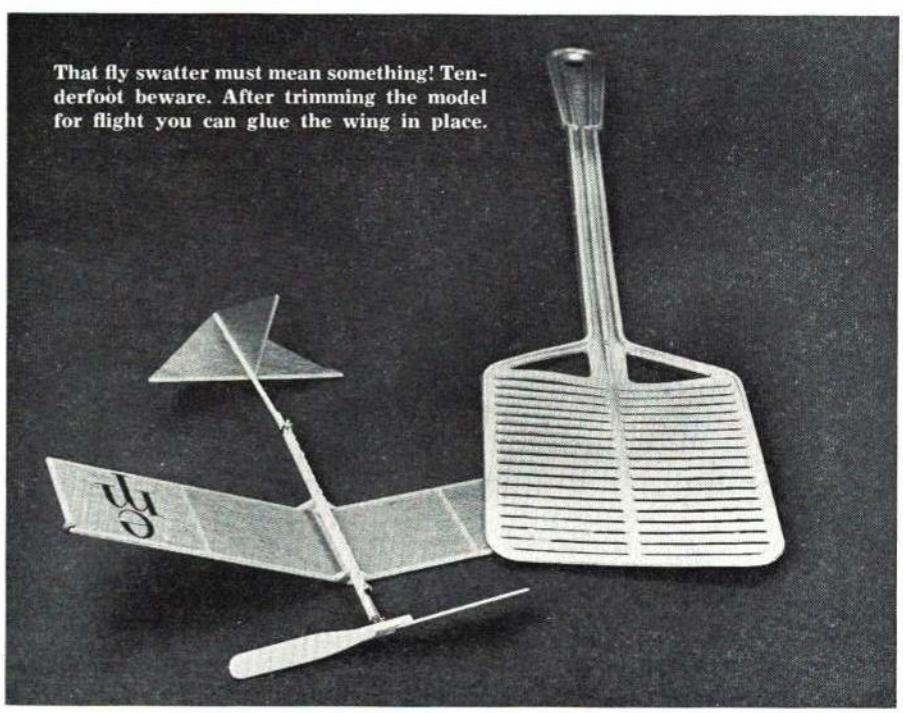
Our little "Escondido Mosquito" carries on this long established tradition of balsa wood insects. "Escondido" is a Spanish word meaning "hidden," however, it is also the name of the small city in California where the author resides.

Construction: Although the model is con-

Continued on page 77

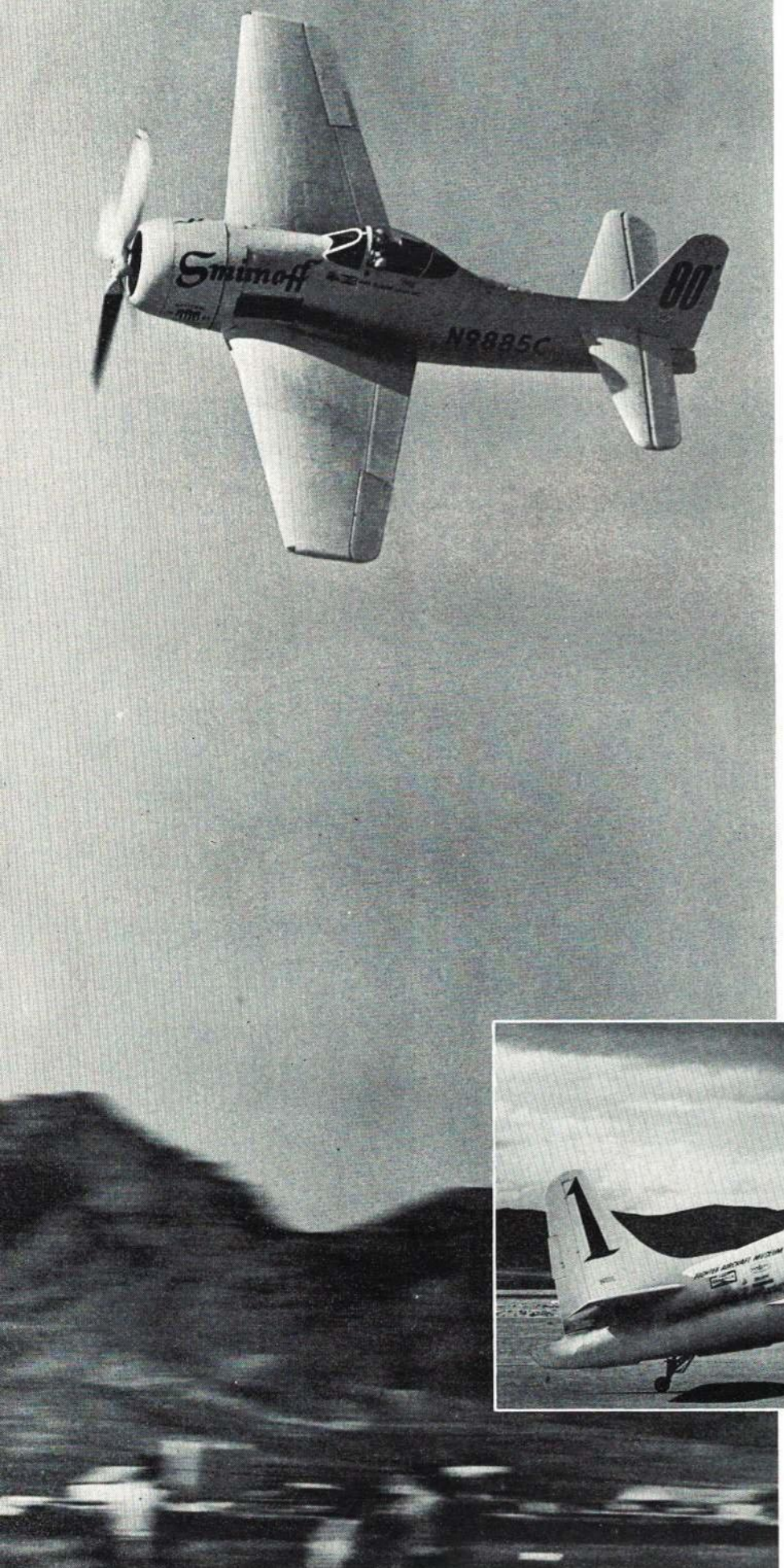


There is no easier way to make a balsa prop; just be sure the hole is centered and true.



That fly swatter must mean something! Tenderfoot beware. After trimming the model for flight you can glue the wing in place.

The Unlimited's



In 1964 a Nevada cattle rancher with a white Bearcat and a bright idea brought back big-time air racing. Now the crowds turn out wherever the big, fast prop jobs fight for prizes.

DON BERLINER

UNLIMITED! A beautiful word. No restrictions. The sky's the limit!

Realistically speaking, there isn't any such thing, but sometimes you can get pretty close. In competitive aviation, the closest is probably Unlimited Class pylon and cross-country racing, in which the only formal limits are that an airplane has to be powered only by reciprocating engines, and it can't weigh over 21,000 lbs. at takeoff.

Outside of that, you can do pretty much as you please. No limit on engine modifications or airframe changes. No limit on horsepower, cubic inches or wing area. No restrictions on what you can do to modify an already fast ex-military machine. For that matter, you don't have to start with a Mustang or Bearcat, but not for many years has anyone tried to build an original racer that would challenge a properly prepared surplus fighter.

Today's Unlimited races, with their cut-down and painted-up P-51's, F8F's, Corsairs and Sea Fury's, are a direct outgrowth of the last 100% unlimited races. Prior to World War II, the highlight of the aviation year was the Cleveland Air Races, with its featured Thompson and Bendix Trophy Races, in which the only rule was that it had to fly. Horsepower, wing area, visibility, flight characteristics — they were strictly up to the designer's ingenuity and the pilot's nerve. Some of the products of this wide-open idea will live as long as there are peo-

What a comparison, Smirnoff Bearcat and the World Speed Record holder, Conquest I.

All, Jim Larson.

Look closely at each of the planes here. The differences are more than skin deep, yet note Mustang No. 44's canopy and the camouflaged painted AT-6 part of another racing class.

ple who get excited about airplanes. The Gee Bee Super Sportster was probably the wildest to come out of that era, but the great Brown, Weddell-Williams, Laird, Chester, Wittman and Folkerts racers have all captured the hearts of true enthusiasts.

After the war, so much technical advancement had been recorded that something had to change. The most obvious development was the jet, and it was so much faster than its poor prop-driven cousin that separate divisions of the Thompson and Bendix Races were established just for the few jets the military wished to throw into a race. Since no jets had been declared surplus, no civilian had anything with which to compete with even the earliest turbos, like Lockheed's P-80, Republic's P-84, and North American's P-86 and FJ-1.

In the regular Thompson and Bendix Races (unfortunately diluted by calling them "Reciprocating Division"), there were no major rule changes, but the availability of surplus combat planes at ridiculous prices — $1,500 for an almost-new fighter plane of your choice — resulted in a revolution in what is now called the Unlimited Class. In the face of scores of expertly designed, professionally built and highly powered P-38's, P-39's, P-51's, P-63's and Corsairs, the only thing the veterans could do was retire their old racers and get new ones.

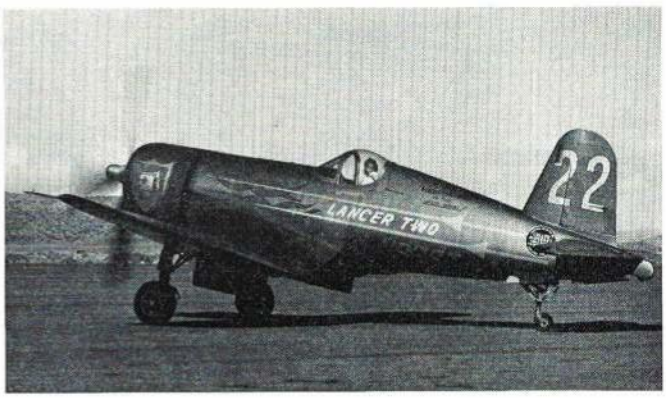
The Laird "Meteor" in which Roscoe Turner had won the last prewar Thompson Trophies — 1938 and 1939 — remained suspended from the roof of his Indianapolis hangar, and Turner kept to his word about retirement. The runner-up in 1939, Tony LeVier, had become a Lockheed test pilot famous for his brilliance with the P-38, so what could be more logical than for him to race one of the big twins? Earl Ortman was third in '39; for '46 he put aside the classy Marcoux-Bromberg and wisely got a P-51.

F8F-2 owned and flown by Walt Ohlrich has red rings on cowl, blue and white on rest of fuselage. It placed first in consolation race at 344 mph. Spinner from P-51H.

The distinguishing feature of Able Cat is not visible; under that normal cowl is huge Wright engine. Still testing, not even painted.

This guy's stomach feels rather heavy in tight pylon turn. Nifty racing number(?). Wings clipped and Hoerner tips fitted.

A colorful name and plane. It is red, white, and black. Wings and stab black. Red is the long stripe on fuselage. A P-51D.



An early model Corsair in green with red "fire," gold stripes and an emblem/shield on cowl. An almost stock plane with big engine.

The pylon racer of the late E. D. Weiner meticulously painted with black 12″ squares on yellow. Prop blades: green, blue, orange, red.

Fourth in finals at 358 mph with no airframe mods. Highly polished surfaces helped Dr. Cummins place well. Many-color trim design.

Bardahl Special is not modified other than in engine department but is fast cross-country racer. Loud and beautiful in flight.

Another P-51 with no mods, but what a gorgeous paint job; it is obviously red, white and blue. Owner/flyer is Howard Keefe.

Fourth-placer Harry Crosby was gone, but Steve Wittman, who had placed fifth in that last old Thompson Race, left his red "Bonzo" at home and got a Bell P-63.

Most of the four dozen big ones that were at Cleveland in 1946 were pretty much stock. They may have been missing guns and armor and most of the heavy radio gear, but few of the airframes had been changed, and hardly anyone had bothered to soup up engines that were already more powerful than anyone had ever raced.

The few that were modified were winners. A bunch of guys at Bell Aircraft, in Buffalo, N. Y., completely reworked a pair of late-model P-39's and then watched one of them qualify 15 mph faster than anyone else and go on to win the Thompson with ease — 90 mph above the prewar record. In the transcontinental Bendix Race, Paul Mantz' red P-51C won by 15 mph, thanks to its then-secret wet wing and a beefed-up engine, and added more than 150 mph to the old record. The best of the prewar racers would have had to be content with last in the Thompson and "only" 17th in the Bendix.

These new racers were far heavier and much larger than their home-built predecessors, but they had so much more power that it really didn't matter. And so a lot of pilots figured that if a lot of horsepower gave them all that speed, even more horsepower would give them even more speed. The idea was simple and it worked. The most obvious case was that of ex-Navy test pilot Cook Cleland. In 1946, he flew a 2,000-hp Goodyear FG-1D Corsair to sixth place at 357 mph. He replaced it with an F2G-1 (FG-1D with a huge P&W R-4360 putting out around 4,000 hp) and won with a record 396 mph the next year.

From then on, cut-down wings, souped-up engines and hot fuels were common. While the airplanes may have lacked the total individuality of the custom-built prewar racers, they were fast and colorful and very loud and exciting. At least until the industry lost interest in air racing in 1949 and the Cleveland Air Races closed up shop.

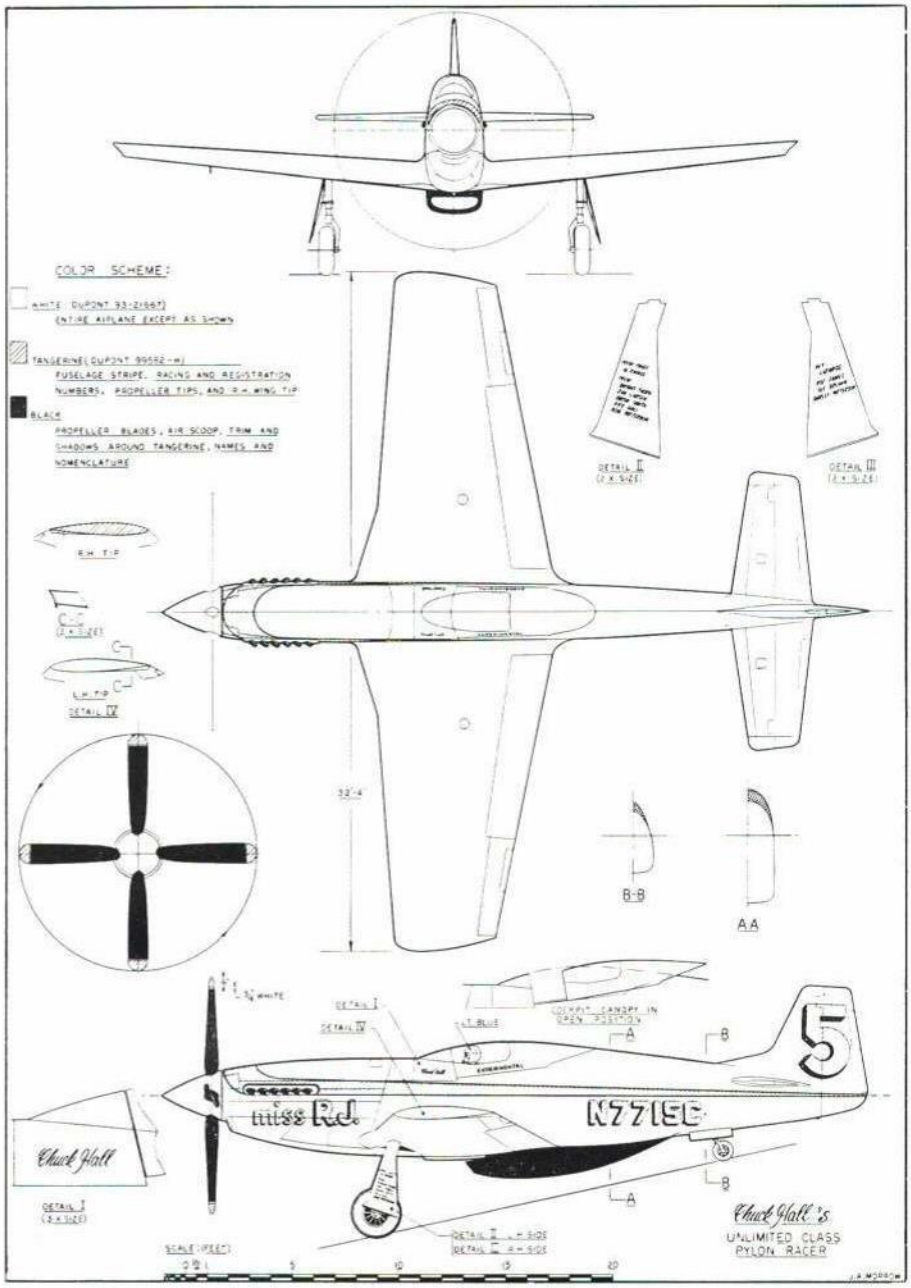
For the next 15 years, the only racing was for the Goodyear midgets, renamed the 190-cu.-in. class. Most of the unlimiteds sat around and corroded, many of them back in the weeds at Cleveland-Hopkins Airport and at small fields around Ohio. It was a sad time for big, fast airplanes with propellers.

Anybody who knew anything about air racing knew that the Thompson and Bendix airplanes were a thing of the beautiful, romantic past. Too bad, but that was one of many things that had changed, along with the length of skirts and the beat of music.

Of course, there were an awful lot of people who didn't know very much about air racing. One of them was a short, stocky Nevada cattle rancher who had made quite a name for himself in the dangerous world of unlimited hydroplane racing and was flying a white Bearcat around his 270,000-acre ranch. In addition to being a real sport, Bill Stead was a first-class businessman; his decision to bring back big-time air racing was followed by the kind of planning and hard work that had made him a successful rancher. It was to make him one of the leading figures in the history of air racing.

The new era started out in 1964 much like the one in 1946, with one really hot modified job and a bunch of beautifully maintained but basically stock airplanes. The need for more speed quickly became apparent, and enthusiasm took the place of reason, the way it is supposed to in racing. And while Reno wasn't the only place the Unlimiteds raced, it was the first and it was the only one to stick with them. Las Vegas tried it, and so did Palm Springs, and even that old folks' haven, St. Petersburg, Fla. But Reno remained the place to go if you wanted to

Continued on page 83



Clean, much modified P-51D flown by Chuck Hall placed second in pylon races at 377 mph. Drawing prepared by Hall's crew chief.

Heat That Glow Plug

After starting, keep your plugs heated with a NiCad battery for better all-around engine operation. Here's why and how.

ROBERT M. ALMES

CAN you imagine 200-plus flights averaging ten minutes, liberally interspersed with touch-and-go landings, an occasional taxi-back for another takeoff, and never an engine failure? Too incredible? Would you believe 200-plus flights on a twin-engine model without engine failure? Make that inverted engines! And how about adding 250 to 300 rpm to the top end, and subtracting it from the low end? Throw in cooler engine operation and better lubrication? We've even got a way to stop the engines!

Magazine articles dealing with twin-engine models almost always say if, when going full-bore, one engine quits, you have a barrel of snakes on your hands. When that happens to you a couple of times you start to run scared — especially when you contemplate a flashy high-speed pass close to the ground.

I have had well over 450 twin-engine flights. They include the P-38 and B-26 with inverted engines, the P-61, and an original with upright engines. The number of engine failures at full throttle with upright engines, or inverted engines, was about the same. However, failures at idle throttle settings with upright engines were considerably less than those experienced with inverted engines. But, even with the upright-engine installation the idle performance was far from satisfactory. Too often, one engine chokes and quits when the throttle is advanced on a touch-and-go landing. Conclusions? Maybe the tanks are improperly positioned, or the venturis are too large. I've fooled around with all that and more. The problem really stems from the very thing that turns you on with twin-engine models — that wonderful sound of two synchronized engines beating in perfect harmony.

If you can find two engines of the same make and power rating that will consistently maintain the same rpm throughout their useful life, you are indeed fortunate. I have repeatedly paired Enya 60's from a selection of six and have as much as 300 rpm difference appear at their best individual peak. Fuel, air temperature, humidity, running time? You pick a reason. Let's consider a particular engine that you have run many times. You know that engine, almost always adjust it by ear and expect it to operate satisfactorily. Then one day it runs a little "doggy" at the same needle valve setting that gave top performance the day before. What's the harm? The next flight you make a small adjustment.

Now let's take two engines that you have independently run many times. You can repeatedly adjust them individually to the setting that you know provides the best performance. But try tuning the one while the other is roaring. It can't be done. You could start one, tune it, shut it down; then start the other, tune it, and then start the first one again. That's got each running at its best setting. But, there could be as much as 200 to 300 rpm difference between engines. Can you tell the difference in flight? You sure can! And what happened to that wonderful harmonious twin-engine sound?

You could lean the one or richen the other, but you will surely mess up the idle

TECHNICAL FEATURE

With practice, inverted engine installation is just as easy to start and operate as any other. It is not a factor in reliability. Glow heat improves any engine or installation.

Bud Atkinson uses a D cell NiCad in his Mentor. He even uses it for starting — which looks mighty impressive to the judges at a contest. He still gets about ten flights per charge.

of one or both engines. If you lean the slow one to match the faster-running engine, you'll really risk in-flight failure. Richening a fine-running engine to slow it down, makes for an engine that keeps changing rpm's in flight. So now we have a right turn — just won't trim out because suddenly it's a left turn. Try a loop. One engine sags because it's a hair too lean, and the other scats because it's leaning to perfection. There you go, corkscrewing through the sky.

We can solve these problems by hooking a battery to the glow plug. What's technical about hooking a battery to the glow plug? Well, it's like this. During my tests three different Heathkit Thumb Tachs were used. The readings of one were about 50 rpm lower than the other two. Several each of two different engine brands were tested. This was to assure me that the results obtained from one brand of engine were reasonably applicable to another brand. We are not interested in comparing the power output of one brand engine versus another, nor are we concerned with the rpm of a new engine versus a well-broken-in engine versus a worn-out dog. Further, we are not concerned that the Thumb Tach may show a top reading of 10,000 rpm while a more sophisticated piece of test equipment may show that the rpm was really 10,250. We are only interested in rpm with battery heat to the glow plug, compared to rpm without heat.

It would be redundant to describe the results of each engine tested. So let's just talk about two specific well-used Enya 60's. Tests were made with these two engines installed inverted in a P-38, and again when installed inverted in a B-26. This was done because the relative tank position to the spray bar in the B-26 is ½" higher than in the P-38. The rpm readings were the same in each model.

Individual runs first were made on these engines to determine which normally peaked at the lower rpm. Without glow heat applied one showed its best, reasonable, safe peak to be about 10,025 rpm. With glow heat applied and no further adjustment to the mixture it would increase to 10,450 rpm. The second engine reached a similar peak without glow heat at about 10,200 rpm. Its reading with glow heat is not important. It is enough to say that it was higher than that produced by the first engine, but not in the same ratio.

In preparation for flight I want to start the slower-running engine first. Therefore, I use it in the left nacelle because I don't like to start one engine with the other running at my back. By starting the left engine first I move away from it to work at the other. I get the slower, left engine running at its 10,450 rpm with glow heat. Since I already know that the right engine runs faster than the left engine, I am not interested in adjusting it without glow heat. Therefore, I leave the battery connected and adjust the needle valve to produce that perfect harmonious synchronization. The right engine will actually be running a little slower than its maximum rpm, but with glow heat the run is smooth and clean.

I may be a little gun shy, and consider my best reasonable safe peak rpm without glow heat to be a little bit richer than if I were flying a single-engine model. So what? Glow heat gives me two smooth,

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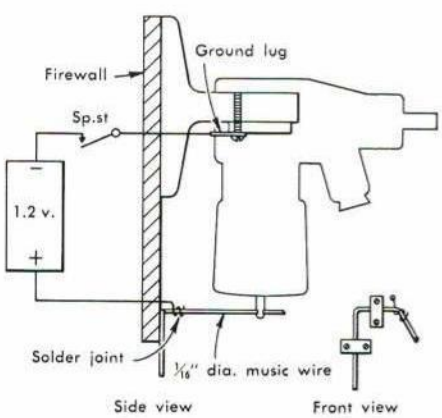


For efficient operation be sure the leads are well-grounded to engine case and the plug.

Author's other twin is B-26 Invader with two inverted 60's. Besides reliability, another benefit of glow heat is engines stay in synchronization through all throttle settings.

The 'Classic'

With charts, sketches, scaling techniques, and clear plans, author tells how to make any-size version of this winning contest gas model—from ¼A to C.

BRUCE HANNAH

THE Classic, in the making for several years, has gone through many modifications. It is the brain-child of two Bruces, father and son, along with Dick Schenz who experimented with construction techniques and refinements for pressurizing engines. My son and I were disenchanted at most contests with square wing tips and stabs; deep-bellied, high-thrust, chunky fuselages, so we decided to design a model that could put us in the winner's circle, which would be simple to build, able to fly with few adjustments and, above all, be pleasing to the eye.

I showed a sketch to other modelers. Most of their comments were, "Boy, that is a Classic-looking free-flight," hence the name. We built a ½A version, and experimented with different combinations of flight characteristics.

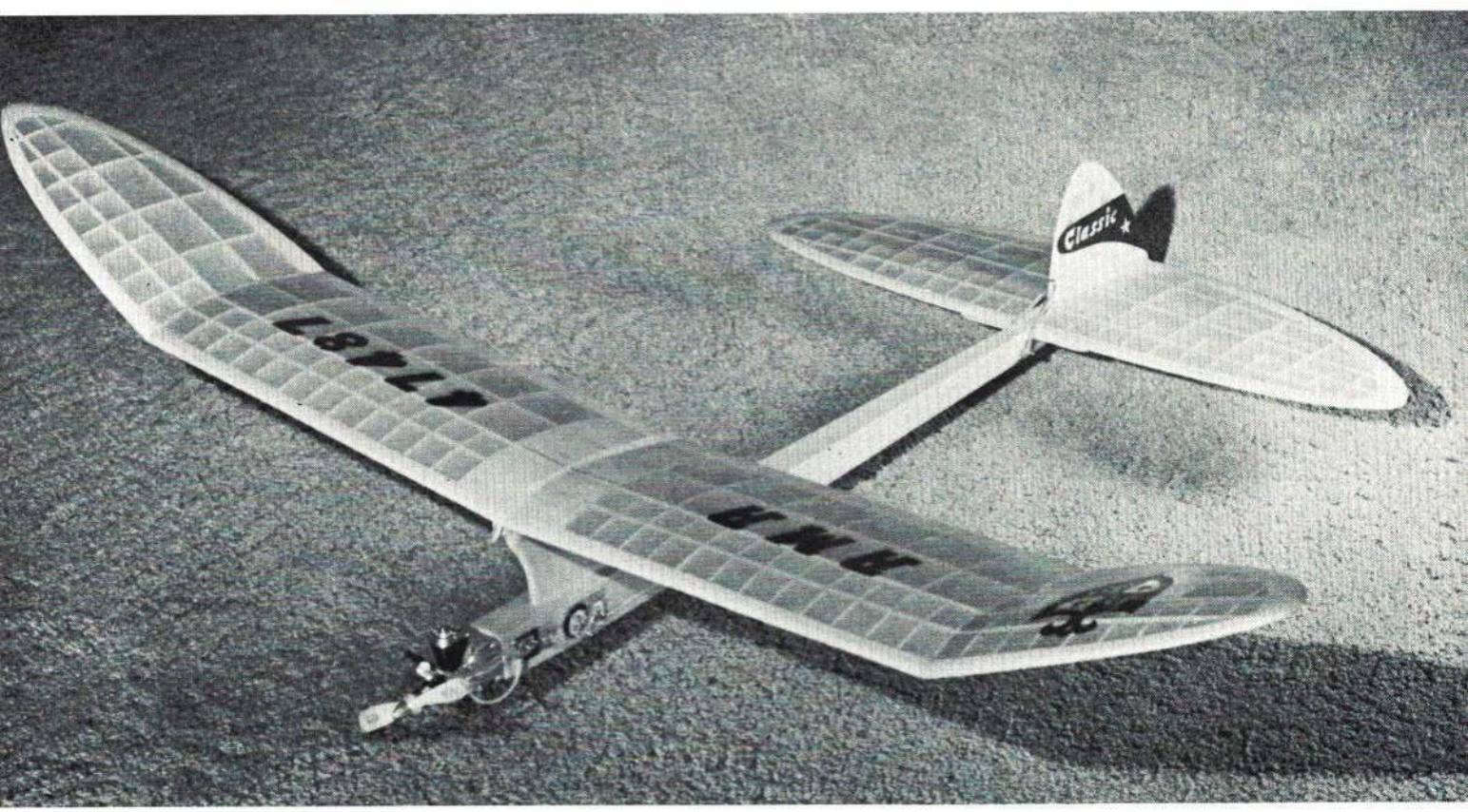
The first flight pattern was power to the right, glide to the left. The Classic took three degrees tilt in the stab to achieve the correct amount of glide turn. No side-thrust was needed, but four degrees down-thrust was used to help in the VTO's and prevent looping under power. The recovery was satisfactory, but on friendly advice we tried a flight pattern with both power and glide to the right. The model had a very good transition from power to glide.

The Classic 420 and 500 are using pressure and the Classic 420 also had an auto-rudder. The aircraft can take substantial power without changing its flight characteristics.

The airfoil is a modified Clark Y with a 10% high-point, 35% back from the leading edge. The flat-bottom airfoil was used, first, for ease of construction; second, for a fast climb with a fair glide. The fuselage top was flat and straight, so angles for wings, stab, engine thrust, etc., can be measured.

The fuselage is built by first laying down the top, then gluing on the sides, formers, skid, firewall, and bottom while in this position. When the glue is dry, turn fuselage top up, and slide pylon down into fuselage, and then glue into place, making sure there is plus two degrees incidence to top of fuselage. The fuselage was made to fit the existing ½A Cox gas-tank mount; the bigger Classics fit Tatone beam-engine mounts, without tank.

The stabilizer is elliptical in shape, using



Although it carries two mechanical timers, ½A Classic is a real climbing screamer. Author recommends using a right-right power glide pattern because of easy transition at engine cut-off. Jap tissue used for covering is non-warping. Strong structure too.

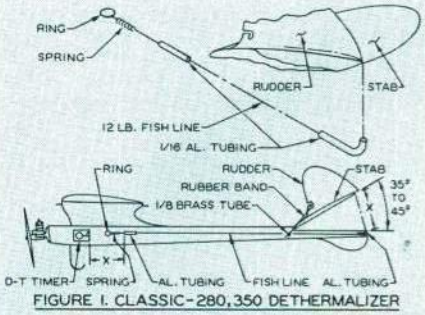


FIGURE 1. CLASSIC-280, 350 DETHERMALIZER

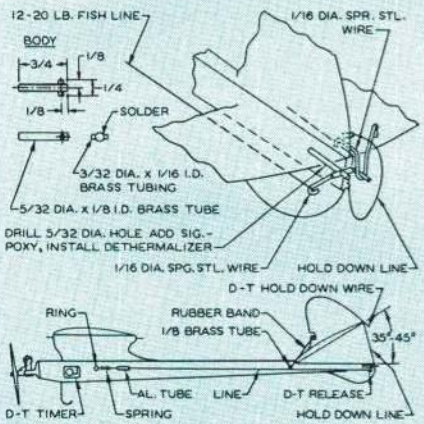


FIGURE 2. CLASSIC-420 DETHERMALIZER

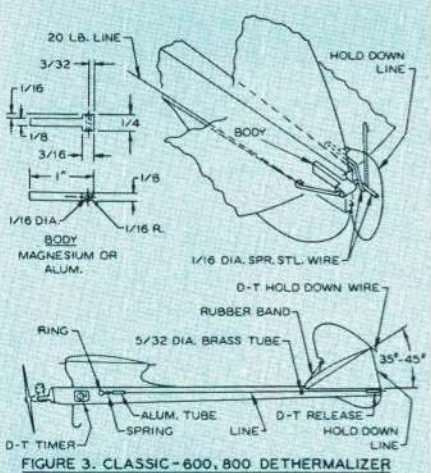


FIGURE 3. CLASSIC-600, 800 DETHERMALIZER

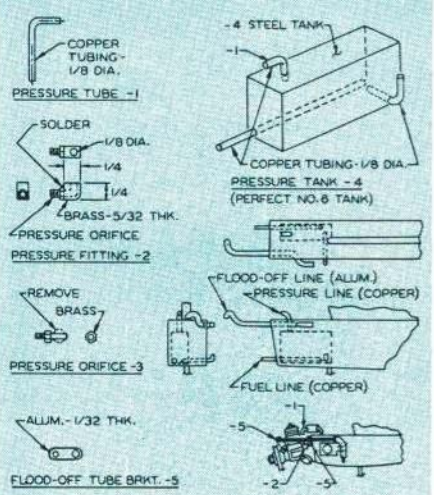


FIGURE 4. PRESSURIZED FUEL LINE DETAILS

a laminated leading edge for easy building and to help subdue warps. Balsa strips are coated with glue, one strip on another, then form-curved around the stab ribs, while glue is wet. Rudder has built-in dethermalizer rubber-band tension hook. Lightening holes are used in such places as plywood, rudder, wing ribs, stab ribs, pylon, etc. Quite a weight-saver.

Epoxy was used in such places as firewall, skid installation, gussets in wing, wing mount. The rest of the model uses Titebond glue. Japanese tissue was used on all versions. Tissue is very light and less likely to warp surfaces as badly as silk or Silkspan, but do not fly in a stubble field with tissue! Eight coats of clear butyrate dope, 75% dope-25% thinner, were used.

Three types of dethermalizers were used. On the 280 and 350, it is a simple arrangement as shown in Fig. 1. The spring is about 1⅛" long, with a fairly stiff action. This spring takes some tension and vibration off the timer disk, improving timer reliability.

In 1968 the design won the Northern California Free-Flight Council Over-all Gas Championship Perpetual yearly award. At local meets in California, we have won 15 trophies and one National record with our Classics. Two ½A Classics and one C Classic have floated off over the mountains, so if you build one, don't forget the dethermalizer lever.

We also enjoy flying rise-off water models, so a standard setup for floats was decided on: 1) front float and, 2) floats on the stab. We used a formula based on front and rear weight in ounces distributed around the center of gravity of the model. It floated beautifully and took off on about 4- to 6-ft. runs every time. Bruce Jr., 15 years old, holds the Jr. Class B Row record with his B Classic equipped with floats. Total time: 7 min. 58 sec.

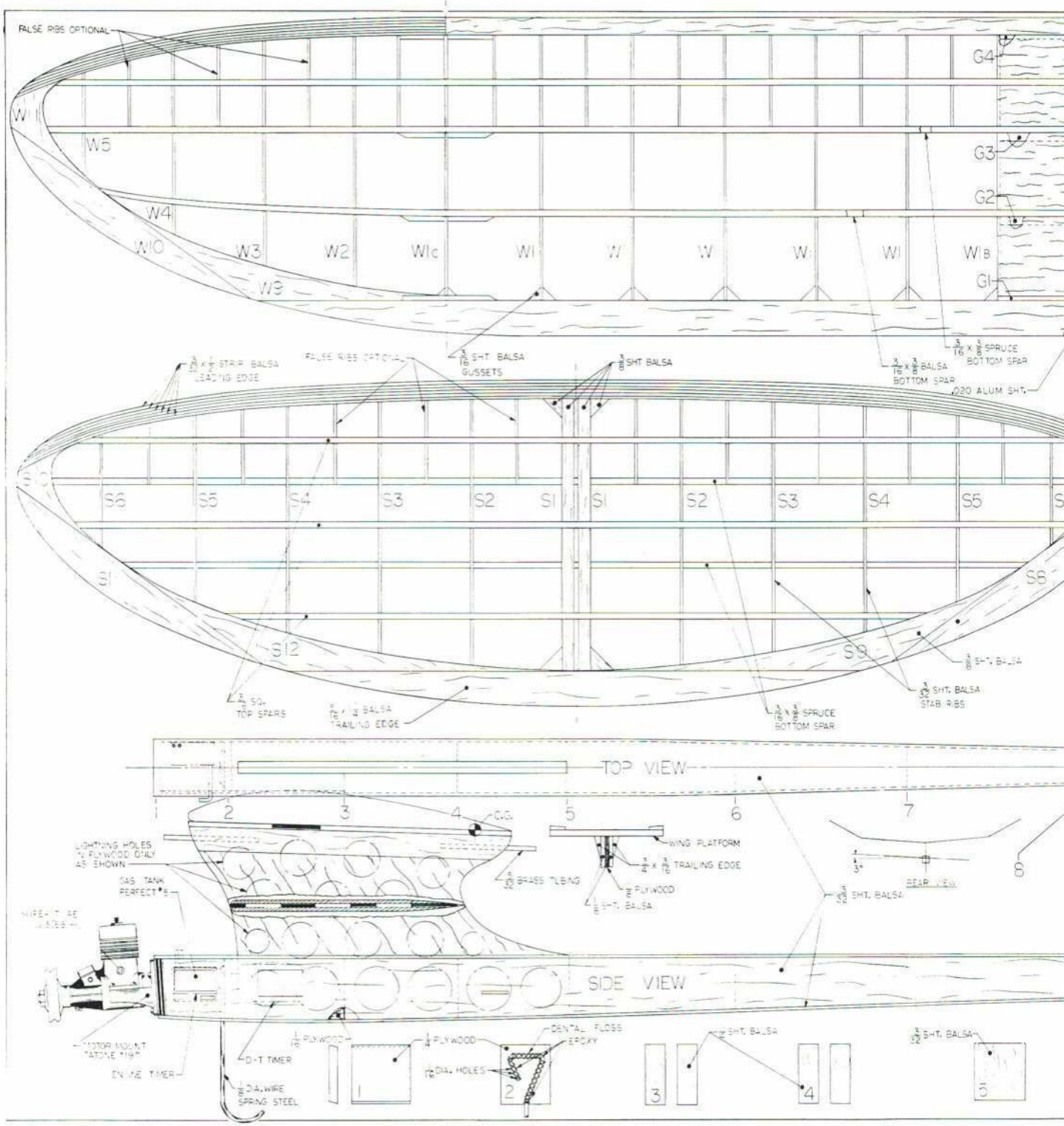
The first models were built too heavy. We found we could reduce weights by carefully picking our wood. The wing was reduced from 4 to 2½ ozs. by using medium balsa wood instead of hard balsa as on the ½A Classic. The larger Classics have spruce for the lower two wing spars, hard balsa for the top spars, medium balsa for ribs, and wing tip blocks. The fuselage sides require rock-hard balsa to take rough landings in plowed fields and airstrips on all sizes from ¼A to C-size. The vertical stabilizer can be soft AAA Contest Balsa. The horizontal stabilizer was best when using soft balsa for leading edge laminations, medium balsa for the ribs, and hard balsa for the trailing-edge blocks; the bottom and top spars should be rock-hard balsa. The pylon for the ½A and A should be rock-hard balsa; however, the B and C should be laminated with ⅛" balsa on both sides with ⅛" plywood in the center. Use holes in the plywood, as shown, to lighten pylon.

The tubing must have all sharp edges removed. Be sure no edge of the tubing is touching the dethermalizer string. The X-dimension to the aluminum tubing determines the angle of the pop-up stab. The 420 uses a slightly different pop-up device on the rear of the fuselage, as shown in Fig. 2. Two sizes of brass tubing are soldered together as shown. The 600 and 800 use a slightly different pop-up at the rear of the fuselage, made from magnesium or aluminum as in Fig. 3.

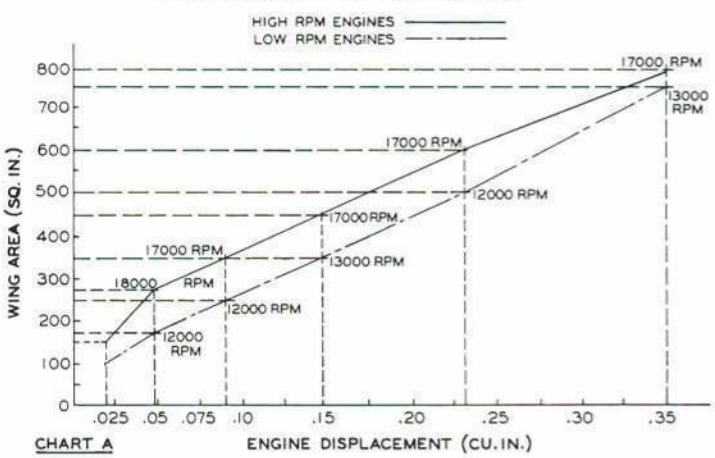
The engine may be run standard or pressurized. For the standard gas tank setup, a regular Cox red plastic tank was used on the 280. On the 350, 420, 600, and 800 a Perfect rectangular tank was modified as shown on the plans. The pressurized setup used is shown in Fig. 4. This is a rectangular Perfect tank with the tubing as shown. If autorudder is desired, see Fig. 5. The timer used to actuate this system was a Tatone Flood-off installed upside down. I used the tab to

The hand launch is typically a javelin heave into the wind while simultaneously releasing timer. Power vastly exceeds weight.

Everyone has his own launching style. Not only must the release be accurate, but must demonstrate good form.

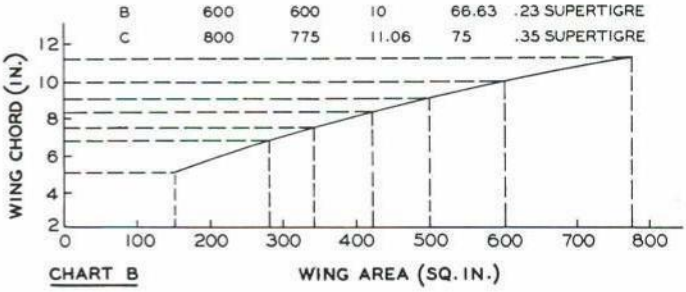


DISPLACEMENT TO WING AREA

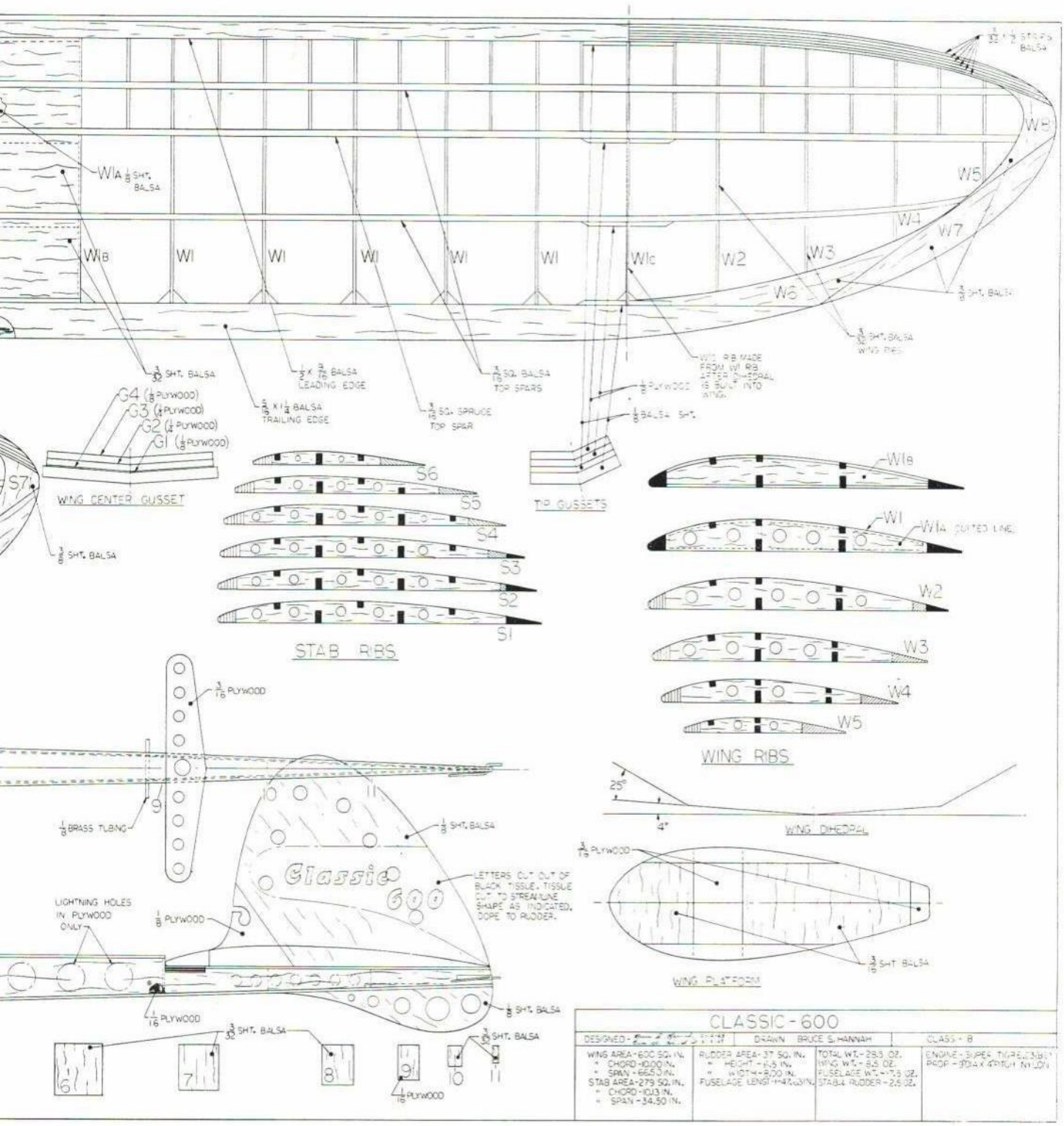


WING AREA TO WING CHORD

CLASS	MODEL	AREA	CHORD	SPAN	ENGINE
1/4A	150	152	5	34	.020 COX T.D.
1/2A	280	283	6.8	46	.049 COX T.D.
A	350	341	7.5	50	.09 COX T.D.
A	420	420	8.38	55.75	.15 SUPERTIGRE
B	500	517	9.25	61	.23 SUPERTIGRE
B	600	600	10	66.63	.23 SUPERTIGRE
C	800	775	11.06	75	.35 SUPERTIGRE



FULL SIZE PLANS AVAILABLE — SEE PAGE 70



CLASSIC - 600

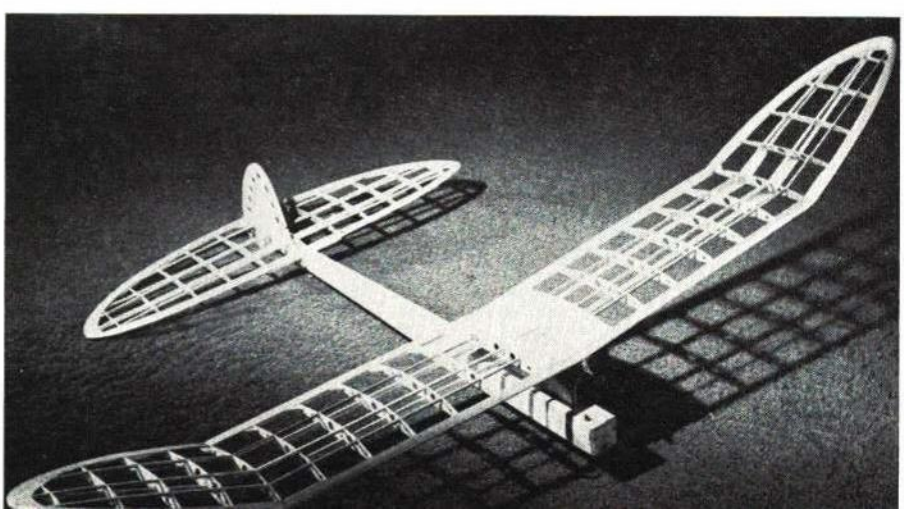
DESIGNED - [illegible] DRAWN - BRUCE S. HANNAH CLASS - B

WING AREA - 600 SQ. IN.
= CHORD - 10.00 IN.
= SPAN - 66.5 IN.
STAB AREA - 279 SQ. IN.
= CHORD - 10.13 IN.
= SPAN - 34.50 IN.

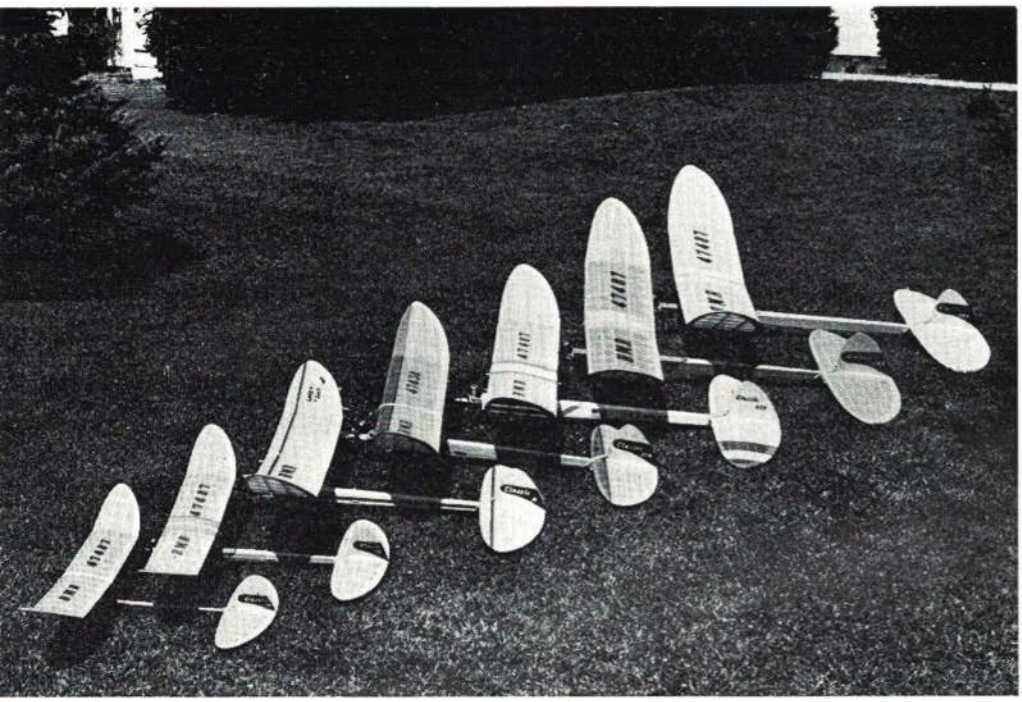
RUDDER AREA - 37 SQ. IN.
= HEIGHT - 6.5 IN.
= WIDTH - 8.00 IN.
FUSELAGE LENGTH - 44.63 IN.

