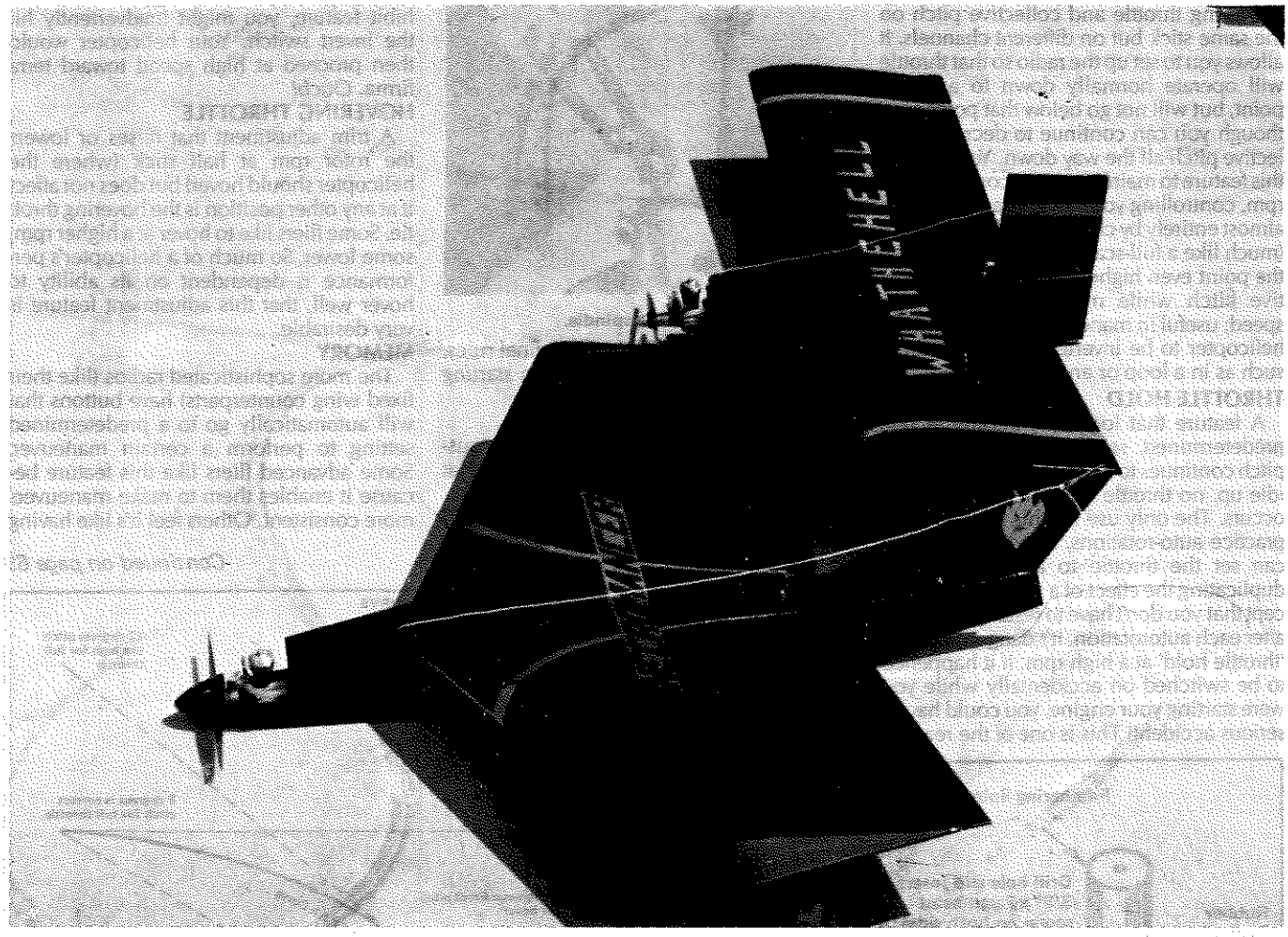
WHATHELL & NECROMANCER



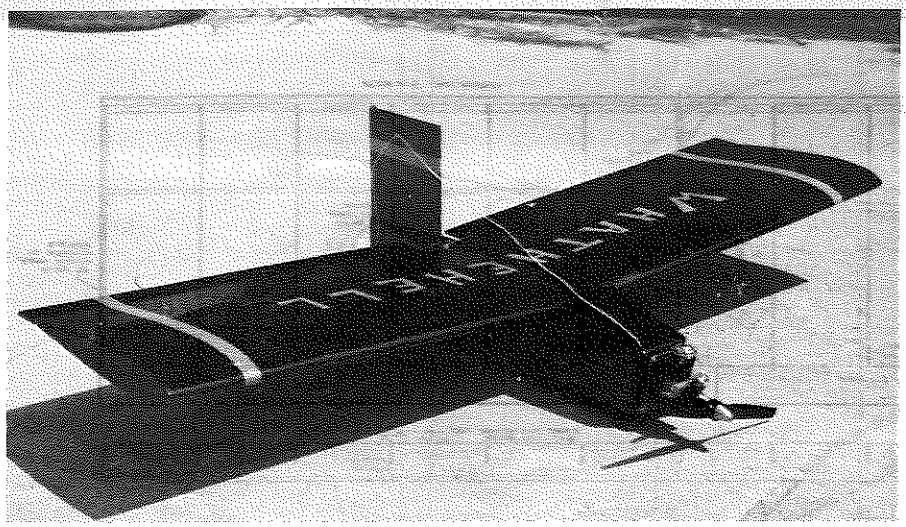
By BRUCE THARPE. . .Two half-A R/C designs that share a lot of similarities are the result of the author's late-night imagination. Building is simple, and the flying? Let's just say that it is a blast!

• Okay, it's almost midnight. You've been at your drawing board for a few hours now drawing a funny-looking flying wing thing that you're not sure will even fly. All that's left to do is think of a name and write it in the title block so that you can hit the sack. What the hell would *you* name it?

Aside from the difficult chore of naming these models, I really do like to design model aircraft, especially weird model aircraft. I generally stick to relatively small designs, partly because of my small drawing board, but mostly because it's so easy to experiment with them. Crashing a simple Half-A canard that took two weeks to build is much less painful than seeing a .60-powered one munch it during the first critical seconds of the test flight. The tiny model can be hand launched over a nice, grassy field and if it goes in, it probably won't be broken. If your experiment works, *then* you build the .60 version.

Well, I really did build a Half-A canard, and it really did crash, and no, I didn't build the big version. That's the beauty of experimentation with small models—you can try virtually any oddball design with a minimum expenditure of time, money, and frustration. And if you're lucky, some of the ships may actually fly!

