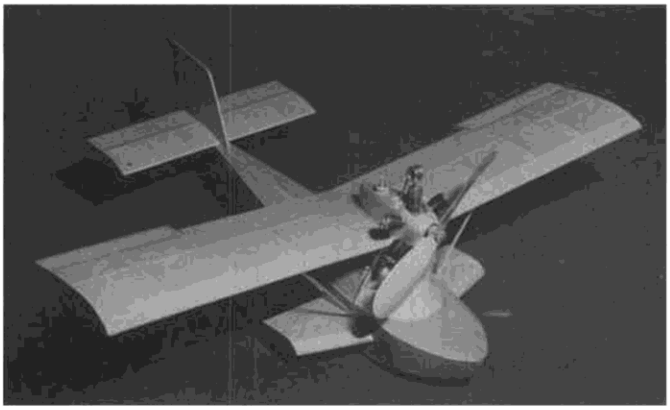
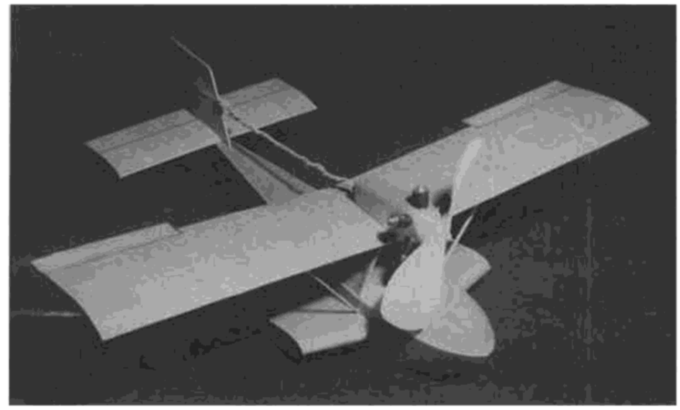


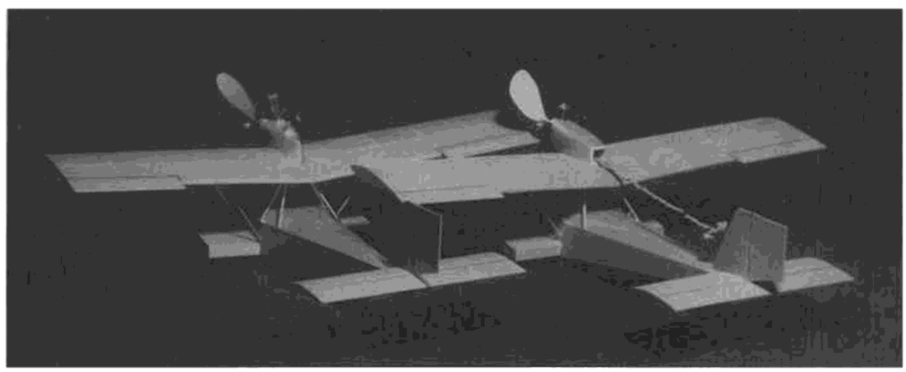


This month's Peanut can be built either as a CO_2 or rubber-powered model. The CO_2 model will consistently do two minutes outdoors, but the rubber model is limited in flight time because of the small prop. Both models had severe flight problems that were solved in a clever way . see text.

PEANUT SCALE + DORNIER + 'LIBELLE' + PEANUT SCALE

By WALT MOONEY . . . This month the professor presents a two-for-one model; a neat little Dornier flying boat that can be built either for rubber or CO_2. Naturally, both are excellent fliers.

• In the early Twenties, Dornier designed and built a little three-place flying boat. It had simple lines and looked like an excellent design for a small model. This inspired the two models presented here. It can't be said that these models flew right off the drawing board. They didn't. In fact, both of them had identical terrible problems which took a little test flying to solve. Solving the problems became a challenge, and the challenge was met so successfully that the CO_2 model has consistently flown for 80 seconds indoors (we flew it in front of **Model Builder**'s illustrious editor and a batch of other witnesses at the last Peanut Proxy Contest). It will do 120 seconds or more every time outdoors in smooth, stable flight. The rubber-powered model has also been adjusted into a stable flier, but its flight time is fairly short because the propeller diameter is somewhat limited.



