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SCALE R/C MODELER

VOL. 4, NO. 2 APRIL 1978
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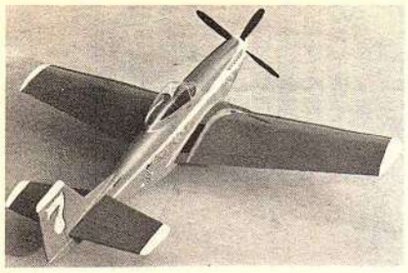

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SCALE R/C MODELER

VOLUME 4, NUMBER 2 APRIL 1978

FEATURES:

DEPARTMENTS:

COVER:
Nothing beats the excitement of a jet, yet this F-16 swings a prop on the nose. R & S Hobby Products' kit can be dolled up with retracts and a sexy paint scheme. Feature article in this issue gives numerous hints to simplify construction of this rakish beauty. (Photo by J. R. Naidish)

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If you missed it at the hobby shops or newsstands, you can still get a copy delivered right to your door. Just drop $2.50 in the mail and we'll get one out to you. When you see it, you'll agree that this is one of those rare magazines that actually says

(Continued on page 77)

Editorial (Continued from page 5)

of the R/C hobby, both from a manufacturing and participation point of was of "stick-construction." We really just intended to differentiate this since encountered several finished versions of the DGA-15 and "Job-

DAVE PLATT ANSWERS...

Dave cannot answer all letters submitted, due to space limitations, although every effort will be made to cover relevant questions. No personal replies are possible, and letters submitted in typed form will get first priority. The best letter in each issue will receive a year's subscription. Direct all questions to Dave Platt, c/o Scale R/C Modeler Magazine, 7950 Deering Avenue, Canoga Park, CA 91304.

RETRACT MODS

Dear Dave,

I was at the Nats in Riverside this year, and was very impressed with an FW-190 built from your kit. I don't remember who flew it, but he did place second in Sport Scale. I've been meaning to build this model, and that superb performance finally did it. Since the Nats, I have finally built one. I must say that I'm happy with the model.

There is one problem, however. This was the first time I used retracts and, following your recommendation, I installed Rom-Airs. When I pull a loop, the gear legs come slightly out of the wells, but they go back in level flight. Is this because of too little pressure? It's been cool here, and maybe the freon doesn't have enough power to hold the wheels up? Any answer for this one?

Dick Hansel
Philadelphia, Penn.

Dick wins a year's free subscription to *Scale R/C Modeler* for his interesting letter. Each issue, we give a subscription for the best letter published in "Dave Platt Answers."

First, the fellow who flew that particular FW-190 (there were other 190s at the Nats) was our good friend Don Lien. He's one of the sparkplugs of the Southern California Scale Squadron. His was the best FW-190 we've ever seen.

Now, about your question. There are two things you can do: one involves only a simple change to your model and will help somewhat, but the second (and ultimate) solution needs to be built into the model.

First, switch to air pressure, instead of freon, to drive your Rom-Airs. There are three advantages to switching to air: a) You can get more pressure in the tank (120 lb./sq. in. safely); b) You get this pressure regardless of temperature fluctuations, which affect freon, and; c) It's cheaper and easier to use air. If you pinch the lines to obtain a more realistic retraction speed, then this changeover to air is even more important.

Sonic Systems (P.O. Box 192, Whippany, NJ 07981) has an air pump suitable for the job, along with a special filling valve which you can install in place of the Rom-Air valve. You might also want to get one of their in-model pressure indicators

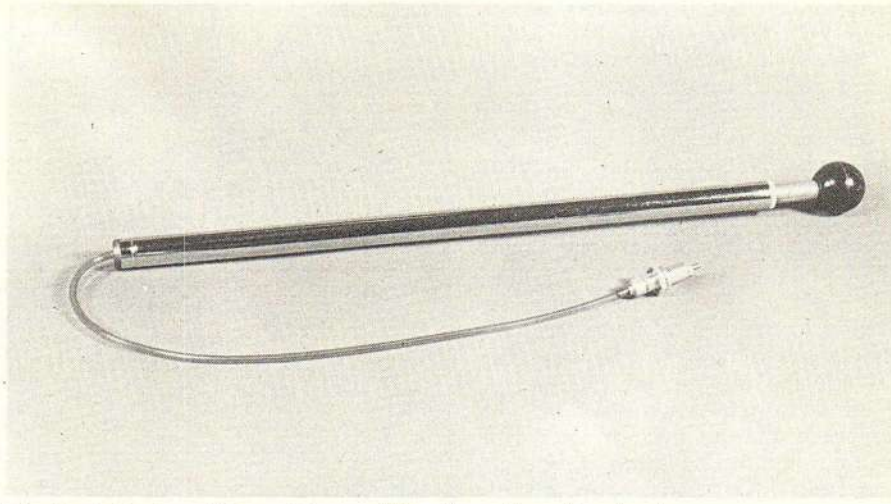
(the "Monitaire") we always install one of these.

As we said, this will help the sagging retracts, but the only proper solution is to provide some sort of up-lock for the Rom-Airs. We recently tackled this problem as part of our design work for a new Sport Scale Martin-Baker M.B.5. The simple gadget shown here solves the problem. The concept is based on a practical application of "differential." For those not familiar with this useful little mechanical trick, we'd better explain.

In *Figure 1,* we see normal servo operation. A typical servo will rotate 45° each side of center. If we connect a pushrod as shown, it will travel the same linear distance "up" and "down."

Refer to *Figure 2.* By drilling a new off-center hole in the output wheel, the linear distances traveled by the pushrod are now unequal, although the servo itself is still traveling 45° each way.

Carrying this idea to its logical conclusion, *Figure 3* shows that, by drilling the hole and attaching the pushrod as shown here, we can make the pushrod travel normally in one direction, but not move (linearly) at all in the other. Although the servo still revolves 45° to Position 2, there is no practical fore or aft movement of the pushrod. Actually, the pushrod moves about 1/16″ while traversing the arc, but this can be compensated for at the 4-way retract valve.



The Sonic Systems "Super Charger II" replaces freon in retracts. Cheaper and more reliable. (J. R. Naidish photo)

Our system uses this differential effect as follows:

1) In the first half of servo movement (servo goes from gear down to gear up), the 4-way valve is operated by the pushrod.

2) During the second phase of the sequence, the valve is not moved

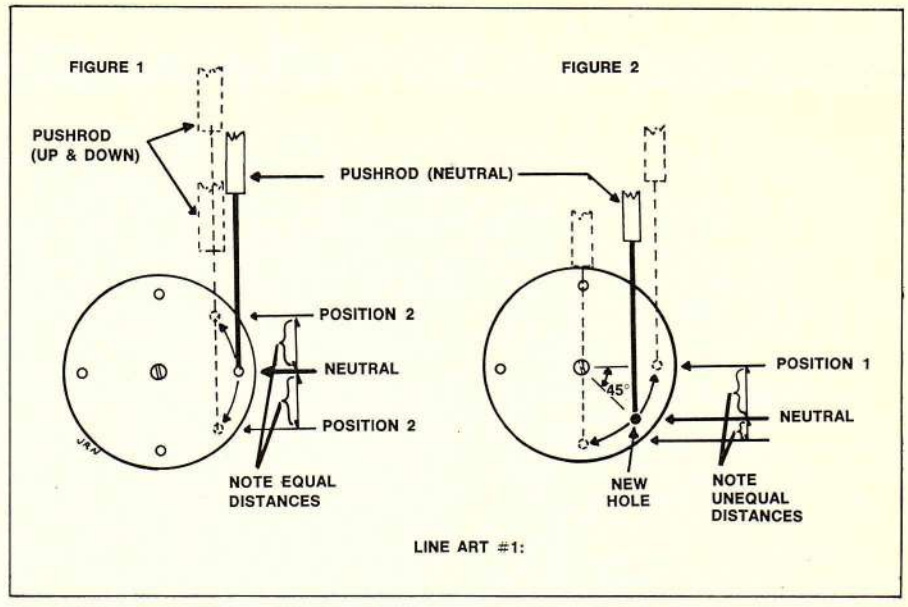
by the pushrod.

3) If we now drill another hole in the servo wheel (as shown in *Figure 4*), we can run a second pushrod to a mechanical up-lock. This lock will not move during the first half of the two-part sequence, but it does lock and unlock during the last half of servo transit.

To complete the system, we need a 3-position retract switch on our transmitter instead of the 2-position switch usually used. Failing this, we can run the retract servo from a different auxiliary channel (say flaps), which has a lever instead of a switch. This "delay" in the retraction sequence is needed to insure that the wheels are cleanly in the wells before the locking pin is actuated.

From the gear-down position, with the servo at one end of its travel, the first signal moves the servo halfway, and retracts the gear. After a short hesitation, the next signal is made to drive in the lock. Coming down, the reverse applies: the gear is first unlocked, and is then extended.

There are probably many ways to fabricate an up-lock. The one we used here was simply a piece of wire driven by a bellcrank. This wire runs above the gear door but under the wheel, so that inflight G-loads push the tire against the wire. The whole system is sown in *Figure 5,* and is very simple to construct.



LINE ART #1:

* * *

Dear Dave,

When can we expect the release of your Duellist twin, as mentioned in the Summer '77 issue of SCALE R/C MODELER?

Gene McCabe
Oakland Park, Fla.

We're asked this one quite often, so here is the dope: our twin kit is not quite ready, but it should be available as this issue gets to you in late February. We have revised the design, with a larger tail, altered force arrangement and modified ailerons. The new version (the *Mk. 2 Duellist*) will be available only on a direct-order basis from: Dave Platt,

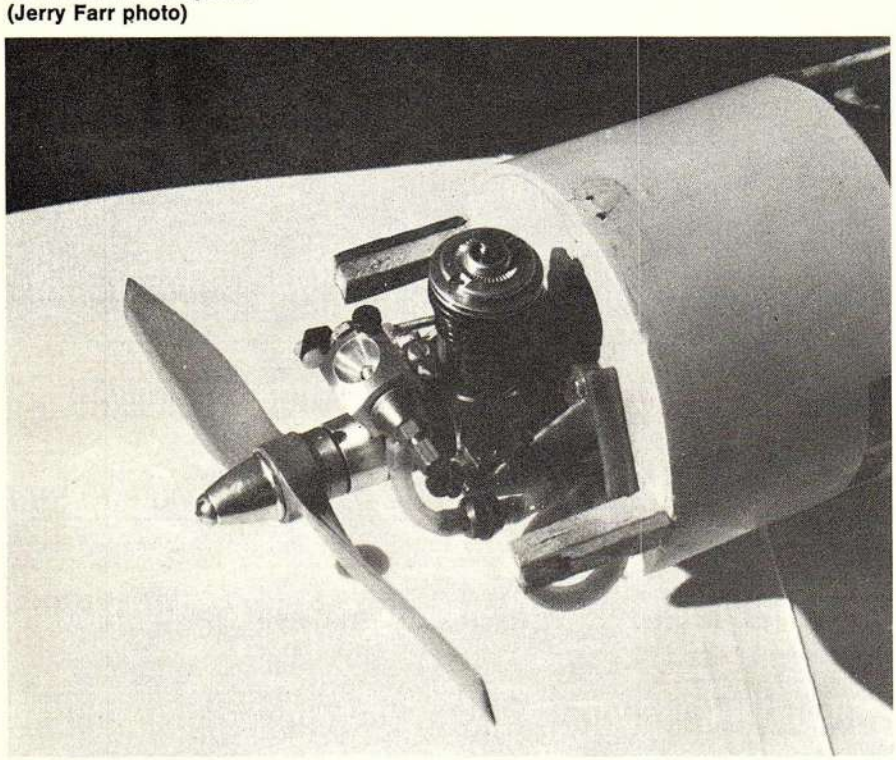
(Continued on page 73)

the schoolyard scene

Jerry Farr's super-sleek and saucy Citabria is stuntable and simple to build. Plans available from Hal Osborne, 1932 Conejo Lane, Fullerton, CA 92633 ($3.00). The design, which was featured in our December issue, can be built from the scrapbox. (Jerry Farr photo)

Schoolyard products

By George Chabot



The Tarno carb offers a simple conversion of the Tee Dee for throttle operation. Works great! (Chabot photo)

I would like to start this month's column with some thoughts on a situation which I hope is more atypical than usual in the hobby. Recently, I was chatting with my local hobby emporium owner about a kit that I was working on for an article. His first words were, "I hope the kit you have is better than the two I have in stock." The kit I had was of top quality, it went together quickly and looked like what it was supposed to, once assembled.

My response was to ask him what was wrong with the two kits he had. "Well," he said, "they just don't look like much when you open the box." Now I wonder how many modelers just superficially look at what's in the box and do not visualize the finished plane. That first impression can be deceptive. Many new materials are being included in today's kits, in an effort to simplify construction. The particular plane in question is a good example, as it happened to be foam and ABS plastic. It didn't look like much in the box but, on the other hand, it only took a few evenings to put together.

I used to be in the modeling business as a kit manufacturer, and I can appreciate the time and effort it takes to produce even the simplest R/C kits. It takes a tremendous number of research and development hours to come up with a workable

design for a kit. Most of the people in this business are dedicated and conscientious modelers. They **ARE** concerned with the quality of their product. The next time you're shopping for a model, don't judge what the finished result will be by a quick glance at the contents of the box. Just because a kit doesn't have a zillion parts does not mean it won't produce a fine airplane.

Many manufacturers design their kits with the least amount of parts, in order to simplify construction. Most of the time, the manufacturer does things with the modeler's best interests in mind. Because the modeler (and this means you) is his livelihood, the manufacturer literally stakes his reputation on how you react to the contents of his kit box. You can't judge a book by its cover! So take a few minutes to browse through a kit in an objective manner. You just might be surprised to discover that the boxes with the fewest parts make not only the best models, but they're often the best buys.

* * *

I recently had the opportunity to use some new ½-A products and

Specialty Model Manufacturing's new audio tacl

would like to share my experiences

One of the most outstanding items I tried was the GloBee Stinger. This is a self-contained, portable, hand-held starter. The information sheet that comes with it is very complete, and I suggest that you read it carefully before using the starter. It has always been a hassle to have to use a separate battery for my starter. With the GloBee, this problem is eliminated. This starter is designed like a long wand, in order to accommodate the rechargeable lead-acid batteries.

At the flying field, everyone wanted to try out the GloBee, so I kept track of the number of starts made with it. After some 83 usages, I was convinced that its capacity is more than ample for an average weekend of schoolyard flying.

A very nice feature is that the on/off button can be locked with a twist to prevent accidental operation. You can reverse the rotation, if the need ever arises, by simply disassembling the case and reversing two leads. Overall, my impression of this starter is excellent, and I would not be without it in my flight box. The GloBee Stinger is manufactured by Fusite Division, Emerson Electric Co., Cincinnati, Ohio, 45212 and is available at your dealer.

* * *

I finally got hold of a sample of the Tarno carburetor, and this is really the answer to getting a Cox Tee Dee to idle reliably. Installation took about 10 minutes, and requires no special tools. This particular engine went in a Model Merchant P-40, which features its own (included in kit) 90° rotating scale retracts. I used Cox red can fuel for the flight tests, and the idle was superb (3000-3200 rpm). That reading may sound high, but the model won't even roll at that rpm. I did not detect any appreciable loss of performance on the top end, and the airplane performed just as it did before the addition of the carburetor.

As far as low speed adjustments, forget it. There are none, other than a mechanical stop-screw, and apparently none are needed. Tarno has done a fine engineering job on the low-speed fuel/air ratio. After setting the needle valve at full throttle for best rpm, the Tee Dee idled right down the first time. I made six flights, and the engine never quit at idle, as is the case with some carbs.

Several fliers have commented to me that muffler pressure to the tank seems to aid the reliability of the Tarno ½-A carb. I didn't find this to be the case, but we all know that the Cox engines vary appreciably in the amount of crankcase pressure they produce, the way they are timed, etc. If your particular engine seems balky with the carb, try the tank pressure technique . . . it may make the difference.

This is an excellent item, and it is an absolute must for scale contests. The added points you will receive for scale takeoffs, landings and slow passes are certainly worth the $12.95 price. Available at hobby shops, or from Tarno Aero Engines, 942 Grou, Montreal, Quebec, Canada H4N 2C7.

I finally got around to finishing the Robart ½-A retract gear installation in a new AT-6 design. These landing gears are the greatest things since glo-plugs. They work everytime, and are extremely smooth. The down lock is via an over-center cam and is very positive, and the complete unit is rugged enough for those in-

(Continued on page 74)

good for tweaking small engines, or for getting airborne prop readings.

ACE'S WILD!

For size, quality and price, ACE R/C's 3-channel Micro System kit wins hand down. You'll have a "pat" hand if you build one, for there's no gamble with this radio.

Staff Report
Photos by J. R. Naidish

We remember Fred Marks from the old days, when he was the local witch doctor who performed his voodoo magic on our ailing radios. The guy is a real electronics wizard. That's why our first choice was obvious when it came time to look for a new radio for our Schoolyard Scale projects . . . when we saw Fred's name as the designer of the 3-channel ACE Digital Commander Micro System kit, we knew it just had to be a natural winner.

We talked to ACE R/C to find out more about the radio, and learned about some interesting features of this mini-system. Since our electronics building experience verges on total ineptitude, the first question was about ease-of-construction. After reading through the clearly-explained, step-by-step construction booklet, we were convinced that the winning hand in the radio market was "ACEs wild."

The whole design emphasis of the Digital Commander is simplicity. The transmitter, which is capable of 1-7 channels (actually nine), has two PC boards, with a handful of components on each. The RF board comes pre-assembled and tuned, of course, which saves a lot of hassles. The RF power is no slouch, with a full 600 milliwatts radiated output — that's better than some "custom" radios! Furthermore, with the addition of a few simple Deans connectors (not furnished), you can interchange frequencies. We particularly liked that idea, since we could use the transmitter with an assortment of airborne installations.

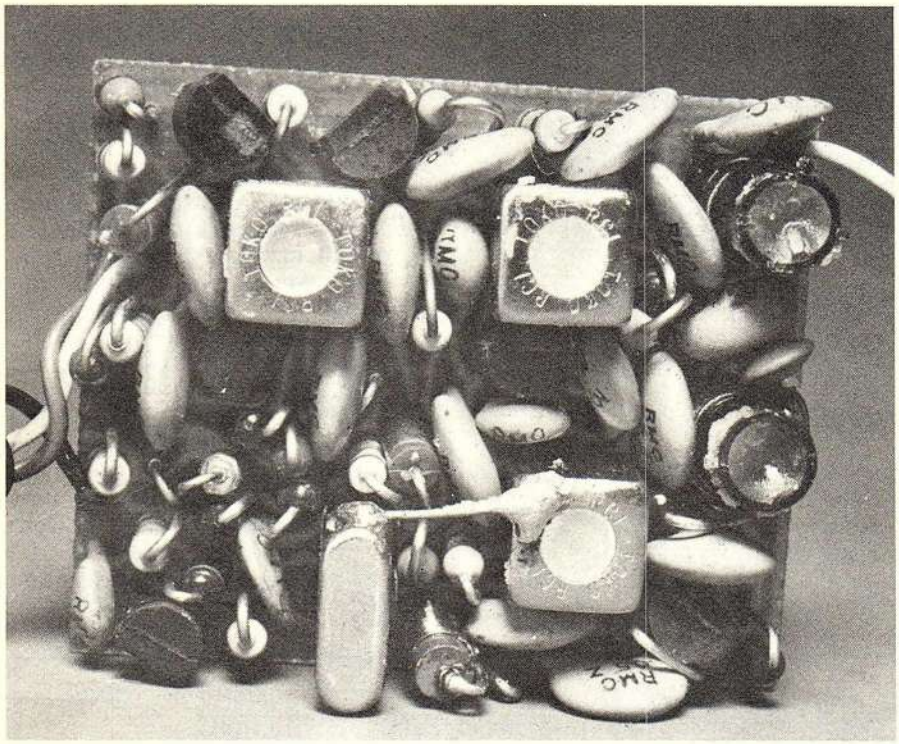
There are only 25 components (excluding control pots) which need to be soldered to the encoder board. Even better, all diodes have been totally eliminated . . . these little buggers create the most common problems in electronic kits — try as you will, it seems that at least one diode always winds up installed backward. Logically, if there are only twenty-five components, instead of the more normal 50-75, the chances of component failure are reduced by at least half — making the reliability factor very high indeed.

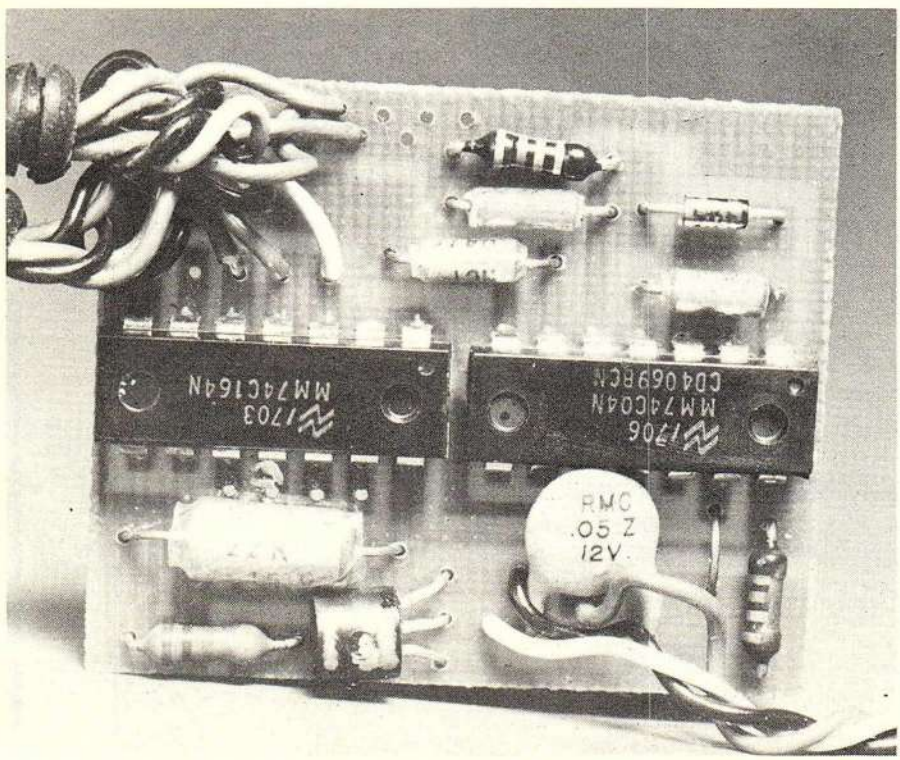
A very important consideration is that the transmitter is configured as a single-stick. You just wouldn't believe how many fliers can't handle the two-stick Mode 1 arrangement commonly found on imported radios.

Just ask anyone who has had to hunt up someone who could teach him how to fly on this weird stick configuration. The Dunham stick is open gimbal, and it is very smooth and precise. It's the same stick assembly used by several top-of-the-line radios.

The third function is a vertical lever, with an easy-to-locate trim adjustment on the top of the case. The meter is an ESV (Expanded Scale Voltmeter) which is calibrated to tell you when the battery needs replacing (it's a dry cell). The whole package is done up in an attractive red vinyl-clad aluminum case — not plastic.

Construction of the transmitter is facilitated by the well-written and concise instruction booklet. Each section of the text has an introduction which gives some of the theory behind the item you are about to build. It's nice to know how and why what you are soldering tbgether works . . . this seems to add some subtle reassurance that you actually might be able to do it right. Each building sequence is presented in a checklist format, so that there's no fear of missing a step.





The completed receiver board (above) is packed with components, especially when compared to the decoder board (below), with its CMOS chips. Current drain is only 7 ma.

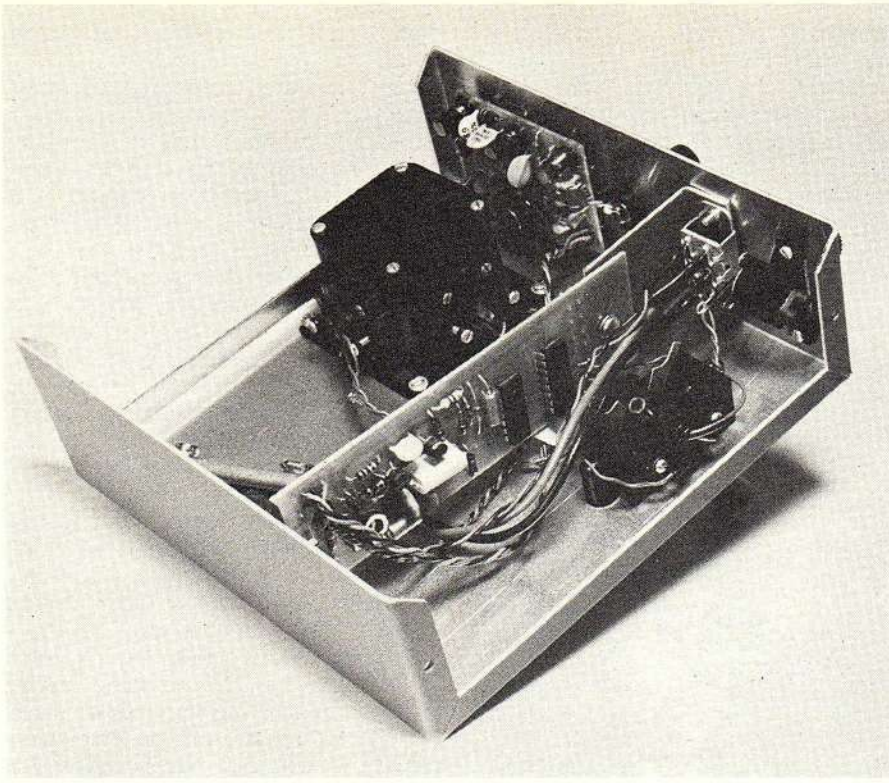
With just a handful of parts to solder onto a nice big board, you get a little low-pressure practice working with electronic components. Actually, the majority of time spent on the Tx is the mechanical mating of the sub-assemblies onto the case front, as well as connecting up all the wiring harnesses. While not difficult, we'd recommend setting aside a few uninterrupted hours of tranquility for the wiring tasks, since this is where the human error factor might cause a simple goof.

It took about eight hours total to complete the Tx (including studying the manual, sorting parts, etc.). Anyone who has built an electronic project before can easily shave 2-3 hours from that. A good quality VTVM (Vacuum Tube Volt Meter) or solid state VOM (of at least 20,000 ohms per Volt) is required for tuning. We borrowed a friend's and had no trouble getting everything just right.

Fred Marks came up with a highly sophisticated, yet simple receiver design for the Digital Commander Micro System. The case is a tiny 1½ x 1¾ x 1″ and it weighs only 1.5 oz., so it fits easily into any .049-size ship. Even at that size, the receiver has full 8-channel capabilities by just plugging in more servos. There's no need to add or substitute components. This expandability feature is fast making the ACE airborne system one of the most popular around. It can be used in any installation, and is fully compatible with almost all transmitters. Its low price makes it an ideal "second" radio.

The Rx makes no compromises in quality, using CMOS circuitry for superb range and noise rejection characteristics. A current drain of only 7 mils makes this a fine receiver for Schoolyard Scale, since even a 100 mah battery pack yields plenty of flying time. The electronics incorporate voltage regulation, AGC and a "keep alive" feature to ensure solid control in low-battery or edge-of-range conditions. This receiver gives no quarter in terms of quality to even the most expensive rigs.

At first glance, the receiver looks like a jumble of components tightly spaced on a stamp-size board. Once you get into it, the 68 components go easily and logically into place. It becomes a matter of "putting square



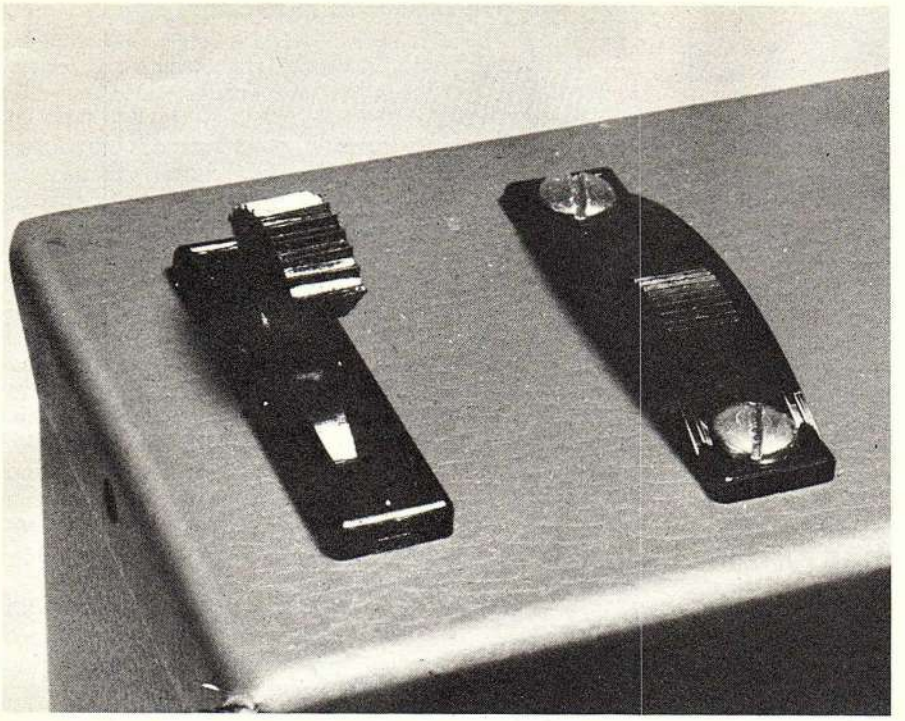
Interior of the Digital Commander transmitter reveals minimal number of components. To get eight channels, just add another gimbal assembly, additional pots and wiring. Ni-cads can be substituted for the dry cell.

pegs in square holes," especially after the first dozen or so components are in place. It's a real tribute to the instruction booklet that the builder isn't left with that sickening "I'm lost" feeling, but you actually gain confidence with each completed step.

