



PHOTOS BY TOM SCHMITT

Bill Winter's ROOKIE MK II

By **BILL WINTER** . . . It's a distinct pleasure to introduce this month's feature construction article. Designer of the Rookie II is the undisputed Dean of aircraft modeling and model magazine editors.

• You can enjoy this airplane. It is a happy machine. Let's forget such worn out cliches like easy to fly. It stood the test of time. Published almost 25 years ago with the then sensational K&B .45, it was built

by the many hundreds. Some people still fly originals. Others still build from old magazine plans or some plan service. I receive pictures. A couple of clubs recently were prekitting small numbers for some

members.

The MK II presented here is modified, and a bit simplified, to take advantage of the unique performance envelope made possible for generous wing area and light



The Rookie II is very similar to the original design of almost 25 years ago. Appearance changes may be subtle, but this one is up-to-date in every other sense of the word . . . a fine blend of modern and traditional design techniques.

loading by the newer, more potent of the 4-strokes, in this case the Enya .60. Another motivation was the advent of Turn around and more enjoyable aircraft that resulted, which, in turn, makes the Rookie II with its more than 6 sq. ft. of area more appropriate than ever as a fun/trainer.

In 1960 (I began in 1927), having married off a few of the nine kids, I managed at long last (with a used Orbit reed set) to get beyond escapements. Reeds, like prop soon to follow, was a different world. I had to teach myself to fly awesome "multi" or "full house." I created my own trainer, capable of aerobatics by the novice. The cabin Smog Hog was fading, and the low-wing Astro Hog must have been around, because, how otherwise, would I have dared my first low wing? The Dark Ages taboo that low wings were impractical haunts us to this day. There is no reason why a safe, docile low wing doesn't make as good a trainer as any high wing. I feel more comfortable with the MK II than I would with many aileron/ trainer bombs that dominate the scene today.

I wanted a touch of realism, a fresh look, so incorporated a long sheeted canopy and big tip plates. The tip plates on the MK II are smaller, rather cosmetic, and maintain the older Rookie theme. To slow down the craft I used a thick, semi-symmetrical foil. A "zip" section, it was 2/3 upper, 1/3 lower with a well-rounded leading edge. The tail dragger gear was given a huge tread as a cross-wind precaution.

A hot-flier son test flew it, including consecutive rolls on the first flight. At the club site guys laughed, warning it could not possibly roll with such a huge wing and such small ailerons. It displayed a suitable roll rate and two members, then in the top 10 at the Nats, put it through the full pattern. Dumbo the trainer! Since then I have had many user inputs. People fly without the tip plates with no ill effect, and many round off the tips as well, but then needed more aileron span. The MK II has larger span ailerons. One man reported that the big tip plates displayed a weathervane effect in stiff cross wind takeoffs—my smaller ones show no sign of that.



With test pilot Don Srull at the controls, the Rookie II makes a low-n-slow pass for photographer Tom Schmitt. Tip plates increase aileron effectiveness at low speeds.

I quickly discovered that the MK I could fly in ground effect while I walked beside it, holding up elevator. Inverted and consecutive rolls came easily—it needs very little persuasion to go inverted. But for a beginner, the coordinated use of rudder, ailerons and elevator, was a nightmare. Most of us flew elevator with the left hand (also rudder), and ailerons and power on the right. Also, a reed servo required two channels, so a reed transmitter was a forest of sticks. Experts pulsed all those

sticks like a concert pianist for truly proportion flight (at least to the eye). I was in constant trouble—not even an instructor.

There was no such animal then. All I knew was to get it off the ground quickly, regardless of tilted wings and errant headings, after which I was home free. Mother was less forgiving.

By selecting light wood and covering with nylon and dope, gross was held to 6 lbs. plus. The KB .45 was a very light en-



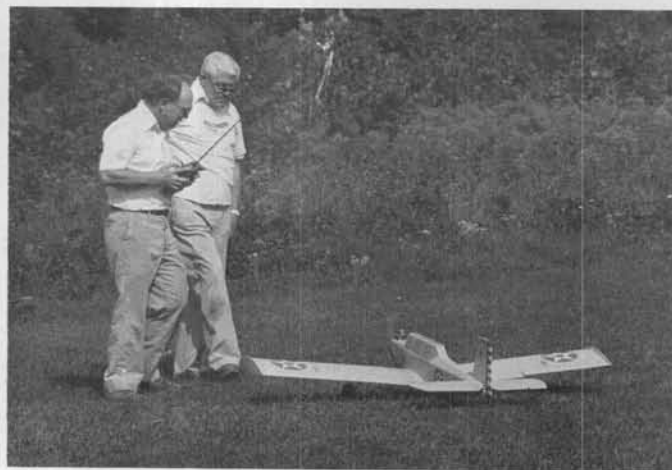
We've asked Sahib Winter to send us plans for the exotic fieldbox shown in this photo. Ship is painted typical military trainer yellow.



