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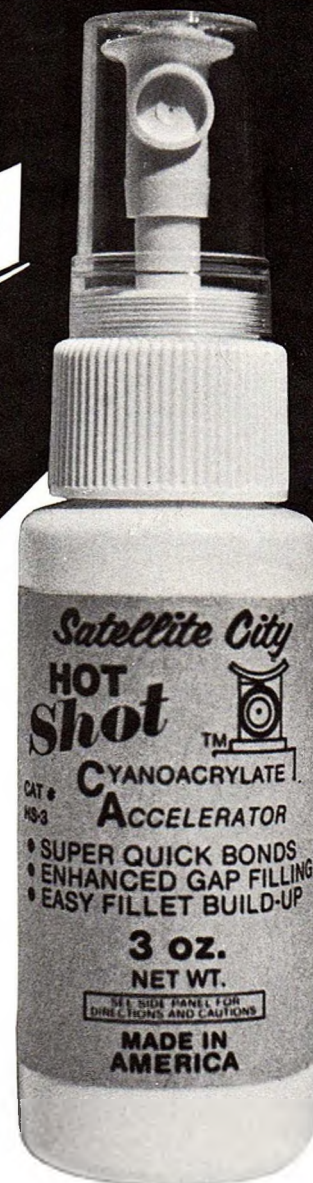
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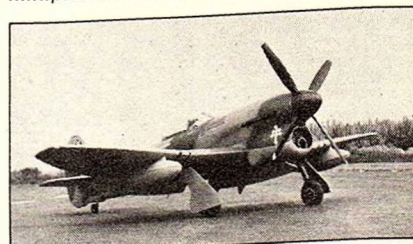
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WIN A CARIBBEAN CRUISE!
SUPER-SCALE SWEEPSTAKES
See Pages 28-29



Miniplane ... page 34



Tempest ... page 44



COVER:
Vito Tomeo designed this large Tempest for a .90 engine. Complete building details are included in this issue. The young lady is Vito's daughter, Kim. (Tomeo photo)

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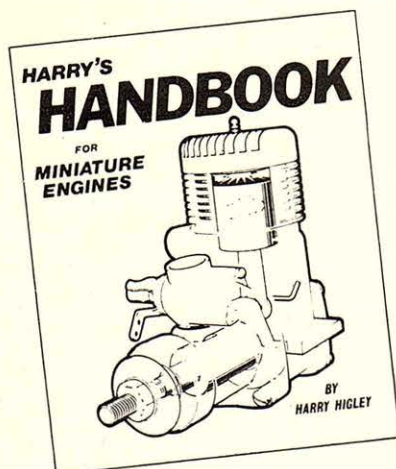
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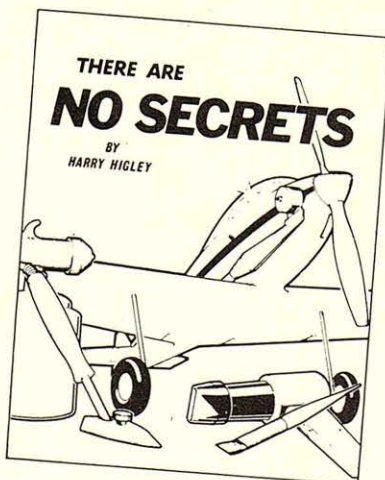
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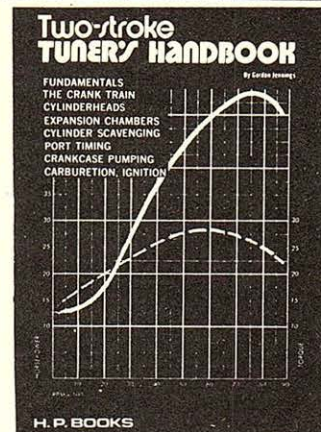
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It may sound trite, but the backbone of our hobby is the man behind the counter at your local hobby shop. The next time you're about to drop that substantial order into the mailbox, think twice about how many small essentials you rely on your local retailer to supply. Where would you (and your local club) be if your neighborhood merchant closed his doors tomorrow?

Sometimes mail-order buying can't be avoided, but what are you really saving when you support a company perhaps thousands of miles away? The next time you're in the market for a bargain, give your local retailer a try first ... you'll be making a better deal in the long run. (This editorial comment printed courtesy *Scale R/C Modeler* magazine)

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Information Courtesy Hobbypoxy Paints



The last two issues have carried do-it-yourself paint formulas, so that the scale modeler can mix his own military colors. Here are the latest formulas from the labs of Hobbypoxy:

The following two formulas are extreme examples of why the scale modelers become so frustrated when they try to shade their own colors. It does take special experience, only because the means of producing these colors is not obvious.

The first formulation this month is Matte White, FS 37875, which duplicates the flat undersurfaces of WWII Navy aircraft. When mixed with our Gloss Hardener, the same color represents the undersurface for present-day Navy and Marine Corps aircraft, such as the McDonnell A-4 Skyhawk and the F-4 Phantom.

The Matte White completes our

presentation of the early WWII Navy three-color camouflage scheme, which includes also our two prior formulas for Sea Blue and Intermediate Blue. To further complicate the situation, Matte White and Sea Blue alone were used in the latter part of WWII as the Navy's two-color camouflage scheme.

It should be further noted that toward the very end of WWII and during the Korean conflict, Navy aircraft were painted Gloss Sea Blue overall.

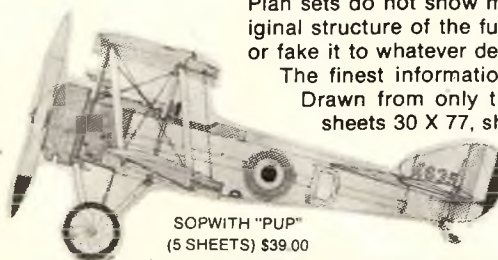
And now for the formula: to a 1/2 pint (8 fl. oz.) of H10 White, add 16 drops H81 Black, 6 drops H49 Cub Yellow and 4 drops H33 Stinson Green.

Our second color this month is Light Blue Gray, FS 36440. This is used today in a matte finish on the upper surface of the A-4, F-4, etc. along with Gloss White on the undersurface. Get your graduate or syringe out and to 50 parts of H10 White add 21 parts H70 Gray, 2 parts H66 Dark Red and just 1 part of H49 Cub Yellow.

We apologize for the fact that it is impossible to make the above formulas as simple as those in the first two releases. □

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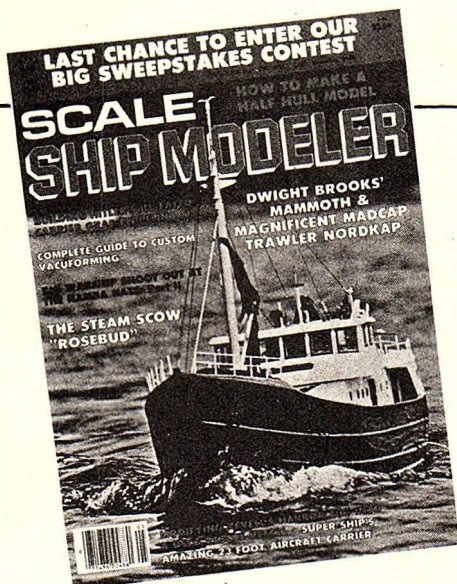
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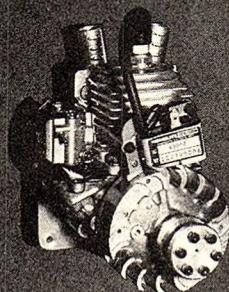
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Book Notes

Reading and research for
the builder of the model.



With the demise of *Profile Publications* several years ago (they're now only published by the executors of the defunct corporation in rather expensive cumulative hardbound volumes), scale modelers lost a valuable reference tool. While not always the most accurate of information sources, the slender *Profile* volumes were handy guides to at least reasonable Sport Scale documentation. Like Wylam's plans, they weren't the best, but they were the only game in town.

Recently, this reviewer previewed a new series which, by all indications, will supersede and exceed *Profiles*. Known cryptically as *Aerodata International*, the series already has individual titles on the FW-190A, Spitfire, P-51D, Me 109E, Hurricane and P-47D, with more "favorites" to follow.

Printed in magazine format size, on good-quality paper, each 60-page release is a complete documentation package. A good 3-view, plenty of fine photos (lots showing gear detail, etc.) and even sketches of cockpits make these a good find for the modeler on the prowl for usable information. At least one set of color 4-views and a page of color profiles are included.

The text is nothing to write home about, but it's at least accurate, if bland. But who wants these titles for armchair reading? The *Aerodata* issues are so tailor-made for the

scale modeler that it's a wonder the publisher didn't print dotted lines around the photos to make it easier to cut them out for use in the documentation portfolio! As mentioned, the successor to *Profile* is here, and the quality has improved, in the bargain.

Published by Vintage Aviation Publ., and available in the U.S. from Milbooks.

* * *



Bruce Robertson's *Aircraft Camouflage and Markings, 1907-1954* could have had some superb appeal. We say "could have," for the book suffers from some shortsightedness by the artist who executed the profusion of color materials. While bountiful, the color profiles are almost postage stamp size, serving little purpose other than to show roughly where the camouflage lines should occur. When you're trying to cover every possible air force and paint scheme in the world, there's little choice but to compress everything into the available space. It's too bad, for the material is obviously authoritative, and the title would have been a sure success if it had been spread out to three or four books.

But don't abandon *Aircraft Camouflage and Markings*, for when the fat is trimmed away, there is still plenty of meat for the documentor. By and large, the markings of the



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key squadrons are nicely executed (although most are in black-and-white). The color chips on the last page are of some use, but they are reproduced from inks, and not paint.

Actually, the majority of the book is dedicated to R.A.F. camouflage and markings, with the U.S. markings receiving a paltry 23 pages. With the above in mind, this is still a recommended reference source. There are few quality color reference books still in print, and Robertson's work is certainly accurate enough for most Sport Scale purposes.

Published by Aero Publishers, and available either directly from them (329 Aviation Road, Fallbrook, CA) or from Milbooks. Price \$18.95.

* * *



In a documentation marketplace that is glutted with every conceivable book on the various combat aircraft, the more routine everyday sport aircraft are often neglected. Perhaps they're just taken for granted, because they are so readily available, but it's amazing how today's "everybody's got one" airplane can suddenly fade into oblivion. It seems that, if the magazines don't photograph and record them, these planes invariably are lost to time.

The homebuilt suffers this fate worse than any other breed of airplane. Usually constructed in garages, or marketed by one-man companies, they are perhaps the most ephemeral type of aircraft. That's what makes Michael Markowski's latest compendium *The Encyclopedia of Homebuilt Aircraft* such a valuable

reference tool. Well over a hundred do-it-yourself projects are recorded in this 576-page paper-bound book. You'd have to search pretty far afield to get documentation on such airplanes as the Taylor Titch, Rogers Sportaire, or the Jeffair Barracuda, yet they are all preserved within these pages.

As in most compilations, each aircraft gets only a cursory write-up, yet even in its brevity, the listings describe an amazing amount of structural information. The *Encyclopedia* manages to get either a 3-view or a few photos of each design, but don't expect these to be of anything more than mediocre quality... some of the drawings have obviously suffered in having been photo-reduced to the point that critical lines have disappeared. But, even with its flaws, the book rates a place on the modeler's shelf because of its content.

Published by Tab Books, as #2256 in their "Tab Modern Aviation Series." Price \$12.95.



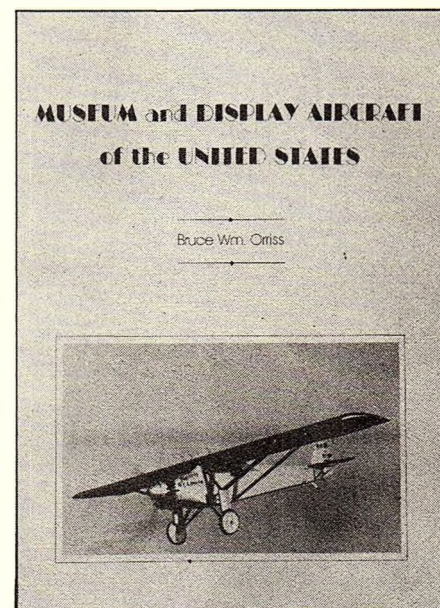
In today's rapidly expanding area of model interest in twin ducted fans, reading matter on the *F-15 Eagle* becomes of practical interest. Jeff Ethell has established the definitive history of this tactical fighter, with a complete tracing of the genesis of the aircraft. We scanned the book, initially, and found plenty of photo data, as well as some nice color pages. But, where are the 3-views and detail drawings we modelers rely on so heavily? What an oversight for a book publisher! The scale modeler will have to use the data supplied in a plastic model kit, in conjunction with the book, to get a total perspective of the aircraft.

We wouldn't let that deter you from getting your hands on a copy of the book, for it is a reading experience, in itself. Discovering how

so complex a piece of weaponry comes together is thrilling, and Ethell has a writing style which very much suits the subject matter.

Just released, you can order this title directly from: Specialty Press, Box 426, 729 Prospect Ave., Osceola, WI 54020. Price \$14.95.

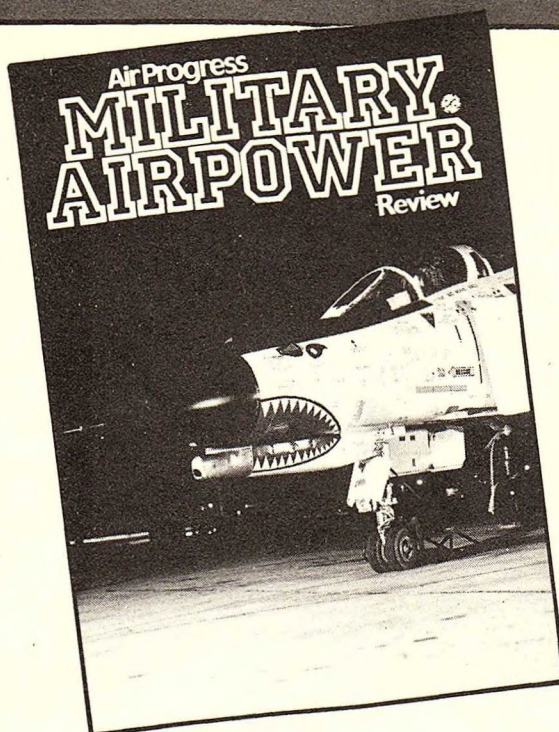
* * *



Perhaps one of the best books to ever come off the presses of the American Aviation Historical Society is Bruce Orriss' *Museum and Display Aircraft of the United States*. Essentially a directory of all the airplanes currently in the holdings of museums around the country, the book is notable for its completeness. Listings are alphabetical, by state, but the Index cross references everything by aircraft type, so that it's easy to put one's finger on any particular subject. The book was published in 1976, so the information as to the Curator's name may be a little out of date, but the book does tell you what the hours of viewing are, as well as any special periodicals or catalogues the museum might have. There are over a hundred museums listed in this 71-page paperbound book, and one would have to really look to find any listings which have been omitted.

Published by the American Aviation Historical Society (Box 99, Garden Grove, CA 92642) and available from Milbooks. Price \$6.95. □

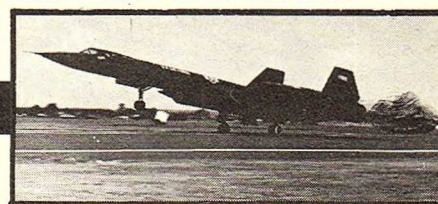
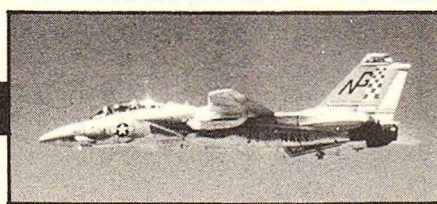
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There can be nothing more frustrating than a balky chain saw engine. But that engine, while it may look like a simple piece of equipment, is actually amazingly complex. Getting to the root of the failure can be a problem, and there are some powerplant failures which need very sophisticated test equipment to isolate and diagnose. We won't pretend that the following information will solve every engine failure. However, it will point you in the right direction and, with a little skill and luck, you'll be able to fix most of the common ailments yourself, without any elaborate tools.

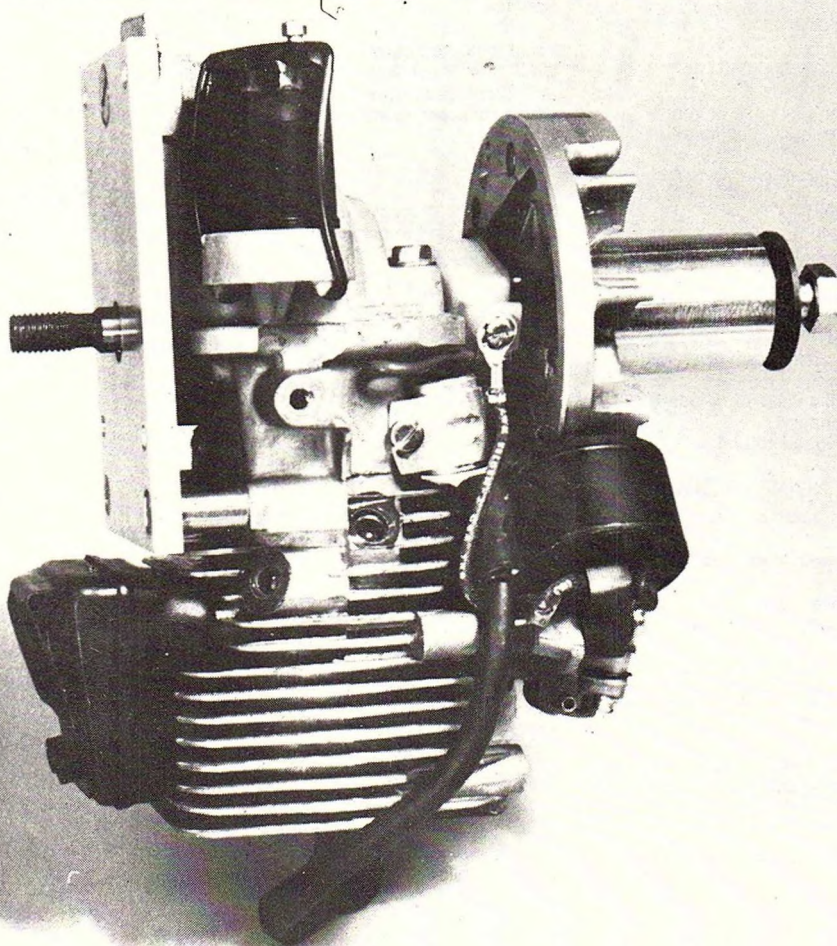
In general, we can trace the most common engine malfunctions to three basic areas: 1. Compression failure; 2. Ignition failure, or 3. The fuel/air ratio proportions. That really is a gross oversimplification, but it does help to put the workings of the engine into three generalized areas. Before proceeding, we strongly urge anyone who is going to tackle engine repairs, or especially if you are considering doing some slight hop-up to get more power out of that engine, that you purchase a copy of the *Two-Stroke Tuners Handbook* (The

TROUBLESHOOTING THAT CHAIN SAW ENGINE

Model Agency Press, 7021 Vicky Avenue, Canoga Park, CA 91307. Price \$5.95, plus \$1.50 postage). This book will help tie together the synoptic items we can only touch upon here. Working on a chain saw engine is really not difficult, providing that you have the right tools, and the best tool to start with is a good understanding of how the en-

**MANY
ENGINE PROBLEMS
CAN BE TRACED TO
EASILY CORRECTABLE,
DO-IT-YOURSELF
FIXES**

By Aldo Van Owen



CHAIN SAW TROUB

Symptom: ENGINE WON'T START, HARD TO START, CUTS OUT, MISFIRES

CAUSE	REMEDY
Spark plug or carburetor loose	Tighten to specifications
Carbon buildup around exhaust port and/or in muffler	Clean away carbon with wooden scraper
Crankshaft seals leaking	Replace seals
Flywheel key sheared	Replace key
Engine air leaks	Test at service shop
Rings worn, causing compression loss	Test at service shop
Engine seized, or broken connecting rod, crankshaft, etc.	Test at service shop
Spark plug fouled, wrong gap, broken insulation	Clean and gap or replace with correct plug after checking gap
Wire insulation frayed or connection loose	Replace wire or secure connection
Incorrect spark plug	Replace with plug recommended by manufacturer
Breaker points	Replace or clean and regap
Lamination: wrong air gap	Reset to specifications
Condenser faulty or ground poor	Tighten ground. Replace if damaged.
Coil damaged	Test at service shop
Flywheel magnets weak	Test at service shop
Diaphragms damaged	Replace
Pulse passage plugged	Clean or replace
Adjustment needles	Replace and adjust, or readjust
Inlet valve dirty or worn	Clean or replace
Diaphragms or gaskets damaged	Replace
Wrong gasket to crankcase	Replace
Fuel tank empty	Add fresh fuel
Wrong oil-gas mix	Drain tank. Add correct mix
Dirty, stale, or watered fuel	Drain tank. Flush with fresh fuel. Clean, flush, or replace fuel filter
Kinked, plugged fuel hose or vent	Clean passages to and in carburetor
Cracked, cut, or leaky fuel line	Replace

Symptom: ENGINE OVERHEATS

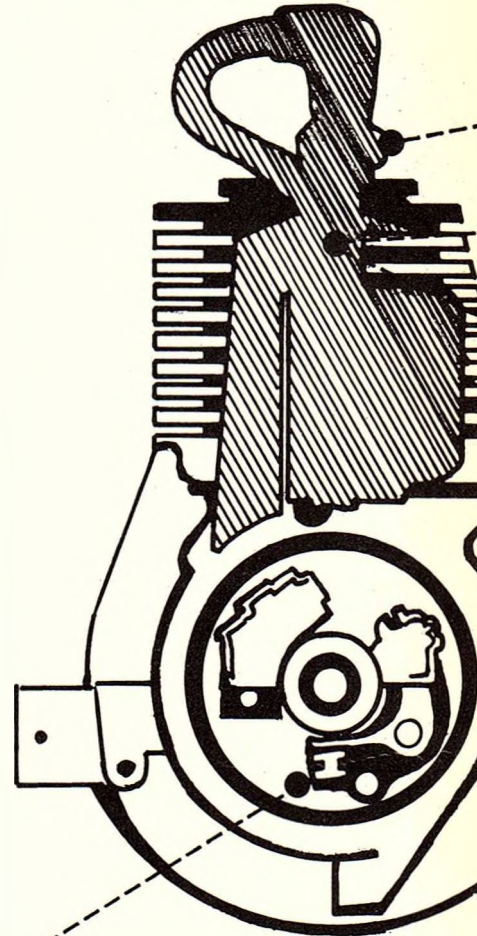
Wrong spark plug	Replace with correct plug
Carbon-fouled spark plug	Clean, gap, and reinstall. Or replace with correct plug after gapping
Wrong timing	Reset
Carbon buildup around exhaust port and/or in muffler	Clean away carbon with wooden scraper.
Wrong fuel mix	Replace with fresh fuel
Intake leaks in fuel system or crankcase	Check hoses, seals, gaskets. Tighten or replace
Diaphragms, inlet valve or adjustment needles damaged	Replace
Too lean high-speed setting	Adjust

Symptom: ENGINE FLOODING

Inlet valve obstructed or damaged	Check filters, clean carburetor. Replace valve and valve seat (if equipped)
Adjustment needles damaged or set incorrectly	Replace and reset
Fuel tank or hoses plugged	Clean or replace
Fuel pump diaphragm damaged	Replace
Diaphragms damaged	Replace

Symptom: ENGINE STARTS, RUNS BRIEFLY, STOPS

Fuel-air mix wrong	Adjust following manual
Inlet valve dirty	Clean or replace
Diaphragms defective	Replace
Fuel passages clogged	Clean all passages
Fuel-tank vent plugged	Clean or replace
Water in fuel mix	Clean, flush, or replace fuel filter. Flush fuel hose and carburetor. Add fresh fuel
Dirty air filter	Clean or replace
Air leaks	Check gaskets and fuel line. Replace damaged parts
Fuel filter dirty	Clean or replace



POINTS CAN BE DIRTY, OR GAPPED WRONG

SCORED

LESHOOTING CHART

---● CRACKED CASING

---● FOULED SPARK
PLUG ELECTRODE

---● SPARK PLUG GAP
INCORRECT

---● SPARK PLUG
LEAKING

PISTON

Symptom: ENGINE IDLES ROUGHLY

Air leak in fuel line
Air leak in crankcase
Dirty air filter
Carburetor settings wrong
Damaged low-speed needle valve
Dirty carburetor

Check hose for cracks and chafing
Test at service shop
Clean or replace
Check owner's manual
Replace
Disassemble and clean

Symptom: ENGINE LACKS POWER

Carbon buildup around exhaust port
and/or in muffler
Cylinder and/or piston scored. Piston rings
worn, broken, or stuck. Crankcase seals
damaged. Air leaks in crankcase or
intake
Fuel tank not venting
Fuel filter or fuel lines dirty
Carburetor settings wrong
Faulty spark plug
Weak spark

Clean away carbon with wooden scraper
Check at service shop
Clean or replace
Flush or replace
Readjust according to owner's manual
Clean, check gap
On magneto-ignition, check gap. Reset tim-
ing. Clean or replace points

Symptom: ENGINE STARVES ON ACCELERATION, IDLES TOO FAST

Fuel filter dirty
Inlet valve damaged
Low-speed mixture screw set wrong
Air leaks in carburetor or its mounting

Clean or replace
Replace valve and seat
Check owner's manual
Check gaskets and seals

Symptom: ENGINE DOES NOT RUN FULL SPEED

Wrong needle adjustment
Diaphragms defective
Spark plug breaking down
Wrong timing
Breaker point gap too small
Carbon buildup around exhaust port
and/or in muffler
Piston rings worn or cylinder scored
Tank vent plugged
Air or fuel filters dirty
Choke or throttle butterfly valves not
fully open
Inlet valve dirty

Readjust, following owner's manual. If adjust-
ment causes no change, replace needle
valve
Replace diaphragms. Readjust carburetor
Replace spark plug
Reset
Reset
Clean away carbon with wooden scraper
Have checked by service shop
Clean
Clean or replace
Check linkage for obstructions or damage.
Check butterfly for damage
Clean and/or replace. Check fuel for
contamination

---● RINGS BROKEN OR WORN

---● CYLINDER WARPED OR SCORED

---● SEALS JOINING
CRANKCASE HALVES LEAKING

gine works . . . that's where the book comes in.

Let's examine the three areas we have isolated.

COMPRESSION

If the fuel/air mixture can't be compressed sufficiently, the mixture will not do the work it is supposed to when it ignites. Since we have a prop strapped to the crankshaft, we can get a good feel for compression just by slowly turning over the prop. Be sure that the spark plug wire is disconnected before doing this! Unlike glo engines, these chain saw engines have pretty loose fitting rings, so there may not feel like a lot of compression. What to watch for is how sharply the prop snaps through the compression stroke. If it's sluggish, there's probably an internal air leak.

If you suspect a compression problem, send the engine to an authorized repair center, or take it to a local shop which specializes in chain saws. Only a pro can handle repairs to the rings, crankcase, etc.

Just flipping the prop won't be a conclusive test of compression. The

engine often has to warm up before sufficient peak compression is reached. If there are no lubricants in the cylinder, it will feel like minimal compression. The best test for compression is to get (borrow or rent) an engine compression gauge from a garage or other source. Try to get the type which threads in (take a plug to be sure to match the threads). To do the test properly, you'll need an electric starter.

Install the gauge, after adding a few drops of oil down the spark plug hole. Crank the starter until the needle won't register any higher. If you aren't getting about 80-90 psi, you probably have a compression problem. This could be a myriad of things, from a scored piston or sleeve, to worn rings or even crankcase seal leaks. Again, refer the problem to an experienced engine man.

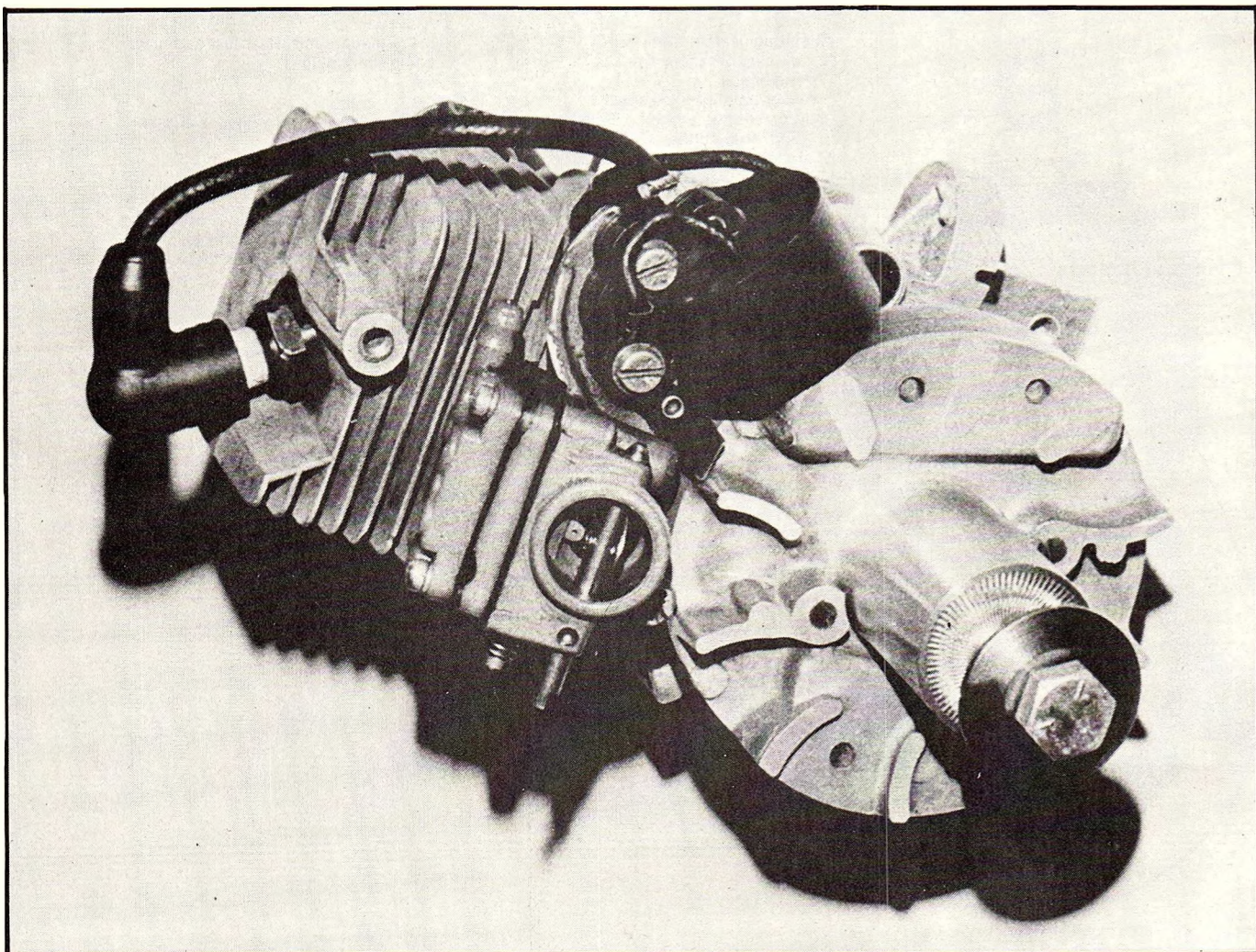
IGNITION

Since you have the spark plug out to do the compression gauge check, scrutinize the electrode. If it is charred with a sooty substance, or even distorted with dirt, you have probably been running the engine with

too much oil in the fuel, or operating at too rich a setting. There are special files and brushes for cleaning the electrode (at the automotive parts store). Often, poor idle and hard starting are simply caused by using too cool or hot a plug, so don't hesitate to try another style of plug.

