T-28 B

BY DAVE PLATT

R/C Modeler Magazine is proud to present what may well be the world's finest scale design. Winner of the 1966 British Nationals, Dave Platt's T-28B is a project for the dedicated scale builder. As a bonus, its flight characteristics equal its appearance!

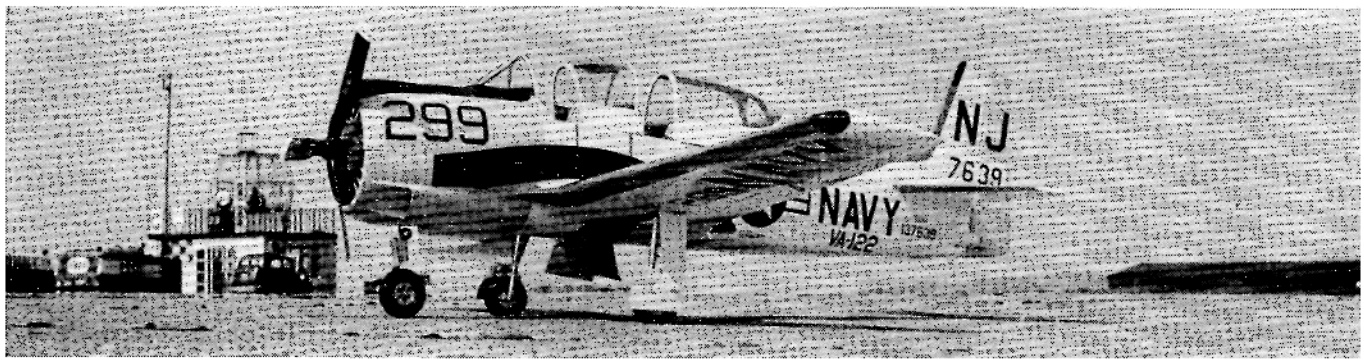
DID you ever start building a model, and somewhere along the line you went cold on the project and left off half-way through? If you did, I would bet that the pieces still hang in the workshop. I'd further guess that your wife, anxious that so much money (wives don't remember **time**) shouldn't go to waste, asks if you'll ever complete the model. Invariably you reply that you will "one day." Really, you couldn't care less, but you still keep the remnants.

The fact is, I know a couple of guys who **never** finish a ship. As it is, they have the best collection of wings and fuselages in town, but unfortunately, they are all for different models!

I mention this well-known malaise because, in a way, it is the direct opposite of what happened to me with this particular scale model. It was started merely because it seemed so ideal a subject, but without any real love or feeling on the part of the builder. But, as it gradually took shape, a genuine affection for the T-28 took hold of me, and the finished model was, in my eyes, the most beautiful ship I had ever constructed. It is often said, usually with a good deal of truth, that a scale modeler must **love** a plane before he can face all the effort of designing and building a model of it. But, as I now know, this doesn't **have** to be a rule of the game. At least, not at the start!

After the 1965 British Nationals, where I flew my Miles Magister, I began looking for a suitable subject for the 1966 event. As the Maggie's Doom had been due to flying from grass with the two-wheeled landing gear, I stipulated that the new project **had** to be a trike geared design. (I now feel that proportional gear will be the end of this sort of trouble — the pilot can hold **slight** up-elevator, thus avoiding stalling the model right off the ground. But, at the time, I was designing for reeds.)

It should be remarked at this point, that here in England, it simply isn't good enough to build a scale job less than perfect, and such items as motors sticking out, or servos in the cabin are taboo! If your model can't measure up to these high standards, someone else's **will**, and it becomes pointless to bother with less than the best. In the same vein, any alterations to the outline or sections of the model can, and will, lose you the contest. In 1965 the judges found something (actually the wingtip section chord/thickness ratio) on the Magister to be 1/10" out, and docked points accordingly. These considerations, then, ruled out types like the Airacobra (motor sticks out) and the Comanche (nowhere to put the RC junk except in the cabin). Not that I would consider the Comanche, since I have always stuck to military



aircraft.

