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SPITFIRE

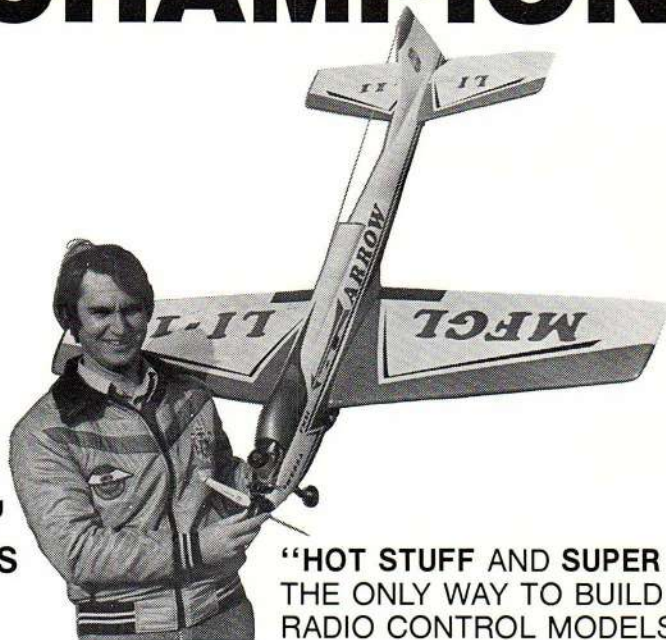
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COVER: Larry Lemons performed a few minor cosmetic mods to the Pica Spitfire, and came up with a contest-worthy machine. The feature article in this issue gives all the details on how to get the most out of this popular modeling subject. (J. R. Naidish photo)

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SCALE R/C MODELER

VOLUME 7, NUMBER 4

AUGUST, 1981

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The industry's biggest public unveiling was a whopper

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**North American's B-25 Mitchell
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Martin's B-26 Marauder was a super-slick, state-of-the-art aerial hot rod. Fast, streamlined, all the right curves, it was one of those "doing-a-hundred-miles-an-hour-standing-on-the-ground" designs. Unfortunately the hot description applied to flying the ship. Single-engine performance was frightening, it landed faster than anyone wanted, and short stubby wings caused observers to wonder what kept it in the air. The B-26 flew more like a giant fighter than a lumbering bomber, with never an overabundance of stability.

The North American B-25 Mitchell, on the other hand, was plain vanilla by comparison. The fuselage was boxy, its gull wing had no vices, it could take off in the length of a carrier deck, land at normal speeds, and was stable in flight. Its most outstanding feature was a design lending itself to a high degree of modification. Models ranged from unarmed photo-recon planes, to normally armed medium bomber configurations, to the ground-attack H model with fourteen fifty-caliber machine guns plus an unbelievable nose-mounted seventy-five millimeter cannon.

PAPPY GUNN and JIMMY DOOLITTLE

Two important names in the evolution and development of these aircraft. Gunn's expertise was applied to the B-25 in the South Pacific where island-hopping ground-attack missions were daily occurrences. With all that low-altitude combat the B-25 needed better forward firepower. The first cannon-carrying Mitchell was developed by Gunn and was strictly a jerry-rigged affair. It was so effective, however, that North American heard about it and developed the G model with the cannon and four fifty-caliber forward-firing machine guns. Next came the H model with the now famous cannon and a total of ten forward-firing fifty-caliber weapons—just what was

needed for ground attack and naval harassment.

Jimmy Doolittle's name is synonymous with the Tokyo raid and the B-25. However, early B-26's were giving the Army Air Force fits—something had to be done. The aircraft had far too much potential and was too badly needed to let a combination of misuse, mechanical problems, and bad reputation eliminate it from needed service. General Hap Arnold requested that Doolittle evaluate the aircraft and make recommendations. Piloting techniques, structural deficiencies, and morale problems were corrected by Doolittle. Difficulties with engine failure on take-off were fixed, the "one-a-day-in-Tampa-Bay" problem subsided, and the B-26 went on to record one of the best survival records of World War II.



PHOTOS and ARTWORK

By the award-winning author of *The Gee Bee Racers*, Charles Mendenhall, this book contains over 225 vintage photographs of the Marauder and the Mitchell. From early drawing-board designs, through the most commonly produced models, to final experimental variants which paved the way for more advanced aircraft. Almost without exception, photos selected for this work have not been published to date and were taken from government archives and personal collections.

Included in this volume, and printed in blue ink, are twenty pages of original artwork and line drawings. Three views, plan views, factory engineering drawings, photos of nose-art, and sectional works all provide detailed perspective regarding these fascinating planes. Enameled page stock, hardcover binding, printed end papers, and 8½" x 11" page size top off this book and help to make it an excellent value.

SPECIAL DATA DIRECTORIES

An important part of *Deadly Duo* is Mendenhall's detailed data bank which provides a wealth of information covering each model produced in the evolution of these famous aircraft. Information presented includes: quantity built, serial number sequence, charge numbers, dimensions, powerplant models, armaments, performance capabilities, bomb loadings, crew, and a special Interest Item. This latter category describes in a nutshell for the reader the unique characteristics of each model and helps in understanding the evolution of the type.

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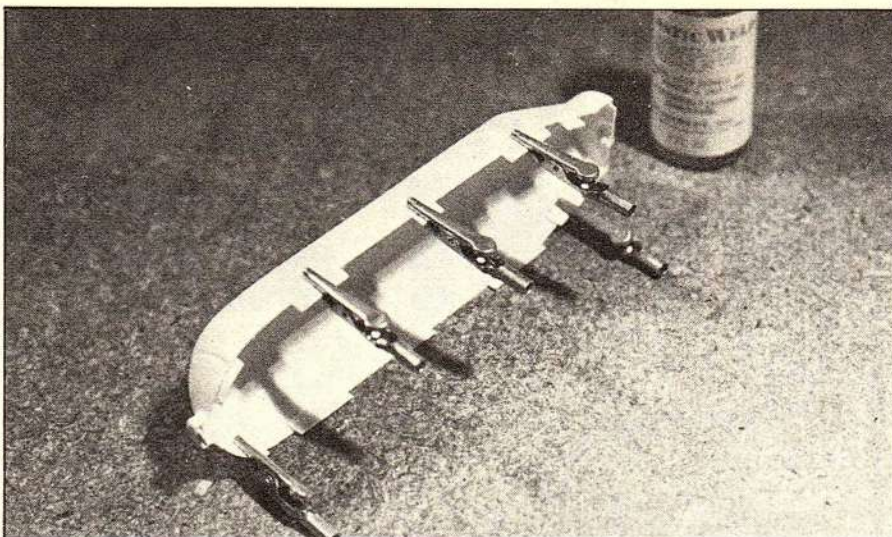
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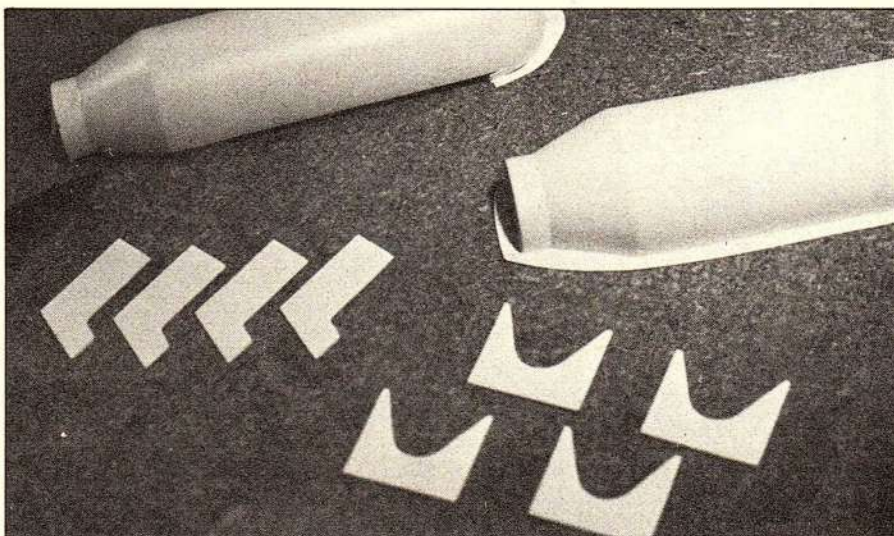
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Small alligator clamps temporarily secure tabs on a bomb's half-shell. These tabs later join the two halves together.



Fins can be made either from plastic (for static display) or plywood if the bombs are to be dropped.

these joints are almost dry (about $\frac{1}{2}$ hour) brush thinner on each of the tabs, slip the two bomb halves together and brush the seam one more time with thinner. Let the assembly dry overnight. It may be necessary to tape the halves together in order to maintain the alignment while drying.

Once the casing is dry, remove the tape and paint all the seams with the cement slurry you made earlier (from now on I'll call it MUK), let it dry for about a half an hour, and paint them again with MUK.

The bombs assembled in this manner will be suitable for static display only. Should you wish to permanently fix them to your model or make them a droppable option, a slightly different method should be used. In any case, remember real bombs were built for a one way trip—but you will want to use yours over and over—so build them right. Trim out and sand the halves as before, then trace the outline of the casing onto a piece of $\frac{3}{8}$ " balsa sheet. This piece will form the backing for the seam, a rigid core for dropping, and a solid anchor for the bomb shackle should you decide to go all the way.

Carefully trim this former to fit the casing half. Once fit, apply a generous bead of Wilhold RC-56 to the inside edge of the bomb half, insert the balsa former half way into the casing, and place it flat on the bench to dry for at least 24 hours. Repeat the glue operation with the second half on the next evening, being sure to keep the newly glued side up, so that the glue does not run off the seam. Do not try to use the Wilhold RC-56 without the balsa core because the cement will not dry



CHRISTEN EAGLE 1

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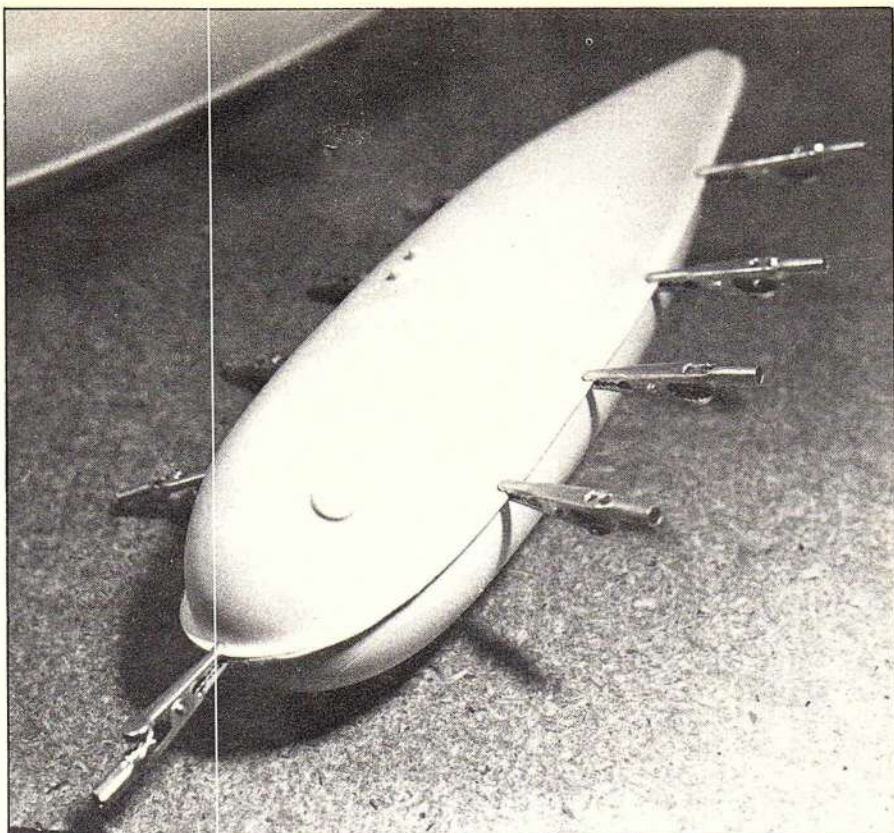
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without the balsa core to absorb the thinners after it has been sealed inside the bomb.

Before moving on to the fins, sand and fill all seams until smooth using either MUK or spackle. Now the fins on both the permanently mounted and the static display bombs are cut from the plastic sheet which is provided. They are then attached to the casing with MUK. However, if you plan to drop your bombs, you will have to make the fins out of 1/32" plywood and enlarge their bases sufficiently so that they may be placed through a slot cut in the casing and epoxied to the balsa core. Once installed, paint the seams on both sides of the fins with MUK.

At this point, no matter which model you choose to build, all you will have is a rather crude looking bomb. But that is about to change. First, make sure that all seams are smooth and fill any imperfections. Now look for any scale documentation that provides proof of welded seams and rivet joints. Using a pencil, draw all panel lines, welds or seams directly on the bomb itself. To form a seam, simply put a double layer of masking tape along one side of the pencil line that indicates a seam, then back fill to the masking



The molding seams are left intact on the auxiliary tanks, and the two halves are simply joined with adhesive and clamped till dry.

TIT MAGNUM III

INCREDIBLY POWERFUL!

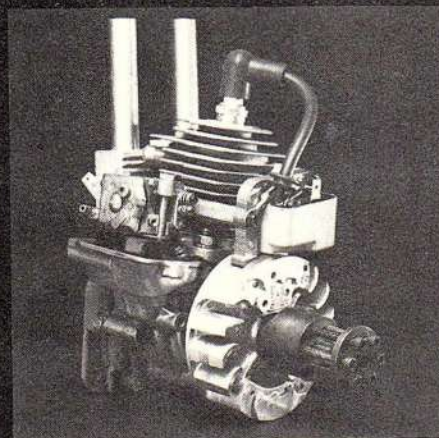
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tape approximately 1/2" with wood filling spackle. Let dry, sand smooth, and remove the masking tape. Presto! A perfect lap seam.

Rivet detail is even easier. A hypodermic needle filled with white glue is all it takes. Simply put a row of glue dots along any line where rivets are needed. Weld seams are

formed by drawing a line with the white glue and needle. As I said earlier these bombs were made for a one way trip and were not as neatly built as one might think.

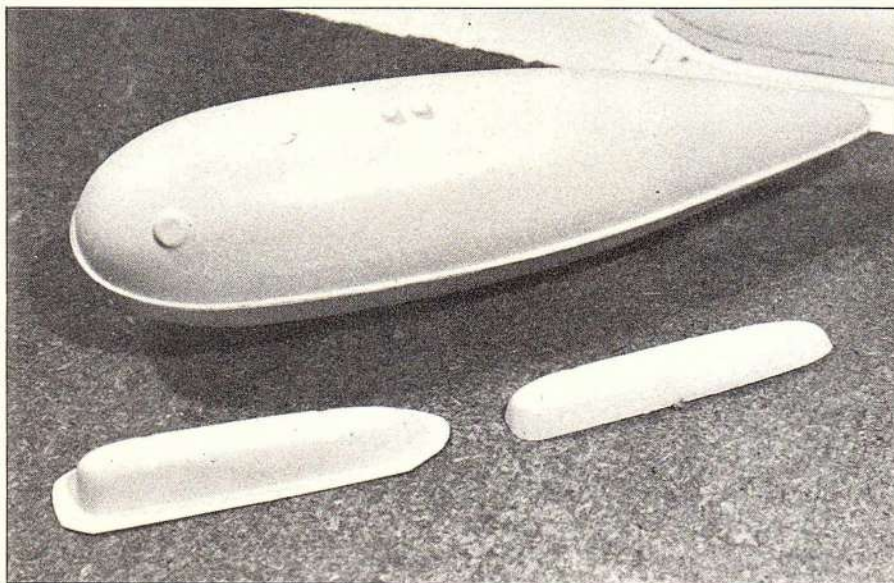
The eyebolts are made from #10 solid copper wire soldered into a loop. The impact detonator cap is simply a scrap piece of plastic cut

in an octagon shape. The time delay detonator is fashioned from a plastic instrument bezel, and the fin spreader bars are sprue from any plastic model kit.

Now wipe the entire bomb clean with R&S Perfect thinner (it does not attack the plastic), then spray or brush with Perfect paint, add any printed detail and make up the arming cable from 1/2A lead out control line cable.

Look carefully for these bomb and accessory kits on your dealer's shelf. They are produced in very limited numbers, so you may have trouble finding them. Send \$1.00 for the complete catalogue of items available for almost any size model. Write directly to: Dave & Al's Scale Products, P.O. Box 7131, Akron, Ohio 44306. They also make a full line of cockpit interiors.

One thing's for sure, these kits have the ability to add a whole lot to the overall appeal of any finished aircraft. In fact these bombs or tanks, once attached to your model, will transform it into a true replica of a real warbird. Then the time, money, and effort invested most certainly should be rewarded by some extra points from even the strictest of contest judges. □



A finished wing tank, with corresponding attachment fairings. The fairings are balsa reinforced, in order to support the tank.

Stampe SV4B

1/4 Scale \$325.00

This very complete kit has plans for both canopy or open cockpit version. Also, install a 10cc to 30cc engine. Wingspan 84". Radio-4 ch.



All kits are very complete. Each kit contains the necessary balsa, hardwoods, nylon tank, pre-formed landing gears, aluminum and A.B.S.

motor cowlings, tires, engine mount, sets of plans, plus die-cut parts. Our degree of prefabrication has rarely been met in scale kits. **GET ONE TODAY.**

Bucker Jungmeister

1/4 Scale \$275.00

The closer to full size you get, the more realistic the actual flying of the model, and this kit gives you that feeling and true characteristics. Wingspan 66". Engine 10-15cc.



Seychelle \$97.50

If you fly an intermediate slope soarer, you must have experienced envy watching a full house soarer going through its paces. Join in now. Wingspan 69".



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SR/CM LOOKS AT... FLIGHT TIMERS

Don't overlook an inexpensive flight timer as an important tool in your field-support box.

Staff Report

J. R. Naidish photos

Why give coverage in a national magazine to something as peripheral as a series of flight timers? In our way of thinking, flight timers are like tachometers . . . most everyone thinks they can do without them. So, who really cares if you have to deadstick a few landings? If we were flying helicopters, having an accurate indication of when the fuel supply was about to run out would be critical—but why get up tight about it with a scale model.

Naturally, the contest flier always wants to know what his time-status is during a flight, for going overtime can cost him points. But, even in practice or when sport flying, it's preferable to avoid a "one-shot-at-it" deadstick landing. That valuable scale model is just too important to risk getting caught short and too far out. Our own Byron Pitts was a perfect example. With a Rossi in the Byro-Drive, an eight minute flight was about the limit we could get. Deadstick, the model wouldn't glide far enough to make a landing from anywhere but directly above the runway. Had we had a timer, several damaging weed landings could have been inexpensively avoided . . . we

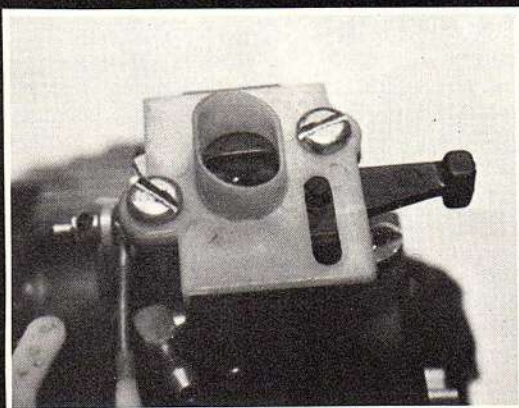
(Continued on page 72)

The rectangular TC02 countdown timer (upper left) records time remaining in a programmable count, then sounds an alarm for 30 seconds. The smaller 35S (below) has no alarm, but gives up to a fifteen minute calibrated count. The large unit at the right is the Model 66C stopwatch, which features split timings and calibrations in 1/100ths of a second.



The TC02 countdown timer, seen here attached to a transmitter. Unit slides in and out of a mounting tray, and is about the size of a compact cigarette lighter.

VORTAC MFG. CO.
P.O. BOX 469 OAK LAWN, ILL. 60453



VORTAC'S MANUAL CHOKE

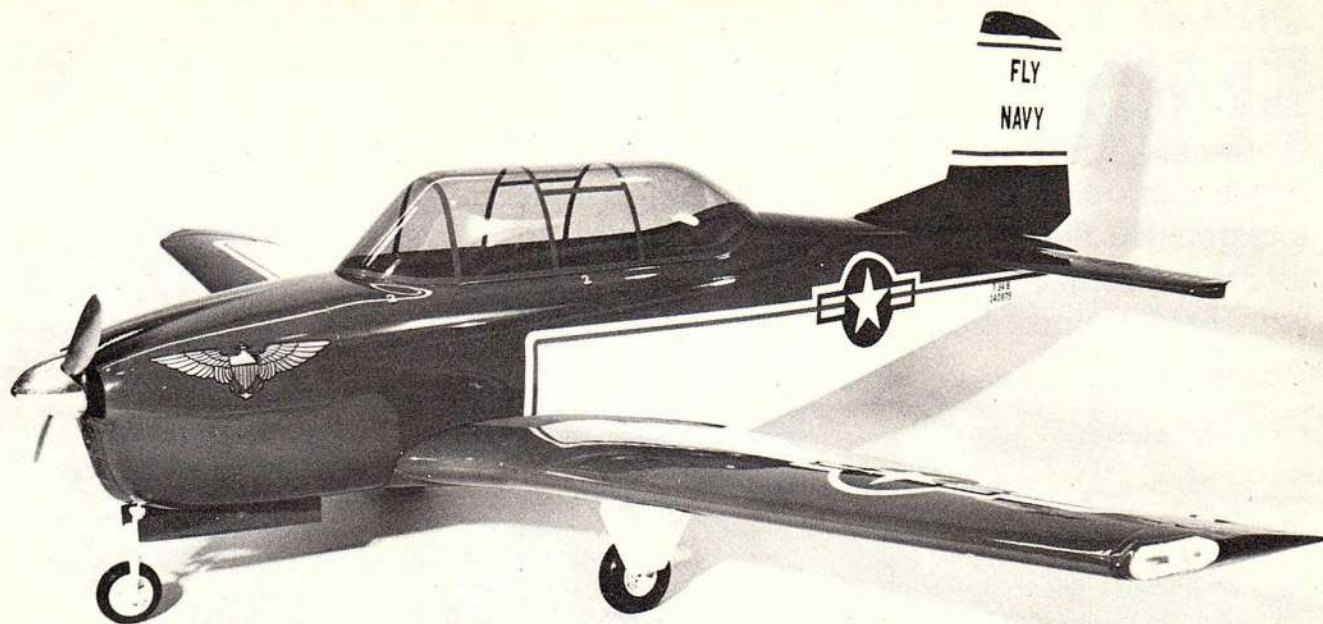
(FOR GIANT SCALE GASOLINE ENGINES)

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- SAFE. KEEPS HANDS AND ARMS OUT OF THE PROP ARC.

\$5⁹⁸

(SEE YOUR DEALER)



The hit of the show was the Byron Originals' Beechcraft Bonanza series. The military T-34 Mentor conversion, shown here, was only one of four possible variations from the basic kit.

THIS WAS TOLEDO

A shocker of a trade show, this year's event wasn't typical at all. We left undecided as to whether we had seen anything new, and we were bemused as to what trends and indexes the show predicted for the future.

By Patrick H. Potega, Executive Editor

Photos by P. H. Potega and George Jenkins

We've been going to Toledo each year for as long as we can remember. Somewhere along the way we lost count, but we started this annual madness at least 18 shows ago. Not that this makes us any sort of expert, or qualifies us for anything (except perhaps where to dine or stay in Toledo), but we have learned the professional journalist's skill of assimilating a lot of seemingly divergent information, and distilling it into a simple (often overly simplistic!) overview. Not that we're bragging, but we are usually close to hitting the mark when it comes to evaluating the show. We were right

in seeing the movement toward big airplanes, and we saw ducted fans as a really practical commodity when everyone else said it was going to be a flash-in-the-pan. Making pretense to being a crystal ball gazer is risky, but we just seem to be right about the industry trends more often than we're wrong.

This year's Toledo show seems to have thrown us a curve ball. All our bravado about seeing trends was shot down when the '81 show took shape. We were predicting, in our own mind, that 1/4-scale would be the hands-down hit of the show. But, we also expected .60-sized kits to make a

strong comeback, after their notable absence in any numbers during the past year. We even thought, because of the unstable economy, that the budget appeal of Schoolyard Scale would cause a revitalization. Needless to say, we got some surprises.

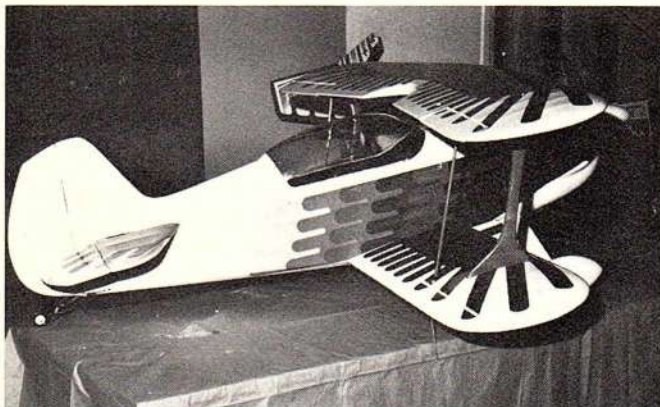
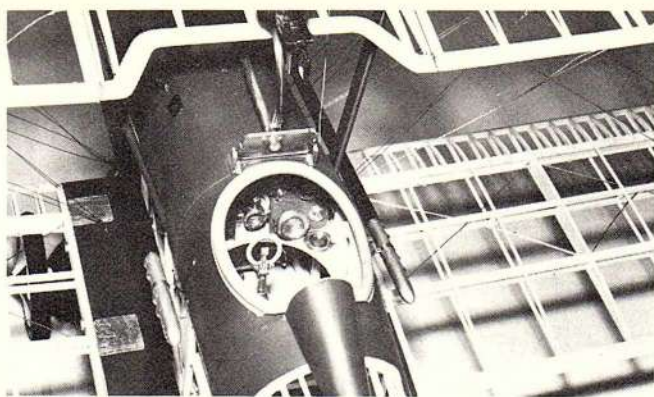
Scale is not an inexpensive hobby to pursue. Kit prices have soared astronomically . . . how about \$700 for a Quadra-powered P-51!? Even if you spend less than \$150 for a good kit (not an easy thing to do these days), the accessories can break the bank. Engines are worth more than silver, per ounce! Wheels, tanks, resins (all petroleum-related items), escalate quicker than one's bank account. On the average, the *typical* Sport Scale kit probably winds up costing the consumer \$500-\$600 (not including radio!). A contest caliber plane can easily withdraw \$1,000 from your savings.

At the time of this writing, the economy is still in a very sensitive condition (the space shuttle launched this a.m., just to establish a reference) The Toledo Show reflected that stagnant economy. Overall sales, according to numerous sources, are down. Scale is doing stronger than ever, primarily because it delivers the best enjoyment and satisfaction quotient to the modeler for the time and money invested. Modelers are building as much as ever, of course, but they are doing one or two super projects per year, instead of trying to build everything they can get their hands on. Pattern is dying quickly, as an event, and Pylon is virtually a lost cause (we saw only one racer at the Show!).

The economic factors which "man-



The sleeper of the show was this 40" span S.E. 5a. Over 700 parts in this museum-quality kit from MiniCraft/Hasegawa. Price will be about \$300.



Of the numerous Christen Eagles at the show, this A.R.F. version by Higgins/Contempo looked the best. Unusual foam and epoxy construct, and designed for chain saw engines.



From Executive Design, a magnificent Monocoupe 90-A, done in quarter-scale for .90 engines. A slick kit.



Quarter-scale Stearman, from Barron's Scale Classics, available as a plan set. 75" span biplane uses a chain saw engine.



Wendell Hostetler's booth shows his beautiful giant-scale Acro, P6-E, Jungmeister and Liberty Sport. All sold as plan sets, with accessories.



T & D Fiberglass showed their new semi-kit (no wood) of the Christen Eagle. The 63" span model should fly fine on a .90.



Vito Tomeo showed his 1/5-scale creations. Both the Judy (an upcoming article in SR/CM) and the Tempest are available as plans. His .90-size Sea Fury is also a plan offering.

ipulate" this hobby are numerous, and intricately inter-related. The old saw that "this hobby was born in the Depression" doesn't necessarily make it follow that the hobby will flourish in a recession. This year's show graphically illustrated that the hobby is taking a conservative economic posture . . . i.e., don't spend a lot on R & D. Today, when money gets tight, the public has plenty of alternative outlets for recreational activity. Everything from jogging to roller skating, as well as good ole TV (notice how home video equipment is booming) are all alternatives to building models. Carving solid wood models may have been the way to spend a weekend in 1930, but today's money-restricted person has many other ways to spend his time (and money).