Test the spark by attaching the cap to the plug, and hold the plug against the engine case (away from the plug hole where it might ignite residual fuel). Flip the prop. The spark should be strong. The sound will be a loud snap, and the blue arc will be very bright. Compare it to another plug from your flight box, or purchase a specially made test plug, which is designed to show how good the ignition part of the engine system is.

Always make it a point of cleaning the plug, and checking the gap. Refer to the manufacturer's instructions for the correct gap. When in doubt, .025 is usually a safe bet. Remember that an engine with mechanical breakers can be producing a great spark, but the spark timing could be off. Refer this to a trained technician. Watch out for broken or frayed wires. Model usages are hard



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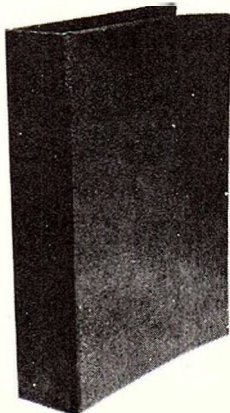
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on wires, coil leads, etc., and wires are often found broken or badly frayed. If nothing surfaces, only some sophisticated electronic test equipment will give you more information on an ignition problem. Your lawn mower or chain saw shop can usually save the day here.

CARBURETION

Fuel problems on a chain saw engine are very parallel to those on a glow engine. The venturi and needle valve of the glow engine is replaced by a slightly more complicated metering system (typically a variation of the Walbro carburetor). This is little more than a diaphragm pump and fuel metering system in one package. Most lawn mowers use a comparable arrangement. If you do not understand them, then don't monkey with 'em.

To test if the engine is drawing fuel properly, first troubleshoot the fuel reservoir system and all lines leading to the carburetor. Once it is verified that the tank and hoses are working okay, choke the engine until fuel fills the feed line. Then flip the prop (disconnect the spark plug wire) two or three times. Remove the plug. Is the end wet with gaso-

line? It should be, if the carb is working correctly. For the time being, we'll dismiss crankcase problems, although it should be noted that if there is insufficient crankcase compression or even upper cylinder compression, the fuel may be getting through the carb correctly . . . but going no further.

Modelers, for some unknown reason, love to tweak needles. Let it be said that, except for drastic changes in temperature or barometric pressure, once the needles of a Walbro-style carb are set, there are hardly any changes ever necessary. Any adjustments of more than 1/8 turn indicate a problem with the engine (that problem may or may not be related to the carburetion system).

The carbs on these engines are amazingly tolerant of dust and dirt, but they also seem to be totally disabled by a small speck of lint in just the wrong place! Although our common sense tells us not to advocate removing or cleaning the carburetor, we must confess that it isn't that difficult. You should be very careful when disassembling the carb, noting gaskets, rubber diaphragms and springs. Look for dirt in the seats of the needles, or in the filter screens inside the carb. The rubber

diaphragms often develop small pinholes, or they leak around the perimeters. We prefer to replace these, as a matter of course, so you may want to be sure that you can get access to them from a lawn mower or chain saw shop before proceeding.

As you can see, the above remarks are rudimentary, at best. The guidelines should be taken just for that, as a basis for at least isolating the probable source of your problem. Often, one problem may have already caused another, so that the engine failure may need several corrective measures. For example, a dirty carb causes a momentary fuel starvation problem. The engine goes over-lean, then quits. The modeler erroneously corrects the problem by opening the top end needle, and the engine runs for several flights with far too lean a setting. This scores the rings. The engine will not run right until both problems are cured, of course.

The chart presented with this article is meant to direct you to the source(s) of your engine problems, and to help troubleshoot them. Remember, none of the remedies are dogmatic, but they will work most of the time. When in doubt, seek professional help before making the problem worse. □

BADGER...

Tools to help you finish like a pro.

The BADGER 400 Detail/Touch-Up Gun is the perfect tool to use for finishing larger R/C models. You can blend, shade and stipple . . . achieve special effects such as camouflage, smoke, fire and weather damage, etc. This lightweight tool bridges the gap between the small precision air-brush and the larger guns with bigger spray patterns. Adjust for round or fan spray. Available with fine, medium or heavy spray tips and can be operated with air, CO₂ tank or pressure

SS FOTO/FRISKET FILM can be used on most surfaces that are to be painted without fear of damage to the surface or previously painted areas. This 2 mil vinyl is extremely easy to cut and prevents the modeller from cutting through the film into the surface on which they are working. FOTO/FRISKET FILM has a translucent backing which makes it possible to lay over lettering, logos, insignias, etc.,

and see through to pre-cut stencils. FOTO/FRISKET FILM will not buckle when sprayed on—thus preventing underspray. Available in sheets or rolls.

BADGER'S FLUID FILTER was designed for use with the air-brush that uses jars or bottles. The microscreen filter eliminates lumpy paint or foreign particles that would normally pass through the air-brush and cause plugging. The Fluid Filter slides on and off easily for quick cleaning.



Ask your favorite Hobby or Craft store about BADGER. For a complete color catalog BA 300 send \$1.00 to cover postage and handling to Dept. 841. Prices slightly higher in Canada.

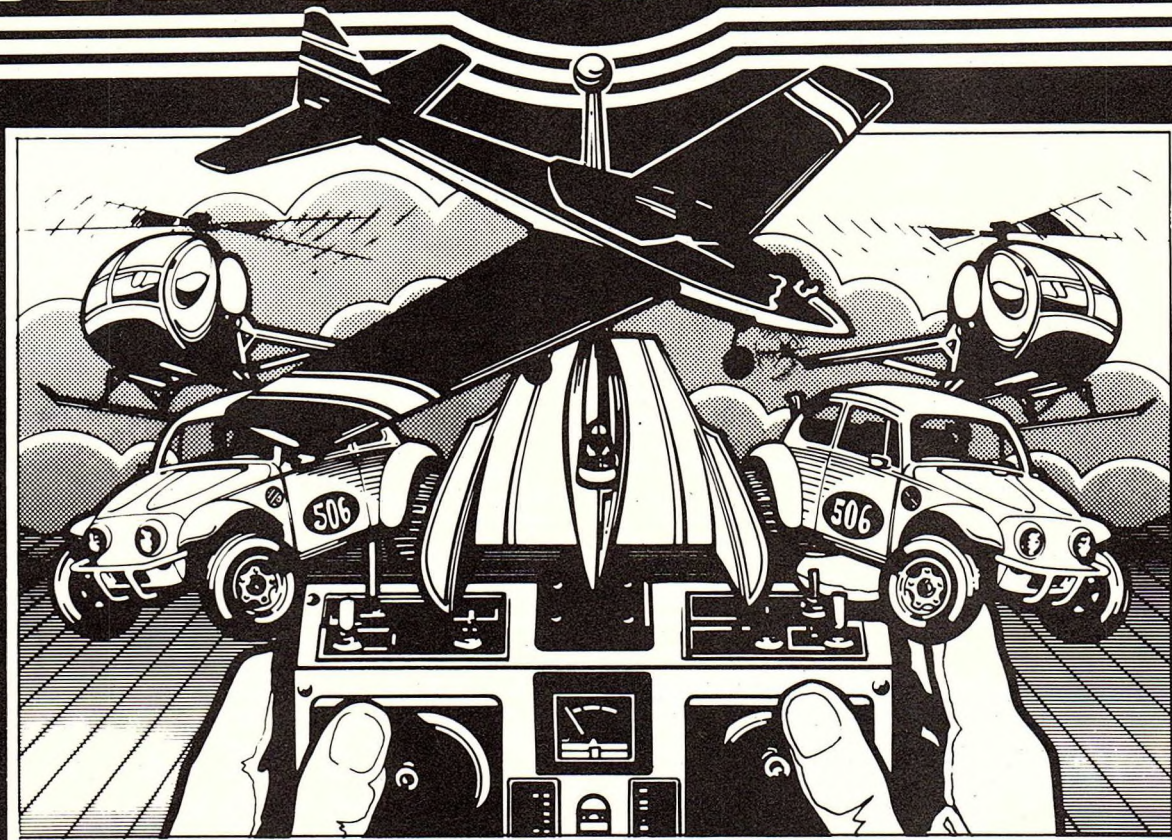


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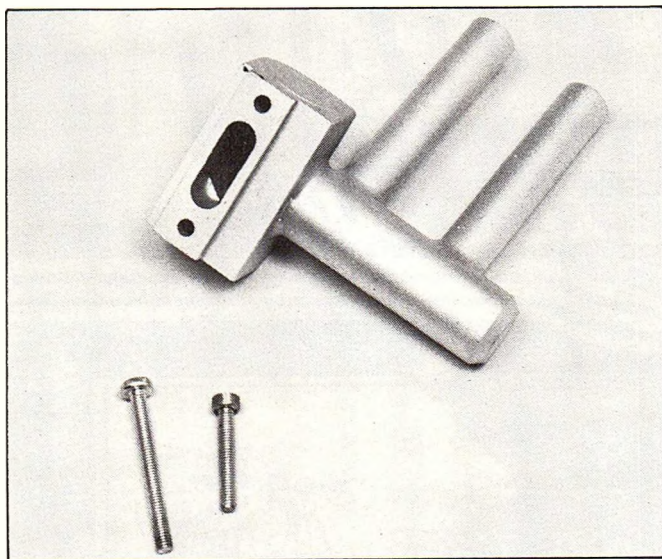
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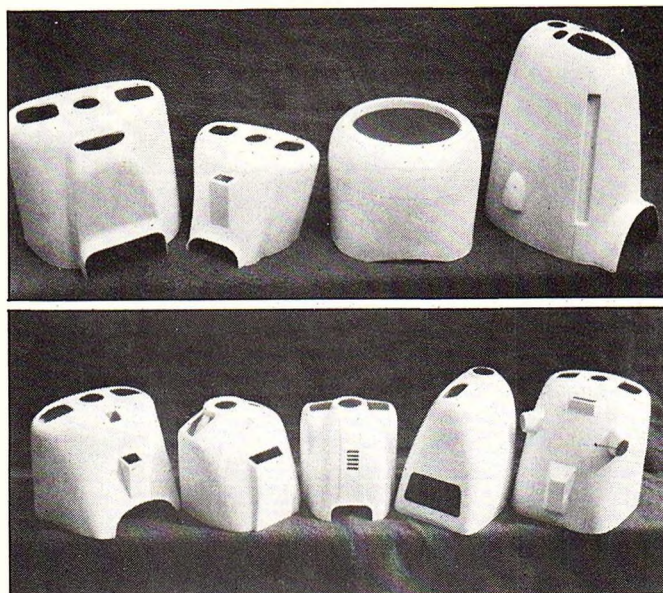


PITTS MUFFLER

For those looking for a muffler for their Pitts, Smith Mini-plane, Skybolt, Christian Eagle or Cessna, this new exhaust system from Slim Line will work just perfectly. The welded aluminum muffler is of one-piece construction, and is especially engineered to fit into tight cowls. The exhaust tubes are 2½" long, but can be trimmed to fit any installation.

The muffler can be used on either bolt-on or strap-on installations, and can be ordered in .40, .60 or .90 sizes. The prices range from \$19.95 to \$22.95.

For more information or a catalog, write to: Slim Line Mufflers, P.O. Box 3295, Scottsdale, AZ 85257.



MORE T & D

T & D Fiberglass has released a whole bevy of new cowls. The first series is a set of cowls specifically for the "Pilot" line of giant-scale aircraft. The cowls are available for the Pitts S-2a, Decathalon (modified slightly to accept a Quadra), Christen Eagle, Buckner Jungmann (in either the Hirth or Lycoming engine version). You can also get wheel fenders for the Jungmann, and wheel pants for either the Eagle or 18. scale r/c modeler

Decathalon.

The other cowls which have just become available are for: Stern's Liberty Sport (modified to accept a Quadra), Bob Upton's Baby Ace (modified to accept a Quadra), Dario Briosighella's WACO "ARE," and Jim Folline's PT-19. All, except Folline's PT-19, have wheelpants available, also. All of T & D's cowls are epoxy resin and glass cloth.

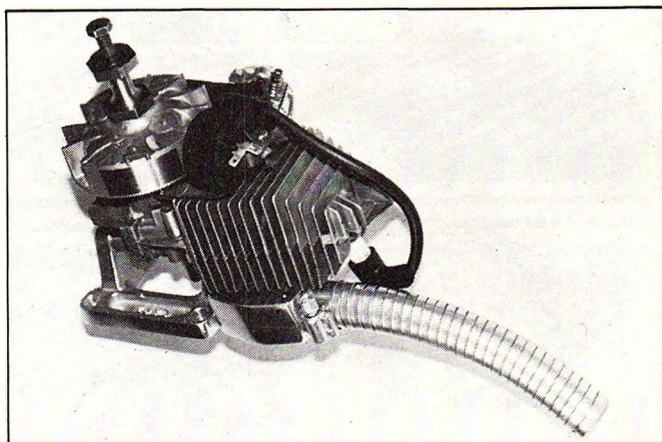
Send an S.A.S.E. for a complete listing of all of the cowls available, directly from: T & D Fiberglass, 30925 Block, Garden City, MI 48135.



BLACK BARON PAINT

Coverite has announced that there will be a new selection of colors available in their Black Baron paint line this Fall. Fokker Red, Cub Yellow, Curtiss Blue and Aluminum will be the latest colors. Many of these colors will match Permagloss covering materials. As you know, this paint is an epoxy, but it comes premixed in a spray can. It is convenient, and has very good covering characteristics. We don't know if the colors will be available as matte or gloss, but we assume that the gloss variety will be most probable.

These should be in the hobby shops at this time, as manufactured by: Coverite, 420 Babylon Road, Horsham, PA 19044. Price \$4.79 per can (13 ounces).



FLEX-OFF

Flex-Off is the unlikely name for Tatone's newest exhaust product. But, since it is flexible, and since it does keep the exhaust off the airframe, the name is rather logical. The flexible piece of conduit comes in 12" lengths, and is available in the following sizes: ½", ⅝", ¾", and 7/8". Each length comes complete with a worm-drive clamp for securing it to the muffler. The prices range from \$5.75 to \$6.50.

Check for these products at your retailers, or order direct

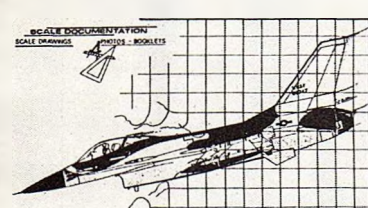
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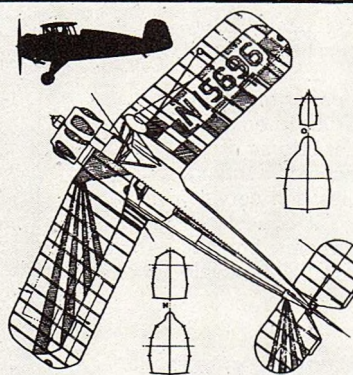
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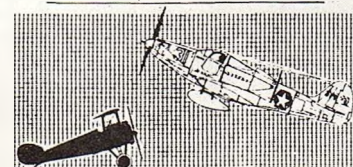
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REPLA-TECH CATALOGUES

With the number of inquiries we get every day for scale documentation, most of them wind up going to Repla-Tech Int'l. Bob Morrison has, over the years, compiled one of the most complete and comprehensive listings of plans, photos and other documentation resources, that almost any aircraft can be found among his wares. Not only do his catalogues show his own drawings, but also the 3-views of Robert Hirsch, Bjorn Karlstrom, and now the MAP drawings from England. There is even a separate catalogue for R/C plans, and a third catalogue which lists color photos of literally hundreds of aircraft. Is there really any excuse for not documenting that scale model, now that you know what's available . . . and all from one source?

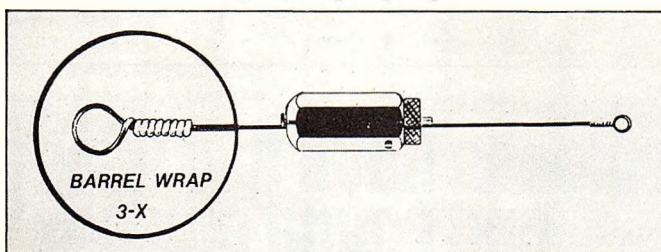
All three catalogues are available for \$2.00, directly from: Repla-Tech Int'l., 48500 McKenzie Hwy., Vida, OR 97488.

KWIK TWIST

Du-Bro has a neat little gadget which is perfect for making barrel wraps (round loops) in music wire. It's just what's needed for rigging and guy wires. The tool can handle wire up to .023" wire.

They also have 1/4-scale turnbuckles, for rigging those monster-sized models. Made of steel, these, and the new Kwik Twist tool, are all that's needed to rig any model.

Look for these products at your hobby shop, as manufactured by: Du-Bro Products, 480 Bonner Rd., Wauconda, IL 60084.



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GLASS PRODUCTS

As you can tell by the aircraft in the background, we didn't take the photo of these new products! However, that doesn't mean that they are intended only for Pattern ships. As a matter of fact, these new fiberglass related products will probably be bigger sellers to the scale crowd.

The Rouse Products Milled Fiberglass is a unique product, being essentially shredded fiberglass cloth. This is ideal for making up a filler with resin for large holes, or to build up fillets. As a binder, it's ideal for keeping weight to a minimum while supplying mass.

The Micro Spheres are pretty much the glass bead variety of microballoons. These are mixed with resin to fill small holes or blemishes.

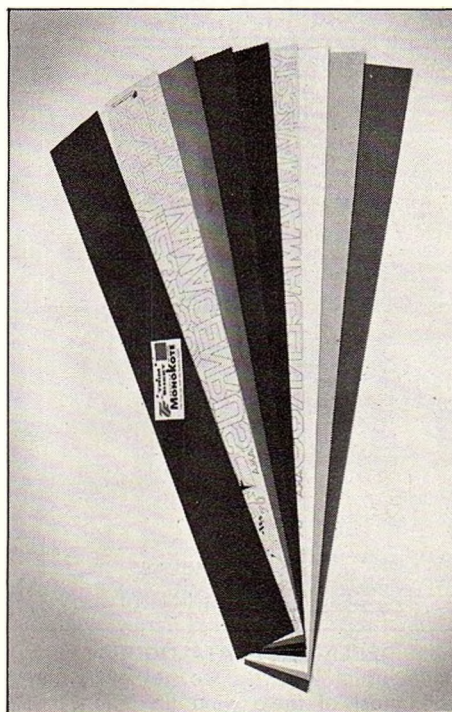
Visco Fill is an interesting product, being a paint thickener. Mix some in with your favorite primer, and rub it on over an area of pinholes and watch them disappear. Brush it on to a rough area, and you'll get a better surface for sanding.

Rouse Products also specializes in Rossi sales and service, and they carry a complete inventory of parts.

Your local shop may not have these products yet, but ask for them, as manufactured by: Rouse Products, 111 Fruitvale Blvd., Yakima, WA 98902.

little flexible to resist cracking. The Jug cowl lists for \$30.00, and there is also a new cowl for Jemco's SBD Dauntless.

Write for a complete listing of cowls and wheelpants to: Fiberglass Master, P.O. Box 134M, Bayshore, NY 11706.



NEW MONOKOTE COLORS

Although we can't immediately think of any scale airplane which would need them, Top Flite has released two new colors of Monokote Trim Sheets . . . Circus Pink and Metallic Brown. We won't question which models would use them, but if you ever need these colors, you now know where to get them. The Trim Sheets, if you have never used them, are handy for small amounts of trim, where buying a roll of Monokote would be impractical. A lot of scale modelers use the aluminum or silver colors and make access hatches from them, or other small scale details where the look of a slightly raised panel is needed.

Available at hobby outlets, as manufactured by: Top Flite, 1901 N. Narragansett Avenue, Chicago, IL 60639.



GLASS COWLS

Fiberglass Master has again added more cowls to its already extensive line of cowls and wheelpants. This big cowl is for the giant Nosen P-47. This includes the cooling flaps. These cowls are hand laid up, with laminated layers of cloth and resin, for strength and light weight. They are made a

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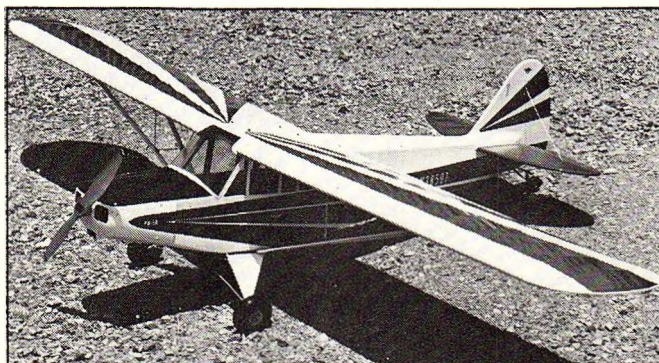
CANNON POWERPLANTS

Cannon R/C has been getting more into the engine line with their new .30 Twin G-Mark powerplant. The small twin features twin ball bearings, Schneurle porting, a slide carburetor and a built-in muffler. The possibilities for such a small twin are great in numerous scale models, where swinging a large prop is more important than high revs. We suspect that these would be ideal as a matched set in a twin, for the reliability would be superb. The engine retails for \$174.95.

Along the same lines, Cannon is also importing two very professional tachometers. The "Basic" tach has two ranges: 0-10,000 and 0-25,000 rpm. It is a direct drive mechanism, which is held against the spinner nose or the prop nut. It will not load even the smallest engine, and has good accuracy. The price is a very surprising \$22.50.

The "Professional" model has three speed ranges, and comes with a separate probe for sensing the engine rpm. Again the price is a very low \$34.95.

Look for these items at your retailers, or order direct from: Cannon R/C Systems, 13400-26 Salicoy Street, North Hollywood, CA 91605. A complete catalog is available for 75¢.



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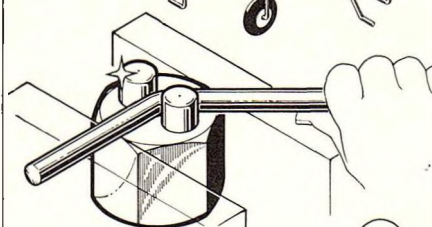
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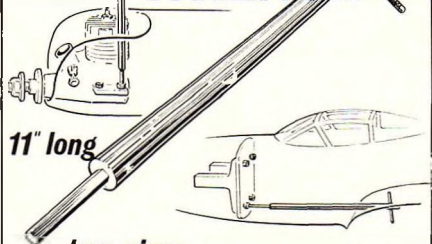


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GIANT-SCALE SUPER CUB

Royal Products is now importing a new 1/4-scale kit of the PA-18 Super Cub. Of all wood construction, the kit includes some nicely die-cut plywood and a fiberglass cowl. The wing comes in two pieces, for easy transportation. The 105 1/2" span model has 1,733 sq. in. of area, and is intended for either a .90 or a small chain saw engine.

Check out this kit at your retailers, as imported by: Royal Products, 790 West Tennessee Avenue, Denver, CO 80223.



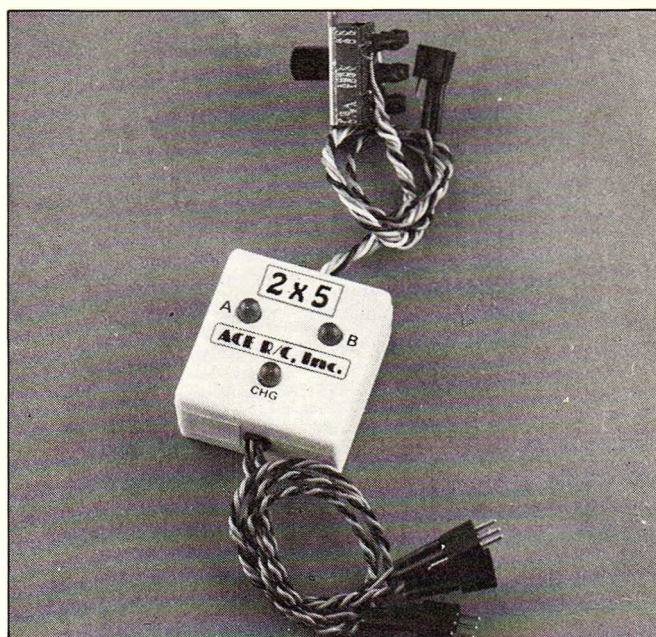
IKON IS BACK

After a long absence, Ikon Northwest is back on the scene with some exciting new products. Their first kit will be a giant-scale PA-18 Super Cub. This 9-foot span model can take off in 10 feet, into a 5 mph wind. Designed for the Quadra, the construction is mostly 3/8" square balsa and spruce. The landing gear comes prebent, and all the ribs are precut. The cowl nose, shock covers, instrument panel and seats are formed. Decals for the interior and exterior are included. A photo page, with cockpit details, is included for proof of scale. The all-up weight is only 14 pounds.

The perfect companion for the Super Cub would be Ikon's float kit. These are 46" long, and will support up to 30 pounds. They are foam, with balsa and plywood sheeting. Glass covering materials and all hardware and wires are included. They weigh about 3 pounds.

Ikon has also been approved as an authorized Quadra service center, and they can turn around your engine in 48 hours, and that includes a bench run and tach test.

For more details, send \$1 for catalog to: Ikon Northwest, P.O. Box 566, Auburn, WA 98002.



REDUNDANT POWER SOURCE

With battery failures being the most prevalent cause of crashes, buying a little life insurance is a worthwhile investment. Warning systems which blink lights or sound a horn aren't much value, except to tell you that you are about to crash. ACE R/E has developed a small black box which will allow your airborne system to transfer to an alternate battery pack. True, this necessitates another battery pack, but for giant-scale models, this should pose no problem.

One slight drawback to the Redundant Power Source is that it must operate from a five-cell pack configuration. It's no big deal to simply wire another cell of the same capacity to your existing pack, or you can buy specially wired packs from ACE (550 or 1200 mah). Because there is an extra cell, the airborne system actually gets 20% more power. This gadget is intended to let you fly with true peace of mind, and LED indicators tell you that you have switched to the alternate battery supply. Please specify Kraft (regular or Sport system), Futaba or ACE/Proline when ordering.

The Redundant Power Source comes in kit form for \$12.50, or assembled in the \$25.50-\$27.50 range. See your local retailer, or order direct from: ACE R/C, Box 511, 116 W. 19th Street, Higginsville, MO 64037.

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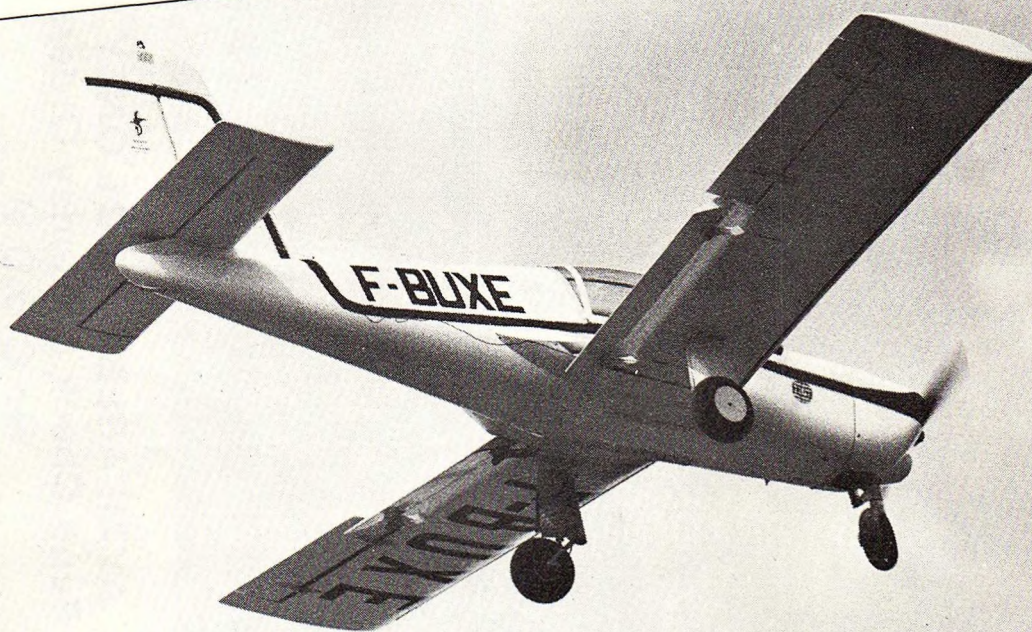


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TRICK OR TREAT?

