A GOLDEN-OLDIE COVERING THAT'S TOO GOOD TO GO AWAY

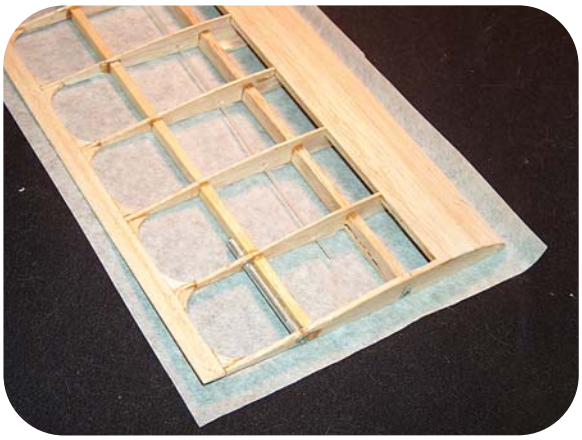
Secrets of SILK

by R.A. Benjamin

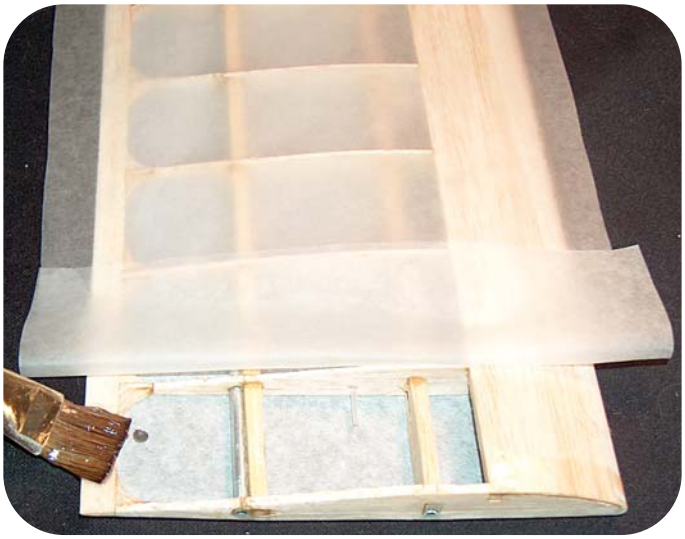
SILKSPAN IS A unique variety of tissue paper made from carefully selected plant fiber. It's the stuff from which teabags are made. At roughly the time World War II was fought, model builders got their hands on some of this material and discovered that it made an excellent covering for their airplanes.

I'm uncertain who came up with the term "silkspan," which is marketed under the name Modelspan, among others. But as the name implies, the material is closer in durability to silk—the gold standard of model airplane coverings—than the finer-grained, more delicate papers that aeromodelers have always called "Japanese tissue."

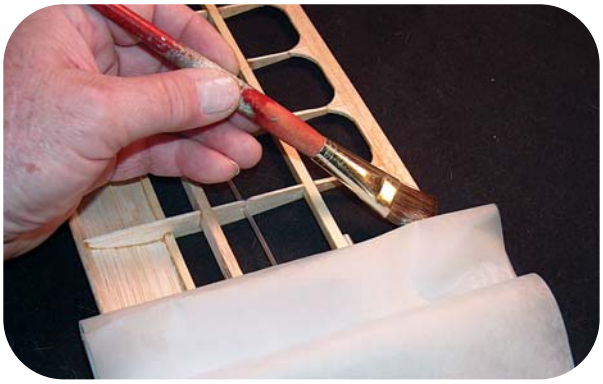
Left: Tools of the trade. Along with the Comet Aeronca Chief fuselage ready for covering is a big jar of nontautening clear nitrate dope and brush, a water spray bottle, a sheet of silkspan, and an aileron that the author has already covered.



Above: The inboard end of the left wing rests on the sheet of silkspan that has been cut to size to form the bottom surface covering. Leave at least this amount of extra material around the edges with which to work.

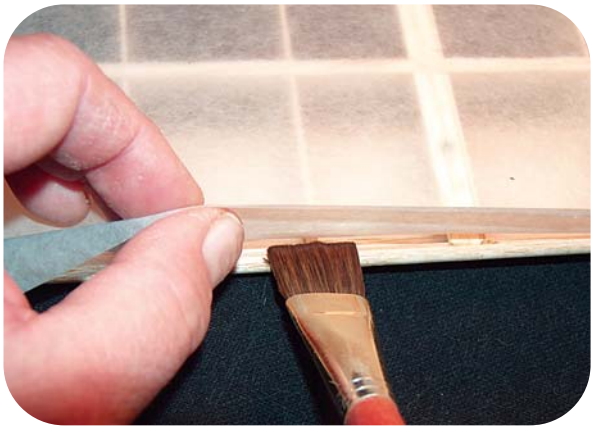


Above right: This is the top surface, but that's okay. The sheet of covering has been water-sprayed, laid smoothly in place over the wing panel, and then folded back to allow the author to dope the first section of the structure to which he wants the silkspan to adhere. It's usually best to begin at the wing root, as shown.