Three-quarter rear view gives a good idea of the strut arrangement. Vertical stab on rubber model must be strong to withstand the pull of the motor.

Since you have been told there was a flight problem originally, a description of the problem, its cause, and its cure is in order.

The problem: On early test flights, both models spiraled in to the right, very sharply. The radius of the spiral was about three feet. To have a model hit the ground at your right ankle after a two-second flight is somewhat disconcerting. It took about a quarter of an inch of left rudder deflection to overcome the right turn, which obviously wasn't the answer because the gliding flight became as terrible to the left as the powered flight had been to the right.

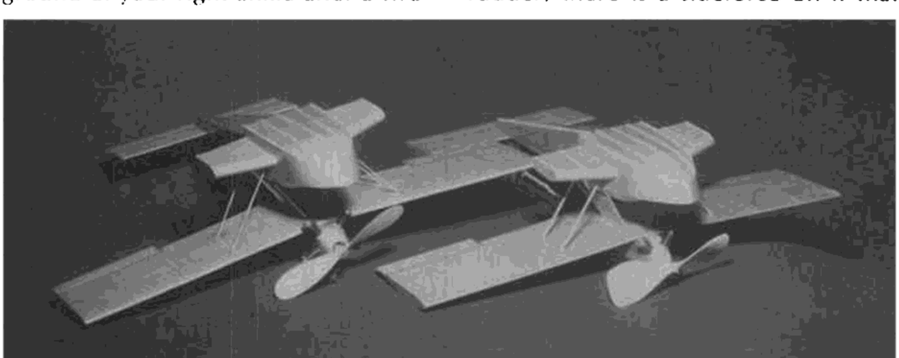
The cause: The propeller slipstream which moves aft in a swirling motion hits the rudder, but only the bottom half of the swirling slipstream hits the rudder; the top half passes above it. Since only part of the propeller blast hits the rudder, there is a sideforce on it that causes a tight right turn under power. Sidethrust adjustments were tried, but even very gross angles weren't successful.

The cure: Straighten out the slipstream below the wing. How? Well, there is no exactly scale way, but there is a way that can be almost invisible and certainly no detriment to the looks of the models. Install a couple of flow straightener vanes below the wing, aft of the propeller. Simply fill in between the forward and second cabane strut on each side with a sheet of thin transparent plastic. These panels keep the flow from going sideways and force it to go nearly straight back over the vertical tail . . . and whaddayaknow, the problem is solved.

Compared to solving the flight problems, building the models is very simple. Most of the building methods are the old standards. Assemble the parts over the plans, using balsa for all the major structural components. The powerplant installations are the major nonstandard efforts.

To have a reasonable rubber motor length requires an open ended nacelle and a strong vertical tail to support the rear motor hook. The nacelle is assem-

Continued on page 109



Hull and sponson strakes are added after the hull has been covered and doped. Celluloid airflow straightener between front and 2nd cabane struts is just barely visible on model on right.

Peanut . . . . . . *Continued from page 83*
bled from block balsa built to fit around the square cross-section of the Williams Bros. plastic thrust bearing. When the wing is installed make sure that the strut joints are all secure and that the struts are strong enough. They have to take the pull of the wound-up rubber motor.

The CO_2 shown here is the single-cylinder Brown and the standard fuel tank. The filler is located on top of the nacelle where it is most convenient. The tank is in an upright position in the hull; you can camouflage it with a dummy pilot if you desire. Because there is a certain amount of pressure associated with filling the tank, it is essential that the sheet fill-in at the wing roots be strong enough to provide finger support for the filling operation. Use firm, rather than soft, balsa sheet. To install the nacelle with the motor on the wing requires that the tank be unscrewed from its top so the top can be inserted through the small hole in the center section. This hole must be built into the wing structure before the wing is covered.