J. R. Naidish photos



Christian Tachet's Rallye Sport makes a fly-by with the flaps lowered. The eight-foot span model weighs 27 pounds.

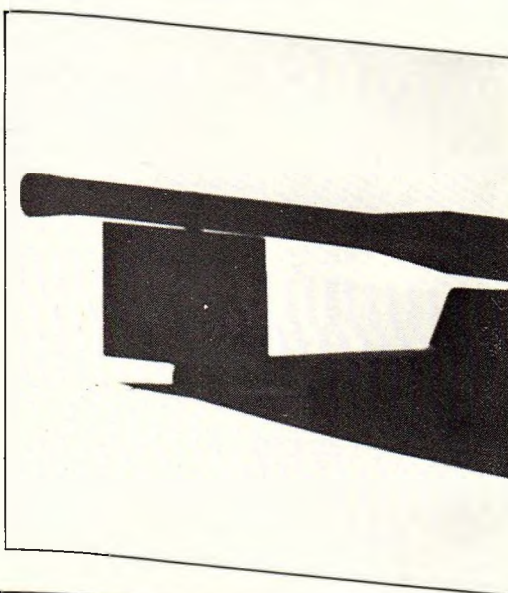
HELD OVER THE HALLOWEEN WEEKEND, THE SIXTH ANNUAL Q.S.A.A. FUN-FLI WAS A REAL TREAT

Staff Report

The big question before the Las Vegas Q.S.A.A. Fun-Fli this year had to be what effect the I.M.A.A. event held earlier in the summer would have on the entries. With the sagging economy, the effect on travel was bad enough, without having two national giant-scale meets. To compound the problem, a vicious rumor was afoot (allegedly promulgated by 24 scale r/c modeler

the leadership of the I.M.A.A.), that the Q.S.A.A. was a "dead issue." That's not the kind of publicity that makes for attracting large crowds!

Fortunately, the rumors were unfounded, and most of the modelers in the know ignored the propaganda. But, that still didn't help to bolster the roster at this year's Q.S.A.A. The organization need not apologize



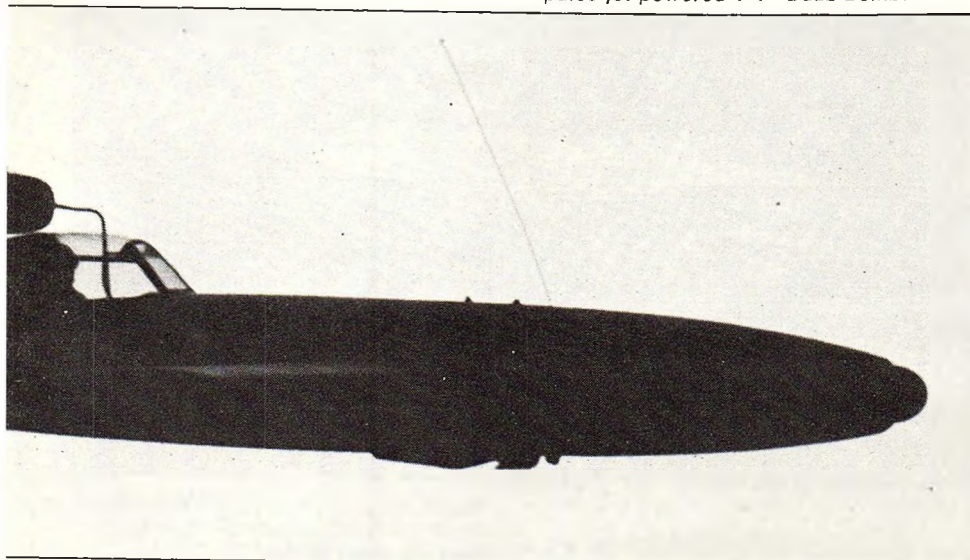


Frank Johnson's huge B-17 put on an impressive show. Four .40s power this 10-footer.



The hit of the show was the West German team's fifty-pound C5A Galaxy. The span was over twelve feet!

Jorg Vogelsang, and a dedicated group of modelers from West Germany, flew this pulse-jet powered V-1 "Buzz Bomb."



for attendance being down, for they pulled some 169 aircraft, from a half dozen countries. We won't deny that a preponderance of the entrants were from California and the surrounding states, but there was still good representation from the East and South.

All of this talk of entries must be predicated by the fact that air travel to Las Vegas has just about doubled from last year. With money in short supply, traveling isn't possible for many modelers. But, from the looks of Las Vegas, modelers weren't the only ones not traveling. In the six years we have attended the Q.S.A.A. event, we've never seen "tinsel town" look so much like a ghost town. The hotels had plenty of empty rooms, and the casinos were empty. Show reservations for top name stars, usually impossible to get, were on a walk-in basis.

With this in mind, the Q.S.A.A. was actually the main event in the city that weekend. And, as usual, the meet drew one heck of a crowd. The cars were parked as far as the eye could see, and throngs of people swarmed through the pit areas throughout the weekend.

This year, the scene of the action returned to the dry lake bed of the desert outside Las Vegas. Last year's abortive attempt to move the meet to facilities nearer town was wisely abandoned. This gathering of the big birds is just too large to be accommodated anywhere but in the vast expanses of the desert.

One can always count on the Q.S.A.A. event to be the showcard of the amazing and unusual in aircraft. This year was no exception. Beyond a shadow of a doubt, the most impressive project at the field was Wolfgang Muller's 148" span C-5a Galaxy. This 50-pound monster flew with four .60s, and featured such beautiful scale features as a Flattner-type elevator, spoilers and flaps (all multi-segmented). As usual, the Germans set the standard of excellence

at the show, easily topping their last year's B-17.

The Galaxy flew superbly, and the crew members showed that the model, which had over 130 flights before it arrived here, was built to be flown. Touch-and-goes were done routinely, and the takeoffs were at such an exaggerated angle that everyone thought that a stall was inevitable. In all, the sight was most authentic and convincing.

But the real showstopper was another German entry. Jorg Vogelsang, who last year thrilled everyone with an immaculate scratchbuilt radial engine, brought a real surprise this year. His pulse-jet powered V-1 "Buzz-Bomb" was one of the most unique scale projects yet seen. For those who have never experienced pulse jets, they are true jet engines, but a reed valve, instead of turbines, give the propulsion. These are probably the noisiest model powerplants ever devised, making the sound of a thousand amplified vacuum sweepers. Primarily used in control line, the Germans have for years been successfully flying them in R/C ships.

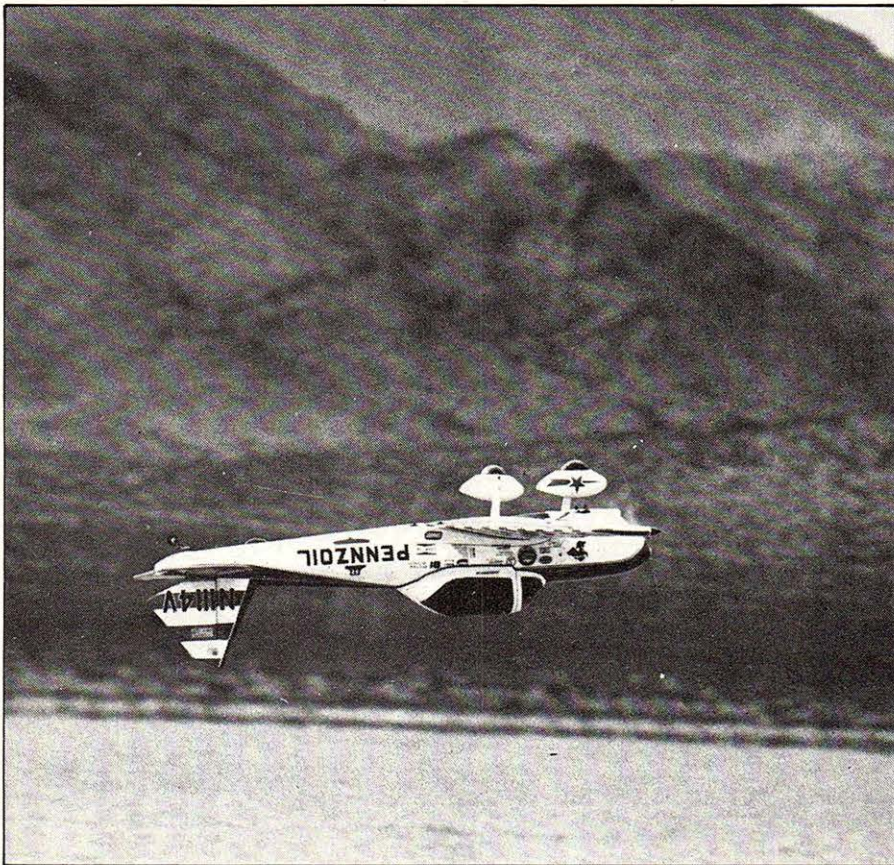
A compressor and generator are needed to ignite the pulse jet, so a full ground crew and massive support equipment are mandatory (in the old days, we used to ignite them with a bicycle tire pump). The V-1 doesn't just taxi out and take off. Because the pulse jet is essentially a ram jet (ironically, the direct descendant of the original jets which powered the devastating V-1s), the model must achieve a minimal speed in order to attain any significant thrust. To achieve this velocity, the model is catapulted from a 40' launching ramp, and a bungee hi-start is actuated to pull the plane into the air.

The Germans are big advocates of pulse-jet flying, but the concept has never caught on in this country. As a practical form of flying, it is still too major an undertaking for even a full club. But, as something to experience, the project was simply breathtaking.

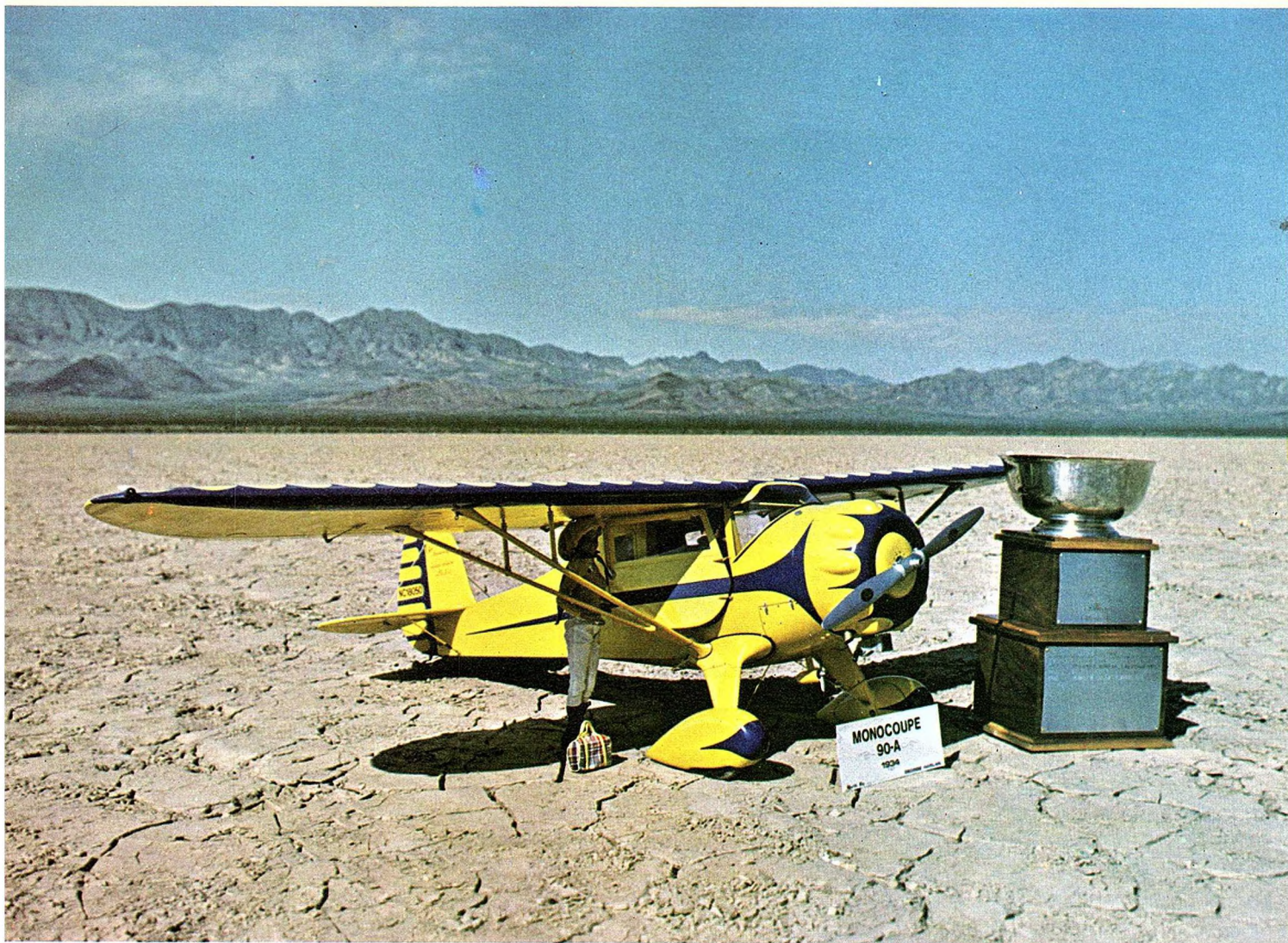
Such major events tend to dwarf the more pedestrian aircraft. But, there were some exceptionally beautiful machines at the meet. Hardly anyone seemed to pay attention to the CAP model which sported a Kavan FK 50 twin powerplant. This beautiful 4-cycle engine is perhaps one of the most expensive engines available (about \$1,500), but it flies the 16-pound model magnificently. The vertical performance was mind-boggling. The sound levels were so low that one could hardly hear the engine if another craft was in the



Bill Wendt's Cessna Ag Wagon sprayed a realistic "dust." The 104" span model was scratchbuilt.



John Bashore, Jr., flew this Don's Custom Models' Super Chipmunk to perfection. Even tri-colored smoke!



1.

1. George Harlan's Monocoupe won "Best of Show." 2. P-39, by Joe Zimmerman, was choice for "Best Military." 3. Joe Bashar's Super Chipmunk was a real work of art.

2.



3.



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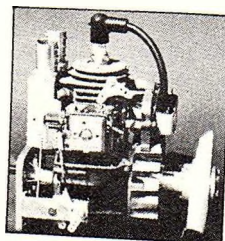
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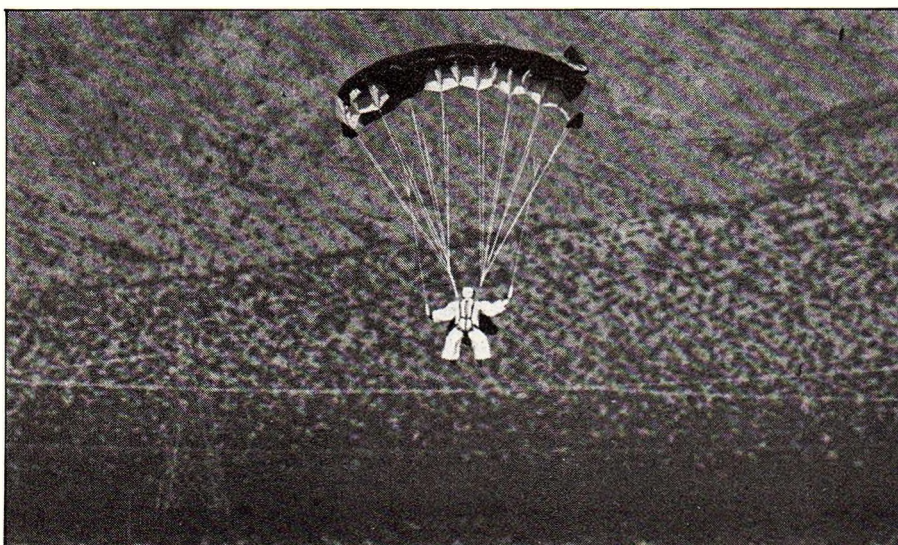
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Otto Schulze (West Germany) dropped an R/C actuated skydiver from beneath this J-3, then steered it back to precision landings.



air. Other notable engines we saw were the Webra 4-cycle .90, in Jerry Nelson's Starlet, and the new Super Quadra, of which there were a couple of samples available.

The "Best of Scale" award went to a magnificent Albatros. The 84" span beauty featured a Taplin .40 engine, and functional warping for the wings and tailplane. Even the wheels were hand built on this machine.

The "Best of Stand-Off Scale" trophy went to Chuck Fuller's immaculate AT-6 Texan. This 40-pound monster (10'6" span) was most noteworthy for the finish it displayed. The checkerboard was hand painted, and the scale panels and rivets were done to perfection. It's no wonder that the plane was sold before the show closed!

Wes Vosburg didn't use plans for his "Best Biplane" winning Fly Baby Bipe model. He started with the factory drawings to ensure the ut-

most accuracy on this 88" span machine. The 25-pound model shared the same paint as Dick Enos "Best Finish" winning Fly Baby. The metallic paint was applied to perfection, and both models were so intricately detailed that they were also candidates for the scale awards.

One plane which we particularly fancied was Mel Barber's Sikorsky S-39 amphibian. The homemade retractable undercarriage was neat, and the model was foldable to facilitate transportation. As might be suspected, the plane has been flown successfully from both land and water. Mel also got the "longest distance traveled" award, as he hails from South Africa.

Another personal favorite was Joe Zimmerman's P-39 Airacobra. This 96" span fighter is the prototype for Scale Flights upcoming new kit. While this one was a bit underpowered with a Quadra, the 23-pound machine will soon be refitted with a more powerful engine. The scale finish on the model was most authentic, with weathering and some of the nicest panel and rivet detail we've seen. With trike gear retracts especially made for the model by Airways Retracts, watch out for this kit, for it promises to be a winner. The modelers thought so too, for the plane was awarded the "Best Military" trophy. The model was built in less than five weeks!

Ron Karwacky's 1918 Curtiss Jenny had logged 391 flights before coming to Vegas. Webra .91 four-cycle used for power.



The "Best Civilian Aircraft" trophy was awarded to Dave New's immaculate Cessna 140. This scratchbuilt model had well-done corrugated details on the exterior, and a very neat cabin interior. With all of these gorgeous machines, one would be hard pressed to select an overall top model for the coveted "Best of Show" award. But, George Harlan's Monocoupe was such a runaway favorite that only a glance was needed to tell even the most casual observer that this was the cream of the crop. With working running and navigation lights, and a cabin interior that would take your breath away, the model deserved all of the praise it got.

There were other models, just as deserving of awards, but only so many planes can be acknowledged



The pit crew gives a heave to return the Scale-Flight P-39 to the ready line. A just-released kit.



The pulse-jet powered Buzz Bomb, being catapulted off its elaborate launch ramp. The photo clearly shows the bungee cord which helps it get momentum. The jet reaches speeds in excess of 200 mph!



out of 169 entries.

The meet this year was moved to the last weekend in October, to hopefully consolidate what had been in years past a battle between two major events. The Circus/Circus Tournament of Champions always occurs the first week of November. By scheduling the Q.S.A.A. meet the weekend before, it was hoped that modelers would come for one, and just stay over for the other. We're not sure whether this theory proved itself, in fact.

Again, the economy had a lot to do with this. The Tournament of Champions didn't start official flying until the Thursday of the following week. This meant a costly layover for most people, with little to do but watch the practice flying during the early week. Few people had the ability to give ten days to attend both events. Since the Tournament is an invitational event, it would seem logical that it be held Monday through Thursday, to consolidate the two events. Of course, the promotional

aspects to Circus/Circus would be lost by such a change, so we can only assume that the situation will remain a dilemma for both events.

The Q.S.A.A. also moved their dates to get away from what seemed an insufferable annual problem with the weather. Although it might seem illogical to reschedule for dates later in the winter, the desert environment of Las Vegas actually becomes more predictable as the season transition progresses. While the temperatures in late October can get somewhat nippy (at least by desert standards, with daily highs in the mid-60s), the probability of winds and the hot weather which can be unbearable in the open desert drastically diminishes.

The move made sense this year. Friday was flown under perfect conditions, with temperatures in the mid-70s, and hardly a puff of wind. Saturday surprised everyone, as a freak storm entered the region. The



Full-size aircraft does a thoroughly illegal buzz-job over the crowds. You don't have to be a modeler to be a fool!



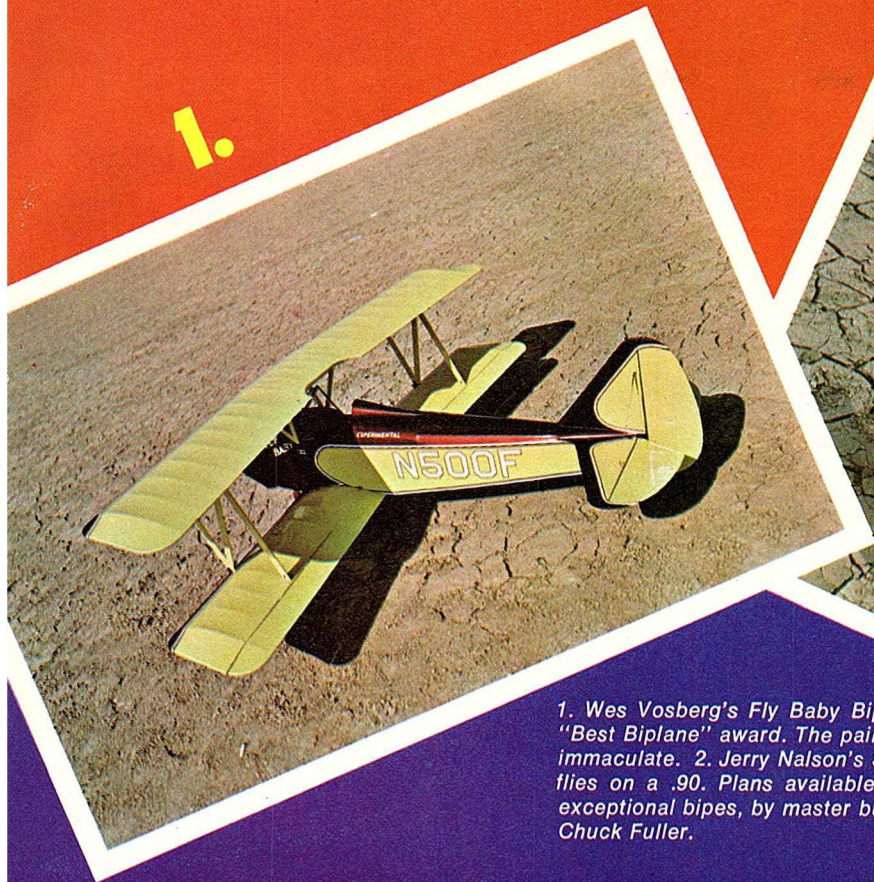
Two more shots of the elaborate C5A brought from West Germany. It flew most convincingly, with touch-and-goes, and even had fully operational spoilers and flaps.

clouds threatened and sprinkles fell Saturday morning, but it wasn't till about noon that the clouds really opened up. As with the fast changing conditions in the desert ("If you don't like the weather, just stand still until it changes"), Sunday dawned clear and warm. In all, it was one of the best flying weekends in Q.S.A.A. history. The light rain only helped to adjust the humidity to more reasonable levels, and almost anything is better than the sand storms which have marred almost every previous gathering.

In writing this article, we realize that no amount of words could replace the actual experience of being at the Q.S.A.A. Fun-Fli. The stark reality of a flightline stretching almost as far as the eye can see, and 169 planes all available for the eye to take in are hard to describe. The endless flying, from dawn to dusk, the unique models from all over the world, all of these things can't be visualized by mere words. The Fun-Fli is a learning experience, and this year there were more manufacturer's booths than ever (even Lou Ross, of multi-cylinder fame, was there).

What we're trying to say is that there's just nothing that can be put on paper which can replace the excitement of actually being there. Hopefully, by next year and the seventh (that's a great number in Vegas) Fun-Fli, economic conditions will have changed so that more models and spectators can attend. If you want to see the best that giant-scale has to offer, put the last weekend in October on your calendar and plan to spend Halloween in Las Vegas! We guarantee that it will be a treat!

1.



2.



1. Wes Vosberg's Fly Baby Bipe won the "Best Biplane" award. The paint job was immaculate. 2. Jerry Nalson's Starlet flies on a .90. Plans available. 3. Two exceptional bipes, by master builder Chuck Fuller.

3.



SMITH MINIPLANE



A sweetheart of a biplane, for either scale competition or aerobatic work. This one is for a .60-.80 powerplant.

Photos by the authors





By Al Kretz & Steve Orts

The original Miniplane was born in 1957 during a hangar flying session in Frank Smith's garage, in Fullerton, California. Frank, an avid homebuilder who always liked biplanes, had some years earlier bought an old Travel Air 12W "basket case" and rebuilt it completely. The Travel Air proved to be quite a big ship, and so Frank had a vision of a little, trim single-seat biplane.

Eight months after conceiving the idea of the Miniplane, Frank had the little ship airborne. From the first flight, his Miniplane handled like a dream and soon became widely popular. Frank began construction on a second Miniplane and his friend, Lee Wainscott, prepared a set of detailed plans for homebuilders. Before the second Miniplane could be completed, Frank passed away and his good friends Wainscott and Howard Terril completed the ship by June, 1958.

The DSA-1 (Darned Small Airplane) is one of the outstanding examples of designs suitable for successful home construction. Engineered with the amateur constructor and

pilot in mind, the Miniplane is built for full aerobatic performance and is stressed up to $9\frac{1}{2}$ Gs. The original Miniplane, powered with a Lycoming O-235 engine of 100 hp, had a cruising speed of 120 mph and a fantastic rate of climb—around 2,500 feet per minute. A second Miniplane with a 75 hp engine did almost as well. The current design provides for the use of any light aircraft engine from 65 to 115 hp, with excellent performance even with the smaller engines.

In August, 1959, Frank's old friend, Tom Messick, flew the original Miniplane (N90P) to Rockford, Illinois, for the 7th Annual International Fly-In of the Experimental Aircraft Association . . . a 4,200 mile round trip. Accompanying Tom was Frank's son Donald, a Fullerton High School senior, who flew a Piper Vagabond which he had helped his Dad rebuild early in 1958. Both young Smith and Messick received EAA trophies for flying the longest distance to the Fly-In. Donald's mother, Mrs. Smith, flew the commercial airlines from California to

Rockford to be with the boys at the Fly-In. While both the Vagabond and the Miniplane made it on time to the Fly-In, Mrs. Smith, traveling via commercial airliners, was late.

Mrs. Smith has maintained her interest in aviation since Frank's death, and is very active in the support and promotion of aircraft homebuilding.

The little Miniplane, which combines a sleek appearance with excellent performance and maneuverability, is a fitting memorial to Frank Smith, whose fine design has become one of the most popular flying today.

* * *

About seven years ago, a new member came into our Illinois club. His name was Mo Niebecker, and he was from Georgia. At one of our meetings, he brought a film which showed a full-size Smith Miniplane his father had built several years before.

At that time, I was flying a Bristol Bullet biplane which used to be available through Den Hobbie Supply. I was really happy flying this biplane and thought that the

Smith Miniplane would be an ideal subject for a model. The idea was like that of many people, and it was soon shelved and forgotten.

A couple of years after that, Sig Manufacturing Co. came out with their 40-sized Smith Miniplane and a few guys in our club jumped on them right away. The Sig Smith Miniplane proved to be a decent little biplane, but as far as I was concerned, I felt it was too small . . . only a .60 size would suit me.

For several years, the idea of the Smith Miniplane kept returning to me and I had even thought about the possibility of drawing up my own plans . . . and maybe even kitting it. I never advanced past this point, however, until Steve Ort (a member of our club) heard me speak of it.

He said that he would be interested in joining me in this project. Well, one thought led to another and, in mid-January we decided to get started.

The first thing Steve and I did was to go see Mo Niebecker and his father Elmer. Elmer had moved up into our area. They were able to supply us with 3-views, photographs, and even a construction manual for the full-size Smith Miniplane.

Steve took the 3-views to work and had them blown up to a wingspan of 51". The 51" span is not only a good size for a .60 biplane, but it also is exactly $\frac{1}{4}$ -scale of the original. If you want to build quarter-scale, but you don't want to end up with a huge plane, this might be the way for you to go. With these 3-views

being exact-scale in outline, we decided to make a few modifications. We left the wing outlines and the nose and tail moments the same. We then enlarged the tail surfaces somewhat, and proportionately scaled down the fuselage cross section. This was because the scale outlines proved too large for a .60 sized biplane and would have given too much drag. We did this so carefully that, when you or the judges look at the 3-views, it is very hard to determine if there is any difference at all.

Once we started the construction drawings of the plane we decided to try to get them done as quickly as possible, because there was a local mall show coming up. We wanted to have the planes built by then. The drawings took about three weeks,



Settling in for a landing, the Miniplane proves its stability. No vices with this biplane.



The Miniplane has become a classic of two-winger design.

SMITH DSA-1 "MINIPLANE"

DESIGNED AND BUILT BY FRANK W. SMITH
FULLERTON, CALIFORNIA - 1957

SPECIFICATIONS & PERFORMANCE

ENGINE - 100 H.P. LYCOMING O-235 (ORIGINAL MINIPLANE)

EMPTY WEIGHT - 616 LBS.

GROSS WEIGHT - 1000 LBS.

FUEL - 17 GALS.

OIL - 6 QTS.

WING AREA - 100 SQ. FT.