Bill didn't say whether Don had just taken off, or was making a low pass, or landing, but note there is no sign of up elevator.



Rookie is an easy ship to build; no frills, just a fine basic aircraft for sport, advanced training, and aerobic practice.



Wide landing gear tread makes ground handling a cinch, even in fairly cushy grass. Test pilot Don Srull taxis by for inspection.

gine. The MK II with at least another pound in its hefty powerplant, big Atlas Servos, Sig Koverall and epoxy, is 8 lbs. plus. Ah, progress! But it still gets airborne on a fast taxi on striking a sod bump, and still never drops a tip when hung out to dry. Some dihedral provides hands-off stability—any trainer must be hands-off stable (unless it is *Advanced*). The light loading and tip plates fought off tip stalls, so it was impossible to spin (but we didn't know about high rate elevator either). As to its handling capabilities, I give two examples.

Once, inverted at low altitude directly overhead, I lost radio. (Reed systems maintained neutrals.) The ship continued full bore (throttle positionable) into the distance, faded slowly to the left, then to the right, circling the entire area at constant altitude (remember, elevator in neutral). Eventually it arrived overhead on its original heading, where I regained control, throttled and rolled out for a quick landing. On another occasion I lost all control but rudder during aerobatics, and landed on the runway. No stay-where-you-put-it design could survive. So the MK II is distinctly user-friendly.

Except for the nose, the MK II keeps the same outlines. The firewall is moved well aft due to the length of the big 4-cycle. What isn't visible is the elimination of some blocks (\$\$\$), and incidental struc-

tural alterations throughout. For example, the built-up stabilizer has fewer pieces, and fuselage laminations are modernized, including a facing of 1/64th ply. The nose is streamlined now into the CB metal spinner, with a top hatch for tank inspection (tank removes through cabin), and a bottom lip air scoop for better cooling, especially for the 4-stroke case. Aileron horns are now on the top, although I'd prefer the bottom as on MK I, but this is for easy adjusting on the field (I have stiff knees).

The Enya 4-st. .60 merits considerable discussion. Compared to 2-strokes, this is a heavy, massive engine, making for a bulky installation and a CG problem with the original nose length adhered to. As this is written, the Enya, according to both Chinn and Lee, is the most powerful of its breed and size. Mine was run a few times on 15% nitro 2-stroke fuel, then broken in on 10% Red Max, and finally 15%, 4-stroke fuel, which has much less oil than 2-stroke fuel.

I still don't know the best prop for the MK II, but an 11-8 wood was so-so, and I now have a 14-6 wood. The thrust and raw pulling power, especially toward the lower end, are impressive. The helper should use a two-hand hold—reminds me a little of my giant scale with an 18-6. Torque is high, so right rudder is required during takeoff acceleration, as it would be on a full-scale high-powered tail dragger. With

such aircraft, raising the tail prematurely, causes a bad left swing—and you'd need a powerful right leg, as pilots will tell you. The 14-6 shows high torque on the up side of very open outside loops, and control correction is essential.

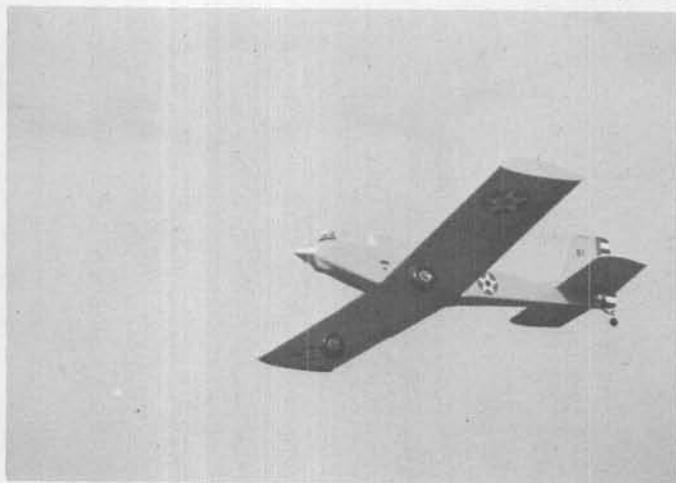
Other pilots argue me out of the Enya .80, the same size, bored, but several ounces lighter—but be my guest! We have no need for more power, although more power would increase vertical performance. On the 15% Red Max, a bit rich, the 14-6 tachs 8300-400, but idle remains in the 3000 range, which makes for long, low approaches, and considerable run-out. It may be that an on-board booster will permit a lower idle, but with booster lead in place now, then removed, there is no audible difference. A 40-stroke idle sounds low because it fires on every second stroke. The 14-in. prop provides great disk area, and an .80 would force high pitches because diameter cannot go up on this ship. However, people are driving 4-strokes to higher rpms, and we may yet also do so. You should tach because a prop unloads in the air for still higher rpm—my choice is not to come within 1500 on the ground of the max rpm indicated on the chart. You hear about valve float but few mention valve temperatures.

