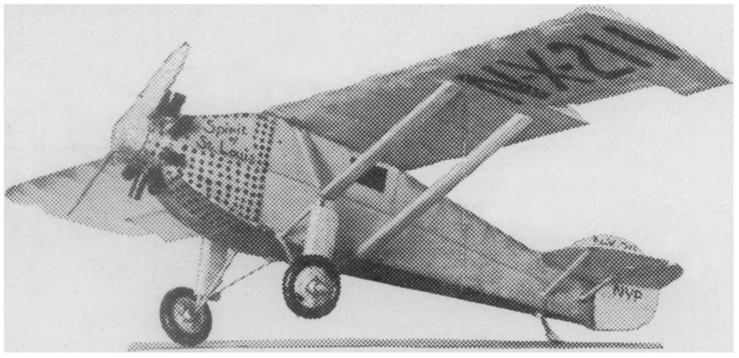
Building and Flying Model Airplanes



Finishing the Lindy Model

This is the eighteenth and last of a series of articles by Paul Edward Garber. Mr. Garber is in charge of aeronautics at the Smithsonian Institution.

The following material will now be required:

4 pine braces 9x¾x⅛ inches.
2 pcs. metal tubing, 4¾ inches long with a ⅛ inch inside diameter.
2 pcs. of the same tubing, 5½ inches long.
1 pc. of the same tubing 3¾ inches long.
1 pc. balsa wood 4¼x⅜x¾ inches.
2 upper pine braces 3"x⅛" diameter.
2 lower pine braces 4"x⅛" diameter

The first step is to fasten the wing to the fuselage. This is done by means of two screws passing through the holes near the center of the wing and into the second upper spar of the fuselage. Be sure that the wing is at right angles to the center line of the fuselage. Next we will prepare the four braces which must reach from the bottom longeron to the wing strengtheners as shown in Figures 1 and 2. At a distance of six inches from one end the front two of these are to be cut over to one side and this remaining part rounded, as shown in Fig. 2-a. The flat section of the braces is to be streamlined, that is, made so it will pass easily through the air, to the shape shown in Fig. 5-a. The rounded part goes in front. Now take the two 4¾ inch lengths of tubing and pinch a portion near one end as shown in Figure 3, and through this part drill a hole large enough to pass a small screw, such as a No. 00-¼" long with a round head. The long portions of the front tubes are to be four inches long, and the bends are to be such that when the tubes are placed at a forty-five degree angle the short parts will engage the streamlined braces.

When these have been correctly shaped they may be screwed to the fuselage and the streamlined braces may be fastened in the short sockets and nailed to the strengthening pieces in the wing. The 2 other braces are shaped and attached in like manner, but must be bent forward from the pinched portion to engage the lower end of the front tubes as shown in Fig. 2-g.

Obtain two wheels about two inches in diameter. These may be purchased from model supply houses, taken from a ten cent store toy, or turned from wood. Now take two nails about No. 16—2 inches long, pass them through the wheel axles and bend them as shown in Fig. 1-b. Solder a small washer on the nail near the wheel, pass the shank of the nail up the front tube, and solder the nails and two tubes together as shown in Fig. 1-c and 2-g. Two upright braces are next made. They are shaped as shown in Fig. 1-d and Fig. 5, from the piece of balsa wood 4¼ inches long. They are Ambroided and wired at the two points of intersection. From the short length of tubing 6 tube sockets are made as shown in Figure 4. Two of these are used to attach the upper end of the upper braces, the lower end being wired to the juncture. The other four are used on each end of the two braces which extend from the point of juncture just named to the joint of the rear brace and longeron. The rear socket is fastened under the other socket, using the same screw for both.

In the original plane flown by Lindbergh every effort was made to reduce head resistance. One instance was in the joint between the wing and fuselage, where the two were blended together. We will do the same thing and attach a piece of covering to the upper surface of the fuselage in front of the wing as shown at Fig. 2-f and carry it over the wing, and adhere it in back of the trailing edge. Dope may be used

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newer and hardier forms behind them, and a great development of land-dwelling reptiles, which had hitherto been relatively unimportant. This age was the Permian.

It is admittedly stretching things a bit to jump from a similarity in color between the Mars of today and the earth of the Permian yesterday, to the conclusion that our nearest neighbor planet is now undergoing the hard times of a Permian period of its own. But at least it is worth a question and a conjecture.

There remains still one planet not yet examined. Venus is a more difficult object for astronomical study. But in many ways it resembles the earth far more closely than any other member of the sun's family. It is slightly smaller than the earth, a diameter of 7600 miles as against our 8000, but has about the same mass. Therefore the force of gravity is about the same there as here. If a man should ever reach Venus he would be able to walk normally as soon as he stepped on its soil, neither falling crushed by his own weight, nor leaping over hedges and houses without intending to. That would be a great comfort.

Like Mars, Venus has atmosphere comparable with that of the earth. Only there would seem to be a great deal more atmosphere on Venus than there is on Mars. There may even be more atmosphere on Venus than there is on the earth. But it would not be a monstrous, smothering, murderous atmosphere like that of Jupiter and the other great outlying planets. Telescopic observations have never penetrated to the actual surface of Venus, because of the constant veil this atmosphere throws about the planet, but it is pretty certain that it is not abnormally deep judging by what we know about the relations between the size and mass of the sphere. It has been suggested that the atmosphere of Venus is like that of the earth, with the addition of a great deal of water vapor, making a constant blanket of cloud or fog.