If we had to give a synopsis of the show . . . say it all in one sentence . . . it would read: Toledo '81 was limited in major airframe efforts, heavy on imports, and the primary focus was on accessory and secondary items.

We knew something was wrong the first day. We set up our special photo room, which we do each year to make sure our readers get a good look at the newest and latest items as soon

as they are unveiled. After the first day of shooting, something seemed very different from previous years. There were over a dozen rolls of film already "in the can," and we had only photographed three new airframes among all the other products we had shot. The remainder of the photos were of accessories.

The name of the game this season was ancillary items. Gadgets and goodies abounded. Newfangled hot-shot stuff to make life easier, more fun, safer and better were shown in almost every booth. Better linkages, carburetors, fail-safe devices . . . and every other conceivable type of "whatchamacallit" . . . was on display. Another trend we noticed was a lot of "preview" items. It's not unusual for a manufacturer to "test market" a possible new product by bringing a prototype to the show. If it goes over well, he starts production. If no orders are received at the show, he has saved the expenses of tooling and manufacturing.

Sure, there were some major new kits on parade in the halls. Byron's Bonanza "series" was most impressive with its T-tail and military variants. For .60 engines, this is one model both beginners and experts will appreciate, which is probably

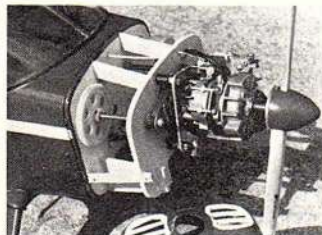
why it was the undisputed hit of the show. Top Flite introduced a J-3 Cub for .40 engines (a surprising departure from the WWII fighters which have become the mainstay of their scale line). Hasegawa unveiled a superb scale kit of the S.E.5a, for museum scale, which will be distributed by MiniCraft for about \$300.

If one were looking for new scale kits, they were to be found not sitting on the manufacturer's tables; but rather they were hung and strung from ropes, wires and cords. Too big to sit on standard 24"x8' display tables, the new kit releases were primarily of the 1/5th and 1/4-scale sizes. Byron's ultra-special kit of the P-51 (available at last!) was the big excitement of the show. Platt showed a 1/4-scale Great Lakes, while companies as divergent as Hobby Shack, Higgins/Contempo, Coverite, Wendell Hostetler, T&D and even Midwest made commitments to the big airplane movement.

We hadn't gotten many aircraft photos because almost all of the new planes were too big to easily transport to our photo room. The same trend held true as the static display tables filled up. It took no more than a pair of monster models to fill up a table. Don Godfrey's gargantuan



REALISTIC MODELS PRESENTS NEW 1/4 Sport Scale 1947 STINSON VOYAGER



Specially designed motor mount easily accepts Eastcraft Lectra-Start. Sold separately at \$129.95.



Leaf spring tail wheel and highly detailed, vacuum-formed fins and rudder.



This top-quality aircraft has been designed from the ground up, with pre-cut interlocking aircraft-quality plywood and AAA balsa for maximum strength and easy construction.

Features:

- Functional Doors
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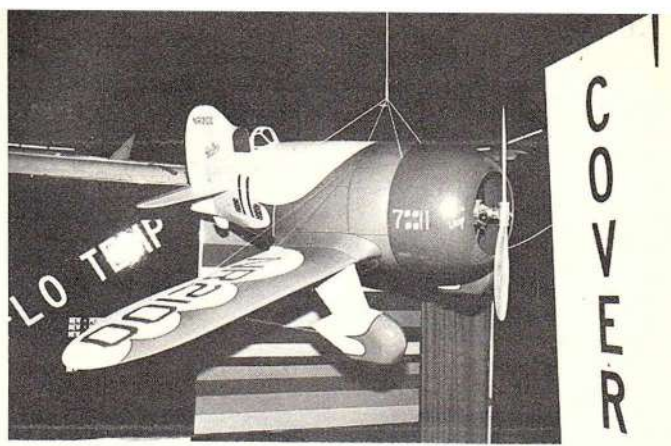
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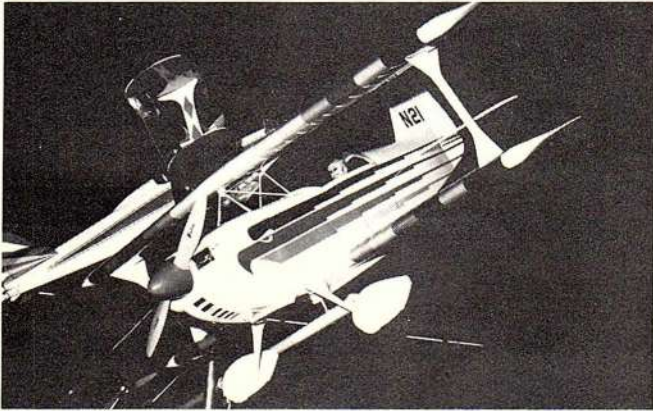
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Platt's 1/4-scale Great Lakes Trainer is meant for a Quadra. A real departure from his usual 1/5-scale line.



Gee! That Gee Bee is sure nice. This time a big .90-sized one from Coverite, as a full-blown kit. Designed by Henry Haffke.



Cass Engineering is offering a balsa, glass and foam kit of the Christen Eagle. For Cass Drive or a chain saw engine.



Starduster "Too" is a plan offering by Dario Brisighella. At $3\frac{1}{4}" = 1'$, the biplane flies nicely on a chain saw engine.

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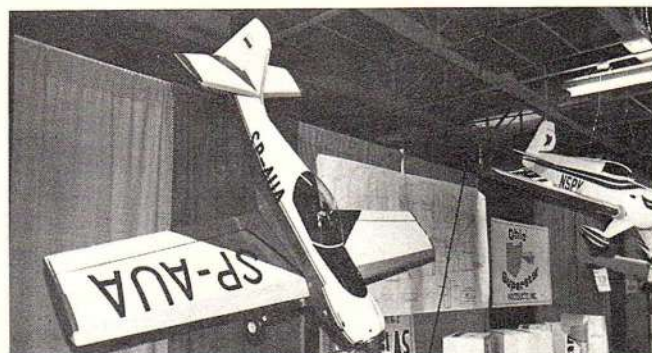
R/C Kits featured a 1/4-scale Chipmunk. Very aerobatic on a .90.



The Svenson booth again featured their Stampe and Feiseler Storch. Designed for .60-.90 engines.



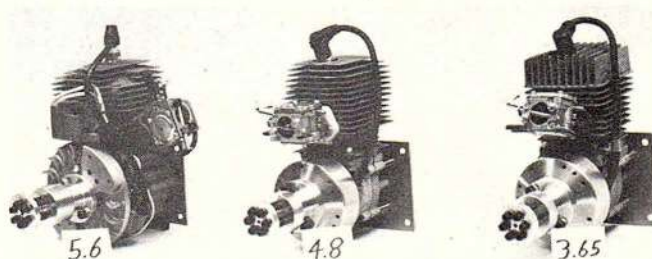
From Canada, the J-5 display was of their Stinson Voyager and their popular Zenair.



Ohio Superstar made a hit with their big Zlin, for a .90 engine, and the Super-Fli for .90 and larger power plants.



Hobby Shack has gotten into the giant-scale movement with a line of exclusive imports. The Decathlon, Tiger Moth and Pitts are soon to be joined by other new designs.



The Roush Mfg. booth displayed three new oversized chain saw engine conversions, in the c.i. displacements designated. Quite a trend this year toward larger engines. All engines from the Kioritz line.

B-25 (with two Quadras) was perhaps the ultimate example of where these big airplanes are headed . . . the plane was so big that the fuse is transported in two segments! We apologize to our readers for photos of models with distracting background items, but the only way we could even get photos was to shoot them where the models stood.

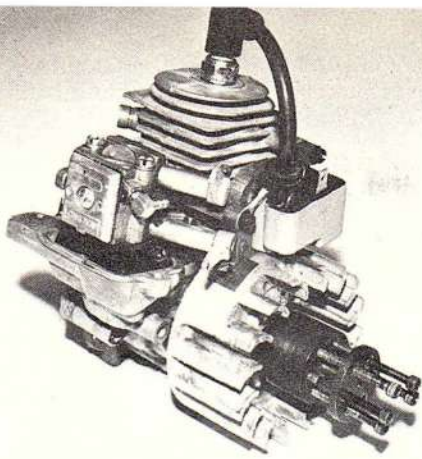
Speaking of Giant Scale, the most oft asked question we had at the show was when *Scale R/C Modeler* would be bringing out more of our special "Giant Scale Models" issues. For numerous reasons, we are not currently planning any issues exclusively dedicated to large aircraft. For one thing, the import and impact of the two specials we did were meant to stimulate the early growth of this movement. We wanted to get the word out to the maximum number of people, so we virtually coined the term "Giant Scale" and spread the

word about this then infant movement. Now, with Giant Scale so well received, there really isn't the urgency or immediacy at hand. There are two excellent newsletters by the QSAA and IMAA which do a superb job of covering the field of big airplanes, and they are doing more to spread the word than any magazine could ever do.

But, above and beyond all of this, the very fact that we were segregating Giant Scale out of the normal mainstream of scale modeling raised some issues of concern. There has always been a nagging problem about making these big airplanes look "outside" the scope of normal modeling activities. Several learned minds even questioned whether, with issues of size limitations, legalities of insurance and the like, whether we were not making a strong case for "the opposition." The theory was that, given an accident involving a large

airplane, whether we had inadvertently given the plaintiff some ammunition by showing that we considered these planes to be "outside" the realm of "normal" modeling by dedicating special issues to it. With that sobering thought in mind, we resolved to incorporate big scale activity into our regular issues, thus adding further legitimacy to it.

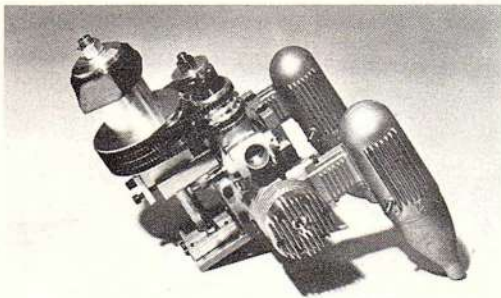
From a strictly practical point of view, we also learned a lesson. If you want to get the word out to the maximum number of people, you don't publish a special. These are often poorly distributed or, as we found out, sold before anyone can even locate a copy. The best way to spread the gospel of "Bigger is Better" is to keep exposing Giant Scale in each issue of a magazine that you know a lot of people are going to get to see. Big airplanes have long outgrown the "special issue" category of magazines.



The "Magnum II," from Higgins/Contempo, is a new Homelite 2.6 c.i. engine. Rated at 3 hp (26-27 lbs. thrust @ 7,500 rpm), the engine shown here is an incomplete prototype. Electronic ignition with magneto featured.



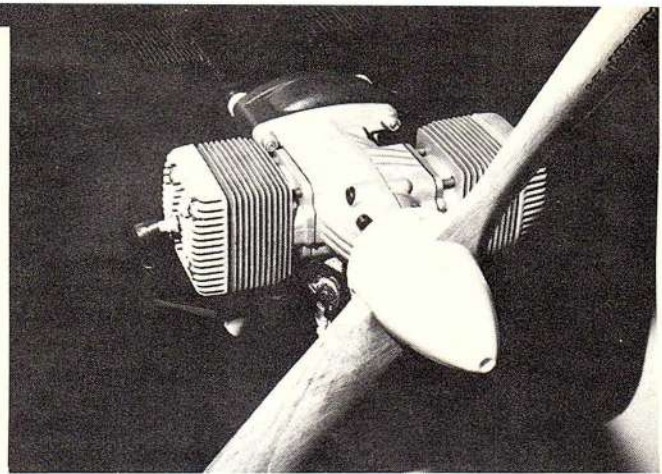
The Webra solutions to the big airplane power plant problem include (clockwise from the bottom), the twin geared .61s (\$480!), the planetary geared Speed .61, the .91 4-cycle, and the .91 Speed in its geared configuration. Available from Circus Hobbies.



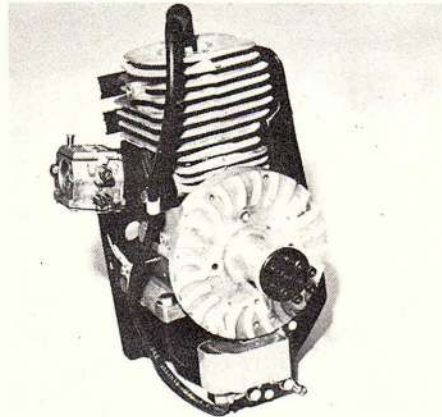
A new company, A&M Aircraft Supply, showed a series of single and double belt-driven power systems. The Whirlwind Twin, shown here, is meant for two engines in the .40-.90 categories.



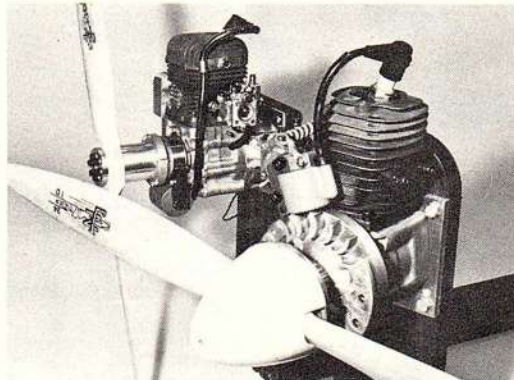
Special high-performance exhaust manifold, imported from Germany, is designed for the Quadra. Check with Trail Mfg., or Dario Brisighella for more info.



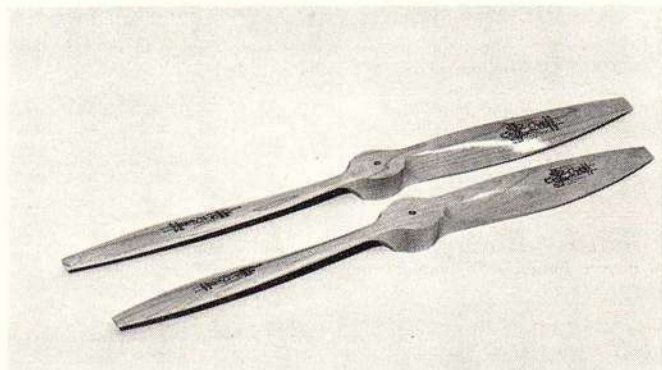
The opposed twin Tartan engine, from World Engines, offers a nice solution to getting power without a big engine.



The J.C. Enterprises 3.7 c.i. engine is still in the developmental stages, but it shows promise. Features self-advancing timing, for easy starting.



From Gibbs Research, two Kioritz engines. The 3.9 c.i. (front) swings a 24-10 prop at 6,000 rpm, while the engine in the back is the standard Kioritz 2.4 c.i. power plant.



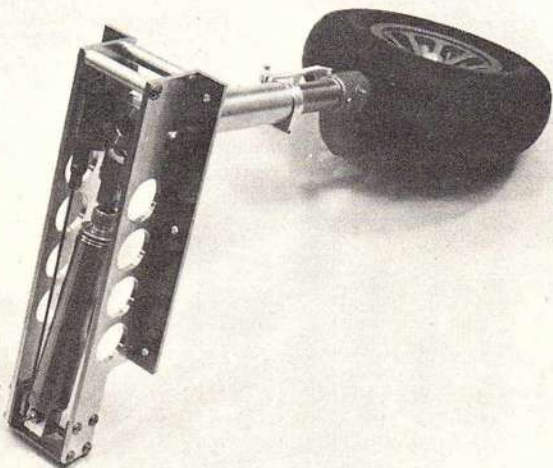
J & Z is showing their ultra-large props, in 22 and 24" diameters. More pitch, for better performance.

Converted chain saw engines—and the attenuating accessories and hardware—abounded in Toledo this year. Every major two-cycle engine manufacturer was represented: Kawasaki, Homelite, Kioritz, and McCulloch. Manual and servo-driven chokes, engine mounts, mufflers and exhaust

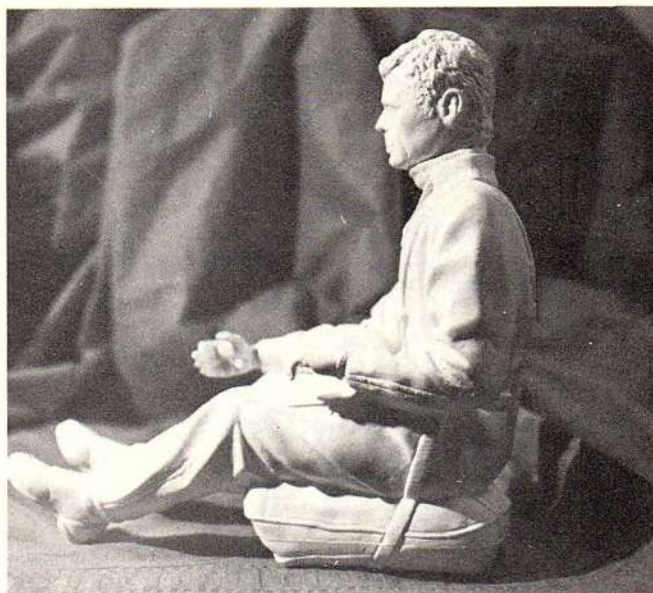
stacks . . . they all appeared in profusion. Engines of larger displacements seemed the trend. To follow this up, the radio manufacturers all touted the "heavy duty" servo that could, in the case of Kraft, literally lift a bowling ball.

Even though the quarter-scale

movement got the bulk of the attention, the primary thrust this year was in accessories. One of the biggest secondary items at the show was plans . . . someone was walking around with a catalogue of some 300 Giant Scale plans. This tells one something: the major expense of de-



Exciting new Giant-Scale retracts from Annco (they used to make servos years ago). Beautifully machined. Designed for Nosen-size models. Scale P-51 wheel is 6 1/2" diameter, and is sold separately . . . all cast and machined hubs!



Big 1/4-scale pilot is a projected new release from Du-Bro. Price range is expected to be about \$15.95. Nicely detailed.

Dave Platt presents . . .

THE ULTIMATE

Spitfire

The legendary beauty and efficiency of the Spitfire has always made it an attractive choice for an R/C model. Happily, it proved to be a good-flying subject, with performance equal to its aesthetic appeal. Consequently, there have been many kits for Spitfires. Some were better than others, but none was truly right.

Now the emergence of 1/5 scale has enabled us to design "the ultimate Spitfire". Accurate to the last subtle curve. Magnificent indeed just sitting, it is simply awe-inspiring in flight!

Powered with a .90 to 1.20 glo engine (or a Maximizer) for realistic flying speed, our ultimate Spitfire will provide an intense experience for the sophisticated R/C modeler.

Scale 1/5 full size □ Span 88" Length 76" □ Weight 15 to 20 lbs.

Kit Includes: 2-sheet full-size plans show everything -- installation of retracts for mains and tailwheel, details of sliding canopy, etc. Cut and machined wood parts; wire; nylon goodies; fiberglass cowling; functional scale spinner; formed canopy and exterior details.

Optional extras: Retracting L.G. System, 1/5 scale fighter pilot figure, scale non-flying prop.

KIT PRICE \$249.00

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(Clipped wing version shown -- plans also show full wing)

veloping and prototyping a full-blown kit (in almost any scale) was being eliminated, in favor of marketing the same model as a plan set, or semi-kit. It's safer to sell a \$30 set of plans, and maybe a cowl, wheel pants and canopy, than to risk trying to recoup the investment in several hundred kits at \$150 each. A couple of kit manufacturers are even altering their product so that the modeler



Dave Platt showed his "sportsman" version of his 1/4-scale pilots. These are almost miniature statues, they are so realistic.



From Aerolite comes a healthy stainless steel turnbuckle, along with swages, cables and all the goodies for giant scale.



The keys in the photos give some scale reference to this high-performance starter for chain saw engines. Works off 12 Volt battery supply. Available soon from Dario Brisighella.

(Continued on page 26)

72 INCH SPAN, 10 LBS.

FOR TWO 40's & RETRACTS. ALL Balsa CONSTRUCTION. 28 MOLDED PARTS INCLUDING WINDOWS, COWLS, NOSE, FULL INTERIOR & GEAR DOORS. PLANS, INSTRUCTIONS, AND 3-VIEWS.



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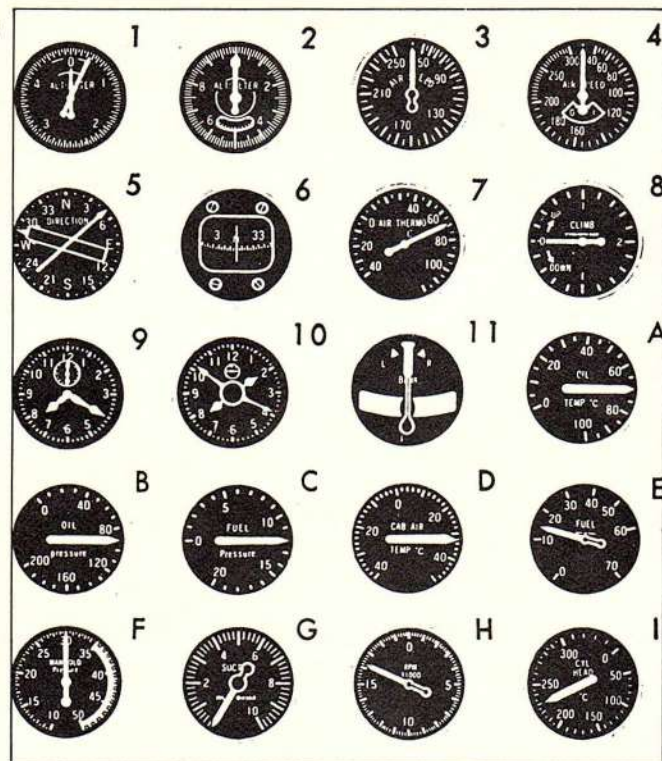
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Du-Bro showed their 1/4-scale ball-links, and their heavy duty hinges, with cotter pin hinges.



Tatone has a new set of instrument faces for giant scale. These are 13/16" diameter, and come with metal bezels and plastic face covers. Nicely done.



Top Flite's new 77" span J-3 Cub is big and impressive, yet it needs only a .40 for power. Very nicely done.



Midwest's J-3 Cub is an all-foam version, for .09-.15 engines. The military L-4 version shown here by Jim Newman, will be illustrated in the kit.

22 scale r/c modeler



The popular PBV Catalina is being marketed by Mr. G's. \$400 kit features lots of epoxy/glass items, with foam flying surfaces.



Sig's Kwik-Bilt P-51 has been redesigned, to the point that it fooled everyone who saw it . . . we all figured it was wood or fiberglass. Should be highly competitive.



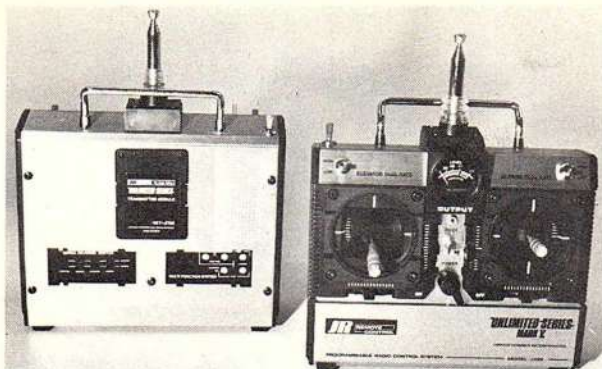
Fiberglass fuse and foam wings on this Skylane from Italy highlight a new kit. The Aviomodelli kit is being imported into Canada by Socadimo. .61 engine.



Teenie-weenie P-51 is being imported by Circus Hobbies. Cute model flies on .049-.09 engines, with 2-4 channels.



Highly detailed Spirit of St. Louis can be R/C'ed with rudder only and .020 power. Flyline is back and growing stronger in the mini-scale area.



The new JR Radio's "Unlimited Series" incorporates many of the finest features of European programmable radios. Loaded with luxury features to make scale operations more simple.



ProLine is now a subsidiary of ACE R/C, and they plan to put the radio back on top as the leader in quality and precision.



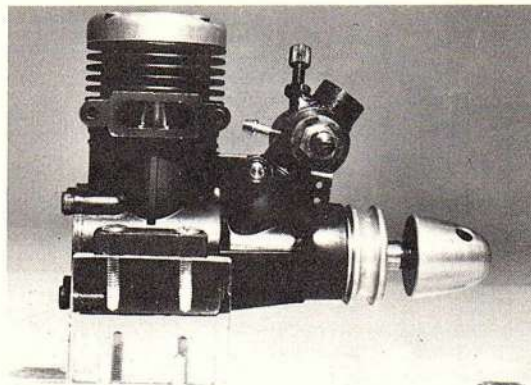
Kraft's "K-Line" series is a new imported low-budget radio. Five channels, complete with ni-cads, for \$229!



Airtronics now has a five and seven-channel system in their line, with all the deluxe features of their other systems.



Royal Product's Titan servo is a shocker, with lots of quality for under \$20!



Midwest Model Supply unveiled the new HP Goldcup .20. Ideal for smaller scale projects.

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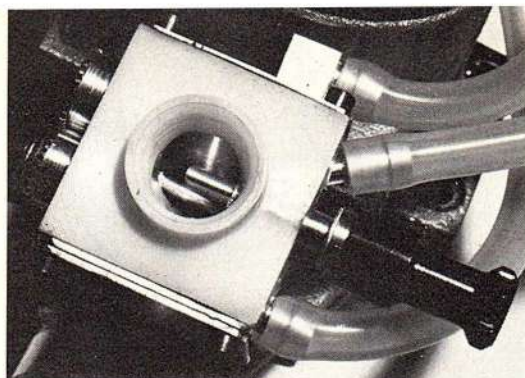
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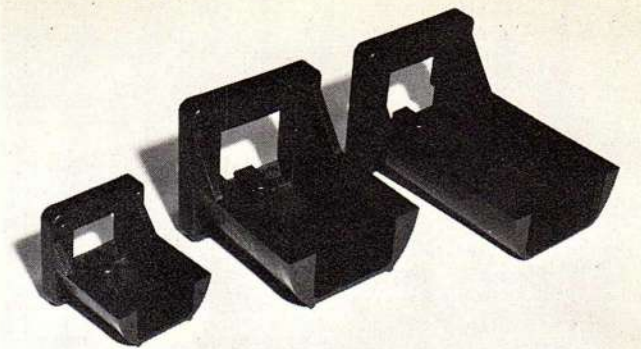
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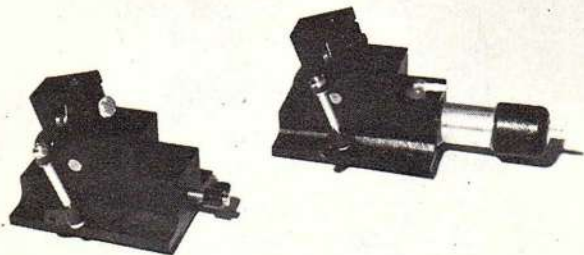
TOLEDO



Robart unveiled a prototype for a new concept in carburetors. It has a bifurcated throttle barrel, and will have optional internal pump and auto-mix.



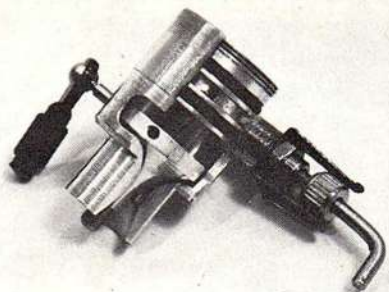
Hayes Products showed its full line of improved glass-filled engine mounts. In sizes from .049 to .91, they are strong and light.



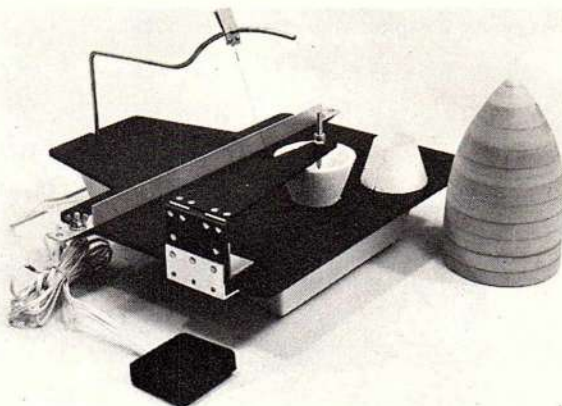
B & D Enterprises has retractable tailwheels in both mechanical and pneumatic options. Compact, yet strong enough for many large aircraft.