Engine length requires a special mount

Continued on page 95



The Rookie II is a natural workhorse-type airplane for a club, or for the individual who wants to experiment with chute drops, air photography, glider towing, etc. Bet we'll see a lot of them this summer.



I learned a great deal my first year in model boating. How to install engines, how to build radio boxes that wouldn't leak, how to cross-start using a starting rope, how to build boats from plywood, and the list could go on and on. In my twenty years of involvement in R/C boating, the improvements have been unbelievable. Those just entering the hobby cannot appreciate our excellent radio control systems like those of us who learned on reed systems. I sometimes hear someone complain about a lack of supplies for model boating. They should have been around twenty years ago. The improvements made in model marine engines in twenty years have been tremendous. Twenty years ago, there were very few marine model engines. That situation certainly doesn't exist today.

The availability of fine running models in fiberglass, epoxyglass, and plastic allows for rapid access to the hobby. The introduction of "instant glues" has reduced building time for those of us who enjoy sticking together wood boats. The fine finishing materials allow tough, long lasting paint jobs. And more improvements seem to come along. One can only wonder what the next twenty years will provide for us in the way of model boating enjoyment.

ONE MORE TIME

As we begin a new boating season, I hope some of you will take the time to send in photos and information about what is happening in your area. Although I cannot promise to use everything sent to me, I do try to incorporate items sent by readers whenever possible. Black and white photos are preferable. Sorry, Polaroids are not acceptable for reprinting. Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, Washington 98498.

Rookie Continued from page 20

with long arms. The carb is in the rear, and inverted in this case. I used a Tatone metal mount intended for the Enya .60 but had to file away a bit of the metal to clear the projecting carb. Since the carb is inverted, I reversed the throttle arm to upright—otherwise the clevis is not accessible. When pulled back, the clevis, attached to a Du-Bro threaded coupler soldered to the cable, jams the firewall. I installed a piece of large diameter tubing through the wall, allowing the clevis to retreat almost out of sight. Since the pushrod sheath enters the rear of the large tubing, the gap can be sealed with epoxy-lite, or microballoons and epoxy, etc. The inside of the nose wood adjacent to the clevis at the carb is excavated to permit detaching the clevis. The silicone tubing from the case breather exits the nose bottom, using the wide drain hole.

While the Enya has a nice choke extension exiting the side of the nose, we find that no choking or priming is necessary. The starter picks up suction quickly enough. Incidentally, the extension prop nut with the CB spinner has a different thread than the Enya shaft—we had

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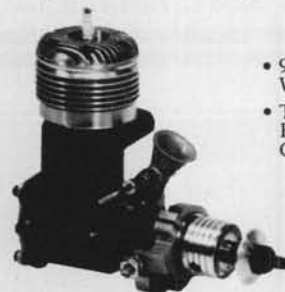
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another made. But none of this is particularly burdensome.

Should you wish to go 2-cycle, it is suggested you resize the firewall and move to suit. A warning. Some engines, including this Enya, have the plug located on the front. Therefore, it is highly recommended—I think imperative—that a normal lock-on booster *not* be used. Install a remote booster attachment. You cannot continue to safely disengage a standard lock-on. Two incidents during the first 11 flights convinced us—and this with a helper handling the plug.

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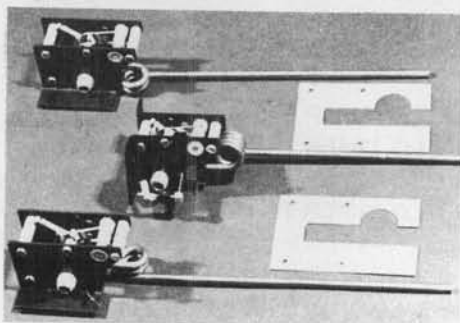
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At 8 lbs. plus (some people will end up at 9 or 10 because they always do), the MK II slow flights beautifully, and from near minimum speeds rolls and inverts easily. In high rate, the ailerons are quite powerful, even in slow flight. Not sensitive, just powerful. All usual maneuvers can be done close in, and in a very small box, at easy-to-handle speed for any Sunday pilot. The MK II's unusual envelope appeals so much to others that I am asked to bring it out so they can fly it. I hardly get to fly it myself.