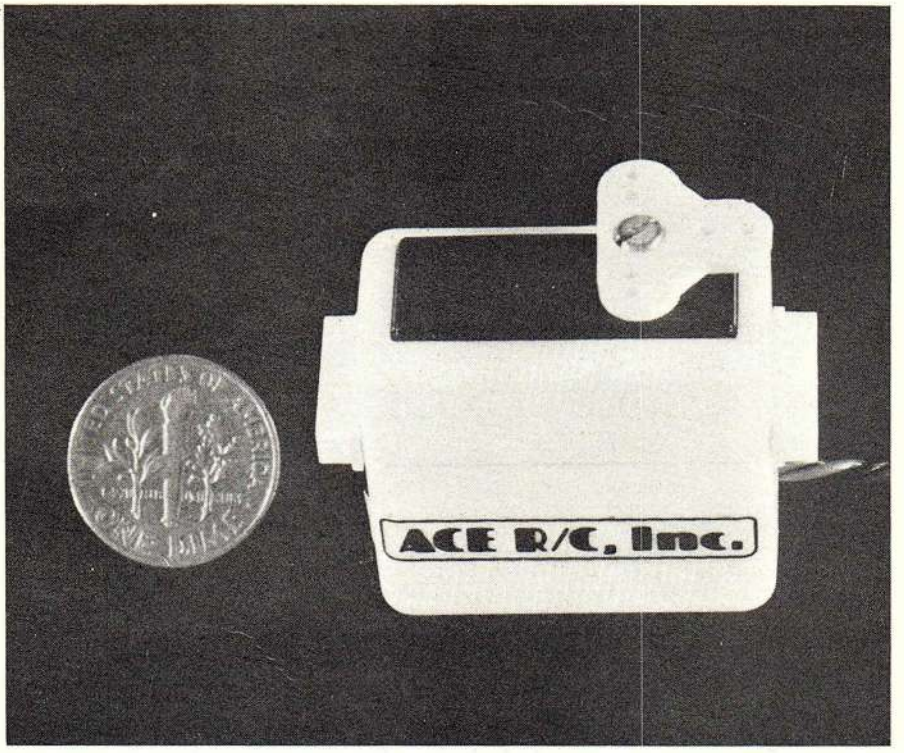
Be careful when handling the unattached CMOS device, but that's the only minor concern during receiver construction. While it took us six hours of total time to complete the receiver (again including reading instructions, sorting components, etc.), you'll easily decrease that by 50% if you know what you're doing.

Although the Rx can be tuned with a good VTVM or VOM, the best results will be had by using an oscilloscope. Any significant troubleshooting is almost impossible without a scope, so plan to have one available for a few hours when it's time to make the final adjustments. Blaine Rawdon, who was also building a Micro System at the time, helped us get our radio properly tuned, although we were almost perfect with our VTVM settings.

Blaine had a slight tuning problem with his Tx. Pot #1, which determines pulse width, just wouldn't come in properly without a scope. We suspect that he may have been misreading the VTVM the first time around. He also had a bent wiper on a pot, which took all of ten minutes to trace and fix. Our unit worked perfectly right off the bench,



Detail of easy-to-reach third function trim tab, conveniently located on top of the Tx case, next to the guarded on/off switch.



The Micro servo is one of the smallest in the industry, which makes it ideal for Schoolyard Scale installations. A fast, accurate and responsive electromechanical device. (Photo courtesy ACE R/C)

which really pleased and surprised us.

The ACE Micro servos are really something else. Measuring .625 x 1.25 x 1.28″, these little jewels put out about four pounds of thrust, and weigh only .75 oz.! With a 100 mah battery pack, a two-channel airborne system weighs 4.25 ozs. (full house is only 5.75 ozs.)! These are just the ticket for Schoolyard Scale.

The heart of the servo electronics is the Signetics NE544 IC in the amplifier. This chip delivers a linear one shot, instead of the usualy exponential one shot of most other servo amps. The resolution and accuracy of this servo has to be seen to be believed. The servo will plug right into any positive pulse receiver (or a pulse inverter kit allows it to be used with any negative pulse receiver).

We thought that the servos were going to entail the longest time. Those tiny components to be fitted on that almost microscopic board looked like a real challenge to the eye and hand. We jumped right in and emerged an hour later with a completed servo. The radio comes with one servo already built and centered, which is used to adjust the Tx pots.

The Micro servo uses Bourns lubricated feedback pots, which require an occasional (maybe once a year) cleaning and re-lubing. Always use the recommended lubricant for this. At $27.95 per servo in kit form ($32.95 assembled), these have to be a natural for the flier who wants to expand his radio for a minimal investment.

George Chabot, our Schoolyard Scale correspondent, happened to be in the shop the day we had finalized the radio tuning. A little diplomatic sweet-talk from George and, the next thing we knew, we had agreed to let him do the flight testing. As of this writing, he has flown the rig in a sailplane, just to make sure that I did a good job (he just doesn't trust me and my ten thumbs!). Initial reports are very enthusiastic, with almost unlimited line-of-sight range. George will be writing a full user's report for his next column.

Blaine Rawdon's radio already has countless hours of flight time in his competition sailplane. Blaine is especially pleased with the speed and accuracy of the servos, and he's already thinking about a second airborne system.

How did the ACE Micro System stack up, from a builder's point of view? It took us about 20 hours to get a functional 3-channel radio of superb quality — a radio which has total interchangeability with our other systems, and which has full eight function capabilities (as well as optional interchangeable frequencies in the Tx). While the transmitter uses a dry battery, the airborne system has Ni-cads (a charger is included). At $124.95, we can't see how anyone could pass up this radio, especially since all that's needed to build one is some common sense and the ability to follow instructions.

One things that we can unequivocally attest to is that certain sense of self-satisfaction when you flip the switches and actually see the radio you built work . . . that has to be one of the finest feelings a modeler can have. Thanks Fred, you really dealt us modelers an Ace high, royal straight flush! □

C-O-O-O-L IT!

Build this simple radiator system for that overworked and overheating scale engine, then have a ball with Glycol.

By Tom Barber and Tom Cone **Photos by J. R. Naidish**

Engine overheating, and the concomitant reliability problems, have plagued aircraft (both full-size and models) ever since reciprocating engines were used to swing propellers. In 1923, preliminary tests were conducted with Glycol (Ethyl Glycol) in a primitive one-cylinder engine. It was a major breakthrough. By 1928-29, the Curtiss D-12 series engines had proven the feasibility of this new cooling additive. It took the technology of WW II to prove that air cooling was a more practical way to go, although the compromise was definitely not in favor of the engine, per se.

It seems to have taken all this time for radiator cooling technology to filter down to the modeling field. But now a functional Glycol system can be incorporated in your scale model. The simple-to-fabricate radiator shown here, in conjunction with the Robart Pumper and a marine head, achieves several improvements in engine performance. First, the scale engine installation need no longer be an intricate system of air-deflecting baffles, cut-outs, louvres, etc. Any reasonable size opening (often the one where the original radiator — or even oil cooler or turbocharger intake — was located) will suffice.

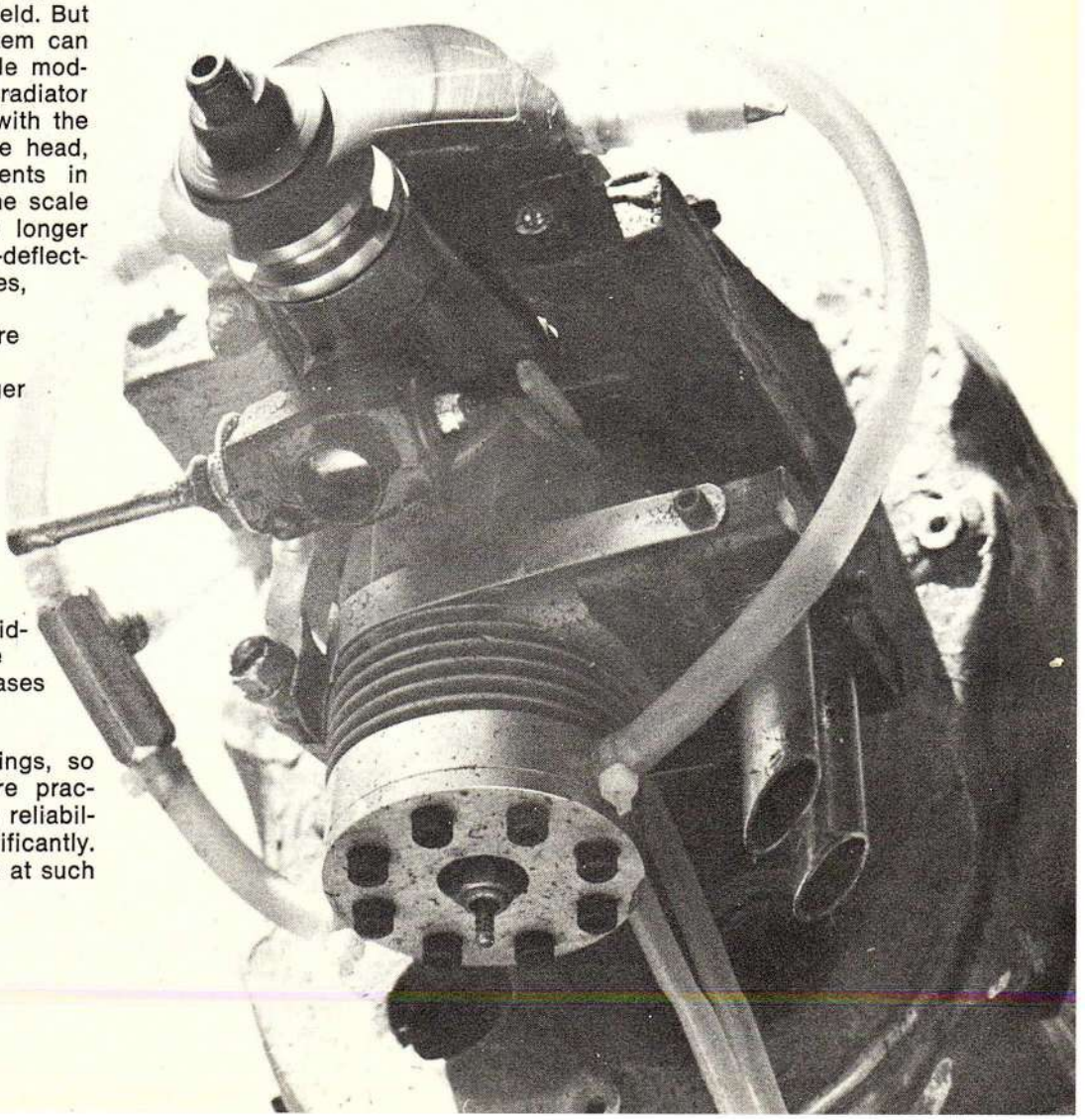
Secondly, and more importantly, this Glycol system yields a significant increase in engine performance. Since the engine's ambient head temperature is lowered considerably, hotter fuels become practical . . . with their increases in power. The engine also becomes less sensitive to needle valve settings, so much so that lean runs are practically eliminated. In all, the reliability coefficient goes up significantly. Who can turn up their noses at such an exciting proposition?

The development of our prototype cooling system came about rather logically, although the actual research was strictly a cut-and-fit affair. After being educated as to the engine performance that model boaters were getting from their water-cooled engines, we just had to see if the same principles would prove out in aircraft applications.

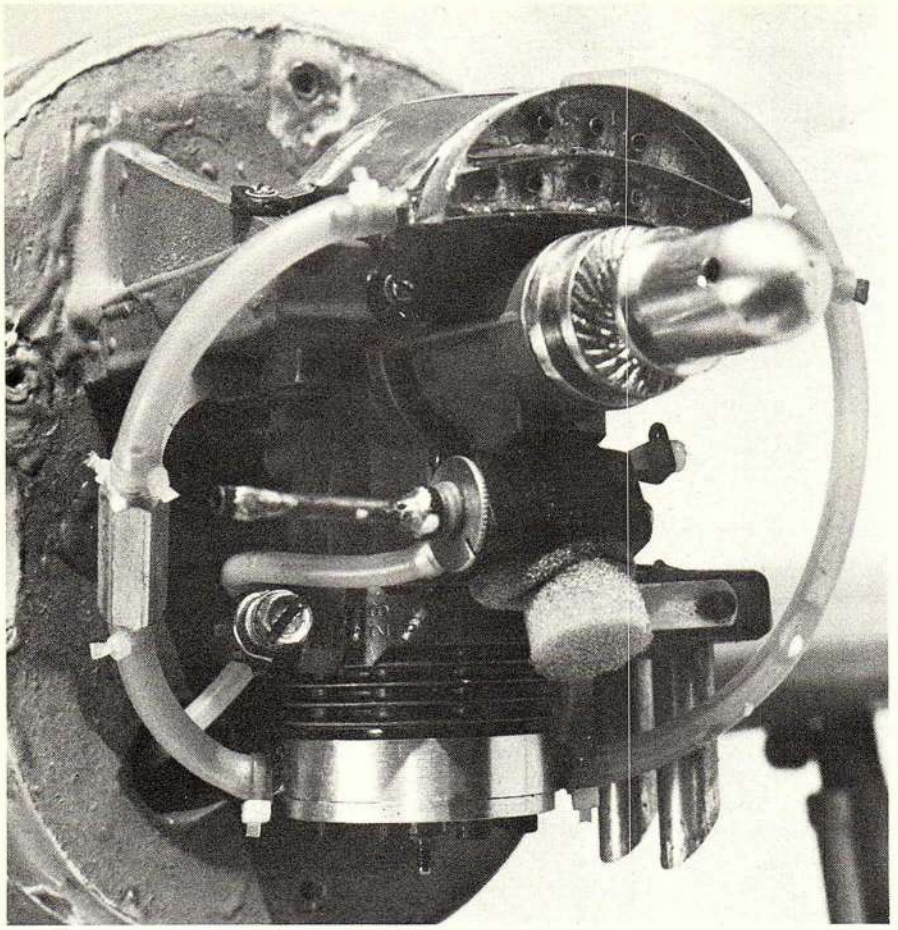
The initial experiments utilized the basic concepts of the "thermo-syphon." Essentially, the very heat of the engine is used to circulate the coolant. Once a basic radiator was designed (more on this later), it was simply a matter of fitting a small diameter line between the "tank" and the head. A large-bore return line was then connected. Once the system was filled, it is the heat of the engine which forces the water through the larger tube, and around through the smaller one. It's sort of a perpetual-motion sealed unit.

The results were very promising, as we found that the needle setting moved leaner by almost a full turn! There was a net gain of about 400 rpm (on 40% Nitro fuel). We found it very difficult to force the engine into an over-leaned condition on the ground or in the air. The faster the engine runs, the hotter the head gets . . . and the hotter the head, the faster yet the coolant circulates. We were frankly amazed at the simplicity of our jury-rigged set up.

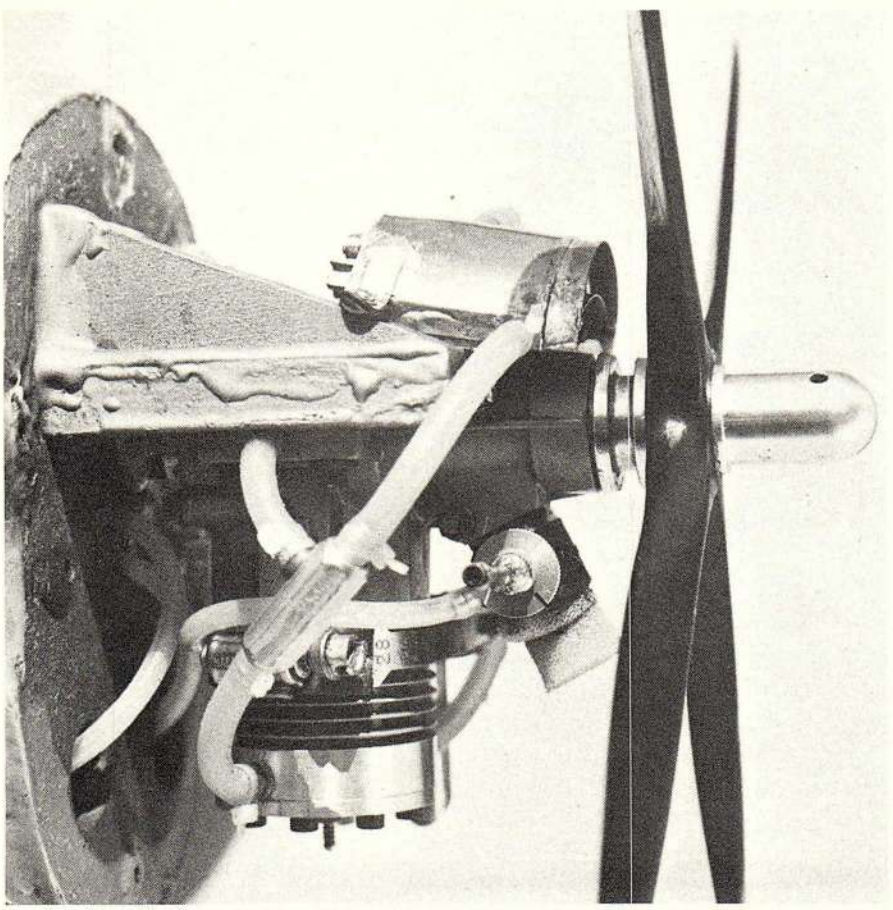
If something so easy to do worked so well, then something a little more



Look closely, for that whirring prop isn't readily apparent. An extra 700 rpm were gained by liquid cooling the head.



The Robart Pumper gets its pressure from a tap through the mounting lug into the crankcase. Four-bladed prop is for display only.



Radiator gets cooling air through a series of 1/8" brass tubes. Volume of glycol is only 2 ozs., so heat dissipating area need not be large.

complex would have to do the job even better. A true water pump system seemed the logical progression. Since the Kraft .60 in our P-47 was equipped with a Perry pump, we faced some restrictions in easily tapping crankcase pressure to actuate the Robart Pumper. Exhaust manifold pressure seemed a reasonable alternative, but we found that the Pumper was not designed for such minimal pressure. The results were very disappointing. The thermosyphon technique was actually superior to this method.

Undaunted, we surmised that there was still another was to skin the cat. We finally wound up tapping crankcase pressure directly through the engine mounting lug, as shown here. These high-performance Schneurle engines have an abundance of crankcase pressure anyway, so the little we were robbing was hardly missed. One thing we did discover is that the Robart Pumper is only happy when connected to its own pressure fitting . . . this is important.

Thus, in the configuration you see here, we have achieved a simple and reliable cooling system that is self-contained and fully adjustable. The flow rate can be controlled by the valve adjustment on the Robart Pumper. These settings are non-critical, and are mostly a function of the radiator's capability to cool the liquid sufficiently.

Since we have only built one of these systems, which worked right off the bat, we can only surmise that we were either very lucky, or that the working parameters of the design are not very critical. Maybe there's a designer out there somewhere who can supply us with some formulae for radiators. But, if you keep within the specs we've laid out here, you'll most likely get good results immediately.

The drawings show the dimensions of our radiator, as well as its basic construction. The "half-moon" shape is merely a function of the space available in the P-47's cowl. We suspect that a plain metal control-line tank, with sufficient brass tubes inserted, would be a quick and dirty way to get into the ball park. When installing the airflow tubes, remember that the more exposed cooling area, the more efficiently the system will work. The use of external cooling fins on the radiator should be considered, if space permits. Internal baffles, to retard and direct the coolant flow, would be a real custom touch, but these don't seem to be necessary.

(Continued on page 71)

SCALE TOURNAMENT OF CHAMPIONS

The big jackpot was $14,000 in an 18-pilot invitational, but the real winners were all the modelers who came to see the world's best scale aircraft compete.

Staff Report **P. H. Potega photos**

Take the excitement of Las Vegas, add the incentive of $14,000 in cash prizes, and you have the makings of one phenomenal contest. Spice things up with eighteen of the world's best Scale contestants (from six countries), and the event takes on all the attributes of an unforgettable spectacle. Four days in this rarified atmosphere—it was as if one had been whisked off for a long weekend at some Mount Olympus for the gods and demigods of Scale—and one had no choice but to call it the greatest show on earth. No mere contest this, but a true "happening" . . . a total experience in the penultimate state of the art.

The hurly-burly, hustle-bustle of Circus-Circus Hotel/Casino (which hosted and co-sponsored the affair) was almost discordant with the Convention Area, where the eighteen pristine examples of Scale sat like immutable sculptures. Like any good piece of art, each subject could permit countless hours of viewing pleasure. It was a simple matter to be wiled away by the supreme artistry of aircraft like Bob Nelitz's World Champion Chipmunk.

The spell was broken as the model was whisked away to an anteroom, where Keith Ward and a panel of judges prevailed with the all-too-real function of static judging. The scoring was via a hybrid FAI system, wherein "equalizing" K-factors were assigned the aircraft by their inherent complexity. Simple aircraft, such as John Roth's perennial Volksplane, received a 1.0 multiplier to their raw static scores. No planes there qualified for the maximum 1.5 factor (multi-engine, all-metal aircraft), but three ships did get the 1.4 due single-engine, all-metal military aircraft (Platt's Dauntless, Phil Moore's PZL Wilga and Bud Nosen's Jug).

Bob Nelitz's exceptional Chipmunk has now won every major Scale competition, including last year's Internats and Nats. An immaculately executed model, flown to perfection by a real professional.

Success at last! Dave Platt's heavy-metal Dauntless, resurrected from a bad mishap at the Nats, captured second place honors.

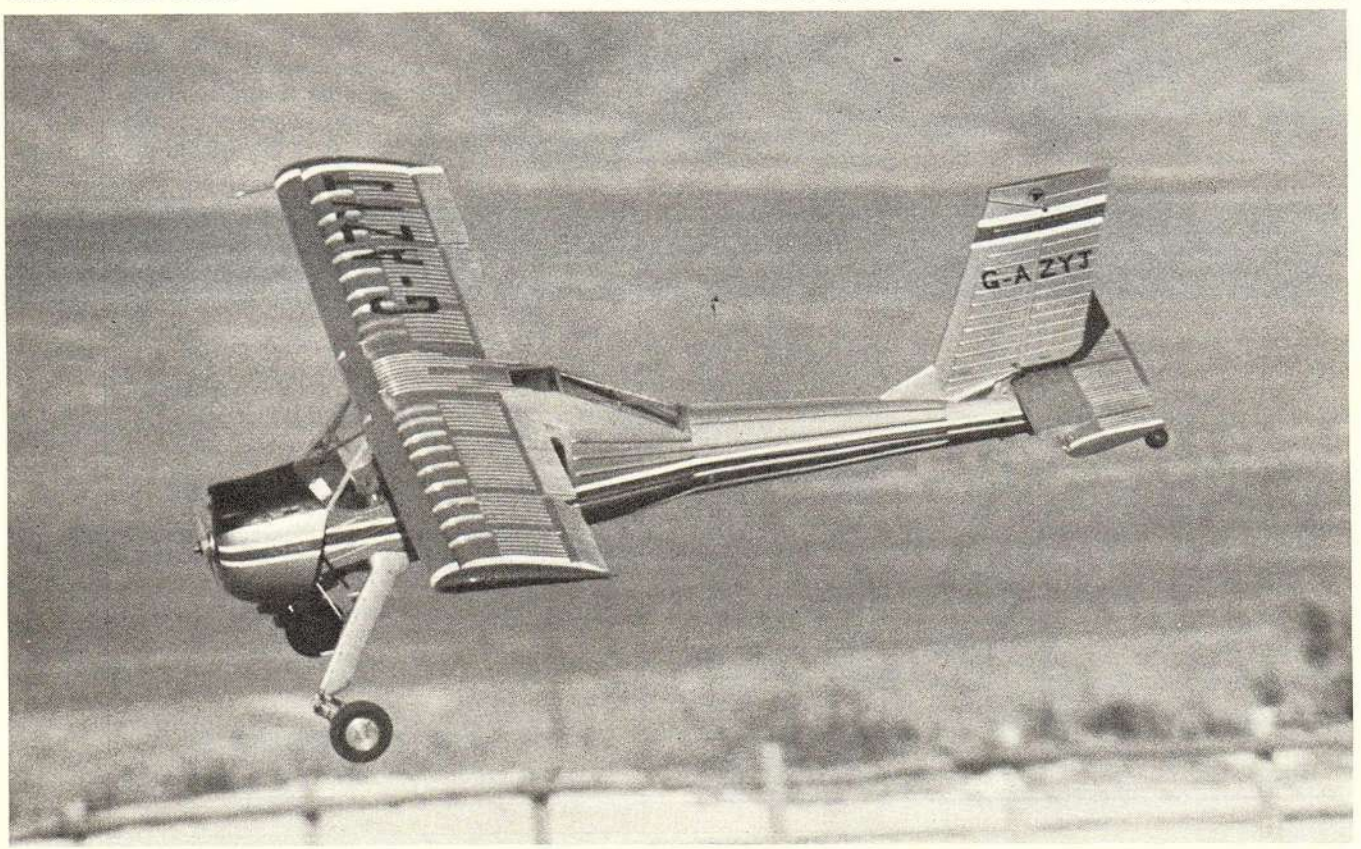
As it turned out, the K-factor essentially determined one's final standings in this closely-contested event. It was interesting to note that seven aircraft actually got higher raw static scores (Fidelity and Craftsmanship points) than Dave Platt's SBD. But Dave wound up third in static because of that very high K-factor. In FAI, this scoring technique is fair, since it prevents a very basic, yet immaculately executed model from walking away with all the marbles.

The shortcoming of the scoring in Vegas was that, unlike the FAI, where a converse equalizer is applied to the flight scoring, the Tournament's flight rules permitted only the *loss* of up to 10% of one's static score. Thus, Bob Wischer's Nats winning Piel Beryl (K-factor of 1.1) could never catch Steve Sauger's Fairchild 22 (K-factor 1.2). Ten percent of 1.2 is only .12, which still left Sauger a .08 multiplier edge in the contest, even had both aircraft been given identical static scores.

In spite of that seeming inequity, we favor this scoring system in a contest of this sort. It drastically de-emphasizes flight performance, which really takes the pressure off the pilots (several aircraft were proxy flown). The scoring also reaffirmed that Scale is an event which is really won in the workshop.

Static scores were pretty close in the top two-thirds of the field, with only 109 points separating fourth from tenth places! As one might suspect from such top-caliber entries, judging was severe. Steve Sauger's immaculate Fairchild got downgraded because of a never-before-detected flaw in its fuselage profile. There

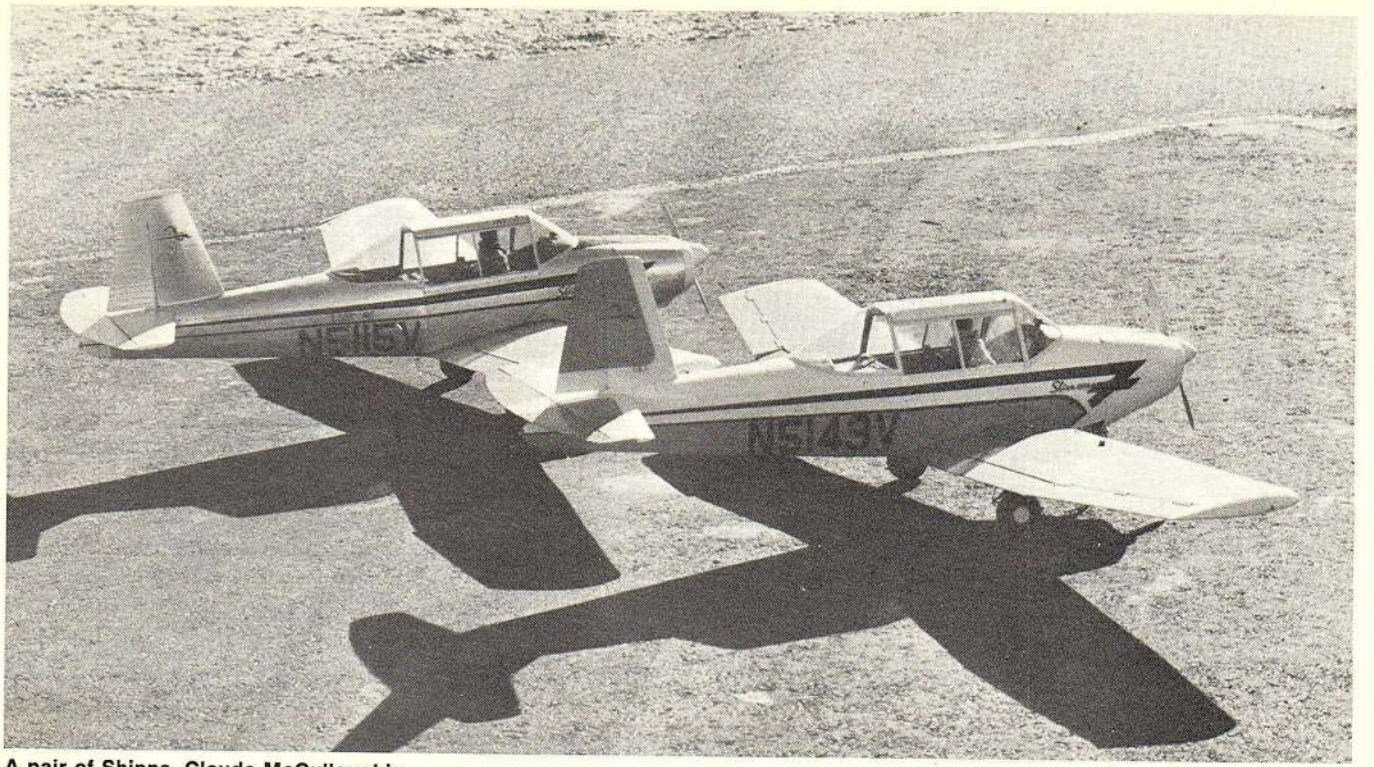
From England, Phil Moore's PZL Wilga was one of the most unusual subjects at the Tournament. Corrugated metal-like finish was most impressive. While second after the static judging, the Wilga slipped to third overall.



were even rumors that points were being deducted because the slots in screw heads were not at the correct angles!

Reigning Internats Champ Bob Nelitz showed 'em all what a near-perfect model should look like. His famed Chipmunk garnered 923.5 Fidelity points and 824 Craftsmanship points. Going into the flight portion of the event, Bob had a virtually unbeatable 218 point lead.