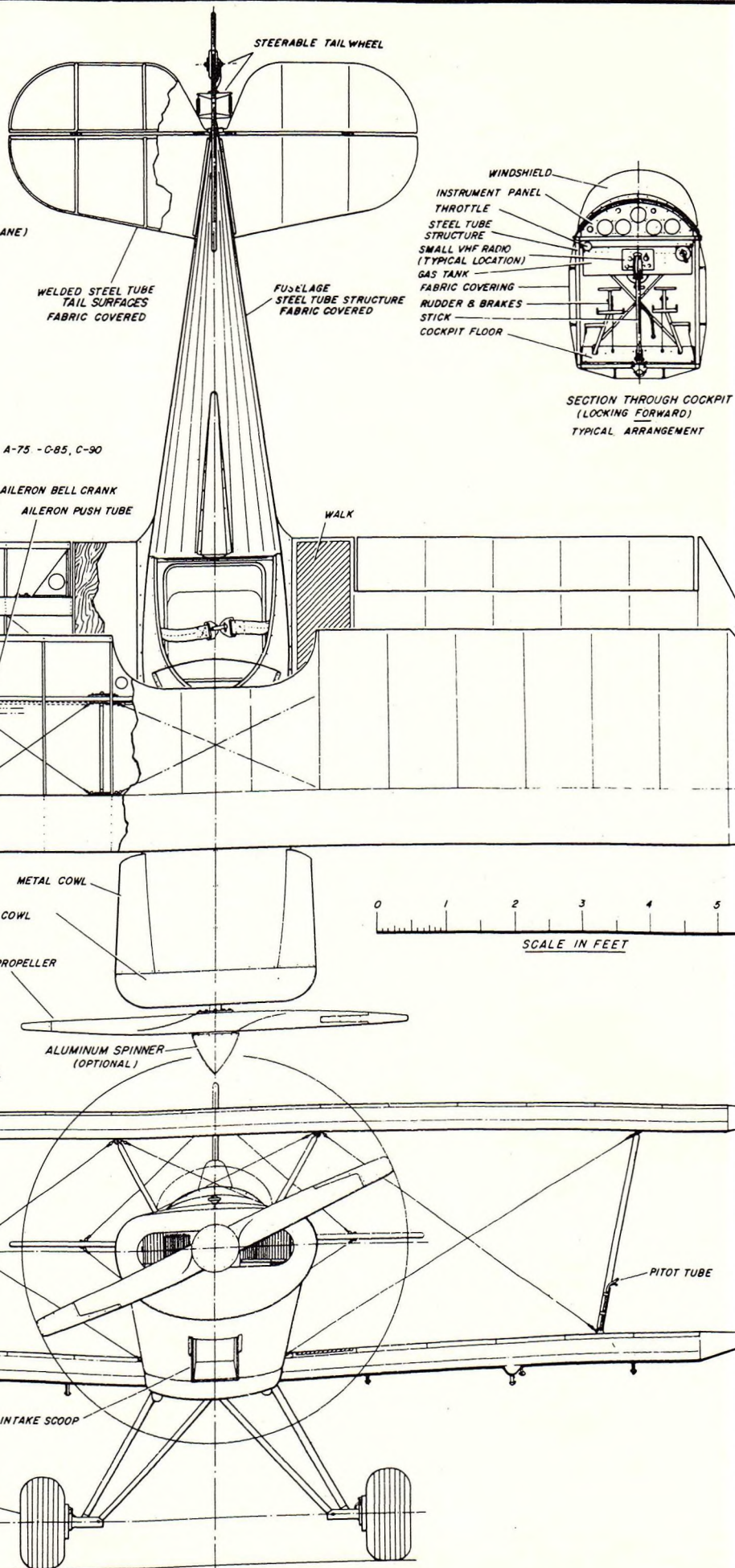
SPAN - 17'0" / 15'9"

LENGTH - 15'1"

CRUISING SPEED - (LYC. - 120 M.P.H.)

RATE OF CLIMB - 2500' PER. MIN.

ALTERNATE POWER PLANTS - CONTINENTAL A-65, A-75 - C-85, C-90



even with both of us working every night.

When the drawings were completed, we started construction. We both started on different areas of the plane, so that we could inform each other of any problems we might run into. Steve started on the wings, and I started with the fuselage. We are happy to say that only a few minor snags were encountered by building right off the original drawings. Steve managed to get his finished before I did, because I had to attend a trade school for a week.

Before we started painting our

Smith Miniplanes, we decided it best if we each went with different color schemes, so that we wouldn't be duplicating our efforts. Steve decided to go with the color scheme used on the original prototype Smith Miniplane. By the way, Steve received the color photos for his documentation from Mrs. Smith herself. I decided to paint mine with the color scheme that Elmer Niebecker used on his full-size aircraft.

We managed to finish both planes in time for the mall show, although I had to stay up all night in order to finish.

At the local mall show, we managed to win Best Non-Military, Best Paint, and the most coveted award they had to offer—Best of Show. Because this was the first public outing for the planes we were more than pleased.

After having done so well locally, we decided to attend the Mint Julep Contest. Also by this time, we had given up on the idea of kitting the Smith Miniplane on the advice of our local banker. We then decided we would market the plans and cowl only by mail.

Due to local bad weather we didn't manage to get any test flights on the planes until two days before we left for the Mint Julep. The day of the test flights was cold and windy. We only flew each plane one time, because both trimmed out quickly and we felt comfortable immediately. The Smith Miniplane proved to be a very gentle flying aircraft.

So, with only one flight on each plane, we packed up and headed for the Mint Julep. The planes were static judged on Friday night, and the flying was to start early Satur-

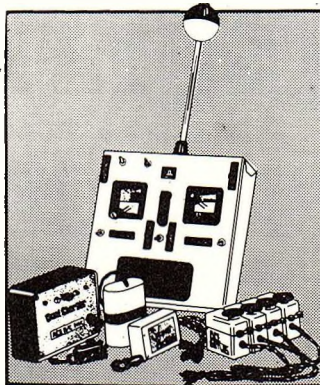


In the air, the biplane will hold its own with any model in aerobatics, if the four-aileron version is built.

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Silver Seven System

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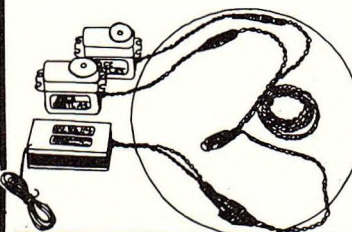
26K10-Christy Mixer, Bi-Directional \$29.95
26K11-Christy Mixer, Uni-Directional \$29.95



Noise Trap

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26K17-Noise Trap, Kit \$3.95

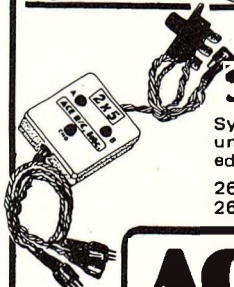


2x5

Redundant Power Source

System normally draws from two 5 cell packs unless one fails... then the bad pack is switched out. Less connectors, with switch.

26K15-2 x 5 Power Source, Kit \$12.50
26K15C-2 x 5 Power Source, Assy. \$19.95



ACE R/C, Inc.

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day. Steve decided Saturday morning not to fly. The paved surface was totally unfamiliar to him, and he didn't have much previous experience with a scale taildragger aircraft. I did fly mine, however, and when the final results were posted, I had managed to place 3rd in my class. Steve and I were more than happy, because we just wanted to get some exposure for the Smith Miniplane. The trophy was just icing on the cake.

The next stop on the contest trail for the Smith Miniplanes was the Sig IMAC Championships. The entries numbered well over one hundred. Even with this heavy competition, our planes did very well. Steve placed 2nd in the highly contested Sportsmans Class, and I managed to place 5th in the Advanced Class. We both felt that this was better than the results showed, because I was flying the two aileron version, which is not quite as competitive as the

The models have won numerous static and flying contests.

four aileron model would have been. We highly recommend the Sig Contest. I have been there every year, and it is a must contest on my list.

Upon arriving home, there was a letter waiting for us from the Mint Julep. The letter stated that we had qualified for the Scale Masters Championships. We had thought earlier about going to the Nats, but with Steve not being able to take time off work, I decided to drop the Nats and go to the Masters. Knowing that the Smith Miniplane would have to compete against the multi-optioned aircraft, I decided to get as much flying time as I could on the Smith Miniplane. I went out to the model park every chance I had. Before leaving some last minute touch ups were done to the plane.

After traveling for three days, my wife and I arrived at Fountain Valley, California, which was the site for the Scale Masters. The static judging was done on Friday and the flying started early Saturday morning. I was very pleased, after the first round, to find out my static

score was only five points below the top score. However, after that things did not fare too well. The judges seemed to favor the military aircraft because, after closer observation of the scoreboard, it was noted that not one non-military aircraft was in the top ten in static. To add to this, as far as I could see, all the flying judges were Pattern judges. They seemed to favor the faster military airplanes. The Smith Miniplane, with no mechanical options, still managed to place fifteenth.

In the Fall, we took the models to the Chicago Expo. They really made an impression there, taking both second and third in Non-Military Scale.

You might remember, before you start any scale airplane, that you should get all the proper documentation needed to prove to the judges that your color scheme is authentic. This shouldn't be too difficult, because of the large number of Smith Miniplanes that have been built throughout the world. Also, before beginning construction, you might want to give some thought to the two types of ailerons shown on the plans. The scale two-aileron version will result in a model that has very scale-like and docile flying characteristics. We would like to stress that, if you would like a plane that is "snappier" and will be more competitive in the advanced type maneuvers, use the four aileron version.

For the most part the construction is fairly basic and straightforward. If you have any building experience at all, you shouldn't encounter too many problems with this plane. As with most biplanes, the mounting of the upper wing should be the only

(Continued on page 62)



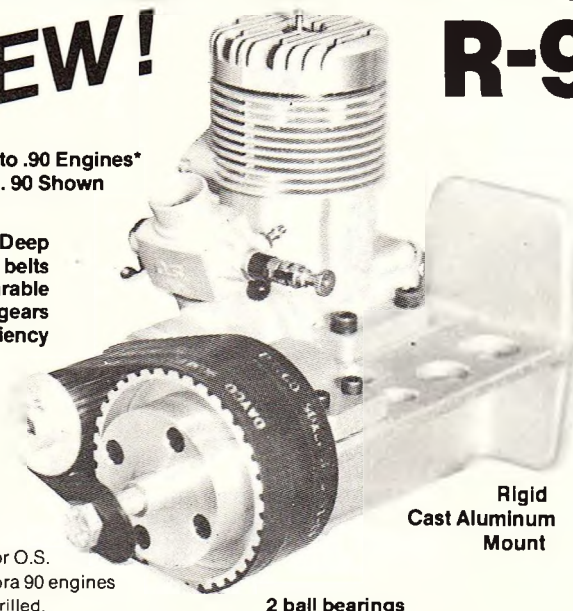
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OLD: 72.080 (white and brown), 72.160 (white and blue), 72.240 (white and red), 72.320 (white and purple), 72.400 (white and orange), 72.480 (white and green), 72.560 (white and yellow).

NEW: Channel 12 (72.030), Channel 38 (72.550), Channel 40 (72.590), Channel 42 (72.630), Channel 44 (72.670), Channel 46 (72.710), Channel 48 (72.750), Channel 50 (72.790), Channel 52 (72.830), Channel 54 (72.870), Channel 56 (72.910).

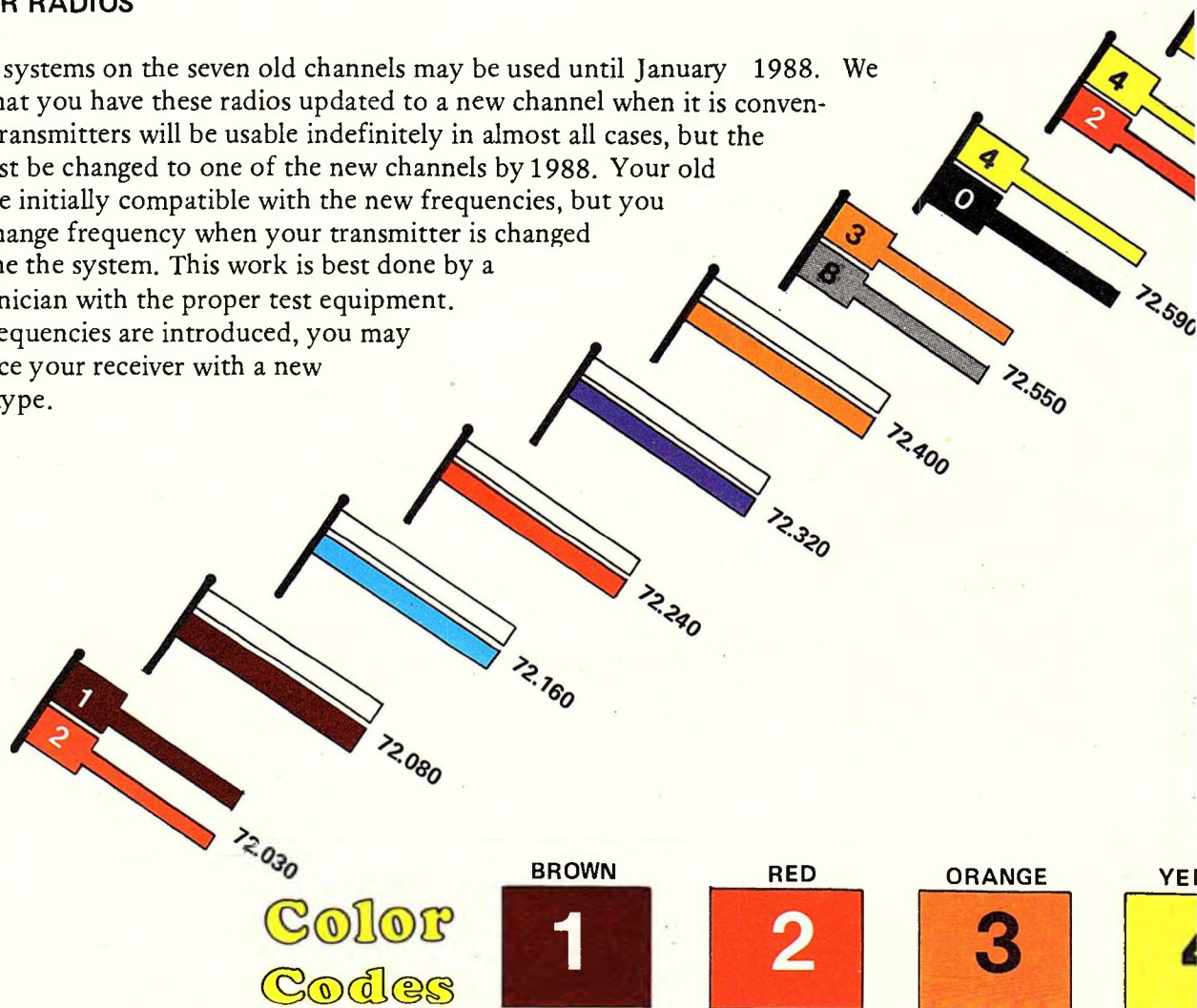
New frequencies are identified by a channel number and a new color scheme (see the drawing below). **The old frequencies remain the same.**

NOTE: Previously used frequencies in the 27 and 53 MHz bands remain legal. Model fliers generally avoid 27 MHz due to the possibility of interference from CB operations. 53 MHz is for licensed amateur radio operators only.

Even-numbered channels in the new band are being introduced first to allow you to use radio equipment that you already own for as long as possible. In 1988 more channels will be made available.

YOUR OLDER RADIOS

Radio systems on the seven old channels may be used until January 1988. We recommend that you have these radios updated to a new channel when it is convenient to you. Transmitters will be usable indefinitely in almost all cases, but the frequency must be changed to one of the new channels by 1988. Your old receiver will be initially compatible with the new frequencies, but you will have to change frequency when your transmitter is changed over and retune the system. This work is best done by a qualified technician with the proper test equipment. When more frequencies are introduced, you may need to replace your receiver with a new narrow-band type.



Frequency Control System

72 Mhz - Aircraft Only

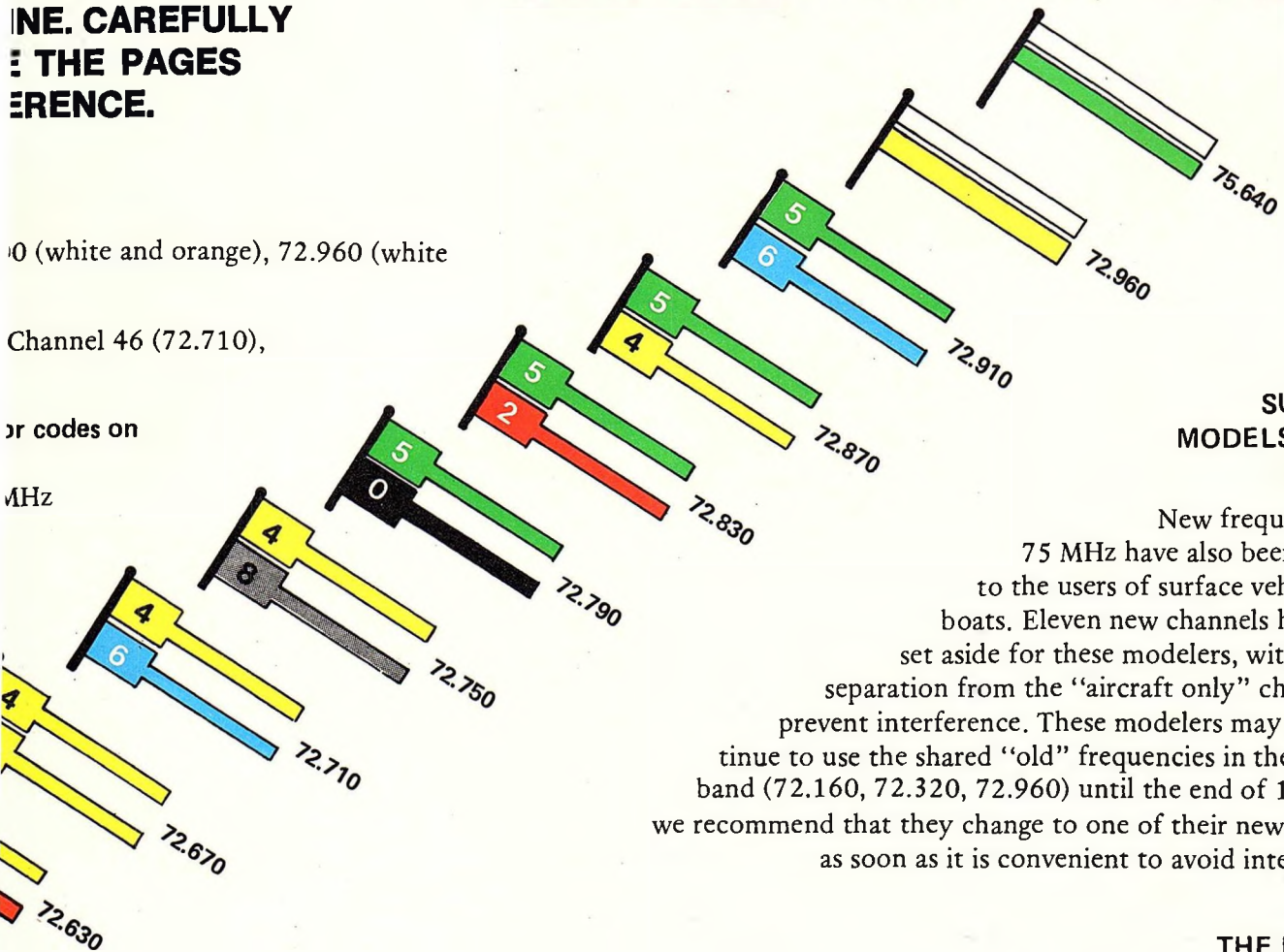
YOU COURTESY
LINE. CAREFULLY
THE PAGES
REFERENCE.

0 (white and orange), 72.960 (white

Channel 46 (72.710),

or codes on

MHz



WHAT
ABOUT
SURFACE
MODELS (CARS,
BOATS)?

New frequencies on 75 MHz have also been granted to the users of surface vehicles and boats. Eleven new channels have been set aside for these modelers, with enough separation from the "aircraft only" channels to prevent interference. These modelers may also continue to use the shared "old" frequencies in the 72 MHz band (72.160, 72.320, 72.960) until the end of 1987, but we recommend that they change to one of their new channels as soon as it is convenient to avoid interference.

THE FUTURE

In January 1991, a total of 50 channels will be available for "aircraft only" operation by modelers. These will be numbered by channel from Channel 11 through Channel 60. Non-aircraft users will have Channels 61 through 90 in the 75 MHz band. Properly-licensed modelers may continue to use the 53 MHz band.

For more information and additional copies of this chart, write to the Academy of Model Aeronautics, 1810 Samuel Morse Drive, Reston, Virginia 22090.

Academy of Model Aeronautics

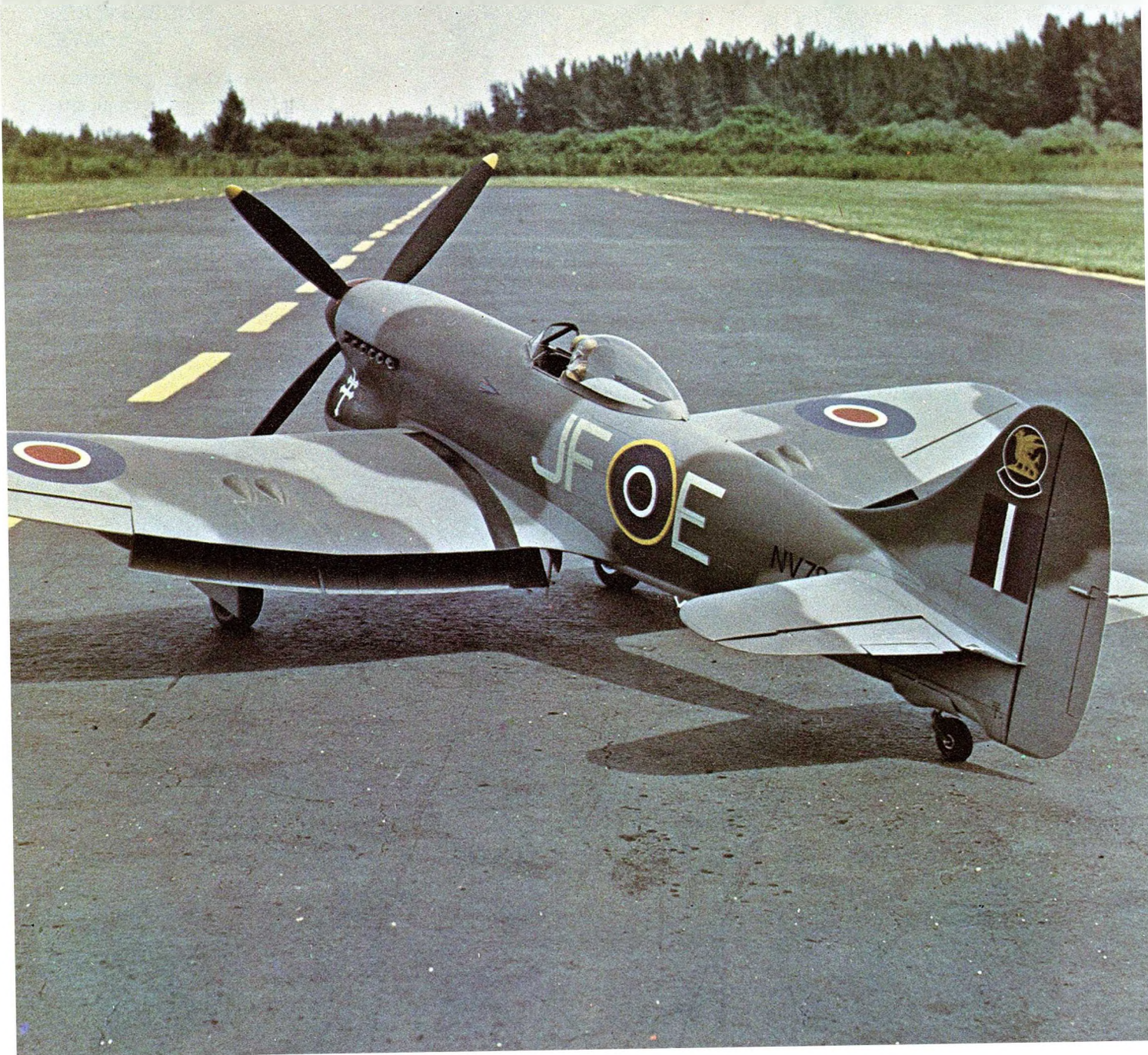


Tempting **TEMPEST**

An 80" span fighter for a .90 engine, with lots of class and character.

By Vito Tomeo

Photos by the author

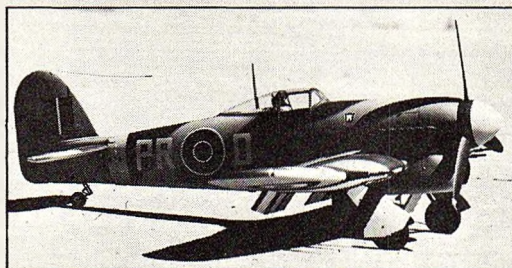


HAWKER TYPHOON

For the scratchbuilder, a big WW II fighter
with all of the scale details.

By Alfred J. Trapanese

Photos by the author



The Typhoon is so closely related to the Tempest, that both aircraft are presented in this special double feature.

The Hawker Typhoon was the direct predecessor of the Tempest and, as such, deserves recognition as part of our coverage of the Tempest. Al Trapanese's model makes the ideal showcase for this unique two-airplane feature article. It, like Vito Tomeo's Tempest, is a large model. By comparing and contrasting the two fighters, a better feel for the evolution of both can be gained. Far too little tribute has been paid to these British aircraft, yet they were among the best performing fighting machines of the war. We are proud to be able to give our readers this double-package of Hawker history.

(PHP)

* * *

"She certainly sorted the men from the boys," was a statement once made in reference to the Typhoon, for the Typhoon was a monster of an aircraft. With a 24-cylinder Napier Sabre powerplant generating 2,200 hp, swinging a 14-foot 3-bladed (later 4-bladed) propeller, the ship weighed over six tons loaded. The result was an aircraft that had a high wing loading, and we all know what that means!

The aircraft also had the tendency for high speed stalls, due to a term then referred to as "compressibility." Actually the high speed stalls were more attributed to the airfoil design. Pilots accustomed to flying Spitfires, which had relatively low wing loadings, were in for quite a surprise when they flew the Typhoon for the first time. The torque of the huge Sabre forced the plane to drift towards the right on takeoff, which

could only be corrected by applying rudder and brakes. The lateral stability was apparently poor, and the ailerons really did not become effective until speeds of over 100 mph were reached.

The Napier Sabre powerplant also had many teething problems, the least of which was its tendency to catch fire during the startup procedure. The very early version Typhoons had problems with their empennages parting company during high speed dives. This problem accounted for the loss of many pilots, and was eventually corrected in the field by riveting "fish plates" around the fuselage at the empennage attachment point.

One might be thinking to themselves at this point, that the aircraft was a total failure. Not true. Please keep in mind that I am describing the early version Typhoon 1as. Most of the problems were corrected in the 1b versions. Also, keep in mind that the Typhoons were hastily constructed during a national emergency as an interceptor to counter the German heavily-armored, heavily armed, long-range fighter escort that was never developed.

