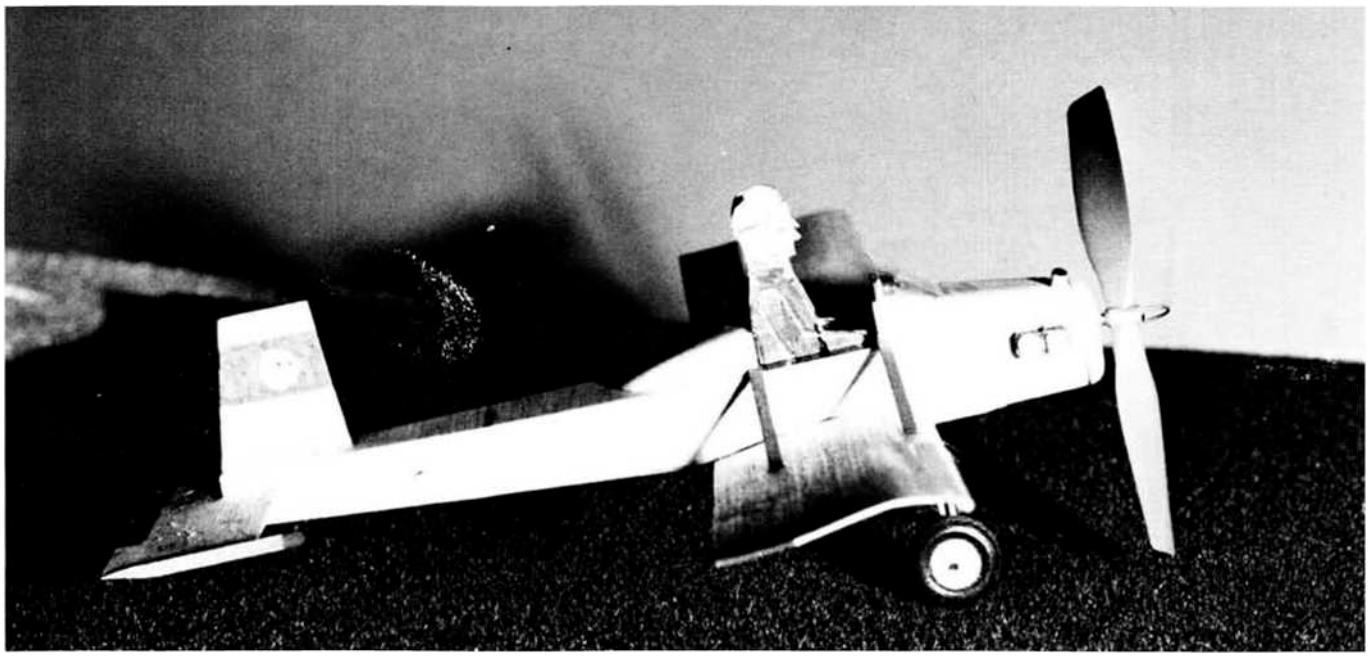


EVANS VP-2

Construction of this model is so simple that WALT MOONEY skipped over it, and instead, has answered our request to expound on flight trimming rubber selection for small free flights. It's a gem . . . don't miss it.

#This is an all sheet Peanut Scale model of W.S. Evans' two place version of the Volksplane. Basicly, the real airplane is a little wider version with a little more wing area so that it can carry two people. The design is a good one for a person wanting to build his first airplane because of its simplicity, and that very simplicity makes it a good design for a model to be built in a hurry and within the capability of near beginners.

Evans Aircraft, P.O. Box 744, La Jolla, CA 92037, has an excellent brochure on the VP-2 for $3.00 and sells plans for the full size airplane for $45.00. The brochure is a good place to gel a 3-view and details.

This particular design was evolved so that the author's whole family could each build themselves a model for the Las Vegas New Years Peanut Scale contest. Five models were built in one evening; the details and decorations were put on in an hour or so of the following day, during the 1972 Christmas vacations. Dad added pilots, instruments and dummy cylinders to his. One son added a fancy felt pen color scheme. Mom added a little color and a girl pilot, and Daughter and the other son left theirs pretty plain.

