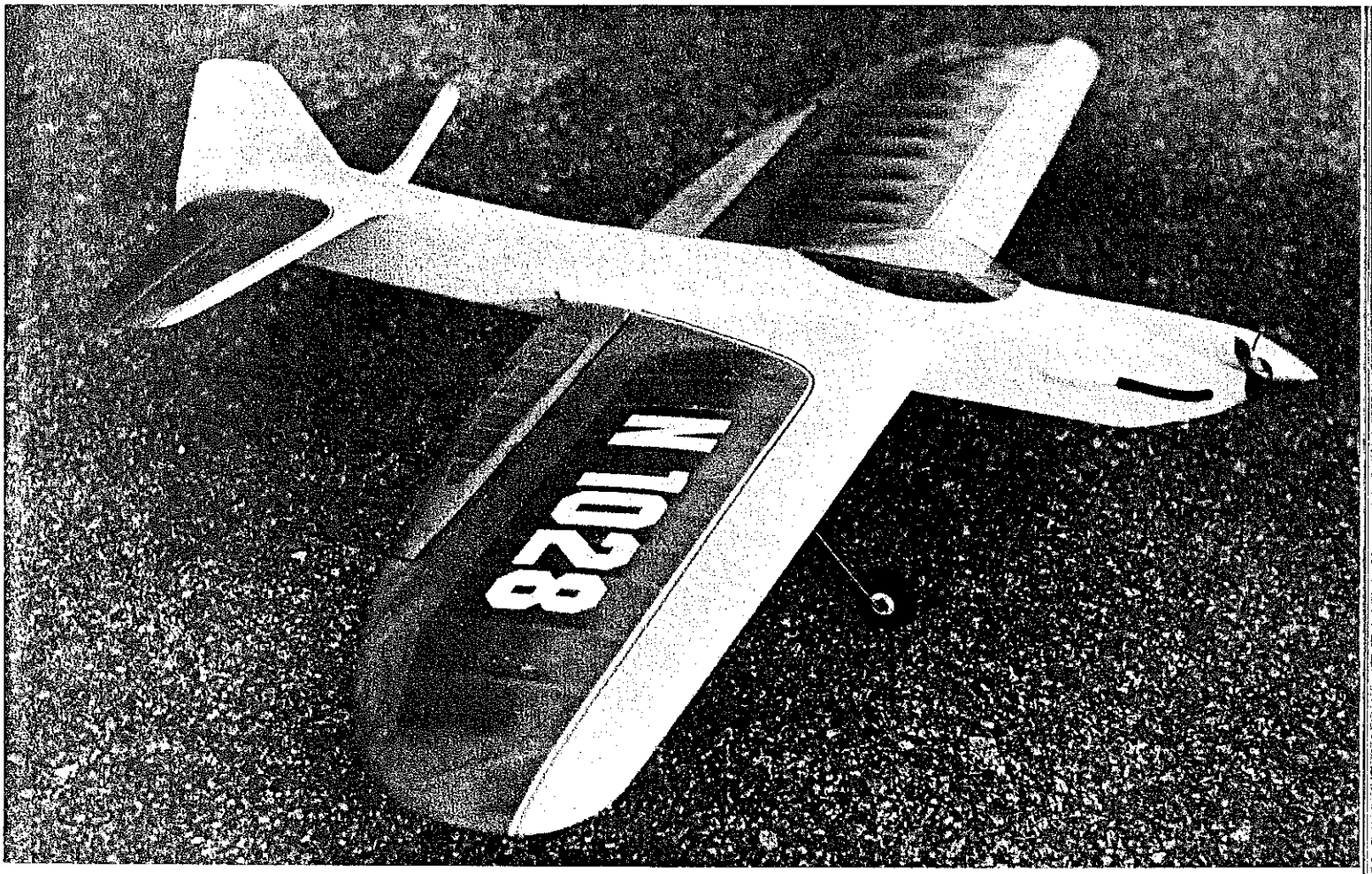

As it is, this model already has the "presence" of a full-size Stunter, but the addition of cockpit detail and wheel covers would help to enhance this aspect. The outside fuel line from the front chicken-hopper feed tank is the only giveaway that this is not a full-blown Stunter.

