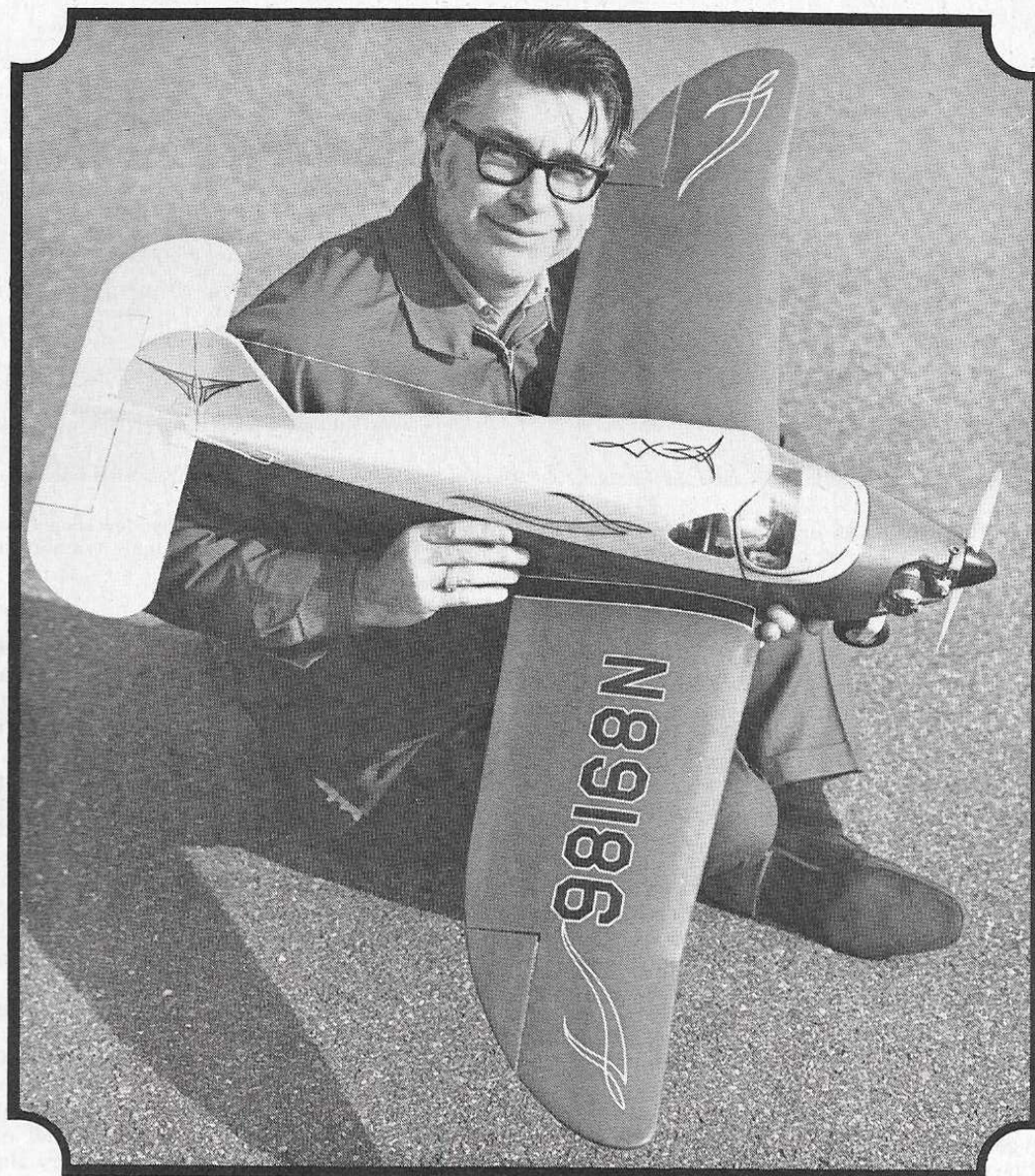


A Classic "Culver V"



This Stand-Off Scale R/C model of the Post-War Culver "V" brings back a plane that history forgot. Its advanced ideas were lost in a surplus market.

