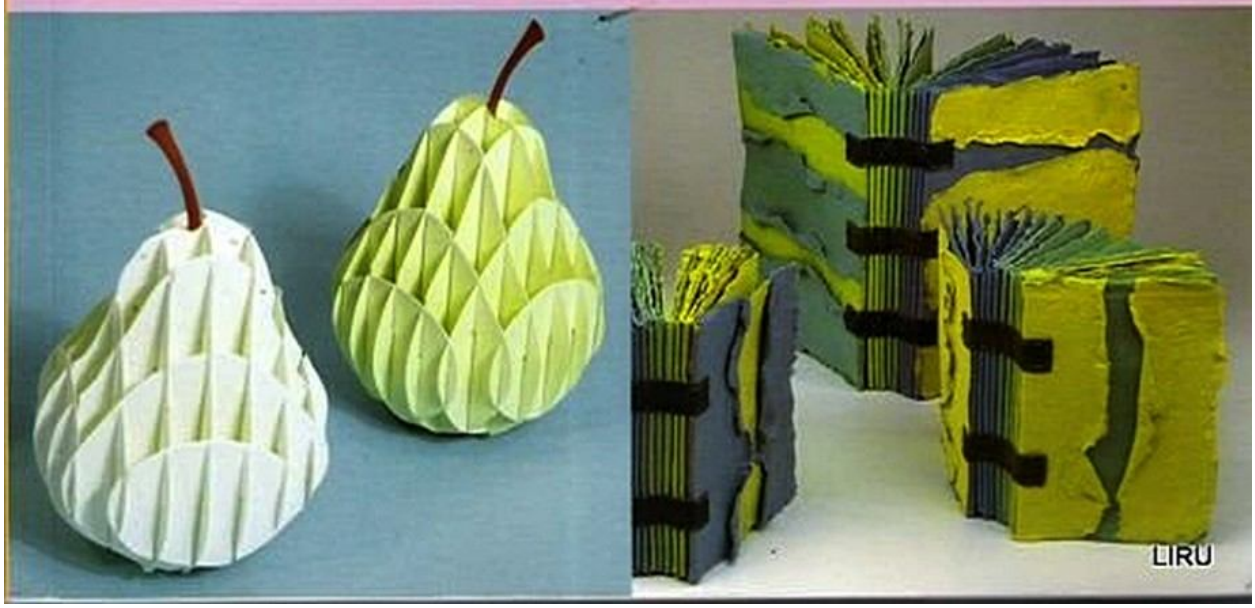
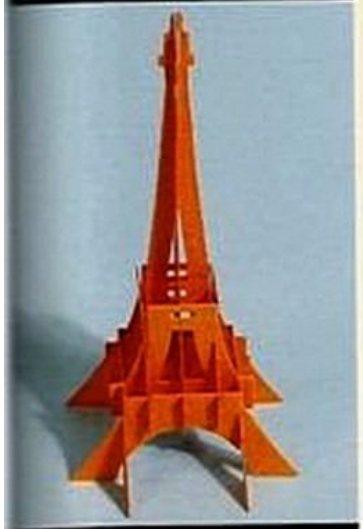
PAPER
in three dimensions

Origami, Pop-ups, Sculpture, Baskets, Boxes, and More

DIANE MAURER-MATHISON





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LIRU

Diamond-Fold Designs

BY MAKING JUST THREE simple folds in a paper square you can create the versatile diamond fold, a nifty little structure on its own or combined in multiples.

To make a diamond fold, begin with a square paper and make a horizontal valley fold followed by a vertical valley fold. Then open the paper, flip it over and make a diagonal valley fold. Flip the paper again and push in the center, bringing two points together to create its dimensional shape.

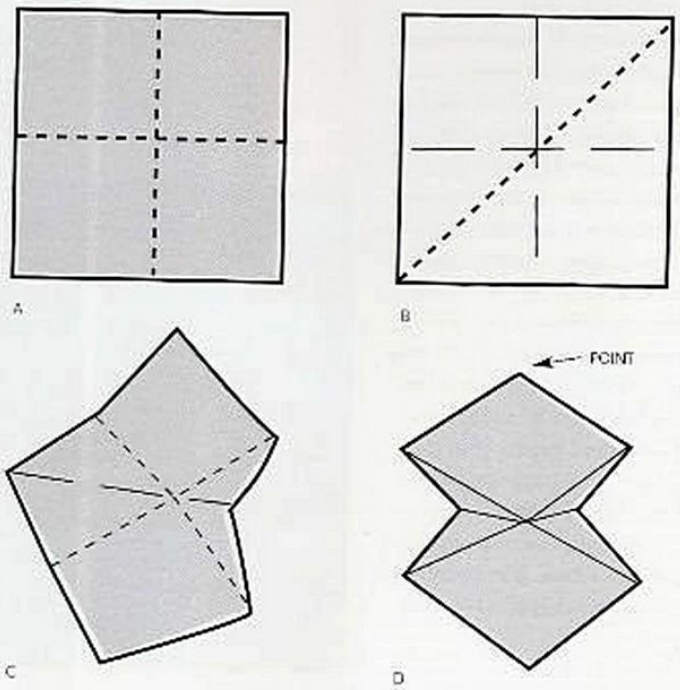
Multiples of a diamond fold can be joined to create a structure called a star card ornament. The same structures, if attached differently, can be assembled to create an origami caterpillar book.

STAR CARD ORNAMENT

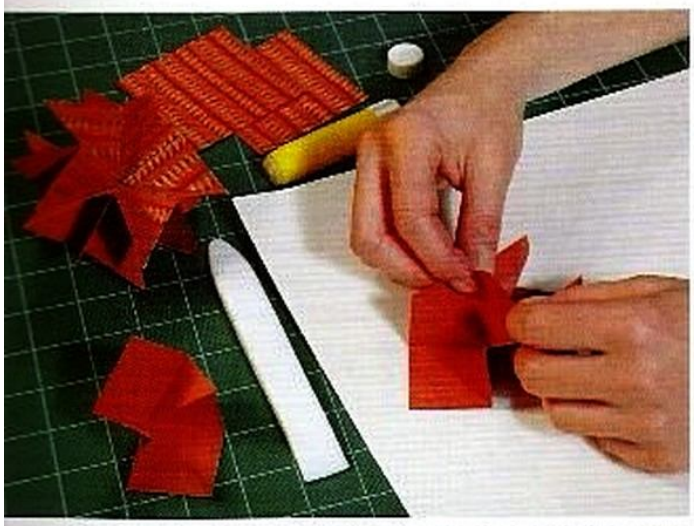
Lay out five individual pieces (each facing up), align their points, and use a dry adhesive to glue them together. There are two ways to hang the ornament. Holes can be punched in the first and last points and ribbon can be strung through the holes, or ribbon can be sandwiched between the first and last points and hard covers made for the card. Variations on the technique, such as those shown in the charming leaf-printed card by Lynne Carnes (opposite, top right), can be made by cutting the folded elements into interesting shapes before assembling them.

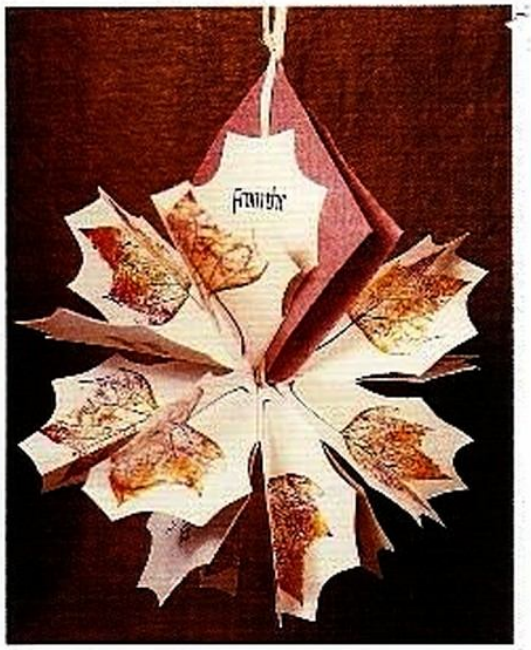
ORIGAMI CATERPILLAR BOOK

Elements for the caterpillar book are created in the same way as for the ornament, but the book is assembled by aligning the elements so that the point of one structure is slipped into the center of another. The two surfaces are then adhered together to create the book.



The diamond fold starts with a square of paper. Make two horizontal valley folds—one in each direction (A). Open the paper up, flip it over, and make a diagonal valley fold (B). Open the paper again, flip it again, and push in the center to collapse and finish the structure (C and D).





ABOVE Adhering the folded elements, points up, to create a star card ornament
RIGHT Lynne Carnes created this leaf-printed structure by cutting the edges of the folded elements to mimic the leaf outline before assembly.

To create a caterpillar book, adhere the folded elements with one point up and one down. The book and elements (with added tiny maze card, see next page) are by Fred B. Mullett.

DIAMOND-FOLD MAZE BOOK

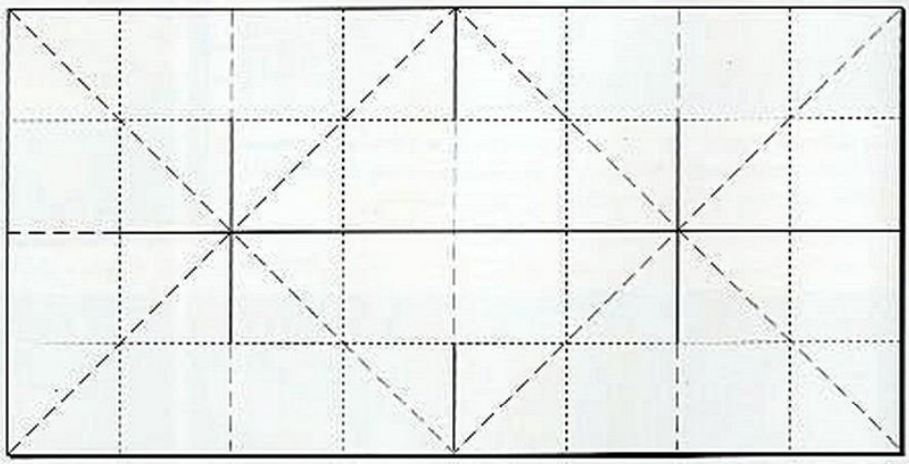
Artist Mary Howe sent me a diagram for a maze book (also known as an *origami book*) that contains a diamond fold similar to the element used in the caterpillar book. The diamond folds in this book, however, are not created individually and then glued together; they remain attached to one another from the start. The book is created by folding a single sheet of paper and then cutting parts of the folds to open the sheet up. The sample shown was made from a piece of paper that measured 8 1/2 × 17 inches. Follow the diagram to form the appropriate mountain and valley folds. (Mary notes that it doesn't matter which you do first as long as you pay attention to which type of fold you are doing.) Cut the slits that open the paper after the folding is done, and then manipulate the diamond-shaped areas to form the a-maze-ing book.

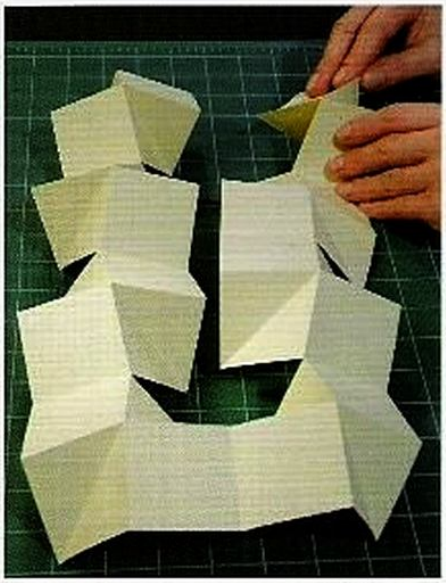
Follow the diagram and make the mountain and valley folds before cutting the slits and manipulating the diamond folds to create the book.

CUT

MOUNTAIN FOLD

VALLEY FOLD





A diamond-fold maze book model reopened to show how the paper looks after folds and slits are made.

HAPPY BIRTHDAY, A DIAMOND-FOLD MAZE OR ORIGAMI BOOK BY MARY HOWE
PHOTO BY KEN WOISARD

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Folded Exploding Cards

EXPLODING CARDS or invitations that pop out when you open them, combine origami and pop-up techniques. They are easy to make, by creating a diamond fold and adhering it, point up, to a piece of folded cardstock or to hard covers. Tuck confetti inside the card to add to the fun of opening it.

SIMPLE EXPLODING CARD

Begin folding a square of paper with the message side up (or create your message later). Make a horizontal valley fold and a vertical valley fold. Then flip the paper over and create a diagonal valley fold as shown on page 46. Push on the center of the fold to pop it into shape. Then adhere it to its backing with a dry adhesive.

