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Stained Glass

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by Vicki Payne



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Wiley Publishing, Inc.

Stained Glass For Dummies®

Published by
Wiley Publishing, Inc.
111 River St.
Hoboken, NJ 07030-5774
www.wiley.com

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Published simultaneously in Canada

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Library of Congress Control Number: 2010935561

ISBN: 978-0-470-59132-1

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1



About the Author

Vicki Payne has hosted the internationally syndicated show *Glass with Vicki Payne*, on PBS, for more than two decades. With her husband Chris, she owned and operated one of the largest stained-glass teaching and supply centers in the Midwest. She has produced more than 50 stained-glass DVDs, authored nine bestselling books about the art-glass craft, and invented and developed some very helpful tools for glass workers.

Vicki is also the host of *For Your Home*, the second-most-aired home-and-garden series on television and has hosted the *Handmade Gifts* and *DIY Crafts* television series on the DIY Network. She's also a frequent guest on other national and regional home-improvement and craft shows. In addition, she's an accomplished educator and a much sought after speaker at the International Hardware Show, Builders Show, and International Furniture Market in High Point. As the creative force behind Charlotte, North Carolina-based Cutters Productions, Vicki has made her name synonymous with the how-to industry. She also serves as a consultant to companies in the home-improvement and furnishing industries, where her innovative development and marketing strategies are fully embraced.

Dedication

This book is dedicated to my mom, Mary James. She was an accomplished glass artist who never failed to encourage me to pursue my dreams and to do what I love. Thanks Mom, I miss you.

Mary James
1924–2010

Author's Acknowledgments

I want to thank my husband, Chris Payne, for coming out of retirement to help me create all the projects and samples in this book. It was great fun to share the studio together again.

I would like to thank the folks at Glass Accessories International for their great glass cutters. They always make me look like a pro. Thanks to Lori at Glastar Corporation, Glass Accessories International, and Copper Tools for their unwavering support for more than 20 years. I appreciate the glass manufacturers Spectrum Glass Company, Bullseye, and Uroboros Glass for providing me with glass photos. Thanks to Randy and Carole Wardell at Wardell Publications and Ron Bovard for helping me track down more photos.

A special thank you to all my girlfriends, staff, and family who had to listen to me turn down invitations and new projects because “I have to work on my book!” You guys are great friends and allies. Special thanks to Dan Rutter for picking up the slack so I could play in my studio and to my daughter Sloan Rutter for her help and support.

I also want to thank my acquisitions editor, Erin Calligan Mooney, my project editor, Chrissy Guthrie, my copy editor, Amanda Langferman, and everyone else from Wiley who helped make this book what it is today.

Thank you to Mike LoBiondo for his great photos that really make this book pop! Next time, Mike, let's do the photo shoots when it isn't 95 degrees in the studio!

Publisher's Acknowledgments

We're proud of this book; please send us your comments at <http://dummies.custhelp.com>. For other comments, please contact our Customer Care Department within the U.S. at 877-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002.

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Contents at a Glance

<i>Introduction</i>	1
<i>Part I: Glass, Glorious Glass</i>	7
Chapter 1: Welcome to the World of Glass.....	9
Chapter 2: Getting Started with the Right Tools	21
Chapter 3: Setting Up Your Glass-Working Studio	43
<i>Part II: Easing Your Way into the Art: Basic Stained-Glass Techniques</i>	53
Chapter 4: Designed to Succeed: Working with Patterns and Selecting Your Glass.....	55
Chapter 5: Making the Cut: Glass Cutting 101	73
Chapter 6: Grozing and Grinding Glass for a Perfect Fit.....	93
Chapter 7: Soldering Your Way to Well-Jointed Projects	99
<i>Part III: Practice Makes Perfect: Stained-Glass Projects Aplenty</i>	115
Chapter 8: Creating Copper-Foil Projects	117
Chapter 9: Building Leaded-Glass Projects	149
Chapter 10: Making a Stained-Glass Box.....	185
Chapter 11: Shedding Some Light with a Basic Panel Lampshade.....	207
Chapter 12: Putting Your New Skills to Work: Project Patterns	221
<i>Part IV: Adding a Little Heat to the Mix: Working with Warm Glass</i>	233
Chapter 13: Getting Your Studio Ready for Warm Glass	235
Chapter 14: Starting Simple with Basic Fusing Techniques	253
Chapter 15: Heating Things Up with Some Advanced Fusing Techniques.....	265
Chapter 16: The Art of Shaping Warm Glass.....	279
<i>Part V: The Part of Tens</i>	299
Chapter 17: Ten Strategies to Improve Your Soldering Technique.....	301
Chapter 18: Ten Glass Works You Must Study	307
<i>Index</i>	311

Table of Contents

.....