TOTAL WT. - 23.5 OZ.
WING WT. - 8.5 OZ.
FUSELAGE WT. - 11.5 OZ.
STAB & RUDDER - 2.5 OZ.

ENGINE - SUPER TIGEREDIBLE
PROP - 9" DIA X 4" PITCH NYLON



Uncovered B class model shows the typical competition free-flight construction. For good climb and glide, light weight is very important; note extensive use of lightening holes in ribs, rudder, etc. Elliptical wing and stab tips are beautiful in flight and considered most efficient.



This display of the many possible sizes of Classics shows the author's devotion to this one design. He has tested and won with each size. Success in contest free flight is not just a matter of having the best design, but more often a matter of having it perform consistently and predictably under many conditions. Another factor is having reliable mechanisms such as the timers, pop-up stab, auto-rudder, etc. Most important, however, is the flyer and his talent for properly trimming the model in the first place.

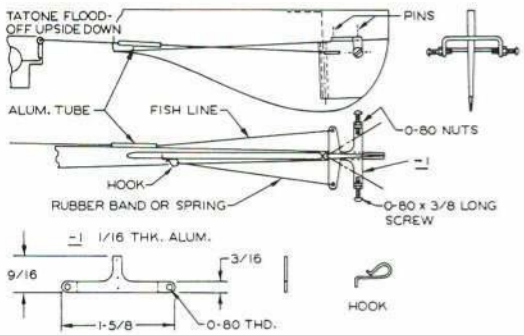
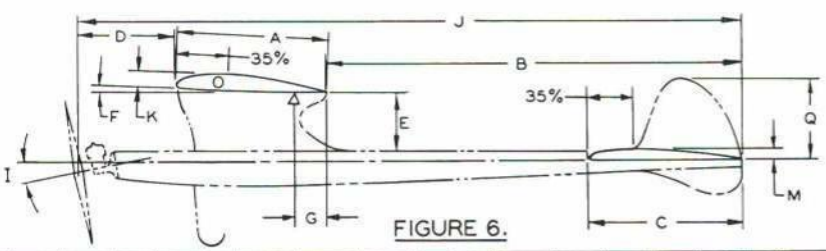


FIGURE 5. CONTROL DETAILS

TABLE OF WEIGHTS				
CLASS	DISP.	TOT. WT.	MODEL	WING AREA
1/4 A	.020	5-1/2 OZ.	CLASSIC-150	150 SQ. IN.
1/2 A	.049	10 "	CLASSIC-280	283 "
A	.09	13 "	CLASSIC-350	341 "
A	.15	20 "	CLASSIC-420	425 "
B	.23	29 "	CLASSIC-600	600 "
C	.35	44 "	CLASSIC-800	775 "

FIGURE 6.



CLASSIC	WING CHORD	WING RIB HEIGHT TO CHORD	TYPE AIRFOIL	WING ANGLE OF ATTACK	WING AREA (FLAT)	WING SPAN	STAB CHORD	STAB RIB HEIGHT TO CHORD	STAB SPAN	STAB ANGLE OF ATTACK	STAB AREA	TAIL MOMENT ARM	NOSE MOMENT ARM	PYLON HEIGHT	CENTER OF GRAVITY	HEIGHT OF RUDDER	ENGINE DOWN THRUST	OVERALL LENGTH
	A	K	O	F	-	-	C	M	P	-	-	B	D	E	G	Q	I	J
280	6.8	.68	MOD. CLARK Y	2°	283	46	7.0	.44	24	0°	138	23.18	3.50	2.62	.75	4.50	4°	33.48
350	7.5	.75	"	2°	341	50	7.75	.50	26	0°	161	25.31	3.25	2.75	.94	5.00	4°	36.00
420	8.37	.83	"	2°	420	55 1/2	8.50	.54	28 7/8	0°	193	28.00	3.75	3.00	1.00	5.50	4°	40.13
500	9.25	.92	"	2°	517	57 1/2	9.37	.63	31 3/4	0°	250	30.62	4.25	3.37	1.06	6.00	4°	44.13
600	10.00	1.00	"	2°	600	66 1/2	10.13	.68	34 1/2	0°	279	33.38	4.18	3.75	1.13	6.50	4°	47.63
800	11.06	1.13	"	2°	775	75	11.25	.80	38 3/4	0°	342	38.13	4.69	4.25	1.25	7.25	4°	53.88

hold the squeeze-off wire down, to hang the auto-rudder ring on. In using the timer this way, when the engine cuts off, the auto-rudder snaps over at the same time.

Flying: Adjusting should be done carefully. Down-thrust is built-in, as is the turn in the glide. Tilt in the stab is used for turn in the glide, 2 degrees to 3 degrees tilt, either right or left. Turn will occur toward the high side of the tilt. A superior transition from power to glide was found with the use of a right turn in the glide.

The balancing of the model can be done before leaving the work bench. It is very important that the model balances as indicated on the plans. If model shows tendency to be tail-heavy, clay may be added through the engine timer hole to bring model to balance point. When model balances, hand-glide until a turn of about 50 ft. in diameter, either right or left, is accomplished.

The first power flight should be made with engine running very rich with about a 10-second engine run. Always use a right power turn. Left turn under power with the Classic is asking for trouble. The rudder should be keyed down at the rear, with about ⅛" of right rudder at the leading edge of the stab for first flight. Observe model carefully under power flight for any indications of left turn. If flight under power shows any indications of going left, check for too much left engine thrust, or add more right rudder.

If all looks well, try next flight with engine leaned out almost to peak with about 8- to 10-second engine run. The third flight is made wide open with same engine run. Gradually increase engine runs to full 15 seconds. Model should be hand-launched for these first flights. When adjusted, it should fly straight up, or have a slight right turn under power. VTO takeoffs are easy to obtain, due to the stable characteristics. To VTO, model should be straight up or slightly forward into the wind. As long as no trouble has been encountered this far, the model should VTO right off the deck.

Flying with floats presents a slightly different set of rules. Model must be first adjusted as described without floats, then floats are installed with rubber bands. ROW models must float at least 30 seconds in flying attitude without any part of model touching water, except, of course, the floats. Same flight-characteristics should be aimed for right power turn, and right glide. All steps to adjust model without floats are valid with one exception. Engine runs should be longer to start with, because floats give so much drag, model will not be high enough to recover from possible stalls. Model should not stay on the water for more than 4 or 5 ft., because the longer it stays on water, the more likely a dunking.

Sizes of engines and props: T.D. Cox 049 with a 6" dia. x 3" pitch prop, for ½A; T.D. Cox 09 with a 7" dia. x 4" pitch prop for the B; Supertigre 35 with a 10' dia. x 3½" pitch prop for the C. This suggests pertinent facts for the other sizes of Classics.

In choosing a Classic to match the engine you may have, see chart A. If the displacement 23, look at the propaganda sheet that came with it to find the rpm's — 14,000, 17,000, etc. Start on the bottom line of chart A with the displacement, read up until you cross the rpm line closest to your engine. Read across to your left and it will tell you what wing area you should have. Now go to Chart B, start at the bottom of the chart with the wing area you have selected, and read up to the curved line.

Now read across to your left and it will tell you what wing chord your model should have. On Fig. 6, you will find a chart showing wing areas, stab areas, movement arms, wing chord, etc., for six different sizes of Classics. The plans shown in this article are for the Classic 600 or the Class-B size.

THIRTIETH IN A SERIES

GETTING STARTED IN R/C

Terms common to the well-versed R/Cer explained

HOWARD McENTEE

OUR last part of this series explained R/C model abbreviations that usually appear just as a group of letters. This time we cover words common to the well-versed R/Cer — but many of which may be uncommon to those just getting into R/C. Again, all were picked from past issues of this magazine and we list them alphabetically. Many of our explanations are not "engineering-type," but cover the terms in general model usage.

ACTUATOR: Magnetic control surface mover that does not have an electric motor. Used in simpler pulse propo systems.

ANALOG: Form of proportional control system based upon the smooth variation of some system variable, such as pulse width, pulse rate, and audio tone.

ARC SUPPRESSOR: Components used to reduce radiation of electrical disturbances caused by sparking at electrical contacts. In R/C, used mainly on servo motors.

BELLCRANK: An L-shaped component pivoted where the two arms join. Used to change direction of control linkage movement; often used in wings on aileron linkage.

BIAS: An electrical voltage applied to such components as electronic tubes, semiconductors. Usually lower than other applied voltages.

BLIND NUT: A form of threaded fastener attached permanently in areas one couldn't reach with a normal nut. Often used to hold down engines, servos, etc.

BUTTERFLY TAIL: Two halves of a tail surface that are inclined (usually upward) at a sharp angle from horizontal. Such a tail performs the dual functions of both rudder (and its fin) and elevator (with the stabilizer). Can steer plane sideways, also up and down.

CERAMIC FILTER: Tiny units used in super-heterodyne receivers in place of regular IF transformers.

CHANNEL: Rather outmoded term, holdover from days of reed systems. It then referred to number of audio tones used in the system; two tones were required for each servo. Present meaning refers to number of controls (control surfaces, throttle, any other items operated via radio) in a model. We much prefer the term "control" in this connection.

DEAD-STICK: Infers that the engine of a flying plane has stopped. Thus, we refer to "dead-stick landing," a landing with engine not running.

DECODER: Elements in a receiver that unscramble pulses, tones or other control signals and channel them to the proper control movers in model.

DIGITAL: Control systems that operate somewhat like digital computers. Much of the circuitry is either full on or completely off. (See Part 29 of this series.)

ENCODER: Elements in transmitter which produce required pulses or tones in conjunction with transmitter control sticks and levers.

FEEDBACK: In R/C, refers to a specific type of servo, widely used in multi-control systems. Such servos have a feedback element, usually a variable resistor, linked to output arm of servo.

FLYING STAB: Plane stabilizer which is pivoted and is moved to produce climb or dive action. This takes the place of more usual fixed stabilizer with movable elevators on its trailing edge.

FULL HOUSE: Multi-control system that can vary at least the rudder, elevator, ailerons and engine throttle.

FUSE: Short term for fuselage.

GIMBAL: A form of joint that allows movement in many different directions. Multi-control transmitter sticks have gimbal joints.

GLITCH: A short, unwanted control movement of a plane, which is not initiated by the modeler. Can come from interference, short-time loss of signal, etc.

JUMPER: Short piece of wire, often on printed circuit board. Sometimes permanent, often temporary while making tests.

LAND: Raised copper portions that form interconnections on printed circuit board.

LINEAR OUTPUT: Usually in reference to the push-pull connections for linkage available on many servos.

LOADING COIL: Small coil of wire inserted in antenna circuit — usually in transmitter. Can be internal, termed bottom-loading, or somewhere in the external whip antenna of the transmitter, called center-loading.

MICRO-SWITCH: Actually a trade name, but generally applied to a switch of very small size, which has a "snap-action" contact closing and opening.

MODE: Multi-propo transmitters are classified as Mode 1, Mode 2, etc. Signifies which controls in the model will be actuated by a certain movement of a specific control stick. Example: Mode 1 has aileron and throttle on right stick, rudder and elevator on left; Mode 2 has aileron-elevator on right, rudder-throttle on left; Mode 3 has rudder-elevator on right, aileron-throttle on left, etc.

MONITOR: Small receiver used to check transmitter output, listen for interference on operating frequency.

POWER PACK: The set of cells that provide power for either transmitter or receiver. Also known as "battery packs."

PULSER: Electronic circuitry in transmitter that produces continuous series of pulses, which can be modified by movement of control stick or lever.

PULSE OMISSION DETECTOR: Receiver circuitry which is triggered by cessation of pulses from transmitter. Often used to operate throttle servo in simpler propo systems.

PULSE PROPO: Proportional control system of simpler type that operates by varying length or rate (or both) of transmitted pulses.

PUSHROD: Linkage between servo and control, which moves fore and aft to vary control position.

RACK: Toothed component in servos that moves in fore and aft direction to drive pushrod.

RATE-LENGTH SYSTEM: Propo system which operates by variation of pulse rate and length.

REED SYSTEM: Control system based upon a set of tuned steel reeds in receiver, which directs numerous tones from transmitter to the desired servos.

REGEN: Abbreviation for super-regenerative receiver.

RELAYLESS: Receiver which has no relays. Most of those made today are in this category. Transistor circuits have replaced the relays.

REPETITION RATE: Also shortened to "rep rate." Usually refers to the frequency of a group of pulses sent out in a continuous string by digital transmitter. (See Part 27 of this series.) Also called "frame rate."

SUPER-HET: Also shortened to just "het." Means super-heterodyne, a preferred type of receiver in R/C.

STAB: Short for stabilizer, the horizontal tail surfaces.

SQUARE WAVE: Waveform used in most propo systems today. Transmitter pulses are turned on and off very rapidly, rather than gradually.

SUB-MIN: Sub-miniature parts or components, those which are very small.

TORQUE ROD: Linkage to control surfaces that rocks from side to side — used mostly in simplest control systems.

TRIMMABLE: Refers to controls which do not move in exact step with a stick, lever or knob on transmitter. In other words, not proportional. Trimmable throttle, for example, allows full range of throttle action, but with this sort of control it is harder to achieve any exact desired throttle setting, as is possible with propo throttle.

VOLTAGE DROP: Reduction of voltage in a wire or component due to resistance encountered.

ZERO-ZERO: Trim setup of many multi-stunters wherein both elevator and stabilizer are set at zero angle to a reference line along fuselage. They are thus set at same angle to each other.

Messerschmitt "Gustav"

From the first flight in 1935 until the end of WW II, more than 33,000 Bf-109's were built. Markings for various aces described.

JAMES ROBERT SMITH

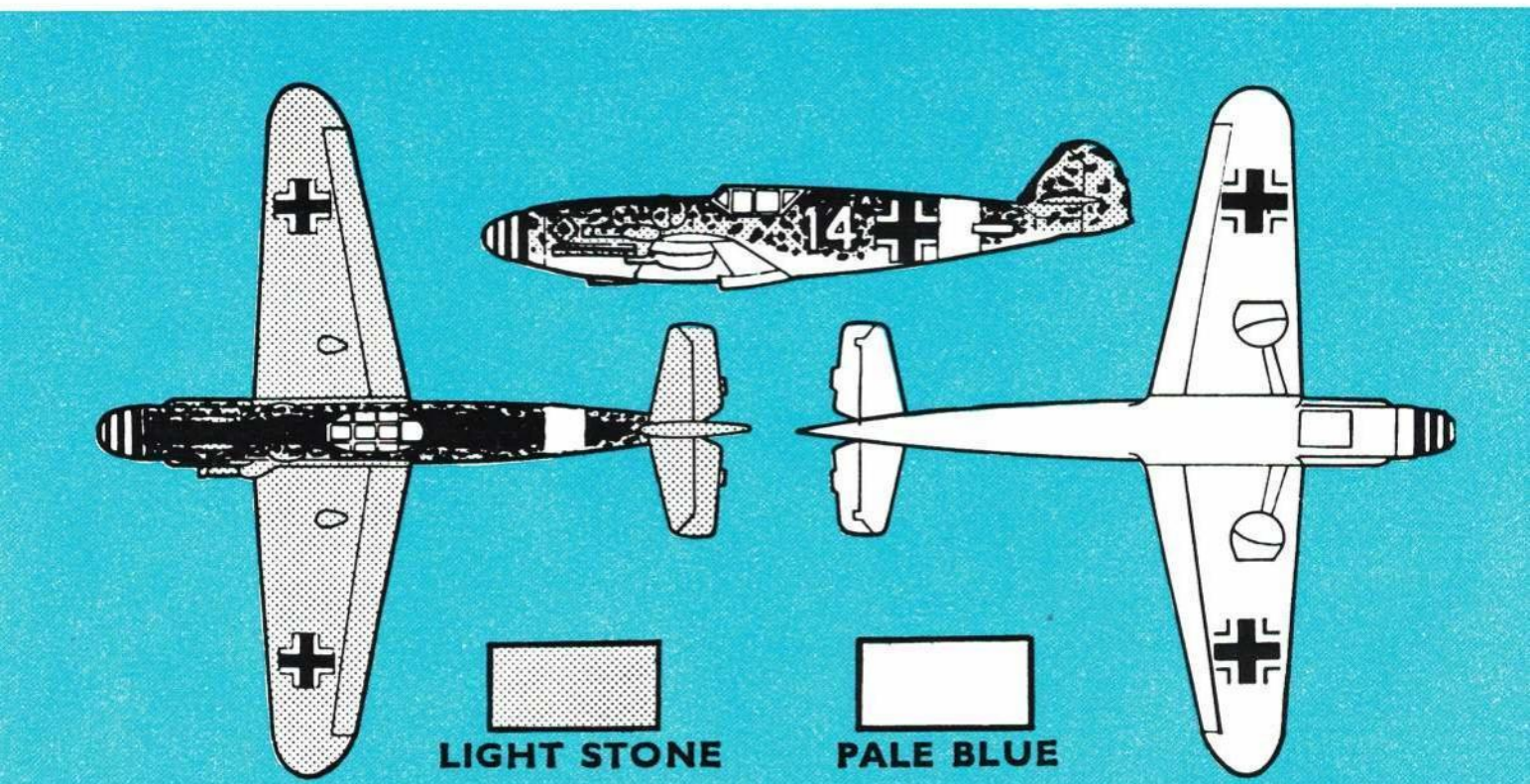
THE first Bf-109 flew in 1935. It first saw action (Bf-109B) with the Condor Legion in Spain. The "E"-series had been built by the beginning of World War II and became the standard Luftwaffe fighter. Near the close of the Battle of Britain in 1941, the Bf-109F came into use with more powerful engines and in 1942 was replaced by the Bf-109G.

In spite of its drawbacks which became obvious to enemy pilots as the war progressed, some 70% of the Bf-109 fighters manufactured in Germany were the "Gustav" type. The grand total of Bf-109 production was more than 33,000 and, though obsolete, production increased rapidly during the later stages of the war under the pressure of the Jagerstab. Output went from 930 in January 1944 to 1600 in September of the same year; 14,212 being manufactured in 1944 alone. Some Bf-109's were exported: Bulgaria (145), Finland (70), Japan (2), Rumania (70), Slovakia (15), Spain (25), Hungary (59).

The Bf-109G-6 differed from its predecessors mostly in its ability to take several different engines (including the BD-605 AM, AS, ASB, ASM, or D) and a heavier armament. It was not pressurized. The G-6 was the first to introduce the 30-mm MK-108 cannon. Weapons of this caliber were found necessary to combat the B-17 Fortresses. The G-6/U4 carried three of these guns — one firing through the airscrew spinner, and two mounted in underwing gondolas. The standard Bf-109G-6 armament consisted of an engine-mounted MK-198, two cowling-mounted MG-131 machine guns, and two 20mm, MG-151 cannon in underwing gondolas.

The first planes produced had the standard vertical tail surfaces but most had a tail similar to the G-5/R2, except it was of wood construction to conserve supplies of light metals. The Bf-109G-6/U4-N, which briefly equipped two squadrons which operated in the Cologne area, was an improvised night-fighter equipped for "Wilde Sau" tactics — free-lance night-fighting, aided by searchlights, with Naxos Z warning and homing receivers installed aft of the cockpit. The Bf-109G-6/R1 and R2 were fighter-bombers and assault aircraft. The Bf-109G-6/R1 had a single 550-lb. bomb and the R2 had 21cm. WG-21 rocket tubes firing 21cm. projectiles. The name for this armament was "Dodel" — It replaced the wing guns. Dodel is impossible to translate into our language, but the installation was disliked by all pilots using this plane because the Dodel only increased the well-known landing difficulties.

My model is made from a 1/72 scale Airfix by Craft Master; ME Bf-109G-6 kit manu-



Drawings on this and opposite page are from 1/72-scale kit manufactured by Airfix in England, and imported under license by MPC.

By using the ABT decal sheet No. 30, the author duplicated color scheme for 109G-6 flown by Erich Hartman — claimed 352 victories.

Authentic markings bring the model to life. The same decal sheet includes Galland's markings. Sheet No. 14 contains other sets.

factured in England, and here under license by MPC. It's a superior kit with good fits, clean castings and no flash on the parts. I did not like the decals in the kit. If you use them, I would suggest doing something to "flat" them to remove the shine.

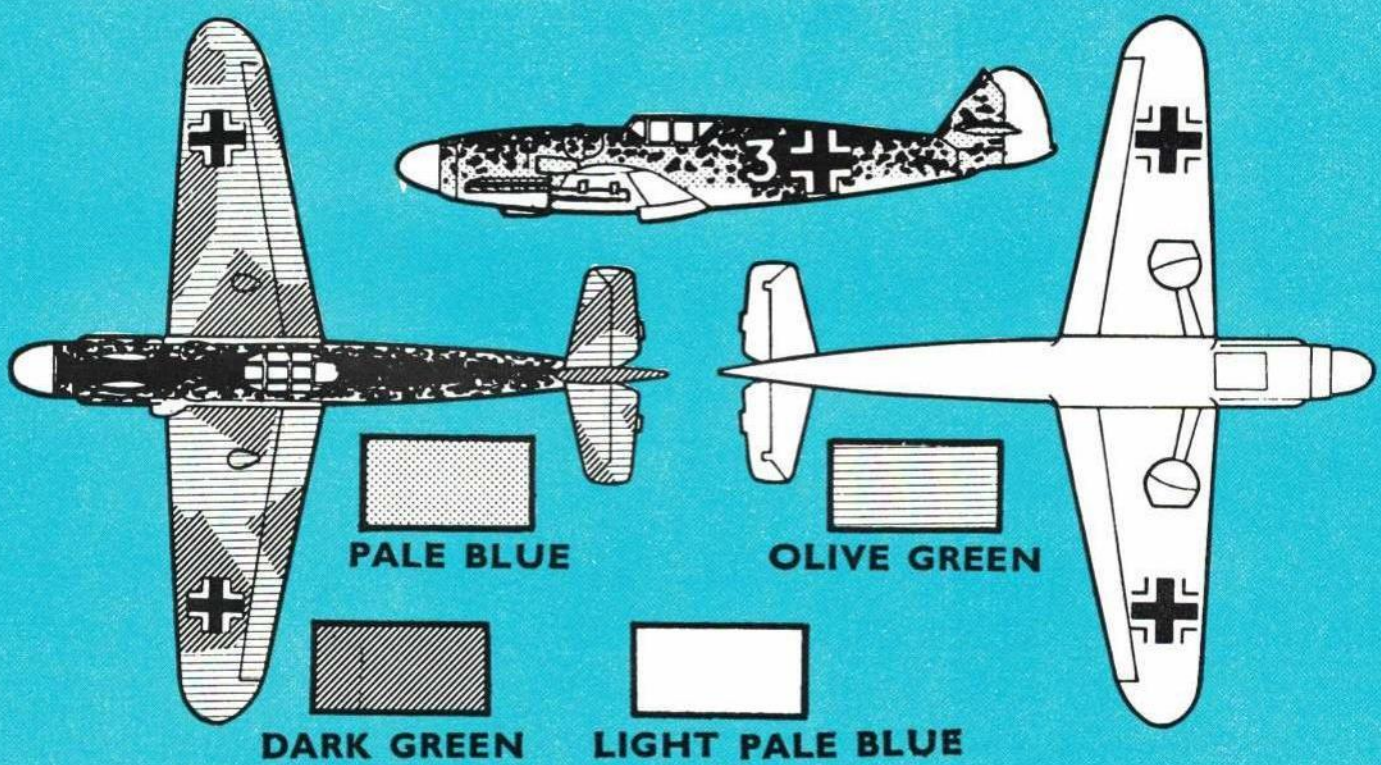
The two drawings are from the kit and show color scheme and decals which are in the Airfix kit. After I saw the ABT decal sheet No. 30 which has decals for Major Erich Hartmann (Kdore. 11/JG 52, in Jan. 1945, in the Eastern Front Campaign), I decided to use his color scheme and markings.

This high-score pilot had 352 victories — more than any other Luftwaffe pilot. I think ABT manufactures decals among the best in the world. The register is never sloppy, and detail always good. This decal sheet No. 30 is really very interesting and has complete sets of markings for two German aces' planes (Hartmann and Galland). Included with the decal sheet is a booklet which shows where to locate the various markings. This is most helpful — the decals have to be seen to be appreciated. Another good ABT decal sheet for this kit is the No. 14 sheet, which gives two complete sets. One is for Hauptmann Hans-Joachim Marseille of the Jagdeschwader 27. This high-score Luftwaffe pilot had 158 victories in the African Campaign.

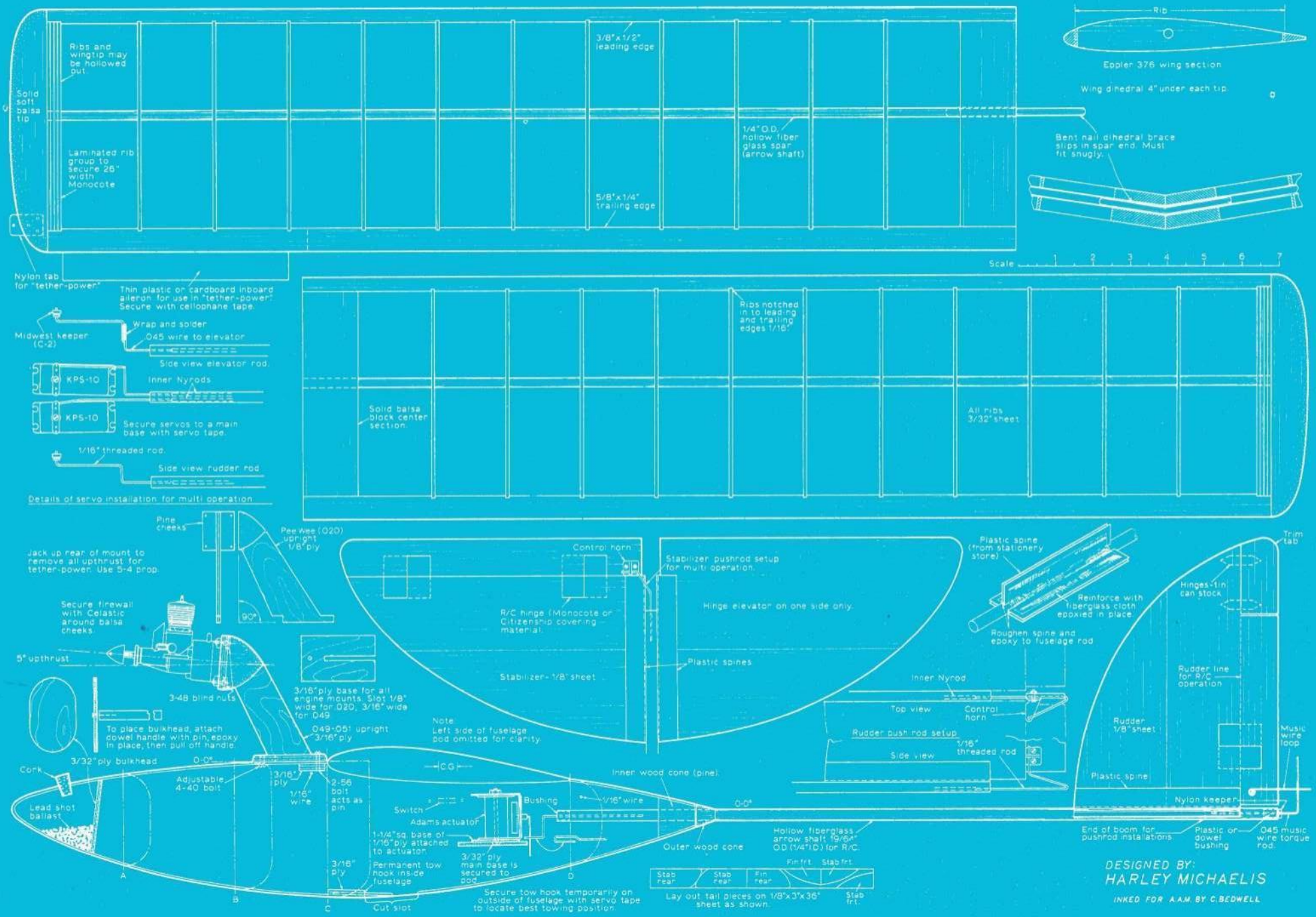
Here is Maj. Erich Hartmann's color scheme: pale blue undersurfaces, with pale blue ¾ up on sides of fuselage; yellow wing tips, yellow band on fuselage; black, green and dark-green top surfaces in splinter pattern, dark-green mottle on top of fuselage; red and white spinner, flat-black prop blades and tires with dark-gray wheel centers. If you use Galland's markings, file the cannon bulges from the fuselage and wheel-well bulges and you will have a Bf-109F. Then you could use the Galland markings of Sheet No. 30. One of the Airfix kits has the swastikas, but there is no reason to do without the Luftwaffe swastikas because ABT has a sheet (No. 10) which has the swastikas used between 1939-45. There is an assortment which will make almost any type of 1/72-scale German model plane.

If you use the following basic instructions, you can have a most presentable model. First, to remove mold release which is on all kit parts, they should be dunked in warm detergent suds. Rinse in clear warm water. Break all parts off plastic trees in kit and use a fine-wire mesh strainer for dunking and rinsing small parts. Remove parting lines on all parts by sanding or scraping

Continued on page 88

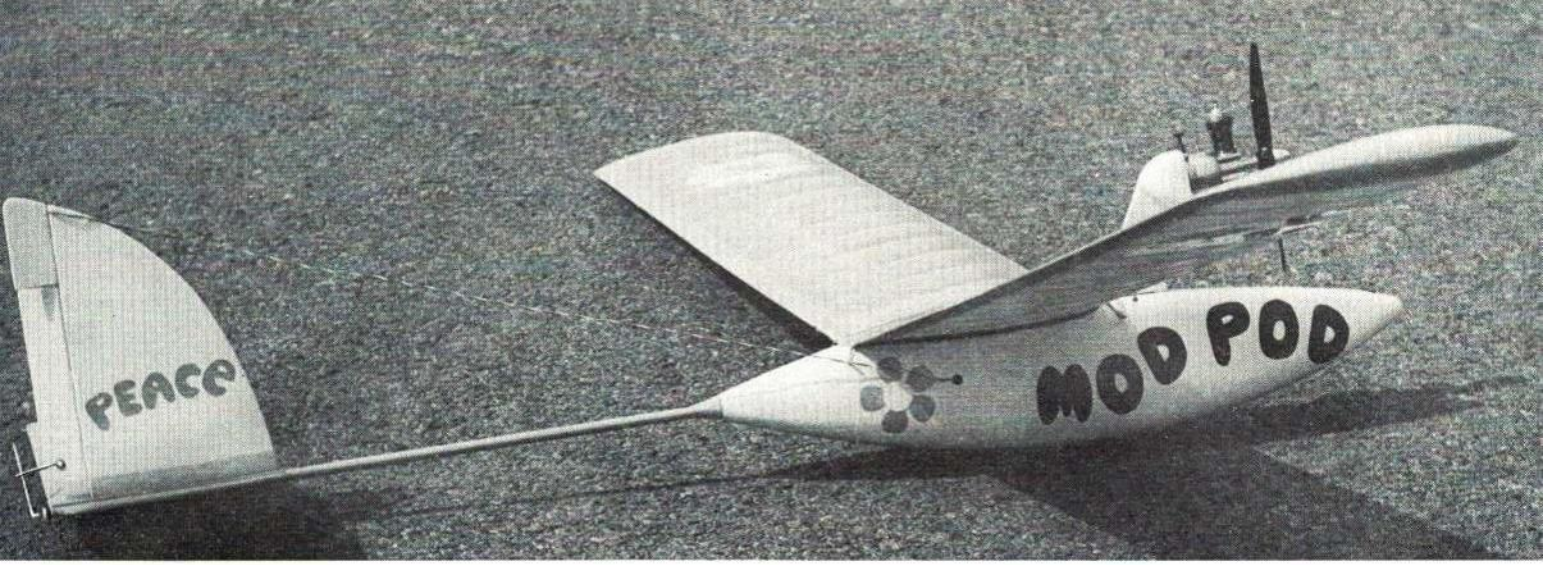


For color schemes such as those shown in these photos and drawings an air brush is needed. Text details various painting procedures.



DESIGNED BY:
HARLEY MICHAELIS

INKED FOR A.A.M. BY C. BEDWELL



Mod Pod

This versatile model may be flown in 8 different ways, with or without radio. Designed for durability, repairability, and club production as official trainer.

HARLEY MICHAELIS

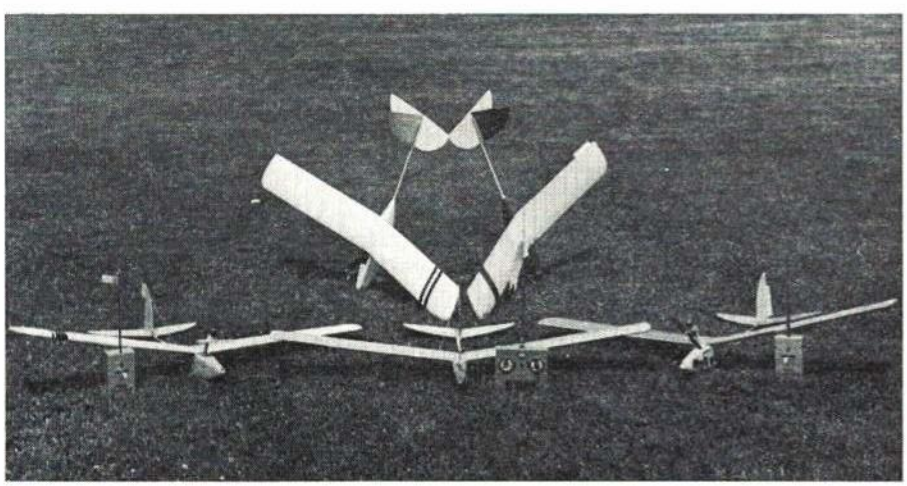
THE 54" Mod-Pod is a versatile, universal model that introduces revolutionary, exciting new concepts! It offers something for everybody, regardless of age or experience level. It is an ideal trainer — tough, stable, forgiving and a great teacher about flight in many forms. It expands and interchanges to fly in eight different ways, three without engine or radio.

It has a look that is love at first sight for most everyone. Trimmed up in either a "racing" decor with stripes and numbers, or "daisied up," it is instantly received by all young "Mods" as one of their own. One cannot be indifferent to Mod-Pod. Everybody wants to look at it, touch it, hold it, or fly it!

In its basic form, the Mod-Pod is a simple, highly capable soarer, readily run up by towline or hi-start catapult. It also lends itself to an interesting variety of hand games. Two or more flyers can toss it back and forth in a form of playing "catch," including variations called "Around the Barn," "Hot Pepper" and "Boomerang" — to be explained. Or, flyers can compete in distance, duration, racing and spot landing events, for hours of inexpensive pleasure.

With a detachable engine mount, it quickly becomes a sport free-flight with anything from a hot Pee-Wee through the McCoy and Cox 049's and Cox 051 engines. On the Pee-Wee, it is most docile — just right for small fry. On the more powerful engines, it is a real bomb and will quickly become a mere speck unless fuel is limited.

It further expands into R/C to become a sport ship or slope or thermal soarer. Its design makes it an ideal rudder-only ship. It quickly accepts the Ace R/C Commander outfits, for simple proportional with a minimum of fuss and expense. The pod is roomy enough for all current digital proportional gear and with just two servos for rudder and elevator, the Mod-Pod becomes an exciting performer. On a hot 049, it will climb almost out of sight on a full tank. Without engine, it will tow like a skyrocket on the electric winch. It's built to stand the strain. On the slope, it is a highly maneuverable, groovy little penetrator that will make a fine showing. A true soarer, it has a low sink rate and surprisingly long glide ratio, even with the load of engine and radio.



At last an all-purpose model. Start with it as an FF glider, try towline, then use a tether to fly in circles, later use power, and finally go radio. Modelers have always thought that pod and boom models are easiest to make and fly. This surely suits Mod Pod. Anyone can fly it — and we dare you to try. Text tells how to make fiberglass pod, but you can also order one. Write Editor AAM for source address.

Tether-Power — A New Ball Game.

Mod-Pod introduces Tether-Power, a fascinating, challenging and entirely new mode of flight, involving the use of a spin fishing outfit. Tether-Power is a sort of combination of control line, free flight and remote control, all at the same time. Here, a beginner can first fly his tethered Mod-Pod in close circular flight (30 to 50 ft. radius) and be successful. He will find it easier than U-control, since no control is needed. He just has to hang on! Then, as he gets the feel of the ship, he can raise or lower the rod to do some "touch and go's" or skim the ground at top speed. As confidence is gained, he can, at will, let line out to enlarge the circle and increase the altitude, to several hundred feet, if he wishes. And, at will, he can reel in line and bring his plane back in.

Circular flight is easy and safe since the Mod-Pod can be trimmed to assure stable flight and minimize the chance for calamity. If tension on the line is released so it can freely slip through the fingers, it will tend to go in a straight line. With practice, the Mod-Pod can be sent straight out 200 to 300 ft. at a time on the more powerful engines. It can then be made to gently turn, by gently applying the fingers to the line and returned to a circular path. Or, with firmer application of pressure, the turn may

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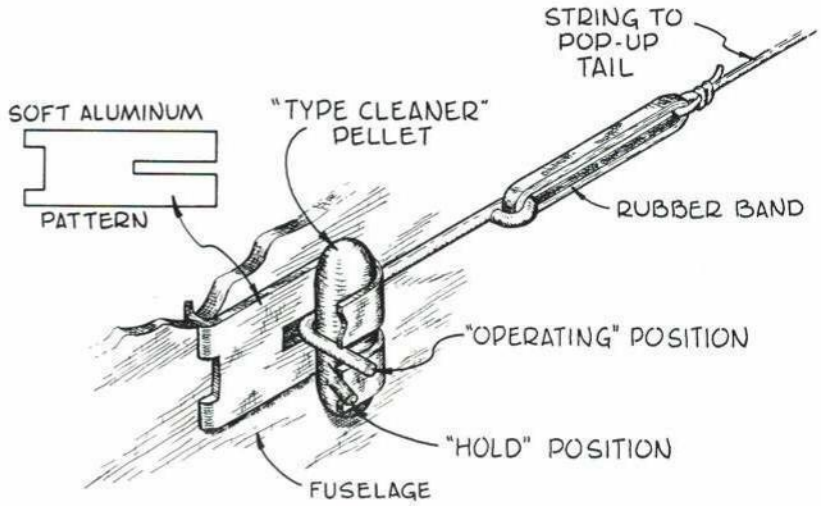
F/F **BOB MEUSER**
General Correspondent
SPORT



Light-weight non-burning dethermalizer timer is not only ideal for light small models, but desirable for all types. Band pulls pin slowly through the pellet.

Hank Cole's glider launcher is the answer if all your buddies are somewhere else about the time you need a launch, or if you would like to put in a few test flights on the way to work. According to Hank, the mechanical stooge does a better job of launching than a people-type stooge — goop called "A. W. Faber Plastic Type Cleaner" will in calm or wind.

We wouldn't attempt to draw a parallel between Hank's stooge and any of Rube Goldberg's creations, of course. But there really is a Rube Goldberg, and he once lived in Hank's area. Not that there is any connection, of course. One thing about Hank's device that keeps it out of the R. G. class — it works!

A tug on towline A pulls pin B from hole in pin C, releasing arm D, which, under the combined pull of the towline and the action of the spring hinge E, moves forward causing pin F to be pulled by string G from hand H, whereupon rubber bands I release glider J. Honest, it does!. . . .

Light-weight D. T. timer: What do you do with a Winter-Cupper (Coupe d'Hiver) in the Summertime? When Summer comes in, fuses are out, in many parts of the country, because of the fire hazard. And a mechanical timer is too heavy. Hand-launched gliders have the same problem. The gadget shown in the sketch just might be the answer. The heart of the device is a rubbery goop called "A. W. Faber Plastic Type Cleaner No. 7540," used on typewriters, and available in stationery stores. It acts somewhat like a liquid in that it flows under pressure. Perhaps "Silly Putty" from the toy store would work the same way — we haven't tried it. Here is how it works. Set the wire hook in the "hold" position. Roll up a little cylindrical pellet of type-cleaner between your fingers and pop it in place — it is sticky enough to stay there. When you are ready to launch, flip the end of the hook into the "operating" position. Slowly but surely the wire hook slices through the type-cleaner, and up goes the tail. There are probably a thousand variations of the same basic principle, and we will leave it up to you to work out the details of the one that best solves your particular problem.

If any of you out there have another solution and want to become a) rich, b) famous, or c) both, send it in. . . .

Gieskieng's prop: Bill's almost unbelievable attention to detail is reflected in his highly successful one-blade prop — quite a departure from the "buy it, bolt it on, and forget it" school of modeling. Bill covers the blade with fiberglass imbedded in Hobbypoxy No. 2, sands it to an accurate profile and rubs it to a mirror finish, and ends up with rather sharp leading and trailing edges. Bill says "Balance is very important. The thing to keep in mind is that the prop must balance both horizontally and vertically. The forward rake of the blade increases efficiency and helps dynamic balance by counteracting the thrust load. Sweepback has two functions — it makes for smoother running, and it helps reduce undesirable compressibility effects associated with high tip speeds." The tips of an FAI-class power model prop do run at well over two-thirds of the speed of sound! "The inner stations indicating 'Phillips entry' have the leading edge raised about 6% of the chord and are close to being semi-symmetrical sections. The outer stations have a gradually raised entry toward the tip. The airfoil high point moves back to the 40/45% point. The reason is that it is vastly more efficient at high tip speeds than a section such as the R.A.F.6. The blade must be rigid or the flutter will cause losses of thrust up to 20%." This rather drastic condensation and interpretation of Bill's notes and sketches cannot hope to really show the care and skill Bill puts into his FAI-class gassies.

Gieskieng says "A modeler would have to be crazy to build the way I do." Yea, Baby, like a fox! . . . .

For the Bookshelf: Most books on aerodynamics fall into either of two categories. On the one end of the scale is college textbook — not much help for most free-flighters unless they happen to be students of aerodynamics. On the other end of the scale is the kind that shows, incorrectly, the air bouncing up over the top surface of the wing, leaving a dome-shaped region above the wing labeled "partial vacuum." Worse than worthless — probably copied mostly from other equally worthless books of the same kind written a quarter-century earlier. In contrast, there is a little jewel of a book on the market called "Shape and Flow.

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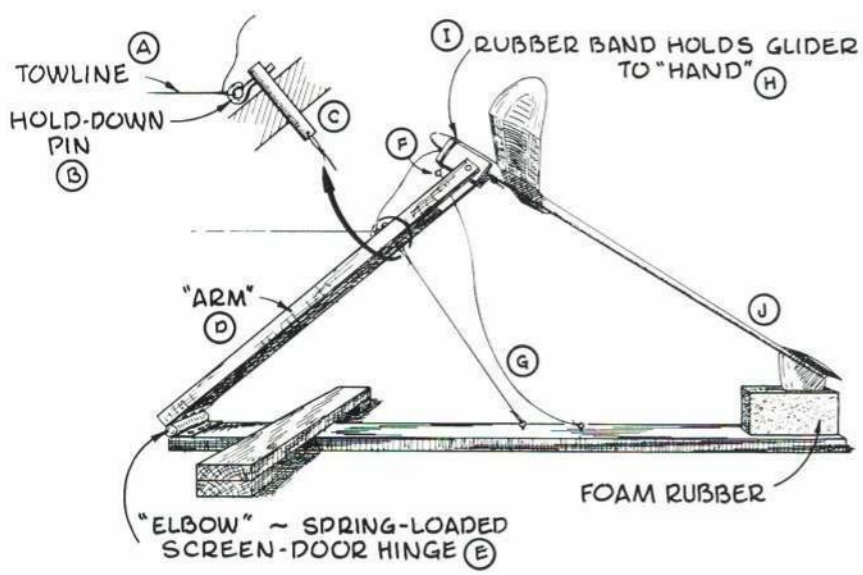
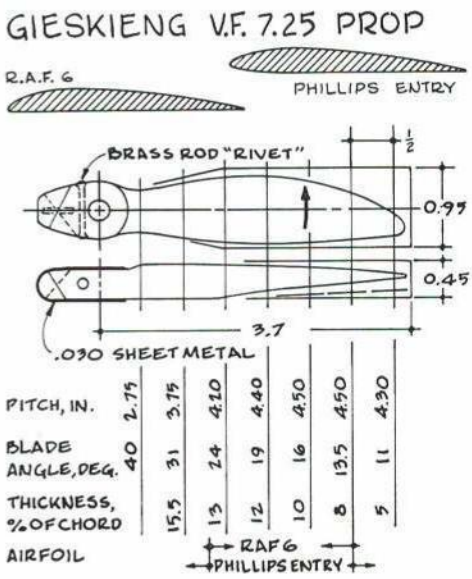
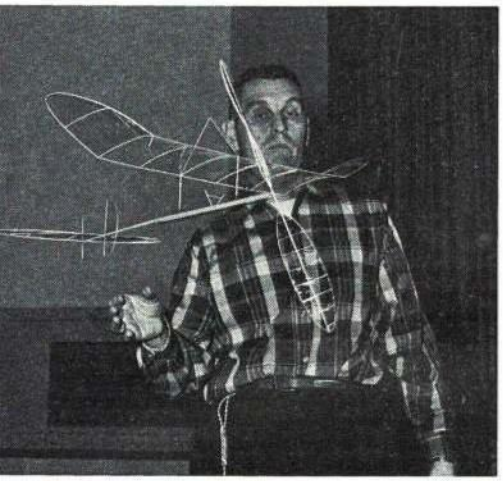


Hank Cole's towline glider launcher never complains about standing in the noonday sun. Sequence of operation is fascinating and well thought out. Always successful.



Bill Gieskieng's single-bladed FAI-Power prop uses special foils and shapes on blade.



Bill Conkling

Holding his breath, Hal Crane test-hops one of his world record attempters. He is one of the leading U. S. low-ceiling flyers.

F/F BUD TENNY
Specialist Correspondent
INDOOR

About the time you read this, the 1970 Indoor World Championship will be taking place. The site is a salt mine 400 feet underground, located about 60 miles north of Bucharest, Romania. It is expected that teams will be entered from Austria, Czechoslovakia, Finland, Germany, Hungary, Italy, Romania, Yugoslavia and the United States. Poland may send a team for the first time; France had one entrant in 1968, but there has been no recent word on their activity. Finally, England participated in 1961 and 1962 and they hope to at least get observers to this event.

For those who are really serious about indoor flying, the World Champs is the high spot — a pinnacle — of indoor flying. The solemn pomp and ceremony, the fierce and highly sportsmanlike competition, and the multi-lingual excitement of a World Championship is deeply impressive to even the most experienced flier. Each three-man team and their manager have laid a small portion of their country's honor "on the line;" you feel it right up to the very end. No matter what place his team has finished in, a competitor in any international meet has met and mingled with the finest fliers in the world. It is both humbling and gratifying to be a part of the scene; one wonders at the end why nations must fight when people from those nations get along so well.

International indoor activity has another facet not often appreciated by the average U. S. modeler. This is the activity in World Records; there is one indoor record for each of the four international ceiling height categories. These categories are defined by ceiling heights: Cat. I is 8 meters (26.24'); Cat. II is 15 m (49.2'); Cat. III is 30 m (98.4'), and Cat. IV is Over 30 meters. The most intense activity has been in Cat. I. Jiri Kalina set the first record at 17:29 and Stan Chilton of Wichita, Kansas, upped it to 17:52. Kalina raised it again. Hal Crane of Hampton, Virginia, exceeded Kalina's mark twice in successive sessions and Kalina came back with a resounding 21:06. There it stands; international regulations require a 2% increase, so the next record will have to be greater

Continued on page 66

F/F WALT MOONEY
Specialist Correspondent
SCALE

At last, a low-cost way to have fun in Las Vegas has been discovered. We refer to the Second Annual Peanut Scale Contest which took place there on Jan. 3. Entrants competed for seven hand-crafted trophies, plus merchandise awards, and a true spirit of fun prevailed. Additional prizes were provided for the worst crashes, and these proved especially popular.

While nightime temperatures were down around the 18-degree mark, making the early contestants shiver a little, the afternoon warmed up sufficiently to permit shirtsleeve flying. Perhaps the main reason for the fun, was the fact that this was strictly a "low pressure" contest. Unlimited flights were permitted, and scale judging was not required. Under this system the juniors were able to compete with the open entries on a fairly even basis.

Additional humor was added to the occasion by the colorful hats (left over from New Year's Eve parties) which were provided for each contestant. As an indication of the tremendous interest that Peanut Scale has attracted, one of the timers was no less a personage than Gil Horstman, well-known R/C pylon racer!

Aircraft entered covered virtually the entire spectrum of aviation history and included: 1911 Deperdussin, Ryan M-1, several DH-6's, an Eastbourne Mono, a Volksplane, two Pilatus Turbo-Porters, a General Aristocrat, a Pyret Taupin, a Waterman Racer, several others, including French homebuilt.

As a point of interest, we asked about the occupations of some of the entrants, just to see what these people do when they aren't playing with model airplanes. It would be difficult to assemble a more mixed group: an Air Force F-111 pilot, a bartender, a housewife, several students (juniors), a history teacher, an aircraft crew chief, a graphic designer, a roofer, and well, you get the idea. Looks like Gambling for Peanuts is fun for anyone.