I doubt that anyone building this type of airplane will read a blow-by-blow con-

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struction article. We all know from experience that there are two priorities: getting things square and duplicating alignments and balance as a plan specifies. One cannot overdo the use of triangles, a straight-edge, and taking pains with shim blocks, etc., when aligning bulkheads, propping up edges, etc. A stern post not precisely on the centerline, or at a right angle to the work surface—as an example—means that a plane never will fly properly. Accuracy and integrity of structure is a matter of discipline, which does require world-class expertise, or being a cabinet maker.

The lighter you build this airplane, the more fun you will have. Since the MK II picked up two lbs. over the Mark I, how can weight be pared? While most of my increase came from the much heavier engine, a 1200 mAh airborne pack, (above CG for balance) big servos, Koverall and epoxy paint, some possibilities are evident. One can use an iron-on textured material, such as Solartex and dispense with colored paints, or merely use dis-

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crete trim. I do use MonoKote on most of my planes, but don't care to use it on large, heavier ships with open frames. But if you MonoKote, the roof won't fall in.

Free flighters, et al, know the importance of wood selection. Careless choice of wood can cost a pound on this airplane. Outside of the old adage that blocks should be soft and spars, etc. hard, I find myself grading medium in most instances, from a tad soft to a tad hard. Sheeted edges can be a bit soft, and wide sheet trailing edges a lightish medium. Can this piece be softer and have enough strength, or must it be a bit harder? If you were to use medium throughout you'd end up with a medium weight aircraft. Fine tuning wood makes a big difference if you bother.

Obviously, no low-wing-loaded craft is at its best in a wind. A 10-mph wind is more than more people think (ever measure it?), and 15-mph can be choppy and turbulent. The MK II can handle wind but the ride will be bouncy. If you are stuck with gale-force Sundays, then you need a

bomb in your stable. But no bomb can do the surprising things this machine is capable of.

About flying. If you have flown ailerons and have done touch-and-goes on anything, you can safely fly this airplane. Many who have flown 3-channel until now, will be tempted by such an easy step up. But as always, you should seek out a check pilot to guide you through your first few flights, and advise you through early aerobatics. I won't claim that even the most docile and forgiving of big engined aerobatics-capable planes is as fool-proof as an Eaglet. I must admit, age and infrequent flying has made me a hacker again. I do have a routine for new and strange craft.

First, check out ground handling with prolonged taxiing, circling, S-turning, eventually simulating increasing faster takeoff runs, aborted when the ship gets light on its wheels. Taxi back after each, turning the ship right and left until you are completely comfortable—that is, no hesitancy with left or rights, coming and going. By now you will be aware of rudder corrections during runs, and whether or not response requires adjustment.

The first takeoff requires no more than 2/3 power and only the gentlest of up elevator to rotate to airborne. Never yank any airplane off the ground. Continue out straight in a shallow climb concentrating on maintaining heading until altitude permits a wide gentle turn. Finally on a reverse heading at, say, twice landing pattern height, fly a straight line back and forth at, say, 75% speed. Trim as necessary for straight and level flight. It is OK to carry slight trims (on this flight) to offset turn tendencies, etc. but if excessive trimming is required, or if responses are too sensitive, or slow, it is precautionary to land and make clevis and horn hole adjustments. Unless such corrections are an immediate problem, remain aloft and make several high passes back and forth. Try a wide 360, one way, then the other, and if that feels well, then a Figure 8.

Forget aerobatics, even a simple loop, on the first flight. Before fuel runs low, instead, set up several simulated approaches, the first quite high, and the following two progressively lower. On each, seek to split the runway, make the first at at least 1/3 power, then cut back progressively until the third is a fast idle. Each time, as you go around, add power smoothly, never blasting from idle to full. Don't showboat the first landing. It is better to use 1/2 to 2/3 of the runway than to undershoot with obstacles and with panicky, upsetting throttle responses.

I'd suggest two or three such flights before trying aerobatics—unless you are adept at aerobatics. Begin with a loop, and repeat as you get a feel for response and loop diameters. Note how the ship tracks and what, if any, corrections are required. If trims are correct, and no warps present, or one wing heavy, the track should be automatic. Flying back and forth, try inside half loops at each end to reverse direction, rollign out to level flight, until you manage level flight coming out

of each "Immelman." After this, a Cuban 8 is a small step and an excellent practice maneuver that tells you when you can stay ahead of the machine. Rolls come naturally at this point. Consecutive rolls require a slight touch of down at the top of each.

