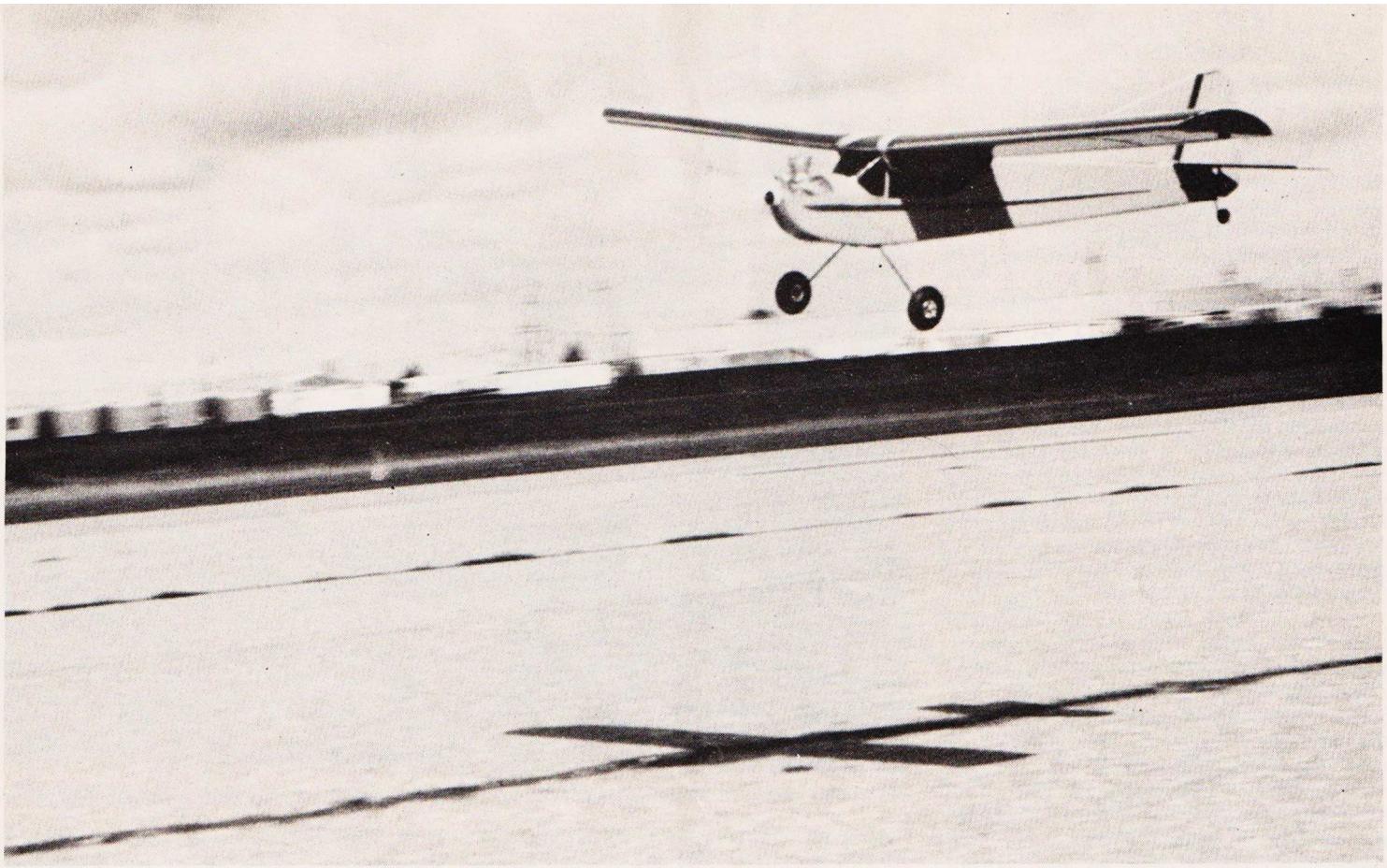


A nice, low pass down the middle of the runway, steady as a rock and typical of high wing monoplanes, is the performance highlight of this fine trainer.