But I digress. To cut a lot of searching short, the decision was resolved to a choice between the Ryan Fireball or the T-28. One day, someone (perhaps me!) will tackle the Fireball, but in the meantime, I decided on the T-28.

Even then, it wasn't all plain sailing. After scaling the plans, the fuselage looked so **enormous** that I couldn't visualize it flying. The cowling worked out at 8½" diameter, and to my knowledge, no-one else had ever made a model with so little working prop-blade! After a month or two of horrified looks at the plans, the fateful decision was made in earnest — we had to make it or we'd never know! If it didn't fly, at least we would have learned something!

Just about this time, I purchased a McCoy .60, the only motor likely to heave the bird aloft as I saw it. Remember, we are required to use silencers, too! Similarly, I obtained three deBolt retractable gear units — in my blissful ignorance imagining these would solve the undercarriage problems. I have to laugh when I look back on it, but more about the retract units later.

Some time later, the model now finished, we were confronted with the immediacy of the first flight. After I had run out of excuses to my clubmates (you know the form — "Deac's not charged," "No fuel," "Someone else flying on my frequency," etc.), we ran up the motor on the 1⅝ prop I had selected. Thrust seemed excellent, so after a final check of the gear, it was chocks away!

I needn't have worried! The lumbering bird gathered speed, and when I was well satisfied of flying speed, she was lifted off. Grab altitude quick . . . what have we got? . . . a nasty left turn and a slight down pitch that full up-trim won't quite correct . . . get used to it, man . . . they're all screaming at me . . . fly around for a couple of minutes, you can't hit anything up there. . . .!

After a somewhat hairy landing, trim adjustments were made, then more flights. An hour later she didn't frighten me anymore, and flying was a breeze and a pleasure! Just like a Taurus, really, and the appearance in the air was wonderful!

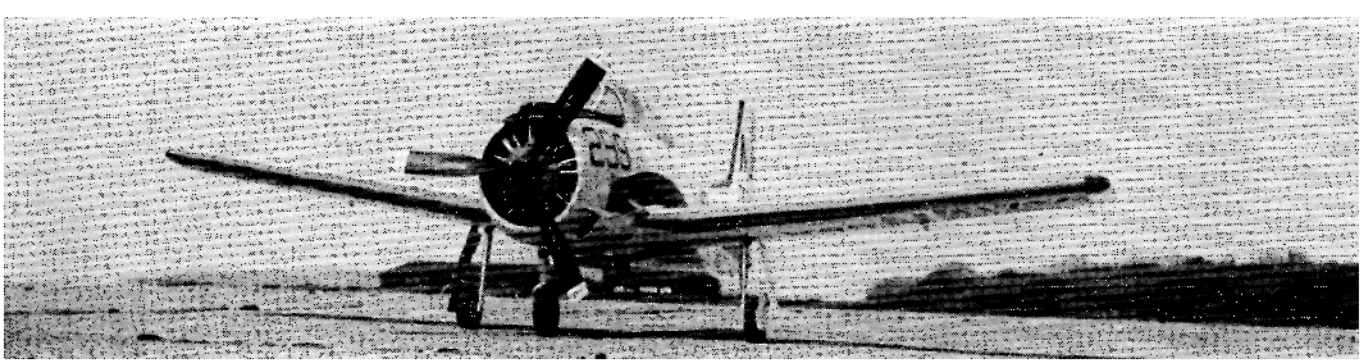
Later on, the T-28 went on to win the Nationals for me, after 15 years of trying in various categories. The Bristol RC Rally, a well-known contest gaining countrywide support, fell to her winning ways too.