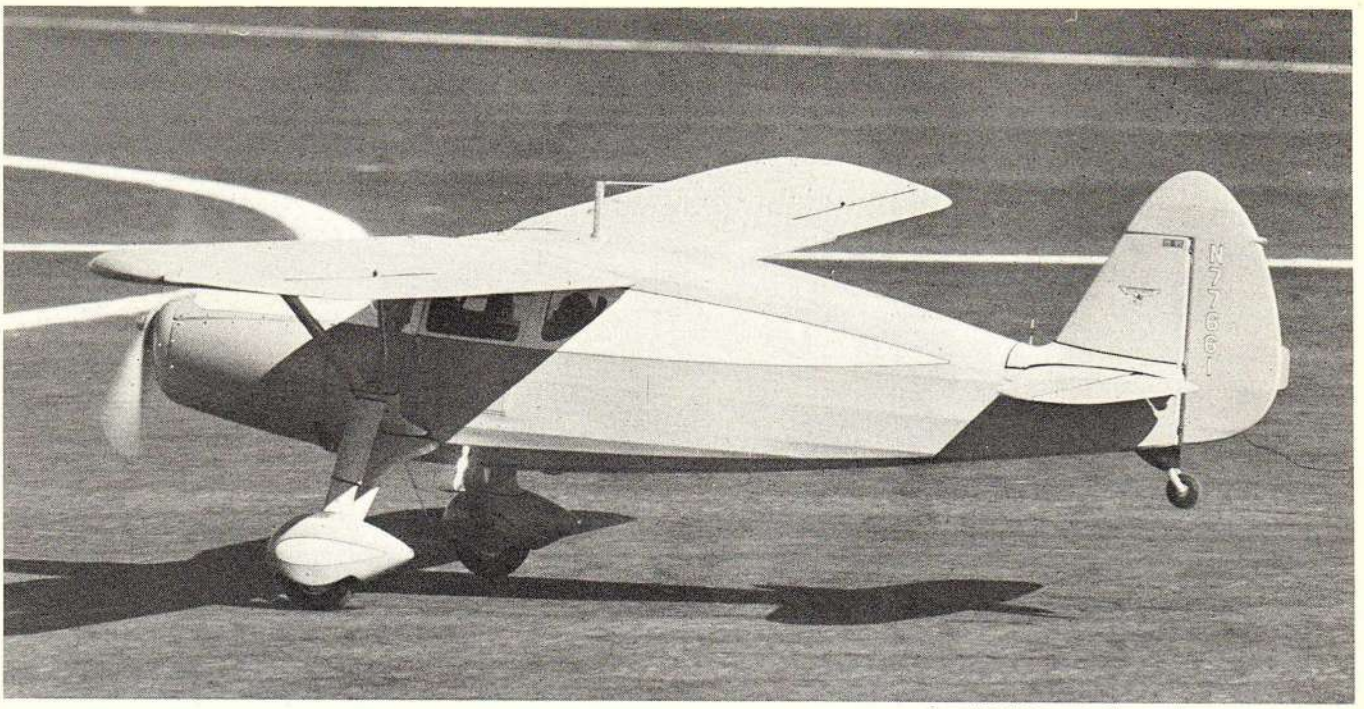
Phil Moore brought his unusual PZL Wilga from England. This Polish STOL aircraft was replete with corrugated skin and was detailed down to the most minute feature. The ship was duly awarded second place in static. The Wilga's flight performance was amazingly realistic (remember



A pair of Shinns. Claude McCullough's model (foreground) was proxy flown by Maxey Hester to fourth place, while Jerry Fingler's all-metal (!) version was right behind, in fifth. Jerry hails from Canada.

George Rose worked the engine overheating problems out of his classic Curtiss Hawk P-6E to capture sixth place.

that flight points were a lump-sum score of impression points for demonstrating prototype performance). With functional full leading edge slots, the Wilga virtually lept into the gusty air. The flight judges appreciated the slow, lumbering performance and awarded one of the



Our '78 Internats Scale team really got a surprise, when their entries wound up near the middle of the pack. Steve Sauger's Fairchild 22 had some problems on its first flight (repairable), and Bob Wischer got clobbered because of the K-factor in the static scoring system. Wound up seventh and eighth, respectively.

highest flight scores in the contest to Moore.

The first day of the scheduled two days of flying was cancelled because of the obnoxiously gusty Nevada winds. The only plane to even attempt a flight was Andy Sheber's ¼-scale Pitts "Big Stinker." The official entry was a ⅓-scale (!) Pitts S-2A (featured in *Scale R/C Modeler's* "Giant Scale Models" special issue) flew the next day. Convincingly realistic, the big Pitts really stole the show, especially when the scale smoke system was turned on. We predict that next year's Tournament will see a swing toward the larger models, with their attenuating benefits of better detailing and more flight "impression" points.

Even though '77 Nats winner Bob Wischer kept the pressure on with two of the best flights of the contest, and while Dave Platt stole second place from Phil Moore with a gorgeous .975 flight, Bob Nelitz was simply untouchable on the flight line. Posting the two highest flight scores of the meet (one was a .99), he proved that his skills as a pilot equalled his talents as a builder. His efforts netted him the first prize of $3,500!

But the contest itself seemed amazingly secondary. The wind and rain of the first three days only reinforced the almost round-the-clock get togethers inside the casino. One could literally spend day and night "rapping" with a bevy of the world's most talented and knowledgeable scale modelers. None of the usual mad contest rush to talk with so-and-so before he packed up for the day. Instead, you constantly were bumping into fliers and friends and felt no pressure to do anything more than find a quiet spot and chat. Such opportunities are rare at the average contest.

Perhaps the most moving, yet typical situation observed was the sportsmanlike gesture of the fliers when they presented the flight judges with commemorative music boxes. This exemplified the overall feeling of camaraderie which pervaded the Tournament. As Dave Platt summed it up: "This is the best contest I've been to in over thirty years of modeling." That's high praise from a veteran like Dave, and well-deserved appreciation for Model Airplane News and Circus-Circus Hotel/Casino, the co-sponsors of the Scale Tournament of Champions.

* * *

Just days before press time, we heard the unfortunate news that there will be no '78 Scale Tournament. This is regrettable. But a positive note is that next year's Vegas Pattern event stipulates scale or semi-scale models which will fly realistic prototype maneuvers. Thus, the long-term impact of Scale on the Las Vegas scene will make the '78 contest much more akin to Scale than Pattern. Still, the flavor and influence of a truly international exact-scale meet will be lost forever . . . and that's a great loss, indeed. □

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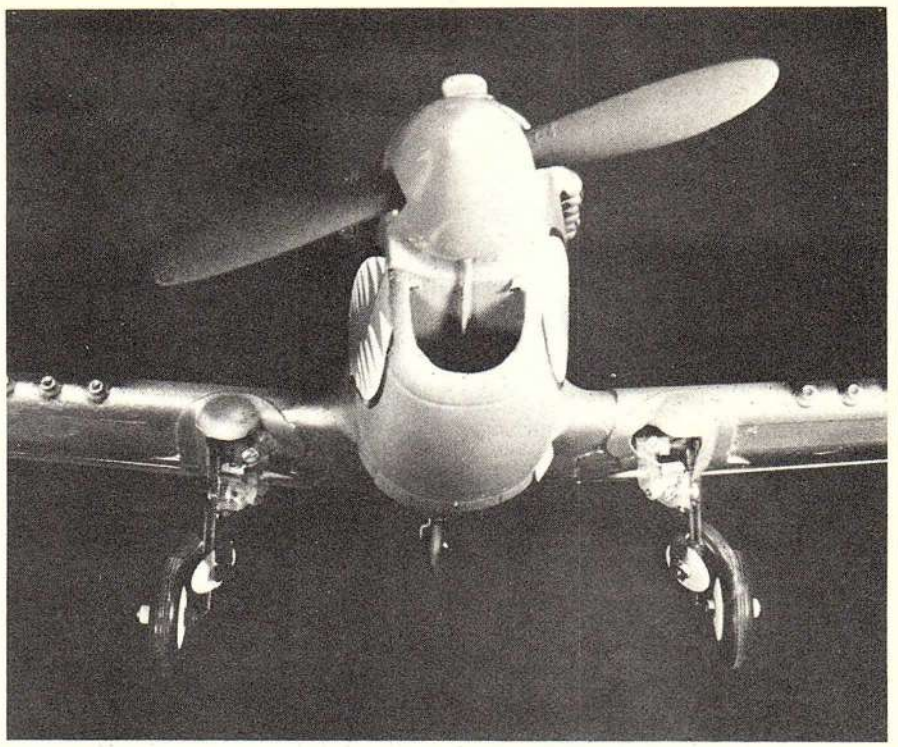
SHADES OF CHENNAULT

Our intrepid expert-in-residence for Schoolyard Scale takes an in-depth look at the only retract-equipped ½A kit on the market. The Model Merchant P-40 is all plastic and foam.

By George M. Chabot
Photos by J. R. Naidish



Look closely at the landing gear. Multiple-exposure photography captures rotation of gear as they fold back. That's scale!

One of the most identifiable WW II fighters is the Curtiss P-40, as it was popularized by Claire Chennault and the infamous "Flying Tigers." Actually somewhat of a dog, in comparison to the Mustang or Spitfire, the Warhawk was as rugged as a Corsair, and it's low-altitude maneuverability made it a natural for the Flying Tigers' search and destroy missions. Through the vigilante-style exploits of Chennault's team, every schoolboy can identify the "fighter with the shark's mouth." So illustrious an airplane deserves to be modeled in Schoolyard Scale.

The Model Merchant ½A P-40 is an attractive proposition for several reasons. What first attracted me to it was the amount of scale detail already on the molded pieces. The ABS plastic fuselage comes pre-joined, and is complete with panel lines and all the fine details needed to make the Warhawk attractive and realistic. When I found out that the model came with a set of functional scale rotating retracts, the proposition of building one was just too tempting to pass by.

When I got to the hobby shop to claim my long-awaited kit, I must admit that my envisioned expectations were somewhat disappointed. The P-40 is of all-plastic and foam construction, and I had some real problems trying to readjust my concepts of what a model airplane kit should look like.

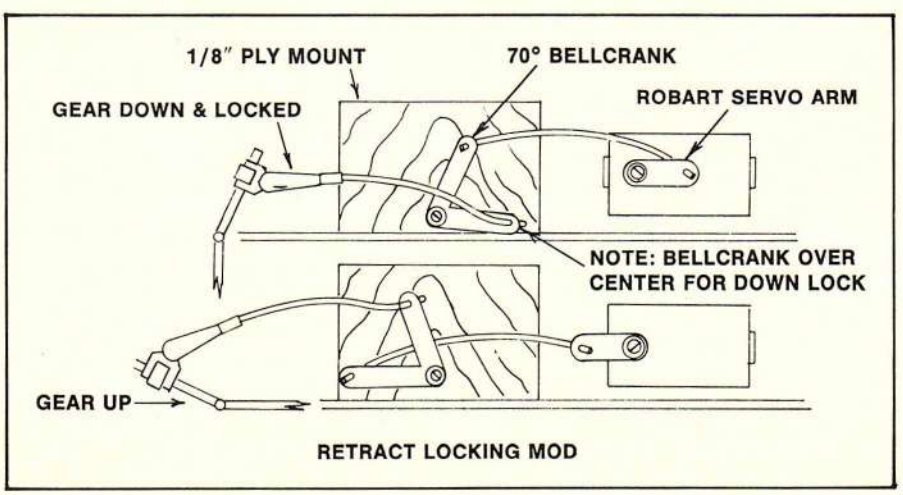
In the opened kit box before me was the above-mentioned fuse, and several sheets of vacuformed sub-assemblies (belly pan, chin cowl, wheel fairings, etc.). The wing parts turned out to be four sheets of a special-density foam, wood for the spar and trailing edge, and a formed-plastic leading edge. How could all this plastic and foam produce that gorgeous camouflage P-40 I had seen in the ads? Oh well, I groaned, you asked for it and you got it!

I went home and threw the kit in the corner. That evening, I casually thumbed through the photo-illustrated instruction booklet. About halfway through the pages, a light suddenly went on in my head. My initial disappointment had actually grown out of some previous bad experiences with plastic models. I had even owned a Cox control-line P-40 . . . and I never did get it to fly. There I was, a plastics bigot!

I pulled out the kit box and made a conscientious effort to re-evaluate the product on a more objective level. I played with the plastic pieces, cutting a few of them out and temporarily taping them in place. I immediately discovered that the various pans and cows totally hid the molding flange on the fuselage. The more parts I taped together, the better the plane looked. Within an hour or so, I had most of the components positioned and the P-40 looked really great!

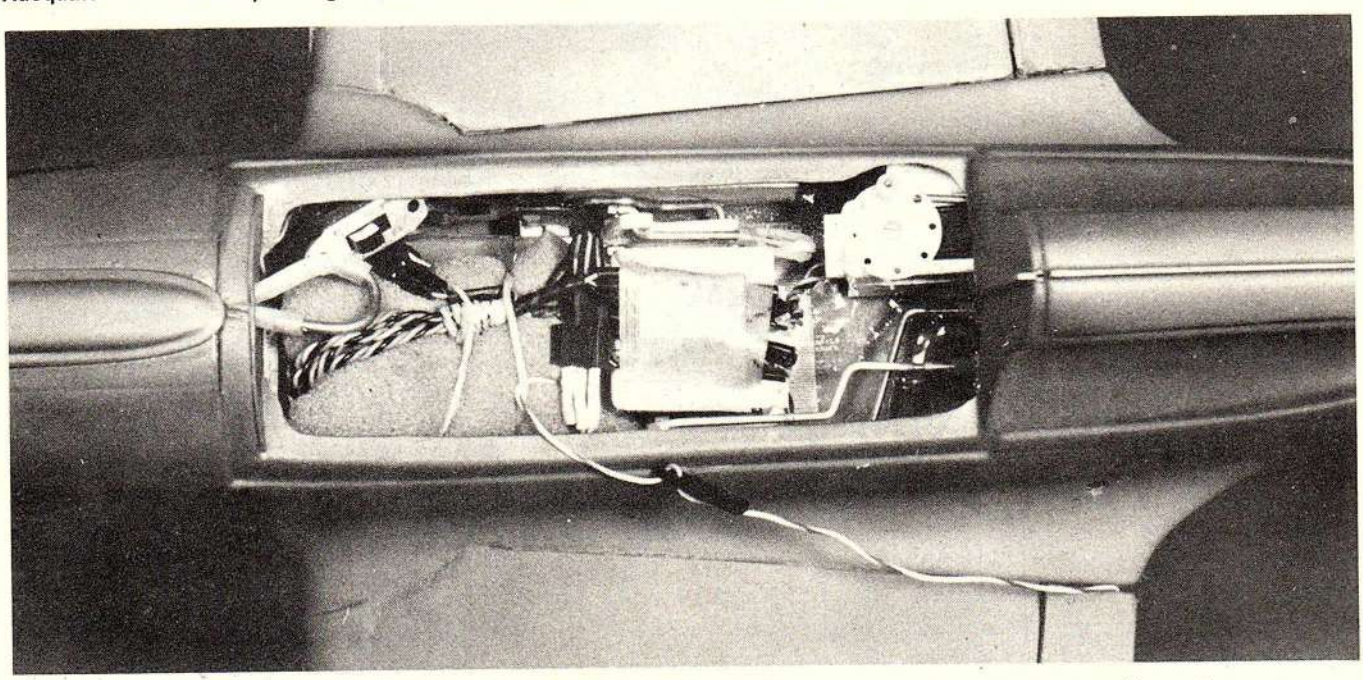
I jumped into the project with renewed faith. — and with a lesson learned. The superficial looks of a bunch of pieces in a kit box can be very deceiving. To have passed up the Warhawk because of a mistaken first impression would have been a sad mistake, indeed.

Once I completed the project, I more thoroughly understood what

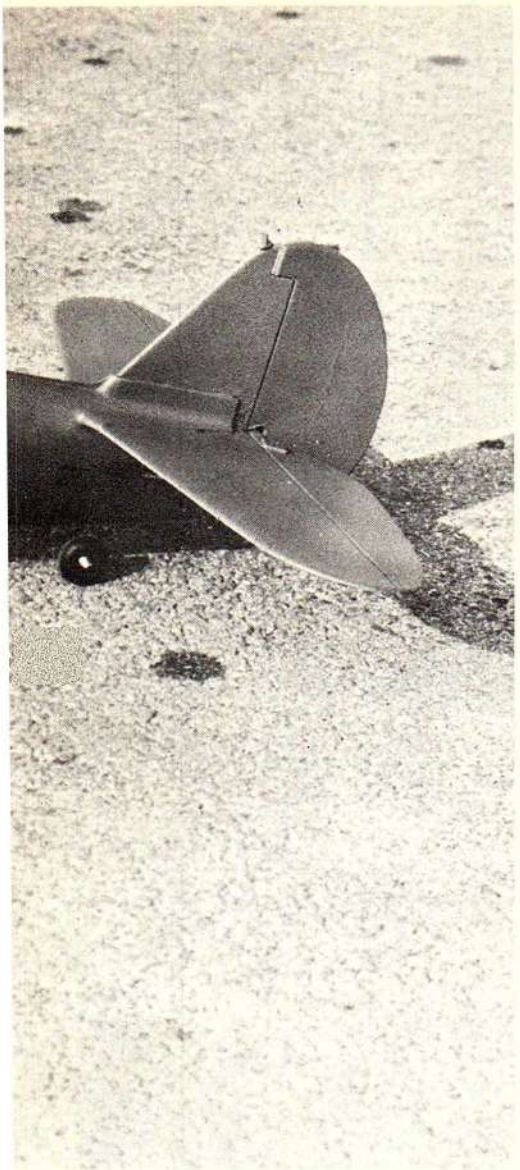


RETRACT LOCKING MOD

Adequate moments and pleasing lines of this mini-fighter make it an excellent Schoolyard Scale subject.



Radio installation is crowded, yet easy to do on servo mounting plate provided. Ace's Micro system used with good success. Access through cockpit allows permanently mounted wing.



the manufacturer was driving at with so radical a kit design. The extensive use of plastic really speeds construction, since all the parts are essentially done as they come out of the box. Time spent in carving, contouring, shaping and sanding is eliminated. The model is also ready for painting, without a lot of filling and priming. A straight airplane is almost guaranteed, and it's hard to build up extra weight when all the pieces are pre-fabricated. A fringe benefit is that, since there is no balsa dust and related mess, the P-40 can be assembled right in the living room.

All this isn't to say that the Warhawk kit isn't without fault. The photos in the instruction book are a little vague, but anyone who has built a plane before will have no trouble following the written text. Handling the plastic may be unfamiliar to most, but if you use sharp scissors to remove the pieces from their sheets, it will go easily. Always cut the pieces oversized, then use

sandpaper to bring them down to their final outlines.

The P-40 is designed to be a one-piece airplane. The wings, which are so simple that they can be completed in an evening, are permanently glued onto shoulder flanges molded into the fuselage. How do you install the radio? All the linkages (even the retracts are put in through the spacious cockpit cutout. This yields a very rugged model, which is still easy to service and maintain. This is one of the most intelligent ways to build a model I've ever seen.

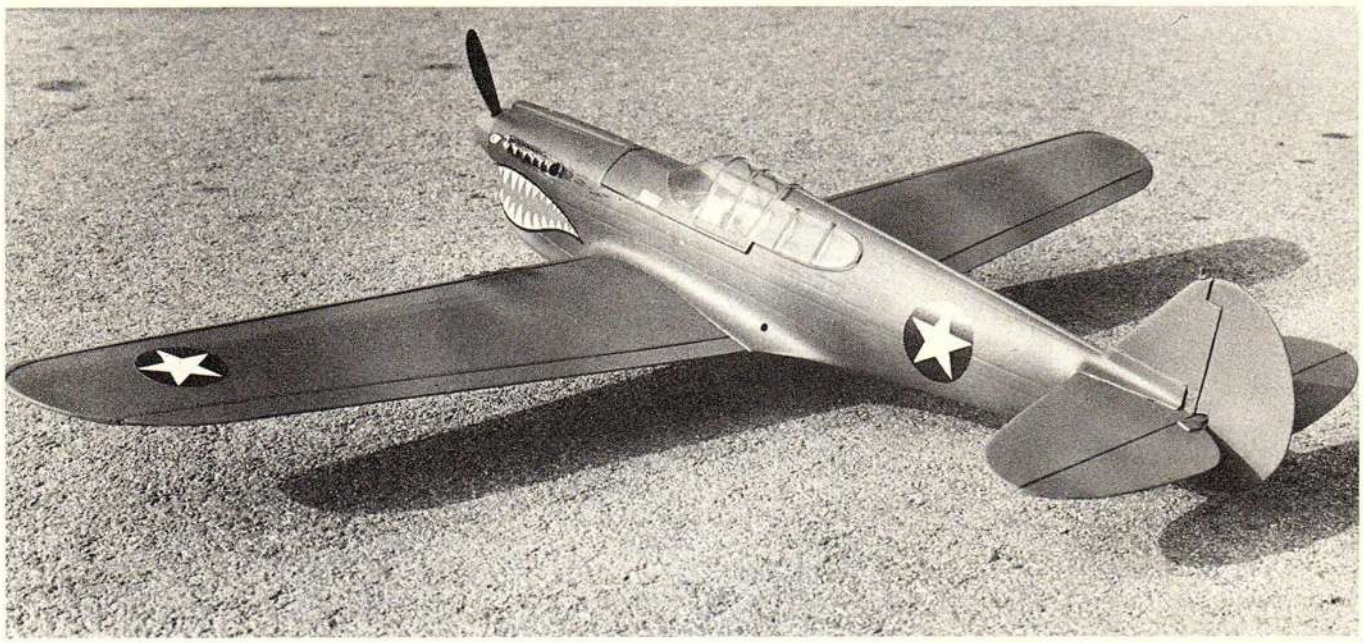
As you get into the kit, you'll appreciate things like the radio installation tray, which provides a flat area onto which the servos are taped. Three of Ace's Micro servos just fit in the fuselage. The kit also includes its own aluminum engine mount, and there's a set of "press-apply" decals, as well.

The retracts, a major innovation in ½A kits, work great. The wheels actually rotate as the gear fold back into the wing. In use, however, I found the system somewhat flimsy. After a talk with the manufacturer, they assured us that future kits will have an improved mechanism.

If you have one of the early kits, we'd recommend some basic mods for upgrading the retracts. Replace the main 3/32" gear wires with ⅛", using the old wire as a template. When bending the new wires, arrange the angle of the actuation arm inside the fuse so that it is vertical when the wheels are down. This keeps the servo pushrod at 90°. Use beefier bearings where the gear legs enter the fuselage, to eliminate wobble.

Grind the pin off a Du-Bro metal clevis, then drill a hole ⅛" farther back from the pin location. Make this hole just large enough to accept a 2-56 bolt. Redrill the hole in the Du-Bro aileron connector which attaches to the gear pivot arm. The idea here is to get a better tongue-and-groove effect at this linkage connection, so don't hesitate to tighten down the nut and bolt . . . remember that the linkage just has to rotate sideways. These simple mods greatly improve the retract system, and they take only a few extra minutes.

To prevent transmitting any direct loads to the retract servo (a 180° servo is required), we engineered a simple, "over-center" lock with a 90° bellcrank. If you know how to reverse a servo, you can use the bellcrank in the normal way, instead of reversing it, as shown in the sketch.



Not bad for a "plastic" airplane! Wing area is generous, especially when the model comes out at about 24 ounces.

It took a grand total of five evenings to complete the Warhawk. It then took a weekend to apply the camouflage paint scheme and install the radio. We used a combination of R & S "Perfect Paint" and Pactra's "Formula-U" for the finish. These polyurethanes are highly recommended on the plastic and foam. Shades of Chennault! Once finished, the P-40 looked most convincing. There's no way in the world you could ever do justice to all those compound curves in balsa, and I'm glad I made the effort to build a plastic airplane.

FLYING

I set up the P-40 with coupled rudder and ailerons, by running another pushrod from one of the aileron linage arms. This isn't all that necessary, but it does help to have some ground steering with the retracts. Once completed, the Warhawk weighed only 24 ounces (that's with three servos!), so I guess the plastic and foam concept does make a difference. As with any Schoolyard Scale model, that Tee Dee should be strong (18,000 or more rpm). Don't hesitate to use tank pressure and high Nitro (60%).

Even with the wobbly undercarriage, the P-40 took off straight as an arrow, and broke ground in about 40 feet. The climb-out was substantial, and it was soon obvious that the Warhawk really scoots. With the gear up, it's a sight to behold, and there's a noticeable increase in speed. The instructions specify a rather forward C.G., and that's because the Center of Gravity shifts aft when the gears come up.

With a honking engine, there's almost no maneuver this little fighter won't do. All the guys at the field were impressed with the Warhawk . . . it's a stable machine, but definitely not intended for the inexperienced pilot. Popping the wheels in and out for touch-and-goes is really fun, and you really don't appreciate how much extra fun can be had with retracts until you try them.

In all, the Model Merchant P-40 is a revolutionary breakthrough in Schoolyard Scale engineering and technology. Not only are the scale retracts, when properly set up, a great feature, but the extensive use of plastic and foam make it an almost fool-proof building project. In this day of increasingly limited time for building airplanes, this quick-construction method may just be the way all models will be fabricated in the future. □

Who can take a sunrise, sprinkle it with dew;
Cover it in choc'late and a miracle or two? . . .
The Candy Man, the . . .

Candy Man

By Aldo Van Owen

Photos by J. R. Naidish

When young Charlie won a trip through Willy Wonka's scrumdidily-umstious Chocolate Factory, the kids (and heads, for different reasons) reveled in the lyrics of Sammy Davis, Jr.'s hit music. And it was early in 1975 that another Charlie (Beck, and friend Jim Modes) won himself the right to fly the Ooompa-Loompa of the pylon racing world . . . a real, live P-51 Mustang. Like a dream come true, Charlie and Jim were into the candy cane, sugar-sweet world of heavy-metal aviation. Their Mustang,

while costing lots more than a whole garden full of Willy Wonka bars, was immaculately maintained when they took ownership.

"Talk about your childhood wishes!" What red-blooded, adult-sized kid wouldn't want a toy like that?! The team never actually got too serious about racing the big machine, and the Mustang stayed pretty much stock throughout its racing career. True to form, they dolled up the exterior with a blazing red paint scheme. Jim wanted to dub the candy-apple colored P-51 "Big Red," but his wife prevailed and christened the racer "Candy Man."

At the time, they didn't realize that Sammy Davis, Jr.'s song had taken on a secondary connotation in the drug culture (pilots are such clean-livers). I guess you might say that they were hoping that the P-51 would be a real "pusher" on the race course! Charlie's wife completed the motif with a snazzy characterization of Sammy on the fuse sides.

The brief, two-year racing career of Number 77 wasn't what you'd call spectacular. The Mustang flew twice at both Reno and Mojave, taking a victory in the Medallion class and a third in one Championship race. But Candy Man was intended, all along, as a fun machine, and Jim never pushed the Allison at more than 85" of manifold pressure. At $15-$20,000 apiece for a new engine, the gamble just wasn't worth it.

Jim Modes, an ex-Mustang pilot from WW II, enjoyed not only weekend forays with "Candy Man," but he also pressed the P-51 into service as a CAP search-and-rescue plane on numerous occasions. The aircraft's high-altitude capabilities and speed made it a good choice for locating downed aircraft in the mountainous terrain of southern California.

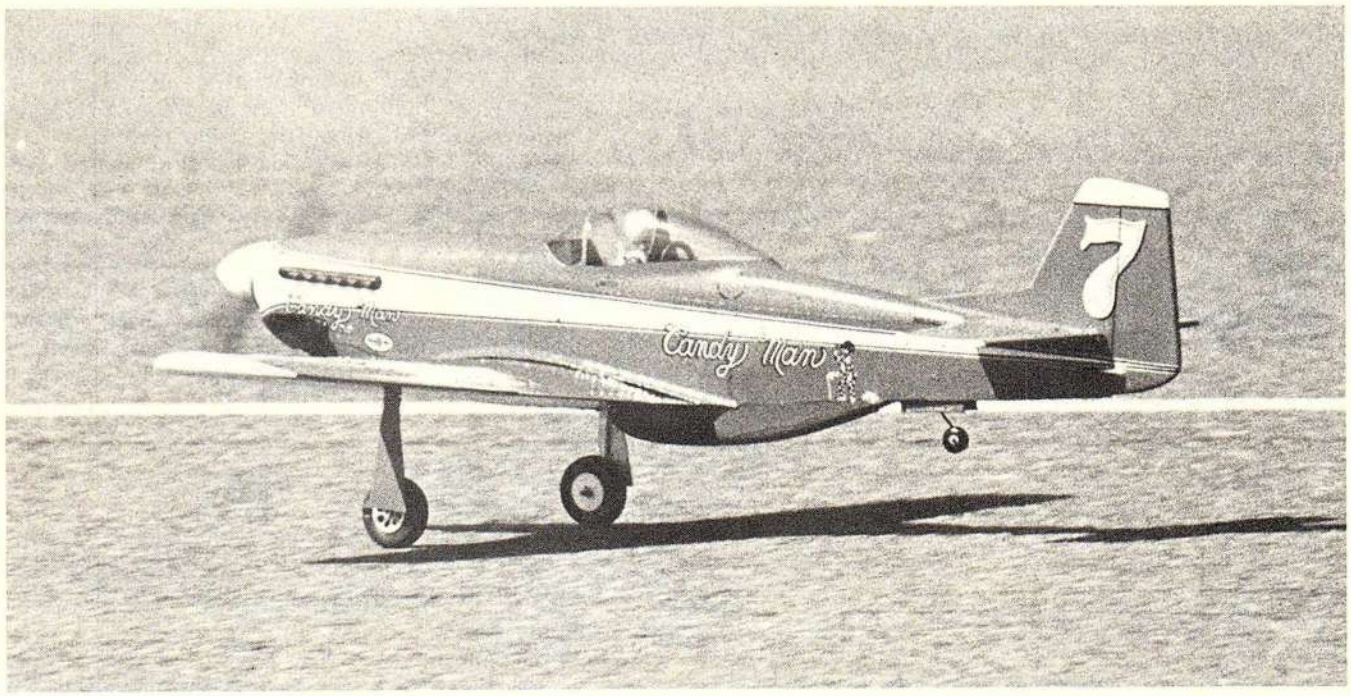
After two years, maintenance on the aircraft made operations a loosing proposition, and "Candy Man"

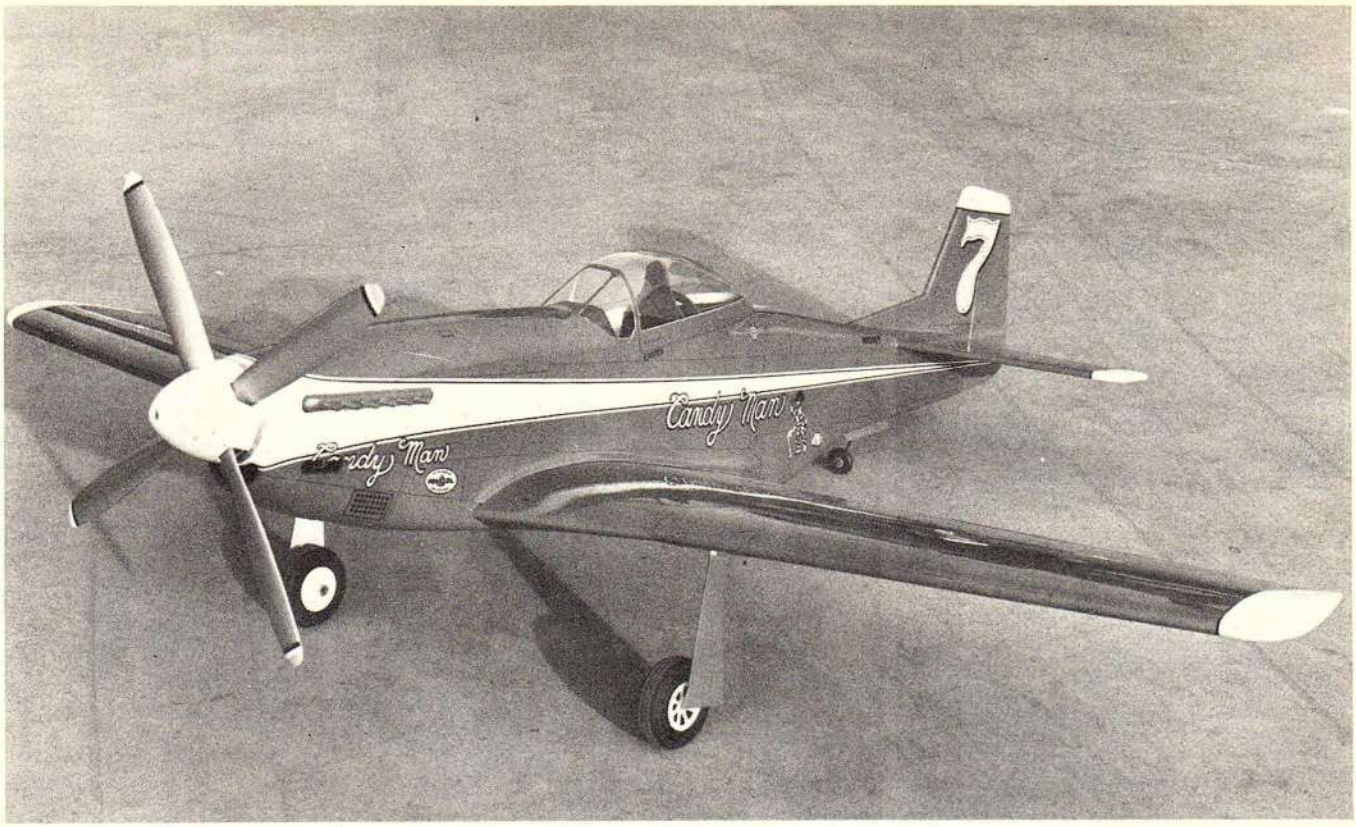
A dream of a Mustang come true. The House of Balsa kit is one of the nicest we've seen—much more than a mere box of balsa.