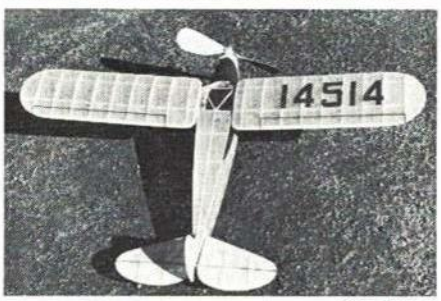
Although the majority of the contestants were from the immediate Las Vegas Area, Bill Warner, Bill Hannan, and their sons made the 5-hour drive from their homes in southern California, and reported having a fabulous time (without once getting near a slot machine). Warner was able to win first place and the other three Californians also managed to take home trophies.

If your club is looking for a good-fun event, which can serve as a fill-in between more "serious" contests, by all means consider Peanut Scale. The models are inexpensive to build, and are seldom badly damaged, since they are so light.

The San Diego Orbiteers have held several club Peanut Scale indoor contests, one of which was a one-design contest for models of the Volksplane (a home-built whose prototype was built in this area by W. S. Evans and test flown by Walt Mooney), which resulted in nine entries. These indoor Peanut Scale events turned out to be much fun.

Times generally run between 20 and 30 seconds, with a minute being approached by the better models. Highest time so far was achieved by a much over-powered Warwick Bantam model which zoomed up to stick its winding loop into the accoustical tile ceiling and then did 2½ hours of vertical rolls before it came down.

As an aid to getting started in Peanut Scale and flying for fun in general, the 1970 *Plans & Things* catalog is available for 25 cents (to cover postage and handling) from: W. C. Hannan Graphics, P. O. Box A, Escondido, Calif. 92025.



Fudo Takagi

Fairchild 24CB with Cirrus engine molded for rubber power with 20¾ in. wing span is light, delicate, and quite easy to fly.

Fudo Takagi

Captured in flight outdoors, a peanut scale rubber-powered deHavilland DH-6 cruises by. One of these models lasts a season.

F/F CHUCK BROADHURST
Specialist Correspondent
POWER

What's it going to be like flying FAI Power at the USA Free Flight Team Selection Finals at Albuquerque?

That question is really "bugging" those of us who will be heading for the high country of New Mexico come Labor Day Weekend. For one man's answer we checked Bill Gieskieng of Denver. Bill, editor of the National Free Flight Society's *Digest* and an acknowledged expert in FAI Power, has flown at Albuquerque and Taft (Calif.) as well as in mile-high Colorado. In fact, when he came out of the highlands last November to fly in the Western Free Flight Association's annual at Taft, he dazzled the Far Western flyers with his fabulous variable-airfoil "flapper" ship "Meta Nemesis." Using an Aldrich-modified piped Supertigre 15, Bill posted a convincing 23:33 winning score. Here's Bill's answer:

"It will be tough! I can't speak for the Wakefield and Nordic flyers because their task of picking air is different from the power challenge. The thin air will cut power, of course, but the relative coolness and lack of humidity will help in other ways. Thrust will be noticeably less — enough that you can feel the difference holding the model in your hand. Drag will be down too, and

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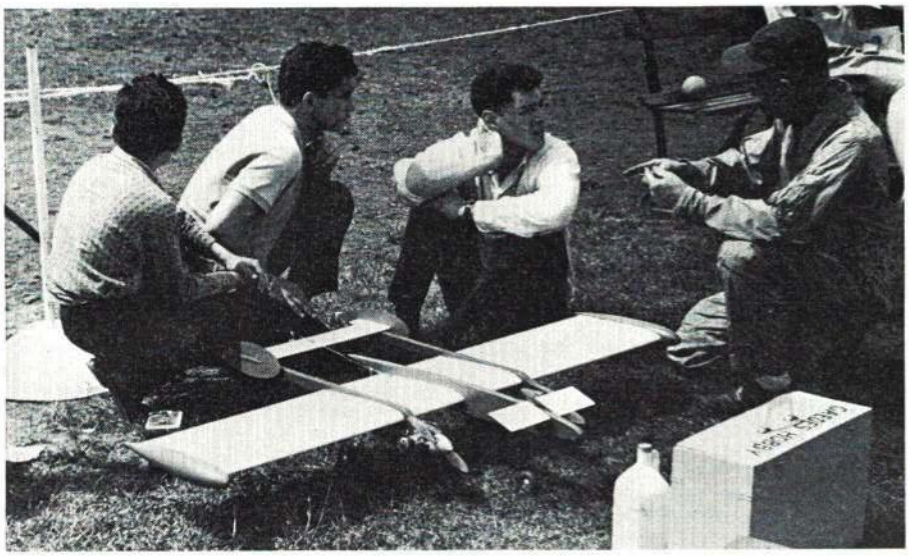
Where the action is . . . Free Flight



Rudolph Anderson explains the whys and wherefores of "Whats-It," a novelty ship powered by two Johnson 35's. Uses stabilator up front to help this big thing do the maneuvers.

C/L BILL BOSS
General Correspondent
SPORT and SCALE

A 1970 rules change reminder: Several control-line rules changes proposed in 1969 and approved by the CLCB became effective Jan. 1, and appear in the AMA rule book for 1970. All contest-minded modelers and CD's are urged to review the following events for changes:

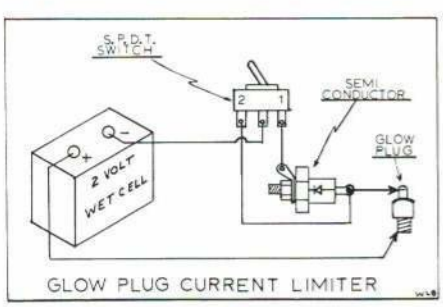
Speed — New anti-whipping rule: ½A Profile Proto — 2 line-control for Jr's only; B Profile Proto — change in Para. 6.16.2; C speed — engine limit for Jr's.

Scale, Stunt and Dive Bombing and Strafing — All have changes in line-size requirements.

Navy Carrier — Interpretation of Para. 20.9 "The signal of the pilot's intent to land shall be given as the model crosses the deck beginning his lap prior to landing. If other than a hand signal is used, the pilot shall describe his signal to the official immediately prior to each of his flights (i.e., before he starts his engine)."

Be prepared, read the rule book, and don't find out on the day of the first contest that you did not meet one of the new requirements — your day will be more fun and the job of the event judges and CD's will be made a lot easier.

In addition to the event changes above, a new, special Sport Speed event has been added to the supplemental section of the rule book. This event is designed to encourage the beginning speed flyer in an event where commercially available engines and fuels will be competitive. Perhaps, CD's might want to try this event in areas where the speed event participation is lagging. (From AMA's "Competition Newsletter," Dec. '69.). . . .



Half-volt forward voltage drop of silicone diode lets only 1.5V get to plug from wet cell.

Modelers perform benefit for Babe Ruth Little League: Mike DiAgostino, Sec. of the Staten Island Sky Devils, tells us that for the past two years, the club has engaged in model air shows for the benefit of the South Shore Babe Ruth Baseball League. The air-show features control-line in which combat, stunt, two-speed flying, formation flying, and novelty craft are demonstrated. The benefit performances are held at the Little League field and have raised $60.00 or more through spectator contributions at each show. The proceeds have been used by the Little League toward the purchase of uniforms and equipment for the young players.

Congratulations to the Sky Devils for their efforts in aiding the Little League organization and for promoting our own sport of model aviation. More activity of this type by the many clubs and associations around the country would be a fine way of bringing our activity before the public. Mike also reports that the club has acquired several new members as a result of this activity. (From AMACGNY Newsletter.). . . .

Glow-plug current limiter: Warren Truppner, Staten Island, N. Y., says that the glow-plug current limiter shown in the sketch has been used for several seasons. Plug burnout during starting when using a two-volt wet-cell can be eliminated by the use of a semi-conductor. Glow plugs of various manufacturers vary in the amount of current they draw and the voltage that can be safely applied. Through the use of the semi-conductor the current can be controlled, and the device has been used successfully on engines from .010 to .60.

A single-pole double-throw switch is used in the circuit to provide these operations. Position No. 1 allows current to flow through the limiter to the plug. Position No. 2 permits full current to flow to the plug and is also used for charging the battery. For those desiring an "Off" position, an SPDT switch with a center Off position can be used. Note: The battery cannot be charged with the current limiter in the circuit. Source of the semi-conductor is Arrow Electronics, Part No. 3F10 DC-IR Silicon Power Rectifier, No. Amp. 100PIV — Cost of part approximately 85 cents. . . .

Modeler receives special award: How do you interest a young boy in building and flying a model of a prop-driven plane in this age of Jets and Spacecraft? Richard Kurth may have an answer to this often-asked question.

Dick, a native New Yorker, is constantly present at the Flushing Meadow Flying Field and his purpose is to teach others. He likes to fly as much as anyone but his prime

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C/L JOHN SMITH
Specialist Correspondent
SPEED and RACING

Junior flyers, now hear this! The 40-class speed is in this year. And on two lines, no less. So get out all those hot rat-race engines, put 'em in a speed ship and join the go-fast generation. Since most 40's have about the same dimensions as the 29's, it should be a simple trick to put the bigger engines in the old airplanes. Check the new AMA Rule Book for all requirements.

Make sure that all bellcranks are installed in a safe and sane manner. Use a good, solid mounting — a hardwood plate with a bolt to hold the bellcrank, such as by Perfect Products. Hold the top on the model with bolts into the metal pan. Two bolts through the wing and one in front of the elevator. No bike spokes, please!

If you've flown speed before, you won't have too much trouble. The Rat'ers should find things easy, too. Newcomers be prepared for a fast airplane, maybe letting a more experienced flyer take over for the first flight. Play with props until you get the best combination for the best speed. Line clips by Sullivan Products are recommended for fastening line to handle and airplane. The old style slide-clips have been known to vibrate open in flight and are not safe.

For those using clear finishes on speed models, you will make all timers happy if you paint the "line side" of your cowl or vertical fin with a splash of bright paint. It helps to see the airplane, especially the ½A models when you are flying against certain backgrounds.

If your model jumps the dolly on takeoff, or for any reason loses the prop and continues to run, make sure before you fly again that the resulting vibration did not loosen glue joints in the airplane. Of course, if the engine burned out before you got it shut down, you have other things to worry about.

Newcomers in speed should make up a pocket tool kit containing a spare prop, glow plug, pin to remove spinners, prop- and glow-plug wrench, screw driver to remove hold-down bolts, and a rag. Have one member of your pit crew carry these tools with him at all times and you'll save a lot of time looking for tools when you're in the circle to fly. . . .

The last Competition Newsletter from AMA shows a few CL Speed records wide open. If you turn a good time be sure to check current records. You may have set a new record without knowing it. . . .

Will the 200-mph barrier be broken this year? Several people are pushing close. Frye and Roselle, the C Record holders, have been over the magic number several times, but not for a full flight. Who is going to do it?

C/L JOHN BLUM
Specialist Correspondent
CARRIER and STUNT

At the first Nats Carrier event in 1948 the scores ran 370.46, 200, and 157.84, through third place. The winner, a 43¾" Skyraider by Cal Smith (June 1951 *Air Trails*) had a high speed of 56 mph and a 43-mph low (70-ft. lines). The 1951 Nats winner was an SE-5 at 225.45 pts. In 1952, Nats winners had 388.08, and 288.86 pts. Models typical that year were the Grumman Bearcat and Douglas 0-38.

Smith's 1950 Skyraider was large by today's standards, some eight to ten inches extra in span. (The 44" max. span wing rule holds true today as it did 20 years ago!)

It's interesting to note many of familiar problems existed then, too. The 1950 Skyraider used an ignition O&R .60 with two-speed points, on gas and oil. The 3-line J-Roberts control system (as we know it today) was off in the future. It was recognized that a wide range between "high" and "low" was needed to produce a winning score. It also was felt the emphasis should be on low to produce a desirable landing speed. The variable-pitch propeller, third-line-operated chokes, trailing parachutes, and wing-flaps released by timers were the slow-flight gimmicks tried at the first Nats Carrier event. The parachutes may be out now, but we've heard the variable-pitch prop "noise" in the not-to-distant past; and the third-line and wing flaps seem to undergo constant scrutiny and change.

Smith's 1950 article offers great insight into needs: happy balance on weight (not too light, not too heavy — still a major controversy among competitors); perhaps more of a trend to the smaller engines (emphasized by AMA rules change for two-engine classes in 1963); and the requirements for both speed phases.

The 1953 meet produced scores of 379.9, 391.5, and 147.8 pts.; 1954 was the first over "400" flight (by Don Dimizi, a Senior) at 417.4 pts.; Bill Netzeband won Open with 385.5 pts.; Junior Bob Hemingway had 361.9 pts.

Dimizi's design was to gain monumental popularity. It was a Fox .35-powered, 125 sq. in., AF-2S Guardian (22 oz.). Note that the three first-place winners used 35 engines. Bill Netzeband flew a 36" span, 396 sq. in., Convair Sea-Dart, using a Fox .35, while young Bob flew a 38 oz. Great Lakes using a K&B .35. Immediate problems were being overcome, new methods of throttling were evolving (short article on early throttles, by Cal Smith, January, 1954, *Air Trails*).

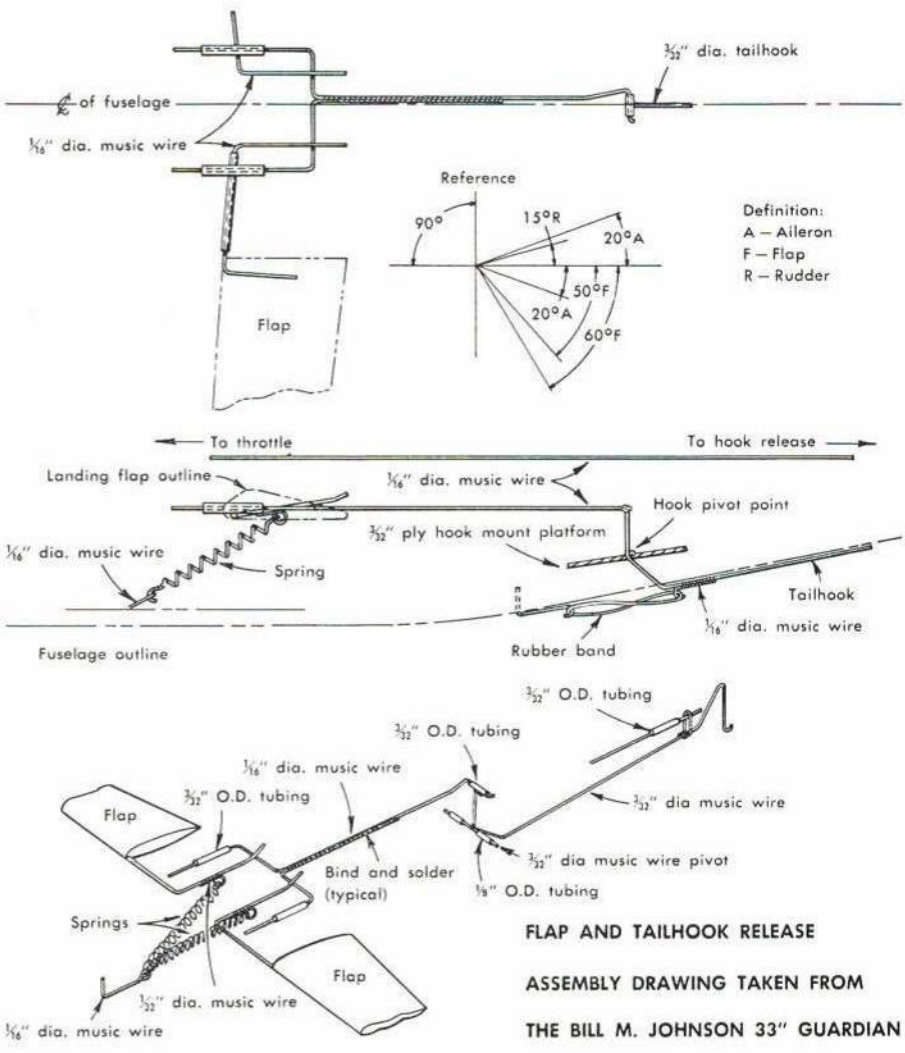
The Guardian is the most-built carrier model independent of engine size. Netzeband's plans in the Feb., 1962, *American Modeler* offered plan availability in a size model easily adaptable. When Class I (up to and including .40) came along, only an engine change was necessary to convert to the "small" class. The long nose-moment, spacious wing area and shoulder-wing add to its success.

Bill Johnson (the throttle man) has a 33" Guardian that can be adapted to Class I or Class II. It offers a different approach in flap release. Here's how: 1) a transition period from "high" to "low" before the flaps drop and, 2) the flaps, in released position, are independent of tail hook movement on landing. This latter permits lighter "loading" of the tailhook and less wear-and-tear on the flaps and model at point of landing. Also noted is the recommended amount of flap, aileron, and rudder movement; this setup will also supply to other models. . . .

Semi-scale Hansa-Jet will fly a nice AMA pattern. Engine is neatly hidden in cockpit area. Fine-mesh window screen simulates the cockpit windshield. Designed/flown by Mike Scott.

At the 16th King Orange Internats, held January 1-4, 1970, at Sebring, Ray Willman, of St. Louis, placed first with a 589-point flight in Class II, at 117.60 mph high and 27 mph low. Made the first flight in Class I at the King Orange only to find that the center of circle didn't align with the center of the deck. Washed-out the inboard tip, flap, and aileron on a deck-arresting cable guide, on his K&B .40 Guardian.

Charlie Banks, of Terra Haute, took first in Class I with a 535-point score. There were very few landings on the deck, and many flights lacked performance due to maximum concentration on the "low" end for the point differential.



FLAP AND TAILHOOK RELEASE ASSEMBLY DRAWING TAKEN FROM THE BILL M. JOHNSON 33" GUARDIAN

Fantastic photo by Dr. Pfost shows Lowe's Lanier Midget Mustang in mortal combat with another open pylon racer. Both lost.

R/C DON LOWE
General Correspondent
SPORT and PATTERN

Cold weather flying: Most of us fair-weather flyers who live in snow country scurry to the basement when winter arrives and spend the dismal months planning and building our new creations for the following spring. I can remember early in my R/C modeling years when nothing but an earthquake, driving rain or blinding snow storm would keep me from flying at least once a week, but alas, my ambition has cooled (and maybe I've aged a bit?). But not so with Marvin Braley and sons Mike and Marty of the WORKS Club in Dayton, Ohio. These guys fly the year around and have a ball with their ski- and float-equipped ships. I made one of their flying sessions and it was great except I almost froze.

Marvin has some tips on cold-weather flying that may be useful to you hardy types. First of all, he encourages you to keep planes, transmitters, and batteries inside the heated car instead of the cold trunk on the way to the field. This keeps batteries and engines warm. Warm batteries have more ampere-hours than cold batteries and the thermal lag due to their mass will cause them to cool slowly and therefore give longer flying time. Also, a warm engine will start better. (I recall a few years back at the Toledo Conference in February when Ed Sweeney could not start the engine for a demonstration flight until he stuck it into the warm exhaust of a car!)

Marvin recommends for starting that the glow plug be removed, rotate engine to top-dead-center and fill with Cox Red Can fuel. He then replaces plug, rotates engine two or three times, hooks up battery, and flips using a "chicken" stick. This last item is very important since cold engines loaded with fuel are nasty. I have also used cigarette lighter fluid for starting a cold engine and this works very well. What you need, of course, is a highly volatile fuel that will vaporize at the cold temperatures. If you have a starter, this is a big help, but is most definitely not a cure-all. If the engine is loaded don't just crank away at high speed since it probably won't start. I find that "bumping" the starter is more effective since quite often the engine fires more readily at low rpm. This technique is also good with starters at normal temperatures. High-speed starter cranking seems to be good only when the engine is dry and you're trying to pull in fuel.

Marvin installs skis so that the ski angle of attack is not allowed to change over one or two degrees. This is necessary since a larger change will allow pitch moments to develop aggravating control. Also, if the skis increase to too high an angle of attack the aircraft becomes more sensitive to rudder. In regard to the latter, installing skis or floats will make the ship more sensitive to the rudder control and often it is necessary to decrease rudder throw or add fixed fin area.

I recall flying Marv's ski equipped "Stark Shark." This ship was extremely sensitive

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So what if it snows, Mike and Marty Braley are ready. Floats are as good as skis.

R/C FRED MARKS
Specialist Correspondent
TECHNICAL ITEMS
AERODYNAMICS

Last month we looked at some simple checks of components for kit systems, including inductors, diodes and capacitors. While transistors cannot be checked for quality using the simple VOM, they can at least be checked for failure in either an open or shorted condition.

Follow the check of transistors carefully because the effects are different depending on whether the transistor is PNP or NPN. First the PNP. Clip the negative head of your VOM to the collector and the positive lead to the emitter of the transistor. An intermediate resistance should be obtained. Now touch the base lead to the collector. The resistance reading should swing slightly lower. Repeat with the base lead touched to the emitter. The resistance reading should swing higher. If a zero reading is obtained for the first test, the transistor is shorted. If an infinite reading is obtained for all tests, the transistor is open.

NPN transistors are checked as follows: Clip the negative lead of your VOM to the *emitter* of the transistor and the positive lead to the *collector*. An intermediate resistance reading will be obtained. Touching the base lead to the collector will again decrease the reading and to the emitter should give a higher reading. If a zero reading is obtained for the first test, the transistor is shorted. If an infinite reading is obtained for all tests, the transistor is open.

All of the preceding checks take much longer to read about than they do to perform. In either event the time taken to check components for kits or home-building is much less than the time spent unnecessarily tracing problems caused by faulty components in a completed unit.

If you own an oscilloscope, or have access to one, the circuit shown in Fig. 1 will prove almost invaluable. It simply demodulates the RF signal produced by the transmitter for presentation on the scope. If a problem occurs in a system (particularly digitals which are difficult to troubleshoot without an oscilloscope) and the cause is not obvious, this little rig will tell in seconds if the problem is in the transmitter. When used prop-

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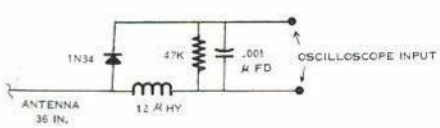
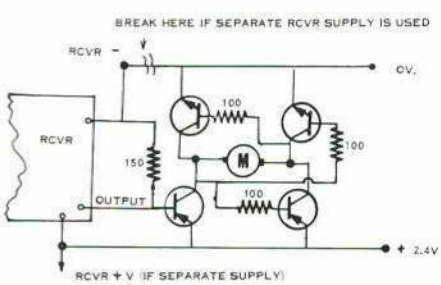
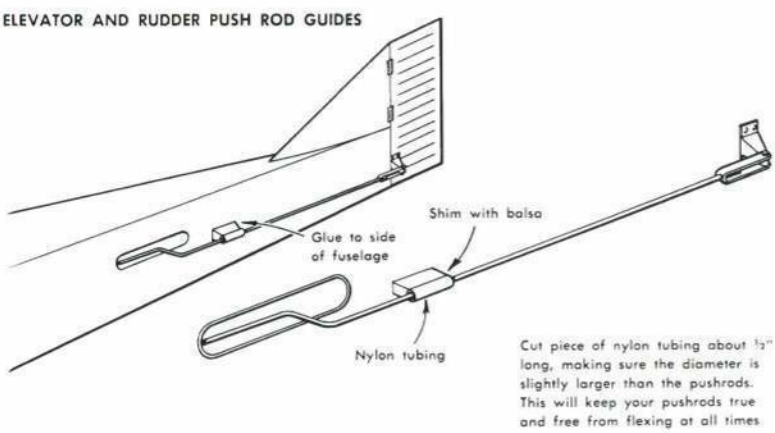
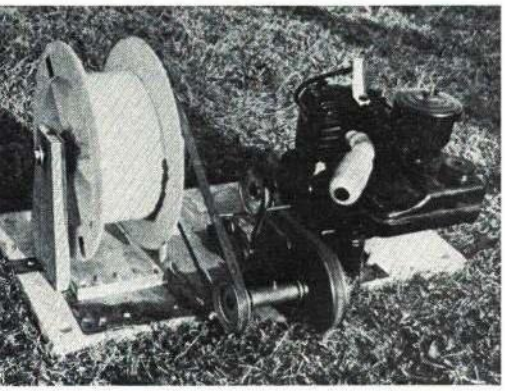


Demodulation circuit for use with scope to read transmitter pulse train or tones.

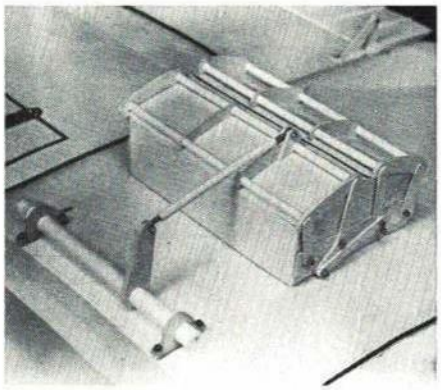


Basic bridge circuit eliminates battery centertap in driving GG servo. By Potgeiter.





Glider winch with belt drive from 2-hp engine to built-up plywood drum. Using light line, this is more than adequate.



Plastruct tubing and model railroad bolts suitable for detailing some parts of super-scale R/C plane. McCullough's FU-24 again.

R/C HOWARD McENTEE
Specialist Correspondent
GLIDERS and FAI

R/C Scale World Champs: Held at Bremen last summer on a trial basis, this meet has been elevated to full FAI World Championships status, will be held every second year — on the years between the R/C Stunt World Champs. The meet will be in England over Bank Holiday Monday, Aug. 31. Contestants expected to arrive Aug. 27, practice Aug. 28. Competition Aug. 29-30, leave Sept. 1. Site in Cranfield, Beds., 80 km north of London. The 1971 Stunt Champs in England. . . .

John Burkam Gets Heli Record: FAI has announced via AMA that the flight time of 5.65 sec., set last May 18 at the DC/RC Symposium, has been certified. Don't laugh at the short time — it's a lot tougher than many realize. We witnessed this flight made under very gusty conditions; most of us wouldn't even have tried it!. . . .

Nov. Soarplane Snow Gaggle: Nine members of Northern Conn. RCC (Westfield, Conn.) showed up for last glider comp. of the season. Endurance event penalized pilot one point for every second glider was in flight under 5 min. and over 6 min.; also subtracted one point for every foot up to 100 ft. away from the spot, on landing. Winner Burt Williams totaled 21 points, had to force his Bergefalke down to get within the time limit; he was 21 ft. from the spot.

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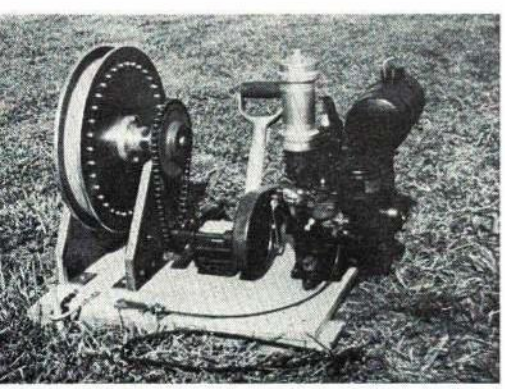

Heavy-duty glider winch here has more power and sturdier drive train. More important is all-metal riveted drum for nylon lines.

R/C CLAUDE McCULLOUGH
Specialist Correspondent
SCALE

Scale Champs: All members of the U. S. R/C team are building new models for the 1970 Scale World Championships in England August 27-30. Maxey Hester picked a special Ranger-powered Ryan ST on display at the Antique Airplane Assoc. Annual Fly-In and photographed the details for duplication. The ship has a dazzling red, white and black color scheme, with checkerboard bottom surfaces. Hale Wallace is also going the aerobatic route with a copy of Lumley's DeHavilland Chipmunk that is often seen at air shows. Walt Moucha has a 3" = 1' (7 ft. 4 in. wingspan) version of Pete Bower's home-built "Fly Baby" featuring folding wings, scale airframe construction and power by a Webra Blackhead 61.

Roy Yates, the 1969 R/C Scale Internationals winner, reports that the meet will be held at the RAF College aerodrome at Cranfield. This is 65 miles north of London and 30 miles north of Luton Airport, easily reached from the M-1 Motorway. It is hoped that one of the features will be a display of vintage and early aircraft from the famed Shuttleworth collection.

Some European teams will not be picked until next summer and Roy may show up for the United Kingdom trials with a twin-engine entry, the STOL Dornier 28A. The 1969 German team members Bruno Klupp and Walter Reger are building a retract-gear Cherokee Arrow and the classic Boeing P-26A.

"D" is for detail: Since the details of a scale job can take as long as the model itself, any shortcut is welcome. Particularly handy is Air-O-Sheet, the butyrate-type plastic which is a major ingredient of Lanier ARF's. It is smooth, needs no filling, can easily be cut with scissors or X-acto knife and bent, stretch-molded or vacuum-formed to shape. The special liquid Air-O-Cement welds pieces together in a few seconds. Thicker pieces are formed by laminating the 1/32" sheets. Great for instrument panels, seats, cockpit gadgets, landing-gear wheel covers and the like. Obtainable in several colors, it may also be doped but this should be sprayed on in thin coats to avoid warping or melting.

A recent addition to model railroad items is Plastruct butyrate tubing, available in diameters from 1/16 to 1¼" with wall thick-

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R/C GEORGE SIPOSS
Specialist Correspondent
R/C CAR RACING

Quite a few hobbyists joined ROAR at the recent MATS show in California. ROAR had a booth and several demonstrations. Even your editor joined in with his home-made R/C car. An improvised race course was set up on the parking lot where mock races were held. A "Love Bug" bodied car (made by IRWIN and sold in toy stores for $2.95) made demonstration runs. A few lucky spectators were given a chance to steer the cars while the owner held on to the "buddy box." Two ramps also were set up with a slight incline and an 8' gap between them. The cars sailed through at about 30 mph while one of the cars ran between the ramps, just as in real "thrill" shows.

Most builders now use a sidewinder setup with a 6:1 gear ratio. Two-channel radios can be used. Some builders with four-channel radios build an additional receiver into the second car, take two of the transmitter controls out of the transmitter and build them into a separate box. In this manner the second car also can be run while the first car is running and the number of cars in a race can be doubled. (If you are somewhat ambidextrous!)

While not publicly displayed at the MATS the cars being prepared by HEATHKIT and Dynamic showed great promise. The Ra/Car booth had an entire R/C car shown in operation . . . but the car was completely sectioned so that the two-speed gearbox, clutch and suspension elements could be seen working. . . .

Summer is just around the corner and races are being held by every club in preparation for the R/C car Nationals. This year's race may be held in the Midwest and attendance should be fantastic. All car manufacturers report record sales and indications are that in 1970 cars will really "make it."

Mr. Leo Spencer, 13 Sugar Maple Rd., Levittown, N. Y., 11756 has formed a racing club whose members are mature hobbyists and ex-racing buffs. . . . Jim Anderson, 76th Army Band, APO N. Y., 09058 is stationed in Germany and reports they hold races against German R/C car clubs. . . . V. L. Wilkinson, Rt. 2 Box 198, Harrah, Okla., 73045 plans opening a commercial car track. Shades of karting and slot cars?. . . . On the regional level, Bob Blair's So. Cal. club

Continued on page 77

Immaculate McLaren sportscar scratch-built by Bob Welch of Seattle. Handmade wheels, gearbox, chassis, etc. Reliable and fast.

The world's most beautiful flying boat.

Royal Mari

Magnificent twin-40-powered seaplane by one of Japan's leading modelers is a fully stuntable graceful flyer which can handle all ROW conditions.

YUJI OKI
Photos by author

RECENTLY, R/C modelers have been driven away from flying sites for various reasons, usually building of factories and houses. Now we are almost forced to the foot-hills. As a matter of fact, I often visit hills nowdays and I find few flat, flying sites, but some lakes and good slopes. In this situation, I have tried to develop R/C hydroplanes and slope-soaring gliders.

I want to introduce my twin-engined flying boat, which was flown very successfully at the OS Invitational Symposium at Lake Biwa near Osaka last fall. Although the R/C hydroplane itself is not a novel subject for modelers, it is regarded as a difficult one to handle. The reason is supposed to be in the fact that the hydroplane has a problem of solving the adjustment on, or in, the water, in the air, and in between. We know of many cases that ignore one of these problems, rather than try to solve it. That is why some planes jump up in a VTO, making a steep climb without showing any beautiful planing. Some crawl on the water without an ability to conquer the "hump." Some fly unstably in the air because of the parasite drag caused by the floats or the hull of inadequate designs, etc.

I have had an ardent wish to duplicate a beautiful, thrilling takeoff and landing, and a good performance in the air of a full-size flying boat into that of an R/C model. I did not avoid the problems of the two spheres (water and air) but tried to solve them.

The flying boat in this article might not be the ideal, or the ultimate one. The study of R/C hydroplane must be continued in the future, but I have many witnesses prove the ability of this plane. This is not a contest plane. Its purpose was to enjoy flying it and its appearance.

The points considered in the basic study prior to designing were as follows: 1) Performances on the water and in the air; 2) A simple but strong structure in order to simplify maintenance when one is far from a work shop; 3) A beautiful appearance.

I won't give how-to-build details, but will comment on design and structure.

Hull: The performance of a flying boat depends on the design of the hull. This is the primary difference from a land plane whose fuselage design has relatively less importance — at least in R/C model planes. Considering lateral stability on the water, takeoff characteristics, parasite drag in the air, and structural weight, a hull with a bottom of relatively large area (instead of a deep hull) and with a sector section (fan-shaped section), was taken as a basic concept. The propriety of this assumption has been well proved since by practical experiments and improvements. The front part of the plane to the step has been improved several times, and now the plane shows very good performances both on the water and in the air.

The hull is an orthodox semi-monocoque structure which has a planked shell over a keel, longerons and formers. Waterproofing is the most important process. Before building, all the parts must be dipped in the clear dope, and the same process is required after planking. As to planking a sheet, it is easy to cement one hem and dry it, and then to spray water on the sheet and bend it.

Tail: We often see flying boats with their stabs in a high position to avoid water splashes. I adopted this system at first, but soon found that the slipstream pushes the stab upwards and prevents takeoff. In addition, this system produced some structural weak points.

I therefore lowered the stab radically and gave it a small dihedral. Even with this dihedral, water splashes were not completely avoided, but they seemed to do no harm to the takeoff. The fin, stab and tail part of the hull are built in one unit.

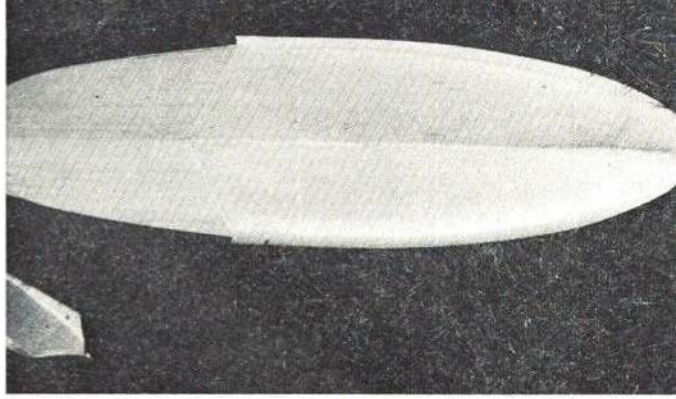
Wing: The airfoil and structure are conventional. The main spar is positioned a little rearward to install an 8 oz. fuel tank in the wing. It is recommended that hardwood reinforcements be added from the wing root up to the engine mount.

Engine mount: In the first prototype the engine position was about 5 cm. more to the outside than on this version. But the engines have been put nearer to the center-line, to be safer in case of the single-engine flight. The cherry-wood mounts are supported by the front and rear spars.

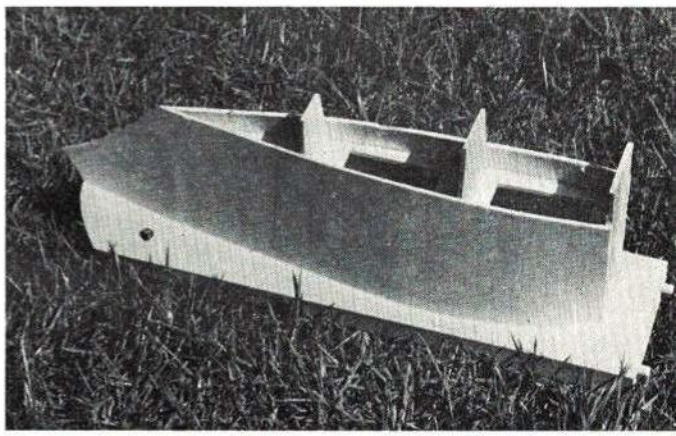
Wing tip floats: These support the plane in a standing state and in initial, slow plow-

Continued on page 79

ne

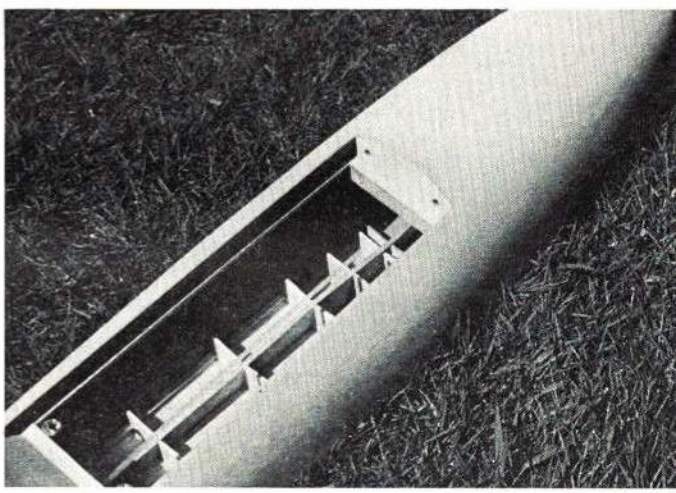


Don't omit the spray rails. Install after fiberglassing hull bottom. Use spruce shaped to triangular cross-section before mounting.

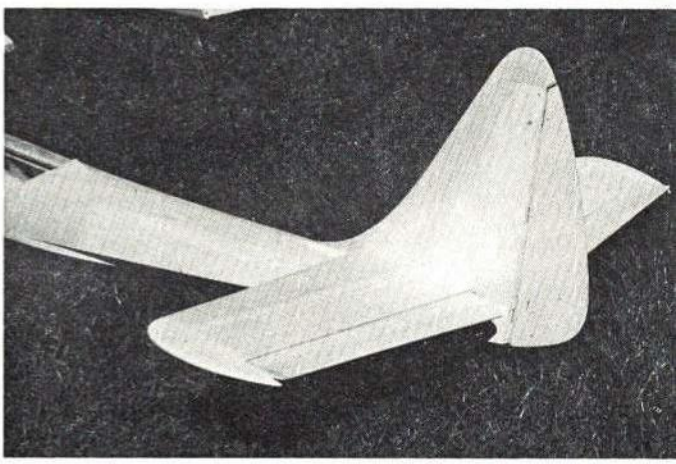


Although bolted to wing, the pylon is to be removed from hull with wing for transporting. Use long leads from the servos to receiver.

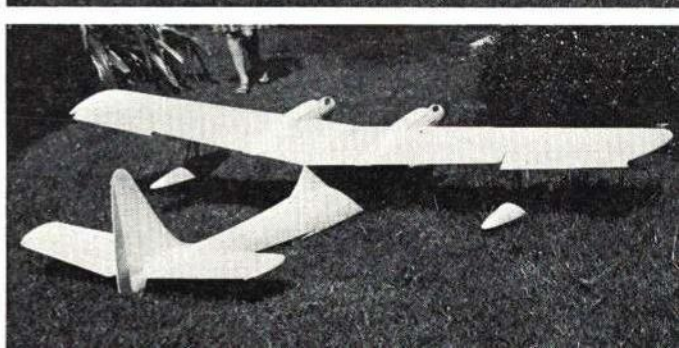
Ready-to-fly at the OS Invitational Symposium at Lake Biwa, author at the controls. Most beautiful takeoffs are made starting with up-elevator to get on step, then let it fly off with just up-trim.



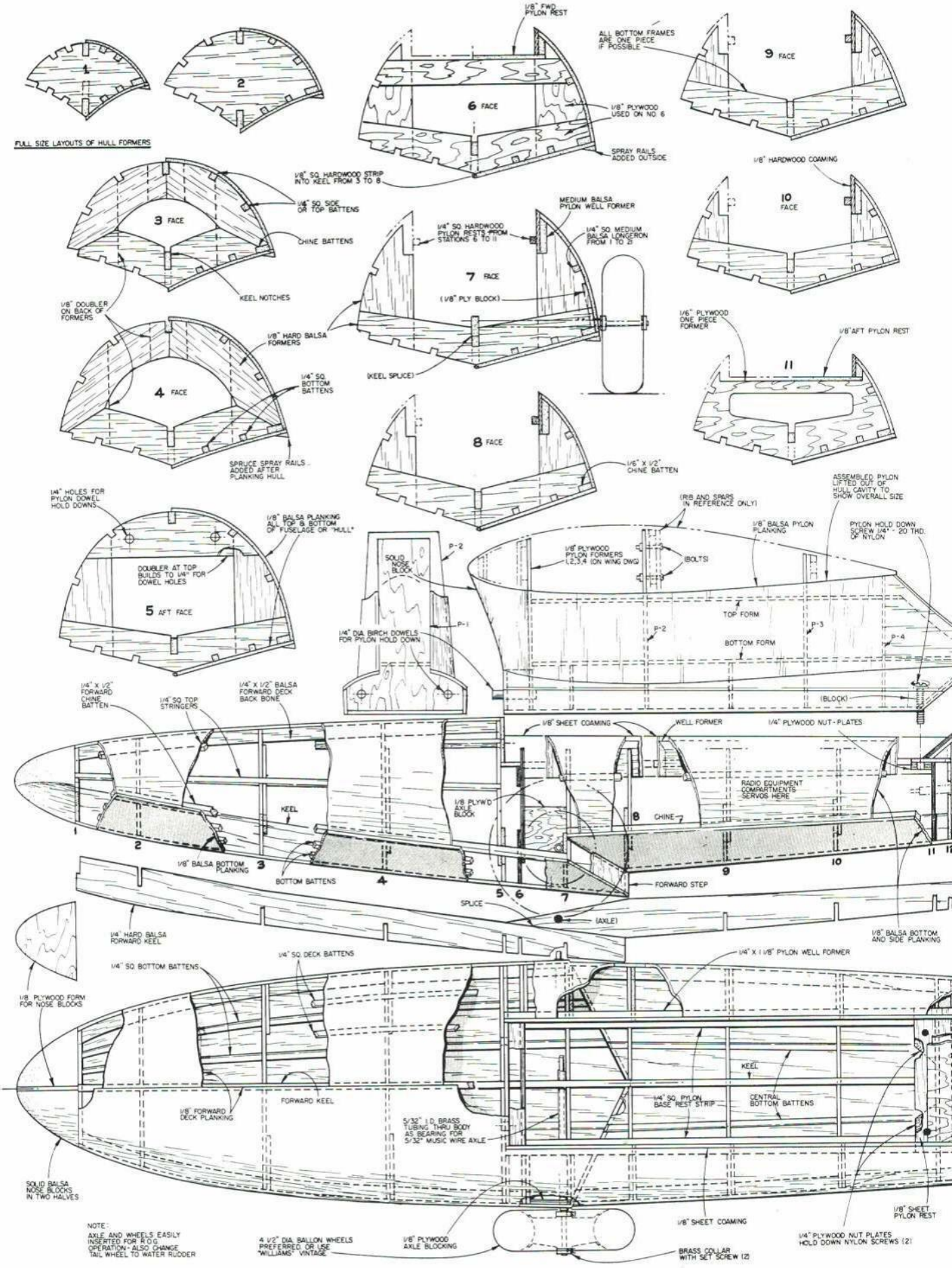
Important points inside hull are dowel holes and CamLocks for attaching pylon. Pre-dope all interior parts of hull before assembly.



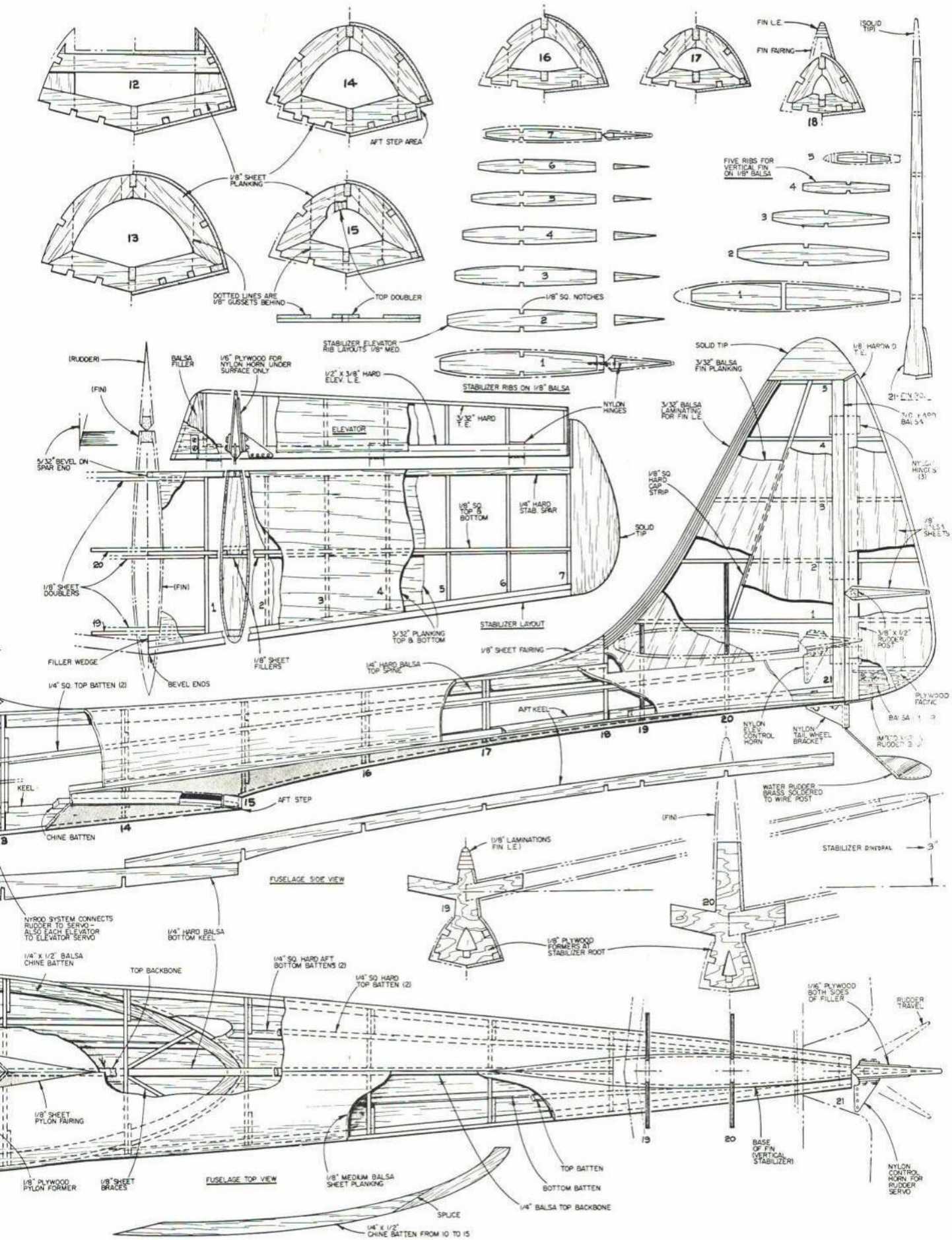
Generous dihedral in stab reduces spray problems during takeoff. Rudder is quite large, easily handles single-engine flight.