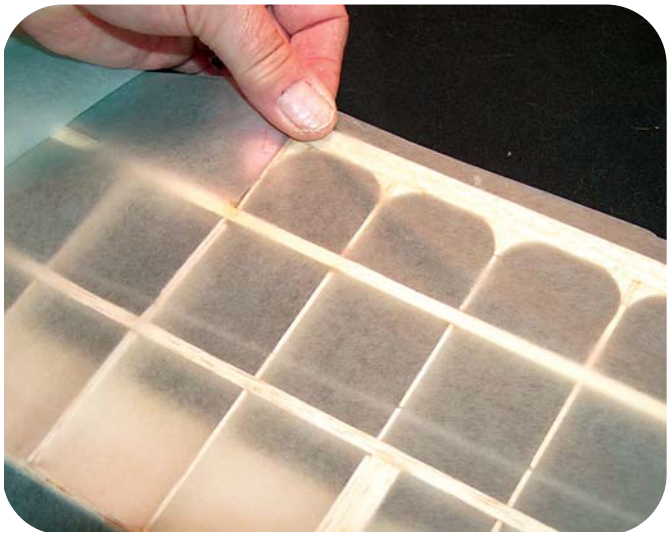


Above: Fold the loose section of covering out of the way, and dope the edges of the structure partway along the span.

Left: The damp silkspan has been laid in position, and the author presses, pats, and gently stretches the material to get it flat and smooth.



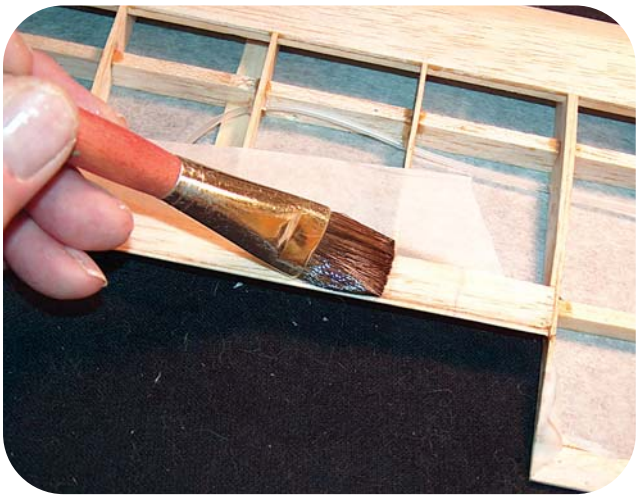
Above: The process doesn't always work the first time. Lift any edges that don't stick, add more clear dope, and then press and pull some more.



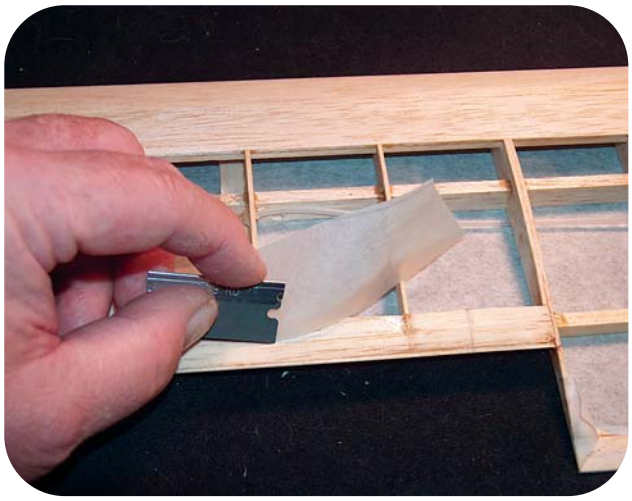
Left: Learning to press and pull with your thumb and forefinger is one of the key skills to working with silkspan. Dope, stretch, press, and pull some more, the rest of the way out to the wingtip.