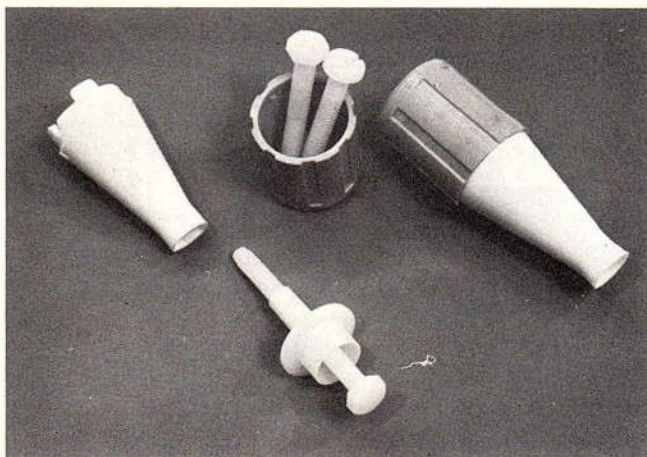
Cockpit kits and ordnance, in molded ABS plastic, can be purchased from Dave & Al's Products. A very impressive list of accessories.



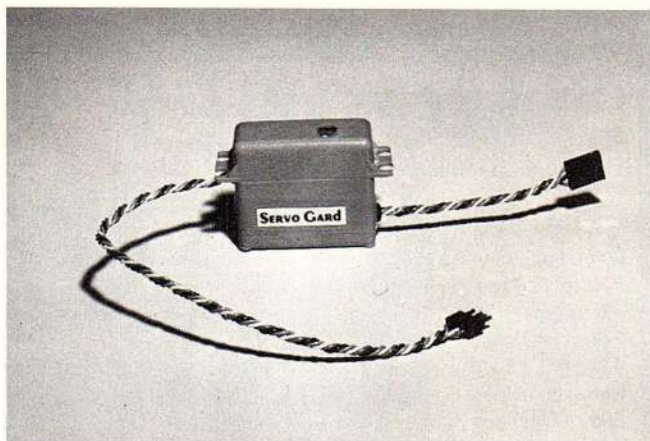
The M & H variable venturi is a new approach to carburetion. For scale, it would mean no large intake orifice to ram air into the venturi. Limited production.



Foam cutter that can make cones, cowls, etc., is being marketed by Royal Electronics. Lots of possibilities for scale.



Handy wing nut wrenches, from Sonic-Tronics, as well as wing bolt reinforcement ring (middle) make getting it all together a little easier. Company now owns Phoenix Hobby Products.



Servo Gard will instantly take the engine to low throttle if there is a loss of signal or drop in battery current. From R. F. Enterprises, it just plugs into the system.



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can get the plane by ordering a semi-kit and supplying his own wood. The fact that customers are demanding this indicates that the modeler wants to spread out his investment in a plane, by buying the wood and materials only as he needs them.

Gadgetry is nice. We personally like to tinker with goodies which make our engines, radios and airplanes operate better. We're suckers for any electronic box that promises to perform magic. We scale buffs like to put that something extra in our models. We always succumb to ads which claim that a little \$20 goodie will tell us when we are about

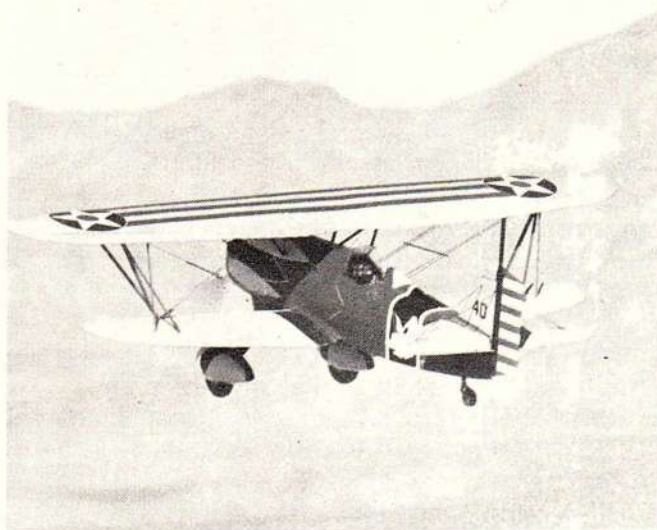
to lose our model. We like blinking navigation lights . . . as a matter of fact, we love anything that folds up, moves on rails, articulates, droops, releases, rotates, ejects, falls off on command, moves in the cockpit, etc.

Ironically, a slow economy may foster the growth of the low-dollar gadget market, but the same economy is actually antagonistic to the success of these types of products. Let's face it, most of these gimmicks and gadgets are "extras" . . . we only buy them as luxuries. When money is tight, we stick to the staple necessities (wheels, tanks, fuel pumps,

etc.) and we tend to shun the "non-essentials."

As we walked the crowded halls (attendance appeared to be down a bit this year), we did see plenty of superb scale kits. Sig has revamped their P-51 in the Kwik-Bilt series, and one would be hard pressed to tell that it's a plastic-shelled airframe. Many of the better scale kits, quite frankly, were imports. Hobby Shack had some Pilot kits on display, ranging from .40-sized WWII fighters to a 1/4-scale Tiger Moth, which were truly outstanding. Cir-

(Continued on page 76)



George Rose finally got the laurels, as his oft-campaigned Curtiss Hawk P6-E took "Best of Show" honors.



Vito Tomeo's magnificent Sea Fury (featured in our December '80 issue) took top honors in the "Military Stand-Off Scale" event.

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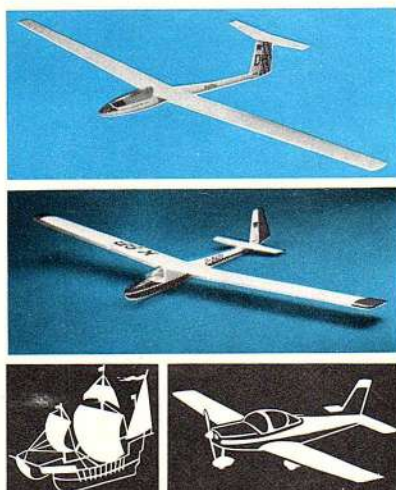
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Accessories for No. 4255 include; No. 118, Pylon engine mount. No. 93, Spoilers. No. 94, spoiler coupling and No. 68, towline release mechanism.

CIRRUS 75 (No. 4254) Quickie kit with ready-formed epoxy fuselage and R/C installation accessories. Foam wing, balsa-veneered, Wingspan 9'3 1/2".

K88 (No. 4259) Quickie kit with ready-formed epoxy fuselage, finished components, and R/C installation accessories. Carefully patterned after its full sized counterpart. Wingspan 9'2".

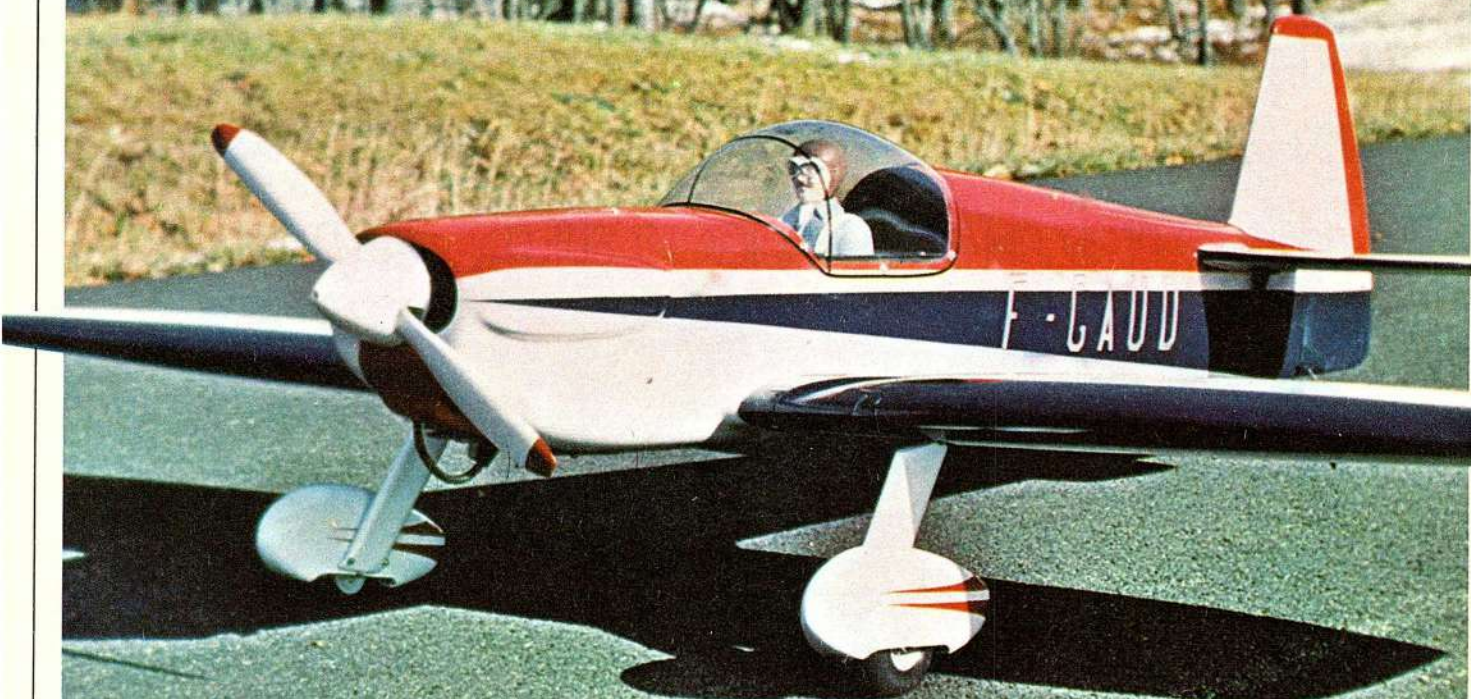
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GIANT- SCALE CAP 201

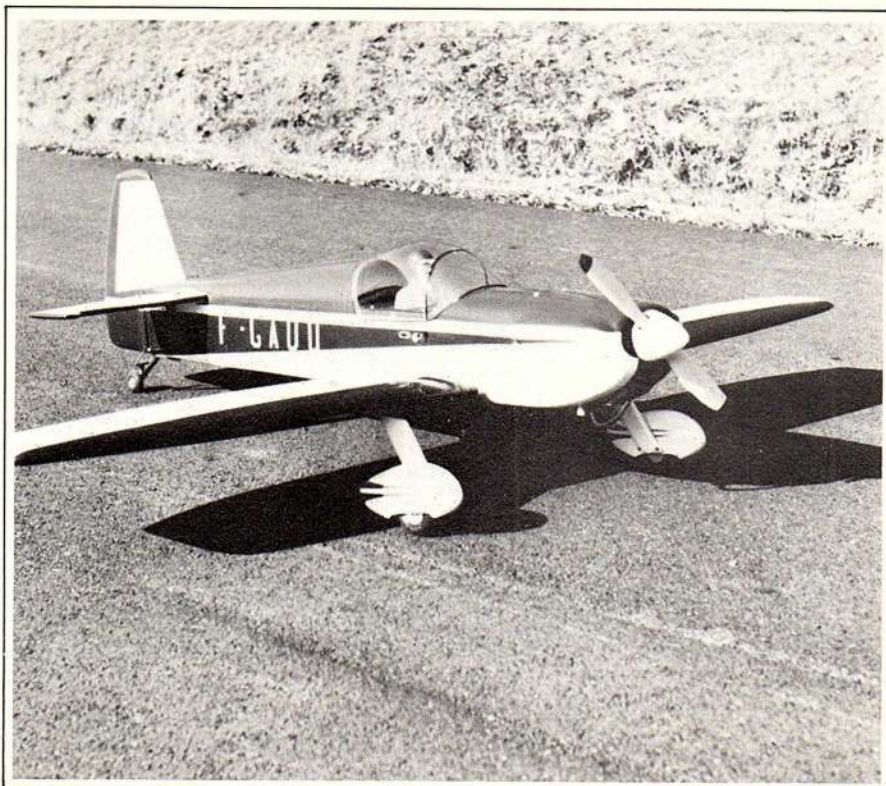
The latest technology makes this aerobatic machine one of the best A.R.F. type models we've ever seen. By David G. Richardson Photos by the author

If what's ailing you is that you are just plain tired of competition, and you have been thinking of getting into the leisurely pace of giant-scale, then maybe I've got a special treat for you. I'm sure that you, like me, had some minor reservations about such a major shift in flying styles. Maybe you drive a sub-compact car. Perhaps you really enjoy the thrill of a Pattern-type airplane, which can do more than putt-putt around the sky. There's also the question of building time, with many of these behemoth projects taking up to a year to complete. Quarter-scale seems appealing, but there also seem to be some real shortcomings for many of us.

But, what if I said that there was a kit on the market that could be ready for paint in about 25-30 hours, which has plug-in removable wings for easy transportation, and that flies even better than many aerobatic models? And it is as scale as you could want, to boot! If this has got your attention, then the Higgins Aero Company, Inc. CAP 20L is what you need. This 3" = 1' scale version of the popular French aerobatic monoplane is not unique to the modeling world. Bridi has a kit of one, and the model has been done in plan form several times. Of course, the reason is that it is one heck of a great flying model, in any scale.

What makes the Higgins version so significantly different is that it is a very unusual type of A.R.F. kit. The wings unplug, which solves those transportation problems. Higgins has developed a process which mates the strength and durability of epoxy/glass with the light weight and resiliency of foam. Each component is formed with white gel-coated epoxy/glass over polyurethane foam. What results are wings that have very smooth surfaces, almost ready to paint, and a straight and true fuselage. Weight is surprisingly light, of course. All of the basic components are painted with lacquer thinner, and require only slight filling and sanding prior to painting.

I have been into quarter-scale since the beginnings, having built and flown one of the first of Don Godfrey's Stearmans and I even scratch-built my own design of the Waco UPF-7. These big airplanes are nothing new to me, but building something almost totally pre-fabbed was a very unique experience. I was attracted by a construction process which afforded the best of both worlds . . . I could have the strength and ease of finishing which epoxy/



With plug-in removable wings, the Cap makes a handy travel package. Span is a big 81 inches.

glass allows, with the vibration resistance (important with chainsaw power plants), and light weight of foam.

Other than the basic airframe components ((wings, fuse, stabs, etc.) the kit also has a profusion of extra hardware. The canopy is molded acrylic, not butyrate. A 1 x 1-3/8 x 21-1/4" oak beam serves as the mounting plate for the landing gear and the wings. A C.B. tailwheel is included, as well as C.B. hinges and horns. As usual, all that's needed to finish the kit are paint, glue, engine and radio. With that in mind, the \$329 price tag becomes very reasonable. I don't know what kind of price tag you put on your time, but I estimate that the hundred or so hours that I've saved in framing up and preparing an airframe for painting would probably come to about 75-100 hours. Even at a dirt-cheap \$1.00 per hour, that's still a heck of a deal!

The fact that the basic framework of the model is achieved with polyurethane foam (not the white polystyrene foam) means that the model is not subjected to the vagaries of solvents, glues, etc. In reality, the entire construction is done with either a slurry of epoxy and microballoons or with Hot Stuff. You'll find the epoxy/microballoons a very pleasurable medium with which to work.

Of course, the polyurethane foam is impervious to fuels, gasoline, and almost all paints and thinners.

Normally, I wouldn't bore you with the basic construction of a basic Almost-Ready-to-Fly model, but the CAP 20L is so unique that I'm going to give you some highlights of the more interesting (and different) fabrication procedures. You'll find that your experiences with standard balsa kits won't gain you much here, and any previous dealing you've had with foam airplanes won't matter much either. As a matter of fact, since most of the construction is such a departure from normal building practices, there's no reason to suspect that a relatively inexperienced modeler could get the job done. Do bear in mind that all the steps which the builder does execute are critical ones (aligning the wings, tail surfaces, etc.), so it should not be assumed that sloppy workmanship will be acceptable.

The first thing that is done is that the dihedral board in the kit is divided into two 36" sections, and an 8" center piece. The platform is jiggled to give the required 1" dihedral (it's actually anhedral, since the board accepts the inverted wing). There's just enough dihedral in the CAP to eliminate that droopy wing tip appearance. The foam cradles from the cores are bonded to the assembly, so that you now have a jig in which to position the wing and fuselage structure.



While the smooth exterior would never divulge it, the CAP is a foam and epoxy-laminate model. Unique blend of these two materials yields light weight, super strength and quick building.

That huge piece of oak is then drilled to accept the landing gear. The wheels stay permanently on the "spar" over which the wing panels slide, so that the fuse always sits on the main gear, whether the wings are attached or not. U-boxes are fabricated over the oak beam. These will form the receptacles into which the wing beam will slide in the cores. I covered the last 7" of the beam with masking tape, to approximate paint build-up later. The foam core is marked and a channel for the U-box routed out. Once the cores are positioned in the cradle, and the beam fitted, the boxes are secured with slow curing epoxy and micro-balloons.

Because this is a fully aerobatic airplane weighing 17 pounds, a rear spar is also used. This is brass tubing and a rod system, much as those found on sailplanes. The ailerons are already molded into the wing, and they must be cut free and capped. This can be done by either sealing them with epoxy, or by bonding 3/32" balsa facing to the exposed foam ends. The aileron servos are mounted one in each wing, to give positive control. Most radios have no problem with long pigtails from a Y-connector, but if you have any doubt, contact your radio manufacturer or a service center.

Believe it or not, getting the wing positioned and installed actually constitutes about 80% of the pre-paint-

ing work on the model. This is a critical area, of course, so a lot of time is spent measuring, checking and double checking.

Matching the fuselage halves for a flush fit may look like a problem, at first. During shipping, the parts may have taken on a slight twist. But, epoxy/glass has a memory, and will return to its original molded shape when coaxed. Simply weigh down the halves on a flat surface, and they'll be straight the next morning. I found it easier to assemble the tail wheel assembly and firewall into one of the half shells, then to join the two halves. The Quadra is installed with 1½ degrees of side thrust and about a half a degree of down thrust. The Quadra installation requires ¼" spacer on the firewall to get the correct prop clearance outside the cowl.

After smaller items like the cowl and wheelpants are prepared, you are ready for painting. Do all filling and patching with acrylic glazing putty. The kit includes documentation for three different paint schemes. Most any type of paint will go over the acrylic primer already on the model. I opted for acrylic paints, because they are lightweight, and can be rubbed out.

This is a big airplane, with an 81" span and 1,220 sq. in. of area. Regular servos seem more than adequate, even though the model is fully aerobatic and lots of throw is called for on all the surfaces. With a Quadra, the CAP 20L is fully capable of going almost straight up! For some reason, the model seems to like to fly inverted better if about 2 degrees of down thrust are added. This will

eliminate any need to hold in some down stick. Note that the plans call for differential in the elevator linkages, so that there's more down than up.

Were there any problems with the Higgins kit? To say "no" would be unfair, but to turn around and say "yes" is also misleading. I had one of the very early pre-production kits, and there was some shipping damage involved when I finally received the kit. As a result, I had to do a lot of unexpected filling and repairing to the external shell. I took about a hundred hours of work to get the model flyable, but even then I had to clear the bench and set up my camera for construction photos which the manufacturer wanted. I found some rough moldings and air pockets, but I understand that today's kits don't have any bad lay-ups. I have no reason to assume that the manufacturer's claim of being able to complete the CAP in 30 hours (ready to paint) is entirely realistic.

With my luck, I always get caught up in these magazine projects in the dead of winter. The weather was actually decent up until the week I began to do the final trim on the model. By the time I was ready to test fly, the weather had turned from the nicest we had all year, to the worst I've seen in a long time. Test day was a gale wind and temperatures so cold that I was surprised the engine didn't freeze!

Braving all my courage (and with the help of long underwear), I managed to get in two very hairy flights in totally gusty air. On the basis of some thirty minutes of accumu-

lated flight time, my conclusions are as follows. The CAP 20L is extremely stable and yet responsive. Even in the turbulent air, I tried several full stalls and each time it fell forward, with no tendency to snap or spin.

My Quadra-powered version weighed 19 pounds, some two pounds over the recommended factory weight (probably because of the extra fillers needed). Yet, the model cruised easily along at about 1/4-throttle. At full bore, the CAP would do virtually anything in the book. As mentioned, a little too much down (i.e., up) trim was needed when inverted, but the added down thrust should cure that. Once you have progressed to the "hot dog" pilot stage, the throw on the ailerons can be increased slightly. I understand that the official pilot for the company, Corky Hietman, can do sustained knife-edge and Lomcevak.

Darrel Higgins, owner of Higgins Aero Company, had some of the same frustrations I had in trying to find good weather in which to test his models. In frustration, he picked his entire company up and moved to California. The ads which have appeared in the magazines until now have been incorrect in showing an



A Quadra provides enough power for vertical maneuvers. Aerobatics are as breathless as those of the full-size machine.

FOURNIER RF-4D



Big, 1/4 Scale Model for 4 to 6 function radio and -40 to -60 engines.

The kit is a slightly simplified version of Mick's WORLD CHAMPIONSHIP winning model.

LENGTH - 59 1/2 in (1.51m) WING SPAN - 110 in (2.8m)
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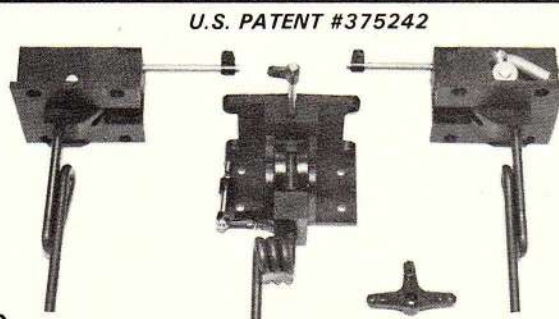
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B&D Enterprises

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Canopy screws on, to help minimize vibration cracking. This is one foam airplane that can have a luxury paint finish.

Indiana address. The correct address for the company is: Higgins Aero Company, 635-3 North Twin Oaks Valley Rd., San Marcos, CA 92069. Because the weather socked me in, the Editor agreed to not only get some more pictures of one of Darrel's machines to fill out the ar-

ticle, but he also said he would do some flying of one of the production kit models which was recently completed in his area. So I expect that you'll be reading a further flight report after my part of this article is ended; but let me conclude by saying that the advanced state-of-the-art incorporated into the Higgins CAP 20L makes it one of the most innovative, timesaving and quality A.R.F. models I have ever seen.

* * *

FLIGHT REPORT (Supplemental)

By Patrick H. Potega
Executive Editor

Poor Dave Richardson! He busted his backside trying to get his CAP 20L done for this article. So he made the deadline, but couldn't get any decent weather to photograph or fly the model. He did manage to get a few photos between snow storms, and he even sneaked in two flights one windy day. As it turned out, many of the photos were unusable, for one reason or another. So, we volunteered to help out with some extra photos. Darrel was having several of the models built by local fliers for use as factory demo planes, and he offered to get one together in time for deadline (a big advantage to an A.R.F. kit). As it later turned out, Dave sent along enough additional photos to complete the article.

Naturally, we didn't make too much of a fuss when we learned that Dave's flight report was somewhat incomplete, and that we (as an impartial third party), would have to prove that the CAP could do all the fancy maneuvers, such as the Lofthcevak, knife-edge flight, etc. Our thumbs were just itching to turn that spirited monoplane loose, for we hadn't flown a really hot giant-scale model since the Byron Pitts.

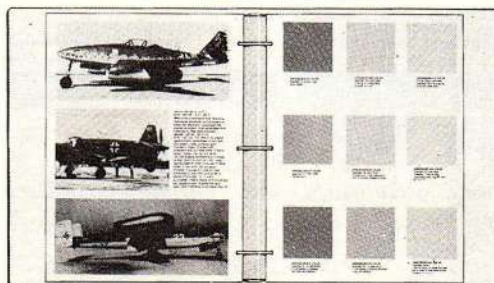
When Darrel arrived with the

(Continued on page 77)



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Retail value - \$181.20
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T-34B
Retail value - \$186.20
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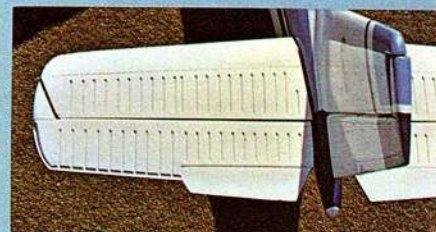
V-35B Bonanza
Retail value - \$162.44
Factory direct - \$138.08
(plus \$8 shipping)



Kit includes scale wingtip nav/strobe detailing.



Scale effects include molded louvered inspection panel landing light and grill plus scale nose gear strut, wheel doors, cowl flaps, engine exhaust & removable cowl.



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Wing Span - 68"
Wing Area - 1400 sq. in.
Length - 62"
Power Quadra engine or .60 Byro-

Kit highlights of our new Beechcraft Series

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- plus all necessary hardware and die-cut materials to complete model.

Model	Wing Span	Wing Area (sq in)	SPECIFICATIONS		Power (No Prop) Reducer required	Length
			Ready-to-fly wt.	Channels No. req.		
V-35B	66"	700	8-9	4-6	stand. .60s	53"
F-33A	66"	700	8-9	4-6	stand. .60s	53"
A-36	66"	700	8-9	4-6	stand. .60s	54 1/2"
T-34B	66"	700	8-9	4-6	stand. .60s	53"
T-34C	66"	700	8-9	4-6	stand. .60s	57"



MiG-15
Wing Span - 57"
Length - 55"
Wing Area - 600 sq. in.
Flying Wt. - 8-9 lbs.
Power - Byro-Jet Ducted Fan & .60 Engine.

MiG-15
Suggested Retail Value
\$170.68

Factory Direct Price
\$145.08
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1/5 Scale P-51D Mustang

Actual photo of model on final with operational flaps and scale retracts extending.

SPECIFICATIONS

WING SPAN 85"
WING AREA . . 1300 sq. in.
LENGTH 76"
Ready-to-fly weight . . 22½ lbs.
CHANNELS 4
(6 for flaps & opt. retracts)

Retract System

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Complete Power Package Included in Kit!

Consists of:

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Optional Pneumatic Retract System!

(Includes all necessary hardware)

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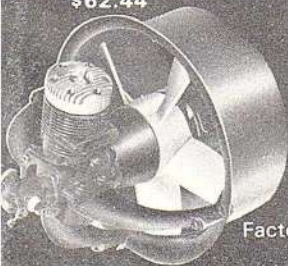
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Prices Effective June 1, 1981 (subject to change without notice.)

Byro-Jet Fan Unit
Suggested Retail Value
\$62.44



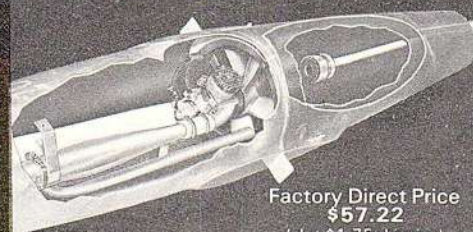
Factory Direct Price
\$53.08
(plus \$2.00 shipping)

F-16 Kit
Suggested Retail Value
\$270.26
Factory Direct Price
\$229.73
(plus \$10.50 shipping)



F-16
Wing Span - 47"
Length - 74 ½"
Effective Wing Area - 750 sq. in.
Flying Wt. - 9½ lbs.
(less optional tanks & missiles)

Byro-Jet Tuned Pipe System
Suggested Retail Value
\$67.31



Factory Direct Price
\$57.22
(plus \$1.75 shipping)



Jerry Heaton's immaculate TBM-3C was one of the top entries in the meet. Its demise is shown elsewhere in this article.

FUN-FLI (1/8TH STYLE)

Are Fun-Flies actually in danger of becoming too popular? The 1/8th Air Force found that the idea of an Un-Contest can easily get out of hand. It may have been a bit too big, but it was still one memorable weekend!

Staff Report Photos by J. R. Naidish

We're sure that the 1/8th Air Force, from Phoenix, Arizona, would like to brag that they have such successful Fli-Ins that they even managed to pull a couple of contestants from England this year. Actually, the ninth annual gathering of the scale people was one of the biggest (maybe too big, as we shall

discuss later) and best yet, but the two chaps from England were there as guests of Larry Wolfe, doing research on fan technology at Jet Hangar Hobbies. But the meet did pull entrants from California, Texas, New Mexico, Colorado and even Connecticut.

The 1/8th Air Force, which is

really a group of modelers from all the clubs in the Phoenix area expressly drawn together to promote scale building and flying, dedicates much of its energies to running this contest. A more active fellowship you couldn't find, as they all scurry around in their dapper blue pilot's shirts. One does not often see so complete a team venture, for never once during the weekend did we detect any of the "blue-shirts" even sitting down. Unlike many clubs where a handful of hardcore activists do all the work, the 1/8th is full of live wires. If there is one ingredient which has made this recipe of a funfli gell, it's the hard work of all the hosts.