Introduction **1**

About This Book	1
Conventions Used in This Book.....	2
What You're Not to Read.....	2
Foolish Assumptions.....	3
How This Book Is Organized	3
Part I: Glass, Glorious Glass.....	3
Part II: Easing Your Way into the Art: Basic Stained-Glass Techniques	4
Part III: Practice Makes Perfect: Stained-Glass Projects Aplenty.....	4
Part IV: Adding a Little Heat to the Mix: Working with Warm Glass	4
Part V: The Part of Tens.....	5
Icons Used in This Book	5
Where to Go from Here.....	6

Part 1: Glass, Glorious Glass..... **7**

Chapter 1: Welcome to the World of Glass **9**

Stained-Glass Techniques.....	10
Leaded glass	11
Copper-foiled glass	12
Adding a Little Heat: Warm Glass	13
Getting to Know Glass.....	15
Surveying different glass types	16
Touch and feel: Taking a look at textured glass	17

Chapter 2: Getting Started with the Right Tools **21**

Getting a Handle on Hand Tools	21
Glass cutters.....	22
A variety of pliers.....	24
Warming Up to Soldering Equipment	26
Soldering irons	26
Soldering iron tips	28
Soldering iron stands	29
Tip cleaners	29
Solder	30
Getting Turned On to Power Tools	30
Glass grinders.....	31
Saws.....	32



Constructing Your Project with the Right Tools	34
Looking at lead-specific tools	34
Focusing on foil-specific tools	37
Staying Safe: Purchasing the Right Safety Equipment for Glass Projects	39
Assembling Basic Drafting Supplies	40
Paper for patterns	41
Rulers and triangles	41
Pattern shears	41
Adhesives	41
Markers and knives	42
Light box	42

Chapter 3: Setting Up Your Glass-Working Studio 43

Knowing What Makes for a Good Studio Space	43
Flooring	44
Lighting	44
Ventilation	45
Storage spaces	45
Setting Up Workstations and Storage Areas within Your Studio	46
Workbench and worktable areas	46
Grinder station	47
Storage area for all your tools	48
Glass storage area	50
Storage area for lead and other metals	51

***Part II: Easing Your Way into the Art:
Basic Stained-Glass Techniques 53***

**Chapter 4: Designed to Succeed: Working with
Patterns and Selecting Your Glass 55**

Patterns 101	55
Using ready-to-build patterns	56
Having three copies of each pattern	57
Enlarging designs with an opaque projector	57
Laying Out Your Pattern	59
Determining your project's finished size	60
Drawing the outside dimensions of your panel	61
Incorporating cut size into your pattern	64
Tracing your design onto your pattern	65
Numbering the pieces	66
Color coding the pieces	66
Marking the grain of your glass	66
Cutting Out and Working with Templates	67
Cutting templates	68
Keeping track of your templates	69

Selecting Glass for Various Projects	69
Cathedral glass	70
Opalescent glass	71
Textures and patterns	72
Chapter 5: Making the Cut: Glass Cutting 101	73
Selecting Your Practice Glass	73
Getting to Know Your Glass Cutter	74
Preparing the cutter	74
Getting a proper grip	75
Cutting Straight Lines.....	77
First things first: Making the score line.....	77
Letting it all fall apart: Breaking scored glass	80
Working with Curves.....	84
Cutting curves	85
Controlling the break and run.....	86
Cutting Out Shapes around Your Templates	89
Positioning templates for cutting	89
Cutting the right way: Inside curve, outside curve, straight line	90
Cutting out circles	91
Chapter 6: Grozing and Grinding Glass for a Perfect Fit	93
Working with Grozing Pliers	93
Filing	94
Nipping and prying	94
Powering Up for Faster Results: Glass Grinders.....	95
Using your grinder.....	96
Marking your pieces before making adjustments.....	97
Chapter 7: Soldering Your Way to Well-Jointed Projects	99
Solder 101: What It Is and How It Works	99
Prepping and Using Your Soldering Iron.....	100
Setting your iron to the correct temperature	100
Getting a good grip on your iron	101
Keeping your tip clean	102
Soldering Copper-Foil Projects	102
Selecting the right solder for copper-foil projects	103
Applying flux to your project	103
Tackling tack soldering	105
Running the perfect bead	106
Removing excess solder.....	110
Soldering Lead-Came Projects	111
Selecting the right solder for lead-came projects.....	111
Testing your iron's temperature.....	112
Soldering the perfect joint	112
Removing excess solder.....	113
Soldering Safety	114

