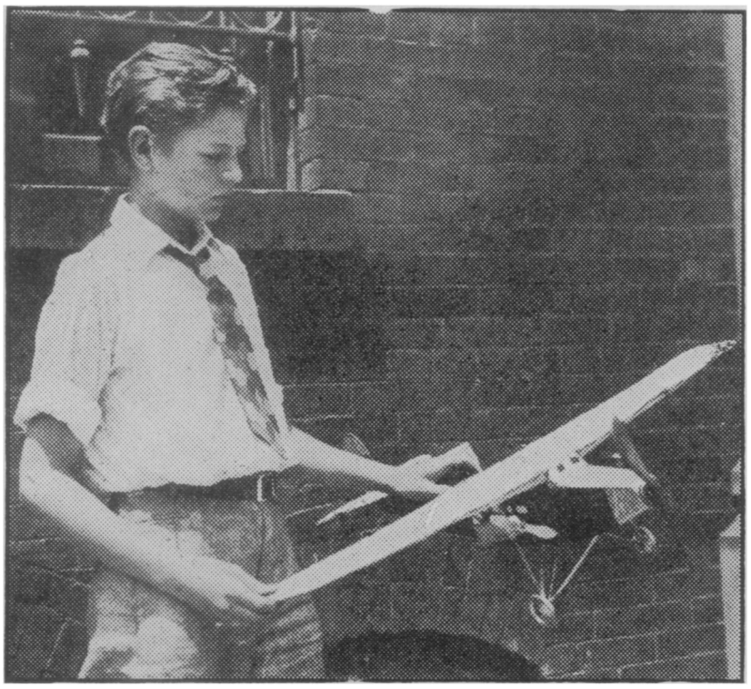
Building and Flying Model Airplanes



A FLYING MODEL OF COMMANDER BYRD'S North Pole airplane and its maker

This week the SCIENCE NEWS-LETTER presents the first of a series of articles to run through the coming weeks which tell how to build and fly model airplanes. These articles are prepared by Paul Edward Garber, in charge of aeronautics at the Smithsonian Institution, and one of the leading authorities on model airplanes.

How to Start

Building and flying your own model airplanes will allow you to play a part in the interesting development of aviation. Whether you are young or old, son or father, daughter or mother, you can easily build and fly your own small-sized aircraft.

You will find it a fascinating sport. The construction of the models is an absorbing occupation for evenings at home. When the model is completed and flown, you will be thrilled by the results.

The first model airplane to be described will be an easily constructed scientific model. You can make it in a few evenings of work by carefully following the directions. The materials will cost only a few dollars.

While building and flying model airplanes is a great sport, it has played an important part in the development of aeronautics. Langley flew models successfully and showed that mechanically propelled flight was possible. The Wrights experimented with gliders and models before they invented the airplane.

Perhaps you through your work with model airplanes can aid in the advancement of aviation. Models are being used today at the great aeronautical laboratories, such as at Langley Field, Va., to solve some of the problems of airplanes.

Tools and Materials Needed

The construction of a model airplane does not require the use of any unusual tools nor material that is hard to obtain. A hand saw, small plane, penknife, ruler, pair of pliers with side cutters, razor blade and a scrap of sandpaper will suffice for the first model to be described.

The wood needed may be obtained from a lumber yard, but probably every boy will be able to save this expense by using a board from a packing box, or cutting up yard sticks, which are often given away by local notion stores. The propellers are cut from small blocks of wood, easily obtainable. The wings are made of wood and wire; the wire should be preferably No. 16 aluminum, which most hardware stores carry. This is best, but ordinary hairpins of the heavier kind can be used. The wings are to be covered with thin tissue paper, or China silk. These are easy to obtain locally, the silk costs about $1.00 a yard; ¼ yard will be enough for the model. Most of the wire fittings can be made from heavy hair pins, but the propeller shafts should be stiffer wire, such as hat pins.

The propellers are powered with rubber. The best form consists of what is known as rubber thread, and is obtainable from rubber companies and model supply houses. A substitute may be made by linking together in form of a chain, long rubber bands, which all drug stores carry. In every instance the material which is lightest and strongest should be used. The actual sizes of material required will be specified in connection with the construction of parts.