ANOTHER IDEA

Multiples of the design, in graduated sizes, nested inside one another look exciting exploding from the interior of a book when its pages are opened. Just be sure that the center point of the explosion paper is flush with the spine of the book before you adhere the *unfolded* pages to two adjoining book pages. Once again, using a dry adhesive will give you best results.

A single diamond fold adhered to hinged bookboard makes a great pop-up party invitation. This invitation is by Jennifer Philippoff.

CREATING AN ORIGAMI BOWL AND LID

WHAT YOU'LL NEED

FOR THE BOWL

Decorative text weight paper for bowl
Metal edged ruler
Pencil
X-Acto knife

FOR THE LID

Bone folder
Backboard
Decorative paper
Mat knife
Ruler
Scrap paper
Square
White glue and glue brush

Debra Glanz has taken another traditional origami structure, the origami bowl, and with the addition of a fanciful tiered rigid top has transformed it into a charming lidded vessel. The owner of a paper company called Reminiscence Papers, she designs and markers her own patterned papers, which enhance the structures she creates—a marriage of paper folding and bookbinding techniques. When Debra combines several bowls in graduated sizes she creates sculptural towers (page 61). Debra's instructions for creating an origami bowl are below.

1 Dividing your paper into thirds

Begin with a sheet of decorative paper with a text weight of 20 to 32 pounds. Later, you can work with cardstock for more durable bowls. Cut your sheet of paper at a ratio of 2:3 (for example, 4 × 6 inches or 6 × 9 inches). On the right side of your paper make two small pencil marks along the longest edge, dividing your paper into thirds (A).

2 Folding along the thirds lines

Bring one short edge of your paper over to meet the pencil mark furthest from it (B). Crease. Open that fold (C) and repeat from the opposite side (D), leaving this side folded.

3 Folding the outer thirds in half

Bring the cut edge of the recently folded section back out to the folded edge (E). Crease. Repeat with the opposite side (F). At this point your paper has three layers. You will be looking at the right or decorated side of the paper.

The bowl with lid removed.

LIRU

4 Folding the first four corners

Open one of your folded sides over the other (G). Bring the two cut corners down to meet the center fold line (H). Crease. Do the same with the two folded corners (I). (Depending on the weight of your paper, these may be a bit stiffer to fold.)

5 Folding the remaining corners

Return the cut edge to the outer folded edge leaving all four folded corners tucked inside. You'll see the right side of the paper again (J). Open the other folded side over the side with the tucked corners (K). Repeat steps 4 and 5 to fold down all four corners and return the cut edge to the folded one (L, M, & N).

6 Opening the bowl

Finally, grasp the center of each of the inside folds. Gently pull up and out, being careful not to pull too hard and cause the layers at the points to separate. Keep pulling these folds until they nearly lie flat. "Squash" and crease the unit, making two new points (O).

7 Shaping the bowl

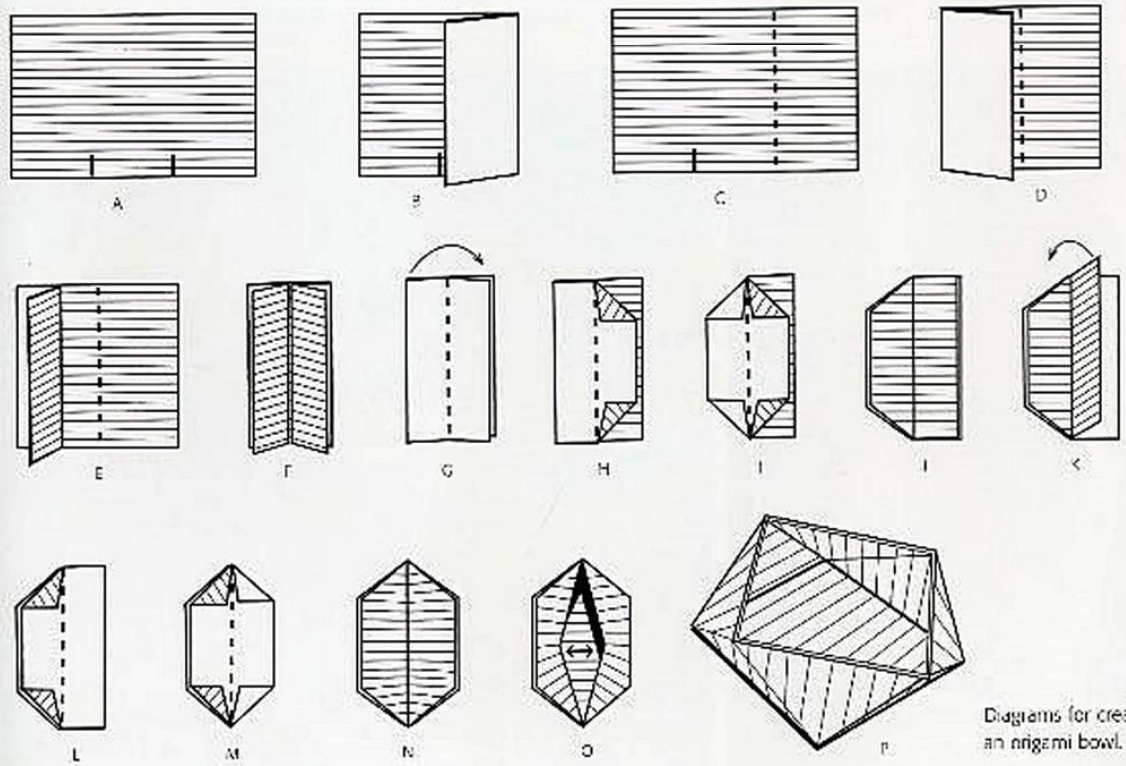
From the outside, gently squeeze the two points of this unit allowing it to pop into a bowl shape (P). You may help this step along by prodding and pulling where necessary.

DECORATIVE LID

You can easily create a lid to fit any size origami bowl using the same techniques you used to create the accordion-fold book covers.

1 Constructing the lid

Measure the bottom of your origami bowl and then transfer the measurements to a piece of bookboard or heavy matboard. Make sure that the grain of your board runs vertically. Use a mat knife and a ruler or a heavy-duty paper cutter to cut out two boards to make the two-part cover for your



Diagrams for creating an origami bowl.

bowl. One board should be 1 inch wider and longer than the base of the bowl, or 4 inches square for a bowl with a 3-inch square base. The second piece of board should be cut 1/8-inch smaller all around than the bowl base, corresponding to the bowl's opening. (When they are eventually glued together, the smaller board will rest inside the bowl to keep the lid in place.)

2 Finessing your work

Check to be sure that the corners are cut at right angles and that edges are straight. If the cutting has left ragged edges on your board, lightly sand them.

TIP

Although matching grain direction may not be essential for working with tiny bowl lids, larger ones may warp if grain direction is not matched.

3 Preparing the cover papers

Check for grain direction on the text weight decorative paper you've chosen to cover the bookboard. Arrange it on your worktable so that the grain matches your bookboard and then cut two pieces, each 1 inch wider and longer than the bowl covers. This will allow for a 1/2-inch border around each cover board.

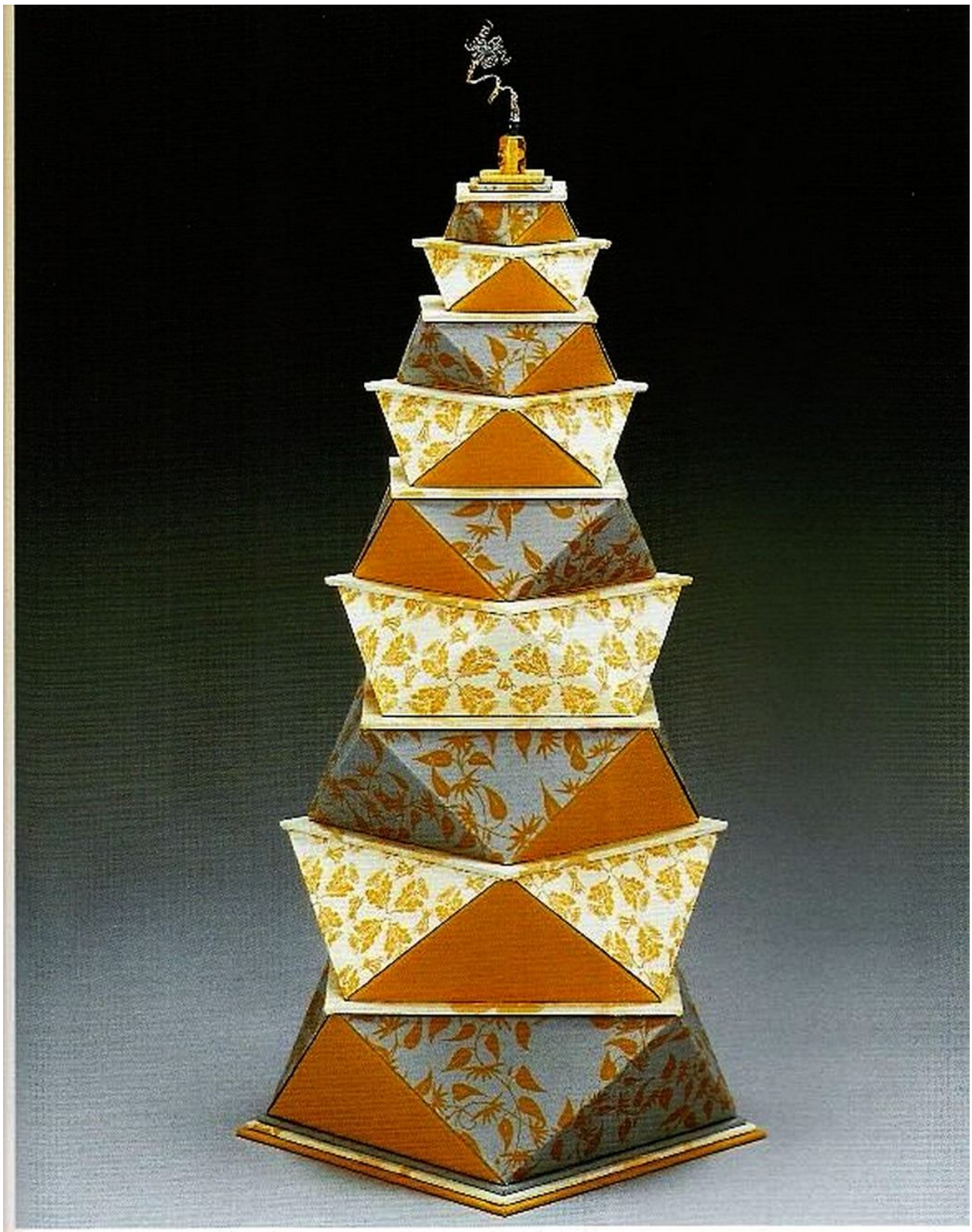
Cover each piece of bookboard following the directions of page 42. When both boards are covered, glue them together with the wrong side of the smaller paper-covered board centered on the wrong side of the larger one and place under a heavy weight until the glue is dry.

ANOTHER IDEA

If you want to stitch buttons, beads, or a tassel to decorate the bowl lid, punch stitching holes with an awl and hide the stitching material between the lid liner and the bowl cover before they are glued together. Additional thinner boards in graduated sizes could also be added to decorate the bowl lid, or beads could be glued in place with jeweler's cement. A platform can also be created for the origami bowl by covering bookboard and gluing it to the base of the bowl.

A fanciful origami bowl by Debra Glanz.