Be careful when making the coils in the tubing for the motor installation. If they are bent without some sort of support to prevent it, they tend to kink, and if they kink, they will not allow proper gas flow, and will quickly break due to engine vibration. Use a round dowel to wrap the tubing around, making sure that the tubing is always in contact with the dowel at the point that it is being bent.

The horizontal and vertical tail structure is completely standard. Simply assemble them over the plans.

Similarly, the wing is built directly over the plans. The two center ribs must lean outward slightly to allow for the dihedral, which is put into the wing after it is removed from the plan. Use very soft sheet balsa for the ailerons. Use soft sheet for the root fillers on the lower side of the wing if the model is to be rubber powered. Use firm sheet if the model is to be CO_2 powered, because the model will have to be held at this point when the tank is being filled. Add full-depth balsa doublers on each side of the center ribs in the area where the hole for the fuel lines must be made.

The sponsons that go on either side of the hull to provide lateral stability on the water, are simply little wings. Use light balsa for the leading edges to keep the total weight low. Rib contours for the three sponson ribs can be found on the side view.

All ribs are actually shown only on the side view. The horizontal tail ribs all have the same contour, and the same can be said of the wing ribs. Note, however, that the tip ribs are thicker material, and in the case of the wing, there are two thicker center ribs.

The hull is built using two side frames built directly over the plans. The side frame has been hatched on the drawing for emphasis. As the sides are drying on the plans, cut out the three bulkheads and the centerline keel piece. A segment of a circle must be removed from the keel piece to clear the CO_2 tank. Remove the sides from the plans and separate them, then cement them together at the tail post and add the cross braces. The front three cross braces are the bulkheads. Crack the side structure to make the sharp bend at the step bulkhead. Just behind the step bulkhead add a 1/16 x 1/8 cross piece between the bottom longerons. Cement it to the bulkhead all the way across, as well as to the longerons on each end.

The nose of the hull is made from block balsa. Hollow it as indicated by the dotted line. A top panel of 1/16 sheet balsa extends back to the second bulkhead and provides a deck. A long narrow triangle of 1/16 sheet on edge makes the top center shape of the hull from the step bulkhead to the front of the tail.Sticks of 1/16 square balsa are added at the top of each side of the aft two bulkheads. These bend sharply at the step bulkhead and then are cemented at the top of the centerpiece two bays further aft. A sheet balsa filler is used between these top stringers and between the last two bulkheads for the CO_2 model. It has a hole in it to just fit and thus support the top of the tank. This area is simply covered with tissue for the rubber-powered Libelle.

The windbreak can be cut from file card stock or any thin cardboard or heavy bond paper. It wraps around and is cemented at each end to the second bulkhead. It is also cemented all along its bottom edge to the deck.

Cover the model with tissue. After all parts are covered and the tissue has been shrunk with a mist of water, dope the model. A seaplane has to be watertight, so a little more dope than you usually use may be required. Inspect the hull and sponsons carefully to make sure all sides have received enough to make them watertight. The aft skeg and the hull and sponson strakes are added after the hull has been covered and doped. They were made from model railroad basswood stock and should be given a final coat of dope after assembly.

The original Libelle had an 80 horsepower Siemens five-cylinder radial engine. Williams Bros. plastic dummy cylinders with dress snap heads are used to simulate the engine details. The original airplane was aluminum, so the models can be covered with silver tissue or lightly sprayed with silver lacquer after doping. Avoid a heavy paint job. Movable surfaces are indicated by black lines.

This article started with a description of flight problems, so the basic advice has already been covered. Make sure that the center of gravity is at the point shown. This may require a little weight as far forward as possible in the noseblock of the rubber model, but will probably not be required for the CO_2-powered version. A little washout in both wings may prove helpful. Use surface adjustments to control the gliding flight and use thrust adjustments to control the powered flight. Have fun, that's the main idea. •