The Whathehell is a prime example of this technique. I honestly did not know if it would fly or not when the time came to try it. I had designed other flying wings, but they were basically powered gliders (Half-A's, of course) with cambered airfoils and reflexed trailing edges. They flew fine, but I wanted a flying wing with high performance and good stunting capability, much like Bill Evans' Scimitar series. His planes



The first of the author's flying wing-type half-A models, the Whathehell has a symmetrical airfoil for neutral stability. Looping and rolling maneuvers were accomplished with ease.

use a slightly cambered airfoil with very little reflex. Carrying this a bit further, I went with a symmetrical airfoil and no reflex, but I worried about stability. Would it be controllable? Theoretically, a symmetrical airfoil has neutral stability which should be alright. Besides, it's been done before; I've seen the R/C combat jobs in magazines so it's got to work!

Then I decided, "Ah, what the hell, I'll just build one and see if it flies!" I knew that I didn't want to spend too much time on the project which meant it must be as simple as possible. That led to the constant-chord wing and the rather squared-off look that it has. It took about two weeks of sporadic work to finish the Whathehell and get down to business.

A couple of good test glides were encouraging, but not totally conclusive. But the test flight strongly confirmed that it was a winner! All looping and rolling maneuvers, inside and outside, were accomplished with ease. At 18 ounces, the Whathehell performed well and above my expectations and has been a truly *fun* plane to fly.