LIRU



FACETED TOWER (6 × 18 INCHES) BY DEBRA GLANZ

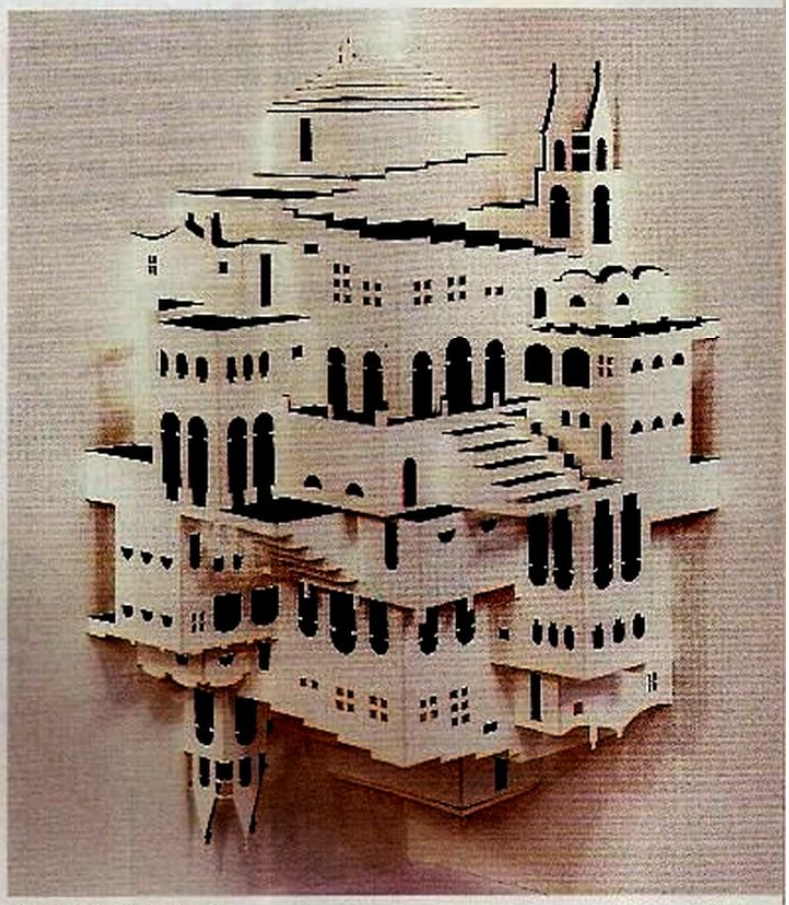
Individual origami bowls take on a new artful dimension when they are stacked together to become a tower. The papers used are all designed and produced by Debra's wholesale paper company, Reminiscence Papers.

Origamic Architecture

TWO DECADES AGO, Japanese professor/architect Masahiro Chatani was inspired by origami to create a new dimensional paper art form called "origamic architecture." By cutting and folding a single piece of paper, he replicated architectural details of buildings around the world. Some ten years later, Ingrid Siliakus, a Dutch artist, saw the work of Professor Chatani and was fascinated by the ingenious manner in which his origamic architecture cards were designed—and by the beauty they radiated. After studying Professor Chatani's art for some years, she began creating her own designs. Ingrid's specialties are buildings of master architects (she was recently commissioned by the Museum of Modern Art in New York to create a work replicating the redesigned museum building) and intricate abstract sculptures inspired by the works of artists like M. C. Escher.

Ingrid believes that the art form is not really origami, as precision *cutting* is essential to creating origamic architecture works. (True origami is made only by folding paper.) Some people think origamic architecture has its roots more in pop-ups. But that label is not wholly accurate either. As Ingrid explains, "The distinction between pop-up cards and paper (origamic) architecture cards is that in pop-up cards a model is usually folded out of more sequences of paper. With paper (origamic) architecture, however, an object is cut out of a single piece of paper. It is done by a combination of detailed cutting and folding. To design a pattern from scratch, the artist needs the skills of an architect to create a two-dimensional design, which with the patience and precision of a surgeon, becomes an ingenious three-dimensional wonder of paper."

The word *card*, I must say, seems totally inappropriate when used to describe Ingrid's work. Her reversed mirror image designs are on a par with those of the finest paper artists. I do see a relation to pop-ups, however, and hope that the previous exercises will give you the confidence to try your hand at origamic architecture.



REFLECTION BY INGRID SILIAKUS
This masterful work in origamic architecture was inspired by the work of artist M. C. Escher. The bottom half is an exact mirror image of the top, only flipped horizontally.

LIRU

CREATING THE CANAL HOUSE CARD

WHAT YOU'LL NEED

Cardstock
Bamboo skewer or dowel
Dry adhesive
Dull knife blade (optional)
Eraser
Metal ruler
Pencil
Removable tape
Self-healing cutting mat
Stylus
X-Acto knife

Ingrid Siliakus believes that cutting and folding some cards from existing patterns is the best way to get an understanding of the craft. To help you become familiar with origamic architecture she has provided easy-to-follow instructions and a diagram for making *Canal House*, an origamic architecture card (pictured on page 74).

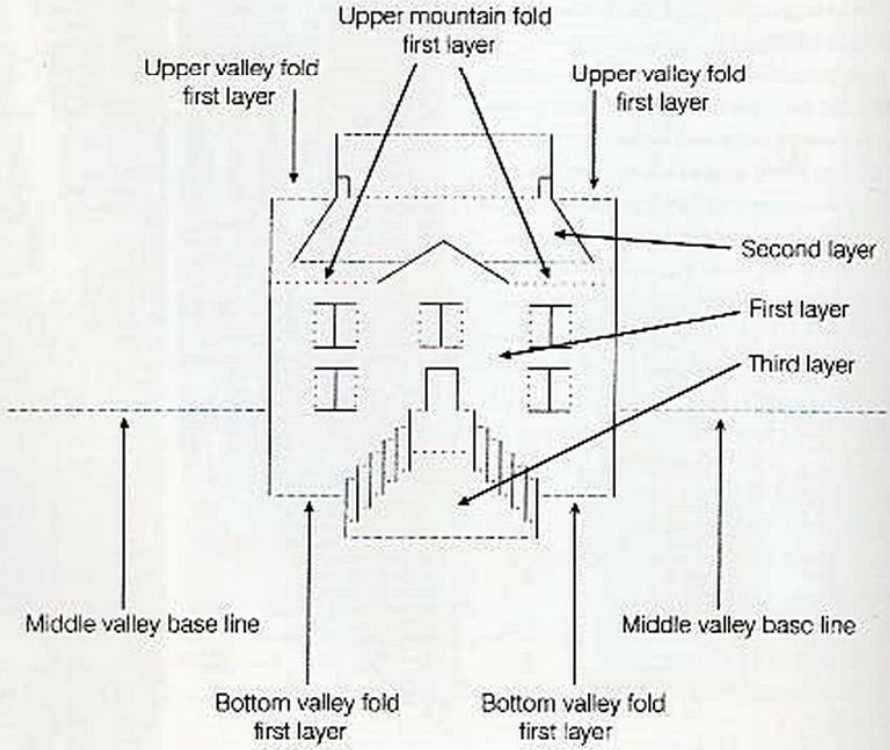
1 Copying the design

Place a sheet of cardstock on a cutting mat and draw a faint pencil line in the middle of each side of the paper. Draw it horizontally, matching the paper's grain. Copy the design by tracing it or scanning it into your computer and printing it out. Cut the copy paper down so that it fits on top of the cardstock, then attach it to the cardstock with removable tape, making sure that the midlines match up.

2 Perforating the cutting and folding lines

Mark all cutting and folding lines by making a tiny hole with a sharp stylus at the beginnings and the ends of the lines. The solid lines are the cutting lines. Lines made up of dashes, are the valley folds, and the dotted lines indicate mountain folds.

After all the lines have been carefully marked, remove the copy from the cardstock and erase the pencil lines. A completely perforated design will now appear on the cardstock.



The *Canal House* diagram.

LIRU

3 Cutting the solid lines

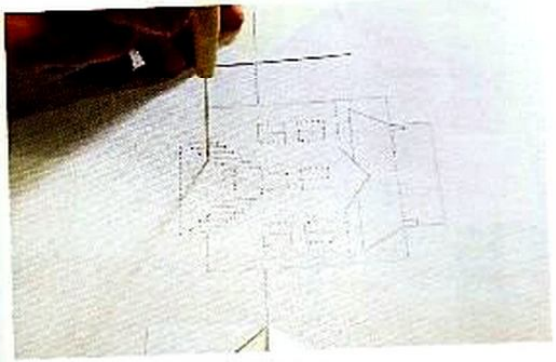
With the design as a guide, first cut the uninterrupted solid lines. Use a metal ruler and a sharp cutting knife, and cut from the beginning to the end of the line. Keep the knife perpendicular and try to cut the lines without pausing. Any hesitation or interruption will show in the piece.

4 Partially cutting or scoring the fold lines

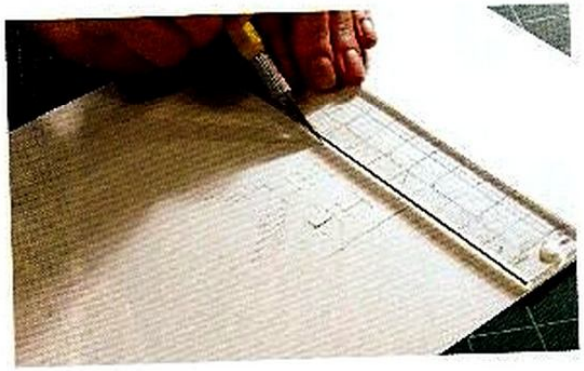
The next step is to cut the fold lines two thirds of the way into the paper. You can also score deeply along these lines, but cutting is preferred. As before, make one straight cut, using the ruler as a guide from beginning to end. The valley folds are cut first, on the *back* of the cardstock. If you have never partially cut paper this way before, practice first on a separate piece of paper. You may also choose to reserve a special knife for partial cutting that is duller than your regular knife blade.

5 Folding the architecture card into shape

This step takes a lot of time and patience. Start by folding the middle valley base line (main fold line) to see which mountain folds move forward and appear by themselves when this is done. If some of the folds resist falling into place, you can score or cut them a bit more. Tweezers, or thin wooden dowels can be used to raise parts of the design and ease the mountain and valley folds into place. Do not try to position the folds all at once, but gently bend all of them a little and progress slowly.

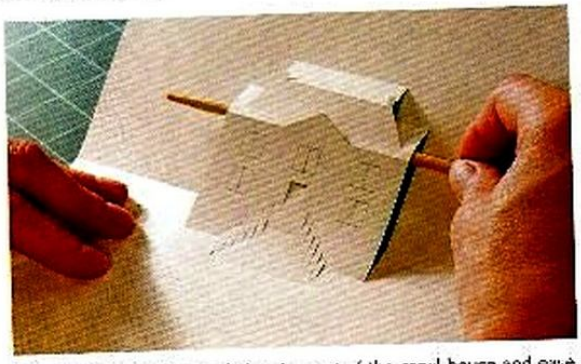


Perforating the cutting and folding lines.



Cutting the solid lines.

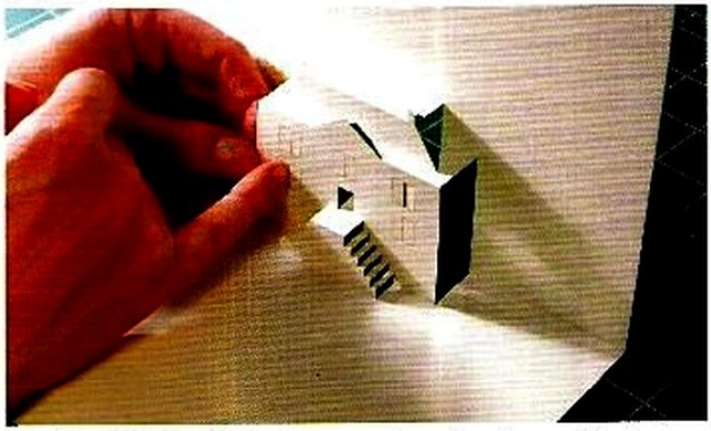
Partially cutting the fold lines.



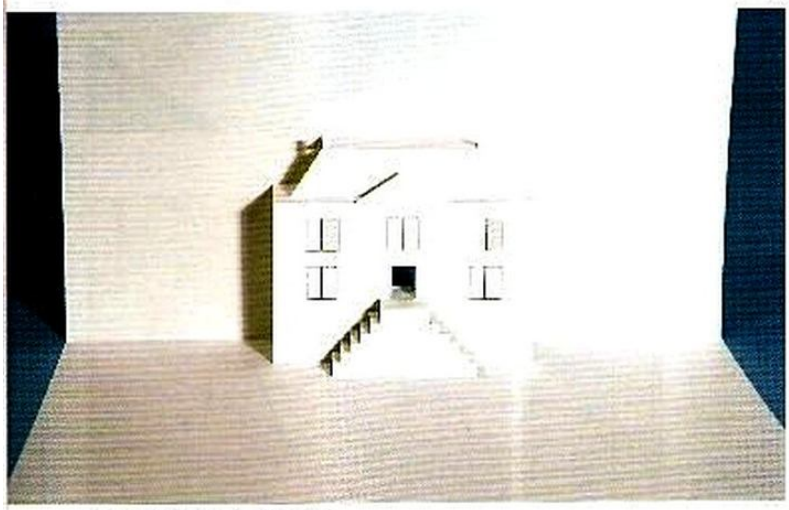
Using a wooden dowel to help raise part of the canal house and ease its mountain and valley folds into place.

Remember that the folds that are deeper get more difficult to reach as the card slowly finds its form. When all parts of the cards have been folded far enough, carefully close the card entirely. Use a bone folder to sharpen the folds.

