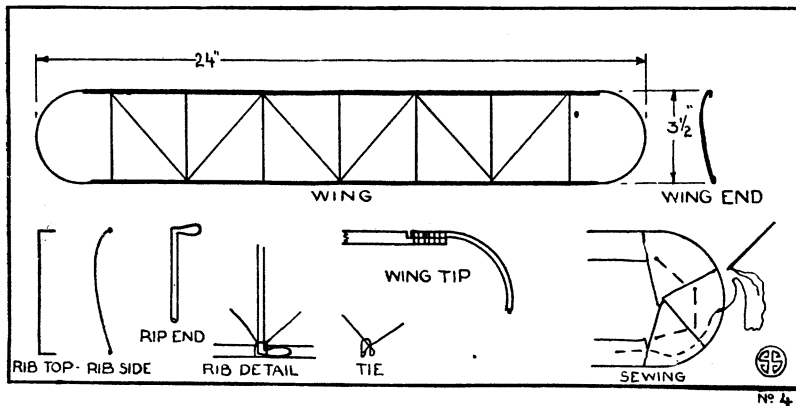


Building and Flying Model Airplanes

Ruins May Bridge Gap



Making the Wings

This is the third 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.

Now that our model airplane has its frame, propeller and rubber motor, it must be fitted with wings.

Inasmuch as the wing supports most of the weight of the model when in flight, it should be made to embody the utmost efficiency; it should be light and strong, and must be made true so that the model will fly straight.

The following materials are required:

2 pin sticks, 21"x1/8"x1/16"; 36 inches of No. 16 aluminum wire; 1/4 yard china silk or thin paper; thread, needle and pins; glue and wing solution.

To commence construction, smooth the two sticks with sandpaper, and find the center of each. Make marks outward from the center three inches apart, and cut a slight recess in the end of each stick as shown in the detail drawing marked "wing tip."

Next take the wire which should be No. 16 aluminum, but if this cannot be obtained other light wire slightly smaller in diameter than a pencil lead will do. From the wire cut seven pieces, 4 inches long for the ribs. Cut the remainder in half and from each piece form two semicircles, with extended ends. The radius of the semicircles is to be 1 3/4". These are the wing tips.

Take each rib, and bend the ends at right angles, for a distance of 1/4 of an inch as shown in the detail drawing, "rib top." Each of the ribs thus formed is to be again bent into a curved shape as shown in the detail drawing, "rib side." It will be noticed that this curve is somewhat like a parabola. It is the correct shape for securing lift from the wing. These must all be alike. The end of each rib is to be slightly

flattened as shown in the detail drawing "rib end," to facilitate binding it to the sticks. This flattening can be easily done by holding the rib on a piece of iron and hitting the tip with a hammer.

The next step is to bind each rib onto the sticks at the points marked. The greatest curve of the rib must be in front. When this ladder-like frame is completed it should be strengthened against lateral play by running a thread diagonally from rib to rib as shown in the plan drawing of the wing. The detail drawings "rib detail" and "tie" illustrate how the thread is tied about each rib and carried on to the next. While making these ties be sure that each thread is tight and that the ribs are kept at right angles with the sticks. The next move consists in tying on the wing tips. This is done as shown in the detail drawing "wing tips."

This completes the frame. It must next be covered. This can be done with either silk or paper. If the latter is used a piece slightly larger over all than the frame is secured. The center sections of the frame are covered with glue and the paper applied, making sure that it is drawn tightly leaving no wrinkles. Each succeeding frame is covered and when the tips are reached the paper is folded over them and trimmed with a slight margin, which is glued to the under surface near the tip wire. The tendency in stretching the paper should be to pull it laterally rather than from edge to edge, so as to preserve the curve of the wing.

If silk is used it is applied in the same way, but the ends can be made neater if they are sewed as in the detail drawing "sewing," which shows the cloth at the end folded over and pinned, after which a plain stitch is taken close to the wire, and finally the excess cloth is cut off.

(Just turn the page)

Important prehispanic ruins in northern Mexico, of a civilization that bridges the gap between the Pueblo culture in the southwestern United States and that of the more advanced culture of the Aztecs and Mayas in southern Mexico, have recently been inspected and studied by Dr. Eduardo Noguera, of the Department of Archæology of the Mexican Department of Education.

The ruins are of a fortified city on the crest of a hill about 35 miles southeast of Zacatecas, the capital of the state of that name. The locality was apparently chosen for defense, Dr. Noguera says, and suggests that the prehistoric town was surrounded by enemy tribes. The hill is about 500 feet high and over 3000 feet long at its greatest point, and where it is not naturally defended by steep cliffs it is surrounded by stone walls which are double in some places.