Field and Bench

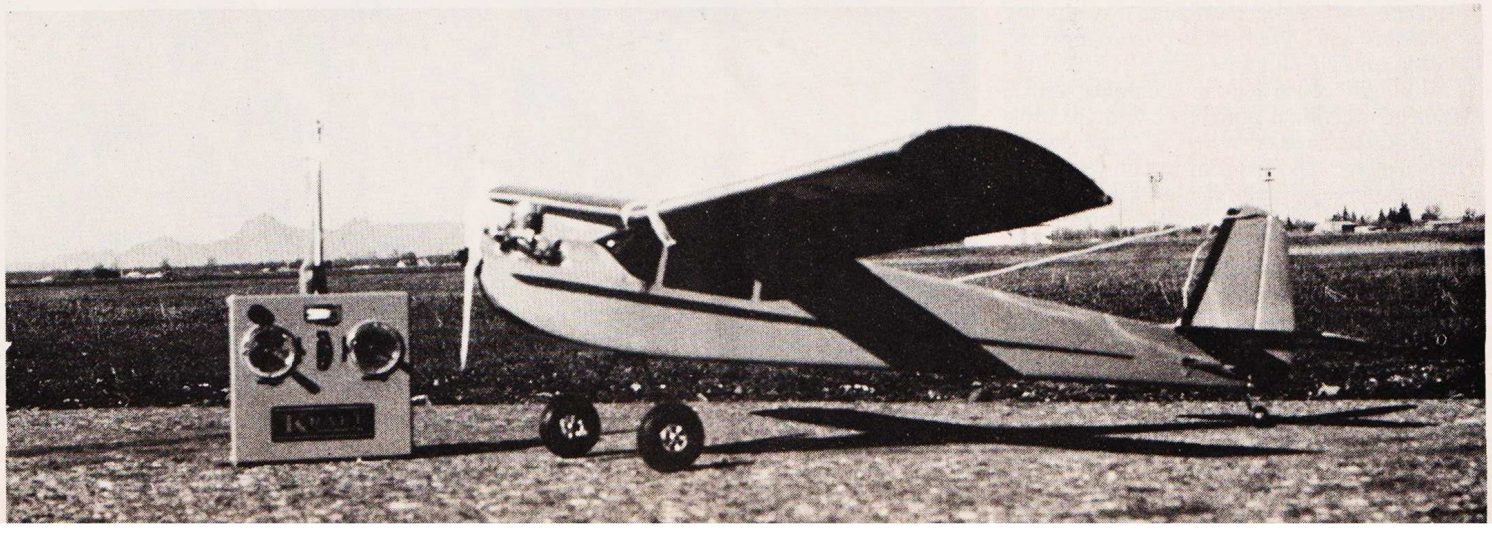
BRIDI RCM BASIC TRAINER KIT • O.S. MAX 25 R/C ENGINE KRAFT KP-4B WITH KPS-12 SERVOS

BY JAMES KITCHEN . . . who better to check a trainer than one of our multitudiness number, the Sunday flyer? Turns in an excellent report for our subject this month.

• The first thought that comes into your head upon seeing this article and byline may well be, "Who is Jim Kitchen—and what qualifies him to do a Field and Bench?" I am not recognizable among the nation's top competitive flyers, as a member of a prominent R/C club or association or as one of Walt's longtime modeling cohorts. I am "Joe Newcomer" to R/C flying, a convert from U-Control and a Sunday flyer whose total R/C experience at this writing amounts to nine months. I'm a 39-year-old civil engineer whose main qualification is that I am going through the usual newcomer's agonies myself—right now! I built some U-Control kits back in pre-MonoKote days, but this is only my fourth R/C model. The three previous R/C planes were built from kits, two from the same kit (Headmasters).

I view R/C flight training as comparable to the three phases of military flight training in pre-jet days (primary, basic and advanced). A 3-channel Headmaster served me well as a primary trainer, but I needed a model for basic training that would continue to upgrade my flying skills and confidence. Some readers may not agree, but I have a decided preference for smaller models which can easily accommodate today's miniature equipment without the additional cost and fuel-guzzling nature of their bigger brothers. The June, 1972, issue of M.A.N. helped solve my problem. An article on the Toledo Hobby Show described the Bridi Hobby Enterprises' exhibit, where a scaled-down ver-

Looks almost like the Piper Cub patiently awaiting its next student pilot. Fine ground handling characteristics not usual for a tail dragger.



sion of their highly successful RCM Trainer for .09 to .19 engines was introduced. This model of 4-channel design with a 50″ span and wing area of 410 sq. in. suited my specifications for a basic trainer: It would provide aileron experience with the added feature of flying a tail dragger.