As just mentioned, the original intent of the Typhoon was as an interceptor but, because of its thick airfoil and high wing loading, its role was changed to ground attack. The interceptor role was left to the Spitfires. In the ground attack role, the Typhoon really shined. Its thick airfoil gave it the capability of carry-

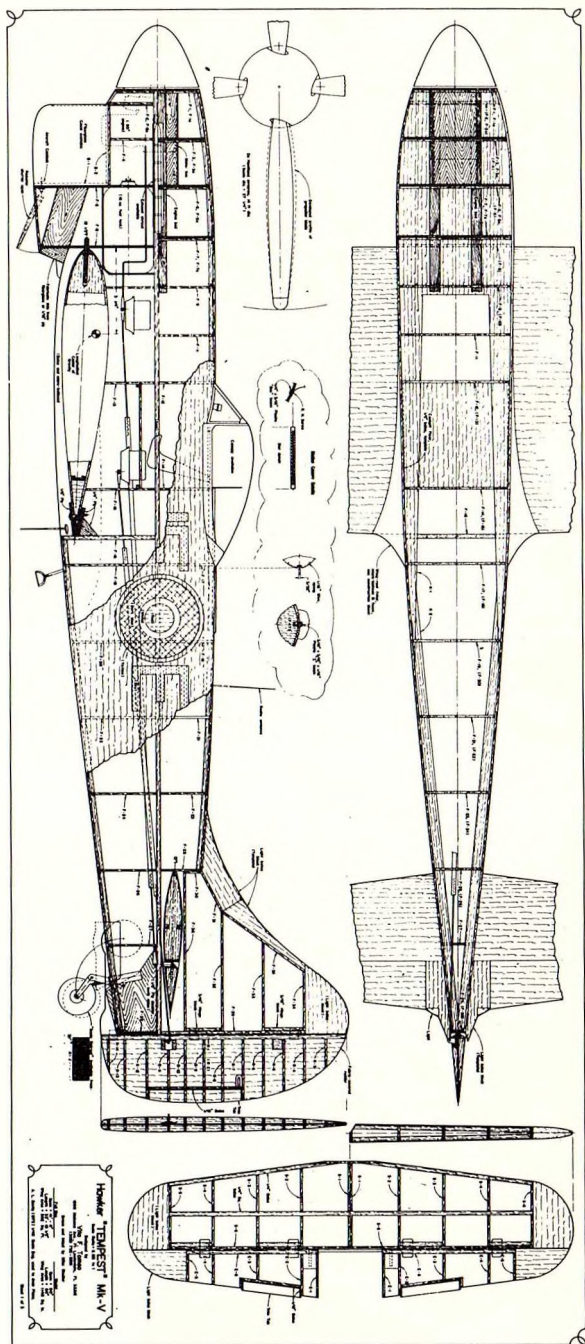
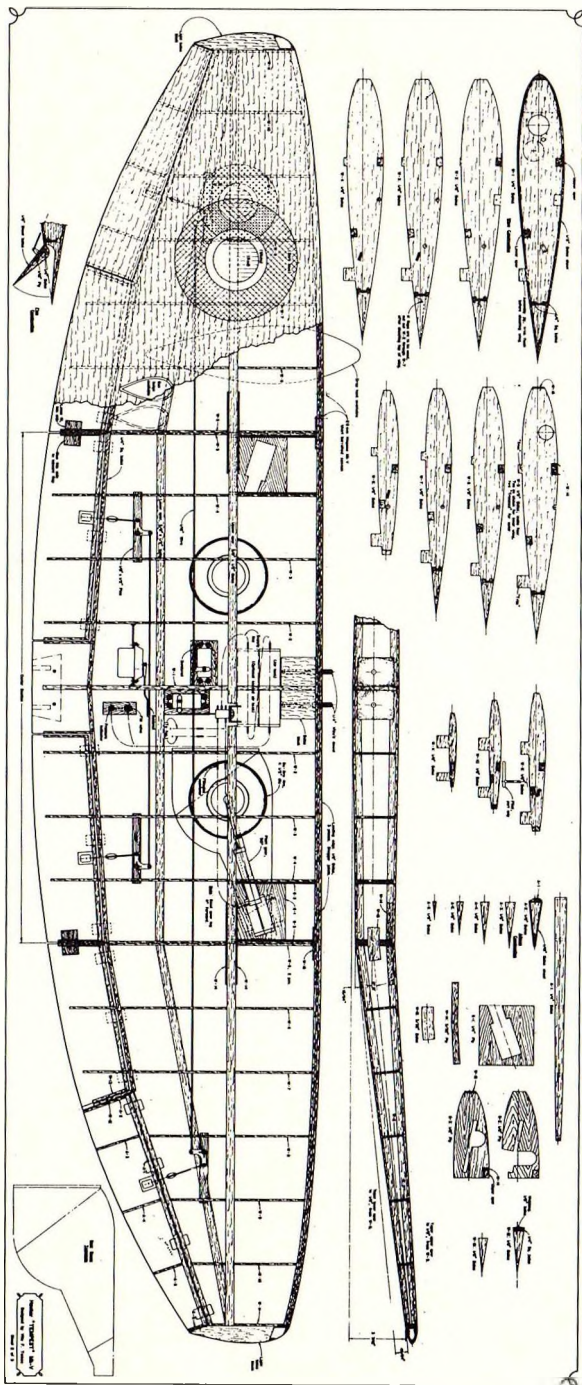
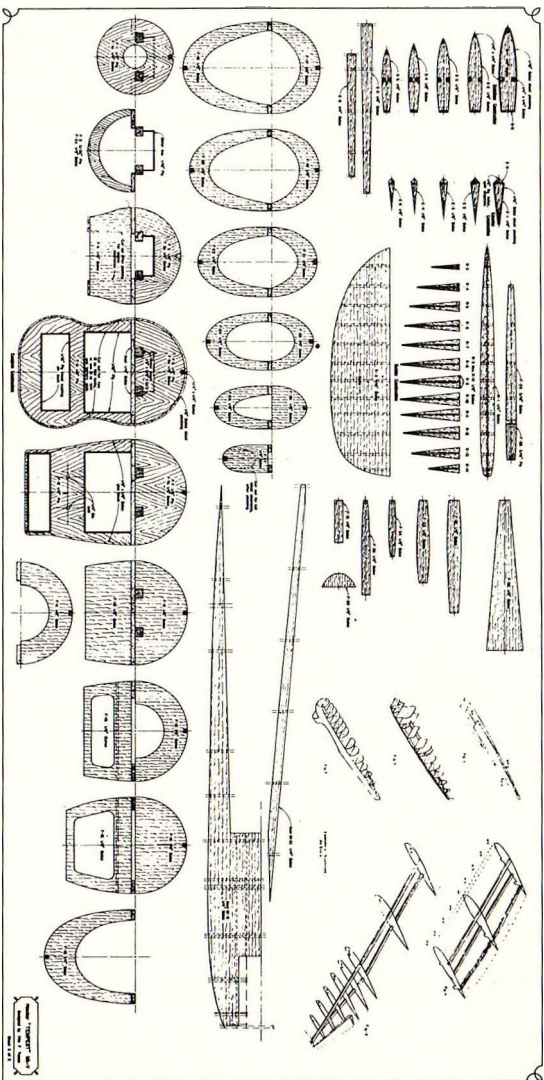
(Continued from page 66)

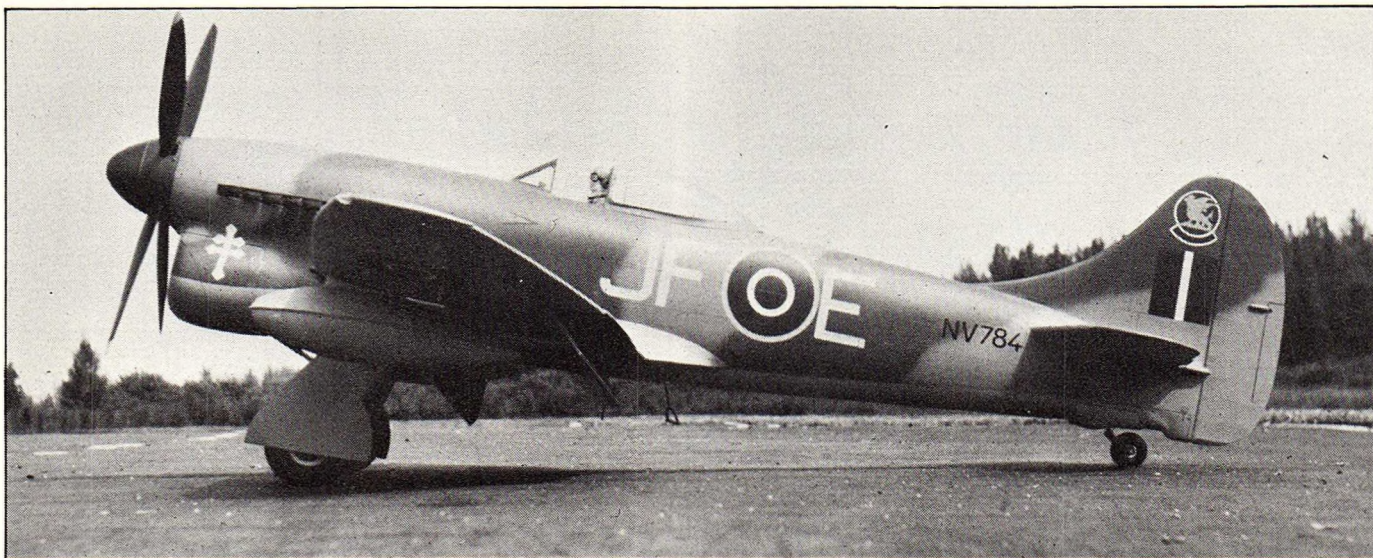
The Hawker Tempest was the last of Sidney Camm's designs to see service during the Second World War. Early in the development of the Typhoon, it was realized that the limiting factor in its performance was the thick wing section, which had been designed before the war. Work was started at Kingston on a new, thinner laminar flow wing, resulting in the proposal to develop a thin-winged Typhoon.

Two prototypes were made in late 1941. It soon became apparent that the differences would be so marked that the name Tempest was adopted to supplant the original Typhoon. In June, 1942, six prototypes were built. One had the Sabre Six engine (Tempest I), two with the Centaurus V (Tempest II), and two with the Griffon 11B (Tempest III). These later were replaced by Griffon G1 powerplants (Tempest IV) and one was refitted with the Sabre II (Tempest V).

The Tempest V prototype was actually converted from a Typhoon airframe and featured a built-up cockpit canopy with car-type entry doors, as fitted to early Typhoons.

FULL-SIZE PLANS AND ACCESSORIES
ARE AVAILABLE DIRECTLY FROM THE
AUTHOR. SEE TEXT FOR PRICES AND
ORDERING INFORMATION.





The Tempest may not have lines which appeal to every scale modeler, but the chin cowl and rounded tail make for a distinctive model.

A suitably strengthened Typhoon empennage—with a taller fin and rudder—was fitted. Early test flights revealed the need for still larger tail surfaces, so the tailplane was increased in area, the fin and rudder contours were refined, and a dorsal fin was incorporated.

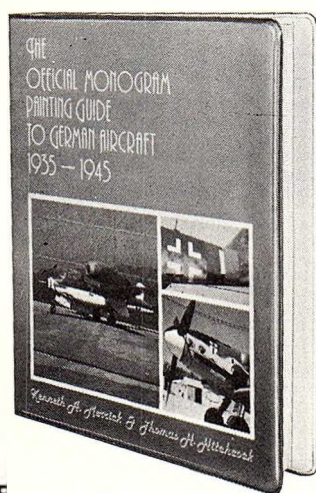
Its maximum cruising speed of

400 mph enabled the Tempest to combat the V.1 "flying bomb," being the only aircraft in service with the necessary speed. The three squadrons in service at the time accounted for over one-third of the total number of V.1s destroyed.

While some modelers may find the the Tempest too boxy-looking, I admire the stark beauty of its unique curves. From a model designer's point of view, the plane is an excellent choice for a .90-sized airframe. The fighter was amazingly similar

to the Sea Fury, which I had developed 1/5-scale plans for (December '80 *Scale R/C Modeler*). Both machines have wide landing gear, good moments and an elliptical wing. While you may feel that a double-tapered wing is a disadvantage, my experience has shown it to be a most efficient configuration. Since the Sea Fury was a proven commodity, I had no qualms about tackling the Tempest.

The model evolved from A. L. Bentley's superb 1/48-scale draw-



THE OFFICIAL MONOGRAM PAINTING GUIDE TO GERMAN AIRCRAFT 1935-1945

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JET PLANES OF THE THIRD REICH

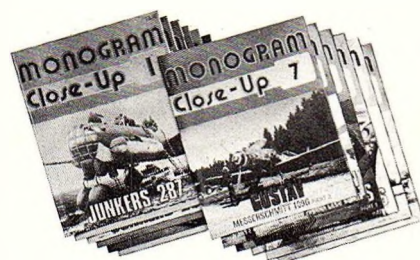
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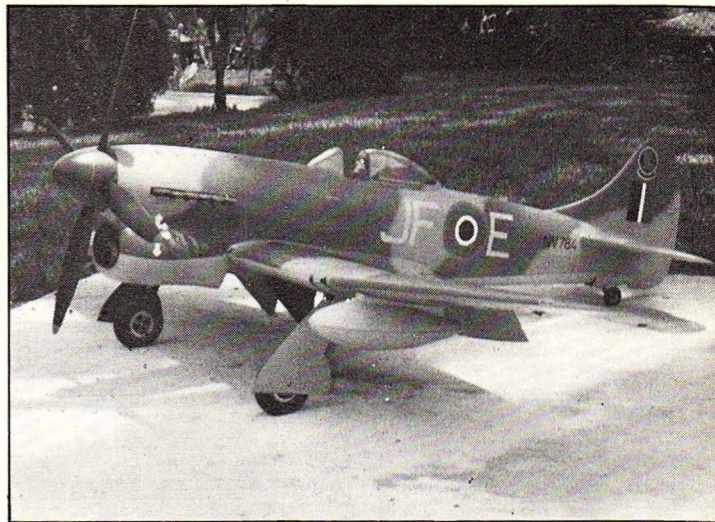
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The elliptical wing is very efficient, which is why this 80" span fighter can fly on a straight-drive .90.



The drop tanks and spinner are available accessories. See text for ordering information. A plan-kit is also available.

ings. These were followed to the letter, to ensure the utmost in scale accuracy.

There was never any doubt as to the size of the model. It would be powered by a straight-drive .90. As with most scale models, the Tempest was configured around the available hardware and accessories. The airframe was virtually designed around the readily available 5-inch spinner.

This resulted in a 6.15:1 scale ratio, which is slightly under 1/6-scale. The wingspan came out to be 80 inches, with a 66-inch length, and 1,148 sq. in. of area. This roughly equated to the general configuration of the old Sea Fury, except that the Tempest would be a little longer in the fuselage.

I was determined to not have to resort to chain saw or belt-driven powerplants. I wanted a good .90, such as the O.S. or Rossi, to fly the model. As I did my calculations, I realized that I would have to cut a

few corners from the over-engineered structure of the Sea Fury. I calculated that 16 pounds would be the optimum weight for such a model. As I looked over the Sea Fury plans, I saw that rearranging the spacing of ribs and fuse formers would help to lower the weight. As I drew the Tempest, I became conscious of how much extra wood we put in our mod-

(Continued on page 76)

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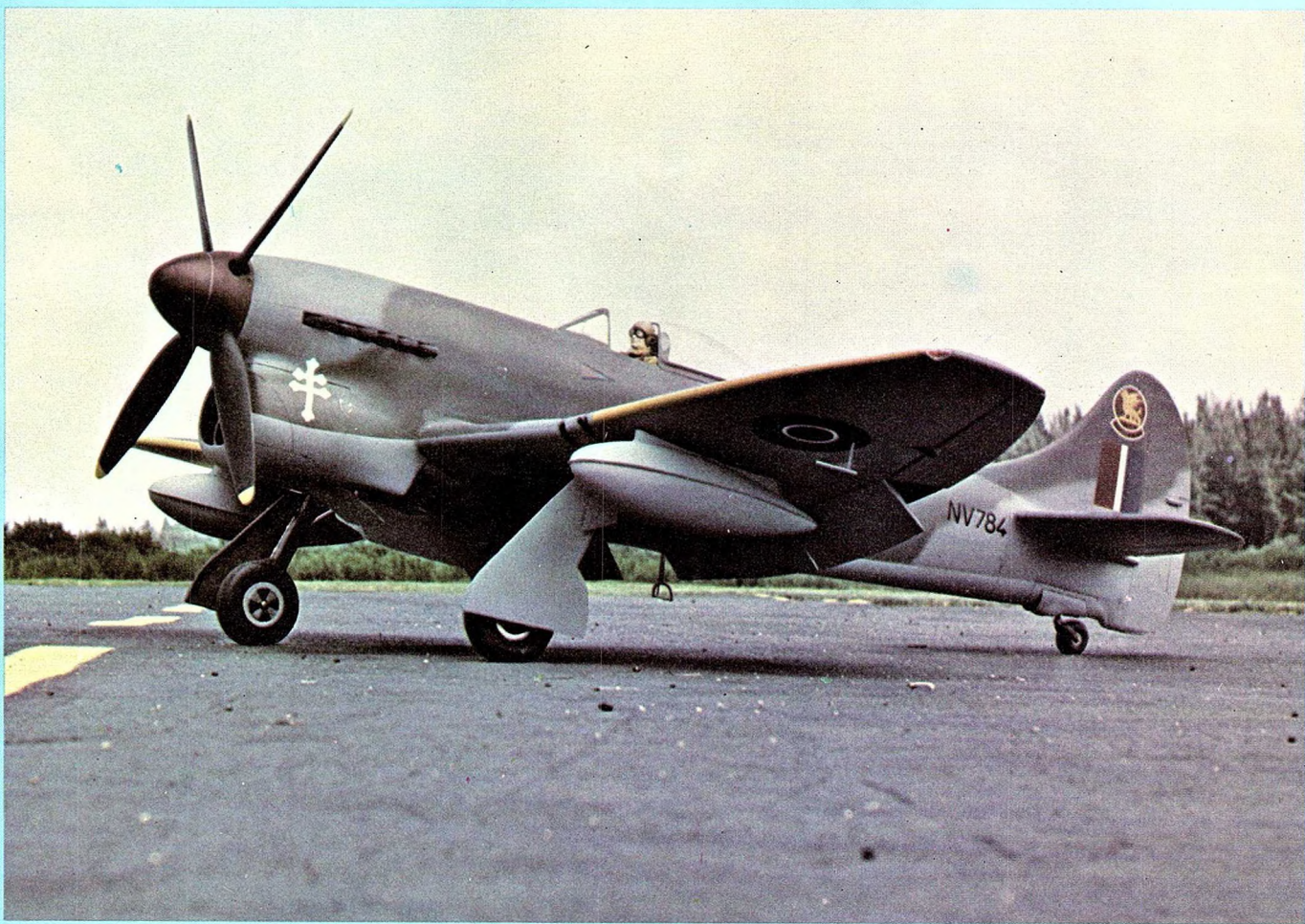
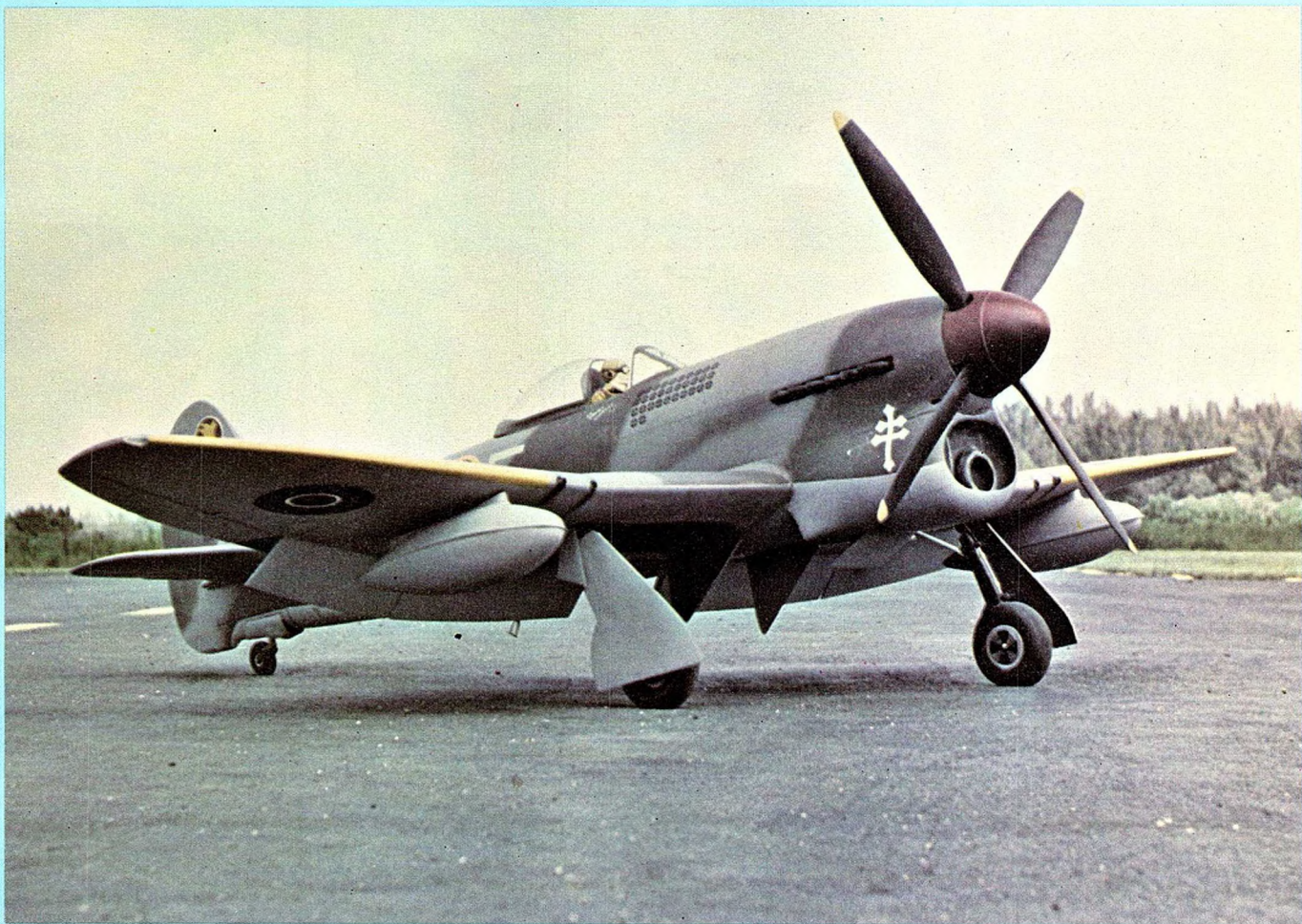
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classic CUB

An ideal project for someone just getting into R/C, the J-3 from Top Flite is a classic machine.

By Bob Zaring

Photos by J. R. Naidish



Is there a scale modeling subject more popular than the P-51 Mustang? Until recently, I wouldn't have believed so. However, after experiencing the popularity of the Top Flite J-3 Cub, I would have to cast my vote for the yellow putt-putt, instead of the sleek fighter.

When I first heard that Top Flite was going to release a Cub kit, I reacted as many did: Not *another* Cub kit! But, when I looked around the hobby shop shelves, I realized that the only other Cub kit on the market (excluding the giant-scale ones) was Sig's version. Actually, it was interesting that Top Flite waited so long to release a Cub. They used a full-size Cub several years ago to promote MonoKote. The aircraft was entirely covered in red, white and blue MonoKote, and the J-3 sort of became an official symbol for Top Flite's covering material.

But, the wait was worthwhile, from the modelers' point of view. The kit they produced is a real winner. It was no surprise that they opted for the popular .40-size engine. There were actually almost no quality kits

for that size engine, except for a handful of high-performance aircraft. Bringing out a slow-flying trainer type was perfect marketing on Top Flite's part.

For me, the kit couldn't have come at a more opportune time. I had just finished my *ab initio* flight training on a very basic trainer. Jay Replogle, of the Hobby House in Van Nuys, California, had guided me through those first struggling solos. He also, as a good hobby retailer should, advised me as to my options for a second model. In one conversation, I recall having the J-3 plans spread out on the counter. We bantered about the pros and cons of the model. I commented that the kit looked a little complex. Of course, after my only experience with a slab-sided box, anything with more than ten pieces appeared to be a maze.

Since my aspirations were to get into scale as soon as my talents permitted, the Cub had a lot of appeal to me. Some more proficient modelers may find this hard to believe, but the lines of the model looked as racy and sexy as any military

fighter . . . I guess that's all relative.

Jay was quick to point out that the biggest stumbling blocks he could foresee were not only that I had not had very much building experience, but also that the Cub was a taildragger. Given enough patience and time, I could overcome the problem of not having the building experience. But, the real question was whether I could handle a taildragger. For most beginners, flying is a one-handed experience. The left hand, which controls throttle and rudder, gets used so infrequently that there really is no true learning. The finesse of using the rudder is, therefore, almost non-existent.

I gave the whole dilemma some thought. On the one hand, I might be jumping into a model that would not only tax my limited building skills, but also might prove too difficult to get off the ground once I had completed it. On the other side of the coin, the more I looked at the Cub, the more I wanted it. I guess the fact that I'm writing this article tells you which side of the argument won!

I carried the kit box home, feeling







The S.T. .45 really hauls the Cub around.

smug as the proverbial bug in the rug. I had plenty of time to dedicate to the kit, since my faithful trainer was still intact. I could build in the evenings, and fly on the weekends. This security blanket quickly went to shreds, for the first flight on my trainer after I started work on the Cub saw it get glitched right out of the sky. Suddenly, I was in a panic to get the kit done.

The real pinch in this situation was that I had figured to use my weekend flights to gain some knowledge of the workings of the rudder. Now, I was stuck with only about twelve hours of total stick time, with almost no rudder time. As I began to assemble the model, the big question of handling a taildragger loomed in my mind.

The Cub is a nice size model. The span is 77-1/8", which is just right for the average cramped building room. With a projected weight of 41½-61½ pounds, it is a lightly loaded machine, which helps to keep it manageable for those with limited stick time. The finish is nothing exciting, so ironing on some fabric will make it look quite authentic.

I read the instructions carefully, before starting. However, as I got into the kit, I found that it was suf-

ficient to let my common sense guide me through the sequences. In several instances, this saved me some frustrations and embarrassment. For example, the instructions say to sheet the top of the fuse in the nose area, then to install the tank. Common sense tells you that this is backward. You may want to consider making the tank accessible from the cabin area, or even build a hatch to get access to the area. Tanks do leak, and fuel lines often need replacing.

The same reverse logic was found in connection with the pushrod installation. The kit instructions say to cover the fuse first, then locate and install the pushrods. Few modelers are so proficient and hygienic that they can do an entire radio installation in a finished fuse without getting glue-smudged finger prints on everything. We recommend doing the entire radio installation first, then do the covering. There is plenty of room for the radio in the cabin area, and it is accessible through an openable cabin door.

I would say that these two points are so minor that they couldn't even be considered as negative remarks about the kit. I made absolutely no modifications to the kit, and I've felt no need to change anything after many hours of flying.

As a rank beginner, I'm perhaps the wrong person to be commenting

on a kit. After all, I really have nothing to compare it to. When I expressed this concern to the Editor, he claimed that I had the thought processes backward . . . I was the perfect candidate for a model like the Cub, for I had no preconceived notions about how I thought a model should be built. He said that it's the old-timer builder, with lots of kits under his belt, who insists that he knows better than the kit manufacturers. He changes things. As a neophyte, I was able to complete the project without prejudice. After all, the J-3 is a kit intended for guys like me, I guess.

If I were to pass along any relevant comment on the Cub, it would be that the kit seemed to have a lot of little pieces to it. I realize that there's no way to get the stringer and longeron look of the Cub without an intricate open framework structure. Be prepared to do a lot of gluing, trimming, etc.

Since the wing builds flat, there's little concern for warps or misalignments. The wings slide onto the fuse like a sailplane. The wing struts are functional, and I recommend following the kit instructions carefully to make sure that you get the dihedral and alignment correct. It takes only minutes to rig the model at the field, so don't think that the functional struts are a negative factor. As a

matter of fact, the Cub is one of the most transportable models because the wing does brake down into two components. Always check to be sure that the ailerons are properly connected before flying the model.

As mentioned, covering the Cub is a simple project. Yellow PermaGlos Coverite fills the bill nicely, with Balsarite sealer applied to all the wood beforehand to get better adhesion. Even though I had almost no experience with iron-on fabrics, I had no problems at all with the Coverite. Once completed, the fabric look of this material made the model look most authentic, and no further sealing or fuel proofing was required.

I was undecided as to what engine to use. It was tempting to go for one of the reliable and lower priced powerplants, such as the Enya or O.S. However, something inside told me that having some extra margin of power couldn't hurt on such a high-drag aircraft. I gave the nod to the SuperTiger Schmeurle .45. This is a very smooth engine, with lots of get-up-and-go. With this engine, the Cub will easily sustain inverted flight, while this might not be possible with a lower output engine. The engine starts easily, and has proven to be a very wise investment.

Once the Cub was flown, I realized that I had received a bonus with the J-3. The Cub turned out to be more than the putt-putt model I had first perceived it as. I would have been happy with just cruising around the sky, but Jay showed me that the model was indeed quite aerobatic. He did loops, rolls, Immelmans and inverted flight with ease. Both of us were a little surprised at how well the model flew, especially the inverted flight.

My first opportunity to handle the Cub came quickly. Jay had gotten the machine airborne, trimmed out, and he didn't waste any time giving me a sweet taste of the fruits of my labors. Because I hadn't flown in a while, added to the fact that I had such limited flight experience to begin with, I took some few circuits of the field to get the feel of the Cub. Actually, the model was just as easy to handle as my original trainer. Aileron control was something new to me, but I didn't find it that much different from rudder control. I especially enjoyed the way the plane turned.

It took me a few flights before I felt confident enough to attempt a takeoff by myself. I listened as Jay talked me through previous flights, telling me that he was holding in rudder at this point, or not using it.



The lightly loaded Cub can be a real floater. The paint scheme necessitates only a quick covering job with Coverite.

The wings build in two panels, to facilitate transportation. This is the author's second airplane, ever!



I ran through the takeoff processes thousands of times in my mind, to be sure that I would not have to dwell too much on the mental part of it. When the moment of truth came, I was shocked that it happened so fast, and that I apparently reacted almost instinctively. The J-3 was off the ground before I could even begin to panic. The model was not half the bear that I thought it would be. Only the slightest nudge of rudder as the tail came up was all that is necessary. No rudder was needed in the turns, because there is a slight amount of dihedral in the wings.

Landings are just as easy. The Cub tends to float quite a bit, because of its light wing loading. This drove me crazy from the beginning. My trainer had been rather heavily loaded, by comparison, so I found the Cub whizzing past my head every time I tried a landing. Thanks to Jay standing by my side, the model would eventually land (with him at the controls). By watching him, I saw the proper shallow angle of approach needed to get the J-3 on the ground. By carrying a little power, I was able to get the Cub to settle right at my feet.



It may not surprise anyone to read that I was actually flying aerobatic maneuvers before I had fully mastered the art of taking off and landing. It's probably the security of having lots of air between the model and the ground that makes stunt flying seem less dangerous than the pedantic feats of taking off and landing (which are done right at ground level). The loop was easy to master, but those rolls took a lot of frustrating attempts. Jay explained that a flatbottomed wing doesn't roll well, because the model stops flying momentarily when the wing is inverted. The rolls are almost always egg-shaped and elongated. You have to get the knack of nudging in some down elevator as the model goes over on its back, otherwise you find the plane heading precipitously toward the ground.

The Immelmann is a combination of the loop and a roll. The half loop is easy, but you must not exaggerate it too much, or so much airspeed will bleed off that the half roll out to upright flight will be almost impossible. I have learned to keep the half loop tight, and to anticipate the half roll a little, so that the model starts it immediately upon

Written by
Patrick H. Potega, Executive Editor,
Scale R/C Modeler Magazine



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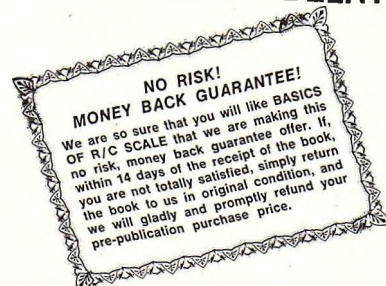
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While you'd never expect the J-3 to be aerobatic, it will do most anything, even very stable inverted flight.

reaching the upside down attitude in the loop. Don't be stingy on the aileron travel, or the Cub will never do this maneuver.