Inverted flight now comes easily. After a half roll to inverted, seek to enter inverted with the nose slightly high, no more than 10 degrees above the horizon. As the nose falls you have time to feel for the slight down elevator that will hold inverted without undulations. Expect a few attempts. Wingovers and stall turns are largely a matter of practice. But by now you can make easy recoveries from any attitude. Never overload any aircraft with high stick forces. The ship, by itself, will always go back to flying and controls are used only to gently restore it to a normal flight path. Of course, a hot shot pilot will do pretty much what he wishes in a single flight. (Incidentally, consecutive outsides and inverted can be done well at 1/2 throttle.)

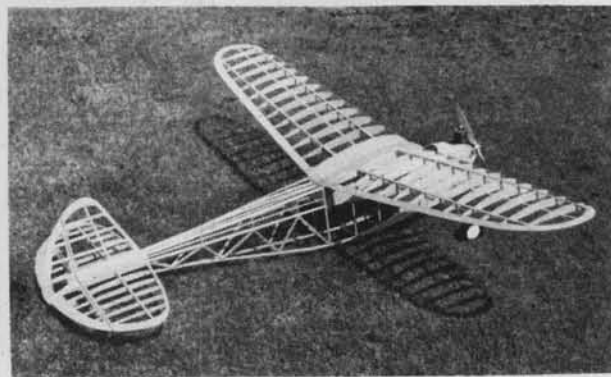
A few loose ends. The 1/2-oz. (or 3/4) glass cloth is brushed onto raw fuselage wood with thinned K&B Satin Brushing epoxy. The material need not be pulled, or worked around curves. It spreads fine ahead of the brush. When dry, give a second coat and when that sets up overnight, sand very lightly with fine paper, then give a third coat. Two thinned sprayed coats of epoxy suffice.

There is a question of compatibility of epoxy over butyrate used on the flying surfaces. Most say this is compatible. One manufacturer says no. I played safe by spraying two coats of thinned epoxy primer over the butyrate. My ship is all yellow, with red-white-and-blue star insignia and striped rudder.

The plans specify the CG location just aft of the spar, which is a safe "over stable" position. The earlier MK I was balanced at 40% of chord and handled well. It probably was more sensitive in responses, but I was younger then. I don't recommend changing the position now given. One check for CG location is to hold a constant elevator position during an outside loop and if the recovery buttonhooks (lower altitude than the entry), then the CG is too far forward for advanced aerobatics. Control-line people know this well.

Finally, if you prefer to build the historically correct MK I, plans are still available through Rosenstock's plan service—even to carpet thread Figure 8 stitch hinging on rudder and elevator.

Aerobatic pilots will wish to fine-tune props. I generalize at the 14-6 wood. Why? Well, in electrics and 4-strokes there is much room for fiddling due to the generally lower rpms (requiring more pitch, in relation to specific rpm). Also, all 4-strokes are not equal. There is one make, less powerful than my Enya, but possessed of remarkably low idles. You will need to juggle torque and rpm, and speeds through some maneuvers. I'd suggest trying things in the 12-13 diameter range with pitches from 6 to 8. In 2-cycle we know offhand that a 7-4 is good for this, a 10-6 for that, an 11-7 for something



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Thank you.

Teachers Only . Continued from page 48

parts the following month.

So I gave a copy of *Model Builder* magazine to our school librarian and asked if they would take out a subscription. We now have this fine *Model Builder* magazine available to students and teachers out of our school library. Have it in your school library for all to enjoy. My students love it and it's out every day!

For centuries the THUNDERBIRD had been one of the major legendary figures of the western Indians from Mexico to Alaska. Images and origins varied, but the legend remained the same: a large, power-



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ful bird who caused thunder with a flap of his wings and lightning by a blink of his eyes by hurling arrows carried in his talons. His power was used for good to conquer evil and establish peace for all.

With the Air Force's decision to form a precision flight demonstration team, a selection of aircraft, crew, name, and home base had to be made. The Air Force's choice was the Republic F-84G Thunderjet, a crew of seven officers and fifteen enlisted men, the name "THUNDERBIRDS" and Luke Air Force Base near Phoenix, Arizona.

The F-84G was to serve the Thunderbirds with honor from June 1953 to February 1955. It was to be the only straight-winged aircraft flown by the team until 1974 and the T-38A Talon. She stretched a length of 38' 8", had a wing span of 36' 5", and reached a height of 12' 7". Her weight was a shade over 11,000 lbs. and could reach a speed of over 600 miles per hour and an altitude of 45,000 feet using the 5,600 lb. thrust power of her single Allison