***Part III: Practice Makes Perfect:
Stained-Glass Projects Aplenty* 115**

Chapter 8: Creating Copper-Foil Projects 117

Cutting and Foiling Your Glass Pieces	117
Prepping the pattern and cutting your glass	118
Setting up your work board.....	119
Selecting your foil	119
Applying the foil.....	122
Soldering Copper-Foil Projects	125
Framing and tack soldering for stability	125
Filling in the gaps	127
Running a bead to connect the pieces	127
Soldering intersections	129
Removing excess solder from seams	131
Creating a solder frame for smaller projects	131
Abracadabra: The Magic of Wire.....	133
Decorative accents	133
Structural applications.....	133
Cleaning Up and Adding Finishing Touches	135
Cleaning your project.....	136
Applying metal patina	136
Project: Butterfly Sun Catcher	137
Project: Sunflower Panel with Metal Frame	141
Project: Round Rose Window	146

Chapter 9: Building Leaded-Glass Projects 149

Selecting and Working with Lead Came	149
Choosing the right size and profile of lead came	150
Stretching lead came	151
Cutting lead came	151
Preparing Your Work Board and Laying Out Your Pattern.....	154
Constructing Your Lead Project	155
Framing it up	156
Putting the project together piece by piece.....	156
Achieving the perfect lead fit	158
Squaring it up	159
Soldering Lead-Came Projects	160
Setting your iron's temperature.....	160
Soldering joints and intersections.....	161
Removing excess solder.....	162
Finishing Up and Cleaning Up	163
Making a panel airtight and waterproof.....	163
Polishing the glass and adding patina.....	166
Framing your project.....	167
Project: Geometric Leaded Panel	167
Project: Art Nouveau Tulip.....	174
Project: Round All-American Panel	179

Chapter 10: Making a Stained-Glass Box	185
Selecting the Glass for Your Box	185
Art glass	187
Mirrors	188
Beveled glass	188
Fun and interesting objects	189
Using Special Tools to Construct a Glass Box	189
Visualizing the Basic Box Layout.....	190
One size fits all: Foolproof prep for cutting a perfect fit.....	191
Cutting the pieces using your strip cutter.....	192
Laying out and foiling the pieces	195
Assembling the Basic Box	196
Soldering the box pieces together	196
Attaching the hinges.....	198
Attaching the chain	200
Adding box feet	201
Mixing It Up with Some Variations on the Basic Box.....	201
Project: Box with beveled top	202
Project: Box with a 3-D flower	204
 Chapter 11: Shedding Some Light with a Basic Panel Lampshade	 207
Different Styles of Lampshades: Panel versus Dome	207
Selecting the Glass and Hardware for Your Lampshade Based on Your Pattern.....	209
Deciding what kind of glass to use and how much	210
Choosing the right lampshade hardware	211
Prepping Your Pattern and Cutting Out Your Glass Pieces	212
Foiling the Glass Pieces	213
Laying Out Your Pieces for Lamp Assembly.....	214
Soldering for Stability	215
Tack soldering.....	215
Running smooth beads along your lamp's seams	217
Capping Off, Cleaning Up, and Adding Patina.....	219
 Chapter 12: Putting Your New Skills to Work: Project Patterns	 221
Project Tips and Tricks.....	221
Enlarging a design.....	221
Selecting your glass	222
Copper-Foil Projects.....	222
Hummingbird panel.....	222
Mr. Buzz sun catcher.....	223
Floral panel.....	223
Lily panel.....	223
Lead-Came Projects.....	223
Wright-inspired panel.....	223
Picture-perfect panel.....	223
Landscape panel	224
Sunshine panel	224

***Part IV: Adding a Little Heat to the Mix:
Working with Warm Glass*..... 233**

Chapter 13: Getting Your Studio Ready for Warm Glass 235

Knowing What Makes a Good Warm-Glass Studio	236
Space requirements.....	236
Electrical requirements.....	236
Ventilation	237
Adding the Right Tools and Supplies to Your Warm-Glass Toolbox.....	237
Choosing the right kiln for your studio.....	237
Furnishing your kiln.....	240
Gathering a few other tools and supplies	243
Wearing the right safety gear	245
Selecting Fusible Glass.....	246
Determining glass compatibility	246
Choosing the right glass size to purchase.....	247
Spicing things up with glass shapes and characters.....	247
Preparing to Fire and Use Your Kiln	248
Making sure your studio is safe	248
Preparing shelves and molds	249
Test firing.....	250
Keeping firing charts	251

Chapter 14: Starting Simple with Basic Fusing Techniques 253

Understanding the Firing Process for Fusing Glass	253
Initial heat-up segment.....	254
Ramp-up segment	254
Flash-cool segment	256
Anneal segment.....	256
Cool-down segment	257
Preparing the Glass for Fusing and Firing Up the Kiln.....	257
Working with multiple layers of glass	258
Loading the kiln.....	259
Working with a table-top kiln	260
No peeking!	261
Project: Fused Sun Catcher	261