One of the P-51's best maneuvers is the perpetual "mains only" ground roll. The model will track straight as an arrow forever, with the tail high. Very docile for a taildragger.

was put up for sale. When the right party came up with the asking price of $67,000 (a real bargain in today's $100,000 Mustang market), the fire-engine red plane moved on to a new owner. "Candy Man" has since been divested of its colorful livery, but the machine can still be seen flying in the skies of northern California.

It took House of Balsa to make a personal dream come true. Last year, I did up one of their ½A P-51s in the dazzling "Candy Man" bright-red scheme. At the time, I really wanted a .40-sized copy of my mini-masterpiece. So, when I heard about the forthcoming kit last year, I persuaded (*browbeat is the word!* PHP) the Editor to get me one of the first kits. I managed to get one of the





The Mustang can be built in either the "D" or "H" versions, and retracts will fit easily. House of Balsa will soon release their own gear-folding system.

first boxes off the assembly line, and the wait was well worth it.

In the usual tradition of quality evident in all the House of Balsa airplanes, the Mustang kit box was literally packed with unusual and distinctive materials. What got my immediate attention were the fantastic decal sheets. There's one for the "Candy Man" racing version, plus another full sheet for various military renditions. The decals are paintable mylar; they go on great and look much better than the water-application types.

In conjunction with the decal sheets is a full complement of documentation materials. There's a color 3-view for the military version, as well as a convenient 3-view (for any of the variants). If you opt for the "Candy Man" motif, House of Balsa supplies an assortment of color photos . . . instant documentation portfolio!

One look at the plans and the builder will see an immediate similarity between this kit and the construction methods of the ½A version. A very concise instruction booklet, illustrated with over 100 step-by-step photos, makes assembly an easy proposition. The wing is built-up and fully sheeted, and the builder has the choice of constructing either the "D" or the straight-leading-edged "H" variant.

The landing gear blocks are a nice improvement, with nylon inserts for the upright retaining wire. This eliminates that inevitable gear wobble which results with the traditional all-wood blocks. While I didn't opt for retracts, it looks as if some of the smaller commercial units, such as the Rhom FAI, would fit in the relatively thin wing. House of Balsa just might have their own intermediate-sized retracts out by the time you read this.

The fuselage is a fast builder. Just frame up the sides, add the blocks for the nose areas, insert the molded canopy and turtle deck area and you're ready for sanding. The chin block is a full-depth hatch, for simple access to the entire engine and tank areas. The nose profile is narrow enough that a muffler can be hung outside the fuselage. A standard CB spinner caps the nose.

The kit box states that the P-51

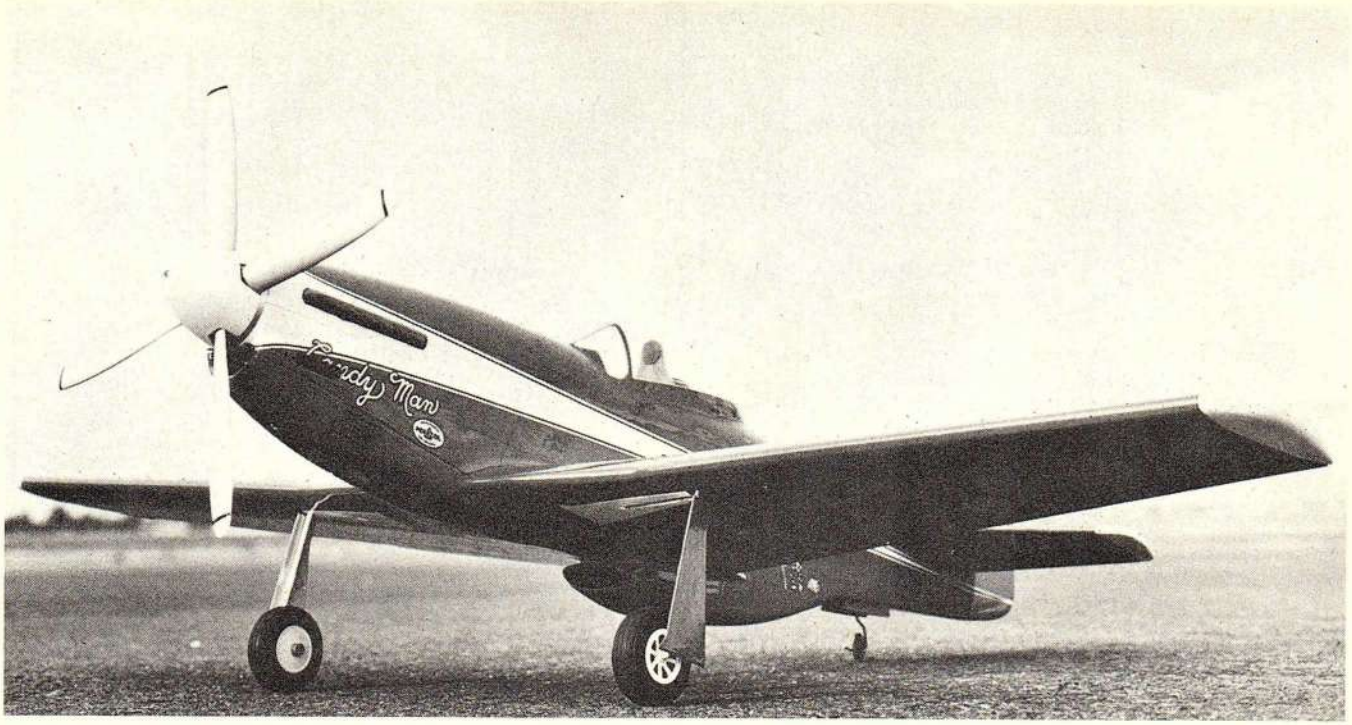
Clawing for sky, the .40-powered ship was a real go-getter. An extremely well-balanced machine.

can be flown on any .29-.40 engine. A .29 would probably be all right, but a .35 would make a better choice. With a .40, especially if your bird comes out light, it might be a little hot. Naturally, if you're after high-performance aerobatics, the .40 is the best choice. For my average piloting skills, the .35 turned out to be a fine choice, but make sure your bird weighs in at less than 5 lbs.

Back to construction. The wing fillets are done just like the ½A ships, with paper. This method is simple, easy and quick. The tailfeathers are sheet balsa, so there's nothing difficult there. The coupled tailwheel is simplified by using two pushrods to the rudder servo. This is certainly a smart approach to this tricky problem, and it's a wonder I didn't think of it before.

There's lots of room for the radio installation, and three standard servos will fit nicely across the fuselage. There will be no problem accommodating the extra paraphernalia for flaps and retracts, as well. The overall parts fit is superb, as anyone who has built any of the House of Balsa kits can attest. It took just two evenings to frame up the wing, and another three to get the fuselage and attenuating equipment ready for the finishing stages.

I understand that we're in for a rare treat, since the Editor himself is going to honor us with a personal flight report (I honestly didn't even think he was coordinated enough to walk, yet alone fly a plane!). In closing, let me add that my Mustang handles like a well-balanced gyroscope. The P-51 only confirms my feeling that everything House of Balsa makes is, just like Willy Wonka sings, "satisfying and delicious"



Even the ground angle of the P-51 is right on. Outlines are very good for competitive Sport Scale events.

FLIGHT REPORT

By Patrick H. Potega
Executive Editor

I hate to steal the show from our illustrious author, but I did have the opportunity to fly not one, but two of the Mustangs. One was a real "beater," having been used for R&D (Rekitting and Destroying) and was powered by an old dog of an Enya .35. The second ship was a mint-condition, racing .40-powered "Candy Man."

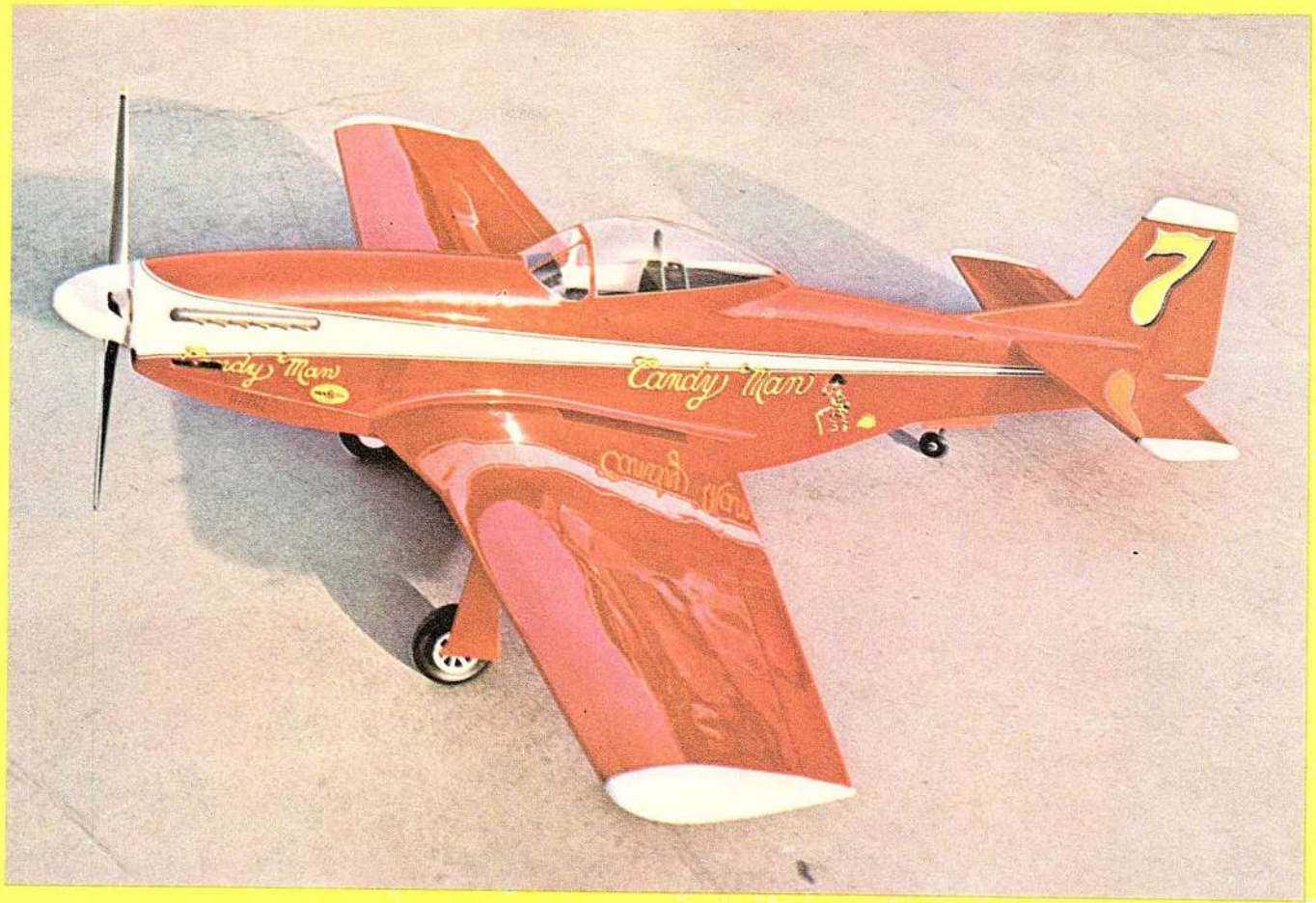
The old chug-a-chug was put up first (I don't really think that the owners believed that I could really fly R/C). Right off the bat, I was impressed with the exceptional ground handling of this taildragger. Tail high, the P-51 would literally roll along forever on the mains, with no tendencies to veer or nose over. This little trick got to be so much fun that I was soon doing "extended" touch-and-goes, with a 30-yard roll before lift-off.

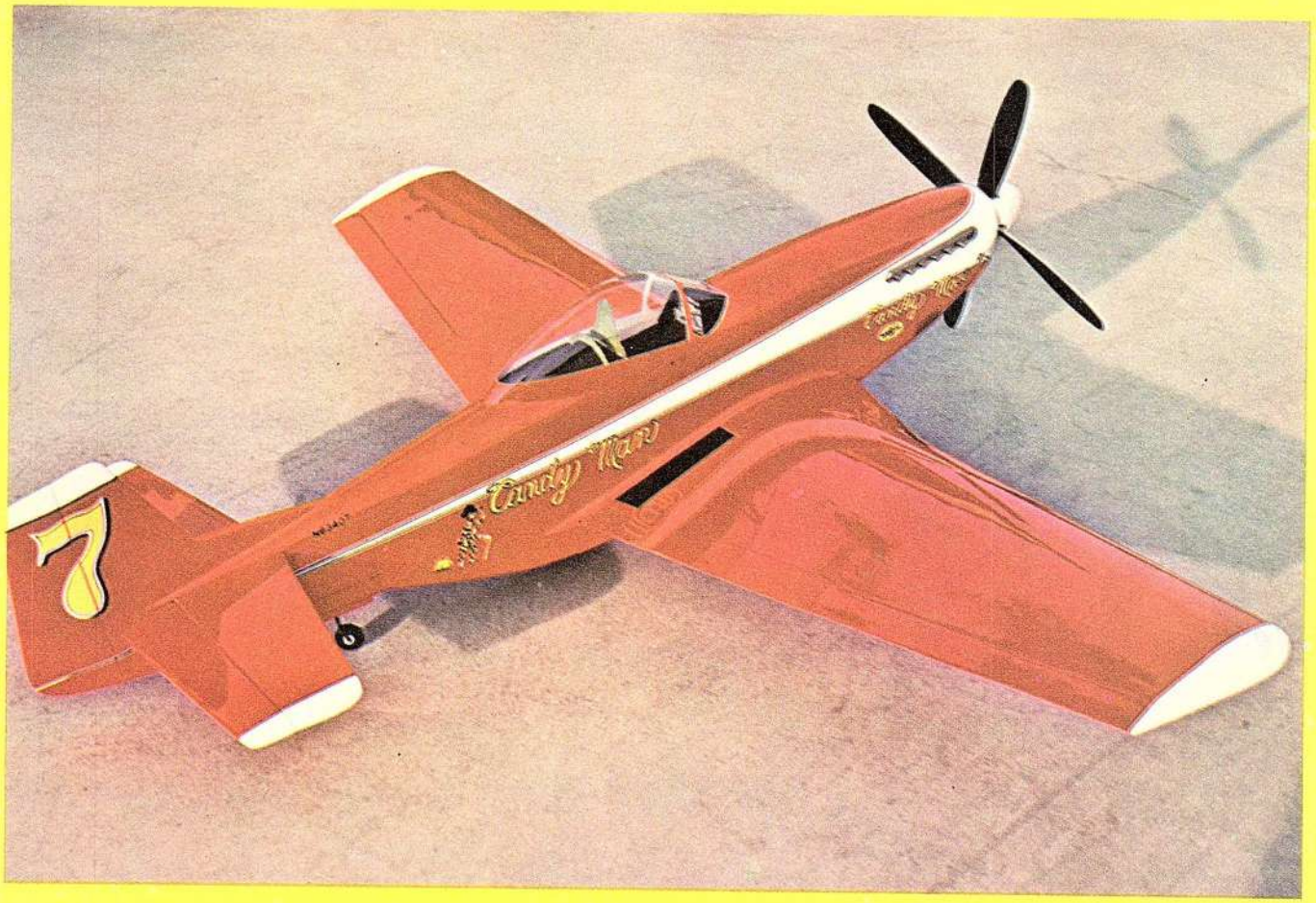
Once airborne, the only way to really describe the P-51 was "well-balanced." The Mustang was one of the nicest airplanes I've flown, in terms of control feel and coordination. We've all had models, even the best Pattern designs, that required more pitch control than yaw, or vice versa; but the Mustang was a happy blend of balance and sensitivity. It's just one of those rare designs that flies so well that the pilot looks even better than he is.

The .35-powered ship was a tad overweight, from so many repairs, yet it was very comfortable and maneuvered very nicely . . . lacking only the guts for the sheer vertical maneuvers. The .40-engine plane was a firecracker, and it would do anything in the books with almost no effort. For the average weekend flier, I'd recommend the .35. If you have a stock, non-racing .40, the effect would be the same. Just remember that the kit will normally come out at less than 5 pounds, so it weighs less than a Formula I racer.

To look authentic, the P-51 sports a rather thin-looking wing section, so it really came as a shock to see how well the plane handled in slow flight. A couple of times I was too long on final and wound up literally hovering over the runway at about ¼-throttle. The machine never wavered and resembled a sailplane floating in a slight breeze. The only word for it is docile.

This spritely 49" span ship is an agile performer, yet I never felt as if the plane was getting ahead of me. I walked away with the impression that anyone who could handle an intermediate Pattern tariner would find the P-51 an enjoyable model. □


Candy Man
7


Candy Man
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Concours d'Elegance

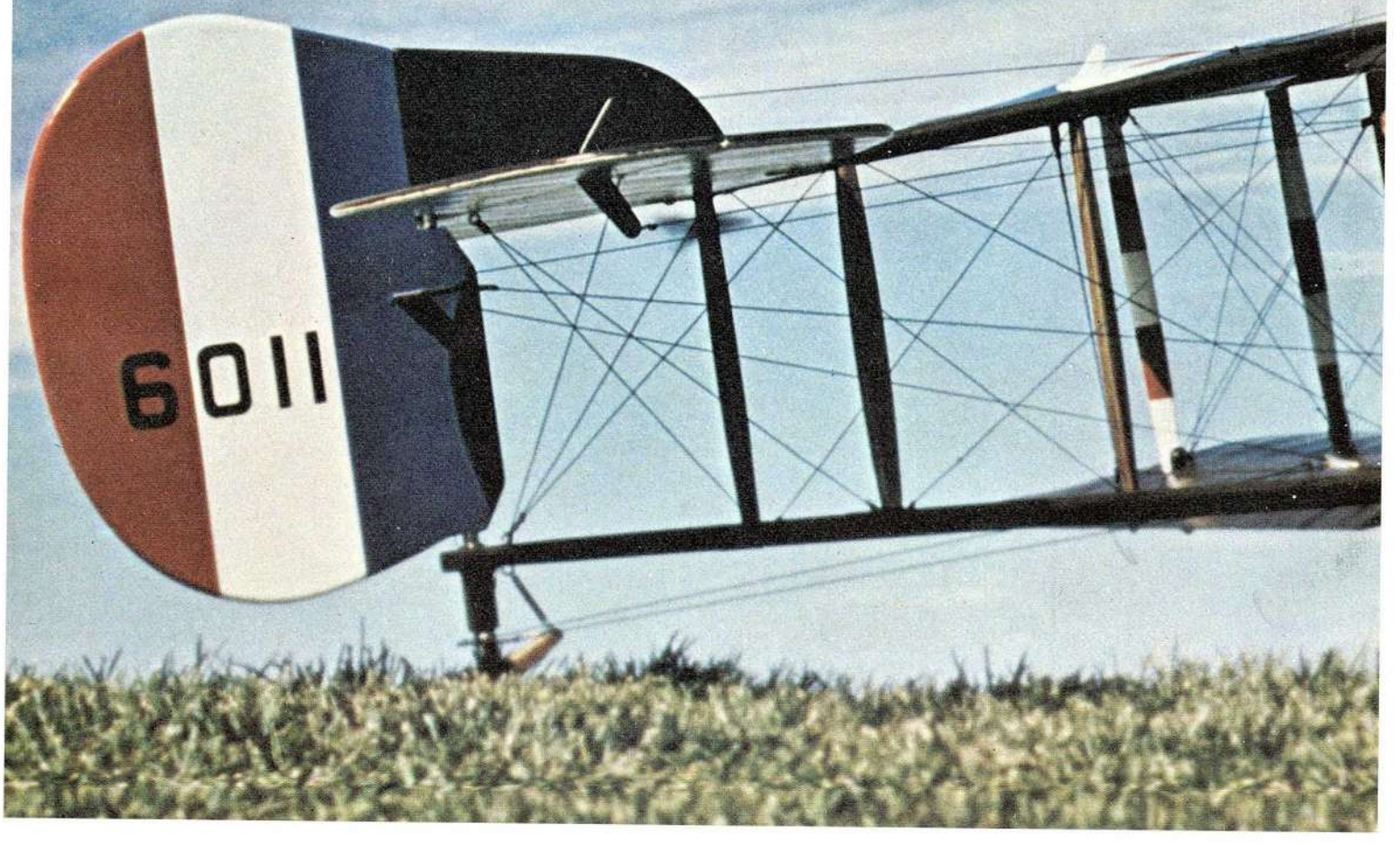
CONCOURS D'ELEGANCE

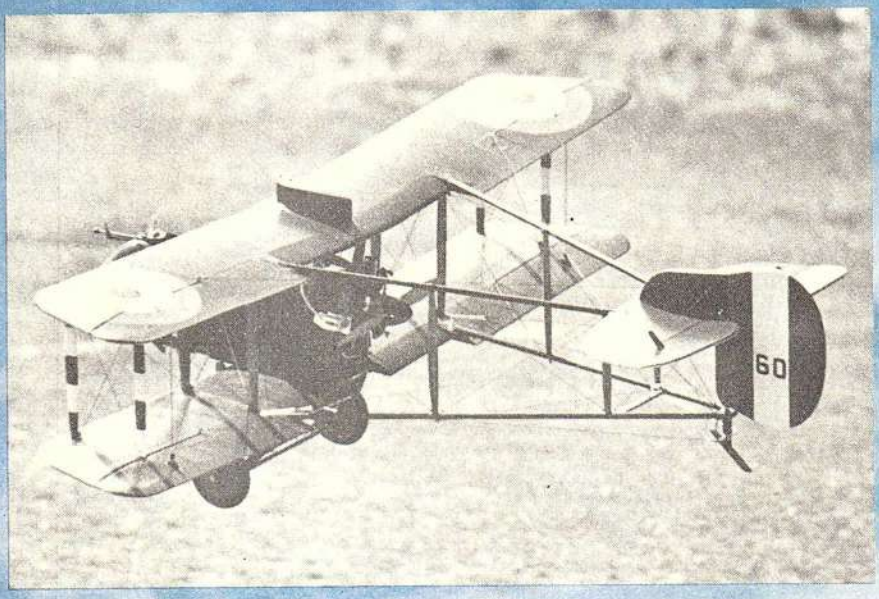
Steve Atwater's finely detailed and superbly rendered R/C miniature of the de-Havilland D.H. 2 is a classic specimen of the true scale modelers' art. A 600 hour labor of love, the project required five rolls of dial chord just to execute the spider web of rigging. Each wire is functional in this one-piece model, since the rigging keeps the dowel-rod tail booms from warping.

At 12 pounds, the H.P. .61-powered de Havilland flies at a rather heavy 28 ozs./sq. ft. Flight speeds are realistic, and the model really lumbers through the loops . . . much like the prototype must have. The 12-6 pusher prop was donated by a friend, which saved Steve the difficulty of running the engine backward. The LeRhone engine is from the Williams Bros. kit. The finish is SuperPoxy over Super Coverite.

As an AMA entry, the model suffers from one problem. In order to fit the model into his car, Atwater had to clip 6″ off the wings! Quite a concession to make, especially since the remainder of the model is still built to the original 2″ = 1′ scale . . . there is just no simple way to break down the plane for transportation. This qualifies the D.H. 2 as an anomaly, in being a non-exact scale AMA Scale model!

In spite of that, the de Havilland is an exquisite scale miniature, and a tribute to the modeling talents of its builder. □





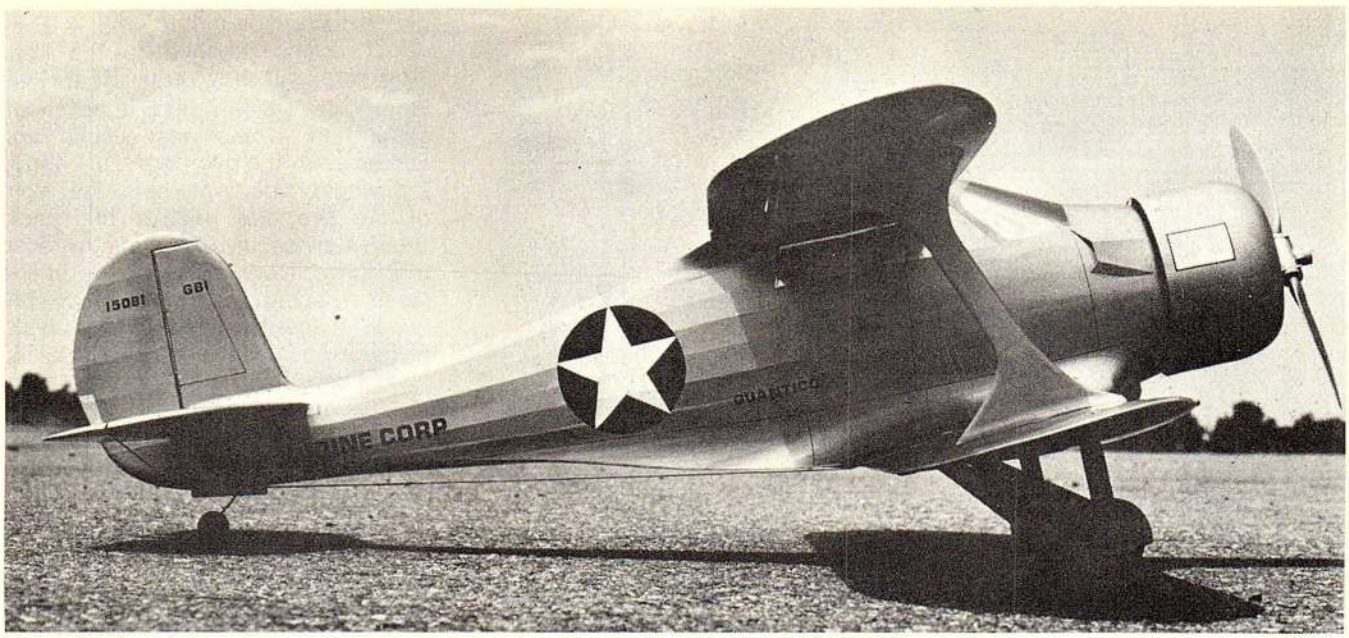
A salute to the "Hill Country Craftsmanship Award" recipient of last year's WW I Jamboree.

Text and photos by J. R. Naidish

MR. BEECH'S STAGGERING STAGGERWING

Walt Beech's two-winged wonder of the '30s was faster than most contemporary fighters. Today his Model 17 is one of the most cherished of antique aircraft, and the Royal kit brilliantly captures the elan of this prized "Golden Age" classic.