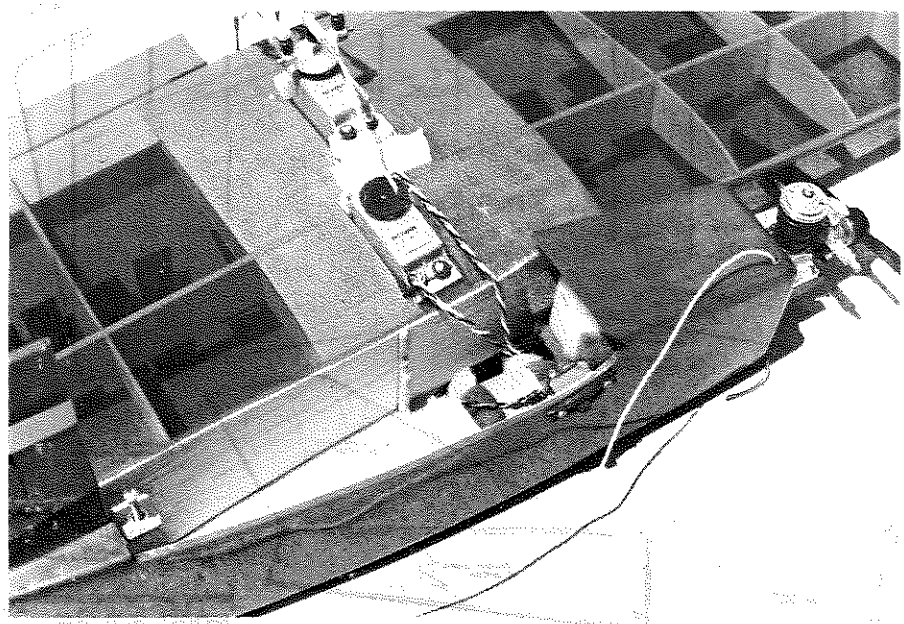
CONSTRUCTION

I simply love to design, and I love to design simply. I just can't envision any modeler who feels capable of flying the Whathehell having any troubles during construction. You probably already have enough scrap wood laying around to build it. One change that you may wish to make is eliminating the dihedral and building the wing in one piece. I only put the dihedral in for looks, basically. Modifications to fit personal preferences are, as always, strongly encouraged. You will be happiest only when the model looks the way you want it to look.

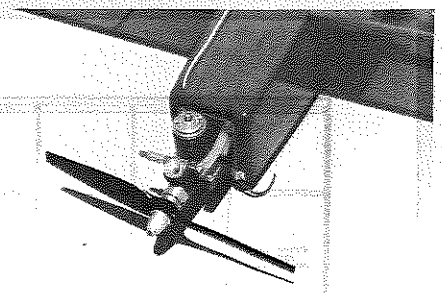
FINISHING TOUCHES

The Whathehell can be finished any way that you wish, but some type of plastic covering is recommended to save time and weight. Mine is covered entirely with transparent red MonoKote with yellow and black trim MonoKote for the decorations.

Mount a hot .049 or .051 securely to the firewall using a commercial engine mount. Install a two-ounce fuel tank as high as possible in the fuselage to get it nearly in line with the needle valve on the engine. I



Radio installation is tight, but author's four-channel Futaba system fit nicely under two-ounce fuel tank in front of wing. A 100mah battery pack was used to save weight.



Inexpensive 1/2A engine is more than adequate for the Whathehell.

added the "cat whisker" skids for landing on concrete, but haven't tried it yet.

RADIO INSTALLATION

I won't try to fool you into thinking that the Whathehell has a lot of room for the radio, because it doesn't. If you have a micro system there's no problem, but most of us don't. My four-channel Futaba receiver fit nicely under the two-ounce tank in front of the wing. I also used a 100 mah battery pack to save space and weight. The mixer (I used a Du-Bro) and linkages will take up most of the remaining space. The former will probably have to be cut away quite a bit to clear all the equipment. Try to mount the switch in a spot that won't interfere with hand launches.