Venus is probably warm, unless this cloud blanket modifies the heat, for the planet's orbit is only three-fourths of our distance from the sun. Of course, not being able to see the actual surface, we are unable to say whether there are any oceans on Venus—but the chances are just as

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great that there isn't any land! Assuming, however, that there is, it would seem that the normal climate of Venus would resemble that of the earth's tropical rain-forests: almost constant fog, rain on a minute's notice a dozen times a day, a damp warmth very enervating to human beings but supporting an unimaginably rich jungle vegetation which in turn harbors an unimaginably rich development of animals.

There have been periods in the world's history when far wider stretches of the earth probably had such a climate. The coal age was such a one, when vast forests of ferns, or fern-like seed-plants, of mammoth horsetail rushes, of great harsh trees like nothing that now grows, stood thick and rank in the vast, level bogs that filled what is now most of the eastern half of this country. Again, there was a tremendously rich vegetation during the days of the dinosaurs. Both these times must have had exceedingly warm, moist, cloudy climates, to produce such a welter of vegetable and animal life. It is quite possible also that even earlier periods, such as the Devonian, or age of fishes, when sea life predominated over land life, may have had such a cloud veil wrapped around the earth.

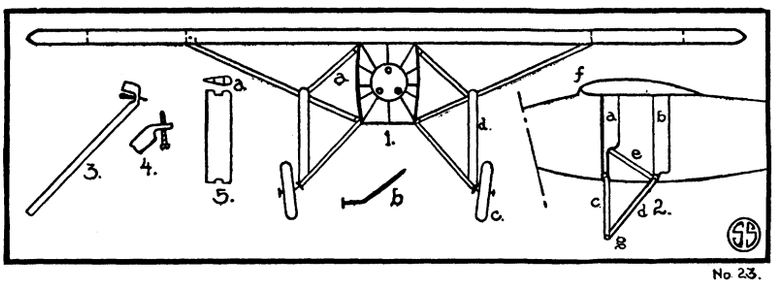
Venus, then, seems to be the darling of the solar systems—if we of the earth modestly except ourselves for the once. Mars, the only other possibility, is wry and withered, but our sister Venus seems to have the vigor and sap of life in her.

But the mystery still remains, and probably will remain for many generations. If we ever succeed in piercing that fog, what shall we see? A planet mostly ocean, swarming with Devonian king-crabs and sharks? A luxuriant Carboniferous bog forest? A landscape over-stridden by monster lizards long since vanished from the earth? Or the towers and cities of a people adapted to a foggy light and inured to a constant tropical warmth?

Science News-Letter, December 17, 1927

California's redwood trees will last about 100 more years, at the present rate of consumption.

By making paper money smaller, it is expected that the government can save $4,000,000 a year.



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for adhesive, and care must be taken to get a smooth joint.

The model should now be a very close reproduction of the original "Spirit of St. Louis", but differs from it in a few details. The most striking departure is the propeller, which we have had to increase in order to make the model capable of flight. The original sized propeller scaled down would be inadequate. The photograph shows a scaled propeller, whereas the one you have made is two inches longer. To accommodate this increased length we have lengthened the landing gear, and braced it a trifle differently to allow for its increased length. In the original plane the upright streamlined braces are enclosures for the shock absorbers, but we have not added this detail. Lindy's plane had the juncture of the slanting streamlined braces and the wing enclosed in a housing. This may be duplicated by forming the housing from Plastic Wood.

A great deal can be done in the way of improving the model by painting it. All surfaces should be painted with aluminum paint. On the right under side and the left upper side of the wing, facing the model, the designating mark N-X-211, Lindy's license number, is to be painted with large letters facing rearward.

You should look through back issues of magazines and newspapers and find a photo of the original plane and from it copy other features. In this way you will see a window on each side through which Lindbergh observed the progress of his plane and a set of six small windows are in the wing above the others. These windows may be indicated by black paint, or by cutting the fabric and inserting a piece of celluloid in the proper place. All of us recall the beautiful metal nose of the original. You may duplicate this by painting black spots on the front of the model, but a far better way is to use a coating of tinfoil. Procure the kind which has a mottled surface, such as comes about typewriter ribbons or candy. Fasten this to the fabric, coating it with shellac and sticking it in place. The lettering, "Spirit of St. Louis," should most assuredly be added. A dummy motor can be made by gluing on nine radial pieces of black painted dowel stick as was done in the above model, or the individual cylinders can be made more like the originals by adding flanges, valves, exhaust pipes, tappet rods, etc. The tank air inlets, the air speed indicator, the earth inductor compass rotor and other features may be added, details of which can be procured from photographs of Lindbergh's plane.

To fly the model set all controls in neutral. Remove the motor stick and attach thereto a rubber motor composed of twelve strands of ⅛-inch flat rubber, looped from a piece 15 feet long. It is attached by means of the "S" hook at one end and the shaft hook at the other end, after passing through the cans, as was done for the other two models previously described. Wind the propeller about a hundred times, either with the finger or by using a winder. Insert the motor in the model, snap the dress clips to retain it and rest the model on the ground, having a good smooth runway underfoot and a clear field for at least 200 feet ahead. Make a final inspection to be sure all is O. K., then release the propeller. The model should rise from the ground and fly. Adjustments can be made by use of the rudder, elevators and ailerons, to insure straight flights, or correct balance. By the manipulation of the controls your model may be made to perform various aerial maneuvers.

With the completion of this model this series ends. I trust that you have gained a liking for the fascinating sport of model flying, and know that you can now proceed with other models, using the knowledge you have obtained from this series. If any of you have any problems to be solved in connection with these or other models I shall be glad to assist you. You may address me in care of the SCIENCE NEWS-LETTER.

Science News-Letter, December 17, 1927

There is less sap in trees in warm weather than at other times.