By Col. Bob Thacker
Photos by J. R. Naidish



How's this for Accuracy of Outline? Actually, the full-size D-17S is probably less accurate to factory specs around the cowl area than the model! (Full-size aircraft photo from SR/CM files)

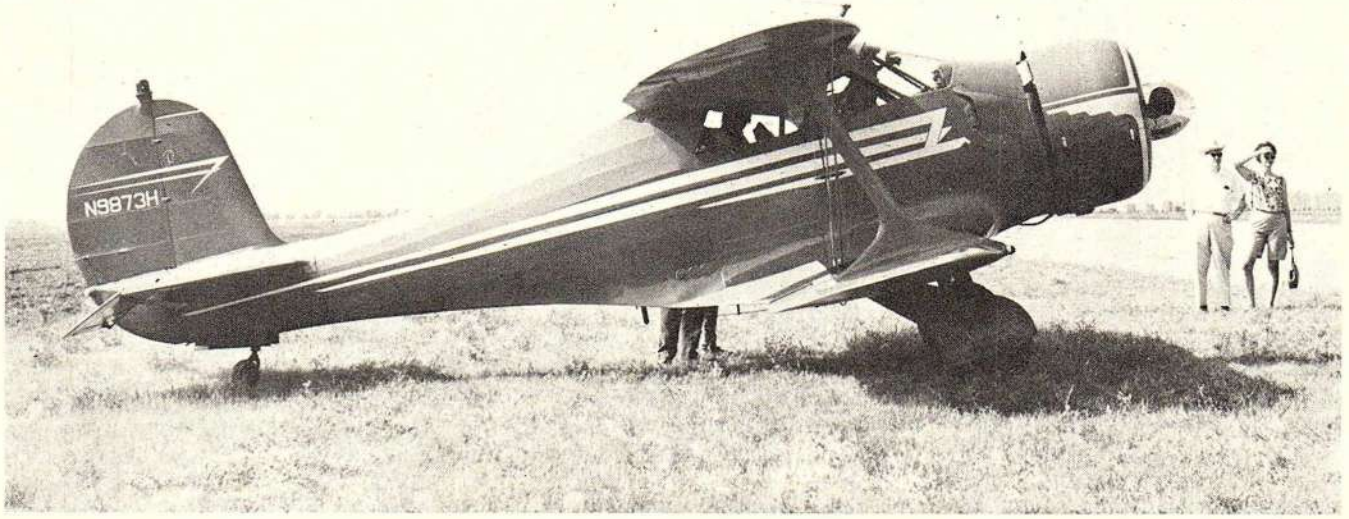
1940 found the Navy and Army Air Corps in the market for a small utility aircraft . . . something for the bigwigs to tool around in. Since the Beech Staggerwing was faster than many fighters, it seemed a logical choice. A batch of D17s were ordered, under the military designation UC-43 (nicknamed Traveler). The Staggerwing has always been a sentimental favorite of mine, but finding one in military markings was too much to resist.

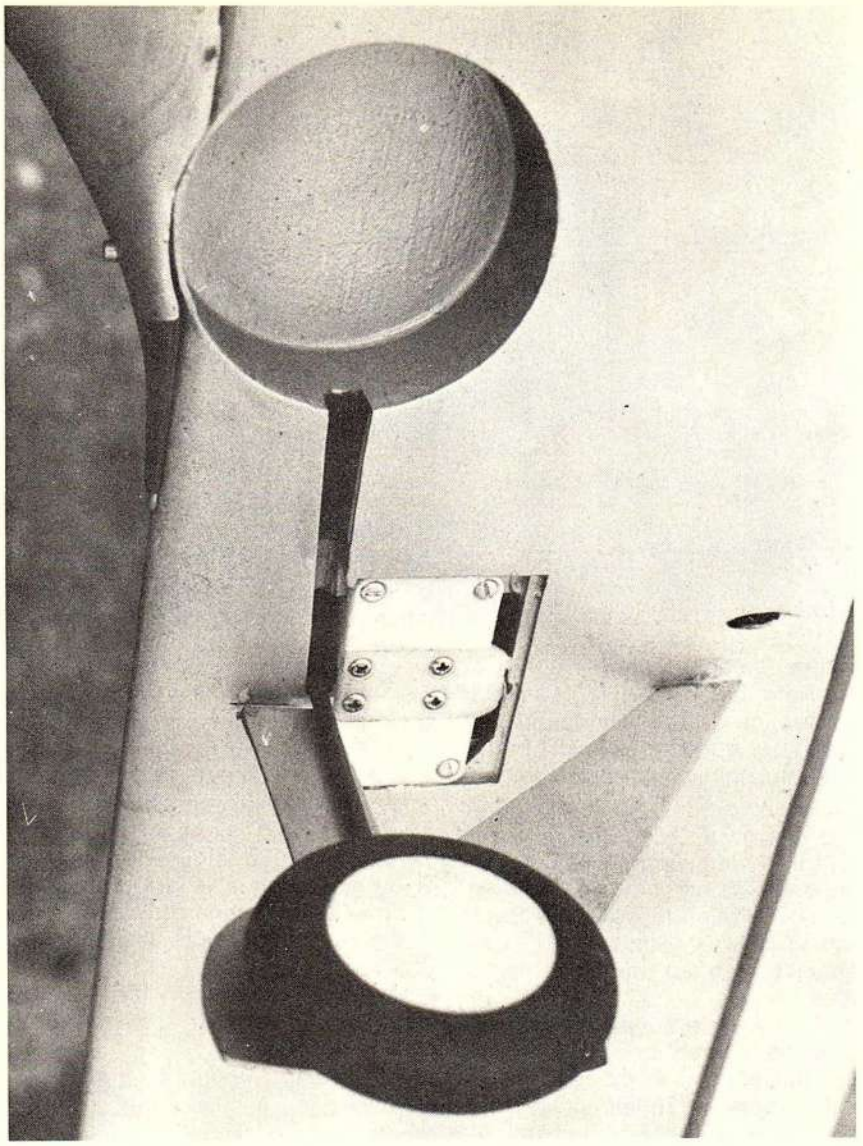
The psychology of selecting a design, be it scratchbuilt or a kit, is very important. After I had designed, engineered and scratchbuilt my de Havilland 88 "Comet" (*Scale R/C Modeler's* "Bonus" issue) for last year's Nats, I was a prime candidate for something a little less complex—maybe even mundane. While I had a lot of fun executing the de Havilland, it was a vicious model to fly at 47 oz./sq. ft. In a way, I'm glad it's gone. I was really up tight about even flying such a lethal weapon. When I saw how straightforward the Royal Beech 17 kit was, I knew I had found my next love affair (model type, of course).

The Royal kit is a typical Japanese presentation when it comes to the plans, but a little study reveals the obvious. There are no hidden secrets. The wood is first class, and the fittings are excellently produced. The fuselage formers are all ⅛" plywood. The average modeler will do quite well with this box full of goodies.

The fuse sort of builds right in your lap. The pre-cut bulkheads make the whole thing a matter of just getting the pieces in the right places. Tack a piece here, a piece there. Hit each joint with cyanoacrylate for temporary alignment. Add a stringer here, another there. When it starts looking like an airplane's body, go over all the glue joints with aliphetic glue for added strength. One little catch . . . remember to cut a hole in the bulkhead where the tank will go. Guess who didn't, and wound up practically standing on his head to make this cutout in the closed-up nose area?

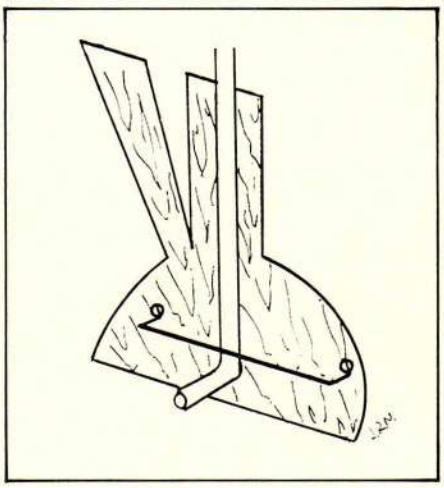
If you enjoyed the fuselage, and were amazed at how quickly it went together, then you'll be glad you have some extra time to dedicate to the bottom wing. If you aren't going to use retracts, I have two opinions. First, you're missing a good bet and, secondly, you're missing a good bet! Since the plans don't show modern





Detail of Col. Thacker's retract installation, which is fully explained in the text. This area of the kit requires some modifications.

ply gear doors is a little unique. They aren't firmly attached to the gear strut wire, but they rather float. This is important, since there is no shock absorption in the gear itself. Drill two holes in the gear door just above the wheel axle, one near the front of the tire and one at the back. Bend a piece of .074 piano wire so that there are two 90° bends at the same spacing as the distance between these two holes. Then bend a loop on each end about 3/16″ from each end. These loops accept the two bolts, while the gear strut is captured inside the wire, between



DETAIL OF GEAR DOOR ARRANGEMENT, AS DESCRIBED IN THE TEXT.

retracts, I was pretty much on my own. I measured the wing's maximum thickness . . . 1." I measured the Goldbergs retracts . . .1"! I wanted to use the Goldbergs not only because they have a very positive retraction sequence, but because I just happened to have a set. The only course of action was to modify the height of the retract mechanism.

This project requires relocating the wing spars backward about ¼″, so that there's room for the linkages. The retract servo is buried in the center section, ahead of the spar. Use spruce for the new spars, and be sure to add vertical grain sheer webbing in all the bays.

The wheel wells will also disrupt the leading edge stock. I know this sounds risky, but just follow along. The actual wheel wells are built up from two laminations of 1/64″ ply. When these are properly cemented in place, they tie all the wing structure together again. I took the precaution of replacing the kit balsa sheet stock with 1/32″ ply to the outside of the wheel wells. When this is done, the wing becomes much stronger than the original, and the modifications are really minimally basic.

Lowering the profile of the Goldberg gear is also simple. Some whittling away at the nylon, then some filing and sanding is all that is necessary. Don't get carried away. Just remove about a sixteenth of an inch (the thickness of the top sheeting). You'll have to knock a hair off the top edges of the movable cam which locks the gear. Remember to shave both ends of this piece. Since the gear is almost literally butted against the leading edge stock, there is no room left for the shock-absorbing coils. Take out your wire bender and make the three simple bends necessary to fabricate a new straight-legged strut. You'll give up a little by not having any shock-absorbing system in the event of a botched landing, but the compromise is well worth it. This plane is just made for retracts, so take the time to put them in.

My method of attaching the 1/32″ it and the gear door. Now the wire strut can bounce around and slide back and forth in this "slot," without putting too much stress on the door. The wire naturally pulls the door up when the gear retract. Attach the doors to the wing with miniature piano-type hinges (available at craft stores), but be sure to use the variety which have a removable pin, so that removing the door for service is simplified.

At least the top wing is easy. I built it as per plan. The same is true of the empennage. You'll appreciate all this straightforward construction after the hassle with the retracts in the bottom wing. I've found that the Beech 17 flies much better with the gear cleaned up, so the long-term benefits override the short term problems. If you're going to fly this machine in contests, it's almost mandatory that the gear be retractable.

Since the Editor of this prestigious rag berated me soundly at my first contest with the Staggerwing, I must comment (in my own defense) about a few of the supposed "rules" of the

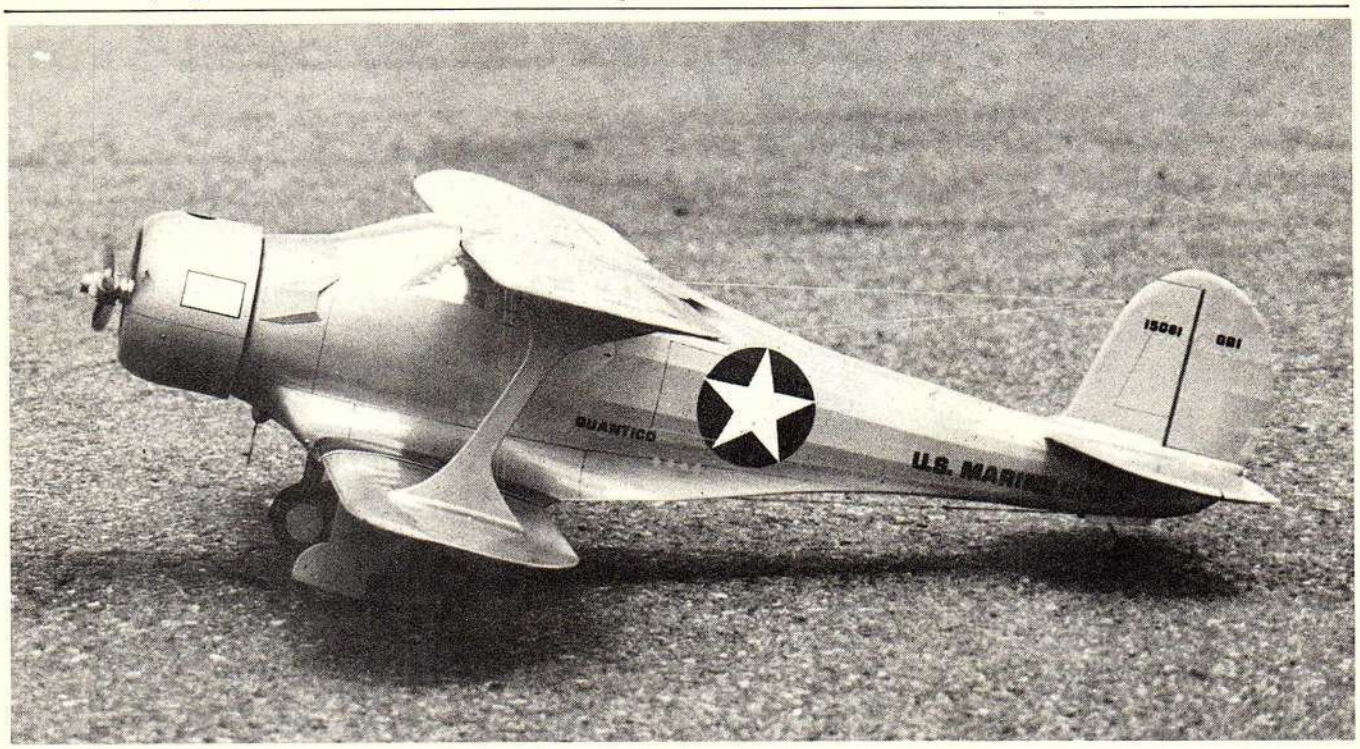
contest game. The first thing out of the Editor's mouth wasn't eloquent and flowing praise for my machine, but rather: "Where's the dummy engine?" As you can see in the photos, I did nothing inside the cowl to dress things up. I didn't feel I had to. This is supposed to be a Sport Scale model. The judges *aren't supposed* to judge such things as dummy engines, cockpit detail, etc. They are specifically instructed in the rule book to overlook these items.

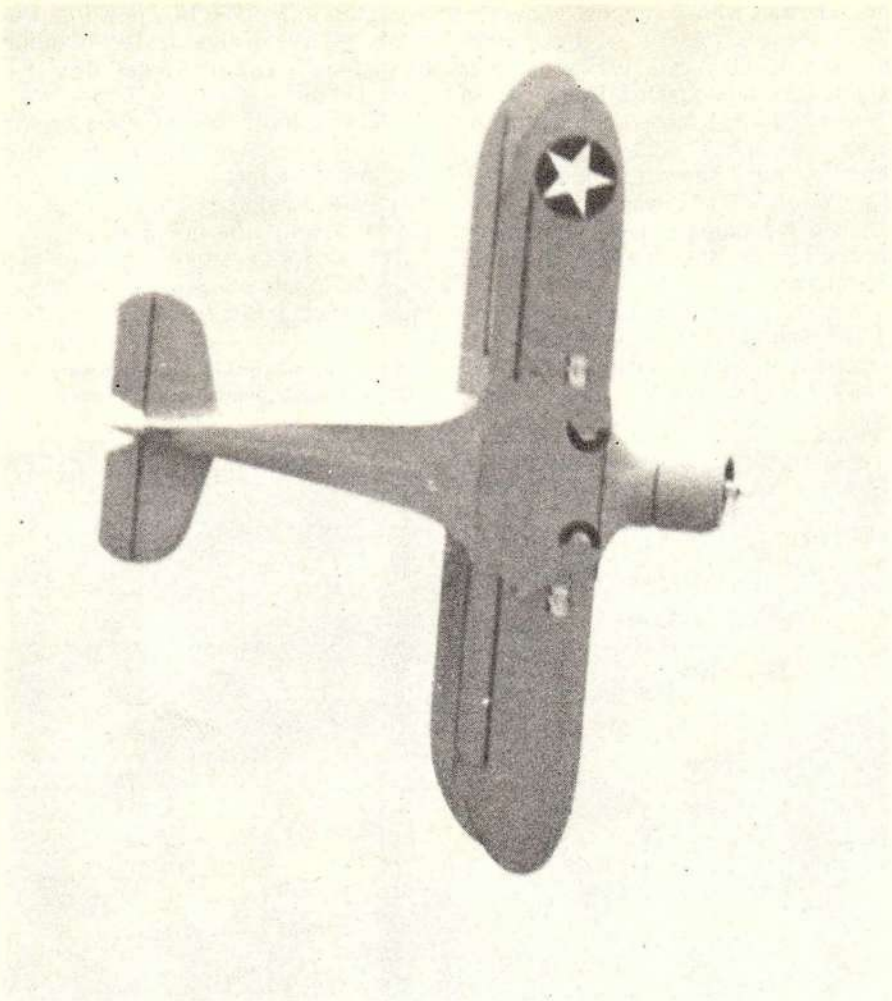
So I played the game. I made the windows from Chrome Monokote. All that the judges could see under the cowl were engine bearers. Wouldn't you know it . . . I got clobbered in static points. While I'll never admit that a magazine Editor could ever be right, I later decided to install a dummy engine. (*I may never be right, but I know a* faux pas *when I see one!* PHP). I guess that you have to play the contest game the way it is, not the way the rules say it should be played.

The covering method is nothing earthshaking. The open-bay wings are done in Super Coverite. This authentically simulates the original cloth covering. The metal areas are executed in Monokote. I'm a firm believer in using this mylar material to duplicate aircraft metal. The aircraft I modeled belonged to a Major General (note the two stars on the cowl), so one can assume that this "big-brass" airplane was kept in immaculate condition. To put weathering on it would be unnatural.

The Coverite areas received two brushed coats of SuperPoxy Clear, then a shot of SuperPoxy Silver. This

The reverse stagger is actually a very intelligent aerodynamic configuration for a bipe.





That distinctive profile could only be a Beech. A very clean airframe, which moves out at a nice speed.

is a metal flake paint, i.e., it achieves its color by minute pigments of synthetic metallized paint. Since agitator paint equipment is sophisticated and expensive, the standard hobby airbrushes need some care to spray it properly.

The metal pigments tend to clog the needle on internal mix guns, but this is lessened if the airbrush is kept spraying continuously. It also will help to thin the paint slightly more than normal. Panel and detail lines are done with a Rapido-Graph drafting pen. Dry-transfer letters make up the Marine markings. Monokote is used for metal access panels, etc. When everything is done, spray the whole model with a coat of Clear SuperPoxy.

This airplane is not set up zero-zero. The thrust arrangement is 1° downthrust and 3° right thrust. If I were to do it again, I'd opt for 4° side thrust, since I'm still carrying a touch of rudder trim. The wings are zero-zero, both to each other and the stab. With an all-up weight of only 8½ pounds (dry), there's little concern about wing loading problems. An O.S. Blackhead .60, swinging a 13-6 prop, provides the motivation. The initial flights were made with the C.G. about ½" ahead of that called for on the plans. Since then, I've moved this rearward about ¼", and the Staggerwing handles much better. Even when noseheavy, the model was still pleasantly aerobatic. There's about 6 ounces of lead under the cowl for C.G. purposes.

For those who concern themselves about such things, the control surface throws on my ship are as follows: elevator and rudder deflections are 25° either side of neutral. The ailerons have no differential, and there's about 20° of up and down travel. The flaps deflect downward 25°. I strongly urge anyone building this plane to do the flap number. They're just great for realistic takeoffs and landings. So let's trot off to the flying field for that first flight.

I always break in my engines right on the model. This gives everything a chance to shake loose or fail. It is especially important to help verify the correctness of the radio installation. The O.S. engine I installed had been setting in the box for almost two years. Things were so gummed up that it took an application of my heat gun to break the congealed oil that had frozen the piston into the sleeve. Maybe it was all that solidified oil that caused me some problems in breaking in the engine. After 4-5 tanks of fuel, it was reliable enough to try a flight.

Some people have different opinions of how to takeoff a taildragger. My method is to hold about a quarter up elevator for the first 10-12 feet of the takeoff roll. Concentrate on keeping the nose pointed straight. After this initial acceleration period, the up elevator input can be re-

With flaps and retracts, the Staggerwing makes a competitive Sport Scale subject, with plenty of flight performance.

laxed. The tail will come up of its own accord, but your primary task is to keep that model tracking down the white line. The Staggerwing does not groundloop readily, even with those rigid gear struts. A touch of up elevator will produce a smooth transition from ground to air.

After last year's Comet project, flying this pussycat of a conventional airplane was a real joy. What a relief to a veteran contest flier to have an honest airplane, with no twitchiness or nasty habits. In flight, the aileron response is snappy. Turns need a tad of rudder to keep the nose from dropping into the turn, but that's no big problem. As a matter of fact, the Beech 17 is a good aileron airplane, but it's when you're in a contest, trying to execute a picture-perfect Horizontal 8, that the rudder trim becomes noticeable.

I previously mentioned the importance and desirability of flaps for improved landing characteristics. The 25° of flap deflection is not very much—just enough to create some much needed drag (this is a clean airplane) without disturbing the lift capabilities of the lower wing. The plane noticeably ascends when the flaps are lowered if a bit of down trim is not fed in. Remember, the retracts ain't got no shock absorbing coils, so the slower and softer the Staggerwing can be made to contact *terra firma,* the happier the undercarriage will be. If you land hard, check the gear wires and make sure that the wheels still go cleanly up into the wells.

The flaps perform another critical function. They give effective washout at the tips of the lower wing. This aids stability on the flare out. The ailerons naturally get a little mushy at slow speeds, and the lowered flaps seem to help this. In the "dirty" configuration, the Staggerwing is a piece of cake to set gently on the runway. I've had over 40 flights on my bird, and each landing is a thing of beauty.

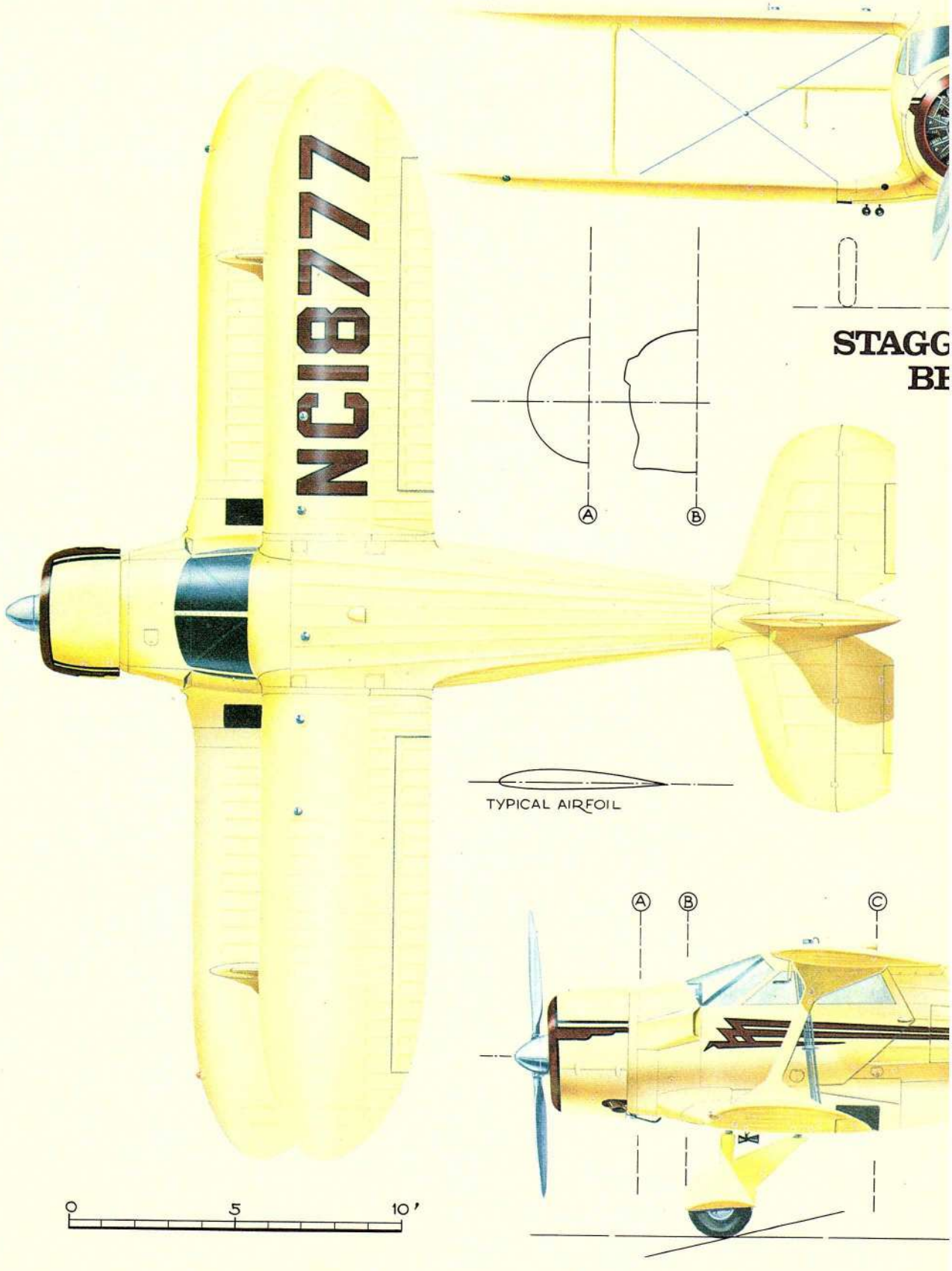
In spite of the Editor's remarks about the lack of engine detail, I still managed to trophy in my first contest with the Beech. It's a fine contest ship, when such factors as static points, flight performance, reliability and overall impression points are considered. With retracts and flaps, there are plenty of "gimmicks" to make it interesting and competitive. Bipes always look different enough to offer the contestant who flies one a subtle edge. The original Staggerwing was fully aerobatic, so optional maneuvers are limitless. It was also a 200+ mph airplane, so scale speeds are zippy . . . this is a big plus in windy or gusty conditions.

I'm glad I chose the Beech Staggerwing for all the reasons enumerated in this article. Maybe some of these factors will make you consider this Royal kit for your next project. If so, I hope you will enjoy yours as much as I have been delighted with my staggering Staggerwing.

* * *

SUPPLEMENTAL REPORT

I was really upset with the flight performance of my Staggerwing at the '77 Nats. Although the bipe had flown well in practice, the high heat (density altitude) and gusty winds at March AFB led to a situation where the Beech literally staggered around the sky. I was perplexed, so I went back to my private flying field (the military erroneously thinks *they* own Camp Pendleton), and conducted some experiments. Like magic, a 12-6 prop transformed my bipe into the sweetest flying, most stable airplane I've ever flown. I'd definitely recommend trying various props on your Staggerwing, and be aware of the stability problems over-proping can create. □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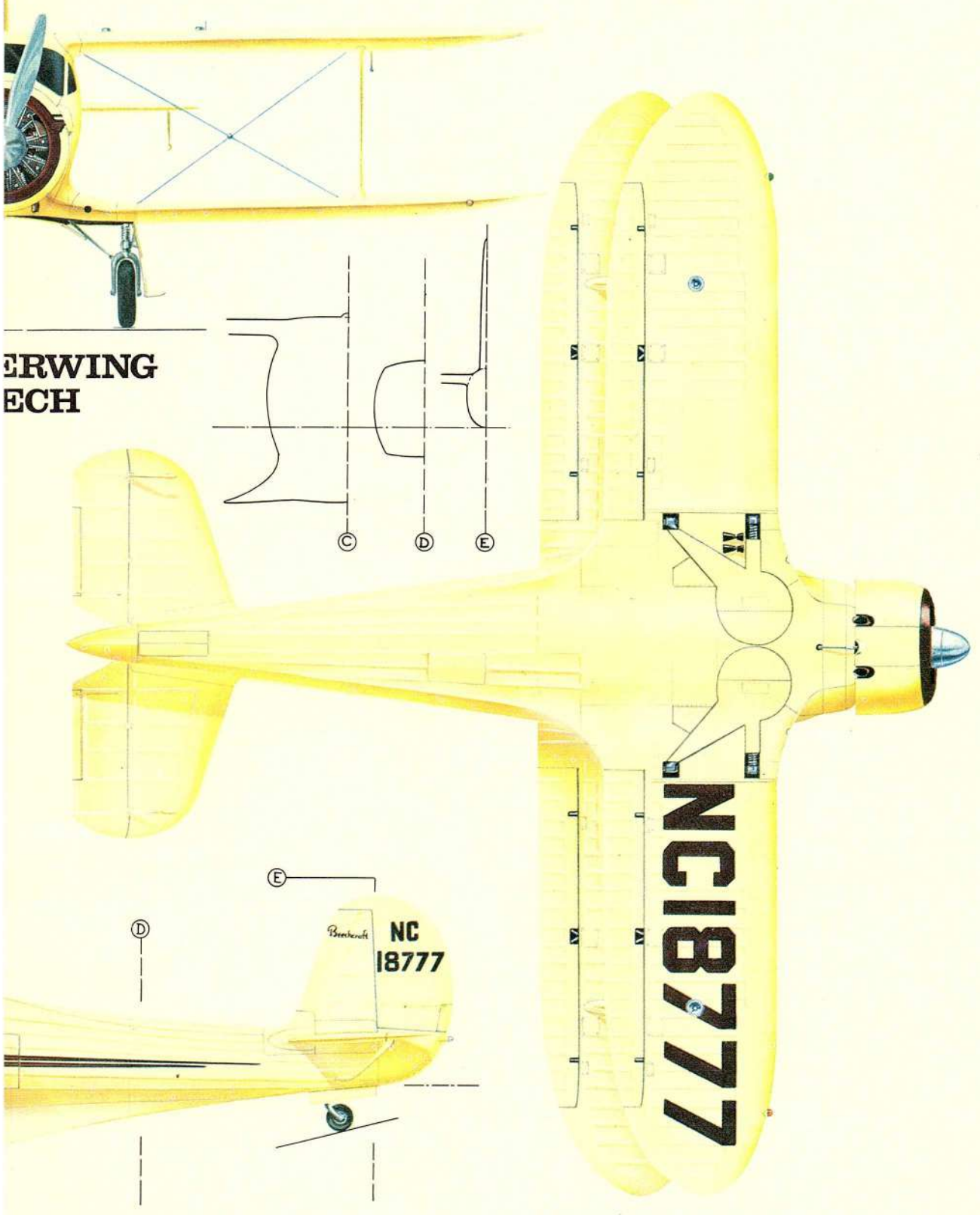


BYRON KARLSTROM

F-16!