But too much of a good thing can create its own problems. By the time the sun was getting high in that clear blue Arizona sky on Saturday, it was already becoming obvious that the attendance figures for this year were going to be dramatically higher than ever before. The pits were looking like a model swap meet by 10 o'clock. The count of pilots was already near a hundred, and the airplane-laden vehicles were still pouring into the parking lot.

We don't attend many modeling get togethers where there are more people on the fliers' side of the ropes than on the spectators'. The pits were obviously crowded, and just moving around among the airplanes was tricky. That wasn't the worst of it, if course. As Murphy's Law dic-



Very clean Jug from the Jemco kit, by Garland Hamilton.

tates, most of the pilots had transmitters on only one or two frequencies. 75.640 MHz was so bad that it honestly looked as if some fliers would get only one flight per day! No amount of organization can get in more flights than there are available slots on a given frequency. The members of the 1/8th hussled frequency clips as quickly as possible, but there were a fair number of delays on some frequencies.

While the sign out front may say "Fun-Fli," what's going on behind the scenes in a situation like this is anything but fun. It was evident that the club members were really pushed to the limits in trying to handle the rampage of entrants. The philosophy behind having a fun-fli is *supposed* to be a low-key affair that doesn't put any pressure on the participants to compete; and it's also *supposed* to eliminate a lot of the routine man-jobs associated with running a full-blown contest, i.e., scoring, tabulations, judging, flightline expediting, etc.

Well, part of the problem is that the 1/8th Air Force really doesn't have a pure non-contest. What they have held for the past eight years has been a hybrid event: those who wanted to could post maneuver scores, being judged by their fellow pilots; while the other entrants could just buzz around the skies. This little twist, which kept the pro pilots coming back, has obviously turned into a "contest-within-a-non-contest" type meet. Even though there are only three maneuvers (all being the pilot's choice), the amount of paperwork and tabulating becomes rather staggering.

We like the low-key competitive philosophy. It gives the fledgling contest participant a chance to "get his feet wet," without any severe criticisms or extreme pressures. Since fellow pilots are judging the maneuvers, the desire to reach out and help a struggling pilot is always there, so the whole thing can turn into an invaluable learning experience. Because the pilot can pick any maneuvers, it's not unusual for a newcomer to get very good scores (positive reinforcement) for such "kiddie-car" maneuvers as the Fly-By, Procedure Turn, etc.

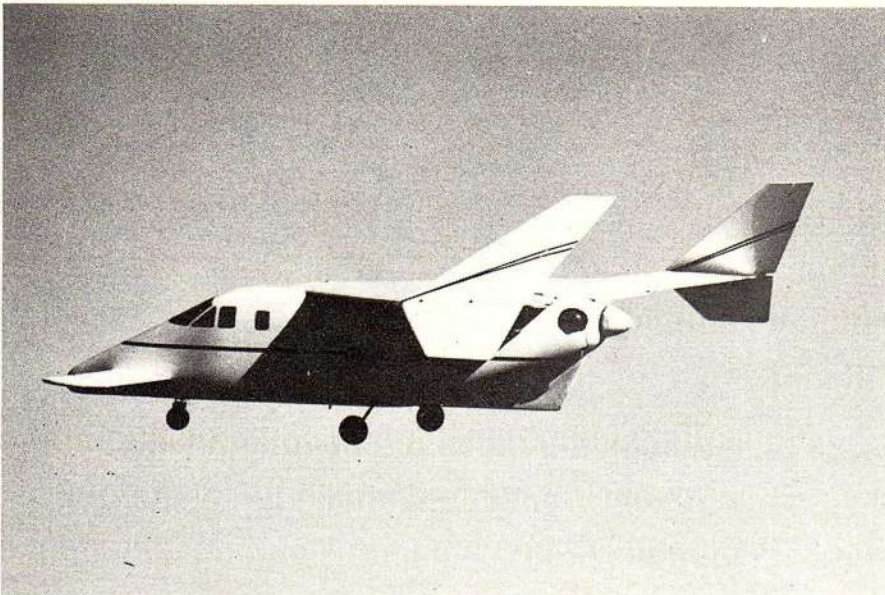
The experienced pilots like it, too. It's one of the few events on the "contest circuit" where one can be darned proud if he wins, yet feel no qualms if he loses. The pressure is sure there—you have to fly against not only the guy who won the U.S. Scale Masters last year (the 1/8th Air Force's own Kent Walters), but



Ted White won Best Military with his Martin Baker M.B.5. Did every maneuver in the book—even three-point rolls—right on the deck.



Bob Frey's Lightning climbs out. Bob had the dubious distinction of doing the lowest pass of the weekend.



Col. Bob Thacker's unusual OMAC I, which is test model for full-size aircraft being developed by Lear.



Film strip sequence shows the tragic loss of Jerry Heaton's TBM-3C. It was probably the readjustment to droop the ailerons (wash-in) which caused the snap roll on takeoff.

also Ace pilot Ted White, and a whole bevy of pilots who all placed in the top ten at the Masters. Even then, the "amateurs" sneak in a good flight and steal the laurels from the pros. This year, two relative newcomers took trophies home in the hotly-contested Military Class. Our feeling is that this low-pressure competition is an important part of the meet, and we hope that the 1/8th will see fit to keep it as part of their annual get-together.

Over the years, the event has subtly altered its complexion, and most of the changes were to help slow the fantastic growth that has occurred at this annual gathering. There used to be a Biplane Class, which included anything with two wings. But that was dropped, for the Aero-Masters were taking over. Today, the class still exists, but it is a Scale Biplane Category. So, a lot of fat has already been trimmed, and the 1/8th is now faced with the dilemma of what to do next year to keep everybody entertained and satisfied.

It's pretty obvious that something has got to give, and it will be interesting to see what decisions the Phoenix boys arrive at next year. Limited pre-registration is a possibility, although it's always so difficult to say no to someone who has become a long-standing participant . . . do you kick out last year's winner just

because he got his information in too late? Most of the people come to Phoenix in groups—contingencies from fixed locales, and it would be hard to explain why only certain of the So. Calif. Scale Squadron could attend, and why some of their buddies had to stay home.

Ironically, the only answer may be to escalate the stakes at the meet, and swing away from the un-contest thinking. Putting more competitive bite would tend to shy-away the newcomer (which is a big loss), but at least it might give the pros a chance to flex their muscles in a well-run pre-season event. We all see the big guns bringing out their newest contest machines at the Phoenix meet, for they can trim them out, get peer reaction, and even get some semi-serious judging of the plane on which they have put all the marbles. Perhaps, by keeping a "Static Class" and even giving it more play, the number of aircraft which show up could be kept high, without putting such a burden on the frequencies.

The Static Class concept is another feature which has made the Phoenix meet a big success. The spectators really get involved at this event. Formal ballots are prepared, so that the viewers can vote for their favorite aircraft. The "People's Choice" trophies are definitely the most prestigious, in the eyes of most

of the participants. On Sunday, all flying stops for an hour, and the airplanes are queued up in one long line. The spectators are then allowed to come out on the runway and view each plane up close. This year, the line of airplanes exceeded the length of a football field, when placed wing to wing tip . . . and the line of onlookers was equally as long!

Maybe the idea should be to make only airplanes which don't fly eligible for the People's Choice awards—this would still motivate those "closet modelers" who would rather build than fly. Interestingly enough, one of this year's trophy winners in the People's Choice Award never did fly his 1/4-scale Sopwith Pup, so maybe there's some logic to this kind of thinking.

We don't profess to have all the answers, but perhaps our comments have put into perspective some of the problems that having too good an idea can spawn. The concept of a Fly-In seems to work too well in most situations, with the Las Vegas Q.S.A.A. event being another example of a low-key event that pulls almost 200 models each year. It's obvious that such an event strikes a respondent key in many modelers . . . if all of our contests could pull such large numbers of entries, our hobby probably would be considered better than golf! Learning where that narrow line



Larry Wolfe's new Mirage, with smaller scale outline wing . . . flew fast and smooth.

38 scale r/c modeler



"People's Choice" for the meet was G. R. Laine's Byron F-16. With a Rossi in the fan, it really performed.



F-100 Super Saber prototype, by Jerry Ortego, was flown in its primer. Expected to be a kit.



between a controllable crowd, on one hand, and a big and enjoyable contest is to be drawn, will be hard to find.

The converse also applies. We have to give some thought to why a Fly-In packs the bleachers with spectators (remember that this flying field is about 20 miles outside of town, in the middle of the desert!)? Also, why does a non-contest environment breed so much interest among sport fliers and pros, alike? Our traditional contests are not representational of the entire cross section of the scale community—but that's to be expected. After all, the Olympics isn't an index of all levels of sports competition, and few of us would sit for hours in front of the idiot tube watching amateur football or sandlot baseball. When it comes to competition, we demand, by definition, to see the best pitted against the best.

Where our traditional contests do fall short is in attracting new blood to the ranks of the contest circuit . . . if anything, having the same few dominate the trophy classes tends to discourage participation by the less skilled modelers. Over the years, we've seen this as the inevitable downfall of Pylon Racing and Pattern, as events. Only some watchful planning will keep it from making Scale a stale and stagnant event in future years.

Actually, the Scale Squadron gave contests a big shot in the arm several years ago when they originated the concept of Team Scale. This happy merging of the closet builder and the proficient flier, as a team entry, has achieved phenomenal success all over the country. The one problem we've detected is that this event not only fills a much-needed transitional gap, but that it inadvertently also serves as a comfortable crutch for the builders of the models. In all the years we have been covering scale contests which incorporated Team Scale, we are finding the same Team participants year after year. The fellows building those lovely hangar queens aren't going out and learning how to fly them . . . they seem quite content to specialize in Team Scale entries, and many of the "partnerships" of pilot/builder are actually becoming permanent fixtures on the contest circuit.

In principle, there's nothing wrong with that. If a fellow enjoys doing nothing more than building models, and can get recognition elsewhere than at static shows, then that's fine. But, these modelers aren't filling the gap that is slowly being created by the better pilots going from greatness to almost virtual unbeatability. Sure, there's always some fledgling pilots showing up at the meets, but we see

only a mere handful who are preening their feathers for the "big time." We suspect that the new concept of declared Expert and Novice Classes might help, but past experience has tended to show that we always wind up with the perpetual Novices and the same old group of Experts.

So, there's the big risk of making the 1/8th Air Force meet nothing but another big contest. Maybe that's what we should be striving for . . . some way to keep making our contests bigger and bigger. As we have discussed, they are bound to dwindle, if our present philosophies of competition are followed. The innovative thinking of the 1/8th Air Force may be the guiding light we shall be looking toward in the future. One thing for sure, we have probably seen the last of the big "fun meets" in the Phoenix area . . . the event must be regulated.

Although we didn't get actual figures, the number of pilots probably peaked out at over 110, and we estimate that there were nearly 175 aircraft on the field—guys like Larry Wolfe showed up with multiple entries (Larry had four ducted fan aircraft on display). If one was looking for a trend among the myriad models present, it would have to be the total diversity. Although the 1/8th puts artificial labels (for convenience) on the aircraft, such as



David Lowell came from Texas with the Confederate Air Force to fly this Jungmeister. A large showing from the C.A.F.



Marty Moad's Me 410 did rolls on takeoff, with Ted White at the sticks.



Bill Cranston, of the C.A.F., did a fine flying job with his Bridi P-51.



Bob Scott's Nieuport 11, caught in an embarrassing moment.

General Aviation, Biplane and Military, no one class seemed to predominate. WWII *wasn't* especially predominant—which is a staggering statement! There were as many biplanes and civilian entries. It's a sign, we feel, that modelers aren't following the crowd, or trying to emulate the fellows who are always grabbing the headlines by winning contests with

WWII fighters. Lots of twins were on hand—more than ever before—and pretty evenly split between civilian and military types. Ducted fans showed up in larger numbers than ever, and one highlight of the meet was the prototype (still in primer) of Jerry Ortego's soon-to-be-kitted F-100.

Sizes of models illustrated even more diversity. Three of the Scale Flight Zeroes showed up, with .90 engines and in 1/5th scale. Jerry Heaton had a magnificent 1/5th

scale TBF, which sadly was destroyed on takeoff. As might be expected, the .60-sized machines were in the majority, with a good sampling of the .40-sized machines. What surprised us was to find a small, but significant, representation of 1/2A and .19-powered models. Schoolyard Scale seems to still be alive and kicking.

We saw everything from an Avro Vulcan (prototype for a future ducted fan project) to a Blohm & Voss B.V. 141 a symmetric bomber. A pair of immaculate Byron F-16s put on a real show. Rossi powered, they really ate up the sky, and the crowd was so impressed that one of them won People's Choice, while the other took fourth in that event. There were Gee Bees, pushers, giant scale, four-engined B-17s, and just about everything in-between. We wonder how many of the spectators appreciated that they were seeing one of the best cross sections of scale modeling ever gathered?!

Not only is the Fun-Fli a great place to see a lot of nice airplanes, it's probably the one place on earth you can see some of the best pilots letting it all hang out with some daredevil flying. Ted White tradi-

(Continued on page 74)

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1



2



3

1. Work-in-progress P-38, by Bob Frey, features Fowler flaps, retracts, from the Royal kit. 2. Garland Hamilton was commissioned by Piper to build this superb Seneca II (from SR/CM plans). 3. Tom Weemes let Ted White fly his Gee Bee Model E . . . ever see one do an eight-point roll?! 4. Most unique model at the Fly-In was John Arand's B&V 141. 5. Neat Stafford Mooney, built by Rich Westlake.



4



5

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Ready to fly -
Weight: 17 lbs.

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WIRRAWAY

WHAT RESEMBLES AN AT-6, FLIES AS EASILY AS ONE,
YET SPORTS AUSTRALIAN MARKINGS?

By Roland Baltes

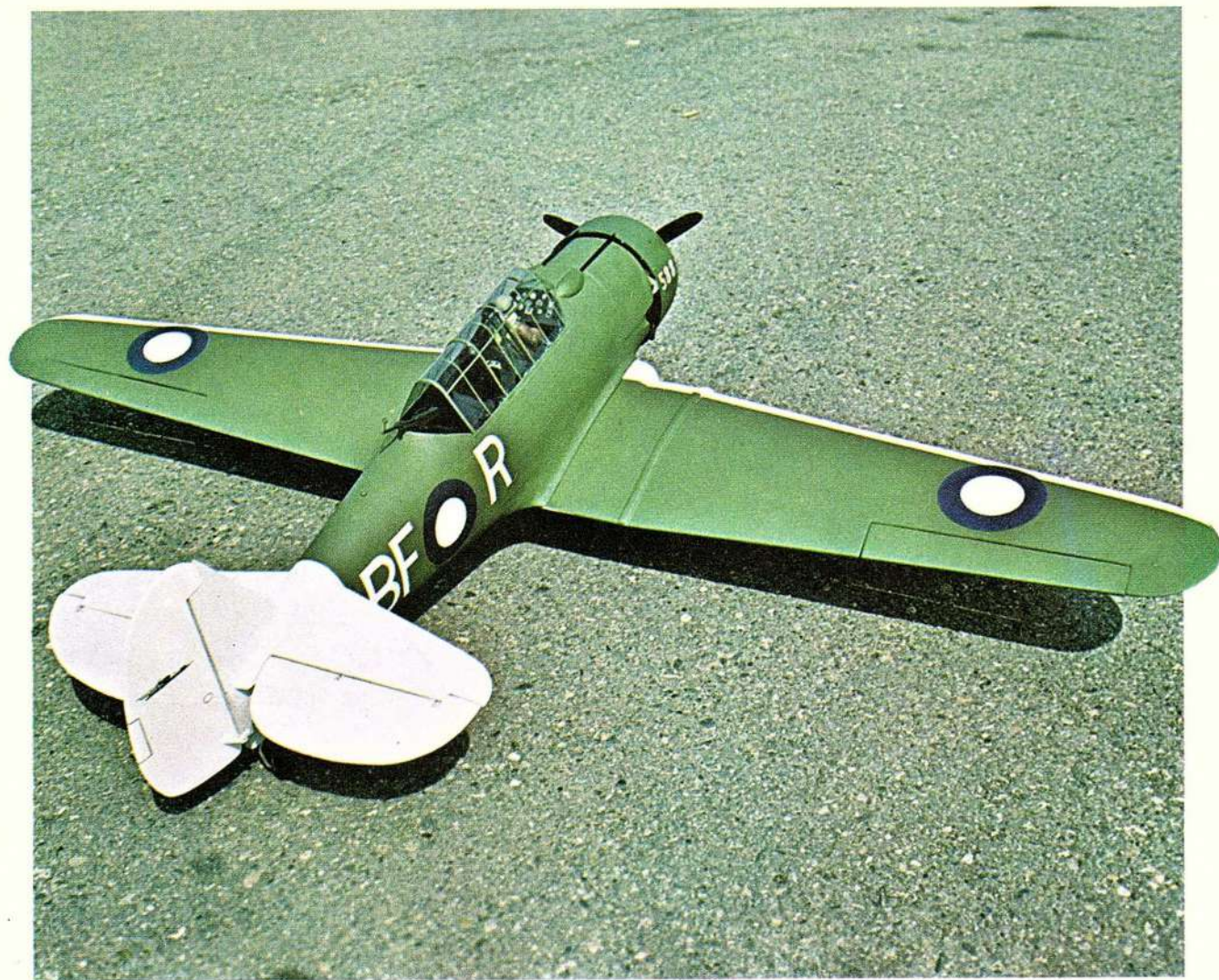
Photos by J. R. Naidish

Probably one of the best known military trainers was the North American T-6. Also known as the SNJ in Navy lingo, it probably trained more pilots worldwide than any other type of airplane. That versions of it were also used in combat

is not a well known fact, since its performance hardly made any headlines.

Like many successful airplanes, the T-6 was the result of a lengthy evolution. Its origin traces back to 1935, when General Aviation Corporation





designed a low wing two-place open cockpit trainer known as the GA-16. The Army Air Force was sufficiently impressed and subsequently ordered in 1936 a modified version from North American Aviation, the parent holding company of General Aviation, which was given the military designation of BT-9. Additional improvements and modifications were made over the years, resulting in other versions such as the BT-10, BT-14, BC-1 and finally the T-6/SNJ. The BC-1 (NA-33 design) is what leads us to the Wirraway.

The BC-1 was selected by the Australians for license production by their fledgling aircraft industry. Three companies with some civilian aircraft experience consolidated, and formed the Commonwealth Aircraft Corporation. Their first product—which came to be called “Wirraway”—flew in March of 1939, having an

official designator of CA-1. Besides providing the experience to a new aircraft industry, the Wirraway was primarily intended to be an advanced trainer. However, modifications from the basic design were made by the Aussies, which eventually resulted in a variety of CA dash numbers and versions with light bomb racks, machine guns fore and aft, and split dive flaps. Over 700 were produced. Outfitted with guns and bombs, the Wirraways raised havoc during early WWII in Malaya, New Guinea, and in the defense of Northern Australia. One is credited with a Zero kill, when Flying Officer J. S. Archer pounced on the unwary enemy below and quickly splashed him.

The Wirraways were powered by a P&W 600 hp nine-cylinder radial driving a three-bladed variable pitch prop. Wing and upper and lower

fuselage decking was aluminum covered, while the fuselage sides and all control surfaces were covered with fabric. Those equipped with bomb racks could lift up to 1,000 lbs., but 500 lbs. was more typical. Top speed is quoted as 205 mph, with normal cruise being around 180 mph.

More info on the Wirraway can be found in the *Profile Publication* No. 154; the January 1973 issue of *Aero Modeller* magazine; and Paul Matt's *Historical Aviation Album* (Vol. XVI).

Were it not for *Profile* No. 154, I seriously doubt that the Wirraway would have ever come to my attention. The similarity to a T-6 was quite obvious, as a result, I mentally filed it away as another one of those airplanes to build someday. The subject came up during a chat with the Editor, who didn't seem to need much convincing that the Wirraway

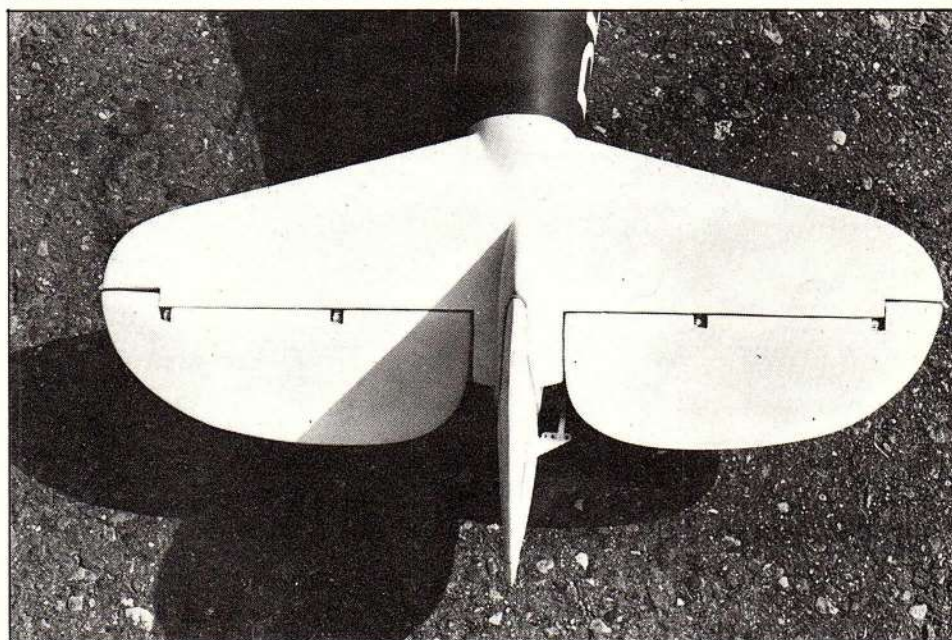
One could easily confuse the Wirraway with the T-6, and they both descended from the same lineage.

would make a good article. Rather than starting from scratch, it was agreed that converting a kit would be the best way to go. Bob Holman's T-6/SNJ kit was selected.

While awaiting the arrival of the kit, I dug out *Profile* No. 154 and began mentally determining the conversions necessary to make the T-6 kit into a Wirraway. Obvious was the rounded wing tips and rudder. Not so obvious was the greater sweep back of the Wirraway's horizontal stabilizer and the straight trailing edge of the wing. Since I planned to follow and use the three-views in the *Profile*, I would also need to incorporate machine guns.

The Holman T-6/SNJ kit comes with an excellent epoxy/glass fuselage and cowl, molded upper wing center section which incorporates the wheel wells, a nice canopy, foam wing and stabilizer cores, and a bunch of balsa . . . but no instructions. The kit parts are in support of the plans provided, which show the built-up construction. You are on your own as to how to use the foam pieces and epoxy fuselage. These obviously save lots of work, but it means that you have to have some experience in putting kits together. Definitely not a project for the beginner. One thing that puzzled me is that Bob advertises the kit as being 1½"-scale, while the drawings say it's 1 5/8". Oh well, it really doesn't matter for Sport Scale.

To me, using foam wings was nothing new, so I didn't anticipate any problems. Installation of retracts (Rom Air) turned out to be a frustrating task, since it required butchering the beautiful foam center section to provide a means for mounting the gear. I ended up making a full-depth spar out of ¼" plywood which runs behind the wheel wells. To this I attached ¼" ply gear mounting plates, which are angled to insure that the wheels move slightly forward during retraction, so that they fit properly into the wheel wells. This is one of the nuisance features of a T-6 which, when done right, looks really neat. Another complication is that the gear legs are pretty short and, if done to scale, will interfere with the standard Rom Air cylinders. I had to modify my units so that the air cylinders point outward, a configuration which I understand you can buy from Rom Air, or you could use a different make of retract units. Nevertheless, this meant that foam

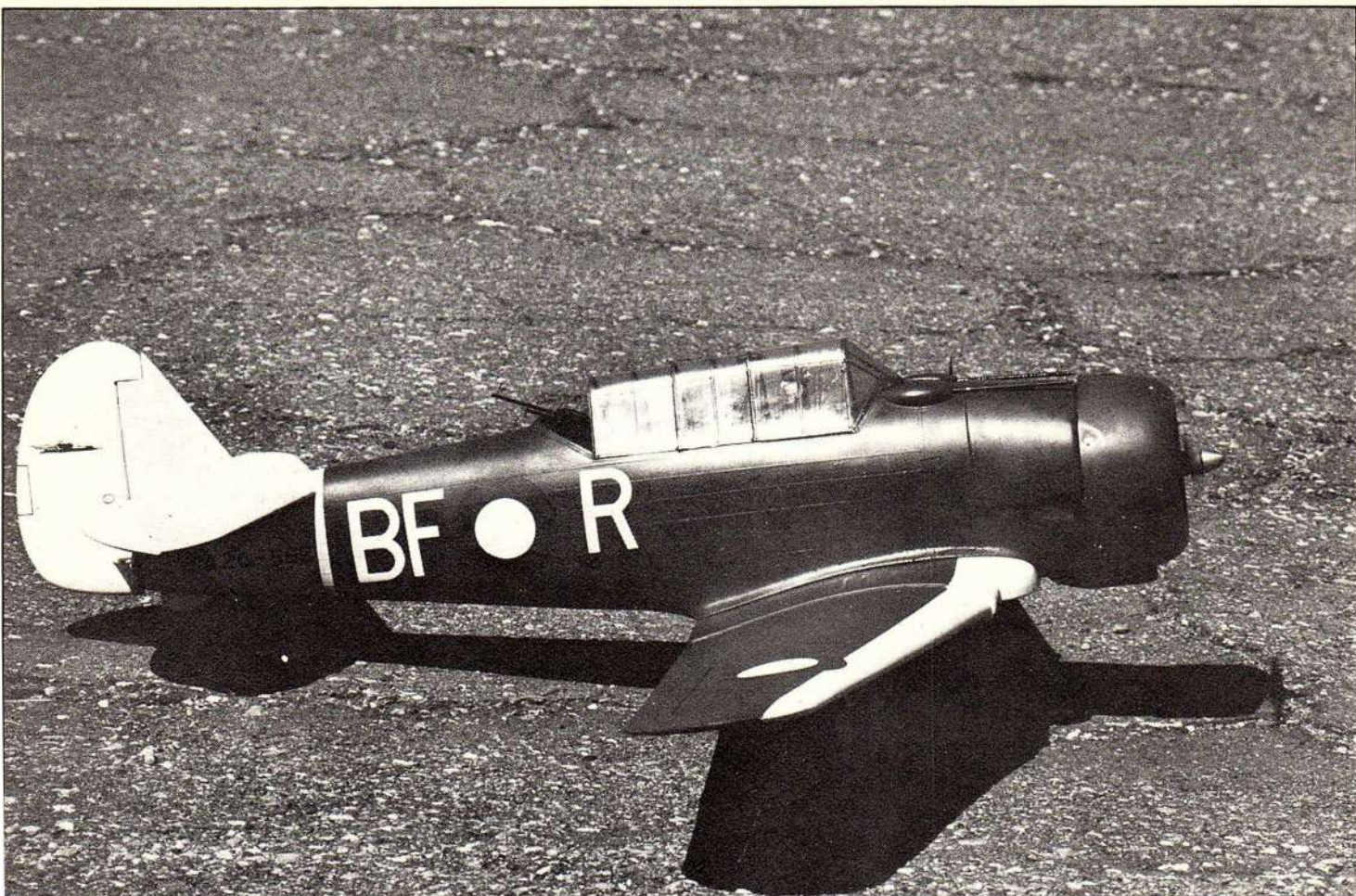


Two of the changes made in the Holman kit were alterations to the outline of the stab and rudder.