FLYING

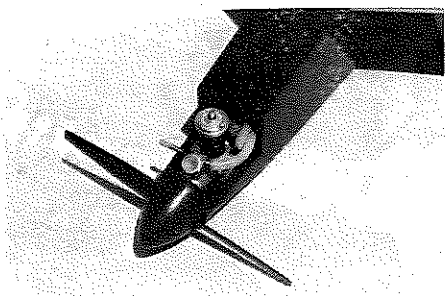
Get that C.G. within 1/8 inch of that shown on the plan. Use lead if you have to—this may add a little weight, but it's worth it; trust me. The elevons should be set in a neutral position.

Fire the engine up and have at it. The plane is fast and incredibly responsive so be gentle with the sticks until you have a good feel for it. Try a roll, but be careful! The first time I gave it full aileron for a roll it did about three before I could let go—I was lucky that it was right-side-up when it came out of the stunt! It won't go out of sight rolling straight up, but it's pretty spectacular for a Half-A job. When the engine quits, just glide it into a soft landing on the grass.

I think that I have had more fun flying this little bugger than any other R/C plane that I've built. This might be just the perfect plane for you to fly after work at that big field down the street. Or if you normally fly from a grass field you can use it as a quick diversion from your pattern training or scale jobs. And when one of your flying buddies walks over and asks, "What the hell is that?" you can politely grin and respond, "That's right!'

List of Materials

(3) 1/8 x 1 x 36 Balsa—Spar, Trailing Edge, Elevons
(1) 1/16 x 3 x 36 Balsa—Ribs, Sheeting, Wingtips
(1) 1/4 sq. x 36 Balsa—Leading Edge
(2) 1/8 x 3 x 36 Balsa—Fuselage Sides, Top, and Bottom, Former, Fin
(1) 1/8 Plywood (Scrap)—Firewall, Wing Hold Down
(1) 1/16 Music Wire—Torque Rods, Push Rods
(1) Dubro Control Mixer
(1) Sullivan Two-Ounce Slant Fuel Tank
(1) Half-A Engine Mount and Screws



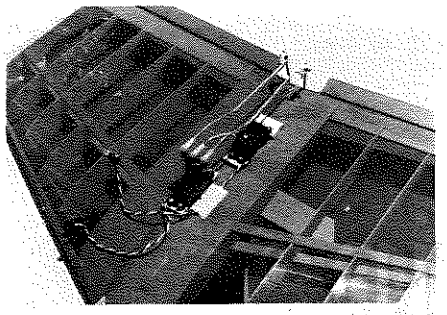
As in Whathehell, a half-A engine is used; 6-3 prop, 1-1/2-inch Goldberg spinner tops it off.

* * *

Necromancer is a follow-up design to the Whathehell flying wing. The Whathehell is a great model for flying, but its squarish lines admittedly leave a bit to be desired in terms of appearance. Necromancer was designed for stylish looks while maintaining simplicity.

It had to be simple, because I began the whole project just two weeks before the Northrop Flying Wing Contest. The plans were drawn in two days, but I got bogged down in class work and was only able to finish the wing and most of the fuselage.

Appearance and ease of construction were placed above performance while designing the Necromancer. I always thought that a tapered, swept wing of short span