Bored with so called "Sunday" flying? Most of us soon are if the plane is one of the usual "trainers" that only vaguely resemble a real plane. But no one is bored when he is the center of attention as you will be when you take a beautiful scale model out of the trunk. More than that, you will be the envy of everyone when you make that low pass fly-by and almost see the pilot wave to you.

If you have ever been afraid of Scale models or thought of them as tricky or poor flyers, you can quickly get over this feeling with the Culver "V."

Here is a four pound, 51" span Enya .29 powered Kraft radio controlled model of a post-war "safe" personal plane. It has taken the boredom out of Sunday flying for me; why not you too? This is a zippy little ship that is fun to fly.

FLYING MODELS

by Stan Hines

Background

Shortly after V-J Day, the Culver model "V" was announced and placed into production. It is one of many post-war designs that were intended to provide civilian wings for the vast number of returning World War II airmen. The designer, Albert W. Mooney, began his career in aviation design in 1929 when Don A. Luscombe formed Mono-Aircraft Corporation in Moline, Illinois. The chief engineer at that time was Clayton Folkerts who later designed a series of well known racing planes. This company produced the *Monocoupe*, *Monocoach*, *Monoprep*, and *Monosport* airplanes. Despite a promising start the de-

pression of the 1930's forced Luscombe to sell the company to Knight K. Culver who changed the name to Dart Manufacturing Company and moved it to Columbus, Ohio.

The Dart Company struggled along until 1939 when it was dissolved and a new company, Culver Aircraft Corporation, was formed. By this time Mooney had risen to the position of chief engineer and had designed the first Culver "Dart" lightplane. This basic design grew into the well known Culver "Cadet." Later after the company was sold to Walter Beech in 1941 this plane evolved into a series of Air Force and Navy airplanes designated PQ-8, PQ-14, TDC, and TDC-2C models.

The post-war attempt of this company to return to civilian aircraft manufacturing was with the Culver model "V" for "Victory." It incorporated the ideas Mooney had long



It pointed toward the future. Imaginative in engineering, it introduced new concepts in the Culver "V," but war-weary pilots became absorbed in

ground-based pursuits. And those that flew sought the more sophisticated aircraft to better satisfy their highly trained military flying skills.

felt were required for a safe, economical and simple to fly personal aircraft. However, partially due to high production costs, a recession in light plane sales market and a \$3,750.00 price tag on the airplane, it was not a commercial success and the Culver Aircraft Corporation was soon thereafter dissolved thus ending a distinguished line of light planes, but not the career of the designer.

For those of you who are light plane buffs like myself, the Culver "V" was a truly new airplane in its day and would even compare favorably with today's light planes. It is a two-place, fully enclosed cockpit, tricycle landing gear, stall-proof, spin-proof type of airplane. The stab and flaps were interconnected in what was called a simpli-fly control system. Furthermore, the gear was fully retractable, flaps and gear were electrically operated, and the engine was a fuel injection, Continental, 85 hp., which eliminated the carburetor. On the original plane, the entire stab moved and the so-called elevator was just an extra trim for the pilot to make final touchdown or in the air adjustments. If you want to go one step beyond what I did in making a model of this interesting plane, you might install the identical system designed by Al Mooney for the model "V." It consists of interconnecting the flaps and moveable stabilizer. An instrument panel dial permitted the pilot to select several different pre-set positions. For take-off, the control dial on the instrument panel was merely set to "take-off" position and the flaps and stab were automatically set for the quickest, safest take-off possible. After clearing the airport, this dial was set to "climb" and the ideal setting is obtained to give optimum climbing characteristics. After reaching flying altitude, the dial was set to "cruise" and you could settle down for as long as a seven hour flight, which was possible in the model "V." Arriving at your destination, the dial would be set for "approach" and the flattest, safest possible glide was obtained. Touchdown was made by setting the dial to "land," the power cut and the Culver drops slowly, neatly down on the runway. Based entirely on my own recollec-

tion, this may indeed have been its undoing since to obtain such semi-automatic type of flying, a great amount of maneuverability was sacrificed. If the intended market was the returning military pilot, this was a critical if not fatal misjudgement of his needs which were better filled by war surplus.