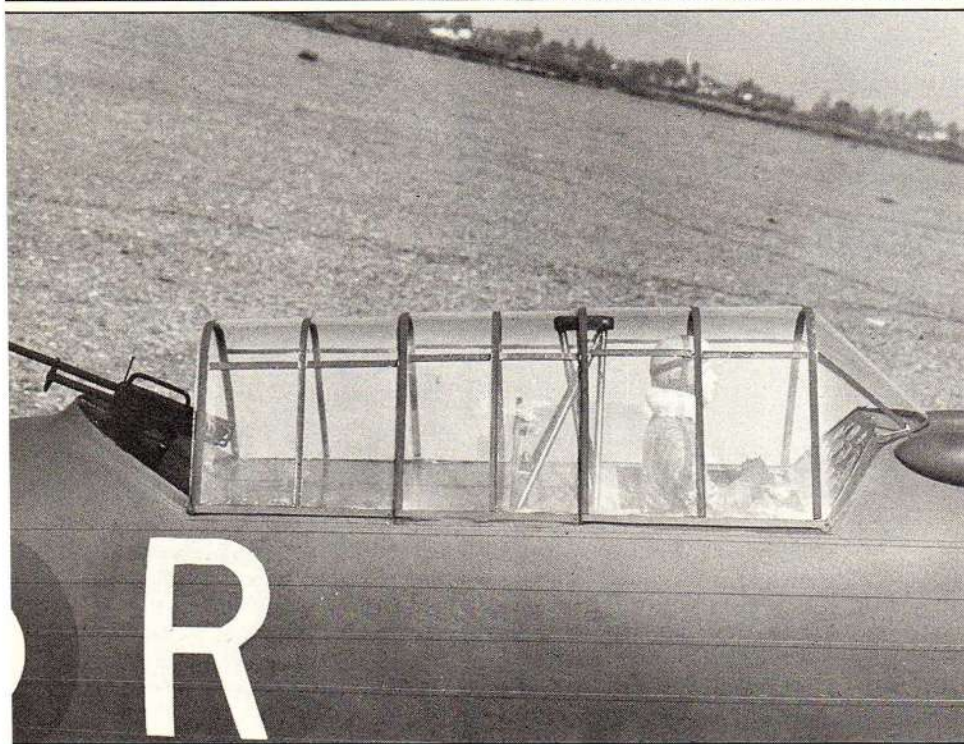
had to be dug out on the outer wing panels to allow room for cylinders and air lines.

On the other hand, making a new rudder was easy. As mentioned earlier, the Wirraway's rudder is more rounded, so the kit pieces go into the scrap box. I built up a new rudder with ribs, and covered it with Cover-ite to simulate the fabric. The same could be done with the ailerons and elevator.

Once you get over admiring the quality of the epoxy/glass fuselage, you realize the amount of work it saves. This was my first use of a ready made fuselage, so it was somewhat of a learning experience. For the Wirraway conversion, the only major modifications involve simulating the fabric covered fuselage stringers and adding machine gun bulges. The stringers I simulated by applying 1/16" striping tape, while the bulges for the guns ahead of the canopy were made from block balsa shaped as best as can be eyeballed from the three-views.



Taxiing out, the Wirraway shows the same gentle handling characteristics as the wide-tracked T-6.



Detail of the cockpit area shows a slightly altered canopy from the one supplied in the T-6 kit. Gunner's position can be opened or closed.

A couple pieces of brass tubes serve as the front guns. The single rear gun is a little more complex

and was made from scrap balsa and brass tubing. It's mounted to the fuselage using a Du-Bro ball link,

which not only allows it to swivel, but renders it easily removable to prevent handling damage. If you use the rear gun installation, cutting off the aft portion of the canopy would be appropriate. However, if you flinch on cutting up a beautiful canopy, keep in mind that some versions of the Wirraway had an optional fixed rear canopy.

My lack of experience in working with completed fuselages came to light while trying to install all the innards. Since the fuselage interior is nothing but an empty cavity, a tank platform was in order. This was satisfied by deftly measuring, juggling, and inserting a plywood plate behind the firewall. Also, since I didn't like just putting in a pilot bust, I cut out a space for a full length Flying Officer and provided him with a seat and cockpit floor. Next came the servo mounting rails, pushrods, etc. and finally the tank. Guess what, I couldn't get the tank into the tank compartment anymore. Of course more cutting and cussing finally did the job, but I learned a lesson . . . plan ahead.

Another area that needs some forethought is the installation of the tail-wheel mounting and steering. This is best done prior to installing the stabilizer, since it allows some access to the back end interior. Rather than going to an unsightly method of coupling rudder and tailwheel on the exterior, I opted for two pushrods. Also hidden inside is the elevator pushrod which, of course, means that trim adjustments can only be made at the servo end.

Getting back to the exterior, some additional changes need to be incorporated to make it look like a Wirraway. For example, exhaust stubs are on both sides, versus just the right side as on a T-6. At the time of the photo session, I had not incorporated this detail on my model. Lots of other stuff and detail could be added, such as corrugated skinning of the fin, rivets here and there, access panels, gun sight, antenna mast (not on all versions), landing lights, navigation lights, and on and on. The list is almost endless and, somewhere along the line you have to make a decision to call a halt . . . otherwise, it will never get done.

A step required prior to flying is painting. The end result depends how much effort and time you are willing to spend. All balsa parts—like wing and stabilizer—were first covered with $\frac{3}{4}$ oz. glass cloth and K&B finishing resin. After sanding, auto primer was brushed on and then wet sanded to a smooth finish. I had even brushed on a coat of primer on the fuselage which turned out to be a waste of time since the epoxy fuselage is good enough, as is. The few pin holes could have been filled with



Even without flaps, the Wirraway tends to be a floater. The addition of flaps would be a simple procedure.

auto putty (also known as Green Stuff by the plastic modeler fraternity).

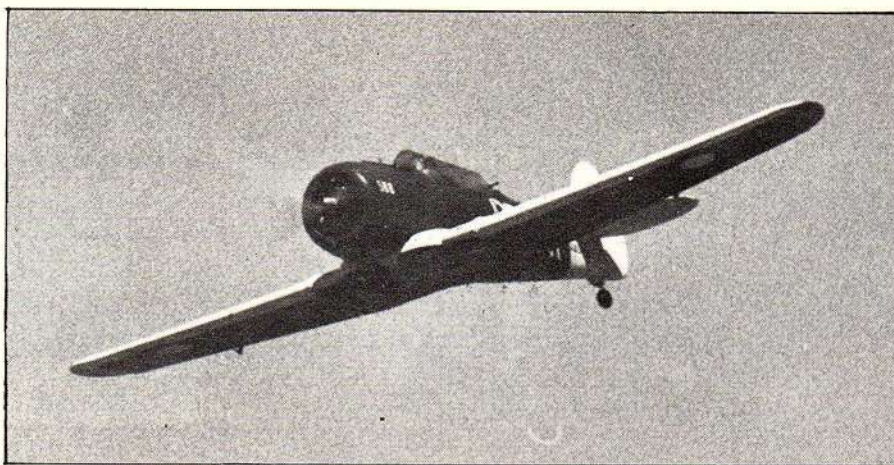
For color and markings, I followed the scheme depicted in the *Profile*. The basic overall olive drab, green, or whatever is R&S Perfect paint (PC-39) which came pretty close to matching the color. White trim and markings are Hobbypoxy, while the medium blue used as part of the Australian insignia is Aero Gloss dope. The reason for using a variety of paints was not for the purpose of pleasing all advertisers, nor was it an attempt to test the compatibility of these products. It's simply due to the fact that over many years of modeling, I have collected a variety of finishing products, none of which by the way, provide the ultimate perfect magic finish. I do have to admit that this was my first try with the R&S paints, using the spray cans no less, which does its job but also it's not the ultimate answer.

The large fuselage letters and roundels were applied using the wet paper technique. That is, cutting out the design from a sheet of typing paper, then using the paper as a stencil while spraying on the marking. The wet paper clings to the part and avoids any risks of pulling off paint which is quite common with tape. The smaller letters and numbers are decals. Hobbypoxy clear with the dull hardener was sprayed overall to blend this mess together.

Unless you build display models, the most exciting part is yet to come. Besides installing the radio gear correctly the most important thing is getting the model balanced properly. To be on the safe side I lean towards being slightly nose heavy on initial flights. I therefore had to add 16 oz. (bolted on fishing sinkers) on my Wirraway. Total weight ended up being 9 $\frac{1}{2}$ lbs. Power is a trusty old Super-Tigre .60 with Perry carb, and a Tatone exhaust manifold, which does an excellent job of muffling the engine.

After some taxi tests at a local parking lot, the first flight took place at the famed Mile Square Park . . .





With the gear cleaned up, the Wirraway moves along smartly. The author's prototype came out at less than seven pounds!

a great place to test fly, since there's virtually a square mile of open area! If you are expecting one of those "it flew right off the boards" reports, I'm sad to say that the first flight was somewhat erratic and lasted only one circuit of the field before I aborted. I found it hard to believe that the model might still be tailheavy, but later investigations proved only that I had put in too much down trim on those large ele-

vators. No fault of the model design, but a very dumb pilot error!

After readjusting the elevators, the model behaved in a very sensible manner. Those who have flown the Holman T-6 will attest to its simplicity of handling and smooth stability. The Wirraway is identical, with lots of forgiving characteristics. The Super-Tigre isn't a brute of an engine, so I don't have the raw power to do all the vertical maneuvers. But the basic loops and rolls are effortless, and they can be done at a rather nice scale speed.

The takeoffs are typically tail-dragger, and some judicious rudder

juggling is needed to keep the model tracking down the white line. The short main gear, spaced wide apart, makes it pretty hard to ground-loop. Landings still elude me, and I have the feeling that it's because the model is so much of a floater. I get the wheels almost on the deck, go to flare, and the slightest up elevator gets the model hovering above the runway. Flaps seem the logical answer, so that a bit of drag would help keep the model on heading. Retrofitting them would be a bit of work, but this might be a future project. If you decide to incorporate flaps, they were split flaps, in three segments.

Overall, the Wirraway turned out to be a worthwhile project. The modifications were so simple that they didn't require that much extra building time. This is only my third scale model, and the Aussie design gave me a distinctive looking machine, without all the hassles of having to almost redo a kit. I think that the Wirraway offers the best of both worlds—you get the convenience of building a kit, with the advantage of coming up with a very different and out-of-the-ordinary model.

As the Wirraway pilots say: "Tally Ho!" □

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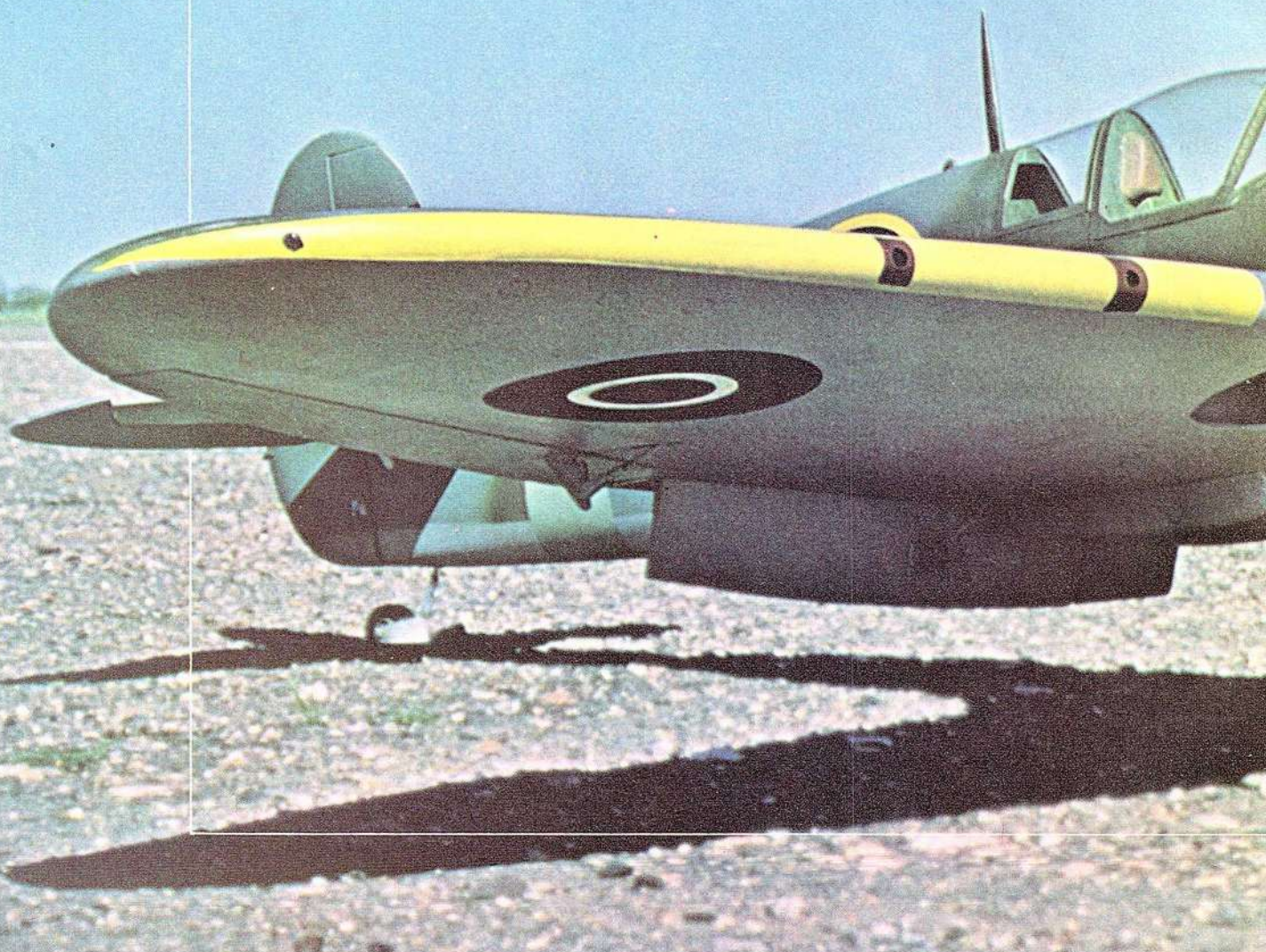


SPIT WITH "IT!"

Get it all with a Spitfire that puts it all on the line. A few simple kit mods can put "it" all together for you.

By Larry Lemons

Photos by J. R. Naidish



In the last issue (June), we presented two dynamite Spitfire articles. Dave Platt's 1/5th scale Spit, and Phil Sibille's superb article on modifying the Pica kit of the Spitfire. As promised, here is another fine offering, by perhaps the one scale modeler who has built more Spitfires than anyone else. As a matter of fact, Larry Lemons, of the 1/8th Air Force in Arizona, builds nothing but Spits . . . that's specialization! Like Phil Sibille, Larry doesn't believe that the only way to get an accurate scale model is to start from scratch. No matter how much one modifies a kit, there's still an appreciable savings in time when working with parts which someone else has cut out.

It's not unusual to hear some dis-



gruntled modeler say that the kit he just finished was so bad—he had to make so many mods—that it would have been easier to have started from scratch. That's true if you've never attempted to scratchbuild. Plotting airfoils, engineering structures, lofting formers, etc. can take weeks . . . and that's just to get ready to start drawing the preliminary plans. Most kit manufacturers take extensive measures to test all of the kit engineering and aerodynamics. Often a prototype, which took months to fabricate from scratch, is totally scrapped.

As Larry's article graphically illustrates, many kit mods spring out of not an error in design by the manufacturer—although there are as often as not enough of these—but the changes that are made are generated from personal improvements. The Pica Spit kit does not have flaps, so adding them can often necessitate a redesign of the wing structure. Personal choices in items like engine, radio gear, etc., can often sprout

design and/or structural mods. When someone says he modified the heck out of a kit, it doesn't follow that the kit was bad to begin with.

We urge our readers to read Mr. Lemons' article in conjunction with Phil Sibille's "Mods for a Spit Kit" piece from the last issue. Between the two of them, there is a goldmine of ideas which will keep any Spitfire buff busy for a long time. Also, even if you aren't particularly interested in altering the Pica Spitfire, the type of changes these modelers are making can apply to virtually any scale model. (PHP)

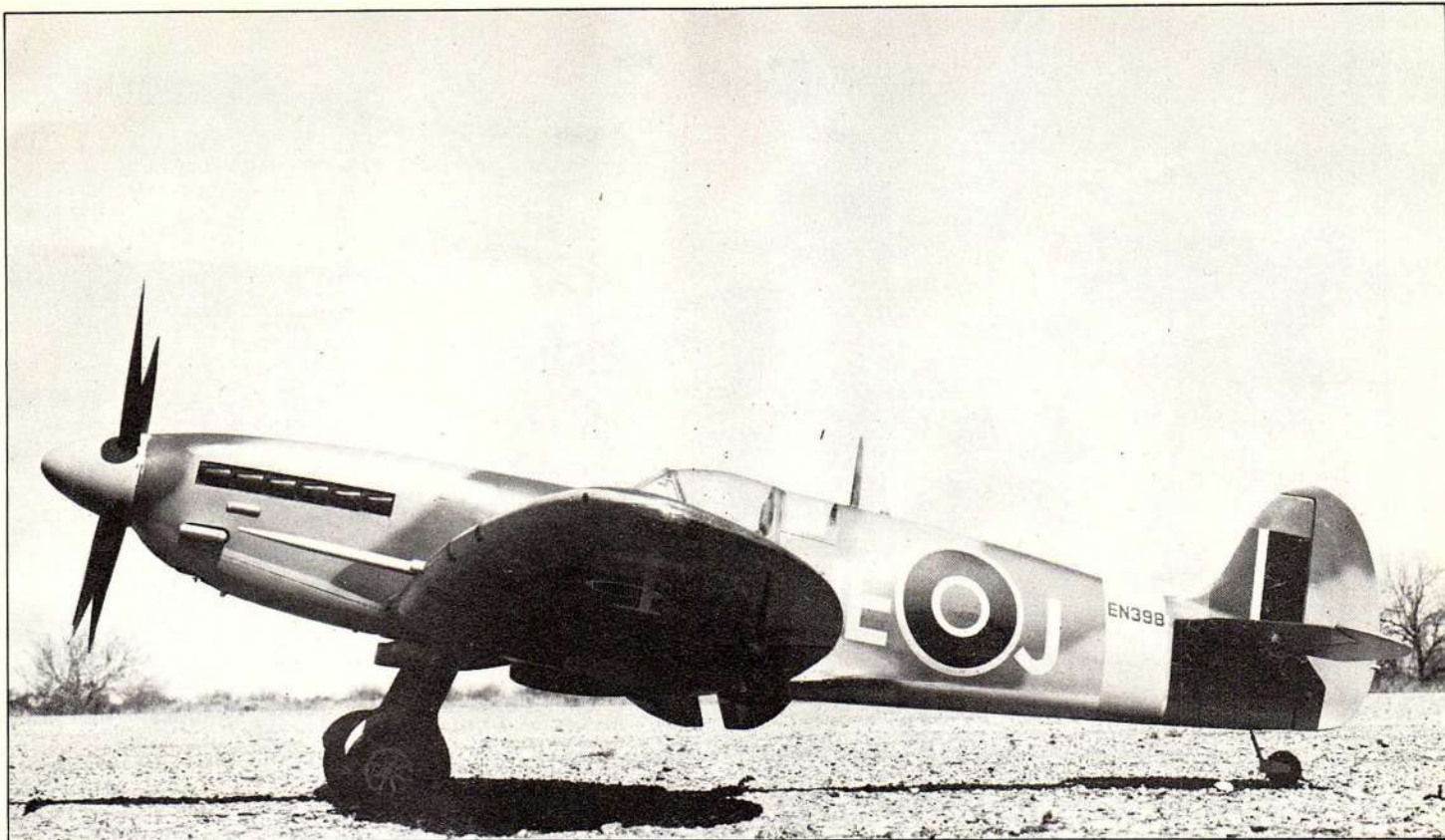
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I'm what you might call a "Spitfire nut" . . . totally addicted to the famed Battle of Britain fighter. If you want to see me go crazy, just show me a photo or painting of that elliptical wing. My mania manifests itself in my having built countless renditions of the Spitfire during my modeling career. I don't think any of my fellow flying friends in

the 1/8th Air Force can even remember seeing me bring anything else but a Spitfire to the field.

Actually, this long string of Spitfires were a logical progression. I'd build one, making a few experimental changes. Some worked, while some of the mods proved rather impractical. The whole thing is a long learning curve, which is punctuated by yet another and another model. The plane you see here is perhaps the ultimate refinement of what can be done with the basic Pica kit. All of the mods are proven and practical. There are many alterations which could be done (a look at what Phil Sibille did with his Spitfire is proof of that), but I have learned to avoid the exotic mods. We all like to see a plane like Phil's, with cannon access hatches which work, and the like. But, past experience has taught me that those kind of models are better admired than owned. Intricacy breeds complexity . . . and failure rates soar dramatically as complexity increases. Keep it simple





While the main gear are still too far forward, all the other changes have brought the Spitfire more into scale outline.

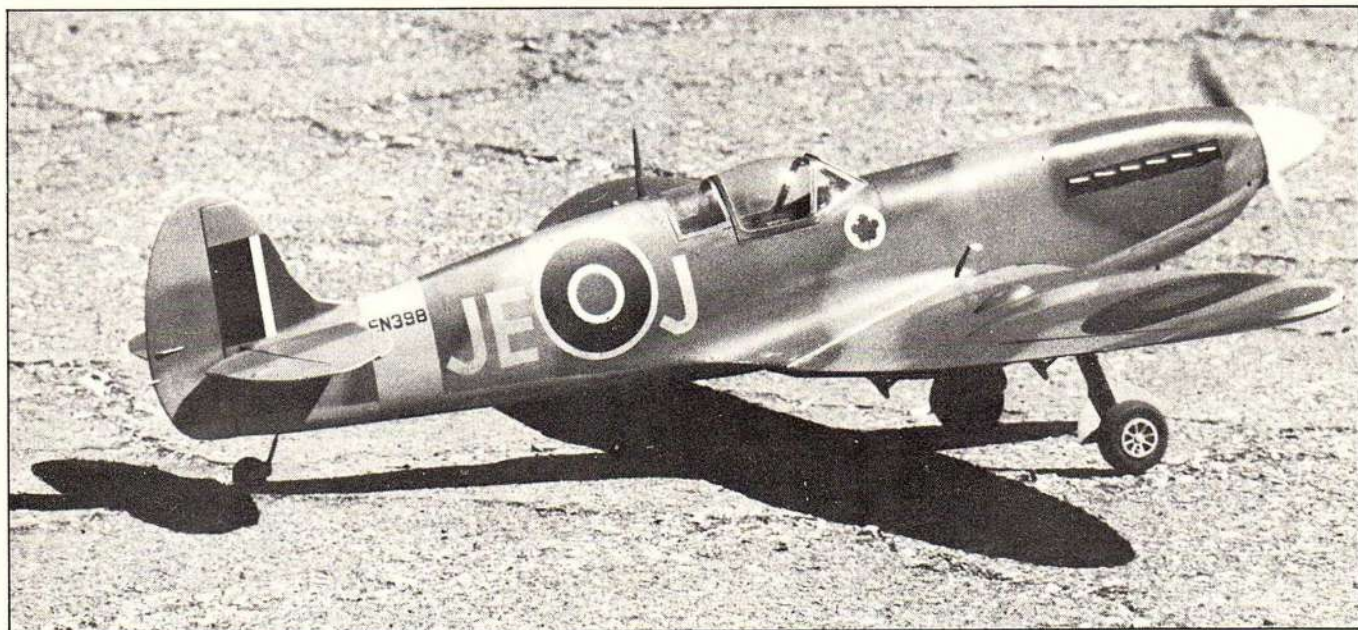
is my motto. I'm a sport flier, so I don't particularly fancy an intricate model. Phil Sibille, on the other hand, has obviously designed his model to win any contest (I understand he won the Tangerine this year). You pick the style which suits your own needs best.

As can be imagined, I have been researching the Spitfire for years. The more I research the British fighter, the more obvious the errors

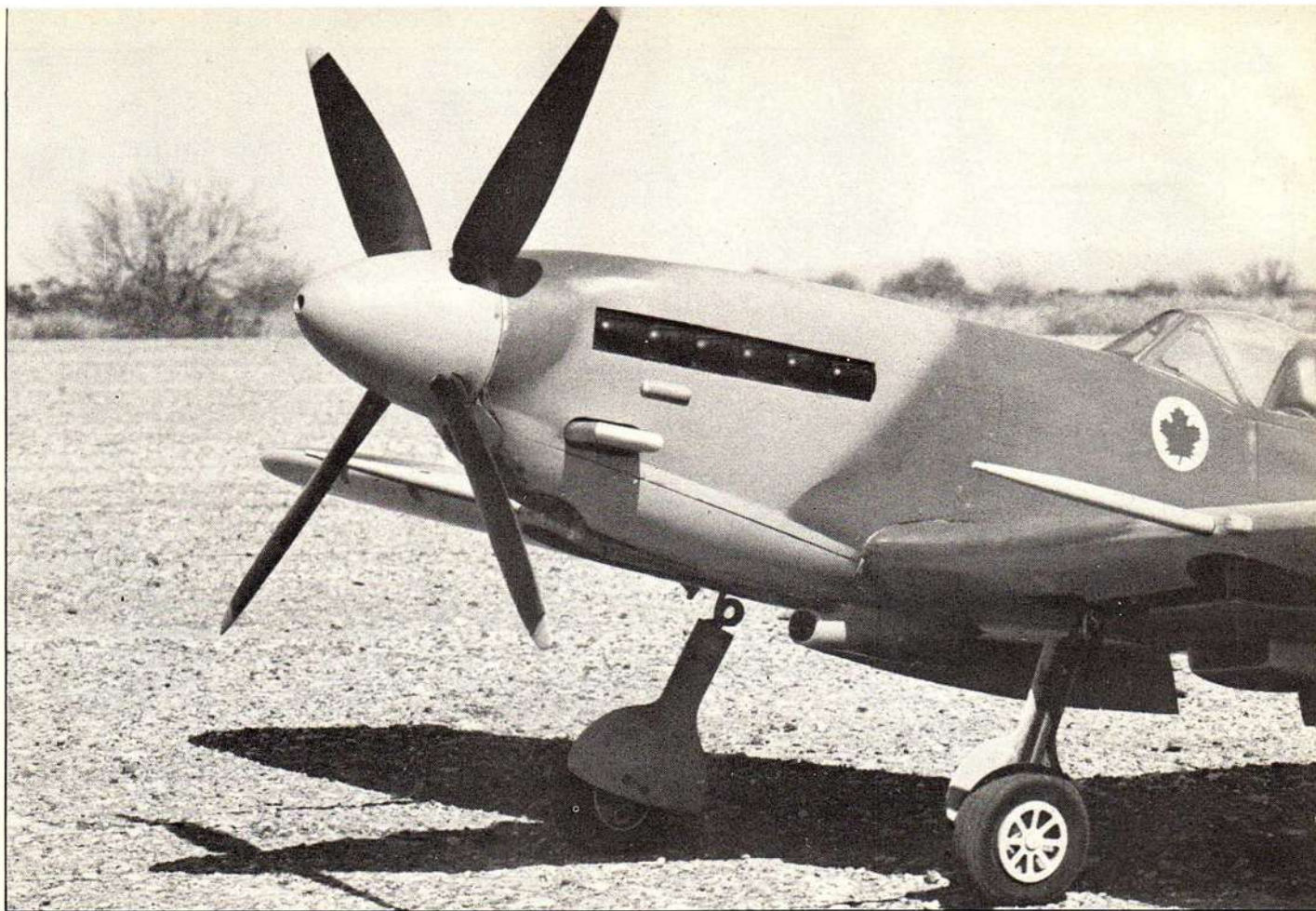
in outline were in the Pica kit. While perhaps not the world's most authoritative documentation source, I have found that the old *Profile Publications* offer the most straightforward documentation. One or two sheets give all the information the static judges want, and there's very little ambiguity. One thing I've learned is that it's not wise to tell the judges all you know, nor is it sensible to try to tell the judges what they

should know. The path of least resistance makes the most sense, and I'm happy to get by without raising a judge's eyebrow, or challenging his knowledge.

Knowing too much can be a curse. You want the most perfect model possible. Unable to resist this urge to build that "ultimate" model, I began work on a special Spitfire... a Spit that would have all of "it!" For those who wish to follow the



Taxiing out for a flight, the Spit proves itself a docile groundhandler. The relocated tailwheel facilitates steering.