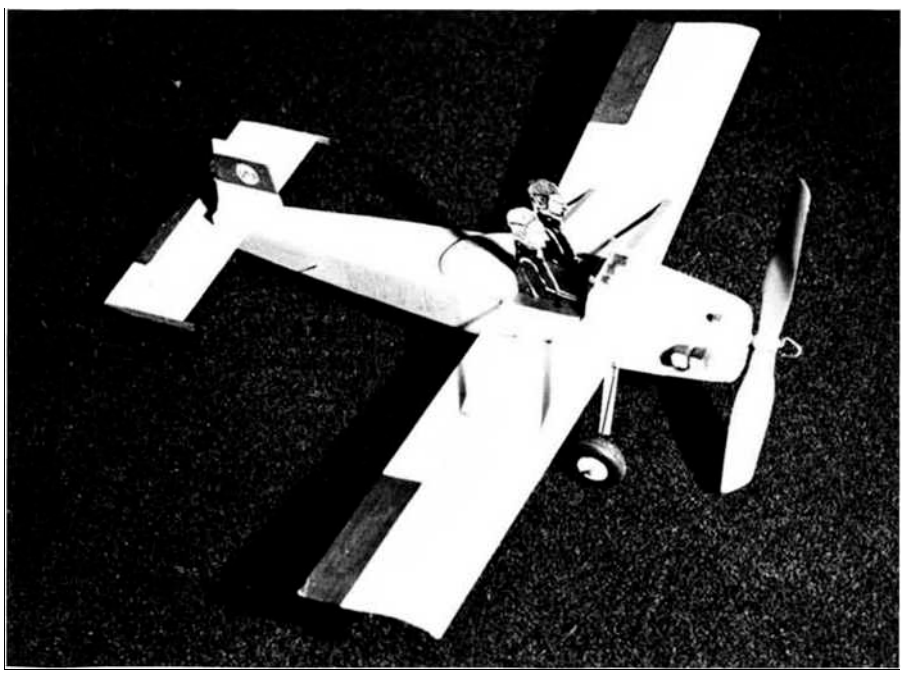
In Las Vegas, they all flew, but the author's wife got the longest flight out of hers by 2/5 of a second, leaving him second best, as usual.

Because the model is so simple and because construction articles have been done so often before, and because the editor says the author is guilty of glossing over the techniques of flying these things *(And he admits it, too! WCN),* the construction will not be mentioned. It is assumed that you have a finished model and arc about to start flying it.

After many years of observing my models and other people's models, we have concluded that the reason for poor flying characteristics narrows down to only a few specific problems.

First and most common is the center of gravity being loo far aft. The further forward the airplane's balance point (Center of Gravity), the more stable the model will be. This must not be carried to extremes or the model will have the absolute stability of a bomb. Nevertheless, if your model flys erratically in any fashion, check to see that it balances at the point shown on the plans, and even if it does, it may be worth your while to ballast the model to move the balance point an eighth of an inch or so further forward.

The second most common problem is warps, or surprisingly, the lack of them. Significant non symmetrical warps are obvious problems, and should be eliminated. On most models there is one wing warp that is, if not absolutely essential, at least almost always beneficial. This warp is referred to as "washout," and is a symmetrical warp in which the trailing edge of each wing is warped up as it proceeds towards the wing tip, so that the tip of the wing flies through the air at a lower angle of



Simplicity of this design makes it a natural for sheet balsa construction, which also makes it a natural for a family or beginner's project.

attack than the wing root. A model that stalls and then drops a wing can be a disaster; one that wobbles from side to side is a disaster waiting for a place to happen, and "washout." will usually cure the problem. (Please take note of the VP-2 wingtips in the photos).

The above are the two most important items; all the other problems can be solved with propeller thrust line changes, or elevator and rudder setting changes . . . except one. This last one is rare, but occasionally a modeler will put on a propeller that is too big, or has too high a pitch, and the model will be unflyable for any length of time. Generally, it is easier to adjust a model to fly consistently with a small propeller than with a larger one. Durations are lower with a smaller propeller, however, and therefore if you are interested in long flight time you will tend towards the larger diameter, slower turning, higher efficiency propellers.