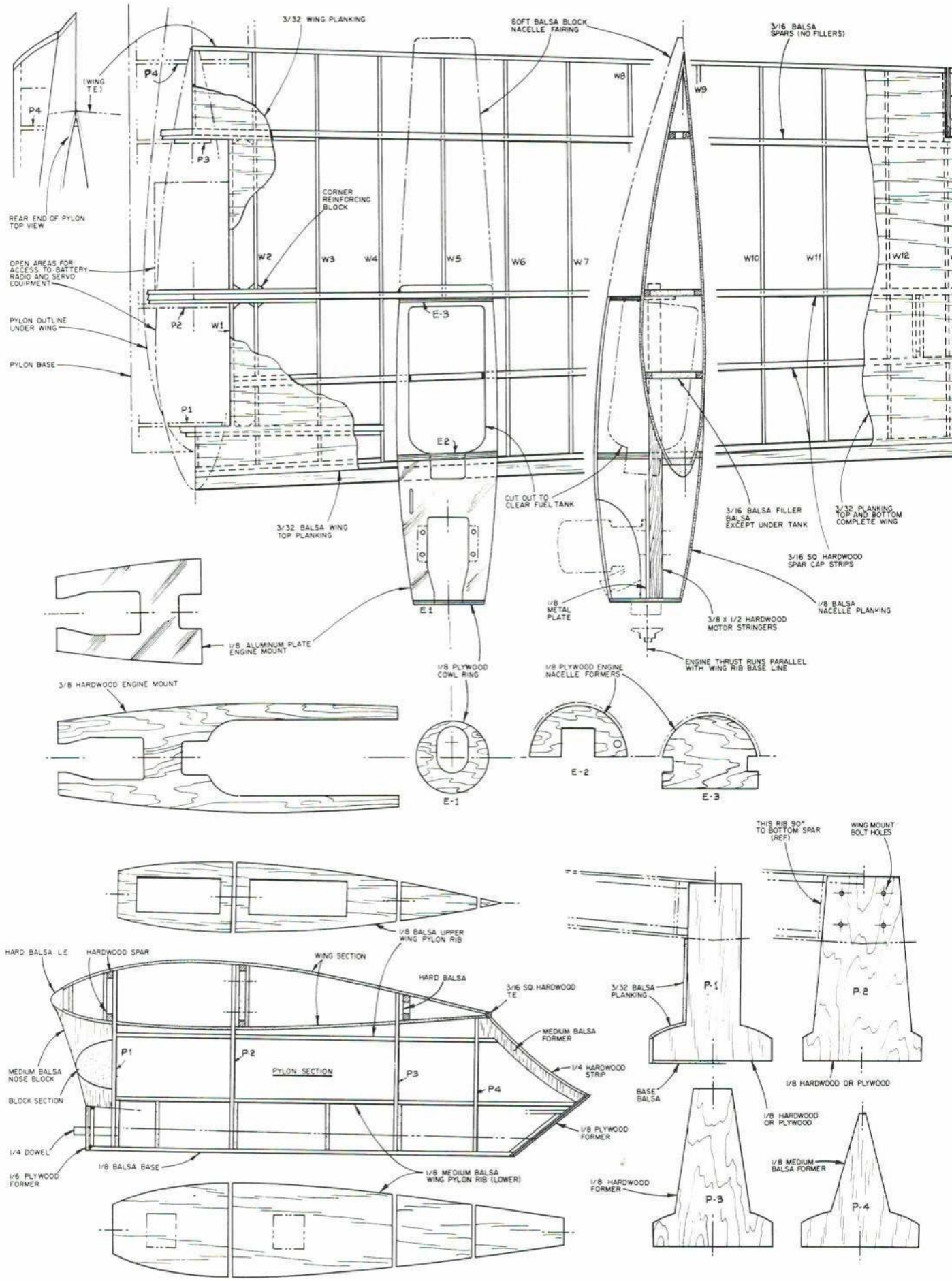


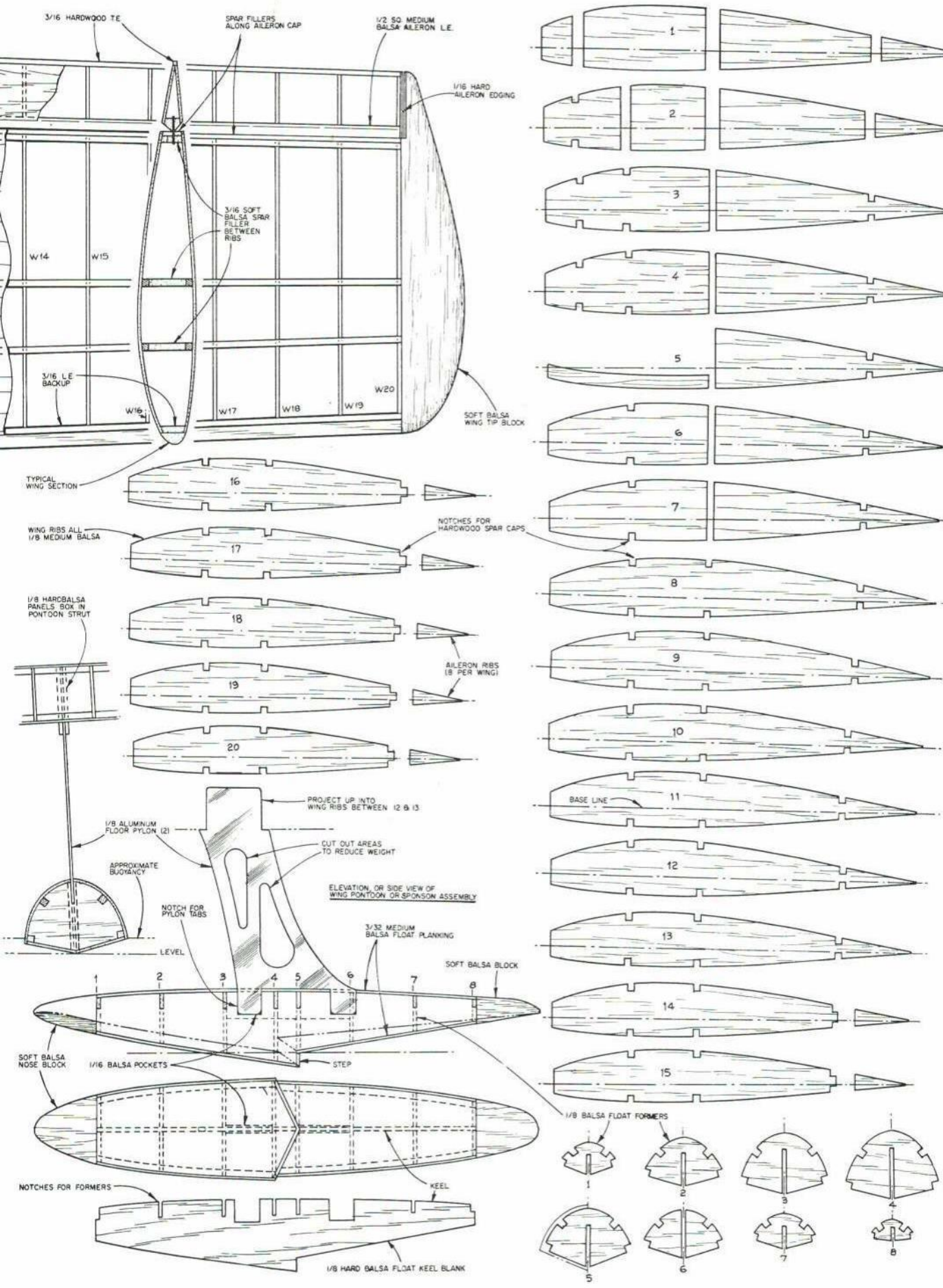
Completed model ready to paint. If you do not want a twin, this model flies very well with one big center-mounted 60.



FULL SIZE PLANS AVAILABLE — SEE PAGE 70


12
14
16
17
18
FIN L.E.
FIN FAIRING
(SOLID TIP)
AFT STEP AREA
1/8" SHEET PLANKING
13
15
DOTTED LINES ARE 1/8" GUSSETS BEHIND
TOP DOUBLER
1/8" SQ. NOTCHES
STABILIZER ELEVATOR RIB LAYOUTS 1/8" MED.
STABILIZER RIBS ON 1/8" BALSA
FIVE RIBS FOR VERTICAL FIN ON 1/8" BALSA
(RUDDER)
(FIN)
BALSA FILLER
1/16" PLYWOOD FOR NYLON HORN UNDER SURFACE ONLY
1/2" X 1/8" HARD ELEV. L.E.
ELEVATOR
3/32" HARD T.E.
NYLON HINGES
5/32" BEVEL ON SPAR END
1/8" SQ. TOP & BOTTOM
1/4" HARD STAB. SPAR
SOLID TIP
1/8" SHEET DOUBLERS
STABILIZER LAYOUT
3/32" PLANKING TOP & BOTTOM
FILLER WEDGE
BEVEL ENDS
1/8" SHEET FILLERS
1/8" SHEET FAIRING
1/4" HARD BALSA TOP SPINE
1/4" SQ. TOP BATTEN (2)
AFT KEEL
KEEL
AFT STEP
CHINE BATTEN
FUSELAGE SIDE VIEW
SOLID TIP
1/8" HARD T.E.
3/32" BALSA FIN PLANKING
3/32" BALSA LAMINATING FOR FIN L.E.
1/8" SQ. HARD CAP STRIP
1/8" SHEET
1/8" X 1/2" RUDDER POST
PLYWOOD FACING
NYLON ELEV. CONTROL HORN
NYLON TAIL WHEEL BRACKET
WATER RUDDER BRASS SOLDERED TO WIRE POST
(FIN)
STABILIZER DIHEDRAL
3"
1/8" LAMINATIONS FIN L.E.
1/8" PLYWOOD FORMERS AT STABILIZER ROOT
NYROD SYSTEM CONNECTS RUDDER TO SERVO - ALSO EACH ELEVATOR TO ELEVATOR SERVO
1/4" HARD BALSA BOTTOM KEEL
1/4" X 1/2" BALSA CHINE BATTEN
TOP BACKBONE
1/4" SQ. HARD AFT BOTTOM BATTENS (2)
1/4" SQ. HARD TOP BATTEN (2)
1/16" PLYWOOD BOTH SIDES OF FILLER
RUDDER TRAVEL
1/8" SHEET PYLON FAIRING
1/8" PLYWOOD PYLON FORMER
1/8" SHEET BRACES
FUSELAGE TOP VIEW
1/8" MEDIUM BALSA SHEET PLANKING
TOP BATTEN
BOTTOM BATTEN
1/4" BALSA TOP BACKBONE
SPRUCE
1/4" X 1/2" CHINE BATTEN FROM 10 TO 15
BASE OF FIN (VERTICAL STABILIZER)
NYLON CONTROL HORN FOR RUDDER SERVO


3/32 WING PLANKING
SOFT BALSA BLOCK NACELLE FAIRING
3/16 BALSA SPARS (NO FILLERS)
(WING T.E.)
P4
P3
W8
W9
REAR END OF PYLON TOP VIEW
CORNER REINFORCING BLOCK
OPEN AREAS FOR ACCESS TO BATTERY RADIO AND SERVO EQUIPMENT
W2
W3
W4
W5
W6
W7
W10
W11
W12
PYLON OUTLINE UNDER WING
P2
W1
E-3
PYLON BASE
P1
E2
CUT OUT TO CLEAR FUEL TANK
3/16 BALSA FILLER BALSA EXCEPT UNDER TANK
3/32 PLANKING TOP AND BOTTOM COMPLETE WING
3/32 BALSA WING TOP PLANKING
3/16 SQ HARDWOOD SPAR CAP STRIPS
1/8 METAL PLATE
1/8 BALSA NACELLE PLANKING
3/8 X 1/2 HARDWOOD MOTOR STRINGERS
E1
1/8 ALUMINUM PLATE ENGINE MOUNT
ENGINE THRUST RUNS PARALLEL WITH WING RIB BASE LINE
1/8 PLYWOOD COWL RING
1/8 PLYWOOD ENGINE NACELLE FORMERS
3/8 HARDWOOD ENGINE MOUNT
E-2
E-3
E-1
THIS RIB 90° TO BOTTOM SPAR (REF)
WING MOUNT BOLT HOLES
1/8 BALSA UPPER WING PYLON RIB
HARD BALSA L.E.
HARDWOOD SPAR
WING SECTION
HARD BALSA
3/16 SQ. HARDWOOD T.E.
3/32 BALSA PLANKING
P-1
P-2
MEDIUM BALSA FORMER
P1
P2
PYLON SECTION
P3
P4
1/4 HARDWOOD STRIP
MEDIUM BALSA NOSE BLOCK
BLOCK SECTION
1/8 PLYWOOD FORMER
1/4 DOWEL
1/8 BALSA BASE
1/8 MEDIUM BALSA WING PYLON RIB (LOWER)
1/6 PLYWOOD FORMER
BASE BALSA
1/8 HARDWOOD OR PLYWOOD
1/8 HARDWOOD OR PLYWOOD
1/8 MEDIUM BALSA FORMER
1/8 HARDWOOD FORMER
P-3
P-4


3/16 HARDWOOD T.E.
SPAR FILLERS ALONG AILERON CAP
1/2 SQ. MEDIUM BALSA AILERON L.E.
1/16 HARD AILERON EDGING
3/16 SOFT BALSA SPAR FILLER BETWEEN RIBS
W14
W15
3/16 L.E. BACKUP
W16
W17
W18
W19
W20
SOFT BALSA WING TIP BLOCK
TYPICAL WING SECTION
WING RIBS ALL 1/8 MEDIUM BALSA
NOTCHES FOR HARDWOOD SPAR CAPS
1/8 HARDBALSA PANELS BOX IN PONTOON STRUT
AILERON RIBS (8 PER WING)
1/8 ALUMINUM FLOOR PYLON (2)
PROJECT UP INTO WING RIBS BETWEEN 12 & 13
CUT OUT AREAS TO REDUCE WEIGHT
APPROXIMATE BUOYANCY
ELEVATION, OR SIDE VIEW OF WING PONTOON OR SPONSON ASSEMBLY
NOTCH FOR PYLON TABS
3/32 MEDIUM BALSA FLOAT PLANKING
LEVEL
SOFT BALSA BLOCK
SOFT BALSA NOSE BLOCK
1/16 BALSA POCKETS
STEP
KEEL
NOTCHES FOR FORMERS
1/8 HARD BALSA FLOAT KEEL BLANK
BASE LINE
1/8 BALSA FLOAT FORMERS

The

Phantom

Built in 19 versions and numerous variants this internationally famous aircraft carries three times the load of a WW-II B-17, has a remarkable speed range of 12 to one. And that's just the beginning.

DON BERLINER

FROM Phantom to Banshee to Demon and back to Phantom.

The completion of a full circle? No, more like a sharp upward spiral, for the first Phantom bears only the faintest similarity to the potent Phantom II which has been the first-line fighter/attack bomber of the U. S. for many years and is assuming a similar role with the British and Israeli air arms.

When the slender, graceful McDonnell FH-1 Phantom I completed its carrier qualification tests in July, 1946, the U. S. Navy had its first jet fighter, though its performance was not up to that of the Army Air Force's classic P-80 Shooting Star. But when the F4H-1 Phantom II qualified for carrier operations in early 1960, the Navy found it had an airplane equal or superior to any in the world.

Really, for the first time, the Navy did not have to be content with a second-rate fighter plane. All the old handicaps of carrier operation — extra equipment, performance-killing weight of a beefed-up structure to withstand the shock of landing — were completely overwhelmed by a fine design and plenty of power.

And final proof came in March, 1962, when the USAF ordered Phantom II's for its own use, thus for the first time recognizing a carrier plane as superior to land-based craft of the same class. Inter-service rivalry being what it is, such a move was not made without careful thought. Since the Navy received its first production F4H-1's in 1961, the Phantom II has been out front.

Performance is the outstanding characteristic of the ungainly machine, for it is three times as fast, and will climb twice as high in 1/6th the time of its grandfather, the FH-1. World records by various versions of the F-4 are the clearest indication of its potency, for they were made by standard military aircraft which had to be performing below still-secret maximums.

Its best: 16 km. straightaway run: 1,606 mph; 3 km. low-altitude straightaway run: 902 mph; 100 km. closed-course run: 1,390 mph; 500 km. closed-course run: 1,216 mph.

Los Angeles to New York: 2 hours, 48 minutes (869 mph).

Sustained altitude: 66,443 ft.; maximum altitude: 98,557 ft.

Climb to 9,842 ft.: 34.5 sec.; climb to 19,685 ft.: 48.8 sec.; climb to 29,527 ft.: 1 min., 1.6 sec.; climb to 39,370 ft.: 1 min., 17.2 sec.; climb to 49,212 ft.: 1 min., 54.5 sec.; climb to 65,617 ft.: 2 min., 58.5 sec.; climb to 82,021 ft.: 3 min., 50.4 sec.; climb to 98,425 ft.: 6 min., 11.4 sec.

The Phantom II started out life as a long-range, all-weather attack fighter — a replacement for the none-too-successful McDonnell F3H Demon of the 1950's. Little by little, the machine became more powerful and more complicated and more versatile. The resulting airframe with its upturned wingtips, downturned stabilizers and bulging nose was wrapped around a pair of General Electric J-79 engines rated at more than 17,000 lbs. of thrust each, with afterburning. So, despite its considerable weight which can go over 55,000 lbs., the Phantom II is one of those rare aircraft which can do many jobs well.

Air Force RF-4C reconnaissance at Udern, Thailand. Opposite, top to bottom: Navy F-4B Phantom from carrier Midway drops bombs on Viet Cong in ground support over South Vietnam; Air Force F-4C approaches Cam Rahn Bay, South Vietnam — outline of carrier-deck arresting hook may be seen aft of twin tail pipes; Navy's first twin-seat supersonic fighter during tests. Climb to 30,000 ft. barely exceeds one minute. Top 1,606 mph, maximum altitude 98,557 ft.

As a bomber, it can carry 18 750-lb. bombs, or 15 680-lb. mines, or 11 1,000-lb. bombs, or 11 150-gal. napalm tanks, or four Bullpup multiple rocket packages, or. . . . For many fighter Phantoms, the basic load includes four Sparrow radar-guided air-to-air missiles and four Falcon infrared-guided missiles. Other armament can include one or more 6,000-rounds-per-minute, 20-mm. cannon; pods of 2.75- or 5-in. rockets; Shrike air-to-ground missiles; or any of a variety of free-fall bombs, bomb dispensers and bomb clusters. In all, the F-4 can carry about three times the normal load of the standard U. S. bomber of World War II — the nine-man, four-engine B-17.

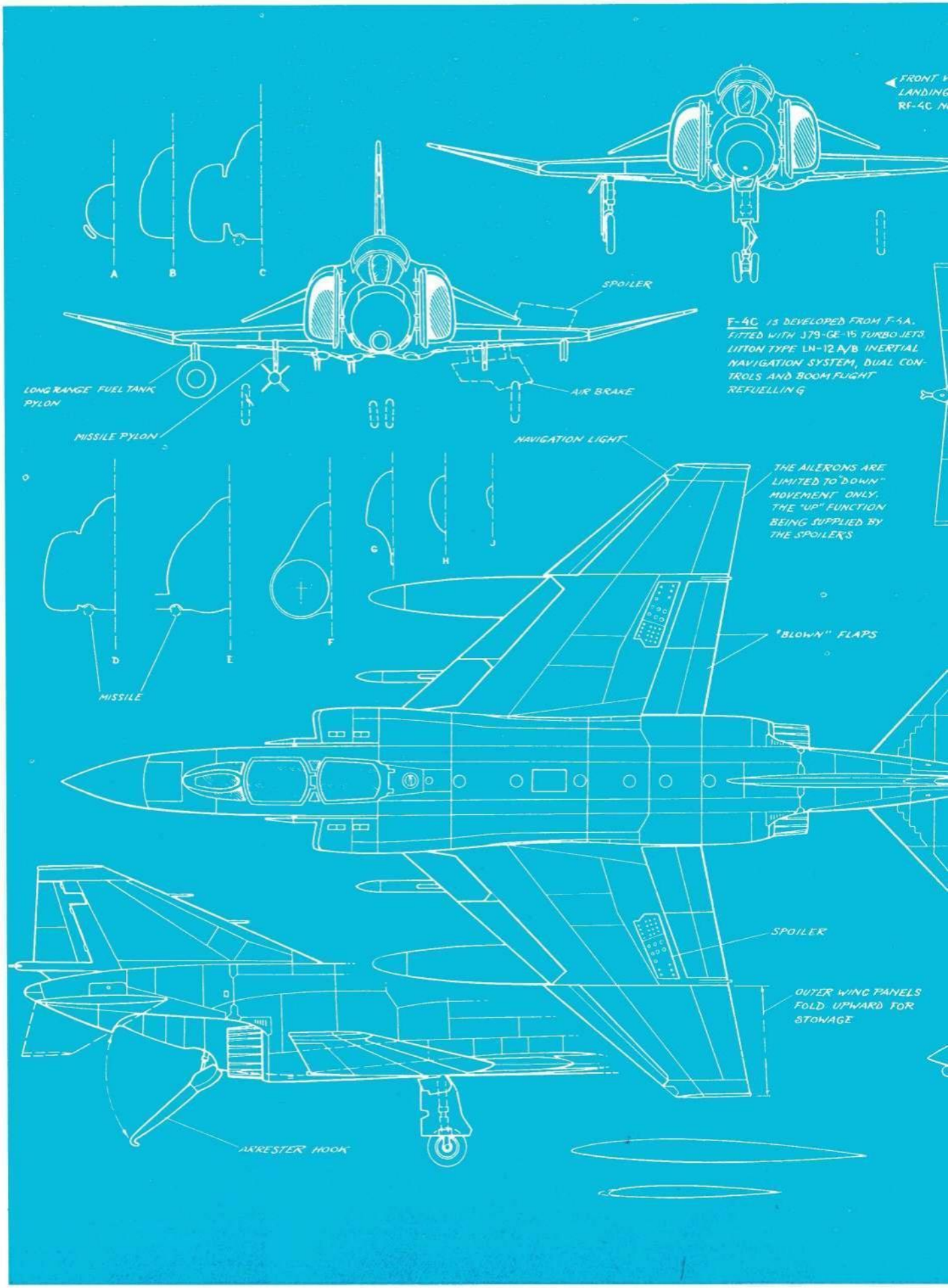
To direct the airplane and control all its armament is a great collection of electronic gear: pulse Doppler radar fire control systems, radar bombing systems, solid state communication/navigation/identification/and counter-measures systems. The reconnaissance versions carry an equally elaborate array of optical, infrared and electronic sensors, including many types of cameras with automatic in-flight film processing and film ejection, and extensive data recording equipment.

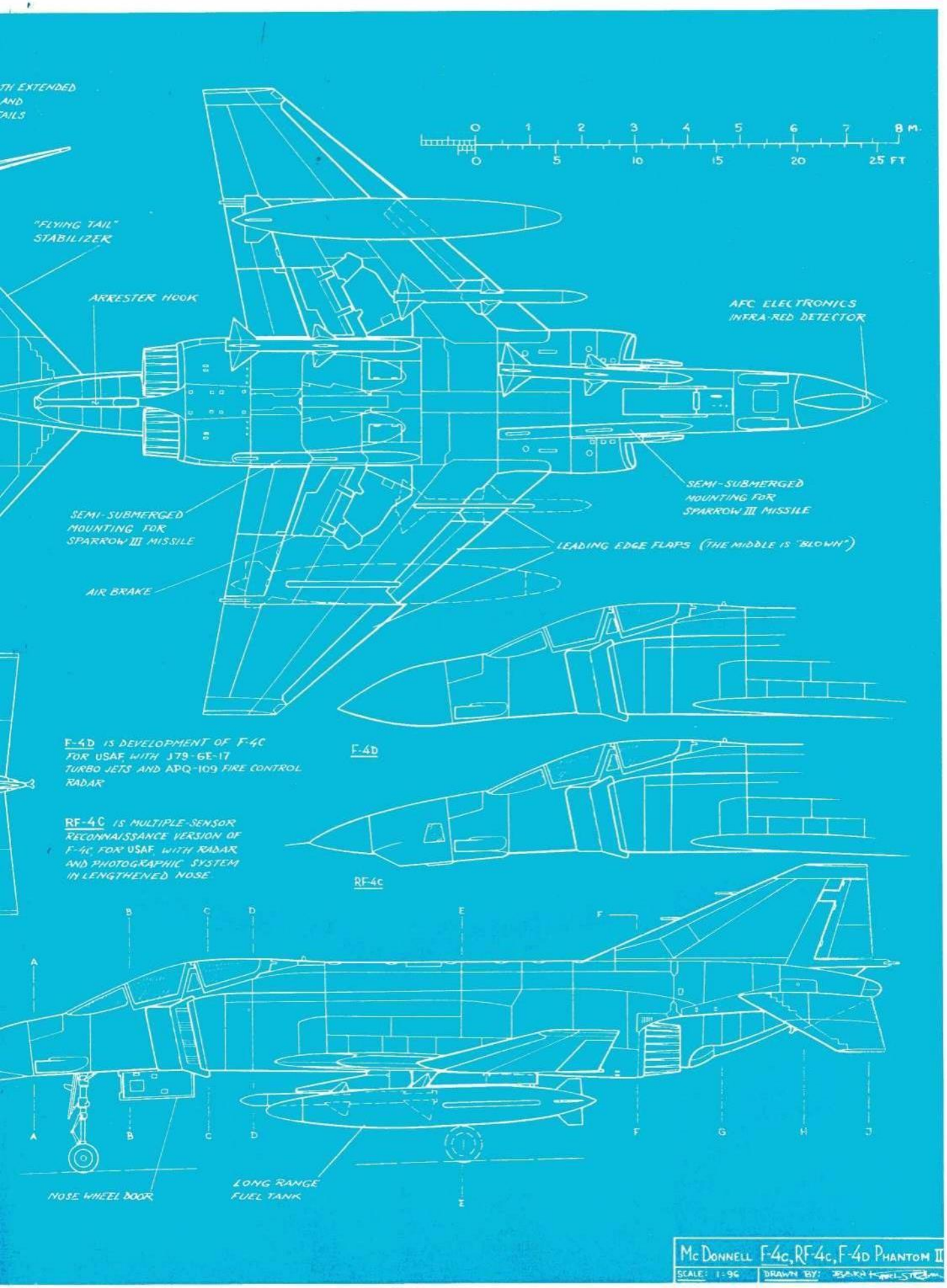
Since the earliest days of aviation, one of the simplest measures of an airplane's worth has been its speed range: top speed divided by minimum flying speed. For most common types, the range is no more than three or four to one. For the Phantom II, it is fully 12 to 1, thanks to terrific top speed and some clever devices which give it a bottom speed of about 130 mph with everything hanging down. To achieve this, the engineers at McDonnell (now McDonnell Douglas) applied full-span drooping leading edges on the wings, boundary-layer control via compressor air blown over the flaps, spoilers taking the place of "up" aileron, and interconnected ailerons and rudder for low-speed control.

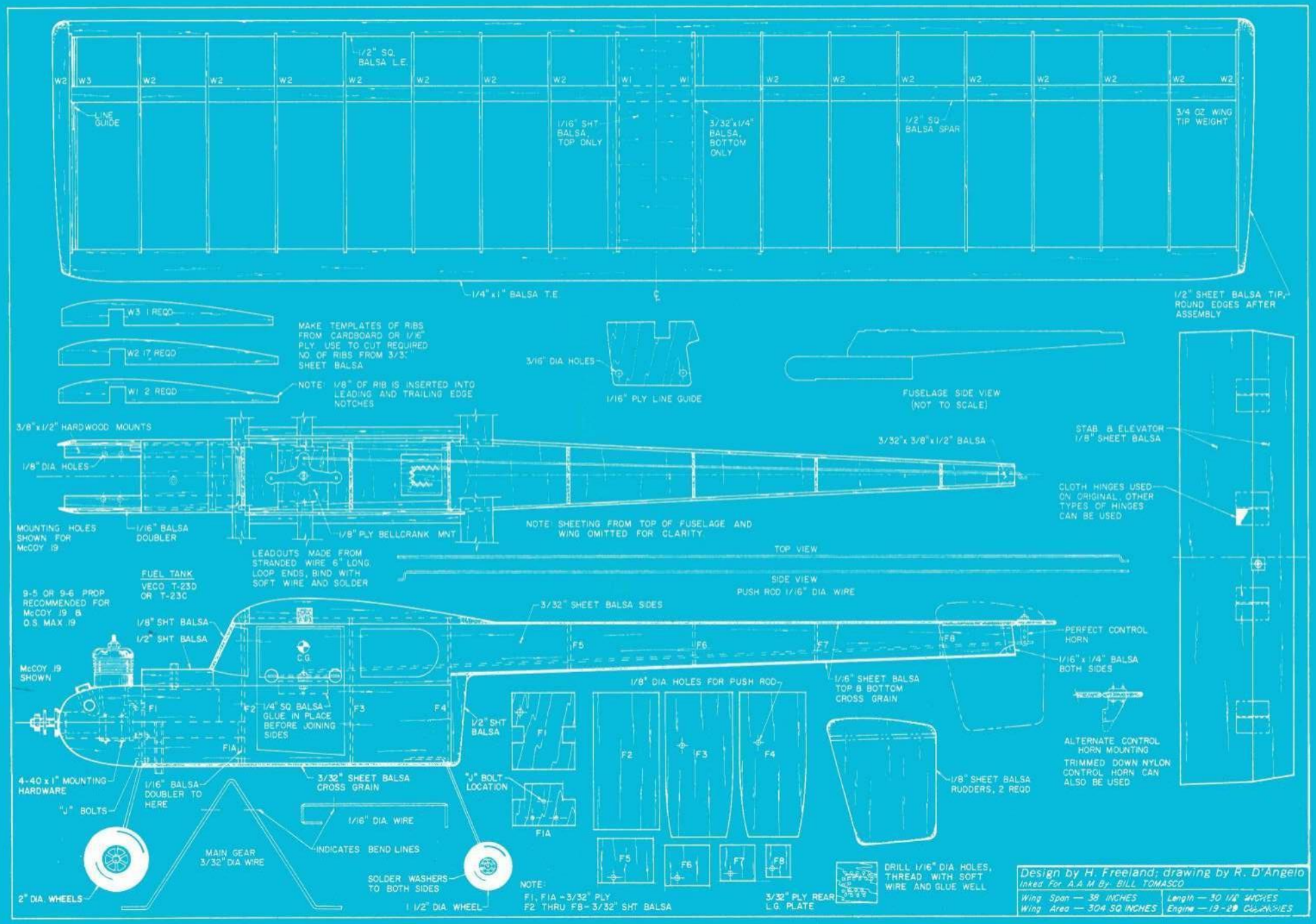
To make the versatility of the Phantom II meaningful and not just a novelty to be shown off at the Paris Air Show, it has been fitted out with sufficient fuel tanks to give it highly unusual range for an airplane with a pair of kerosene-gulping J-79's. Internal tankage totals no less than 2,000 gallons, while standard auxiliary tanks are a 600-gallon tank under the fuselage and a 370-gallon tank under either wing. The total of more than 3,300 gallons gives a range of more than 2,000 miles with reserve, and over 3,000 miles with just one in-flight refueling.

Dimensions of the Phantom II have not remained constant through its many models. Wingspan of every version has been 38' 4.9". Length has varied due to different equipment: most versions are 58' 3.1", with

Continued on page 82

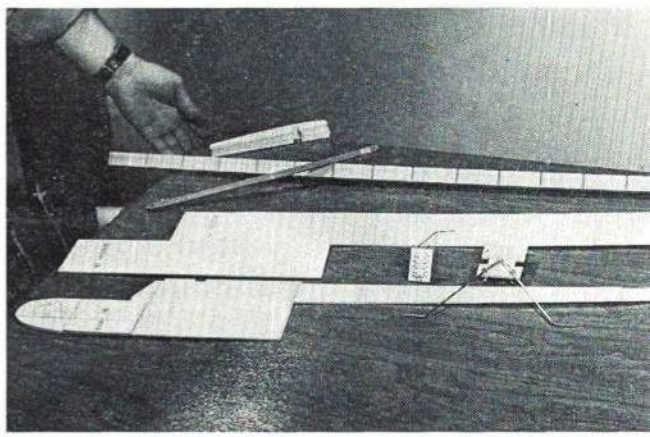

A
B
C
SPOILER
LONG RANGE FUEL TANK PYLON
AIR BRAKE
MISSILE PYLON
F-4C IS DEVELOPED FROM F-4A. FITTED WITH J79-GE-15 TURBO JETS LITTON TYPE LN-12 A/B INERTIAL NAVIGATION SYSTEM, DUAL CONTROLS AND BOOM FLIGHT REFUELLING
NAVIGATION LIGHT
THE AILERONS ARE LIMITED TO "DOWN" MOVEMENT ONLY. THE "UP" FUNCTION BEING SUPPLIED BY THE SPOILERS
G
H
J
D
E
F
MISSILE
"BLOWN" FLAPS
SPOILER
OUTER WING PANELS FOLD UPWARD FOR STOWAGE
ARRESTER HOOK


TH EXTENDED
AND
TAILS
0 1 2 3 4 5 6 7 8 M.
0 5 10 15 20 25 FT
"FLYING TAIL"
STABILIZER
ARRESTER HOOK
AFC ELECTRONICS
INFRA-RED DETECTOR
SEMI-SUBMERGED
MOUNTING FOR
SPARROW III MISSILE
SEMI-SUBMERGED
MOUNTING FOR
SPARROW III MISSILE
LEADING EDGE FLAPS (THE MIDDLE IS "BLOWN")
AIR BRAKE
F-4D IS DEVELOPMENT OF F-4C
FOR USAF WITH J79-GE-17
TURBO JETS AND APQ-109 FIRE CONTROL
RADAR
F-4D
RF-4C IS MULTIPLE-SENSOR
RECONNAISSANCE VERSION OF
F-4C FOR USAF WITH RADAR
AND PHOTOGRAPHIC SYSTEM
IN LENGTHENED NOSE
RF-4c
A B C D E F G H J
NOSE WHEEL DOOR
LONG RANGE
FUEL TANK
McDONNELL F-4c, RF-4c, F-4D PHANTOM II
SCALE: 1-96
DRAWN BY:



FULL SIZE PLANS AVAILABLE — SEE PAGE 70

On 50- or 60-ft. lines the Dragonfly seems to fly slowly. It has good strong pull and landings are easy with tricycle gear.



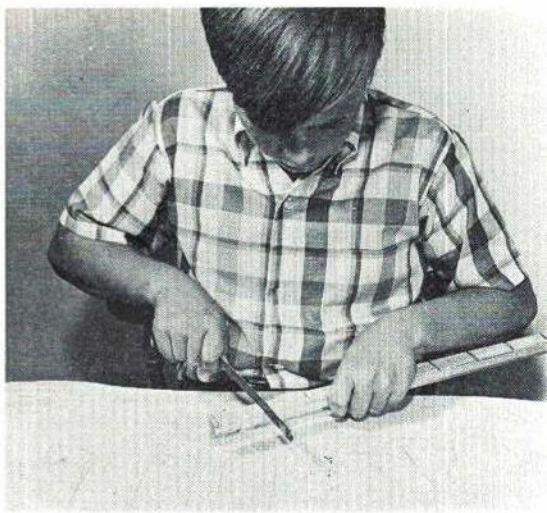
All photos, John Eastman.

Simplest way to build any model from plans is to prepare most of the parts and lay them out as in a kit. Note markings for bulkheads.

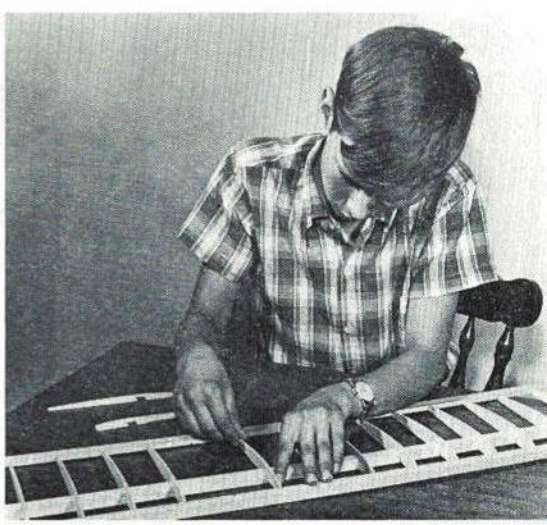
Dragonfly

Slow flying 19-powered model is suitable trainer for the Tenderfoot who is ready for a larger engine and longer control lines.

HARRY FREELAND



Leading and trailing edges are made by taping them together and then cutting the rib notches with a doubled hacksaw blade.



Assemble the wing on flat surface by pinning spars to tip ribs, then fit in all other ribs. Align structure, pin, and glue together.

THE Dragonfly was designed to be a little bit different from the average sport plane, seen at the local flying field. It had to be fairly easy to build, fly and transport. Most of all, it had to look like a real airplane. To these ends, I believe I have been successful.

Two models were built to test out the design. One was powered with an O.S. Max 19, the other with a Fox 25. Both models flew, as they say, right off the board. Takeoffs and landings were a breeze and level flight was nice and groovy. If I ever get around to it, I'm going to try a symmetrical airfoil on this ship. I think with this type of airfoil, the design will make a really nice sport-stunt ship, capable of most stunts.

To some of you the landing gear arrangement may seem to present some problems on takeoffs and landings. However, I haven't encountered any problems with this gear.

Study the plans and gather the necessary material, and let's start building.

Fuselage: Begin by making up the fuselage sides. Glue one piece of $^3/_{32}$ x 3 x 33" balsa to another piece of $^3/_{32}$ x 3 x 13", edge to edge, according to the plans. Both fuselage sides can be made from three sheets of $^3/_{32}$ x 3 x 36" balsa. (The waste material can be used for the ribs and tip riblets.) After the glued sheets are dry, trace the side view on the sheet with ball-point pen. Notice that the top of the fuselage goes $^3/_{16}$" up into the wing. Cut out fuselage sides.

Glue $^1/_{16}$" sheet doublers to fuselage sides. (I use contact cement.) Make sure you have a right and a left side. Mark motor mount location, firewall and all former locations. Glue motor mounts to sides with Ambroid, clamp, and let dry. Glue formers No. 2, 3, and 4 to one side, using a triangle to make sure the formers are 90 degrees to fuselage side. When dry, join to other fuselage side. Use bottom of fuselage to keep everything in alignment.

After this much is dry, add firewall and plywood piece No. 1A. Leave rear of fuselage as is until later. Drill hole in plywood bellcrank mount for bellcrank and glue inside of fuselage according to plans. Add $^1/_4$" sq. braces and glue well. Bend pushrod from $^1/_{16}$" dia. wire as shown and make Z-bends to each end. Make up a set of leadouts approximately 6" long, and add to bellcrank. Install bellcrank to mount with pushrod attached.

Thread remaining formers on pushrod wire and glue formers to fuselage sides. Add the $^3/_{32}$" and $^1/_{16}$" pieces to extreme rear of fuselage. These pieces strengthen the rear end of the fuselage. Bend and install main landing gear to firewall with "J" bolts. The rear gear is bent and bound with soft wire to the plywood mount, and glued into fuselage. Mount tank at this time. Add top and bottom sheeting (cross grain in the original). Glue $^1/_2$" sheet balsa and windshield block to top of nose section. Use soft balsa. Carve and sand to shape. Add rear tapered block to rear of cabin area; carve and sand to shape.

Stabilizer and elevator: Stab and elevator are made from $^1/_8$" med. sheet balsa. Note that the tips are angled. This will give the correct rudder offset. Sand leading edge and trailing edges round. Add control horn and hinges.

Rudders are cut from $^1/_8$" med. sheet balsa; the edges are rounded, and then both are glued to stab. Both rudders should be at same angle as shown on plans. After all this is dry, the stab can be glued to the fuselage after inserting pushrod into control horn.

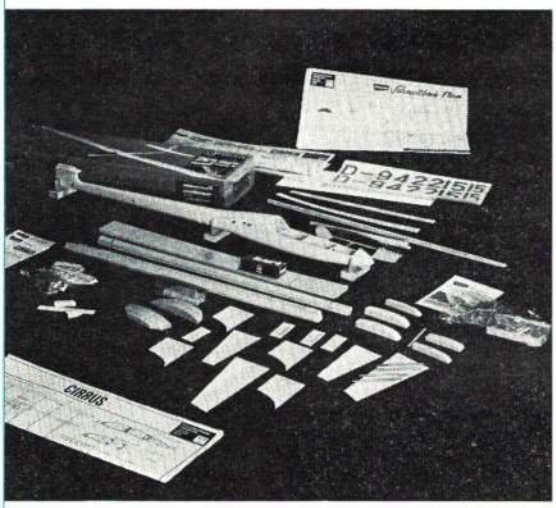
Wing: The wing is started by first pinning the $^1/_4$ x 1" trailing edge and the $^1/_2$" sq. leading edge together, marking the rib locations. Using two hacksaw blades taped together

Continued on page 89

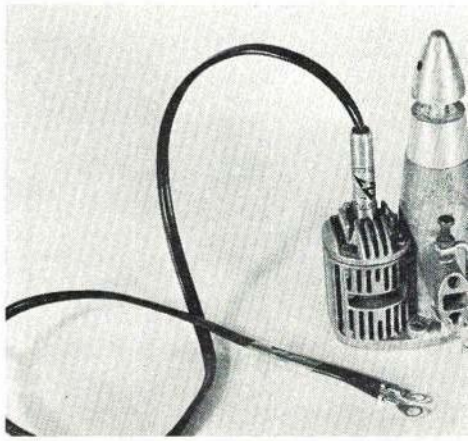
Revell / Four new kits. Just released, P40, Bf109G, Supermarine Seafire, and DC-8. Well detailed, kits are 1/32 scale except DC-8 in 1/144 scale. Price $2 ea. **Revell, Inc.**, 4223 Glencoe Ave., Venice, Calif. 90291

NEW PRODUCTS CHECK LIST

Write the manufacturers for more data; tell them, "I saw it in American Aircraft Modeler."

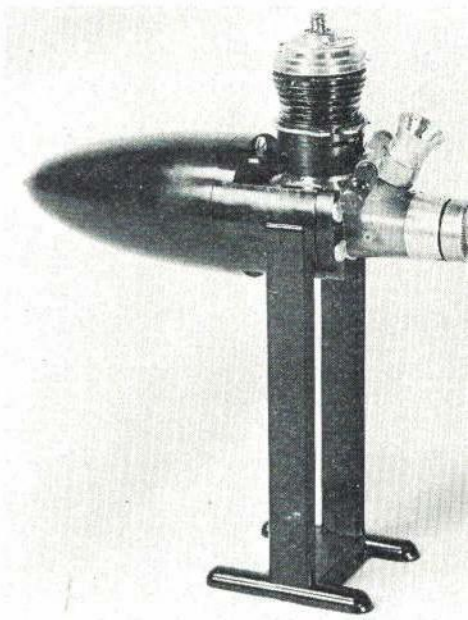


AHM/Graupner/Cirrus. 10′ R/C sailplane features high-impact injection-molded fuselage, formed canopy, balsa rib construction for wing. Rudder and elevator control standard with aileron control optional. Also available: APU engine pod for 09 engine. $45.00. Write **Johannes Graupner**, Kirchheim Teck, Germany or **AHM**, 621 E. Cayuga St., Phila., Penn. 19120

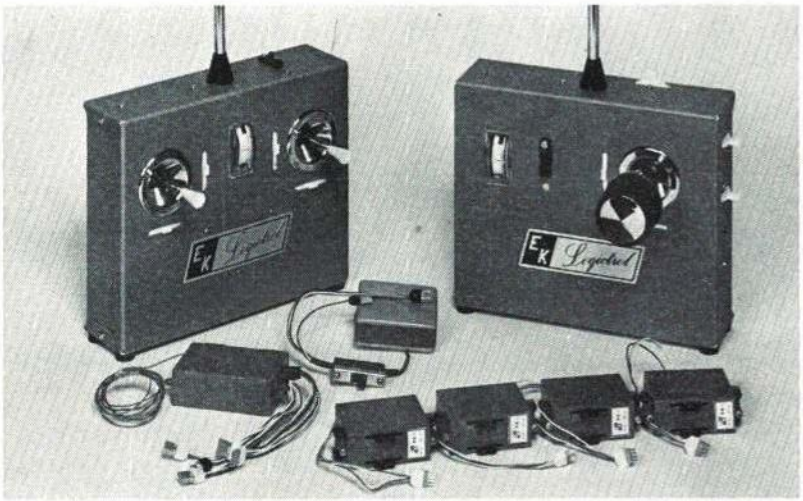


Du-Bro Products, Inc. / Battery cable. 24″ long with no moving parts, cable connects firmly to glo-plug with built-in hex fitting. $2. **Du-Bro Products, Inc.**, 480 Bonner Rd., Wauconda, Ill. 60084

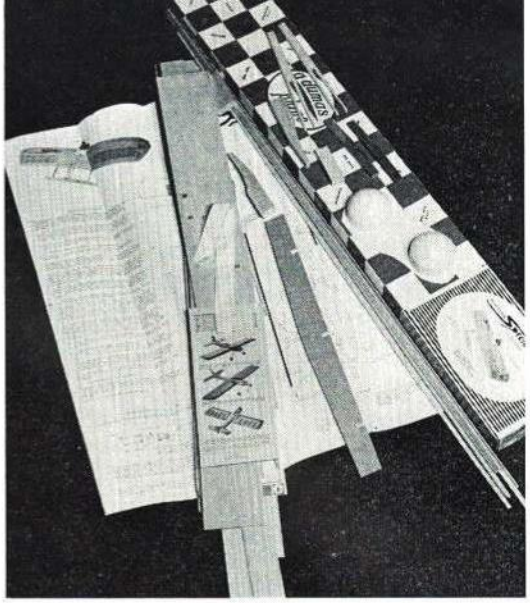
D&R Products / Engine pod. All plastic, self-contained fuel tank for use with **Cox 049 Tee Dee** or **Medallion** engine, unit can be rubber-band-mounted to wing of sailplane for auxiliary power. Engine mounted inverted or upright in precision press-fit slots. $4.95. **D&R Products**, 27635 Forbes Rd., Laguna Niguel, Calif. 92677



Centuri / Beginner's rocket kit. Everything needed to launch the novice into rocketry. Safe but effective solid-fuel propellant provides 1500′ altitude, parachute descent. Kit includes launch pad, ignition switch, 36-page textbook manual and field kit. $8.95. **Centuri Engineering Company**, Box 1988, Phoenix, Ariz. 85001

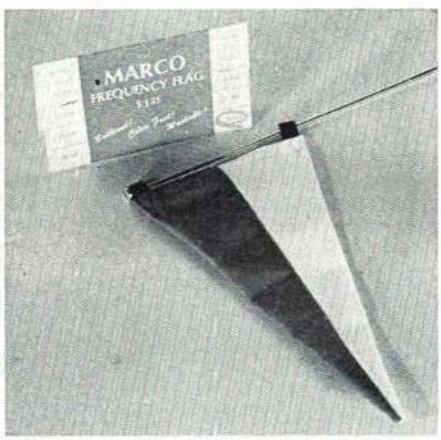


EK Products/1970 line of Hi-Rel systems. Available in 3-, 4-, and 6-control sticks with adjustable "stick pressure" and micro-ceramic pots for minimum friction. Servos, with dual output arms, have Hi-Impact polycarbonate molded cases. Receiver features all-silicon circuitry and double-tuned RF for maximum signal to noise ratio and excellent selectivity. All airborne electronics coated for added protection and housed in a Hi-Impact polycarbonate thermoplastic case. All standard frequencies, new low prices starting at $369.95. **EK Products, Inc.,** 3233 W. Euless Boulevard, Hurst, Tex. 76053

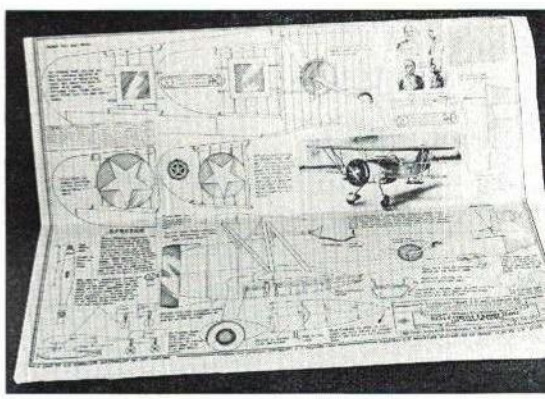


Dumas / Spectrum combat kit. Hot new combat model gives speeds of over 120 mph. 42" span. Booms and leading edge of spruce, recessed engine mounting, and plastic bubble for pacifier fuel tank. Recommended for 35 engine. $5.95. **Dumas Planes,** Box 6093, Tucson, Ariz. 85716

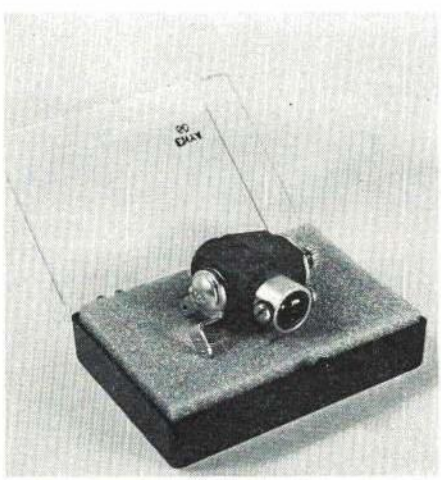
Thom Hook Associates / Aviation book and record. Monaural 12" lp record taken directly from the PA system at rural airshow. Lots of engine noise, cheering crowds, etc. Also **Illustrated Flying Basics,** widely illustrated, lots of good pointers for general aviation or advanced Sunday flyer. Record, $4; book, $2; both $5. **Thom Hook Associates,** Ferry Farms, Annapolis, Md. 21402



Marco / Frequency flag. In five solid colors for 27-mc band, five dual colors for 72 mc. Tough, washable, easy mounting. $1.25. **Jim Martin,** 26 Tatton Dr., Bloomfield, N. J. 07003

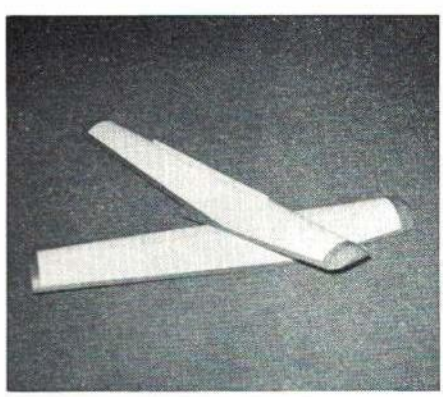


Cleveland Model and Supply Co./ Catalog No. 4. Famous old-line kit maker now has available over 200 historic C/D plans from kits dating from 1920's. C/D kits famous for their authenticity and quality. Now build your own from scratch. Catalog No. 4 gives details, price lists for updated plans. 50 cents. **Cleveland Model & Supply Co.,** 10307 Detroit Ave., Cleveland, Ohio 44102



Perry Aeromotive / Carburetor. Featuring built-in fuel reservoir and unique fuel-metering system which uses engine vacuum to ensure smooth idle; carburetor adjustable for high- and low-speed settings. Provides proper fuel at any setting. Available for most 60 engines. Full instructions. $13. **Perry Aeromotive,** Box 3283, Victory Center Annex, North Hollywood, Calif. 91609

Model Aeronautical Press, Ltd./ Radio Control Manual No. 3. Well written and comprehensive, hard-bound book is addition to any R/C library. 36 reduced plans of scale and model R/C ships, detailed articles on pylon racing, winning contests, covering techniques. Lots of pictures. **Model Aeronautical Press Ltd.,** 13/35 Bridge St., Hemel Hempstead, Herts., Gr. Britain. 15 Shillings International Money Order

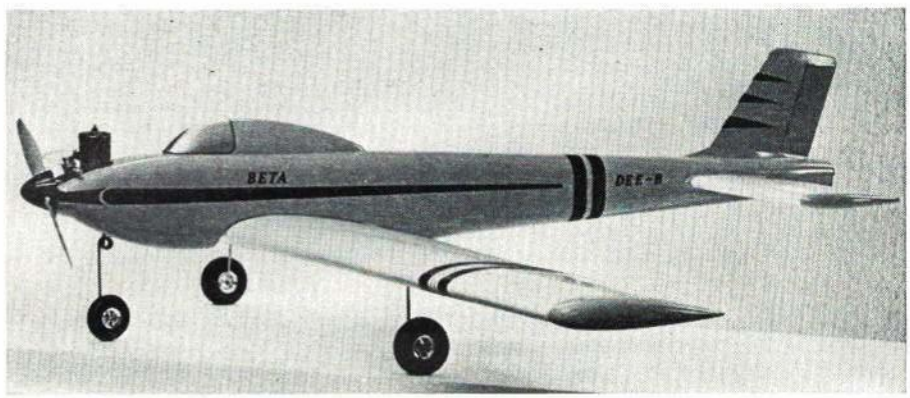


Puget Sound R/C Electronics / New-design floats. Foam core with plastic covering, floats use special step section to reduce power needed to ROW. High strength. 33, 36, and 44" in kit form. 33" kit for 5½ to 8½-lb. planes, $13.95. **Puget Sound R/C Electronics,** 1547 Hoff Rd., Bellingham, Wash. 98225

CHECK LIST

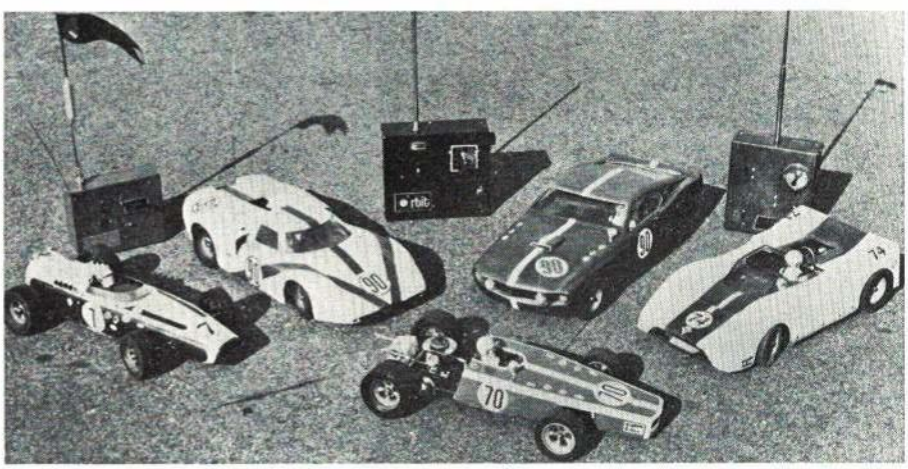
Product 60 Hobbies / Two new Beeches. Strong, rugged construction, **Bonanza Aerobatic** and **Vee Tail** models have 62" span, can be powered by 35 to 50 engine. Special custom **Veco 50** inverted engine mounting available at factory to produce smooth cowl. Also available with standard engine mounting. Weight, 4 to 6 lbs. depending on R/C gear. **Bonanza**, $69.95, **Vee**, $79.95; supplied with inverted **Veco**, $45 extra. **Product 60 Hobbies**, Box 19133, Salt Lake City, Utah 84119

Lafayette Radio Electronics / Products catalog. Bury your nose in the new **Lafayette** catalog, chock full of items of interest to R/C enthusiasts, hobbyists and experimenters. Not all hi-fi by any means. Get on mailing list. Write **Lafayette Radio Electronics**, Mail Order Center, 111 Jericho Turnpike, Syosset, L. I., N. Y. 11791

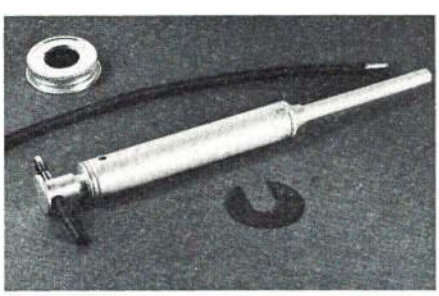


Dee Bee/ New R/C entries. Alpha and **Beta,** two new A.R.F. kits use vacuum-formed fuselage, 62" foam wing. Alpha uses shoulder wing, recommended for 35 to 60 power. Beta is hot low-wing version, clean lines, integrated canopy, recommended for 45 to 60 power, contest performance. Both available for full-house proportional control. Alpha $47.95, Beta, $48.95. **Dee Bee,** West Lamb's Rd., Pittman, N. J. 08071

Top Flite / MonoKote markings. Three of a series of MonoKote markings for scale or general use, sheets provide standard AMA markings, USAAC wing insignia, complete markings for Navy scale model planes. AMA, $1.39; Navy, $1.50; Army, $2.95. **Top Flite Models, Inc.,** 2635 S. Wabash, Chicago, Ill. 60616



Ra/Car Developments/R/C racing cars. New line of modularized gas-powered R/C kits or ready-to-run cars is close to real thing. Features interchangeable drive-train parts, front end, body, etc. Quality materials. Prices for typical units, $250 with R/C gear, others higher and lower. Write for full listings in brochure. **Ra/Car Developments,** 307 N. Euclid, Fullerton, Calif. 92632



BK Model Product / Fuel transfer pump. Adaptable to any standard one-gallon fuel can, pump is well made. Model BK 128. $7.95. **BK Model Products,** 4765 E. Iliff, Denver, Colo. 80222

D&R Products/Switch and servo tray. Mounts three servos and on-off switch in single unit. 4½ x 1¾". Price, not including switch, $2.95. **D&R Products,** Box 966, San Juan Capistrano, Calif. 92675

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TOP FLITE MODELS, INC.