The hill is a series of five terraces, and each terrace has its groups of buildings. The approach is guarded by a small pyramid and from there an avenue leads uphill to the first terrace. Minor avenues lead to other parts of the hill and to other edifices.

On the first terrace is a great "salon" about 130 by 100 feet. It is surrounded by a wall, and within are 11 pillars constructed of stone. They are at irregular distances from each other but are placed at regular distances from the walls. Their purpose is a mystery. Even in their ruined state the highest of them are over 17 feet.

This salon leads to another many times larger and also surrounded by walls which open at the east end and give access to a small pyramid. A third pyramid on the same terrace is of a peculiar structure in that its top is not truncated as in the case of all other known pyramids of the Mexican Indians. It is about 50 feet high and 35 feet at each base line.

A fourth pyramid of this ancient Indian city has a series of rooms of different sizes built into one of its sides. Although this structure is in a very bad state of ruin, the material that remains gives an idea of what it was in its heyday.

The best preserved edifice of all is another pyramid in an adjoining quadrangle. It is 33 feet high and has a series of rooms or living quarters.

The material out of which this city of pyramids is built is yellowish gray porphyry coming from the geological formations of the hill on which the

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city stands and others in the vicinity. The stone fractures easily and the building blocks are of uneven sizes, but none over six or eight inches long. The mortar used is of red lime mixed with straw.

The ruins have been known for over twenty years but they have been neglected by scientists, both American and Mexican, mainly because the large number of Maya and Aztec remains in other parts of Mexico have detracted from others by their greater artistic aspects. But from a scientific standpoint these ruins are of the greatest importance, Dr. Noguera says, and will open a new horizon in American Indian archaeology. So far no excavations have been made in search of pottery and implements which will give a picture of the lives of this unknown race of pyramid builders.

Science News-Letter, August 20, 1927

In some old Greek cities it was customary to sacrifice 100 oxen to the gods when a citizen discovered a new theorem in geometry.

The tunnel being built through the Cascade Range in Washington State will be 7.78 miles long and will pass 2,000 feet under the mountains.

BINDER COVERS FOR SCIENCE NEWS-LETTER

Many subscribers have expressed a desire for a convenient binder in which to file their copies of the Science News-Letter. We therefore have prepared an attractive and durable loose-leaf binder-cover of gray leather-like stock, printed in dark green and complete with fasteners. Each binder-cover will hold one volume (six months or 26 issues).

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Airplanes

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Cloth must be painted with some solution to make it air tight. The solution may be collodion, which is sold at drug stores, or it may be a solution composed of celluloid dissolved in banana oil. A piece of celluloid can usually be found about the house in the form of an old comb or brush back, tray, etc. Banana oil is sold at paint and art stores. Celluloid is put in the oil until no more can be dissolved, after which the solution is ready to be applied. It should be brushed on thinly. If the constructor has access to a flying field he could procure some regular airplane wing solution, known familiarly as "dope." This makes an ideal model wing solution, especially if thinned with acetone, a drug store product.

After covering, the wing should be laid on a flat surface, to insure its remaining true while the rest of the model is completed.

Next week we will take up the construction of the elevator or smaller wing, after which the model will be finished and ready for flying.

Science News-Letter, August 20, 1927

If one pair of English sparrows increased without hindrance for 10 years, it would have over 275 billion descendants.

A traveling tank built into a motor truck is used to transport young fish comfortably from hatcheries to streams, in Idaho.

The skull of a child who lived in Peru 500 years ago shows signs of rickets, indicating this childhood disease is not a recent plague.

Some of the horses brought to this country by the Spanish explorers escaped and started growing herds of wild horses in the United States.

The Grand Canyon of the Colorado River is America's outstanding example of the enormous power of rushing water to wear away the land.

Government economists are studying clothing worn by children to determine the most efficient ways of cutting materials and the most healthy clothing standards.

One scientist has described the defensive odor of the skunk as comparable to a mixture of perfume musk, essence of garlic, burning sulphur, and sewer gas, intensified 1,000 times.

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.

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

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Early blooming, hardy chrysanthemums that can be grown in northern gardens are being sought by government tests.

Ginseng grown in Manchuria was once reserved as a rare and potent medicine for the exclusive use of the imperial household in China.

Ivory is properly the material of the elephant's tusks, but some rhinoceros horns and hippopotamus teeth find their way into the ivory market.