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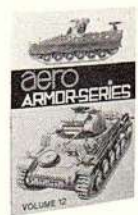
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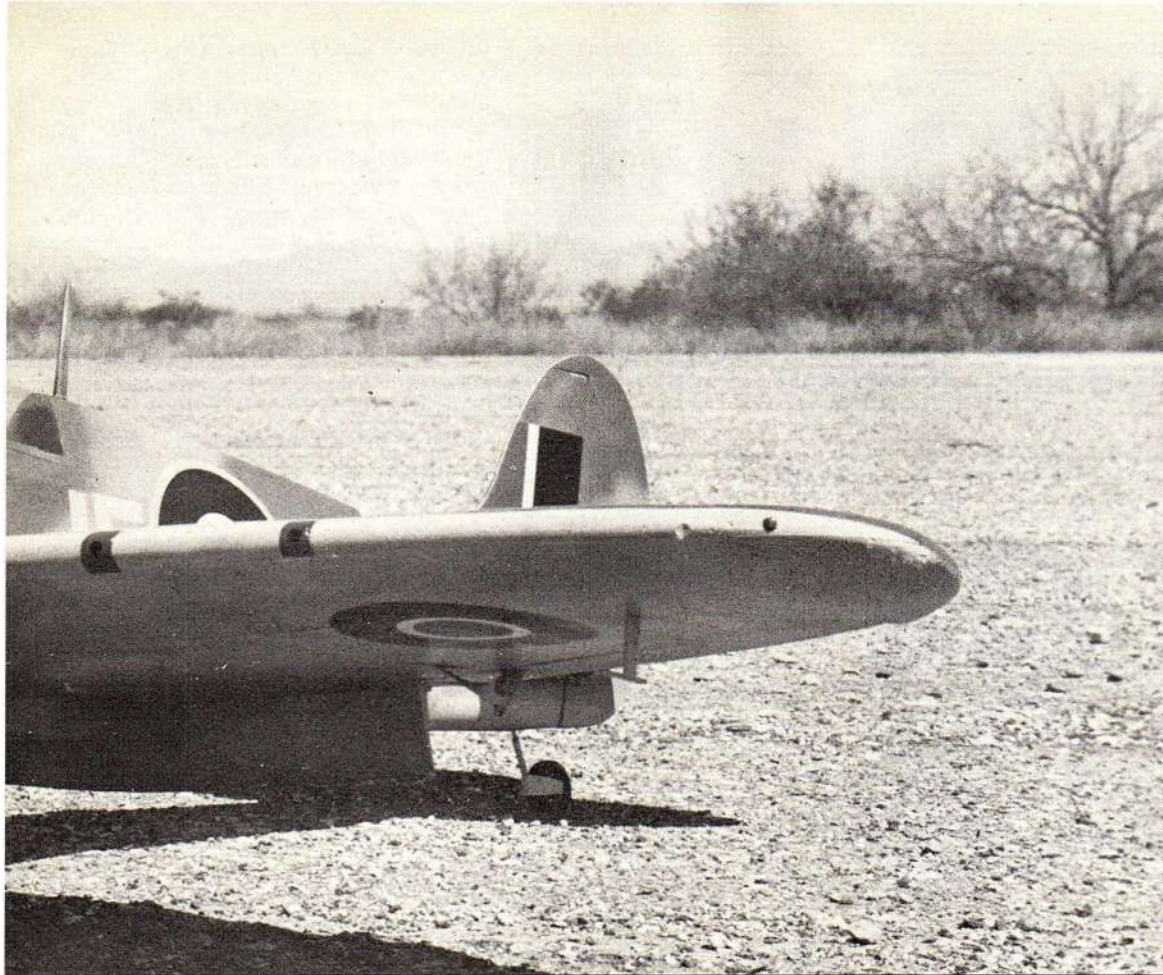
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Note how the squarish nose area is accentuated by some simple reshaping. Access to engine is through bottom hatch.

mods I am about to discuss, I highly recommend having a set of the kit plans in front of you . . . everything is more easily understood when you can see it graphically. For those who don't have access to the kit plans, I'll make the discussion as graphic as possible. Bear in mind that the way these mods are done, especially things like flaps and tailwheel, apply to almost any kit.

Like the Pica Spitfire kit, there are numerous kits on the market which show their age by not having flaps and sometimes retracts shown. Dave Platt originally designed the Pica kit of the Spitfire over a decade ago. In those days, Sport Scale was an event which was intended as almost a Pattern event with models that looked like real airplanes. There was no pressure to design a highly refined scale model for kit production . . . that darned thing just had to look like a Spitfire. Take a look at what Jemco recently brought out in their SBD kit, and the contrast between what used to be a highly competitive kit, and what it is today, becomes obvious.

Cosmetically, the Spitfire, as it comes out of the box, requires sur-



No mistaking the planform of the Spitfire. Note that the radio area behind the cockpit is completely glassed in.

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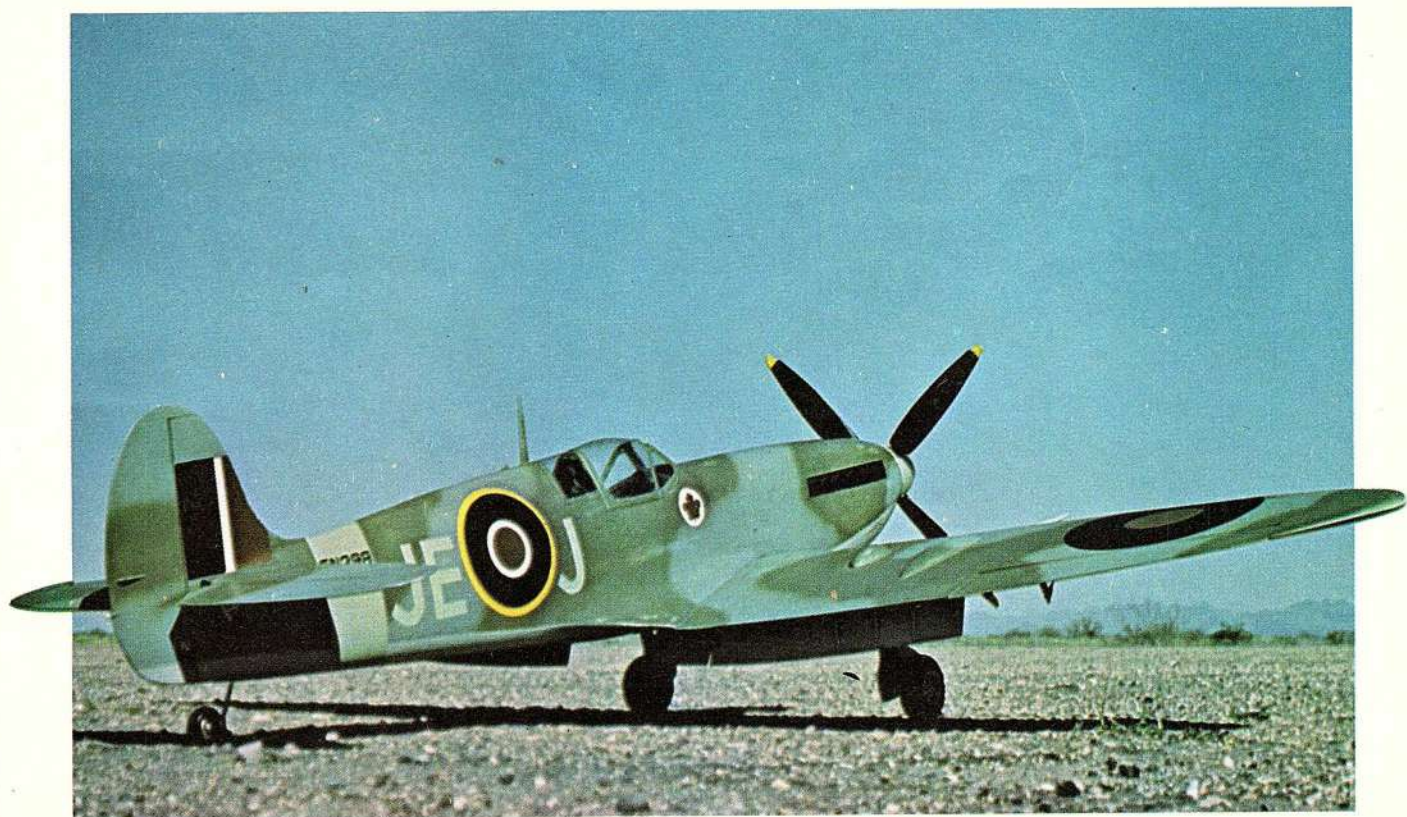
prisingly few changes. One obvious place where the outline suffers is the nose area. The Mk. IX had a very distinctively square nose because of the installation of the boxy Merlin engine. Referring to Section A on the plans (firewall cross section), the sides of the fuse are thinned down by the thickness of the 3/32" sheeting. This will automatically square off the corners to the correct profile. I did not use the built-in wooden beam mounts for the engine, but instead opted for a Tatone metal mount. To accomplish this, I moved the kit beams deeper into the fuse, until they were flush with the new 1/4" ply firewall. This keeps the strength of the fuse intact. I removed the 1/2 x 1/2" balsa filler shown next to the beams, and ran the beams in that location, flush against the fuse sides.

The kit shows part of the fuse sides made removable as a one-piece cowl. This gives too many lines for the judges to notice. Years ago, when access to the entire engine was often necessary, such a big cowl was helpful. But, with today's relatively no-fuss power plants, a more minimal access is acceptable. I glue the two side cowl filler blocks permanently in place. Engine access is from the bottom block which is still made removable. Because I was running a Webra Speed, which is much too long for the original engine area, I moved the new 1/4" ply firewall back, giving a length of 4 5/8" from front of fuse nose rig to the firewall. I made the firewall 1/8" taller, to give a better feel for the bulky Mk. IX nose profile. Use blind nuts in the tank compartment to secure the removable bottom block. The fuel tank floor is pretty flimsy, so I replaced it with a 1/8" ply one.

To properly fill out the flowing lines around the nose, I laminated a piece of 3/16" soft balsa as a doubler, this served two purposes: the exhaust stacks could be properly inset into the fuse sides, instead of looking as if they were just glued on; and the contouring of the corners left a little extra wood to play with.

The cockpit area on any scale model should receive significant attention . . . everyone looks at the cockpit. The radio area behind the pilot is wrong in the kit. After the turtleneck is sheeted and sanded to shape, cut out the entire area shown by the windows on the plans, and wrap the butyrate around the entire area, as a one-piece assembly. The addition of a full cockpit will add

(Continued on page 79)





The Hawk flew effortlessly, even at 35 pounds.

THE HAWK'S FIRST FLIGHT

Flight report on the huge 1/4-scale Curtiss P6-E.

By Charles Gray and Larry Ranallo (with cooperation from Richard Barron)

Photos by the authors

Normally, it's the policy of this magazine to give its readers all the information on a particular model. However, in this case, we are varying our usual format to offer you only a flight report on a 1/4-scale P6-E Hawk, instead of a complete feature article. Typically, readers like to write to either the magazine or the manufacturer after they have completed a project. Our desk is stacked high with letters and photos, readers who are (deservedly) proud of their latest scale projects and who want to share their beautiful airplane with us. We always enjoy getting this kind of mail, and we often run such photos in a special "Aviation Album" section of the magazine.

In this situation, the flight report on the Hawk was forwarded to us from Dick Barron, who designed the model and who markets the plans and accessories under the Barron's

Scale Classics name. Models built from Dick's plans are always getting trophies at the various static shows. His P6-E for .60 size has won numerous "best" awards, and this Quadra-sized version promises to be another winner. The photos Dick forwarded with this flight report were of enough quality that we decided to print the flight report in its entirety. We also realize that there are many modelers out there who have been investing hours in numerous P6-E projects around the country, and most of them probably don't have any idea of how well the model will fly once it's completed. Have faith, for herewith is the good news! (PHP)

* * *

Well, here it is Big Bipe fans—a first flight accounting and flight report for all those 1/4-scale P6-E builders who have yet to fly their own model. This story is told by the

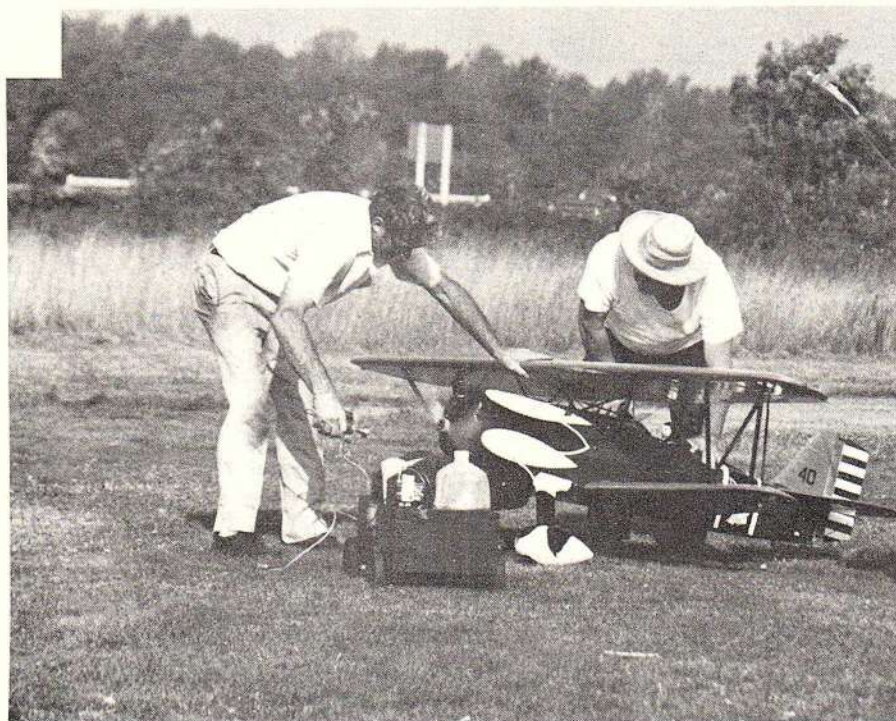
builder Charles Gray, and Larry Ranallo (ace test pilot). Also contributing to the story is Dick Barron of Barron's Scale Classics, 1213 Holly Springs Lane, Grand Blanc, Michigan. Both Charles and Larry are members of the Mentor area MARCS R/C Club.

The plane was built pretty much according to the plans, with the major exceptions being the use of pine and Lite ply in the fuselage. The wing spars were made of balsa in one solid piece, full span. All controls are wire cable, except for the ailerons. A servo was used for each aileron, with the aid of cable extensions. The model was covered with Silkspun Coverite, and sports a K&B paint job. Powered with a Quadra, 20-6 prop and a one quart fuel supply, it is ready to fly at 35 lbs. The radio used is a Cirrus 700 with five large servos. The time Charlie took to build the model was "one winter."

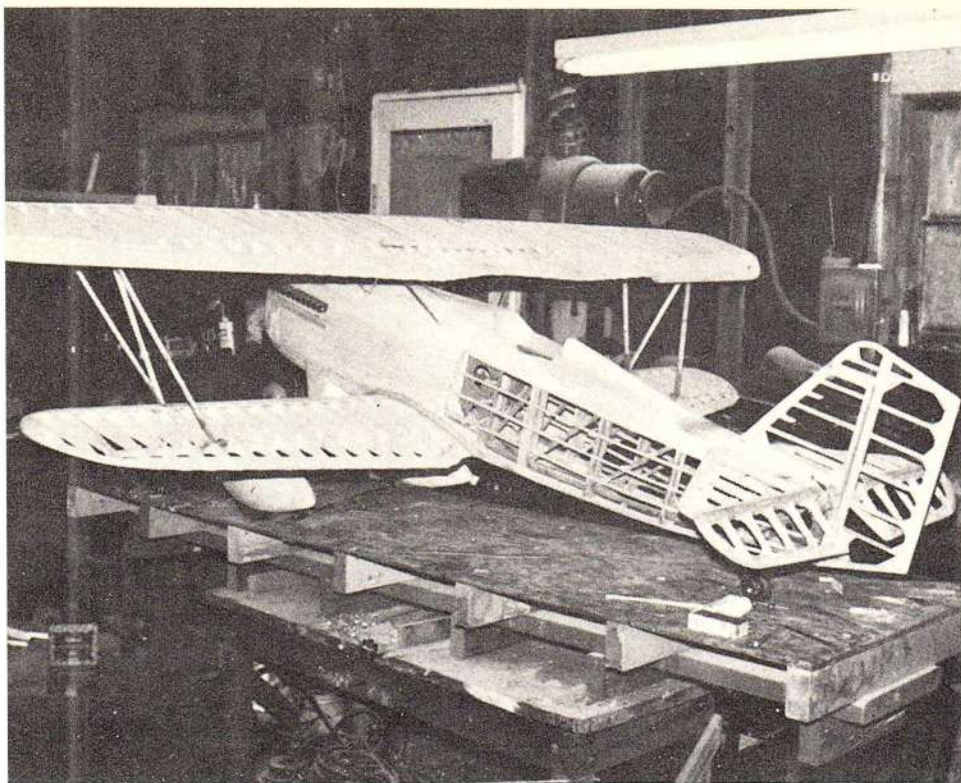
Larry Ranallo has been flying R/C since 1969, and is a well-qualified "first flight" test pilot. The following is Larry's account of the first flights.

"The first four flights, 20 minutes each, were made with an 18-6 prop on the Quadra. We pulled 12 lbs. on a fish scale at 8,200 rpm, using a Heath Tach. Without changing the needle setting, we installed a 20-6 prop and got 20 lbs. on the fish scale at 7,800 rpm. Were we excited!!! With the plug gapped at 19 thousandths, that's how we flew it.

"It was a beautiful Saturday morning, with a three to five knot wind from the Northwest right down our longest runway, which is 600 feet. Charlie wanted me to taxi a bit to see how the tailwheel would hold up. I had evil thoughts as I taxied down the runway for position. I wasn't about to wait to satisfy Charlie's concern for the tailwheel. In the meantime, as I was taxiing down the runway, Charlie kept talking . . . "Let the plane move before you turn the tail . . . now, no fancy tricks . . .



A heavy-duty starter gets the Quadra cooking. The fish scale pulled 20 pounds, on the initial thrust test.



The "bare bones" of the machine are authentic to the framework of the full-size Hawk. Mostly balsa and ply construction.

the guy wires are not on . . . nice straight and level flying . . . make a long run down the runway," and on and on, like a clucking mother hen. "Charlie really thought the P6-E

would take the whole runway. I gave it quarter throttle and, with the three to five knot wind, the plane rose gently after about a fifty foot run. I did a lot of Figure 8s and climbing turns just to check the trim and airworthiness of the airframe and radio. As the time to land approached, my knees were starting to sag. This plane was flying so smoothly and looked so beautiful, and the flying sensation so real (the full scale effect was there), that I didn't want to give up the feeling of flight.

"On final approach, after cutting to low throttle, the plane flew a long glide to a stall at about six inches of altitude and nosed over so gently it didn't even break the prop. Now I had a feel for the plane. That second round was terrific—full scale landing and taxi back to the box. The only trim was three turns of down on the elevators.

"The following week we did more aerobatics—loops and rolls, etc. I got some altitude and tried one roll without diving for speed, but it turned into a 45 degree rollout. Boy, was I happy to have that altitude. Charlie changed the fuel from a 16-1 to 20-1 gas-to-oil mixture and the Quadra cut out in mid air, but we landed upright with no damage. With

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the same mixture, it cut out on another flight resulting in a slight kink in the landing gear. This plane is smooth flying and has much more feel to it than a Pattern ship.

"I still was so thrilled that I wanted a P6-E, but with no garage or station wagon I settled for a Fleet. Now I want a garage and trailer, so that I can keep the plane intact. I harped at Charlie to build another one about 10 lbs. lighter, but he wants to build other planes."

Larry suggests the plane could have been built faster had there been more scale detail information at hand and asked for scale information sources. Short of access to the full scale P6-E in the Air Force Museum (Dayton, Ohio), the Hawk buff should have copies of the *Wings* and *Airpower* magazine listed below. They are still available as back issues for \$1.75 each. Write to:

Sentry Books
10718 White Oak Avenue
Box 3324 Granada Hills
CA 91344

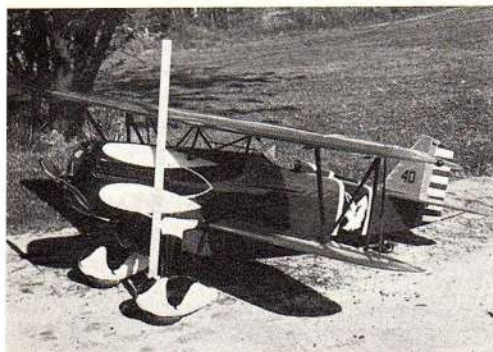
Ask for *Wings*, Vol. 6 No. 2, (April 1976), and *Airpower*, Vol. 6 No. 2 (March 1976). Enclose payment of \$3.50.

Also, *The Curtiss Hawks* by Page Shamburger and Joe Christy is a must for all of the Curtiss Airplanes. The price is \$24.95 and well worth it. It is available from most of the aviation book sellers that advertise in *Scale RC Modeler*. One source is:

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3850 Coronation Rd.
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I would like to express my sincere appreciation to Charley and Larry for making this flight report possible. If you desire more information, write to Charles Gray, 4860 River Road, Perry, Ohio 44081. Be sure to enclose a stamped, self-addressed envelope. □



The thing sticking up beside the cowl is a yardstick, apparently to give some feel for the size of the model.

Book Notes

(Continued from page 7)



eration by the world powers. Each plane is shown with a brief developmental description, a small 3-view (too small for any practical use, unfortunately), and color photographs. The book has page after page of color photos, but don't expect to find more than one or two of each aircraft type.

There are some interesting aircraft for standard propped engines, such as the A-1 Skyraider or the venerable DC-3. But there are also some really tempting subjects, such as the SIAI/Marchetti SM.109, Aeritalia AM.3C, Scottish Aviation SA-3 Bulldog, or even the Breguet Alize Br. 1050. There are fascinating twins, such as the de Havilland DHC-5 Buffalo, or the Dornier DO 28D Sky servant.

Bear in mind that this sourcebook is little more than a glorified browsing catalogue, since there will still be the problem of locating more extensive documentation on whichever aircraft might catch your fancy. But *Modern Military Aircraft* is a fine reference source to have around, if for nothing more than its "inspirational" value.

Published by Crescent Books, and available from Milbooks. Price \$12.95.

* * *

Undoubtedly, in years to come, the next generation of modelers will look to the Korean and Vietnam wars for their inspiration, just as we have looked to World War II. It is then that books like *Aircraft of the Vietnam War* will reach their full value as reference sources. However, we can still get some mileage from this book, for this pictorial review is loaded with photos of



airplanes like the A-4 Skyhawk and Skyraider, both of which are practical models today.

This paperbound magazine-format size title has no color data, and there are no 3-views or other primary documentation information. But each of the 64 pages is packed with good-quality black-and-white shots. These are ideal for rounding out a documentation portfolio. Other than a brief introduction, there is no text.

Published by Arco, and available from Milbooks. Price \$4.95.

* * *



While a title like *The British Fighter Since 1912* might leave the wary book buyer a little cold, the fact that this title is released under the prestigious Putnam name changes the situation. The pace is fairly rapid through the 400 pages of this work, going from the early Vickers and Bristol pushers, through today's Hawker Siddeley Harrier. As might be expected, each page is packed with data and historical perspective, with representational photos of most of the types interspersing the text. Now and then, a small 3-view emerges, but the book is definitely a reader's adventure, and not an illustrated guide for the documentor.

The title is ideal for a one-book reference to virtually all British fighter aircraft, and the fact that the information, albeit slim for each type, is authoritative, makes it a prime candidate for those obligatory "general reference" sources every well-rounded library should have.

Published by Putnam (London) and available from Milbooks. Price \$14.95. □



Squat, yet with a certain sassiness in its squarish lines, this Danish sailplane tug is designed for stable, high-performance flight.

POLY-T-FIVE?

If esoteric aircraft turn you on, here's an off-the-wall cutie from Denmark that will get lots of attention.

By Dr. L. E. Stephenson

Photos by the author

The winter 1971 issue of *Air Trails Sport Aviation* featured a Danish sportsplane known as the Poly-T-Five (pronounced "Poly-tee-five"). The plane was constructed by a group of students attending the Denmark Polytechnical University, in Copenhagen. This was the fifth plane in a series, the four previous craft having been sailplanes . . . thus the

62 scale r/c modeler

designation FIVE. The Poly-T stemmed from the type of school. During the construction of the model, the director of the construction for the full-size plane, Professor Morgens Birkenholm was contacted several times, in order to gain more insight as well as specialized data. Mr. Howard Levy, well known American and foreign aviation photographer

sold several of the original pictures, taken for the *Air Trails* article to the model builder for planning purposes. The actual drawings for the model were scaled-up from a three-view drawing which was attached to a brochure pertaining to the plane, at the Paris airshow of that year.

The plane was designed as a "glider tug," which is European for "tow plane," and was more than five years in the making. The fuselage and fin were constructed of light wooden frames covered with aircraft plywood, and the wings were the usual wooden "boxbeam" type with wooden ribs. The surface forward of the boxbeam was *balsa*. The remainder of the wing was composed of plywood, and fiberglass reinforced plas-

tic. The ailerons were plywood covered, and the divebrake/spoilers were aluminum. The tailplane was "all-flying," and at this point the model construction deviated from the original. The purist could easily modify the plans, but this model builder has not had the best of luck with "all-flying" stabilizers on smaller power models.

The original main semicircular-undercarriage was unique, in that the construction was completed by winding fiberglass reinforced plastic around a huge wine vat. The general specifications of the plane are: length—20 feet; height—7.5 feet; wing span—32 feet. As a glider tug, the plane could complete up to six tows per hour by utilizing its short takeoff and landing techniques: by deploying the divebrakes/spoilers, and closing the louvers in the cowl during descent.

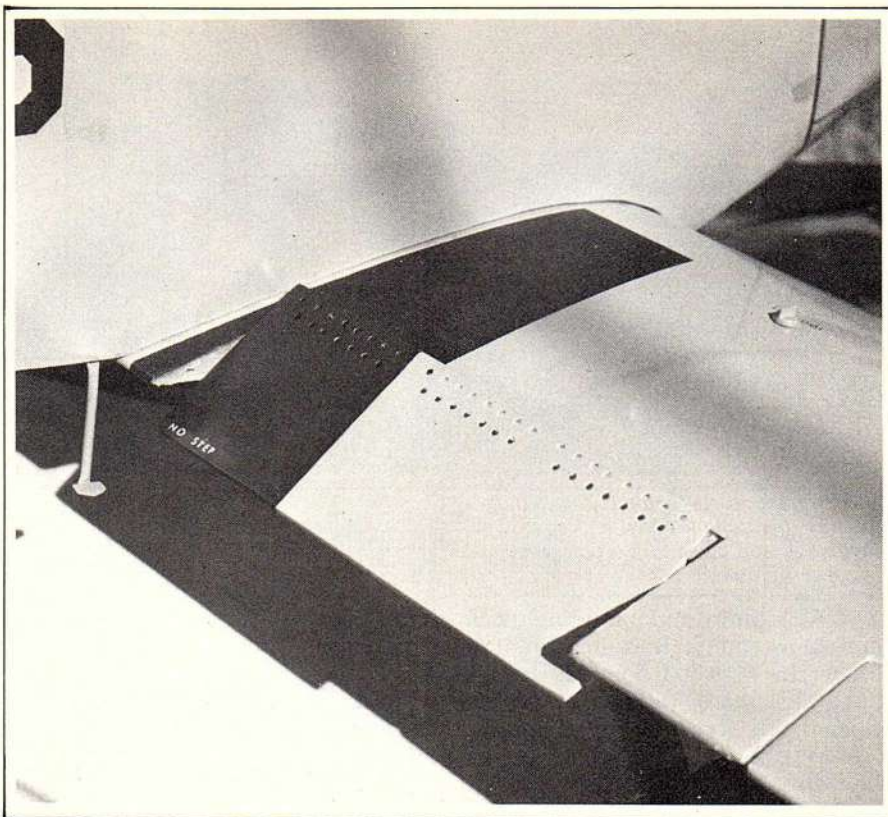
This model was designed for the "intermediate" modeler, that is, one who is familiar with working drawings, rather than following the usual step-one, step-two instruction sheet. There are no difficult procedures to be followed, but the assembly of the vertical fin and horizontal stabilizer require some serious thought. Therefore, the details of that assembly are outlined. Common sense, appropriate skills, and the proper tools are the major requirements.

Drawings:

The writer and builder worked from original three-views, and photographs (as well as from written documents, sketches, and verbal instructions. Robert Morse, whom most of you know as a master at the art of model aircraft drafting, has drawn the full-size plane which are more than adequate to construct a superior model, both in looks and flying characteristics. The plans may be obtained from Mr. Morse, c/o Mammoth Scale Plans, 3351 Pruneridge Ave., Santa Clara, CA 95051. The plans are sent for \$7.95, while a molded canopy goes for \$15.95. An epoxy cowl can be ordered from: Paul Steiner, 3186 Allen Way, Santa Clara, CA 95051. Price \$14.95. Enclose \$2.00 postage on any item ordered.