Hot New Ones!

MonoKote™ Sealing Iron

WITH TEFLON COATING

STAND INCLUDED

$9.95

CONE SHAPED NOSE: Iron held upside-down will seal concave areas like fillets, etc.

SIDES:
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POINTED TIP: For hard-to-reach areas

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Especially Designed To Simplify Model Covering

- LIGHTWEIGHT—weighs only 8 oz.
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R/C NOBLER

R/C NOBLER
Full house multi-channel
Wing span: 51 inches
Wing area: 550 sq. inches
Weight: 4½ - 5 lbs.
Engine: .35 to .45
Kit RC-14

$29.95

Kit includes many new innovations such as mechanically coupled flaps and elevators and a built-in jig to assure perfectly straight wing construction; precision-machined balsa parts clearly marked and cleanly die cut; complete nylon hardware; elevator, rudder and flap horns; formed canopy; landing gear with tiller bar silver-soldered to nose wheel gear at correct position; and detailed, illustrated step-by-step booklet on building this model, with separate easy to follow instructions on flying for beginner and expert.

FREE IN EVERY KIT

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Self-Stick Die Cut MonoKote Markings

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Series of fuelproof, authentic aircraft markings; correct proportions and colors. Die-cut from self-adhesive MonoKote. Simply peel from backing and press down on model. Adheres to dope, plastic, fiberglass and, of course, Super MonoKote.

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VERY REALISTIC SEMI-SCALE PROFILE STUNT U-CONTROL MODELS

Junior Aces

Mustang P-51B
Kit N11

$3.50

Also Cosmic Wind, Kit N12
Hawker Hurricane, Kit N13

Built up stunt wing; simple sheet fuselage, etc. Takes .049 engine; 24" wingspan. Features very complete plans and instructions for the junior modeler. Crisp diecutting, formed wire parts; nylon bellcrank, horn etc. included.

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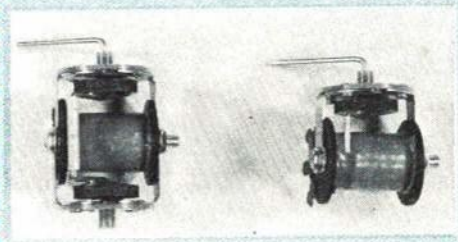
No. 24L15—Dow Corning Silastic, 2 oz. $1.50



ADAMS ACTUATORS NOW MANUFACTURED BY ACE R/C

Ace R/C is proud to announce that we are licensed to produce the Adams series of actuators, protected by both U.S. and Worldwide patents. Ace will be the exclusive hobby distributor for resale.

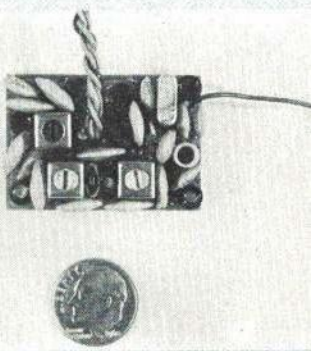
The same high quality and TLC (tender loving care) that was given to the manufacture of these actuators by the late Frank R. Adams will be a part of the tradition Ace will carry on.

Magnetic actuators offer the greatest versatility of any of the simple actuating devices. They weigh much less than any comparable rudder actuating device. Being electro-mechanical devices they have only one moving part and are "noise"-free. Easy to install and maintain. No electronics to burn out. The design has evolved so that they are probably the most rugged of any device of this kind.

Available in several different sizes so that you can buy the smallest you need for the airplane you wish to use, and therefore have the lightest possible weight, yet ample power.

With the Baby you can get a total all up airborne weight of less than 2.5 ounces using SUPERHET equipment!

No. 14K15—Baby Regular Coil	$7.95
No. 14K58—Baby Twin, Regular Coil	10.95
No. 14K173—Standard Single (1RLV)	7.95
No. 14K121—Stomper Twin (2RLV)	10.95



NEW! NEW! NEW! NEW! NEW! NEW COMMANDER DE GEM RECEIVER

The designers of the fabulous Commande DE Receiver have miniaturized and weight h been reduced! The new Commander DE Ge Receiver measures only 1 1/16" x 1 1/2" 1/2". Weight of the bare receiver is approx mately .5 ounce.

This is superhet equipment, and uses th same high grade components as the proven re ular Commander DE. As a matter of fact, son of the exact same components, such as IF ca and RMC capacitors, are used in the mini ve sion, simply because they have proven ther selves and are not finicky as far as tolerance temperature is concerned. This does not allo as great a shrinkage, but it does make for d pendability.

The new Commander DE Gem is doub ended for output into a dual actuator. Hov ever, it may be converted quite easily to sing ended operation to feed into an actuator of th Bentert type.

Operation is on 2.4 volts with phenomer range. May be used with 3 volts.

No. 12K2—Commander DE Gem Rx $31.5

NOTE: The Standard Commander DE and S receivers are furnished in the Commander Pac ages. The GEM is offered separately at th present time.

RAND PRICE REDUCTION

Since the time we acquired the Rand Mar facturing facilities, we have run a very care cost analysis of the actuators and GG pack a Dual pack. In view of lower overhead and eco omy effected because of continuing mass p duction, we are happy to announce the duction in price of a number of these uni The savings are not as a result of any short cu The same high quality as always.

When so many other prices are rising, it with pleasure that we announce the followi reductions:

No. 14K127—HR1, formerly $14.95, now only	$11.
No. 14K128—HR2, formerly $18.95, now only	$14.
No. 14K126—LR3, formerly $19.95, now only	$15.
No. 15G40—GG Pak, formerly $39.50, now only	$33.
No. 15G46—Dual Pak, formerly $75.00, now only	$60.

(All units shipped since February 2, 1970, ha been invoiced at the foregoing prices)

ADAMS ACTUATOR COMPARISON CHART

TYPE	GRAM WT.	MILLIAMP 2.4 V	DRAIN 3.6 V	SIZE LESS SHAFT	RECOMMENDE USE
Baby Regular	17	110	*	1 x 1 1/8 x 3/4	.010 - .020
Twin Baby Regular	22	110	*	1 x 1 3/8 x 3/4	Hot .010 - .02
Single Standard	29	220	330	1 1/4 x 1 3/8 x 1	.049 to .10
Twin Stomper	43	220	330	1 1/4 x 1 3/4 x 1	Hot .049 - .23

* NOT RECOMMENDED FOR USE AT THESE VOLTAGES

We Have The PULSE of R/C!

PROVEN RELIABILITY! IN PRODUCTION NOW! LIGHT WEIGHT SYSTEMS! VERSATILITY FOR SMALL PLANES; POWERFUL ENOUGH FOR LARGE JOBS!

The reception of our Commander R/O series could only be called fantastic--from California to New York, from Texas to Michigan, from Colorado to Illinois, from Mexico to Maine, from Oregon to Florida--there are satisfied users everywhere. AND the list is growing!

Acceptance is from beginners--BUT a lot of it is coming from the digital pros as well! One of them writes: "I never realized how much fun simple R/O flying could be until I bought one for my daughter--now it looks like I'll need another for her!" . . . "No long trips to flying fields--just short jaunts to the neighboring areas; and my fuel bills are low" . . . "I am 16 and just completed my 10th successful flight with a Whiz Kid, Commander R/O equipped. Great!!!" . . . .From a California dealer: "One of my customers has sold his "X" brand digital and all his big equipment. He's sold on R/O fun flying!" From Carl Goldberg: "Just a word to let you know how much I've enjoyed flying your Ace Commander Rudder-Only Stomper in our Ranger 42. . ." And so it goes!

A number of clubs are talking about Rudder-Only or SAC (Single Axis Controlled) contests for next year!

The Commander series of Packages from Rudder, to Ghost, to Fast Pulse are all designed around Transmitters engineered by Don Dickerson. Each is designed for its specific function.

The airborne packs of the Commander systems are built around the Commander Superhet. Used as a DE unit in the R/O packs, it has been redesigned for a 3.6 volt input and Single Ended (SE) output for the Ghost and Fast Pack. Thousands of these receivers are proven in the field.

The Commander Series is completely wired, tested and guaranteed. It will not be available in kit form immediately. Transmitter battery, 9 volt of the M1603 or equivalent, is required.

Recommended chargers for the nickel cadmium battery packs used in the airborne units are shown at right.

A Commander package can be your doorway to fun--whether you are a novice wanting to get into Radio Control; or an old hand wanting a change of pace.

COMING--New Commander R/O Pack!

Watch this space next month for the new Commander Rudder Only Baby Twin--only a few more grams but with 60-75% more power--for larger versions of the small ships. The Baby Twin Pack has an airborne weight of only 2.85 ounces!

COMMANDER CHARGERS

Now chargers of four different kinds as required by the Commander series of airborne units. Baby--25 ma at 2.4 v; S--Standard and Stomper--50 ma at 2.4 v; GG--60 ma at 3.6 v; FP--100 ma at 3.6 v. Assembled.

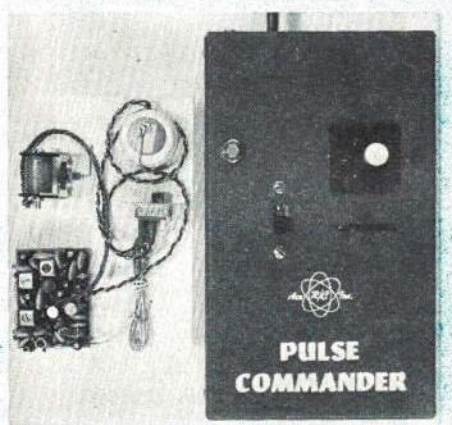
No. 34K4—Commander Baby Charger	$4.95
No. 34K5—Commander S* Charger	4.95
No. 34K6—Commander GG Charger	4.95
No. 34K7—Commander FP Charger	4.95

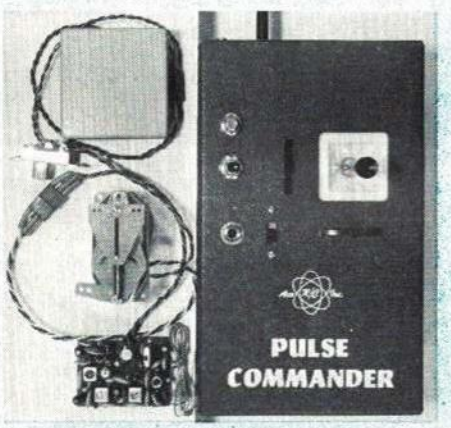
* Standard or Stomper

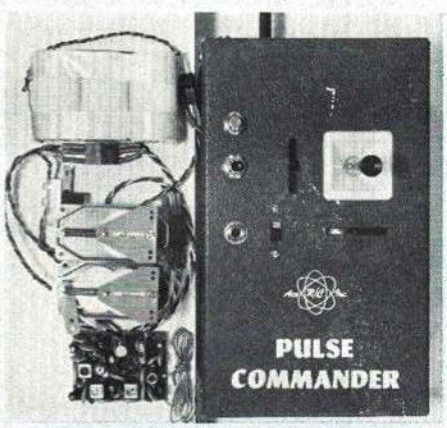
VARI CHARGER

If you want a more universal type of charger for your nickel cadmium battery supplies the Vari-Charger has much to recommend it. It features a high quality transformer and will charge up to 5 or more cells in series with up to 150 milliamp current. Charging rate is adjustable from 20 to 150 mils, with easy-to-use chart.

No. 34K21—Ace Vari Charger Assembled	9.95
No. 34K22—Ace Vari Charger Kit	7.95







COMMANDER R/O PULSE PACKS
Ideal for Beginners and Sport Flyers

RUDDER ONLY PULSE IS: LIGHTEST--2.5 oz. for Baby * SIMPLEST--only one moving part, noise free * VERSATILE--arrange to suit * EASY to install * LOW COST to operate and maintain * GREAT for Beginners--CHALLENGING to the pros * FUN!

The R/O Packs feature the Dickerson transmitter described above with the Rand single axis stick, and the Commander DE 2.4 volt superhet receiver. Has an Adams actuator of the size of your choice, depending upon your aircraft, with nickel cadmium batteries wired with an on and off switch. AND each pack will save you $10.00 if you bought the individual items separately.

The R/O Baby is for .010 to .020 jobs, has two 225 MA nickel cadmiums, and the regular Baby Adams actuator. The airborne weight is 2.5 oz.

The R/O Standard uses the LV single Adams actuator for more power for .049 to .07 size. Uses larger capacity nickel cads. Airborne weight is 4.5 oz.

The R/O Stomper used the LV Twin Adams actuator for up to .15 or can be boosted for use with .19. Airborne weight is 4.9 oz.

(Charging equipment extra)

No. 10G15—Commander R/O Baby	$69.95
No. 10G16—Commander R/O Standard	71.95
No. 10G17—Commander R/O Stomper	74.95

All 27 MHZ, except 27.255. Specify.

COMMANDER GHOST PULSE PACK
Provides Rudder, Elevator, Motor

Using the same basic Dickerson Transmitter but with two axis stick control, the Ghost uses pulse width and pulse rate and full on-off for control. Receiver is new Commander SE designed specifically to feed into a Rand GG Pack, 3.6 volt nickel cads. This system should be used in planes of .09 and up.

(Charging equipment extra)

No. 10G18—Commander Ghost Pack $109.00
All 27 MHZ, except 27.255. Specify

You can convert your new Commander series Rudder Only System (Blue-Grey vinyl case only) to either of the two systems shown above. This means as you gain experience you can step up without obsoleting your original investment.

COMMANDER FAST PULSE PACK
Retains Elevator During Motor Signal

The system here is an electronic decoded one which allows a much faster pulse rate and rudder and elevator just quiver. You have FULL control of elevator response on motor command--An Ace EXCLUSIVE! Up to .29.

Receiver is new Commander SE, Rand Dual Pak, with 1 amp 3.6 V nickel cads.

(Charging equipment extra)

No. 10G19—Fast Pulse Commander $139.00
All 27 MHZ, except 27.255. Specify

No. 10E116—R/O Factory Conversion to Ghost System above	$45.00
No. 10E117—R/O Factory Conversion to Fast Pulse System	$75.00

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Our NEW Handbook-Catalog is bigger and better than ever. We specialize in equipment for the Beginner, Sunday and Fun Flyer. More items for the do-it-yourselfer; more products from most major manufacturers, in addition to many Ace exclusives. Greatly enlarged HANDBOOK section. Last year this was called "bible for R/C", "a MUST!" by R/C editors. Price is just $1.00 POST-PAID. This is completely refundable on your first order! And that order also puts you on our mailing list for our newsletters and R/C Data Service—acclaimed the world over. You can't lose—send your buck on a round trip today. It could be the best dollar you ever spent!

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R/C TECHNICAL FEATURE

FRED M. MARKS

Commander Fast Pulse Pack

A Blue Ribbon Review

THIS is a dual-proportional pulse system produced by ACE Radio Control, Inc. of Higginsville, Mo., who incidentally produced the first dual proportional pulse system — the famous TTPW by Walt Good.

What is dual-proportional pulse? A pulsed tone is transmitted to the receiver. The width of the pulse is varied to provide rudder control. The repetition rate of the pulse is varied to transmit elevator control information. The decoder simply amplifies and filters the pulsed tone to provide a square drive pulse for the rudder servo. An extra trick is required for interaction-free elevator control. One edge of the pulse is coupled capacitively to electronic rate decoding circuitry which converts the repetition rate to a variable-width output pulse. The servos oscillate at the repetition rate, about the nominal control position but the amplitude of movement is slight.

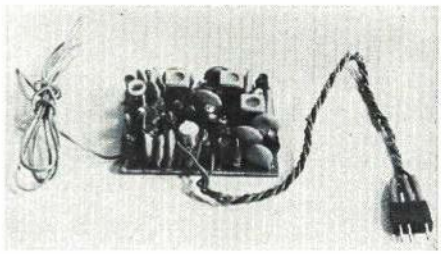
The ACE dual-proportional system uses the Pulse Commander transmitter designed by Dan Dickerson, whom many of you will remember as half of the team which designed the B&D Pulsatone. A sophisticated pulser is used to provide interaction-free pulse-width and pulse-rate control. An Audio tone of 600 Hz is pulsed at a nominal 15 pulses per second. Repetition rate is varied plus and minus five pulses per second for elevator. Pulse width is varied up to 60%/40% for rudder control.

A unique technique is used to obtain throttle control. Most pulse systems have used signal-on and -off for throttle changes. During throttle changes, both the rudder and elevator servos would "go around" causing a rapid though harmless oscillation of the airplane in both pitch and yaw. The primary problem is that elevator control is not available during throttle changes, thus making difficult such maneuvers as a touch-and-go.

As noted above, rudder control is obtained with a 60/40 pulse variation. By simply changing the pulse width to as much as 95/5, the rudder will go around quite rapidly. Push-buttons are used to shorten or lengthen pulse width to the point required for good go-around. But, since we still have a clean 5% on time which can be sensed by the elevator decoder, elevator is retained during throttle change.

Also of interest was the use of parallel transistors for final RF amplification. A center-loaded antenna is used. The system is available on the 27MHz frequencies.

The receiver used is a single-output version of the excellent Commander DE superhet. As of this writing, ACE informs that an even smaller version is forthcoming. The new receiver is an extra cost item at this time. The dimensions of the new receiver will be $1^1/_{16} \times 1\frac{1}{2} \times \frac{1}{2}$" compared to $1^5/_{16} \times 1\frac{3}{4} \times \frac{5}{8}$" for the present version.

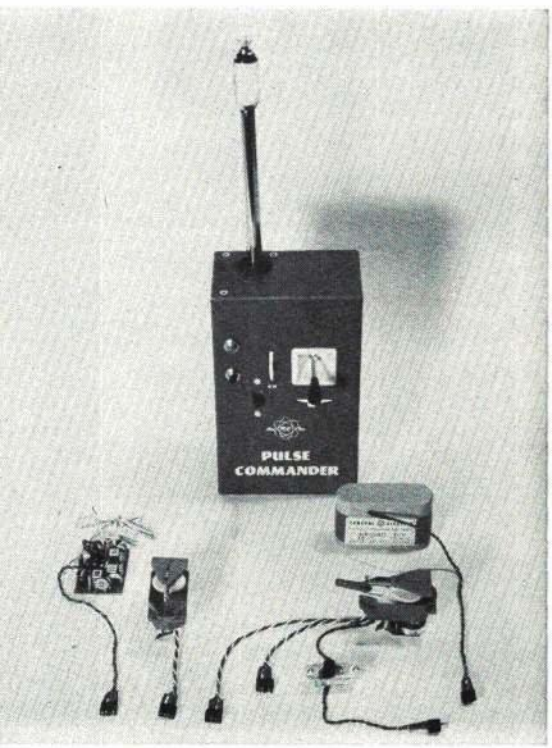


ACE's standard single receiver is this very sensitive 2.4 to 3.6 volt superhet Commander. It uses all silicone circuitry. Is very small.

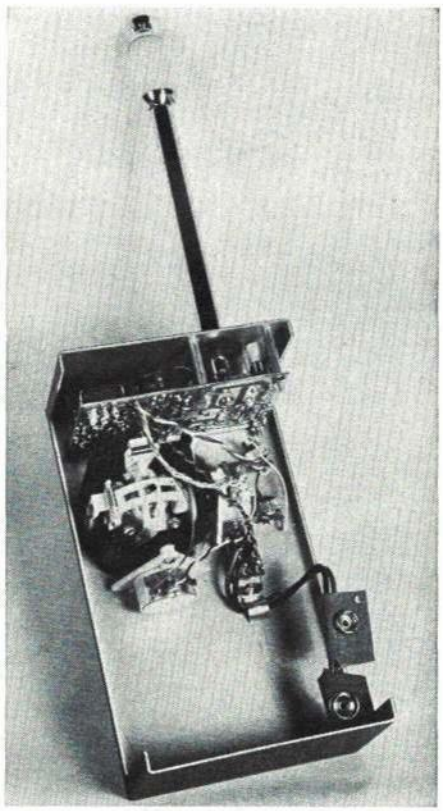
About one year ago, ACE became the owner of RAND, maker of the RAND Dual Pak. The Dual Pak, now produced by ACE, is the heart of the dual-proportional system. The Dual Pak consists of the rudder servo and its amplifier, elevator servo and its decoder/amplifier and a 3.6-volt, 1.0-ampere-hour nickel-cadmium battery pack. The rudder and elevator servo amplifiers are bridge amplifiers to permit the use of a 3.6-volt supply with no center-tap. The amplifiers and decoder utilize 12 silicon transistors and an integrated circuit. The rudder amplifier board also serves as the wiring junction for the switch harness, receiver, and elevator servo.

Physically, the transmitter is housed in a gray vinyl-clad box 4 x 7 x $2\frac{3}{8}$". A RAND stick assembly is used for very smooth, well-centered control. Miniature pushbuttons are used for high and low throttle. A 9-volt dry cell is required for the transmitter. The airborne pack including receiver and RAND Pak (with battery) weighs approximately 10 ounces. The receiver dimensions

Continued on p. 87.



A sophisticated ready-to-operate single-channel set. No matter what you fly, single systems seem to be more relaxing to use.



Having powerful output, the transmitter is just as well designed and made as multi digital rig. Smooth Rand sticks.

Test-flight plane is Sig's D. H. Beaver. Wing was painted with foam spray colors, fuel-proofed, with sprayed polyurethane.

MAY 1970

MODEL AVIATION

Official magazine

A.M.A. NEWS

Academy of Model Aeronautics • 1239 Vermont Avenue N.W., Washington, DC 20005

Question: to Muffle or Not to Muffle

The **AMA chartered Valley Forge Signal Seekers** (Pennsylvania) polled RC clubs recently in an effort to determine current thinking about engine mufflers, particularly for radio control use. The poll sought to find out whether current mufflers are thought to be satisfactory (if not, for what reasons), and it also sought opinions on the possible need for AMA noise abatement standards and muffler rule legislation.

Of the 272 AMA chartered clubs contacted, 138 responded; 44 require muffler use as a club rule while 94 have no requirement at present. Altogether, the responding clubs represent 5,467 AMA members.

Analysis by the V.F.S.S.

Over twice as many muffled clubs felt poor silencing was a problem as compared to the non-muffled group (52% against 22%). This is logical in that most who have gone to mufflers have done so because of noise. They are more affected by this area, or are more sensitive to it. The voluntary flyers use mufflers for varied reasons, but noise is generally less important to them than power loss.

This is reflected by the fact that two-thirds of the non-silenced clubs felt power loss was a definite shortcoming — even more so than the muffled clubs (61%). Perhaps the muffled groups have learned to live with the problem a little better. Both groups agree power loss is excessive.

Poor size or shape is a pretty general question. Along the lines of fitting the plane, about one-third of all those responding felt this was a weak area. Although very important to the scale fan, it is less vital to the average plane.

Poor means of attachment attracted replies from about 40%. Comments to clarify this include exhaust discharging on the plane, mufflers should be angled outward, there is no standard exhaust stack, and means of attaching are often weak — breaking from vibration, etc.

Only one-fifth of the clubs felt there was no real need for corrective action — they were not dissatisfied. However, only 9% felt this effort should be dropped. Both figures certainly indicate there is much room for improvement.

Recommendation for design of integrated engine/muffler were received from over two-thirds of the muffled group and one-half of the non-muffled group. This response is based upon the premise that the matched combination is the best means of obtaining maximum power with best silencing. In this way the muffler is literally tailored to the engine, instead of taking a basic type of muffler and making an adapter to fit different engines. The overall result should also be mechanically stronger.

Establishment of a noise standard was supported by over half of the muffled group, but by only 16% of the non-muffled group. Perhaps there is a feeling that this is on the road toward compulsory mufflers — distasteful to those who don't need them. It is interesting that of the 20 non-required clubs which felt mufflers soon would be required, 10 would like to see standards set. Put another way, in the non-required clubs, two-thirds of those who supported noise standards felt mufflers would soon be required. They are looking for the best possible product.

The suggestion for AMA muffler legislation drew over 40% of the clubs which presently require mufflers — but only 6% of the non-muffled clubs. Those who need mufflers have nothing to lose through legislation. Those who don't need or want them would lose if legislation were enacted.

The comments of clubs on the questionnaire brought a large number of interesting thoughts and facts to light. The clubs report a large number of members who are looking for good mufflers. Very few are against them completely.

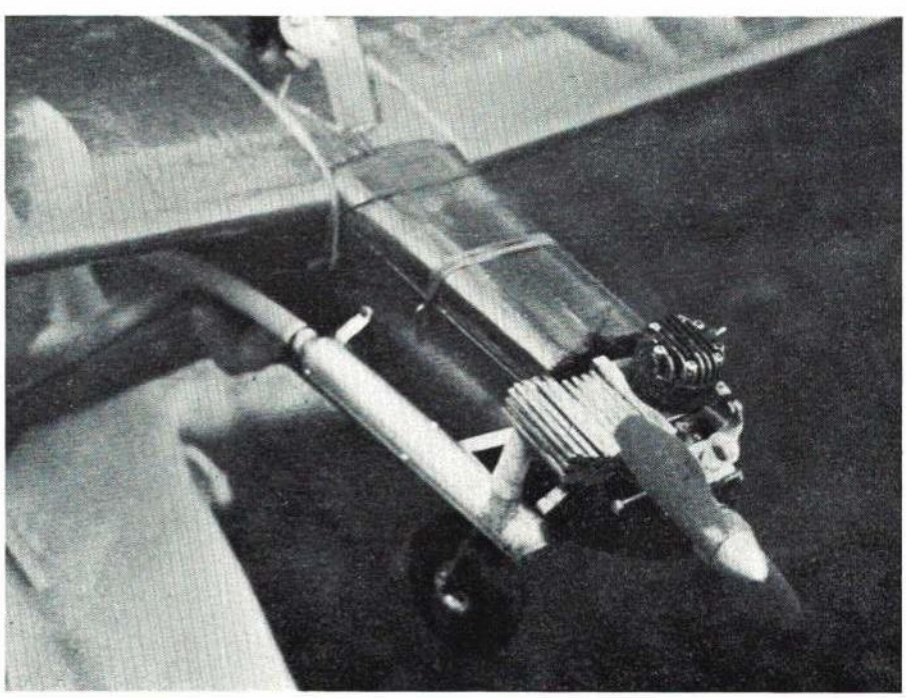
It is unfortunate we are dealing in an area of opinion. Residents who complain of noise may live next door to people who don't even notice the sound. Whether we have legislation, standards, or nothing (as at present), acceptable noise level is a matter of opinion. A number of comments speak highly of two mufflers which have fairly low power loss, but others feel these two mufflers do not sufficiently reduce the noise level and, for this reason, are banned by some clubs. Opinion!

Suggestions by the V.F.S.S.

Approximately 45% of the 5,000 plus modelers covered by this survey are using mufflers. When the clubs which anticipate needing mufflers actually make the change, then the number will increase to more than a half of the members surveyed. Improvements are needed for those who have silencing problems, without hurting the other clubs.

1. The AMA should *not* be encouraged to legislate mufflers. AMA consists of many clubs in different parts of the country — metropolitan, urban, rural, high altitude, etc. There is no uniform national problem; therefore, no national solution. Clubs must be relied upon to enact their own rules to fit their own problem.

2. A noise standard should be established by the AMA. Design parameters are needed, and once a standard is established the manufacturers will have a definite target to meet or exceed.



Front end of the Senior Falcon RC model by Fred Van Keuren shows the installation of his home-built muffler for the Fox 59RC. The adapter is finned for additional cooling. The downward link between the adapter and the muffler is teflon tubing. Van Keuren reports good sound reduction.

3. Engine manufacturers, in particular, cannot tool up for an integrated engine/muffler design without some sort of assurance of a market. Perhaps this report will give a better feel for potential sales, and these could be significant if there were sufficient muffler improvement.

4. Several clubs are doing some research. Perhaps their efforts can be coordinated. If not, the AMA should embark on a muffler fund — as was done with the frequency fund drive — to obtain professional services. Control line clubs should provide some degree of financial support also.

5. Once a standard is established, the AMA must take a positive approach toward having engine and muffler manufacturers push toward supplying the equipment that will meet or exceed the standards.

Which Way for AMA?

It has long been obvious that there are many AMA members who do not need to use mufflers. At present they seem to be in the majority, although the trend is definitely toward increasing need for mufflers. Because of this, any AMA-imposed legislation concerning mufflers would cause more harm than good at this time.

What, then, can AMA do to help those who need mufflers? Preliminary studies have indicated that AMA rating of mufflers is impractical — it is too easy for anyone to modify mufflers and thus render ratings meaningless. The best approach suggested to date seems to be that AMA should initiate a program to develop field procedures for relatively simple on-the-spot measurement of muffler effectiveness — a tool to enable club officers or Contest Directors to determine what is acceptable and what is not.

At press time this subject was on the agenda for the AMA Executive Council's winter meeting. It was anticipated that some knowledgeable people in the field of sound measurement would be asked to develop procedures and possibly a special purpose, low cost instrument for field checking. How deeply AMA subsidization of such a program might go was to be a principal item of discussion.

If this approach results in a specific project approval, the end result to be hoped for would be a noise standard which both individuals and manufacturers might be able to use in a simple and direct manner.

According to some people who seem to be well informed on the technical problems involved, it seems possible that a small instrument, about the size of Heathkit's hand held Thumb-Tac (which measures RPM), might result. The thinking is that such a gadget would be held a certain distance from the engine exhaust, and it would tell by a simple go-no go indication whether the noise level is acceptable.

Whether this crystal ball interpretation will be realized is a big question mark. At least, however, the subject is not being ignored, and with continued attention some help will be forthcoming.

The Valley Forge Signal Seekers have provided an excellent example of how an AMA chartered club can be an effective force in stimulating national thinking on local problems. The VFFS survey was a monumental job done in excellent fashion with considerable care and much detail. **F. Van Keuren** kept AMA headquarters informed of the club's effort and provided the report upon which this article is based.

WHAT AMA RC CLUBS THINK ABOUT MUFFLERS:

The following quotes represent most of the different kinds of comments received with the returned questionnaires. Although the selected comments are not indicative of the relative amount of following for any particular viewpoint, they represent the most significant points.

Our club — this year — has made it a law for mufflers. We have lost too many good fields to drop the subject. One big thing that would really help is a standardization of exhaust stack design for easy attachment of muffler. AMA established noise standards will be difficult to apply, but it must be done on a factory level with independent lab testing, with each company using some lab.

Our field is remotely located, so mufflers are not needed. Some members do enjoy using them because it is more pleasant. More would use them if they were designed for the particular engine, with little power loss, and if it were not heavy or bulky. A scale type muffler to be used inside a cowling for large scale models would be welcome.

. . . I don't believe AMA should pass any kind of legislation for mufflers because problems vary. The country is too big to pass a muffler rule. Every club will have to act on their own, although the AMA might set up some sort of standard. . . .

Our members have tinkered around with their mufflers to the point where complaints are practically nil. And what a pleasant difference a muffled field makes. Our muffled members still bring home a large share of the hardware from contests.

We hope to see it become a must in AMA competition and on AMA national level. We outlaw [deleted] and [deleted] due to noise level.

Noise standards are impossible to establish and enforce. This has been tried many times by cities with truck and auto noise. Some of our members are using the new mufflers with open front ends. We have concluded that the mufflers merely conform with the requirement rule and are not really mufflers. [Deleted] and [deleted] mufflers are good. Our homemade mufflers are better. After flying for four years with mufflers, we do not care to return to the noisy days of the past. The lady who complained about our noise, and forced the muffler issue, actually did us a favor. The question of tolerable noise level remains a matter of good sense, not precise measurement.

We recommend extra points in the events like Pattern for those who use mufflers, but *not* compulsory mufflers.

Only reason mufflers are used is to funnel fuel out, keep planes cleaner.

. . . had a muffler rule for engines above .23 two years ago. It was voted down about six months later. Many engines were ruined by lean runs, and many mufflers were lost in flight. Members also found it difficult to fly without engine sound when several models were in the air simultaneously. The club, in general, is against mufflers.

AMA muffler legislation will only cause problems in remote areas where noise is not a problem. AMA-established noise standards might be okay if mufflers were type-accepted, but how do you keep people from modifying them?

We have had a lot of trouble in our club with the muffler bit for various reasons. But I feel this can be overcome by a new design and theory of the engine-to-muffler relationship. I am working on the idea . . . it is just a matter of time and they will be required nationally anyhow.

The AMA ought to say how much "noise" an aircraft should make! The AMA should sell the *calibrated* Db meters to clubs (maybe even the "sound box" to enclose the plane for a reading). It should be *up to the member to meet the standard*, play power games, find the right combinations, etc., and have his fun. (He could use *any* muffler.)

We seem to get overheating when we use mufflers. I think it's because it is hard to get the right needle setting. You hate to cook a $40 engine. It would help if AMA could standardize exhaust stack size. [Deleted] has a light muffler I wanted to try, but my exhaust was the wrong size.

. . . Most members agreed that if a good engine-muffler combination should be developed, and proved out that it overcame most of the shortcomings now seen, they would probably use it even though it was not required.

. . . The club officers are instituting a program of muffler education, so to speak, in an attempt to convince the membership that the mufflers would be a good public relations move, even though we have received no noise complaints to date. To paraphrase an old proverb, it is better to lock the barn door before the horse is stolen. Personal use of mufflers by the club officers will be the first step in this program.

Our club is so far out we do not need mufflers, nor will we need them for some time. The ones we have used are either too noisy, or they cut power, and since we fly at 7,200 ft., we need all the power we can get.

It is unfortunate that the . . . has seen fit to ban the tuned pipe from competition. The development of a good no-power-loss muffler would eventually parallel that of the tuned pipe — no wonder the manufacturers are hesitant about shelling out the greenies needed to develop a *good* muffler.

We are not plagued with confined flying areas, and mufflers are the least of our problems. I suppose mufflers are the coming thing, but mickey mouse attachments are not wanted in this area. We feel mufflers should be an integrated part of the engine; otherwise, forget it.

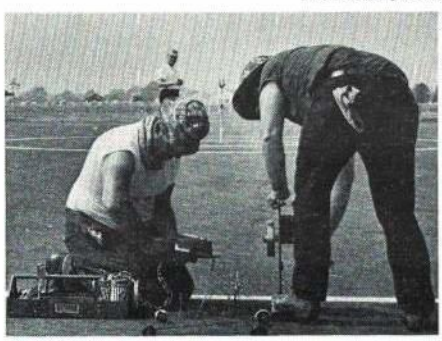
Several members have tried mufflers, but have not really been satisfied with them. Some of the newer types are on order, but have not been received yet. The price of the latest mufflers appears to be way too high.

Record Reviews

A report of selected recent record holders highlighting the designs and equipment used.

CL C Speed national AMA record, Senior age class: 177.97 mph, established by Robert C. Mohr, Fogelsville, Pa., on July 18, 1969.

Don Mohr photos



In the upper photo Robert is shown with his record setting Kansas Twister which was modified by installation of a flat, high-mounted stab instead of the normal low butterfly tail. The lower photo shows a flight about to begin. Robert, in the background with the Speedmaster single line handle for the H&R model unit, stands ready for the start by George Rohrbach, holding, and Tom Arner, cranking the starter.

The model was powered by a Supertigre G65 and Rev-Up Series 200 prop of 9" diameter by 14" pitch. The engine was deburred and freed-up, used surgical tubing bladder tank, K & B Speed Fuel. The 22" wingspan model weighed 36 ounces.

Mohr's record was set during the 1969 National Contest and continues in effect. The Junior age class C Speed record does not carry over to 1970 because current AMA rules provide for a maximum engine size of .40 cubic inch.

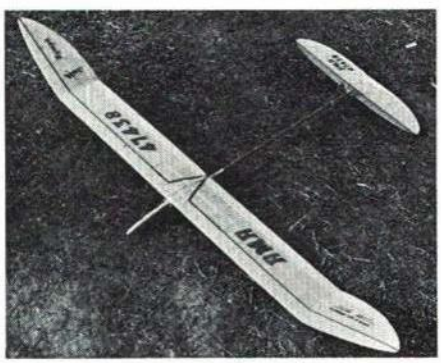
Indoor Helicopter national AMA record, AMA ceiling category I, Open age class: 7 minutes, 44.4 seconds, established by Thomas F. Vallee, Laurel, Md., on October 19, 1969.

This model is said by Vallee to be a simplified (easy to handle) version of the Bill Bigge helicopter in the *1959-61 Zaic Yearbook*. The model is essentially two counter-rotating propellers of 12" diameter held apart 4" by a motor stick of 9.25" overall length.

The rotor spars were of selected Micro Dyne spar stock, covered by Micro Dyne B microfilm. Power was supplied by a 12" loop of .043" Pirelli rubber lubed with a mixture of green soap and glycerine. The motor stick employed a .001" tungsten wire brace, "Tenny style" rear rubber hook. The model weighed .013 ounce.

Ahead of the upper rotor is a short length of .040 sq. in. balsa for a ceiling bumper. Vallee reports that the original length was found to be too short (the rotor flared enough to damage itself with ceiling contact), and it had to be lengthened.

FF A-1 Towline Glider national AMA record, Junior age class: 19 minutes, 32 seconds, established by Bruce Hannah, Rancho Cordova, Calif., on September 27, 1969.



This model of Bruce's own design has a projected wingspan of 47.75" and center chord of 4.75". Stab size is 17" x 3.5". Overall fuselage length is 31.5".

The wing airfoil is a modified NACA 6409 section of 8% thickness; stab is modified Clark Y of 6% thickness. Surface covering is Jap tissue finished with clear aircraft dope. The model weighed 5.08 ounces.

A fiberglass fishing pole blank was used for the rear of the fuselage. The model has a movable tow hook, auto-rudder, Tatone dethermalizer timer. It was built from Sig balsa.

Bruce reports light winds the day of the record flights, 5-8 mph, but the thermals were very spotty. His first flight was short of a max at 1 minute, 32 seconds, but the other six flights were each a full three minutes.

CL Jet Speed national AMA record, Junior age class: 162.10 mph, established by Danny Bartley, High Point, N. C., on October 5, 1969.

Danny's Dyna Jet powered model was designed by John Bartley, weighs 26 ounces. It has a wingspan of 24" and center chord of 3". The stab span is 11", 2½" center chord. Overall fuselage length is 26¾". Control of the model is by a Stanzel Monoline handle and H&R torque unit.

The jet engine was fitted with one extra reed valve, Champion plug, home built 7 oz. fuel tank. The model was finished with orange Hobbypoxy.

FF A-2 Towline Glider national AMA record, Junior age class: 19 minutes, 42 seconds, established by Brian Van Nest, Sunland, Calif., on September 1, 1969.

Brian's model was designed by Craig Cusick and Bob Van Nest. It has a wingspan of 75.25", 6" chord, and stab span of 21.75", 3.37" chord. Lindner airfoils were used for both the wing and stab. The model weighed 15 ounces.

The model was covered with Jap tissue and finished with nitrate dope. A Tatone timer was used for dethermalizing.

Brian says that his towline broke on one flight, but the model maxed anyway thanks to a thermal being present at the time.

CL B Proto Speed national AMA record, Junior age class: 140.02 mph, established by Danny Bartley, High Point, N. C., on July 18, 1969.

Danny's model is an original design named Aquarius, powered by a Supertigre 29 RV ABC engine using a Fireball Cool plug, Top Flite 7¾"D x 9"P prop, pen bladder fuel tank. The model has a wingspan of 30", 5" center chord. Fuselage length is 21½", used Harter proto pan.

Control was by an H&R torque unit in the model and a Stanzel Monoline handle. Except for the pan, the model was covered with Top Flite MonoKote. The model weighed in at 23 ounces.

FF Wakefield Rubber national AMA record, Open age class: 38 minutes, 18 seconds, established by John W. Allen, Albuquerque, N. Mex., on September 27, 1969.

A feature of Allen's own-design model is a fuselage front boom of 20" length made from .010" wall aluminum tubing. The rear boom, detachable from the front, is formed

of 1/16" balsa over a round tapered form, then covered with Jap tissue.

The prop of 24" diameter by 28" pitch was carved from a 1" x 2" x 24" block as per Hatshcek's in the 1965 *American Modeler Annual*. Power is supplied by 16 strands of 6 mm Pirelli rubber, Sig rubber lubricant.

The polydihedral wing has a flat span of 51", 4 13/16" chord, Benedek B-7406-F airfoil. The stabilizer of 16" span by 3⅜" chord has the Benedek B-6405-B airfoil. The model's center-of-gravity is located at 80% of the wing chord.

The wing is mounted at 2°30' positive angle relative to the fuselage centerline, while the stab is set at 0°. The prop has no downthrust, but 1½° right thrust, and the stab is tilted 4° for right turn. Together, these adjustments give a right-right pattern for the climb and glide.

The model is covered with MonoKote. A Seelig timer is used for the pop-up stab dethermalizer. The model weighed 230 grams.

U.S.A. Scale Teams

Most of the "ifs, ands and buts" about U. S. Radio Control and Control Line Scale Teams were removed as a result of the FAI CIAM (Committee for International Aero Modeling) meeting last November. At that meeting these two classes were elevated to World Championship status, and Great Britain's offer to be host in 1970, August 27-September 1, was accepted.

Most will recall that contingency plans were announced long ago to use 1969 Nats results to form the U. S. Scale Teams if, in fact, there should be such World Championships this year. There will be World Championships, and, therefore, the following Nats winners have first option at being team members.

Control Line

1. Linton Keith, Jr., Santa Clara, Calif.
2. William Harney, Wakefield, Mass.
3. Andrew Sheber, Livonia, Mich.

Radio Control

1. Maxey Hester, Montezuma, Iowa
2. Hale Wallace, Johnson City, N. Y.
3. Walt Moucha, E. Northport, N. Y.

In the event that any of those listed find themselves unable to participate, or unable to have ready an entry conforming to FAI rules, Nats runners-up will take their place. All have indicated that they expect to participate as U. S. team members.

World Championships are organized under the auspices of the Federation Aeronautique Internationale, headquartered in Paris, France. The AMA is the U. S. modeling representative of the FAI through authority granted by the National Aeronautic Association.

AMA News Bits

Model Aviation Hall of Fame

1970 selections to be added to membership in the **Model Aviation Hall of Fame,** Camp Murray, Tacoma, Wash., are:

Richard Korda
Albert L. Lewis
William J. Winter

They join **Walter Billett** (deceased), **Willis C. Brown, Carl Goldberg, Dr. Walter A. Good, Charles H. Grant, Jim Walker** (deceased), and **Frank Zaic,** who were named at the inception of the Hall in 1969.

Dick Korda is probably known best for his long rubber model flight of 43 minutes and 10 seconds in 1939 to win the Wakefield Cup. His success provided inspiration for many modelers, and his designs were kitted by several manufacturers.

Al Lewis was one of AMA's founding fathers. He was AMA president in 1938, and later he was AMA executive director. Currently, he is editor of *Air Progress* magazine.

Bill Winter needs no introduction to readers of these pages, as he is publisher of *American Aircraft Modeler*. He has written model airplane books, innumerable articles, and has at various times been editor of several model airplane magazines.

The eleven AMA regional vice-presidents, plus nine others, form the Nominating Committee for the Model Aviation Hall of Fame. The awards are to be presented by **AMA President John Patton** at the Hall of Fame banquet in Spokane, Wash., on June 13.

The New DCRC Symposium Concept

Instead of the traditional technical meeting, the **DCRC Club** under the leadership of President **Bob Denny** has made this year's theme contest management and improvement including a judge's training course. Lectures (by AMA President **John Patton** and AMA FAI coordinator **Maynard Hill**) on May 16 in the auditorium of Johns Hopkins Applied Physics Lab are to be followed by actual flight judging classes at the DCRC flying site in Columbia, Md., and then an evening banquette. On May 17 there will be a full fledged FAI aerobatic competition. Advanced registration required — details from **Carl Lorber,** 8306 Fremont St., New Carrolton, Md.

Prefers A-1 Glider Performance

A recent issue of *Max Fax*, newsletter of the **AMA chartered D. C. Maxecuters** discusses the relative merits of an A-1 Towline Glider against an A-2 in a combined event. What brought on the subject was a Nats conversation in which one party stated that the A-1 and A-2 classes should not have been combined since the small A-1 could not compete fairly with the larger A-2.

Max Fax doesn't agree. With an A-1 at 53% of the A-2 surface area and only 35% of the A-2's weight, the monthly paper figures the A-1's performance may be well ahead of the A-2. And the smaller A-1 may be built more quickly and, with less materials, at a lower cost. *Max Fax* is edited by **John Thornhill,** Mt. Airy, Md.

Unique Contribution

The **Bunker-Ramo Corporation,** Canoga Park, Calif., has an interesting payroll contribution arrangement known as "Our Fund." By means of payroll deductions, the company will make contributions in the employee's name to his choice of any of the organizations authorized by the International Revenue Service to be tax-free non-profit charitable, educational or scientific organizations.