Making the Frame

When model airplanes were first made by boys, shortly after the first flight by man, made by the Wright brothers in 1903, the models resembled full sized machines, and like their originals were heavy and flew but short distances. Most of the models were flown indoors because they did not require much room. They were often hard to fly outside where the slightest wind would unbalance them. As the large machines were improved, however, the models too became more stable and capable of longer flights. Gradually outdoor flights became common, and soon it was necessary to find large fields to accommodate the longer trips made by the better models. Gradually two kinds of model airplanes developed, one class known as scale models being copies of the large machines, and the other class

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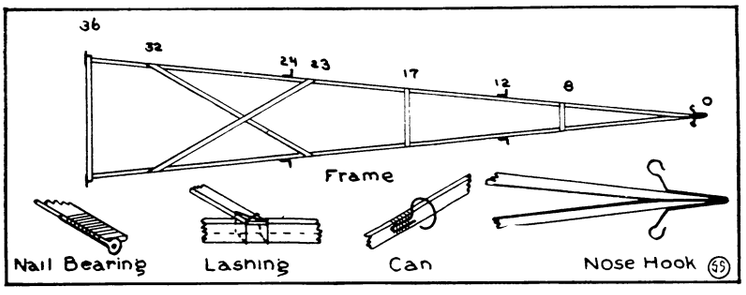

Model Airplanes

(*Continued from page* 83)

known as scientific models which consisted of the bare essentials for flight, namely a frame, propellers and wings. The scientific models are easiest to build and make the longest flights. Whereas the first model airplanes flew but fifty or sixty feet, the record today is over a mile, with a duration of more than ten minutes.

In these first articles the writer will describe the construction of a scientific model made in the easiest manner from the simplest materials. Although elementary in design and construction it nevertheless embodies correct principles and if made correctly of light materials it should fly at least five hundred feet and remain in the air half a minute.

Nowadays for purposes of identification the Department of Commerce requires individual markings on aircraft, similar to automobile licenses. For instance, Lindbergh's famous "Spirit of St. Louis" is identified by the symbol, "N-X-211." We, too, will follow this custom and call this first model the "S-S-1." After you have built your model you may want to give it your own symbol.

The first part of the "S-S-1" which we will make will be the frame, which supports the wings and power plant. The corresponding part on man-carrying planes is called the "fuselage." For this we will require the following material:

2 pine sticks 36" x 3/8" x 1/8"
1 pine stick 36" x 1/4" x 1/16"
10" of small strong wire
1 hatpin
2 small nails.
Glue and thread.

The two large sticks are to be made smooth with sandpaper, and then cut at one end in a long wedge, as shown in the detail drawing. This wedge must be such that the open ends of the "V" formed will be 7" apart. When this wedge has been cut glue is put on the inside faces of the wedge and the pieces stuck together.

Ordinary glue will do, but a product named Ambroid is better for our purpose. It is stronger, dries quicker and is waterproof. Most hardware stores and sporting goods stores carry it. After joining the wedge the nose hook shown in the drawing should be made of small stiff wire, and placed over the point of the frame, after which it is bound on, thus strengthening this joint.

The other end of the frame next occupies our attention. It is the place for the propellers, so we will make the bearings for them. Take the two nails, flatten one end and hammer the rest to produce a slightly flattened side. In the flattened end of each drill a hole large enough for the hatpin to pass through. These holes can be drilled with a hand drill. If you do not have such a tool the nearest garage will drill them for you. Tell them to use a number 52 drill, or a 1/16" drill. This size is correct for most hatpins. When completed bind these bearings to the ends of a piece of the 1/4" wood, 7 3/4" long as shown in the detail drawing. Lash the brace to the open ends of the frame as shown.

Another detail drawing shows how to make a strong lashing. Pass the thread in the direction shown by the lines, make several turns, then tie. Use Ambroid in this joint and spread a little over the thread when finished. Next form an "X" brace out of two pieces of the 1/4" wood and lash it in place. The other braces are next put in. At the top of the drawing several numbers are shown. These represent numbers of inches away from the point of the model. If you will lay a yardstick or other ruler along the frame with the beginning at the point, you can put a mark on the frame where each of the numbers are and thus mark out the correct places for all of the parts. Do this on each side and you will get your braces true. In lashing on these parts make your work strong and neat. Do not have heavy coarse joints. When the Ambroid has dried cut away protruding parts of the braces which extend beyond the sides.

In the detail drawings a wire fitting is shown called a "can." These little fittings are very useful on models for they distribute the pull of the rubbers and keep the frame from getting bowed. They serve the same purpose as do the agate rings on fishing rods. Four cans are made from wire to the shape shown, and they are lashed to the sides at points 12 and 24. Finally hold the frame up and sight with the eye from the nose hook to the nail bearings. Make sure that the sides are true and that the cans line up with the hook and bearing holes. This completes the frame. Hang it up where it will not get damaged or distorted.

Next week we will make the propellers for this model.

MEMORANDUM

This blank space serves a dual purpose. It allows you to clip out the article on the reverse of this page without destroying any other article. It can also be used for notes and the recording of your own observations.