Finally, you can adhere the cardstock to another heavier piece of paper if you desire. If you created your card from a heavy piece of cardstock, it may not be necessary to glue it to another piece of paper.



After all the folds of an origamic card are properly positioned you can attend to details like opening the tiny windows of a structure.



CANAL HOUSE BY INGRID SIUAKUS

DESIGNING YOUR OWN CARD

When you have completed Ingrid's *Canal House* you may want to try designing your own card. I asked Ingrid how someone could best go about creating a simple design. She stressed that one should (as she did) start with cutting and folding as many cards as possible from existing patterns to get a solid understanding of origamic architecture. Look for Ingrid's book *Origamic Architecture from Building to Card* along with other books containing origamic architecture patterns.

When designing a card, she noted, the most important line is the middle base fold line—a valley fold—as shown in the diagram on page 72. The best thing to do is use graph paper and put the horizontal middle base line in first. If you wish to recreate an actual house, photographs should be taken from all angles to see which side of the structure would be best for the design. When you have decided which part of the house you will use, you divide the house in layers. You start by drawing one layer onto your graph paper, with the middle line as your guide. The cut lines are drawn vertically and the fold lines horizontally.

The measurement from the bottom horizontal valley fold to the middle base line should be exactly the same as the upper mountain fold line is to the upper valley fold line. Next, the second layer is drawn onto the first layer, using the bottom valley fold of the first layer as your guide. You now do the same with the second layer as you did with the first layer. And then you proceed to the next layer, and so on.

When you are done, Ingrid adds, you scan the design into the computer and print it out, or photocopy it, and cut and fold it to see how it works. When you are satisfied with the basics of the house, you draw the windows, doors, and other decorations.

LIRU

Slice-Form Pop-Ups

ANOTHER TYPE of dimensional paper art popularized by Masahiro Chatani is often referred to as "geometric origami." According to a leading practitioner of the craft, Sandy Jackson, it really has little to do with origami and is more appropriately called "slice forms." In slice forms, three-dimensional models of various objects are created by fitting together slices of paper inserted into a series of slots to create the form. When the structure is standing open, the slices are at right angles to one another. When the paper angles are decreased, the form begins to collapse and eventually lays flat. Slice forms have been used for many years to make mathematical models.

Sandy's interest in slice forms (she admits a lifelong interest in puzzles and geometry; so she probably *likes* math) began when she took Masahiro Chatani's book *Pop-Up Geometric Origami* along on a trip to Paris. Before she was able to tackle any of the projects in the book, however, Sandy was overcome by the desire to make a model of the Eiffel Tower. She followed that successful project with a pop-up slice-form tree for a Christmas card. Before long she was designing and selling kits to make various slice-form structures and selling pattern stamps to decorate the forms through her business SAS (Some Assembly Required).

Slice-form pears by Sandy Jackson.

CREATING A SLICE-FORM EIFFEL TOWER

WHAT YOU'LL NEED

Cover stock
Graph paper
Matboard
Scissors
Stylus
X-Acto knife with #11 blade or craft knife

When I asked Sandy how to design a slice form from scratch, she gave the following directions for creating an Eiffel Tower. You can use these as a guide to create your own designs. Making designs with Sandy's kits can also help you get a feel for how objects like a pear or egg might be replicated in paper slices. Many of the steps could be done on the computer, but paper artists may prefer to create the structure the "old fashioned way."

Sandy explains, "I use either a real object or a picture of an object to get some key measurements to establish some reference points and get the basic shape." For the Eiffel Tower project she used a postcard of the monument and drew the structure on graph paper.

1 Making a set of templates

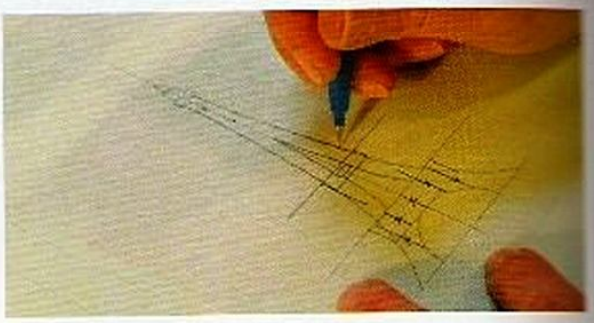
Since the Eiffel Tower needs multiples of some pieces, you need to make a set of templates. To make a set of templates, lay the graph paper on top of a piece of cover stock with a piece of matboard underneath. Use a stylus to poke holes through the graph paper and cover stock to position the corners, curves, and slots.

Next, cut out the template pieces, leaving a border around each shape so that the holes aren't too close to the edge of the paper, which would make the shape unstable.

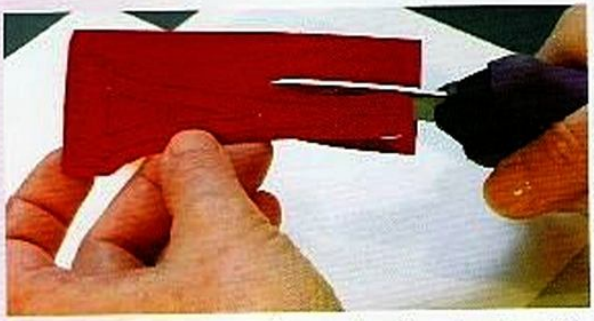
2 Transferring the pattern

Then repeat the hole-poking process to transfer the pattern to the final piece of paper. There are two different tower top sections, two sets of four identical pieces for the middle, and the bottom (legs) of the tower. Most sections of the structure can be cut with a craft knife, but the slots should be cut with scissors.

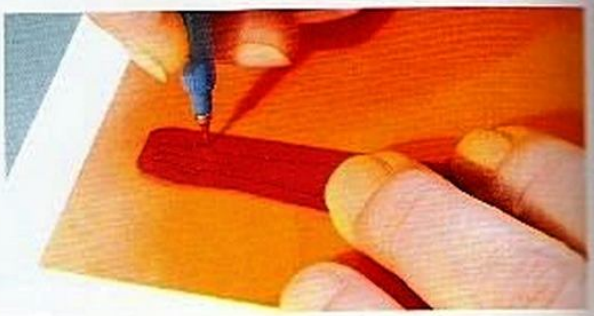
Drawing the Eiffel Tower model from a photographic reference.



Perforating the graph paper drawing and the red coverstock beneath it to begin creating a pattern for a tower section.



Cutting out a piece of perforated coverstock to be used as a template.



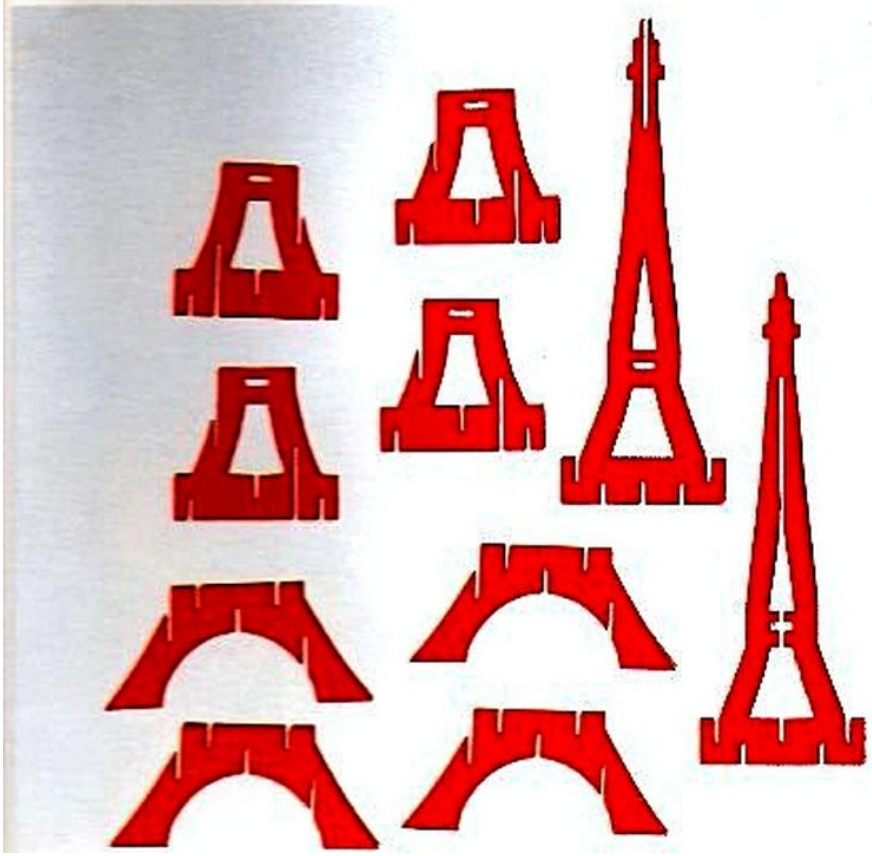
Using the template to perforate the orange paper used for the tower.

3 Cutting the slots

The slots, at this point, are really a thin line of holes, marking the area to be cut. The width of the slots (1/32- to 3/32-inch wide) will be easier to maintain if cut with scissors rather than using a knife and a straightedge. When using scissors, cut along the right edge of the slot and end the cut by closing the scissors. Then cut along the left edge of the slot in the same way. A sliver of paper will usually curl down a bit and stick out below the main piece of paper. Remove the sliver by turning the paper 90 degrees counterclockwise. Then use the tip of the scissors to cut across the end (just like cutting any inside corner). Resist the temptation to turn the paper over when cutting the end of the slot. If you cut from the back, the cutting edge of the scissors will be 1/16-inch away from the end of the sliver. This will always leave a little piece of paper at the end of the slot, which will get in the way when you put the model together.

Cutting out a tower section.

Creating a slot in a tower section.



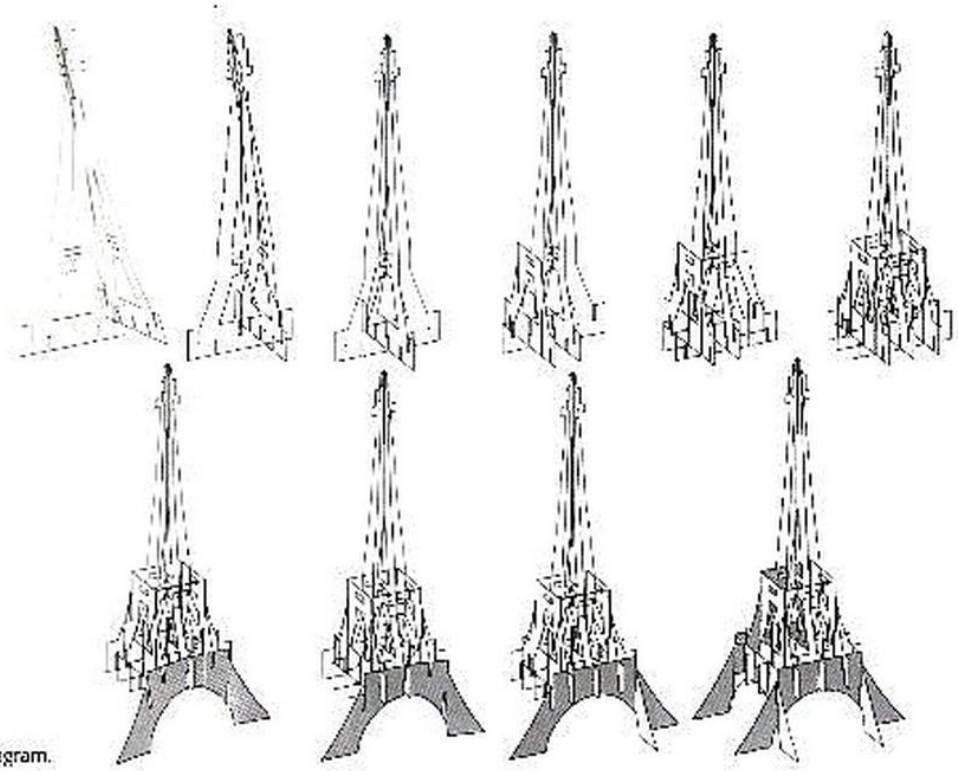
The tower parts ready to be assembled.

4 Assembling the tower

After all the slots are cut, carefully fit the tower's sections together according to the diagram below. When fully assembled, a twist of the wrist will collapse the slice form so that it is flat enough to send through the mail. A recipient can then easily pop it up again into a small freestanding sculpture.