Another new product introduced at about the same time was the O.S. Max 25 R/C engine. I decided that the Bridi RCM Basic Trainer and the O.S. Max 25 R/C engine would make an ideal combination for my basic trainer.

While building the model, the thought occurred to me that since the present stage of my R/C experience is probably typical of other R/C'ers to whom these new products would appeal, this combination would make a good subject for a "Field and Bench." I queried Walt about the possibility of such an article and several weeks later received a favorable reply.

This kit combines a simple and well-thought-out design with the highest quality wood and hardware. All parts are pre-cut which can be a little disconcerting to a person who is familiar with seeing sheets of die-cut parts. All the individual parts stared me in the face including such items as fuselage side sheets; bulkheads; 18 3/32″ wing ribs, all uniformly cut, sanded and held together with two extra long pins; other wing components (spars, leading and trailing edges, sheeting and ailerons) bundled together, and tail surfaces including pine inserts for attaching rudder and elevator control horns. Hardware included main landing gear, rudder, elevator, and aileron horns, tail wheel assembly, and landing gear straps with the smaller items neatly packaged. Parts can be conveniently checked against the itemized list provided. A dry-run through the plans and parts' identification are always advisable before beginning serious construction.

As an engineer, I can really appreciate the detailed, full-sized working plans provided. I am used to looking at plans, but there is considerable difference between plans for highways and those for model airplanes. All plans are meant to be self explanatory, but it helps to know a little bit about what is being explained. These plans are exceptionally clear and should be understandable to the beginner building his first plane. As an additional tool, recommended construction procedures are photo-illustrated and explained on both sides of a 17″ x 22″ supplementary information sheet. Between the detailed plans and the supplementary information any questions about actual construction of the model should be resolved. This step-by-step procedure should be particularly useful to newcomers and should reduce the danger of building oneself into a corner.

Although construction techniques are a matter of individual preference and are usually acquired over a period of time and a number of models, word of mouth from fellow modelers and helpful hints from model magazines are valuable sources. I can't say that my techniques are the best, but here are some things I have learned so far. I use Titebond and epoxy for gluing—Titebond for the wings and fuselage, back of the fuel tank compartment, and epoxy for fuselage bulkheads, motor and landing gear mounts, firewall, tank compartment, for joining wings, and rudder and stabilizer to the body.

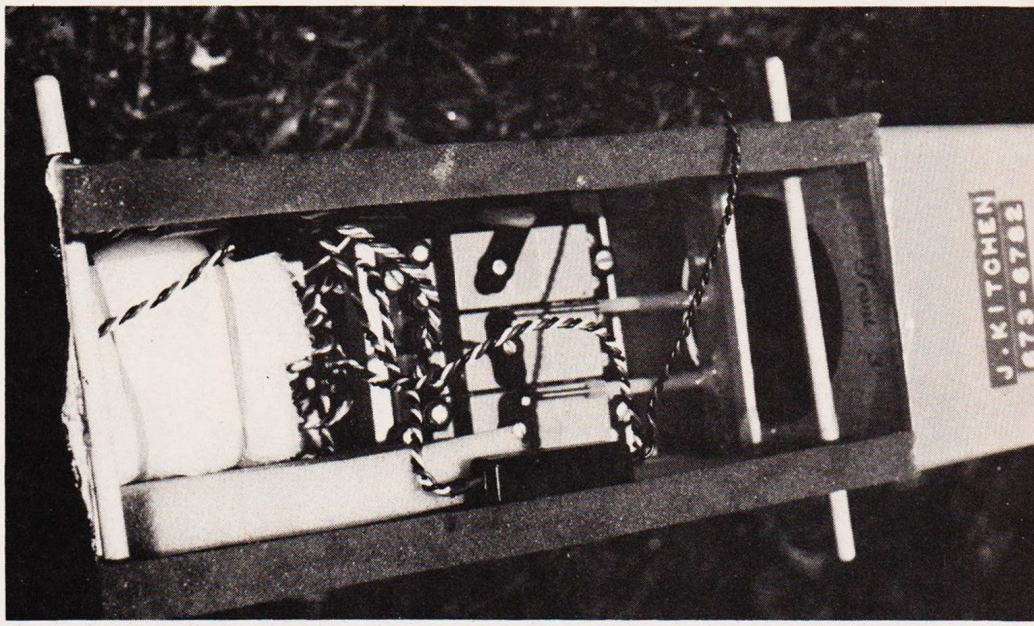
Bill Shelby, author's flight instructor, checks wing alignment as part of the pre-flight program.