Once the model is balanced right and has no wrong warps . . . and enough of the right ones, it should be glided power off, that is with the propeller freewheeling, or with very few, (not more than 50) winds if you don't have a freewheeler. The glide path is adjusted with the horizontal tail. If the model dives . . . that is, continues in an ever steeper arc towards the ground while its speed keeps increasing, bend the trailing edge of the horizontal tail up. If the model pilches nose up, slows down almost to a stop, and then dives (this is known as stalling), the trailing edge of the tail should be bent down. The amount of displacement of the trailing edge of the tail to provide enough

With pilots THAT skinney, you don't hardly need a wider cockpit!

adjustment is fairly small, so proceed carefully and lake your lime at this stage.

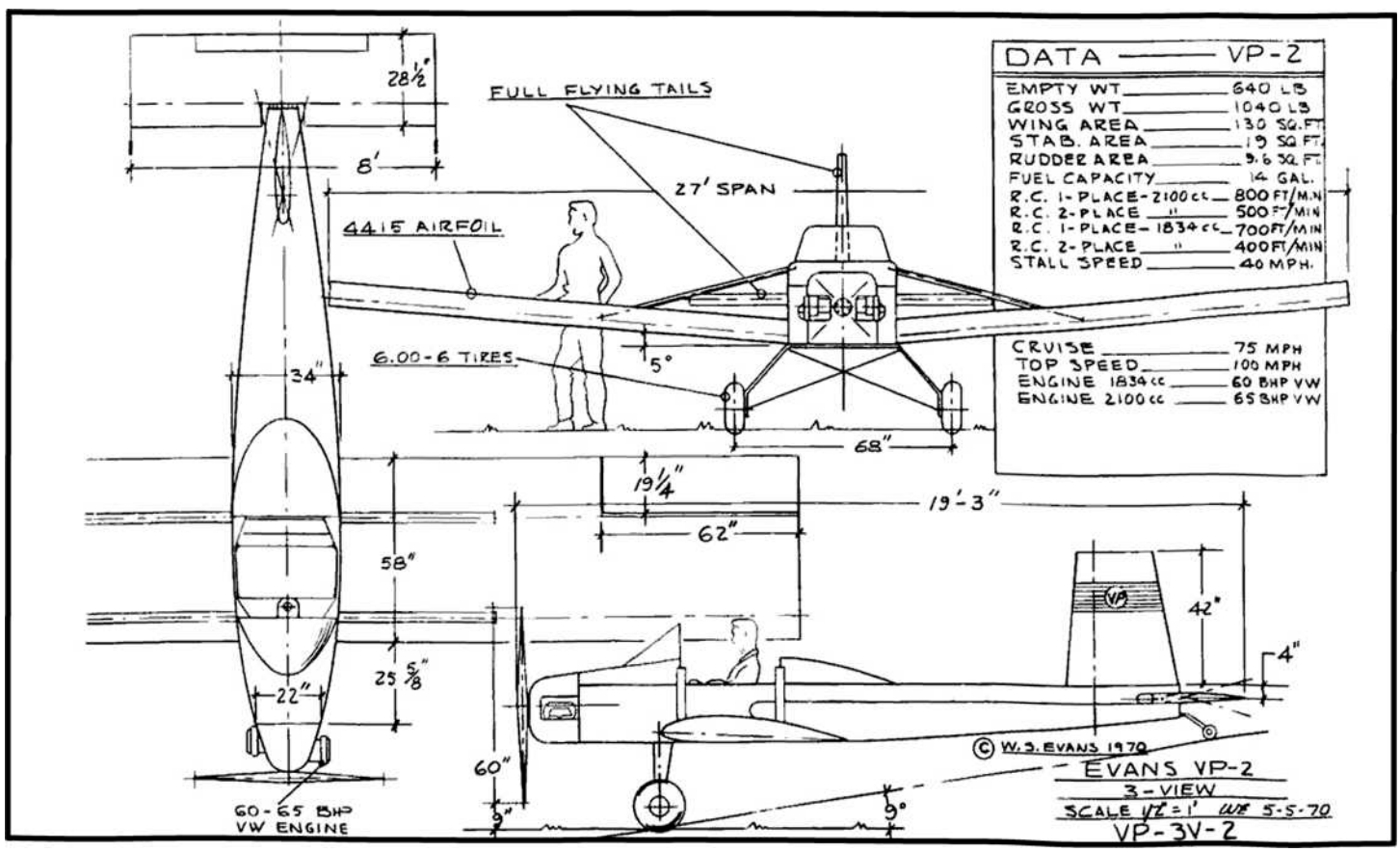
The model should glide in a relatively straight line. A sharp turn can be corrected by moving the trailing edge of the rudder in the direction away from the turn. However, if your rudder looks straight at this point, a turn is almost always because of a warp in the wing. Sometimes, if the propeller is large and does not freewheel, its effect is to make the model roll and turn to the right, hence the reason for the few winds during the glide tests.