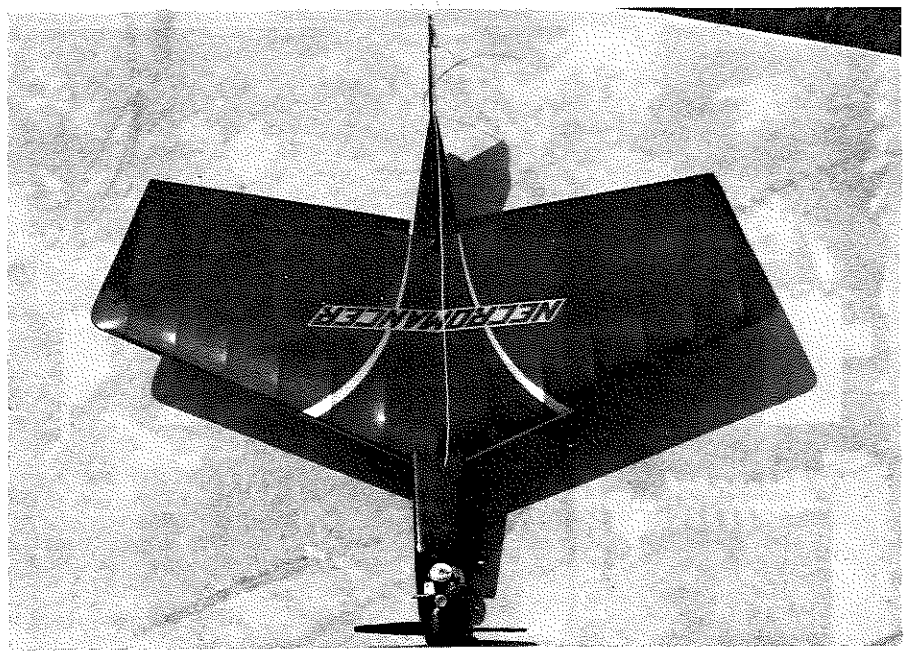
Elevator and aileron servos are both mounted in wing, mixed with Du-Bro mixer.

would look nice on a model, so I tried it. With the engine so far out in front, a long fuselage behind the wing was necessary for balance. The small cowling makes getting to the engine simple, and the spinner completes the sleek look.

It's a bit more work than the Whathehell, but the work that you put into your Necromancer will be instantly repaid the first time you do a low pass down the strip. Its long, tapered fuselage and swept fin really give the impression of high speed, even though it is actually no faster than most sport Half-A's.

Due to its larger size and greater weight (23 oz. vs. 18 oz.), the Necromancer won't perform like the Whathehell (few Half-As will). However, it will do anything that can be done with a two-channel aircraft, including the most beautiful axial rolls that I've seen. The plane is smooth and predictable and most importantly, it has "class."

I first came across the name Necromancer in *Firestarter*, a novel by Stephen King. In the story, Necromancer was a beautiful black horse. A dictionary defines a necromancer as "one who foretells the future through communication with the dead." Kind of spooky, huh? I tried



Evolution of the Whathehell design resulted in the Necromancer, noticeably sleeker and more refined than the earlier version. Stylish looks belie simplicity of construction.

to maintain the image by painting the fuselage black and adding the little "firedevils" to the fin.

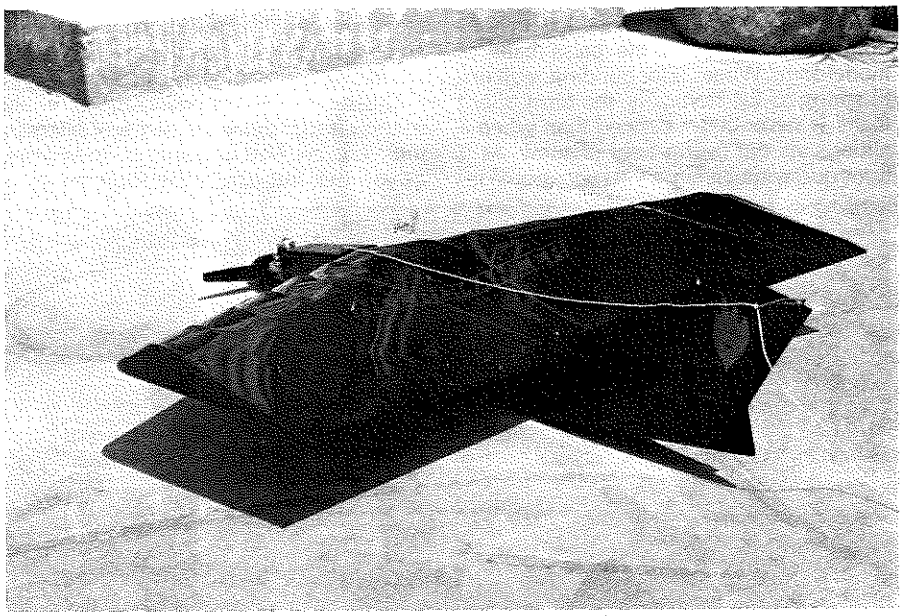
CONSTRUCTION

The price you pay for building a tapered wing is having to cut out those ribs! I cut them out one at a time, which took a while, but they were accurate and didn't have beveled edges like they would with a stack-and-sand technique. Once this chore is finished, construction is a breeze.