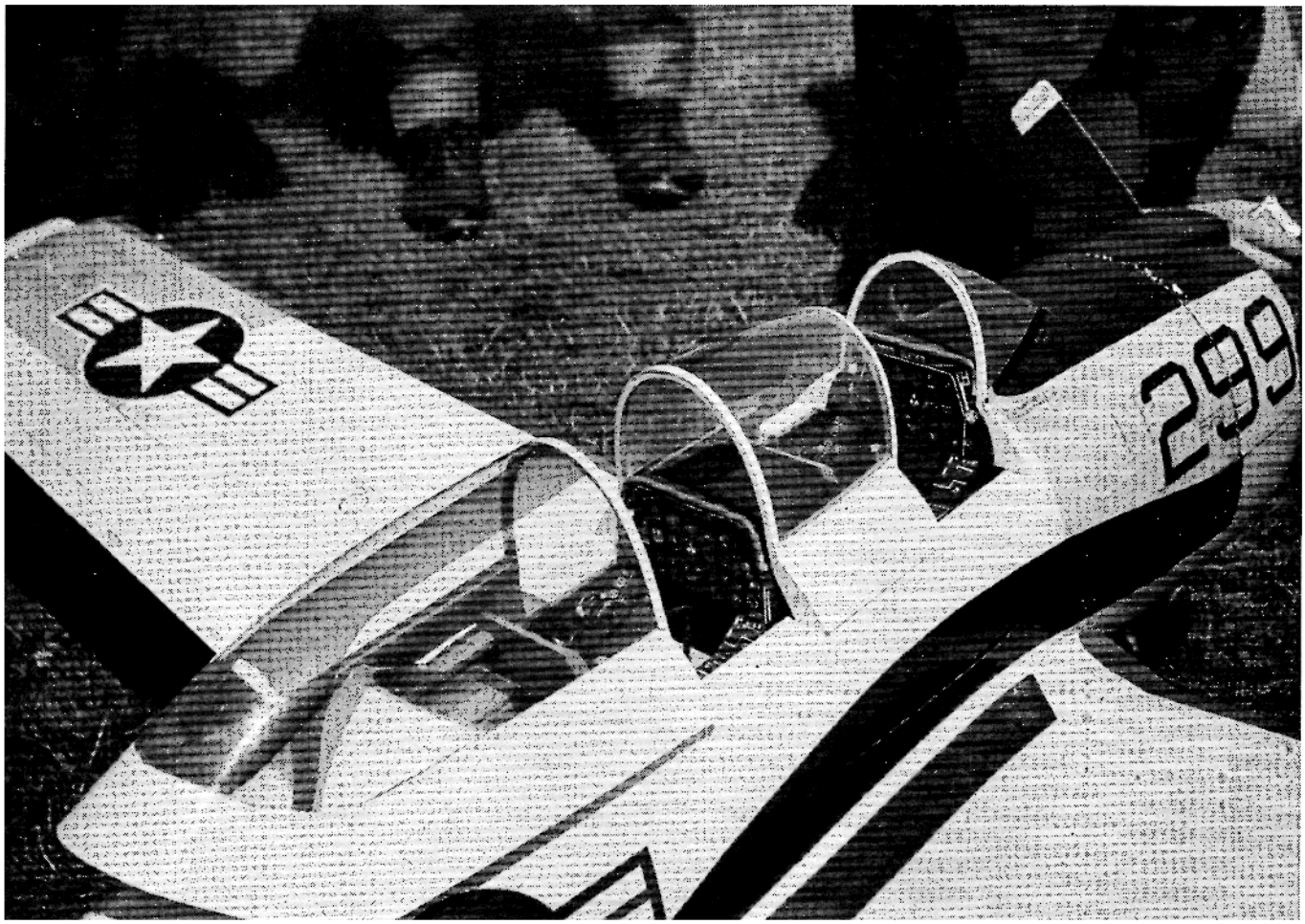
In case any of you readers are as daft as I am and fancy owning one of these ships, I'd better see if I can help you along. The very first thing I suggest you do is purchase a Monogram plastic kit of the T-28D South Vietnamese COIN fighter-bomber. (Since my own model was built, I notice that Monogram is producing a T-28B, but I haven't examined the kit.) This does emphasize the variable nature of the model — it can be made in a tremendous variety of color schemes and versions. Build up the plastic model as a replica of your chosen scheme for the RC model — it will prove to be of great value later on, guiding you on small details. Anyway, you need the kit to get the stencilled instruction notices which, by the way, run into hundreds of words. Also, the cockpit details will be helpful. These things would have made our plans **too** involved — they're bad enough as it is! Likewise, the Monogram plastic Wright-Cyclone 9-cylinder radial engine is well worth building, and will be handy when you tackle the dummy engine.

