

# Building and Flying Model Airplanes

## Making the Elevator and Assembling

This is the fourth of a series of articles by Paul Edward Garber, telling how to make model airplanes. Mr. Garber is in charge of Aeronautics at the Smithsonian Institution.

The construction of model airplane "S-S-1" is now complete except for the small wing or elevator. The elevator is made in the same manner as the wing which has previously been described.

The following material is necessary:

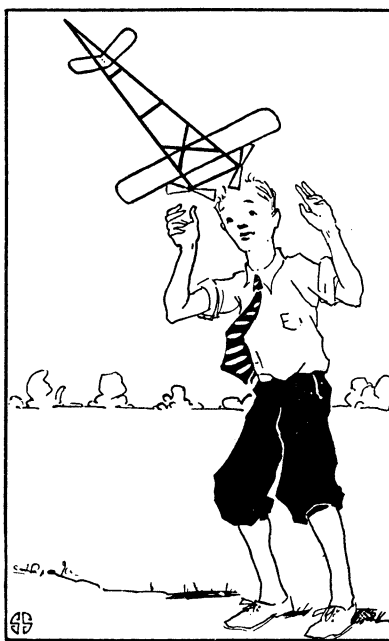
- 2 pine sticks, 8" x 1/8" x 1/16"
- 27 1/2" of No. 16 aluminum wire
- Remnant of silk or paper from yesterday
- Thread, needle and pins
- Glue and wing solution
- 3 rubber bands 3" long
- 1 block of pine wood 1 1/2" x 1/4" square

The same directions that were used for making the wing may be followed in making the elevator. But after the center of the sticks is found, bend each stick slightly upward. This bending is done by either heating the center above a candle flame and bending it as the wood fibres are felt to give, or by soaking these two sticks about half an hour in boiling water, after which they are placed in a form made by hammering nails into a piece of wood so as to make a "V" shaped fence against which the sticks are held by other nails. They should be left in this frame overnight to dry, after which they will permanently retain the angle.

The idea of having the elevator bent upward is to impart steadiness to the model's flight. This angle is known as "dihedral." The front view of the elevator shows the amount of dihedral necessary. It is such that the tips are one inch above level. The ribs are placed 1 3/4" apart. The methods of bracing and covering are the same as were used for the wing.

At the bottom of the drawing is shown a side view of the model when assembled. It will be observed that the wing is placed near the back, with the greatest curve of the wing toward the point of the model. The elevator is placed near the nose with the edge which is near the greatest curve resting on the small block of wood. The idea of this is to raise it to secure proper lift.

The wing and elevator are held in place with rubber bands. To use these for fastening the wing the rubber bands are placed under the



long sticks of the frame and the loops each side of the stick are held open above the stick while the wing is slipped underneath. It is carefully centered and lined up true. The elevator is fastened in a similar manner, but the rubber band is looped under the two sticks, as they are so close together near the point. The model is now ready to be flown.

## Flying the Model

Model airplane "S-S-1" is now ready to fly.

If you have carried out carefully the directions given in the previous articles, you will find that the model is capable of flying at least 500 feet, probably more.

Select a large field for trying it out. The field should be free of trees or other obstructions, and should be level. Preferably the ground should be covered with long grass to cushion the landings. It is suggested that the wings be removed from the model while carrying it from your home to the field to prevent damage to it.

The winding of the model is somewhat of a long job, inasmuch as about 600 turns are to be stored in each set of rubbers, therefore if you have a geared hand drill make a hook with a straight shank, fit it in the drill chuck, and take this tool along with you to the field for winding. When you get to the field, get away from any bordering trees and prepare to fly the model with the

(Just turn the page)

## Unique Mound Exhibit

A private museum of Indian remains in which the exhibits were arranged by the ancient mound builders themselves, is the unique possession of Don F. Dickson of Lewistown, Ill.

Some time ago Mr. Dickson began excavations on an Indian mound on his father's farm near here. He found a large number of skeletons, including several of infants, together with a great quantity of utensils, tools and weapons of stone, bone and pottery. Instead of removing his finds and placing them in glass cases, he left them exactly as they had been placed centuries ago by the Indians, removing the last traces of dirt with a teaspoon and a fine brush. He has erected a temporary shelter over his excavation, with a walk and a railing inside, so that visitors can inspect the evidences of an ancient American culture under conditions that are usually possible only to archaeologists.

One of the most tragically appealing burial groups consists of the skeletons of a man and a woman, lying very close together, with the bones of a baby between them. Around them are their implements and weapons, and the food-pots that contained provisions for the last long journey of the little family.

Prof. W. K. Moorehead of Phillips Academy, Andover, Mass., who has been conducting extensive mound explorations in southern Illinois, has inspected Mr. Dickson's work, and reports that he is much impressed with the discoveries. He is now endeavoring to raise funds for the investigation of similar mounds in the neighborhood, and possibly also to give the unique exhibit already prepared a permanent housing.

Prof. Moorehead states that the only thing of this kind elsewhere in the world is a housed-over excavation at Mentone, France, showing the culture of the Stone Age in Europe. Even this famous exhibit, however, does not match Mr. Dickson's in point of size, for it contains only eight burials, as against more than forty in the American mound.

Science News-Letter, August 27, 1927

The cardinal principle of science is that we know nothing until we can find it out. There is no authority that can give answers in advance to any question of fact.

—David Starr Jordan.