Baby Bird

Tom Dixon

Oftentimes the most grueling part of Control Line ½A Stunt flying is obtaining a proper run from the engine throughout the more abrupt maneuvers. Our author takes a different approach to this problem by using an .049 diesel as the source of motivation.

WHAT YOU SEE here was to be the "secret weapon" in ½A Stunt at a recent Nats. Alas, work responsibilities and care and involvement with my new son meant that the building schedule went out the window. Now it's finished and working well. Look out the next time!

Some background is in order, as the Baby Bird is unusual in some respects. The basic design is a six-tenths scale-down of my Phoenix published a while back (February 1984) in *Model Aviation*. A more modern bubble canopy is used to simplify fuselage construction; most people seem to favor this style fuselage anyway. There is no separate cowl, again for simplicity, but also to allow ample airflow to carry away exhaust gases. If you want to get fancy, feel free to sculpt a cowl.

I also opted to go with a clear doped tissue (Sig Ply-Span) finish, as no appearance points are given in ½A, and certainly much weight is saved this way. Small ½A models are more weight critical than larger Stunters due to Reynolds number effect, so every little bit helps.

The most unusual part of the model by far is the power plant—a diesel. The Tee Dee .049/.051 has been the standard for attempts at ½A Stunt since Dick Mathis published his Pinto back in 1972. I even dabbled with a mixture of cylinders and cranks to get the Tee Dee to work in my Gremlin (published in *Model Builder* in 1975). All of this experience told me the Tee Dee, at least without a bladder tank, was not the way to go. There seemed to be no truly acceptable power plant.

Enter Tony Eifflander of the British F2B team at the 1984 Control Line World Championships. Tony had the audacity to be flying one of the P.A.W. .35 diesels that he and his father manufacture. His engine runs were different from the snarling .60s and Schnuerle .45s, but they had an appeal all their own and were extremely quiet. What impressed me most was Tony's running an 11 x 7½ prop on his .35, as the