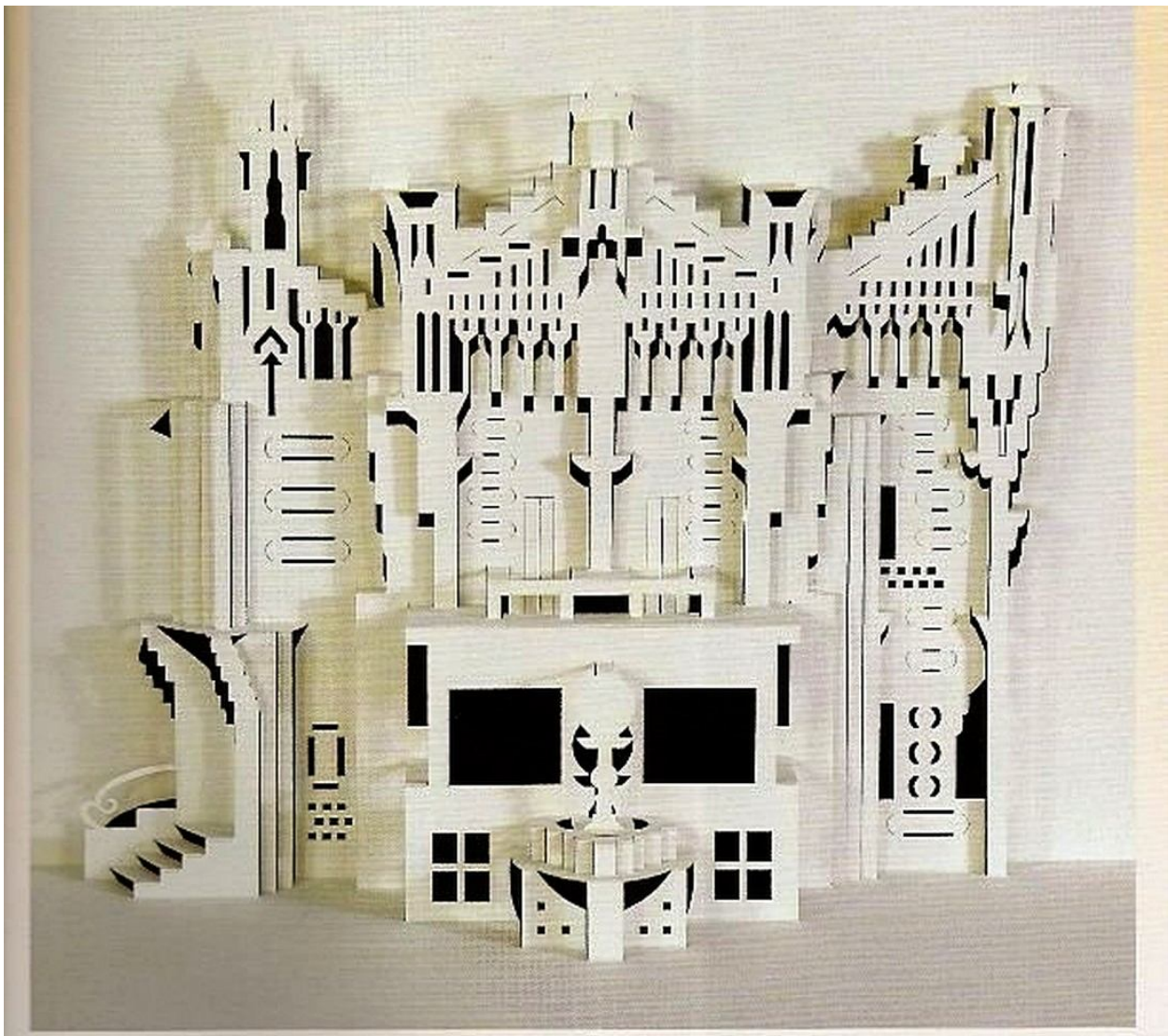
Assembling the tower by fitting the slots together.

The Eiffel Tower slice form by Sandy Jackson.

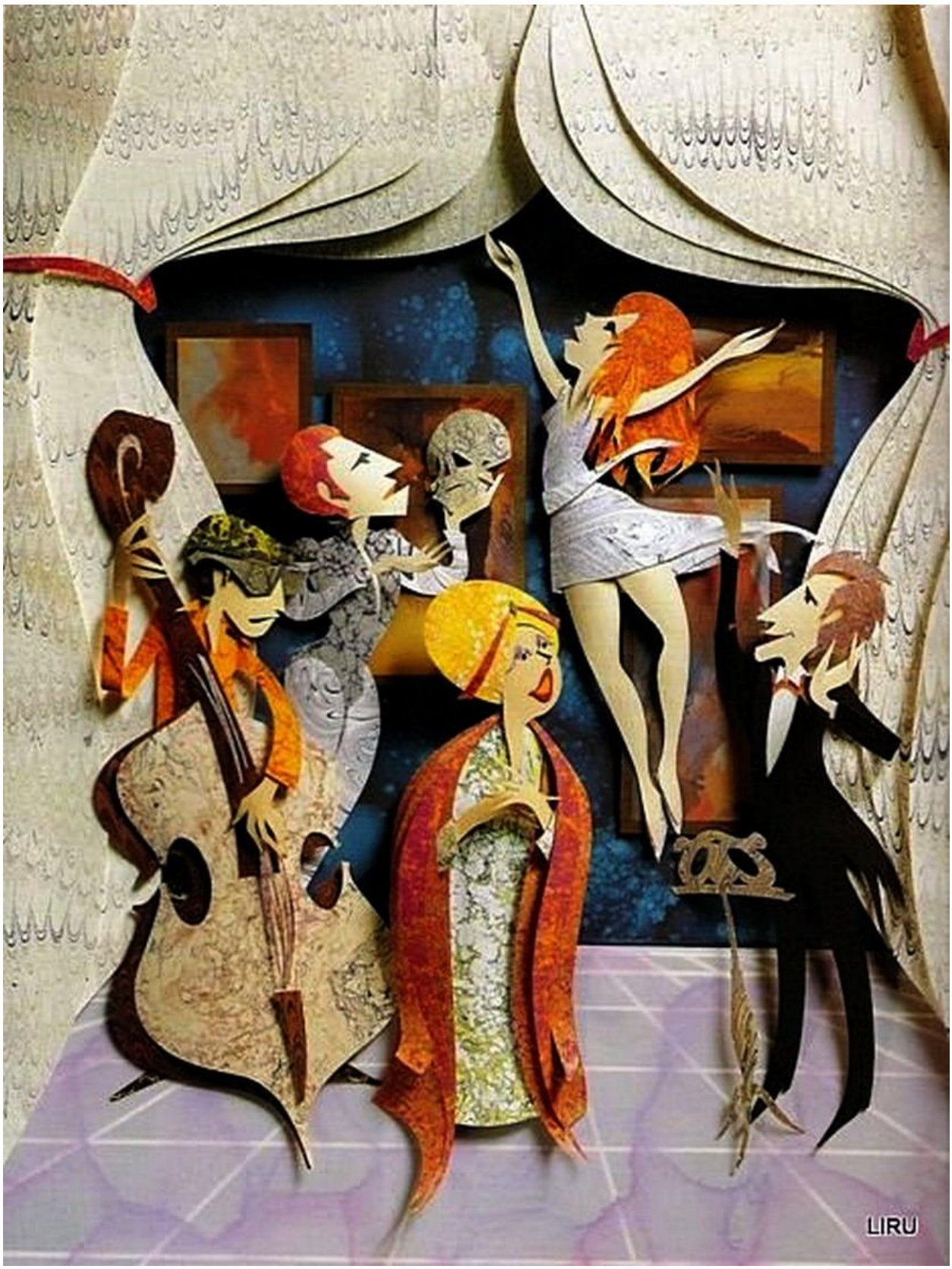


The tower diagram.

LIRU



CASA VICENS (8 × 11½ INCHES) BY INGRID SILIAKUS
Ingrid's meticulous attention to detail is especially evident in this particularly intricate piece of origamic architecture. It was inspired by the single-family residence Casa Vicens, designed by Antoni Gaudí. "Seeking and finding a cooperation with each type of paper and with each cut or fold one makes," Ingrid notes, "is an immensely fascinating and challenging process."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Exploring
TRADITIONAL PAPER SCULPTURE

TRADITIONAL PAPER SCULPTURE, sometimes called three-dimensional illustration, has a long history as a medium employed by illustrators and graphic designers for use in advertising. It most often focuses on realistic subject matter as opposed to abstract designs like those shown in the work of Jeanne Petrosky (see chapter 1). Once used in store window displays to attract shoppers' attention, three-dimensional illustration soon gravitated to magazines and newspapers where in 1932 it was even used to sell Ivory soap. Today, although still used extensively in advertising, traditional paper sculpture is now receiving its proper respect as a fine arts medium and finding its place in galleries worldwide. It is a fun medium to explore, and because you can copy source materials to create works rather than having to be a skilled draftsman, with a little practice most anyone can produce simple paper sculptures.

Paper sculpture is sometimes defined as paper that has been transformed from a flat plane into a three-dimensional form with concave and convex surfaces. Light and shadow play on these surfaces to create dramatic visual effects. If you crumple a white piece of paper, place it near a lamp and take a moment to observe the hills and valleys created, you'll see how light paints the various paper planes in varying degrees and shades of shadow. Many paper sculptors, like David Wood, prefer to work with stark white paper for it's dramatic effect, while others like to make more colorful works, often creating their own decorative papers to use in their art.

OPPOSITE *LA TIMES CULTURE* BY HAL LOSE

An Introduction to Paper Sculpture

MUCH CAN BE LEARNED about paper sculpture by cutting out different paper shapes and bending or curling them to see what kinds of forms can be created. Ideas for paper sculptures may grow from your experiments as you realize that by scoring and shaping a narrow pointed piece of paper you've created a structure that closely resembles pond grass or by rolling oval-shaped cutouts over a pencil you've created realistic columbine flower petals. Work with white medium-weight paper when you begin. Then try papers in various weights to familiarize yourself with their possibilities.

COLUMBINE (DETAIL)
BY NANCY LENORE COOK
Although Nancy typically works with Canson and other western papers, the background in this sculpture is a Japanese paper called Kyoseishi. Nancy uses colored papers in many of her works and enjoys the way the subtleties and shadings of colors mimic those in nature.

CREATING BASIC PAPER SCULPTURE ELEMENTS

Some of the techniques used in paper sculpture—cutting, scoring, and creating mountain and valley folds—are discussed on pages 36–39. By learning a few more techniques, such as curling, rolling, and feathering, you'll soon be able to shape paper into three-dimensional curved structures.

Making an S-shape

Begin exploring three-dimensional curved shapes by using an X-Acto knife to cut out an elongated S-shape from a piece of heavy paper. If using machine-made paper, be sure the S follows the grain of the paper. Then use an X-Acto knife with a dull blade or a stylus to score the cutout, following the curve down the center of the S. (You can try using the same blade you used to cut out the S-shape but apply minimal pressure to avoid cutting completely through the paper.) Now create a mountain fold, using your fingers, to bend the sheet away from the scored line. The resulting form will be a curved shape with angular flat planes that catch and reflect the light. This shape could represent ripples in a pond or stream.

Exploring other curved shapes

Cut out a wider piece of paper and try scoring two curving lines in it—one on the front of the sheet to be bent into a mountain fold and one on the reverse side of the sheet to become a valley fold. Now try slicing out more narrow, slightly curved pieces of paper that taper to a point. Score and fold these to create new structures that could become elements for a paper sculpture.

TIP

Although you may be tempted to try cutting shapes with scissors, long gentle curves can be most accurately cut with a sharp X-Acto knife.