Science News-Letter, August 27, 1927

## News-Letter Features

Born over four years ago of the demand and interest of those individuals who had caught a glimpse of *Science Service's* news reports to newspapers, the SCIENCE NEWS-LETTER has since proved interesting to laymen, scientists, students, teachers and children.

Into the pages of the NEWS-LETTER are fed the cream of *Science Service's* output directed at the newspapers of the world. To this is added material especially prepared.

Turn the pages and note:

It is a *separable magazine*. You can clip or tear out any article without losing or damaging another article on the other side.

Each article is automatically *indexed* by the key word printed above its heading. Articles can thus be filed easily into any system of classification.

Each article is automatically *dated* by its last line.

The current *news* of science, reported for *Science Service* by its own staff and correspondents throughout the world is presented and commented upon in each issue.

Books are *reviewed in brief* as they are received from the publishers.

*The classics of science* and striking passages from current books, addresses and periodicals are carefully selected and published.

Important *anniversaries* of science are appropriately noted week by week in a special department.

Regular articles tell of the happenings in the *skies* and in the *great outdoors*.

*Photographs* aid in the telling of the week's science.

Great care is taken to keep its editorial content not only *interesting* but *accurate* as to fact and implication.

The *Science News-Letter* is *copyrighted* and is sold with the understanding that it is for *personal, school, club or library use only*. Publication of any portion is strictly prohibited.

A shortage of good work horses and mules is predicted.

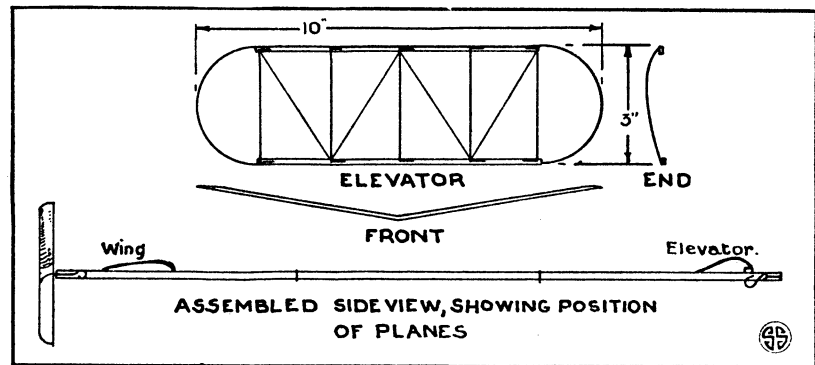
The American antelope is the only hollow-horned animal that sheds its horns every year.

The oldest known record of a naval battle is on the wall of an Egyptian temple, at ancient Thebes.

The Hawaiian Islands are tops of mountains that stand 30,000 feet from the floor of the Pacific.

## Building and Flying Model Airplanes

(Continued from page 133)



wind; therefore go to the edge of the field from which the wind is blowing.

Assemble the model in the manner explained, and launch it for several preliminary glides before winding it in order to balance it. If the model dives down too rapidly, move the elevator slightly forward and try another glide. If the model climbs and stalls too much, move the elevator back or cut a thin slice off the elevator block. The large wing may also be moved correspondingly forward or backward to balance the model. Continue adjustments until the model glides forward nicely. If you are not equipped with a geared winder such as a hand drill, wind each propeller 600 times, by turning it with your finger, rotating the left hand one in the direction the clock goes, and the right hand one the other way. If you have a winder allow a friend to hold the propellers and support the model horizontally while you go to the nose of the model, unhook the "S" hook from the nose hook and by placing it on the winder hook wind the rubber. Do this enough to store 600 turns in the rubbers, taking into account the geared advantage of the winder, and making sure that you are causing the propellers to turn in their proper directions.

When the propellers are wound, face the wind, hold the model over the head with a hand on each propeller, and thrust the model forward, in the same manner as is illustrated in the drawing. The model is designed to fly with the small wing in front. If the model dives or climbs too rapidly make the same adjustments as for the glides. If it turns, slide the wing sideways. If the model is properly adjusted it will climb rapidly to get altitude, then turn a half circle and fly with the wind.

If the model does not fly satisfac-

torily after all of the foregoing has been observed, two faults may be holding it down; either it is too heavy or it is underpowered. The only way to correct overweight is to go over the model carefully, eliminating every extra bit of weight. If the model is underpowered, it should be wound more before launching, or more rubber must be used, or the rubber now on the model must be strung tighter and formed into more strands.

The rubbers should be capable of standing 1,000 revolutions. This will insure a long flight. It would not be wise to turn 8 strands of rubber more than 1,000 turns, but if the model is lightly made, it may fly with seven strands, and these may be turned up more than the thicker bunch. Experiment with your model to get the greatest duration and distance. By doing so you will learn that when a model is light it will fly with less rubber than a heavy one. Less rubber may be turned up for more revolutions. Thus lightness works two ways to make long flights.

If you have not had a hand drill for winding the model you will have found that winding by hand occupies quite some time. Any sport can be improved by reducing the irksome work and using the time saved for more enjoyment.

Therefore in the next article directions will be given for making a geared winder which will be an improvement over hand methods and even be more efficient than the drill, because it will wind both motors at the same time. It will be made out of an egg beater, so procure one on your way home from the flying field. Get one which has the beater shafts well secured in the frame, and preferably has the big driving gear running between the two smaller gears.