The AMA has been so authorized (contri-

Bill Crame photos

Inset photo shows Bob Underwood, St. Louis, Mo., giving youngsters a taste of RC flying by means of Kraft's Buddy Box system. Saves wear and tear on the owner/flyers nerves — and the plane. Other shot shows Frank Beatty of the Tri City Sky Steelers during a presentation on scale modeling to the Signal Chasters RC Club of St. Louis. Beatty has collected scale information for years.

butions are tax-free), and so **John F. Keller** has directed his contribution through Bunker-Ramo to the AMA. Terrific, John! We hope that other AMA members in companies with such a plan may follow your example.

Easy Way to Cut Brass Tubing

The *Birmingham RC News* paper edited by **Bill Haywood** for the **AMA chartered Birmingham Radio Control Assn.** (Ala.) suggests a way to take some of the hardship out of cutting brass tubing. The suggestion is to place in the tubing the largest piece of piano wire which will fit and then, using side cutters, cut the tubing as if it were a piece of copper wire. The publication cautions to not use enough force to cut the piano wire inside. After the tubing is crimped on one side, revolve and continue crimping with minimum pressure until the cut is complete. Use an ice pick or similar tool to slightly flare the tubing end.

Down to Earth Club

A bit of good natured humor was had when the **AMA chartered Shreveport Area Radio Kontrol Society** (La.) introduced its "Down to Earth" certificates during the club's annual Christmas party. The complete text of the certificate follows.

This is to certify that heedless of danger, cost, loss or anguish

John Doe
Tiger Among Sharks

did abjure, refrain, and refuse to be a pussycat, and in the ensuing shattering display learned the essence of the immutable maxim affecting all golfers, lumberjacks, outfielders, balloonists, and RC flyers that whatever goes up must come down. He has thus fulfilled every requirement for membership in the Down to Earth Club.

From this day forth, then, let it be known that behind his stiff upper lip is a row of tightly clenched teeth. In fact, they've been gnashed. He crashed. Further, he is therefore fully entitled to state with sagacity and authority born only of painful personal experience to all who have not yet endured the march back to the workbench — "your turn will come."

The club's paper, *Sharks Sparks*, edited by **J. D. Alexander**, says that **Jake Shirer, Chuck Bailey, Ivan McKinney, Leo Bouchard, Keith McCoy, Jack Wimer, Ernest Johnson** and **Buddy Norton** received these coveted (?) awards.

Big Rubber Scale Models

Last December the **AMA chartered N.A.R. Flightmasters** ran at Los Angeles what the club called the **1st Annual Jumbo Rubber Scale Contest.** At least in recent times, this is the only contest we know of calling for rubber scale models of this size — 48" minimum wingspan.

Andy Faykun, the winner, blew a motor while winding for a flight — really tore up the model. It was thought he was done for the day, but after a two-hour field repair job, he put up a flight of 3 minutes and 58 seconds. Compared to most of today's small rubber scale models, those big ones must have been quite a sight.

AMA Contest Director for the event was **Carl Hatrack**, assisted by **Joe Bailey.**

Dentists Make Top RC Flyers

Reminiscing how some of the top RC Pattern flyers have been dentists (**Don Coleman, Jim Edwards, Ralph Brooke**, etc.), **Bill Haywood** in the *Birmingham Radio Control News* publication of the **AMA chartered Birmingham Radio Control Association** (Ala.) ponders why.

"Of course, RC flying is probably a natural for them because they must be good with their hands. . . . There is one outstanding reason which struck home after analyzing their enviable records," said Haywood. "A dentist must use a mirror several hours daily in order to properly treat teeth. This training equips them for RC flying admirably since left is right and up is down in that mirror, so he must be able to make the differentiation instantly as one must do in flying RC. As you all know," he went on, "one of the most difficult things a beginning RC flyer learns is that he must reverse his thinking when the plane is approaching, and then instantly do another turnaround when the plane swooshes by and zooms away."

Too Much Business Is Bad

The **AMA chartered Memphis RC Club** (Tenn.) has recently taken to transacting most all club "business" at Executive Board meetings in order to save regular club meeting time for a maximum of programs and other more entertaining and informative activities, reports the club's paper, *Memphis Monitor*, edited by **L. T. Hord, Jr.**

The very success of the club brought about the gradual drift to more and more business being conducted during regular club meetings. The recognition and correction of the problem undoubtedly will do much to make for more spirited meetings.

Indoor Special Action Committee

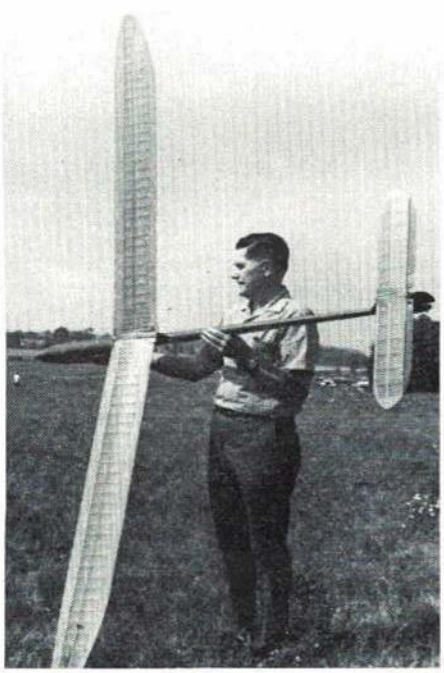
Indoor News and Views, edited by **Bud Tenny** (Box 545, Richardson, Tex. 75080) of the **National Indoor Model Airplane Society**, reports the formation by **Roger Schroeder** (4111 W. 98th St., Overland Park, Kans. 66207) of a **Special Action Committee** of indoor modelers from various parts of the country who have agreed to help beginners. The list of volunteer instructors, which is steadily growing, consists of **Donald Sump** (Lewiston, Idaho), **Orval Stewart** (Nashville, Tenn.), **Charlie Sotich** (Chicago, Ill.), **Jim Richmond** (Bensenville, Ill.), **Chester Wrzos** (Lynchburg, Va.), **Phill Lawry** (Auburndale, Mass.), **Bud Tenny** (Richardson, Tex.), **John Thornhill** (Mt. Airy, Md.), **Dave Linstrum** (Simsbury, Conn.), **Cy Baucke** (Fullerton, Calif.), **Roger W. Schroeder** (Holbrook, Nebr.), **Jim Noonan** (Milwaukee, Wisc.), **Vern** and **Dale Hacker** (Euclid, Ohio), **Harry Cook** (Overland Park, Kans.), **Robert Underwood** (St.

John Burns, Jr.

Left: Beech Bonanza RC Scale model designed by Jack Burns, Oak Park, Ill., built by EAL Capt. Dick McCann, has 66" wingspan, .60 engine. Much right engine thrust needed, as butterfly tail has little rudder effect on ground. **Below:** Bill Hirshberger's RC Sailplane, built in 1953, was still around for DCRC meet in June 1969.

Hugh Langevin

Gaily decorated with tissue was the Uranus 6 FAI Power model by Joe Wagner, Dobbs Ferry, N. Y., flown in 1969 Bong Team Finals. Former team member's engine had Miebach tuned pipe.



Jim Davidson

Happy are these youngsters, all winners of the 3rd Annual Huntsville, Ala., Junior Meet for AMA Racers and Indoor Hand-Launched Gliders.

John Thornhill

Piper J-3 built by Ken Curtis, Greenbelt, Md., has 9-foot wing, Enya 60RC power, weighs about 12 pounds, has slow scale-like flight. It is scratch-built using **Air Progress** 3-view details.

Louis, Mo.), **Bob Dunham** (Tulsa, Okla.), **John English** (Tulsa, Okla.), **Bob Hanford** (Tulsa, Okla.) and **Tom Vallee** (Laurel, Md.).

If you need help with an indoor model, or know of someone who does, get the complete address of the nearest instructor from Roger Schroeder.

Watch That Exhaust Spray!

"The flyer who cranks up his engine and promptly sprays the airplane parked next to him with a good coating of oil mixed with dirt" is a particular gripe of the **AMA chartered Tri-Cities Aeromodelers** of Kingsport, Tenn. "This mixture is hard to get out of clothing, and it certainly does nothing for a sparkling new wash job on your car. Let's all think to check the position of our airplane before cranking it. It's no trouble to avoid this irksome practice. Let's all try!"

'Nuff said.

Editor Admits Wife Did Work

Most hubbys won't say it, but **Wayne Dempler** did. In a recent issue of *Fly Paper*, published by the **Greater Pittsburgh ARCS**, he said that he has been masquerading for six months as editor even though his wife, **Karen**, has been doing the work.

When he did fess up, he did it right, for now her name will appear on the paper's masthead.

AVP Makes Good Use of Magazine

An **AMA Associate Vice-President** from District III, **Ralph Pennetti**, advises that he has been putting to good use his copy of *AAM* after he has read it thoroughly. The school his daughters attend has a very limited budget for purchase of books and magazines, and so he turns his copy over to the school each month. He also donated his copy of **Bob Lopshire's** book, *Beginners Guide to Building and Flying Model Airplanes.*

Ralph suggests that AMA members may want to pass on their magazines to nearby schools. The response he has obtained has been excellent.

AMA Nomination Time

Between now and the date of the Nominating Committee meeting at the 1970 National Contest (not specified when this was written) is the time for submitting names of candidates for offices to be elected later on this year. The victors will be in office for two-year terms, 1971 and 1972.

Up for election is the national position of AMA president and vice-president positions for districts II, IV, VI, VIII and X. See the AMA district map on page 60 for the number of your own district. The same page lists current AMA officers.

As per guidelines first instituted in 1969, it is now required that any candidate for national office (president or secretary-treasurer) must have served, or shall be currently serving as either: elected officers of the AMA (such as vice-president) or as officers appointed by the president or the vice-presidents (such as Contest Board members, associate vice-presidents or committee chairmen). Also, it is required that a candidate be a Leader member (or Contest Director) of the AMA.

For elected district officers (vice-presidents) the same requirements are applicable, or either of two others may be substituted: Leader members recommended by vote of an AMA chartered club, or by a current Contest Director.

Names of all qualified candidates must be submitted in writing prior to the start of the Nominating Committee meeting. All such names will be considered by the committee, but only two names per office will be approved by the committee for listing on the ballot. However, the ballot will provide for write-in votes for any additional candidates who meet the requirements. Candidates are also urged to submit in advance, to the committee, any statements, documents or evidence supporting their nomination. Note: the Nominating Committee is made up of the elected district vice-presidents or their designated representatives.

Now is the time to consider and submit names for the 1970 election. Names may be submitted by any AMA member, in writing with a statement of at least 100 words concerning the candidate's qualifications, to the member's district vice-president, with a copy to AMA HQ. Consent of the person named should be obtained prior to submission.

This announcement is published at least 90 days prior to the annual Nominating Committee meeting in accordance with procedures enacted by the Executive Council in 1969.

Contest Coordination Conference

The **Northern California Radio Control Society** performed an important function last January when it arranged for a meeting of area club leaders. Purpose of the meeting was to prevent conflicting dates and thus assure every club of maximum contestant participation in all scheduled contests, races, fly-ins and other events.

The meeting wasn't all business. It included an all day flying session at Madera Airport.

Shoulder-Patch Club Identification

The **AMA chartered Tri-City Sky Steelers**, Granite City, Ill., agreed in a recent meeting that they wanted to obtain shoulder-patch club emblems. They probably would have gone out and bought the patches immediately, but they found themselves without a suitable design.

Rather than to assign the design task to one of the club's art-inclined members, **Howard Ogden** proposed a contest within the membership. The initial showing of emblem designs was in January; final judging was planned for the February Sky Steelers meeting.

Les Adams Co.

Scene at Hobby Industry Association of America trade show at Chicago last February. Public Affairs officers from Glenview Naval Air Station look over the new Guillow Dauntless kit with Earl Smith and AMA Executive Director John Worth. Lt Cdr. Frank Sequeira, L, and Cdr. Mel Knouse met with Worth and HIAA members to initiate planning for the 1970 National Model Airplane Championships July 27-August 2 at Glenview.

Russ Brown

A study in total concentration was the start of the RC Sport Pylon Race of the Cleveland (Ohio) Radio Controlaires at Chardon last year. The event drew 25 entries, and the club's 2nd Annual Pylon "500" is already scheduled for this year, May 31. Photo submitted by Frank Vidmar.

Many of the photographs in the AMA News section were contributed by AMA members. If your favorite type of model is not pictured, most likely none was received. Your assistance is requested in submitting interesting photos on all subjects, together with sufficient information for captions and photographer's name. Send photos (which cannot be returned) to Picture Editor, AMA HQ, 1239 Vermont Ave., N.W., Washington, D. C. 20005.

Submitted by Whitey Pritchard

RC Slope Soaring Pylon Races by the RC Bees Club have attracted big turnouts for the California club. Sailplanes neck and neck here.

AMA News Extra .....

1970 NATIONAL MODEL AIRPLANE CHAMPIONSHIPS

Where: Glenview Naval Air Station near Chicago, Ill.
When: Monday, July 27, through Sunday, August 2.

The following Nats information is subject to approval and confirmation by Navy sources by March 30. The next issue of this magazine will give further details and any revisions to the information contained here. Note: the tentative status is due to the uncertainty (at press time) of Monday and Tuesday flying.

Tentative Details

* RC Class D Pattern instead of Class C (trophies for Expert, Novice, Jrs., Srs.).
* RC Classes A and B added--if schedule submitted to Navy is approved.
* All Scale events (RC, FF and CL) will use AMA rules.
* FF Coupe D'Hiver added--first time at the Nats as an official event.
* CL Scale Racing (Goodyear) added--first time at the Nats as an official event.
* Indoor site availability unconfirmed--two days (Monday and Tuesday) currently planned.

Entry Information

* Advance basic entry fee: $10.00
* Late basic entry fee (Monday only): $25.00
* Advance entry postmark deadline: June 22
* Entry forms available April 15. Send stamped, self-addressed envelope (with 6¢ postage for each form desired--10¢ each if Air Mail is desired) to: Academy of Model Aeronautics, 1239 Vermont Avenue, N.W., Washington, D.C. 20005

HIGHLIGHTS OF AMA EXECUTIVE COUNCIL ACTIONS--Midwinter Meeting, Toledo, February 27

1. Nats competition event schedule approved (subject to Navy okay) as recommended by Nats Executive Comm.

2. Status of official publications--AMA News (Model Aviation), Competition Newsletter, AMA Monthly Mailing, confirmed as sources of "official" AMA information. Bylaws revision approved for Leader Member vote.

3. Special interest representation within AMA--recommendations of the AMA president (as published in Jan. 1970 AMA Monthly Mailing) endorsed; including expansion of Associate VP programs, internal PR efforts.

4. Anti-noise (muffler action)--development of low cost noise measurement device endorsed; also continuation of legal and educational efforts to promote greater public acceptance of model aviation activities.

5. Contest Director recognition--expansion of current policy approved to reward contest workers: Class A meet, CD only; AA meet, CD plus one worker or any category director; AAA meet, CD plus two workers or any category directors; AAAA, CD plus category and event directors.

6. Scale Contest Board proposal--tabled for study until next Executive Council meeting at Nats in July.

7. Addition of accident insurance coverage--not approved, due to increased cost and HQ handling factors.

8. RC Contest Board proposal for separate Pylon, Pattern and Scale boards--rejected due to conflict with by-laws regarding primary modeling categories which are authorized to have contest boards.

9. Contest Board procedure revision, to provide minimum of six months delay of rules effectivity when model designs or equipment changes are required--approved for recommendation to contest boards.

10. Anti-pollution device proposal--to reward AMA and AMA members for sales contact efforts--not approved.

RC TEAM SELECTION PROGRAM--LATEST DETAILS

Memphis, Tenn., will be the site for the Team Finals in September. The bid of the Memphis Radio Control Club to host the event was accepted, and early planning is now underway. World Championship rules will be in effect for the finals, as per page 47 of the 1970 AMA rule book:

* FAI builder-of-the-model rule will be applicable
* Models must meet FAI size and weight rules
* Mufflers will be required

See AMA News Extra, page 51, of the March issue of this magazine for other program information. Each program entrant must have an FAI stamp on his AMA license (from AMA HQ, $1.25 if not purchased with license).

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.

DIRECTORY OF AMA OFFICERS

Which officers live in your district? Select correct address when writing officers.

EXECUTIVE COUNCIL

President:
John Patton, Route #5, Frederick, Md. 21701
Secretary-Treasurer:
Earl Witt, Longview Trailer Court, R.D. #3, Chambersburg, Pa.
Executive Director
John Worth, c/o AMA Hq., 1239 Vermont Ave. N. W., Washington, D. C. 20005
Vice Presidents
I: Cliff Piper, 391 Elm St., Pittsfield, Mass.
II: Wm. Boss, 145-24 223rd St., Laurelton, N. Y. 11413
III. Ron Morgan, School for Vet Children, Scotland, Pa.
IV: C. Telford, 8612 Rayburn Rd., Bethesda, Md.
V: J. Perdue, 203B Cloverleaf Dr., Athens, Ga. 35611
VI: Gosta Johnson, 6810 S. Crandon, Chicago, Ill.
VII: Jack Josaitis, 23663 Lawrence, Dearborn, Mich. 48128
VIII: William Lank, 3143 Rotan Ln., Dallas, Tex. 75229
IX: Stan Chilton, 446 Ida, Wichita, Kans.
X: Vic Cunnyngham, Sr., 4337 Hornbrook St., Baldwin Park, Calif. 91706
XI: R. D. Stalick, 2807 S. Oak St., Albany, Ore.

CONTEST COORDINATORS:

I: Elvin Bowe, 101 S. Riverview, Haverhill, Mass. 01830
II: E. F. Hoffman, 158 Carpenter St., Belleville, N. J.
III: Ken Reber, Rt. #2, Shippensburg, Pa. 17257 (East)
M. Weisenbach, 4568 West 146th St., Cleveland, Ohio 44135 (West)
IV: D. L. Johnson, 3367 Sudlersville So., Laurel, Md.
V: T. McLaughlan, 4140 Fern Ct., Pine Glades, Pensacola, Fla. 32503
VI: Whalon Webb, 15722 Vine Ave., Harvey, Ill. 60426
RC: Al Signorino, 11959 Glen Valley Dr., Bridgeton, Mo.
VII: Odell Marchant, 2004 N. Hillsboro, Minneapolis, Minn. 55427 (North)
W. Hartung, 14759 Kilbourne, Detroit, Mich. 48213 (South)
VIII: M. Frank, 2933 Blankenship, Wichita Falls, Tex. 76308
IX: R. R. Combs, RR #1 Box 712, Morrison, Colo.
X: D. C. Farnsworth, 301 Carl Dr., Visalia, Calif. 93277 (North)
Pete Brandt, 5817 W. Ironwood, Palos Verdes Peninsula, Calif. 90274 (South)
XI: A. L. Grell, Rt. 1 Box 165, Tangent, Ore. 97389

CONTEST BOARD COORDINATOR: Don Lindley, 301 E. Elizabeth Dr., Crown Point, Ind. 46307

Bold type below indicates Chairman of Contest Board.

FREE FLIGHT CONTEST BOARD:

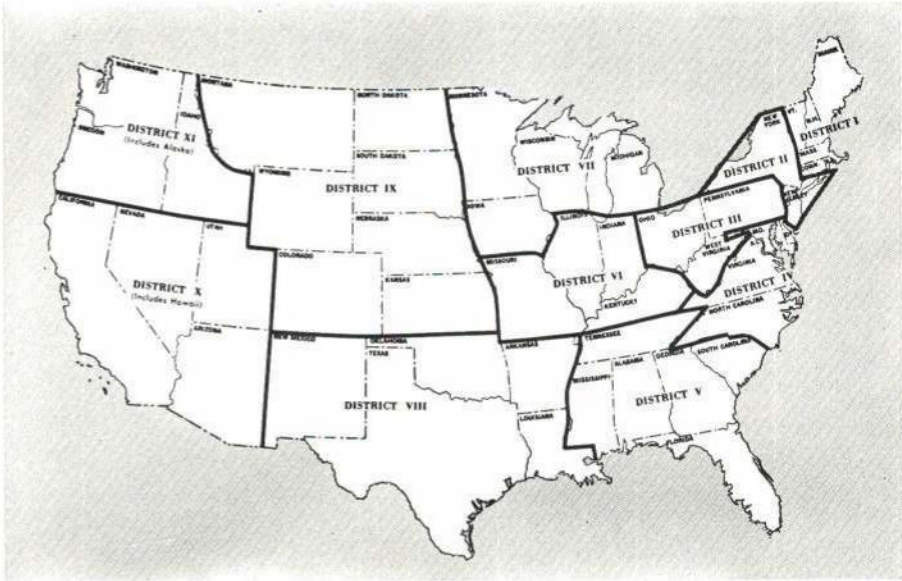
I: Henry Struck, R.F.D. #2, Hamburg, Old Lyme, Conn.
II: E. Fronczek, 34-14 Broadway, Long Island City, N. Y. 11106
III: Floyd Miller, 1313 Brookridge Dr., Columbus, Ohio 43211
IV: J. V. Boyle Jr., 219 Shenandoah Rd., Hampton, Va. 23361
V: G. C. Pickel, 1631 Steen Dr., Clarksdale, Miss. 38614
VI: Chuck Borneman, 1401 W. Taylor, Kokomo, Indiana 46901
VII: P. W. Klintworth Jr., 894 Brooklawn Rd., Troy, Mich. 48084
VIII: Buzz Averill, 2314 Palomas dr., N.E., Albuquerque, N. Mex. 87110
IX: Frank Monts, 6519 Marjorie Lane, Wichita, Kans.
X: John Pond, 4135 Avati Ave., San Diego, Calif. 92117
XI: J. Lenderman, Route 2, Box 460, St. Helens, Ore.

CONTROL LINE CONTEST BOARD:

I: J. Ennis, 165 Grafton St., Brockton, Mass. 02401
II: J. G. Pallet, 30 Emerson Rd., Brookville, Glen Head, N. Y. 11545
III: Laird Jackson, 523 Meadowbrook, St. Davids, Pa. 19087
IV: Wm. Pardue, 1407 Gracewood Dr., Greensboro, N. C.
V: W. D. McGraw, 1325 Carol Dr., Memphis, Tenn.
VI: Arthur J. Johnson, 1818 Oslo Drive, Rockford, Ill. 61108
VII: Howard Mottin, 2124 Common Rd., Warren, Mich.
VIII: Leland Morton, 8614 Triton, Dallas, Texas 75227
IX: J. R. Mason, 2214 S. Pine Crest, Wichita, Kans.
X: J. E. Barr, 7418 Collet Ave., Van Nuys, Calif.
XI: Keith Loutocky, 1419 S. 48th, Tacoma, Wash.

RADIO CONTROL CONTEST BOARD:

I: H. A. Thomasian, 369 Brigham St., Northboro, Mass. 01532
II: R. Noll, 96 Pine Knoll Rd., Endicott, N. Y. 13760
III: Howard Grogan, 1326 Wakeling St., Philadelphia, Pa.
IV: W. C. Northrop Jr., 56 Holly Lane, Newark, Del.
V: Herbert Davis, 3800 River Oaks Rd., Birmingham, Ala. 35243
VI: Bud Atkinson, 734 North 6th St. Terr., Blue Springs, Mo. 64015
VII: Peter Waters, 31219 Kendall, Livonia, Mich. 48154
VIII: Wm. A. Knost, 6914 E. Admiral Pl., Tulsa, Okla.
IX: Loren Tregellas, 3003 S. Everett, Wichita, Kans.
X: G. E. Nelson, 121 Medinah Pl., San Ramon, Calif. 94583
XI: R. Brooke, 3431 S. 194th, Seattle, Wash. 98188.



HOW TO USE THIS AMA DIRECTORY

Over 150 AMA members serve as volunteers on various committees which determine operating policies of Academy activities — many are listed here. Members are invited to communicate their comments, suggestions, proposals, or complaints by writing to the appropriate committee at any time. Note that the Executive Council and Associate Vice Presidents represent area interests for general AMA policy matters. Wherever district numbers are shown, write to the nearest address for your area. It is recommended that a copy of any correspondence be sent also to AMA Headquarters.

ASSOCIATE VICE PRESIDENTS:

I: J. Ross, 19 Sterling Dr., Dover, Mass. 02030
II: A. Schroeder, 18 Spencer Rd., Glen Ridge, N.J.; J. Moynihan, 123 Evergreen Dr., Tonawanda, N. Y.
III: R. DeLaVeaux, 1316 Gilham, Philadelphia, Pa.; R. Pennetti, 3918 Brandon Rd., Pittsburgh, Pa.; A. Seidowski, 21460 Sheldon Rd., Brookpark, O.
IV: T. Baker, 406 Hawthorne Rd., Kings Mtn., N. C.
V: F. Schwartz, 2400 West End Ave., Nashville, Tenn. Jerry Wagner, 274 E. 9th St., Hialeah, Fla.
VI: J. Blum, 2417 Glen Pl., Granite City, Ill. 62040
VII: F. Morrissey, 14100 W. Park Ave., New Berlin, Wisc. 53151
VIII: B. Kurtz, 6127 Henderson Ave., Shreveport, La.
IX: J. Kelly, 7020 E. Colfax, Denver, Colo. 80220
X: E. Cantrall, 863 Murray Dr., Honolulu, Hawaii

PRESIDENTIAL ASSISTANTS:

RC: M. Woods, 1721 Kingsbury Ln., Okla. City, Okla.
FF: J. Pond, 4135 Avati Ave., San Diego, Calif. 92117
CL:
Safety Committee: E. Henry, Chmn., 9154 Severin Dr., Berkeley, Mo. 63134
Junior Committee: R. Lopshire, Chmn., Box 107, R. D. No. 2, Cochranville, Pa. 19330

NATIONALS EXECUTIVE COMMITTEE:

J. Clemens, 1905 Greenville, Dallas, Tex. 75206
R. Morgan, School for Vet Children, Scotland, Pa.
J. Patton, Route #5, Frederick, Md. 21701
L. Peters, 3025 Hillglen Rd., Dallas, Tex. 75228
E. Shipe, 729 Falcon Way, Livermore, Calif. 94550
P. Sotich, 3851 W. 62nd Pl., Chicago, Ill. 60629
E. Witt, Longview Trailer Ct., R. D. No. 3, Chambersburg, Pa. 17201
J. Worth, c/o AMA Hq., 1239 Vermont Ave., N.W., Washington, D. C. 20005

FAI CIAM REPRESENTATIVES

Coordinator: M. Hill, 2001 Norvale Rd., Silver Spring, Md., 20906.
RC: J. Patton, Route #5, Frederick, Md. 21701
CL: S. Wooley, 821 4th St., Marietta, O. 45750
FF: D. Linstrum, 12 Holcomb St., Simsbury, Conn.
Scale: L. Weber, P. O. Box 355, Rio Vista, Calif.
Rockets: G. H. Stine, 127 Bickford Ln., New Canaan, Conn. 06840

FAI PROGRAM ADMINISTRATORS:

CL: L. Jackson, 5231 Meadowbrook, St. Davids, Pa.
FF: D. Linstrum, 12 Holcomb St., Simsbury, Conn.
Ind: C. Mather, 3880 Echochee Ave., San Diego, Calif.
RC: T. Rankin, Team Selection Comm. Chmn., 10317 Crestmoor Dr., Silver Spring, Md. 20901

RC FREQUENCY COMMITTEE:

W. Good, 9802 Parkwood Dr., Bethesda, Md. 20014
E. Lorenz, 69 Colburn Dr., Poughkeepsie, N. Y. 12603
H. McEntee, 490 Fairfield Ave., Ridgewood, N. J.
J. Phelps, 1 Foxberry Ln., Liverpool, N. Y. 13088
P. Runge, 1107 Main St., Higginsville, Mo. 64037

Fly Safely!
Follow AMA Rules

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

April 4-5 — Sebring, Fla. (AAA) Florida FF & CL State Championships. Site: Sebring Air Terminal. J. Kloth CD, 3932 Yardley Ave. N., St. Petersburg, Fla. 33713.

April 11-12 — Taft, Calif. (AA) SHOC FF Annual. Site: Gardner Field. J. Tischler CD, 1306 King Court Dr., Anaheim, Calif. 92804. Sponsor: **Sky Hoppers of Orange County.**

April 11-12 — Asheville, N. C. (AA) Southern States Championship RC Pylon Races. Site: Old Asheville-Hendersonville Airport. V. Helms CD, 800 Tyvola Rd., Charlotte, N. C. 28210.

April 25-26 — Tacoma, Wash. (AA) Third Annual Spring RC Contest. Site: Mt. Rainier RC Society Field. B. Gale CD, 811 9th Ave., S. W., Puyallup, Wash. 98371. Sponsor: **Mt. Rainier RC Society.**

April 26 — Creve Coeur, Mo. Spirits "Fly for Fun Meet." Site: Spirits Field. T. McGinnis CD, 7491 Amherst, University City, Mo. 63130. Sponsor: **Spirits of St. Louis RC Club.**

April 26 — Daytona Beach, Fla. (AAA) Daytona Eagle-Beagle CL Meet. Site: Embry Riddle Campus (Air Port). H. Lambert CD, 1312 Golfview Dr., Daytona Beach, Fla. 32014. Sponsor: **Embry Riddle Model Airplane Club.**

April 26 — Taft, Calif. (AA) Califas A11 FAI FF Annual Meet. Site: Gardner Field. E. Beach CD, 1015 N. Sage, Rialto, Calif. 92370. Sponsor: **Califas Club.**

April 26 — Odessa, Tex. Odessa Prop Busters RC Club Fun Fly. Site: Buzz Hurt Ranch. S. Hood CD, Box 6622, Odessa, Tex. 79760. Sponsor: **Odessa Prop Busters RC Club.**

May 2-3 — Taft, Calif. (AAA) West Coast FF Championships. Site: Gardner Field. B. Fallon CD, 2667 61st St., Sacramento, Calif. 95817. Sponsor: **Capitol Condors & Oakland Cloud Dusters.**

May 2-3 — Greensboro, N. C. (AA) 1st Annual Greensboro RC Meet. Site: Greensboro Radio Modelers flying site. B. Johnson CD, 4139 Sheridan Rd., Greensboro, N. C. 27405. Sponsor: **Greensboro Radio Modelers Club.**

May 3 — Council Bluffs, Iowa (AA) Mid-Western Spring CL Warm-up. Site: Iowa School for the Deaf. J. Dreier CD, 1918 Avenue R, Council Bluffs, Iowa 51501. Sponsor: **Balsa Busters.**

May 3 — Dallas, Tex. (AA) CMC Spring FF Annual. Site: Preston Rd., N. C. Hornbeck CD, 3506 Duchess Trail, Dallas, Tex. 75229. Sponsor: **Cliff Cloud Climbers of Dallas.**

May 3 — Wichita, Kans. (AA) 3rd Annual Wichihawks Spring FF & CL Rally. Site: Wichita Modelers Council Field. J. Mason CD, 2214 So. Pinecrest, Wichita, Kans. 67218. Sponsor: **Wichihawks Model Airplane Club.**

May 9-10 — Monroe, N. C. (AA) N. C. Championship RC Scale Contest. Site: Monroe RC Club Airfield. V. Helms CD, 800 Tyvola Rd., Charlotte, N. C. 28210.

May 16-17 — San Antonio, Tex. (AA) 2nd Annual Alamo Regional RC Contest. Site: Hurt Airport. G. Aldrich CD, 3219 Shady Springs, San Antonio, Tex. 78230. Sponsor: **Alamo RC Society.**

May 16-17 — Tulsa, Okla. (AA) Spring FF, CL & RC Rally. Site: Tulsa Glue Dobbers Field. W. Salnikov CD, Rt. 1, Box 130-C, Coweta, Okla. 74429. Sponsor: **Tulsa Glue Dobbers, Inc.**

May 16-17 — Jacksonville, Fla. (AAA) FF, CL & RC Rebel Rally. Site: White House Field. H. Pierce, Jr. CD, 208 W. Forsyth St., Jacksonville, Fla. 32202.

May 17 — Creve Coeur, Mo. Spirits Fly for Fun. Site: Spirits Field. R. Williams CD, 4060 Bondurante Dr., Bridgeton, Mo. 63044. Sponsor: **Spirits of St. Louis RC Club.**

Continued on page 86

SIG FIRST IN BALSA AND MODEL SUPPLIES

2 New SIG R/C kit designs

$8.95

$9.95

SIG 'AAA' BALSA — NEW PRICE LIST

SHEETS

36" LENGTHS

1/32 x 2	20c
1/16 x 2	23c
3/32 x 2	26c
1/8 x 2	31c
3/16 x 2	36c
1/4 x 2	46c
3/8 x 2	52c
1/32 x 3	32c
1/16 x 3	32c
3/32 x 3	40c
1/8 x 3	45c
3/16 x 3	54c
1/4 x 3	72c
3/8 x 3	85c
1/32 x 4	45c
1/16 x 4	45c
3/32 x 4	49c
1/8 x 4	63c
3/16 x 4	72c
1/4 x 4	80c
3/8 x 4	1.08
1/32 x 6	98c
1/16 x 6	98c
3/32 x 6	1.12
1/8 x 6	1.17
3/16 x 6	1.26
1/4 x 6	1.40
3/8 x 6	1.70
1/32 x 8	1.25
1/16 x 8	1.25
3/32 x 8	1.35
1/8 x 8	1.40
3/16 x 8	1.55
1/4 x 8	1.75
3/8 x 8	1.95

48" LENGTHS

1/32 x 3	43c
1/16 x 3	43c
3/32 x 3	54c
1/8 x 3	60c
3/16 x 3	72c
1/4 x 3	89c
3/8 x 3	1.24
1/16 x 4	62c
3/32 x 4	68c
1/8 x 4	80c
3/16 x 4	94c
1/4 x 4	1.05
3/8 x 4	1.38
1/16 x 6	1.35
3/32 x 6	1.46
1/8 x 6	1.56
3/16 x 6	1.68
1/4 x 6	1.87
3/8 x 6	2.20

36" LENGTHS

CONTEST 4-6 LB. STOCK

1/32 x 3	37c
1/16 x 3	37c
3/32 x 3	45c
1/8 x 3	50c
3/16 x 3	59c
1/4 x 3	78c
3/8 x 3	92c

C-GRAIN 8-12 LB. STOCK

1/32 x 2	26c
1/16 x 2	28c
3/32 x 2	31c
1/8 x 2	36c
3/16 x 2	46c
1/4 x 2	51c
3/8 x 2	57c
1/32 x 3	6c
1/16 x 3	36c
3/32 x 3	44c
1/8 x 3	49c
3/16 x 3	58c
1/4 x 3	76c
3/8 x 3	89c

V-H STOCK 12 LB. OR MORE

1/16 x 3	36c
3/32 x 3	44c
1/8 x 3	49c
3/16 x 3	58c
1/4 x 3	76c
3/8 x 3	89c

★ SECOND GRADE SHEETS

36" LENGTHS

1/32 x 3	18c
1/16 x 3	18c
3/32 x 3	22c
1/8 x 3	25c
3/16 x 3	29c
1/4 x 3	38c
3/8 x 3	48c

PLANKS

36" LENGTHS

■ 1 SQ.	60c	1-1/2 x 3	2.20
1/2 x 2	85c	2 x 3	2.65
3/4 x 2	1.05	3 x 3	4.05
1 x 2	1.26	1 x 4	1.75
1-1/2 x 2	1.50	1-1/2 x 4	2.95
2 x 2	1.75	2 x 4	3.55
1/2 x 3	1.08	3 x 4	5.35
3/4 x 3	1.62	1/2 x 6	2.56
1 x 3	1.75	3/4 x 6	2.95
1-1/2 x 3	2.65	1 x 6	3.45
2 x 3	4.05	1-1/2 x 6	4.75
3 x 3	4.25	2 x 6	5.50
1/2 x 4	1.75	3 x 6	7.00
3/4 x 4	2.00	1/2 x 8	2.80
1 x 4	2.25	3/4 x 8	3.50
1-1/2 x 4	2.95	1 x 8	4.50
2 x 4	3.55	1-1/2 x 8	5.25
3 x 4	5.35	2 x 8	6.50
1/2 x 6	2.56	3 x 8	9.25

BLOCKS

3" LENGTHS

■ 1 SQ.	6c
1 x 2	12c
2 x 2	16c
1 x 3	16c
2 x 3	23c
3 x 3	38c

6" LENGTHS

■ 1 SQ.	12c
1/2 x 2	14c
3/4 x 2	18c
1 x 2	22c
1-1/2 x 2	26c
2 x 2	30c
1/2 x 3	25c
3/4 x 3	28c
1 x 3	31c
1-1/2 x 3	38c
2 x 3	42c
3 x 3	70c
1/2 x 4	30c
3/4 x 4	34c
1 x 4	40c
1-1/2 x 4	52c
2 x 4	62c
3 x 4	90c
1/2 x 6	44c
3/4 x 6	50c
1 x 6	59c
1-1/2 x 6	82c
2 x 6	92c
3 x 6	1.35

12" LENGTHS

■ 1 SQ.	22c
1/2 x 2	28c
3/4 x 2	35c
1 x 2	42c
1-1/2 x 2	50c
2 x 2	60c
1/2 x 3	38c
3/4 x 3	54c
1 x 3	60c
1-1/2 x 3	74c
2 x 3	89c
3 x 3	1.35
1/2 x 4	59c
3/4 x 4	67c
1 x 4	80c
1-1/2 x 4	99c
2 x 4	1.20
3 x 4	1.79
1/2 x 6	86c
3/4 x 6	99c
1 x 6	1.15
1-1/2 x 6	1.60
2 x 6	1.84
3 x 6	2.68
1/2 x 8	94c
3/4 x 8	1.17
1 x 8	1.50
1-1/2 x 8	1.75
2 x 8	2.16
3 x 8	3.10

18" LENGTHS

■ 1 SQ.	31c
1 x 2	63c
2 x 2	90c
1 x 3	97c
2 x 3	1.35
3 x 3	2.03
1 x 4	1.18
2 x 4	1.80
3 x 4	2.70
1 x 6	1.73
2 x 6	2.75
3 x 6	4.00
1 x 8	2.25
2 x 8	3.25
3 x 8	4.85

24" LENGTHS

■ 1 SQ.	44c
1 x 2	84c
2 x 2	1.20
1 x 3	1.20
2 x 3	1.80
3 x 3	2.75
1 x 4	1.58
2 x 4	2.40
3 x 4	3.58
1 x 6	2.30
2 x 6	3.65
3 x 6	5.36
1 x 8	3.00
2 x 8	4.30
3 x 8	6.20

SHAPED L.E.

3/8 x 1/2	28c
1/2 x 1/2	32c
3/4 x 3/4	50c
1 x 1	72c

SHAPED T.E.

1/8 x 1/2	17c
3/16 x 3/4	20c
1/4 x 1	26c
5/16 x 1-1/4	31c

TRIANGULAR CUT

1/4 SIDES(X)	17c
3/8 SIDES(X)	22c
1/2 SIDES(X)	26c
3/4 SIDES(X)	36c
1 SIDES(X)	48c

NEW BALSA ADDITIONS

SHEETS — 36" LENGTHS

1/32 x 3 x 36	50c		
1/20 x 3 x 36	32c	5/16 x 3 x 36	76c
TAPER CUT SHEETS (TO 1/16" EDGE)			
1/4 x 3 x 36	74c	1/4 x 4 x 36	82c
ROUNDED-EDGE PLANKING			
5/32 x 1/4 x 36 LENGTHS		8c EACH	
ROUNDED-EDGE (Aileron & Elevator)			
1/4 x 1 x 36	40c	1/4 x 2 x 36	55c
3/8 x 1 x 36	45c	3/8 x 2 x 36	65c
WING SKINS — 36" LENGTHS			
1/16 x 12 x 36	1.75	3/32 x 12 x 36	1.95

SIG SPRUCE

36" LENGTHS		48" LENGTHS	
1/16 x 1/8	5c	3/32 x 3/32	7c
1/16 x 3/16	6c	3/32 x 1/8	8c
1/16 x 1/4	7c	3/32 x 1/16	9c
3/32 x 3/32	5c	3/32 x 1/4	10c
3/32 x 1/8	6c	1/8 x 1/8	8c
3/32 x 3/16	7c	1/8 x 3/16	9c
3/32 x 1/4	6c	1/8 x 1/4	11c
1/8 x 1/8	6c	1/8 x 3/8	14c
1/8 x 3/16	7c	1/8 x 1/2	17c
1/8 x 1/4	8c	1/8 x 3/4	22c
1/8 x 3/8	10c	3/16 x 3/16	12c
1/8 x 1/2	13c	3/16 x 1/4	12c
1/8 x 3/4	17c	3/16 x 3/8	15c
3/16 x 3/16	9c	3/16 x 1/2	19c
3/16 x 1/4	9c	1/4 x 1/4	20c
3/16 x 3/8	11c	1/4 x 3/8	24c
3/16 x 1/2	14c	1/4 x 1/2	30c
1/4 x 1/4	15c	3/8 x 3/8	32c
1/4 x 3/8	18c		
1/4 x 1/2	22c	24" LENGTH	
3/8 x 3/8	24c	3/16 x 3/4	15c

LARGE BUNDLE OF ASSORTED STRIPS — "SHORTS" AND "SECONDS", 89c

BIRCH PLYWOOD

FINEST GRADE — FLAT SHEETS

12" LENGTHS		24" LENGTHS	
1/32 x 6	30c	1/16 x 12	1.20
1/16 x 6	35c	1/8 x 12	1.40
3/32 x 6	35c	3/16 x 12	1.60
1/8 x 6	40c	1/4 x 12	1.80
3/16 x 6	40c	48" LENGTHS	
1/4 x 6	45c		
1/32 x 12	50c	1/32 x 12	2.40
1/16 x 12	70c	1/16 x 12	2.80
3/32 x 12	70c	3/32 x 12	2.80
1/8 x 12	80c	1/8 x 12	3.20
3/16 x 12	80c	3/16 x 12	3.20
1/4 x 12	90c	1/4 x 12	3.60

SIG BASS WOOD

18" LENGTH SHEETS

1/16 x 2-1/2	15c	3/16 x 2-1/2	23c
3/32 x 2-1/2	17c	1/4 x 2-1/2	28c
1/8 x 2-1/2	19c	3/8 x 2-1/2	35c

BLOCKS

1/2 x 3/4 x 6	6c	3/4 x 2 x 6	14c
1/2 x 3/4 x 12	11c	3/4 x 2 x 12	27c
1/2 x 3/4 x 18	16c	3/4 x 2 x 18	40c
3/4 x 3/4 x 6	7c	3/4 x 3 x 6	19c
3/4 x 3/4 x 12	14c	3/4 x 3 x 12	37c
3/4 x 3/4 x 18	20c	3/4 x 3 x 18	55c
3/4 x 1 x 6	9c	3/4 x 4 x 6	24c
3/4 x 1 x 12	17c	3/4 x 4 x 12	47c
3/4 x 1 x 18	26c	3/4 x 4 x 18	70c

SIG BIRCH DOWELS

12" LENGTHS		36" LENGTHS	
1/8 dia.	3c	1/8 dia.	6c
3/16 dia.	4c	3/16 dia.	9c
1/4 dia.	5c	1/4 dia.	12c
5/16 dia.	5c	5/16 dia.	12c
3/8 dia.	6c	3/8 dia.	15c
1/2 dia.	7c	1/2 dia.	20c

1/16 dia. available in 12" lengths 2c

SIG DECAL PROOFER

MAKES ALL DECALS FUEL-PROOF & DURABLE (ONLY ONE COAT REQ.) 4 Oz. Jar, 59c 3 Oz. Spray, 59c

SIG MODEL PINS

#8	1/2 Long	#20	1-1/4 Long
#14	7/8 Long	#24	1-3/8 Long
#16	1 Long	#28	1-5/8 Long
#17	1-1/8 Long	#32	2 Long

Pkt. 15c 1/4 lb. $1.15 1 lb. $3.95

MODEL MAKER'S "T" PINT

Pkt 10c 1 oz box 39c 4 oz box $1.95

SIG RUBBER BANDS

#8	1/16 x 7/8	#62	1/4 x 2-1/2
#10	1/16 x 1-1/4	#64	1/4 x 3-1/2
#14	1/16 x 2	#84	1/2 x 3-1/2
#16	1/16 x 2-1/2	#105	3/8 x 5
#in	1/8 x 2	#107	5/8 x 7
#32	1/8 x 3	PACKETS 15c	

ALL SIZES AVAILABLE IN BULK AT: 1/4 lb. Pkg. $1.10 1 lb. Pkg. $3.95

SIG AIROLAC

OUR NEW HIGH-GLOSS CELLULOSE ACETATE BUTYRATE DOPE FEATURES TRIPLE-GROUND PIGMENTS FOR AN ULTRA-SMOOTH, GLASS-LIKE FINISH. IT'S FAST-FILLING & LEVELING — BLUSH-RESISTANT & FADE-PROOF. NOW AVAILABLE IN 15 COLORS:

Lt. Red · Medium Red · Gloss White · Lemon Yellow · Cub Yellow · Gray · Med. Blue · Dark Green · Gloss Black · Sky Blue · Brite Green · Brite Orange · Dark Blue · Brite Silver · Brite Gold

COLOR:	4 oz. 69c	8 oz. $1.19	
Pint $1.79	Qrt. $2.98	Gal. $8.95	
CLEAR:	4 oz. .89c	8 oz. 98c	
Pint $1.49	Qrt. $2.39	Gal. $7.19	
THINNER:	4 oz. 39c	8 oz. 59c	
Pint 98c	Qrt. $1.69	Gal. $4.39	

AIROLAC ALSO AVAILABLE IN PINT SPRAY CANS ($1.49) IN ALL COLORS

SIG CORE BOND

NEW CONTACT TYPE CEMENT FOR BONDING WOOD OR PLASTIC TO STYROFOAM. Pint $1.95 / Qt. $3.50

SIG DOPE BRUSHES

FINEST QUALITY CAMEL HAIR — IN TWO WIDTHS: 5/8" 25c 1" 29c

RAZOR PLANE

USES DOUBLE-EDGED BLADES $1.39

R/C FUEL TANKS

NEW SIG DESIGN HAS TWO-PIECE PLUG & LEAK-PROOF SCREW-CAP PLASTIC CONTAINER AND FLEXIBLE PICK-UP / NON-CORROSIVE BRASS TUBING. 4 oz. $1.05 6 oz. $1.15 8 oz. $1.25 12 oz. $1.40

PRESSURE FUEL PUMPS

FAST, EASY WAY TO FILL BIG FUEL TANKS. AVAILABLE IN: Quart $2.89 Half Gallon $3.19 / Gallon $3.49 Pump Only $2.39 / Primer Bottle 29c

COPPER WIRE

FOR BINDING C/LINES, L/GEAR 15c

SIG EPOXY

STRONGEST GLUE EVER DEVELOPED FOR THE MODELER / COMES IN 2 PARTS (A & B) — IN POLYETHELENE SQUEEZE BOTTLES, WITH SPECIAL NO-DRIP CAPS. 1-1/2 oz. pack 89c 3 oz. pack $1.39 12 oz. pack $3.95

SIG EPOXOLITE

NEW 2-PART EPOXY PUTTY / LIGHT AS BALSA & STRONG AS EPOXY / QUICK SETTING / EASY TO WORK / LONG SHELF LIFE / EXCELLENT BUTYRATE DOPE ADHESION / CAN BE CARVED, SAWN AND SANDED. 4 oz. Set $1.69 8 oz. Set $2.95

SIG NYLON SHEET

.010 THICK NYLON, MAKES 16 R/C OR C/L HINGES (3 x 4 SHEET). 25c

SIG CONTEST RUBBER

NEW "HIGH POWER" RUBBER STRIP. 1 LB. of 1/8" $5 1 LB. of 1/4" $5

SIG CELLULOID

.008 x 8 x 10 12c .015 x 8 x 10 30c

FLITE-FOAM

WHITE EXPANDED BEAD FOAM (1 lb PER CUBIC FOOT) 12" WIDE PLANKS

1x12 35c	1x36 90c	1x48 $1.20	
2x12 69c	2x36 $1.80	2x48 $2.40	
3x12 89c	3x36 $2.70	3x48 $3.60	

NEW CELASTIC

FANTASTIC NEW PLASTIC MATERIAL BECOMES SOFT AND PLIABLE WHEN DIPPED IN THINNER. MOLDS TO ANY SHAPE — CAN BE SANDED & DOPED. PERFECT FOR COWLINGS, FILLETING & REINFORCING. USES. 9 x 18 SHEETS: Light 85c / Heavy $1.00

WE HAVE NEARLY ALL MODEL AIRPLANE PRODUCTS ADVERTISED

SIG FOAM BOND

NEW CONTACT TYPE CEMENT FOR BONDING BALSA TO EXPANDED POLYSTYRENE / WILL NOT ATTACK FOAM / COLORLESS & STAINLESS PINT Can $1.25 QUART Can $1.95 THINNER: PINT Can 89c

SIG NYLON PUSHROD

COMPLETE WITH THREADED STUD & SERVO CONNECTOR, AVAIL. IN 2 SIZES: 30" Set 79c / 48" Set $1.25

BULK PUSHROD (10 Ft. Long): $1.49

PUSHROD STUDS (Set of Two): 10c

PUSHROD KEEPER (Set of Two): 25c

SIG SHEET NYLON

USE .010" THICKNESS FOR HINGE MATERIAL / 1/16" FOR BELLCRANKS, CONTROLHORN EXTENSIONS / 1/8" FOR HEAVY-DUTY BELLCRANKS AND BEARINGS / 4" PER SPECIAL NOSE BEARING BLOCKS AND OTHER ITEMS

.010 x 3 x 4	25c	1 16 x 2 x 4, 60c
1/8 x 2 x 4, 95c	1/4 x 1 x 4, $1.00	

SIG NYLON WING SCREWS

1/4-20 x 1"	Package of 4, 39c
1/4-20 x 1-1/2"	Package of 4, 49c
8-32 x 1"	Package of 4, 35c

SIG NYLON BUSHINGS

THREE SIZES NOW AVAILABLE — AT 15c PER PACKAGE. #4 #6 #8

SIG NYLON WASHERS

FOUR SIZES (Inter. Dia.) AVAILABLE AT 15c PER PACKAGE): 3/32" Dia. 1/8" Dia. / 5/32" Dia. / 3/16" Dia.