WHAT YOU'LL NEED

Medium-weight white paper (such as Canson Mi-Teintes)

Self-healing cutting mat

Glue brush

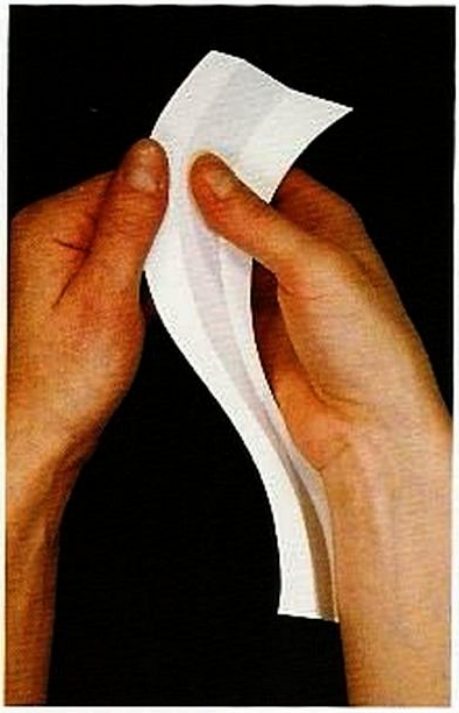
Paper curling devices (a wooden dowel and bone folder will be fine)

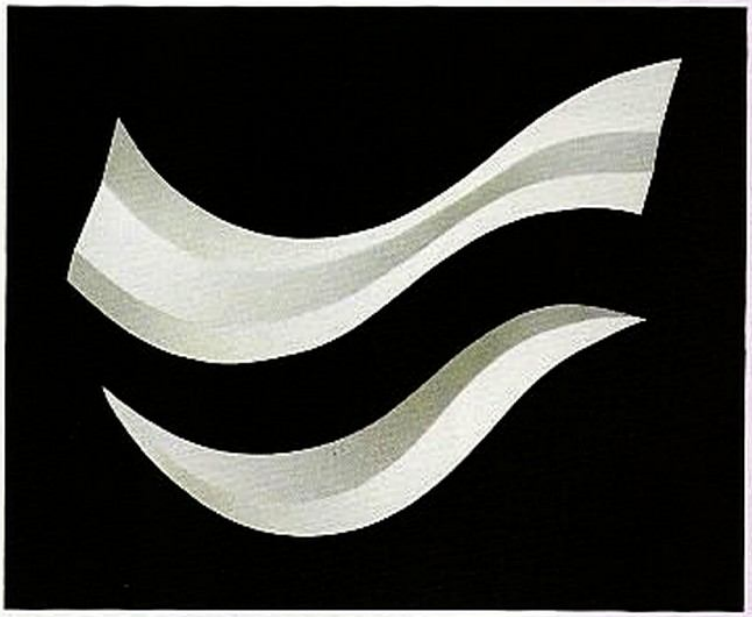
Stylus

Toothpicks (these can be used to apply glue in areas too small for glue brush application)

White glue

X-Acto knife with #11 blades (a second knife with a dull blade will be helpful)





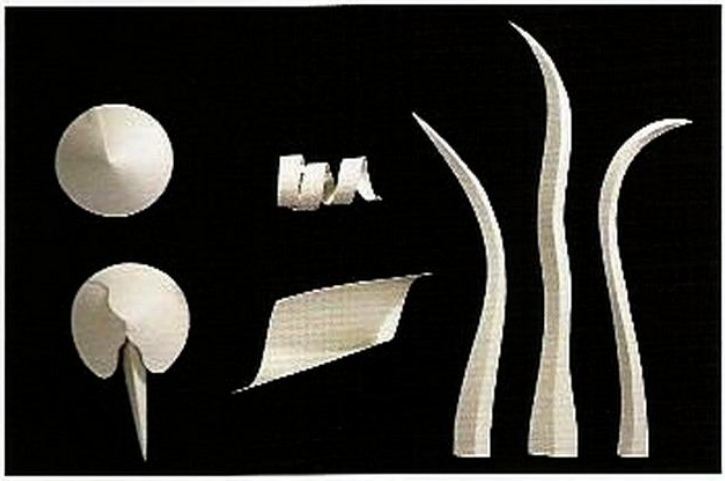
LEFT Bending the scored paper away from the fold line to create a mountain fold.
ABOVE The angular flat planes of scored and raised paper catch and reflect light.

Mastering curled paper

To practice curling paper, cut out a long strip of paper with the grain running across it, and roll it over the edge of a bone folder as though you're curling a ribbon for a gift package. Now roll an identical piece of paper around a dowel to see how that influences curl. Notice how much the paper springs back. Think about how curled forms might be used in a piece to represent flower tendrils cascading from a bouquet or curls of hair peeking out from under a woman's hat. Play with the forms to see how they can be further shaped by rolling them with your fingers to tighten them, or by pulling the paper to open a curl. Try curling different kinds and weights of paper to see how each reacts.

Making circular or oval shapes

Cut out a paper circle or teardrop shape and slice into its center. Overlap the edges and glue one edge over the other to create a structure that might become a flower petal, a horseshoe crab shell, or, if divided at the top and the bottom with smooth flowing cuts as in Hal Lose's sun sculpture (below), the beginnings of an animated face. Another way to give a flat cutout a rounded shape is to use a metal spoon burnisher (used for transfer lettering and metal crafts) over a soft surface. Australian calligrapher and paper sculptor David Wood notes that it is critical that each cutout be shaped around all of the edges on the back of the paper to take the sharpness off the paper and give a rounded effect.



ABOVE Scored and curled papers can become elements for many different paper sculptures.
RIGHT *SUN IMAGE* BY HAL LOSE

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Paper Sculptors' Tips and Tricks

MANY PAPER SCULPTORS are self-taught and have devised their own tricks and techniques. Hal Lose, for instance, sometimes uses a clothes steamer to relax paper enough to create complex curves. He assures a flawless finish to his work by smoothing the outer edge of each of his cuts with an etching tool. Dental tools are also part of Hal's paper sculpting toolbox; he often uses specially sharpened teeth-cleaning tools to score his papers.

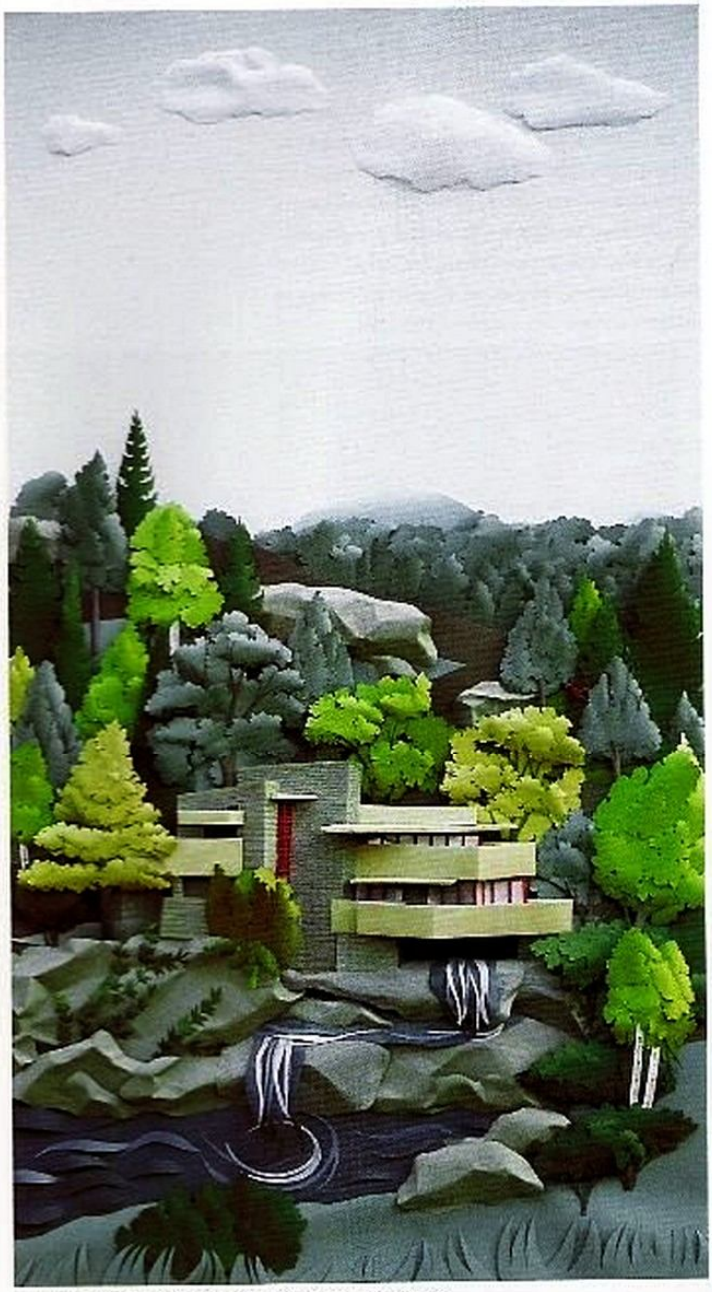
Although some daring paper sculptors use a knife or blade as a drawing tool, at least on simple shapes, most use lightly drawn pencil lines as a guide to help them. Other sculptors tape photocopies of drawings or photographic reference material to their paper and cut through two layers of paper at once, eliminating the necessity of erasing pencil lines later on.

Many artists use pieces of foamcore to raise layers of paper, accentuate shadows, and give added dimension to works. The foamcore pieces are sometimes glued together to attain a height of as much as 4 inches in works used for illustration and designed to be photographed head on. Other materials—such as four-ply matboard, foam tape, and even pieces of clear plastic—may also be used to elevate layers of a sculpture. When the sculpture is designed to be viewed from all angles, of course, elevating materials must be completely hidden.

Hidden attachments, used to glue sculpture elements to a heavy watercolor paper backing board or other support, include paper tabs and loops (like those created for a paper chain). White glue is applied to one side of the attachment and pressed against the backing while the other side is glued to the back of the sculpture piece.

Many sculptors have a favorite paper, but often the subject of the sculpture will dictate the paper to be used. David Wood works with BFK Reeves paper, using 250gsm for large work and 190gsm for smaller works. He finds it softer than watercolor paper and easier to manipulate. It embosses well, which is important when David chooses to add lines and textures to individual pieces.

PIED BEAUTY BY DAVID WOOD
The intricate and delicate sculptures depicting the images in this poem have been inlaid behind the writing surface into the cut out shape of a fish.



Hal Lose likes to work on Canson Mi-Teintes and Canson Ingres papers, often marbling the paper to give another dimension to his work.

Nancy Cook prefers to work with Strathmore charcoal paper because "it's strong and forgiving" when you bend and crease it. She often uses charcoal paper to create a landscape, but switches to stiffer, stronger Arches watercolor paper in different weights to create other works that require a paper with more rigidity. Many of Nancy's paper sculptures, like *Pennsylvania Woodlands II*, feature very realistic-looking rocks. To create them Nancy uses a mottled Canson paper with a stiff "hand" to it. Because the paper is somewhat rigid, Nancy can cut a rock shaped piece of it, curve it, and then pinch it in a way that mimics the natural planes found on rocks in nature.

ABOVE *PENNSYLVANIA WOODLANDS II* BY NANCY LENORE COOK

RIGHT *IRISH WELCOME* (10 × 20 INCHES) BY NANCY LENORE COOK

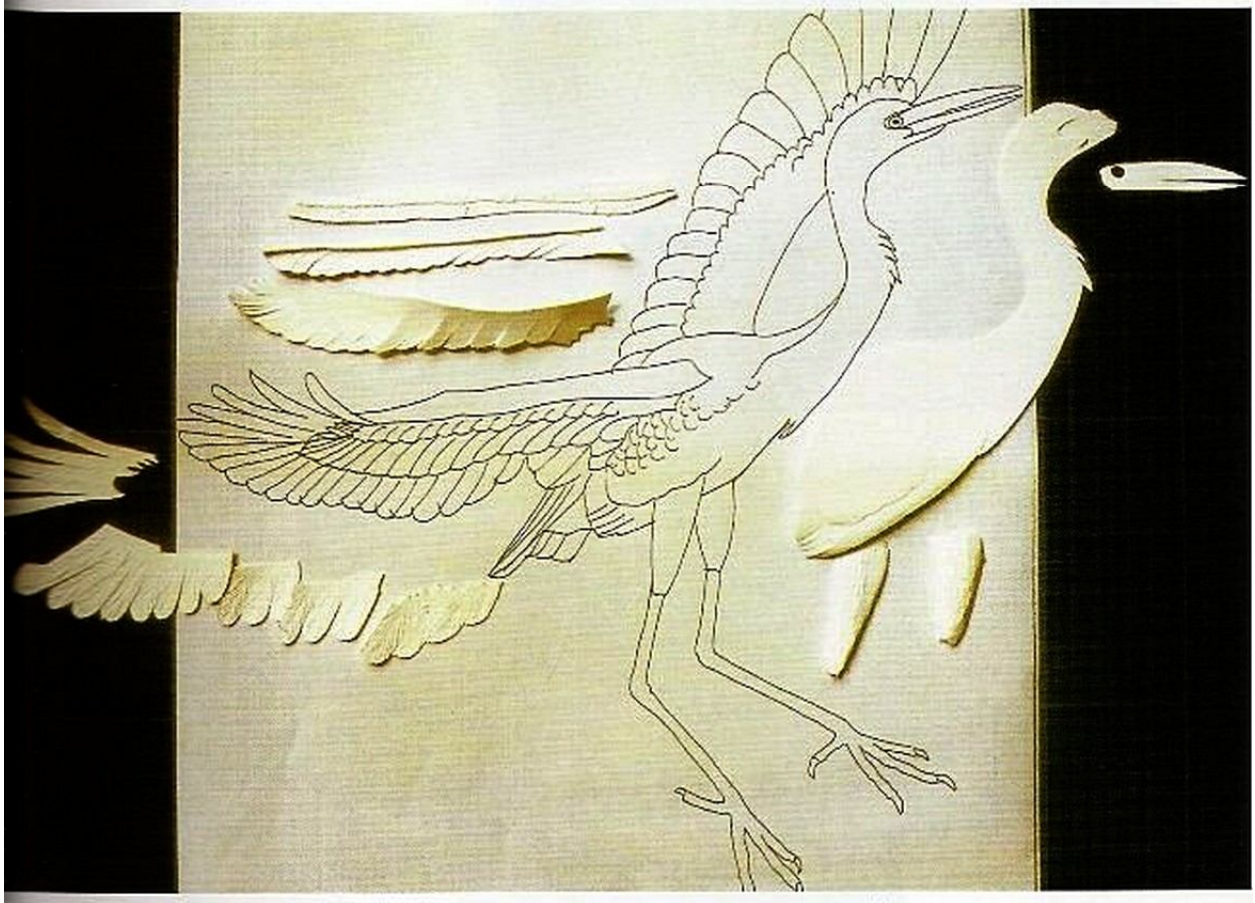
A plate of fruit and vase of flower always greets Nancy when she visits a small hotel in Ireland. The joy she felt when seeing the familiar offering on her last trip inspired her to create this paper sculpture. She worked from a photograph and cut black paper to abstract the shape of the vase, its reflection, and shadow before adding more colorful detail to the piece.