I haven't gotten the nerve to try the inverted flight myself, but Jay makes it look so easy that I'm sure it's only a matter of time. As one can see, the Cub is a rather versatile

aircraft. It's not just the trainer that most modelers would view it as, although it does make a great trainer. It also has some spirit and can get the novice pilot started in rudimentary aerobatics.

As one who came into this project with only a dozen hours of stick time, and the limited building experience of having only constructed one trainer, I think that I can honestly say that the J-3 is a superb second building project. The kit has lots of parts, but it's not complex. Any-

one who can follow instructions and understand a set of plans will not be stumped by the Cub. Once completed, you'd have to look far to find a better behaved airplane. Don't let the taildragger configuration fool you, for the J-3 is a very docile machine on the ground.

If you are new to R/C, or just new to scale, then I suggest that you give the Top Flite Cub a careful look the next time you are in the hobby shop. You can't go wrong with the Cub . . . it's a classic. ☐

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MASTER SCALE MUSTANG (PART 2)

**Jim Meister gives the blow-by-blow description
of the Mustang's first flights.**

By Jim Meister, President of Master Scale

J. R. Naidish photos

In the last issue (February), Jim Meister, the designer of the Mustang, discussed all of the exciting extras which he included in this .90-sized P-51 kit. The model is exact scale, and there are eight large detail sheets and drawings with the kit, as well as 12 pages of photos. There are instructions for modifying Rhom retracts to get a scale undercarriage, as well as drawings which show how to build a scale retractable tail wheel for about a buck!

This installment gives all the details of the Mustang's flight characteristics. Also, Jim has taken his over two years of research and has offered some helpful comments to those modelers who are building the Platt Mustang. Jim caught some important errors in the kit's drawings, and he offers some corrections so that the modelers can modify their P-51s accordingly. We're sure you'll agree, once you have seen and experienced the Master Scale Mustang, that it is probably the ultimate scale kit project. (PHP)

* * *

But, before we get into the flight characteristics of the Mustang, let me diverge to a topic which particularly interests me. It's apropos here, for the Mustang really brings home the proper use of the rudder on a scale model. So many modelers are negligent of the most important control on an airplane that I'm going to spend some time discussing it. On

a full-size aircraft, the rudder is the most used control during and after both takeoffs and landings. How many R/C pilots do you know who use the rudder during the climb out?

We have watched carefully at many scale contests, and we estimate that perhaps only one out of every ten pilots use rudder for anything more than taxiing or maneuvers (some don't even use it during aerobatics!!). We have also noticed that the most prevalent cause of crashes just after takeoff is the failure to use rudder. Many photos of planes caught just prior to impact shows the model standing on its left wing tip, with full right aileron in plain view, but with no rudder command at all.

What caused the crash? As we know, when a plane accelerates, the prop causes an invisible force which acts on the aircraft as if left rudder were being held. During the acceleration and climb out, right rudder must be kept in to cancel this effect. Without the compensation, the model can easily snap to the left if a stall situation should arise.

We have all flown models which seem incapable of making a good right aileron turn at low speeds . . . this is especially apparent if the model is at high power settings. Only the use of right rudder along with the ailerons will save the day.

We suggest that you take one of your old knock-about models to the flying field, and ask a friend to as-

sist. Have him remind you to hold a rudder correction after takeoff, so that you can experience how this helped your flying. It may not take much on many airplanes, and too much rudder can get you into as much trouble as none at all. We especially urge you to learn to use the rudder in crosswind situations (the rule of thumb is to keep the ailerons into the wind, i.e., keep the upwind wing low, and use rudder to steer). Remember that the same effect holds true during the landing approach. Many a time the correct use of rudder could have saved a landing that started to drift.

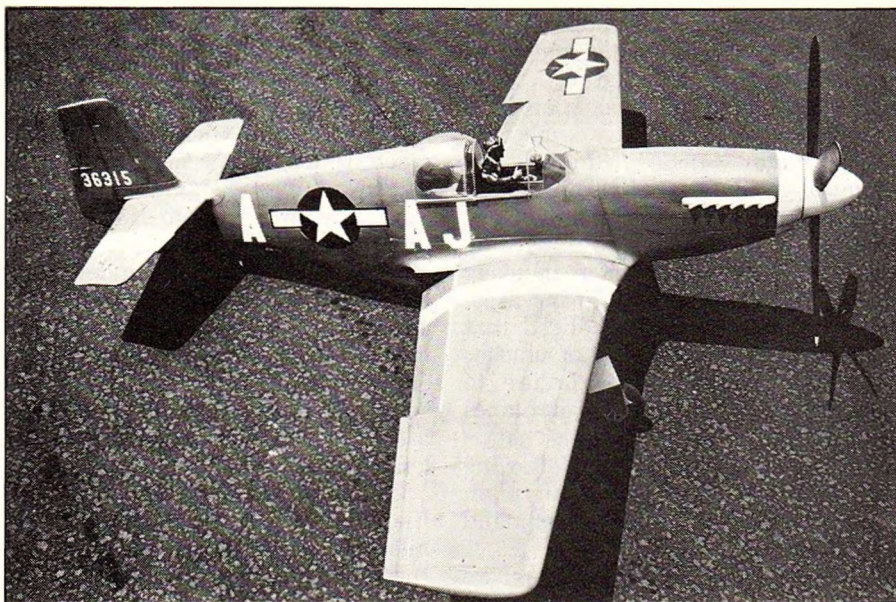
Try flying at low speeds and using the rudder in conjunction with the ailerons to make tight turns without snapping into a potential spin. This maneuver is helpful for saving those low level flameouts just as the model passes over the end of the runway.

Now that we have our little lesson for the day out of the way, let's proceed with the flight report on the Master Scale Mustang. The word about our new project had spread so much that we actually had to take the three days prior to the maiden flight to inform everyone of the event. There was quite a crowd on hand on the all-important day.

Our experience has been very predictable with every new model we've

The .90-sized Mustang is one of the most accurate representations of the fighter ever done.





With functional sliding canopy, working retracts (the doors cycle separately), and even functional oil cooler doors, the P-51 makes quite a showpiece.

ever test flown . . . Murphy's Law always prevails and at least one emergency occurs. Typically, it's something like a retract failure. The P-51 was no exception.

The wind was blowing at a constant 15 mph down the 5,000 foot runway at Camp Pendleton. It was decided that the gear would remain down during the first flight, just in case. Even with a strong wind, the model still handled well in the cross-wind taxies.

As the Mustang accelerated, the tail came up on cue. A few feet further, and the wind caused the model to takeoff all by itself! A climb to a safer altitude was immediately initiated, to get out of the turbulent wind near the ground. Smoother air was found at a higher altitude, and the preliminary stall tests were conducted. Even in the dirty configuration, with full flaps deployed, the P-51 remained as steady as a rock. The ailerons remained effective throughout the stall.

Then the bad luck began to catch up. The engine mysteriously quit, and we were setting up for a dead stick landing before we knew it. We mistakenly left the flaps down, and

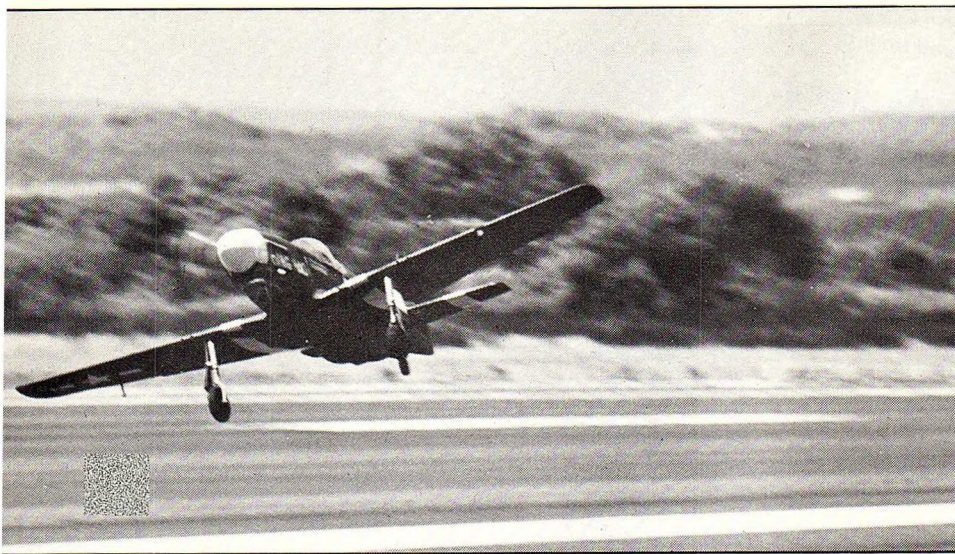
the Mustang glided very well even in this configuration.

We changed the plug and, without refueling, headed for the blue. The second flight was selected for trying the gear up. We cycled the gear, and enjoyed watching the gear doors cycle open to accept the retracts, then swing shut again. We performed this maneuver at half power. As we advanced the throttle, the nose kept trying to come up. We found that we had to carry a lot of down trim (about 1/8") to compensate. We suggest taping a reminder of this to your transmitter.

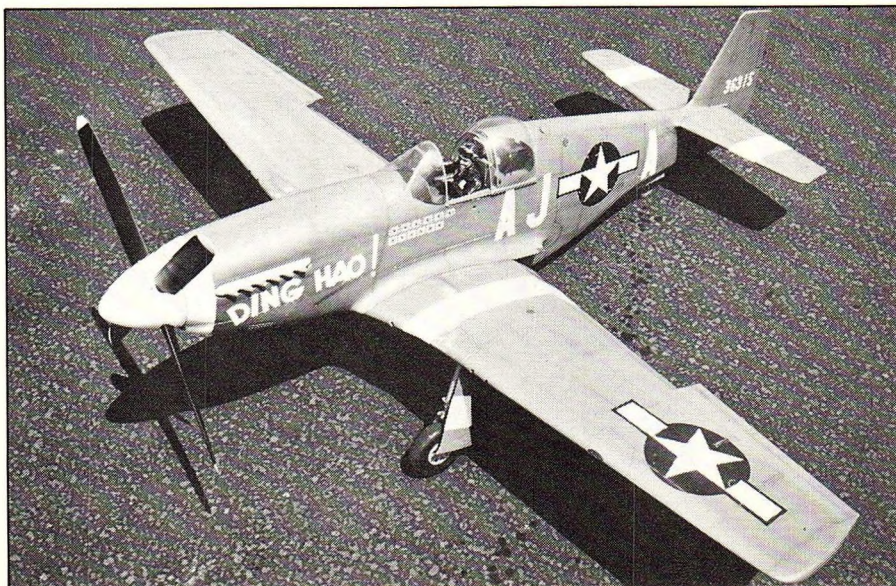
The roll rate is very scale-like. You'll find that the hidden aileron linkage system limits the amount of



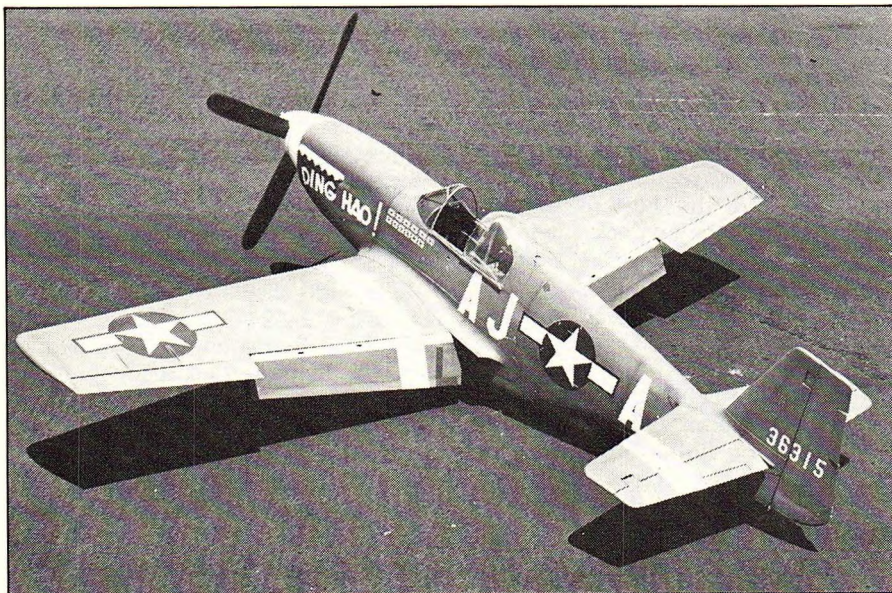
The whirling static prop adds to the illusion of reality. The plans even show how to fabricate that.



Airborne on its first test hop, the Mustang proves its mettle.



The Master Scale plans are some of the most complete ever produced, detailing every exterior and interior feature of the model.



available throw, so don't plan hot-dogging any aerobatics; but, for sport flying or contest work, the aileron sensitivity is perfect. We were concerned about the laminar airfoil, since we had heard so many nasty things about how they behave on models. We were delighted with the way the wing performed. There were no tendencies for premature stalls, or nasty handling characteristics. Contrary to our expectations, the wing does not have to fly at high speeds; as a matter of fact, it is one of the best slow speed wings we have flown.

Our bad luck was still holding, as the engine again mysteriously stopped. Another flawless dead stick landing pursued. We discovered that those .90 engines really gulp the fuel, and our 7-8 minute flight had totally drained the tank (which we had neglected to top off after the previous short hop). We judged the Mustang a total success, and subsequent flights reconfirmed our opinion.

As we reflect back on the 28 months of research we devoted to the project, we feel that it was time well spent. We have what we consider to be the most accurate model and 5-views in the world. We stand by our original claim that there exists today no drawing, plastic model or R/C kit which is as accurate as the Master Scale Mustang.

We have examined over 200 photos of the full-size Mustang, and we have found mistakes in every other Mustang model on the market. We recently had a chance to examine one of the latest P-51 offerings, which also coincidentally is .90-powered. We don't intend to throw stones at another modeler's work, but we do take exception to some of the claims that their project represents the "perfect Mustang." Let us explain:

When the Merlin engine was first mated to the P-51A airframe, it was too deep at the firewall. This resulted in a rather unsightly bulge under the cowl ahead of the wing. It looked as if the wing was recessed. The engineers solved the problem by simply lowering the wing about four inches. The cockpit was then four inches deeper (the pilots loved the extra leg room). This new kit we're evaluating here neglects this subtle change, and the P-51A and B versions are shown the same on the drawings. We estimate the error on the model to be about $\frac{3}{4}$ " (about a 7½% error factor). When modeling in "exact scale," this is an intolerable error.

We also detected a gross error in the P-51D side view. The drawings

SMITH MINIPLANE

(Continued from page 41)

"hard" part of the entire construction. This will be explained in further detail in the sequence of construction.

The way we usually start a scratch-built plane is to cut out all of the pieces, so that we have a "kit" laid out before us.

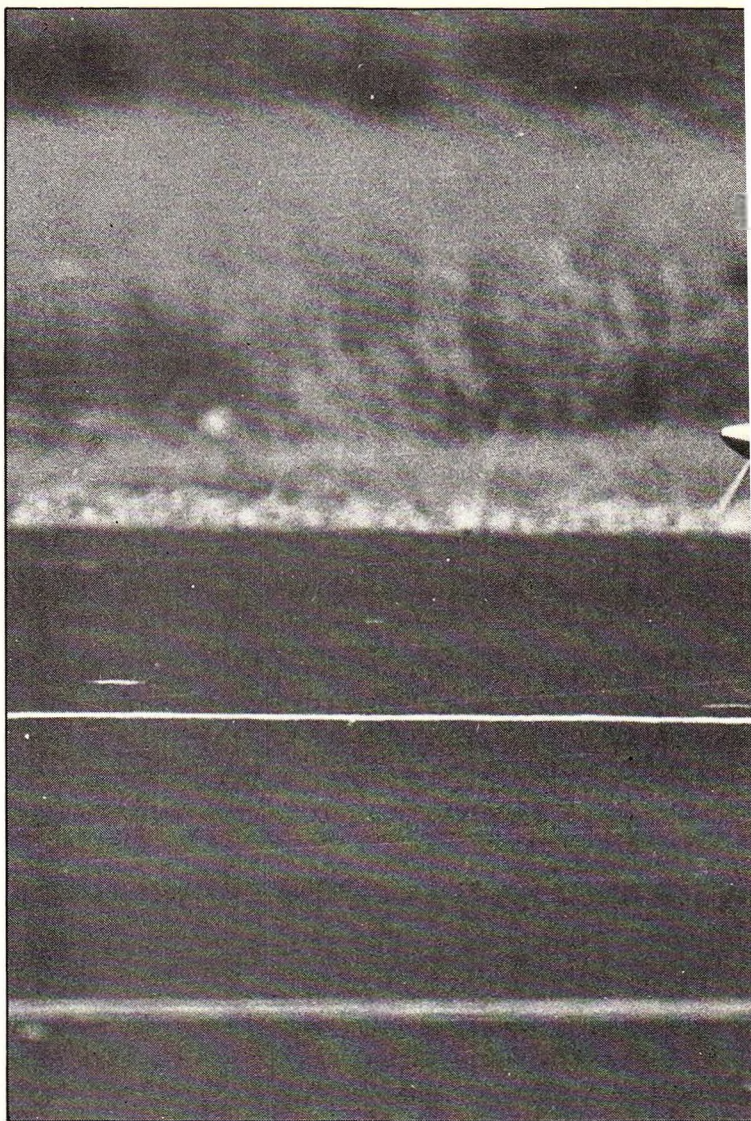
Start with the top wing, by laying each rib down on the plans and sliding a 3/16" sq. strip under the ribs until they lay true on the plans. The three center ribs should be cut off, as shown, and the studs then form the W-2 ribs. Construction is standard from this point, except that, if you decide to sheet the top center section before you flip the wing over, be sure to install and glue the blind nuts for the wing mounts before permanently installing the plywood plates. The ailerons are cut out after the wing is framed up. Glue on the top and bottom leading edge aileron strips, using the dimensions shown on the plans in Step 1. Cut directly behind the two main spars, and remove the ailerons. Then trim the remaining wood, as shown in Step 2. Add the sheeting to the back of the spars and on the leading edge of the ailerons, as shown in Step 3. Now you are ready for hinge installation.

The bottom is the same, except that there is a dihedral brace. You must also decide whether to use the bellcrank on 1/8" torque rods, if you are building the four-aileron version.

Begin the fuselage by gluing the inside and outside front doublers in place. Making sure that the outside doubler protrudes beyond the fuselage sides, to allow for the plywood plates. Add the 3/16" sq. inside stringers. Place the fuse sides upside down over the plans and pin down the front one-third. Cut the 3/16" sq. horizontal pieces to the proper length, as shown at locations F6, F7, and F8. Draw the fuse together at the rear. You must sand an angle here, in order to be able to draw the fuse into the proper width.

The 1/8" stringers can be added at this time. Just behind F1 and F4, glue in some scrap balsa to hold the fuselage shape, so that it can be removed from the building board. You can now glue in F1, making

62 scale r/c modeler



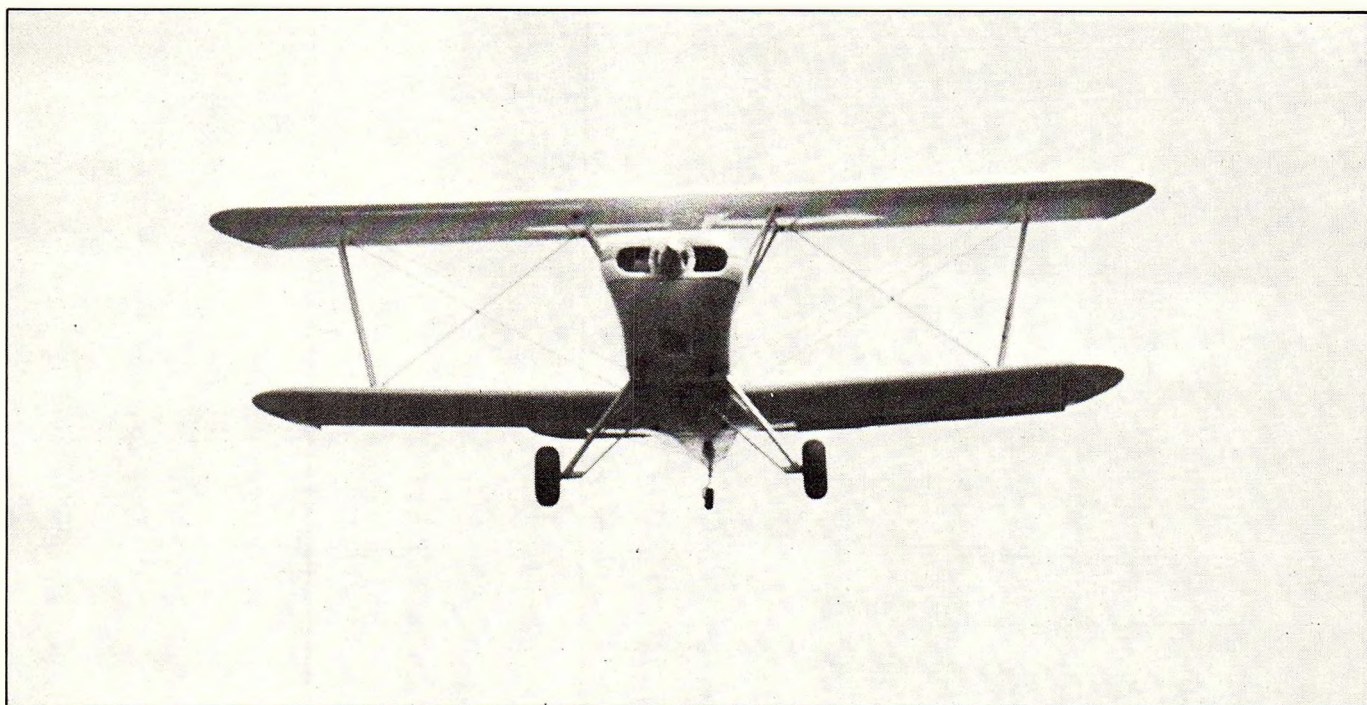
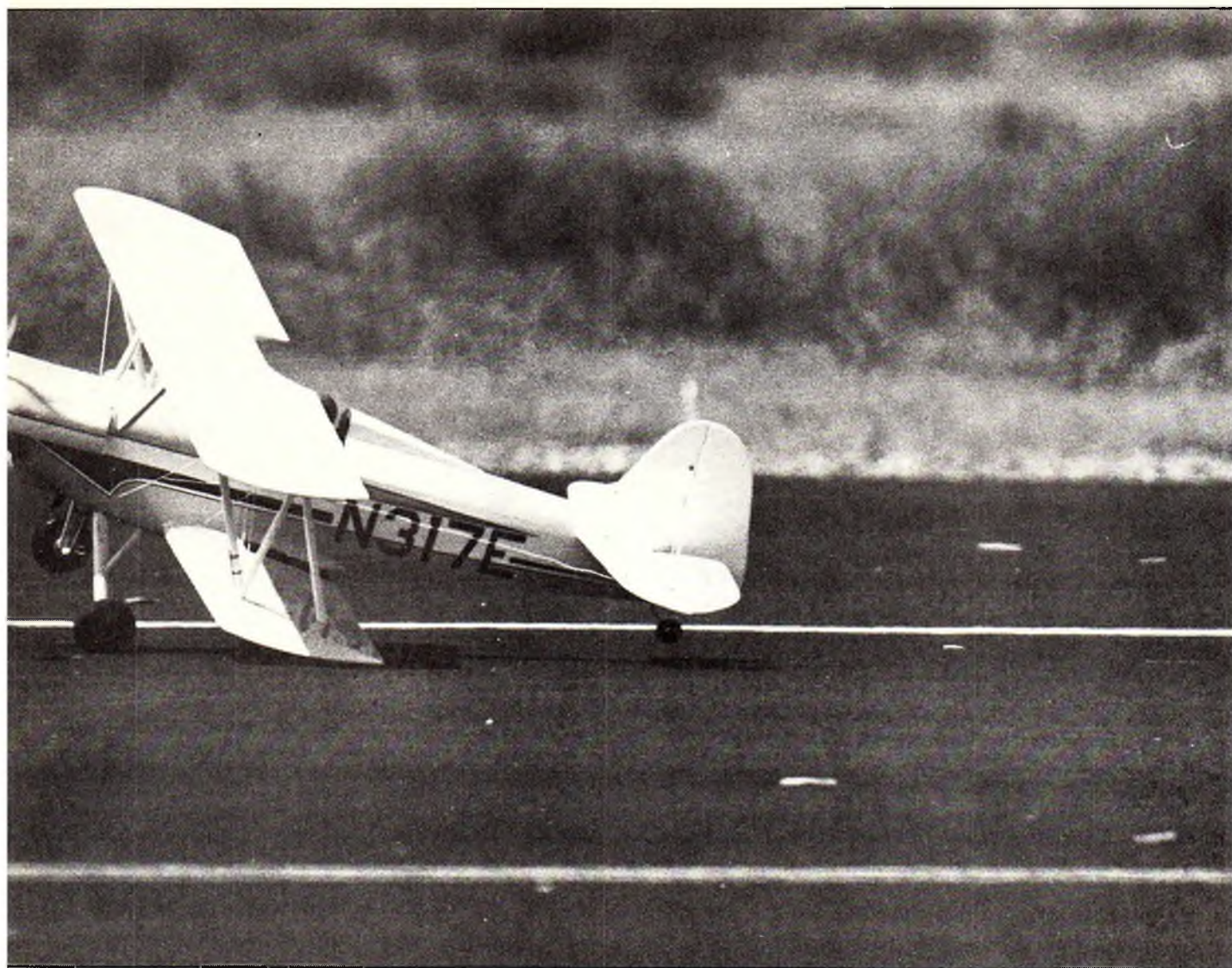
Typical biplane landing! Even with the wide landing gear, a crosswind will still raise a wing tip.

sure that it is square with the fuselage. Separately construct the front turtle deck frame, as an assembly, directly on the plans. Do this by placing the two 1/8" plywood plates over the plans, adding F2, 3 and 4, as well as the hardwood blocks. When dry, remove from the plans, and glue to the fuse. This guarantees that the cabane mounting holes will be true. Add the bottom plywood plates, rear turtle deck stringers, front turtle deck sheeting, and all the other remaining pieces.

Bend the landing gear wires as shown, then bind and solder. Sandwich with the wood sizes shown on the plans, and sand to a streamlined shape. The dummy brake housings were made by hollowing out appropriate size dowel stock. The "N" struts are constructed in a similar manner, except that the brass attachment tabs are added before they are covered with balsa. Even though

a balsa cowl will be discussed, you can save a considerable amount of work by ordering a fiberglass one. To build the cowl from balsa, start by gluing C4 to the center of C3. Add 1/4x2" supporting strips to the sides of C4 and butt them down to C3. This will form a solid structure which will enable you to glue all three C1s and C2. You finish the basic structure by planking and sheeting the assembly from C2 back to C3.

The side sheets can now be added by using 1/32" plywood, and forming them to match the shape given on the 3-views. The scoop and bottom flare on the cowl are made by adding balsa blocks. After the cowl is shaped and the final sanding is done, apply three layers of light fiberglass cloth and resin to the outside of the assembly, doing one layer at a time and sanding as each dries. When you are confident this will



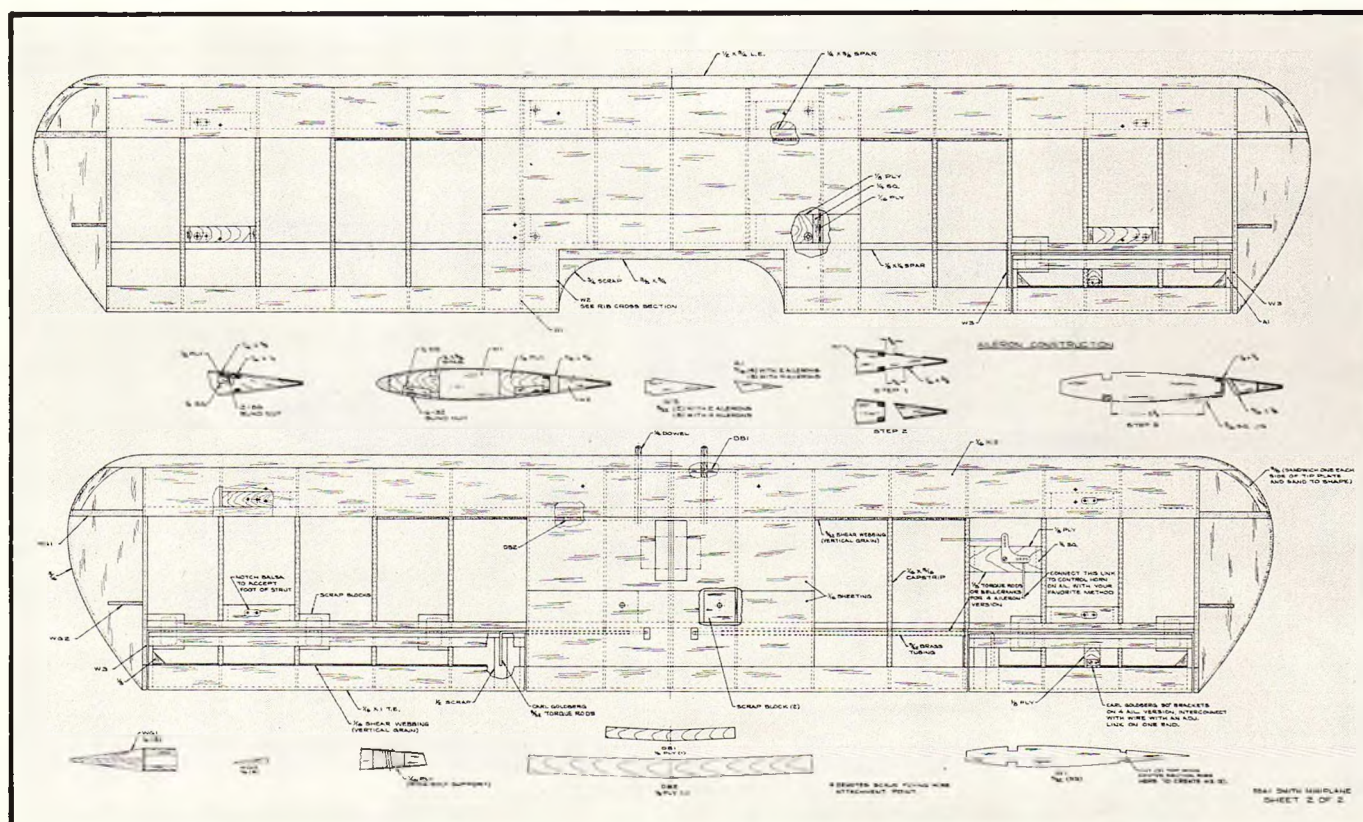
Comin' at 'ya! The high drag of the model can be overcome with engines as powerful as an .80.



structure, were covered with Super Coverite. Using K&B Superpoxy clear, all of the fabric and wood surfaces were given a medium to heavy coat. The wood surfaces are then lightly sanded with 500 wet or dry (we used wet). Sand the fabric surfaces until, when held up to a light, about 70% of the surface is smooth. We now used Hobby Poxo Filler on the wood surfaces, using the directions on the can. Let this dry overnight, and sand with 220 garnet paper.