Before you start cutting wood, there are a few things you're going to need, and inasmuch as some of them will take a little time with a machinery owning friend (if you can't do them yourself, that is), we'd better get to rounding up these bits. First, a Mac .60 and a Merco throttle assembly. Drill out the throttle to the maximum bore it will take and assemble the motor. Make a new disc-rotor of Tufnol, check the run of the crankshaft races, and replace if necessary. You have no more problems here.

Next, the retractable undercarriage units. I quickly learned that, while obviously perfectly okay for their intended purpose, the deBolt units do not have sufficient power to lift the longer and heavier leg/wheel setup usually found in a scale model. Also, they are too fast for scale realism. Both of these problems are solved by further gearing-down of the unit by about 7:1. That is, it takes roughly seven seconds to retract instead of one second. The power, which, incidentally, I took from the same Deac 6V pack as already supplies the rest of the F&M Midas/Matador outfit is considerably increased and makes mincemeat of the leg/wheel combo of this design.

Now, since it is not possible to add extra gears within the existing train, it is necessary to add the 7:1 reduction gearing **as the first stage.** This means taking out the motor and putting said gearing in its place. Now we can mount the motor on extended side-cheeks. You will notice that, on the plans, the unit gets about 1" longer, but it is not necessary to cramp things inasmuch as there is plenty of room in this direction. Actually, in my own units, we replaced the

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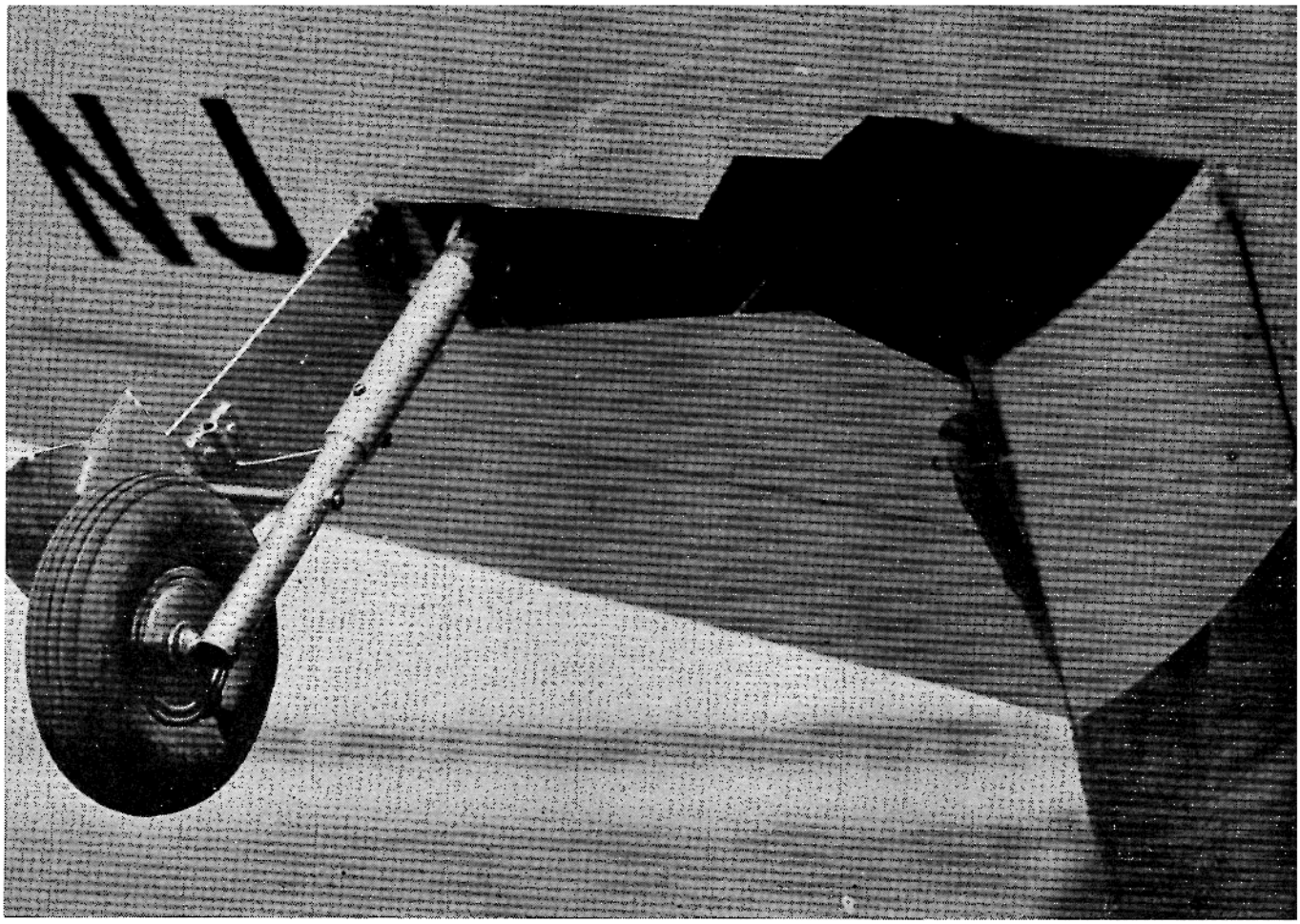