SIG NYLON ACCESSORIES

SERVO MOUNT, SCREWS, 4 for 29c
R/C 90° BELLCRANK (with bolt) 25c
R/C CONTROL HORNS (with bolts), IN LONG OR SHORT SIZES, 25c ea

SIG HARDWARE

BLIND MOUNTING NUTS, 4 per Pkg:

2-56 Size, 20c	3-48 Size, 20c
4-40 Size, 20c	6-32 Size, 25c

NUTS AND BOLTS, 4 each per Pkg:

2-56 x 3/8, 15c	4-40 x 1", 20c
2-48 x 2, 4, 15c	4-40 x 1-1/2, 20c
4-40 x 3/8, 15c	6-32 x 1-1/2, 25c

3/8" WOOD SCREWS, per Pkg., 15c IN THREE SIZES: #1 #2 #3

2-1/2" METAL C/L BELLCRANK, 15c
SPADE BOLTS, Package of 4 for 25c
J" Type BOLTS, Package of 4 for 25c

THREADED HARDWOOD BLOCKS, IN 2 SIZES, 25c Pair: 1 4-20 8-32

ENGINE MOUNT SCREWS, IN TWO SIZES, 6 for 15c: #4x1 2 #6x3 4

R/C LANDING GEAR (HARDWOOD) BLOCKS (PACKAGE OF TWO), 39c

R/C LINK, WITH 9" LONG ROD, 35c

R/C ROD COUPLERS, Pkg. of 4, 25c

AIRCRAFT TAPE, 1", 20c 2", 25c

1/2A C/L DACRON LINE (60') 25c

SOCKET HEAD SCREWS (PKG. OF 4 WITH WRENCH:

4-40 x 3/4", 49c			
6-32 x 1", 55c	8-32 x 1-1/2", 59c		

MASKING TAPE (12 FOOT), 15c PER ROLL: 1/8" 1/4" 3/8" 1/2"

HEATPROOF FUEL LINE: ABSOLUTELY HEAT AND FUEL PROOF — SUITABLE FOR ALL ENGINES (049 THRU .61). LARGE FUEL LINE (per foot), now 45c MEDIUM FUEL LINE (per ft), now 35c

SIG JAP TISSUE

PRE-WAR QUALITY JAPANESE TISSUE IN ORANGE, YELLOW, RED, WHITE, BLUE OR BLACK. 18 x 20 sheet 7c

BAMBOO PAPER

HEAVIER THAN OUR REGULAR JAP TISSUE — IN YELLOW, RED, WHITE, BLUE OR BLACK. 21 x 31 sheet 15c

SILKSPAN

OO WHITE: 19-1/2 x 24-1/2 sheet 5c
GM WHITE: 24 x 36 sheet .10c
SGM WHITE: 26-1/2 x 33-1/2 sheet 15c

SIGRAY

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May '70 AAM

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Meuser on F/F

the Fluid Mechanics of Drag," by A. H. Shapiro, published by Anchor Books. If you have any interest in things like why does roughening the surface increase the drag in some cases and decrease it in other cases it would pay you to look into it. It has dozens of photos showing, for example, what actually happens inside the boundary layer. There is a whole chapter on flow at low Reynolds number (small size, low speed) and, Man, that's where we live! Shapiro, a prominent aerodynamicist, has taken the trouble to lay the whole thing out in a clear, logical, non-mathematical, step-by-step fashion, punctuating each idea with a well-illustrated experiment. Still I venture there are many who call themselves aerodynamicists who would profit by reading it. And all for the paltry sum of $1.45. . . .

Need a Left-Handed Turbo-Encabulator?: Don't know where to buy one? That seems to be half the battle in free-flight — knowing where to buy some of the weirdo supplies we use. Like Dacron towlines, aluminized Mylar tape, small ball bearings, fiberglass fishrod blanks for Nordic tailbooms, special solders, goops, and gunks of all kinds. If you have any hot tips, send them in, I'll check them out and pass them along. FAI Model Supply's Ed Dolby tells me he now stocks Nordic booms and at my suggestion is looking into several other items. His new catalog is just off the press. . . .

Club publications: If your club puts out a newsletter containing anything that might be of interest to other modelers — building and flying tips, gadgets, plans, contest results, or whatever — would you kindly send a copy my way c/o this mag? I'd surely appreciate it. . . .

Old Trophies Never Die: Have 50 or a 100 old trophies in the attic? Wonder what to do with them? Here is a tip. We hear that race driver Sterling Moss is planning to melt down all of his solid silver trophies, and to re-cast them as a solid silver coffee table. But then again, what would a fellow do with a great big pot-metal and plastic coffee table?

Tenny on F/F

than 21:32. That is a tall order for 26' ceilings! Jiri Kalina also holds the Cat. II record at 26:40, Jim Richmond of Bensenville, Ill., holds Cat. III with 33:47 and Karl-Heinz Riecke of Germany has the Cat. IV mark at 45:40.

As this is being written, the indoor contest activity is just beginning to pick up around the country, only to taper off as the weather warms up. This writer has never been able to understand why indoor flying peaks in the winter. Certainly, outdoor models can't be flown enjoyably in winter, but you can't really appreciate indoor flying until your model drifts lazily around the gym on a warm summer evening about sundown. The models fly better, no one is anxiously waiting to play basketball in the site, and you are comfortably warm. Indoor sites can't be heated because of the drafts from the blowers, and each flier's "personal thermal" (warm air rising from body heat) increases air turbulence to upset the model's flight. Besides, the rubber motors lose about 40% of their power in the cold. Brrr!

Part of the increasing activity will be postal meets, where clubs in different parts of the country (or the world — there have been international postal meets!) agree to fly particular events and exchange results by mail. This livens up the local competition; no one knows who won until the mail is delivered, and the suspense is killing.

At first, indoor postals took place only be-

tween clubs with sites with similar ceiling heights. Later, members of N.I.M.A.S. (the National Indoor Model Airplane Society) developed proven "fudge factors" to equalize ceiling differences. The flight times from the lower ceiling are multiplied by this fudge factor and then matched against the times from the higher site. Fudge factors are figured thus:

Let C1 be the ceiling height of lower site and

Let C2 be ceiling height of the higher site; then:

HLG Fudge = C2/C1, and Fudge for rubber powered models = $\sqrt{C2/C1}$. The HLG factor should not be applied if it is greater than 1.5, since HLG performance is not a linear function of ceiling height.

Contest announcements are almost a lost cause in a column such as this: but if clubs hold regular flying sessions an attempt will be made to list a contact man. For example: Ken Kraemer, 3945 N. 41st St., Milwaukee, Wisc. 53216 and Tom Vallee, 444 Henryton So., Laurel, Md. 20810 can furnish information about regular sessions.

Broadhurst on F/F

the models will still get high. The thing to avoid at all costs is an overweight model, as climb and glide will suffer. If the power flyers are not downwind from the Wake and Nordic boys and can't piggyback, it will be really wild. Thermals come in all sizes and shapes in Albuquerque and it will not be easy to avoid the downers.

"Albuquerque's flying site, one of the best, is just outside the city limits. The site is bordered on one side by a towering mountain range that often times protects it from bad weather. However, the weather does cause strange things to happen. For instance, in the mornings there can be a bit of light wind as the slopes "drain" off. It may be that the usual early morning dead-air rounds won't be so dead!

"Thermals are a bit hard to pick because there are lots of little hillocks that create uneven heating and turbulence — breaking thermals off at irregular intervals. The mountains are just a couple of miles away and they add their bit to the problem. My guess is that the weather Labor Day Weekend will be beautiful. There will be periods of almost complete calm and short periods of gusty winds (you name it, and it will probably happen at least once during the three days).

"At the Semi's last September there were times of extreme turbulence at high levels, and ships with plenty of decalage and fairly thick airfoils handled it best. The ground will be almost bare with only a minimum amount of tiny scrub and short, dry grass. It'll be easy to spot a ship on the ground. Bikes are a great help, but there are plenty of trails for chasing by car. It's hard to imagine a better place to chase in the U. S.

"When we flew at the Albuquerque Semi's last year the wind was variable. As I remember, there wasn't a compass direction that wasn't utilized sometime during the day. (Our chasing distance varied from an extreme of about 1.5 miles to 150 feet!) Visibility was a problem, but if binoculars are used at the Finals it should be minimal. The problem is that ships have to have good visibility under a crazy-quilt of differing background. There'll be blue sky, light and dark mountains, dark horizon (sometimes models will be below the launching site), the multi-color backdrop of the distant city, and the perennial patchwork of all shades of clouds. There is hardly a color combination for models that will work under all of these conditions. Best bet is a lot of white on top of the wing to save the downhill "just-maxed" type of flight. Unfortunately, there is so much brightness reflected from

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No. 0102, Skyvan — Semi-scale twin 049-powered STOL transport. Simple construction, all-balsa. For C/L **$1.50**

No. 1191, Scimitar — Unusual-looking R/C stunter. High-speed maneuvers, clean tracking, 60 engines. Low-tail Rivets look. By Joe Foster. **$3**

No. 1192, Ryan Mailplane — Light, F/F, with plenty of details. For rubber indoor or outdoor. Plan has scale views. **$1.50**

No. 1193, Mig 21d — 40-powered C/L version of Russian fighter is fast, stable flyer. By Roland Baltes. **$2.50**

No. 1194, 1937 Gas Model — Half-size 049 copy of great old-timer. Has durability and easy-to-fly characteristics. Frank Ehling. **$2**

No. 1091, Halberstadt — Nearly scale R/C WW I fighter with semi-symmetrical 6' wings. 60-powered. Two-sheets. **$4**

No. 1093, Hooptee II — Record-holding rat-racer developed over years of competition. .40 engine. **$1.25**

No. 0791, Pusher Galore — Bill Hannan's all-sheet, rubber pusher for Tenderfoot. Looks like supersonic transport. **$.75**

No. 0894, Voltswagon — Trainer and stunter by Marsh for electric tether flying with slot-car motors. Plans for the pylon included. Great club activity. **$1.50**

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

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

No. 0992, Fouga Cyclone — Scale model of jet-assisted French sailplane, by Nick Ziroli. Gains altitude easily on 09 engine. A two-piece 7-ft wing. For R/C. **$3.50**

No. 0993, La Jollita — Profile 15-powered Goodyear C/L racer by James Kloth, fast, groovy. On mild fuel and engine does 85 mph. **$1.25**

No. 0891, Jungster — Realistic R/C stunter by Leake with swept midwing. 60 powered. Smooth maneuvers. Two sheets. **$3.50**

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**

No. 1181, Junkers D-1—Joe Tschirgi 1918 fighter, proportions for perfect R/C scale. .45 engine. Low-wing has 500 sq. in. **$2.50**

No. 1182, FAI Pussy Cat — On this FF, Earl Thompson used high thrustline, rear fin, clean lines to hurdle climb/transition gap. Hot .15. **$3.50**

No. 1281, Strato-Streak '68 — Frank Heeb's ½A F/F updated version of hottest gas model of 1941 era. Simple pylon, 275 sq. in. **$1.50**

No. 1282, Sky Mite — Small R/C multi by Hibbard has performance of larger craft. Foam and fiberglass. Span 52". Weight with 4-channel gear, 4 lbs. .19 to .35 engines. **$2.25**

No. 0191, Curtiss-Wright Jr.—Robert Hawkins transformed open-cockpit, pusher of thirties for single channel. First step into RC scale. Span 44". Use .049. **$2.50**

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. 0292, Dingus — Netzeband's C/L delta ideal non-scale carrier. For competition — fun to fly, durable trainer. 40 R/C engine. **$1.75**

No. 0391, El Cochino — Bob Morse conventional-design stunter. 57" low-wing. Can be extended 6" as R/C trainer. **$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. 0492, Biceps — Don Yearout's show Control-Line bipe spectacular performer. .60-powered, flies slow, maneuverable. Two sheets. **$4**

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

No. 0592, Messerschmitt Bf. 109E — R/C, semi-scale by Munninghoff. Mean look of efficient fighter. Two sheets. **$3.75**

No. 0593, Manta — Howard Kuhn's Boost Glider for model rockets easy to build from sheet. A winner. **$.75**

No. 0691, Jr. Sky Squire — R/C sport-trainer by Jess Krieser, .09 to .19. From Galloping Ghost to multi-digital proportional. Span 48" (416 sq. in.); 3 lbs. **$2.50**

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**

No. 0693, Mustang — Rabe's great near-scale C/L stunt. Flies pattern with ease. S.T. .40. Over 57". **$2**

No. 0792, Rivets — Speedy, responsive R/C. Owen Kampen design for .020. Adams Baby Actuator, rudder-only. **$1.75**

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No. A693, Sweeper — Windy Urtnowsky's giant, C/L stunter, 78" span. .60 up front. Many trim adjustment features. **$2.75**

No. A695, Lady Maxley — Brian Donn's A/2 Nordic towline. Davis 3 foil. Ritz construction. **$1.50**

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No. A692, Miracle Worker — John Blum's C/L trainer. Combat, carrier, stunt. Easy-to-build profile. .35 engine. **$1.50**

No. A694, Montana Duster — R/C Class-C stunter by Simon Dreese, semi-scale appearance. Foam wings, simplified assembly in 6 hrs. Two sheets. **$3.50**

No. 1291, Demon Delta—Fast, mild-stunting C/L for 35-45. Looks like modern fighter. Attract attention for demonstrations. By Jerry Farr. **$2.50**

No. 1292, Dolphin II—Czechoslovakian R/C for pusher, 09-15 mounted at rear under T-tail. Rudder/motor, good slope soarer. **$1.75**

No. 1293, A/Wonder — Simple all-balsa A-1 towliner by Bob Stalick. Ideal for beginners at towline events. **$1.50**

No. 0201, Cardboard Cutie — Inexpensive all cardboard C/L for Tenderfoot, 049. Two sheets. **$1.25**

No. 0202, Push-Air — For Brown's tiny CO_2 engine. Simple F/F by Ehling, like Curtiss-Wright Jr. **$.75**

No. 0203, Ole Tiger — Bob Morse's swift Formula I R/C of Bob Downey's famous racer. K&B 40. **$3.50**

No. 0204, Classical Gas — Haught's C/L stunt for 35, for flyers graduating from profiles. **$2**

No. 0205, Kestrel — Dave Boddington's delightful R/C rudder-only soarer with 02. **$1.50**

No. 0301, 1916 B&W — Biplane on floats was Boeing's first airplane. Beautiful R/C job by Francis Reynolds, uses a 60. Two sheets. **$4.50**

No. 0302, Bearcat — Al Rabe's stunt C/L was talk of the 1966 Nats. Aldrich customized ST 46. **$2.00**

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THIS MONTH'S PLANS

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Total: $

the city that a white wing can even be camouflaged if a model heads in that direction.

"To sum up, it will be a wide open meet and it will stay that way until the last round. It will pay to keep flying no matter how bad your score looks. Thermals will be wild and plentiful and piggybacking can backfire. A bunch of ships might be close together but some will go up while others come down. Best way to piggyback a power ship in good air is to launch downwind — if you can! The air near the ground will probably be more turbulent (because of the bare surfaces and little hillocks) so I would think that thermal-finding devices should be as high as possible to keep from giving false signals. I have a hunch that the Albuquerque Finals won't be settled by large strings of maxes, but by the best downdraft times. It's hard for me to imagine that anyone will manage 15 straight maxes.

"Finally, I just want to add that the Albuquerque bunch is among the finest modelers I have ever met. They are friendly, sincere, and are doing their utmost to make this a great meet."

Boss on C/L

enjoyment from the hobby is interesting others and getting them started properly. He is always ready and willing to help someone start an engine or launch a plane. He has taught countless youngsters the rudiments of control-line flying. But Dick even goes further.

He feels that the only way to get bystanders truly interested is to put a control-handle in their hands and let them fly. Once someone flys, the question of prop versus jet becomes minor. Dick has built a solid-wing trainer with a .15 engine for the smaller boys and a Ringmaster for the older ones. Whenever he sees a group of interested onlookers he gets one of these ships airborne and invites any and all to fly it. The results are gratifying since many of these boys go on to build their own plane and return to the field seeking further assistance from Dick.

In recognition of his unselfish service, Dick was recently presented with an award by his fellow members of the Forest Park Model Aeroplane Club at their first annual dinner-dance. (John H. Droesch, VP, Forest Park Model Aeroplane Club.). . . .

Stop wet-cell terminal corrosion: Bothered by corroded terminals on your 2-volt wet-cell batteries for starting engines? There's a spray-can product called "Anti Rust Wax," available from the Krylon Paint Company (Product No. 1321). When sprayed on clean battery terminals it will keep them bright and free from corrosion indefinitely. . . .

New wood filler: Looking for a better wood filler for small holes and fillets? Sears Roebuck's "Soft Wood Filler" is fine grained, has an acetone base, is neutral in color and sands easily. Drying time is normal. It has little shrinkage, takes paint well. The filler can be thinned easily to any desired consistancy by adding acetone. The filler costs about 20 cents, comes in 1½ oz. tubes. . . .

Large scale wheels: Builders of large, heavy scale models require wheels that will stand up under the punishment of rough landings, yet have proper scale appearance. Veco inflatable (3-3½") wheels provide the scale appearance, but are prone to blowing out on rough landings with ultra-heavy loads. Du-Bro wheels (no-bounce type) stand up under severe use, but do not have the real scale look due to the small nylon hub. To get both features in one wheel take the tires from Du-Bro, and the hubs from Veco. These wheels have been used successfully on planes in the 15-pound category.

Remove the hubs from both sets of wheels without puncturing the tires. Assemble the Du-Bro tire on the Veco hub by using two screw-drivers (or similar objects) in the same fashion that you would use tire irons for putting an automobile tire on its rim. When done you will have a set of wheels of good scale appearance that will last several seasons.

Lowe on R/C

to rudder and, in fact, led to a cartwheel on a touch-and-go due to overcontrolling. Marv's skis are installed so that the tail drags in the snow. The ships seem to take off and land very well with this rigging. The floats are rigidly installed as one would for flying off water. Marv also cautions that float-equipped models will experience a considerable change in flight characteristics and may have to be retrimmed in pitch. . . .

Contests and such: Had the good fortune to make the Second Annual Tangerine International R/C Championships in Orlando, Fla. While there I participated in a group discussion led by Jim Kirkland relative to ways and means to improve R/C operations at the NATS in '70. Guys like Jim Whitley, Art Schroeder, Don Coleman, Rod Chidgey, Walt Schoonard, Norm Page, Lou Penrod and others spoke out. The problem seems to be the basic desire to retain the open Nats entry philosophy of past years, coupled with the ever increasing number of contestants and added events. One profound observation offered by Jim Whitley was to make maximum use of the daylight hours. Let's not cut it off at 5:00 or 6:00 p.m. but go 'til dark, if necessary with civilian help (volunteers from contestants?).

This makes sense if use of the air station is possible during these hours since 3-4 more hours flying time can be gained. Another worthy idea suggested a gross screening or eliminations in the first day's flying to weed out those that are obviously not Nats contenders. This still permits any modeler to enter a Nats and get a few flights, but saves valuable time for the serious contenders. Most large contests appear to be going to some form of eliminations these days. This seems to be the only way of handling a large number of contestants, presuming that streamlined operations, short patterns and maximum use of flying time still don't solve the problem.

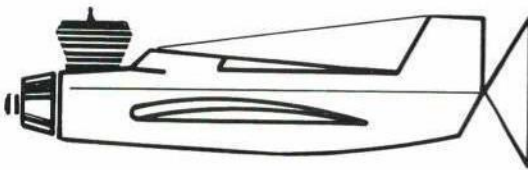
The streamlined operations bit can take some interesting forms such as used at last year's Masters at Atlanta. Here each contestant was assigned a time to fly and he cranked up and flew on time regardless of whether his predecessor was still in the air due to time overrun. Of course, with this possible flight overlapping a compatible frequency arrangement was made. This technique would appear useable only if tight schedules are maintained in the sense of contest management, i.e., getting flyers to line, rotation of judges, etc. One slip and the whole schedule is shot. Short patterns are becoming the thing these days. Possibly it is time to establish an AMA standard in this regard to preclude everyone doing his own thing.

One additional suggestion for Nats use was to fly pylon eliminations at a separate site such as done in California in '67. Such a site may be available in the Chicago Area. . . .

Talk about efficiency: Had a pleasant evening with Leon Shulman (manufacturers' rep extraordinary) and Bill Welker of World Engines. Leon talked of handling 150 contestants at their one day meet and providing five rounds of flying with a mixture of classes A, B, and C and scale. This was accomplished with a short pattern and no loss of time between flights. They have plans for even more efficiency in '70. Will report in detail on that later.

HOBBY PEOPLE

BRAND NEW 1970 MODELS



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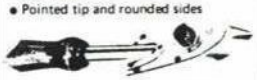

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Another unique facet of this contest was awarding prizes to all contestants — that's really a heck of a good idea if you can afford it. There's nothing like a little recognition to keep the novices and newcomers trying. It also helps take care of those poor guys who transition from A to B, B to C and CN to CE and get clobbered by the experts in these classes. It's particularly tough for a CN guy to step into CE and win anything for a long time — unless they are natural pros like Norm Page of Chicago. . . .

Trends: Just when contest aircraft designs seem to be shrinking due to lighter and smaller equipment, things happen that halt or reverse the trend. For example, the new vogue of retractable gears adds weight which must be accommodated by adding wing area to keep wing loading down or accept higher wing loadings and a handicap in some maneuvers. So we gain in lighter equipment weight and lose in the weight battle with more on-board equipment. For example, last year's average multi had around 600 sq. in. wing area. My Phoenix had about 620 as did Norm Page's Avenger and Tony Bonnetti's Trouble Maker. The Lanier Plastics have about the same area.

I noticed at the Orlando Tangerine meet that Norm has added about 50 sq. ins. to get loading down. I am also using a larger area of about 720 on the Phoenix now that I have retracts installed. It appears to me that the '69-size contest pattern ships are about the minimum in order to retain good aerodynamic characteristics (remember the Reynolds No. effect?), provide reasonable size for good visibility, and give a good wing loading considering the equipment we must install. Of course, we have seen much smaller pattern ships but I have yet to see one that flies the pattern as well as the larger variety. What do you say?

We are seeing evidence of deeper fuselages which probably are influenced by the European designs. A deep fuselage makes good aerodynamic sense in that it provides lift whenever the wings aren't level, if forced to an angle of attack. All roll maneuvers should be improved and more axial. Don Coleman has a new design which he calls "Crusader." It was flown to the best elimination score at the Tangerine Meet. This ship has a deep fuse and the rolls are outstanding. Don says, however, that the ship has a nasty habit of weathervaning when doing crosswind looping maneuvers. So it looks like you gain a little and lose a little. Any model design that we may come up with will never be the complete "answer" but will represent a good compromise considering all of the maneuver requirements. I would hate to think that a perfect design was possible because then all ships would look alike and wouldn't that be dull?

I would like to see some ambitious modeler take this deep fuse bit to the limit by building a model like some of our air-to-air missiles. These birds have equal-sized wings arranged in cruciform. They are flown by yawing or pitching to turn and are roll-stabilized (they do not normally roll to turn). What a crazy sensation it would be to fly a completely symmetrical model and not know which side is up! Boy, what knife-edge! Wow, what rolls! But gosh, what an ungainly landing gear!

The lighter side of things: A little humor keeps life rosy don't you think? The Imperial Aces of Pueblo, Colo., apparently think so, or at least their editor Joan Alyea. Their January issue of the "Imperial Aces" has a personality quiz — a portion of which follows:

Which of the following fits your personality?

1. *The Vain Flyer* — One who admits he flies better than Phil Kraft.
2. *The Amiable Flyer* — One who grins while he borrows your fuel.
3. *The Shy Flyer* — One who blushes when you tell him his elevator is hooked up backwards (nobody does this).
4. *The Impudent Flyer* — One who aims directly for your tool box when he lands.
5. *The Unfortunate Flyer* — One whose mistakes never show up until he is in the air.
6. *The Honest Flyer* — The one who admits he can't fly worth a darn (as opposed to number 1).
7. *The Dishonest Flyer* — One who hollers glitch or, who's on? when he prangs one.
8. *The Darn Mean Flyer* — One who flies the wings off his plane and then packs up and leaves when it's your turn to show off.
9. *The Sensitive Flyer* — One who cries when he prangs.
10. *The Prompt Flyer* — One who is in such

a hurry to fly he forgets to turn his switch on (no one has ever done that!).

If you are more than one of the above then you have a split personality!

Speaking of splitting; I will do just that for this month — keep those cards and letters coming in. Would appreciate it if you club newsletter editors would send a copy of your publications directly to me: Don Lowe, 5936 Clar-Von Drive, Dayton, Ohio. 45430.

McEntee on R/C

Second event was try at making as many loops as possible and land within 10 ft. of spot, all in three minutes. Abbott Lahti won with seven points (three loops and he was 6 ft. from spot). . . .

What's best glider covering?: To find out, members of the Tustin (Calif.) Model Club hand-glided a Cirrus from a spot 15 ft. above nearby level ground. One set of wings was silked with four coats clear dope, the other covered with Super-MonoKote. Latter wing was 2 ozs. heavier, due to extra internal bracing (doubtlessly the actual covering weight was less for this wing). Fifty flights were made with each set of wings. Total distance traveled for the silked wings was 27,928 ft.; with MonoKoted wings, the distance was 29,308 ft. Average distance of flights with silked wings, 558.56 ft.; with MonoKoted wings, 586.16 ft. Latter thus seems to show superiority. Dale Willoughby (Box 824, Tustin, Calif. 92680) points out the Cirrus was hand-glided some 10.8 miles for these tests!. . . .

East Coast R/C Soaring Society: Representatives of the Monmouth (N.J.) R/C Club, DC/RC (Dist. of Columbia area), Dover (Del.) Mosquitoes RCC, and Delaware RCC (Wilmington) met in Dec. to set up an Eastern glider organization. Each club will hold one open meet this season, probably in May, June, Aug. and Sept. Dick Sarpolus (32 Alameda Ct., Shrewsbury, N. J. 07701) was named Director of the Society.

Two classes have been set up in the rules for the forthcoming meets, which are based largely upon the new FAI R/C Glider competition rules. Class A will follow the FAI rules exactly; these allow maximum wing area of 2,325 sq. in. (this includes both wing and horizontal tail surfaces added) and 11 lbs. maximum weight. However, the FAI allows only 150-meter towline, and flight maximum of 6 min., a definite handicap to the large gliders quite prevalent in the East.

Therefore an added category, Class A modified, has been included in the ECRCSS rules; main changes will allow 300 meter towline and flight max. of 15 minutes. Also, these rules will allow up to 15 competitors to be airborne, if this can be done with no interference. Contact Dick for complete set of rules. . . .

R/C glider meet during Nats: As noted last issue, Chicago flyers have notified AMA of desire to run glider competition during Nats week. Sponsors will supply all manpower, prizes, furnish site (away from Glenview N.A.S.). Two classes available; Class A for gliders with 700 sq. in. area or less (add wing area to that of stab and elevators). Class B is for gliders totaling over 700 sq. in. Max. weight is 11 lbs.; max. area 16.146 sq. ft. Max. flight time will be 10 min., penalty for flights over 11 min. Spot landing points will be given. Launch by hand tow, Hi-Start or power winch; max. unstretched towline length will be 492 ft. For further rules info, contact Dave Burt (3048 Central Ave., Evanston, Ill. 60201). . . .

Make drums sturdy! Few glider flyers realize the tremendous strain put on the cable drum of power winches. What we had thought was a very rugged drum collapsed at the DC/RC glider meet last Spring; don't forget, every turn of cord around that drum is under extreme tension — especially after

THE BIRD WANTS YOU!

"WHERE THE ACTION IS"

THE TEAMS OF EXPERTS

FREE-FLIGHT

BOB MEUSER is "General Correspondent for F/F." In addition, each month we will have one or two of the following "Specialist Correspondents": CHUCK BROADHURST on Power; BOB STALICK on Rubber and Glider; BUD TENNY on Indoor; and WALT MOONEY on Scale. The General Correspondent covers the overall of Free-Flight and Sport Flying. The specialists assist with ideas and dvelopments in their particular categories.

CONTROL-LINE

BILL BOSS is "General Correspondent for C/L." He will be supported by JOHNNY SMITH on FAI and Speed, including Racing Events; with JOHN BLUM on Carrier and Stunt. The General Correspondent will also cover Scale, Sport and Technical items.

RADIO-CONTROL

DON LOWE is "General Correspondent for R/C." He will be supplemented by the following specialists: HOWARD McENTEE on Gliders and FAI activities; FRED MARKS on Technical Items, including Electronics and Aerodynamics; CLAUDE McCULLOUGH on Scale; BOB MORSE covering Formula I and II and Open Pylon; GEORGE SIPOSS on R/C Model Car Racing and Sport; JIM MOYNIHAN ON R/C Boating. Again, the General Correspondent covers Sport and also Competition Pattern.

GET "WHERE THE ACTION IS"

This feature department is for you, the reader. AAM encourages YOU to submit to us ideas, photos, commentary, rules suggestions, questions, drawings, sketches, reports of your local meets, etc. Address your letter to one of the experts or a General Correspondent, c/o AAM's editor, 733 Fifteenth St., N.W., Washington, D.C. 20005. Letters will be reviewed and forwarded to the appropriate correspondent.

Every effort will be made to correspond with each reader who writes us. You and YOUR IDEAS ARE THE FOCUS AND SUBJECT MATTER of "Where the Action Is."

If your material is used, AAM will pay you for it. Whether it is an idea, a photo alone, or a photo used in conjunction with commentary, you will be paid $5.

towing aloft some of the 12-14 ft. monsters! Profiting from the trouble they noted with the DC/RC winch, members of Monmouth R/C Club made their drum super-strong — and it has held up fine so far.

Dick Sarpolus tells us they are not sure of engine power — may be from 1½ to 3 hp. Originally, they picked reduction ratio from engine to drum to produce about 25-30 mph speed of tow. Engine stalled when pulling Dick's huge King Kong aloft. Present setup has 2½-in. belt pulley on engine, 5-in. dia. on countershaft; chain from latter goes from 1¾-in. sprocket to 6-in. dia. Winding area on drum is 12 in. dia. Dick feels a "quick-change" arrangement might be helpful, for light and heavy gliders. This could easily be arranged, by use of variable ratio belt pulley on engine; check drive systems on small motor scooters for ideas.

McCullough on R/C

ness of 1/16" allowing alternate sizes to be telescoped. Being semi-flexible, it is especially useful for fleshing out wire landing gears to scale size and appearance. Long sections will have to be split lengthwise to fit over an already-bent gear but then can be welded back together again with Air-O-Cement. It is perfectly compatible with Air-O-Sheet and can be doped and sanded.

You can get various rings, flanges, caps, elbows and tees in white butyrate to go with the tubing and angles, channels, beams and square tubing in ABS plastic. Any number of scale features can be fashioned with combinations of these basic forms. Complete catalog for 50 cents from Plastruct, Inc., 1621 N. Indiana St., Los Angeles, Calif. 90063.

Yet another RR line that is invaluable for aircraft detailing is the variety of tiny bolts, nuts and washers in sizes from 00-90 up. Fine for assembling tiny parts, simulating landing gear details, framing canopies, etc. Being brass they are easily soldered to other metals. Note the eyebolts used on the operating rod of the agricultural dusting box shown in the accompanying photo, made by hammering the hex head of a 1-72 bolt flat and filing to shape.

Scale data sources: Photos from the files of the Navy may be obtained by addressing: Commanding Officer, Naval Photographic Center, Naval Station, Washington, D. C. 20390. Prices are 90 cents for 8 x 10 glossies and $1.10 for 35 mm. color transparencies, payment made in advance by check or money order. While requests are generally filled from your description of the subject matter desired, they also offer a search service for very specific requirements at a cost of $3.00 per hour. Only photos taken since Jan. 1, 1964 can be supplied since all negatives prior to that date have been turned over to the National Archives and Records Service.

Marks on R/C

erly, it can tell you if the transmitter is generating the proper RF amplitude, the position and movement of pulses, and the presence of all pulses required in the sequence (for digital sets). . . .

A letter received from Dan Potgieter, 412 Dermanent Bldg., Paul Kruger Street, Pretoria, South Africa, prompts a discussion on bridge amplifiers.

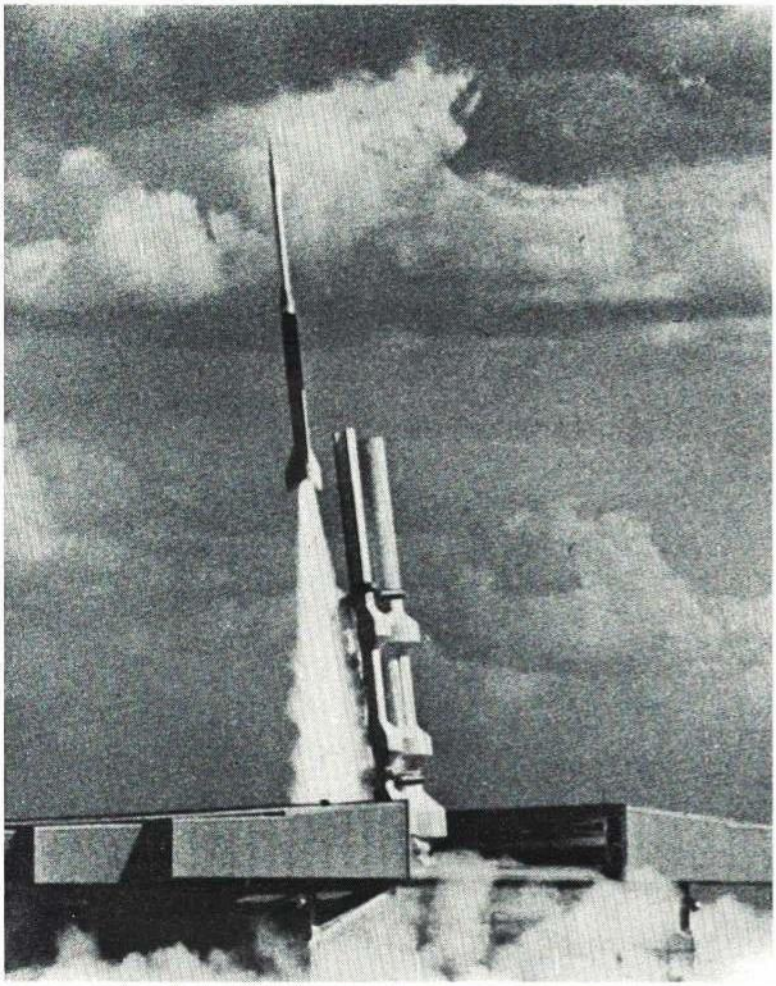
"I built the Versapulse Transmitter according to your instructions," states Dan. "I am using it at the moment for GG with an F&M 3-volt superhet single receiver and a RAND actuator. Perhaps the circuit (Fig. 2) will interest you. It eliminates the center-tap power supply.

"Unfortunately, I do not know the American equivalent of these transistors. They are Philips 2-ampere power transistors (germanium AC188/01 NPN and AC187 PNP). The 2.4-volt servo supply must be nickel-cadmium cells. I am using French Volta-blocs.

"I am constructing your P.O.D. driver circuit, having in mind a three-servo analog system as described by you — proportional rudder and elevator and trimmable throttle. My problem is the lockout of the other two servos while operating the throttle servo. According to your articles (June and April, 1969) this circuit and a suitable decoder and servo amplifier have appeared in the articles."

I verified the circuit shown in Fig. 2, using transistors available in the U. S., Amperex 2N2430 (NPN) and 2N2431 (PNP), and the circuit works well. For those who wish to tinker, the 150 ohm receiver-loading resistor will have to be optimized for your receiver. My tests were with an Ace Commander DE superhet and the value was 100 ohms. While Mr. Potgieter presumably used a separate 3V supply for his receiver, the tests run were with a common supply for receiver and servo so it will work that way.

The bridge amplifier is not new; a number of these have been designed. The Jan. '69 issue of AAM presented a bridge circuit by Don Dickerson. The RAND packs use bridge amplifiers. Certain of the digital designs use them although they are much more complex than that for pulse. The pulse amplifier of Fig. 2 is designed to be active on or off (alternately) at all times, while a digital amplifier is designed to move only on command. The advantages of the bridge amplifier are the use of two power wires instead of three and elimination of drift as the battery pack discharges. The disadvantage in the pulse application is that battery life is cut by more than half so heavier cells or shorter operation are necessary. In the digital system, the complexity of the amplifier is greater and troubleshooting is a little more difficult.



Siposs on R/C

has just completed the racing season. Bob lives at 5572 Stanford Ave., Garden Grove, Calif., 92641.

In the East, Robert Valyou, 42 High St., North Billerica, Mass., has an active club going, while Midwest man Dave Palmeter, 5728 Fontana Dr., Fort Wayne, Ind., looks after the club activities in the Chicago-Detroit-Ohio region. . . . Pacific Northwest has an active group going in Seattle: Bob Washburn, 1443 S. W. 116th St., Apt. B., Seattle, Wash., is the sparkplug.

As you can see, there's plenty of action. Just write to these fellows or directly to R.O.A.R., 2855 Velasco Lane, Costa Mesa, Calif., 92626, for information. Enclose a self-addressed stamped envelope and 25 cents to cover handling. These guys do this on their own time and, after each issue of AAM, they are swamped with requests which are fairly costly to handle. ROAR recently published a 3-page bulletin on the national racing rules for cars, tracks and sanctioned races. Your 25 cents will bring you the set of rules if you request them. . . .

If you really want to experience the thrills of racing you should, of course, build a car. The racing rules give you a guide for wheelbase, body style, etc. If you are handy with tools, all you have to purchase is a set of wheels, tires and clutch; the remainder can be fabricated. Most readers have a spare 19 engine kicking around. Simply mount a 2½-in. dia. aluminum disc on it for a heat-sink on the cylinder head. Make a chassis from fiberglass or tempered Masonite, make a simple suspension from 1/16-in. plate and piano wire, install two servos (mount the receiver and battery in foam rubber) and you are away. This will be a good first effort but not a car for racing. Get a good-quality, simple, rugged kit for a start. Don't make the mistake of going "full house" on your first try. As with your first R/C plane, rudder and throttle will do!

Important auxiliary equipment will be air filter for the carb intake, fuel filter for the gas line, a bumper up front and a throttle over-ride device to permit free revving without the radio. You should mount a rubber-faced wheel on a portable electric motor so that, by rubbing the bottom of the flywheel against it, the car's engine can be started easily. Sure beats the string used by the boat boys.

When you get to this stage you will have acquired the necessary equipment and skills to really enjoy the sport to its fullest. You now should join or form a club, have tech sessions, races, and all-around good fun.

If you have any questions please write to me c/o R.O.A.R., 2855 Velasco Lane, Costa Mesa, Calif., 92626, and don't forget the return stamp if you want a reply.

Escondido Mosquito

Continued from page 15

structed in a straightforward manner, it is important to work carefully and to bear in mind that the lighter your mosquito, the greater its duration. Since the plans are full size, you will be able to work directly over them, using a piece of waxed paper or clear plastic food wrap to protect the drawings from glue.

Wing: Select a light and straight piece of 1/16" sq. strip balsa. Usually, a search through a number of 1/16" sq. strips will reveal a few which are slightly undersize, and that size would be a good choice for this job. Additionally, the strip can be lightly sanded on all four sides to reduce the weight and remove the little hair-like fibers that may be present. The trick is to sand in one direction only, to avoid buckling the strip. Pin down the parts to the plan using straight pins. Do not pierce the wood, but rather angle the straight pins on both sides of each strip to hold it in place. Only a small amount of glue is needed at each joint.

When the wing structure has dried, cut the leading and trailing edges in the exact center, in order to allow one tip to be raised for dihedral purposes. This tip should be raised 1¾" above the building surface, and supported with a suitable block. Cover the wings on the top side only, using the lightest grade of tissue paper that you can obtain. Condenser paper is a good choice, since it is very thin and non-porous, but superfine Japanese tissue can be used instead. Do not shrink or dope the covering, since this might cause warping.

Wing mounts: Cut the wing mounts to

shape from fairly hard 1/32" sheet balsa. Note that the two mounts are different, to provide for an angle of incidence. These mounts also help to strengthen the wing dihedral joint.

Fuselage: Select a light but stiff section of 3/32 x 1/16" balsa for the fuselage. It is important that the material be rigid enough to resist "bowing" under the strain of a fully wound motor. Sand lightly, and notch for the 1/16"-sq. tail boom. Note that the tail boom is offset, as shown on the plan top view, to enable the model to fly in small circles. Glue this joint sparingly, since the angle may need to be slightly altered to suit your particular flying space limitations.

Metal parts: The propeller shaft and rubber motor rear hook are bent to shape using needle-nose pliers. Music wire of approximately .015 diameter will work well. The prop shaft bearing is made from aluminum or dural sheet stock, which is drilled to accept the prop shaft, then bent as indicated on the drawing. Roughen the portion of the aluminum where it contacts the fuselage, and glue in place. A few turns of sewing thread will greatly strengthen the joint. Glue and bind the rear wire hook in similar fashion.

Tailplanes: Glue the 1/16 x 1/32 x 3 1/4" balsa stabilizer leading edge onto a sheet of tissue paper. Allow a few moments for the adhesive to set, then trim the tissue to the triangular shape shown on the plan. This is easier than trying to glue the stick onto an already cut triangle of tissue. The rudder is constructed in the same way.

Glue the stab onto the lower side of the tail boom, using the plan top view as an alignment aid. Next, glue the rudder to the side of the tail boom.

Propeller: The prop hub is made from a medium-weight piece of 1/8"-sq. balsa strip. After cutting to length, mark the exact center of the hub, and carefully push a thin straight pin through it. Do this slowly, and try to keep the pin properly centered as viewed from the end and side of the hub, so that the finished prop will not wobble. Next, measure and mark off the portions of the hub which will be cut away to receive the prop blades. A diagonal line should be drawn on each end of the hub to serve as a guide for the depth and direction of each cut. It is safer to cut the wood away a little at a time, rather than trying to remove the entire corner at once.

The blades themselves are cut from 1/32" sheet balsa. Using a paper pattern as a template, make the two blades as nearly alike as possible, then carefully sand and slightly round the edges. When gluing the blades onto the hub, be sure to check that they are properly centered. After the glue has dried, place a thin wire through the prop-shaft hole, and check the propeller balance. One blade will probably swing to the bottom, indicating the need to be lightened. A little sanding should take care of the problem, and while absolute perfection is not required, the better the balance, the smoother will be the flights.

Slide the prop shaft through the fuselage shaft bearing, and add a glass "seed bead" for a thrust bearing. After inserting the shaft into the prop hub, bend the end of the shaft into a "U," using needle-nose pliers, and force the "U" into the front of the prop hub. Apply a film of glue over the area to keep the shaft in a secure position. A tiny drop of oil applied to the shaft will help reduce friction.

The wing may now be installed. The mounts should be a fairly snug fit on the fuselage, which will hold the wing in place, and yet permit wing shifts for balance purposes.

Power: This model requires only a very tiny amount of power, and in fact, too much power should be avoided. The exact power required will depend upon the weight of the finished model, but here are some suggestions for a start. If 1/24"-sq. rubber is available in your area hobby dealer's shop, give that a try. A single strand of it may prove adequate. Simply tie a loop in each end of the strand, or if you prefer, the loop

at each end may be secured with a couple of turns of sewing thread. Be sure to trim the loose ends of the rubber so that they will not rub against the fuselage, which wastes power.

Or, try a single strand cut from a common office-type rubber band. These vary widely in size and quality, so some experimenting will be needed. Another possibility is to slice your own thin rubber strand from a wider piece, using a sharp razor blade and a straight edge.

If your model turns out to be very light, you may wish to investigate the use of elastic shirring thread. This is the type of elastic used in the tops of socks, shorts, and similar wearing apparel. Again, size and quality varies from brand to brand, so do a little looking around. In the case of the tiny sizes of this substance, a single loop (two strands) may be needed to provide the right power.

Flying: After you have installed the rubber motor, try a gentle hand glide. Shift the wing slightly forward or rearward as required to achieve a gentle descent. Next, try a few turns of the prop, and launch again. If all goes well, try a few more winds and repeat. We prefer to fly our mosquitoes in quite small right-hand circles. In order to achieve this (assuming no warps), it may be necessary to add a *small* amount of ballast to the right wing tip. Although modeling clay is the accepted ballast material, it has a disadvantage, in that dropped pieces may become imbedded in the rug and cause stains. Needless to say, this does not go over too well with the lady of the house. As an alternative, try an artist's kneaded eraser, or typewriter cleaning dough. This material can be handled about like clay, but it will not stain rugs, etc., since it is non-greasy.

Remember to launch the model gently, with the propeller turning. It may also help to release the model in a slight right bank to give it a hint of what it is expected to do. If your flying area is fairly large, you may be able to fly in large diameter circles without needing wing tip ballast. On the other hand, if your flying site is unusually small, it may be necessary to offset the rudder still farther, and add additional wing-tip ballast. All of this can be determined during testing. If the model should happen to crash, the damage can be easily and quickly repaired. Remember, however, that the added weight of the glue required for repairs may bring about the need for re-trimming of the model.

With a little practice, you should find it quite easy to launch the model, watch it make several laps of the room, and have it return to your hand. This may be the answer for the fellows who like free flight, but don't want to chase models!

MATERIAL LIST

1 strip of 1/16" sq. balsa: wing parts, tail boom
1 small piece of 1/32" sheet balsa: tail leading edges, wing mounts, prop blades
1 small piece of 1/8" sq. balsa strip: prop hub
1 small piece of 1/16" sheet: fuselage; OR, 1 strip of balsa 1/8 x 1/16", cut down to 3/32 x 1/16"
1 small sheet of lightweight tissue or condenser paper: covering
1 piece of music wire approximately .015 dia.: prop shaft, rubber hook
1 glass "seed bead": thrust bearing
Sewing thread: binding purposes
1 small scrap thin aluminum sheet: prop-shaft bearing
Rubber strand for power (see text)
Modeling clay or artist's kneadable eraser: wing-tip ballast

TOOLS AND OTHER REQUIREMENTS

Single-edge razor blade or modeler's knife
Straight pins
Glue
Fine sandpaper
Needle-nose pliers

Royal Marine

Continued from page 38

ing, adhering to the water surface. But they must clear the water as soon as the plane gains speed, which can stabilize and lift up the hull. The position and the method of the attachment of wing tips are key points. Tip floats fixed too far to the outside harm the longitudinal stability and those fixed too much to the inside don't have the ability to recover from slanting attitude, when one of them dips into the water.

Attachment to the wing is the most difficult part. In earlier stages, I screwed them into the hardwood mount in the wing, but they were usually broken when the plane landed in a slanting attitude. As the result of repeated experiments, the material of the stays has been changed from wood to aluminum, and fittings from screws to rubber bands. The shocks are consequently absorbed by both the elasticity of rubber and bending of aluminum.

The section and structures are almost the same as the hull.

Mod Pod

Continued from page 31

be made very tight, to be followed by a dive, a swoop on past the flyer and can be repeated as slack is taken up on the other side. As fuel gets low, the line can be retrieved and the Mod-Pod can be scooted in for a nearby spot landing as the glide ends.

With practice, both right and left turns can be made, square and triangular patterns (Goodyear Tether-Power?) can be flown and even a guarded figure-8. Circling high overhead in a state of stable equilibrium, the Mod-Pod can be ignored while the flyer relaxes. Tethered thermal flight during the glide is feasible. The exhausting chase of free-flight is gone. The "hairy" first flights of U-control and the problem of dizziness are eliminated. A taste of remote-control flight is inexpensively enjoyed, and as budget permits, the Mod-Pod can be readily expanded to true radio-control.

The molded pod: Most builders will find this easy and may want to make some extra pods for the small fry who can't. Four basic steps are involved: 1) A solid wood pod is carved in two halves; 2) Female molds are made over the plugs (pod halves); 3) Parts are made in the molds; 4) Parts are joined.

Sig, Ace and Hobbypoxy handle molding materials and your dealer can probably supply you. Sig's little fiberglassing kit contains what is needed, except for some heavier cloth — 4- to 6-oz. weight.

Step 1: Obtain a pair of wood blocks suitable for carving, measuring 1 1/8 x 4 x 20". Join temporarily with a few spots of glue. Draw the pod profile on the block and cut out with a bandsaw. Note the area where engine sets, is an important reference line and must be left flat. Work to shape with a small plane and sanding block. Separate the halves and bevel the saddle to the dihedral angle. Fine sand and seal with a coat of epoxy glue. Gently scrape and fine sand. Mount plugs on a flat surface and coat with release agent.

Step 2: Reference to the Sky Mite article in the Dec. '68 AAM will help in this and following steps. Start female mold with a layer of light cloth such as the Sig, following with additional layers of heavier to build up rigidity. When cured, remove plugs. Fill and smooth any imperfections with Sig Epoxolite.

Step 3: Apply release agent. Again starting with lightweight cloth, form the pod halves in the molds. Add cloth layers to build up an overall thickness of about 3/64" and add additional cloth where wing retaining wires go. When cured, cut excess off flush with mold edges and pry out the pod

"Timer, are you ready? I think I feel one now."

halves from the molds.

Step 4: Fit together with masking tape. Seam with strips of cloth and resin. Put an extra layer of cloth where the engine sets. Place the 3/16" ply plate above where the front wing wire goes. Fill and smooth surface imperfections. Drill wing-wire holes and secure wires with Epoxolite. Hobbypoxy paint will finish beautifully.

The hollow fiberglass arrowshaft boom: If R/C is planned, the rod should have an inside diameter of ¼" which will commonly be 19/64" outside. This gives needed rigidity and space for linkages. Check arrowshafts or blanks at sporting goods and archery outlets. The common Nemo or Crawford pushrods are usually smaller in diameter. Note that rod is cut shorter for digital proportional pushrod installations.