Build the wing halves upside-down over the plans, insuring that the root rib is straight. My Necromancer has dihedral, but the plans now indicate a flat wing. The dihedral actually causes the plane to be overly stable, making inverted flight and outside maneuvers difficult to perform well. You may also want to leave the wingtips off if you think it will look better.

Sheet the center section, then butt-glue the halves together with epoxy. A low aspect ratio wing such as this doesn't need any center braces for strength. Bend torque rods from 1/16 music wire and epoxy them to the elevons. I covered the wing with transparent red MonoKote, then hinged and covered the ailerons at the same time. The wing center section is black MonoKote, and gold MonoKote trim separates the colors.

The box fuselage shouldn't present any problems. The cowl is formed from thick sheets of balsa. Temporarily mount the engine to locate the spinner ring. Sand the cowl to shape using the plywood spinner ring as a guide. Glue the fin in place and finish the fuselage as you desire. My fuselage was filled with clear dope and painted black. If you plan to land the model on a concrete runway, be sure to add a hardwood or music wire skid.



Other planes may outperform the Necromancer, but her style and elegance more than make up for any performance deficiencies she may possess.

FINISHING TOUCHES

Mount a good T.D. .049 or .051 in the nose using a commercial engine mount. I use a 6-3 prop with a 1-1/2 inch Goldberg spinner. Use a two-ounce slant tank and pad it well with foam rubber.

The long fuselage leaves plenty of room for the radio equipment. The elevator and aileron servo are both mounted in the wing and mixed using a Du-Bro mixer. My 225 mah battery is mounted well aft for balancing purposes. Be sure that the switch won't interfere while hand-launching—that could be disastrous!

Balance the model within 1/4 inch of the balance point shown on the plans. Set the elevons to move 1/8 inch for elevator and 3/16 inch for aileron. Control response will be fast, but predictable at these settings.

FLYING

The nice thing about Half-As is that you can fly them in nearby fields. If you live in an urban area, you can usually find an industrial area with large open spaces. You probably won't be bothered if you fly early in the morning, late in the evening, or on Sundays.

The test flight will be easier if you can find someone to launch the plane while you concentrate on flying. You will find that the Necromancer flies very much like any two-channel ship—but, like I said, that first low pass will be the big payoff. All looping and rolling maneuvers can be accomplished. Other planes may outperform your Necromancer, but the style and elegance of this bird more than make up for it.

I fear that I may have gone overboard in my enthusiasm for this plane, but the pleasure that it has brought clouds my view. I honestly believe that if you decide to build a Necromancer, it will be just as enjoyable for you. Send for your *Model Builder* plans right away—you won't regret it! Please send any comments, suggestions, criticisms, photos, stories, etc. to Bruce A. Tharpe, 2380 Cabrillo Dr., Hayward, California 94545.

List of Materials

(2) 1/8 x 1 x 36 Balsa—Trailing Edge, Elevons
(2) 3/16 x 3/8 x 36 Balsa—Spars
(1) 1/4 sq. x 36 Balsa—Leading Edge
(2) 1/16 x 3 x 36 Balsa—Ribs, Sheeting
(3) 1/8 x 3 x 36 Balsa—Fuselage Sides, Top, and Bottom, Fin
(1) 1/8 x 6 x 12 Plywood—Firewall, F2, F3
(1) 1/16 Plywood (Scrap)—Spinner Ring, F1
(1) 1/4 Balsa (Scrap)—Dowel Supports, Cowl
(1) 1/16 Music Wire—Torque Rods, Push Rods
(1) 3/16 Dia. Dowel—Wing Hold Down
(1) Du-Bro Control Mixer
(1) Sullivan Two-Ounce Slant Fuel Tank
(1) Half-A Engine Mount and Screws