NJ

entire gear train and more-or-less started from scratch, as the stamped dural gears did not seem too clever. These we changed to brass machine cut gears throughout. This, however, is up to you.

Two more things need doing to the wing units before they are ready. One is to fix the nylon switcher plate to the shaft by better means than the friction-fit that was originally intended. This feature, if left alone, could and ultimately **will**, cause a failure of the retracting gear as a whole, since everything will go out of sequence. To overcome this, drill a 1/16" hole into the wheel as far as the shaft, insert an Allen screw (serrated end type) of a suitable size that will tap its own thread as it goes in. Tightly screw it up until the serrated end grips the shaft firmly, then check to see that the wheel cannot rotate. Adjustments to the cut-off point can always be made by loosening the screw and re-tightening afterward.

The other item is to replace the stamped-out 1/16" dural con-rod with another made of 1/8" thick steel. New bearing-collets will be needed, and for the 1/8" con-rod should be about .127" wide. **Keep all clearances as tight as possible,** or you will find excessive wobble of the undercarriage legs. This will cause not only an inexactness of retraction, but also makes the airplane sit and run along in sloppy fashion, causing excessive ground-drag.

This lot disposes of the wing units but there is one additional thing in addition to the above modifications to be made to the nose unit. Since we need a retraction angle of about 112 degrees instead of the 85 degrees of the stock unit, it will be necessary to make a new "output drive wheel." The angle of retraction is governed by the distance of the con-rod screw from the axle shaft in the wheel, together with the length of the rod itself. Unfortunately, as my own nose unit is all locked up in the model, I cannot give you actual figures for this, but from memory, the increase was about 3/32". Really, the angle is not too critical for the nose unit, so approximately 110-115 degrees will do, and the difference will not be noticeable in actual practice. Unlike the wing units, you will need to try to keep the increase in length of this nose unit down to a reasonable figure, so mount all parts as compactly as possible, or even mount the electric motor at 90 degrees to the unit if necessary. There is, of course, room to spare in the forward direction.

About the only other things that need sorting out now are the spinner nut and the undercarriage legs, themselves. By now, you'd better ask a different chap to make these, as the first will probably have had a bellyful with the retract-units!