I use epoxy as fuel proofing for exposed sections in the engine and tank compartments, and fiberglass and polyester resin to reinforce the wing panel joint.

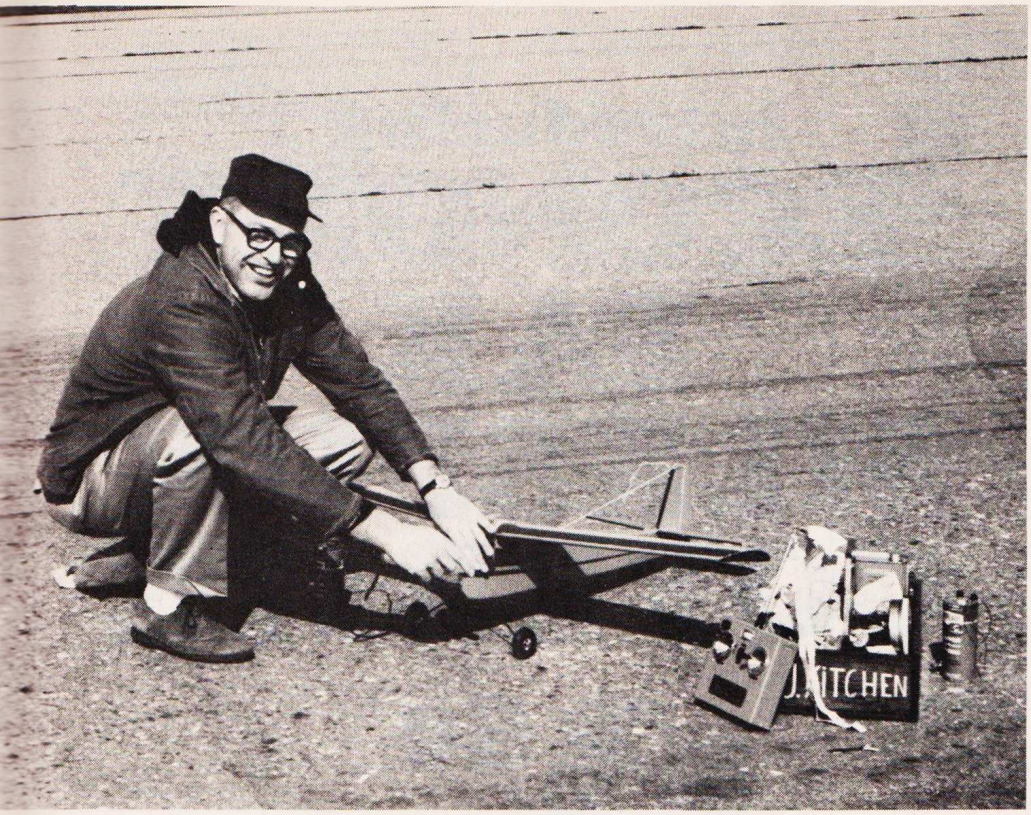
Some design features of the Basic Trainer that contribute to ease of construction are the flat bottom airfoil, beveled center rib section and a flat top fuselage deck. The flat bottom airfoil permits the wing panels to be constructed directly on the building board and should keep warping to a minimum. Bottom wing sheeting and cap strips are pinned directly to the plans (over wax paper for protection from excess glue). Wing panels may then be built straight from this foundation. Use of 3/32″ balsa for sheeting and cap strips results in an exceptionally sturdy wing. The beveled center rib section facilitates joining wing panels and insures the proper dihedral. It is important that the inboard rib of each wing panel be placed at 90° to the building board to take advantage of the beveled rib.

Before joining wing panels, you should plan your aileron installation. This will involve cutting away portions of the beveled and inboard ribs and some of the center sheeting—a job which can be more conveniently accomplished while the components are separate. The flat top fuselage deck makes it convenient to place the fuselage on its back on a flat surface for developing the proper alignment while gluing the fuselage sides and bulkheads together.