Chapter 15: Heating Things Up with Some Advanced Fusing Techniques . . . 265

Creating Your Own Project Design.....	265
Considering your project's size	266
Focusing on layers	266
Understanding the effects of stacking glass	268
Weaving Glass	270
Adding Wire and Other Inclusions to Your Projects	274
Wiring to hang.....	274
Using fiber paper to create holes in glass	275
Gluing hangers to fused projects.....	276
Project: Set of Four Glass Coasters	276

Chapter 16: The Art of Shaping Warm Glass	279
Gathering the Tools You Need to Start Shaping Glass	279
Using the right type of kiln for slumping	280
Picking out and preparing glass molds	281
Opting for Fancier Glass	284
Thin fusing glass	284
Iridescent fusing glass	284
Dichroic glass	285
Glass frit	285
Preparing Your Glass for Shaping	287
Cutting your fusing glass to fit your mold	287
Cleaning the glass	287
Decorating the glass	288
Fire It Up! Fusing and Slumping Your Glass	288
First firing: Fusing the glass	289
Second firing: Slumping the glass	290
Project: Tropical Bowl Slumped into a Mold	293
Project: Glass Vase Draped Over a Floral Former	295

Part V: The Part of Tens

299

Chapter 17: Ten Strategies to Improve Your Soldering Technique

301

Understand How to Control Your Soldering Iron's Temperature	301
Keep Your Soldering Tip Clean	302
Figure Out How to Hold Your Iron	302
Be Loyal to Your Brands	303
Know That You Can Never Use Too Much Flux	303
Find the Right Flow and Rhythm	304
Work on One Area at a Time	304
Keep Your Intersections Clean and Low	304
Mentally Visualize the Size of Your Lead Joints	305
Practice, Practice, Practice	306

Chapter 18: Ten Glass Works You Must Study

307

The Bathers	307
The Entombment	308
Feeding the Flamingoes	308
The Four Seasons	308
Magnolia and Irises	308
Minnehaha Window	309
Mosaics	309
Peacock Windows	309
Wisteria Lamps and Windows	310
Woman and Cupid Window	310

Index

311

Introduction

For centuries, art glass has been ever-present in many parts of life; you find it in homes, churches, public spaces, and even restaurants. You can probably picture one or two beautiful pieces of glass that you've seen at some point, either up close and in person or in an art book. At first glance, you may think only true artists can create such magnificent works as these, but truth be told, glass working is more about craftsmanship than artistry. In this book, I introduce you to this fascinating art medium and help you develop the craft skills you need to create your own glass masterpieces.

About This Book

Art glass is a big umbrella that encompasses several different techniques, including stained glass and warm glass. The two most recognized stained-glass techniques are lead came and copper foil. You can use either construction method to create most stained-glass projects. In this book, you find instructions for both techniques, plus tips on choosing which technique to use for which project.

Warm glass, often called *fusing*, is all about heating glass to form it into different projects. One popular fusing technique, called *slumping*, actually involves shaping the glass into vases, bowls, jewelry, and other neat projects. Because more and more glass workers are embracing these warm-glass techniques, I dedicate a whole part of this book to warm glass and the unique project opportunities it presents.

So if you're interested in giving art glass a try, you've come to the right place! Although hands-on instruction is a great way to learn new glass-working techniques, finding an art center where you can take glass classes is becoming increasingly difficult. That's why I've written this book — to be the next best thing to having your own personal instructor. Sometimes a good book is even better than one-on-one instruction because it gives you the opportunity to go back and review particular steps or processes again and again until you master them. In addition to my written instructions, I include numerous full-color photos throughout this book that make it easy for you to see exactly what you need to do to get rolling with your new hobby.

Before I jump into the nitty-gritty of art glass, I help you set up your studio and fill it with all the necessary tools of the trade. Then I cover the basic techniques of working with glass from using a pattern to cutting your own glass to putting the pieces together. I give you plenty of step-by-step instruction to help you master the basics and then show you how to build on your skills to create fun and beautiful projects. With all the hands-on practice you get in this book, you may be surprised by how quickly you can develop your glass-working skills.

With more than 25 years of stained-glass instruction under my belt, I'm excited to get to share my love and knowledge of this beautiful art form with you. Although this book covers a lot of information, it's easy to follow, and you can adapt it to fit your current skill level. As you get ready to dive into the awesome world of art glass, I encourage you to concentrate on only one goal: to make your next project better than your last one. That way, you'll always be proud of your work.