It is fair to say that the wing constitutes about one-half of the building work of the whole model. Although, basically, a simple straight-taper design with no more parts than are necessary, the retraction of the undercarriage, along with the proper closing of the doors, tends to take a good deal of patient work. It is as well to start out with this realization and avoid the frustration that results when you seem to work endless hours and get nowhere!

The plans contain all instructions necessary regarding the latter job. Structurally, the wing is of normal configuration with one full-depth spar of substantial strength and all ribs half-slotted into it. Ailerons are of the usual form as found on a "Candy" or similar design, and present no problems. I would definitely recommend making the wing in a dihedral building jig, and in this connection, must remind you that although the mean dihedral angle of this aircraft is 6½ degrees, the angle at the wing lower surface is 8 degrees, and this will be the angle required in the jig.

A word about the wing rib drawings is in order. These are shown on the plan as full shapes, less only the 3/32" of the outer wing skin sheeting. This is done simply because I feel that when building a wing of this type in a jig, it is better to make it as if complete, with the trailing edge extending to the tip rib, etc. Ailerons can be made later and inserted in a section removed from the basic wing. This method guarantees a straight and true wing without warps — which could easily creep in with some ribs long and others short. Similarly, the rear twin spars of ¼" x ⅜" are fed into slots cut while the wing is in the jig, after marking their exact position with a long straight edge. Remember to draw chord lines on all the ribs, making sure these are parallel to the board while construction progresses.

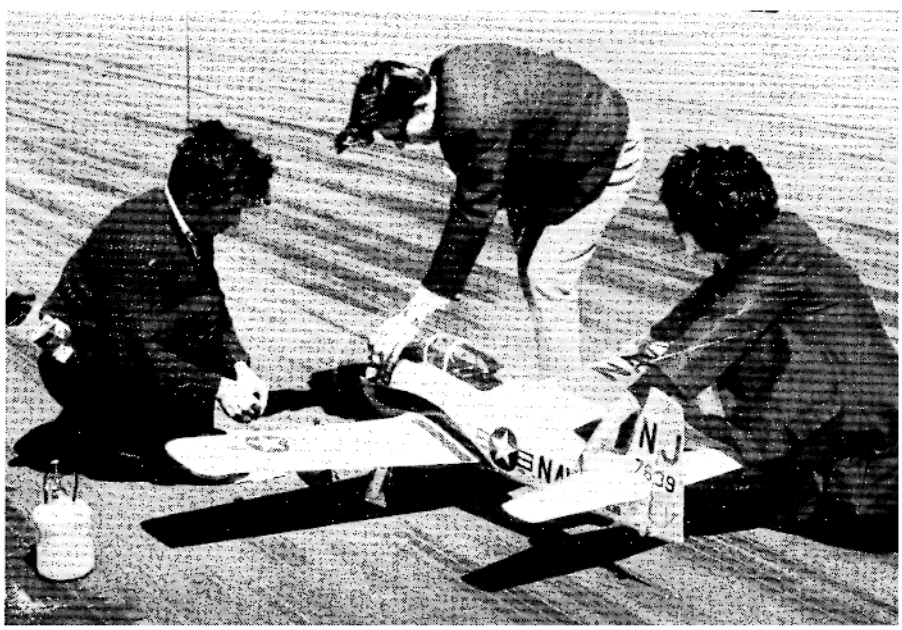
Observe that the central part of W5 is removed from the wing, and after cementing the undercarriage bearer in place, is trimmed a little in length, then glued back at the outer end of the bearer.

The wing upper surface sheeting should be completed while the wing is in the jig. The retract units are then installed and checked for proper operation before sheeting the lower surface, because sections of ribs W2, W3, and W4 will need to be removed to form a well for the legs and wheels. The undercarriage leg-doors are installed next and checked for good operation and fit. Incidentally, the inside wheel covers are hinged onto the under-wing fairing, so they cannot be made until the wing and fuselage are completed. Likewise, don't install the ⅜" dowel wing keys at this time — these will be better done when fitting-up the wing to the fuselage.