A SNAZZY JET, WITHOUT THE HASSLES OF A DUCTED FAN

By Jay Replogle
(Proprietor, The Hobby House)

Photos by J. R. Naidish

Jets! They have a way of making a modeler's blood throb in his veins. The most spectacular, afterburning hot-rod ever designed just has to be the General Dynamics F-16. Those crisp, flowing lines shout speed and performance. So naturally I got all excited when the R & S Hobby Products F-16 appeared as the lead photo of last year's Toledo coverage in **Scale R/C Modeler.** It looked as if my long-time dream of flying a model of the F-16 was going to be realized.

True, this version was prop-driven, but I didn't really want to have to fuss with a ducted fan, so the idea of hanging an engine in the nose was an acceptable compromise. Within minutes of receiving that huge kit box, I was already pawing through the contents. There was a gel-coated white fiberglass fuselage (already joined), a full set of foam cores for all the flying surfaces, plus an assortment of miscellaneous items such as missiles, mylar decals, etc. The belly air scoop is ABS plastic, while the belly pan is fiberglass. A plastic spinner is supplied (more on this later).

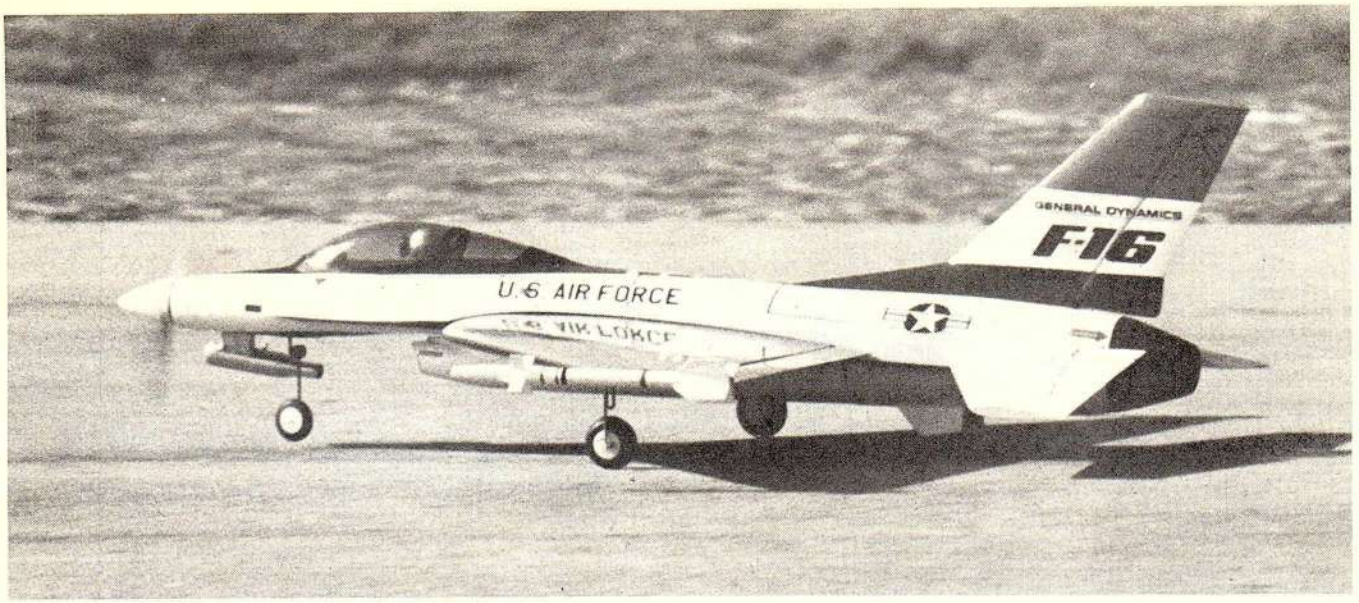
If you're expecting the usual flowery review, full of praise and adulation for the super-duper airplane I built, then I'd suggest that you fasten your seat belts. Don't get me wrong, since I am impressed with the F-16. The kit is worth building, and I am therefore going to take some time to point out some problem areas, and thereby hopefully save you some needless frustrations with your F-16.

All that comes with the kit are a set of half-sized plans. This is normally no problem, but the R & S plan sheet shows some parts full-size, while several of the bulkheads and the stab mounting pieces are not drawn to any particular scale. As a result, quite a bit of "cutting and fitting" are required. In hindsight, I'd recommend establishing a few basic reference dimensions on the model, then use a Xerox enlarger to get a set of corrected plan pieces, where needed.

I intentionally avoided cutting into the fuselage at the tailcone, where a ballast box is shown. Consequently, I had to fish around inside the fuselage when installing the stab mounts. This was crazy, and I recommend that you make a generous opening in the underside of the fuse to facilitate working on the stabs, then close this up later.

I just had to have retracts in my F-16 . . . what jet looks right with the gear hanging down? Since the full-sized ship had a complex, fuselage-mounted telescopic main gear system which would be virtually impossible to duplicate in a model, standard wing-mounted main gear was the only solution . . . as a matter of fact, they don't really look too out of place! Take some time to correctly measure the gear leg lengths, since the tail will drag if they are made too short (and be sure to verify prop clearance).

Instead of full-span strip ailerons, I made them only 14½" long. This is more than ample for a good roll rate, and they look more realistic. That delta-shaped wing is a little misleading, because there is a gen-



Just at the point of rotation, the F-16 shows that it's smooth and stable, with no nasty habits.

erous 690 sq. in. of area packed into only 48" of span. Even at a gross weight of 10 ibs., my F-16 has a respectable wing loading of 32 oz./ sq. ft. Although it looks compact, it's actually a very big airplane.

Before sheeting the wing, check the fit of the cores in the wing saddle. With that huge chord, any small deviations will tend to result in drastic fluctuations in wing incidence. I could have avoided a crash if I had been a little more concientious in this area.

I made a minor mod at the top of the fin, by cutting it off square and gluing on a strip of wood to permit the fin to overhang the top of the rudder. This little touch makes the fin/rudder assembly look more scale-like.

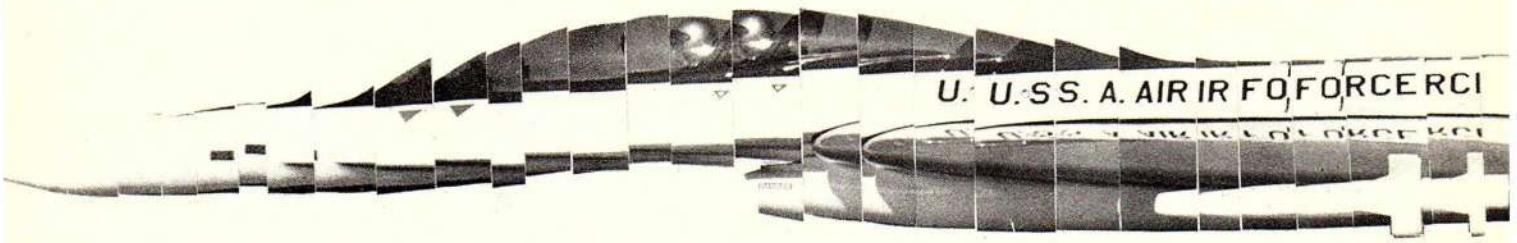
Anhedralled stabs accent the rakish contours of this jet. Sketch elsewhere in this article shows how to install simple, full-flying stab.

The long, tapered needle-nose really cuddles that .60 engine, and a Tatone mount just fits the pre-installed firewall. Several ¼" plywood spacers were required to get the engine far enough forward to fit the spinner. Perhaps a prop-shaft extension would do the job. I engineered a separate bulkhead onto which the Rhom-Air nose gear was fitted (a very tight squeeze).

The radio installation was relocated to the very aft area of the wing saddle, to avoid the penalty of that ballast in the tail. This model will definitely come out noseheavy, so don't worry about weight in the aft sections. If you're using standard-sized servos, you'll find that they fit better over the trailing edge of the wing.

While all of this makes it sound as if building the F-16 was a hassle, I must state that nothing could be further from the truth. Other than the inconvenience of the bulkhead drawings, the model goes together in a fairly straight-forward fashion. The results certainly make it worthwhile. Upon completion, I took the model to the club meeting. Imagine my delight when the crowd awarded my F-16 the coveted "Model of the Month" award.

Boy, was my first flight a bummer! Actually, I suspected things weren't going to go well even before I took that gorgeous red, white and blue (Perfect paint, of course) jet to the field. When the Editor stopped by the shop to give the model his solemn blessings, he was quick to point



The only thing that ruins the illusion is that muffler, which was later replaced by something less conspicuous.

Almost an aborted take-off, but the responsiveness of the F-16 saved the day.

out that the incidence angles looked wrong . . . too much negative. I was sure that I had everything straight, and his parting words were "See you at the field, and bring along plenty of up elevator!"

I got things going at the field and, as luck would have it, the throttle linkage disconnected just after I went to full power for takeoff. As the F-16 zoomed down the runway, with no way to cut the power, I suddenly realized that the plane wouldn't come unstuck without a yard of up elevator *(are Editors ever wrong?!* **PHP**). I had no choice, and I horsed off the model with full up elevator.

What a dilemma! There I was almost bending the elevator stick out of the gimbal, and no way to shut down the engine. Everyone was cheering, thinking that the model was going great! Suddenly, the engine started to sage. Since I was just able to maintain level flight at full power with full up elevator, the loss of power left me shy of enough pitch control to do anything. With no other options, I had to land the plane at almost full bore.

The crash was spectacular. I really thought there would be nothing left but tiny pieces, so I was shocked when I discovered that the landing gear had torn loose, and the bottom of the fuse was scratched. Not bad for a 50+ mph landing . . . the F-16 is sure rugged! I had the damage repaired in a few evenings.

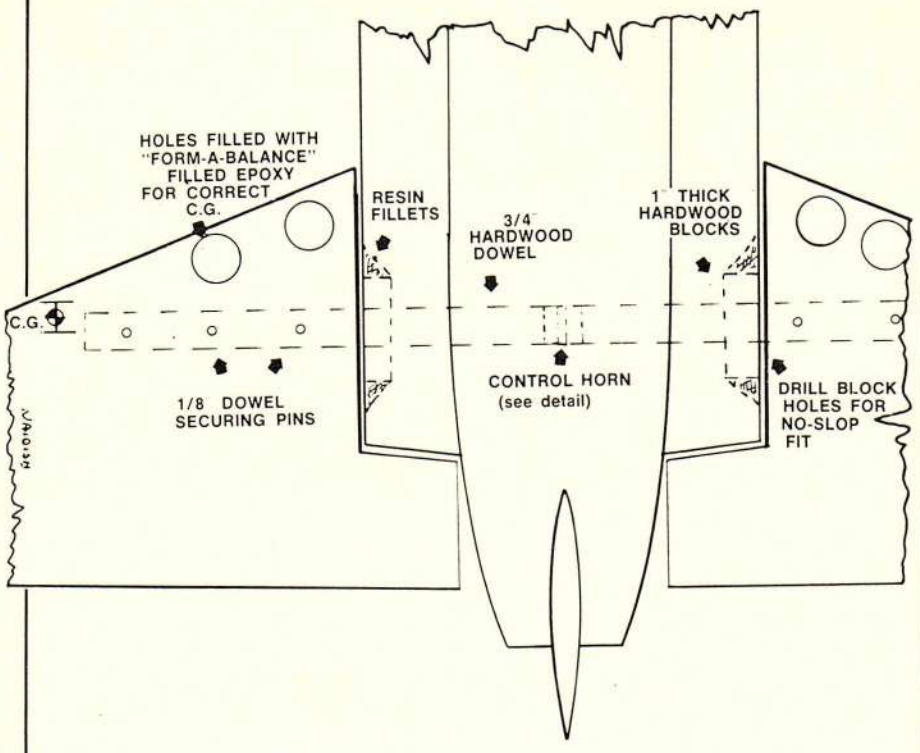
The spinner got damaged in the crash. In desperation, I searched for a substitute, and found that a Fox 2½" spinner (painted white) looked acceptable. The outline is a little off, but this spinner actually fit the nose section better than the original.

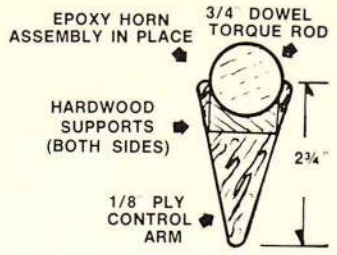
I readjusted the incidences, and the next flight was a total success. Performance of the F-16 is just like that of a good Pattern ship. The rolls are really something with that short-spanned wing. As one would suspect with that delta-wing configuration, the model is almost stall-proof.

The model looks amazingly like the real jet in the air, especially with the gear up. After I saw the flight photos, I decided to remove that

Wouldn't that profile overhead get some favorable comments at your flying field?

Complete with missiles and assorted paraphernalia, the R&S kit builds into an attractive model.



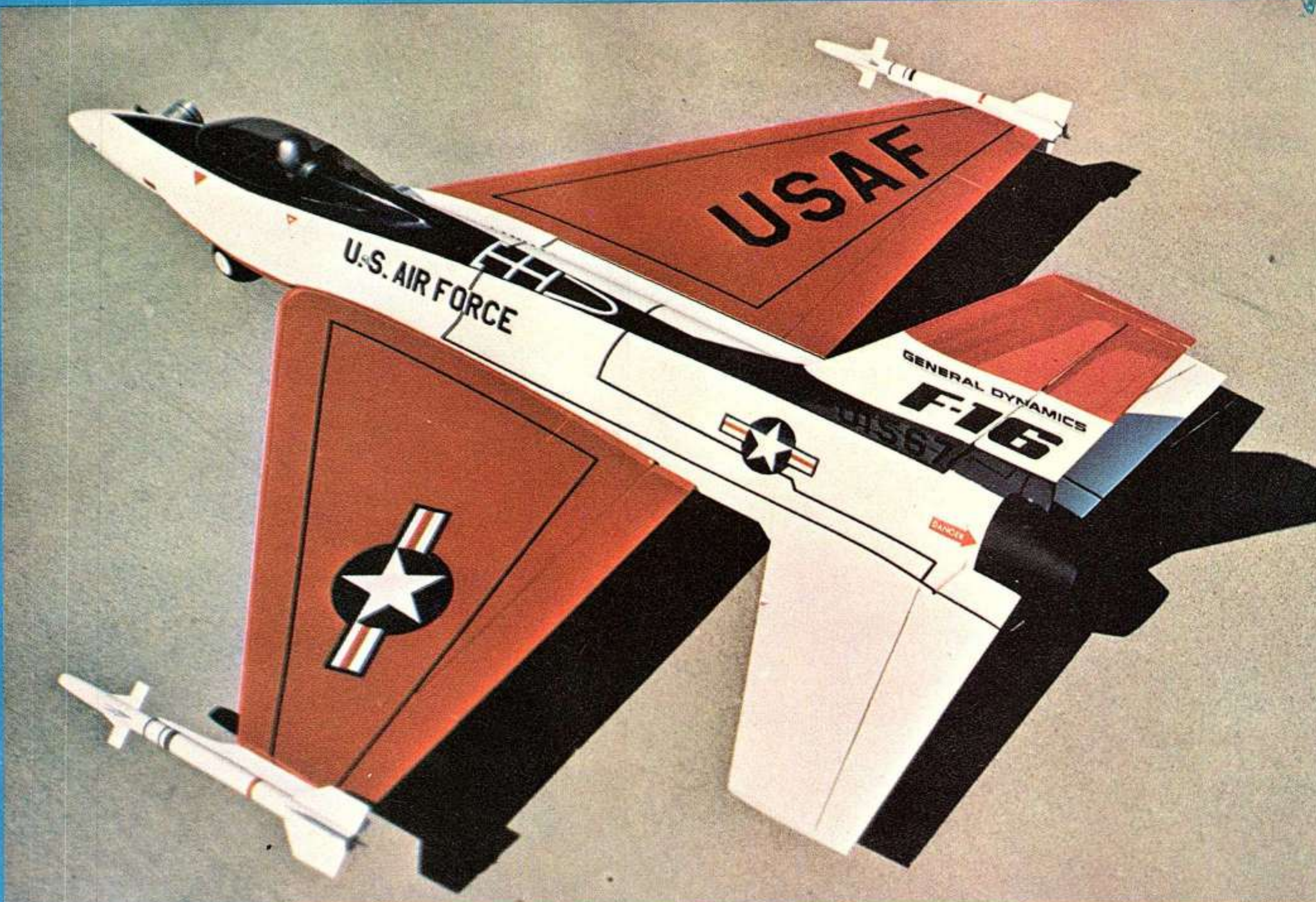


F-16 FULL-FLYING STAB

unsightly muffler and install a small manifold. With its unconventional looks and unusual planform, everyone pays attention when the F-16 flies.

The Editor showed me a drawing from R & S for a full-flying stab suitable for the F-16. The design looked good, and I understand that several prototypes have been flown with the set-up and that it works well. It would sure solve any incidence problems, and would also add to the scale appearance of the ship.

Now that you have the benefit of my experiences with the R & S F-16, you should be able to build your own jet without any problems. It's one of the most distinctive scale projects I've ever tried. If jets turn you on, then turn yourself onto this kit. □


USAF
U.S. AIR FORCE
GENERAL DYNAMICS
F-16
DANGER


USAF
U.S. AIR FORCE
GENERAL DYNAMICS
F-16

BARNSTORMING WACO

Ladies swoon and even the staunchest men cower when Captain Steve Stunning flies out of the annals of aviation history in this saga of thrills and chills from yesteryear, as he barnstorms his way into your hearts astride his trusty WACO YMF-3.

By Richard Uravitch (Eastern Area Editor) Photos by the author

We suspect that Captain Stunning is pulling our leg a bit, since the UMF/YMF series of WACOS were not really barnstorming equipment. Only 35 of these custom-made ships were built, and these were owned by the wealthy.

"HURRY! HURRY! HURRY LADIES AND GENTS!"

"Step right this way folks, and cast your eyes on one of the greatest wonders of our times — the flying machine. Not just a FLYING machine, but a real honest to goodness trick flying airplane. Our pilot, the world famous Captain Steve Stunning, will now put this beauty through stupendous feats of aerial derring-do. Come closer friends and, for the mere pittance of just $3.00, Captain Steve will take you with him to feel the thrill of looping-the-loop, flying upside down, and even stopping the motor in mid-air. You can wave to all your less fortunate friends down here on the ground. So let's go! Which of you adventurers wants to be first . . . how 'bout you young fella . . . ?"

* * *

Right out of the '30s comes the WACO-YMF biplane. This period of aviation perhaps holds more in terms of romance and nostalgia than any other. The barnstorming Jennies, traveling bands of airmen flying aerobatics, wing walkers, parachute jumpers, pilots racing diminutive airplanes with monstrous engines—flying when it was really flying—truly the "Golden Age of Aviation."

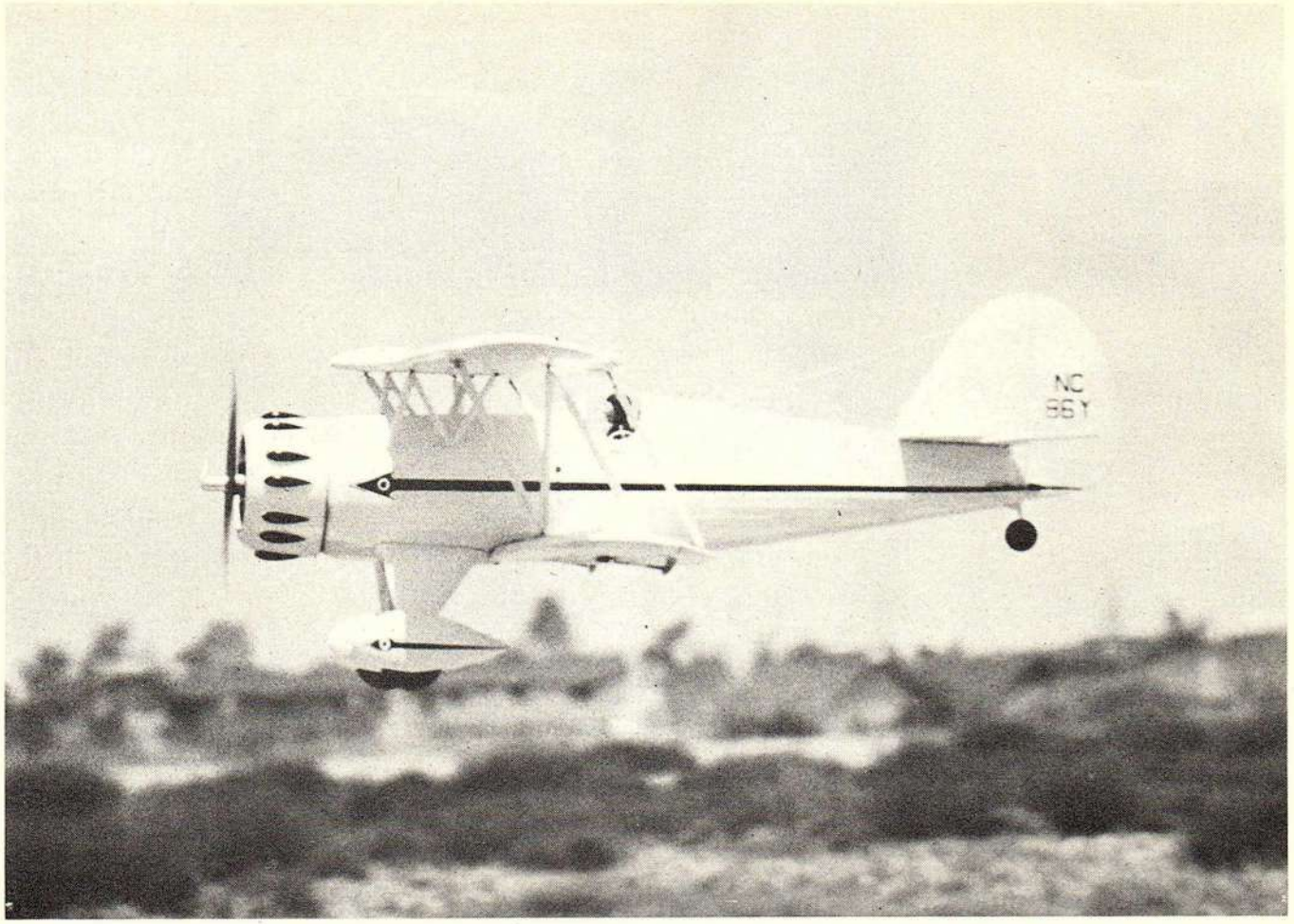
The contents of the Dave Platt kit are quite extensive and of consistently high quality. The balsa is excellent both in itself, and the level of die-cutting. No crunchies here! Plans are printed on four sheets, and are clear and easy to understand. The actual construction sequence is fully covered in a manual which includes isometric drawings of assemblies. The wings, which use a flat bottom "Clark-Y" airfoil section, are built over the plans on a flat board. This minimizes any warping tendencies, although very little exists due to the well-placed sturdy spars. One suggestion I would make during wing construction is to add a 1/16″ ply joiner to the 3/16″ sq. balsa L.E. spars at the point of the dihedral breaks (in both upper and lower wings). Make this full depth, then add L.E. sheeting. As designed, only the rear spar is braced, while a butt-glued joint is all that ties the L.E. spars together.

The fuselage is built upside down over the plan by laying down the basic crutch pieces, and adding bulkheads, then stringers. A novel approach to these stringers (3/16″ sq. balsa) is to put them in as a diamond cross section. This provides more gluing area, and the structure retains a sharp-edged appearance after covering. The tail group is solid sheet, with strips added to simulate ribs. I would suggest that some sheet areas between these simulated ribs be removed prior to covering. The consequent weight loss on the tail group will enable you to more easily balance the completed airplane. The removal of a judicious amount of balsa will not diminish the strength.

In case you were wondering why there are no construction photos in this article, there are two reasons. The kit is so well engineered, the plans and the manual leave very little to the imagination. Photos would be redundant. Th second reason is that once I started moving on the kit, I became very enthusiastic about finishing and flying it.

After finish sanding the entire airframe, it was vacuum cleaned and the application of Silkspun Coverite was begun. I will go on record here as saying I will likely never again use silk and dope. I've been using Silkspun Coverite for a number of years now, and I'm always impressed with the results. Strong and realistic. It will take nearly three rolls of just about any one of the heat-bonded coverings.

Two coats of clear dope are then sprayed on, followed by two light coats of auto primer. Since my documentation called for a cream airplane with black and red trim, I visited my local auto paint house and had them mix the cream in acrylic lacquer. I then plasticized the lacquer with Southern Products' FLEX-ALL (very important to prevent cracking and



Stunning makes one last fly-by before heading for the next town. The crowds will long remember that special thrill of a real aeroplane ride. (J. R. Naidish photo)

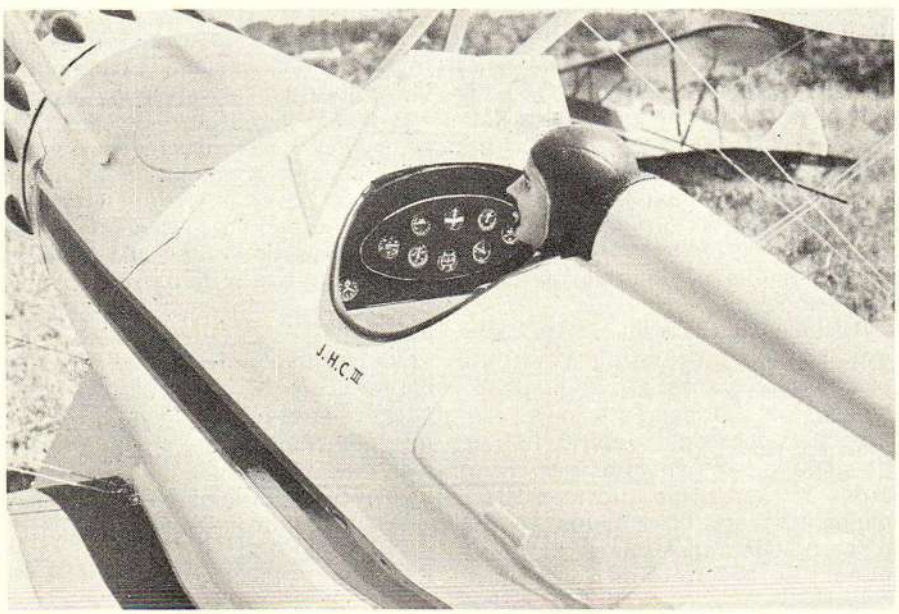
After a long day of hauling penny-a-pounders, Capt. Stunning has already sealed off the front cockpit with its special cover. Before Stunning bought the plane, it was owned by J. Heron Crosman III.

checking with age) and sprayed two medium coats. The "N" numbers were shot through stencils with black lacquer. The red trim is 1/8" D.J.'s Muti-stripe.

For you detail guys, all rivets were applied with a hypodermic syringe (using white glue). The access doors, baggage compartment and front cockpit cover were formed from thin litho plate aluminum—which you can probably con your local printer into giving you. The upper wing gas tank section along with the corrugated aileron covers, were vacuum formed. If any of you are interested, I can supply these vacuum formed parts for a nominal charge. Contact me through the magazine. Finally the whole machine was given two thin coats of clear to seal everything and impart a uniform finish.

My WACO needed on 5 oz. of nose weight to get the C.G. right. The all up weight, dry and ready to fly, is 7 lbs. 13 ozs. on 956" sq. of area, that computes to a rather light 22 oz./sq. ft.

The other WACO you see in some of the pictures was built by a friend of mine, Frank Klotz (no, he doesn't make oil). He allowed me to con him into doing a modification I was originally going to do. Starting with the same kit, Frank generated new upper bulkhead shapes, stringer locations and general outline changes to produce a replica of WACO ZPF-7 owned by a Mr. Al Levinson. Significant changes are in the landing gear, turtledeck shape, addition of a sliding canopy and the modified tail group outline (no blisters on the cowl either). It's a very pretty variation and one requiring a bit more work, as does any modification to a stock kit.



Every kit leaves an impression of some type on the builder. Of this kit, I will say it's terrific. I enjoyed building it and would definitely build another. The most difficult part I found was the fillet work, which took nearly as much time as it did to frame both wings. The forming of a proper fillet between a wood surface and a fabric covered area is a real challenge. As Jerry Puleo (noted Toledo Scale winner) says, "You dig the pain!"

Frank Klotz and I decided to take both airplanes out and trim them at the same time. We figured that, if one went in, the survivor could console the other. We discovered that they handle almost identically, in spite of the fact that Frank's is fully 1-1/2 lbs. heavier than mine. They both fly very scale-like at about 70% power. The WACO—built lightly and film covered — would no doubt fly quite well on a good .45. If you've got a .60 use it, since the .45 will require even more nose weight to get the C.G. right.

I set mine up with maximum aileron and rudder throws and medium elevator throw. It flies majestically. Graceful in maneuvers, it's also a sweetheart on ground handling. Responsive . . . but not sensitive. Just about all you could want in this class of airplane, and this is one airplane that has lots of class.

The wheelpant mounting system as shown on the plans might be adequate if you fly from a pool table but the local "rock farm" broke mine free in short order. Since all my

Frank Klotz's ZPF-7 was modified from the Dave Platt kit. Reshaped tail group and turtledeck, new sliding canopy and revised landing gear make this a distinctively different airplane.

flying buddies will attest to the fact that all my landings are 10 pointers (I'd give myself 5's but you know how friends are!), I felt some solidifying was in order. After sliding the supplied steel mount plate into position on the axle, a 5/32 wheel collar (with the cadmium plating filed off) was placed against the plate and the whole works was silver soldered. The collar is soldered to both the axle *and* the plate. A hard landing will probably drive the gear through the fuselage, but the pants will remain mounted.

Two trim changes I made to my airplane—which seem to make for better penetration—were to add 1/8″ shims under the *rear* cabanes, and to raise the L.E. of the stab 3/32″. This positive incidence in the stab was added during building, while the upper wing incidence was reduced as a matter of personal "feel." However, the plan-indicated thrust arrangements will produce a fine flying airplane.

You'll enjoy this WACO, both building and flying. Contest-wise, my airplane with a number of obvious (in hindsight) omissions scored 90.5 points in static at the recent Rhinebeck Classic Meet, which was its first contest showing. I elected not to fly, since the paint was still wet . . .!