Photos by the author

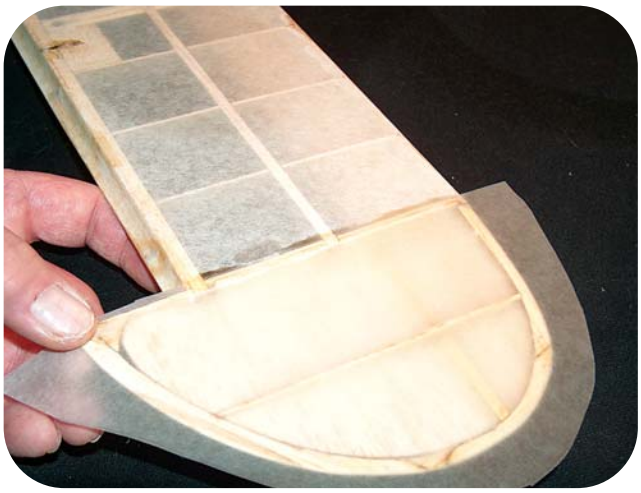
Where the covering goes around a sharp curve, you can slit the edges into a fringe. The dope will hold each little section in place more easily.



This is the beginning of a double overlap. Never pass up the opportunity to use that method; leaving open balsa edges throws away potential structural strength and makes finishing more difficult.



It's easy to use a sharp blade to trim overhang on a flat surface such as this. Practice will teach you to make a single, clean cut through the covering without slicing into the wood.



When a structure section such as this wingtip lies in a plane of its own, it might be easier to cover it as a separate piece. The silkspan has been cut to size, dampened, and set in place, with dope only on the rib at the top. A well-trained thumb is a big help.

For the little 1- or 2-foot-wingspan stick-and-tissue rubber-powered models that were built in WW II times, Japanese tissue was the best choice. It was usually included with any kit you might be lucky enough to get.

For models spanning 3-4 feet or more, the extra strength that silkspan provided made it a better choice than Japanese tissue. Real silk was best for huge models, especially FF or CL gas-powered aircraft, but it cost four to five times as much as silkspan and demanded that you use more dope to seal it and build a good finish.

In the mid-1950s, when I became aware of silkspan, a 2 x 3-foot sheet cost 15¢-25¢ at a hobby shop, depending on the weight grade/thickness you wanted. It was good stuff.

From the end of the war through the 1960s, almost any medium-size model kit you could find had one or more sheets of silkspan tucked in with the various sheets of balsa or rolled up with the plans. You couldn't call yourself a model builder if you couldn't use silkspan.

It's still good, but these days hobby shops (both walk-in and mail order) offer an impressive range of iron-on products that are designed to seal balsa surfaces, cover "open" structures such as wings, and put a color finish on your aircraft at once.

There's no shortage of well-meaning experts who will assure you that products such as silkspan are *too hard* to bother with anymore. And it's no surprise that good ol' plain silkspan can get lost in the glitter of all those guaranteed-to-be-shiny colors.

These one-step covering materials fall into several categories

See the Rest of the Build *Online!*

We only had room to show you step-by-step pictures of the wing. You can see R.A. Benjamin's techniques for covering the fuselage and tail sections on the *Model Aviation* Online site, in the Exclusive Online Features section. **MA**

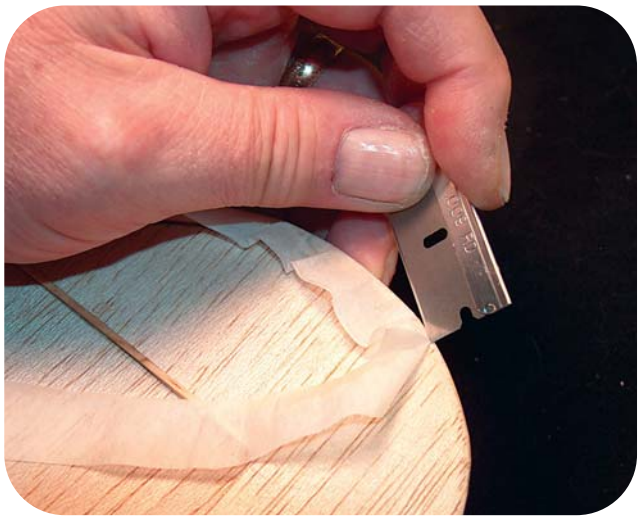
—MA *Staff*

Sources:

Model Aviation Online
www.modelaircraft.org/mag

Fold the loose covering back, and dope the remaining edges.

This is the back side (top surface) of the wingtip. Get plenty of fresh dope on the places where the silkspan is going to stick.



You can trim the silkspan along the back side of a curved surface, such as a wingtip, using a sharp blade and a delicate touch. Don't cut the wood!

including Mylar film, polyester film, and synthetic fabric, and all of them transform a series of tasks—that had to be completed before you could fly your model—into one operation.