A predecessor of the "V," the Culver "Cadet" may very well have been one of the earliest radio controlled models. In August of 1940, sixteen months before Pearl Harbor, the Army Air Force called representatives of all light plane manufacturers to Wright Field to study plans for producing a radio controlled target airplane. More than a half dozen designers submitted proposals, but when the bids were opened Culver was low. So low in fact, that after winning the competition and receiving a contract for 75 airplanes in March, 1944, the Air Force raised the price \$400.00 per airplane to prevent the company from going broke.

The first radio controlled plane produced by Culver was designated PQ-8, and it was something new in aerial warfare. It was obvious from the start that a real airplane controlled from a distance by radio could be flown in any attitude, height and simulated maneuver against air and ground gunners. The next step was to work out the details and this was a complex detailed story in itself at that time. The entire target plane program was carried out for four years under one of the most successful cloaks of secrecy in the war effort.

In a conversation with the Editor, Don McGovern, he recounted a spooky experience. While in service he saw one of these planes fly over at a very low altitude on a landing approach but could see no one in the cockpit. He then realized it was a radio controlled plane.

The success of these radio controlled drones for the Army were so great that the Navy became interested in the program and arranged for half of Culver's production to be assigned to them. Navy counterparts of the PQ-8 were designated TDC-1. A later, vastly improved model was the PQ-14 or the Navy TDQ-C which was still in production as late as March 1946. It was one of the few

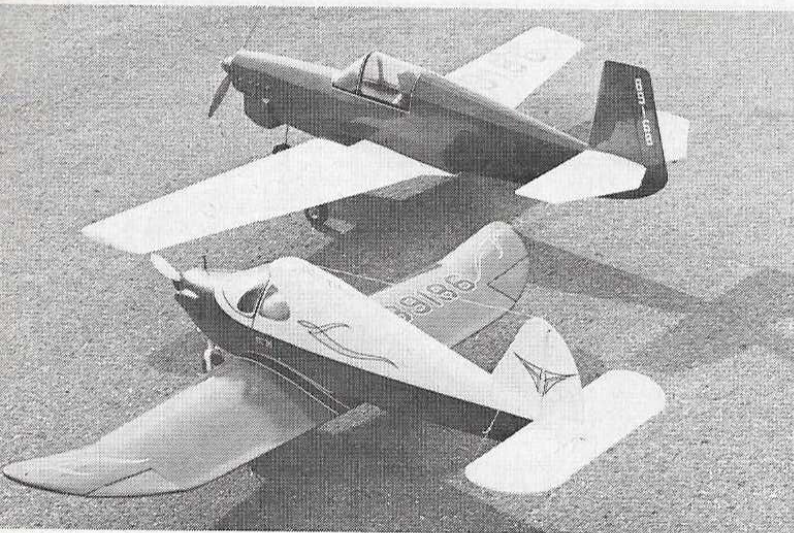
military aircraft contracts not cancelled on V-J Day. Many of these target drones were the test beds for thousands of ideas and engineering developments. These ideas congealed into a single design for the civilian pilot of 1946. Culver was not to compromise on the technical advances in the interest of economy and this accounts for the then high-price. It is truly unfortunate that this superb airplane which appeared to be ahead of its time was not able to survive the recession after World War II, the competition of war surplus aircraft and the very surprising lack of interest in flying shown by the returning war pilots.

The Model

Looking at the control surfaces on the model you will see that there is a large rudder, a very small elevator, and what appears to be a very tiny aileron.

I can assure you that the elevator, although it appears small, is entirely adequate with normal amount of travel to control the plane very nicely. Ailerons are for model purposes quite adequate for normal control, but are sluggish for aerobatic type maneuvers. This is understandable since the plane prototype was meant to be a very stable, easy to fly airplane and controls were meant to be used to trim for level flight but not aerobatics.

The original model of this plane was built without ailerons and was controlled entirely by elevator and rudder. This control system was found to be quite adequate for scale-like performance, despite the rather straight wing with its up-turned tips. There is a noticeable weaving of the plane with rudder only control when making turns. Actually the plane is so stable that it takes quite a bit of rudder travel to effect a turn, and the first few flights were rather scary on this account. Later as I gained some experience it became a very comfortable airplane to handle. Ailerons were added subsequently and the plane became an easy ship to fly and quite responsive and realistic in the air. I recommend ailerons be used. One should be aware, however, that this is not a Pattern



A side mounted Enya .29. Fuselage is narrowed slightly, close to scale.
At left: "Culver" in the foreground, a Mooney M-18 keeping it company.
Below: Dihedral tips were a unique touch. An M-6 foil, hardwood spar.

ship and should not be treated as one, nor should one expect that kind of performance. I have powered this both with an Enya .29 and a .35 and found either power plant quite satisfactory.