When the wing is completed, you can give yourself a pat on the back. But don't take too long because the next item to make is the tailplane. This will be needed as a finished unit at an early stage of fuselage construction. The tail, being only a simple structure, needs no explanation, except to say that all of the wood, especially the ½" sheet chosen for the elevators, should be fairly light— about 5 pound stock. Observe the aerodynamic balance of these elevators — this is as used on the real ship.

Constructionwise, the fuselage has been designed to assemble accurately, and to guarantee this, the horizontal crutch system was used. After making the crutch, glue all upper former halves in place, using a set square to ensure

The T-28B at the 1966 British Nationals. Actual flight movies viewed by RCM evidenced excellent handling characteristics.



perpendicular formers, except for F1 for which an angle template should be cut from scrap. The tailplane may now be added and blocked to an accurate horizontal setting and zero lineup. The cockpit floor, sides, and outer shelves are added next, and planking may commence. When finished, the canopy frames and outline blocks are made, hollowed, and fixed to slide properly. Canopies are molded and added next. Finally, the fin is constructed, making sure it is perpendicular to the workbench. The full-size T-28 has 1 degree right fin/rudder offset and I recommend you this, as a scale job cannot use sidethrust. In any case, although the model is highly aerobatic and really enjoys being thrown through loops, rolls, reversals, vertical upward rolls, and all the rest, it is unlikely that you will do a great deal of inverted flying.

The upper part of the fuselage may now be removed from the bench, and the fuel tank inserted before gluing the lower former halves in place. Before planking the lower fuselage, almost all of the remaining equipment installations and other details should be completed, such as RC gear, pushrods, batteries, nose retract unit, wing attachment fittings, engine bearers, and so on.

After the lower fuselage is planked, the cowling, dummy engine, and under-wing fairing are made. The latter should be built up of ½" sheet laminations rather than solid blocks, as the shape would be too difficult to form by the latter method.

Your plastic kit now proves its worth in making the dummy exhausts, air intakes, and sundry small exterior details. Cockpit details are next on the list. Make a good job of these as the greenhouse shows up your workmanship to an alarming extent!

With the model finished structurally, I always think the most pleasurable work is at hand. Covering and painting a scale job, especially one so vivid and beautiful as the T-28, is an exciting and rewarding experience, and since the exterior finish and color-scheme of any model is all one **really sees,** it pays to have infinite patience at this point.

My own T-28 was covered in white MonoKote which made a very good job I would stress, however, that I regarded this material merely as a "covering and sealing" agent, and **not,** of itself, a finished result. The MonoKote does give a lovely **level** surface on which to work, and provided the bare balsa is nicely finished, the planking of the fuselage and other joints will never show through. Which is more than can be said, at least from my own experience, to the most carefully done sealing job using paints and fillers.

Accordingly, the whole model is now painted gloss white, over the MonoKote, using fuel proof type paint (Hobby-Poxy will be fine). All of the lettering except the '299' on the cowl and the 'J' on the rudder must now be painted, together with the U. S insignias and the black fuselage panels. The International Orange areas are next, followed by the Dayglow orange paint on the nose, wingtips, and rudder. Finally, the rest of the lettering and the stencils are applied.

Regarding these stencils, these are letters called Letraset, and are a dry-print transfer used for typographical display work. They are available in many sizes and type styles in U. S. stationery stores as well as in England. The height of the letters we will use are about 1/16".

To any modeler who would make such a thing as this scale job, instructions about flying it would be an insult. The only thing I will mention, however, is that the model is intended to be flown from a tarmac runway and will not get sufficient speed up on a grass surface — even a very smooth one. Ailerons, being quite large, are sensitive, as is the elevator. The increase in airspeed with undercarriage units retracted, at an estimate, is around 20 MPH, the "clean" configuration giving a very fast model despite the huge size of the bird.

Clear the bench!

The author poses with his Nationals winning T-28B.

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