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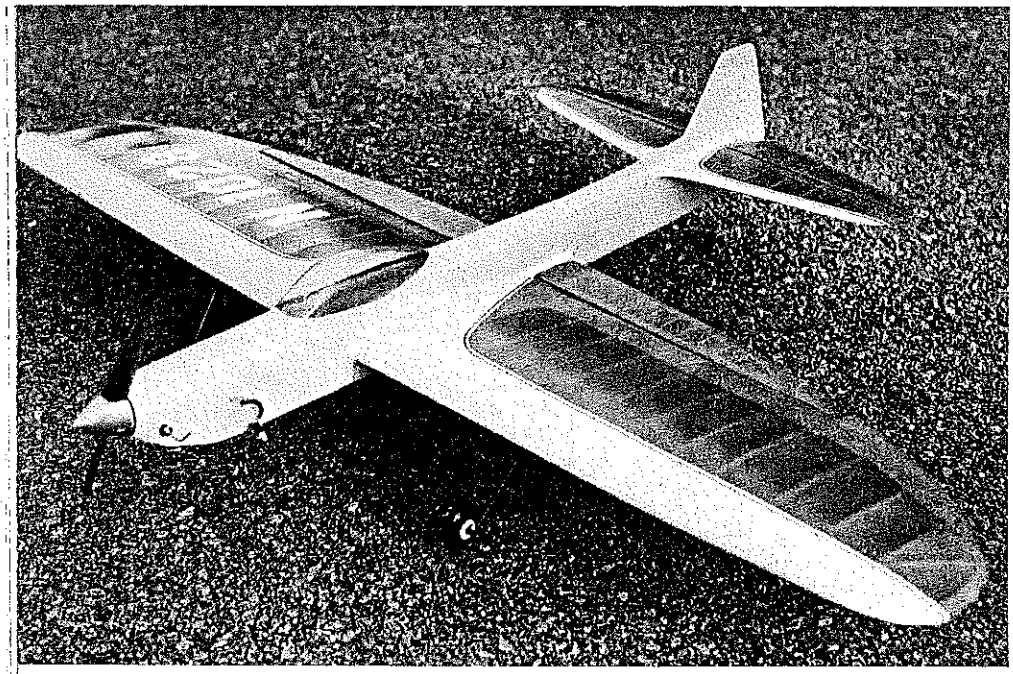
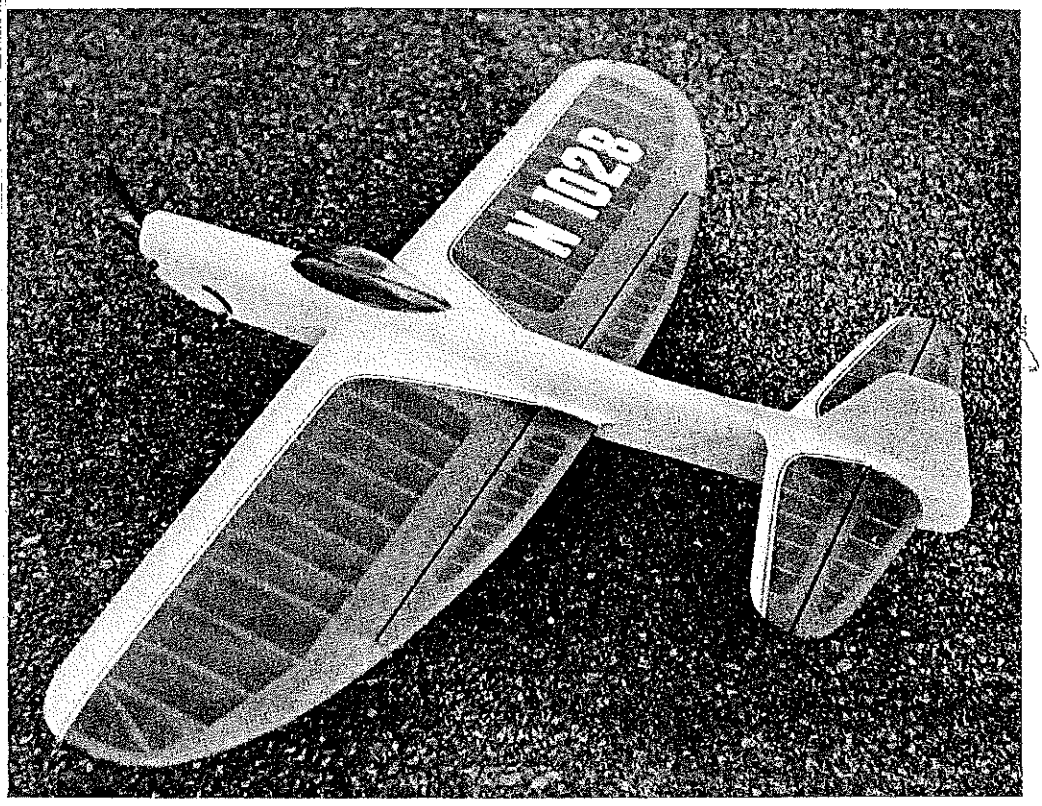


The capped overflow tube and the airstream pressure vent tube combine to help provide steady engine runs. The prop is actually an FAI Team Race item for .15-size glow engines.

diesel works best when loaded down. Such a prop would burn up a glow-type .35 in no time.