Construction:

Construction of the model is really quite simple, and straight-forward. Any moderately experienced builder will need no instructions other than reading the plan. I started by cutting out the formers and the two main side pieces from $\frac{1}{8}$ " light-weight Sig plywood. When assembled, this gives an extremely rugged and straight framework on which to build. The bottom sheet is $\frac{1}{8}$ " balsa with $\frac{1}{4}$ " square balsa stringers to aid in rounding the bottom corners of the fuselage for more realistic appearance. The upper deck from the cockpit at former "E" to the tail is very easily covered with $\frac{1}{16}$ " sheet balsa. There are no compound curves, and the sheets may be joined very easily over the stringers. You will see that there are only three, one on top and one on either side. The top stringer is faired into the cabin block which is made from $\frac{1}{4}$ " balsa block, carved approximately to the shape shown on the drawing and finished after assembly. The cockpit former D2 supports the forward end of the cabin block and also the cockpit sides which are made from $\frac{1}{16}$ " balsa sheet, cut as shown on the cockpit side template.

As a building tip, I find it convenient and helpful to reinforce balsa sheets that must be bent around some curves with the use of masking tape in the critical areas. If this is used as shown, you will have no difficulty in getting a very nice fit at the cockpit area between the sides and the cabin block.

You will notice that the firewall and the thrust line have a negative rake of 5 degrees. This helps greatly in the stability of the model. It does present a slight problem in the mounting of the nose gear in that it must be blocked out slightly at the bottom to prevent it from leaning back too far. The main gear has a definite negative rake to it to simulate the appearance of the actual airplane. This gear arrangement gives very stable ground handling characteristics, and there is no tendency to nose over or to tip from one side to the other as in many trike geared models that I have handled.

An M-6 airfoil is used which I found to be very easy and gives quite good flight characteristics to this airplane. Although the wing plan form has a slightly odd appearance, it is not difficult to construct. I used a foam core for the main wing sections and built-up tips sheeted with $\frac{1}{16}$ " balsa, but there would be no difficulty in making the entire wing built-up if normal building procedures were followed. The plans have been altered to show typical construction.

Having suffered a wing or two to break in the middle when I was first becoming acquainted with radio controlled models, I have found it expedient to mount the landing gear on a very solid piece of wood strategically placed in the wing. This spar not only relieves the wing of absorbing landing shocks, but it also gives it adequate support in the air for any maneuvers that the plane can perform. I used a section of yardstick for this spar. The stab construction is conventional built-up frame covered with $\frac{1}{16}$ " sheet and should again present no particular building problem. As a matter of fact, I lay out the bottom sheet and build the framework right on it and then merely add the top sheet for a complete assembly. You will see that the rudder itself is $\frac{1}{4}$ " sheet as is the elevator. The model is finished in red and white, using the typical color line as used on many of the Culver "V's."

For this size plane, I would not power it with more than a good .35, and I found that an Enya .29 worked just about as well. I have been so impressed with the flying ability of this model that I intend to adapt another one of Al Mooney's designs to a larger R/C model.

As mentioned earlier, the Culver "V" was not a financial success and not very many of them were built. About 1948, Al Mooney found himself again at loose ends and designed and built the first "Mite" designated the M-18. The "18" is significant in that it was the eighteenth design in his 20 years of aircraft design work. It was powered by a Crosley automobile engine of 40 hp., and had the usual Mooney superior flying characteristics, but more about this plane in my next article.

I hope you will build a Culver "V" and I am sure you will enjoy the flying as well as the ground handling characteristics of this plane. You will also enjoy the glances and remarks of your associates when you bring this ship out to the field for some enjoyable Sunday flying. Two last words of advice which apply to any scale model. 1. Keep the weight low by building everything carefully. 2. Be sure the C.G. is exactly where the designer says it should be. While the real Culver "V" was a stall-proof plane, the model definitely is not if the C.G. is too far back! Don't ask how I know.