What's wrong with that? Maybe nothing, depending on what you want.

All iron-on coverings are quick to apply, relatively light, and strong enough to stand up to plenty of real-world use. But all are susceptible to sagging, wrinkling, and seam slippage in time.

It's almost impossible to hide the seams and just about as hard to get paint of any kind to stick reliably to iron-on covering. There is no good way to cover concave surfaces such as wing-root fillets with the material, and no matter what you do it looks like exactly what it is: high-tech plastic wrap.

It's similar to comparing a durable formed-plastic table and a hand-crafted hardwood desktop. Both do their intended jobs well, but each conveys a different message.

If I have your interest, read on. I will take you through an introductory course in learning the secrets of silkspan. I am presenting the lesson as a photo essay.

I'm using a real vintage design as the subject. During the late 1940s

What Is Dope?

It's a paint product, similar to lacquer, that for a long time was the only practical sealer and finish base for fabric-covered full-scale and model airplanes. Many alternatives have appeared on the market in recent years, but there are still some things that dope does best, one of which is to use with various paper-based materials to cover model aircraft.

As far as we are concerned, there are two kinds of dope: cellulose acetate butyrate and cellulose nitrate. "Butyrate" is the kind aeromodelers have used for decades, because it is fuelproof (resistant to the alcohol in glow engine fuel).

"Nitrate" dope was around first, but it fell out of favor in aeromodeling because glow fuel turns it into a gooey mess. The problem is that butyrate doesn't dry as soon as you might think, and delayed shrinkage can distort model structures months after finishing.

Moreover, nothing much sticks well to butyrate dope except more butyrate dope, which limits your options.

Nitrate dope appears to dry after several hours or fewer, and it really does. A nitrate dope base is stable and won't sneak up later and warp your wings.

You can also use *nontautening* nitrate dope, which won't shrink a covering any tighter than it was when you put it on the structure.

Almost any other kind of paint product you can think of sticks to nitrate dope. You can finish over it with more nitrate, butyrate, enamel, epoxy, acrylic, or whatever else you might want to experiment with.

If you are using electric power, the fuel issue goes away. It's good to remember, though, that the *truly* fuelproof finishes, such as epoxy and urethanes, stick to a nitrate dope base *way* better than they do to butyrate. MA

—R.A. Benjamin

and all through the 1950s, the 54-inch-span Comet Aeronca Chief was available as a classic rubber-powered FF stick-and-tissue printwood kit.

"Printwood" meant that all parts, such as wing ribs and fuselage formers, were cut to a pattern printed in black ink on sheets of the requisite thickness of balsa. You cut out each part in turn with a razor blade or one of those pointy model knives, if you could afford it back then. Whether the parts would fit or not was up to you.

If you can find an original printwood kit today, you will probably have to pay a collector price for it. I used a replica laser-cut short kit with an exact copy of the old plans from Tom Martin Radio Control.

I did extensive modifications to turn the Chief into an electric-powered RC model. I added ailerons, spars, fuselage stringers, and scale dihedral, along with many details, but my Comet Aeronca is still a nearly perfect example of the art of covering with silkspan.

We are ready to cover the airplane, but there are a few things that need to be checked one more time before we begin cutting those nice white sheets of silkspan into working-sized pieces.

All structural work must be complete. All power and control-system components must be in place and tested. You can remove some or all of the equipment while covering and doping, but *after* you have done a beautiful job of finishing the fuselage is not the time to discover that you can't get the elevator pushrod supports in place without cutting a hole in something.

Various trim bits such as air intakes, wing fairings, etc. might be designed for mounting after covering. You'll know it when that happens.

Sand everything again. Every rough spot, glue lump, or carelessly rounded edge *will* show through the finished silkspan. Get those things right while you have the chance.

Dope the entire structure. Get at least one wet coat of whichever variety of clear dope you are using onto every structural surface you can reach. This helps seal out moisture and will impart a bit of resiliency to the airframe, while sealing the wood so that the dope you use as a covering adhesive won't be soaked up too quickly.

Sand every bit of structure that will come in contact with the covering with 320-grit or finer abrasive paper. This will help prevent snagging and tearing the silkspan as you cover. It wouldn't hurt to give those contacting surfaces another coat of clear dope and another careful sanding.

Now you are ready. You will find each step of the process illustrated in photographs, with relevant instructions in the captions. MA

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Sources:

Tom Martin Radio Control
(816) 331-8807
www.tmrcsailplanes.com

Bob Benjamin's Web site:
www.rcmodel.com