Conventions Used in This Book

The techniques and projects in this book are meant to help you develop and improve your glass-working skills. To make the text easy to follow, I use the following conventions:

- ✔ Although I recommend that you use clear glass when you're first getting started (because it's more affordable), I use colored glass in this book's photographs to make it easier for you to see what I'm demonstrating.
- ✔ I include lots of project patterns in this book, and in case your space needs aren't quite the same as mine, I also provide instructions for enlarging these patterns if you want to do so.
- ✔ I use *italics* to point out new terms or add emphasis.
- ✔ I use **boldface** to indicate key words in bulleted lists and the action parts of numbered lists.
Any extra explanatory text that helps you get a better handle on a particular step appears in roman text after the boldface step.
- ✔ Throughout the book, I use the terms *art glass*, *stained glass*, and *leaded glass* interchangeably.
- ✔ When writing measurements, I list the width first, followed by the height. (For example, a 4-x-5-inch piece of glass is 4 inches wide and 5 inches tall.)
- ✔ I indicate all temperatures in this book in degrees Fahrenheit.
- ✔ I use `monofont` to make Web sites stand out.

When this book was printed, some Web addresses may have needed to break across two lines of text. If that happened, rest assured that I haven't put in any extra characters (such as hyphens) to indicate the break. So, when using one of these Web addresses, just type in exactly what you see in this book, pretending as though the line break doesn't exist.

What You're Not to Read

Throughout this book, I include a bit of information about the history of art glass because I think it's interesting to know more about how the medium became what it is today. Feel free to skip over this information if you want to cut to the chase and focus only on working with glass.

You'll know information is skippable if it appears in a sidebar (gray shaded box) or is marked with a Technical Stuff icon.

Foolish Assumptions

In writing this book, I made some assumptions about you:

- ✔ You have an appreciation for stained glass and other forms of art glass and want to know how to create your own stunning pieces.
- ✔ You have a space in your home to safely contain your new craft.
- ✔ You realize that you're working with glass, hot irons, kilns, and lead-based products that require special handling and safety precautions, including wearing safety glasses whenever you're working in your studio and following the manufacturer's recommendations regarding all power tools, like soldering irons and kilns.
- ✔ You may have some basic woodworking skills and want to build your own storage bins and work boards. For you, I include some step-by-step construction guidelines.
- ✔ You have an unlimited budget when it comes to investing in what I like to call "all the bells and whistles." Just kidding. Add to your collection of equipment as you have the money and inclination to do so. Note, though, that I introduce you to all the latest tools and equipment that will make this hobby as easy as possible for you with total disregard to your budget. Sorry!

How This Book Is Organized

I've organized this book like I do my classes. I start simple with the supplies and space you need to practice your new art form and go from there. Each part of the book focuses on a different aspect of working with glass. You can easily refer to the specific parts and chapters that contain the answers you're looking for at any particular moment without having to read the entire book. Of course, I secretly hope you read it cover to cover several times, but know that you don't have to. You can skip around to the topics that most interest you.

Part I: Glass, Glorious Glass

Part I is more of an overview than a step-by-step manual. Here, I outline the tools and supplies you need to get started with your new glass-working hobby and show you how to set up your studio. I also introduce the two basic techniques used to create stained glass — copper foil and lead came — and tell you a little about warm glass, the hottest craze in glass studios today. And because the beauty and essence of this art form is the glass itself, I spend some time going over the various types of glasses you'll be working with and provide suggestions for how to work with them.

Part II: Easing Your Way into the Art: Basic Stained-Glass Techniques

This part is all about hands-on practice. In Chapter 4, I jump right into working with patterns for stained-glass projects. I realize you may not be an artist, so I supply lots of resources for finding designs and making them your own with little to no artistic ability required.

After you know how to use a pattern, I show you how to cut your glass pieces to fit it. Although glass cutting can be the scariest part of the hobby, it doesn't have to be. In Chapters 5 and 6, I share plenty of tips, techniques, and ideas to help you master the art of cutting glass and show you how to fine-tune your glass shapes to make them fit your patterns perfectly.

When you're ready to heat things up, I show you how to solder in Chapter 7. By following my helpful tips and tricks, you're sure to be a first-class solder master before you know it. To help keep you safe, I also talk about how to make your work environment a healthy and safe one when soldering.

Part III: Practice Makes Perfect: Stained-Glass Projects Aplenty

It's time to start building the stained-glass projects you've been dreaming about since you picked up this book. In Chapter 8, I show you how to tackle copper-foil projects, including how to work with foil, run the perfect solder bead, and use wire and patina to spice things up a bit. Then it's on to lead-came projects in Chapter 9, where I show you how to prepare your design, work with lead came, solder the perfect joints, and cement your finished panel to give it strength and beauty.

At the end of this part, stained-glass becomes three-dimensional as I show you how to create stunning stained-glass boxes and panel lampshades in Chapters 10 and 11. I also include a few additional project patterns in Chapter 12 so you can get some more practice with both copper and lead techniques. I just know you'll find a project that you can't wait to make next.

Part IV: Adding a Little Heat to the Mix: Working with Warm Glass

This part switches from traditional stained-glass techniques to warm-glass fusing. Because fusing is a whole new way of working with glass, you need to add some new equipment (most importantly, a glass kiln) and safety guidelines to your studio. Don't worry, I cover everything you need to know about tools, supplies, and safety in Chapter 13 so you can start fusing right away!