Extensive (and delightful) conversation with Tony revealed that their Progress Aero Works engines ranged from the .35 down to an .08cc, or .049 cu. in. Aha! The idea of the Baby Bird began. Tony also pointed out that the P.A.W. line of engines is available in this country through Eric Clutton, so there's no need to order all the way from England. (As an aside, I thought Tony's flying was underscored at that meet because he used such a unique setup.) My opinion was verified this year when, still flying the diesel, he won the Gold Trophy—equivalent to our Walker Trophy—at the British Nats. Immediately on returning from the World Champs, I ordered a P.A.W. .35 and an .049 from Eric Clutton. Delivery was very prompt—10 days.

As soon as the engine was in hand, I put the design for the Baby Bird on paper, but for various reasons I didn't begin construction until February; the first flights didn't happen until late August, three weeks too late for the 1985 Nats. It was just as well, as I had a serious fuel tank problem.



The built-up flaps and tail surfaces help to keep the weight down. The original is covered with Sig Plyspan Japanese tissue, but transparent MonoKote or Micafilm could be used as well. The "clear look" is lightweight and in keeping with English diesel model tradition.

The original tank in the model was a typical scaled-down uniflow-vent Stunt tank with a ¾-oz. capacity. Fuel draw was terrible. If the needle and compression were set for good level flight speed, it would quit in maneuvers; set rich enough to run in maneuvers, it would barely maintain level flight.

The problem was that the diesel does not "four-cycle" like we are accustomed to. Add to this the low Reynolds number effects on the venturi (much the same as the low lift effect on a small plane), and you have a very marginal fuel draw. No sweat if you're flying in a Team Race, but no good for Stunt. Highly frustrating to say the least.