So there you have it folks, the derring-do we promised. Was it all we said it would be, young fella? Yes siree ladies and gents, step right up . . . who's going to be next?

* * *

REFERENCE SOURCES

Air Classics Special, Winter 1973. Historical Aviation Album (Paul Matt), Vol. XIII.

Sport Flying, Vol. 2, No. 2 (Feb. 1968).

Sport Flying, Vol. 3, No. 3 (April 1969).

Sad, but true! That empty look in the middle of your model may indeed be telling the world that the builder of the model was also "out to lunch" when it came to finishing that scale ship.

PUT A LITTLE LIFE IN YOUR MODEL

In this series of "how-to"articles, the master of handcrafted little people tells how to add some zest to your scale model with a realistic pilot figure.

By Bill Hannan

A flying scale model without a pilot is like a bowl without goldfish. This is particularly true in the case of "bubble" canopy subjects, as well as those models with open cockpits. Many otherwise splendid scale replicas appear with no one at the controls, and thus suffer a total loss of realism.

From a competition standpoint, the importance of pilots is increasing. Although present AMA Scale rules do not require pilots, the FAI rules do (in very specific terms) as follows: (Item 1.6 i)

*If the pilot is visible in flight in the prototype, then a dummy pilot of scale size and man-shape must be visible in flight in the model. Omission will be penalized by downgradign under 2.7.2 and 3.7.10 up to a maximum of 20%. This dummy pilot will not be judged under 1.10 unless the competitor requests consideration for special ingenuity under 1.10.8.**

From a philosophical viewpoint, the pilot and cockpit area may be the most important part of your aircraft, especially to a layman. In fact, lack of a pilot's enclosure is part of what makes guided missiles so dull and uninteresting. Thus, the pilot and cockpit should be the focal point . . . the place where the people live, not just a necessary evil in this series of articles, we hope to demonstrate the advantages of incorporating pilots, and ease the task of fabricating them.

It's interesting to note that the U.S. may be heading toward this FAI interpretation, and the day is probably fast approaching when pilot figures (or rather the lack of them) will be a basis for downgrading a static score. Judges conferences on the West Coast have been emphatic in their thinking—when judging a scale aircraft, the pilot will be considered as adding to the total realism, and the scores will reflect the fact that a piloted aircraft is more point-worthy than a pilotless machine. **—PHP**

CHOICE OF TYPES

Dummy pilots may be divided into three basic categories: By far the lightest and simplest to make and install is the simple profile representation. Although far from realistic, they do at least provide the silhouette of an occupant, as viewed from the side. In Schoolyard Scale aircraft, these "outline" pilots are often satisfactory, especially because of their light weight and ease of construction. They are certainly better than an unoccupied cockpit.

The head-and-shoulders pilots, though slightly heavier, are much more lifelike, are easily installed, and are probably the most widely used type.

The full-figure pilot is the ultimate

Dave Lovitt's Blackburn Monoplane uses doll figures to good effect. Homemade clothing and rework of head gear lend distinctive air to each pilot. Note rifle-toting pilot for extra realism and "action." (J. R. Naidish photo)

Author's hand-carved pilot represents test pilot Lucien Bossoutrot aboard his Farman. Use of reference sources enable realistic portrayal of actual pilot. (Hannan photo)

Gilmore lion? Well, this ain't them! Remember Roscoe Turner and the Rather, it's unique characterizations by Bill Noonan. (Hannan photo)

choice, but adds additional weight and complexity to the installation.

Dummy pilots may be either humorous or serious representations. The cartoon types can add a note of fun, but unfortunately may have been overused to such an extent as to have become somewhat cliched. However, if restraint is exercised, caricatures still offer fresh possibilities. In addition to the usual range of cartoon characters and animals, some builders have used their own photographs in the production of profile pilots. Perhaps a remote form of Walter Mittyism?

Pilots are widely available in commercial form, some even ready-painted, while others require assembly and painting. It is important to select an appropriate size and type of pilot for your scale model. Although humans vary considerably in size, an extremely out-of-scale pilot will detract from your model's realism. Similarly, the effect of, say a modern military helmeted pilot in a World War One model is ludicrous. Sometimes, an otherwise suitable pilot can be slightly modified to better

Using the information supplied in the forthcoming installments of this article, our Editor painted these preformed plastic pilots from a sailplane kit. Heads turned slightly for accent. Different emphasis on facial tones, hair shades, etc., prevent them from looking like identical twins. (J. R. Naidish photo)

fit the intended purpose, through a change in accessories.

A commercial pilot can often be altered for a more distinctive appearance, with relatively little effort. Simply turning the head, for example, can add remarkably to a candid appearance. To carry this line of thought further, it is quite possible to rework the subject additionally, so as to completely revise its character. The result can be a true one-of-a-kind pilot, that can greatly enhance your model.

For a small model, where weight may be a critical factor, a regular commercial pilot bust may be used as a vacuum-forming mold, for the production of a light-weight duplicate. A Mattell Vac-U-Form toy is just the ticket for this task. Although no longer manufactured, these units surface from time-to-time in garage sales, Goodwill Industries stores and swap meets. Alternatively, such a device can be fabricated at low cost. Articles on the subject have appeared in the April, 1976 *Model Builder* and the April, 1976 *Flying Models* magazines.

(We have had very good success with the Wing Mfg. "Magic Molder." This professional quality vacuforming tool is ideal for not only pilot figures, but for larger items such as wheel pants, cowls, etc. We will be presenting a full article on this almost-necessary scale accessory in a future issue.) **—PHP**

REFERENCES

Working with human features is not really so different from working with, say, the details of an aircraft engine. One would not expect to produce a believable model of an engine without reference material, and the same reasoning should apply to pilots. For a readily available publication, it is hard to improve upon an ordinary mail-order catalog (such as those produced by Sears) which feature hundreds of photographs—many in color—of various types of people. Another often overlooked visual aid is an ordinary mirror!

If you plan to duplicate a particular aviator in miniature—Louis Bleriot, for example—you would need to consult some specialized aviation history books for illustrations. Happily, these are easily available, often from public libraries.

ATTITUDE

One need not be an artist or sculptor to create a realistic pilot . . . merely a careful observer, neat worker and patient craftsman (the same attributes which make a qualified scale modeler). It is also important to be in a relaxed frame of mind. A rush-job is almost certain to be obvious to even a casual spectator. Therefore, allow enough time for the task and try to work in a place free from annoying distractions.

Books have been written on the subjects of miniature painting, and are recommended for those who care to pursue the subject comprehensively. Check a hobby shop which specializes in military miniatures for some invaluable assistance. However, the average scale model aircraft builder may not want to become too deeply involved in what could amount to a second hobby. The intention here is to offer basic guidelines to enable the production of acceptable pilots with a minimum of materials and effort.

Like all forms of modeling, practice makes perfect. Your first attempt can scarely be expected to yield a masterpiece, but each succeeding pilot should show definite improvements.

In the next installment, we'll get into the basics of tools and techniques. In the meantime, do some rudimentary homework . . . look at some reference sources and begin observing facial features. It would be a good idea to also investigate local sources of pilots and speciality shops (dolls, military miniatures, etc.). As we get into the actual execution, you'll be amazed at how easy it is to come up with some really convincing little people who can put a little life into your model. □

Wheelpants and a sporty paint job give N6077V a character all its own. (Photo courtesy EAA)

In Part I of this article (which appeared in SCALE R/C MODELER'S "Giant Scale Models" special issue), Mark Frankel admitted that he had built the ¼-scale EAA Bipe as a personal R & D project, in anticipation of a future full-scale homebuilt effort. The appeal of the big bipe is in a lineage that reflects the sporting looks of a Smith Miniplane with the aerobatic appeal of a Pitts.

The plans for the EAA Bipe are available from Hal Osborne, 1932 Conejo Lane, Fullerton, CA 92633. Highly detailed and comprehensive, the over-six-foot sheet sells for $10.00. An ABS cowl is available from Hal for $5.00.

As the construction notes in Part I emphasized, this bipe is extremely basic to build. The wings are both constant-chord, which eliminates the biggest drawback of most bipes. The plane must be simple to build, for the full-size ship was engineered to be constructed by a homebuilder . . . and the model follows this concept of simplicity.

We now pick up Mark's manuscript with some invaluable data on documentation. The flight report gives the real proof of the pudding, and the EAA Bipe is a fine performer on a Fox .78. With the latest breakthroughs in gear reduction systems, the possibility of using bigger props with more torque makes the EAA Bipe an even more tantalizing scale subject.—PHP

EAA BIPE (Part II)

The conclusion of a two-part article on a superb ¼-scale rendition of one of the sleekest bipes ever designed.

By Mark A. Frankel
Photos by James Lipshutz and Tom Voorhis

Documentation for the scale EAA Bipe is relatively abundant. A 3-view drawing was published in the 1969 *American Aircraft Modeler Annual*, and the September 1967 issue of *Flying* featured an impressive cover shot of Jim Southworth's colorful EAA Biplane. Further data can be obtained from the EAA, Box 229, Hales Corners, WI 53130. The original EAA Biplane is on display at the EAA Aviation Museum, 11311 W. Forest Home Ave., Franklin, Wisconsin.

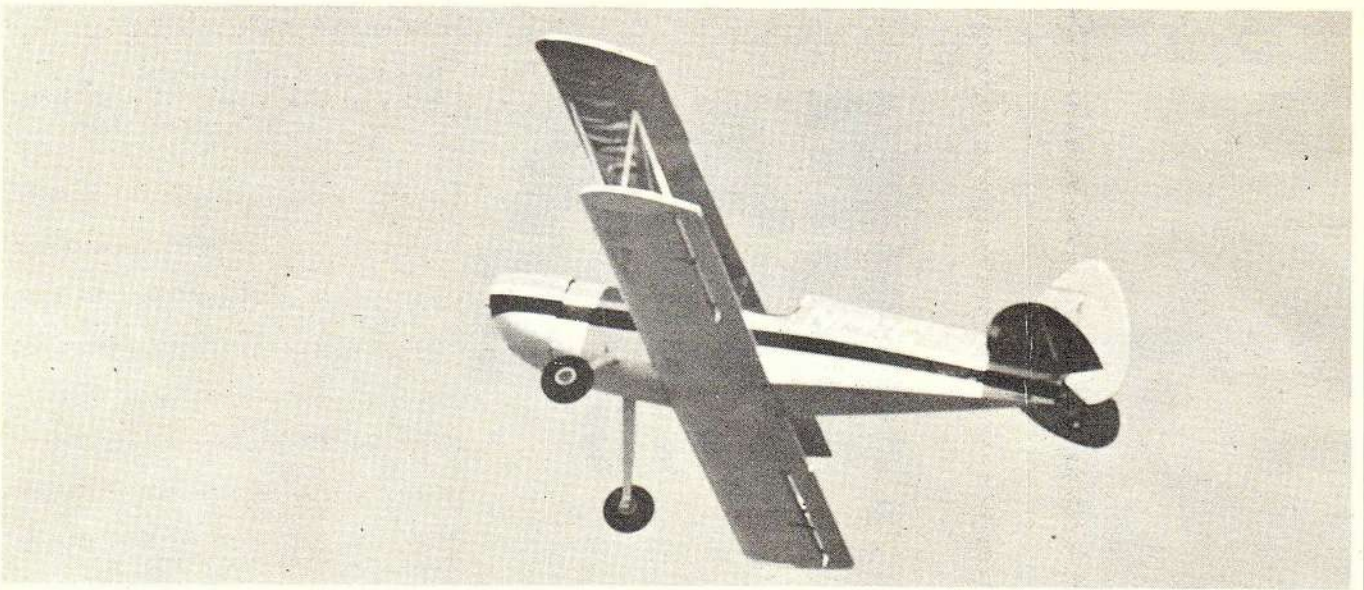
The most productive source of documentation on the EAA Bipe is naturally the Experimental Aircraft Association, Hales Corners, WI 53130. Contact them for price and availability on these back issues of their official journal *Sport Aviation.*

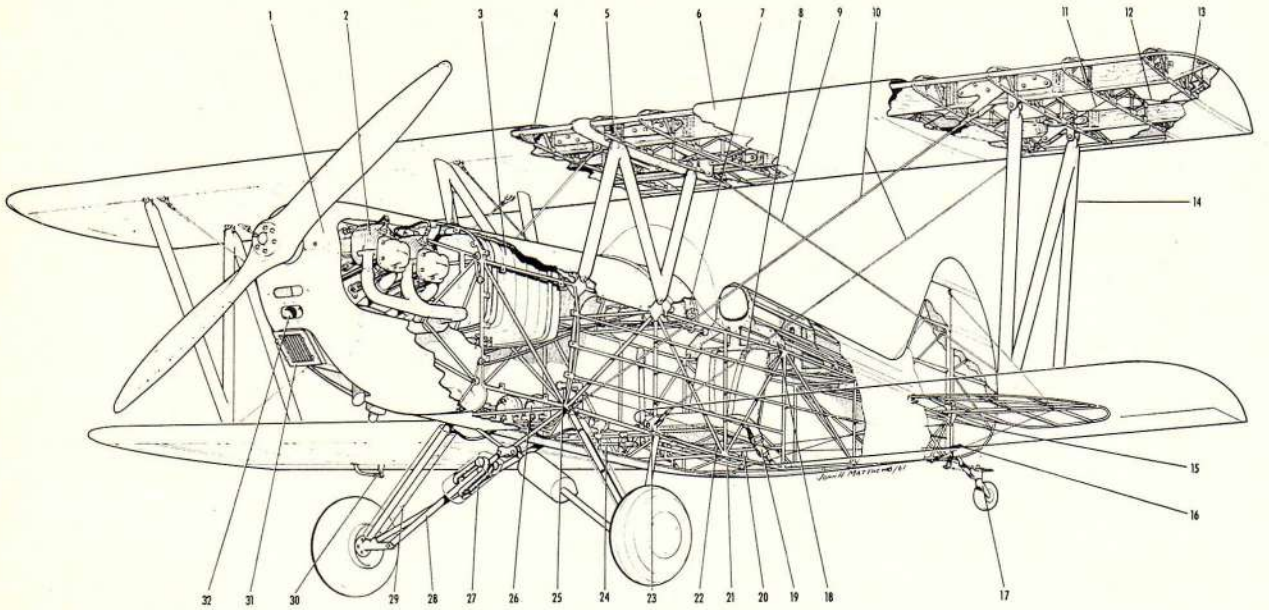
Date	Page	Title of Article
2-72	50	EAA Biplane Wing Construction Building Procedure.
2-72	19	EAA Biplane N177E Modifications, Part II.
1-72	19	EAA Biplane N177E Modifications.
1-72	12	Short 3 inch item — Design Changes.
5-72	49	Most Pleased with EAA Biplane.
9-71	4	Parkside "Eagle" Swoops and Soars.
3-71	53	Compression Strut Details—1/2 page.
8-70	40	Design Improvement—Aileron Controls.
5-69	4	EAA Biplane with an English Accent.
6-68	4	Rebirth of an EAA Biplane.
8-67	32	Wilke MK 1 "Did It."
3-67	32	The Ruby Gem.
6-66	15	The Bay View Biplane.
5-65	4	The CF-106.
7-63	27	EAA Biplanes.
1-63	32	Dyer's Biplane.
9-61	4	The EAA Biplane.
8-60	23	EAA Biplane Report.
4-60	17	Vern's "Baby Duster."

FLYING NOTES

I used a Fox .78, swinging a 14-6 Top Flite propeller. The model is clearly not overpowered with this combination; however, it flies in a very realistic fashion. The takeoff runs are smooth, and the climb outs are gradual. I normally begin the takeoff run holding a slight amount of up elevator and right rudder. The up elevator pins the tailwheel on the ground for the first several yards, to insure positive steering before the rudder has gained effectiveness. Power is fed smoothly and gradually,

THIS PAGE DEDICATED TO THE PROPOSITION THAT, ON THE GROUND OR IN THE AIR, BIPES ARE INDEED BEAUTEOUS!





Pictorial Cut-away by John H. Matthews, EAA 9776

1. Piper J-3 Style Cowling
2. Continental A65 Engine
3. Piper J-3 gas tank
4. Center section assembly
5. Wing attachment fittings
6. Aluminum leading edge to main spar
7. Instrument panel
8. Shoulder harness
9. Streamlined landing wire
10. Streamlined flying wires
11. Anti-drag wire
12. Drag wire
13. Compression strut
14. Streamlined steel tube interplane struts
15. Elevator horn
16. Rudder horn
17. Piper J-3 tail-wheel assembly
18. ¼ in. ply formers
19. Seat belt
20. Elevator bell crank
21. Elevator push rod
22. Lower rear spar attachment point
23. Lower main spar attachment point
24. Right aileron push rod
25. Rudder pedal
26. Brake pedals and pumps
27. Landing shock cords
28. Modified Piper J-3 landing gear assembly
29. Streamlined aluminum strut fairing
30. Aileron horn
31. Carburetor air intake
32. Carburetor heat air intake

since sudden throttle commands are almost a guarantee of ground loops. At half throttle, I ease off the elevator and allow the tail to raise to a level flying attitude. By this time the model has sufficient air speed to maintain directional control with the rudder.

I continue to advance the throttle until full rpm's are reached, at which time the model should have sufficient airspeed to become airborne. A slight application of up elevator unsticks the aircraft. I have forced my EAA to fly before it was ready, and it merely settled back to the runway in a 3-point attitude; this could result in a violent snap roll with other models (a variation in weight, center of gravity or wing incidence could give your model slightly different characteristics).

At altitude you will find that the ailerons are effective but not snappy. The elevator is smooth, and the rudder produces yaw with little or no roll—almost like flying the real thing! Aerobatic maneuvers must be planned to conserve airspeed and altitude. You can't bully your way through with pure brute power . . . the model must be "flown" through.

Landon Cullum, Jr. really modified his EAA Bipe. This plane is the subject of two articles in SPORT AVIATION. See text for more information. (Photo courtesy EAA)

The loop is entered with full throttle from a shallow dive, and the throttle is closed after the model passes the inverted position at the top.

Spins are sometimes difficult to enter because of the reluctance of both wings to stall together; however, full rudder and aileron a moment before the stall will usually produce the desired result (placing the center of gravity slightly aft of its current position should also help the spin entry, but I am not willing to trade the model's excellent low speed stability). Spin recovery is merely a matter of neutralizing all flying surfaces and adding power. Stall turns are truly the EAA's forte. The model seems to hang vertically for an eternity, giving you plenty of time to kick the nose over with rudder.

Landings, like the takeoffs, are long, graceful affairs. I normally fly a downwind leg at about 50 feet with half throttle. After turning onto base, I further retard the throttle and allow the model to begin settling. By the time I turn onto final, I have the engine in a fast idle and the model is sinking in a level attitude. Some power may be carried on the last leg on a breezy day, to insure reaching the runway. When the runway is "made," I cut power and hold the model in a 3-point attitude, allowing it to bleed off the remaining airspeed and settling. Even though my model weighs nearly 15 lbs. I am constantly amazed at how slow it lands.

These ¼-scale models certainly handle smoothly, and the EAA Bipe is no exception. Grandiose and graceful pretty well describe the "feel" of the model. It would be interesting to try one of the new gear reduction units (the Brice Machine Specialties system seems a logical choice), with a 16-18″ prop. This would yield, depending on the final choice of props, a very slow airspeed, and potentially more realistic speeds through the maneuvers. For my personal style of flying, I do enjoy the EAA Bipe the way I have it set up.

As a scale project, my experiment has been a complete success. My preliminary findings will be put to good use when it comes time to embark on the full-size machine. I'm anticipating using the model as a testbed for different cowl configurations, and maybe a new paint scheme. One thing I have learned is that breadboarding one's mental images in balsa of a full size airplane really helps to smooth out the rough spots, and could save a lot of expensive mistakes later. If nothing else, this sort of rationale makes a great excuse for building a big R/C scale model! □

C-O-O-O-L IT!

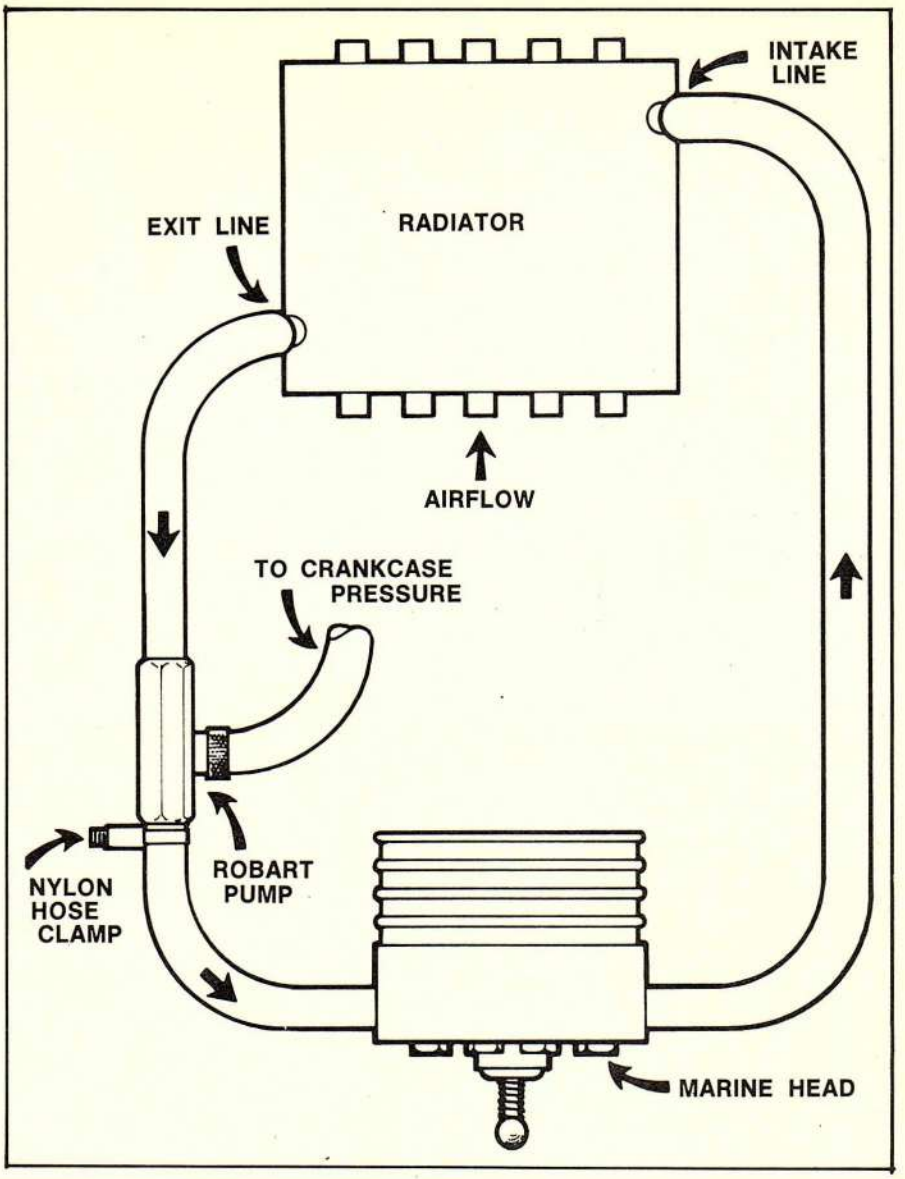
(Continued from page 21)

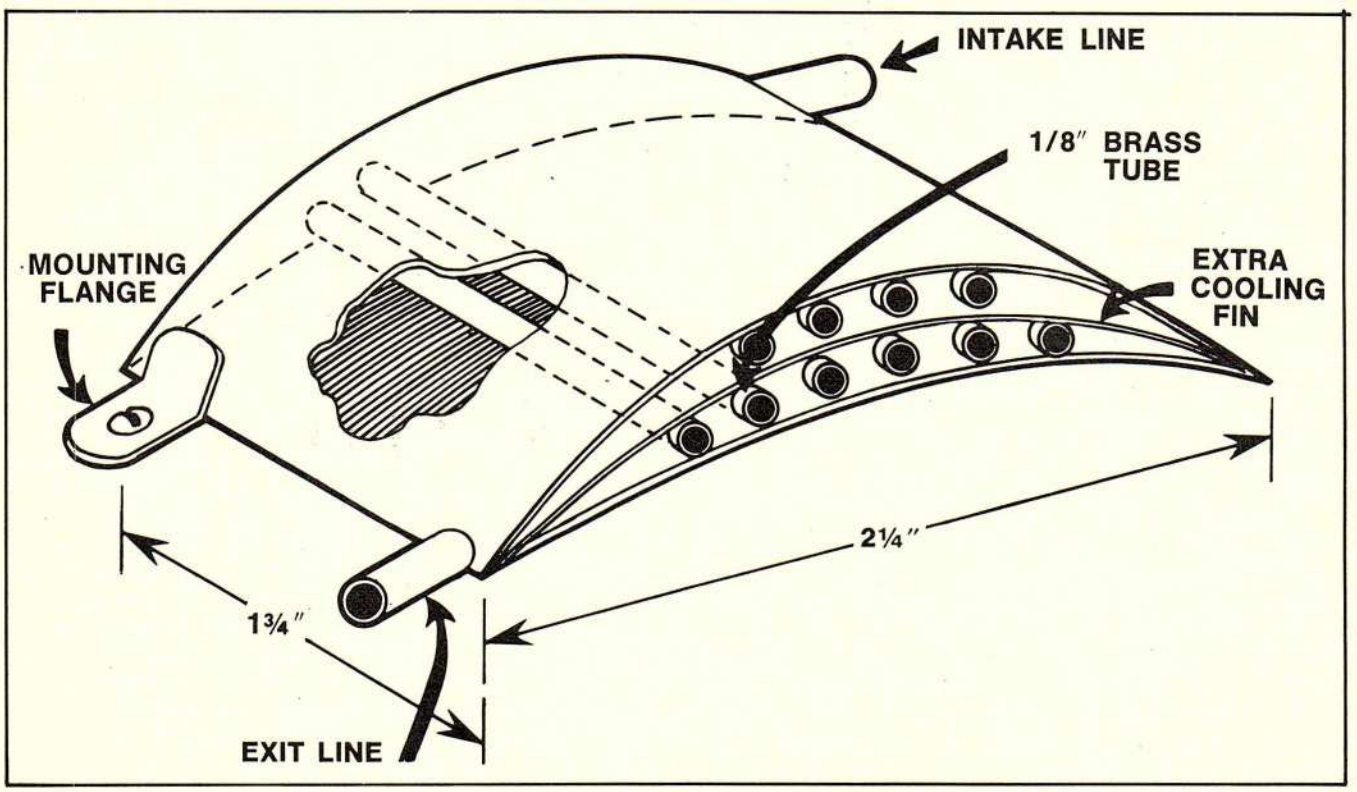
Remember that, in the unlikely event that you build a too efficient radiator, the coolant flow rate can be regulated via the Pumper.

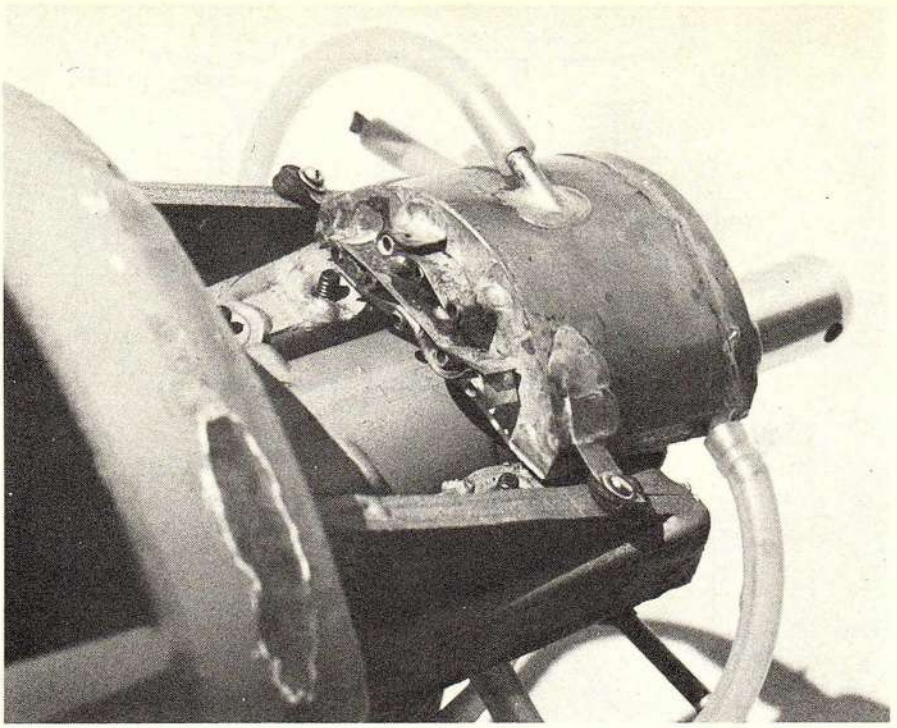
Obviously, the prime determinant of the physical shape of the radiator will be the cowl design of the model. A Fokker D-VII or Pietenpol will have a very automotive-looking style (good luck with all that soldering!), while a P-51 might have the radiator in the oil cooler location, or even way back in the turbocharger intake (good luck with the plumbing!). A big radial might sport a disk-shaped affair, or even two radiators in tandem on either side of the engine mount. You may even wish to try a flush "skin" radiator, since it is necessary to cool only 1½-2 ounces of liquid.

Just because the model now has a radiator, it doesn't mean that proper air flow under the cowl can be neglected. The radiator must get adequate air over all surfaces. Also, the air should exhaust or be dissipated somewhere. The advantage of the cooling system is that it can be located at the most advantageous place on the model, unlike the situation with the engine head.

The inlet and outlet locations in the tank are important. The coolant should travel the farthest possible distance inside the radiator. The photos show the intake and outlet tubes in one position, while the







Extra strips of brass soldered onto extended cooling tubes adds additional heat sink capabilities. Note that the whole assembly is grommet mounted.

are anticipated, then either a clunk or a centrally located pick-up will be necessary. The air bubble intentionally left in the system will disrupt the liquid flow in the inverted position. In scale, this is usually a minimal concern.

Once the radiator is fabricated, test it submerged under pressure and stop any leaks. Make all the solder joints top quality. A rupture or leak could be disastrous, with a cooked engine almost guaranteed. That's why we took the precaution of using four attachment lugs, then grommet-mounted the whole affair to the airframe. Also, the plastic tie-offs at the hose connections are imperative. These are available from ACE R/C.