Because most fusers don't work with patterns, I jump right into the nitty-gritty of warm glass in Chapter 14. I cover the importance of using compatible glass and introduce you to some fun, preformed glass shapes, like stringers, noodles,

and frit, that you can use to decorate your projects. I also walk you through the basics of firing your glass to fuse the pieces together.

In Chapter 15, I show you how to take your fusing projects to the next level by using some more-advanced fusing techniques like stacking, weaving, and incorporating wire and fiber paper. When you're ready to raise the bar even higher, take a look at Chapter 16, where I show you how to use molds to slump and drape your glass into bowls, platters, and vases.

Part V: The Part of Tens

Soldering is the most difficult skill for most beginners to master, so I spend Chapter 17 going over ten strategies that can help you improve your soldering skills fast. To help you get a better feel for stained glass as an art as well as grow your own skills and techniques, I include a list of my favorite Louis C. Tiffany glass projects in Chapter 18. (In case you don't know, Louis C. Tiffany is the number-one, all-time master of stained glass.) Take some time to study these works; trust me, you'll see a big difference in your projects after you do!

Icons Used in This Book

In the margins of almost every page of this book, you find icons. They serve to direct you to particular types of information, including tips, practice exercises, technical tidbits, and more. Here's what the different icons mean:



This icon contains important information that you want to file away for future use. The info marked with this icon often applies to more than one technique or process and is something you definitely don't want to forget as you build your glass projects.



Just to keep the technical critics happy, I've included some fascinating albeit technical data that you don't absolutely have to know to be a successful glass artist. If you're in a hurry or just want to cover the basics, feel free to skip stuff marked with this icon.



This icon points out important, time-saving ideas or suggestions you can use to improve your glass-working skills and make your projects go more smoothly.



I use this icon to tell you when it's time for you to stop reading and have a little fun trying out a new technique.



I use this icon a lot to point out when you need to pay attention for your safety's sake. Art glass naturally involves some hazardous materials that can be especially dangerous if you don't handle them properly. The last thing I want to happen is for you to hurt yourself or destroy a project, so when you see this icon, read the information that follows. Your safety — and the well-being of your project — depends on it!

Where to Go from Here

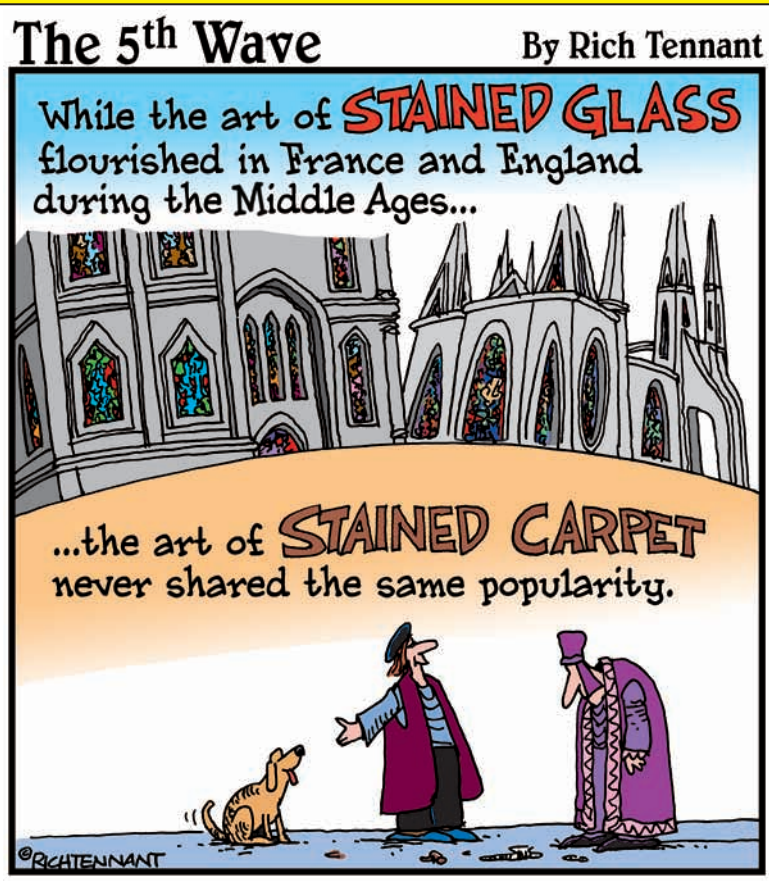
Stained glass is an art form that progresses step by step. So if you've never worked with glass before, I recommend that you start at the beginning and read at least through Chapter 8. At that point, you'll have enough knowledge to create a stained-glass window using the copper-foil technique. If you want to find out more about the lead-came technique, feel free to read through Chapter 9. The chapters on stained-glass boxes and lampshades are important if you're interested in making either one of those types of projects.