A Paper-Sculpted Bird in Flight

THE FOLLOWING process steps describe how David Wood creates a simple structure of a bird in flight. David discovered a book called *Paper Sculpture* by Kathleen Ziegler and Nick Greco several years ago and "saw the vast possibilities of its use with calligraphy." His works now are a perfect marriage of the two mediums.

When starting a paper sculpture, David recommends that you either draw your own images or find a good photographic reference and make one photocopy to a size that can then be adapted to your specific needs. David chose a bird in flight as his reference. He made a fine-line tracing of the bird to use for cutting out the individual pieces and also made one photocopy of the tracing to be used as a template for assembly later.

Since he is working with white paper, David makes sure his hands are clean before getting started. He cuts out the individual pieces by laying the tracing paper on top of his BFK Rives art paper. Using a new #11 blade in his knife, he cuts out individual pieces, allowing for an overlap so he has extra length to glue the pieces to one another.



The tracing of the bird from David Wood's *My Flight* and some of the paper pieces cut from a copy of the tracing.

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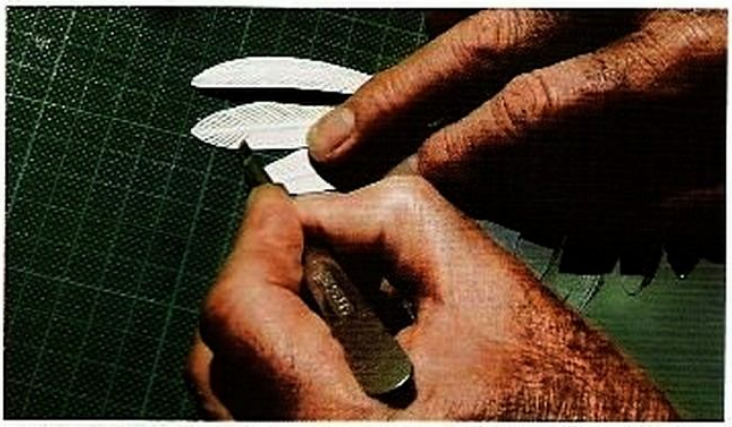
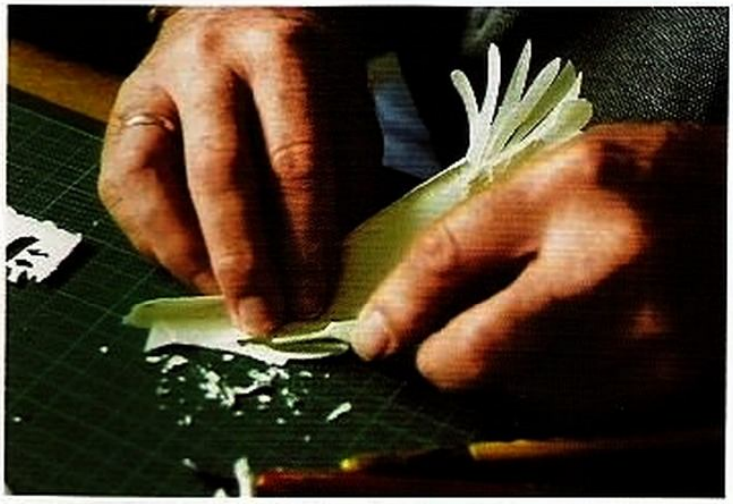


Feathering the scored bird feathers with a scalpel.



To create the feathers David cuts out each one individually and then scores it down the center with a stylus. To accomplish this, he takes a #15 curved scalpel blade and uses a process called "feathering," cutting halfway through the paper to create the "feathered look." He holds the scalpel at a shallow angle so the paper lifts.

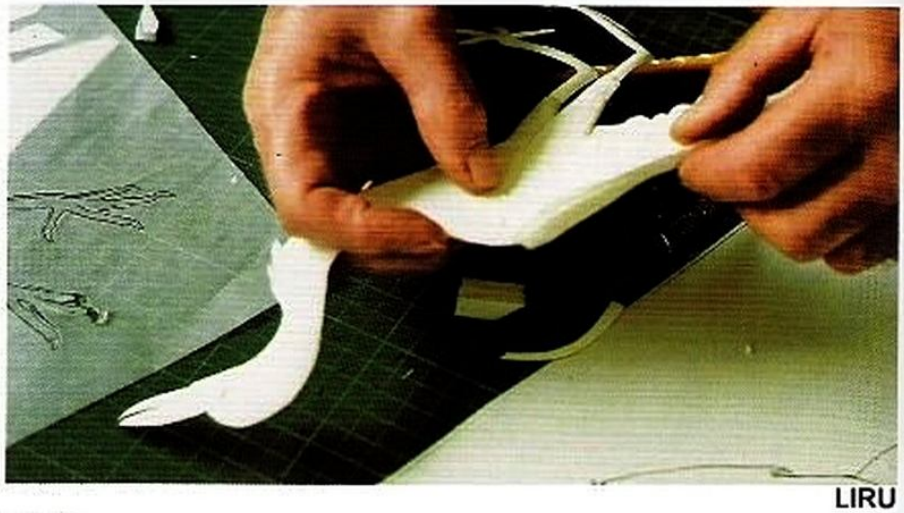
Where the wings join the body, David thins the paper from the back with a very sharp scalpel blade. This reduces the thickness of the paper so that the join of the wings to the body is not so obvious when he glues the pieces together.

David cuts and glues one body part at a time—for example, wings, head, body, and so forth—so that pieces are not lost or damaged. This way, each section can be shaped individually on a thin plastic foam hobby mat (or padded placemat) by using a bone folder or a spoon burnisher.

David assembles all the parts of the bird with acid free PVA glue. He determines the distance the sculpture is to be raised from the background and uses small pieces of foamcore to create this dimension.

After assembly, David uses the feathering technique on the body to create the body feathers. If done at an earlier stage, he risks crushing them. He then completes the work by adding his calligraphic lettering.

ABOVE Thinning the paper where the wings join the body.
RIGHT Gluing the wing in place.



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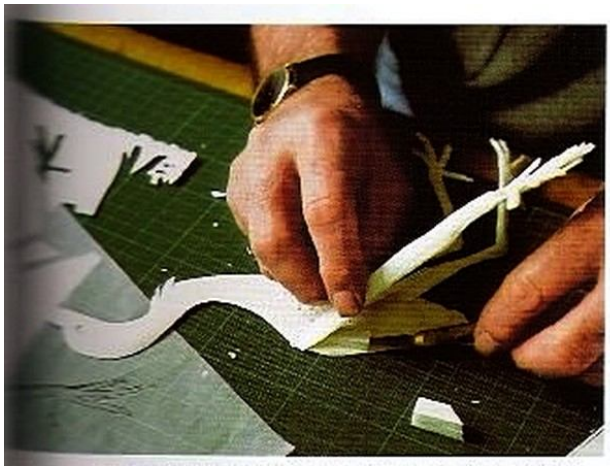
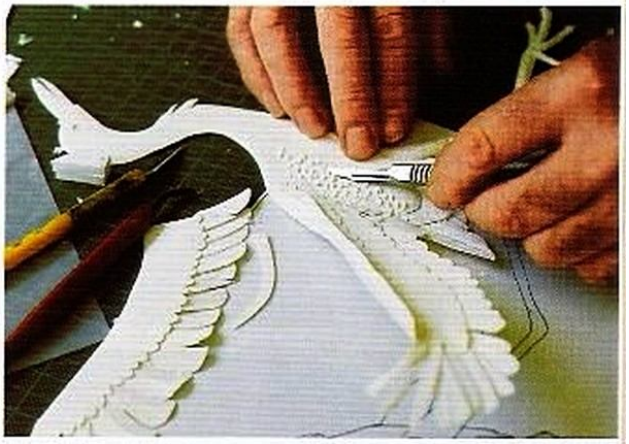


Elevating the bird's wing from its body with a piece of foamcore.



Creating the body feathers.

MY FLIGHT BY DAVID WOOD

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A PAPER-SCULPTED BIRD IN FLIGHT 91

A Pop-up Sculpture Garden

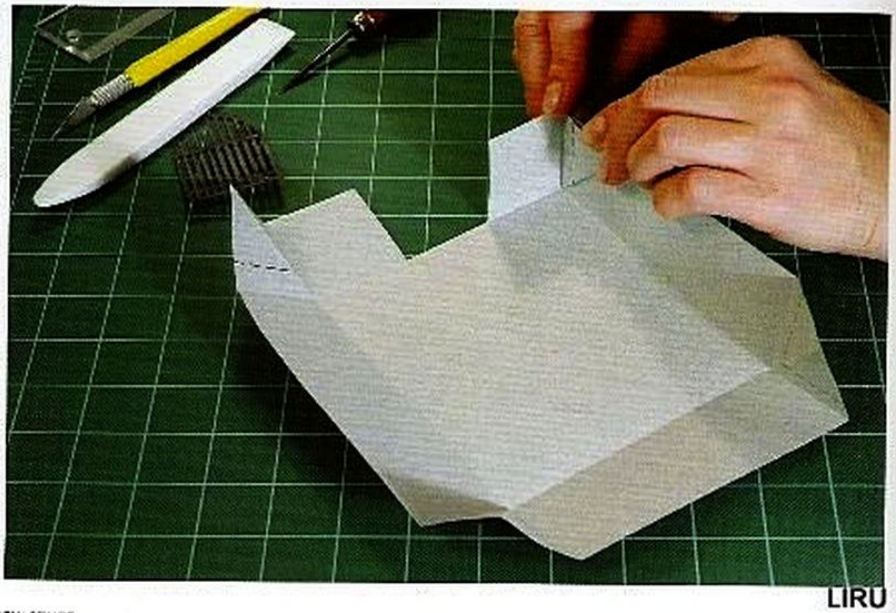
THE FOLLOWING demonstration describes how Nancy Cook creates a pop-up sculpture garden (page 94) which is a combination of collage, pop-ups, and paper sculpting techniques.

To create the garden walls, Nancy measures and cuts a piece of Canson paper to $8\frac{1}{4} \times 8\frac{3}{4}$ inches. Then she draws a grid of intersecting lines on the paper $1\frac{5}{8}$ inches in from the paper's edge. This becomes the interior of the garden. She uses a ruler and an awl to score the intersecting lines and valley-fold them, making it easier to later fold the walls and glue them together.

At this point, she cuts a $1\frac{1}{2}$-inch-wide opening in a short wall to receive a gate with parallel slits and horizontal cross bars that she had previously constructed. She next draws a stone pattern on the interior and exterior walls of the garden.

Before folding the corners of the garden into position, Nancy has to create a diagonal fold to allow the walls to be joined. Then she trims away the extra paper the diagonal fold creates so that only $\frac{1}{4}$-inch of paper borders each original grid line. Next she refolds the diagonal, and glues the $\frac{1}{4}$ inch paper overlaps at each corner to one another, thereby creating a walled structure. After the glue dries, she simultaneously pushes the sides of the garden down as she folds the front and the back of the garden walls flat. This creases the garden walls so that they can fold flat and pop-up again.