Wing:

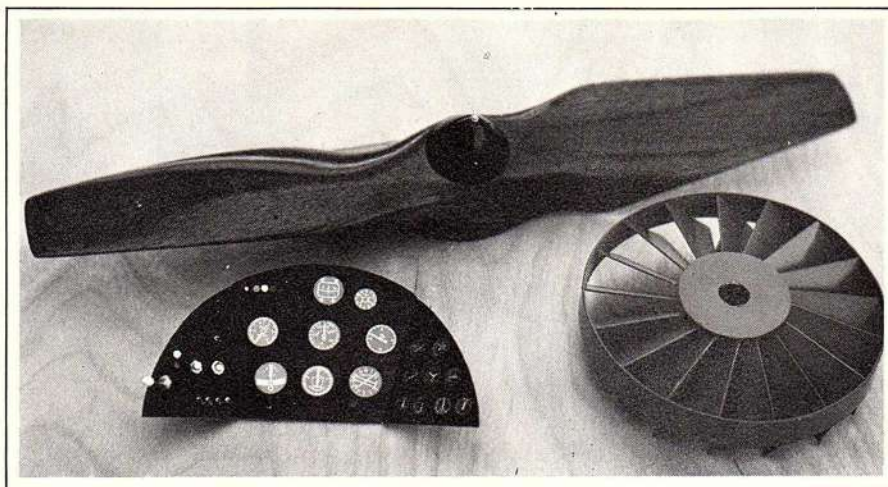
In order to obtain a more perfect fit of the wing to the wing saddle on the fuselage, by using the wing form to final sand the saddle, the wing was constructed first. The ribs were rough cut and sandwiched between aluminum templates for final sanding on a power sander. Naturally, the work can be performed with



The combination divebrakes/flaps are easy to install, and are quite effective.



The T-tail keeps the Poly-T-Five from being just another square model. This is an ideal project for the newcomer to scale.



Custom made items, such as the mahogany prop, instrument panel and cowl louvers, all add class to the otherwise simple airframe.

an X-Acto knife, and a sanding block. During assembly, it is important to utilize the plywood doublers for the dihedral braces, and the section which holds the main landing gear.

A Magna Jig was used to lay up the wing, but any flat surface will do. It is important to cut the push rod holes in the ribs prior to assembly, as that little omission has doubtless caused us all some eventful minutes.

Any of the better adhesives may be used, but for ease and speed of assembly, as well as lightness, one of the cyanoacrylate cements (instant glues) is an excellent choice. Ordinarily, the epoxies or Titebond-type glue is preferable for the attachment of doublers, and the like.

The sheeting in every case was attached with Titebond, after first pregluing both the sheeting material and the area to which it is to be attached. To date, this builder has never had a sheet separate. Of course, one could use a foam wing for this project. There are numerous articles concerning the procedures.

Divebrakes/Spoilers:

These can be fashioned from thin aluminum, and attached to a balsa base, or aircraft plywood may be used. In this case, the aluminum was used, and the holes made with a Whitney punch. The attachment was made with one of the instant glues. The linkage for both the divebrakes/spoilers and ailerons is of the most simple type, being direct push-pull, with one servo for each activity. Since there are no retracts on this model, the retract channel was used for the divebrakes/spoilers.

The final sheeted wing was primed with butyrate dope, covered with silk span and finished with butyrate

dope. The entire plane is painted International Orange, which makes for an easy but distinctive paint job.

There is always a difference of opinion as to whether or not the wings should be built in one piece, and then cut out the ailerons and flap sections. With the Magna Jig, the cutting out of the ailerons/flaps from the completed wing has always seemed the easiest method, especially when constructing constant chord wings. Obviously, the divebrakes/spoilers torque rod must be inserted prior to assembly of the aileron section, and the servo pads.

Landing Gear:

As mentioned in the preface, the original prototype gear was fashioned from fiberglass. However, the gear for the model was constructed from aluminum, but a standard Hallco gear may be used. It is important to bend the radius accurately, and such work is usually performed on a roll-former. Those belonging to a club will probably find that someone in the club will have access to such a machine for the five minutes it takes to do the work; or, if not a club member, any sheet metal shop will usually take the time to help out if approached properly.

Hinges:

Since some builders may wish to assemble the ailerons, and divebrakes/spoilers prior to moving on, it is thought significant to mention that, in this builder's experience, the "pin-them-on" type hinge should be used. That is, those which are actually pinned to the framework with small toothpicks, pins, and or screws. This advice applies to all moving surfaces. There is nothing quite as unnerving as to see a plane go in

with the elevator hanging loose for want of a decent hinge system.

Horizontal Stabilizer and Vertical Fin:

This work was completed on a flat surface (in this case half of the Magna Jig), and the techniques of workmanship are obvious. Note, however, that the vertical fin is 3/8" thick, while the horizontal stabilizer is only 1/4". Please note that the actuator for the elevator must be built in as the work proceeds on the vertical fin. It would be possible to use NY-ROD for the actuator system, but it has been found that this Bowden Cable system of operation does not always retain true linearity due to heat and humidity which necessitates the constant trimming of the elevator during a flight. This particular model was constructed with cables to the rudder horns, but for ease of construction the push-rod system has been depicted on the plans. Naturally, the model will have a slightly cleaner appearance with the cable system, and of course, look more scale-like. Be sure to use a spruce spar in the elevators.

Rudder and Elevator:

Both of these units were formed from very light balsa, and once again please note the difference in thickness. It is a wise idea to silver solder the elevator arm to the crank. Soft solder is a dangerous substitute, and some of the screw lock arms are pure suicide.

Cowl:

Generally, one is a bit smarter when constructing a cowed model if the cowl is on hand prior to the actual building of the fuse. This prevents that old Murphy's Law concerning the fit of cowls from working. This cowl can be made on a "one shot" basis from "model-makers' foam" or can be "laid up" from fiberglass on a lathe-turned plug.

In the case of this model, a plug was made, and for those inclined to avoid the forming of cowls whenever possible, you can purchase one from Paul Steiner as previously noted.

It is important to fit the internal plywood cowl-to-fuse attachment ring to the cowl prior to building the fuse. This technique provides the opportunity to fit the cowl exactly as work progresses. Epoxy was used in conjunction with some very fine fiberglass cloth to attach the ring. It always seems a shame to see nice models with the cowl attached to the fuse with a few sheet metal screws through the outside of the cowl.

The cowl is constructed of epoxy, over which silk is attached with butyrate dope. Persons who have not used this technique will be pleasantly surprised with the results. The silk is filled with a combination of talc and butyrate dope, and then sprayed with the butyrate color.

The check cowls are attached after final finish has been applied to the cowl. The cowl acts as a very effective muffler, since there is considerable space between the lower portion of the cowl and the fuse, and also through the cheek cowls.

Those who will recall the wonderful scale model of the Russian Yak-PM18 by Claude McCullough a few years ago, will remember the fan arrangement used by Claude to depict the real cooling louvers. This model's cowl fan was reproduced in ABS plastic, using MEK as the adhesive (MEK is Methyl Ethyl Ketone, and available at any plastics supply house). Model supply stores sell it for "many bucks" to assemble model airplanes of the plastic type. The ABS plastic is also available in various thicknesses from plastic supply houses—In this case 3/64" was used. It was found that the instant glues did not hold the ABS as well as the MEK.

There is a difference in application of the so-called "fan" in the two planes. In the case of the PM18, it was really a fan to cool the engine, while in the case of the Poly-T-Five it is really a stationary louver which may be closed during descent to keep the engine warm, and of course opened during climb to provide maximum air intake. Obviously, the louvers on the model do not open, and are in fact attached to the cowl, rather than the prop shaft (as in the case of the Yak).

Canopy:

Since the final appearance of any model depends greatly upon the fit of the canopy, it is wise to have the canopy on hand prior to the construction of the fuselage. The canopy can be attached in one piece, or made to open and close, utilizing one of the many methods which have appeared in magazines over the past few years. This particular canopy slides straight back, which lends itself to the tried and true "rail in a rail" system of operation.

Fuselage:

The workmanship required for the fuselage is very straightforward. Persons having a fuse jig will find the work exceptionally easy. Others will need to build on a very flat board.



The cowl and canopy are available commercially, which solves the critical building problems. Sheet tail surfaces, square wing planform, and boxy fuse build as easily as any basic trainer.

Only the areas above the 3/16" sides are curved, and this calls for one of two methods for such curvature. One can use the time honored planking method, or the sheeting method. If the sheeting method is used, the outside surface of the sheet should be very slightly moistened with a diluted ammonia solution, which allows the fibers of the balsa to bend very easily. This modeler used one of the instant glues to attach the turtle deck but Titebond may be used. If the latter method is used, it is a good idea to once again pre-glue both surfaces.

Engine:

A number of different engines were used in this model, and all worked successfully. A .60-size was first tried, and that was found to be a bit fast, although the maneuvers were unlimited. The .45-size engine provided the most realistic flight. It is important to have the engine on hand prior to setting up the engine. It has been found that the mounts made by C.B. Enterprises provide a little extra when it comes to quality, and selection.

Nose Wheel Assembly:

One can either manufacture a system, such as shown on the plans, or rely on the many fine examples on the market. The adjustable tiller arm is very helpful in obtaining optimum tracking during high speed taxi tests.

Assembly:

It will be noted that there is zero incidence in this model. Several variations were tried, but since the prop wash is below the horizontal stabilizer, the zero incidence was the final choice. In order to facilitate assembly,

bly, the wing should be sanded into the fuse saddle, and then attached to the saddle very carefully, maintaining both lateral and vertical linearity.

Once the wing is in position, and the horizontal stab attached to the vertical fin, one is ready to proceed with the assembly of the last two components to the fuse. If the fuse has been constructed carefully, it will be noted that there is a "pocket" into which the empennage fits. It was found that the easiest method of assembly was to use a template on the wing so that the top of the template coincided with the center line or datum line of the fuse. Thus, one can place the fuse and wing in a cradle of some sort, (cardboard box, foam block, etc.) place a level on the wing template, and proceed to insert the vertical fin and horizontal stab assembly into the fuse. At the same time, a couple of assistants need to see that this empennage assembly is square with the world in three directions. That is, vertical to the vertical axis of the fuse, parallel to the horizontal axis of the fuse and parallel to the longitudinal axis of the wing. This aforementioned procedure is the only "tedious" work on the model, but in order to fly well these are indeed critical. Once all leveling devices are in agreement, one of the instant glues may be used to tack the assembly in place. After another very careful check is made for alignment, final gluing should take place with epoxy or Titebond.

SCALE DETAILS

PROP: Five laminations of mahogany were used, and then hand carved. The final finish, after applying mahogany filler, was polyester scale r/c modeler 65

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resin. Several coats were applied, with wet sanding between each coat. The final coat was rubbed with "rotten stone" and waxed with Simonize. It is to be noted that this is a very unusual looking propeller which brings forth many comments, and questions (This is not a flying prop).

MARKING AND RUNNING LIGHTS: Small pieces of the appropriately colored plexiglass were used to fashion the lights. This technique is preferable to painted balsa, and requires very little more time. The plastic can be obtained from a supply house or may be obtained from broken taillights, and marker lights from trucks. In this case the plastic was formed with a Dremel tool and buffed with automotive rubbing compound. The three-views show the light positions, and relative sizes. It could have been simple to place an operational strobe light on the fuse to the rear of the canopy, but one was not available at the time of construction. Radio Shack now has one which would be perfect. Consequently, and old instrument panel light was used (Chicago-C-Light).

DECALS: The registration letters were cut from Monokote and the school insignia was drafted onto decal paper with waterproof ink.

CANOPY MIRROR: This addition to scale was fabricated from sheet brass parts which were in turn soldered together, and sprayed flat black. The silver surface of the mirror was silver Monokote.

STEPS: The foot steps were fabricated in the same manner as the mirror, that is, from sheet brass, and brass tubing, and attached with very small screws to the underside of the fuse. It might be added that all of the scale details were so affixed as to be easy to remove for traveling with the model.

GAS CAP COVERS: These were made from sections of 3/8" dowel rod, with a small piece of aluminum cemented into a tiny slot cut into the dowel. In some cases, lettering was necessary, such as that noted near the gas caps. These letters were the standard pressure sensitive transfer type.

PITOT TUBE: Constructed from two diameters of brass tubing, and made removable by soldering a 4/40 screw into the tube, and inserting a small section of threaded brass tubing into the wing.

AIR HORN: Constructed from a section of 1/4" dowel, shaped with a Dremel tool. This serves as the on and off switch for the radio.

TOW CABLE, BALL, AND HOOK: In the United States the tow plane usually drops the tow rope after releasing the sailplane. However, this procedure is not permitted in Denmark. Consequently, the cable must be reeled in and out for each flight. Thus, there is a pilot-controlled reel situated in the cockpit area just behind the pilot. The tiny light just above the tow-cable ball is lighted by the pilot when he finds it necessary to release the tow cable for some emergency.

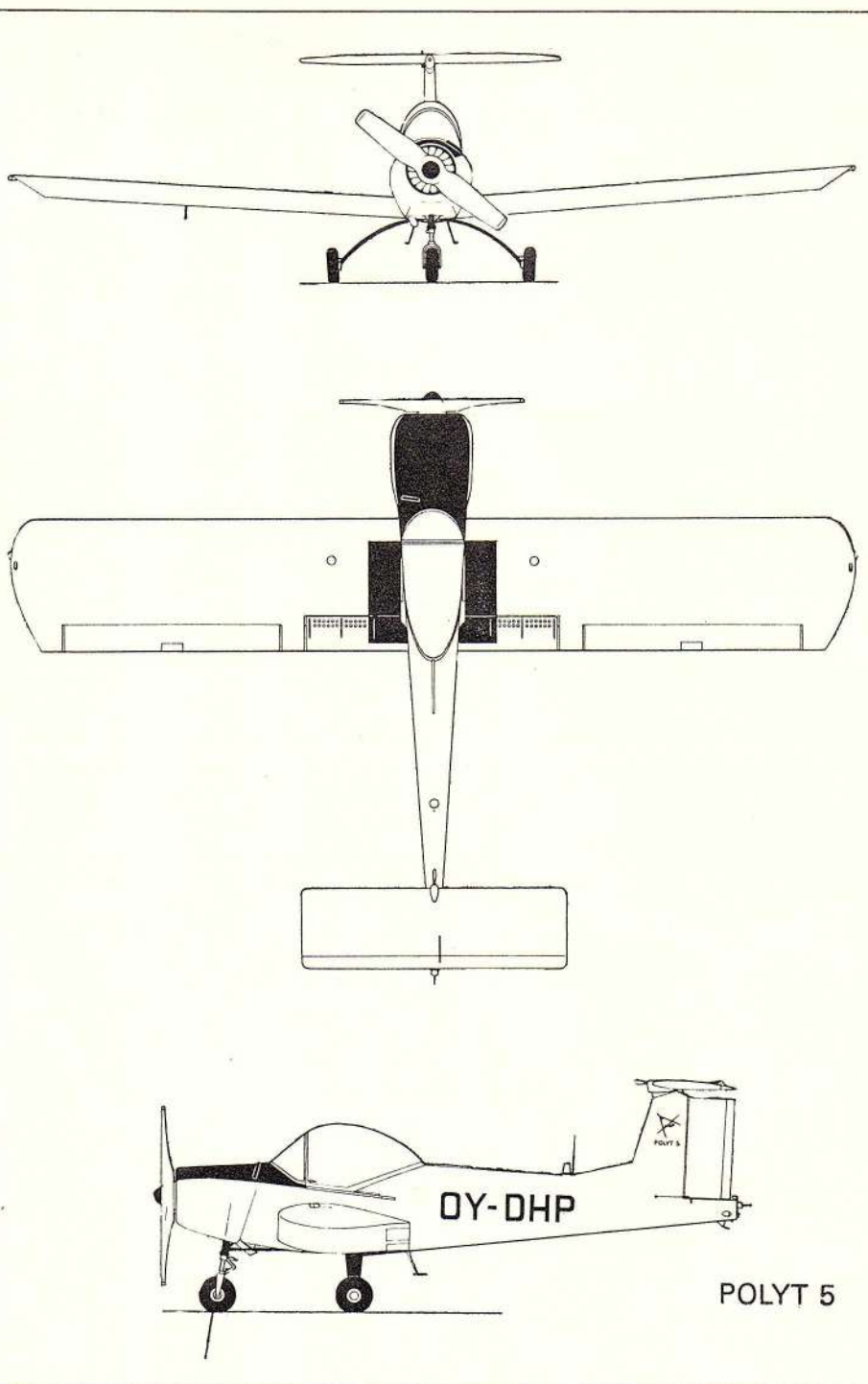
PILOT: The pilot was made from a standard G.I. Joe figure, using only the head and hands. The remainder of the body was carved from foam.

INSTRUMENT PANEL: The panel was constructed in the usual manner, by cutting holes in 1/16" thick aircraft plywood, painting the plywood with black crinkle paint, and covering the rear with clear plastic. Pictures of the instruments were cut from magazines and/or catalogs, and cemented to the plastic. The instrument control levers were made from plastic-headed pins which were filed to shape.

FLYING

It is always wise to set-in considerable down trim for the initial flight, especially when one will not have the benefit of the prop wash to assist with the feel of the elevator. A full 1/4" down trim was set, and it was hoped that the runway was plenty long. Several high speed taxi runs were made, and the nosewheel adjusted for proper tracking. More than one fine model has met an untimely end due to the pilot trying to guide the plane with the nose gear which is—in nine cases out of ten—attached to the rudder. One loses track of the rudder, which might be skewed in one direction or another and, when the plane takes off, the result is a fine cartwheel or snap roll. Do not be surprised when the plane seems to "jump off" the ground instead of slowly flying off. The actual plane did the same thing.

Once the plane has been trimmed out satisfactorily, it will perform every trick in the book. Take the plane up to a safe height, reduce speed, employ the airbrakes/spoilers, and see what happens. After becoming familiar with the plane, hit the airbrakes/spoilers at various speeds while in different maneuvers. No one has ever seen such wild gyrations. It is possible to use a different servo arrangement so that different degrees of divebrakes/spoilers can be applied, and that provides even more interesting flight characteristics.



The model has no bad flight habits and due to very accurate and true construction, there were no trim problems. This is a very enjoyable plane to fly, without annoying habits, and one which elicits many favorable comments on the ground and in the air. In its very first meet, it won the Western United States FAI Championship.

If there are any questions concerning construction, they will be gladly answered by contacting L. E. Stephenson, 1006 Westwood Drive, San Jose, CA 95125. Please enclose a SASE (self-addressed, stamped envelope).

The address of *Air Trails Sport Aviation* is: Conde Nast Publishing Company, 420 Lexington Avenue, New York, NY 10017. This particular plane was also the feature story, and was the cover picture. A single copy of the Winter '71 issue costs \$1.00. ☐

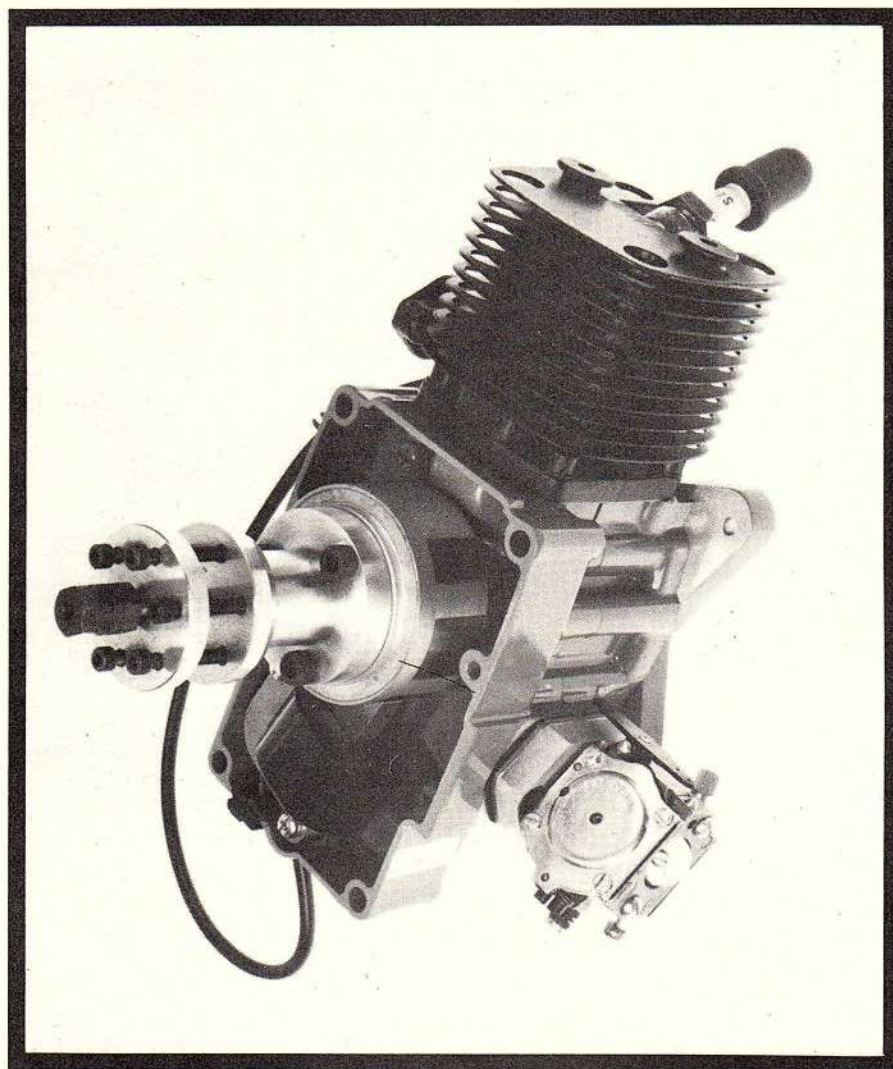
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SR/CM LOOKS AT...KAWASAKI'S GIANT-SCALE power plants

A belated report on two of the real workhorses in the gasoline engine arena. These brutes are already established as delivering punch and power.

Staff Report

J. R. Naidish photos



A real brute for torque and horsepower, the squarish-looking Kawasaki is not your typical chainsaw engine.

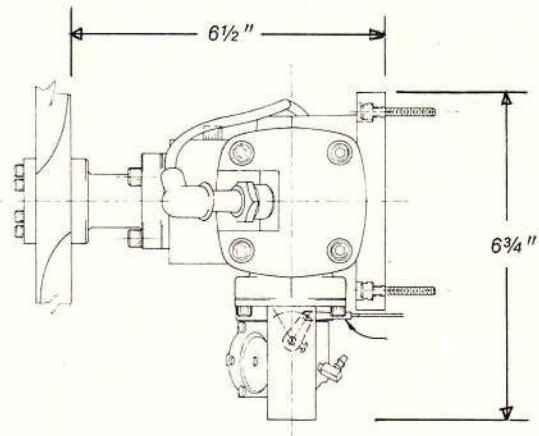
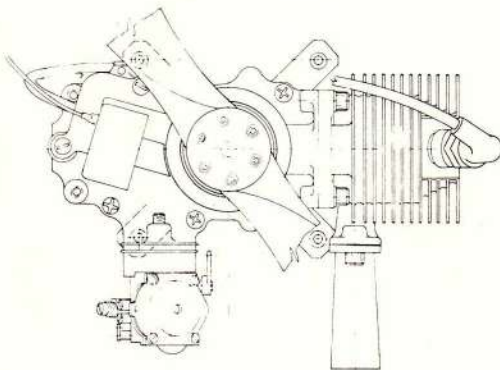
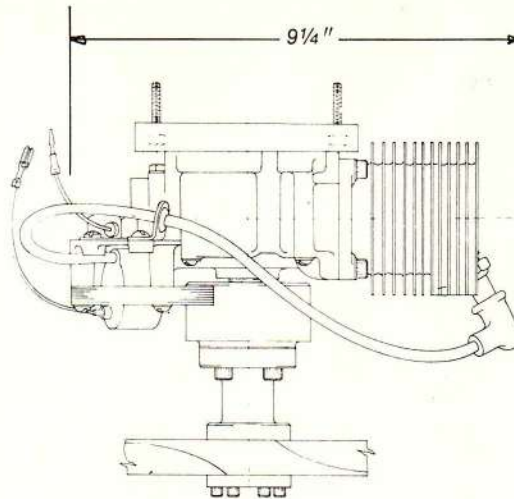
68 scale r/c modeler

Now that giant scale modeling has become an accepted way of life, all the earlier claims and counterclaims about power plants are finally beginning to filter out into something of an understandable pattern. Modelers who originally damned some of the gasoline engines as balky and hard-to-manage came to learn the skills necessary to get maximum performance out of those chainsaw spin-offs. Some modelers are still bemoaning their purchase of an Evra, while many swear by them (not *at* them!). Give one giant scale buff a Quadra, and he'll shudder in disdain, while scores of others won't even touch anything else. It's the same in the .60 market—some fly Foxes, others O.S., and we personally lean toward Rossi . . . variety is this hobby's spice of life.

That's one of the reasons we held off on this long-overdue report on the two power plants from Kawasaki, being distributed by Bob Seigelkoff of C.B. Associates, Inc. (21658 Cloud Way, Hayward, CA 94545). In actuality, the photos and initial data on these engines were compiled after last year's MACS Show. But we knew that, if we published a report on a 2.2 c.i. displacement engine that produced over 18 pounds of thrust at 8,000 rpm on a 20-6 prop, that the whole world would look at us as crazy. Our previous high marks in performance in our Kioritz article were scorned, until the word got out that this engine really was a hot piece of metal. To follow that with what seemed another exaggerated article was just asking to confuse and frustrate (and maybe even alienate) some of our readers.

But time has sorted out the proverbial wheat and chaff, and enough modelers are achieving consistent success with these engines so that we can now safely report that both the TA 36 (2.2 c.i.) and the TA 51 (3.15 c.i.) power plants are among the cream of the crop in giant-scale engines. One thing that separates

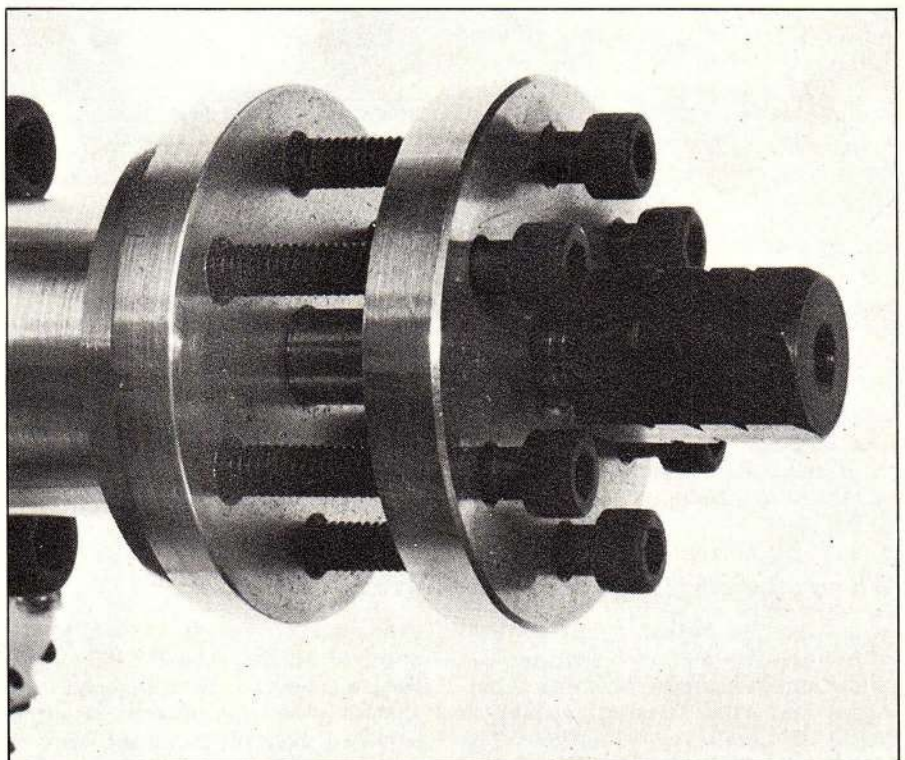
C. B. ASSOCIATES' KAWASAKI TA 36
2.2 c.i. displacement



them from all other gas-eating prop-swingers is that these units are not re-adaptations of chainsaws. Chainsaws don't have to run smoothly—as a matter of fact, their oilers work better with a little help from some internal vibration. Weed eaters are the same way, with mass and dynamic balances that aren't critical for proper operation.

But the line of tools known as "weed blowers" are another matter. The unit isn't hand held, but instead is strapped to the operator's back, so that any excessive vibration levels can be rather annoying and potentially painful. So the Kawasaki engines are taken from the best possible original design source, and they require no counterbalancing or reworking of any sort to get absolutely smooth operation. As a matter of fact, one might say that it's simply a matter of changing the type of fan the engine is swinging when converting it to modeling use.

The alterations made by C.B. are only done to facilitate model usages. The original carb is replaced by a more easily adjustable Walbro (on the TA 36) or Tillotson (for the



The six-bolt hub adds extra safety to the power plant. Note that a spinner attachment is already included.