Part IV is all about warm-glass fusing, so you don't have to go there if you want to focus only on stained glass right now. But if you're most interested in warm glass, I suggest that you also read Chapter 5 about glass-cutting techniques so you don't hurt yourself or your glass as you begin your first fusing project.

Basically, just let your experience, skill level, and interests be your guide. For example, if you're an experienced glass worker but have been struggling with soldering, turn to Chapter 7 for an overview of soldering basics, and then look through Chapter 8 for copper-foil-specific instructions and Chapter 9 for lead-came instructions. Also take a look at Chapter 18 for some strategies for improving your soldering skills.

Part I

Glass, Glorious Glass



The background of the page is a detailed stained glass design. It features a central white flower with yellow centers, surrounded by various shades of pink, red, and orange flowers. Green leaves and stems are interspersed throughout the composition. The entire design is set against a light yellow background, with dark grey or black lines defining the individual glass pieces.

In this part . . .

Whether you're thinking about joining the world of stained glass for the first time, returning to an old hobby, or just wondering how this beautiful art form is created, I'm here to tell you what you need to know to get started. I begin this part by explaining the difference between copper foil and lead came in terms of how each one is used to create beautiful projects. Then I walk you through the various types of glass, tools, and supplies you need to build gorgeous projects of your own.

Finally, I help you through the process of finding and setting up a convenient, safe, and functional home studio. If you like to work with wood, take a look at the patterns and instructions I include in Chapter 3 on how to build your own light box and lead-storage racks.

Chapter 1

Welcome to the World of Glass

In This Chapter

- ▶ Discovering the different construction techniques used in stained glass
- ▶ Examining what's new in this traditional craft — warm glass
- ▶ Identifying various types and textures of glass

Glass is magical. It surrounds you in your home, office, place of worship, and many of the commercial establishments you visit on a daily basis. Although glass serves a very practical purpose today, in some cases, it also makes an important decorative statement (and that's where this book comes in).

The creation and history of glass itself has always held a certain mystery. As a super-cooled liquid, glass has the unique ability to capture light and glow from within. Even with such an awesome feature, though, the chemistry behind glass is really very simple — sand transformed by heat. The various colors you see in glass come from metallic salts and oxides: Gold produces red, silver produces yellow and gold, cobalt produces blue, and copper produces the greens and dark reds.

This vast array of glowing colors in glass enchants craftsman and artisans alike. So, too, does its permanency. After all, glass never fades and its colors never dull. This awesome feature allows the artist to literally paint an eternal image with glass.

In this chapter, you become familiar with the various craft styles used to create beautiful works of stained glass, and you get an introduction to the newest form of art glass: warm glass. Finally, you survey examples of the various types of glass available for you to work with.

A brief history of stained glass

The first real examples of stained glass appeared in the early European churches built around the tenth century. At that time, stained-glass windows became the storytellers of religious history. Artists used paint on glass to tell the stories of the Bible and other holy books.

In the 15th century, stained glass changed dramatically — not in the way the glass itself was made but in the way the artists created the

finished products. With the rediscovery of silver stain during the Renaissance, glass paint colors went from dull black and gray to rich golden colors. (Silver stain is a paint that's applied to the surface of the glass and then fired in a kiln. The stain penetrates the surface and becomes a permanent part of the glass.) The Renaissance brought stained glass, with its many brilliant colors, into vogue for the next 300 years.

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One of the best-known glass artists of all time, American Louis C. Tiffany, began his artistic career as a painter, but after he experimented with stained glass, he never went back to paint. As a young art student in Europe in 1869, Tiffany visited many of the churches and great buildings there. Inspired by the stained glass he saw, Tiffany embarked on a journey to find a glass that could both tell a story and glow from within (in other words, a glass that didn't have to be painted to shine with color). This journey toward colored glass required manufacturers to make glass in an infinite array of opalescent colors.

In the late 1800s, Thomas Edison, a good friend of Tiffany's, invented electric lighting. With this invention came an eagerness to show off the latest techno gadget — the electric lamp. Around the same time, Tiffany developed a stained-glass construction technique called *copper foiling*. Using this technique, he constructed stained-glass lampshades that surrounded the electric light and acted as a beacon for this new status symbol. Over the next 70 years, Tiffany's studio — together with dozens of other highly active studios throughout the eastern and midwestern United States — created thousands of beautiful stained-glass windows and lampshades.

As buildings changed over time, so did the art of stained glass. No changes are more obvious

than the ones you see in the works of American architect Frank Lloyd Wright. He designed more than 1,000 stained-glass works. He called his glass works *light screens* because of their ability to shape the light in any space, much like the way Japanese rice-paper screens shaped light. Many of Wright's building designs incorporated stained-glass windows, doors, and lighting.