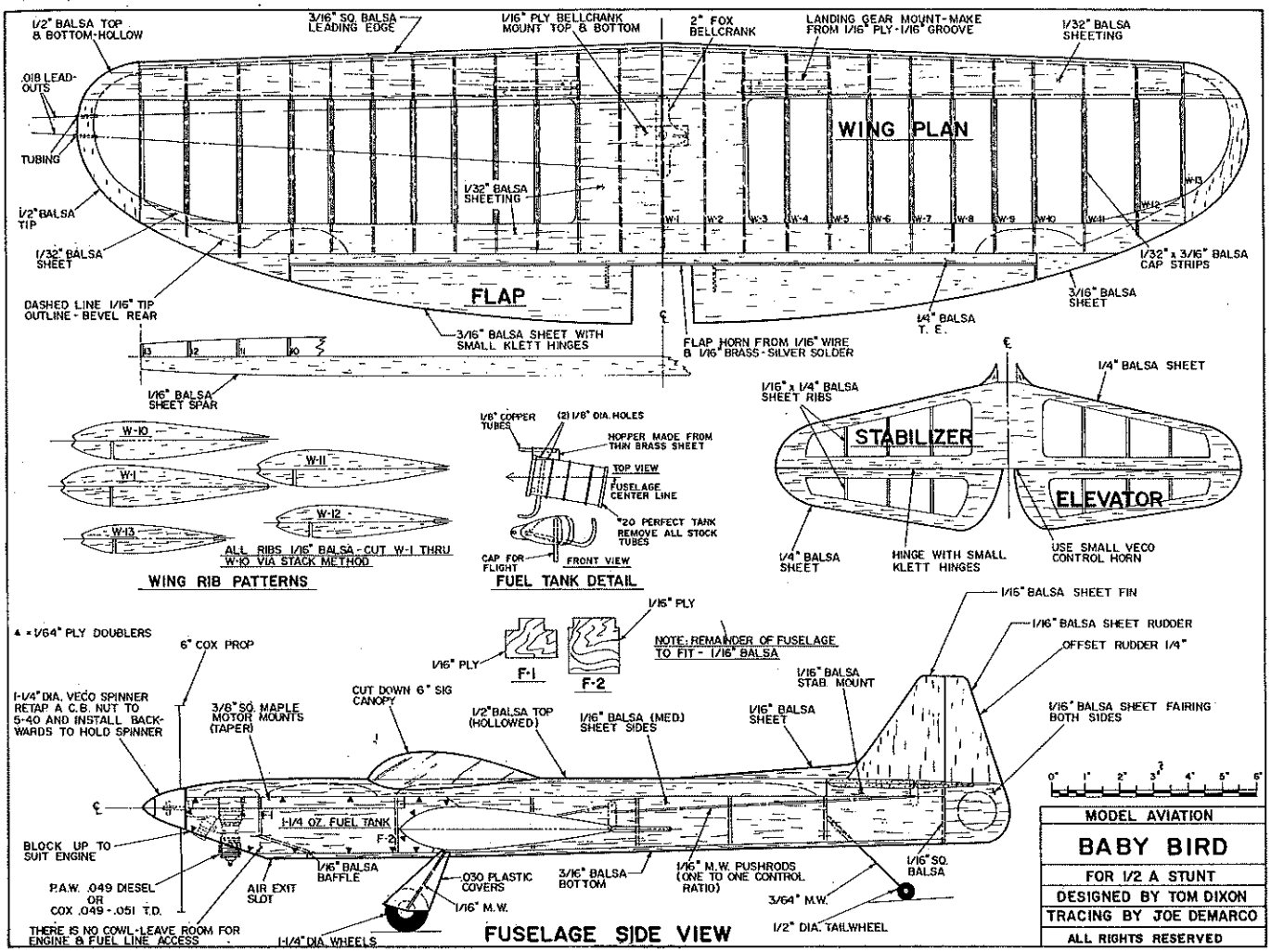
Research of magazines from Europe, where diesels are common, revealed that a front feed tank was most often used to cure the fuel draw and fuel head change problems. The best tank I found was designed by Frank Coombs and Les Bollenhogen and published in conjunction with Coombs' all-sheet diesel Stunters (a separate story in itself) in Australia's *Airborne* magazine. So I soldered up a Coombs/Bollenhogen chicken hopper front-feed uniflow tank using a Perfect ¾-oz. wedge tank as a starting point. Angling the tank enough for proper feed meant that the hopper and feed line would have to go outside. That's why you see black fuel line on the outboard side of the fuselage in the photos. A side benefit of this external feed system is that it's much easier to attach the lines when the engine is installed and reinstalled. It also allows you to warm up the engine, then pinch off the fuel flow to shut it down.

The tank works. If you use a diesel, do not use any other type of tank. If you use a glow engine, you're on your own; I can't be of much help in that regard. I suspect this sort of tank design would improve any engine suffering from marginal fuel draw, and indeed, it is similar in concept to tanks used on Slow Combat and some Racing planes.

Construction. Not too much to say here, as it builds just like a large Stunter. I built mine in an A-justo-jig and recommend you do too. Ribs 1 through 10 are cut in a stack method using thin ply or aluminum templates—the tip ribs are cut separately. The 1/32 sheeting should not be too soft, as it will have a tendency to break; use medium-weight springy wood here. Cap strips can be omitted if you desire by adding the appropriate 1/32-in. thickness (top and bottom) to the rib templates. I found it easier to use cap strips than to redraw the ribs.

The landing gear blocks are simply laminated from 1/16 ply leaving a 1/16-in.-wide slot for the wire gear. The gear can be put in the fuselage if you desire, or left off entirely if you fly off grass and not in competition. The light load on the controls makes bushings unnecessary, but controls *must* be set up as shown or the plane will be too sensitive.

Pushrods are held in place by Midwest nylon retainers designed for use with RC pushrods. They are simple, reliable, and



easy, eliminating the need to solder in tight confines. The flap horn is a standard full-size horn cut down as shown on the plan. The elevator horn is an old, small-size Veco, but an acceptable substitute can be made from 1/16 brass and 1/16 wire. Be sure to use silver solder at the juncture of the upright and cross-wire joiner.