TA 51) version. This is necessary to get adequate fuel draw from a remote tank, as well. A radial motor mount and 6-bolt safety prop mounting assembly are installed to complete the mods. The prop output of this engine, unlike most of the chain-saw varieties, is achieved on the proper shaft assembly, and not the rear output. This means that the main bearings don't suffer any non-design tolerance wear because the engine isn't being operated according to the factory specs.

The engines also feature electronic ignition, but that doesn't mean that they are hard to start. As a matter of fact, of all the gasoline power plants we've examined, the Kawasaki's won the ease-of-starting tests hands down . . . no start took more than four flips! Hot starts were effortless, as long as the carb adjustments were correct and the user didn't inadvertently flood the engine. The transistorized ignition also virtually eliminates any fear of glitching the radio with point sparking.

The engines also permit a very basic throttle linkage installation, with a straight pushrod to the servo possible, instead of the usual bell-crank. This is done by installing the carb directly at the side of the engine, so that the width of the overall engine gets somewhat extreme, at $6\frac{3}{4}$ " on the TA 36.

As a matter of fact, there seems to be nothing one can get for free in the power department. The Kawasakis suffer from being not only a little bulky, but they are a little heavy, too. The TA 36 is big for a 2.2 c.i. engine, being $9\frac{1}{4}$ " tall (including plug), $6\frac{1}{2}$ " long (which is rather normal for these displacement engines), and $6\frac{3}{4}$ " wide. The engine will fit in most installations, but some models—like the big Tiger Moths—are probably too tight a fit. The engines allow the unique feature of permitting the cylinder casing to be rotated, so that the spark plug can either face forward or back. You can also rotate the carb, since it mounts perpendicular to the side of the crankcase. By doing this, you can neatly slip the engine into a Byron Pitts.

The 2.2 c.i. engine is also somewhat heavy, weighing about two more pounds than a Quadra. It doesn't seem that this bulky weight is much of a problem, since most giant models allow ample latitude for shifting batteries and other internal weight to avoid a noseheavy situation. The TA 51 weighs $7\frac{1}{2}$ pounds.

In the final analysis, we must conclude that the extra weight pen-

PERFORMANCE SPECIFICATIONS

Kawasaki TA 36

PROP	RPM	THRUST	AIR SPEED
		(lbs.)	(mph)
18-6	9200	12	51
18-10	7800	14	71
20-6	8000	18	45
20-8	7400	19	55
20-10	6250	16	58
22-6	7050	20	39

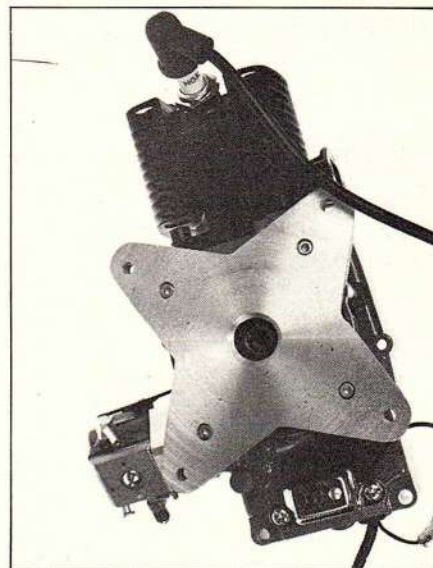
Kawasaki TA 51

PROP	RPM	THRUST	AIR SPEED
		(lbs.)	(mph)
22-6	8000	32	45
22-8	7850	30	59
24-6	6900	32	38
24-8	6250	32	46.9



Bob Seigelkoff revs up the 2.2 c.i. Kawasaki, showing an amazed Ed Morgan how some 18 pounds of pull feels.

alty of the engines are more than offset by the marked increase in power available. The engines are ruggedly made, with heavy-duty ball bearings throughout. As might be expected by the name Kawasaki (they are the world's leader in small two-stroke and four-stroke engines), all the quality is built in. All of the castings are clean, and the counterweight balancing system seems to be very nicely done. The crankcase is tightly packed, for maximum effect of the Schenurle induction. The piston head is intentionally roughened to avoid overshoot of the fuel charge, thus eliminating the need for a baffle on the hemi-head. If the head were smooth, the fuel charge could be splashed over the head and onto the other side of the cylinder, or the fuel could easily flow off the domed head during the combustion stroke.



The engine mount on the TA 36 is designed to be interchangeable with the Quadra . . . by some strange coincidence.

The proof of the pudding is graphically illustrated in the performance charts. The props used were either Top Flite or Zinger (where both companies made the same size propeller, the figure shown is an average rpm reading). After approximately a one hour break-in period (except to put a bit of time on the engine before it really "opens up"), we switched from a 30:1 mixture using Bel-Ray MC-1 oil, to the prescribed 50:1 mix. Don't be afraid to cut the oil way down, for it only increases the performance (assuming the engine is properly broken in). As a matter of fact, Bel-Ray claims that a minimal mixture of 55% oil should be used!

The manufacturer states that the smaller TA 36 achieves its maximum horsepower rating of 2.3 hp at 7,500 rpm. Maximum torque is 1.73 ft./lbs. at 5,500 rpm. The larger TA 51 reached 3.1 hp at 7,000 rpm, with a max. torque reading of 2.38 ft./lbs. at 5,500 rpm. Those impressive torque readings mean that you can swing one heck of a large warclub on the Kawasakis. Remember to use a tachometer whenever you are first setting up an engine in a new model, and keep changing the prop until you either load (or unload) the en-

gine to the best possible rpm for either bhp (speed) or pulling power. The Thrust and Air Speed calculations given in the charts are extrapolated from the manufacturer's data, in comparison to our own rpm readings.

In doing our tests, we not only learned that the Kawasakis are superb engines, but we also discovered that one of the most probable causes for poor engine starting, balky throttle response and lack of power in a gasoline engine is the fuel. Octane ratings really vary from station to station, and what it claims on the pump may not be what you are pumping into your engine. Do not think you are going to improve performance by switching to the no lead or low lead fuels. Stick to the "regular" grade of gas.

Run as little top lube oil as the engine will safely tolerate. The latest kick is to spike the fuel with something like Cox Red Label racing fuel, and this seems to work. Be very cautious of using ether in fuels (it's a killer). But one of the real secrets is to simply avoid old, stale fuel. Gasoline that has been mixed with oil can lose its potency in as little as three weeks. Never mix more than you can burn during the weekend.

Since this review is being written with a considerable amount of hindsight and field testing by numerous fliers, we can safely claim that the Kawasakis have quickly established themselves as the workhorse of the giant-scale movement. We only have to think back to the Nosen P-51 at Las Vegas the year before last, which was terribly underpowered with a Quadra. Last year the model flew superbly with the TA 51. The same sort of success stories have been retold countless times and at numerous flying meets . . . what planes other engines wouldn't fly are now successful with the extra thrust of a Kawasaki. So if you have a slightly overweight model which could use a little more power, measure that cowl and hope that one of the Kawasakis will fit.

* * *

C.B. Associates is now marketing the two engines in an economy "assemble-em-yourself" format. All the components are supplied, and you just put them together. No lathe work or special tools are required, and the average modeler should have no trouble with these kits. The price of the TA 36 kit is \$189.95, while the TA 51 sells for \$199.95 in the un-assembled form. □

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FLIGHT TIMERS

(Continued from page 13)

spent more in repairs than the price of any of these timers.

If you are into ducted fans, you can't survive without a timer. On the other end of the spectrum, those flying the giant-scale models actually need some warning device to tell them that they have been up in the air too long. The lazy flight characteristics of many of these big planes can lull one into almost a sailplane-flier's lethargy. The next thing you know, that unlimited gasoline supply has kept the model airborne over half an hour!

As can be seen, most people don't realize how much of a critical item an inexpensive timer can be. In all honesty, we never used one but, once we tried these handy gadgets, we found it almost habit forming. Just as a tachometer can give you some peace of mind about the reliability of an engine run, so a timer can add security to the total flight program.

The advanced technology of the liquid-quartz watches has caught up with the model industry. You can now get a very compact timer that will give you an easy-to-read display

of remaining time, plus a 30-second buzzer warning at whatever predetermined time you select. The old wind-up "memo-timers" only told you when fuel was exhausted, but these systems can tell you accurately exactly how much time remains in the flight. Gone are the days of "guesstimated" timing with an egg-timer on your belt... the technology in these timers gives full programming capabilities.

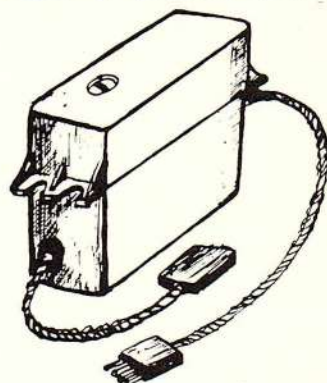
The rectangular TC02 countdown timer counts backward in either standard or military time, triggering a programmable alarm (which lasts 30 seconds). Because of the chip in the unit, the day and date can also be read out. You can set the alarm program anywhere from 12 hours to one minute, and the count shown in the liquid-crystal display is a countdown. As a spin off application, you can also use this as a handy travel alarm clock! The unit comes mounted in a tray, and extra trays can be purchased for \$1.00. The timer can then be transferred from transmitter to transmitter. What we like about this unit is that, once programmed for a selected time to elapse, one need only press a button to reset the timer. It's easy to use, compact and accurate. At \$21.95, this unit comes with an extra battery and a full guarantee.

The squarish-looking Model 35S is designed as a one-function low-cost timer. The timer will calibrate up to 15 minutes (not a reversed count), and the unit does not have any alarm. This is a good unit for someone who merely wants an inexpensive way to monitor the amount of time the model has been in the air. A velcro strip allows for easy mounting and removal on the transmitter. Price is \$11.95.

The stopwatch in the Pateau line particularly intrigued us. This is a landyard hung unit, to be worn around the neck (although it is small enough to fit on a transmitter). The unit will read standard time, so that a flight can be monitored, or the pilot can use the set button to get an elapsed time count in 1/100ths of a second. There's no alarm on this unit, but it will give you elapsed times up to one hour. The unit even has split function capabilities, so that two timed sequences can be entered into the timer's memory. The Model 66C sells for \$19.95.

These timers are currently being sold direct, although the distributor welcomes dealer inquiries. The Pateau timers are available from: DeWeese Distributors, 205 W. Stevens, Santa Ana, CA 92707. □

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SAILPLANE SLIP UP

The June issue's article on the Albatross sailplane infers that the plans for the model shown are by Dale Willoughby, the author. Col. Thacker's 122" span model was built from a set of plans which are still available from **Model Builder** magazine. Specify plan #9751, when ordering, and send \$10.00. **Model Builder**, 621 West 19th Street, Costa Mesa, CA 92627.

U.S. Scale Masters



The 1981 U.S. Scale Masters program will continue the tradition started last year of selecting the best in Scale from around the country. This year's expanded regional selection meets will ensure a better representation at the big finale in August.

Both classes in Sport Scale will be recognized, as well as Precision Scale. Only the top five in the Sport Scale classes will be invited to the Masters Fly-Off, as well as the top three in Precision Scale.

For more information on the U.S.S.M.C. program, contact the co-chairman in your area:

East Coast Chairman:

Dale Arvin
3428 Charlestown Pike
Jeffersonville, IN 47130
Phones: (502) 588-9109 (O)
(812) 283-5719 (H)

West Coast Chairman:

Harris Lee
c/o Scale Squadron of So. Calif.
24672 Seacall Way
Dana Point, CA 92629
Phones: (714) 760-9466 (O)
(714) 493-8083 (H)



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(812) 283-5719 (H)

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FUN-FLI

(Continued from page 40)

tionally dominates this show, being the acknowledged master of pilotage. This man flies everything from his favorite Martin Baker M.B.5, to a Formula I racer (T-tailed Rivets, being scale), to a twin .60-powered Me-140 . . . and he flies them all at less than 10 feet through all the maneuvers. Ted does a roll on take-off with the twin-engined bomber, then later does 8- and 16-point rolls with Tom Weemes' Gee Bee Model E. The man is a natural pilot, and he can do any maneuver in the book—and always with less than a wingspan between the model and the ground.

But low flying and thrilling stunts can get infectious, and soon one flier is trying to outscare the crowd. Garland Hamilton, who has only been flying for four years, had even the likes of Ted White white-knuckling it as he made his low passes on the deck . . . inverted. On a few of them, an extra coat of paint on the model would have meant the difference between a scrape and a miss. This man is a definite threat in the contest circles, for each of his models is a museum piece, and he was actually commissioned by the Piper people to build a scale model of their Seneca!

Kent Walters and Bob Frey, the two local hotshots, were in rare form. Kent did his usual SBD dive bomb routine, with a shot gun shell charge in the bomb . . . that sure brings applause from the crowds! Bob Frey built a new P-38, which he plans to campaign this year. He and Ted White did some formation flying that would have done the Blue Angels proud. The exits from the maneuvers kept getting lower and lower, and everyone seemed to sense that the fickle finger of Fate was trying to tickle one of the duo. On the exit from a loop with a roll on the top, Bob's P-38 flew through a thermal (the "dust devils" get so strong that one virtually lifted an F-16 out of its cradle, flipped it over and smashed it to the ground!). Within a wink of the eye, the Lightning was staggering home with one prop snapped off, and a pair of scrapped cowl. Bob won the dubious distinction of having made the lowest pass of the weekend. Only his quick reflexes kept the minor scrape from turning into a tragedy.

Another big drawing card of the meet is the banquet. As we have reported in the past, there's some friendly competition between the

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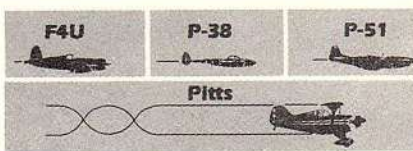
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California boys and the Phoenix crowd. It has become the standing tradition for the host group to sort of "roast" the visitors. Done in the truest sense of good clean fun, it's the sort of fare that is typical of bowling banquets and other sports affairs. This year was no exception, as the 1/8th put on a skit which poked good fun at the Scale Squadron's hosting of the Masters Championships last year. The Editor was commandeered to play the straight-man in an interview with Captain Flapp (Al Casey) and his Public Information Officer (Roger Hightower). Casey was dressed as a derelict cowboy, and did the whole routine in a John Wayne voice.

Rounding out the festivities at the banquet was a slide presentation by Captain Gerald Martin of the Confederate Air Force. There are a large number of these fighter jockeys who have the double pleasure of getting to fly not only models, but some of the rarest full-size warbirds in the world. Martin did a presentation on his participation in the making of the movie *The Battle of Britain*. Imagine, getting to fly both Spitfires and Me 109s! The banquet was so crowded that they had to restrict tickets to 126, and many fliers had to be turned away.

The Scale Squadron had its shot, too. The ranks showed up with the brightest fluorescent orange cowboy hats ever seen. This was a subtle poke in the ribs for the "Cowboys" of Arizona (after all, being a cowboy today is the "in" thing!). As a gag, the Editor was presented with a ten-gallon day-glo orange hat, with no less than a matching orange and blue feather. The Squadron's color is orange, while the Phoenix crowd sports blue.

We have a sneaking feeling that next year we just might see the evolution of a three-day format for the Fun-Fli. For many fliers, getting off for a Friday is tough, but even if half the field showed up for the extra day, it would still be a great success, and it certainly would take a lot of pressure off the crowded frequencies. Maybe there will be a real miracle and the allocation of extra frequencies for R/C will happen between now and then . . . but we're not holding our breath! Whatever the 1/8th Air Force decides to do, their Fun-Fli will always be a one-of-a-kind event. There's just something about the blend of the Confederate Air Force, the Scale Squadron, the People's Choice Awards, and all of the little things that come together to make this one great weekend. □

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THIS WAS TOLEDO

(Continued from page 26)

cus Hobbies showed some imports which are sure to be seen on the contest circuits. A firm from Canada is marketing some rather novel Italian kits.

Even radios reflected this import trend. Kraft shocked the industry with its "K-Line" series of budget-minded radios. Who would have ever thought the day would come when the name Kraft would appear on a radio manufactured off-shore? The hobby has become a truly eclectic affair, with real international flavor. The U.S. may still hold a strong edge on technology, but other countries are showing that they can produce lots of quality at a very reasonable price.

Such trends in importing may discourage the major manufacturers (the auto industry has graphically shown what uncontrolled imports can do), yet it tends to promote growth for the smaller businessman. Such an economy is ideal for direct selling, and only the one-man companies can succeed in that market, with their low overhead. Hobby shops tend to hold down their inventory and acquisitions, so the modeler often turns to the magazine ads for his shopping. We've never seen so many cottage operations which sell direct, as we saw this year at Toledo.

Quite frankly, we didn't see too much new this year . . . or, at least, not as much as we had hoped to. What was new was very exciting, such as the Higgins/Contempo Christen Eagle (there were no less than seven different Eagles being offered by various manufacturers!). There were more than enough booths that looked like they were just revamps of last year's efforts. While there was certainly *plenty* of products from which to choose. The scale flier won't lack for planes to build during the coming season . . . and he certainly will have an abundance of hardware with which to garnish his favorite model.

* * *

Even with the major space we have dedicated to Toledo in this issue, there are plenty of items which had to be omitted. Please look for further information in future "Scale Showcase" product reviews. For further information on the items pictured here, please consult the "Manufacturer's Directory."

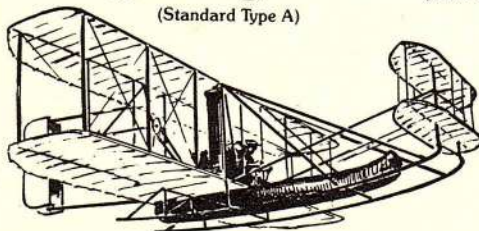
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CAP 20L

(Continued from page 32)

model, we were very impressed by the way the model disassembled to fit in some very small spaces. The wings are removed just the way they are on many full-size aircraft. A stub of a spar protrudes from the fixed center section on the fuse. This slips into spar tube in the wing. This allows for a very compact model, yet the fuse is always on its landing gear, which are attached to the small spar on the fuselage.

After snapping a few photos it was our turn. The Quadra was really humping, and you could feel the thrust just revving the engine in the pits. The CAP 20L is actually slightly larger than true quarter-scale, being $3\frac{1}{4}" = 1'$ scale. The model we were about to take into the air weighed just about 17 pounds, on the nose.

As we taxied out, we began to get that same feeling of size and mass that always happens when a quarter-scale model is being flown. The 81" span machine looks impressive even on the taxiway. The wide-track gear gives a definite feel for stability, and taxiing in even slight crosswinds is effortless. Once on the runway, the power was poured to the Quadra and, without a gasp, the engine let out a roar and the CAP just about took off in its own length. Only a quick nudge on the elevator kept the model from lunging straight up.

To say that there is an excess of power is an understatement. By the second circuit of the field, the throttle was already back to less than half. At this setting the model felt as if it could still do a decent roll. Since it wasn't our model, we didn't try it! After we got accustomed to the control response, which was pleasantly well balanced, we put the throttle to the stops and went for broke. The rolls were crisp and clean, with lots of response from the ailerons. We didn't detect the need for excessive elevator in the inverted mode, but Darrel had to admit that he did not know whether the thrust had been modified to the 2 degrees mentioned in Dave's article. He did note that paying attention to the wing alignment will often eliminate this minor trim situation.

We did Cuban 8s, Top Hat, Immelmans, both inside and outside loops. The plane was still too new to have been properly trimmed out, so there was a bit of hunting through



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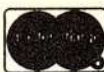
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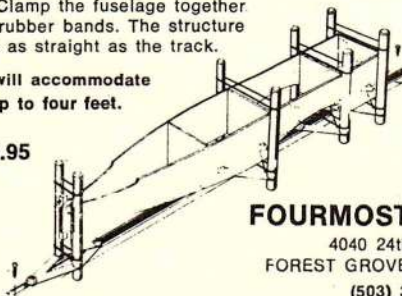
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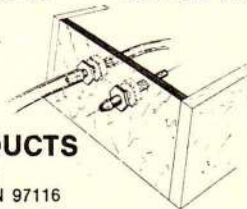
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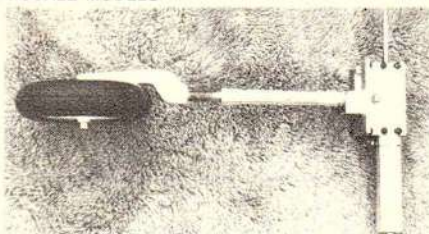
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the outside maneuvers. We tried a Lomcevak, and was surprised to see the CAP go effortlessly over the top on the first try! I must admit that the CAP wanted to do those prolonged knife-edges in the worst way, but I just couldn't keep the model in the correct attitude. I suspect that more rudder was needed, for the model would actually climb during the brief intervals I had it on its side.

There was plenty of fuel, so I really wrung out the CAP. The more I flew the machine, the more adept I became at the maneuvers (we Editors just don't have enough time to do much flying). I must admit that, if I had the time to practice, the CAP would make one heck of a fine Pattern model. It is the only positive plane I have flown since my old days as a Pattern flier.

Later, I had a chance to examine one of the kits, and I was most impressed with the quality of the design. An airplane of such size that can be built in so few hours is a major technological breakthrough. The price is just about right for all the man hours of work already done for the modeler. We already got the word that this construction process will be adapted to many other designs in the future, with a Christian Eagle (which we already have had a sneak preview of) coming probably by the time you read this article. The company has merged with a major manufacturer in Los Angeles, so that the previous production delays will be eliminated. They are also negotiating with Homelite, and plan to have a new chain saw engine on the market soon.

Readers are asked to please note that the address which appeared in the old Higgins ads was incorrect. Please address all correspondence to: Higgins Aero Company, Inc., 635-3 North Twin Oaks Valley Rd., San Marcos, CA 92069. Phone (714) 744-6867. □

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ERROR OF OMISSION

The June issue carried a story about Wendell Hostetler's Super Scale Liberty Sport. Due to an oversight, we omitted the address to send to for the plans. The Liberty Sport plans come complete with instructions, and sell for \$24.50 (postpaid). Send directly to: Wendell Hostetler, 1041 Heatherwood Lane, Orrville, OH 44667.

SPIT WITH "IT!"

(Continued from page 56)

a lot to the overall impression the model makes on the judges.

The tailwheel on the Spitfire is a tricky piece of work. I've never known a fixed gear that was so complex. The point of attachment for the wheel strut has to be moved ahead about 1½". The kit-supplied tailwheel mounting bracket is then recessed up into the fuse deep enough so that it is just hidden. A 1/8" ply mounting plate is fabricated for this. Bend the wire so that the wheel stays in place beneath the hinge line. The new connection of the servo to the rudder is done with a short link to the new tiller arm on the tailwheel. To complete the realistic outline of the tailwheel, a piece of brass stock is soldered to the lower part of the leg, to simulate the fork on the full-size plane. The caster now built into the tailwheel makes for surprisingly positive steering and great ground control.

I have seen two other Spitfires from this kit break in the middle of the fuse. I suspect that it's the high power of today's engines and the long nose moment. To avoid this, I glass the fuse area around the wing with two layers of 2-oz. glass cloth, laid at 45 degrees to each other. Go easy on the resin, or you'll wind up with a flying brick. Those complete the mods for the fuse. Phil Sibille said that he reshaped the profile of the turtledeck, to make it flatter. I don't find the kit's outline in that area objectionable, so I guess that one becomes a matter of personal preference.

Mods to the wing are a different matter. It didn't take me long after beginning the alterations for the flaps to realize exactly why the kit didn't have them. Making split flaps for an elliptical wing is a pain in the empenage! The flaps disrupt the existing structure at the trailing edge, so a total engineering change is in order. The flaps run from just outside rib W4 to the ailerons. The dihedral changes slightly in the area of rib W5, which means that the flaps are actually segmented in two pieces. The small piece that runs to rib

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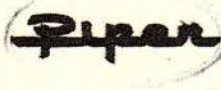
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W5 is driven by a pin connecting it to the main flap segment. A new trailing edge spar is made from 3/8 x 1/4" balsa, and is applied to the bottom of the wing section. This serves as a hinge area for the flap. Because of the double taper in the wing, the spar has to be sanded to the contour of the wing.

The flap is rather thin, so it was made by laminating 1/16" balsa to 1/32" ply. This helps eliminate twisting and warping. The riblets are simulated by gluing on strips of 1/8" balsa . . . these also help minimize twisting. Don't let these flaps fool you . . . they are very large and most effective. They take a lot of servo thrust to move to their scale 80-degree of deflection (any less and they really don't work very well). Watch for binding hinges or other items which might restrict full flap movement.

The linkages are achieved with a "T" shaped bellcrank, much like the ones used in control line. It is critical that the flaps be lowered by a *pulling* motion in *all* the linkages. If a pushing action is tried, the flaps don't deploy equally, and air pressure makes them work like uncontrollable ailerons!! I made the "T" bellcrank by cutting two Goldberg 90-degree bellcranks to tie together. Regular 90-degree cranks are used out in the wings, to drive standard control horns on the flaps. The flaps are most effective, and I have made emergency landings by diving at 45 degrees to the runway, then coming over the threshold at a dead crawl . . . all with perfect aileron control.

I'll be the first to admit that the retracts on my model are not in the scale position. To do so requires reworking the main spar, so that the gear sets further back. That's a very major project, and should not be attempted by any modeler not conversant with the structural engineering of a model wing. In talking to pilots who had the opportunity to fly the Spitfire (full-size) and its famed adversary in the Battle of Britain, the Me 109, the Messerschmitt was rated superior in ground handling. That's most interesting, since the Messerschmitt has its gear further back, and we modelers normally think that moving the gear forward makes for better ground steering. As a matter of fact, the Spitfire was not considered a pleasant airplane to land.

Don't forget to add the blisters on the wing for the wheel wells, as well as the humps for the machine gun locations. Use very soft balsa blocks for these.

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The entire model is covered with 1/4-ounce cloth and resin. I mixed all my own paint colors, using Pac-tra's Formula-U. Apply a base coat of silver, so that the later paint scraping for weathering will look authentic. My first inclination was to go through all the hassles of doing raised panel lines. But, the Spit had flush riveted panels, so I simply used acetate ink in a Rapid-O-Graph pen to simulate the panels.

Even with all of the modifications, the plane came out at a scant 6 3/4 pounds. This is a real featherweight, considering that the elliptical wing has over 700 sq. in. of area. The end result is scale speeds that can be maintained with a wide margin of safety.

The very light weight, plus the generally excellent design of the model, make this one dream of a plane to fly. Tracking is like its on rails. I thought it might be too light for good flying in the wind, but the model holds its heading through all the maneuvers in the gustiest weather. In a dead stick glide, it feels like there's a sailplane up there. Put someone a little more adept than me on the stick and the Spit will do all of "it" with ease. I wouldn't hesitate to recommend the Spitfire as an ideal intermediate model.

The one consistent problem I've had with the Spitfire models is poor idle on the engine. For some reason, I just could never get that inverted installation to give reliable results. As anyone who flies contests knows, engine reliability is critical. I finally gave up trying to tweak the engine, and installed one of the on-board ni-cad systems, which operates off a micro-switch. I've never had an engine problem since then, and mine is one of the few airplanes out at our desert field that can be taxied indefinitely, then the power can be poured to it and the engine won't cough and die.

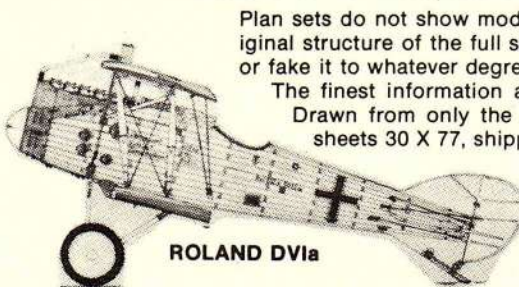
So, if you are looking for a model that will leave you with the feeling that "this is it!", the Spitfire is just what you need. It won't disappoint you... every time that big elliptical wing flashes overhead, you'll know that the certain something which makes the Spitfire a thoroughbred among fighters is the "it" you have always been looking for in a model.

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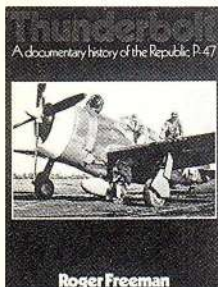
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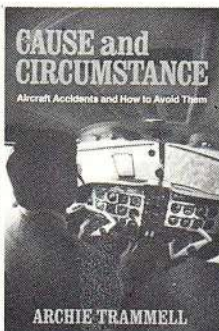
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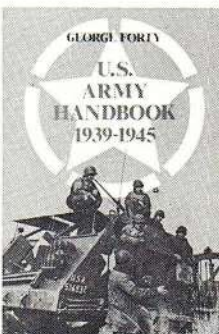
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