The method of mounting the engine was new to me. The nose section consists of a 1/4″ plywood plate for a motor mount atop a preshaped balsa nose block affixed to a 1/8″ plywood firewall. Blind mounting nuts on



Servo trays are a great invention. Flat battery is forward under gas tank—lots of foam used here!



Author tests his firing finger on the O.S. engine. It was a simple starter without finger damage!

the underside of the plate hold the engine in place. Liberal use of epoxy between plate and block and firewall makes a surprisingly strong installation. It's a good idea to temporarily screw the mounting bolts into the blind nuts to prevent them from filling with epoxy during this gluing. It was necessary to enlarge the existing engine cutout to accommodate the O.S. Max 25 engine. Two degrees of right thrust are included in the cutout. Be careful to maintain this offset while enlarging the cutout, and double check to make certain that the plate is properly installed with thrust to the right!

One problem a beginner might experience is the need for gouging out the nose block to make room for the lower crankcase section of the engine. I solved this problem with an X-acto gouging blade. The result was not too pretty, but it serves the purpose.

The only real difficulty that I experienced in building the model was in installing the plastic windshield. This windshield is a nice feature. It gives the plane a more realistic appearance in comparison to some of the other trainers on the market. A windshield pattern is provided and the detailed instructions describe how it should be installed. Because of the stiffness and smoothness of the plastic, I found it hard to get the epoxy to hold the windshield in position. I roughened the plastic with coarse sandpaper and later resorted to scoring it with an X-acto knife in order to finally get the epoxy to hold.

I discovered MonoKote when I built my first R/C model. Its convenience of application and lack of offensive odor makes it hard to beat. After my first experience, I bought a Sealector iron and super shoe for use on subsequent models. I borrowed a heat gun to use on this model. A heat gun eliminates those dents in the balsa that always seem to appear no matter how careful you are. I did have a minor problem especially with the smaller balsa parts. You need one hand to hold the part, another to hold the gun and a third to press a damp Kleenex on the hot MonoKote to squeeze out the air and get adhesion to the balsa! Approximately 1-1/4 rolls were required to cover the model. This leaves a 3/4 roll surplus for possible waste and future repairs.

The adherence and heat-shrinking characteristics of MonoKote do not work as well on epoxy and fiberglass as on balsa surfaces. Fiberglass is the more difficult surface. I have been unable to obtain a wrinkle-free application. This is most noticeable on the 4" fiberglass swathe which reinforces the wing panel joint. However, at times like this, the engineer in me comes out and opts for strength over beauty. I would be interested in learning if anyone has reduced or eliminated this problem.

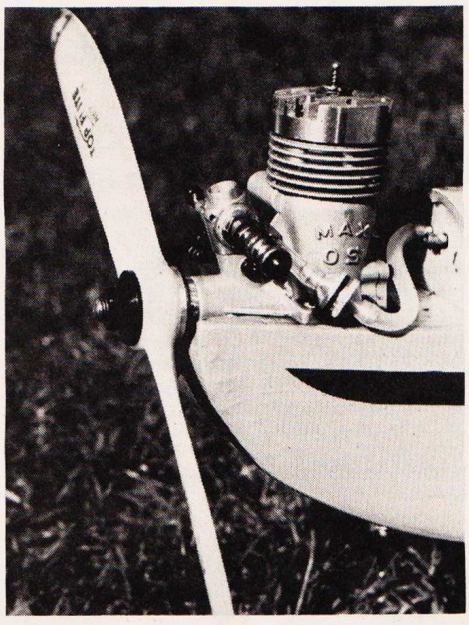
I got a little careless with the heat gun when applying the MonoKote around the plastic windshield and suddenly learned that heat will melt plastic! Much to my chagrin, the windshield which had given me such a problem in installation was ruined. A letter to the manufacturer explaining my problem brought a new plastic windshield by return mail. There was no charge for my stupidity—which I appreciated very much—but I had to wrestle the windshield back into place all over again.

I finished the model in orange and blue MonoKote trim and used black trim for the windshield and cabin windows. The orange and blue color scheme is in deference to my wife, Ellen, who puts up with all those little inconveniences that R/C wives have come to accept. (They are also a reminder of college days at Syracuse.)