Plastic spine tail piece supports: These are found at stationery stores, usually on glassine covers. Look for those with a ⅛" wide opening and flat sides to best fit the sheet-balsa surfaces. Rough up for better adhesion. Scrape off any finish on the boom. Lay Saran Wrap on a flat surface. Smear epoxy on spines and secure to boom, in plane with each other, parallel to the axis of the rod and with a bit of dihedral. Position for maximum contact with rod; five-minute epoxy is good here. When cured, lay a single piece of fiberglass cloth across spines and rod bottom and secure with epoxy. When cured, invert assembly and attach fin spine, reinforcing remaining spine surfaces with a single piece of cloth on either side.

Attaching boom to pod: Drill a 1" length block of pine to tightly accept the rod. Work into a cone to fit the interior end of the pod. Make another for the exterior end. Slip the rod through the pod end and slip on inner cone. Invert pod and weight down so the engine mount reference area makes contact with the work surface. Prepare blocks to support the boom *absolutely parallel* to work surface.

In this next step, only cone is to be secured, so avoid getting adhesive on the boom. Put a couple of small dabs of epoxy or epoxy putty on the cone, and reposition boom as above with blocks. Eyeball for alignment along the pod. When cured, recheck alignments and if good, glob in adhesive to secure cone thoroughly with rod out. Position outer cone on rod to give proper tail moment. Permanently secure rod to inner cone.

Tail pieces: Cut parts from ⅛" sheet balsa, join and sand. If engines are to be used, fuel-proof with MonoKote covering, or the Hobbypoxy "Easy Does It" treatment. The spines will gradually lose tension, so surfaces must be secured with strips of MonoKote (sticky) or Citizen-Ship covering, placed to overlap on either surface. For non-R/C use, a trim tab is on the fin. For R/C use, the trim tab is used also, and hinges are made with above covering items. No trim tab is used on the elevator. Hinge one side only.

Engine mounts: Bases and uprights are joined with epoxy which fuel-proofs the mounts; .020 mounts have no upthrust. Others have upthrust as shown, used for R/C and free flight. Upthrust is removed for Tether-Power — later discussed. The 020 engines are screw-mounted to cheeks (pine, etc.). Other mounts have a 3/16" ply firewall containing 3-48 blind nuts. Firewall is secured to balsa cheeks with Celastic or glass cloth wrapped around.

When mount is finished, drill 3/32" holes in base front, 3/16" from edge. Position mount on pod, its rear at front of wing saddle. Mark pod where hole in base is and carefully drill a 3/32" hole here in pod. Use small round file to make a 5/16"-long slot, working rearwards. Enlarge rear portion of slot so head of 4-40 bolt will just go in. Screw bolt in under base with a gap that will snugly fit the slot when jammed forward. Remove mount and drill a 1/16" hole in base rear, securing a small plywood plate behind the upright if necessary. Attach engine and place mount in position and point engine straight forward without any side-thrust. Drill 1/16" hole into pod and 3/16" ply plate above retaining wire. Screw a 2-56 bolt into the base hole and enlarge hole in pod and ply, so this bolt, acting as a keying pin, will just slip into the hole.

The rear end may be secured with rubber bands, permitting rapid attach and detach, but if desired, a 4-40 bolt may be used with nut, to more firmly secure the mount. On the prototypes, side-thrust was never needed, even when the ships were trimmed for a bit of left turn in the glide. The Pee-Wee mount was found to be suited for both free flight and Tether-Power, as is. How-

ever, with larger engines on Tether-Power, it was found necessary to remove *all* upthrust by blocking up the rear of the mount. For this purpose a wood block may be prepared, a hole in its top and a 2-56 pin in its bottom.

Wing: Fiberglass spars (¼" Crawford pushrod) joined with a dihedral brace made of a common nail, yield a wing that stands almost any flight stress, and weight with MonoKote is only about 6½ ozs. Ribs are easy to cut if a birch ply template is made first. Work a ¼" hole in it, and sharpen a bit of the rod as a cutter. Insert in the template hole, press and twist to cut holes in balsa.

The center section is 1" balsa block which supports the fiberglass spars. No sheeting, multiple bracing, etc. is needed. The hole in the block is marked with the template and must be cut with its axis parallel to the top and bottom. Sand in the bevels and then carve to airfoil shape. Find a nail to snugly fit the rods. Lay across an open vise and bang in the angle as you hold a sharp object, such as an old triangular file, in the center. Slip blocks on rods and insert the brace. Make sure blocks will properly align with each other, and then epoxy rods to the blocks. Slip ribs on rods, without adhesive.

Prepare and add leading and trailing edges and extreme tips. Secure the thin nylon tab (piece of hinge material) in the left tip for use with Tether-Power flight. Join panels with epoxy using the dihedral brace. The "inboard aileron" used in Tether-Power flight, is attached to the covered wing with Scotch Tape. That shown on the plans, bent at a 45-degree angle, was adequate to offset line drag, but in individual instances, a larger area may be required. These are easily made from thin plastic or cardboard.

Tow hooks: Optimum tow position is found by trial. A temporary, external tow hook, can be stuck to the pod with servo mounting tape and will hold a few times on hi-start. Start at 1" rearward of the leading edge. If plane stalls, move hook forward. If climb is too shallow, move rearwards. On the electric winch, due to additional airspeed, the hook position can be further back and it will climb at about a 70-degree angle. A permanent hook may be secured from inside to avoid damage in landings, and is accessible through a slot cut in the pod that permits the ring to drop off. A small split ring used for fishing ties easily to the monofilament line.

Hi-start catapult device: Join 200 ft. of 6- or 8-lb. test monofilament line to 50 ft. of ¼" flat rubber. Put a small split ring on the line end and make a loop in the rubber end. Tie a piece of colored cloth 2 ft. from the ring. Secure rubber to ground with a stake, large nail or screwdriver. This will catapult the bare airframe. For R/C applications, double or triple the lengths of line and rubber and use extra rubber, doubled up for increased power. The rubber can be made in a large loop.

R/C installation: Bases of 3/32" ply are individually fitted to support servos or actuators in proper position. Secure to the pod sides with cloth and resin. Switches mount to the pod. Receiver and batteries are wrapped in foam and stuffed forward in the pod. The Mod-Pod is easily set up for rudder-only with the Commander outfits using a torque rod of 045 music wire, as indicated. A 1 ¼"-sq. base of 1/16" ply is secured under the bolt head on the Adams actuator. This base is then attached to the main base with small screws.

The torque rod is supported on either end of the boom with a bushing of dowel or plastic. Make a little doughnut-shaped

keeper from nylon to place on either end to keep the torque rod from shifting horizontally. Shape the forward end of the torque rod first, and slip through the boom. Then bend in the right angle to go into the wire loop on the rudder. Servos can be secured with servo mounting tape. The link to the elevator (which is hinged on one side only) may be a length of wire. The link to the rudder is the inner tube of Nyrod, using threaded rods on either end. Trim is adjusted by moving the tail pieces in the spines once the links have been attached. Note in photos and plans how the pushrods are routed and bent to tie servo to moving surfaces.

Flight Preparation

Balancing for optimum glide: The airfoil is stable over a wide range of CG positions and optimum glide is achieved solely through balance. With the engine mount off, add shot to balance at 50% of chord as a starter. Two or three ounces may be needed. Glide will be surprisingly flat and faster than you expect. You should get 80 to 100 ft. on the bare airframe in a hand glide. When you have achieved the best glide, remove the wing, invert the plane and balance on a straight edge. Mark the point of balance with a notch on the saddle edge. Add engine mount and remove shot to balance here. Keep this shot in a special container so you have it handy to switch from powered to non-powered flight. In all modes of flight, this single point of balance will assure optimum glide. Check frequently for warps, as well as at the outset, as this will effect performance.

Initial Flights

Hand-launch games without engine or radio: Almost everyone knows about playing "catch" with a ball. "Mod-Pod Catch" consists of tossing a Mod-Pod back and forth among two or more flyers. Surprising distances can be achieved in a straight line, especially with a little extra ballast and extra zip in the toss. Flyers at the bases on a baseball diamond will be able to get it from base to base. A skilled launcher at first can heave it in a steep bank toward second, and get it to a flyer at third, in a maneuver called "Around the Barn." At closer ranges, the Mod-Pod can be streaked from flyer to flyer in a form of "Hot Pepper" — ouch, that stings! A skilled launcher can put his Mod-Pod into a full circle and catch it himself while still airborne — boomerang! Somebody out there will think about it and come up with a new game — "Mod-Pod Baseball" — played with two teams of flyers on a baseball diamond. Two or more flyers, with one or more Mod-Pods, can compete for maximum distance, duration, precision spot landings, and in simultaneous tosses, can race to a given finish line at a given starting signal.

Towing by hand: Good results depend on proper tow-hook position and technique. Use a monofilament line setup, as for the hi-start. Have a friend hold the ship, pointing it slightly up. Run hard to get it going, and when altitude is achieved, gradually slow down so ship can assume a normal glide attitude. Trim for gentle turn. Fly in calm air.

Catapulting with the hi-start: The ship should be trimmed for a very gentle turn and launched in a direction slightly opposite to that of the turn. The line dimensions suggested will easily put the bare airframe to 150 to 200 ft., fully stretched out. For R/C, longer lines and stronger elastic will boost the ship to several hundred feet.

Free flight with the engine mounts: No side-thrust was needed on the prototypes, but it will be wise to take the usual precautions of first flying with the engine fourcycling (running very rich) and with small amounts of fuel. Should thrust changes be indicated, shim engine with washers. Trim ship for gentle left turn in the glide. On the Pee-Wee, 150 to 200 ft. will be attained, but on larger engines, it may be 1000 ft. or more on a full tank. Since there is no provision for dethermalizing, it will be wise to fly in dead air.

Tether-Power — The Brand New Ball Game: Reread the first part of this article. Use a spinning outfit that will hold 150 yards or more of 6- to 8-lb. test line. Balance the ship for glide with the inboard aileron off. Trim ship for straight glide. Attach the aileron. Secure the line to wing with a snap swivel. Remove all twist in line. *With larger engines, you must jack up the rear of the mount to remove all upthrust, or the plane will not be controllable.* Use a Cox 5-4 prop, such as the new gray plastic. When starting with larger engines, attach 20 ft. of 2"-wide crepe paper to the fin to slow it down until you gain experience, and remove it bit by bit. Use small amounts of fuel at first. Use about 40 ft. of line at first, and leave bail open on reel. Just hold line tightly in your hand. When launched, have your crewman put it in straight and level flight. When aileron and thrust are in proper adjustment, the ship will hold in a circle with no tendency to turn in, and no tendency to climb until airspeed builds way up, or line is freely let out. Learn by doing.

Radio controlled flight: This is easiest of all since the plane is controlled. Balance and hand glide. Without power, you can use hi-start, electric winch or slope wind to get airborne. With engines (049's, etc.), give it a mighty heave and fly. Make any indicated adjustments in balance, trim and thrust. Happiness is Mod-Podding.

Phantom

Continued from page 45

the RF-4B and RF-4C at 62' 11.2", and the F-4E at 62' 11.8". Height for the early F-4B was 15' 10.6"; for the RF-4B 16' 3.5"; for the F-4C 16' 5"; for the RF-4C, F-4D and F-4E 16' 5.4"; for the F-4J 15' 9.8", and for the British F-4K and F-4M 16' 1".

Versions and variants:

AH-1 — original designation of USN attack fighter.

XF4H-1 — prototype Phantom II flew May 27, 1958.

F4H-1 — first production version, December, 1960. First had J-79-GE-3 engines, then -2, then -2A; from 41 on, -8 engines.

F4H-1F — 11th production F4H-1 for USAF evaluation; became F-4A.

F4H-1P — photo-reconnaissance version of F4H-1; became RF-4B.

F-4A — new DOD designation of F4H-1; for USN, USMC.

TF-4A — non-combat trainer.

F-4B — interceptor/attack fighter for USMC (entered service June 29, 1962), USN (1961). Long-range radar, J-79-GE-8A, -8B engines.

RF-4B — USN, USMC reconnaissance with multi-sensor gear in long nose. Was F4H-1P. First flew May 12, 1965. J-79-GE-8 engines.

F-4C — USAF fighter. Dual controls, inertial navigation, larger tires, boom refueling. Was to have been F-110A. First flew May 27, 1963.

RF-4C — USAF reconnaissance version of F-4C. Long nose with sensors. Was to have been RF-110A. First flew May 18, 1964.

F-4D — fighter for USAF, Imperial Iranian AF. APQ-109 fire control radar. First flew December 8, 1965.

YF-4E — used by McDonnell for development of F-4E.

F-4E — F-4D with J-79-GE-17 engines. Slotted stabilator, multi-barrel cannon in nose. First flew June 30, 1967.

F-4G — USN fighter with J-79-GE-8A, -8B engines. AN/ASW-21 digital data communications equipment.

F-4J — USN, USMC fighter with J-79-GE-10 engines. Drooped ailerons, slotted stabila-

tor, pulse Doppler radar. First flew May 27, 1966.

RF-4J — RF-4C with J-79-GE-10 engines.

R-4K — Royal Navy. Rolls Royce Spey engines. Extra-extendable nose gear for catapulting, drooped ailerons. First flew June 28, 1966.

F-4M — Royal Air Force. Rolls Royce Spey engines, extensive British equipment. Reconnaissance pod, low pressure tires. First flew February 17, 1967.

Unlimiteds

Continued from page 19

see the fastest thing in motor sports.

While the airplanes are very much the same as what was raced at Cleveland 20 years ago, the feeling is different. Most of the reason is the setting: a high-altitude valley surrounded by the Sierra Nevada Mountains, air so clear and clean it makes you ashamed of your home town, and so much space that you want to run around like a puppy.

Way down at the far end of the place is an area known as the "Unlimited pits," where a section of the vast concrete ramp was reserved for, in 1969, 12 Mustangs, five Bearcats and a Corsair, plus a half dozen visiting fighters. This is probably the biggest collection of fighter planes in at least 20 years, though their vivid paint jobs and immaculate condition make it clear that they left the service a long time ago and are now strictly civilians. Still, the attention each is getting from its crew looks for all the world like preparation for a big mission.

And, in a way, that's exactly what's happening. While the gun ports are carefully faired over and the armor plating has been sold to a scrap dealer, and the deadly business has been traded in on sport, still they will once again be going up to prove superiority or suffer defeat, in a test of men and metal. The winners will be heroes, the losers will be unknown.

One of the many original ideas of the late Bill Stead was to have a flying start for the Unlimited racers. He really didn't have much choice, for the scrubby field used for the first Reno Races was barely satisfactory for one-at-a-time takeoffs, and a race horse start for all those dust-blowers would have been a mess. Bill got Bob Hoover to fly the pace plane, in hopes that the highly respected aerobat would be able to control a bunch of flaming individualists.

Bob handled them like a veteran of Indy 500 starts, and the air-start for racing became one of its most exciting symbols; just as exciting as the old race-horse style, and far safer. And that pretty well tells the tale of Reno's Unlimited races — plenty of action, but not a single injury.

And the people come out to see airplanes.

Blue ones and purple ones and green ones and striped ones and checkerboard ones. Airplanes with clipped wings and tiny canopies and oversize engines and paddle-bladed props. And the hot ones are so much faster than the stock ones that you can't help wondering how much World War II might have been shortened if some of these guys had been allowed to work on combat planes.

It seems like almost all they do is work. From early in the morning until sundown — and sometimes through the night, with the aid of portable floodlights — they connect and disconnect, clean and polish, and fiddle with hundreds of strange little parts. Reno has to schedule three full days for time trials, because the preparation of these big beasts is such a tricky operation. But eventually, each one of them is ready to go. The engine barks, coughs out great clouds of smoke and the prop starts to turn over. Crewmen scramble out of the way and the awkward bird waddles along, between the two rows of Unlimiteds and out onto the taxiway.

Taxi, warm up, takeoff and climb. All quite normal and conventional. Then up to a couple of thousand feet to join in echelon formation with a half dozen others. A wide swing around the field, then off across the mountains to get into perfect formation. After a few minutes of nervous waiting, someone in the crowd catches a glimpse of a flash of sun reflected off a highly polished wing. The announcer picks up the cry and soon everyone can see them coming.

Smoke begins to trail from a couple of the airplanes and it quickly becomes clear that throttles are being eased forward. Hoover brings them on down to a couple of hundred feet as they cross the airport boundary. Now, with full power, they push down nearer the ground and the starting line. With a muscle-straining climbing turn into the infield, Hoover sends seven big, powerful racing machines on their way in a great rush of sound.

Before the cheers and screams from the grandstand have had much chance to subside, the first airplanes emerge from the low far turn and level out into the backstretch, accelerating past the 400 mph mark like it didn't exist. Then around the north trio of pylons and right down on the deck past the stands. So much speed and noise that the senses are momentarily numbed, but it's a great sight, even if it lasts but a few seconds.

Mach .6 at 50 feet altitude, fuel consumption well over 200-gph, and enough Gs on the turns to impress an astronaut. Why? For a trophy, a few minutes of adulation, and a check to cover part of your expenses. Doesn't make a lot of sense, does it? But then, it's not supposed to make sense. Only things that aren't so much fun have to make sense.

Heat That Glow Plug

Continued from page 21

clean-running, perfectly synchronized engines that won't fail.

The experts will tell you that keeping the plug hot at idle is good, particularly with inverted engines. Quite a number of RC'ers do exactly that, but they usually switch the heat on only when the engines are at idle. To me this is a case of not being able to see the forest because of the trees. If keeping the glow plug hot at idle is a good idea then you just have to install a sophisticated switching scheme to connect the battery heat when the throttle is reduced to or near idle. I say, if you're going to lug the battery around all through the flight — use it. Or is the heat good for idle but no good for high rpm? I can get an engine to give excellent performance at peak rpm without glow heat, but I admit I can't get two of them to do it in perfect harmony. Since it's so easy to do with glow heat, I leave the experts to regulate the pistonators and discommode the carbolators. You know all about that.

Let's consider the goodies that even experts don't argue. Glowplug heat for idle rpm. Like the high-side rpm, you can obtain equal and constant low-side rpm. Without glow heat, my best idle is about 2200 rpm. My P-38 and B-26 weigh 16 and 17 pounds respectively. Each has retractable landing gear and the least complicated brake system is the electric brake. The Aeropiccola brake seems to work best for me, but 2200 rpm does not help much. With glow heat I can get an idle of 1600 rpm. A little shaky, but fairly good. A sure thing is 1800 and the brakes work fine — so that is what I use.

When you open up the throttles, the glow heat makes for smooth and sure response. One servo with a wheel or dual output works both throttles. So there you are — the high side and the low side. What happens in between? Well, you can't expect everything to be perfect. However, the only time I reduce throttle is preparatory to a landing and half throttle is used to allow the bird to slow down enough to lower flaps. The difference in engine rpm at half throttle has little effect on the flight controls.

How about a single-engine model? Is the hot glow plug worthwhile? You better believe it. Bud Atkinson has a mania for scale models. He uses the hot glow plug for his inverted Webra .61 in the T-34. He likes to peak his engine at a slightly rich setting of 10,150 rpm and let it smooth out with glow heat to 10,500 rpm. That's a healthy increase in rpm, but that is what the Thumb Tach shows it will do. So, I think glow heat is well worthwhile for single-engine scale, particularly inverted engines. But, that is a case of improving the reliability of an engine without relation to another one. In the case of twin-engine operation, individual engine reliability is not enough — they must be induced to operate together. That is where the hot glow plug really helps.

You say that's all very fine, but you don't have a Thumb Tach. You don't need one. When I throw on glow heat to the left engine I can hear it jump up the scale, but I don't know how much. How do you find the slower running engine? When you find you have to lean one to catch the other, or richen one to slow down, you ought to be able to figure which is the slow engine. How do you know when they are synchronized? When you hit the synchronization point you'll know the sound. And after a few flights you start to be real finicky about precise harmony. It is really surprising how sharp your ear can be.

Installation of an internal glow-plug battery source is quite simple. Here are a few hints. If twin-engine is your bag, a separate source for each engine should be used. A

1.2-volt, 1200-MA (C cell) nickel cadmium battery weighs 1.5 ounces and will keep a static plug hot for about ten minutes. However, when the engine is running, the resistance goes up and the drain goes down. I really don't know how long the cell will last on a running engine. My curiosity was satisfied by the fact that I have made eight flights of approximately ten minutes duration and still had battery power.

When I used the C cells for internal power, I had arrangements to permit starting with an external 1.2-volt, 4-AH D cell to conserve the internal source for use only when the engines were running. On occasion an engine may prove to be troublesome getting started for the first run of the day. After the first run I generally made all subsequent starts on the internal power source. Bud Atkinson needed a little weight in the nose of his T-34 so he used the D cell as his internal battery power and all starts and runs were made on that source. That seemed like a good idea so I used D cells in the B-26. I recharge these cells about every fourth charge on the radio gear. Each D cell weighs about 3.75 ounces. If the extra weight doesn't bother you, go to it!

Any small SPST switch and R/C hookup wire will do the job. Drawing I shows a typical installation. Note that we do not use an alligator clip for contact to the glow plug. An alligator clip dances around in flight and usually results in shorting out to the base of the plug or the engine chassis, or

the wire-to-clip connection breaks. The torsion spring arrangement as shown has proven best. The 1/16" piano wire extends from the firewall out about ½" beyond the plug terminal post, and in its disengaged position should be offset to one side of the plug terminal post about ½". This requires that the wire be forcibly moved to the other side of the plug terminal post, thus insuring adequate pressure loading for good positive contact.

If you use the C cell and wish to make starts with an external power source, the piano wire should extend below the firewall and be exposed to the outside for ready connection of an external power source. The other external power-source lead may be connected to the needle valve to complete the circuit. However, be sure the switch to the internal source is off before connecting the external source. If the switch is on when you hook up the external power source — whooee!

There is one small gezelbob with twin-engine installations. It would be time consuming to recharge each cell separately or expensive to have two chargers. So let's make sure that the left nacelle installation has the positive terminal of the battery connected to the piano wire and the negative to the ground terminal lug. The installation in the right nacelle should be reversed, having the negative terminal connected to the piano wire and the positive to the grounding lug.

When you charge the batteries, disengage the piano wires from the glow-plug terminal posts, connect the positive terminal of the charger to the left nacelle piano wire and the negative terminal of the charger to the right nacelle piano wire and then clip a jumper wire across the needle valves or some other engine grounding point. The batteries are now in series for charging. You say nothin' happens? Oh, yes, you got to turn on both switches. After the charge be sure you turn the switches off before replacing the piano wire terminals against the glow plug terminals. There are all kinds of schemes you can use for charging. Just be sure you know what you're doing!

AMA Contest Calendar

Continued from page 60

May 17 — Denver, Colo. Jefco RC Special Aerobatic Events. Site: Jefco Field. D. Johnson CD, 12604 W. Virginia Ave., Denver, Colo. 80228. Sponsor: **Jefco RC Club.**

May 17 — W. Suffield, Conn. (A) Nor-East RC Air Races. Site: Peterson Farms. G. Sawn CD, 6 Audrey Lane, Thompsonville, Conn. 06082. Sponsor: **Northern Conn. Radio Control Club.**

May 17 — Dayton, Oh. (AA) Dayton Buzzin' Buzzards 1000 Lap RC Rat Race. Site: Municipal Flying Circles. J. Martin CD, 551 Aberdeen, Dayton, Oh. 45419. Sponsor: **Dayton Buzzin' Buzzards.**

May 23-24 — Huntsville, Ala. (AA) Rocket City RC 10th Annual. Site: Old Huntsville Airport. C. Scholefield CD, 2709 Briarwood Dr., S. E., Huntsville, Ala. 55801.

May 23-24 — Chicago, Ill. (AA) 8th Annual Season Opener RC Meet. Site: Kikapoo Woods. D. Foley CD, 4329 So. Spaulding, Chicago, Ill. 60632. Sponsor: **RC Club of Chicago.**

May 23-24 — Sumter, S. C. (A) 1970 Iris Festival RC Invitational. Site: County Airport. R. Thompson CD, P. O. Box 621, Sumter, S. C. 29150. Sponsor: **Sumter Model Airplane Club.**

May 23-24 — Lafayette, La. (AA) 2nd Annual CL & RC Model Aviation Day. Site: Ovey Comeaux High School. C. Castaing CD, P. O. Box 788, New Iberia, La. 70560. Sponsor: **Acadian RC Club.**

May 24 — Clarksdale, Miss. (AAA) Clarksdale Climbers 10th Annual FF & RC Meet. Site: Fletcher Field. Mrs. G. Pickel CD, 1631 Steen Dr., Clarksdale, Miss. 38614.

May 29-30 — Schenectady, N. Y. (AA) Empire State RC Championships. Site: Air National Guard Base. A. Sattler CD, 1857 7th Ave., Schenectady, N. Y. 12307. Sponsor: **Thundervolts RC Club, Inc.**

May 30-31 — South Bend, Ind. (AA) Tri-Valley RC Multi Meet. Site: Club Field. J. Hoffer CD, 1312 Brummitt Ln., South Bend, Ind. 46615. Sponsor: **Tri-Valley RC Club.**

May 31 — Lockport, N. Y. (AA) United Pylon Racing Circuit RC Meet. Site: Niagara County Model Airport. H. DeBolt CD, 3833 Harlem Rd., Buffalo, N. Y. 14215.

May 31 — Fresno, Calif. (A) Fresno's Monthly FF Contest. Site: Near Kerman, Calif. F. Gallo CD, 1725 Kenmore Dr., W., Fresno, Calif. 93703. Sponsor: **Fresno Gas Model Club.**

May 31 — Tacoma, Wash. (AA) Mt. Rainier All Pylon RC Contest. Site: Mt. Rainier RC Society Field. B. Gale CD, 811 9th Ave., S. W., Puyallup, Wash. 98371. Sponsor: **Mt. Rainier RC Society.**

May 31 — Chardon, Oh. (AA) CRC "500" Pylon RC Races. Site: Club Field. F. Vidmar CD, 26500 Zeman Ave., Euclid, Oh. 44132.

May 31 — Tullahoma, Tenn. (AA) Coffee Airfoilers 6th Annual Old Timers FF Meet. Site: Model Field. C. Tuthill CD, 101 Westwood Dr., Tullahoma, Tenn. 37388. Sponsor: **Coffee Airfoilers Model Airplane Club.**

June 6-7 — Oklahoma City, Okla. (AA) TORKS 10th American RC Annual. Site: To be announced. C. Brownlee CD, 3033 Rolling Stone Rd., Oklahoma City, Okla. 73120.

June 6-7 — Valley Park, Mo. (AAA) Greater St. Louis Modeling Association's FF, CL & RC Meet. Site: Buder Park Model Field. J. Blum CD, 2417 Glen Pl., Granite City, Ill. 62040.

June 6-7 — Nashville, Tenn. (AAA) 7th Annual RC Midsouth Championships. Site: Percy Warner Park. B. Reuther CD, 216 Vaughns Gap Rd., Nashville, Tenn. 37205. Sponsor: **Middle Tennessee RC Society.**

June 7 — Colorado Springs, Colo. Pikes Peak Fun Fly. Site: Pikes Peak RC Club Field. B. Hayhurst CD, 1219 Oswego, Colorado Springs, Colo. 80904. Sponsor: **Pikes Peak RC Club.**

June 7 — Bristol, Conn. (AA) Hornet's Model Classic CL Meet. Site: Elmwood School. J. Scott, Jr. CD, 265 Witches Rock Rd., Bristol, Conn. 06010. Sponsor: **Hornet's Model Airplane Club.**

June 12-13-14 — Asheville, N. C. (AA) 16th RCNC Invitational RC Meet. Site: Old Asheville-Hendersonville Airport. V. Helms CD, 800 Tyvola Rd., Charlotte, N. C. 28210.

June 13-14 — Pensacola, Fla. (AAA) Fiesta Five Flags FF & RC Model Championships. Site: RC: Corry Field, FF: 8A. T. McLaughlin CD, 4140 Fern Ct., Pine Glades, Pensacola, Fla. 32503.

June 13-14 — Houston, Tex. (AA) Houston RC Club Contest. Site: Houston RC Field. L. King CD, 3303

Ripplebrook, Houston, Tex. 77045. Sponsor: **Houston RC Club.**

June 13-14 — Des Moines, Iowa (AA) Des Moines Modelaires Scale & Pylon RC Rally. Site: Des Moines Modelaires Field. J. Bonanno CD, 201-S.E. Rose, Des Moines, Iowa 50315. Sponsor: **Des Moines Modelaires.**

June 13-14 — Kansas City, Mo. (AA) KCRC Annual RC Meet. Site: Lake Jacomo. B. Drummond CD, 9115 Charlotte, Kansas City, Mo. 64137. Sponsor: **Kansas City RC Association.**

June 13-14 — High Point, N. C. (AA) High Point CL Model Airplane Meet. Site: Spinners Flying Field. L. Underwood, Sr. CD, 1507 Whitehall St., High Point, N. C. 27262.

June 14 — Endicott, N. Y. (AA) 5th Annual Northeast RC Pylon Racing Championships. Site: Tri-Cities Airport. R. Noll CD, 96 Pine Knoll Rd., Endicott, N. Y. 13760. Sponsor: **Aeroguidance Society, Inc.**

June 14 — Council Bluffs, Iowa (AAA) 7th Annual CL Midwestern Model Airplane Meet. Site: Iowa School for the Deaf. D. Hutcheson, CD, 317 Spencer, Council Bluffs, Iowa 51501. Sponsor: **Balsa Busters.**

June 20-21 — Dallas, Tex. (AA) Sun & Fun FF Rally. Site: Preston Rd., N. B. Chenault CD, 5906 Jim Miller Rd., Dallas, Tex. 75228. Sponsor: **Cliff Cloud Climbers of Dallas.**

June 20-21 — Dayton, Ohio (AAA) Wright Brothers Memorial 8th Annual RC Meet. Site: Wright Patterson A.F. Base. D. Lowe CD, 5936 Clar-von Dr., Dayton, Oh. 45430. Sponsor: **Western Ohio Radio Kontrol Society.**

June 20-21 — Davenport, Iowa (AA) Davenport RC Society 2nd Annual RC Meet. Site: Scott County Park. W. Kroeger CD, 3820 Homestead, Davenport, Iowa 52802.

June 20-21 — Ft. Worth, Tex. National Fun Fly Championships. Site: Thunderbird RC Field. B. Lutker CD, 6029 Walraven Circle, Ft. Worth, Tex. 76133.

June 21 — Westhampton, L. I., N. Y. (AA) Suffolk Falcon's "Early Flyers" RC Scale Meet. Site: County Rd. 31, North Side and adjacent to Suffolk A.F.B. Fence. D. McGovern CD, P. O. Drawer E, 140 Wagon Lane, W., Centereach, L. I., N. Y. 11720. Sponsor: **Suffolk Falcons Club.**

June 21 — Salem, N. H. (AA) Salem Model CL Fair. Site: Salem High School. R. Sherman CD, 408 River Rd., Tewksbury, Mass. 01876. Sponsor: **Lawrence Air-Istocrats.**

June 21 — W. Suffield, Conn. (A) Nor-East RC Air Races. Site: Peterson Farms. B. Williams CD, 347 Southwick Rd., Westfield, Mass. 01085. Sponsor: **Northern Conn. Radio Control Club.**

June 27-28 — Wichita, Kans. (AAA) Mid-Western 10th Annual FF, CL & RC Championships. Site: Beech Field. J. Finley CD, 5217 E. Murdock, Wichita, Kans. 67208. Sponsor: **Wichihawks.**

June 27-28 — Detroit, Mich. (AA) 18th Annual Great Lakes RC Championships. Site: 18 Mile & Mount Rd. H. Mottin CD, 2124 Common Rd., Warren, Mich. 48092. Sponsor: **Radio Control Club of Detroit.**

June 27-28 — Greenville-Spartanburg, S. C. (AAA) S. C. Sate RC Championships. Site: W.C.R.C. Flying Field. J. Nicholson CD, 105 Greenbriar Rd., Spartanburg, S. C. 29302. Sponsor: **Western Carolina RC Club.**

June 28 — Rochester, N. Y. (AA) United RC Pylon Racing Circuit Meet. Site: Monroe County Model Airport. H. DeBolt CD, 3833 Harlem Rd., Buffalo, N. Y. 14215. Sponsor: **Radio Control Club of Rochester.**

June 28 — Fresno, Calif. (A) Fresno's Monthly FF Contest. Site: Near Kerman, Calif. F. Gallo CD, 1725 Kenmore Dr., W., Fresno, Calif. 93703. Sponsor: **Fresno Gas Model Club.**

ACE Pulse Commander

Continued from page 56

are 1 5/16 x 1¾ x ⅝". The two servos mounted side-by-side are 2 x 2 x 1¾" and the battery pack is 1 x 1¾ x 2⅝".

The system was installed in a 15-powered Sig. "Beaver" for tests. Range was checked to a distance of approximately 500 feet on the ground with no problems. The test installation utilized one of the servo mounting kits for the Dual Pak and this is recommended. Regular dowel and wire pushrods were used to the elevator and rudder, nylon tubing and cable for throttle. The use of nylon pushrods for the control surfaces is not recommended for pulse proportional control because the servos will not tolerate the drag and stiffness.

The system was cycled a number of times prior to flying. The airborne unit draws a total of about one ampere from the 1.0 ampere-hour battery pack for a total flying time of just slightly less than one hour. The system was then satisfactorily flight tested in miserably cold winter weather.

Two observations found in flying the system require awareness. Because of the use of wide pulse for throttle, go-around is a little slower than for most dual-proportional sets. This creates no problems, but just beware that a slightly longer blip will be required. The second is inherent in the use of RAND actuators for go-around. As the rud-

der servo goes around, there is a broad flapping of the rudder which imparts an unwanted oscillation of the airplane. A simple modification to the rudder servo control plate will alleviate this.

The procedure is as follows: Looking down on the rudder drive-plate at the slot in which the drive pin (restrained by the spring) rides, open up the slot at the rear into a heart shape about ¼" in diameter. Use a knife and work carefully to keep the edges smooth. This operation will permit air-loads to center the rudder at the extremes of go-around instead of having it thrust out to maximum throw left and right.

The only criticism of the system is the heavy drain of the airborne unit which necessitates the use of 1.0-ampere-hour cells. Do not expect to adapt smaller cells and fly the system in airplanes smaller than 0.10-powered; smaller cells just won't take the drain. This is an ideal system for control of 15- to 29-powered models which will provide long, reliable service.

You Said It

Continued from page 8

of a T.D. 020 for a 36" Buzzard to appreciate this feat. I really feel this type of event would be very popular, especially in the east where large fields are nonexistent. As one club member stated, a side benefit of this event is that you can build a model for it for only $50 worth of Sig Contest Balsa.

I haven't forgotten the WOG I built in 1948. It was a beautiful flying airplane but it could give one a hernia carrying it very far. I remember walking to Dyker Park, Brooklyn (about four miles) to fly it. Had to save my carfare for supplies!

So here's to your magazine and more good editorials and articles.

Harry J. Lowe, Hawthorne, Ca.

Later generations may wonder about that "WOG." It was one of the funny kits designed by your publisher — a planked fuselage with a polywog profile, and an all-sheet wing. A 19 free-flight, it was kitted from over-thick heavy wartime wood and, yup, it was heavy. — Publisher.

Messerschmitt's 'Gustav'

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with razor blade or sharp knife.

Construction: Assemble fuselage by cementing both sides with liquid cement, applying a minimum of two coats on all edges and tightly press the two fuselage halves accurately into place. Crisscross strips of masking tape about 1½" long; they must be stretched tightly across seams. If you have no masking tape, rubber bands can be wrapped around the fuselage with enough tension to set the glue.

Make sure you get all seams together tightly. If you don't, you will have to spend time filling and sanding the gaps in the seams before you paint. Sometimes in spite of trying, the seams will have gaps. Use the same process on the wing seams and other seams which must be joined together. After wings and fuselage are dry, locate and cement wings onto fuselage; then cement the horizontal stabilizer in place. Line them up accurately, then set the cemented unit aside to dry.

Preparation of small parts for painting: Remove all parting lines from parts no matter how small, either by sanding or scraping with knife or razor blade. When all parts are smooth, cement lightly to the plastic runners on edge of parts. In other words, the parts will be cemented in an upright position on plastic trees. With this method you can paint and sand parts until ready to assemble to plane without handling them, i.e., the wheel covers, landing-gear covers, spinner, drop-tank, seat, missile, and gun pods.

Painting: First, spray pale blue on all the undersurfaces and ¾ up on the fuselage sides. Also spray same color on landing-gear covers, tailplane surfaces, drop-tank and rocket tubes. Spray top surfaces of wings and upper tailplane surfaces dark green. Sand and apply another coat if needed. Mask off all dark-green surfaces which are to remain dark green and spray black-green. For painting the mottle, leave the black-green in the gun and test the spray until it is closed down to the smallest opening possible. Then spray mottle on fuselage, top and sides. Paint your mottle very lightly as you want a "hazy" effect.

Mask and spray wing tips yellow underneath, squaring off at ailerons. Mask and spray yellow band on fuselage. Paint the landing-gear struts, seat and wheel centers dark gray; guns, prop blades and tires matte black. Spinner is red with white spiral. When these parts are dry, cement them in place. Cut decals as close to color as possible, soak them in water, then check ABT decal booklet for correct location of decals and place in position. Press firmly so that all the air bubbles will be released and leave a smooth surface.

If you are using the color scheme for No. 3 in the Airfix drawing, paint as follows: dark-gray mottle, becoming progressively heavier toward top of fuselage. Light blue-gray fuselage sides. Pale blue — all undersurfaces, rocket tubes, drop-tank, gun gondolas. Dark green — upper wing and tailplane surfaces. Olive green, to give splinter camouflage effect. Yellow spinner and rudder. Matte-black — wheel tires, prop blades, gun barrels, exhaust and bomb.

If you are using the color scheme on Airfix drawing for plane No. 14, paint as follows: pale-blue drop-tank, gun gondolas. All undersurfaces and lower fuselage sides, merging into light stone — upper fuselage sides, wing and tailplane surfaces. Dark-green mottle over fuselage sides and upper surfaces becoming progressively heavier toward top of fuselage. White spinner and rear fuselage band. Black coverging circles on spinner over white. Matte-black wheel tires, prop blades, gun barrels, exhausts and bomb.

One of the best reference books for detail is the "Messerschmitt ME-109" by Aero Publishers, Inc., 329 Aviation Road, Fallbrook, Calif. ABT decals can be obtained from the manufacturer at the following address: Modeles ABT-5, rue Marius Franay-92-Saint-Cloud, France.

Specifications for the ME Bf-109G-6

Dimensions: Span 32 ft. 6½", length 29' 8", height 8' 6", wing area 174.375 sq. ft. Power-

plant: One 1550-hp Daimler Benz DB 605 ASCM/DCM 12-cylinder liquid-cooled in-line engine.

Armament: Two 13mm. MG 151/20's with 120 rpg. Weights: Empty, 5,900 lbs.; loaded, 6950 lbs. Performance: Maximum speed 387 mph at sea level. Climb to 19,000′ was six minutes. Service ceiling 38,500′, maximum ceiling 39,750′. Range 450 mi. at 330 mph at 19,000′, 615 miles at 260 mph at 19,000′.

Y.O.R.K.S.

Yorkton's Outstanding Radio Kontrol Society will host Canada's largest meet again this year.

The 8th Annual Open Radio Control Meet will be held May 16, 17 and 18; competition is held in all classes, with scale as the number one event. Novelty and fun events are featured.

For scale rules and info on all events contact: Brent Reusch, 221 Roslyn Ave., Yorkton, Saskatchewan, Canada. Y'all come!

Dragonfly

Continued from page 49

with a 1/32″ spacer, cut notches. Pin leading edge, spar and trailing edge in place. Cut required number of ribs from 3/32″ sheet balsa. Note that the two center ribs are undercut 1/16″ to allow for center sheeting. An extra rib is cut 1/8″ from both ends; this rib is used to hold the 1/16″ plywood line-guide. When gluing this rib in place use a 1/16″ spacer between the two ribs.

The line-guide is glued in place after wing is taken up from building board. Glue in all ribs, wing tips and tip riblets. Glue the four pieces of 3/32 x 1/4″ pieces next to, and to the outside of, the two center ribs. These pieces are used to give the covering a foothold. Add 1/2 oz. weight to outboard wing tip. After wing is dry, carve and sand leading edge. Leave center section unsheeted till later. Plywood line-guide can be added now, well glued. Glue wing onto fuselage, making sure it is square to fuselage. Add center sheeting. After drying, sand entire model with fine sandpaper and give it two coats of clear dope.

Finishing: The original models were finished in pre-World War II colors: yellow wings and stabs, and blue fuselage and rudders. Some of the more jazzy paint schemes seen on present day light aircraft can be used, with the result that your Dragonfly will look like a modern private plane seen on the local airport's flight-line. Aero Gloss dopes were used on the originals.

Brush or spray two coats of clear over the whole airplane, sanding between coats. We now are ready to cover. I covered the whole airplane, including stab and rudders, with Silkspan — medium Silkspan on the wings and lightweight Silkspan on the rest

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of the plane. After covering, two coats of clear are sprayed or brushed on, sanding after each coat; two coats of filler are brushed on (I used talc powder and clear dope mix) but any commercial filler can be used. After drying, the plane is well sanded. This should provide a good base for the color. If not, then add another coat of filler and sand well. After a final coat of clear over-all, we are ready for the color coats.

Three coats of Cub Yellow were brushed on the wing and stab-elevator, sanding between coats. These were masked off and two coats of Curtiss Blue were brushed on the fuselage and rudders. After a 24-hour drying period, a coat of clear was put on and allowed to dry. The windshield, windows and rear cabin area were made from white decal sheet. Or these can be painted on.

The rest of the decals were from Finishing Touch, sheet number B301, U. S. Army pre-WWII. This sheet contains the stars and the rudder stripes. Put on the wheels, soldering washers on each side. Mount the motor with about two degrees offset to the right (to the outboard wing side). Hook up the fuel line.

Flying: A set of leadouts are made up 17" long. These extend from the short leadouts at the fuselage, out to beyond the line-guide. Fifty-two foot lines were used to fly the originals.

On the takeoff, remember to keep the handle in neutral. The airplane will take off by itself as soon as flying speed is reached. Most beginners tend to give full up as soon as the model is released. The result is a big loop or wing-over, piling up the ship before it has a chance to show what it can do. *Leave the handle in neutral!*

Landings are the same. This ship will glide to a beautiful landing every time, if given a chance. So take it easy on that first flight and I'm sure you will be rewarded with a long-lasting airplane.

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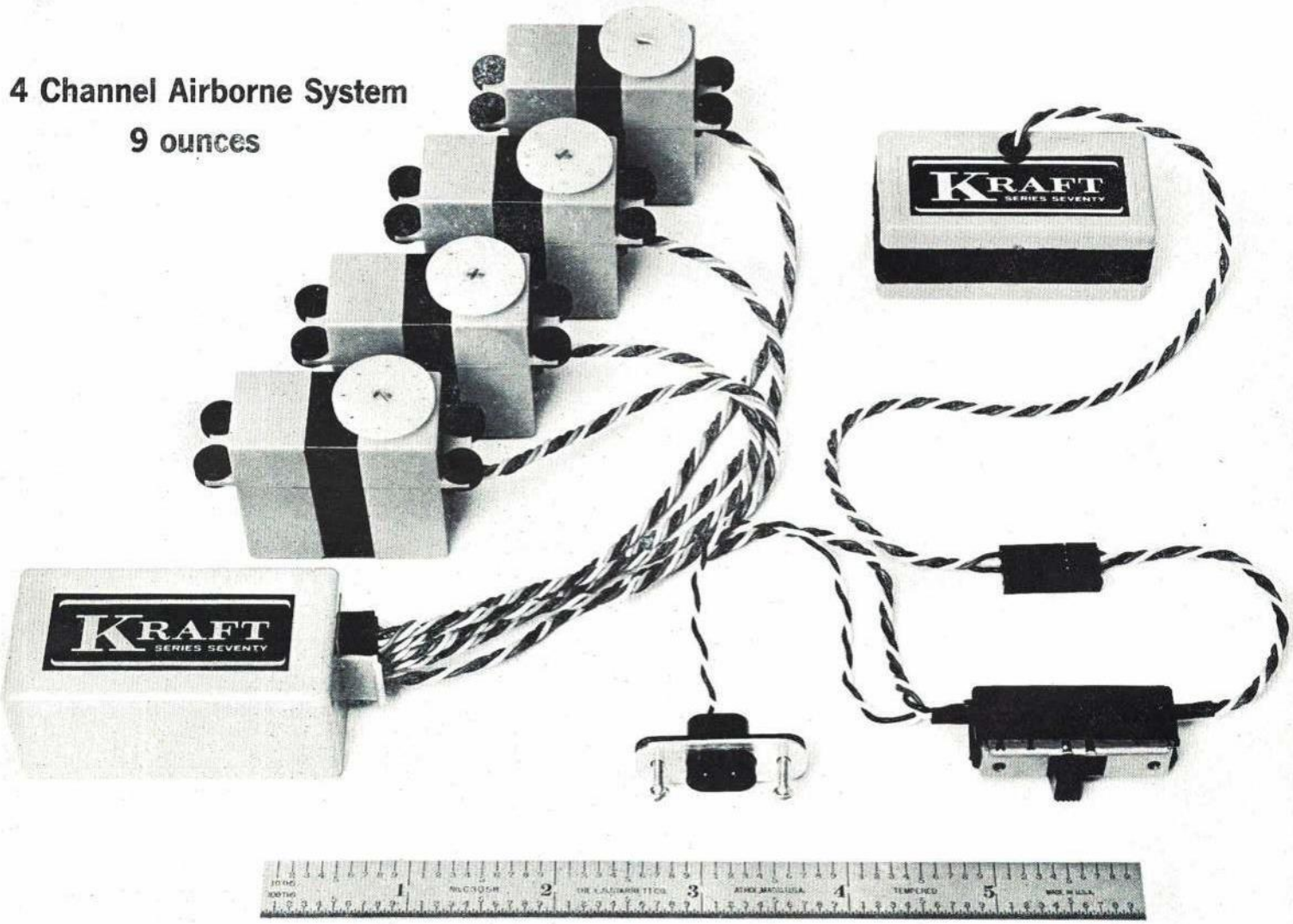

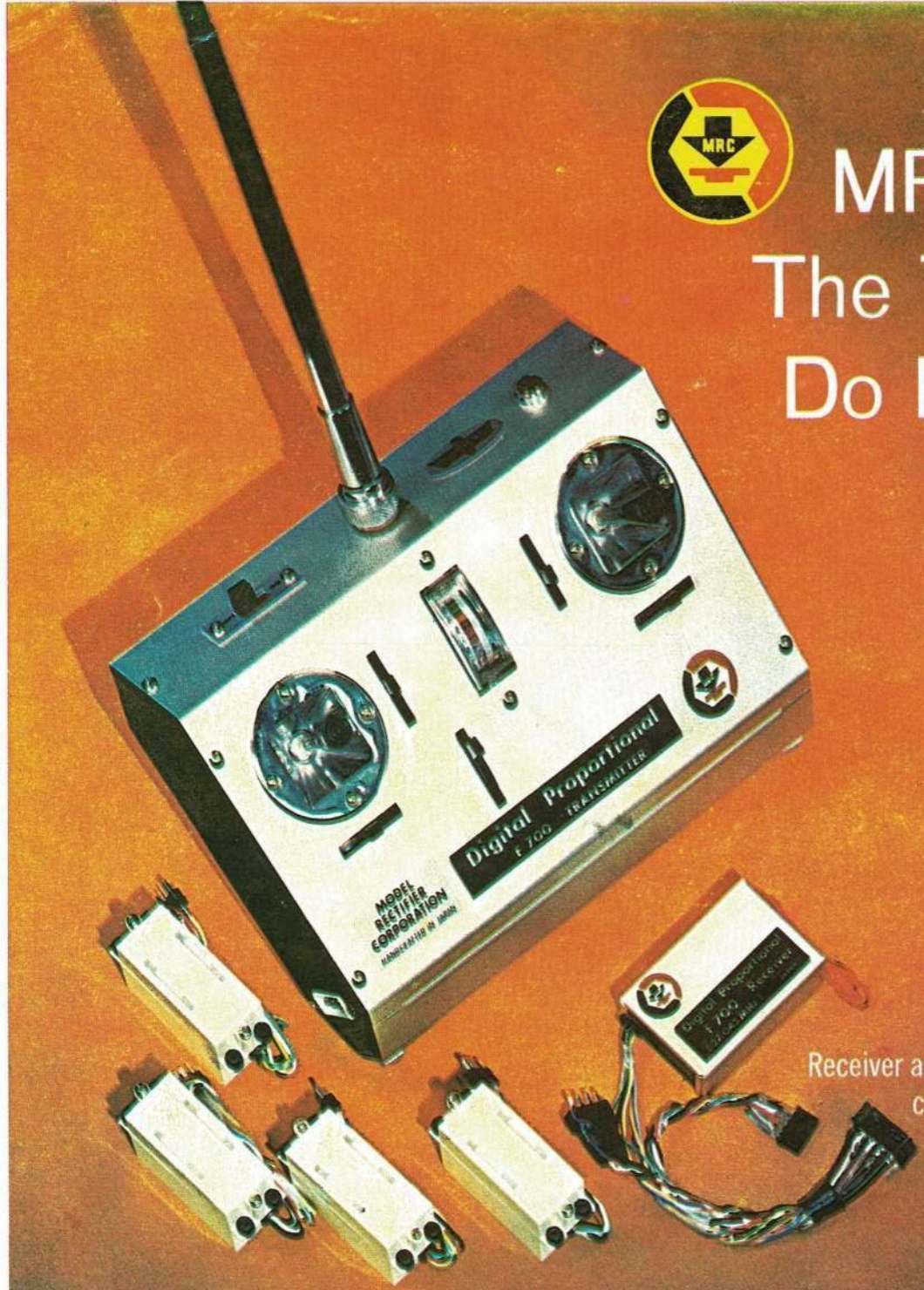

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