Don't overlook the fact that the feed and return lines actually provide cooling, so don't have them touch the engine. Use heavy duty, thick-walled fuel line, such as that available from Prather Products. Periodically check all fixtures and lines for potential leaks.

The Robart Pumper is the original one for .60 engines. The new high-volume design may be an asset for larger displacement systems. The pump is really not laboring to circulate the liquid in this closed system, so it should be highly reliable and trouble free in this application. Definitely keep the pump as close as possible to the crankcase.

The marine head we used is handmade, but Dumas, International Products and Bishop Marine make suitable ones. Even an Octura cool-clamp could be used in a pinch, although the efficiency will be somewhat reduced. We've even thought of using both the cool-clamp and the marine head together, but this is an untested idea, and probably unnecessary.

Filling the system properly is important. A mixture of 90% Glycol (anti-freeze for those who still are in a fog) and 10% water works fine. Using a fuel bulb or syringe, fill the lines and head first by disconnecting the pump at both ends. Then continue to fill the entire system. Tilt and rotate the model until there are no air bubbles trapped in the corners of the tank. When properly done, there should be one unavoidable bubble in the system. This is used for a visual reference to determine the flow rate of the coolant. Check all hoses and connections for leak-proof operation.

Make sure that the engine is already **properly broken in.** Open the valve on the Robart Pumper about three turns. Now, fire up the engine and note the rate at which the bubble passes through the lines. If it takes about 2 seconds (rather rapidly), you'll be just about right. Use the valve adjustment on the pump to regulate this.

After everthing has been operating for about 30 seconds, proceed to leaner needle valve settings. The change should be significant. Our Kraft is running at about ¾-turn from fully closed! The needle should respond in an exceptionally non-critical way, as you have a very broad adjustment range with no increase or decrease in rpm. Wet a finger and touch the head. It may feel slightly hot at full throttle. In flight, with more air flowing over the radiator, the engine will run even cooler. At idle, the head should be only warm to the touch.

You'll undoubtedly want to experiment with hotter fuels. These Schneurle engines really come into their own on hotter fuels, so don't be too concerned with spiking the Nitro content. Do remember that the cooling system is not a substitute for proper lubrication.

If things are not going satisfactorily, the problem is probably attributable to improper radiator placement or design. Bench check the entire system out of the airframe and see if performance improves when the radiator is out in the open. If so, then rework the installation for better air flow. Perhaps more cooling tubes might be required in the radiator. If the radiator is dissipating heat properly, you should be able to feel the difference in temperature between the outlet and intake lines.

For reference, our Kraft .60 (Perry Pump and carb) turns 13,100 rpm (40% Nitro and 11-7½ Zinger prop) without the cooling system. After switching to the marine head and connecting the radiator, the tach jumped to 13,800 rpm. Most noticeable was the fact that the stock engine would tend to sag at the 13,100 rpm setting, while the introduction of the cooling system made the needle settings very broad, with no signs of an overly-lean run. This reliability factor is one of the biggest rewards from our experiments.

We're so happy that we cooled it with Glycol that we're planning a scale pylon racer for our next radiator installation. That empty starboard cheek cowl will house a circular radiator (working on the same principle as the "flow-thru" muffler). The nose cowl will be exact scale, with no unsightly cut-outs for engine cooling. We are also prototyping a radiator for a ducted fan installation, which is where such a cooling system should reap major benefits in performance.

We hope that you too will be prompted to utilize the advantages of the Glycol cooling system in your next scale project. It is an idea that has been too long overlooked, and one that should make some of those "impractical" scale projects a reality. The next time you are installing an engine, take another hour to assemble a radiator . . . and cool it. □

DAVE PLATT ANSWERS...

(Continued from page 12)

6940 N.W. 15th St., Plantation, FL 33313. An SAE will bring details.

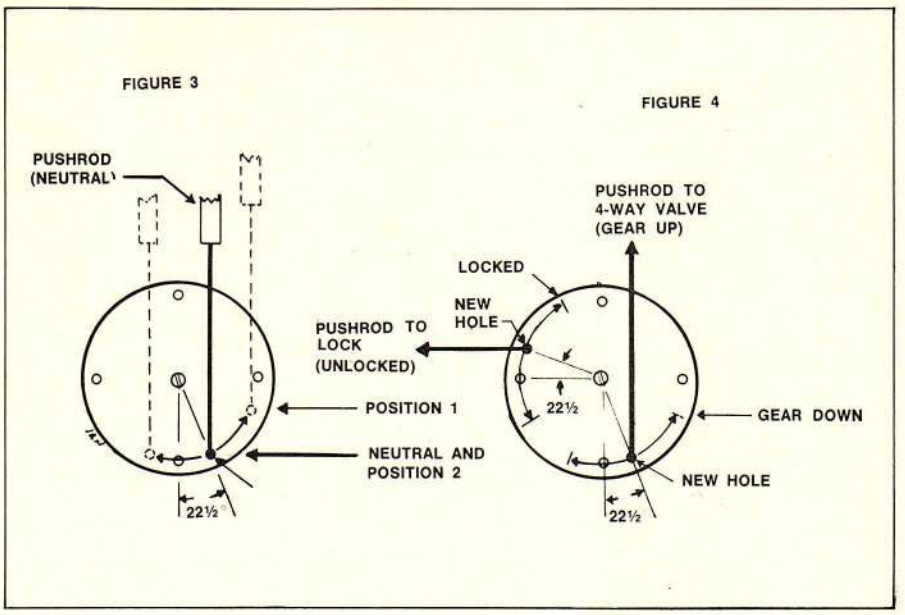
* * *

Dear Dave,

I am working on a .60-powered scale project that requires moving the engine back and driving the prop with a 5¼" extension shaft. I would appreciate any information on prop shaft extensions and their related problems, i.e., bearing alignment, etc.

I would also like to know if a twin, such as the MRC/Ross, would lend itself better to such a proposal.

A. B. Comerford
Malahat, B.C.
Canada



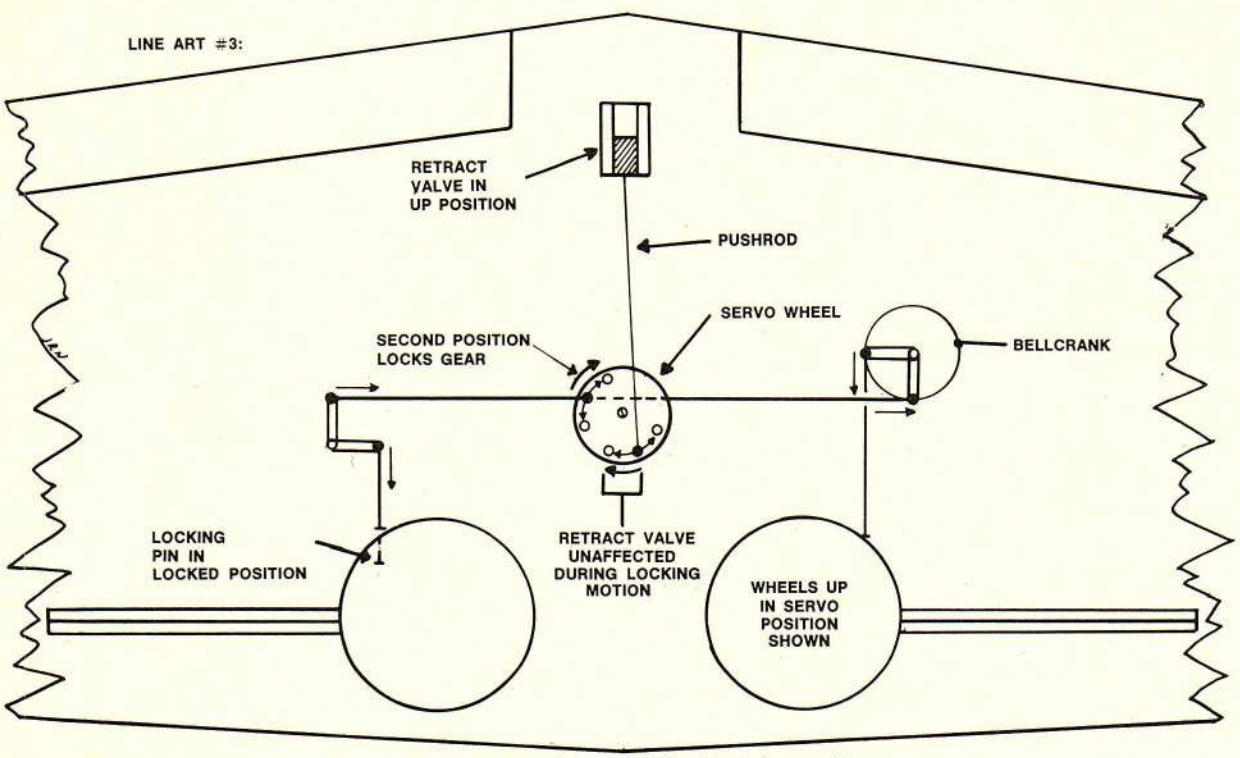
We've never used a prop shaft extension over 1½" in length for a direct drive, and would hesitate to do so. Possibly the best solution here is to mount the prop shaft into the model and pick up the drive to the motor via a universal-joint, as in model boats.

There is no reason for a twin-cylinder engine to be better, or worse, for an installation of this kind. □

drawings by J. R. Naidish

FIGURE 5

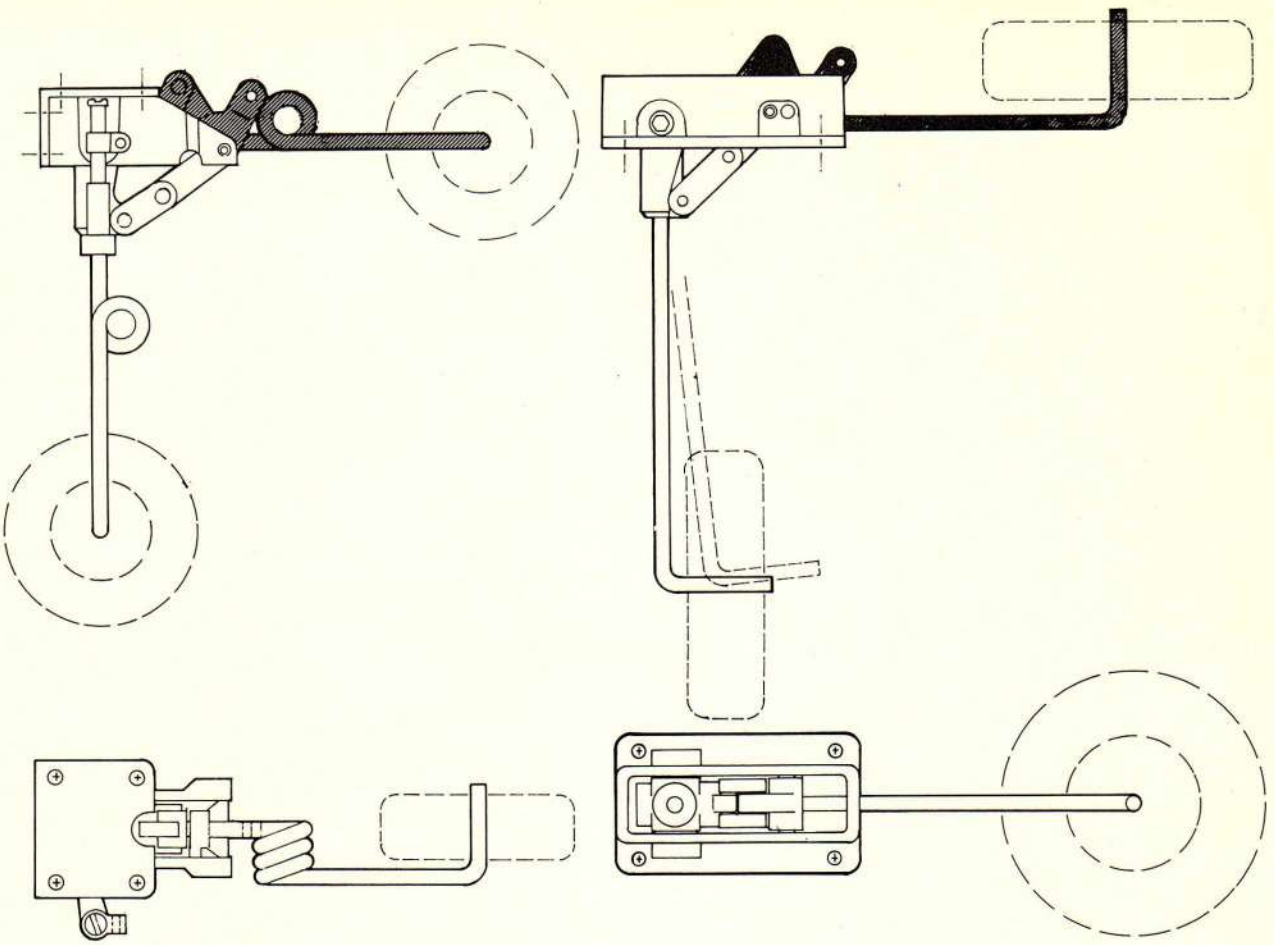
LINE ART #3:



NOTE: Wheels up in servo position shown. Servo motion clockwise actuates locking linkage, but does not move retract valve. Servo motion counterclockwise from position shown keeps locking pins disengaged, but actuates valve for gear down.

the schoolyard scene

(Continued from page 15)



Diagramatic view of Robart's nose gear (left) and main gear. Both have variable geometry.

evitable hard landings.

Robart has cleverly designed the retracts with built-in geometry. If you need more travel for a House of Balsa FW-190, two set screws increase the gear leg travel. Even the nose gear is adjustable. With a unique drag-link arm retraction mechanism, they also look amazingly real.

These little jewels are extremely compact. The main gear is 1 9/16" long, 15/16" wide and 31/32" high, so they'll fit in even the smallest ½A wing. By the time you get done with a main gear only installation, you can anticipate adding only about 2½-3 ozs. (assuming a micro-size servo) to the total weight of the airframe. Each unit weighs only ⅓ ounce. That's a very small penalty for the reduction in drag (up to 15% of an airplane's total drag is the landing gear!).

My installation was made in an Ace foam wing, using the 180° Ace Micro servo (with the Robart ½A adjustable servo arm). The linkages were made from Goldberg threaded rods and Mini-Snap links. The complete set-up took about 2½ hours, including the fabrication of the ⅛" plywood mounts. All the cutouts in the wing were made with an X-Acto knife, without the bother of the "hot wire" technique.

The ⅛" plywood mounting plates were epoxied into the foam wing, then each main gear was secured with #2 sheet metal screws. These are adequate to hold the gear in, even on the roughest landings.

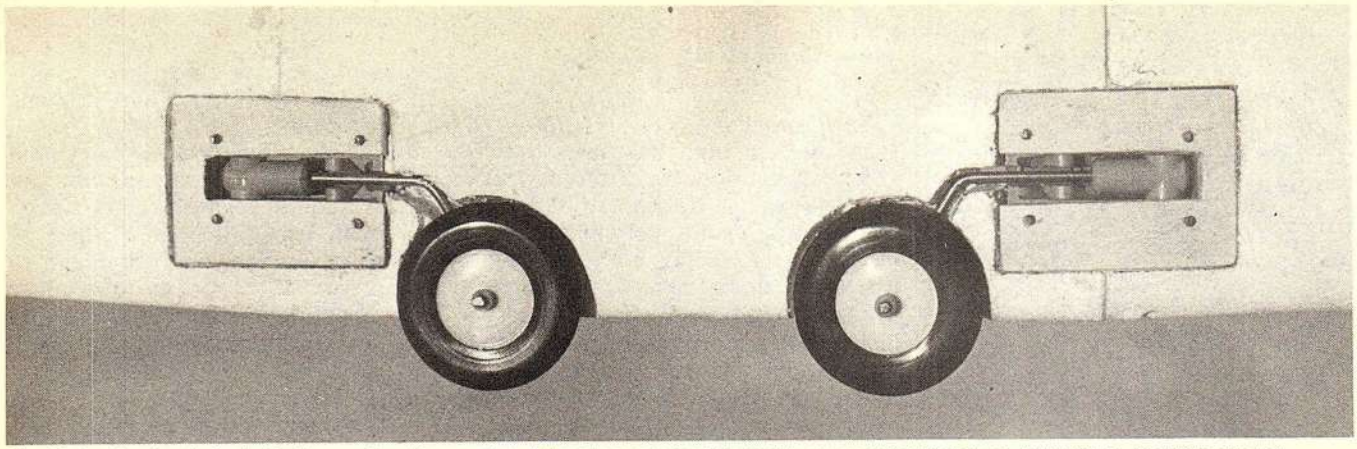
The Robart nose gear is a real work of art. It can be either belly or firewall mounted, and is available in a variable geometry configuration. The steering arm arrangement is comparable to that used on the Goldberg gear, so that the wheel is self-centering during the retraction sequence. The folding drag link mechanism provides a very solid down lock.

These little retracts are already creating a total revolution in Schoolyard Scale. All of the House of Balsa and GMC Models kits take on a whole new dimension with wheels that neatly tuck into the wing. The models fly a lot better, with very noticeable improvements in areas like vertical performance. One thing for sure . . . you'll never see us at the field again flying a Schoolyard Scale ship without retracts. I also suspect that the "big boys" may soon realize that the Robart ½A nose gear makes a superb steerable tailwheel unit for those huge .60-size ships!

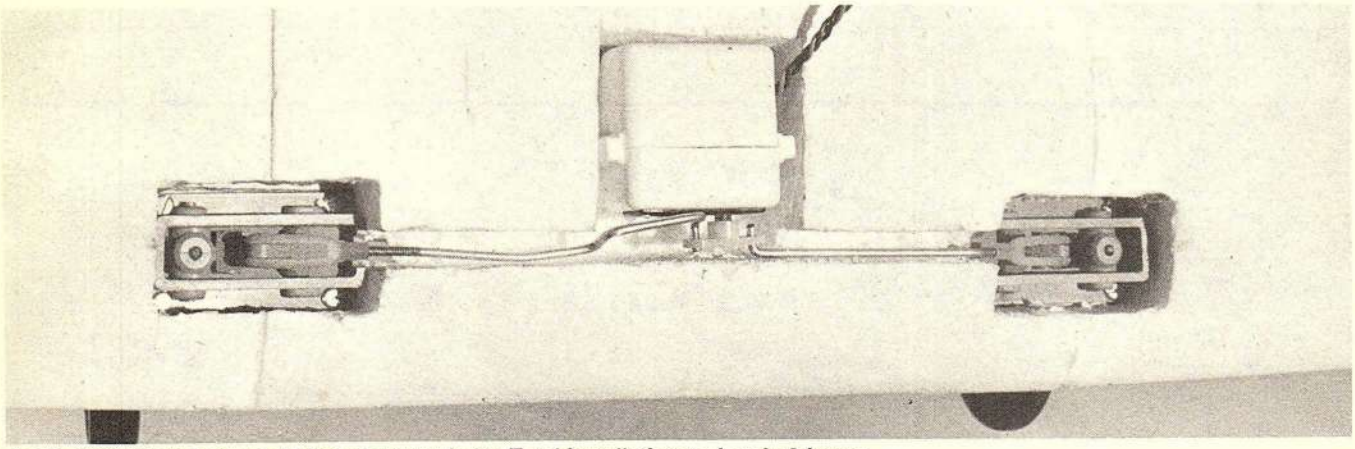
* * *

Another new item is an audio tachometer from Specialty Model Manufacturing, 21028 Golden Triangle Road, Saugus, Calif. 91351. It has a range of 10,000 to 30,000 rpm. This thing really sounds off when tuned to the right reading, and it leaves no doubt as to what rpm your engine is turning, either on the ground or in the air. It is accurate to 1%, has an unconditional guarantee on parts for 180 days (50% off on repairs until 1 year of purchase). An earphone is also included to permit reading your engine without outside interference. Power source is a 9 Volt transistor battery (not included). Price is $39.95 (postpaid in the U.S.). Foreign orders add $5.00 for overseas shipment.

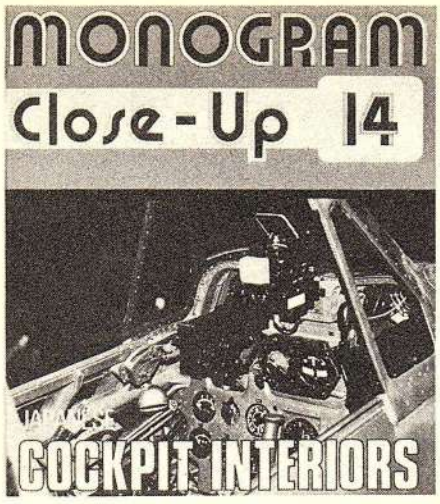
Specialty Models is also releasing a new ½A Me-109, designed by Webb Hill. I saw two of the prototypes and these are really scale. □



The Robart retracts installed in an Ace foam wing. Wheels are raked forward, since wing is for an AT-6. (J. R. Naidish photo)



Ace's 180° Micro servo pulls the gear up nicely. Total installation took only 2 hours.



Book Notes

(Continued from page 9)

The *Japanese Cockpit Interiors* really suffers from the flaws of the 109 book, with photos of WW II cockpit installations taken by U.S. Intelligence *after* the instruments were modified for flying by our pilots. However, there are some superb original Japanese photos, as well as instrument panel arrangement drawings for the modeler. Ironically, the author almost apologizes for the color photos of the interior of an unrestored Nick, saying that "though weathered," the paint was original! In this reviewer's opinion, they should have apologized for the color plates of the Zero's instrument panel looking like a 1977 Cadillac, in terms of condition.

In all, these volumes are essential to the modeler, providing that the reader can separate the wheat from the chaff. These 32-page, magazine-format books seem to indicate a publisher's indecision as to whether they sohuld be slanted toward the modeler or the historian, but both can gain from the material as it stands. Priced at $3.95, they reflect the ever-rising costs of paper and color printing, and they are worth the price. □

Editorial

(Continued from page 7)

something worth reading.

* * *

PLANS AND RULES

Our readers are familiar with Art Johnson, who's fantastic P-82E Twin Mustang graced the pages of our Summer '77 **Twin-Engine Bonus Issue.** Before getting into a very interesting letter on Scale rules, which Art was kind enough to send us, we'd like to comment about the plans for Art's twin. We just discovered that, of the countless plans presented in our pages over the last four years, the P-82E currently holds the record for the most popular design.

Considering the fact that Hal Osborne, who handles plan sales and drafting chores, hadn't even added all the final detail on the plans we ran in that issue (Hal is not too swift on deadline dates), the Twin Mustang still outsold every other plan we've presented.

The P-82E plans are available in two sizes, the two-.40s set (4 x 9½' plan sheet for $10.00), and a superbly executed plan sheet for a two-.10s or .15s Twin Mustang. With a 52" span and 395 sq. in. of area, this latter plan builds into a compact, high-performance machine. Price on the smaller plan sheet is only $7.00. Write to Hal Osborne, 1932 Conejo Lane, Fullerton, CA 92633. Hal also has a nice line of accessory items for some of his plans. See his ad elsewhere in this issue.

Excuse the lengthy digression, and let's now turn to Art's letter on Scale rules:

Your Editorial on Scale Rules in the October issue contained the best commentary I have seen on this subject. After saying that, I will add a couple of my thoughts on the subject. First, the current Sport Scale rules cannot be too bad, or there would not be the rapid growth in Sport Scale seen everywhere.

I believe that AMA Scale and FAI Scale are now recognized and well publicized as the pinnacle of scale achievement. However, I doubt if we will ever see a big expansion in this type competition. I see the big difference between AMA-FAI Scale and Sport Scale as the need to reproduce the aircraft interior in all its minute detail. The requirement to reproduce

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Editorial

(Continued from page 75)

full cockpit/cabin and other details exactly as on the original tends to limit the consistent AMA-FAI winners to modeling the more simple, light aircraft types. There are probably only a handful of modelers in the country able and willing to build this type of model under today's rules. They are the true Masters of Scale.

I do not see AMA Scale models as having an undue advantage when entered in Sport Scale competition. Judges cannot see the interior and small details from the proper distance (I am not sure that ten feet is enough). As for dimensions, it is possible that from eyeball distance, the judges may decide that the outline does not really match the three-view, even though in reality the model is exact scale.

AMA Scale now appears to be a testing arena for progression to FAI international competition, with the models actually built to FAI rather than AMA Scale rules. Perhaps it is time to redesignate AMA Scale as MASTERS SCALE. It would be flown under the FAI rules.

The term "Sport" does not seem to properly describe one of the most heavily contested events at the last two Nats. At the '77 Nats there were twice as many contestants in the Sport Scale event as in any one of the top three Pattern events. This level of interest justifies a breakdown into at least EXPERT and a NOVICE scale category. Minor changes in the current Sport Scale rules could divide the degree of expertise for these events. Progression through the three Scale events could use the same rules now spelled out for the AMA classes. NOVICE, EXPERT and MASTERS SCALE events would give the beginner a place to start, it would force the current "Sport Scale" experts into Masters (AMA-FAI) Scale at the appropriate time, and prevent the current AMA-FAI Scale Experts from competing at a lower level (as they do now).

* * *

SCALE SQUADRON REPORT

The Southern California Scale Squadron has been getting a lot of positive feedback from all over the country. Individual modelers have

Editorial

requested information on becoming affiliate members, and several regional Scale Squadrons are already being formed. Recently, we got word that the Louisiana chapter of the Scale Squadron was getting underway. Those in the area who want more information can contact Fred Moystner, 4030 Franklin Ave., New Orleans, LA 70122.

The purpose of these local groups is to make the building and flying of scale models more enjoyable. The Louisiana group, for example, is compiling a source directory for photos and other documentation requirements. Often, a group can get more accomplished than can an individual. In Scale, success is closely related to interdependence, and a network of Scale Squadrons can be an effective way of helping yourself by helping others.

The Squadron concept is really not in conflict with the recently formed national scale society. As a matter of fact, the two complement each other. The structure might be compared to the E.A.A., with its local chapters, yet all closely tied with the parent national organization. Thus, a modeler is a member of the national scale society, but functions on the local level through his Scale Squadron. The local squadron might host a contest, the rules for which would be approved by the national society. It all fits together nicely.

Since Jim Crummy of the Southern California Scale Squadron has taken over the editorship of the national society's forthcoming newsletter, Dale Willoughby (14695 Candeda Pl., Tustin, CA 92680) is the new Squadron newsletter Editor. He's also the man to contact for more info on forming your own local group, or to become an affiliate member.

Noel Allison, a Southern California Squadron member and the Sec./Treas. of the national society, recently informed us that he will be spearheading a scale judging school. This is the first major frontal attack on one of the most pressing problems in the scale contest arena today. Both static and flying judging will be covered in an attempt to formalize some much-needed guidelines. Noel has promised to keep copious notes, so that a standardized format for use anywhere can

(Continued on page 80)

Editorial

(Continued from page 77)

eventually be established.

For those interested in joining the ranks of the national organization, contact Noel Allison, 4174 W. 120th St., #C, Hawthorne, CA 90250.

* * *

A RETRACTION

Lee Taylor recently wrote us a lengthy letter about one of our pet gripes . . . the state of the art in retracts. If you don't use 'em, you just aren't competitive. If you do use them, the headaches start. The letter points out that air-actuated systems aren't the answer. If you pinch the lines to get scale retraction speeds, the reliability inherent in these systems is compromised.

Lee writes that:

"If air is to be used as the power source, then a small hydraulic damper cylinder attached to the back side of the gear linkage would give a scale-speed retraction. This could be pretty difficult with Rom-Airs, as their gear and cylinder is one unit. It would be pretty easy with mechanical gear, utilizing the Sonic air cylinders.

"The old electric-powered Wing Positracts had what is to me the ideal answer—at least in theory. The gear-driven jackscrew was extremely powerful, gave nice scale speed, and was easy to set up for weird applications. They really weren't too well designed, and tended to be cumbersome.

"There is a fantastic market for an electric motor, gear-driven jackscrew power source that can be plopped into a model like a servo. Just imagine the possibilities for a power source like a servo that can supply a true thirty pounds of force at the same speed as a hydraulic cylinder in the real planes! Criteria? It must be fairly small and light. It should be able to be externally controlled by either switches mounted on a control servo, or by an external amplifier such as the Kraft retracts. This is a call to the manufacturers . . . go to it!

"The second problem is also unique to scale models. The current crop of retracts on the market are long-legged, spindly, very springy, and just plain too blasted weak! The answer is Dave Platt's theory. Landing gears must be strong, with shock absorbing capabilities via spring cylinder struts, not spring wire struts.

Manufacturers, we need some good, strong, spring-loaded scale-type struts that can be either screwed onto the stub wire out of a standard retract mechanism, or a new complete scale-type mechanism to be operated by the previously mentioned jackscrew servo."

We fondly hope that the manufacturers out there will rally to the cause. We've personally talked to some of the manufacturers, and there may be some hope on the horizon. A real problem is cost. Most manufacturers would agree that designing a set of strong and powerful retracts is simple, but who would want to pay for the expensive material required to get all that strength, at an acceptably light weight and in a compact size. Done right, the gear itself would have to be primarily metal (maybe even titanium), and the jackscrew driver would have some pretty precise and exotic components. A set of mains could run upwards of $200!

We modelers can help with some of our designing talents. Maybe someone out there already has a good retract system engineered. Getting that sort of information to the manufacturers would be a good start. The market is there, for what modeler would settle for a set of Pattern ship retracts, when he could install a set of gear legs specifically designed for scale applications.

* * *

AT-6 REPORT

Reports from local modelers building the Bridi AT-6 indicate that the B&D retracts work well in this unusual gear installation. A slight relocation of the gear mounts shown on the plans is required, but the B&Ds work very well.

Speaking of AT-6 racing, the first big California races will have already been held by the time you read this. We'll have a full report and commentary in the next issue. Bob Holman informs us that his Harvard model (designed by Brian Taylor) is also considered official for racing by the Scale Squadron. Bob has a fiberglass fuse available. There will also be foam cores to accompany the fuse. Now there will be a little variety on the flight lines for these "one-class" contests. The official rules and a kit review were published in our October '77 issue. □

ADVERTISER'S INDEX

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Dumas' new ¾"=1' scale model of the Sparkmen and Steven's designed 66' commuter boat "Dauntless", is the newest addition to the growing selection of Dumas scale boats.

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Sport, stand-off scale, P-51D MUSTANG

.29 to .40 power that builds like our ½A's

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Photo of actual model built from kit