Every modeler seems to have one modeling chore that he most dislikes. Until I discovered MonoKote hinges, mine was attaching the control surfaces. Directions for applying MonoKote and making hinges are included in each roll. I have discussed these hinges with other modelers, some of whom have expressed doubt about their strength. Perhaps this could be a problem on larger models, but I have found them to perform satisfactorily on the smaller ones that I have built. A newcomer should find their convenience of application especially appealing. I did manage to put a few dents in my mar-free heat gun finish while using the MonoKote iron to apply the hinges.

For the radio installation, I used my Kraft Series 71 KP-4B system with KPS-12 servos using the three abreast servo tray. This tray leaves more room forward for the receiver but results in a pretty tight lateral fit. The flat battery pack fits in the tank compartment under the recommended SS-4 tank. I used Golden Rods for the rudder and elevator controls, and Du-Bro engine control assembly for the throttle. The aileron control horns provided in the kit were adjustable to any throw. Du-Bro aileron linkage horn set was used to complete the hookup. I previously mentioned that this was my fourth R/C model. The installation described may not be the best, but it represents the sum total of my experience to date and has worked well for me.

Tail wheel and rudder use simple coupling hook-up.



1/4" ply used for motor mount breakaway plate.

Field and Bench

The only possible kit improvement that I would like to suggest is that more detail of the radio installation be shown. This information could appear directly on the plan views, as a separate detail, or illustrated in the construction procedures. I believe that most kit manufacturers could improve their plans in this area. It is particularly important to develop this information for the newcomer. Of course, there are reasons why this is not always done; for example, the great variety of old and new R/C equipment presently in service. A newcomer constructing a smaller model such as this would probably have a miniature R/C system. Plans showing details of one of the more popular miniature systems and the designer's thoughts on the best R/C installation would give the newcomer a better opportunity to plan his installation during construction. The installation could be modified to suit individual preference and experience. Perhaps I have overstated the problem because of my own recent experiences. I still feel uncomfortable installing the equipment even after several successful efforts, and I am always looking for a better way.

My first R/C model was powered by an O.S. Max 19 R/C engine. This engine was purchased after asking advice from a number of fellow modelers. My specifications were for a reliable operating engine with good power and particular emphasis on *startability*. I have had my share of engine starting problems, and, therefore, it seemed reasonable to concentrate on one particular brand of engine with good starting characteristics. I have gained considerable confidence in my engine starting abilities since getting that first O.S. engine.

The O.S. Max 25 R/C engine is on the same chassis as the 19-20 R/C engines and continues the same tradition of quality craftsmanship. Interchangeability is a convenient feature when your old 19 powered ship gets heavy from epoxy and fuel soaking or you feel that you need a little more

power for some fancy maneuvers. The similarity in parts can also be useful to keep you flying.

I prefer to break in my engines in the air, and my neighbors, no doubt, appreciate this preference. Where practical I try to avoid the new engine/new model combination. For one thing, this insures that when you go out to test fly the new model you don't have to worry about the engine. Thus, I broke in the 25 engine by replacing the 19 engine in my Headmaster. I used K&B 100 fuel, a 9x4 prop and a rich engine setting.

I arrived at the flying field on a cold, overcast day with the temperature in the 40's. With no one around to lend a hand, I tackled the problem of starting my new engine. I tried to discover the proper setting by gradually backing off the needle valve from the closed position while burning up the prime. After about 15 minutes of effort, I discovered that the needle valve was vibrating itself closed each time that the engine took the prime. An adjustment to the needle valve spring clamp solved this problem, and the engine was soon purring away. I ran one tank (4 oz.) of fuel through the engine on the ground. I finished the day by making two flights where I took the plane up several hundred feet and practiced figure eights, then landed dead stick. After approximately 10 flights, I considered the engine sufficiently broken in for installation in the Basic Trainer.

Here in Yuba City, California, we are really very fortunate to experience mild winters. The odds are about 50:50 that any given winter weekend will have at least one day of reasonable flying weather. With the plane ready to go, all that I could do was to wait and hope for favorable conditions. Our preferred flying site is a county airport which was constructed as a military flying field during WW II. Prevailing winds are from the north or south so that R/C flying is permitted at one end of the seldom-used east-west runway.