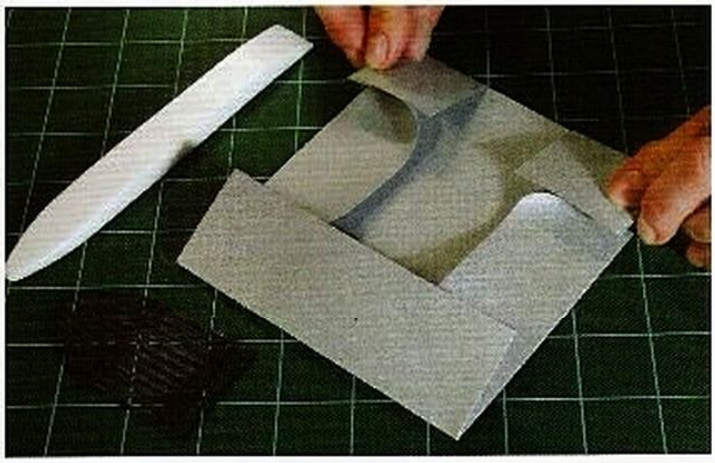
ABOVE Scoring the garden walls to begin folding them. RIGHT Folding the garden walls.

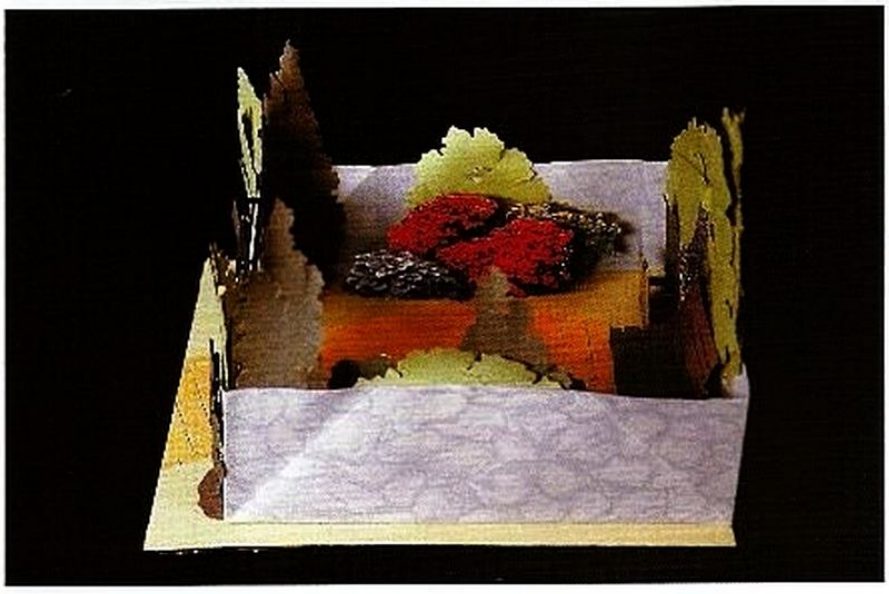


Next, Nancy cuts a 5 × 5⅜-inch "floor" for the garden and collages a brick pathway, as well as a rock bordered pond, onto it. She creates slits in the floor so that paper tabs extending from the base of flowers and bushes, cut from seed catalogs, can go through the slots beneath the floor and hold the foliage in place. She uses arch-shaped tabs of ¼-inch-wide strips of paper to join the plants to one another and to the sides of the garden walls. When the long sides of the garden are pushed toward the center and the short sides of the structure are folded down, these tabs cause the plants to fold, too. When all tabs are in position, she adheres the floor to the garden base.

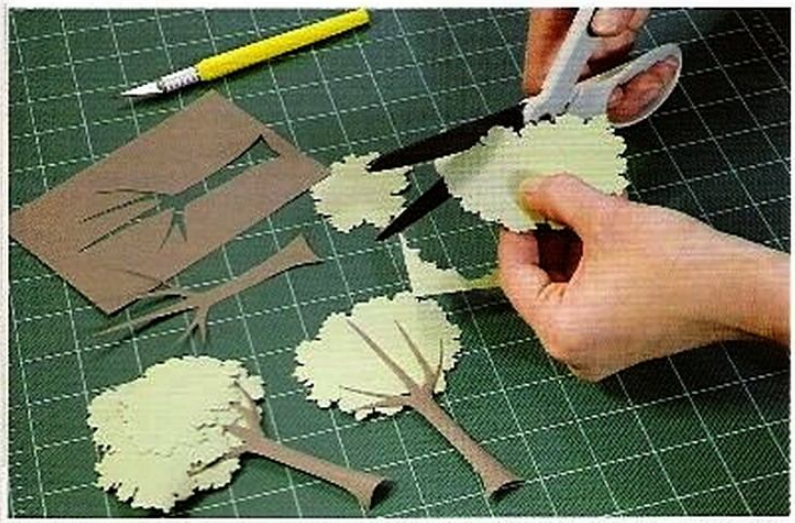
To make the garden a lush and inviting place, Nancy glues multiple layers of paper-sculpted trees to the interior and exterior walls of the garden and adds a paper-sculpted garden bench. To make a tree, she draws and then cuts out the tree trunk and branches. Then she curves the paper with a bone folder to add strength to the shape.

Gluing the garden walls together.





ABOVE Creasing and folding down the garden to create a pop-up design.
LEFT A side view of the completed garden.



Next she cuts out the leaf shapes and creates ruffled leaf edges keeping her scissor hand stationary as she turns the paper being cut. She uses a bone folder to add shape to the leaves and then glues the leaf shapes to one another with tiny V-folded tabs of paper. The tabs allow the leaves to float a bit to add dimension. Then she glues the leaves to the tree branches.

To create the garden base, Nancy cuts a 5¾ × 6¼-inch piece of matboard and covers it with grass-colored paper. She adds more bricks to the walkway to continue it outside the gate and places brown paper mulch beneath the trees to add more realism before finishing by finally adhering the garden to its base.

ABOVE Creating paper sculpture trees. Note how the base of the flat tree differs from the tree trunks shaped with a bone folder.

RIGHT *POP-UP SCULPTURE GARDEN* BY NANCY LENORE COOK The front view of the completed garden.

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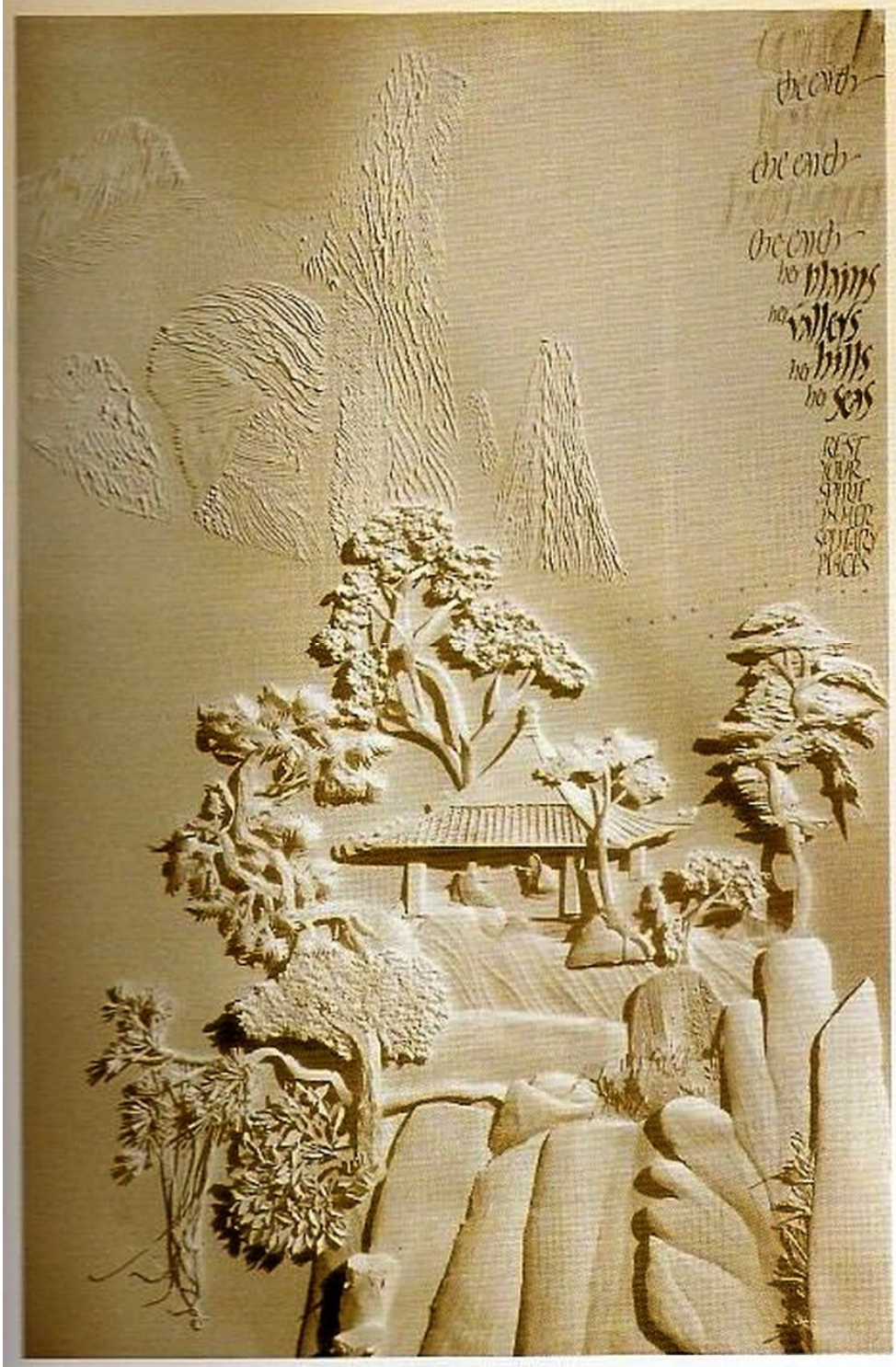
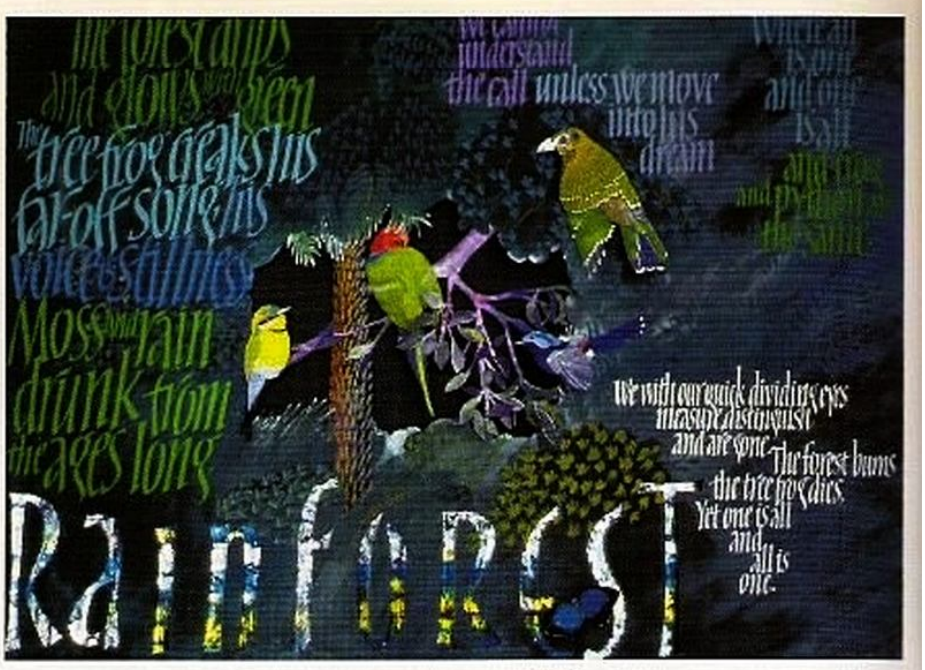


TOUCH THE EARTH (760 × 570MM) BY DAVID WOOD
David used papier-mâché, scoring, and feathering techniques, as well as sculptured images of mountains, temple and trees to create this piece. His fine calligraphy and the subtle use of silver foil add finishing touches to a remarkable work.

ABOVE *THE SHELL SEEKER* (12 × 24 INCHES) BY NANCY LENORE COOK

This paper sculpture was inspired by some photos Nancy took of her daughter in Maine. Nancy explained that it differs from the more detailed work that preceded it in that it is more abstract, just suggesting the setting. As in all of her work, the sculpture tells a story—this one of a child's fascination with the ocean and its treasures.



RIGHT *RAINFOREST* (1000 × 760MM) BY DAVID WOOD

The background paper and all the images of the fanciful rain forest were hand painted before the sculptures were rendered. The images were eventually placed behind a cutout panel to give the work further dimension.