I elected not to use adjustable lead-outs, as experience with my larger T-Bird models has shown me where the lead-outs should go. Just use eyelets or tubing permanently installed at the location shown on the plans.

The photographs should clear up any confusion as to the shape and construction of the nose area. I used an old 1¼-in. Veco spinner and adapted it to the engine by using a C.B. Associates' union nut re-tapped on the small end to match the engine shaft (10-28, as I recall). The nut also had to be cut down on the ¼-28 end to fit inside the spinner, and the nose cap for the spinner also had to be cut to fit. I suspect there are other spinners around that would work as well, or you can eliminate it altogether and shape the front end like an FAI Team Racer instead.

Finish is Sig's Ply-Span tissue (orange) applied with their nitrate dope. The fuselage and rudder were given a couple coats of Sig Nitrate and talc filler, then wet-sanded with 400-grit paper. A thin coat of Sig Skybrite primer followed after the trim design was taped off, and as soon as it was dry, white Sig Skybrite was sprayed (spray can) on the fuselage and the leading edges. No additional fuel-proofing is needed over the nitrate clear if a diesel is used for power.

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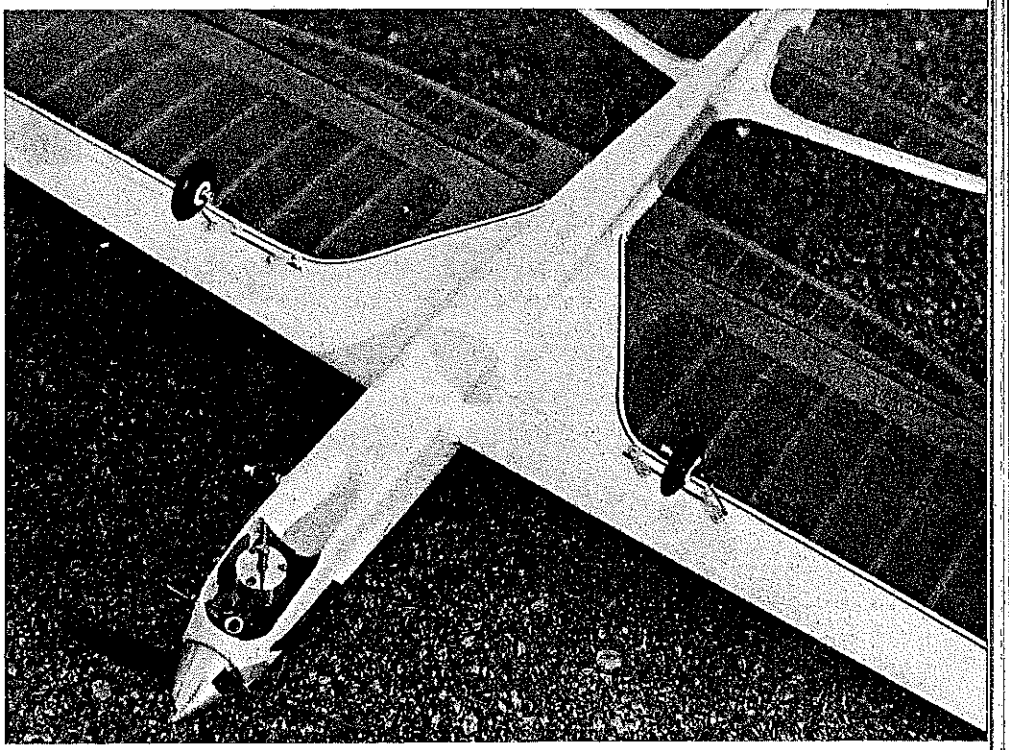

The P.A.W. .049 diesel is installed through the large opening in bottom of the nose. The area behind the engine is relieved and baffled to allow hot air and exhaust gases to exit. The diesel has much more torque than a glow .049, so you will need a prop with a bit more pitch.

had to add an additional rudder to the fuselage to get the turn he wanted, but once adjusted the plane flew exceptionally well as evidenced by the flight time. NFFS (National Free Flight Society) guru Tony Italiano was second in POP with a 9:33, followed by Vito Gagliano's 8:50. Dad Gagliano may want to check with son Charles for some tips on flying the event. David Brown was the lone Junior entrant and posted a time of 3:24.