The arts and crafts movement embraced stained glass, too, but it made a few changes to the stained glass of Tiffany. In the stained-glass doors and panels that accented homes across the Midwest and California, clear glass replaced much of the heavy, opalescent glass. Designs were clean and geometric in style, fabricated from clear glass with just small touches of color. Many panels featured all-clear-glass designs. Thicker clear-glass pieces were faceted, creating bevel-shaped edges that captured the sunlight and sent a cascade of rainbows onto interior walls.

In the 1970s, stained glass made a comeback that incorporated larger-than-life splashes of brightly colored glass depicting such things as flowers and butterflies. With this comeback came the stained-glass hobby movement, which is where I (and you) come in.

Stained-Glass Techniques

Stained glass has many names, most common of which are *art glass*, *leaded glass*, and *copper-foiled glass*. The term *art glass* is interchangeable with stained glass, and both terms reference objects that you create using pieces of colored glass. Note that the colored glass used to create these projects is also called *stained glass* and *art glass*. Don't worry; because the terms are interchangeable, you can't really make a mistake referencing this art form.

The real difference comes in the terms *leaded glass* and *copper-foiled glass*, which describe the specific working techniques used to fabricate stained-glass projects. So what's the difference between these two techniques? The following sections are here to show you, so read on!



When you're ready to start your own stained-glass project, turn to Chapter 4 for tips on preparing your pattern, Chapter 5 for all the details on glass cutting, Chapter 6 for everything you need to know about grozing and grinding, and Chapter 7 for the ins and outs of soldering.

Leaded glass

Stained-glass artists generally use the leaded-glass technique for flat-panel works such as doors, windows, and screens. But you can also find examples of leaded-glass lampshades and boxes. This technique involves creating a leaded-glass panel by connecting pieces of glass together with strips of metal that have been shaped into *U*- or *H*-shaped profiles.

The metal strips used in the leaded-glass technique, called *comes*, come in a variety of widths and profiles, and they can be lead, brass, zinc, or copper. Metal comes are available in 6-foot lengths. Regardless of which metal makes up the came used to create a particular panel, all panels fabricated from comes are called *leaded-glass panels*.

As for which type of came is used for what, comes shaped into *U* profiles typically go around the perimeters of panels (see Figure 1-1 for an example). And comes shaped into *H* profiles link the interior glass pieces together (see Figure 1-2 for an example).

Each intersection where two or more comes meet is called a *joint* (see Figure 1-3). Each joint is soldered together on both the front and back sides of the panel. This double-soldering gives strength to the whole panel.



Head to Chapter 9 if you're interested specifically in leaded-glass projects.



Figure 1-1:
Lead came shaped into a *U* profile goes around the perimeter of a glass panel.



Figure 1-2: Lead came shaped into an *H* profile links the interior pieces of a panel together.

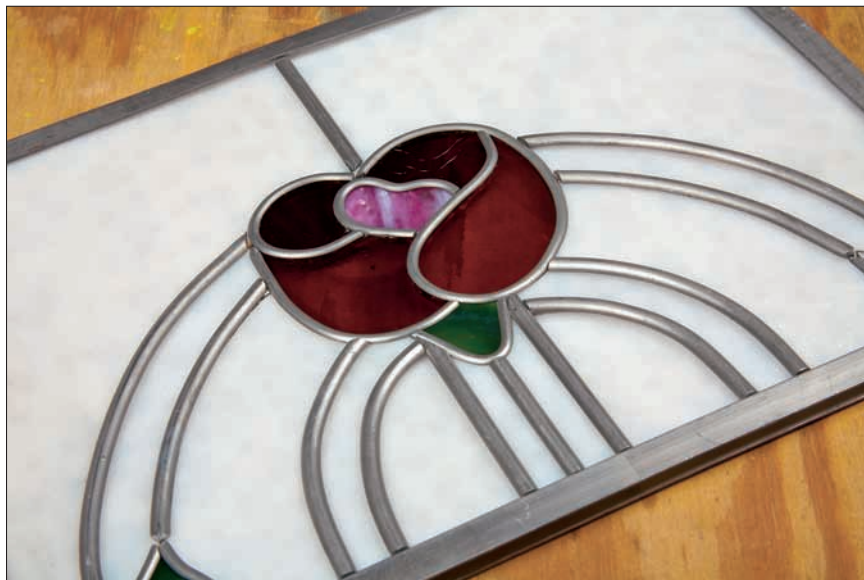


Figure 1-3: Several unsoldered lead intersections, also called joints.

Copper-foiled glass

Using the copper-foil technique to create stained glass involves wrapping thin strips of copper-foil tape around the edges of each individual piece of glass. The foil is crimped around the edges of the glass, creating a copper frame (see Figure 1-4).