I charged the batteries on Friday evening, based on a favorable weekend weather forecast. Saturday morning dawned clear and cool with winds in the 5 to 15 mph range and temperatures in the 50's. I called Bill Shelby, my flight instructor, and arranged to meet him at the site. I am deeply indebted to him for teaching me to fly R/C. Bill has checked out all my new planes (all three of them). With only limited aileron and no tail dragging experience, I especially wanted him to test fly this one.

Bill preflighted the model by visually checking all control surfaces for neutral and the linkage for possible binding. He double checked the ailerons for proper hookup. We rubber banded on the wing while checking the dihedral for proper alignment in relation to the tail surfaces. Bill commented on the exceptionally light weight of the model as we found that it balanced slightly noseheavy. A range check indicated no radio problems.

Satisfied that all was in readiness, I fueled the plane, primed the O.S. 25, hooked up the battery and proceeded to crank the engine. After half a dozen flips, it began to warm up, igniting the prime. A few more flips and it roared to life. Bill checked the controls at high throttle, making a final, minute needle valve adjustment. He throttled back and taxied away from the pit area to check out the tail wheel steering. Satisfied with the preflighting, he pointed the model into the wind and gave full throttle. The plane literally leaped off the ground, becoming airborne in approximately 10 ft. of runway. The plane seemed to take off of its own volition and climbed out at a fairly steep angle. No left or right trim was necessary. We decided to land and take out some of the climb. Two turns of down elevator solved this trimming problem. Bill proceeded to wring out the model on the next flight. He happily exclaimed that this plane was really fun to fly, and that I would find it to be an enjoyable and challenging model. It was fully maneuverable, yet flew at realistically low speeds reminiscent of Cubs, T-Crafts, Champs, etc. However, it does demonstrate a reluctance for inverted flight.

After being airborne on the second flight, Bill handed me the transmitter. Suddenly, I found myself a little shaky on the controls. Perhaps it was "new planeitis," less frequent flying during the winter months or nervousness over the importance

of the model to completion of this article. Also, I may have overestimated my confidence when I set up all control surfaces for maximum throw. The model was very responsive under these conditions and at full throttle moved out smartly. I calmed my nerves by practicing some figure eights and pattern approaches. On one such approach, I gave throttle for a go-around as the plane sailed by a few feet over my head. The plane increased speed while continuing its flight path and beginning to climb. I overheard Bill comment to another modeler that a scale or pattern ship would probably have snap rolled into the runway under the same circumstances. This illustrates two things: The excellent handling characteristics of this model as a forgiving trainer, and a bad habit that I should overcome before graduating to advanced training. I made several landings but was a little apprehensive about trying a take-off because of the difference in steering between nose and tail wheels. I needn't have worried. The only steering necessary was to position and point the model into the wind. Full throttle takes the plane off, literally by itself, in a surprisingly short stretch of runway. No correction for engine torque on take-off was necessary because of the right thrust designed into the model. We completed our picture taking and cut short the flight session because of increasing winds and decreasing temperatures.

My overall impression is one of delight with the performance and handling characteristics of this plane and engine. I consider myself to be a typical builder, being neither a perfectionist nor slovenly. I don't feel competent to deviate from the plans as yet. Using conventional techniques, tools and kit materials I was able to build a lightweight, sturdy model with sufficiently true surfaces to present no trimming problems. The plane can be made more docile by making adjustments to the control surfaces. It can also be slowed down by using an O.S. 20 engine which would still provide plenty of power.

Joe Bridi is to be complimented for recognizing the need for a smaller 4-channel trainer for use with today's miniature R/C systems. He brings, to

the kit designing and manufacturing business, many years of R/C experience which are reflected in the simple construction, detailed plans, photo-illustrated construction procedures and highest quality materials. Bridi Hobby Enterprises has rapidly emerged as a producer of quality R/C kits.

The O.S. Max 25 R/C engine is a welcome addition to the long line of quality engines produced by the Ogawa Model Mfg. Co, and imported by World Engines. It fills a gap in engine development in the 19-20 to 29-30 displacement and provides plenty of power for the increasing number of smaller multi-channel R/C models now available.

My experiences to date have reaffirmed my original belief that the Bridi RCM Basic Trainer and the O.S. Max 25 R/C engine are an ideal combination for both a basic trainer and an all-purpose sports aircraft. I am looking forward to better flying weather and to many hours of pleasurable flying. ■