If the grain is not filled to your satisfaction, repeat the preceding step. Apply to all surfaces a heavy coat of K&B primer, and wet sand until glass smooth with 400 wet or dry (used wet). Now apply the base white coat, using K&B. We have found that by thinning the white down 125%, we get the best spray consistency. Lightly sand this to remove dust or heavy orange peel. Mask off the design you have chosen, and apply the appropriate colors. Lightly sand all trim edges with 600

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(used wet). This will dull the trim edges, but do not fear because a final coat of K&B clear will return the gloss.

If you use the CG shown on the plans, you will have no trouble flying this plane. We were able to get by without adding any lead to the nose of the aircraft. As we have found with other biplanes, it is best to give it a good ground run before trying to lift off, otherwise there can be a torque problem. Of course, if you have built with care and kept it light, it will fly better.

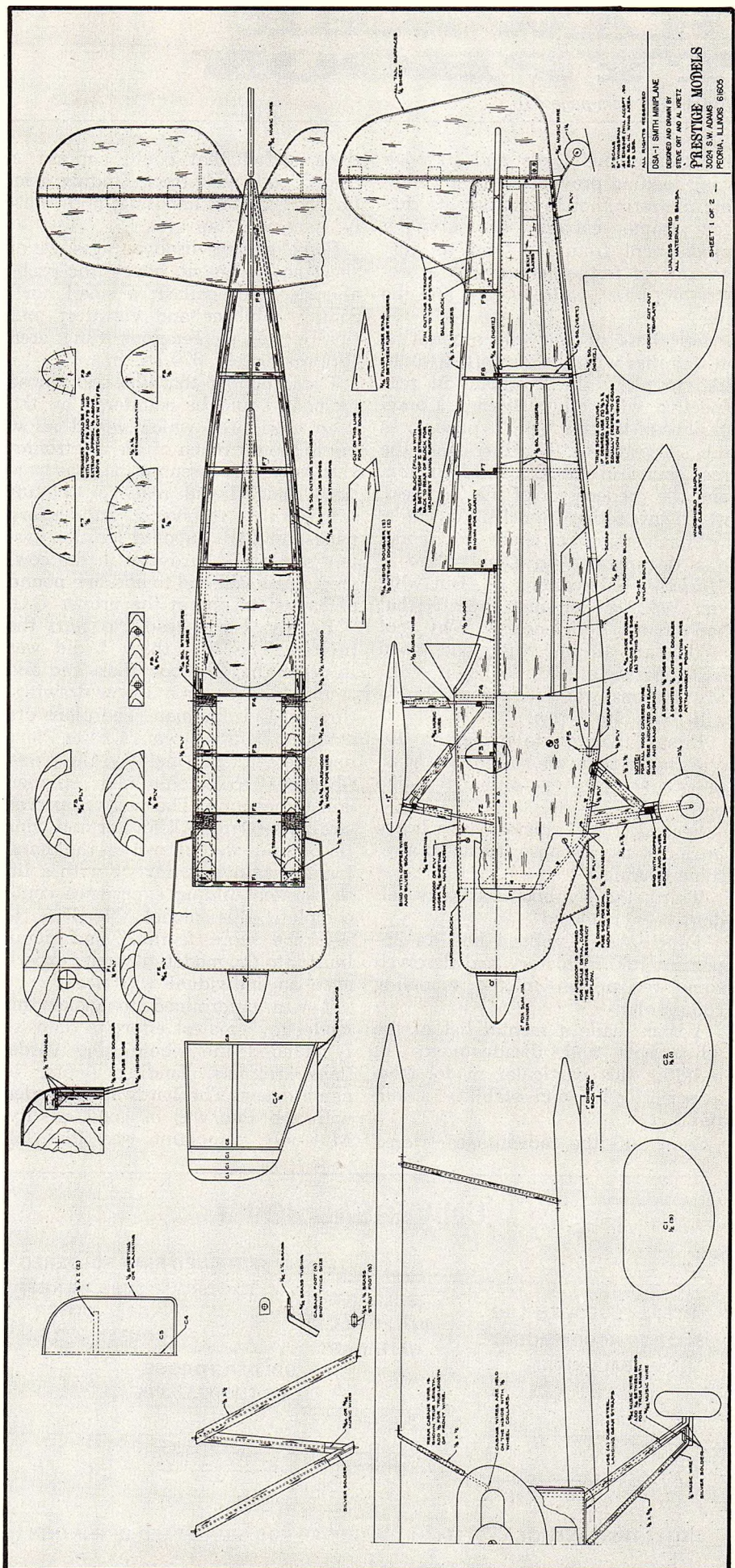
If you are building the model for scale competition, then you'll want to stick with the authentic two-aileron version. Don't expect this one to be too hot in the roll department. Crank a lot of movement into the ailerons when setting up the model . . . you'll need it. That's not to say that the plane isn't maneuverable, for it will do anything in the books in this configuration. It's just that, once you have flown the four-aileron mode, you'll be spoiled forever.

When the top wing ailerons are added, the Miniplane becomes aerobatic with a capital "A." The rolls occur with the slightest hint of a control movement. The snaps are truly amazing, and we guarantee that they will take your breath away. Because biplanes inherently have such high drag configurations, responsive controls are important. This is especially true with ailerons. If you are out to bore graceful holes in the sky, then we would seriously consider the benefits of the four-aileron version. give you the strength needed, remove all of the internal pieces, except the planking and sheeting. The nose section must then be hollowed out.

If you know how to make your own plugs, you may use this assembly to do so. Form the cabane wires as shown, and then shore up the fuselage so that it is square to the building surface. This will enable you to take measurements in order to align the top wing. Install the cabane wires and slide on the brass tabs. We found by installing 1/8" wheel collars under the tabs that it was easier to align the top wing. After it is properly aligned, solder the brass tabs in place and remove the collars by slotting them with a Dremel cut off wheel, and splitting them with a screwdriver. Install the cross wire on the cabanes with the wing still in place. Wrap all wires with wood and sand to shape.

You may use your favorite method to finish the airplane, or you may use the method we used. The wings and fuse sides, which have an open

(Continued on page 74)



HAWKER TYPHOON

(Continued from page 45)

ing tremendous loads and its high wing loading provided a steady aiming platform, not to mention its rugged frame capable of surviving punishment from flak and its vast amount of firepower capable of destroying tanks, railroad cars, and the like.

For those of you who are not at all familiar with the aircraft, I would like to place the Typhoon in perspective with other Sydney Camm designs of the era. The Typhoon was the successor to the Hurricane, the *real* savior of the Battle of Britain, and the predecessor of the Tempest, which saw action from 1943 onwards.

The version I chose to model was documented in *Camouflage & Markings* publications #4. But why, you ask, model an aircraft that had many deficiencies? Why not model an aircraft that had good flight characteristics to begin with? My reasons were numerous, but I will only cite a few:

First, I wanted to model an aircraft other than the stereotype Mustangs and Spitfires—although I like both.

Second, the Typhoon has always intrigued me, because it was so awesome looking.

Third, the Typhoon has very seldom been modeled.

Fourth, the Typhoon had an important role in history and deserved some recognition in the modeling community.

I then made a mental list of the advantages and disadvantages of building this particular model from a performance and stability standpoint.

Some of the advantages were:

thick airfoil that could support a heavy load; wide-track landing gear for good ground handling; and finally, generous flap area.

Some of the disadvantages were: short nose moment, hence, the probable need for ballast; a small horizontal stabilizer and elevator; and finally, not so generous wing area (approximately 670 sq. in.).

I was hoping that the short nose moment would be countered by the deep cowl area which would allow me to mount much of the electronics vertically. My assumption was partially true. I did manage to stuff servos, the receiver, two battery packs, an L&L onboard ignition system and other hardware in the cowl area, but I still had to add one pound of ballast to obtain the proper C.G.

Finally, I was ready to start the project. The first thing I did was to order the Typhoon Plan Pac and *Aero Modeller* scale 3-view drawings through Bob Holman. The plans are actually Dennis Bryant's Elite Plans and the Plan Pac included the plans, fiberglass cowl, aluminum spinner, and the canopy. The plans appeared straightforward. All former and wing rib outlines were drawn on the plans. I am certain that anyone with a little scratchbuilding experience could complete this model. Needless to say, the more features and detail built into the model, the more experience an individual will need.

I was determined to make this model my greatest effort to date, so I included the whole nine yards: flaps, retracts, landing lights, to name a few. The hardware included with the Pac was of good quality.

My only complaint was that, al-

though the canopy was true to scale it was a bit flimsy. I had all intentions of incorporating functioning car-type entry doors in the model, but because the canopy was so flimsy I felt that the canopy would require too much beefing up to make it worth my time. I also reasoned that car-type doors would impair the structural integrity of the fuselage and would require more beefing up. In any case, I convinced myself I really didn't want to incorporate functioning doors.

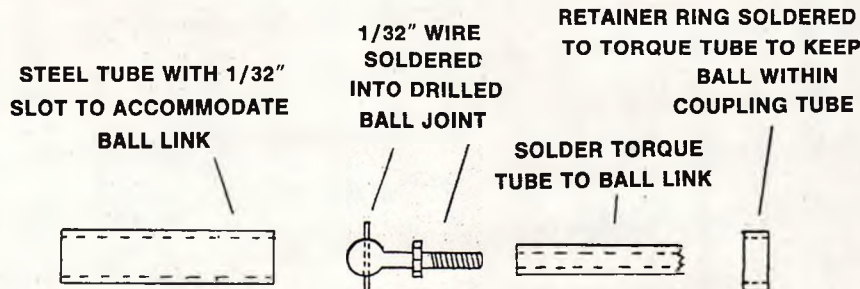
Aero Modeller drawings are a must if details are to be added to the airframe. Cockpit, engine, and retract details are superb. In fact, after completing the basic structure, I folded up the Dennis Bryant plans and referred to the *Aero Modeller* drawings and *Camouflage Markings* publication for the remainder of the aircraft. Enough on that!

Next I bulk ordered my balsa from one of the discount houses. Normally I would have purchased it from my local hobby dealer, but there isn't one within 30 miles of my home, so I had little choice. The big disadvantage of bulk ordering is, obviously, that you cannot hand select the balsa, so you either wind up ordering twice as much and hand selecting from that quantity, or you order only what you need and make do. I opted for the former.

Before I began writing this article, I debated on how detailed I should get with the construction aspects and decided not to get too deeply involved. As I mentioned before, the plans for the basic model are straightforward and should present little difficulty. For those of you who are more experienced builders and desire to go a bit crazy like I did, I didn't think it necessary to go into too much detail except for a few problem areas I encountered. Although the plans are scale, my aircraft is strictly Stand-Off Scale, for I have neither the ambition nor the talent to build scale. This is especially true inside the cockpit. Cockpits are my nemesis. For those more ambitious types who want to add rivet detail, functioning panels, etc., be assured that the plans are accurate.

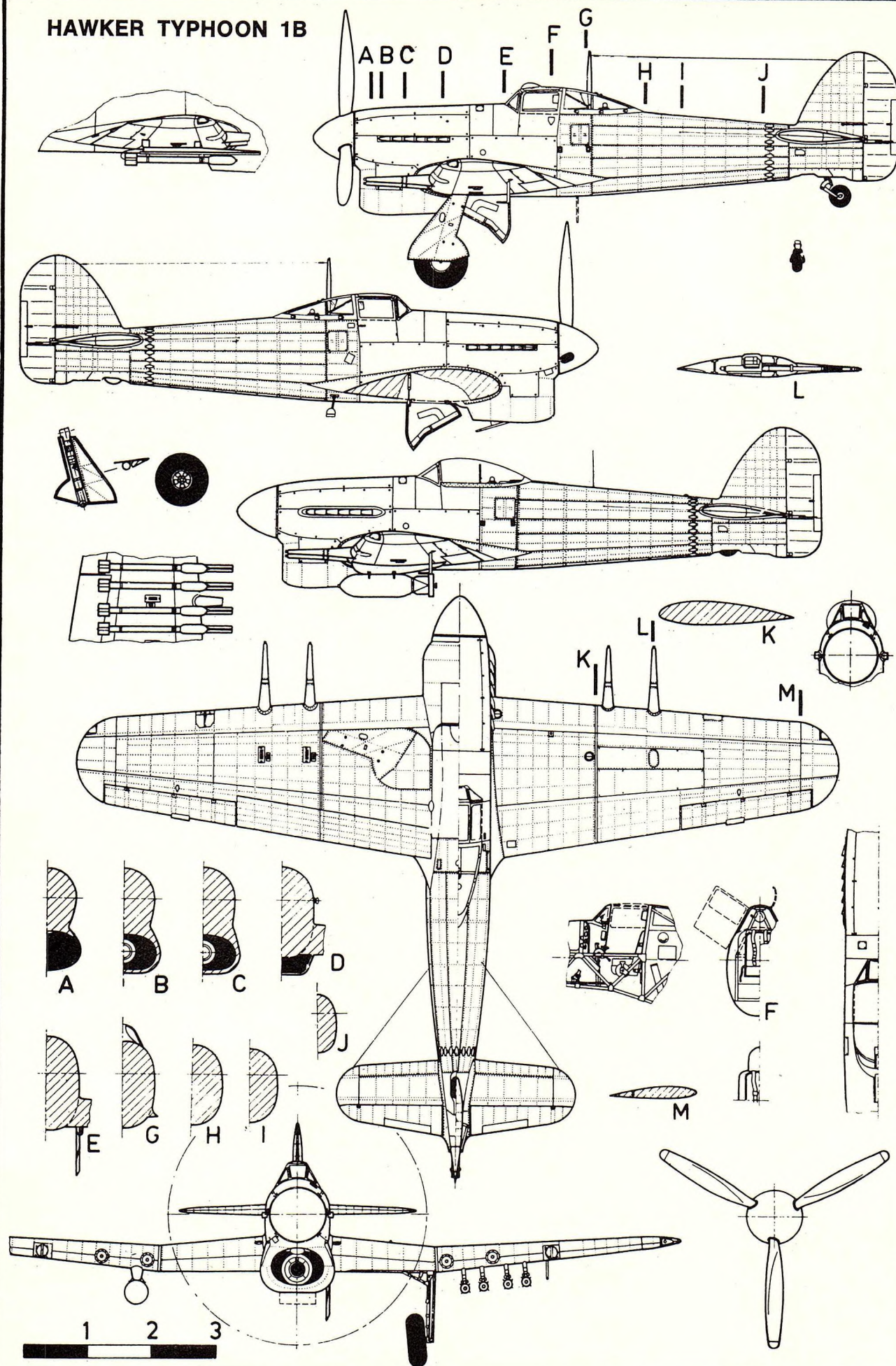
The fuselage is built around a "crutch" which pretty much ensures that the fuselage will remain straight. The formers, side pieces and motor mount section were glued in place and the whole structure was placed in my Adjusto-Jig. One would be hard pressed to keep the fuselage from warping without some sort of jig. The side and bottom sheeting was soaked in a weak solution of

UNIVERSAL JOINT

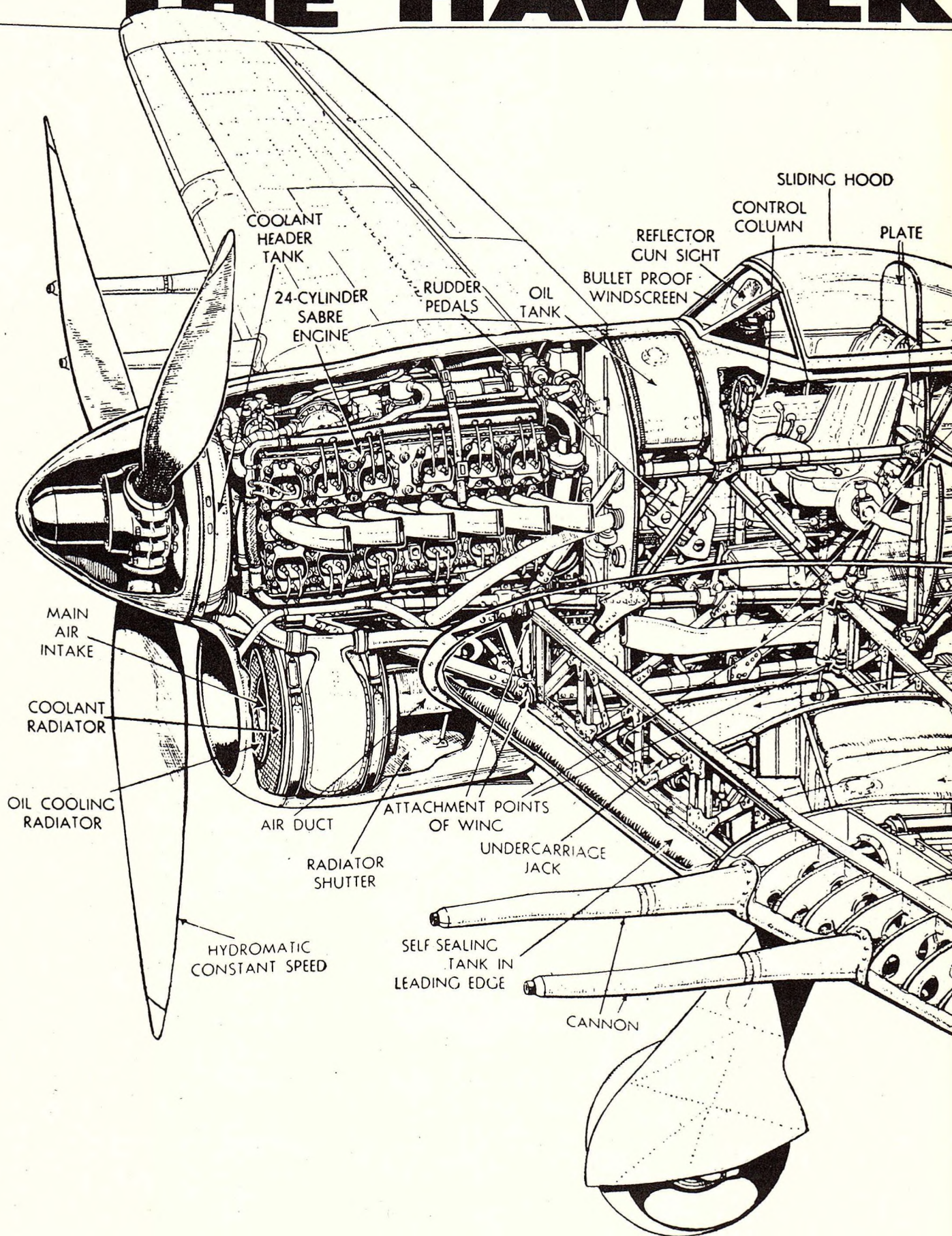


NOTE: THIS LINKAGE SYSTEM NOT INTENDED FOR HIGH SPEED OPERATION

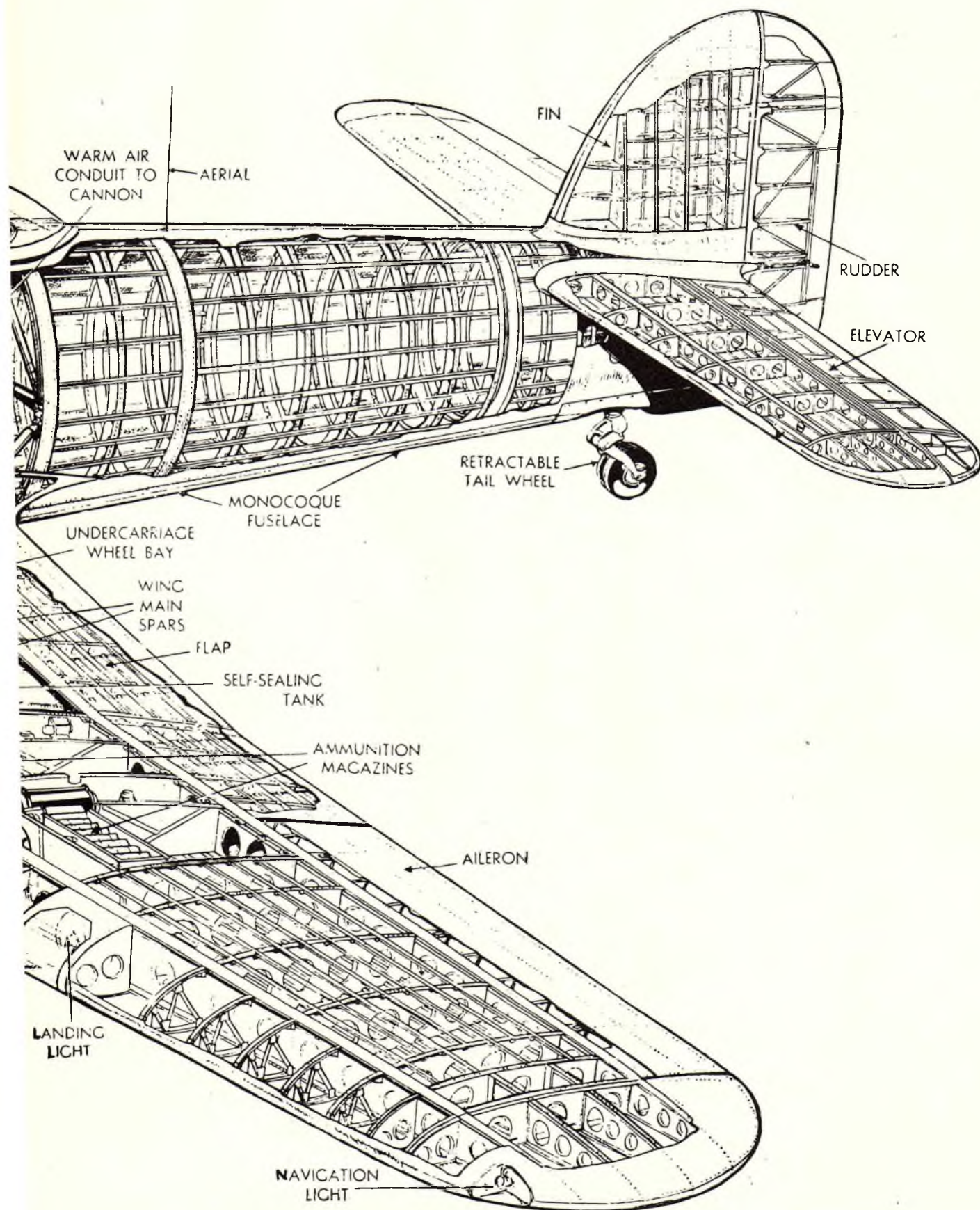
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ammonia and hot water, then taped in place until dry. The sheeting was then glued in place, save one bottom piece for access to the rear portion of the fuselage which must be available for control rod installation. This is one area where I deviated from the plans which show the fuselage covered with 3/8" strips of balsa. This process works well, but adds weight and takes forever! If you have never preformed balsa sheeting before, give it a try. You'll be surprised as to how well it bends around compound curves. Needless to say, keep the rear portion of the fuselage light!

The other area where I deviated from the plans was in the method of wing attachment. The plans show the rear portion of the wing bolted to the fuselage with one bolt. I opted for two, and I recommend you do the same.

If you decide on a retractable tail wheel, with internal control linkages, and now is the time. The retractable tail wheel mechanism design was based largely on the full-scale version as shown in the *Aero Modeller* drawings. I took certain liberties, of course, in redesigning it for use in my model. I even borrowed the method used for retraction and ex-

tension in the full-scale version, except that mine is activated mechanically and not hydraulically. My friend, Al Gamma, fabricated the mechanism for me and I must say it is a work-of-art. Al is a jewelry designer by profession, so you can imagine the workmanship that went into this mechanism. Unfortunately, because Al is a jeweler, he was limited to the type of material he could use in constructing the mechanism. My choices were gold, silver, platinum or brass. Needless to say, I opted for brass.

As you might surmise, the mechanism turned out fairly heavy which caused me grief later with the aircraft's C.G. But that's another story. To continue, all of the surface controls are internal and activated by either push rod (flaps and elevator), cable (rudder and tail wheel) or torque tubes (ailerons). In the real aircraft, all of the flying surfaces were metal covered, with the exception of the rudder which was fabric covered. The only change I made was to substitute wood for metal.

The empennage is straightforward. Make sure the horizontal stabilizer is mounted at 2 1/2 degrees positive incidence, as per instructions. At this point in the construction, you

will have to use a little foresight to determine when different components such as the horizontal stabilizer should be mounted to the main frame. This is where the experience I mentioned in the first part of the article comes in handy.

The wing is built in three sections: center, left and right panels. The sections are then joined and the hardware installed. I chose to follow the plans and not build washout into the outer panels, because I intended to outfit the wing with flaps. From articles I have read, flaps, in essence, serve the same function as washout, by allowing the center section of the wing to stall before the tips. If you choose not to incorporate flaps, then washout on this type of aircraft is a must! I recommend at least two degrees.

If you decide to use external linkages at this point for the ailerons and flaps, no problem. Mount two bellcranks for the ailerons and four for the flaps. Yes, four! Remember there is a flap component on each side of the dihedral break for each panel. I know of no better way to rig up the flaps for effective operation than by bellcranks. Each flap component, in turn, receives its own horn with adjustable clevis.

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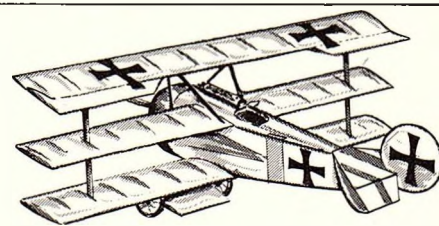
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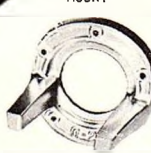
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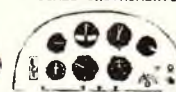


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The flap horns on my Typhoon face upward into the wing, just as the real aircraft. Torque tubes are used for aileron control. The problem I encountered using torque tubes involved the dihedral break. How does one bend torque tube around a curve without using flexible cable such as speedometer cable? Answer: build the torque tube in two sections, using a universal joint as a coupler at the break!

I constructed my own universal joints from bits and pieces of material I had on hand. In fact, my universal worked so well for its intended purpose that I have included a sketch of it. Sterling makes a boat universal for .049 motors that could be used, although it is a bit of overkill.

Split flaps are always difficult. The objective is to make them rigid, but light. The flaps on the Typhoon were made by sandwiching a piece of 1/16" balsa in between two pieces of 1/64" ply to give the desired 3/32" thickness. I used contact cement to join the pieces of the laminate. This proved to be a mistake. For some reason unknown to me, the laminated surfaces seem to be sliding on one another causing the flaps to warp. Fortunately, by clamping them shut they warp back just as easily. Next time, I plan to use epoxy to join the pieces, or increase the thickness of the plywood, or both.

The landing gear doors were made using fiberglass cloth and polyester resin. I tried other material such as metal and wood, but for a variety of reasons found none better than fiberglass for ease of fabricating and durability. The method I'm about to describe is tried and proven, and I highly recommend it. Very simply, before the L.G. cutouts are made in the wing sheeting, heat shrink a piece of Monokote over the area that is to receive the retracted L.G. Tape four layers of 2-3 oz. cloth over the general area slated to receive the gear.

When dry, peel off the fiberglass laminate from the Monokote and sand smooth. Finally, trace out the door design on the fiberglass and cut it out by whatever means. You can now be assured that the doors will fit flush over the opening when the gear are retracted. Everyone has their own means of securing the doors to the landing gear. The method I used was to solder metal tubing standoffs to the gear then tap them to receive a 2-56 bolt. Rubber tubing was then placed over the standoffs to act as a vibration damper. The pants were then bolted to the standoffs, pressing down slightly on the tubing.

While I'm on the subject of retracts, those of us who build 1/8 and 1/7-scale in the 9- to 12-pound range are really hurting. There are no commercially available retract systems that can handle this weight class. The normal 1/8-scale gear system simply cannot handle an aircraft

that weighs more than nine pounds without flexing all over the place, especially on grass fields. Drilling out the mechanism and fitting it with 3/16" struts, such as I did with my Rhoms, helps but isn't the final solution.

One-fifth scale gear is obviously overkill for 1/8 and 1/7-scale. The only practical solution is for one of the manufacturers to design a set of heavy duty retracts utilizing oleo struts for 1/8 and 1/7-scale. I would like to add at this point that most 1/8-scale mechanisms today can handle the weight impact without failing—it's the struts that cannot. Enough on that subject.