The most positive spinoff of what was essentially a lackluster Indoor contest was the presence of a TV film crew from *National Geographic* which captured some representative samples of Indoor flight on film. The crew erected a large black velveteen backdrop and then filmed several models in flight as they repeatedly passed majestically in front of the blacked-out set. The visual effect for those of us watching the laborious process was stunning. Lit from the front and sides, the microfilm ships of Tony Becker and Richard Doig scattered flashes of rainbow colors with each turn of the prop and each new angle of climb or turn.

Scheduled for airing in late fall (possibly October or November) on *National Geographic's* "Explorer" program, the segment is now tentatively titled "Flying Fanatics," which may very aptly describe those of us who attended this year's Indoor Nats at Lake Charles.

Baby Bird/Dixon

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Trimming and flying. Follow the engine manufacturer's instructions, and get familiar with operating the engine on the test stand. Once it is installed in the model, tune it so maximum power is developed when the nose of the model is pointed straight up. This will result in a slightly richer setting in level flight. If the engine is overcompressed slightly, the run will be steadier than if undercompressed as all the fuel will burn, and it won't have a flameout as easily.

Once the engine is properly broken in, you will seldom need to touch the compression screw. I find that quicker starts are possible by opening the needle valve exactly a half-turn from the flight setting and then closing it over five seconds or so as the engine warms up. No priming is needed. I generally start the engine with the model upright, choking it with my finger for two or three flips. Usually another two or three flips is all it takes to get it running.

Line length is 40 ft.—using Sig .008 cable lines cut down from a 52-ft. package. At this length, I needed exactly 1 oz. of tip weight on my model. *Do not try to fly this model with typical Dacron ½A lines!* I use a Perfect ½A handle (modified with a coat hanger wire line carrier à la Rich Porter so line spacing can be adjusted). I've settled on a spacing of 3 in.

The propeller shown in the photos is a fiberglass Bolly designed originally for Goodyear or FAI Team Racing. It has 6.8 in. diameter and 4.9 in. pitch. I've also had good success with a Graupner nylon/glass 7 x 5. Believe me these *are* the right sizes for the P.A.W. .049. I suspect a Tee Dee would use a 6 x 3 or 5½ x 4 prop.

Lap speed on this and other ½A models will be faster than you may be accustomed to (Reynolds number effect again), but this should pose no problem.

Fuel. I use Aero-Dyne diesel fuel right out of the can. Our local hobby shop is run by a Free Flight and Old-Timer enthusiast who stocks this sort of thing. If you are not so fortunate, mix your own per instructions in the engine manual. I, myself, have not tried the Davis Diesel fuel, but it should work fine if it has sufficient castor oil for lubrication. P.A.W. recommends running *only* castor, and I agree based on much experience with lapped, plain-bearing glow engines.

Manufactured diesel fuel appears expensive, but you use only ¾ oz. per flight. Its ether content makes it highly evaporative, so it's best to buy it in pint or half-pint quantities. Likewise, if you mix your own, keep the quantities small. You will also need to switch to neoprene fuel lines, as the diesel fuel will cause silicone lines to swell and slip off the fittings.

Hope you enjoy the Baby Bird. Any questions or comments can be addressed to me in care of the magazine. Fly safely.

Terrible Coupe/Markos

Continued from page 77

mention. Pay attention to the wood grain. Each gusset needs to be hand fitted for a perfect match to the TE. Final sanding of