Once the model is gliding satisfactorily, its time to start the powered test flying. Here, the procedure is to add power (winds) a little at a time, flight by flight, so that the model doesn't do anything grossly unexpected and spoil your whole day.

Adjustments during this phase should be done primarily with thrust line modifications. The basic idea is to point the propeller in the direction you want the model to fly. If the model loops or climbs steeply and stalls, down thrust is in order. If the model turns tightly to the left or rolls to the left, right thrust is in order. Here again, small, careful adjustments arc the order of the day if surprises arc to be avoided.

Obviously, if you are Having outdoors, wide gentle turns are perfectly O.K., and often desirable. If the flying sight is indoors, the model must make circles smaller than the room is wide or the model must ultimately be built harder than the walls! (One of Murphy's more unpopular Laws!)

Indoors, careful thrust line adjustment and careful rudder adjustment also may be



required to get the model to turn tight enough to miss the walls. If the model is determined to spiral dive when it's adjusted to fly in small enough circles, either the model is too big or the hall too small. Warping the wing to resist the roll may help and can be tried. Another thing that can be used is a drag flap on the inside wing. Typically, on a Peanut scale model, the drag flap is a piece of I/32nd thick balsa, I/4 by I-1/4 inches long. This is cemented under the trailing edge with its long dimension spanwise and its quarter inch dimension hanging vertically downward. Thus it makes a little drag brake to force the model to turn without increasing the lift of the inside wing, which would tend to enlarge the circle.

The model now should be adjusted, so next, how about more duration . . . longer flights.

A winder is a must. Indoor commercial winders, having 9 to I, and I6 to I ratios are available (Marlow Engineering). Outdoor winders usually have to be made from hand drills and have ratios like 4 to 1. These are used for the larger models. For Peanut scale 16 lo I is just fine.

Rubber lubrication is important. It will allow you to put in more winds and the motors will last longer. There are good commercial rubber lubes on the market. Castor oil, glycerine, and some silicone lubricants can also be used. The motor should have enough lube on it to look wet without being drippy.

Slack in the motor is important. The number of winds that can be put in a motor is proportional to its length.

A long motor is not easy to wind by hand, but if you have a winder, most peanut scale models can use a loop of rubber that is at least twice as long as the distance from the front hook to the back peg.

Stretching the motor before you start to wind it up is important. Usually, as you start winding it, the motor should be stretched out at least five times its unstretched length. Then about half of its maximum turns can be put in. As you put in the rest of the winds, the procedure is to slowly let the motor work its way back into the model, so when you have completed the winding, the nose plug will be exactly ready for installation in the nose of the model.

Once you know about stretching, slack, lube, and a winder experimentation with the motor size and length arc what will lead you to the longest possible flights with your rubber powered scale model. Indoors, this is the only way. Outdoors, there are thermals, and a clever modeler will learn how to spot them and launch into them occasionally, if not most of the time. Rubber strip is available in a wide variety of widths from 1 mm up to about a quarter of an inch. For the larger models the experimentation consists of trying longer motors and in adding to the number of loops powering the model. For smaller, indoor models the experimentation consists of trying longer motors and in varying the size of the rubber strip used in the motor. Generally, longer loops result in longer propeller runs, but slower climbs and lower altitudes reached. This is sometimes desirable, for instance, if your model climbs rapidly and runs into the ceiling of the room, you can cure this with a longer loop of motor and get a longer flight at the same time. Indoors, the ideal motor is the one that will take the model up just short of the ceiling and then let it down with the last ten or twenty winds still in the motor. Needless to say, this may take quite a few experimental flights, but it is all fun.

It is extremely important to remember that when you change motor size, the model may have to be rebalanced if the C.G. is to remain in the proper place.