Landing and wing tip lights were added to lend a more scale-like appearance. The lights are activated when the master switch is on and the flaps are lowered. Only this combination will allow the lights to work when the flaps are raised the lights

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are extinguished. The lights are very noticeable on heavily overcast days and/or at dusk. The only penalty was about three additional ounces, fortunately, it was all ahead of the C.G.

Moving right along and skipping a few steps in-between, such as mounting of the hardware, the complete aircraft is sanded. A common mistake a lot of modelers make here is that they sand with too fine a grit sandpaper. This is totally unnecessary, especially if you plan to use fiberglass and resin. Typically I will start with #80 grit aluminum oxide paper except on open framework, then jump to #260 wet-or-dry, that's it! Job complete.

Next I applied 3/4-oz. cloth and polyester resin. When thoroughly dry I sanded with #80 paper. Another thin coat of resin was applied and sanded with #320 wet-or-dry. Automotive primer was sprayed on and sanded down with #400 wet-or-dry. Aerogloss flats were used by first spraying on the lightest color then progressively working towards the darkest color. Typically, only one coat of the darker colors are needed, for they are well pigmented. I enjoy working with Aerogloss flats because of their consistency and adhesion properties.

One common misconception here (on the East Coast anyway) is that Aerogloss is a nitrate-based paint. I can assure you it is not! At times I am forced to mix Aerogloss with Sig (a butyrate) to obtain a desired color, and it mixes perfectly! If Aerogloss was a nitrate, it most definitely would not mix with a butyrate. In any case, I don't know what base Aerogloss is, but it is not nitrate. Before I leave this subject I must mention it is not good policy to intermix different brands or types of paint, and should be avoided whenever another alternative is available.

All the emblems were painted on, using a low-tack vinyl shelf paper as

a mask. After years of trying different methods on a variety of aircraft, I found shelf paper the best. If you decide to give shelf paper a try, make sure you purchase the low-tack variety or you will wind up removing the finish from your model. A mask is needed for every color in the emblem. Just remember to obtain the correct shade color for all the emblems and to insure uniformity, a white base coat must first be applied. Black is the only exception. For the straight lines such as the D-Day Invasion stripes, I used plain vinyl tape.

When the aircraft was completed I was delighted to discover that it only weighed ten pounds. I figured with all the extras I added such as cockpit detail, on-board ignition, a non-functional radiator, etc., I was very lucky. That was before I checked the C.G. and wound up adding one pound of ballast to the nose to correct a tail heavy situation. I knew that brass tail wheel assembly would get me in the end! So now the plane weighs 11 pounds, which results in a wing loading of approximately 38 ozs./sq. ft. Just what I wanted! A high wing loading, just like the real thing! Sure hope those flaps are effective!

Now for flying the monster . . . but, first I must set the stage. I didn't want to test fly the plane at the club field, because our paved runway is only 250 ft. long. I wasn't sure it would be long enough to afford me a safety margin in case I had to abort the takeoff. That's why I chose Lakehurst Naval Air Station, which boasts a three mile long reinforced concrete runway used to test carrier aircraft.

The plan was to have my friend Kevin Robertson test fly the aircraft, while I snapped some in-flight photographs. We arrived at Lakehurst early one Sunday morning. I wanted to get there early to take all my still photographs on the runway. This

accomplished, the next step was to perform some taxi trials to ensure that the plane would track straight and have sufficient rudder control, which it did.

A potential problem was that the landing gear had a little more than normal toe in and were also canted in a little more than normal to allow the gear to fold properly inside the wing. My major concern was that the gear might either fold on take-off or nose over because of the toe-in, or the tire might decide to depart from the rim. Momentarily putting my fears aside, I gave Kevin the go-ahead to takeoff.

The plane was lined up on the runway, the flaps dropped 15 degrees and throttle advanced. As the plane accelerated, right rudder was applied to keep it straight. The elevator remained in neutral. At what I guessed to be 100 feet down the runway the tail lifted. Fifty feet later the plane became airborne and began climbing out at about a 10 degree angle. As the crowd cheered, Kevin hit the retract switch, brought the flaps up and began a slow climbing turn to the right. It was truly a sight to behold! Meanwhile, I was busy taking pictures with my Minolta equipped with a 200 mm lens. For those of you who have never taken in-flight shots before, it was difficult to focus on an object moving as fast as my Typhoon was!

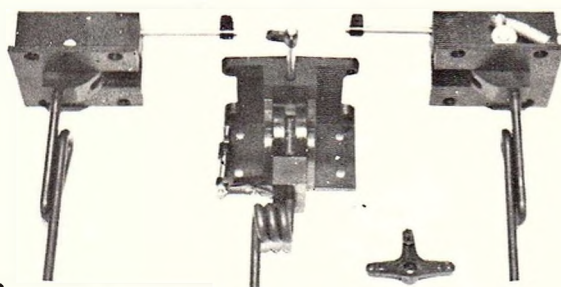
To continue, Kevin finished trimming the plane and commented that it was very stable. He then began making some passes at about 75 feet to afford me the opportunity to get some good shots. At this point the plane had been up for about four minutes. Then it happened! On the downwind leg of one of his passes the Fox 78 began to overheat. He quickly throttled back and hit the retract switch. The plane at this point was about 50 feet above the grass that lined the outskirts of the pavement. A shallow left turn was

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then initiated, when the motor quit entirely.

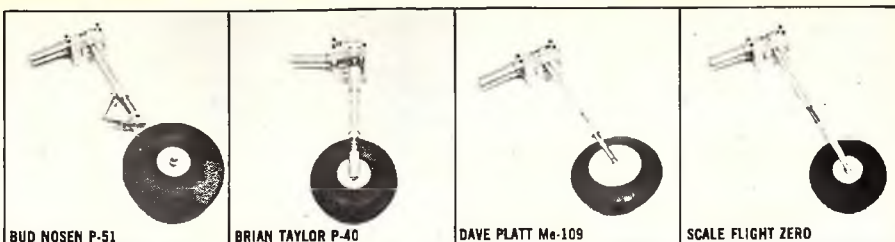
At this point, I knew it was all over! No way was he ever going to nurse it back to the runway. The plane pancaked in about 30 feet short of the runway and, although the damage to the wing was extensive, it looked repairable. One of the retracts was also broken. The fuselage and rudder had relatively minor damage. In fact, the prop didn't even break! The damage to the plane would have even been less if the gear were retracted prior to the crash because the gear caught on some high weeds and caused the nose to slam down hard. My pilot, however, was too busy trying to keep the plane airborne to think of retracting the gear. Remember! When you're heading for the rough, retract those gear! And that's the name of that tune!

The motor overheating was attributed to three causes: the needle valve was set a bit too lean, the exhaust manifold was too restrictive and there was an insufficient amount of openings in the motor compartment to provide an outlet for the heated air. The third cause will be rectified by exhausting some of the motor compartment air out the scale exhaust stacks. It might also be necessary to provide some heat outlets on the sides of the cowl. But that remains to be seen.

The aircraft was repaired during the course of the week and, by the following Sunday, was ready to fly again. The exhaust stacks leading to the motor compartment were opened up to provide a flow-through type of ventilation system. An opening was also made on the top of the cowl, directly above the motor, to further ventilate the motor compartment. This time the flight was without incident.

Rolls to the right were very sluggish, due to the torque of the engine and the minimum amount of throw on the ailerons. Inside loops were wide and steady. No, I didn't try any outside loops! After about six minutes of flying, the gear was dropped, along with about 20 degrees of flaps, and the plane was lined up with the end of the runway for the final approach. The speed was kept up, to preclude the plane from dropping like a brick. Actual touchdown was slower than expected, although a bit bouncy.

In conclusion, it was an interesting project, and I am presently toying with the idea of constructing another Typhoon in 2"-scale powered by an H.P. 120 Goldcup twin. All I need now is something to attack—like a 2" scale train! □



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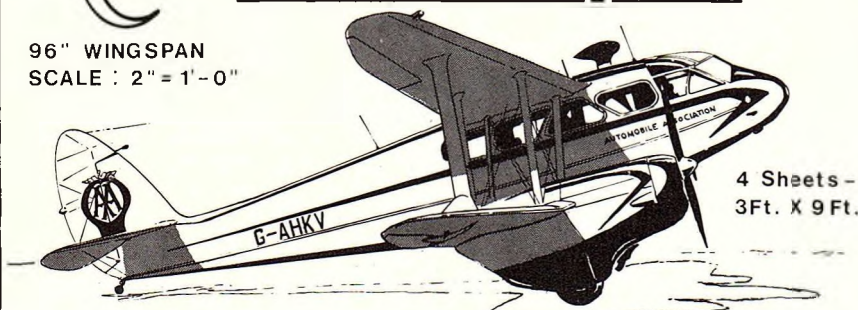
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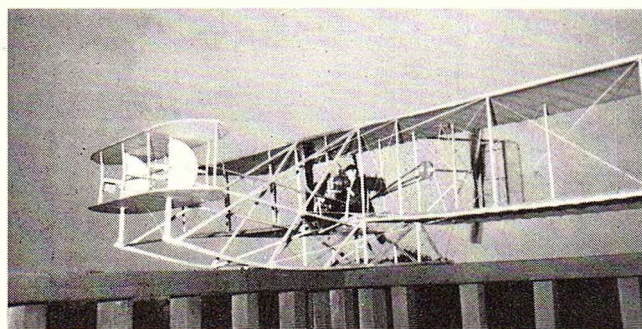
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SMITH MINIPLANE

(Continued from page 65)

Of course, this will be at the expense of scale authenticity.

No matter which version you choose, the Miniplane won't disappoint you. It has a good power to weight ratio, especially with engines like the S.T. .75, O.S. .80 or Profi .78. A .90 would probably not be too much power, but you might find it a bit of a squeeze. If you are considering going that route, a better option would be to use a high-performance .60, such as the Rossi .65 ABC. A .61 is ample power for the two-aileron version. That combination will really make the Miniplane a firecracker!

The Miniplane is a very easy model to fly. It has no nasty characteristics. It takes off by itself, unlike the Pitts and other short-coupled bipes. Since there are no wheel pants, you can operate the Miniplane off grass with comfort. Even though the wing is flat-bottomed, the high Philips entry makes inverted flying a practical reality. Some down elevator is required to hold a normal heading in the upside-down mode. You'll find that outside snaps are exhilarating.

The knife-edge flight is only mediocre, but I don't claim to have any personal proficiency in that maneuver. Perhaps, with enough power and rudder deflection, the Miniplane will hold the knife-edge attitude for sustained periods. Most bipes suffer from vertical performance, mainly because of the high drag. The only cure for this is raw power.

Remember that this model was designed as a scale airplane. The full-size Miniplane was not meant for stunting all over the place... it was just a small, efficient biplane to tool around the country. Turning it into a full-blown stunt machine isn't prototypical, but that's for you to rationalize for yourself. You'll find it helpful, when landing the Miniplane, to carry a little power until touch down.

Whichever version of the Miniplane you opt for, you'll find it one of the most pleasant and fun machines you've ever owned. The model has proven its contest capabilities numerous times, and I hope that your Miniplane will be just as successful.

Full-size plans and a 3-view for the Miniplane are available from the authors: Prestige Models, 3024 S.W. Adams, Peoria, IL 61602. Plans are shipped at an introductory price of \$15 (plus \$2 shipping. Add an extra \$1 for mailing tube). The cowl is \$22 (postpaid). □

show the top outline of the turtle-deck as a straight line from the fin to the canopy. This is incorrect, and there should be a slight bow or curve to this outline.

We also noticed that the P-51B side view drawings in this kit show a small inspection plate just behind the exhaust stack. While we realize that this plate did exist on a few P-51Bs, there's no justifiable reason to show it on a "typical" side view representation. Also, the first vertical panel line forward of the firewall is wrong. It is shown in the same position as the P-51D, but it should actually be moved aft about 1½" on the model. There were other panel line and inspection plate errors, but we can only suggest that you be aware of some of these errors, and allow for them on the model. We offer these comments as constructive criticism, and they are simple matters to rectify when building the kit in mention. Also, we noted that the forward rake of the P-51A side views is incorrect.

In light of these errors, any claims of this kit being representational of the "perfect" P-51 are patently wrong. We have taken the time to engineer out such discrepancies in our Master Scale kit, and that's why we feel that the true Mustang buff will opt for our "exact scale" model. We recognize that nothing built by man is perfect, and we always welcome comments from authoritative sources on the accuracy of our product.

In closing, we want to acknowledge our gratitude to Dick Bernier, who inked all of the blueprints and drawings. Dick is a real guiding light to us.

The Master Scale Mustang is sure to prove a total success on the contest circuit. I took the model to the Masters qualifier and Finals here in California, and it was scrutinized by some of the best pilots and judges in the country. I was gratified that the model passed this "acid test" with flying colors.

We intend to continue the tradition of the Masters Scale series of exceptional scale models. Now that the SBD and P-51 are well along, we have already been gathering documentation on the next big model. So that the suspense won't kill you, it's going to be a P-47 Thunderbolt!

* * *

The Mustang kit, and optional accessories, can be ordered direct from: Master Scale, 1305 Foothill Drive, Vista, CA 92083. See the February issue for options and prices. □

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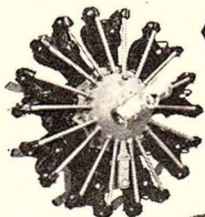
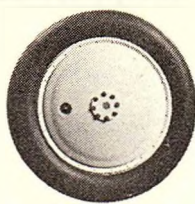
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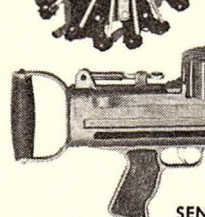
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TEMPEST

(Continued from page 48)

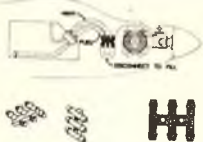
markings. The Third Squadron of the 122nd Wing was available for documentation, so I used it. The fighter was piloted by Pierre Clossermann in May of 1945. The markings are thoroughly British, except for the squadron emblem and the Crusade Cross. Note that the machine had garnered 32 kills. The ship was "Le Grand Charles," and named for Charles DeGaulle. The paints were mixed from K&B SuperPoxy, with the top of the plane done in Ocean Gray, with a splinter pattern of Dark Green. The bottom was Sea Gray. The Tempest has been well documented in numerous sources, so documentation will be no problem.

Since it's an all-balsa airframe, it will be necessary to glass and resin the entire model. Remember to keep the weight build-up to a minimum during the resin process. The February issue of *Scale R/C Modeler* had a good article on a lightweight way to apply fiberglass.

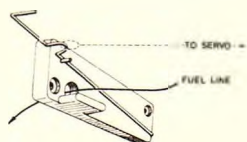
I tried my best to hit that 16-pound magic figure, but I just could not save enough weight. It's hard to keep the weight down on a first prototype, for you are always modifying, filling and changing things. I am confident that careful wood selection and a light finish can produce a 16-pound Tempest. Even at the 17¼ pounds I got on the first model, there were really no flying problems.

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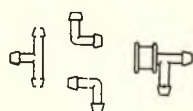


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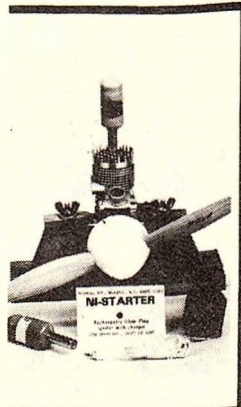
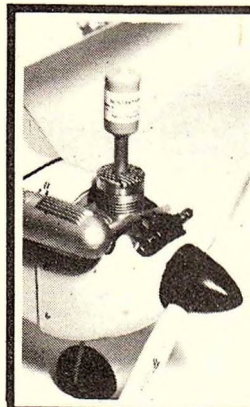
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The Mk. V Tempest is, to me, the epitome of inline engine aircraft. Hawker produced one great looking and clean flying airplane. Of course, the lines of the Mk. V may not appeal to you, but that's no reason not to build a Tempest. There were many versions of this elliptical-winged fighter. The most distinguishable is the Tornado Tempset. This was the successor to the Hurricane and Spitfire, and it more closely resembles the Spit than a Tempest. The large oil-cooler intake ducts on the port wing gave it a distinctive appearance. The stab was definitely from a Tempest, while the fin and rudder came from a Typhoon.

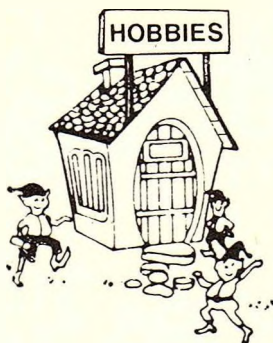
The earlier versions of the Tempest are very confusing. Because of material shortages, Hawker engineers borrowed parts from any convenient derelict. The company also liked to use whatever elements of previous designs had proven successful. It takes a text book and score card to be able to accurately document the early versions of the Tempest.

The later Tempest II was the fore-runner of the post-war Hawker Fury. The air intake ducts on the wings and the monocoque fuselage are the distinguishable features of these designs. If this version appeals to you, the plans can be easily modified. Move the thrust line down 1-5/8". This will necessitate eliminating F-1 through F-4, and reshaping F-5 through F-8. F-5 and F-6 templates are made into 8-7/8" diameter circles. Make F-5 from 1/4" plywood, and remember to recontour K-1.

The Tempest II will require reshaping the fuse from F-5 through F-9. Use a good set of 3-views for this, and work one side of the fuse at a time. Remember that when F-5 through F-8 are altered, you have to cut the formers to accommodate K-1, which serves no real practical purpose. The Tempest is a rugged airframe, and the crash of prototype #1 proved that.

The Tempest Mk.V comes drawn on three large 3x7' plan sheets, with complete construction notes. The plans sell for \$28.00, and come rolled (sent prepaid within the continental U.S.). To save the scratchbuilder some work, I am offering a fiberglass cowl for \$20.00. The Tempest canopy is \$9.50. There are even vacuformed plastic accessories available. The accessories include the exhaust stacks and gun blisters, and sell for \$8.50. The spinner is \$25.00, and the two drop tanks can also be ordered for \$14.95 (set). I have a special price on the whole package. All items listed above can be ordered for a

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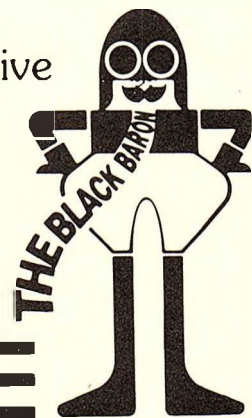
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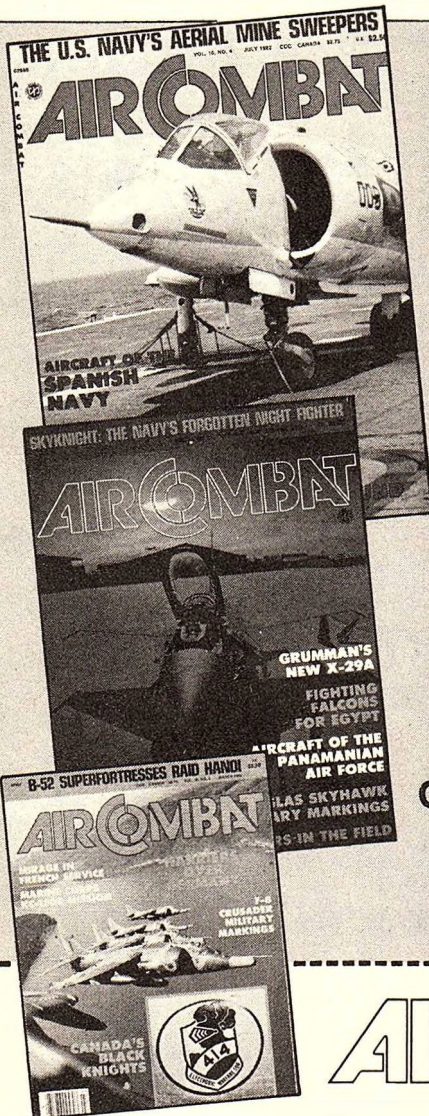
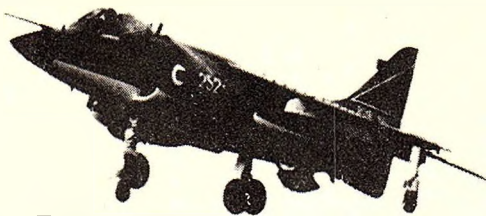
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Even though the curves on the model may look drastic, the Tempest is actually a very easy model to build. The wing is done in three sections. The only really unusual part is that the fuselage must be planked, but anyone who has any amount of building experience will not find that difficult. Being such a large model, it helps to have a good eye for selecting the right balsa for the job. Weight can get out of hand if you don't watch every ounce of structure.

The chin cowl is fitted after the fuselage is planked. I opted for a partial cowl, so that the spinner and prop wouldn't have to be removed every time something needed adjusting.

I guess you could make foam cores for the wing (good luck cutting those double tapers) and tail surfaces, but I think that you'd pick up some weight by doing so. A totally built-up airframe isn't that much work, and it definitely has weight advantages.

The split flaps are bellcrank actuated, as are the ailerons. I don't like Ny-Rod in such applications, especially with such long runs within this 80-inch wing. If you don't want to use the alignment tabs provided on each rib, then a wing jig can be called into service. Whichever system you use, be sure that your work surfaces are straight and true. It's hard to align an elliptical wing, especially if the table is warped! Be particularly careful when joining the three panels.

The retracts can be either the Platt model, or the Airways Retracts. While I haven't used the latter, I have heard some amazing reports of their quality and durability. Remember that this is a 16-pound model, and the gear will take quite a bit of abuse. Note the severe rake of the gear in the retracted position. You can either bend the gear strut, as the plans indicate, or fiddle with the mounting blocks until the up and down positions are correct. Note that the wing of the Tempest is big enough so that all of the retract system can be stored within the structure. The Tempest also has a retractable tail wheel. Originally, we thought this was going to be available commercially, but I guess you'll just have to wing it. The retraction should occur in a forward motion.

Even though the Tempest was a British design, I opted for French

The exhaust porting is similar to the Sea Fury. Cut out the exhaust ports from F-5 through F-8 before installing them to K-1. Box in the air duct with 1/16" ply. A fiberglass cowl is available for the Tempest II, for \$30.00.

Another interesting variant was the Tempest VI. The only distinguishing item was the small intake ducts at the wing roots, and a slightly larger spinner. This machine was capable of 438 mph at 17,800 feet. This is a very simple modification to the plans, of course.

The prototype Tempest model, as noted, came out at 17 1/4 pounds. Since I had some experience with aircraft in this weight class, I wasn't the least bit concerned that the Tempest wouldn't fly.

The wide-stance landing gear made taxiing a snap. The model never wavered once, even in a crosswind. As I poured the power to the .90, the tail came up quickly. The Tempest rolled easily on its mains, with no tendency to wander. The slight torque reaction was easily overcome by a breath of rudder. Acceleration was rapid, and the model was ready to lift off in about 75 feet.

From the moment the model broke ground, I knew I had a winner. The speed was about 75 mph in level flight, which looked very authentic. These larger models sure make a definite impression on a fly-by. I didn't stay up long on the first flight, because the model felt a little tail heavy. I made a few more low passes, and some 360-degree turns to check out the aileron response. I then set up for a landing. I kept a slight amount of power over the fence, and the Tempest floated in nicely with just a little down trim.

Although I knew that the model was balanced somewhat aft of the correct C.G., I was hesitant to add more nose weight. I had already put 1 1/4 pounds in the nose (which is why the plane didn't come out to the projected 16 pounds). I mulled over the situation in my mind while I unwound from that first flight. The added weight was undesirable, I concluded, and I rationalized that the model could be flown safely with just some down trim. I, therefore, refueled and again headed for the wild blue.

As I once more folded up the gear after rotation, I noticed that the Tempest again took on the feel of a tail heavy machine. I was a little befuddled. I had checked the Center of Gravity, and had added enough ballast to bring it within 1/4" of the

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correct location. I had flown other models with a more aft C.G., and they seemed more docile than the Tempest. Down trim helped a little, but the model was not what I would call easy to fly. It wasn't until I had done several maneuvers that I realized the real problem was that the Tempest's aftward-folding undercarriage was actually shifting the C.G. back even more! This model must have its C.G. checked with the gear in the up position.

I found out the hard way that trying to cheat on the nose ballast was a foolish idea. I kept trying to convince myself that I could manage the model, but it took only about nine flights before the inevitable caught up with me. The airplane was controllable, which speaks well for the design. I don't advocate such foolishness as an incorrect C.G., of course. The fact that the damage to the model was so slight in the crash proved that I haven't shortchanged the structural integrity to achieve a light weight. My second Tempest came out at less than 16 pounds, which proved that my original goals were feasible.

The Tempset is a very maneuverable model, considering that it has an 80" span and flies on a direct-drive .90. I wouldn't claim that it will do the full Pattern, but it can handle most basic maneuvers in prototypical fashion. Of course, if you need raw power, there is plenty of room for a belt-drive, or even a small chain saw engine. I personally don't advocate the latter, because you just can't get the rpms needed to achieve a realistic airspeed on a chain saw engine.

With a straight-drive .90, I can do easy loops from level flight. That elliptical wing is amazingly clean and efficient. Don't let the bulky looks of the Tempest fool you. The full-size fighter was one of the fastest machines to take wing, and the model enjoys that same integrity and ability. Again, I must emphasize that one of the real secrets of success is a light wing loading (and, therefore, a good power loading). Strive for that magical 16 pounds, or less. It can be done, so go for it!

The plans and accessories described earlier in this article are available directly from the author: Vito Tomeo Models, 1050 Alabama Avenue, Ft. Lauderdale, FL 33312.

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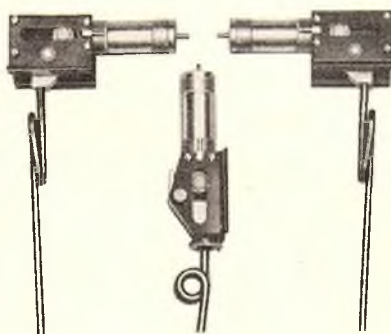
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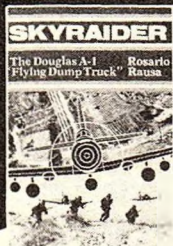
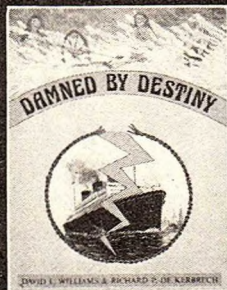


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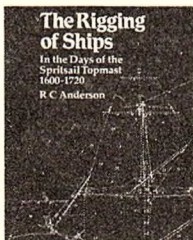
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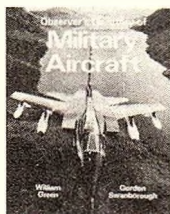
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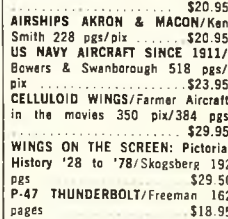


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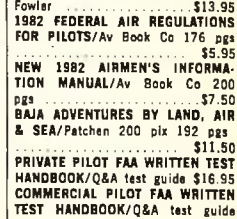
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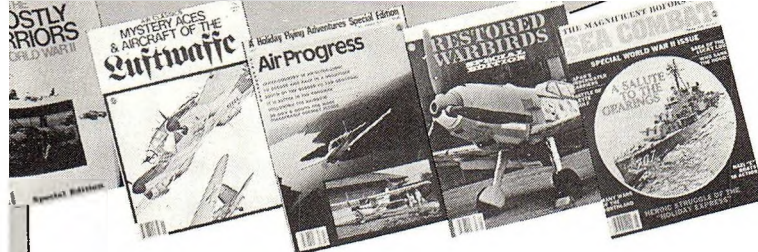
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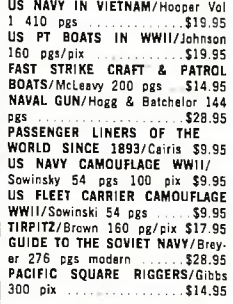


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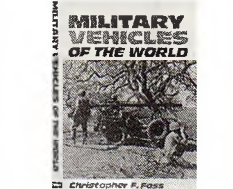


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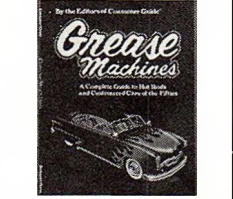


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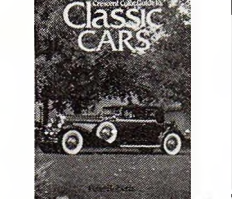
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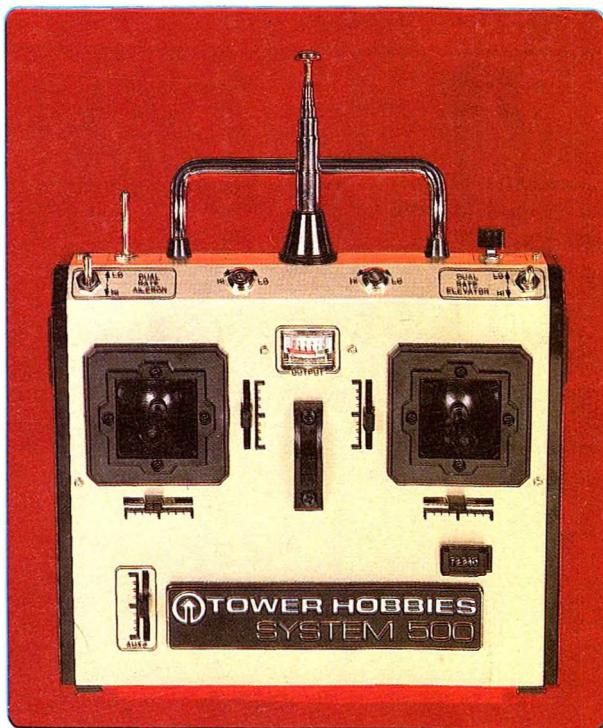
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